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Chapter 1: SYSTEM DESCRIPTION

SCOPE

This document describes the functional specifications for the Compal Note Book personal computer BCL50 series. The system is hardware and software compatible with the IBM PC/AT personal computer.

CPU

- Intel Mobile Pentium M Processor 1.4GMHz, 1.5GMHz, 1.6MHz, 1.7GMHz
- μFCPGA CPU

Chip Set

- Intel 855PM for system controller.
- Intel ICH4-M for PCI to LPC Bridge, PCI IDE controller, Power Management Logic.
- NS87591 for Keyboard Controller, Battery management Unit, and RTC.
- ENE CB1410 for Card Bus PCMCIA controller.
- ATI M9-P for VGA controller.
- ACL202 for AC97 CODEC.
- SMCLPC47N227 for super I/O controller.
- VT6301S for 1394 controller
- RTL8100BL for LAN controller
- W83L518D for Secure Digital

Memory

- No on board memory.
- On board with two 200-pin +2.5V SO-DIMM connector, supporting, DDR memories card. Maximum upgradeable to 1024MB by two 512MB SO-DIMM module.
- 1 MB L2 Cache on CPU.

BIOS

- 512KB Flash ROM for system BIOS.
- Suspend to RAM/Disk.
- Password protection (System).
- Windows 98 ready with PnP
- Various hot key for system control.
- Refreshable
- Complete ACPI 1.0B Function

Power

- 8 cells of LI-ION 2150mAH 18650 size, battery Pack with 63.6WH capacity
- 4.5 hours operation with Battery Mark 4.0.1
- 3 Hrs charging time to 100% capacity on 4300mAH LI-ION Battery (System off or Suspend)

One 2.5", 9.5mm Hard Disk, Up to 60GB

- Bus Master IDE
- 9.5m/m, 2.5”HDD Support
- Support Ultra 100 synchronous DMA

Select Bay devices

- 5.25” 12.7mm height CD-ROM device
- 5.25” 12.7mm height DVD-ROM & CD-RW combo device
- 5.25” 12.7mm height DVD-ROM device
- 5.25” 12.7mm height DVD-R/RW device

Options

- 256/512MB SO-DIMM DDR modules
- Li-ION Battery Pack
- MINI PCI Wireless module
- MDC Modem module

Touch Pad with two buttons

- Left Button

- Right Button

I/O Ports

- One 25 pins Parallel port, EPP/ECP Capability
- One 15 pins CRT port, Support DDC 2B
- One 7 pins TV out port
- One MIC In port
- One headphone-out Port
- One 2pins AC Adapter Jack
- One type II PCMCIA Card Bus slots
- Three 4 pins USB ports
- One RJ11/RJ45 Port
- FIR
- Secure Digital slot(Option)

PCMCIA Card Organization

- One type II card sockets
- 1.8" 10.5mm removable ATA Device
- Card bus card or PC Care with hot insertion and removal
- ACPI 1.1 Compliant.
- Support 5V/3.3V PC Cards and 3.3V Card bus cards.
- Supports PCMCIA-ATA Specification.

Excellent Power Management Function

- Standby mode, Suspend to RAM or Suspend to Disk mode, by time out or by hot key
- HDD Local Stand-By mode by time out
- LCD Local Stand-By mode by time out
- Low battery alarm by beep
- Auto-backlight off when LCD cover closed
- Full ACPI 1.0B supported
- LCD Auto-DIM mode by time out

Switch

- Power switch
- Lid switch
- Kill switch
- User Define Button 1, 2

AC Adapter

- Universal AC adapter module 60W
- 1/P range:90-264Vac,47-63Hz
- 0/P:19V,3.16A

Security

- Boot-up password protection
- Single level password architecture. (Supervisor)

Electrical Specifications

Mother Board

Microprocessor

- Intel Mobile Pentium M Processor 1.4GMHz, 1.5GMHz, 1.6GMHz, 1.7GMHz

System Logic

- Intel 855PMHost Bridge/controller processor host Bus support
- Integrated DRAM controller
- PCI bus Interface
- AGP bus Interface
- Power Management Functions
- Supporting hub Link

Memory

- System DRAM

  Two JEDEC standard 200-pins SO-DIMM DDR memory Module support +2.5V 128/256/512MB.

- System ROM BIOS

  512KB Flash ROM

- 64MB VGA frame buffer on board DDR SGRAM memory.

Fixed Disk Interface

- Intel ICH4-M
- PCI IDE supported
- PIO MODE 4 Timing supported
- Ultra 66/100 synchronous DMA mode supported

Super I/O Controller

- SMSC FDC 47N227
- Supports 2 serial ports, IrDA V1.2, parallel port, and floppy disk controller functions

- Two UARTs for Complete Serial Ports
  Programmable character lengths
  Even, odd, stick or no parity bit generation and detection
  Programmable baud rate generator
  High speed baud rate (230Kbps, 460Kbps) support
  Independent transmit/receiver 16 Byte FIFOs
  Modem Control
  Plug and play with 96 base IO address and 12 IRQ options
- Infrared-IrDA V1.2 (4Mbps), HPSIR and ASK (Amplitude Shift Keyed) IR port
- Multi-mode parallel port
  Standard mode, ECP and EPP support
  Plug and play with 192 base IO address, 15 IRQ and 4 DMA options
- Floppy Disk Controller
  16 bytes of FIFO
  Two FDDs with drive swap support
  Plug and play with 48 base IO address, 15 IRQ and 4 DMA options
- ACPI Compliant

Keyboard Controller

- PC87591L is use as Keyboard Controller and Battery management unit.

Audio CODEC Realtek ALC202

- Single chip audio Codec with high S/N ratio (>90dB).
- 20-bit DAC, 18-bit ADC.
- Stereo full-duplex CODEC with independent and variable sampling rate.
- 4 analog line-level stereo input with 5-bit volume control: LINE_IN, CD,VIDEO,AUX
- Two Analog Line-level Mono Input: PC_BEEP,PHONE_IN
- Mono output with 5-bit volume control.
- Stereo output with 6-bit volume control.
- 2 MIC inputs: Software selectable.
- Power management and enhanced power saving.

- 3D Stereo Enhancement.
- External Amplifier power down capability.
- Multiple CODEC extension.
- Compliant with AC'97 2.2 specification.
- 50mW/8Ω amplifier at LINE/Headphone output
- Jack-detect function to mute LINE/MONO/HP output, to control S/PDIF output.
- Supports S/PDIF out is compliant with AC'97 rev2.2.
- 2 GPIO pins.
- 14.318MHz->24.576MHz digital PLL.
- Supports double sampling rate (96KHz) of DVD audio playback.
- +30dB boost preamplifier for MIC input.
- Power support: Digital:3.3V Analog:3.3V/5V
- Standard 48-Pin LQFP package.

ENE CB1410 Card Bus Host Adapter

- 3.3V operation with 5V tolerance
- 144-pin LQFP or 144-ball LFBGA package for CB-1410 and CB-1211 single slot Cardbus controller.
- Compliant with
- PCI Local Bus Specification, Revision 2.2.
- PCI bus Power Management Inferface Specification, Revision 1.1.
- PCI Mobilie Design Guide, Version 1.1.
- Advanced Configuration and Power Inface Specification, Revision 1.0
- PC99 System Design Guide
- PC Card Standard, March 1997
- Interrupt configuration
- Supports parallel PCI interrupts
- Supports parallel IRQ and parallel PCI interrupts
- Supports serialized IRQ and parallel PCI interrupts

- Supports serialized IRQ and PCI interrupts
- Power Management control Logic
- Supports CLKRUN# protocol
- Supports SUSPEND#
- Supports PCI PME# from D3,D2,D1 and D0
- Supports PCI PME# from D3Cold(CB-1420 and CB-1410 only)
- Supports D3STATE#(CB-1410 only)
- DMA Control Logic
- Supports PC/PCI DMA
- Supports Distributed DMA
- Power Switch Interface
- Supports parallel 4 wire power switch interface(CB-1410 and CB-1211).
- Misc Control Logic
- Supports serial EEPROM interface
- Supports socket activity LED
- Supports 5 GPIOs and GPE#
- Supports Zoomed Video Port
- Supports SPKROUT,CAUDIO and RIOUT#
- Supports PCI LOCK#

VIA VT6301S OHCI PHY/LINK Layer controller

- Single chip PCI Host Controller for IEEE 1394-1995 Release 1.0 and IEEE 1394a P2000
- Embedded 1394 Link core
- Dual Buffer mode enhancements
- Skip processing enhancements
- Block Read Request handling
- 32 bits CRC qenerator and checker for receive and transmit data
- Integrated 400Mbps 1-port PHY
- Supports two 1394a fully compliant cable ports at 100/200/400Mbps

- Supports IEEEE 1394-1995 Standard for high performance Serial Bus 1.0 and 1394a P2000
- Full 1394a P2000 support
- Logic performs bus initialization and arbitration functions
- 2KV ESD protection
- 32-Bit Power-Managed PCI Bus-Interface
- Compliant with PCI specification V2.2
- Supports CardBus interface
- Support I2C EEPROM and 4-wire Serial ROM with GUID PROM Shadow to EEPROM
- OHCI Compliant Programming Interface
- Pin Compatible with VIA VT6306 1394a PCI Host Controller
- 3.3V Power Supply with 5V Tolerant Inputs
- 0.30 micron low power CMOS process
- 128-Pin, LQFP Package
- PCB reference design & schematic available

Real tek RTL8101L LAN Controller

- 100 pins QFP/LQFP
- Integrated Fast Ethernet MAC, Physical chip and transceiver in one chip
- 10 Mb/s and 100 Mb/s operation
- Supports 10 Mb/s and 100 Mb/s N-way Auto-negotiation operation
- PCI local bus single-chip Fast Ethernet controller
- Compliant to PCI Revision 2.2
- Supports PCI clock 16.75MHz-40MHz
- Supports PCI target fast back-to-back transaction
- Provides PCI bus master data transfers and PCI memory space or I/O space
- mapped data transfers of RTL8100 (L)’s operational registers
- Supports PCI VPD (Vital Product Data)

- Supports ACPI, PCI power management
- Supports CardBus. The CIS can be stored in 93C56 or expansion ROM
- Supports up to 128K bytes Boot ROM interface for both EPROM and Flash memory
- Supports 25 MHz crystal or 25 MHz OSC as the internal clock source. The frequency deviation of either crystal or OSC must be within 50 PPM.
- Compliant to PC99 standard
- Supports Wake-On-LAN function and remote wake-up (Magic Packet*, LinkChg and Microsoft® wake-up frame)
- Supports 4 Wake-On-LAN (WOL) signals (active high, active low, positive pulse, and negative pulse)
- Supports auxiliary power-on internal reset, to be ready for remote wake-up when
- main power still remains off
- Supports auxiliary power auto-detect, and sets the related capability of power
- management registers in PCI configuration space.
- Includes a programmable, PCI burst size and early tx/rx threshold.
- Supports a 32-bit general-purpose timer with

W83L518D secure Digital controller

General

- LPC bus is compliant with LPC Spec. 1.01
- LPC bus supports LDRQ#(LPC DMA),SERIRQ (serial IRQ)
- Programmable configuration settings
- 48 MHz crystal inputs
- PCICLK of 33MHz is needed for LPC bus configuration

Smart Card Interface

- ISO-7816 compliant
- PC/SC T=0, T=1 compliant

- 16-byte transmitter FIFO and 16-byte receiver FIFO
- FIFO threshold interrupt to optimize system performance
- Programmable transmission clock frequency
- Versatile baud rate configuration
- UART-like register file structure
- General-purpose C4, C8 channels

Memory Stick interface

- Memory Stick Standard Format specification ver. 1.3 compliant
- Support interrupt polling transmission
- Support FIFO
- Threshold interrupt to optimize system performance
- Automatic clocl halt to prevent underrun/overrun

16 MHz interface clock

SD Memory Card Interface

- SD Memory Card Specifications: PART! PHYSICAL LAYER SPECIFICATION Version 1.0 Compliant
- Support interrupt polling transmission
- Support FIFO threshold interrupt to leverage system performance

24 MHz interface clock

Package

- 48-pin LQFP

Hard Disk Drive

- 2.5”, 9.5mm height, up to 20GB/30GB/40GB/60GB

USB Floppy Disk Drive

- 3.5”,1.44MB, 3 mode USB FDD device support Legacy Boot.

Pointing Device

- Integrated Touch Pad with two buttons.

Optical devices module

- CD-ROM/DVD-ROM/CD-RW/Combo upgradeable

Audio Port

MIC IN

- AC-coupled input, 100mVP-P maximum

Headphone

- 1VP-P

Built-in Speakers

- 8Ω (15x2.5m/m), 1 W

Display Device

- COLOR TFT/SXGA+ LCD (AU B150PG01)SPWG-B
  Dimensions : 317.3 (W) X 242.0 (H) X 6.0 (D) mm (max)
  Active area : 304.5 (W) X 228.4 (H) mm, 15.0"
  1400 X 1050 SXGA+ Resolution
  Response time: 50 (Typ)
  Contrast ratio 250:1 (Typ)
  Brightness 150 Nit (Typ)
- COLOR TFT/SXGA+ LCD (Hitachi TX38D91VC1FAC)SPWG-B
  Dimensions : 317.3(W) X 242.1 (H) X 6.0 (D) mm (max)
  Active area : 304.5 (W) X 228.4 (H) mm, 15.0"
  1400 X 1050 SXGA+ Resolution
  Response time: 57 (Typ)
  Contrast ratio 100:1 (min)
  Brightness 150 Nit (Typ)
- COLOR TFT/XGA LCD (AU B141XN04)
  Dimensions : 298.5 (W) X 226.5 (H) X 5.5 (D) mm (max)
  Active area : 285.7 (W) X 214.3 (H) mm, 14.1"
  1024 X 768 XGA Resolution
  Response time: 50 (typ)
  Contrast ratio 250:1 (Typ)
  Brightness 150 Nit (Typ)
- COLOR TFT/XGA LCD (CPT CLAA141XF01 Rev.2)
  Dimensions : 298.5 (W) X 227.5 (H) X 5.7 (D) mm (max)
  Active area : 285.7 (W) X 214.3 (H) mm, 14.1"
  1024 X 768 XGA Resolution

Response time: 45 (max)
Contrast ratio 200:1 (Typ)
Brightness 150 Nit (Typ)

- COLOR TFT/XGA LCD (Hitachi TX38D81VC1CAB)SPWG-B
  Dimensions : 317.3 (W) X 242.1 (H) X 6.0(D) mm (max)
  Active area : 304.1 (W) X 228.1 (H) mm, 15.0"
  1024 X 768 XGA Resolution
  Response time: 60 (Typ)
  Contrast ratio 100:1 (min)
  Brightness 160 Nit (Typ)
- COLOR TFT/SXGA+ LCD (CMO N141X6-L01)
  Dimensions : 298.5 (W) X 226.5 (H) X 5.5 (D) mm (max)
  Active area : 285.7 (W) X 214.3 (H) mm, 14.1"
  1024 X 768 XGA Resolution
  Response time: 50 (Typ)
  Contrast ratio 200:1 (Typ)
  Brightness 150 Nit (Typ)
- COLOR TFT/XGA LCD (LG LP150X05-A2M2 SPWG-B)
  Dimensions : 317.3 (W) X 241.5 (H) X 6.0 (D) mm (max)
  Active area : 304.1 (W) X 228.1 (H) mm, 15.0"
  1024 X 768 XGA Resolution
  Response time: 40 (Typ)
  Contrast ratio 250:1 (Typ)
  Brightness 150 Nit (Typ)
- COLOR TFT/XGA LCD (Sanyo TM150XG-02L11 SPWG-B)
  Dimensions : 317.3 (W) X 241.5 (H) X 6.0 (D) mm (max)
  Active area : 304.1 (W) X 228.1 (H) mm, 15.0"
  1024 X 768 XGA Resolution
  Response time: 25 (Typ)
  Contrast ratio 300:1 (Typ)
  Brightness 150 Nit (Typ)

Keyboard

- 85 US keys with 101/102 key emulation
- 1 Windows Keys, 1 Application Key
- Standard pitch, 2.5 mm travel length:

- Palm-rest

Mechanical Specification

BCL50 (for TFT 15.0")

333.6mm(W)x276mm(D)x29.9mm(H) front/35.1mm Max.

6.21lb

BCL50 (for TFT 14.1")

333.6mm(W)x276mm(D)x29.9mm(H) front/35.1mm Max.

6.lb

OPTION PACK:

4.14"x5.07"x0.74"[105.1mmx128.8mmx24.0mm]

AC adapter:	260g
BATT (1st):(Li-ION)	430g

MECHANICAL FUNCTION

- REMOVEABLE MEMORY MODULE.
- FOR SECURITY CAN USE KENSINGTON LOCK.
- 11 TYPES OF SCREW FOR EASY ASS'Y STRUCTURE.
- SCISSOR TYPE KEY BOARD STANDARD PITCH 2.5 m/m TRAVEL LENGTH.
- 1 PCMCIA SOCKETS, SUPPORTED WITH ONE TYPE 2 CARDS.

MECHANCIAL MATERIAL

- RECYCLE PLASTIC PC+ABS 94V0

Environment Specification

Operating

Temperature +5°C to +35°C

Relative Humidity 10% to 90% without condensation

Altitude sea level to 10000FL

Storage or Shipment

Temperature -20°C to +50°C

Relative Humidity 10% to 90% without condensation

Altitude sea level to 40,000ft

Chapter 2:Software Specification For System BIOS

System Component Summary

Hot Keys

Fn + ↓	Decrease brightness
Fn + ↑	Increase brightness
Fn + F5	LCD/Monitor(CRT)/TV switch When pressing the hot key, the display device will switch among LCD only,, LCD+CRT, CRT only, LCD+TV and TV only under WINDOWS. It doesn't support switching to TV under pure DOS mode.

After rebooting, pad lock is set to off and Num lock is set to off. In this state, the embedded cursor/number pad is not enabled on the notebook keyboard.

Fn+F5 Toggle Display Sequence:

LCD --> LCD+CRT --> CRT --> LCD+TV --> TV

Connect LCD+CRT+TV at same time

Boot with LCD+CRT+TV first time, LCD+CRT+TV show display at same time.

Toggle display by Fn+F5, the display sequence is LCD --> LCD+CRT --> CRT --> LCD+TV --> TV.

Connect LCD+CRT at same time

Boot with LCD+CRT first time, LCD+CRT show display at same time.

Toggle display by Fn+F5, the display sequence is LCD-->CRT-->LCD+CRT.

Connect LCD+TV at same time

Boot with LCD+TV first time, LCD+TV show display at same time.

Toggle display by Fn+F5, the display sequence is LCD-->TV-->LCD+TV.

Buttons

Power Button

The activity of the power button is as follows:

If power button is pressed for less than 1 second then nothing happens.

If power button is pressed for more than 1 second but less than 4 seconds then system would execute User Requested OFF.

If power button is pressed for more than 4 seconds then the notebook will be powered off by power button over-ride feature.

If OS is running in ACPI mode, the power button acts as the sleep button, and let OS controls the policy of power button (shout down, standby or hibernate).

Power Button Over-ride

Holding down the Power Button for 4 seconds will cause an unconditional transfer to the off state without notifying the operating system.

Lid switch

This section describes the expected behavior of the system when the lid is opened or closed by the user.

If the system is running under legacy mode:

Closing the lid will turn off LCD backlight.

If the system is running under ACPI mode:

The operating system will determine what action to take when the lid is opened and closed.

The possible actions of lid close are **None**, **Standby**, **Hibernate**.

System status indicators

Please refer to Keyboard BIOS specification.

Core BIOS Features

Enhanced IDE Disk Drive Support (EDD)

In addition to AT standard disk drive support:

Auto detecting and sizing of all IDE drives.

Logical Block Addressing

Fast DMA support

Ultra DMA100/66/33 support

S.M.A.R.T

Multi Boot

The notebook can support Multi-Boot for selecting the boot sequence of hard disk, USB floppy, CD-ROM, Network and USB ATA device in Setup.

The notebook doesn't support booting from legacy floppy.

Quiet Boot

Quiet Boot replaces the customary technical messages during POST with a more visually pleasing and comfortable display (OEM screen). During POST, right after the initialization of VGA, The notebook displays an illustration called the OEM screen during system boot instead of the traditional POST screen that displays the normal diagnostic messages.

The OEM screen stays up until just before the operating system loads unless:

Pressing <Esc> to switch to the POST screen and the boot process will continue until the end of POST.

Pressing <F2> to enter Setup.

Whenever POST detects a non-terminal error, it switches to the POST screen near the end of POST, just prior to prompting for a password.

If the BIOS or an option ROM request keyboard input, the system switches over to the POST screen with prompts for entering the information. POST continues from there with the regular POST screen.

Boot Block

The Flash ROM used in many systems today offer the customer the advantage of electronically reprogramming the BIOS without physically replacing the BIOS ROM. This advantage, however, does create a possible hazard: power failures or fluctuations that occur during updating the Flash ROM can damage the BIOS code, making the system unbootable. To prevent this possible hazard, many Flash ROM include a special non-volatile region that can never be erased. This region, called the boot block, contains a fail-safe recovery routine. If the boot block finds corrupted BIOS, it prompts the end user to insert a diskette, from which it loads several files that replace the corrupted BIOS on the Flash ROM with an uncorrupted one.

New Interrupt 15h extensions

The BIOS must support the recently defined standard INT 15 extensions:

Big Memory

Big memory support can report greater than 64 megabytes of RAM. The notebook supports the INT 15h big-memory reporting functions of E801h, E881h, and E820h. This feature reports all available extended memory (both below and above the 64MB limit) using both a real mode (E801h) and a 32-bit protected mode (E881h) interface. Operating systems can access the real-mode interface through the standard INT 15h call. They can access the protected-mode interface through a 32-bit interrupt call, much like the EISA protected-mode interface. The Microsoft-defined E820h function returns a complete memory map through a series of repeated calls.

Plug-n-Play (PnP) Support

To achieve the goal of PnP, a POST conflict detection and resolution (CDR) module, and a run-time services module will be integrated into the system BIOS.

The PnP runtime service module includes multiple interfaces so that the system can support the current DOS, as well as Win98 operating system that include specific support for the PnP BIOS specification.

Security Features

The security feature to be supported is password.

2 Level Passwords

The notebook supports two levels password protection. The password support consists of a User Password and an Supervisor Password. They each contain up to eight characters, and are stored in CMOS.

When the password is enabled, the notebook may display a suitable password prompt on the main display in the following situations:

Turning on from the Off State.

Turning on from Hibernate.

Entering to Setup.

The User will attempt to enter a password, then press ENTER If the User fails to enter the password in three tries the system will return to the state it was turned on from (off, Suspend to Disk).

All user data on screen must not be visible before entering the correct password.

User Password

The user can choose to enable or disable:

Password required on boot

Password required on resume from hibernate

The user password may not be set unless the administrator password is set. If the user wishes to only have one password then the administrator password is used.

Supervisor Password

There are three primary uses for the Supervisor Password:

To protect the contents of the PC Identification strings from changes by the user.

Protect users from changing system configuration that could cause the notebook to malfunction.

As the users password if only a single password is desired.

Valid Password Characters

Valid Password Characters

The numbers 0 to 9.

The letters A to Z (not case sensitive).

The password is stored as scan codes.

Both passwords will be encrypted before being stored in CMOS RAM using the standard Phoenix password encryption technique.

Thermal management

Please refer to Keyboard BIOS specification.

Power Management

Introduction

The notebook supports ACPI. The system will dynamically switch to ACPI mode for configuration and power management when an ACPI OS is loaded.

When ACPI is not loaded and enabled, the power management function will be disabled.

System Time-outs

If the system is running in ACPI mode, system Time-outs is handled by the operating system. BIOS time-outs are disabled. System time-outs are set using the control panel power applet.

System Power Management

The overall system can be in one of the system power states as described below:

ACPI mode	Power Management
Mech. Off (G3)	All devices in the system are turned off completely.
Soft Off (G2/S5)	OS initiated shutdown. All devices in the system are turned off completely.
Working (G0/S0)	Individual devices such as the CPU and hard disk may be power managed in this state.
S1 Sleeping State	CPU Stop Clock VGA Standby, turn off back-light PCMCIA Standby Audio Standby Hard Disk Spin Down motor CD-ROM Spin Down Super I/O Power down
S3 Sleeping State	CPU set power down VGA Suspend PCMCIA Suspend Audio Suspend Hard Disk Power Down CD-ROM Power Down Super I/O Power Down

S4 Sleeping State	System Saves all system states and data onto disk prior to power off the whole system.

Device Power Management

Under ACPI mode, the device specific power management supported by this notebook includes the CPU throttling, monitor power management and the hard disk.

CPU power management

Support CPU low power states C3,C4 and SpeedStep.

Hard Disk

The hard disk will be spun down after a period of no activity based on the settings of the OS.

Display Device

The monitor can be turned off after a period of no activity based on the settings of the OS.

System Wake Up Sources

The table below lists the wake up events for all low power states:

Events	S1	S3	S4	Process required
Hot key*1	X	X	X	X
Power button	O	O	O	X
Lid close	X	X	X	X
Modem Ring (PCMCIA Modem)	X	X	X	X
Modem Ring (MiniPCI Modem)	O	O	X	X
Modem Ring (USB Modem)	X	X	X	X
LAN (PCMCIA)	X	X	X	X
LAN (MiniPCI)	O	O	X	X
LAN (USB)	X	X	X	X
AC/Battery	X	X	X	O
Thermal	X	X	X	O
RTC	O	O	X	X
LPT/KB/Mouse/FDD/HDD	X	X	X	X
Audio/Video activity	X	X	X	X

PCMCIA	O	O	X	Driver
USB	*2X	*2X	X	Driver
CRT (no event) plug/unplug	X	X	X	O
Power Kill (no event)	X	X	X	KB only
Critical low battery	X	X	X	X

Field 'Process Required' identifies that further process for the occurred events must be processed during wake up or resume procedure.

Notes:

- Hot keys are not wake up source of standby, suspend to RAM and Hibernate states.
- Activity of the USB device is dependent on the driver support.

Modem Ring

PCMCIA Modem

The function of waking up the system from Standby is not supported.

MiniPCI Modem

Activity on the modem ring line will wake the system from Standby if OS enable modem ring wake up.

USB Modem

The function of waking up the system from Standby is not supported.

LAN

PCMCIA LAN

The function of waking up the system from Standby is not supported.

MiniPCI LAN

MiniPCI LAN can wake the system from Standby if OS enable wake up LAN.

USB LAN

The function of waking up the system from Standby is not supported.

Real Time Clock Alarm

The Real Time Clock alarm interrupt will wake the system from Standby and Hibernate.

PC-Card Wake Up

PC-Cards can wake the system up in ACPI mode but cannot wake up the system in APM modes.

PCI PME# Signal

The PCI PME# signal can wake the system up in ACPI mode but cannot wake up the system in APM modes.

USB Device

If USB driver is loaded, the driver will wake the system from Standby.

Critical Low Battery

Critical low battery event can't wake the system from Standby in ACPI mode.

Power Management – ACPI

Introductions

The Advanced Configuration and Power Interface (ACPI) is a well-specified power management and configuration mechanism. It evolves the existing collection of power management codes, APM, PnP BIOS, and Etc.

Power State Transition Diagram

The state transition diagram in ACPI mode is as follows:

From (State)	Leave By Condition	Enter (State)
S1/S3	Power Button	S0
	Modem ring	
	MiniPCI LAN	
	Alarm	
	USB	
S4	Resume button request	
S0	Press power button (depends on ACPI OS setting)	S1/S3
	Press lid switch (depends on ACPI OS setting)	
	Standby icon in shutdown menu in Windows.	
	ACPI OS timer expired	
	Critical low battery (depends on ACPI OS setting)	
S0	Critical low battery (depends on ACPI OS setting)	S4
	Press lid switch (depends on ACPI OS setting)	
	Press power button (depends on ACPI OS setting)	

Embedded controller

The keyboard controller will act as the ACPI embedded controller and support the ACPI EC protocol and interface.

Storage Devices and Batteries

Possible storage devices are FDD, HDD, CD-ROM and DVD-ROM Configurations

- Floppy Disk and Hard Disk, CD-ROM and DVD-ROM

The BIOS must report that the correct types of these devices are present even if the drive is not installed in the system during POST. Two devices, which belong to the same category, are not supported in this notebook.

- Batteries

The BIOS must follow ACPI specification and report the correct number of the installed battery and status.

Bootable Device

The system is capable of booting from onboard HDD, FDD, CD ROM and DVD-ROM.

Docking Features

This product does not support docking station or port replicator.

PC2001

The notebook must meet Microsoft Logo requirements in accordance with the PC2001 Guide and the Microsoft Logo test programs.

Miscellaneous Features

BIOS ROM

The system BIOS and Keyboard BIOS share one single flash ROM. The size of the flash ROM is 512KB.

USB Support

The driver provides the USB device support of this notebook after loading the operating system.

IDE interface

The IDE device supported in the module bay will occupy secondary/master channel.

Flash utility – one BIOS ROM only

The flash utility can be used to program both system and keyboard BIOS at the same time.

VGA Support

Support AGP 2.0 that improved the sustained bandwidth that is critical to the enhanced 3D and video performance.

Following describes the expected behavior when a video monitor is connected to the VGA port on the notebook .The feature needs VGA driver support

The BIOS will use both the RGB and pin 11 methods to determine the presence of an external VGA monitor.

Video modes supported on the secondary display path (need VGA driver support)

Supported video modes and timings please refer to the technical reference of VGA vendor. In particular, text mode and standard VGA modes are not supported.

CPU Speed

AC in -> cpu runs in full speed

Batty only ->cpu runs in lowest speed

S4 Resume

System can't boot from any device and "F2" function key beside the HDD.

Customer Specific Features

Display of System Type and BIOS Version Number on Boot

〈System Type〉BIOS Version V1.00*

Note:

✶ The numbers of BIOS version will be changed.

Configuration Requirements

IRQ	Hardware
00	System Timer
01	Keyboard
02	Programmable Interrupt Controller
03	Fast Infrared Port
04	Free
05	SD Device
06	Free
07	Printer Port (LPT1)
08	Real Time Clock
09	SCI IRQ used by ACPI bus , Audio, CardBus, PCI Fast Ethernet , Modem , IEEE 1394, Wireless LAN, USB,USB2.0 and VGA.
10	Free
11	Free
12	PS/2 Mouse
13	Numeric data processor
14	Ultra ATA Storage Controller & Primary IDE controller
15	Ultra ATA Storage Controller & Secondary IDE controller

DMA	Hardware
01	Infrared Communications Controller
02	Standard Floppy Disk Controller
03	Free
04	DMA controller

Notes:

✶ For both IRQ and DMA assignment, if the resource is insufficient, the functionality of the conflicted devices will not be well.

