



## Certificate in Laptop Repairing

Duration : 480 Hrs / 6 Months

### INTRODUCTION

1. What is laptop?
  2. History of laptop
  3. How work laptop?
  4. Advantages of laptop instead of desktop
  5. Difference between laptop and desktop
- LAPTOP MANUFACTURING COMPANIES-Acer /Apple /Compaq /Dell -etc.
7. Operating System review & laptop uses & laptop booting process
  8. Guide to purchase of second hand laptop

### TOOLS AND TESTING EQUIPMENTS

#### 1. LAPTOP HARDWARE TOOLS

- Screw Driver Kit
- Laptop Casing Opener
- Nose Pliers
- Cutter
- Electric Screw Driver
- Tweezer
- Anti Static Wrist Band
- PCB Cleaning Brush & etc

#### 2. LAPTOP CHIP LEVEL TOOLS

- Micro Soldering Iron
- Tip Soldering Iron
- Hot Air Blower
- Magnifying Lenz with Lamp
- Liquid Flux
- Dry Flux & etc

#### 3. TESTING EQUIPMENT

- 1. Analog Multimeter

- Digital Multimeter
- Battery Booster
- Universal AC adapter
- Debug card
- SATA to USB converter
- IDE to USB converter

#### 4. OTHER HARDWARE SPARES

- External Monitor
- External DVD Drive
- Usb Keyboard / Mouse & etc

#### 5. ACCESSORIES

- Laptop bag
- LCD Screen Card
- LCD Cleaner & etc

#### 6. ADVANCED TOOLS

- BGA Rework Machine
- Reballing Kits
- Infrared IC Heater
- PCB Scanner
- Oscilloscope [CRO]
- SMD IC Extractor
- PTH Desoldering Machine
- RCL Meter

#### SMT ELECTRONICS INTRODUCTION

##### RESISTOR

##### CAPACITOR

##### INDUCTOR & TRANSFORMER

#### LAPTOP PARTS VIEW & KEYBOARD & TOUCH PAD

##### 1. components of laptop -Bottom Case &Top Case

Outside Components/ Inside Components / laptop Inner View

##### 2. INSIDE COMPONENTS:

- 1.Ram,
- 2.Hard Disk,
- 3.Battery
- 4.Wi-fi Cards
- 5.PCMCIA Card
- 6.Floppy Disk,
- 7.DVD/CDR Drive,

- 8.Speaker,
- 9.Exhaust Fan
- 10.Processor,
- 11.Heat Sink
- 12.Adapter & Adapter Connector
- 13.Motherboard
- 14.LCD screen

**3. Internal Keyboard review /inner view /key board Manufacturing Companies**

**4. Key board connectors removing method/Broken Keyboard Connector finding method.**

**5. Keyboard connector and lock removing method & key board keys rearranging method.**

External keyboard -2.TOUCHPAD review /touchpad trouble shootings

#### **PRACTICAL**

1. KEYBOARD KEYS REMOVING AND REFIXING METHOD
2. TOUCHPAD REMOVING AND REFIXING

#### **RAM & HARD DRIVE**

1. What is ram?
2. Ram working function
3. Types of ram SRAM [STATIC RAM]& DRAM[ DYNAMIC RAM]/types of dynamic ram.

Laptops ram slot review -

1. SODIMM [Small Outline Dual Inline Memory Module]
2. Micro DIMM [Micro Dual Inline Memory Module]

**4. RAM comparison of ddr 1 /ddr2 & ddr3.**

**5. Ddr1 & ddr2 RAM BUS SPEED list.**

**6. Current ddr3 memory speed list.**

**7. Ddr 1 rams pin details.**

**8. Ram working voltage list**

**9. Ram manufacturing companies.**

**10. Types of hard disk.**

1. IDE Hard disk
2. SATA Hard disk
3. External Hard disk

**11. Capacity of internal hard disk**

**12. SATA to USB convertor & IDE to USB convertor**

**13. Hard disk inside components & its function.**

**14. Hard disk inside parts view & hard disk maintenance guide.**

- DIODE

- TRANSISTOR
- INTEGRATED CIRCUITS [IC]