CMOS RAM management

The BIOS will automatically update certain information in CMOS on each boot. This information includes:

- DRAM size and configuration
- Hard disk configuration
- Always report the existence of one FDD.

If the CMOS RAM fails checksum or a power lost on CMOS battery is detected during boot, an appropriate error message will be displayed:

- Establishing default CMOS configuration
- Run SETUP to change configuration

The system BIOS must automatically load default values defined in the setup menu during POST when encounter these problems. The user must not be required to take any action to continue the rest of POST (or entering SETUP).

System Management BIOS(SM BIOS) version 2.31

Limited DMI 2.0 BIOS information are provided:

BIOS version number is type 0 data item.

Type 1:

- System serial number – 64 alphanumeric characters with 12-character bundle number
- System manufacturer name – 'COMPAL'
- System product name – 32 alphanumeric characters
- System version – 32 alphanumeric characters

EEPROM

There is one EEPROM that is used to store many important system and user data in the notebook. The size of the EEPROM is 2K bytes.

The EEPROM map is listing as below:

Name	Offset	Comments
System Serial Number	00h – 1Fh 20h – 3Fh	32 bytes for Serial number. 32 bytes for Bundle number.
Unused	40h – 4Fh	Unused.
System version	50h – 6Fh	32 bytes for System version.

UUID	70h – 7Fh	16 bytes for UUID.
System product name	80h – 9Fh	32 bytes for System product name.
DMI type 11	A0h – DDh	62 bytes for DMI type 11
Unused	DEh – DFh	Unused
GUID	E0h – E7h	8 bytes for GUID
Unused	E8h – EFh	Unused
Keyboard type	F0h	Define for US/UK/JP keyboard
Keyboard BIOS used	F1h	1 byte for Keyboard BIOS used
Branding	F2h	1 byte for Branding.
Reserved for Compal factory	F3h – F4h	Reserved 2 bytes for Compal factory used
Reserved for keyboard	F5h – F6h	Reserved 2 bytes for keyboard used
Unused	F7h – FDh	Unused
EEPROM initialized flag	FEh – FFh	Set to 55AAh when the EEPROM get initialized.
Reserved	200h - 3FFh	Reserved for BIOS Multiboot III function
Reserved	7A0h – 7DFh	64 bytes for Factory Process

"C" Key

During POST, pressing "C" key could boot from CDROM, instead of changing the boot sequence.

"ESC" Key

During POST, pressing "ESC" key could enable boot menu and exit quick boot logo to see the POST message, instead of changing the boot sequence.

"F12" Key

During POST, pressing "F12" key could boot from NETWORK, instead of changing the boot sequence.

System Setup

Invoking setup

The setup function can only be invoked by pressing F2 when "Press <F2> to enter Setup" message is prompted on the bottom of screen during POST.

The setup uses a menu driven interface to allow the user to configure their system. The features are divided into 5 parts as follows:

Main Allows the user to specify standard IBM PC AT system parameters.

Advanced Provides advanced settings of the system.

Security Provides security settings of the system.

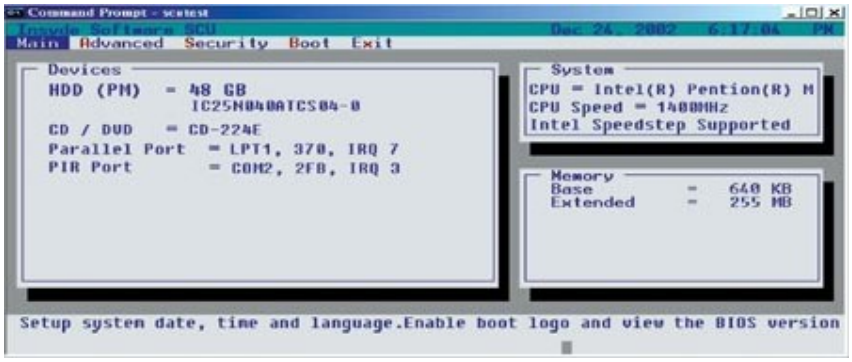
Boot Allows the user to specify the boot options.

Exit Allows the user to save CMOS setting and exit Setup.

During setup, all Fn function keys and power saving functions are disabled.

Setup screens

- Main Menu



System Memory

This field reports the memory size of system base memory. The size is fixed to 640KB.

Extended Memory

Extended Memory size = Total memory size

CPU Speed

CPU Speed = Max speed

Intel Speedstep

Supported The system will support Intel speed step.

Not Supported The system will not support Intel speed step.

System Time and System Date

The hour is displayed with 24-hour format. The values set in these two fields take effect immediately.

Quiet Boot Mode

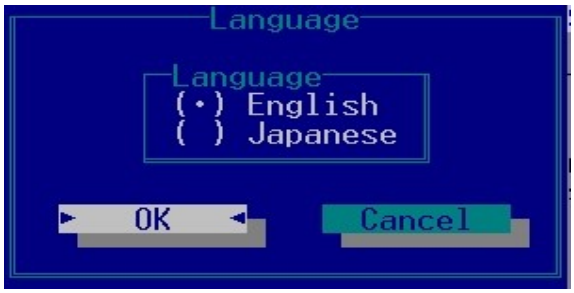
Enabled**:** Customer Logo is displayed, and Summary Screen is disabled

Disabled: Customer Logo is not displayed, and Summary Screen is enabled.

Language

Select the display language for the BIOS.

English */ Japanese*



BIOS Version

Display the OEM BIOS Version.

Advanced menu

LPT Port

Configure parallel port using options:

Disabled: Disabled.

Enabled*:* User configuration – for advanced users only.

Note: Depending on your operating system, disabling an unused device may help free system resources for other devices.

Port Definition

Set the mode for the parallel port:

Standard AT: Normal mode (AT compatible).

Bi-directional*:* Bi-directional mode (PS/2 compatible).

Enhanced Parallel(EPP): EPP mode.

Extended Capabilities(ECP): ECP mode (requires DMA channel).

Port Address

Set the base I/O address for the parallel port. When **Mode** is selected as **EPP mode**, '3BC' will not be available.

None **/ LPT1, 378, IRQ 7** / LPT2, 278, IRQ5 / LPT3 ,3BC, IRQ7

DMA Setting For ECP Mode

If select ECP mode then DMA default **DMA 1.**

FIR Port

Configure the system's Infrared port using options:

Disabled: Disabled.

Enabled*:* User configuration – for advanced users only.

Note: Depending on your operating system, disabling an unused device may help free system resources for other devices.

COM B I/O Settings

Set the base I/O address and IRQ for Infrared port.

Disabled /COM1,3F8,IRQ4/***COM2,2F8,IRQ3***/COM3,3E8,IRQ4/COM4,2E8,IRQ3

DMA Setting for Fast IR

DMA 1*/DMA 2/****DMA 3***

Mode Setting

Normal(16550)/ IrDA(HPSIR)/ ASK IR/ **FAST IR**

Legacy USB Support

Disabled: Disable support for Legacy Universal Serial Bus.

Enabled*:* Enable support for Legacy Universal Serial Bus.

Security Menu

The following is Security menu if both of passwords are disabled, or enter Supervisor password when password is enabled:

Set Supervisor/User Password

Enter this field always shows the message.

If password on boot is required, the password must be set otherwise it cannot be enabled.

The formats of the password are as follows:

Length 10 characters.

Characters Alphanumeric keys only. The shift status i.e. Ctrl, Shift, Alt, and Capital are ignored.

Password on Boot

Allows the user to specify whether or not a password is required to boot.

Enabled a password is required to start the system.

Disabled Do not apply password to the system.

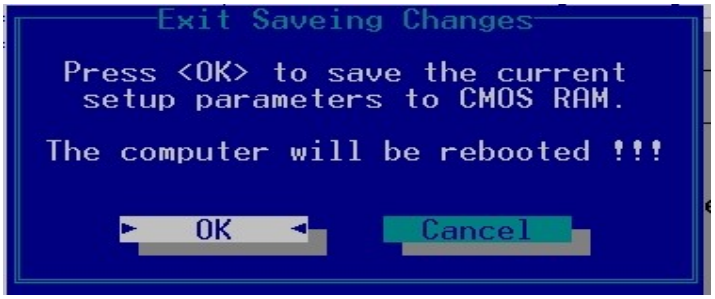
Boot Menu

This menu allows the user to decide the order of boot devices to load the operating system. Bootable devices include the diskette drive in module bay, the onboard hard disk drive and the CD-ROM in module bay.

Exit Menu

Exit Saving Changes

Allows the user to save changes to CMOS and reboot system. The following message is prompted when user press "Enter" on the item.



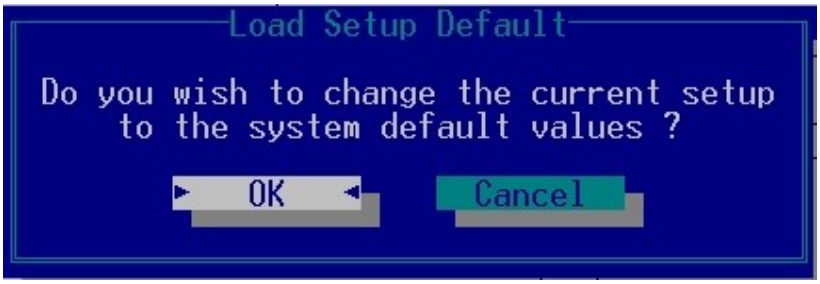
Yes: Exit SETUP and reboot

No: Back to previous screen

Exit Discarding Changes

Load Setup Defaults

Allows the user loads default value in CMOS Setup. The following message is prompted when user press “Enter” on this item:



It still stay in Setup when press a key.

Discard Changes

Allows the user loads previous value in CMOS Setup. The following message is prompted when press “Enter” on this item:

It still stay in Setup when press a key.

OS Compatibility

Windows XP Home Edition /Professional.

Software Specification for KB-BIOS

General purpose

This document define the EC specification with standard interface and also define the special feature for OEM function .It's useful for software engineer to access EC status, and for SA test guide.

Features

- Advanced Power Management 1.2 support
- ACPI1.0 b and PC2001 compliant
- Support SMBus specification V1.0
- Hot keys for system control
- External LED control
- Battery scope report and control
- Sticky key support
- Power switch control
- Speaker control
- Port replicate
- Extra key emulation
- Two host interface channels support
- Internal Keyboard country selection

Types of KB-BIOS provided

- Standard version
- Support for US(87)/UK(88)/Japanese(90) keyboard.
- KB-BIOS command support with SYSTEM-BIOS

Command set 40h-4Fh for OEM defined through Port60/64 and Port62/66

Command Set (from system's point of view) via 60/64 and 62/66

CMD	DATA	Description	return
40h		Boot fail restart	
	0x01-0x7F	Boot fail restart, write in a byte to EC and enable the timer. This command called by BIOS and will cause the system reboot after the byte count down to zero if system still no reset the counter. It could make sure the system success boot up.	None
41h		EC state notification	

CMD	DATA	Description	return
	A0h	Return core code version number	One byte
	A1h	Return platform id	'COMPAL'
42h		Bank assign for EEPROM	None
	0x00-0x07	Bank assign for EEPROM,work with 4D/4E command replace 4B/4C command	None
43h	00h - FFh	Get RAM value from EC, Host can use this command to send address to get OEM RAM value. The address range are from 00h to DFh.	1 WORD
44h	None	Get project ID	0x0A
45h		Hook for every projects	
	70h	Get battery cycle count.	1 Byte
	71h	Get battery learning status.	1 Byte
	72h	LLB resume mode disable.	None
	73h	LLB resume mode enable.	None
	74h	Disable switch LCD/TV/CRT mode.	None
	75h	Enable switch LCD/TV/CRT mode.	None
	76h	Switch LCD/TV/CRT mode by driver.	None
	80h	Enable touch pad.	None
	81h	Disable touch pad.	None
	82h	Enable touch pad enable/disable function.	None
	83h	Disable touch pad enable/disable function.	None
46h		fan speed read	
	01h		
	02h	Reading FAN speed from FAN1 and FAN2	None
	03h	Fan RPM control by EC	None
	default	Fan RPM value,and Fan RPM control by OS	None
47h		Speaker mute On/Off,LED control.	

CMD	DATA	Description	return
	80h	Return back the control right to EC	None
	81h	System Led on and control by OS	None
	82h	Power management Led on and control by OS	None
	83h	Charge Led on and control by OS	None
	84h	Discharge LED on and control by OS	None
	85h	Direct CD Led on and control by OS (not support)	None
	86h	Blue Tooth Led on and control by OS (not support)	None
	87h	One touch button Led on and control by OS(not support)	None
	88h	All LED off and control by OS	None
	89h	Hdd LED on and control by OS	None
	8Ah	Fdd LED on and control by OS	None
	8Bh	MP3 LED on and control by OS	None
	8Ch	2ND battery LED on and control by OS	None
	A7h	Mute off(not support)	None
	A8h	Mute on(not support)	None
48h		Brightness control	
	0h	Time out to turn off panel counter	None
	1h	Adjuest brightness duty cycle	None
49h		Thermal control notification	
	A0h	FAN off and throttling disable	None
	A1h	FAN speed level 1 on and throttling disable	None
	A2h	FAN speed level 2 on and throttling disable	None
	A3h	throttling enable	None
	A4h	FAN speed level 3 on and throttling disable	None
49h	A5h	FAN speed level 3 on and throttling disable	None
		If FAN_NUM >= 2	
	B0h	FAN off	None
	B1h	FAN on speed1	None
	B2h	FAN on speed2	None

CMD	DATA	Description	return
	B3h	Throttling enable	None
	B4h	FAN on speed3	None
	B5h	FAN on speed4	None
		If FAN_NUM >= 3	None
	C0h	FAN off	None
	C1h	FAN on speed1	None
	C2h	FAN on speed2	None
	C3h	Throttling enable	None
	C4h	FAN on speed3	None
	C5h	FAN on speed4	None
4Ah		Auto into S2R(Delay about 4 Secs) or S2D and resume by timeout, This command provided engineer to verify S2R or S2D and resume function is OK or not Resume count(second base), Range is from 0x02 to 0x7F Bit7 = 0 -> Enabled S2R function 1 -> Enabled S2D function	
	0x02-0x7F	Enabled S2R function	None
	0x80-0xFF	Enabled S2D function	None
4Bh		Write the data to device through SMBus interface	
	0. 00h-FFh	Slave address of device	Byte
	1. 00h-FFh	Lo byte address if device is EEPROM otherwise is command or register	Byte
	2. 00h-FFh	Hi byte address if device is EEPROM, otherwise is zero	Byte
	3. 00h-FFh	data byte to write	0=Write OK 0xFE = Fail
4Ch		Read data from devices through SMBus	
	0. 00h-	Slave address of device	Byte

CMD	DATA	Description	return
	FFh		
	1. 00h-FFh	Lo byte address if device is EEPROM otherwise is command or register	Byte
	2. 00h-FFh	Hi byte address if device is EEPROM, otherwise is zero	data byte (00h-FFh)
4Dh		Write byte into EEPROM	
	1. 00h-FFh	EEPROM address	
	2. 00h-FFh	Data byte for write byte	0=Write OK 0xFE = Fail
4Eh		Read byte from EEPROM	
	00h-FFh	EEPROM address	0=Write OK 0xFE = Fail
4Fh		Reserved for R591 utility	None

Command set 50h-5Fh for OEM defined through Port60/64 and Port62/66

Command Set (from system's point of view) via 60/64 and 62/66

CMD	DATA	Description	return
50h	None	Get Docking status.	A0h = No dock A6h = simple docked
51h	None	Get revision number of KB-BIOS	BIOS Rev. 3 bytes byte0 : bit0-bit2 = major number(0-7) bit3-bit7 = type of KB-BIOS e.g. 0 = A, 1=B and so on..

CMD	DATA	Description	return
			byte1 minor revision number(0-9) byte2 If it is 00h then system display “ROM”,other It is “T01” if it is 01h and so on.. .
52h	None	Hook for every projects(Get platform ID)	5 Bytes “BCL50”
53h	None	Reserved	None
54h	0x00-0xFF	EC CMOS RAM read	Data byte from CMOS
55h		EC CMOS RAM write	
	0x00-0xFF	CMOS address offset	
	0x00-0xFF	data byte	0x00 => pass 0x01 => fail
56h		Get SMI trigger source	One byte
		No event	80h
		Ask suspend(On mode)	A0h
		brightness level update	A1h
		contrast level update	A2h
		audio volume decreased	A3h
		audio volume increased	A4h
		Lid open	A5h
		Lid closed	A6h
		External device plugged	A7h
		External device removed	A8h
		Bluetooth wake up event	A9h
		Bluetooth switch event	Aah
		Scr expand event	Abh

CMD	DATA	Description	return
		Display swap event	Ach
56h		Cpu fast event	Adh
		Cpu slow event	Aeh
		Pop up event	Afh
		Resume request from suspend	B0h
		Ask time out event	B1h
		Battery life in critical low state	B2h
		Battery life in low power state	B3h
		Standby request	B4h
		Battery Plug-In	B5h
		Battery Plug-Out	B6h
		Reserved	B7h
		Suspend to RAM request	B8h
		Save to DISK request	B9h
		Docked request	Bah
		Undock request	Bbh
		Reserved	Bch
		Thermal change event	Bdh
		Write LM75 event	Beh
		SMBus event	Bfh
		Password event	C0h
		mute function toggle	C1h
		Power button pressed	C2h
		TV out toggle	C3h
		Beep Alarm event	C4h
		Reserved	C5h
		Change use battery	C6h
		AC power plug-in	C7h
		AC power plug-out	C8h
		IR toggle event	C9h

CMD	DATA	Description	return
		Modem Ring In	Cah
		Unload OS Ultra Base Devices	Cbh
		Surprise undock event	Cch
		Battery polling	Cdh
		PME signal active	Ceh
		Mouse hot plug event	Cfh
56h		CRT plug in/out event	D0h
		Sleep button event	D1h
		RTC date/time update event	D2h
		LCD rotate event	D5h
		Device change event	F0h
		Bluetooth lan event	F1h
		no event	FFh
57h	None	Module identification	One byte bit0 : Main HDD exist bit1 : Int. FDD exist bit2 : CD_ROM exist bit3 : 2nd HDD exist bit4 : LS120 exist bit5 : Ext. FDD bit6 : CRT plug In/Out(1=in) other bit : Reserved
58h	0x00-0xFF	Set flat panel type	None
59h		System state notification	None
	70h	Sticky key mode enable	None
	71h	Sticky key mode	None

CMD	DATA	Description	return
		disable	
	72h	WirelessOn	None
	73h	WirelessOff	None
	74h	Change command to command48	None
	75h	Panel BRIGHTNESS adjust	None
	76h	Fan full on disable	None
	77h	Fan full on enable	None
	78h	Fan Fine Tune Disable	None
	79h	Fan Fine Tune Enable	None
	80h	start get LCD status panel information from EEPROM	None
	90h	One touch button application allow to send scan code(user button) if user pressed	None
	91h	One touch button application don't allow to send scan code(user button) if user pressed	None
	92h	Mail message is waiting(no support in Hurricane)	None
	93h	Mail message end of waiting(no support in Hurricane)	None
	94h	Mute on	None
	95h	Mute off	None
	9ah	Ac off(cut off AC power)	None
	9bh	Ac on	None
	9ch	Enable lid switch resume function	None
	9dh	Disable lid switch resume function	None
	A2h	System enter S2D(S4) state	None

CMD	DATA	Description	return
	A3h	System enter beep mode for battery LB state in CMOS setup	None
	A4h	System enter quiet mode for battery LB state in CMOS setup	None
	A5h	Fan control by EC	None
	A8h	Fan control by OS	None
	A9h	external PS2 only	None
	Aah	Both enable external PS2 and internal touch pad	None
	Ach	Auto enable/disable external PS2 and internal touch pad	None
	B1h	System into standby	None
	B2h	Resume from standby	None
	B5h	VGA suspend enable	None
	B6h	VGA suspend disable	None
	B7h	Modem ring enable	None
	B8h	Modem ring disable	None
	B9h	PME enable	None
	Bah	PME disable	None
	Bbh	In S4 status	None
	Bch	Resume from S4 status	None
	C1h	force battery pack auto learning	None
	C2h	disable battery pack learning	None
	C3h	SMI/SCI Trigger event enable	None
	C4h	SMI/SCI Trigger event disable	None
	Cbh	PCMCIA suspend disable	None
	Cch	PCMCIA suspend enable	None

CMD	DATA	Description	return
	Cdh	Wake up LAN disable	None
	Ceh	Wake up LAN enable	None
	D0h	Disable IRQ1	None
	D1h	Enable IRQ1	None
	D2h	Beep alarm 100mS	None
	D4h	Resume OK	None
	D5h	PCMCIA reset off	None
	D6h	PCMCIA reset on	None
	D7h	Battery stop charge enable	None
	D8h	Battery stop charge disable	None
	E1h	Turn LCD back-light on	None
	E2h	Turn LCD back-light off	None
	E3h	Enable Fn emultion of Ctrl+Alt external KBD	None
	E4h	Disable Fn emultion of Ctrl+Alt external KBD	None
	E5h	Select US keyboard Matrix	None
	E6h	Select JP keyboard Matrix	None
	E7h	Select UK keyboard Matrix	None
	E8h	EC into ACPI mode	None
	E9h	Non-ACPI mode (EC default)	None
	Eah	Enable & Initial USART function	None
	F2h	disable watchdog	None
	F3h	enable watchdog	None
	F4h	enable RTC access by EC	None
	F5h	disable RTC access by EC	None
	F6h	Clear header of Boot code	None

CMD	DATA		Description	return
	F7h		Restart system and Clear header of Boot code	None
	F8h		Shut down system and Clear header of Boot code	None
	F9h		Clear header of Boot code	None
5Ah			RTC update	
	1	A0h	Update Year of RTC ,Year(00-99) BCD format	
	2	00-99	Year which want to display	None
	1	A1h	Update Month of RTC ,Month (1..12) BCD format	
	2	01-12	Month which want to display	None
	1	A2h	Update DAY of RTC ,Day(01-07) BCD format	
	2	01-07	Day which want to display	None
	1	A3h	Update HOUR of RTC ,Hour(00-23) BCD format	
	2	00-23	Hour which want to display	None
	1	A4h	Update Minute of RTC ,Minute (0..59), BCD format	
	2	00-59	Minutes which want to display	None
	1	A5h	Update Second of RTC ,Second (0..59), BCD format	
	2	00-59	Seconds which want to display	None
5Bh			Reserved	

CMD	DATA	Description	return
5Ch	None	Get brightness level	current brightness level (0x00-0x0a)
5Dh		Set brightness level	
	0x00h-0x0ah	new brightness level	None
5Eh	None	Get contrast level	Current contrast level (0x00-0x40)
5Fh		Set contrast level	
	0x00h-0x40h	new contrast level	None

Hot keys for system control

Definitions

All Fn Key will support Sticky key mode.

Fn+ESC	Enter Suspend mode
Fn+ ↓	Decrease brightness (total 10 levels)
Fn+ ↑	Increase brightness (total 10 levels)
Fn+F5	*Power on display* When pressing the hot key, the display device will switch among CRT only, LCD only and simultaneous display. It will not update the setting of option 'Power on Display' in system setup.
Fn+PgUp	Audio volume up
Fn+PgDn	Audio volume down
Fn+F10	Pad Lock Pressing this hot key can enable/disable the embedded keypad. In this mode the keypad is cursor function.
Fn+F11	Num Lock Pressing this hot key can enable/disable the embedded numeric keypad.
Fn+F12	Scroll Lock
Fn+END	Mute toggle (no beep from disable to enable)

- After rebooting, pad lock is set to off and Num lock is also too. In this state, the embedded cursor/number pad is not enabled on the notebook keyboard.
- When the embedded keypad is on, holding down Fn will turn the embedded keypad off.

Note:

✶ Hot keys for brightness/Volume up /dn adjustment are in repeat mode,

✶ others will only be updated once for each key depression.

Audio volume output control

- Use hot keys Fn+PgUp/Fn+PgDn for Increasing/Decreasing respectively, it controls the volume output of the audio chip.
- Use hot key Fn+End to enable/disable audio/speaker output. The default state enabled while system is turned on

External Buttons status report and control

Define the function of buttons which is controlled by EC.

Power Switch

- If system is Off/S2D : System will be turned on while Power switch is depressed by more than 500 ms with or without AC insert
- If system is in S2R/Standby state : System will resume while Power switch is depressed by more than 100 ms

802.11b & bluetooth power button

- Turn on 802.11b RF power and Bluetooth power. (debounce 100 ms)

User Buttons

- Support 2 user buttons,it will launch homologous application.

External LEDs status report and control

Define the Led display status.

Definitions of Lock LEDs

- Num Lock LED: Num Lock State of Keyboard
- Pad Lock LED: Pad Lock State of keyboard
- Caps Lock LED: Caps Lock State of keyboard

Definitions of System state LED

- Blinking: System stand-by/suspend (Amber on for 1 second every 2 seconds)
- Blue Color solid on: System on.
- Blue color off: System off .

Definitions of DC-DC state LED

- There is one dual-color LED indicator both of Blue and Amber color.
- LED colors and definitations :

Blue color and Yellow color defined for battery charging and discharging state. The definitions are listed below:

Battery State	LED colors	Definitation
Charging	Blue and blinking	Battery charging with AC . (LED on 1 second every 2 seconds)
	Blue and solid on	Battery full by AC charge
	Blue & Amber LED off	Battery abnormal stop chargeing with AC (BadCell/OverTemp)
Discharging	Amber and blinking	Battery within low state (<=10%)LED on lsecomd every 4 second
	Amber and solid on	Battery not in low or critical low state. It in discharging state.
	Amber and blinking	Battery within critical low state(<=3%) LED on lsecond Every 4 second

Definitions of IDE accessing state LED

- Reflect the activities of HDD.

(If CD-ROM activing, HW will send singal to EC then EC control the LED)

Definitions of CD-ROM state LED

- If CD-ROM module exist, the LED reflect the activities of CD-ROM.

(If CD-ROM activing, HW will send singal to EC then EC control the LED)

Definitions of Bluetooth/802.11b on/off State LED

- Blue color: Bluetooth/Wireless power on.
- Off: Bluetooth/Wireless power off.

Battery status report and control

Define the battery type spec and battery protection function.

Battery status

- There are four battery states for each battery pack depend on getting the battery state through SMBus protocol from Smart battery pack: full, normal, low, critical low.

- The battery gas-gauge and level of low power states should base on ‘current’ system configuration.
- Battery turn on system condition : gasgauge > 5%

Battery discharge/charging control

Charging	Dischargung	Action
0℃<T<50℃ T>60℃		Stop charging & Battery Led off
T>73℃	T>73℃	Shut down
	R.S.O.C. ≦10%	LB(Beeping)
	R.S.O.C. < 3%	LLB Dependent on OS
	Battery Voltage ≦ 12.0V.	LLC Shut down System
	R.S.O.C < 5% during system is in S2R mode.	S2D
Fast Charge Time out: 8 Hours Trickle Charge Time Out: 1 Hour.		Battery BAD & Battery Led off
Voltage≧17.4V		OverVoltage & Battery Led off

In ACPI mode

- System should 'Save to Disk'(S2D) or beeping(Low condition) depend on OS setting .

Battery type

- The KB-BIOS will support for **smart** battery pack by SMBus protocol.
- ACPI1.0b and PC2001 Compliant,with PC2001 spec “A mobile system must use a Smart Battery or an ACPI control method battery”,our currently design is ACPI control method battery.
- Compatible with Intel’s SMBus and Philip’s I2C bus protocol.

KB-BIOS Power management support

EC will support S1(sleep mode),S3(standby mode),S4(suspend to disk) mode to save the power comsumption.

Power states

- Sleep mode
- LCD panel back-light off
- Save to RAM
- keyboard(int./ext.) scanning off
- Save to DISK
- no actions except turning off system with AC exist or turn off KBC without AC.

SMI/SCI/SWI/SBS/SPB events(To be Changed)

- Following list is which events(SMI/SCI/SWI/SBS) will be generated under different OS.

	APM Mode				ACPI mode					
Brightness level changed	SMI	-	-	A1h	SCI	-	-	-	11h	-
Contrast level changed	SMI	-	-	A2h	SMI	-	-	-	12h	-
CoverLid close	SMI	-	-	A6h	SCI	-	-	-	16h	-
Display toggle	SMI	-	-	Ach	SCI	-	-	-	1ch	-
Battery in critical low	SMI	SMI	-	B2h	SCI	SWI	-	-	22h	-
Battery in low state	SMI	-	-	B3h	SCI	-	-	-	23h	-
Standby request	SMI	-	-	B4h	-	-	-	-	24h	-
Battery pack plugin	SMI	-	-	B5h	SBS	-	-	-	25h	-
Battery pack removed	SMI	-	-	B6h	SBS	-	-	-	25h	-
Suspend To RAM request	SMI	-	-	B8h	SCI	-	-	-	28h	-
Save To DISK	SMI	-	-	B9h	-	-	-	-	29h	-

	APM Mode				ACPI mode					
request										
Docking in	SMI	-	-	Bah	SCI	SWI	-	-	2ah	-
Undock	SMI	-	-	BBh	SCI	-	-	-	2bh	-
AC plugin	SMI	-	-	C7h	SBS	-	-	-	37h	-
AC removed	SMI	-	-	C8h	SBS	-	-	-	38h	-
Modem ringin	SMI	-	-	Cah	-	SWI	-	-	3ah	0 4
PME signal active	SMI	SMI	-	Ceh	SCI	SWI	-	-	3eh	0 2
CRT plugin/out	SMI			D0h	SCI				40h	
RTC Update	SMI			D2h	SCI				42h	

Thermal Status Report and Fan Control

EC will control fan on/off function according to the CPU temperature(EC can get temperature from thermal sensor through SMBus) .In currently spec,Fan will be off when temperature below 55℃ ,and if temperature over 95℃ five times,EC will auto turn off system to protect CPU.For detail data please reference follows table.

Fan State & System State	Temperature
Fan Off	55℃
Fan1=4X(T-60)+95	T
Fan2=8X(T-70)+135	T
Throttling off	85℃
Throttling on	90℃
Turn off Fan & shut down	95℃

Extra keyboard emulation

Windows key emulation

- Left/Right windows keys both depressed: Fn and Application key depressed simultaneously.
- Right window key : press Fn+Left window key.