## PCMCIA CARD & DVD DRIVE

### 1. What is pcmcia card?

### 2. Types of pcmcia card –

1. gold card
2. silver card

### 3. Variety of Pcmcia Card

1. Wireless Card
2. Usb Card [Single/Double/Four]
3. Network Card
4. Tv Tuner Card
5. Combo Card
6. Dvd to Mpeg Card
7. Pcmcia to Serial Port
8. Card Reader
9. Sound Card
10. Modem
11. Pcmcia to IEEE 1394 Fire Wire Adapter

### 4. Pcmcia LAN card logic board [inside view] pcmcia tray & pcmcia adapter

### 5. PCMCIA card troubleshooting.

### 6. optical drive :internal drive (laptop inside using this drives) & external drive (externally using this drives

1. cd rom
2. cd r/w
3. dvd rom
4. compo drive
5. dvd r/w
6. hd dvd r/w
7. blu - ray drive./ various type of dvd drive interfaces . External cd rom & other devices: external blu ray drive/notebook slim cd to desktop ide cd converter./cd/dvd writing software/dvd viewing software's

### 7. SPEAKER: internal speakers & external speaker

### 8. WI FI CARDS review: WI fi card parts /How to Connect the Wi-Fi to Internet?

### 9. Varios types of web camera.

### 1. LAPTOP COMPLETE DISASSEMBLING / ASSEMBLING & its

**Soldering Practice:.** Motherboard smt components removing and refixing method

[RESISTORS/CAPACITORS/INDUCTORS/SMD FUSE & CRYSTAL

## 2. LAPTOP COMPLETE DISASSEMBLING AND ASSEMBLING

### HOW TO DISASSEMBLE SONY VAIO LAPTOP

#### ADAPTER & BATTERY

- a. Direct Adapter
- b. Universal Adapter Car
- c. Air Adapter

#### 4. Laptop adapter voltages & laptop Latest Models, Voltage list

#### 5. Universal adapter & its types

#### 6. Various models of ac adapter connector

#### 7. External battery adapter car & air adapter

#### 8. Adapter polarity identification

#### 9. Adapter opening method

#### 10. Adapter board components:

- 1. SM Transformer
- 2. Bridge Rectifier Diode
- 3. NTC [Negative Temperature Coefficient]
- 4. Fuse
- 5. Oscillator IC
- 6. Opto Couple r
- 7. Switching Mosfet
- 8. Electrolytic capacitor.
- 9. Ac adapter functional block diagram & adapter circuit view.
- 10. What is battery?

#### 11. Types of battery

- 1. Nickel-Cadmium (NiCad)
- 2. Nickel-Metal Hydride (Ni MH)
- 3. Li Ion Battery/how works battery?

#### 12. Battery Cells Connectivity Method

#### 13. Laptop Battery inside View

#### 14. External battery

#### 15. What is usage of battery booster?

#### 16. Laptop battery inside circuit.

#### 17. How to increase battery life?

#### 18. PRACTICAL:

- 1. ac adapter voltage testing method
- 2. ac adapter fuse and capacitor removing & refixing

- 3.ac adapter diode and Mosfet removing & fixing
- 4.battery voltage testing method.

## **LAPTOP MOTHERBOARD AND ITS FUNCTION**

- 1. What Is Laptop Motherboard?**
- 2. Laptop Motherboard Functional Block Diagram & Its Function**
- 3. Acer Laptop Motherboard Functional Block Diagram**
- 4. Acer Aspire 5720 Motherboard Front View & Acer Aspire 5720 Motherboard Back View**
  - a. Single Board Based Motherboard
  - b. Daughter Board Based Motherboard
- 7. How to dismantling a motherboard safely? Tips.**
- 8. Bus Architecture of motherboard what is bus? & types of bus:**
  - 1.Address Bus
  - 2.Data Bus
  - 3.Control Bus
- 9. Some Various Types of Laptop Functional Block Diagram**
- 10. PRACTICAL:**
  - 1.Laptop Motherboard Passive Components Identification & Testing Method
  2. Laptop Motherboard Active Components Identification & Testing Method
  3. Laptop Motherboard Section Identification.