Fn Key emulation (Not support)

- External keyboard Fn-key emulation except Pad-Lock by pressing both Left Ctrl and Left Alt of external keyboard. It will not work on USB keyboard.

Internal Key-Pad mode control

- Numeric key: System NumLocck state.
- (internal key-pad will disable when external keyboard is exist)

Two host interface channels support

Keyboard and mouse interface transfer port

- One channel is dedicated for the keyboard and mouse data transfer(host address 60h and 64h). The Keyboard and Mouse channel of KBC is compatible to the legacy 8042 host interface. It is base on two registers: Command/Data and Status
- The KB-BIOS interrupt generates IRQ1(Keyboard) and IRQ12(Mouse) for system.

Power management interface transfer port

- The other for the power management function(host address 62h and 66h). The Power Management channel of KBC structure and operation are similar to those of the Keyboard/Mouse channel.

Support three independent devices

- The KBC provides three data transfer channels. Each channel has two quasi-bidirectional signals that are used for the direct interface to an external keyboard, mouse or any other PS/2 compatible pointing device.
- The three channels are identical and thus allow the connector ports to be interchangeable.

Devices PnP configuration

Hot Plug-and-Play support

- The KBC watches both external devices, checking if the devices have recently been plugged in or unplugged. The Hot pluggability of external PS2 devices feature detects the attachment or removal of these devices.

Hot swapping control

- When the device is plugged in, the software automatically initializes the state of that device, checks port swapping, and setup the KBC to handle dual-

device operation. In dual-device operation, the internal device is set in the same state as external device. When the external device is unplugged, the internal device becomes the primary device.

ACPI EC interface Specification support

ACPI interface support

- The KBC provides support for Advance Configuration and Power Interface specification(ACPI) Embedded Controller interface.

EC command support

- The 2nd (Power Management) host interface channel of the KBC is dedicated to this function.
- All EC commands defined in the ACPI specification - Read/Write, Burst Mode enable/disable and Query command - are supported.

Internal keyboard change Configuration

US/UK/JP country option

- The KBC supports three country selection by KBD_SEL application.
- You can key in KBD_SEL get the syntax for your option at DOS prompt.

Sticky key support

- Press shift key 5 times will enable sticky key function.Turns on StickyKeys,which allows you to press a modifier key(CTRL,ALT,or SHIFT),or the windows logo key, and have it remain active until the next time you press a key other then CTRL,ALT,SHIFT,or windows logo key. This is useful for people who have diffculity pressing two keys simultaneously.

EC name space Configuration

SMBus EC interface ACPI RAM definition

Offset	Description
60h	SMBus protocol
61h	SMBus statue Bit0-Bit4 – Status Bit5 - Reserved Bit6 - ALARM Bit7 - DONE
62h	SMBus Address
63h	SMBus Command
64h – 83h	SMBus Data
84h	SMBus BCNT

85h	SMBus alarm address
86h	SMBus alarm data 0
87h	SMBus alarm data 1

Word registers to Emulate smart charge RAM definition

Offset	Description
90h – 91h	CHG_MODE0 CHG_MODE1 Bit0 – INHIBIT_CHARGE(0=enabled, 1=inhibit) Bit1 – ENABLE_POLLING(0=disable, 1=enable) Bit2 – POR_RESET(0=Mode unchanged, 1=set power on defaults) Bit3 – RESET_TO_ZERO(0=No change, 1=set charging values to zero) Bit4-15 – Reserved
92h – 93h	CHG_STAT0 CHG_STAT1 Bit0 – CHARGE_INHIBITED(Status of bit in CHG_MODE register) Bit1 – MASTER_MODE(Set if HOST controlled & ENABLE_POLL) Bit2 – VOLTAGE_NOTREG(Set if CHG_VOLT not in regulation) Bit3 – CURRENT_NOTREG(Set if CHG_CURRENT not in regulation) Bit4 – LEVEL_2(Set always at least level 2) Bit5 – LEVEL_3(Set always if level 3 capable) Bit6 – CURRENT_OR(Set if CHG_CURRENT out of range) Bit7 – VOLTAGE_OR(Set if CHG_VOLT out of range) Bit8 – THERMISTOR_OR(Set if thermistor R>100K Ohms)(Open) Bit9 – THERMISTOR_COLD(Set if thermistor R>30K Ohms)(Cold Batt) Bit10 – THERMISTOR_HOT(Set if thermistor R<3K Ohms)(Hot Batt) Bit11 – THERMISTOR_UR(Set if thermistor R<500 Ohms)(Under range) Bit12 – ALARM_INHIBITED(Set if charging inhibited from Alarm) Bit13 – POWER_FAIL(Set if power fail)

Offset	Description
	Bit14 – BATTERY_PRESENT(Set if battery present) Bit15 – AC_PRESENT(Set if charging power source available)
94h –95h	CHG_CURRENT0 CHG_CURRENT1 Bit0-Bit15 – Requested charging current(mA) 0=Turn off charger 65535=Provide maximum safe charger current
96h – 97h	CHG_VOLT0 CHG_VOLT1 Bit0-Bit15 – Requested charging voltage(mV) 0=Turn off charger 65535=Provide maximum safe charger voltage
98h – 99h	CHG_ALARM0 CHG_ALARM1 *** Alarm Bits *** 0x8000 – OVER_CHARGED_ALARM 0x4000 – TERMINATE_CHARGE_ALARM 0x2000 – RESERVED 0x1000 – OVER_TEMP_ALARM 0x0800 – TERMINATE_DISCHARGE_ALARM 0x0400 – RESERVED 0x0200 – REMAINING_CAPACITY_ALARM 0x0100 – REMAINING_TIME_ALARM *** Status Bits *** 0x0080 – INITIALIZED 0x0040 – DISCHARGING 0x0020 – FULLY_CHARGED 0x0010 – FULLY_DISCHARGED *** Error Code *** 0x0000 – 0x000F – All bits set hi prior to AlarmWarning() xmit

1.1.1 Word registers to Emulate smart selector RAM definition

Offset	Description
9Ah	SEL_STATE0

	Bit0 – PRESENT_A(Set if 1st battery present) Bit1 – PRESENT_B(Set if 2nd battery present) Bit2 – PRESENT_C(Set if 3rd battery present) Bit3 – PRESENT_D(Set if 4th battery present) Bit4 – CHARGE_A(Set if 1st battery be charging) Bit5 – CHARGE_B(Set if 2nd battery be charging) Bit6 – CHARGE_C(Set if 3rd battery be charging) Bit7 – CHARGE_D(Set if 4th battery be charging)
9Bh	SEL_STATE1 Bit0 – PWR_BY_A(Set if system power up by 1st) Bit1 – PWR_BY_B(Set if system power up by 2nd) Bit2 – PWR_BY_C(Set if system power up by 3rd) Bit3 – PWR_BY_D(Set if system power up by 4th) Bit4 – SMB_A(Set if 1st battery on SMBus) Bit5 – SMB_B(Set if 2nd battery on SMBus) Bit6 – SMB_C(Set if 3rd battery on SMBus) Bit7 – SMB_D(Set if 4th battery on SMBus)

EC interface OEM common RAM definition

Offset	Description
9Ch	ACPI_FLAG0 Bit0 –Main HDD (1:exist) Bit1 – Internal FDD (1:exist) Bit2 – Internal CD_COM (1:exist) Bit3 – 2ND HDD (1:exist) Bit4 – LS-120 (1:exist) Bit5 –External FDD(1:exist) Bit6 – CRT-PLUG (1:in)
9Dh	ACPI_FLAG1 Bit0 – Sleep button(1:pressed) Bit1 – Video out button(1:pressed) Bit2 – Decrease Volume(1:pressed) Bit3 – Increase Volume(1:pressed) Bit4 – Mute button(1:pressed) Bit5 – Contrast button(1:pressed)

Offset	Description
	Bit6 – Brightness button(1:pressed) Bit7 – Save to disk button(1:pressed)
9Eh	ACPI_FLAG2 Bit0 – ACPI entry S4 state Bit1 = password enable (Fn+F1), set 1 Bit2=beep alarm enable (Fn+F4), set 1 Bit3= touch pad button(1:enable) Bit4=Fn state (1: fn key down) Bit5= CD/DVD mode selected,set 1 Bit6= Digitial mode selected,set 1 Bit7= CD Lock mode enable,set 1
9Fh	Reserved
A0h	UbStatus: Ultra Base control pin status Bit0 – DPWR, Turn on Dock PCI power(0=off, 1=on) Bit1 – UDRF, Undock request(0=inactive, 1=undock & flash LED) Bit2 – UDRS, Undock request(0=inactive, 1=undock & solid LED) Bit3 – EQBF, Enable Q-Buff(0=disable, 1=enable) Bit4 – DWELL, Docked well LED(0=LED off, 1=LED on) Bit5 – QVCCOK, Dock power ready status(0=No, 1=Yes) Bit7 –CheckEject , (SoftEject request : 0=No 1=Yes)
A1h	DCID: Customer ID Bit0 –DockType0, Dock on or not(0=off, 1=on) Bit1 –DockType1, reserved Bit4 – OS_undock OK Bit5 – OS dock OK Bit6 – Safe Undock OK Bit7 –DockChange, Ultra Base had changed from docked to undock or undock to dock (0=no, 1=yes)
A2h	Battery Learning steps.
A3h	SYS_STATUS: System indicator Bit0 – S0LED, S0 state LED(0=LED off, 1=LED on) Bit1 – S3LED, S3 state LED(0=LED off, 1=LED on) Bit2 – VGAQ, VGA H/W suspend(0=VGA on, 1=VGA suspend)

Offset	Description
	Bit3 – PCMQ, PCMCIA H/W suspend(0/1=PCMCIA on/suspend) Bit4 – PCMR, PCMCIA H/W reset (0=disable, 1=enable) Bit5 –ADP,Ac adapter (0=offline, 1=online) Bit6 –SYSR6(reserved) Bit7 –SYSR7(reserved)
A4h	WAKEUP_ENABLE: Enable wake up function Bit0 –PMEWAKE(PME Wk Enable:0=Disable, 1=Enable) Bit1 –MDMWAKE (Modem Wk Enable:0=Disable, 1=Enable) Bit2 - LANWAKE(LAN wakeup enable:0=Disable, 1=Enable) Bit3-Bit7 - reserved
A5h	Reserved
A6h	Reserved
A7h	Reserved
A8h	Reserved
A9h	Reserved
AAh	Reserved
ABh	Reserved
ACh	Shutdown temperature
ADh	Temperature index
AEh	Bit 0~6 :Throttling level 0 = throttling 12.5% 1 = throttling 25% . 8 =throttling 100% Bit7—Sytem throttling HW enable 50%
AFh	THERMAL_STATUS Bit0 – MODE (0=Local mode, 1=Remote mode) Bit1 – FANSPDB0(Fan on/off parameter0) Bit2 – FANSPDB1(Fan on/off parameter1) Bit 2 1 (When control by OS) 0 0 : Fan off 0 1 : Fan on speed 1 1 0 : Fan on speed 2

Offset	Description
	1 1 : Fan on speed 3 Bit3 – INITOK (0:Control by OS 1:Control by EC) Bit4 – Fan1 Active Bit5 – Fan2 Active Bit6 – Fan speed timer init OK Bit7 –SKINMODE 0=skin address 90 1=skin address 92
B0h	CPU_TEMP: CPU current temperature
B1h	SWI_Events: SWI Event indicators Bit1 – Lid Open, Lid open event (0= off, 1= on) Bit2 – PME, PME event (0= off, 1= on) Bit3 –Power Button, Power button event (0= off, 1= on) Bit4 –Ring In, Ring In event (0= off, 1= on) Bit5 – BtWake,Bluetooth wake up event(0=off,1=on) Bit6 – Dock ,Dock in event(0=off,1=on)
B2h	Percentage : Battery in critical low condition.
B3h	Percentage : Battery in low condition.
B4h	Fan1 pulse width low byte
B5h	Fan1 pulse width high byte
B6h	Fan2 pulse width low byte
B7h	Fan2 pulse width high byte
B8h	Bluetooth Status Bit0 – Detach(0=Detach,1=Attach) Bit1 – Power(0=power off,1=power on) Bit2 – Detach Status(0=Detach OK,1=Attach OK) Bit3 –Power Status(0=Power off OK,1=Power on OK) Bit4 – Switch(0=switch off,1=switch ok) Bit5 –Wake up
B9h	Lcd brightness value (0x00-0x0a)
BAh	Lcd contrast value (0x00-0x1F)
BBh	Device module status Bit0- 1=Wirless LAN active, 0=Wirless LAN no active

Offset	Description
	Bit1- 1=BlueTooth active, 0=BlueTooth no active *Bit2- 1=Wirless LAN exist, 0=Wirless LAN no exist* *Bit3- 1=BlueTooth exist, 0=BlueTooth no exist* *Bit4- 1=Kill switch on, 0=Kill switch off* *Bit 5-1=WireLess LAN initial OK*
BCh	Project ID
BDh	*CPU type*
BEh	Reserved
BFh	Reserved

Control method for 1st battery pack RAM definition

Offset	Description
C0h	Bit4-6 – Manufacturer Bit 6 5 4 0 0 1 : Sanyo 0 10 : Sony 1 0 0 : Panasonic Bit7- Battery type 0 : Ni-MH 1 : Li-ion
C1h	Battery Status Bit0 – Discharging Bit1 – Charging Bit2 – Discharging and Now is critical low Bit3-7 – Reserved
C2h-C3h	Remaining Capacity
C4h-C5h	Serial Number
C6h-C7h	Present Voltage
C8h-C9h	Design Voltage
CAh-CBh	Design Capacity
CCh-CDh	Full charge capacity
Ceh	Gasgauge
CFh-DFh	Reserved

Control method for 2nd battery pack RAM definition

Offset	Description
E0h	Bit4-6 – Manufacturer Bit 6 5 4 0 0 1 : Sanyo 0 10 : Sony 1 0 0 : Panasonic Bit7- Battery type 0 : Ni-MH 1 : Li-ion
E1h	Battery Status Bit0 – Discharging Bit1 – Charging Bit2 – Discharging and Now is critical low Bit3-7 – Reserved
E2h-E3h	Remaining Capacity
E4h-E5h	Serial Number
E6h-E7h	Present Voltage
E8h-E9h	Design Voltage
EAh-EBh	Design Capacity
ECh-EDh	Full charge capacity
EEh	Gasgauge
EFh-F8h	Reserved
F9h	Real Fan Speed (Low Byte)
FAh	Real Fan Speed (High Byte)
EBh -FFh	Reserved

Embedded Controller chipset

NS PC87591

The Compact RISC CR16B is an advanced, general-purpose, 16-bit microprocessor core with a RISC architecture. The core is responsible for arithmetic and logic operations and program control.

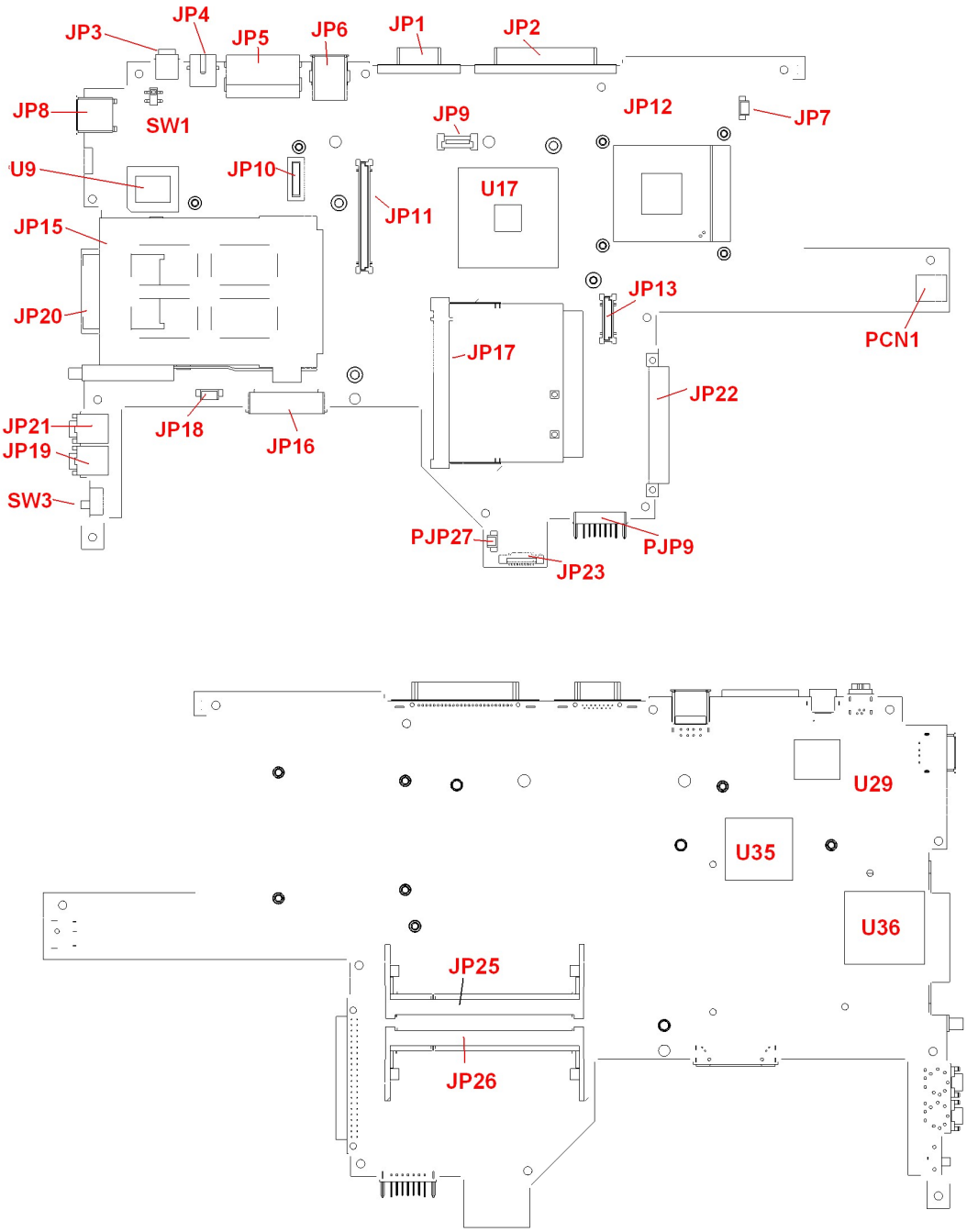
Force update PC87591

For 591-S version support internal rom,and it can force update EC.Press Fn+B+Q keys and then plug in AC,boot loader will force update 591 internal ROM from external ROM.

Chapter 3: Hardware

Major Sub-assembly Specification

System interconnection (For BCL50)

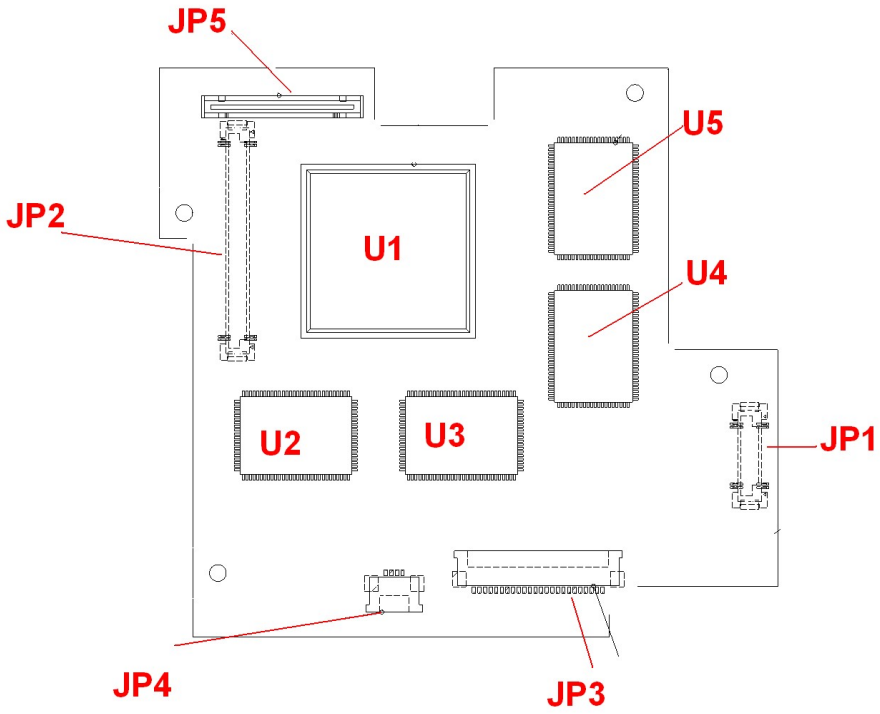


Mother Board

JP1	CRT Connector	JP17	MINI PCI Connector
JP2	Parallel Port	JP18	Speaker Connector
JP3	IEEE 1394 Connector	JP19	Headphone-out Jack
JP4	TV-Out Connector	JP20	SD Socket
JP5	RJ11/RJ45 Connector	JP21	Microphone-in Jack
JP6	USB Connector *2	JP22	HDD Connector
JP7	CPU FAN Connector	JP23	LED FPC Connector
JP8	USB Connector	SW1	Lid Switch
JP9	POWER/B Connector	SW3	Wireless Kill Switch
JP10	MBC Connector	U17	North Bridge
JP11	VGA/B Connector	U9	BIOS ROM
JP12	CPU Socket 479pin	PCN1	AC-IN Jack
JP13	VGA/B Connector	PJP9	Battery Connector
JP15	PCMCIA Socket	PJP27	Bridge Battery Connector
JP16	Module Connector		

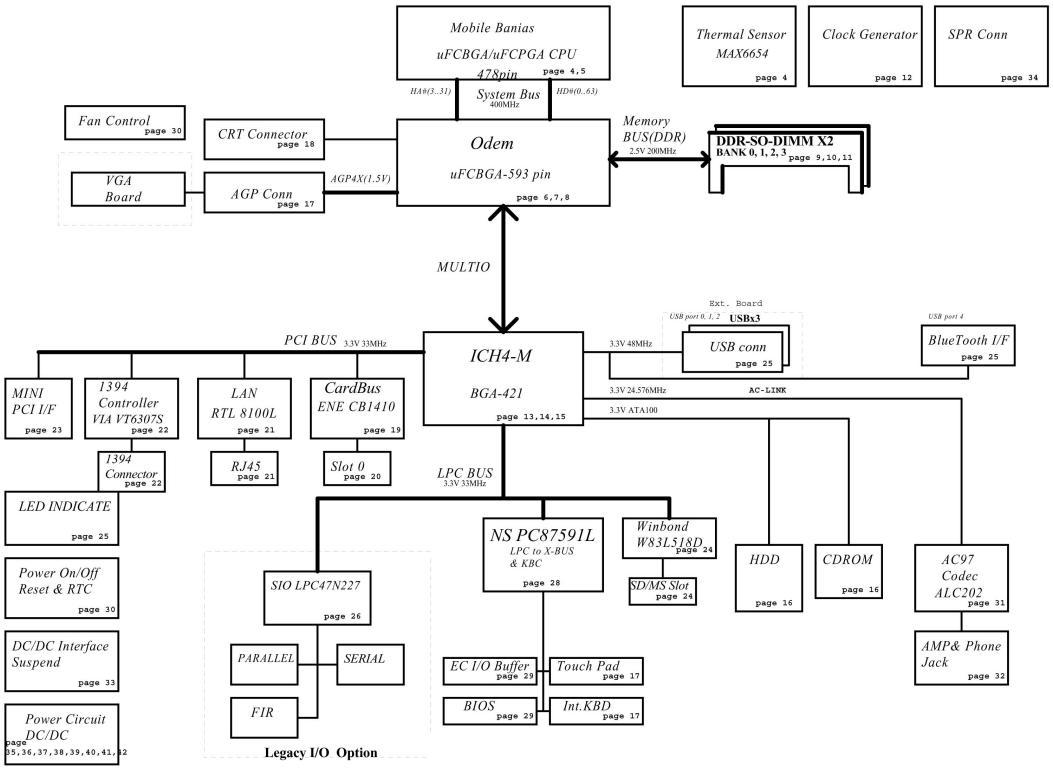
Button

JP25	DDR SODIMM Connector	U35	Card Bus Controller
JP26	DDR SODIMM Connector	U36	EC
U29	IEEE 1394 Controller		



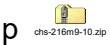
VGA Board

TOP			
JP3	K/B Connector	U2	DDR VRAM
JP4	T/P FPC Connector	U3	DDR VRAM
JP5	LCD Connector	U4	DDR VRAM
U1	VGA Chip	U5	DDR VRAM
BOTTOM			
JP1	VGA/B Connector		
JP2	VGA/B Connector		



1. Intel Centrino Processor 

2. Intel 855PM MCH 

3. ATI M9-P VGA Chip 

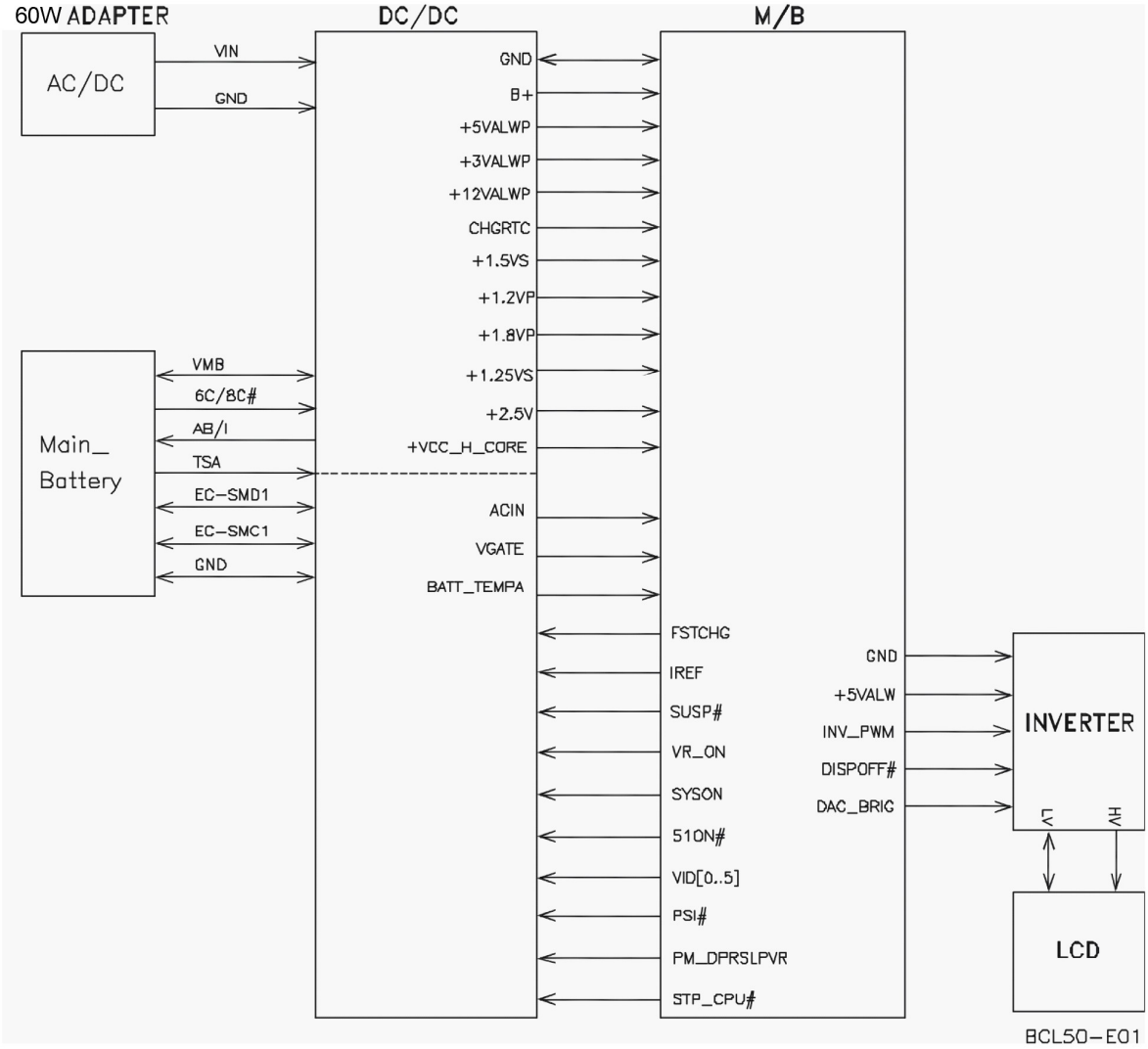
4. VIA VT6301S IEEE1394 Controller 

5. Winbond W83L518D SD Controller 

Chapter 4: DC-DC CONVERTER

BCL50 series Power System block diagram

BCL50 series Power System block diagram



Description

This specification defines the performance and characteristic of 60W AC adapter power supply. It supplies a constant voltage 19V output source for BCL50 series notebook computer.

Feature

Accepts universal input from 90V $_{AC}$ to 264V $_{AC}$

- Offers constant Voltage 19V output source with 60W max output power capacity.
- High efficiency 83% min at 115Vac
- Compact Size

Electrical Specification

- Input Voltage range: universal input, $90V_{AC}$ TO 264_{AC}
- Inrush current: No damage shall occur and the input fuse shall not blow
- Input frequency range: 47~63Hz
- Input Current: 1.8Amax at $100V_{AC}$
  0.9Amax at 240 V_{AC}
- Start-up time: $\leq$ 3sec Max. @115Vac
- HOLD-UP time: 5ms min. @$115V_{AC,}$ full load condition
- OVP: 27V max. automatic shut down
- Short circuit protection: Output can be shorted without damage, and auto recovery
- OUTPUT Voltage Regulation: 18.5-20V including the effects of line Voltage variation, load current, ripple and noise
- OUTPUT Current: 0Amin, 3.16Amax continuous
- OUTPUT Voltage ripple: 300mv PK-PK for resistor load
- OUTPUT Voltage Dynamic regulation: Output voltage within 18.5V~20V, load current 10%←→100%, frequency 100Hz, 50% duty cycle.
- 2.5.3.14 DC OUTPUT PIN OUT:

PIN1 Center Pin Adapter +output

PIN2 Barrel (Ring) Adapter returns.

- 2.5.3.15 POWER CORD: 2PIN LP5*1.8M*LS7C US 2PL
  2PIN LP21*1.8M*LS7E US EC 2PL(EC)
- 2.5.3.16 Temperature Range:

Operating temperature: 0 °C TO 40 °C

Storage temperature: -20 °C TO 65 °C

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.

Dispose of used batteries according to the manufacturer's instructions.

DC-DC CONVERTER

Description

The DC-DC converter is designed to supply the power for ACL10 series notebook computer of Compal. It supply +5VALWP, +3VALWP, +12VALWP, +1.8VSP, +1.05VALWP,+1.5VALWP ,+1.2VSP,1.25VSP,2.5VP for logical system, +CPU_CORE, for CPU and supplies +3VALWP for the built-in NS87591 microprocessor which handles the keyboard and PMU control functions of the system. The power ON/OFF is controlled by NS87591. There is also a built-in charger power source. It can charge battery pack whether the computer is ON or OFF.

- Features
- 2.6.2.1 High efficiency, up to 85% (using battery)
- 2.6.2.2 Accept wide range DC input voltage from 12V to 20V
- 2.6.2.3 Built-in charger power source
- 2.6.2.4 The power ON/OFF is controlled by software
- Electrical specification
- Input Voltage/Current

12V to 20V at the summing point of AC-DC and battery

INPUT Current 5.1A max from battery

INPUT Current 3.16A max from AC-DC Adapter.

Temperature Range:

- 2.6.4.1 Operating temperature : 0° C to 40° C
- 2.6.4.2 storage temperature range : -20° C to 65° C

DC/DC OUTPUT

Fixed output voltage/Current

Item	+5VALWP	+1.8VALWP	+CPU_COREP	+1.2VSP
nominal voltage	+5V	+1.8V	+1.3V	+1.2V
min. current	0A	0A	0A	0A
max. current	3.5A	1.5A	30A	0.1A
peak current	4.5A	2.5A	40A	0.3A
total regulation	5V±5%	1.8V±5%	1.3±0.1V	1.2V+5%
ripple voltage	100mVp-p max.	100mVp-p max.	50mVp-p max	60mVp-p max

Item	+12VALWP	+3VALWP	+1.5VALWP	+2.5VP
nominal voltage	+12V	+3.3V	+1.5V	+2.5V
min. current	0A	0A	0A	0A

max. current	100mA	4A	1.0A	5A
peak current	100mA	5A	1.5A	6A
total regulation	12V±5%	3.3V±5%	1.5V±5%	+1.25V±5%
ripple voltage	200mVp-p max.	100mVp-p max.	100mVp-p max.	50mVp-p max.

Item	+1.25VSP	+1.8VSP	+1.05VALWP
nominal voltage	+1.25V	+1.8V	+1.05V
min. current	0A	0A	0A
max. current	2A	1.5A	1A
peak current	3A	2.5A	2A
total regulation	1.25V±2%	1.8V±5%	1.05V±5%
ripple voltage	50mVp-p max.	50mVp-p max.	50mVp-p max

- Charger
- 2.6.6.1 Controlled by NS87591 microprocessor from motherboard
- 2.6.6.2 Temperature sense capability for the battery (charge active between 0°C~ 50°C)
- 2.6.6.3 Fast charge 3.0Amps(typical.) for Li-Ion Battery when system off, approach 20W fast charge when system ON. (depend on system load)
- 2.6.6.4 When system turn off, the charged time from empty to full be 3.0 hrs typically for Li-ION battery.
- 2.6.6.5 Other battery services are presented by NS87591 microprocessor includes maximum charging timer, charging temperature range etc.
- 2.6.6.6 Charger power:
- BATT+ Constant voltage mode: 16.8V±1% for Li-Ion battery.
- Constant current mode: 3.0A±8%
- Constant adapter current mode: 3.3A±6%

OVER Current protection:

+5VALWP: 6.6~10.5A
+3VALWP: 6.4~10.4A

+CPU_COREP: 30A~35A

OVER Voltage protection:

+5VALWP: 5.51 ~6.00V

+3VALWP: 3.53~ 3.84V

+CPU_COREP 1.85 ~2.1V

Under voltage protection

+5VALWP: 5V *(80%)

+3VALWP: 3.3V *(80%)

+CPU_COREP +CPU_COREP Voltage * (65 ~75) %

Short circuit protection:

Latch mode for +5VALWP, +3VALWP, +CPU_COREP

1.1 I/O

P1:AC adapter input Jack socket

Pin 1: Center pin Adapter power + input

Pin 2: Barrel (Ring) Adapter power return

DC/DC interface

Item	Description	I/O
SUSP#	active low input, enable skip mode of TPS5120	I
51ON#	active low input, this pin controls VS output when system is using battery power, it is controlled by NS87591.	I
FSTCHG	active high input, when NS87591 judges the battery shall be charged, then this pin will be pulled high.	I
IREF	Battery change current control IREF= 1.31 * I change ,IREF= 0 ~ 3.3V	I
ACIN	active high output, when adapter present, this pin shall be pulled high, output for NS87591.	O
VGATE	power good output signal, active high, from +CPU_COREP turn on edge and goes low before falling – 5% of +CPU_COREP.	O
VR_ON	Active high input, +VID(1.2V) on/off pin.	I
BATT_TEMPA	An analog signal, it offers the status of battery temperature for NS87591.	O
VID [0..5]	CPU VID Pin. It determinate the +CPU_COREP output voltage.	I
6C/8C#	High:6 Cell Li-ION Battery, Low: 8 Cell Li-ION Battery	O
AB/I	Battery discharge active pin.	O
EC_SMD1	Main battery SMBus data pin.	I/O
EC_SMC1	Main battery SMBus clock pin.	I/O
MAINPWON	H/W Thermal protection	O
STP_CPU#	CPU MODE control pin , It comes from sorth bright	I
PM_DPRSLPVR	CPU MODE control pin , It comes from sorth bright	I
PSI#	CPU MODE control pin , It comes from sorth bright	I

BATTERY

Li-ion Smart battery for BCL50 series

18650 2P4S 14.8V/4300mAH, Li-ion battery

More than 300 charging/discharging cycles.

Modularized battery pack, easy to be replaced.

On board RTC battery:Maxell ML1220T13RE /3.0V /14mAH Lithium.

Sanyo ML1220T28 /3.0V /15mAH Lithium

BCL50 INVERTER SPECIFICATION

Description

This inverter is designed to light up the CCFL of LCD for notebook.It should be supported following LCD panels.

- BCL50 project

No.	Supplier	Model	Type	Frequency (KHz)			Current (mA)			VS max. (at 0°C) (Vrms)	Work Voltage (Vrms)	Brightness (cd/m^2)
				min	typ	max	min	typ	max			
1.	AU	B141XN04	14.1" XGA	50	60	80	3	6	6.5	1530	660 at 6mA	150 at 6mA
2.	CPT	CLAA141XF01	14.1" XGA	--	50	--	--	5.5	7	1340	680 at 5.5mA	150 at 5.5mA
3.	CMO	N141X6-L01	14.1" XGA	45	60	80	2	6	7	1130	650 at 6mA	150 at 6mA
4.	SANYO	TM150XG-02L11	15.0"XGA	40	--	65	3	--	6	1550	700 at 5mA	150 at TBDmA
5.	LG	LP150X05	15.0" XGA	45	58	80	3	5	6	1370	685 at 5mA	160 at 6mA
6.	AU	B150PG01	15.0" SXGA+	50	60	70	3	5.5	7	1150	700 at 5.5mA	150 at5.5mA
7.	Hitachi	TX38D91VC1FAC	15.0"SXGA+	40	50	70	4	--	6	1600	690Vrms	150 at TBDmA

There are two control signals that come from system to control lamp brightness. One signal is named DAC_BRIG, which limits current to meet LCD lamp current specification. Another one is named PWM, which adjusts lamp brightness. This inverter brightness is adjusted by PWM burst mode. The PWM burst mode is that turning on and off the lamp at a rate of 150Hz. The effective brightness is a function of the duty cycle.

Features

- 2.7.2.1 Wide range 9V to 21V input voltage
- 2.7.2.2 Brightness adjustment by PWM burst mode.
- 2.7.2.3 Close loop controls lamp current.

Absolute maximum rating

- 2.7.3.1 Environment: Temperature: Operating temperature: 0℃ ~ 55℃

Storage temperature : -20℃ ~ 70℃

Humidity: 0 ~ 90% without condensation

MTBF: MIN 50000 hours.

Electrical characteristic

No	Item	Symbol	Min.	Typ.	Max.	Unit	Comment
1	Input voltage	INV_PWR	9	14.8	21	V	Lamp can be ignited by 7.5V input. *Note 1
2	Input current	Iin	--	0.33	--	A	
3	Lamp current	I_L	3.0	--	6.8	mA	**DAC=0V** *Note 2
4	Lamp current	I_L	2.7	--	6.3	mA	**DAC=1V**
4	Frequency	F	45	55	65	KHz	*Note3
5	Output power	Pout	--	--	4.5	W	
6	Efficiency	η	80%	--	--	--	
7	OP-Lamp voltage	V_s	1600	--	--	V	At 0°C
8	Starting time	Tvs	1	--	1.5	Sec	
9	Dispoff#		2.8	3.3	3.6	V	Backlight on/off signal
			0	0.5	0.8	V	Low level
10	Limited lamp maximum current	DAC-BRIG	0		3.3	V	*Note 2
11	PWM signal *note 4	INV_PWM	142	150	158	Hz	PWM signal frequency
			3.0	3.3	3.6	V	PWM signal amplitude
			30	--	100	%	$Duty = \frac{Ton}{Period}$
12	lamp current over-shoot	$I_{Zero-PK}$	--	--	10	%	Line transient(10.8V to 21V/100us) and turn on transient
13	Current Waveform factor	$\frac{I_p}{I_{rms}}$	1.27	$\sqrt{2}$	1.56	Multiple	OR $\frac{I_{-p}}{I_{rms}}$ *10
14	Unbalance Rate	$\frac{I_p - \lvert I_{-p} \rvert}{I_{rms}}$	-10%	0	+10%	Multiple	
15	Turn off current (Hight side)	I_{HL}	--	--	0	A	PWM=30%

15	Turn off voltage (Low side)	Voff	--	--	150Vp-p	V	PWM=30%
16	Voltage Rise time (Low side)	Trise	--	--	300us	us	PWM=30%
17	Voltage fall time(Low side)	Tfall	--	--	300us	us	PWM=30%

Notes:

*1. The lamps can be ignited by 7.5V input voltage of inverter .But ,once the inverter input is 7.5V, its performance may not fully meet the electronic spec. defined.

*2. Limited lamp maximum current by DAC_BRIG signal:

When DAC_BRIG voltage is 0V and INV_PWM enables (100%), lamp has max. limited current.

When DAC_BRIG voltage is 3.3V and INV_PWM enables (100%), lamp has min. limited current.

When add 1V DAC, the 100% Lamp current will decrease 0.5mA.

DAC_BRIG signal comes from system chipset with internal resistance of 3KΩ.

*3. Inverter operating frequency should be within specification (45~65kHz) at max. and min. brightness load.

*4. INV_PWM enable implies INV_PWM signal is High level (On duty cycle is 100%). It is a square wave of 150Hz to adjust backlight brightness that is a function of PWM duty cycle. Backlight brightness is maximum value under INV_PWM at 100% and brightness is minimum under INV_PWM at 30%.

*5. The system interface signals belong to 3.3V.

*6. Please make sure open lamp output voltage should be within starting voltage specification.

*7. Inverter should pass human body safety test.

*8. Inverter should no smoking by any component open/ short test

*9. Transformer voltage stress should not be over 85% under any condition

(turn on overshoot transient and line transient).

*10. Audio noise should be less than 36dB at 10 cm distance.

Electrical specification

Electrical specification

No	Symbol	Min.	Typ.	Max.	Unit	Comment
1	V_{open}.	--	650	--	Vrms	Lamp operating voltage(650+/-50)
	I_L	6.2	6.5	6.8	mArms	DAC_BRIG: 0 V, PWM: 100%
	I_L	3.0	3.3	3.6	mArms	DAC_BRIG: 0 V, PWM:30%
	I_L	5.7	6	6.3	mArms	DAC_BRIG: 1 V, PWM: 100%
	I_L	2.7	3	3.3	mArms	DAC_BRIG: 1 V, PWM:30%
	f	45	55	65	KHz	
	η	80%	--	--	--	

Thermal

All components on inverter board should follow below rules:

Component using conditions (component stress) must be within component specification including voltage rating, current rating, temperature etc.

Connector description

2.7.5.1 Input Connector:

MOLEX:52207-0990 ; JST SM07B-SRSS-TB

Pin No.	Symbol	Description
1	INV_PWR	Input voltage
2	INV_PWR	Input voltage
3	NC	No connection
4	INV_PWM	Adjust brightness by burst mode
5	DISOFF #	Backlight on/off control, active HIGH
6	DAC_BRIG	Max. current limit
7	NC	No connection
8	GND	Power system return
9	GND	Power system return

2.7.5.2 Output Connector:

CN2: JST_SM02B_BHSS-1

Pin No.	Symbol	Description
1	HV	Connected to high voltage of LCD lamp
2	LV	Connected to low voltage of LCD lamp

Note : Please mark " CAUTION HIGH VOLTAGE" around CN2

Safety Protection

2.7.6.1 Open lamp protection:

When inverter is on open lamp status, any component on inverter should be O.K and inverter is no damaged, no fire and no arcing. If inverter can't shunt down during open lamp happen, inverter must pass below conditions:

i.) Human body test.
ii.) Open lamp burning: Inverter burns for 24 hours at open lamp status. No parts damage.

Human body safety test:

Short inverter output, transformer secondary output to GND by a 2KΩ resistor which connects one end to GND and another one to those outputs. They should meet output current limitation requirement as follow. Output current I is the current that flows through 2KΩ resistor.

i.) Output current $I \leqq 0.7mA$, if frequency $f \leqq 1KHz$
ii.) Output current $I \leqq 0.7mA * f(kHz)$, if $f \geqq 1KHz$.

However, output current should be less than 70mA even frequency is more than 100KHz.

Abnormal test:

Any one component is short or open; inverter should be no fire, no arcing. And result must meet output current limitation requirement.

PCB drawing

Chapter 5: Disassembly

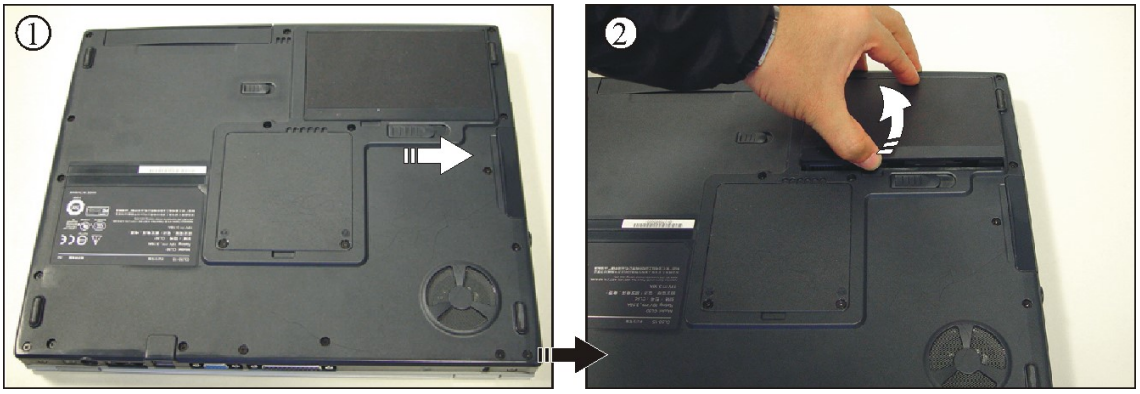
Disassembling the Base Unit

These are the directions for disassembling the base unit. You will need a 6mm Nut Driver, a medium size "+" Screw driver, a chip tool and wire cutters.

These directions are to disassemble the complete unit and will be cross-referenced to Section 7 for the replacement of component parts.

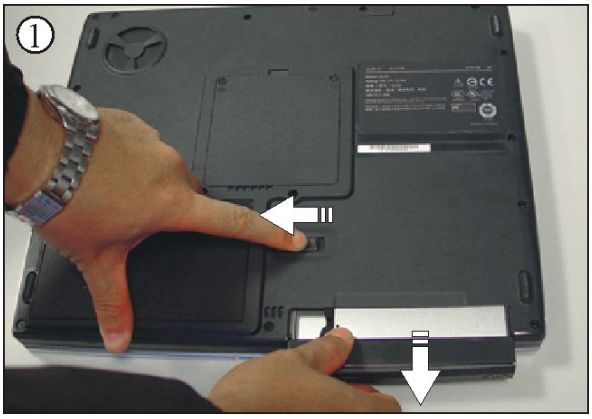
Remove Battery Module

1. Slide the latch lock in direction of the arrow. Battery module will pop-up automatically.
2. Now, gently pull the module out of its housing.



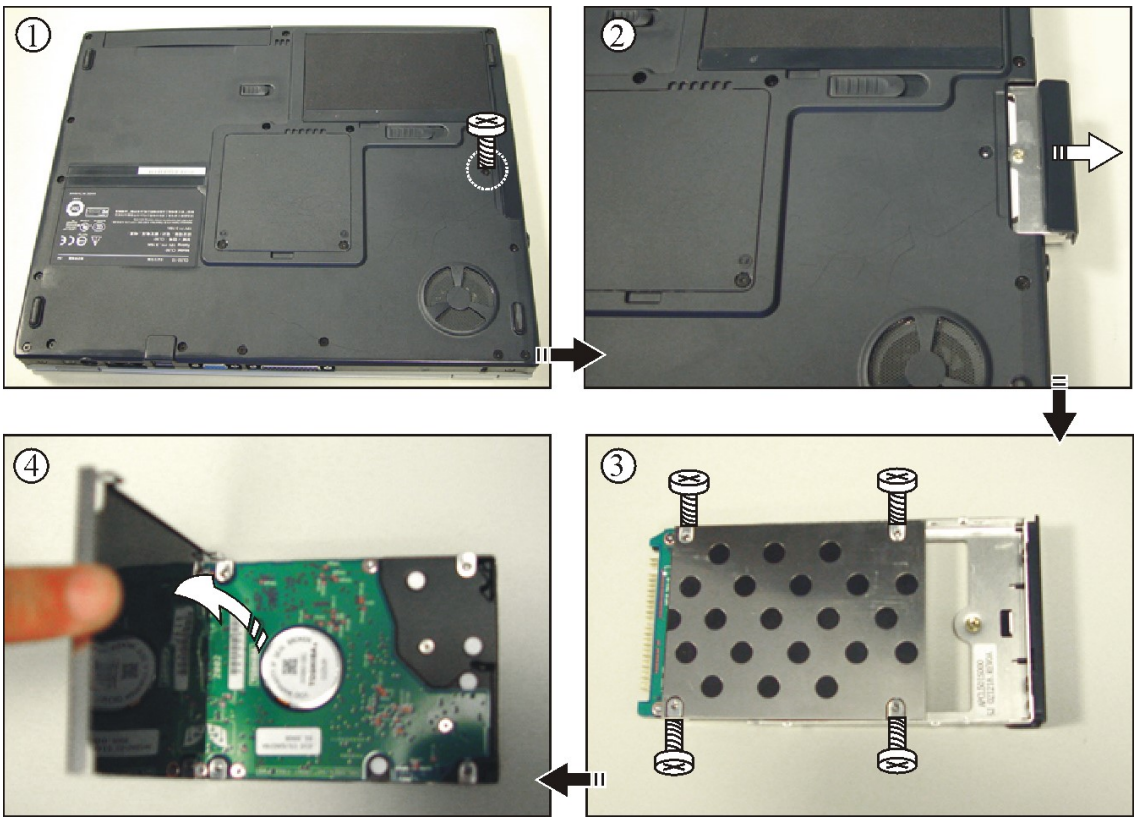
Remove ODD (CD-ROM/DVD-ROM/CD-RW…) Module

1. Slide the latch lock in direction of the arrow. Gently pull the module out of its housing.



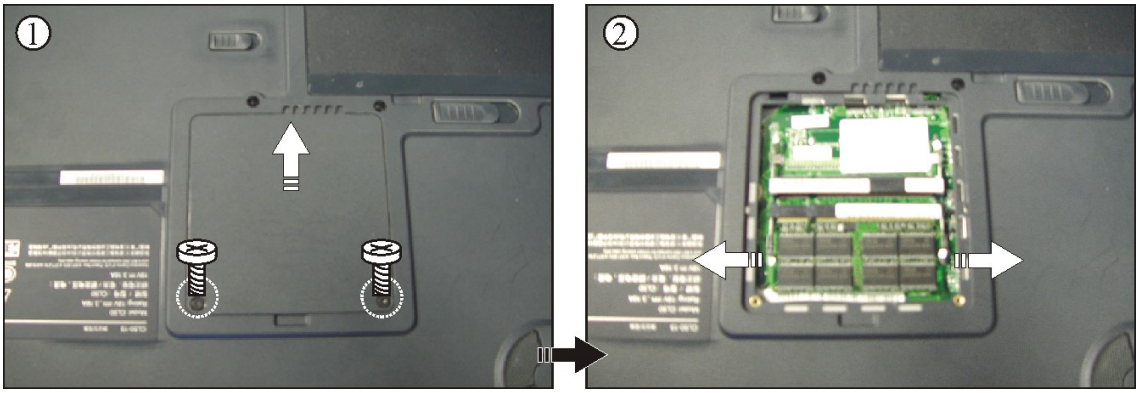
Remove HDD Module

1. Turn the power off and turn the notebook upside down with the back facing you. Remove 1 screws (M2.5X 3).
2. To draw out on the HDD module.
3. Remove 4 screws (M3.0X4) on the HDD carrier.
4. Remove the HDD shield.



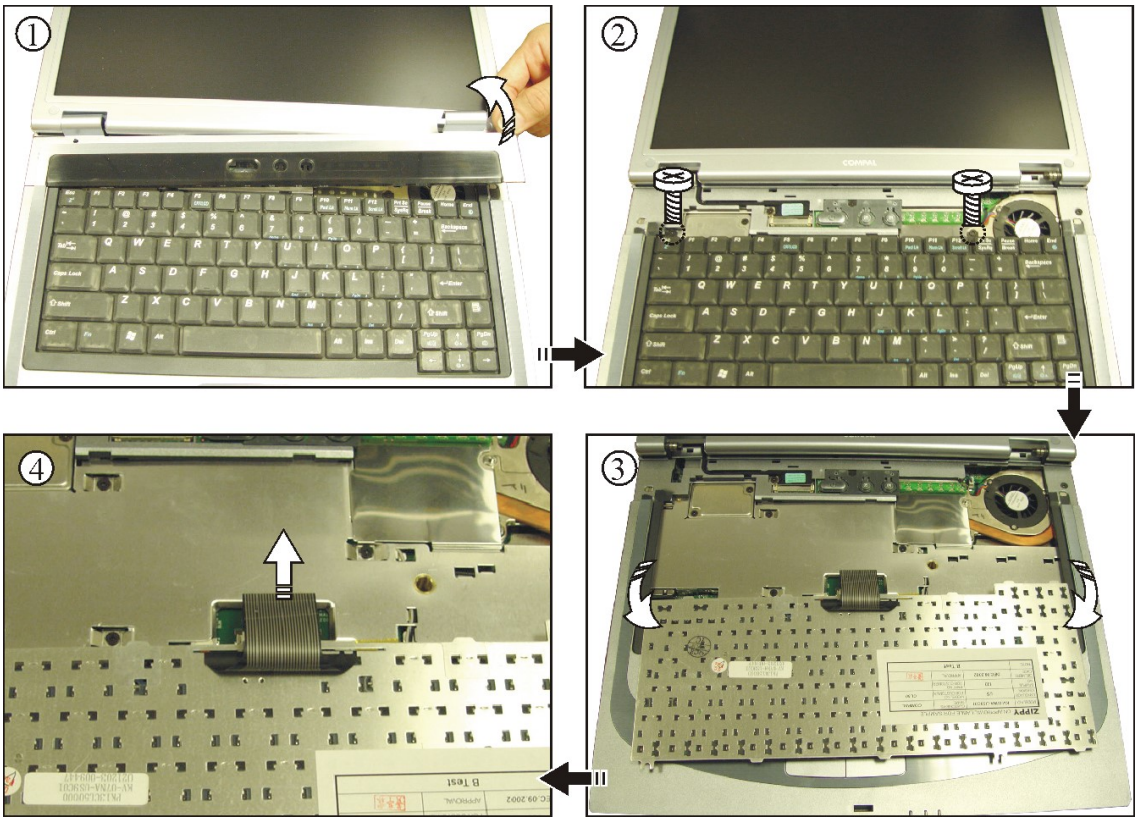
Remove DDR RAM

1. Remove 2 screws (M2.5X3) holding Ram door in place.Gently pick Ram door up.
2. Unlock the DDR SODIMM then pick it up.



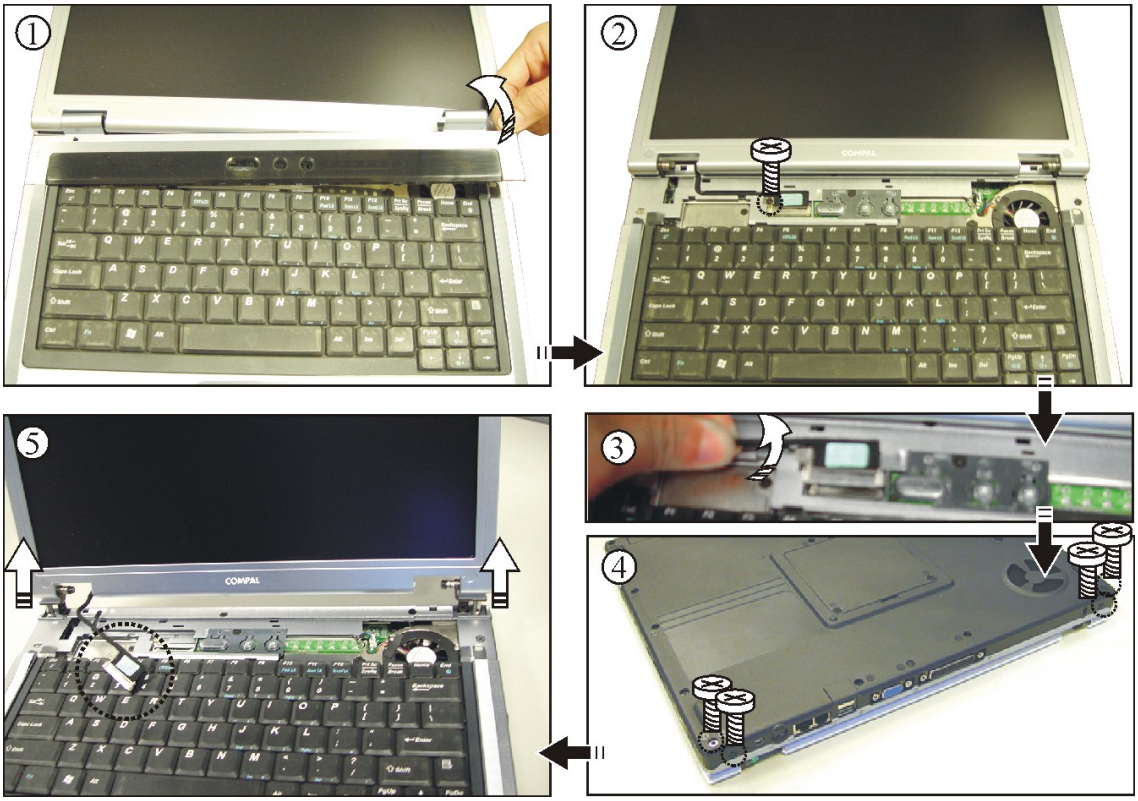
Remove Keyboard

1. Turn the power off and remove the strip cover.
2. Remove 2 screws (M2.5X3).
3. Turn over keyboard in place
4. Disconnect the keyboard FPC connector from mother board.



Remove LCD Module

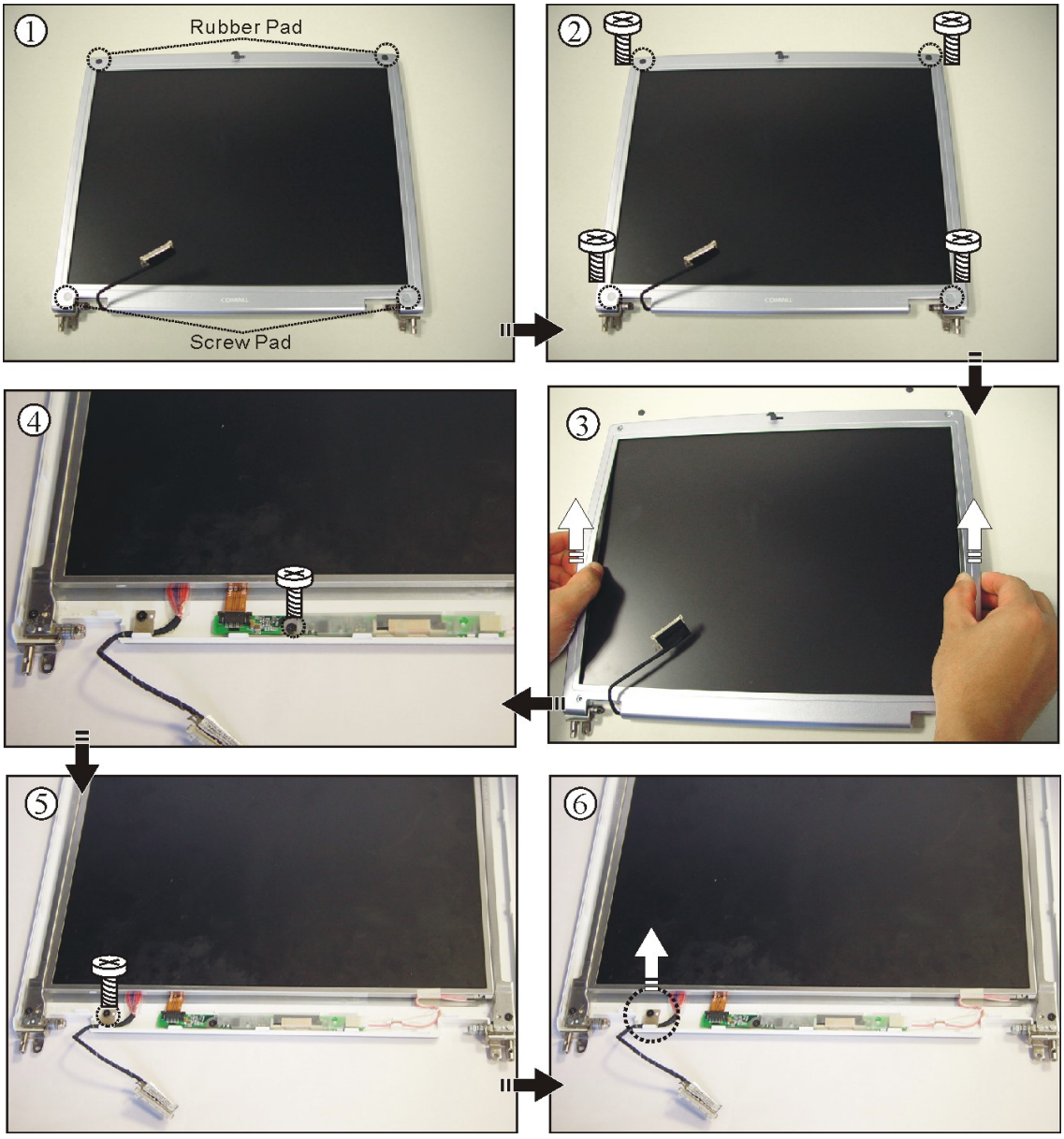
1. Lift strip cover up from the right side, and remove it.
2. Remove 1 screw (M2.5X3) on co-axial cable.
3. Disconnect the co-axial cable.
4. Remove 4 screws(M2.5X6).
5. Disassembly the LCD module from logic base.