## **Laptop Motherboard Sections And Components Identification**

- 1. Important Sections of Motherboard:**
  - A. Main Power B.Battery Power
- 2. CPU Power Section**
  - A.Cpu Voltage Regulator Module [VRM] B.Temperature Control
- 3. Graphics Processor Unit [Gpu] Section**
- 4.Chipset Section**
  - A. North Bridge B.South Bridge
- 5. Bios &Cmos Section**
- 6.Memory Section [Ram]**
- 7.Input&Output [Io] Section**
- 8.Clock Section**
- 9.Keyboard Control&Pcmcia Section**
- 10. Audio Section**
- 11.Laptop Display Section [Lcd-Tft]**
- 12. Laptop Motherboard IC's List:**
  - 1.step down or system main power IC.
  2. Cpu core power [VRM] ic n

- 3.cpu thermal control ic
- 4.fan speed controller ic
- 5.operational amplifier [op-amp]

### **13. Battery charge & discharge control IC**

- 1.pci card power ic
- 2.mosfet gate driver ic
3. io controller ic
- 4.bios ic.& etc.

### **14. Ic's Manufacture Name: Power IC:**

- 1.Maxim
- 2.Texas
- 3.Intersil [Isl]
- 4.Adp & etc

### **15. Motherboard components identification**

### **16. Soldering Practice** 1.Motherboard Smt Components Removing and Refixing Method- Resistors/Capacitors/Inductors/Smd Fuse & Crystal Oscillator/Diode/Transistor/Mosfet & Ic's.

### **1.How to Disassemble Hp Pavilion & Remove The Motherboard**

Laptop Disassembling & Assembling Practical.

## **POWER SECTION**

### **1. Types of power section:**

1. system main power [step down]
- 2.Battery power [charge and discharge]

### **2. Power Section Components:**

- 1.System main power supply IC or step down regulator controller IC
- 2.N & P channel Mosfet [8 leg]
- 3.DC power Jack.
4. Battery charge/discharge control
- 5.Power diode.
6. Power resistors
- 7.Polarity capacitors [tantalum or solid aluminum]
- 8.Fuse [1.5 Amps] or Fusible resistor
- 9.Operational amplifier [Op-Amp] Ic
- 10.Power inductor.

### **3. How to Work System Main Power or Step Down Regulator Section?**

### **4. Functional Block Diagram of Step down Regulator Section**

### **5.Types Of Step Down Ic :**

- 1.Dual Output Step Down IC

2. Triple Output Step Down IC
3. Quad Output Step Down IC
4. Multi Output Step Down IC
- 6. Step Down IC Supply Voltage list For Motherboard Circuit**
- 7. Component Identification of Power Section**
- 8. Functional Block Diagram of Battery Control Section**
- 9. Laptop power working mode:**
  1. adapter power mode
  2. battery power mode
- 10. Power rails description**
- 11. Some power section ics no list**
- 12. System main power IC max1630, max1631, max1632, max1633, max1634, max1635- datasheet/**
- 13. System main power IC tps51120- datasheet**
- 14. Battery control ic max8731a- datasheet**
- 15. power section Mosfet review**
- 16. System main power IC removing & refixing method**
- 17. Battery control ic removing & refixing method**
- 18. Dc power connector removing & refixing method**
- 19. Mosfet removing & refixing method.**

## **Laptop Processor**

- 1. Laptop processor introduction**
- 2. What is a processor?**
- 3. Processor architecture & front side bus (fsb)**
- 4. What are the latest processors? & Intel Laptop Processors review**
- 5. Processor manufacturing company**
  1. INTEL
  2. AMD
  3. VIA
- 6. Types of processor family**
- 7. Amd family processors & block diagram of amd processor**
- 8. Laptop processor socket [old]**
  1. screw type socket
  2. zif socket.
- 9. Latest laptop processor socket & supported processors: socket m supported Intel processors:**
  1. Intel Celeron M,
  2. Core 2 Duo Mobile,

3. Core Duo
4. Core Solo
5. Pentium Dual-Core Mobile

**10. SOCKET G1 & G2 [SOCKET 988 & 989] supported Intel processors.**

**11. Socket s1 supported amd processors**

**12. Latest laptop processor clock speed list**

**13. Processor core technology what is dual core? What is quad core? What is multi core?**

**14. How to remove the CPU?**

**15. How to reduce CPU temperature?**

**16. Laptop cpu cooling fan and its checking method & Various types of laptop processor heat sinks .**

### **CPU power section or voltage regulator module [vrm]**

**1. How work cpu voltage regulator module [vrm]?**

**2. Cpu power section – functional block diagram**

**3. What are some of the switching regulator topologies?**

**4. Cpu power section components**

1. Cpu Core Power Ic
2. N-Channel Mosfet
3. Tantalum Capacitor
4. Inductors
5. Switching Diode
6. Resistors

**5. Component identification CPU power section**

**6. Some laptop motherboard CPU power section**

**7. Some CPU power supply IC's list**

**8. CPU power section soldering practical**

1. Cpu core power ic removing & refixing method
2. N – channel Mosfet [3 leg & 8 leg] removing & refixing method.
  1. Complete laptop disassembling & assembling practical with how to disassemble Sony vaio Series laptop visual.
  2. How to down load the datasheet for laptop motherboard IC's.
    1. Acer laptop motherboard working function and its cold checking [fault finding] method -