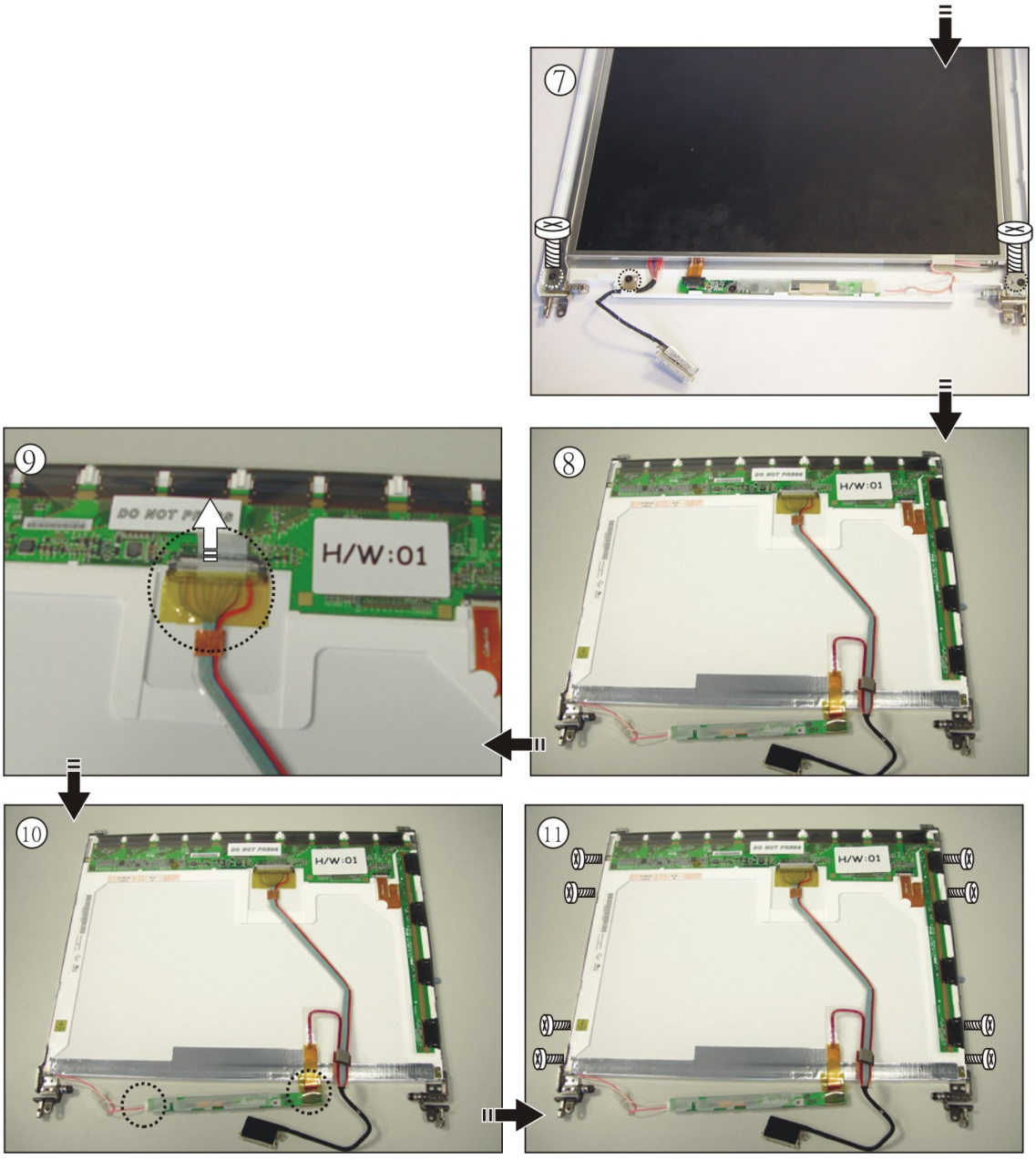
Disassemble the Display and Inverter Board

For a start Remove LCD Module

1. Remove 2 screws pads and 2 rubber pads.
2. Remove 4 screws(M2.5X6)holding the LCD bezel in place.
3. Remove LCD Bezel.
4. Remove 1 screws (M2.5X3) mounting the inverter board.
5. Remove 1 screws (M2.5X3) mounting the co-axial fix mylar.
6. Then remove co-axial fix mylar



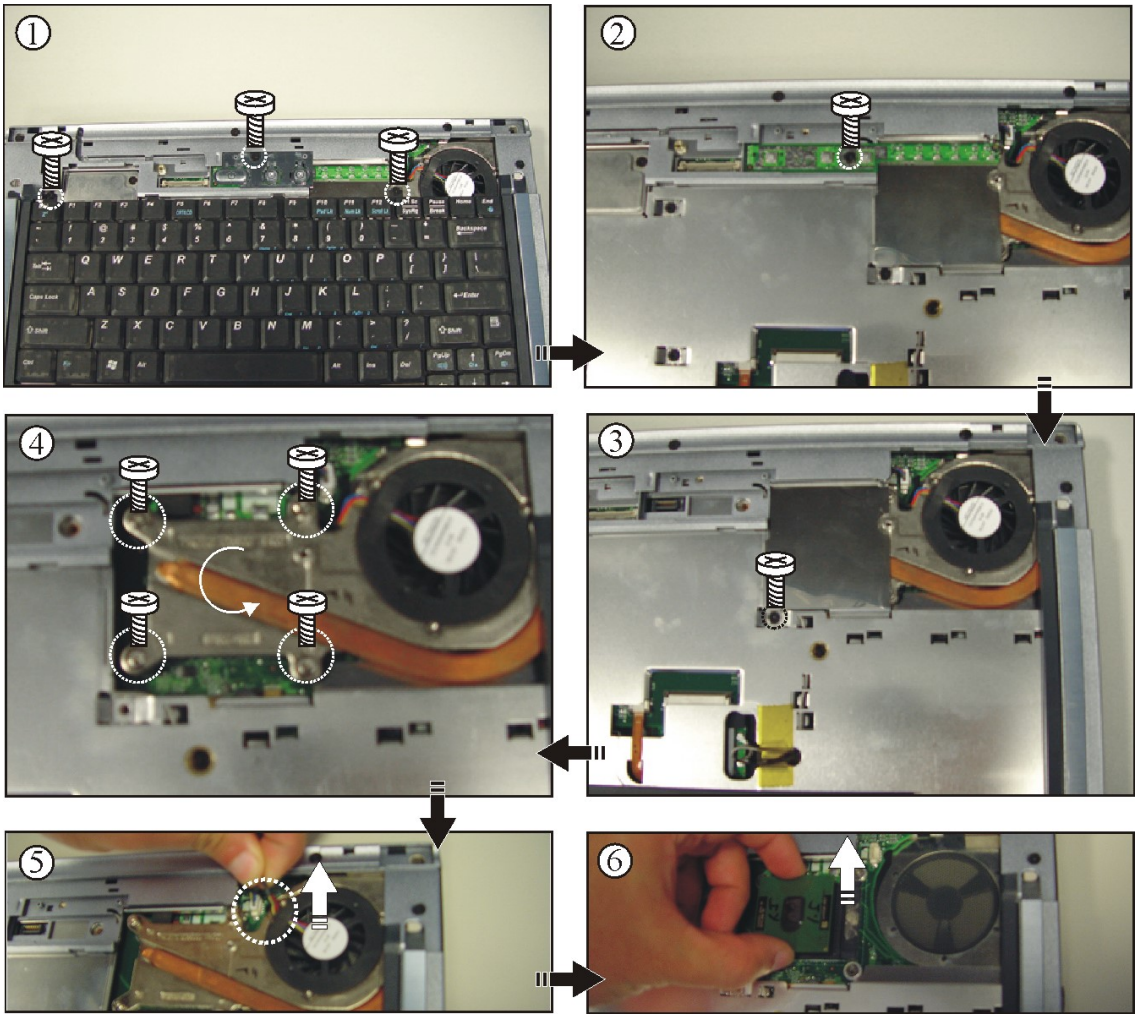
7. Remove 2 screws (M2.5X6) mounting the LCD panel subassembly on LCD cover.
8. Disassembly LCD panel subassembly from LCD cover.
9. Disconnect the coxial cable connector from the LCD.
10. Disconnect the LCD high voltage cable and FPC from the inverter board.
11. Remove 4 or 8 screws (M2.0X3.0FP) mounting the LCD panel on LCD hinge brackets.



Remove Thermal Module and CPU

For a start Remove Keyboard

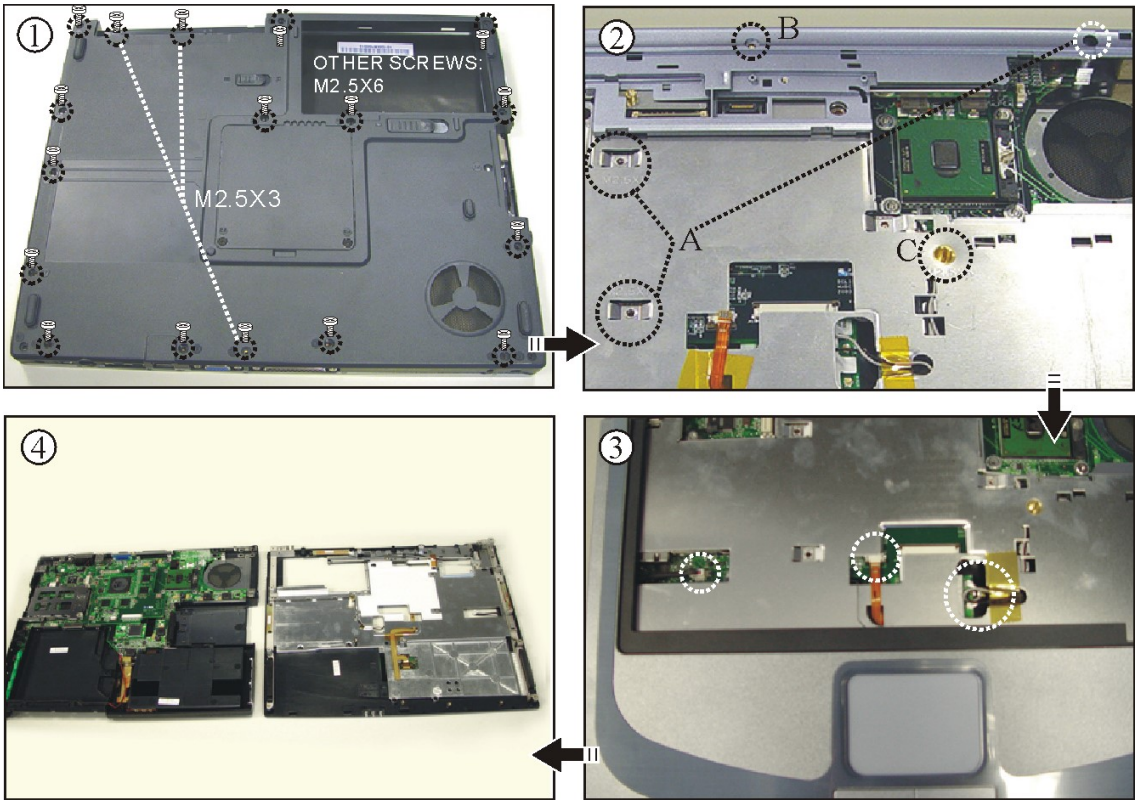
1. Remove 3 screws (M2.5X3), and remove power botton.
2. Remove 1 screw (M2.5X15), and disconnect power PCB.
3. Remove 1 screw (M2.5X6) on the Thermal plate, and remove Thermal plate.
4. Use the opposite direction release 4 screws. (M2.5X6), and disconnect the Thermal module cable.
5. Disassembly the Thermal module.
6. Use “-“ screw driver disassembly the CPU.



Remove Logic Upper

For a start to ,remove KB, remove LCD module, remove battery module, remove HDD module,remove ODD module, and remove Thermal Module

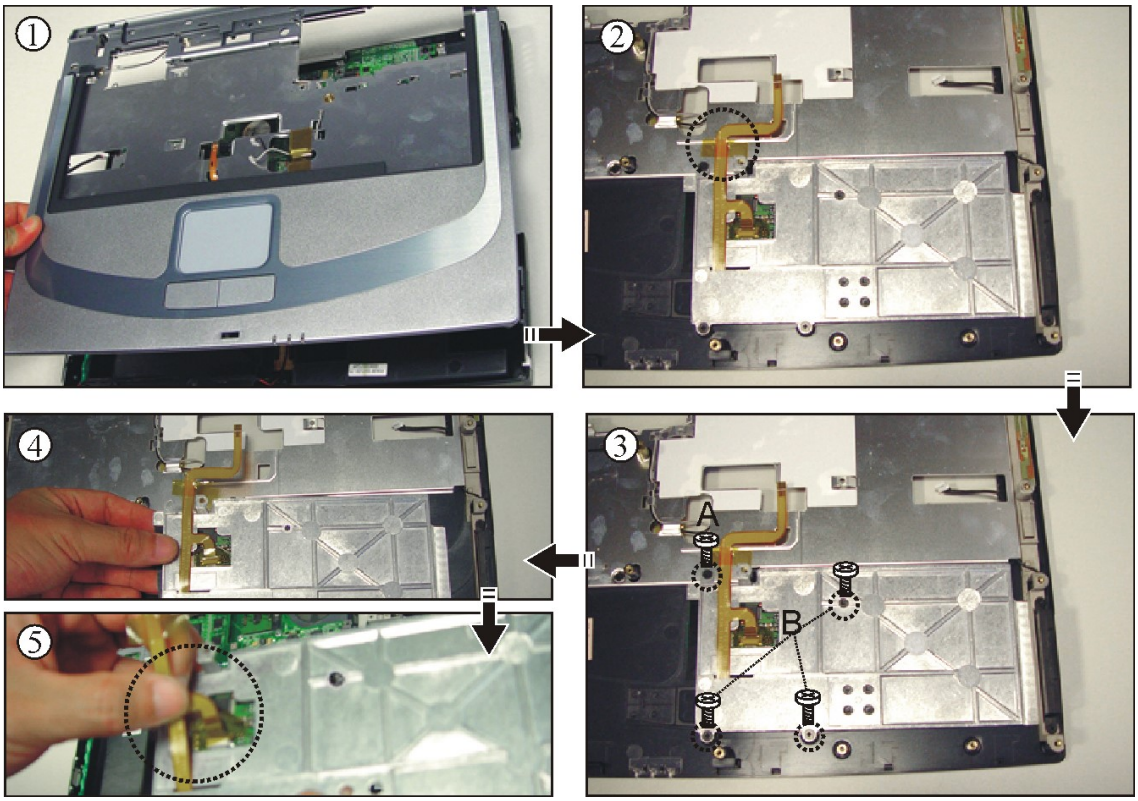
1. Remove screws.
2. Remove 5 screws (A:M2.5X11, B:M2.5X3, C:M2.5X6)
3. Disassembly wireless cable antenna, Touch Pad FPC, speaker cable.
4. Logic upper to separate.



Remove Touch Pad board

For a start to remove LCD module

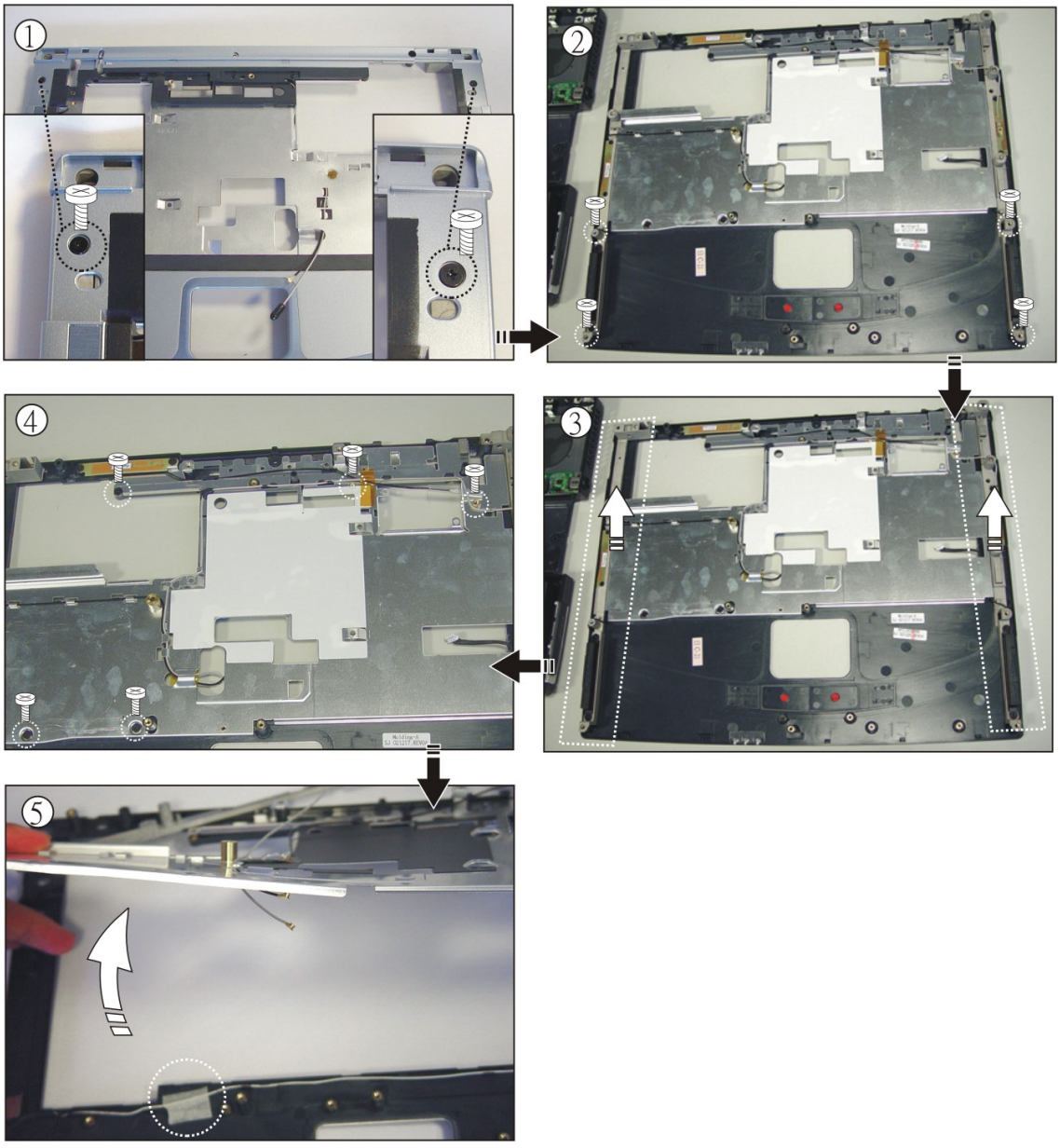
1. Remove Logic upper.
2. To tear open the adhesive tape.
3. Remove 4 screws (A:M2.5X4, B:M2.5X3)
4. Separate upper support.
5. Disconnection the FPC.



Remove Speaker

For a start to remove Logic Upper, remove Touch pad.

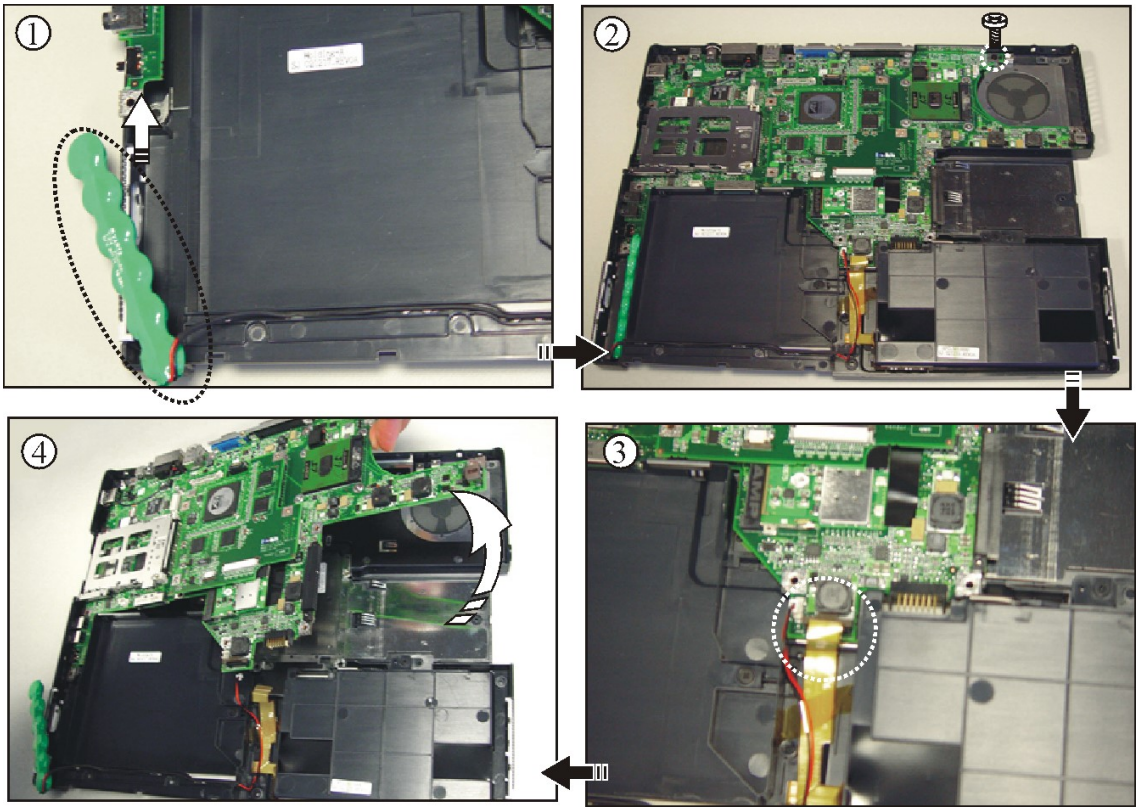
1. Remove 2 screws (M2.5X3).
2. Turn over and remove 4 screws (M2.5X6).
3. Disassembly saddle L & R.
4. Remove 5 screws (M2.5X3).
5. Remove up shield and disassembly speaker.



Remove Mother Board

For a start to remove logic upper

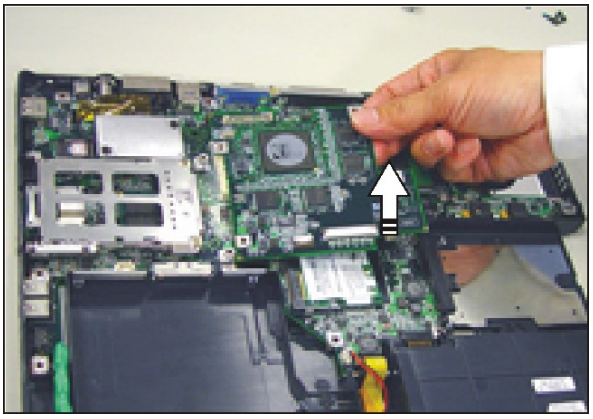
1. Remove Bridge Battery.
2. Remove 1 screws (M2.5X4) holding IO shield.
3. Disconnect the LED FPC and Bridge Battery cable.
4. Disassemble mother board from main frame.



Remove VGA Board

For a start remove Keyboard and remove LCD panel, remove Logic upper

Disassembly VGA board.



Chapter 6: Testing and Troubleshooting

The purpose of this chapter is to provide a systematic method of isolating problems you may have with the BCL50 series Notebook Computer. We assume that you have a basic understanding of DOS-based computer systems as well as knowledge of standard trouble-shooting procedures. This manual is written under the assumption that the problems are indeed related with Notebook itself. The improper usage and application software problems are excluded in this chapter. The system BIOS Beep Code is an integrated unit to detect some errors in the system board. This beep code will give immediate identification of certain system board problems. If the troubleshooting procedure is followed step by step, it can efficiently isolate the problem and the problem can be solved easily.

PERFORM VISUAL INSPECTION

Check the following:

- Power cords are properly connected and secured
- Power supply is adequate for operation
- There are no obvious shorts or opens
- There are no obviously burned or heated components
- All components appear normal

Troubleshooting Flowchart

Use the flowchart in Figure 6-1 as a guide for determining which troubleshooting procedures to execute. Before going through the flowchart steps, verify the following:

- Ask the user if a password is registered and, if it is, ask him or her to enter the password.
- Verify with the customer that Windows XP is installed on the hard disk. Operating systems that were not preinstalled by Compal can cause the computer to malfunction.
- Make sure all optional equipment is removed from the computer.
- Make sure the floppy disk drive is empty.

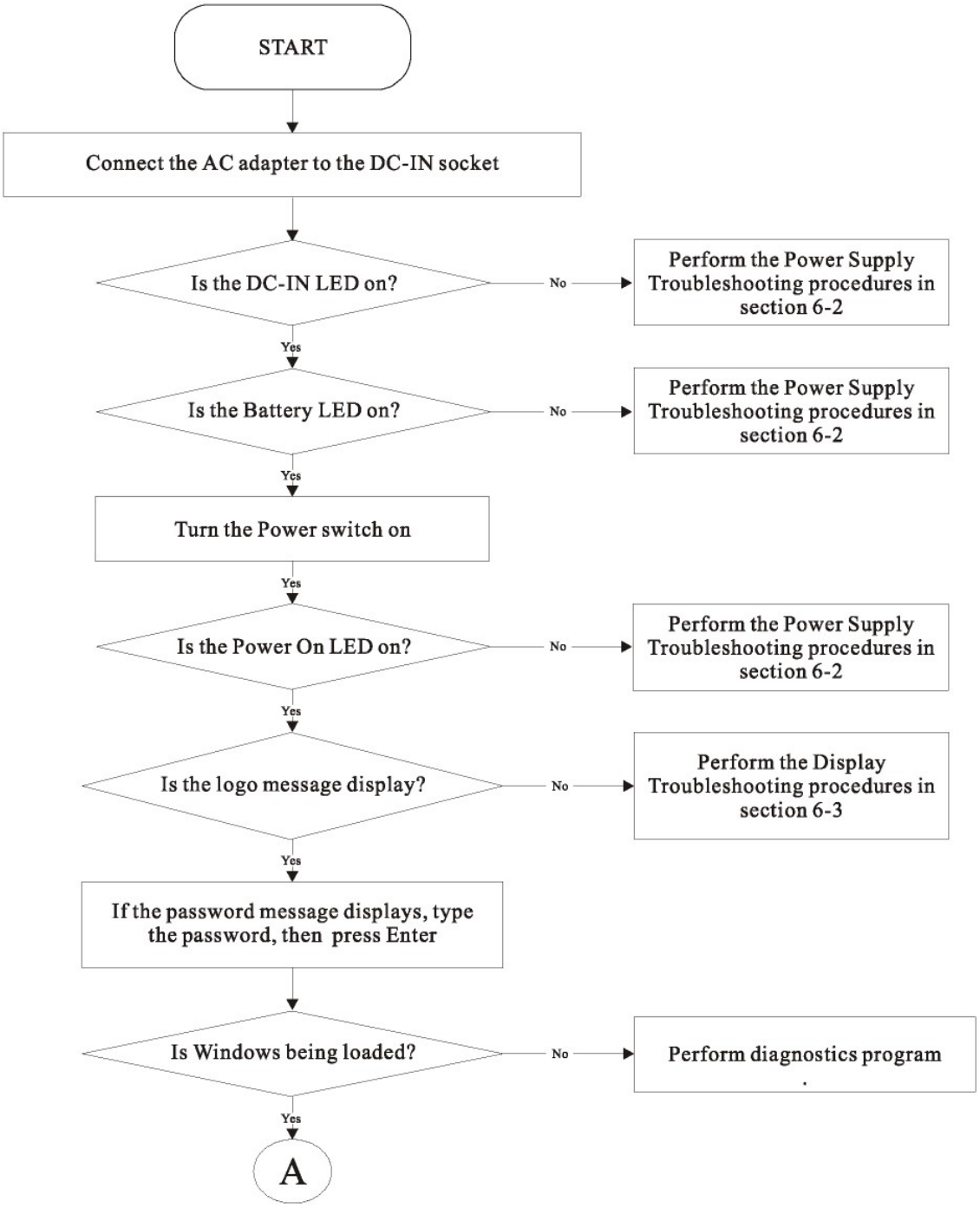


Figure 6-1 Troubleshooting flowchart (1/2)

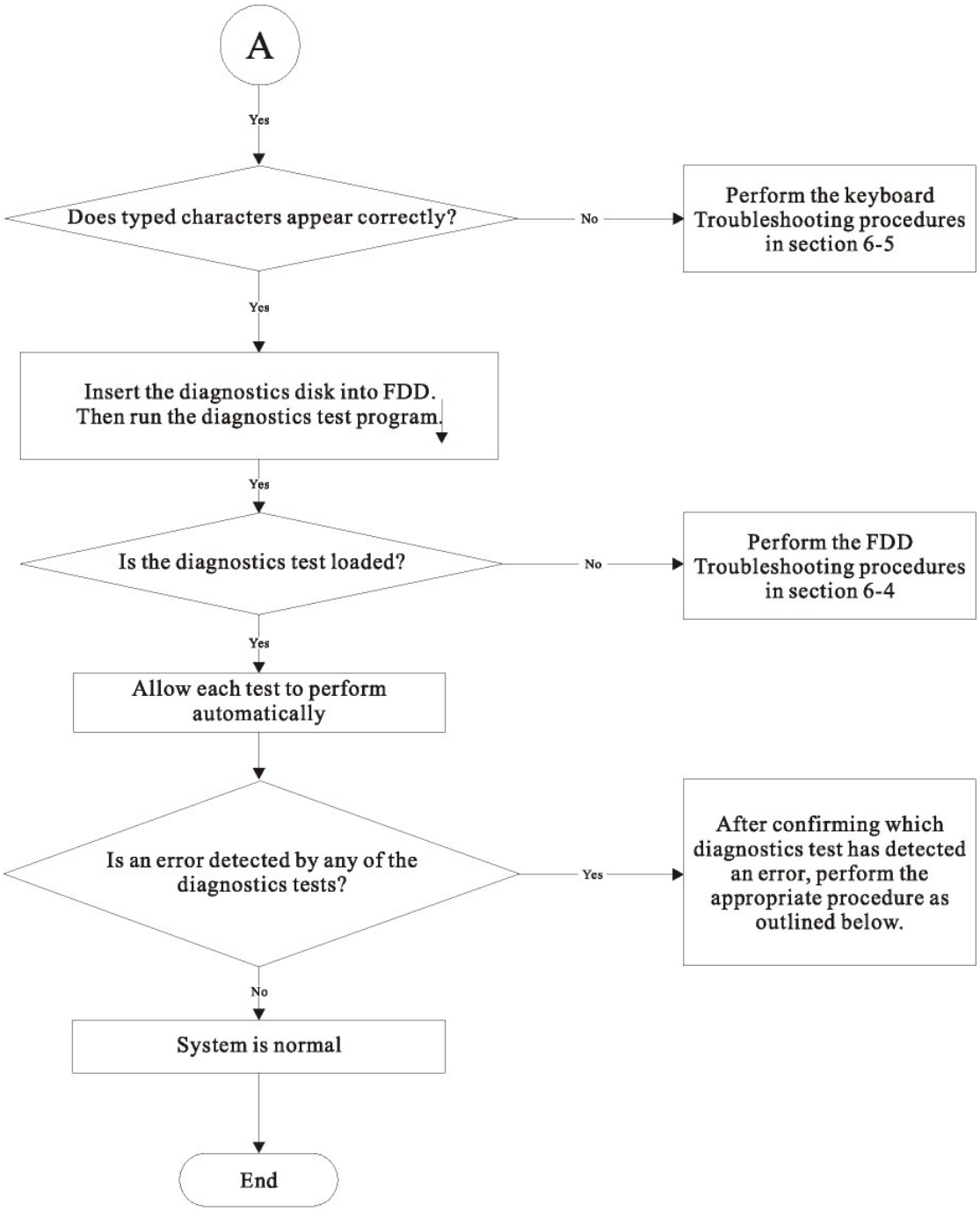


Figure 6-1 Troubleshooting flowchart (2/2)

If the diagnostics program cannot detect an error, the problem may be intermittent. The test program should be executed several times to isolate the problem. When a problem has been located, perform the appropriate troubleshooting procedures as follows:

1. If an error is detected by the main battery test, perform the Power Supply Troubleshooting procedures in Section 6-2.

2. If an error is detected by the display test, perform the Display Troubleshooting procedures in Section 6-3.

3. If an error is detected by the floppy disk test, perform the FDD Troubleshooting procedures in Section 6-4.

4. If an error is detected by the keyboard test, perform the Keyboard Troubleshooting procedures in Section 6-5.

5. If an error is detected by the printer (parallel) port test, perform the Printer Port Troubleshooting procedures in Section 6-8.

6. If an error is detected by the CD-ROM/DVD-ROM test, perform the DVD-ROM and CD-RW/DVD-ROM Troubleshooting Procedures in Section 6-11.

7. If an error is detected by the Modem test, perform the Modem Troubleshooting Procedures in Section 6-12 or the LAN Troubleshooting Procedures in Section 2.11.

8. If an error is detected by the Sound test, perform the Sound Troubleshooting Procedures in Section 2.12.

Other problems that are not covered by the diagnostics program may be discovered by a user.

If an error is detected when using an external USB device, perform the External USB Devices Troubleshooting procedures in Section 6-6.

1. If an error is detected when using the TV-out connection, perform the TV-Out Failure Troubleshooting procedures in Section 6-7.

2. If an error is detected when using the touch pad, perform the Touch Pad Troubleshooting procedures in Section 6-9.

3. If an error is detected when using the speakers, perform the Speaker Troubleshooting procedures in Section 6-10.

4. If an error is detected when using the CD/DVD drive, perform the CD-ROM/DVD Drive Troubleshooting procedures in Section 6-11.

5. If an error is detected when using the modem, perform the Modem Troubleshooting procedures in Section 6-12.

6. If an error is detected when using the PCMCIA unit, perform the PCMCIA Troubleshooting procedures in Section 6-13.

Power Supply Troubleshooting

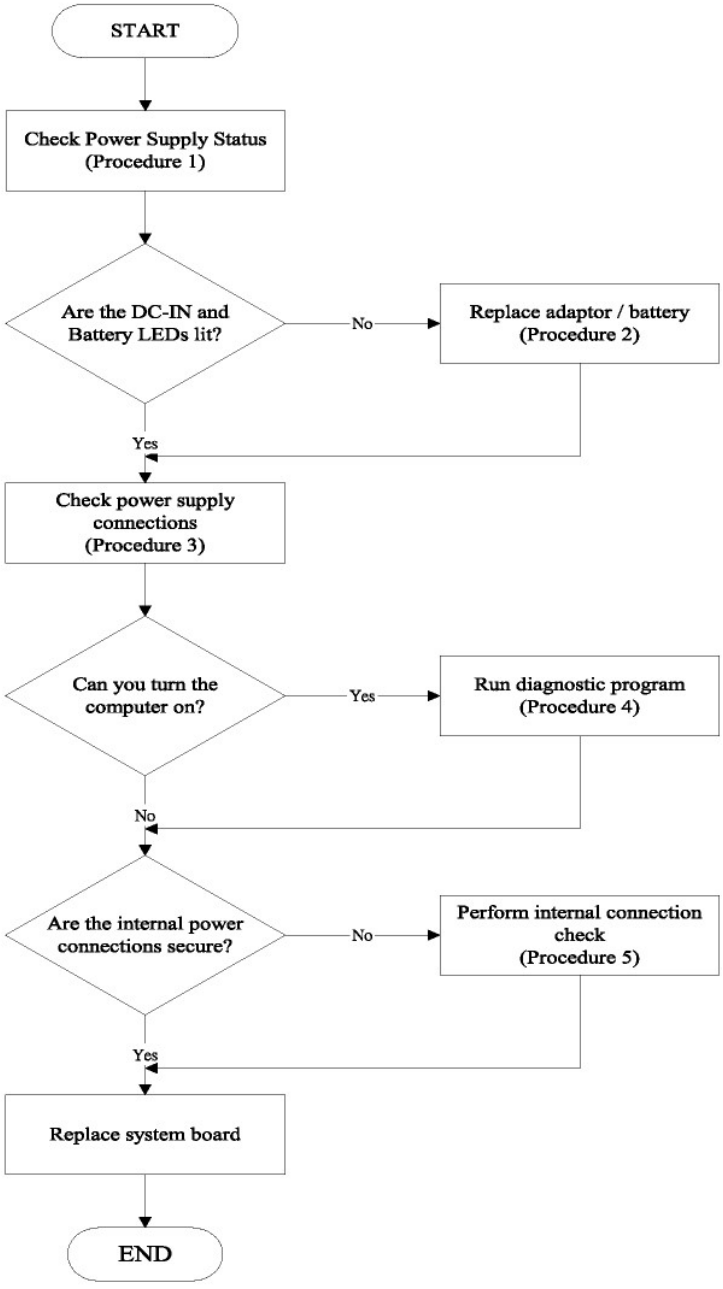


Figure 6-2 Power Supply Troubleshooting Process

The power supply controls many functions and components. To determine if the power supply is functioning properly, start with Procedure 1 and continue with the other Procedures as instructed. The flowchart in Figure 6-2 gives a summary of the process. The procedures described in this section are:

Procedure 1: Power status check

Procedure 2: Adaptor / battery replacement

Procedure 3: Power supply connection check

Procedure 4: Diagnostic check

Procedure 5: Internal connection check

Procedure 1 Power Status Check

The following LEDs indicate the power supply status:

Battery LED

The power supply controller displays the power supply status through the Battery and the POWER LEDs as listed in the tables below.

Table 2-1 Battery LED

Battery State	LED colors	Definition
Charging	Blue, blinking	Battery charging with AC .
	Blue, solid on	Battery fully charged by AC
	Blue color off	Battery abnormal: stop charging with AC (Bad cell/ Overheated)
Discharging	Amber, blinking LED on for1 second every 4 seconds	Battery within low state: 12 minutes remaining
	Amber, blinking (LED on 1 second every 2 seconds)	Battery within critical low state: 3 minutes remaining. The system is protected and cannot be re-powered on without the AC power connected.
	Amber solid on	Battery not in low or critical low state; in discharging state

Table 2-2 POWER LED

Power supply status	POWER LED
System Power On (LED is solid Blue).	Blue Solid on

System Suspended	Amber, blinking
System Power Off.	Off

To check the power supply status, install a battery pack and connect an AC adaptor to the DC-IN port on the computer and to a power supply.

If the Battery LED are not lit, go to Procedure 2

Procedure 2 Adaptor / battery replacement

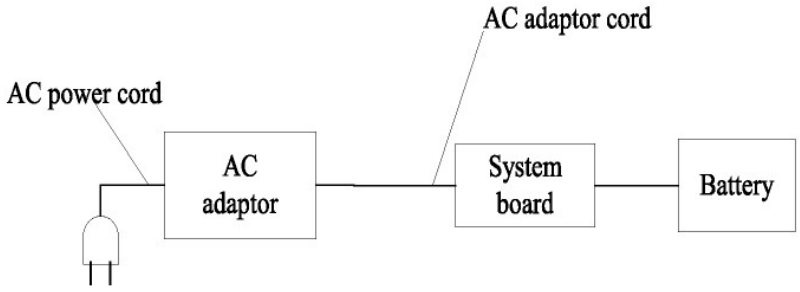
A faulty adaptor may not supply power or may not charge the battery. Perform Check 1.

Check 1 Connect a new AC adaptor. If the problem is not resolved, go to Check 2.

Check 2 Insert a new battery. If the problem is still not resolved, go to Procedure 3.

Procedure 3 Power supply connection check

The power supply wiring diagram is shown below:



Any of the connectors may be disconnected. Perform Check 1.

Check 1 Disconnect the AC power cord from wall outlet. Check the power cable for breaks. If the power cord is damaged, connect a new AC power cord. If there is no damage, go to Check 2.

Check 2 Make sure the AC adaptor cord and AC power cord are firmly plugged into the DC-IN socket, AC adaptor inlet and wall outlet. If these cables are connected correctly, go to Check 3.

Check 3 Make sure that the DC-IN input port socket is firmly secured to the system board of the computer.

- If the DC-IN input socket is loose, go to Procedure 5.
- If it is not loose, go to Check 4.

Check 4 Use a multimeter to make sure that the AC adaptor output voltage is close to 19 V. If the output is several percent lower than 19 V, go to Check 5. If the output is close to 19 V, go to Check 6.

Check 5 Connect a new AC adaptor or AC power cord.

- If the battery LED does not light, go to Check 6.

Check 6 Make sure the battery pack is installed in the computer correctly. If the battery is properly installed and the battery LED still does not light, go to Procedure 4.

Procedure 4 Diagnostic check

The power supply may not charge the battery pack. Perform the following procedures:

- Reinstall the battery pack.
- Attach the AC adaptor and turn on the power. If you cannot turn on the power, go to Procedure 5.
- Run the Diagnostic test following the procedures described Tests and Diagnostics. If no problem is detected, the battery is functioning normally.

Procedure 5 Replacement check

The system board may be disconnected or damaged. Disassemble the computer following the steps described *Replacement Procedures*. Check the connection between the AC adaptor and the system board. After checking the connection, perform Check 1:

Check 1 Use a multimeter to make sure that the fuses on the system board are not blown. If a fuse is not blown, go to Check 2. If a fuse is blown, go to Check 3.

Check 2 Make sure that the battery cable is firmly connected to the system board. If it is connected firmly, go to Check 3.

Check 3 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

Display Troubleshooting

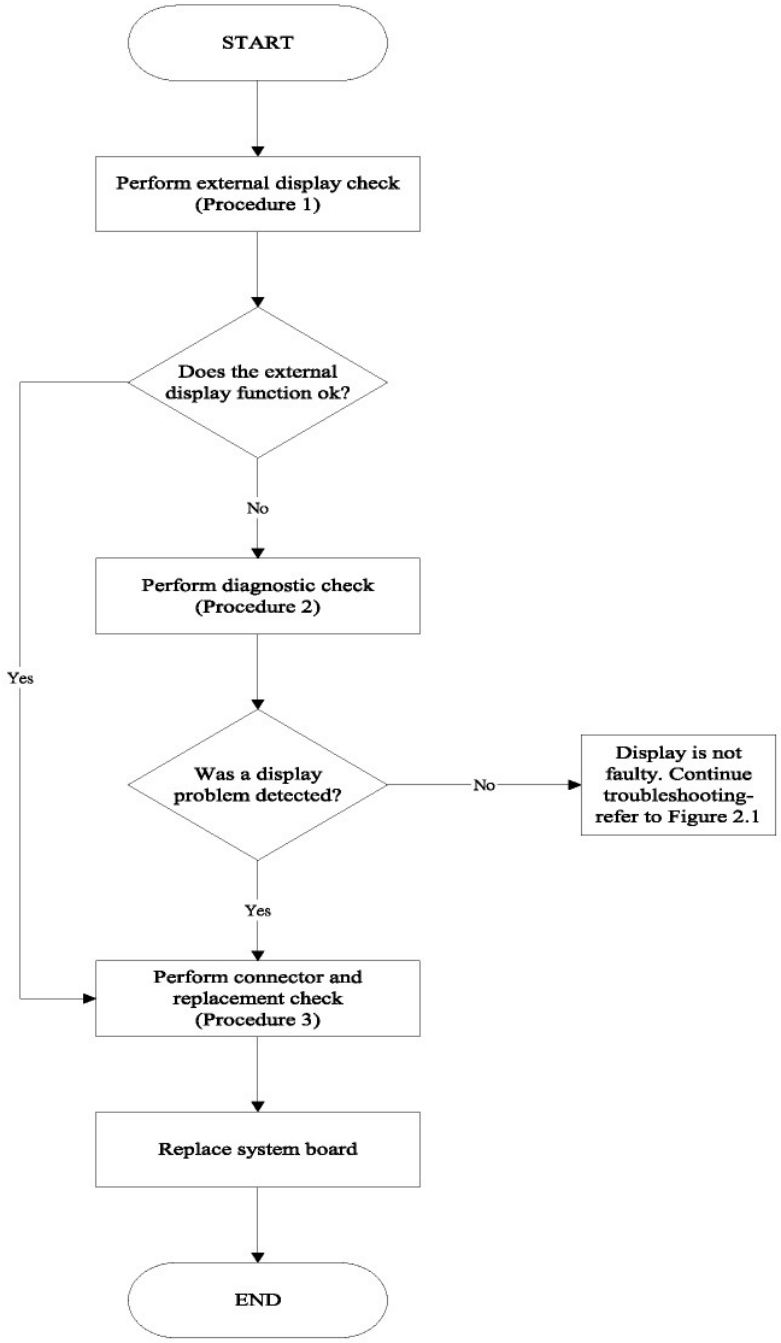


Figure 6-3 Display troubleshooting process

This section describes how to determine if the computer's display is functioning properly. The process is outlined in Figure 6-3. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: External display check

Procedure 2: Diagnostic check

Procedure 3: Connector and replacement check

Procedure 1 External display check

Connect an external display to the computer's external monitor port, then boot the computer. The computer automatically detects the external display. Press Fn+F5 to switch to the external display.

If the external display works correctly, the internal LCD may be damaged. Go to Procedure 3.

If the external monitor appears to have the same problem as the internal monitor, the system board may be damaged. Go to Procedure 2.

Procedure 2 Diagnostic check

The Display Test program is stored on the computer's Diagnostics disk. This program checks the display controller on the system board. Insert the Diagnostics disk in the computer's floppy disk drive, turn on the computer and run the test. Refer to Chapter 3, *Tests and Diagnostics* for details.

If an error is detected, go to Procedure 3. If an error is not detected, the display is functioning properly.

Procedure 3 Connector and replacement check

The FL inverter board, LCD module, and system board are connected to the display circuits. Any of these components may be damaged. *Replacement Procedures,* for instructions on how to disassemble the computer and then perform the following checks:

Check 1 Make sure the DDRRAM module is seated properly. Test display again. If the problem still exits, replace the DDRRAM module. If the problem still exists, perform check 2.

Check 2 Replace the FL inverter board with a new one and test display again. If the problem still exists, perform Check 3.

Check 3 Replace the LCD module with a new one and test display again. If the problem still exists, perform Check 4.

Check 4 Replace the LCD/FL cable with a new one and test display again. If the problem still exists, perform Check 5.

Check 5 Replace the CPU with another of the same specifications. If the problem still exists, perform Check 6.

Check 6 The system board may be damaged. Replace it with a new one.

Keyboard Troubleshooting

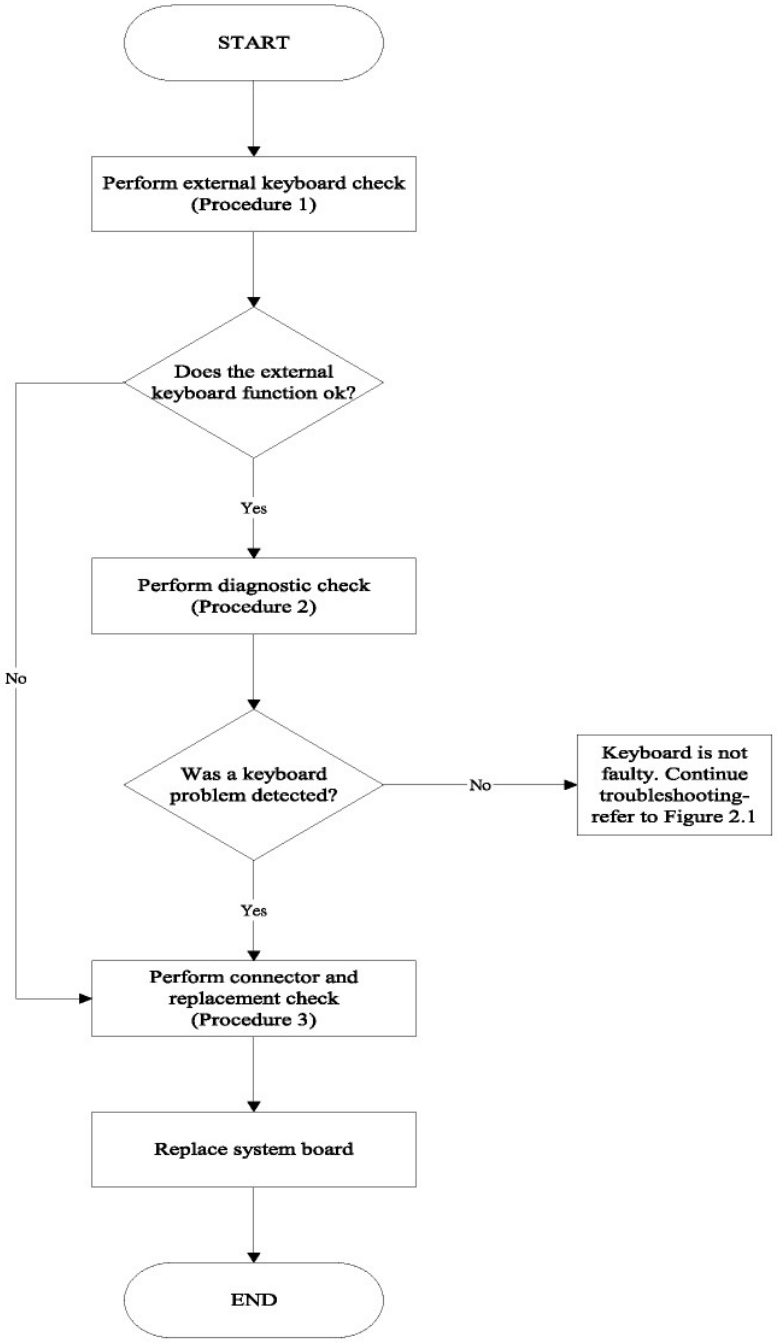


Figure 6-5 Keyboard troubleshooting process

To determine if the computer's keyboard is functioning properly, perform the following procedures. Figure 6-5 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: External keyboard check

Procedure 2: Diagnostic check

Procedure 3: Connector and replacement check

Procedure 1 External keyboard check

Connect a USB keyboard to one of the computer's keyboard/mouse ports, then boot the computer. The computer automatically detects the external keyboard.

If the external keyboard works correctly, the internal keyboard or its connections may be faulty. Go to Procedure 2.

If the external keyboard appears to have the same problem as the internal keyboard, the system board may be damaged.

Procedure 2 Diagnostic test

Run the Diagnostic Program, which will automatically execute the Keyboard Test. Refer to Chapter 3, Tests and Diagnostics for more information on how to run the program.

If an error is located, go to Procedure 3. If an error does not occur, the keyboard is functioning properly.

Procedure 3 Connector and replacement check

The keyboard and/or system board may be disconnected or damaged. *Replacement Procedures* and perform the following checks.

Check 1 Make sure the keyboard cable is firmly connected to the system board.

If the connection is loose, reconnect firmly and repeat Procedure 2. If there is still an error, go to Check 2.

Check 2 The keyboard may be damaged.

If the problem still exists, perform Check 3.

Check 3 The system board may be damaged. R

External USB Devices Troubleshooting

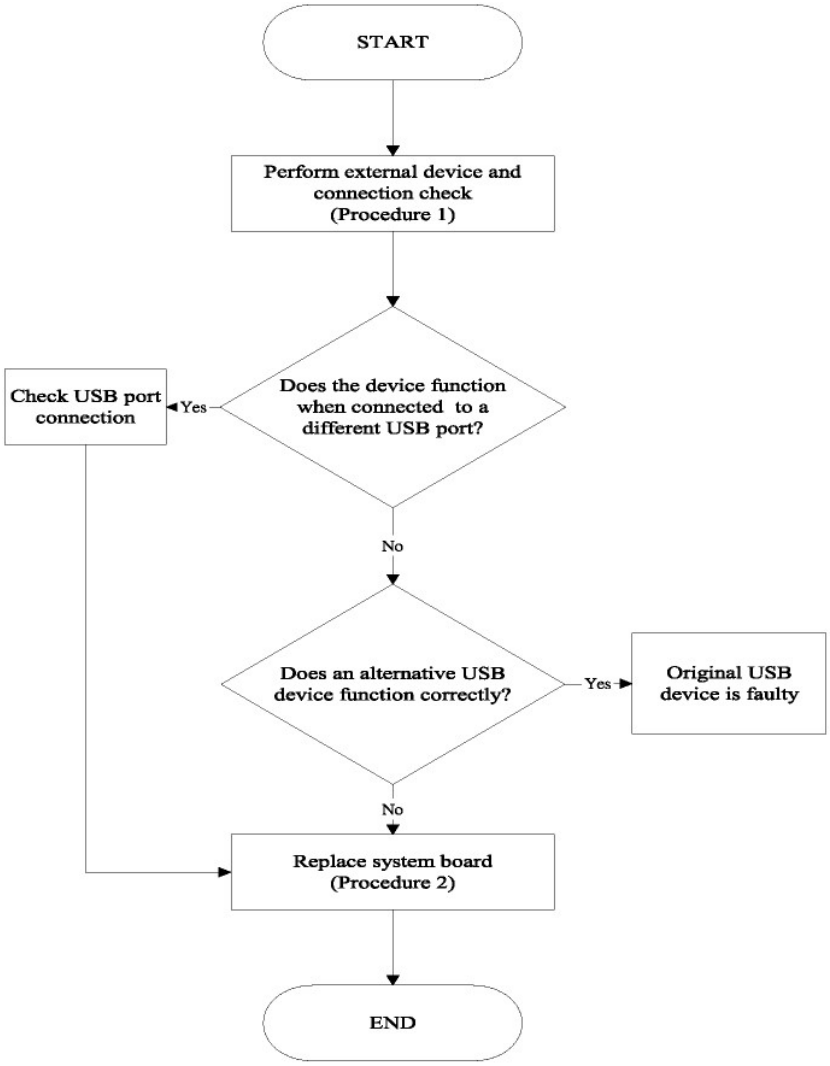


Figure 6-6 External USB device troubleshooting process

To determine if the computer's external USB devices are functioning properly, perform the following procedures. Figure 6-6 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: External device and connection check

Procedure 2: Replace system board

Procedure 1 External device and connection check

The USB device may be damaged or the connection may be faulty. Perform Check 1.

Check 1 Make sure USB device cable is firmly plugged into one of the USB sockets. If the cable is connected correctly, go to Check 2.

Check 2 Plug the USB device into another USB socket (there are three in all). If the USB device still does not work, go to Check 4.

If the device functions correctly when connected to another USB port, go to Check 3

Check 3 Make sure that the USB socket is firmly secured to the system board of the computer. If the malfunction remains, the system board may be damaged. Go to Procedure 2.

Check 4 Connect an alternative USB device to one of the computer's USB ports, and then boot the computer. The computer automatically detects the external device.

If the alternative USB device works correctly, the original device may be damaged and should be replaced.

If the alternative USB device appears to have the same problem as the original device, the system board may be damaged. Go to Procedure 2.

Procedure 2 Replace system board

If the error persists, the system board may be damaged.

TV-Out Failure Troubleshooting

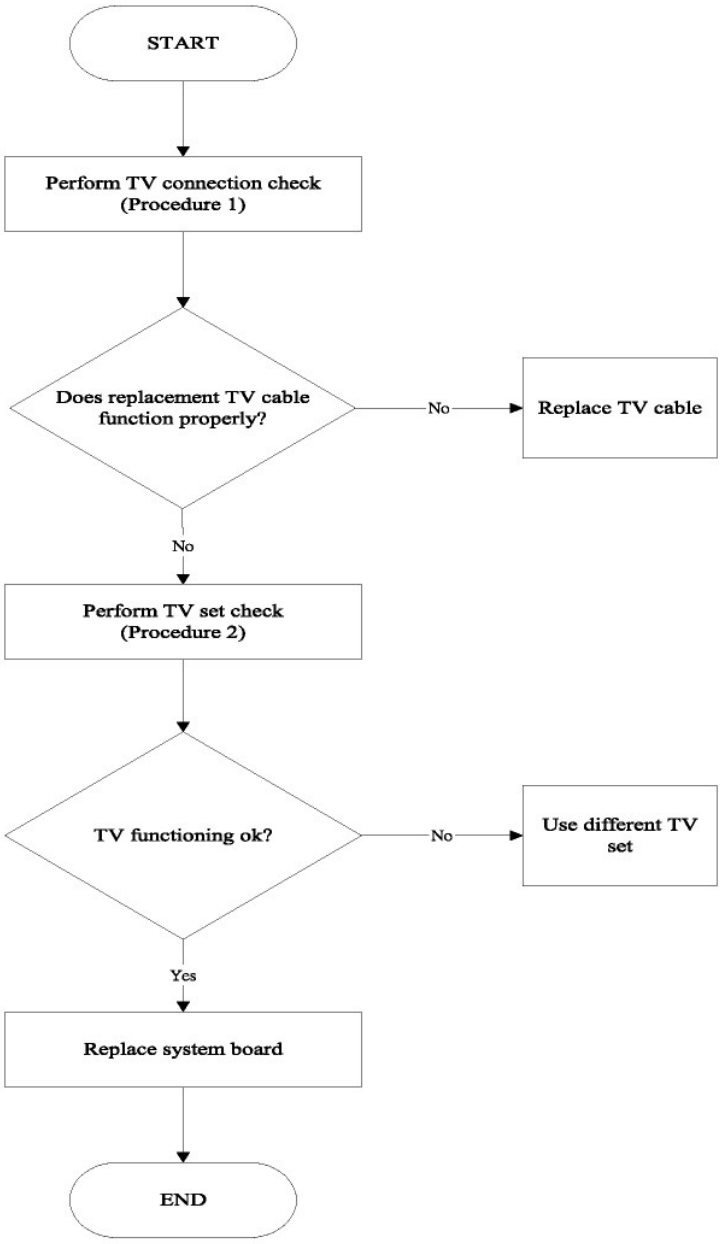


Figure 6-7 TV-out troubleshooting process

To determine if the computer's TV-out port is functioning properly, perform the following procedures. Figure 6-7 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: TV connection check

Procedure 2: TV set check

Procedure 1 TV connection check

The TV cable may be damaged or the connections may be loose. Perform Check 1:

Check 1 Make sure TV cable is firmly plugged into both the TV set and the TV-out port of the computer. If the cable is connected correctly, go to Check 2.

Check 2 Make sure the TV-out port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.

Check 3 The TV cable may be damaged. Replace with a good cable. If the malfunction remains, go to Procedure 2

Procedure 2 TV set check

The TV set may be faulty. Perform Check 1:

Check 1 Try using the set for television reception. If it does not work, the set may be damaged. If the set does work, perform Check 2.

Check 2 Try connecting a different television to the computer. If the replacement television works, the original set may be damaged. If the replacement set does not work the system board may be damaged.