### **GPU & CHIPSET**

**1. Laptop motherboard & GPU block diagram**

**2. Laptop graphics card type's**

1. inbuilt graphics adapter

2.slot or socket type graphics card

3.pcmcia graphics card.

### **3. Graphics card manufacture**

1.ati

2.nvidia

3.intel gma [graphics media Accelerator]

### **4. What is graphics card?**

### **5. How to dry solder the gpu?**

### **6. Laptop gpu safety tips**

### **7. Chipset north bridge & south bridge**

### **8. Laptop motherboard diagram with chipset**

### **9. Northbridge & Southbridge architecture**

### **10. Chipset bus connectivity**

### **11. Chipset manufacturing companies: Intel, via, nvidia , ati ,sis,amd**

### **12. How to find the chipset defeat or not?**

### **13. Lab practice**

1.laptop gpu [graphics chips] dry solder method

2. Laptop Northbridge chipset dry solder method

3. Laptop Southbridge chipset dry solder method.

## **BIOS & CMOS**

### **1. How bios work?**

### **2. Bios IC identification for laptop motherboard**

### **3. Bios settings & bios booting process**

### **4. Configuring for phoenix bios**

### **5. Bios soft ware manufacturing companies**

### **6. Phoenix bios set up, award bios set up, dell laptop bios set up, compaq Presario laptop bios set up & Acer laptop phoenix bios set up**

### **7. Updating your bios & why updating bios software**

### **8. Different type of bios IC & its pin configurations**

### **9. Most bios setup utilities.**

### **10. Some common bios error message**

1. Phoenix bios error codes

2.bios error codes [directly tell the error]

3.bios error codes.

### **11. Cmos battery location for motherboard & different types of cmos battery also known as rtc battery.**

### **12. Cmos battery related problems.**

### **13. How to reset & remove a bios or cmos password?**

1. by removing cmos battery
2. by using software
3. by using backdoor bios password

#### **14. Bios manufacturing website and how to create bootable cd using nuro**

#### **15.**

1. Ami bios text error message
2. award bios text error message
3. phoenix bios text error message.

#### **1. I/O IC 2.CLOCK IC 3.KEYBOARD CONTROL IC 4.AUDIO IC 5.PCMCIA IC 6.LAN IC**

##### **1. IO section**

1. I/O or Super I/O IC in Laptop Motherboard
2. Laptop motherboard block diagram for IO section
3. I/O Functional Diagram & locating I/O chip for motherboard
4. Laptop Io IC –it8510te review laptop Io chip-it8510te block diagram
5. IO chip It8750te Datasheet & Some I/O - Ic Brands

##### **2. Clock Section**

1. What Is Clock? And it's Function
2. Clock Chip Identification for Sony laptop motherboard
3. How Work Clock IC?
4. Clock Generator Internal Diagram
5. Clock Speed Measurement
6. Clock Chip Ics954204 Datasheet & Laptop Clock Ic Brands

##### **3. Keyboard Control IC**

1. Keyboard IC Identification for Laptop Motherboard
2. Keyboard IC Functional Block Diagram
3. Keyboard Control IC -87541v Datasheet

##### **4. Audio Section**

1. Audio Section Parts
2. Audio Chip Identification for Laptop Motherboard
3. Audio Board Failure Symptoms and Troubleshooting Tips.
4. Audio Board for Laptop Motherboard Dell Inspiron 1300 Laptop Motherboard Audio
- Section 5.Stac 9228 Audio Codec Pin Diagram
6. Audio IC Ad1981b Datasheet
7. **Pcmcia Ic:** Functional Block Diagram of Pci1420 Ic & Pcmcia Ic Datasheet
8. Lan IC: Laptop LAN Card Board & LAN IC Rtl8100 Datasheet.