Printer Port Troubleshooting

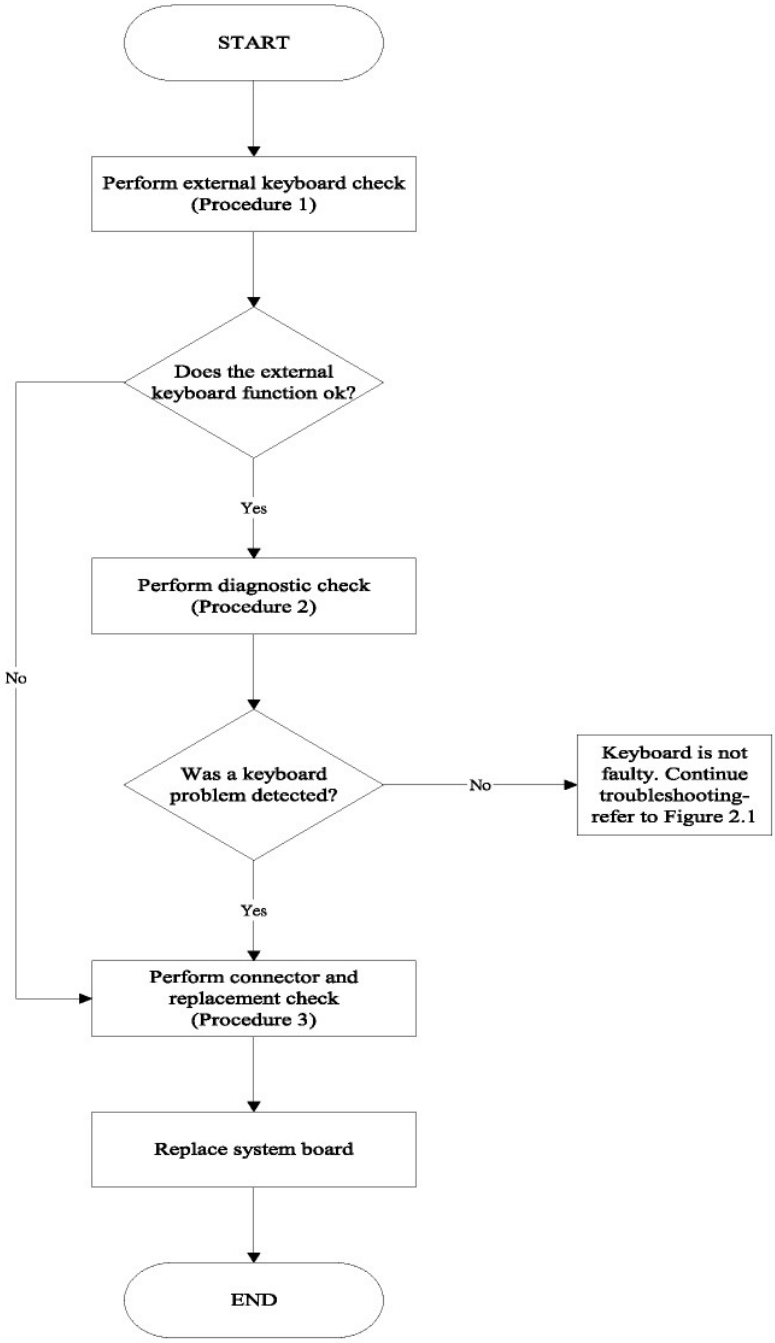


Figure 6-8 Printer port troubleshooting process

To determine if the computer's printer (parallel) port is functioning properly, perform the following procedures. Figure 6-8 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: Diagnostic test

Procedure 2: Printer and connection test

Procedure 3: Replace system board

Procedure 1 Diagnostic test

Attach the printer port loopback connector firmly to the printer port and run the Diagnostic Program. If the printer port test passes, there may be a problem with the printer. Go to Procedure 2. If the printer port test fails, go to Procedure 3.

Procedure 2 Printer and connection test

The printer may be faulty or not connected properly. Perform Check 1.

Check 1 Make sure printer cable is firmly plugged into both the printer and the printer port of the computer. If the cable is connected correctly, go to Check 2.

Check 2 Make sure the printer port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.

Check 3 The printer cable may be damaged. Replace with a good cable. If the malfunction remains, go to Check 4.

Check 4 The printer may be faulty. Replace it with a good printer or connect it to a different computer.

If the replacement printer works or the original printer does not work on a different computer, the printer should be replaced.

If the replacement printer does not work either, or the original printer functions normally on a different computer, go to Procedure 3.

Procedure 3 Replace system board

The system board may be damaged.

Touch Pad Troubleshooting

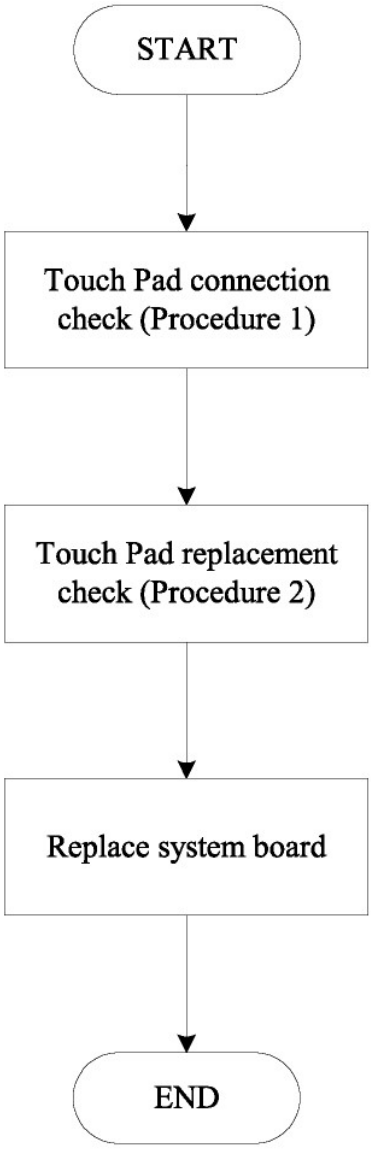


Figure 6-9 Touch Pad troubleshooting process

To determine if the computer's built-in Touch Pad is functioning properly, perform the following procedures. Figure 6-9 outlines the process. Start with Procedure 1 and continue as instructed.

Procedure 1: Touch Pad connection check

Procedure 2: Touch Pad replacement check

Procedure 1 Touch Pad connection check

The Touch Pad is connected by the Touch Pad FPC to the system board. Make sure the Touch Pad FPC cable is firmly connected to the Touch Pad and system board. Replacement Procedures, for instructions on how to disassemble the computer and then perform the following checks.

If any of the connections are loose, reconnect firmly. If any of the connections is damaged, or there is still an error, go to Procedure 2.

Procedure 2 Touch Pad replacement check

The Touch Pad unit or FPC may be defective or damaged.

Speaker Troubleshooting

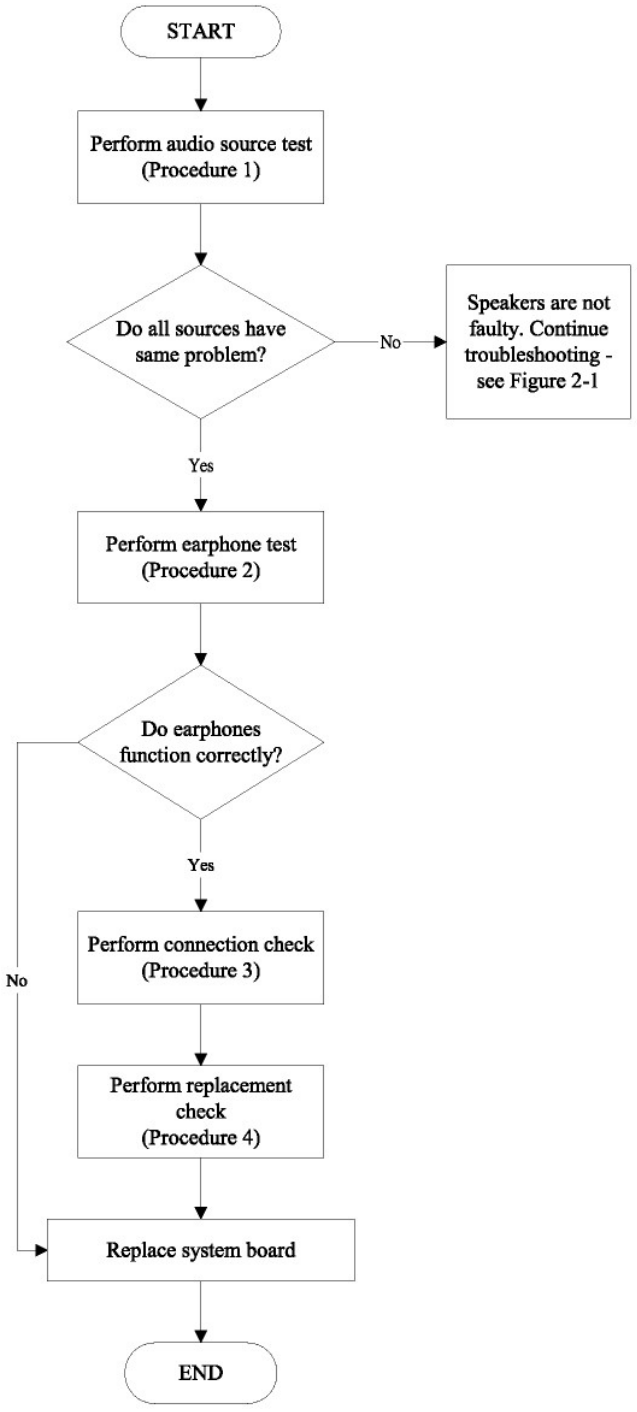


Figure 6-10 Speaker troubleshooting process

To determine if the computer's built-in speakers are functioning properly, perform the following procedures. Figure 6-10 outlines the process. First adjust the speaker volume to an appropriate level. Start with Procedure 1 and continue as instructed.

Procedure 1: Audio source test

Procedure 2: Earphone test

Procedure 3: Connection check

Procedure 4: Replacement check

Procedure 1 Audio source test

Try different audio sources (e.g. an audio CD and digital music file) to determine whether the fault is in the speaker system or not. If not all sources have sound problems, the problem is in the source devices. If all have the same problem, continue with Procedure 2.

Procedure 2 Earphone test

Connect a set if earphones or external speakers. If these function correctly, go to Procedure 3. If they do not function correctly, the system board may be defective or damaged. Replace it with a new one.

Procedure 3 Connection check

Disassemble the computer following the steps described *Replacement Procedures* and make sure the speaker cable is firmly connected to the system board. If the stereo speakers are still not functioning properly, go to Procedure 4.

Procedure 4 Replacement Check

If the stereo speakers don't sound properly, the stereo speakers may be defective or damaged. Replace them with new ones. If the stereo speakers still do not work properly.

DVD-ROM and CD-RW/DVD-ROM Troubleshooting

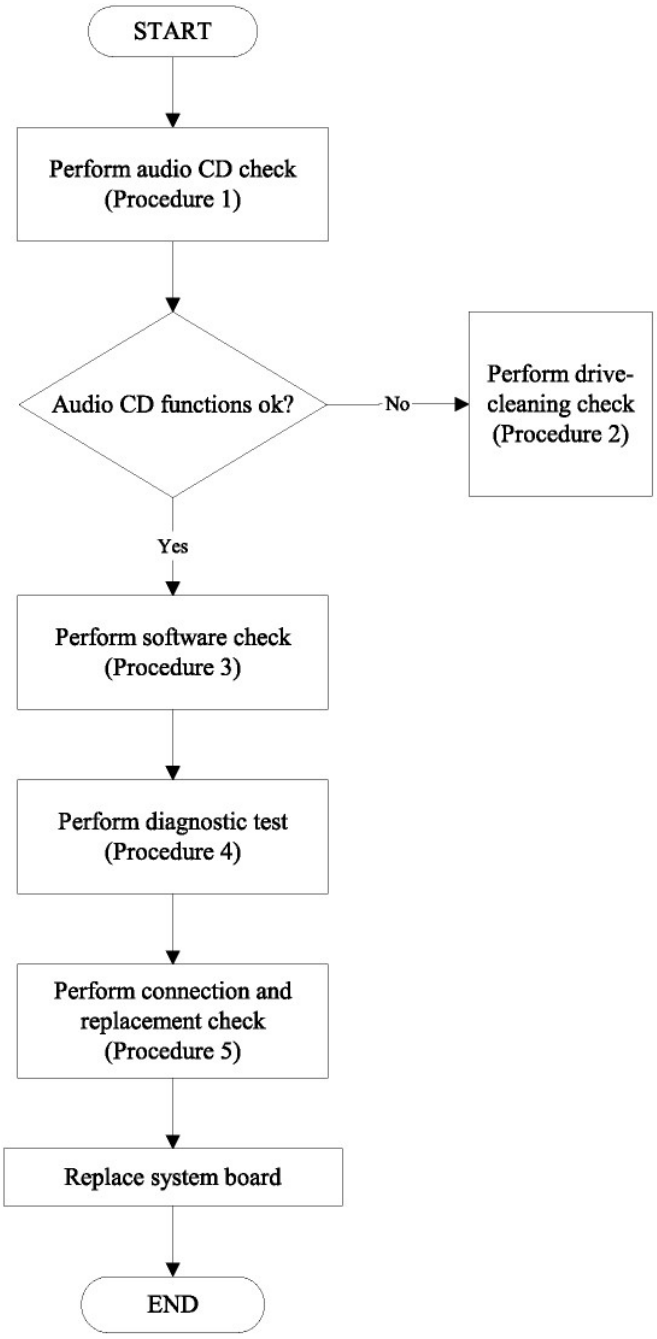


Figure 6-11 CD-ROM/DVD drive troubleshooting process

This section describes how to determine if the computer's internal DVD-ROM drive or CD-RW/DVD-ROM drive is functioning properly. Figure 6-11 outlines the process. Perform the steps below starting with Procedure 1 and continue with the other procedures as required.

Procedure 1: Audio CD test

Procedure 2: Drive cleaning check

Procedure 3: Software check

Procedure 4: Diagnostic test

Procedure 5: Connection and replacement check

Procedure 1 Audio CD check

First, insert an audio CD into the CD/DVD drive. If it works, the problem is not with the drive. Go to Procedure 3. If the audio CD does not work, go to Procedure 2. If the CD/DVD LED on the front panel does not light when the disc is played and the drive gives no response, go straight to Procedure 3.

Procedure 2 Drive cleaning check

Insert a CD/DVD drive-cleaning disk into the drive clean according to the drive-cleaning product instructions. If the problem persists, go to Procedure 3.

Procedure 3 Software check

Ensure that the appropriate driver has been installed on the computer for the CD/DVD drive.

Procedure 4 Diagnostic test

The CD-ROM/DVD-ROM test program stored in the Diagnostics Disk will test the drive's ability to play an audio CD, as well as the functions of the CD control buttons.

If any errors occur while executing the diagnostic program, go to Procedure 5.

Procedure 5 Connection check and replacement check

The DVD-ROM drive or the CD-RW/DVD-ROM drive connects to the system board. The drive may be disconnected, or the drive or system board may be damaged. Replacement Procedures and perform the following checks:

Check 1 Make sure the drive is firmly connected to the system board. If the connection is good and there is still an error, go to Check 2.

Check 2 The drive or drive cable may be defective or damaged. Replacement Procedures. If the drive is still not functioning properly, perform Check 3.

Check 3 The system board may be damaged.

Modem Troubleshooting

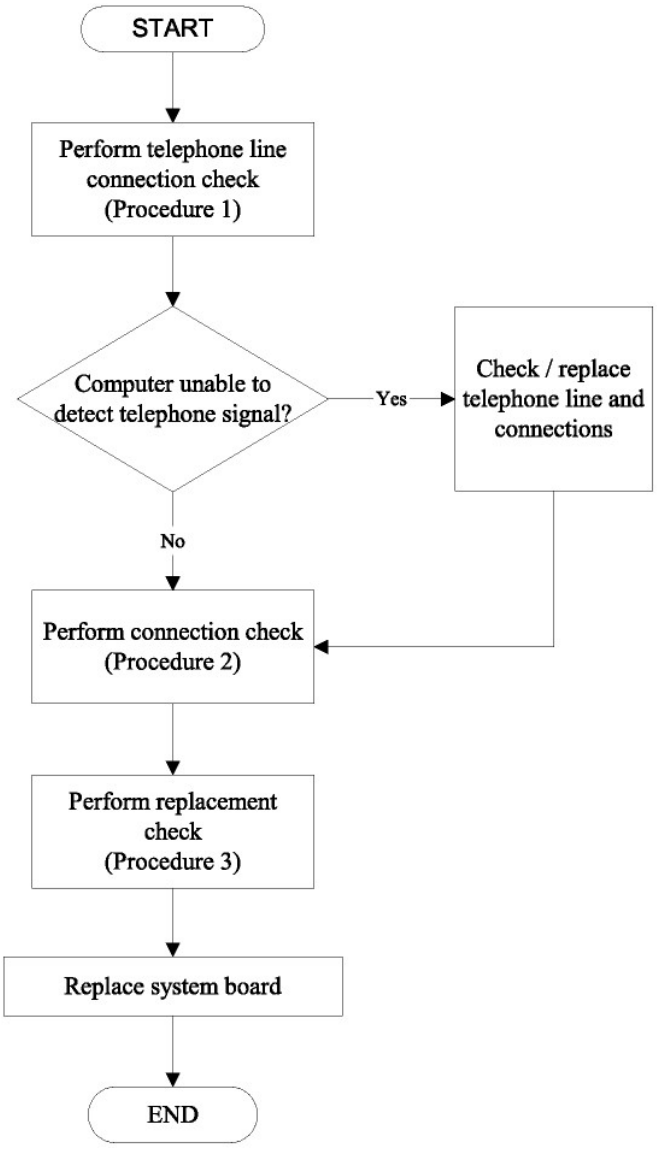


Figure 6-12 Modem troubleshooting process

This section describes how to determine if the computer's modem is functioning properly. Figure 6-12 outlines the process. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Telephone line connection check

Procedure 2: Modem card connection check

Procedure 3: Modem card replacement check

Procedure 1 Telephone line connection check

The telephone cable may be damaged or the connections may be loose. Attempt to connect the computer to a network through using the modem. If the modem does not function at all, go to Procedure 3. If the attempt fails because the computer detects no telephone signal, the fault may be in the telephone cable, the wall socket or the modem port. Perform Check 1:

Check 1 Make sure telephone cable is firmly plugged into both the telephone wall socket and the modem port of the computer. If the cable is connected correctly, go to Check 2.

Check 2 Make sure the modem port is firmly secured to the system board of the computer. If the malfunction remains, go to Check 3.

Check 3 The telephone cable may be damaged. Replace with a good cable. If the malfunction remains, go to Procedure 2

Procedure 2 Modem card connection check

Disassemble the computer following the steps described *Replacement Procedures* and ensure that the modem card is well connected to the system board. If the problem persists, perform Procedure 3.

Procedure 3 Modem replacement check

The modem card or RJ-11 jack may be faulty. Try replacing them. If the problem persists, the system board may be defective or damaged. Replace the System Board with a new one following the steps *Replacement Procedures*.

PCMCIA Troubleshooting

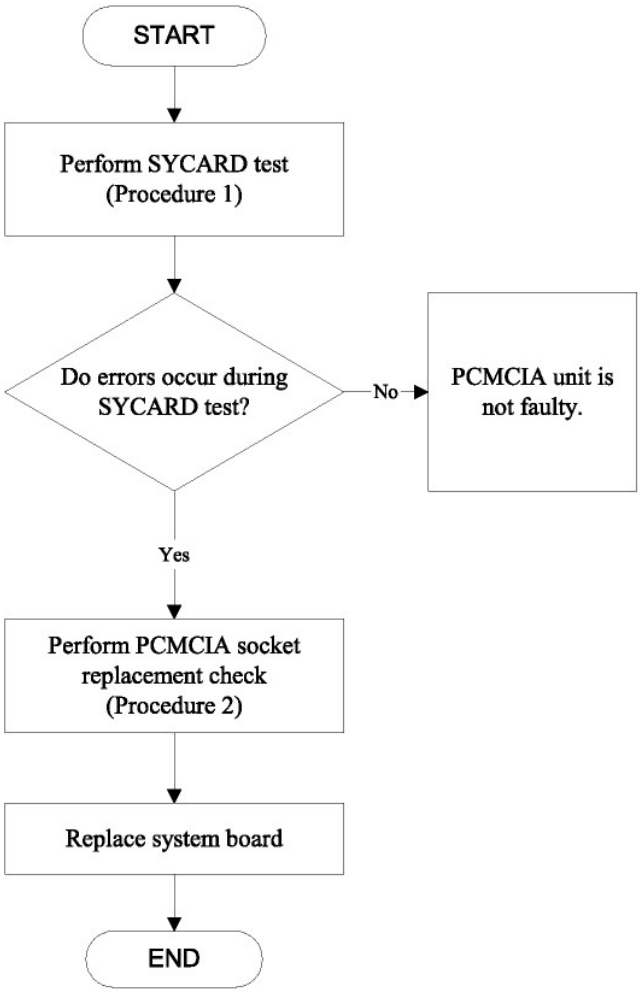


Figure 6-13 PCMCIA troubleshooting process

This section describes how to determine if the PCMCIA card player is functioning properly. The process is summarized in Figure 6-13. Perform the steps below starting with Procedure 1 and continuing with the other procedures as required.

Procedure 1: Sycard test

Procedure 2: PCMCIA socket replacement check

Procedure 1 SYCARD test

The SYCARD test card contains a PCMCIA test program. Ensure the card in fully inserted into the socket before running the program.

If an error occurs during the SYCARD test, perform Procedure 2. If no error occurs, it is likely the that original PC card was faulty.

Procedure 2 PCMCIA socket replacement check

The PCMCIA socket may be damaged or defective, for instance the socket pins can be bent. Disassemble the computer following the steps described in Chapter 4, Replacement Procedures and replace the socket. If the problem persists, the system board may be defective or damaged.

IEEE 1394 Troubleshooting

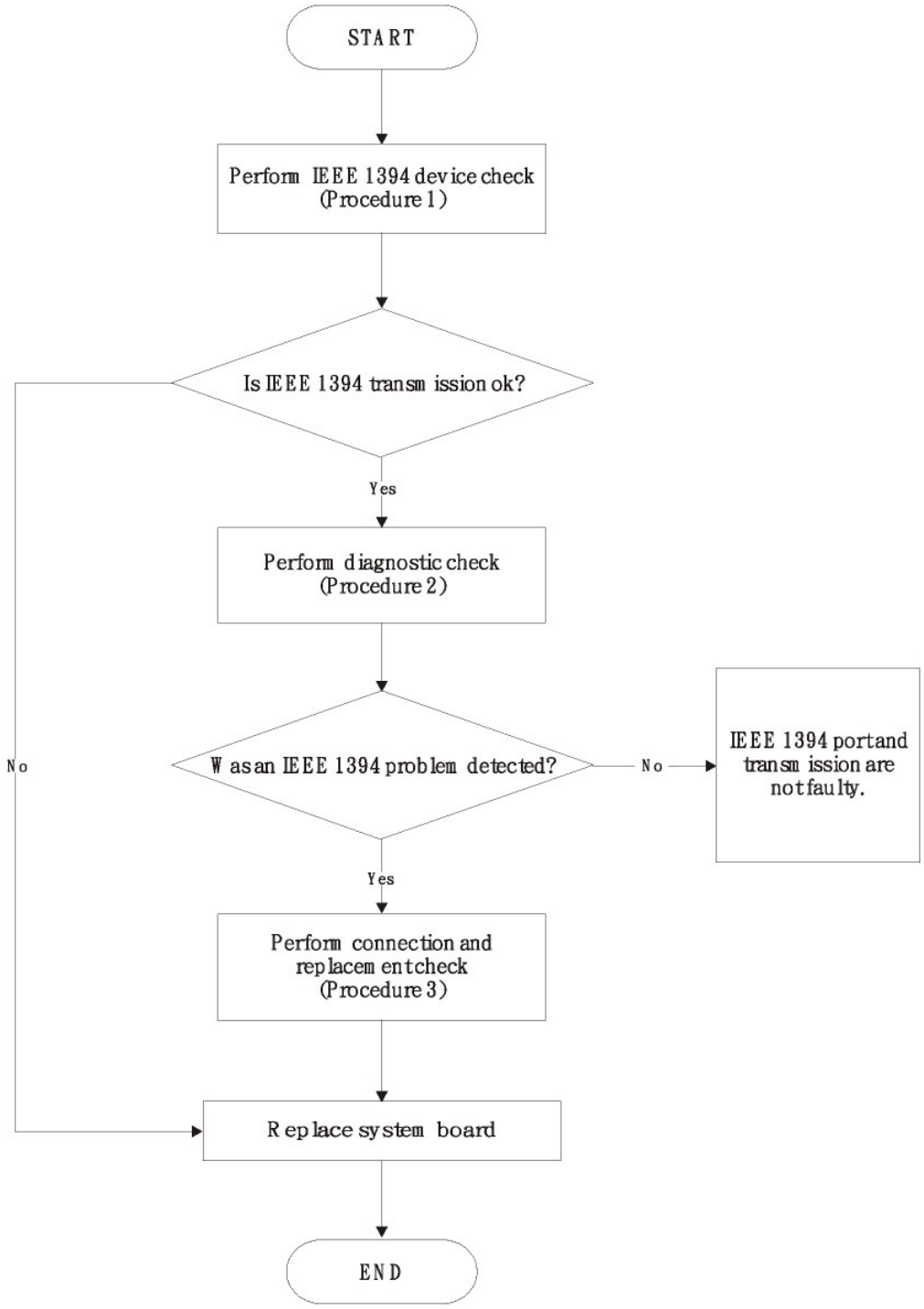


Figure 6-14 IEEE 1394 troubleshooting process

To determine if the computer's IEEE 1394 system is functioning properly, perform the following procedures. Figure 2-14 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: IEEE 1394 device check

Procedure 2: Diagnostic check

Procedure 3: Connection and replacement check

Procedure 1 IEEE 1394 device check

Connect an IEEE 1394 device to the computer's IEEE 1394 port, then boot the computer for Windows XP. The computer should automatically detect the 1394 device. Check whether the device can transmit data to the computer.

If the device is able to communicate with the computer, the problem may be intermittent or connections may be faulty. Go to Procedure 2.

If communication is impaired, there may be a faulty connection. Go to Procedure 3.

Procedure 2 Diagnostic check

Run the Diagnostic Program, which will automatically execute the IEEE 1394 port test to test transmission. Refer to Chapter 3, Tests and Diagnostics for more information on how to run the program.

If an error is located, go to Procedure 3. If an error does not occur, the 1394 port is functioning properly.

Procedure 3 Connection and replacement check

The transmission cable may be damaged or the connections may be loose. Perform Check 1:

Check 1 Make sure the transmission cable is firmly plugged into both the IEEE 1394-compatible device and the IEEE 1394 port of the computer. If the cable is connected correctly, go to Check 2.

Check 2 Make sure the IEEE 1394 port is firmly secured to the system board of the computer. If the malfunction persists, go to Check 3.

Check 3 The transmission cable may be damaged. Replace with a good cable. If the malfunction persists, go to Check 4.

Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter 4.

Wireless LAN Troubleshooting

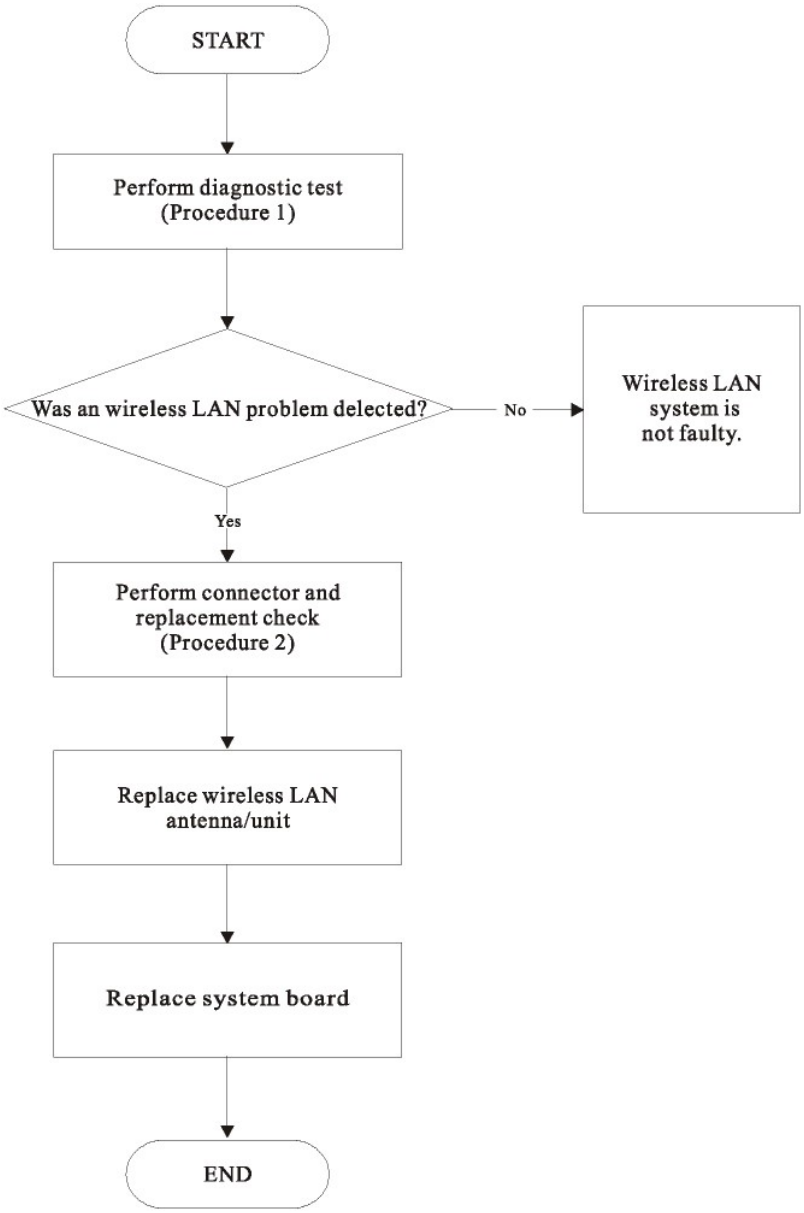


Figure 6-15 Wireless LAN troubleshooting process

The wireless LAN antenna wire, wireless LAN unit or system board may each be the source of a wireless LAN fault. Any of these components may be damaged. To determine if the computer's wireless LAN system is functioning properly, perform the following procedures. Figure 2-15 outlines the process. Start with Procedure 1 and continue with the other procedures as instructed.

Procedure 1: Diagnostic test

Procedure 2: Connector and replacement check

Procedure 1 Diagnostic test

Run the Diagnostic Program, which will automatically execute the wireless LAN test. Refer to Chapter 3, Tests and Diagnostics for more information on the program.

If an error is located, go to Procedure 2. If an error is not located, the wireless LAN system is functioning properly.

Procedure 2 Connector and replacement check

The wireless LAN antenna, wireless LAN unit or system board may be disconnected or damaged. Disassemble the computer following the steps described in Chapter 4, *Replacement Procedures*, and perform the following checks.