#### **LAPTOP DISPLAY SECTION:**

##### **1. Types Of Display:**

1. Lcd (Liquid Crystal Display
2. Tft (Thin Film Transistor Technology)
- 2. LCD with Motherboard&LCD Connector Detail**
- 3. How LCD Display Works?**
- 4. Display Layers and it explain.**
- 5. LCD Back Light [Ccfl] With Inverter Circuit**
- 6. How Is the LCD in a Laptop Computer So Bright?**
- 7. Inner Parts View of Display**
- 8. Structure Of TFT-LCD & Display Inner Layout**
- 9. Comparison of Display 4:3 Standard Displays**
- 10. Notebook LCD Monitor Comparison (Pixel Table)**
- 11. Draw Backs of LCD Screen**
- 12. How to Make TFT-LCD?**
- 13. 7 layers of TFT screen & it's Explain**
- 14. CCFL Lamp or Back Light Lamp**
- 15. Various types of Ccfl Inverter**
- 16. Laptop LCD Back Light Inverter & Its Parts Identification**
- 17. LCD Parts Review**
  1. External Display
  2. Lcd Hinge
- 18. Some LCD Back Light Control Ic's List.**
- 19. How to Replace Broken Screen on Sony Vaio Laptop**
- 20. HCL Laptop LCD Dismantle and its parts identification images**
- 21. Laptop LCD screen complete removing & refix practical live with repairing technique.**

#### **TROUBLE SHOOTING 1 to 28**

- 1. CPU related Problem & its salvation**
- 2. GPU Problem [Video Processor] & its salvation**
- 3. NVIDIA GPU Dry Soldering Method: Most Common Problem Symptoms**
- 4. Laptop Over Heat Problem & its salvation**
- 5. Laptop Power Adapter Testing Method & its problem**
- 6. Laptop Battery Problem & its solution**
- 7. Keyboard Related Problem**
- 8. Network Port Failure**
- 9. USB Ports Failure.**
- 10. Wireless (Wi-Fi) Card Failure**
- 11. Flash Memory Card Reader Failure**
- 12. Internal CD&DVD Drive Failure**
- 13. Audio Related Problem**

14. Laptop CPU & GPU Cooling Fan Related Problem
15. How to Find Laptop Motherboard Failure Symptoms?
16. Hard Disk Failure Reason & its solution
17. Laptop Motherboard Problem & its solution
18. Web Camera Not Working
19. Laptop Display Are Damaged
20. Laptop LCD Screen Related Problems and etc...

#### **TROUBLE SHOOTING CONTINUE**

1. Battery Problems Adapter Problems
2. Keyboard Problems & Touch pad Pointers Not Working.
3. Sound Not Working & Mic Not Working
4. USB Not Working & Power Connector Not Working
5. PCMCIA Card Not Working & Ethernet Port Not Working
6. Mouse (Internal) Not Working
7. Docking Station Not Working
8. on/Off Switch Problems
9. CD/DVD Related Problems
  - a] Eject Problems
  - b] Wont Eject
  - c] Every 10 Mts Automatically Eject
  - d] Lens Not reading
10. Over Heat problems & Lock Problems.
11. Backup Related Problems & Warranty related Problems.
12. Data Recovery problems.
13. Hinge problems & Broken Problems
14. Handling problems & Up gradation problems
15. Inner Noise problems
16. RAM Related Problems & Hard Disk Related Problems .

#### **TROUBLE SHOOTING CONTINUE**

1. Charging Problems
2. CMOS Related Problems:
  1. CMOS battery Problem
  2. CMOS Checksum Problems
  3. Hard disk not detect Problem
  4. Date & Time Not Set
  5. CMOS Setting Not Save Problems
  6. Clock IC Problems

### **3. Bios Error Codes**

1. Direct Error Display
2. Code No. display
3. Password Related Problems

### **4. Processor Related Problem**

### **5. External VGA Not Working**

### **6. Motherboard Related Problems:**

1. Clock IC Problems
2. BIOS IC
3. IO problems
4. Fuse Problems
5. Power IC
6. Terodile Coil, Capacitor, Fuse problems

### **7. Projector Connectivity Problems & Bluetooth Not Working**

### **8. Wireless (Wi-Fi) Not Working**

### **9. Power on-Immediately Processor Fan Off**

### **10. LCD Related Problems:**

1. No Display-Light Ok
2. Intermediate Display
3. No Display-No Light