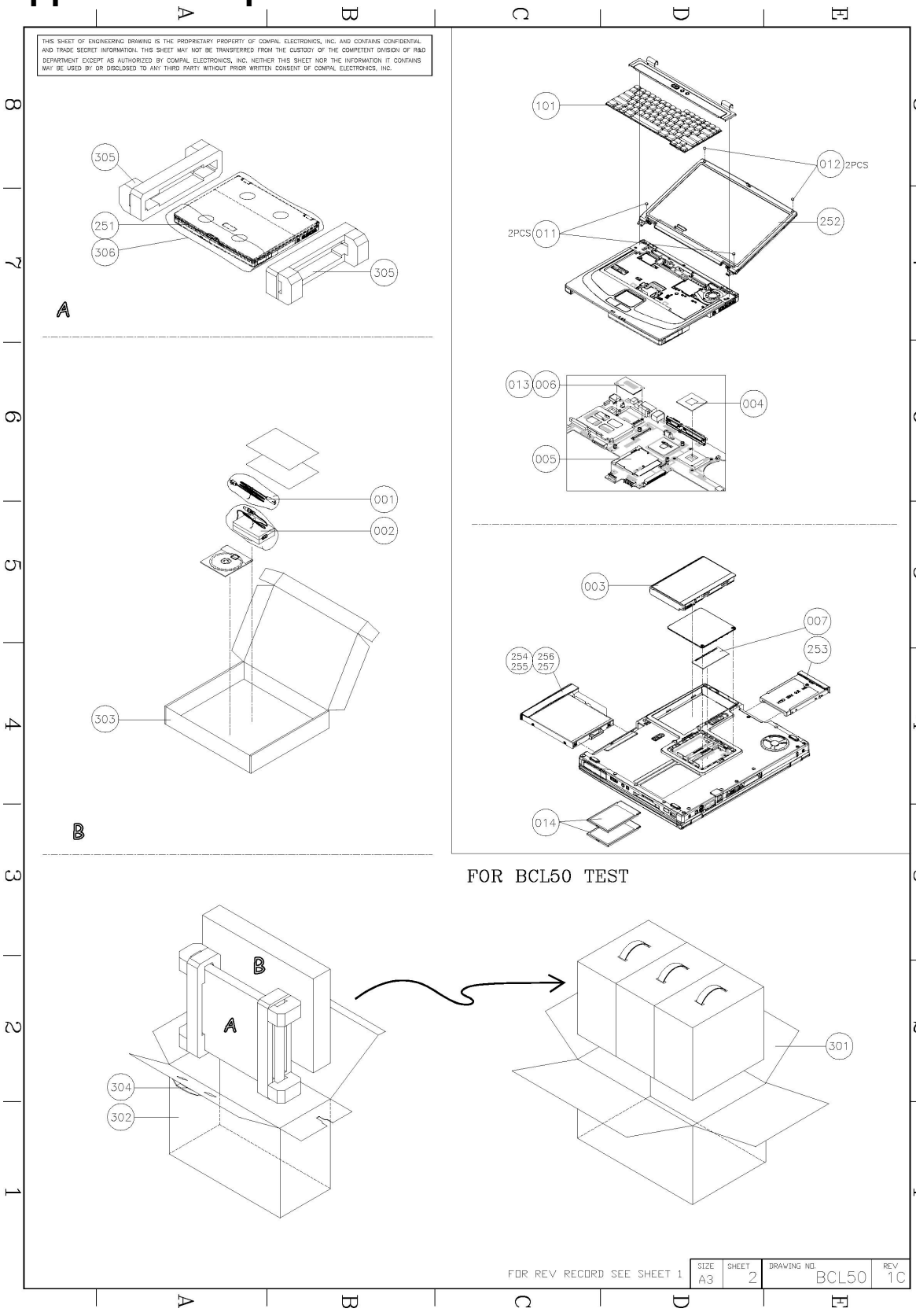
Check 1 Make sure that the wireless LAN antenna is firmly connected to the wireless LAN unit (refer to Chapter 4 for instructions) and that the wireless LAN unit is securely slotted into the system board. If the problem persists, go to Check 2.

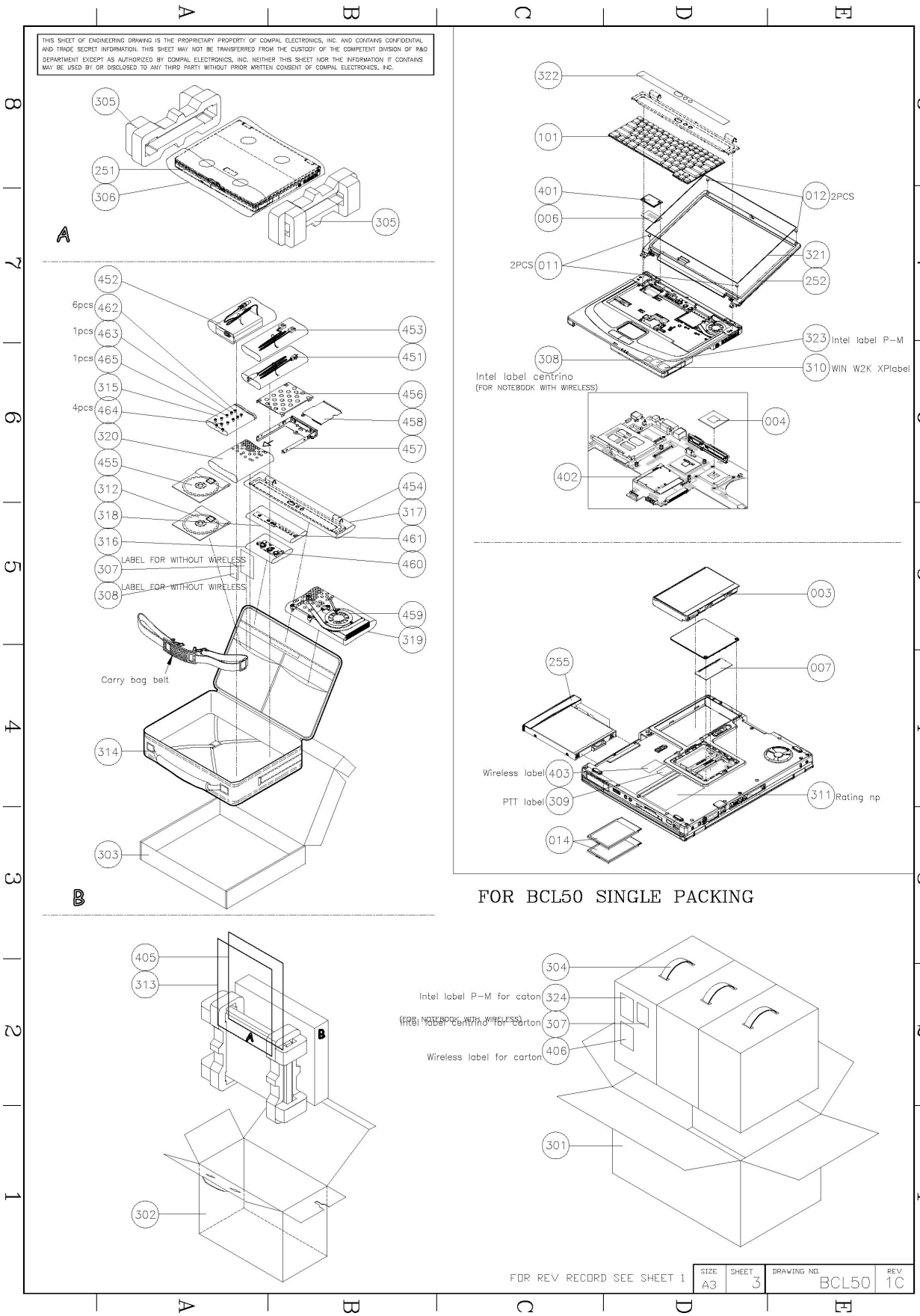
Check 2 Check that the wireless communication switch is turned to "On", then make sure that the wireless communication LED on the front panel is lit. If the LED is lit but the wireless LAN function is still faulty, the antenna may be damaged. Replace with a new antenna following the steps in Chapter 4, *Replacement Procedures*. If the problem persists, or if the wireless LAN LED is not lit when the wireless communication switch is turned to "On", go to Check 3.

Check 3 The wireless LAN unit may be damaged. Replace it with a new one following the instructions in Chapter 4. If the problem still exists, perform Check 4.

Check 4 The system board may be damaged. Replace it with a new one following the instructions in Chapter

Appendix A: Spare Parts

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323 Intel label P-M
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310 WIN W2K XPlabel
Intel label centrino
(FOR NOTEBOOK WITH WIRELESS)
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(FOR NOTEBOOK WITH WIRELESS)
Intel label centrino for carton 307
Wireless label for carton 406
301
FOR REV RECORD SEE SHEET 1
SIZE A3
SHEET 3
DRAWING NO. BCL50
REV 1C

Material List by Single-Item/Single-Level

Date : 04-23-2003
Time : 14:28:14 Drawing No: BCL50
Plant: TW01 Revision: 1C
Report by UID: 8745064

C	NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 50010	LOCATION
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	002	GA050070100	PWR CORD SP12NX1.8MXIS033 SPT-2 BLK	1	001
	003	PK100006020	AC ADAP LITE-ON PA-1600-07C A 19V/3.16A	1	002
	004	PK100009000	AC ADAP ACBEL API1AD02 60W 2P	1	002
	005	GC18658SYB0	BATT US18650G5 LI-ION 4300MAH BCL50	1	003
	006	AB805350030	IC RH80535GC0131M B-1 1.3G UFCPGA	1	004
	007	AB805350110	IC RH80535GC0171M B-1 1.4G UFCPGA	1	004
	008	AB805350210	IC RH80535GC0251M B-1 1.6G UFCPGA	1	004
	009	AB805350300	IC RH80535GC0211M B-1 1.5G UFCPGA	1	004
	010	AB805350400	IC RH 80535GC0***M B-1 1.7G UFCPGA	1	004
*	011	PK292000710	W/L CARD ACT10 WLL030 ASKEY	1 95 --	005
	012	PK292002600	W/L CARD BCL50 WLL220 802.11a+b ASKEY	1	005
*	013	PK292003210	W/L CARD WW3B2100WW_ROW	1 95 --	005
	014	PK010004900	F/D MODEM ACL00 MDC56S-I MDC	1	006
	015	PK051021020	DDR MODU SAM M470L3224DT0-CB0 256M/266	1	007
	016	PK051022400	DDR MODU HYN HYMD232M646A6-H 256M/266	1	007
	017	PK051030700	DDR MODU SAM M470L6423DN0-CB0 512/266	1	007
	018	PK051030900	DDR MODU NAN NT512D64S8HAKWM-7K 512/266	1	007
	019	ELCL505P000	CL50_LCD_SCREW_PAD	2	011
	020	FHCL505N000	CL50_LCD_RUBBER_PAD	2	012
	021	PK320001200	B_T_ MODU BILLIONTON MDC BTSC	1	013
	022	FC51688T000	5168 DUMMY CARD 2 8T000 NO 13 PIN	1	014
	023	PK13CL50000	K/B PACK ZIPPY BCL50 US REV00 A30	1	101
	024	PK13CL50010	K/B PACK ZIPPY BCL50 UK REV00 A30	1	101
	025	PK13CL50020	K/B PACK ZIPPY BCL50 TR REV00 A30	1	101
	026	PK13CL50030	K/B PACK ZIPPY BCL50 TI REV00 A30	1	101
	027	PK13CL50040	K/B PACK ZIPPY BCL50 SW REV00 A30	1	101
	028	PK13CL50050	K/B PACK ZIPPY BCL50 SP REV00 A30	1	101
	029	PK13CL50060	K/B PACK ZIPPY BCL50 SD REV00 A30	1	101
	030	PK13CL50070	K/B PACK ZIPPY BCL50 RU REV00 A30	1	101
	031	PK13CL50080	K/B PACK ZIPPY BCL50 PO REV00 A30	1	101
	032	PK13CL50090	K/B PACK ZIPPY BCL50 NW REV00 A30	1	101
	033	PK13CL500A0	K/B PACK ZIPPY BCL50 KO REV00 A30	1	101
	034	PK13CL500B0	K/B PACK ZIPPY BCL50 JA REV00 A30	1	101
	035	PK13CL500C0	K/B PACK ZIPPY BCL50 IT REV00 A30	1	101
	036	PK13CL500D0	K/B PACK ZIPPY BCL50 GR REV00 A30	1	101
	037	PK13CL500E0	K/B PACK ZIPPY BCL50 FR REV00 A30	1	101
	038	PK13CL500F0	K/B PACK ZIPPY BCL50 DM REV00 A30	1	101
	039	PK13CL500G0	K/B PACK ZIPPY BCL50 CZ REV00 A30	1	101
	040	PK13CL500H0	K/B PACK ZIPPY BCL50 CH REV00 A30	1	101
	041	PK13CL500J0	K/B PACK ZIPPY BCL50 CF REV00 A30	1	101
	042	PK13CL500K0	K/B PACK ZIPPY BCL50 BE REV00 A30	1	101
	043	PK13CL500L0	K/B PACK ZIPPY BCL50 AR-E REV00 A30	1	101
	044	PK13CL50100	K/B PACK SILITEK BCL50 US REV00 A30	1	101
	045	PK13CL50110	K/B PACK SILITEK BCL50 UK REV00 A30	1	101
	046	PK13CL50120	K/B PACK SILITEK BCL50 TR REV00 A30	1	101
	047	PK13CL50130	K/B PACK SILITEK BCL50 TI REV00 A30	1	101
	048	PK13CL50140	K/B PACK SILITEK BCL50 SW REV00 A30	1	101
	049	PK13CL50150	K/B PACK SILITEK BCL50 SP REV00 A30	1	101

Material List by Single-Item/Single-Level

Date : 04-23-2003
Time : 14:28:14 Drawing No: BCL50
Plant: TW01 Revision: 1C
Report by UID: 8745064

C NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 50010	LOCATION
050	PK13CL50160	K/B PACK SILITEK BCL50 SD REV00 A30	1	101
051	PK13CL50170	K/B PACK SILITEK BCL50 RU REV00 A30	1	101
052	PK13CL50180	K/B PACK SILITEK BCL50 PO REV00 A30	1	101
053	PK13CL50190	K/B PACK SILITEK BCL50 NW REV00 A30	1	101
054	PK13CL501A0	K/B PACK SILITEK BCL50 KO REV00 A30	1	101
055	PK13CL501B0	K/B PACK SILITEK BCL50 JA REV00 A30	1	101
056	PK13CL501C0	K/B PACK SILITEK BCL50 IT REV00 A30	1	101
057	PK13CL501D0	K/B PACK SILITEK BCL50 GR REV00 A30	1	101
058	PK13CL501E0	K/B PACK SILITEK BCL50 FR REV00 A30	7	101
059	54BR0130001	SYS.BCL50 W/BT & WLAN	1	251
060	51098630001	LCD ASSY-AU 14" XGA BCL50	1	252
061	51098630002	LCD ASSY-CPT 14" XGA BCL50	1	252
062	51098630003	LCD ASSY-CMO 14" XGA BCL50	1	252
063	51098630004	LCD ASSY-LG 15" XGA BCL50	1	252
064	51098630005	LCD ASSY-SAY 15" XGA BCL50	1	252
065	51098630006	LCD ASSY-HIT 15" XGA BCL50	1	252
066	51098630007	LCD ASSY-HIT 15" SXGA BCL50	1	252
067	51098630008	LCD ASSY-AU 15" SXGA BCL50	1	252
068	51099330001	HDD ASSY 20G TOS (2.5) BCL50	1	253
069	51099330002	HDD ASSY 30G TOS (2.5) BCL50	1	253
070	51099330003	HDD ASSY 40G TOS (2.5)BCL50	1	253
071	51099330004	HDD ASSY 60G TOS (2.5) BCL50	1	253
072	51099330005	HDD ASSY 20G IBM (2.5) BCL50	1	253
073	51099330006	HDD ASSY 30G IBM (2.5) BCL50	1	253
074	51099330007	HDD ASSY 40G IBM (2.5) BCL50	1	253
075	51099330008	HDD ASSY 60G IBM (2.5) BCL50	1	253
076	51099330009	HDD ASSY 20G HIT (2.5) BCL50	1	253
077	51099330010	HDD ASSY 30G HIT (2.5) BCL50	1	253
078	51099330011	HDD ASSY 40G HIT (2.5) BCL50	1	253
079	51099330012	HDD ASSY 60G HIT (2.5) BCL50	1	253
080	51098830001	DVD-ROM ASSY-TOS 8X SHARP BCL50	1	254
081	51098830002	DVD-ROM ASSY-LIT 8X BCL50	1	254
082	51098830003	DVD-ROM ASSY-TOS 8X AVC BCL50	1	254
083	51099030001	COMBO ASSY-TOS 24X (SHA) BCL50	1	255
084	51099030002	COMBO ASSY-KME 24X BCL50	1	255
085	51099030003	COMBO ASSY-QSI 24X BCL50	1	255
086	51099030004	COMBO ASSY-TOS 24X (MTM) BCL50	1	255
087	51098730001	CD-ROM ASSY-TEAC 24X BCL50	1	256
088	51098730002	CD-ROM ASSY-SAM 24X BCL50	1	256
089	51098930001	CD-RW ASSY-KME 24X BCL50	1	257
090	51098930002	CD-RW ASSY-TEAC 24X BCL50	1	257
091	64009830001	PACKING BCL50 14.1"/15" TEST singe	1	300

Material List by Single-Item/Single-Level

Date : 04-23-2003
Time : 14:28:14 Drawing No: BCL50
Plant: TW01 Revision: 1C
Report by UID: 8745064

C	NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 50110					LOCATION
	#	BCL50110	030 14"/15" LCD MP	REF	-	-	-	-	
	001	AB805350030	IC RH80535GC0131M B-1 1.3G UFCPGA	1					004
	002	AB805350300	IC RH80535GC0211M B-1 1.5G UFCPGA	1					004
	003	PK051021020	DDR MODU SAM M470L3224DT0-CB0 256M/266	1					007
	004	PK051022400	DDR MODU HYN HYMD232M646A6-H 256M/266	1					007
	005	PK13CL50000	K/B PACK ZIPPY BCL50 US REV00 A30	1					101
	006	PK13CL50070	K/B PACK ZIPPY BCL50 RU REV00 A30	1					101
	007	54BR0130002	SYS.UNIT FOR MP BCL50	1					251
	008	51098630001	LCD ASSY-AU 14" XGA BCL50	1	01				252
					--				
	009	51098630002	LCD ASSY-CPT 14" XGA BCL50	1	01				252
					--				
	010	51098630003	LCD ASSY-CMO 14" XGA BCL50	1	01				252
					--				
	011	51098630004	LCD ASSY-LG 15" XGA BCL50	1	04				252
					--				
	012	51098630005	LCD ASSY-SAY 15" XGA BCL50	1	04				252
					--				
	013	51098630006	LCD ASSY-HIT 15" XGA BCL50	1	04				252
					--				
	014	51098630007	LCD ASSY-HIT 15" SXGA BCL50	1	07				252
					--				
	015	51098630008	LCD ASSY-AU 15" SXGA BCL50	1	07				252
					--				
*	016	51099030001	COMBO ASSY-TOS 24X (SHA) BCL50	1	30				255
					--				
*	017	51099030003	COMBO ASSY-QSI 24X BCL50	1	30				255
					--				
*	018	51099030004	COMBO ASSY-TOS 24X (MTM) BCL50	1	30				255
					--				
	019	64009830002	PACKING BCL50 14.1" SINGLE	1					300
	020	64009830003	PACKING BCL50 15" SINGLE	1					300
	021	64009830004	PACKING BCL50 14.1" BULK	1					300
	022	64009830005	PACKING BCL50 15" BULK	1					300
	023	X6689830001	W/L CARD PRO 2100 11B INTEL BCL50 SINGLE	1					400
	024	X6689830002	W/L CARD PRO 2100 11B INTEL BCL50 BULK	1					400
	025	X6689830003	W/L CARD WLL220 11A+B ASKEY BCL50 SINGLE	1					400
	026	X6689830004	W/L CARD WLL220 11A+B ASKEY BCL50 BULK	1					400
	027	X6689830005	W/L 2100 NA 11B INTEL BCL50 SINGLE	1					400
	028	X6689830006	W/L 2100 NA 11B INTEL BCL50 CONSIGN SING	1					400
	029	X6689830007	W/L 2100 WW 11B INTEL BCL50 CONSIGN SING	1					400
	030	X6689930001	PIZZA BOX FOR MP BCL50	1					450
	031	51099330003	HDD ASSY 40G TOS (2.5)BCL50	1					W/O DRAW(for C-test)
	032	X6624930001	COMMON PARTS FOR MP BCL50	1					X66

END OF REPORT

Material List by Single-Item/Single-Level

Date : 04-01-2003
Time : 15:02:06 Drawing No: 640098
Plant: TW01 Revision: 1A
Report by UID: 8745064

C NO	PART NO	DESCRIPTION	QUANTITY REQUIRED					LOCATION		
			30001	30002	30003	30004	30005			
#	64009830001	PACKING BCL50 14.1"/15" TEST singe	REF	-	-	-	-			
#	64009830002	PACKING BCL50 14.1" SINGLE	-	REF	-	-	-			
#	64009830003	PACKING BCL50 15" SINGLE	-	-	REF	-	-			
#	64009830004	PACKING BCL50 14.1" BULK	-	-	-	REF	-			
#	64009830005	PACKING BCL50 15" BULK	-	-	-	-	REF			
001	HB4ACY13000	OUTER CARTON C-ACY13-030	-	-	-	-	-			
			0.334	-	-	-	-	301		
002	HB4BCL50000	OUTER CARTON C-BCL50-030	-	0.330	0.330	-	-	301		
003	HB4BCL50100	OUTER CARTON C-BCL50-030 BULK	-	-	-	0.200	0.200	301		
004	HB2BCL50000	CARTON C-BCL50-030 SINGLE	-	1	1	-	-	302		
005	HB2CY250010	CARTON C-CY25-030 R1	1	-	-	-	-	302		
006	HC2ACY13000	INNER CARTON C-ACY13-030	1	-	-	-	-	303		
007	HC2BCL50000	INNER CARTON C-BC50-030	-	1	1	-	-	303		
008	FCTLP2S0116	HANDLE FOR CARTON	1	1	1	-	-	304		
009	FJCL509D000	BCL50_PACKAGE_EPE	1	2	2	-	-	305		X
010	HK3N30W0000	PE BAG N30W-K001 FOR NOTEBOOK	1	1	1	1	1	306		
011	HGBCL500300	INTEL LABEL-CENTRINO CL50-L004 CARTON	-	1	1	-	-	307		
012	HGBCL500400	INTEL LABEL-CENTRINO CL50-L005 NB	-	1	1	1	1	308		
013	HGBCL500500	PTT LABEL CL50-L006 CHA	-	1	1	1	1	309		
014	HGN32N21200	WIN W2K XP LABEL L-213 W2K/XP	-	1	1	1	1	310		
015	EJ4BCL50000	RATING NP-14.1" N-BCL50-030	-	1	-	1	-	311		
016	EJ4BCL50100	RATING NP-15" N-BCL50-030	-	-	1	-	1	311		
017	HDBCL500000	USER'S MANUAL U-CL50-030 ON-LINE CD	-	1	1	-	-	312		
018	HF6BCL50100	QUICK START GUIDE-BCL50-030	-	1	1	-	-	313		
019	HH4TS30I001	CARRY BAG TS30I-H001-030	-	1	1	-	-	314		
020	HK3PM564100	ZIPPER BAG NO.2 TPM564-K002 FOR PCK SCRE	-	1	1	-	-	315		
021	HK3PM564100	ZIPPER BAG NO.2 TPM564-K002 FOR PCK SCRE	-	-	-	0.200	0.200	315A		
022	HK3TS30C005	PE BAG TS30C-K001 FOR ADAPTER	-	1	1	1	1	316		
023	HK3TNB00414	PE BAG L390XW80XT0.04MM BATT STAND	-	1	1	1	1	317		
024	HK3TNB10207	SHIELDING BAG L150XW75XT3.7MIL	-	1	1	1	1	318		
025	HK3TS31J707	BUBBLE BAG TS31J-K008 FOR BATTERY	-	1	1	1	1	319		
026	HK3TNB30003	BUBBLE BAG L120XW95XT0.5MM	-	1	1	1	1	320		
027	FJCL506L000	CL50_LOG_UP_EPE_SHEET	-	1	1	-	-	321		
028	HECL506J000	CL50_PAPER_PAD_FOR_STRIP_COVER	-	1	1	-	-	322		
029	HGBCL500700	INTEL LABEL P-M CL50-L008 NB 252464	-	1	1	1	1	323		
030	HGBCL500800	INTEL LABEL P-M CL50-L009 CARTON 252466	-	1	1	-	-	324		
031	HABCL500000	GIFT BOX C-CL50-030 BULK	-	-	-	0.200	0.200	331		
032	HEBCL500000	PAPER PAD CL50-E001 FOR BULK	-	-	-	0.200	0.200	332		
033	HG32N307600	WIN XP LAB 32N-L077 7121-8169 GM	-	-	-	1	1	333		
034	HGATR100300	INTEL LABEL-P4 ATR10-L004 NB/250198	-	-	-	1	1	334		
035	HK3CT100000	DISPLAY COVER BAG CT10-K001 FOR 15"	-	-	-	1	1	335		

END OF REPORT

Material List by Single-Item/Single-Level

Date : 03-24-2003
Time : 15:15:34 Drawing No: X66252
Plant: TW01 Revision: 1A
Report by UID: 8745064

C	NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30001	30002				LOCATION		
	#	X6625230001	MEC PARTS BCL50	REF	-	-	-	-			
	#	X6625230002	MEC PARTS FOR MP BCL50	-	REF	-	-	-			
	001	AMCL5039000	BCL50_MDC_COVER_PLATE_ASSY	1	1				301		
	002	AMCL5042000	BCL50_THERMAL_PLATE_ASSY	1	-				302		
	003	APCL5010000	CL50_LOG_LOW_SUBASSY	1	1				303		
	004	APCL503G000	BCL50_STRIP_COVER_ASSY	1	-				304		
	005	ATCL5086000	CL50_THERMAL_ASSY	1	-				305		
	006	ELCL503X000	BCL50_MDC_HAUL_TAPE	1	1				306		
	007	FBCL503F000	BCL50_POWER_BTN	1	-				307		
*	008	MAC925003Z0	SCREW M2.5_9_5.5*0.8_03_R00	12	6				308		X
	009	MAC925006Z0	SCREW M2.5_9_5.5*0.8_06_R00	22	21				309		X
	010	MMCK25110Z0	SCREW_M2.5_K_11X0.45_NL	3	3				310		
	011	MMCK25150Z0	SCREW_M2.5_K_15X0.45_NL	1	-				311		

END OF REPORT

Material List by Single-Item/Single-Level

Date : 04-23-2003
Time : 14:29:43 Drawing No: X66898
Plant: TW01 Revision: 1B
Report by UID: 8745064

C	NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30001	30002	30003	30004	30005	LOCATION		
	#	X6689830001	W/L CARD PRO 2100 11B INTEL BCL50 SINGLE	REF	-	-	-	-			
	#	X6689830002	W/L CARD PRO 2100 11B INTEL BCL50 BULK	-	REF	-	-	-			
	#	X6689830003	W/L CARD WLL220 11A+B ASKEY BCL50 SINGLE	-	-	REF	-	-			
	#	X6689830004	W/L CARD WLL220 11A+B ASKEY BCL50 BULK	-	-	-	REF	-			
	#	X6689830005	W/L 2100 NA 11B INTEL BCL50 SINGLE	-	-	-	-	REF			
	001	ELCL508J000	CL50_MINIPCI_SUP	1	1	-	-	1	401		
	002	PK292002600	W/L CARD BCL50 WLL220 802.11a+b ASKEY	-	-	1	1	-	402		
*	003	PK292003210	W/L CARD WW3B2100WW_ROW	1	1	-	-	-	402		
	004	PK292003310	W/L CARD WW3B2100NA_MOW	-	-	-	-	1	402		
	005	HGBCL500000	WIRELESS LABEL CL50-L001 FOR INTEL	1	1	-	-	-	403		
	006	HGBCL500010	WIRELESS LABEL CL50-L001 FOR INTEL R1	-	-	-	-	1	403		
	007	HGBCL500200	WIRELESS LABEL CL50-L003 FOR ASKEY	-	-	1	1	-	403		
	008	HF6CY250000	ADDENDUM SHEET F-CY25-030 WIRELESS	1	1	1	1	1	405		
	009	HGCY2500100	WIRELESS LABEL CY25-L002 FOR CARTON	1	-	1	-	1			X
				-	0.200	-	0.200	-	406		

Material List by Single-Item/Single-Level

Date : 04-23-2003
Time : 14:29:43 Drawing No: X66898
Plant: TW01 Revision: 1B
Report by UID: 8745064

C NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30006	30007			LOCATION
#	X6689830006	W/L 2100 NA 11B INTEL BCL50 CONSIGN SING	REF	-	-	-	
#	X6689830007	W/L 2100 WW 11B INTEL BCL50 CONSIGN SING	-	REF	-	-	
001	ELCL508J000	CL50_MINIPCI_SUP	1	1			401
002	PK292003230	W/L CARD A30 BCL50 WM3B2100WW CH14	-	1			402
003	PK292003330	W/L CARD A30 BCL50 WM3B2100NA CH11	1	-			402
004	HGBCL500010	WIRELESS LABEL CL50-L001 FOR INTEL R1	1	1			403
005	HF6CY250000	ADDENDUM SHEET F-CY25-030 WIRELESS	1	1			405
006	HGCY2500100	WIRELESS LABEL CY25-L002 FOR CARTON	1	1			406

END OF REPORT

Material List by Single-Item/Single-Level

Date : 04-09-2003
Time : 14:08:17 Drawing No: X66249
Plant: TW01 Revision: 1B
Report by UID: 8745064

C	NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30001	LOCATION
	#	X6624930001	COMMON PARTS FOR MP BCL50	REF - - - -	
*	001	GC18658SYB0	BATT US18650G5 LI-ION 4300MAH BCL50	1	003
	002	PK010004900	F/D MODEM ACL00 MDC56S-I MDC	1	006
	003	ELCL505P000	CL50_LCD_SCREW_PAD	2	011
	004	FHCL505N000	CL50_LCD_RUBBER_PAD	2	012
	005	FC51688T000	5168 DUMMY CARD 2 8T000 NO 13 PIN	1	014

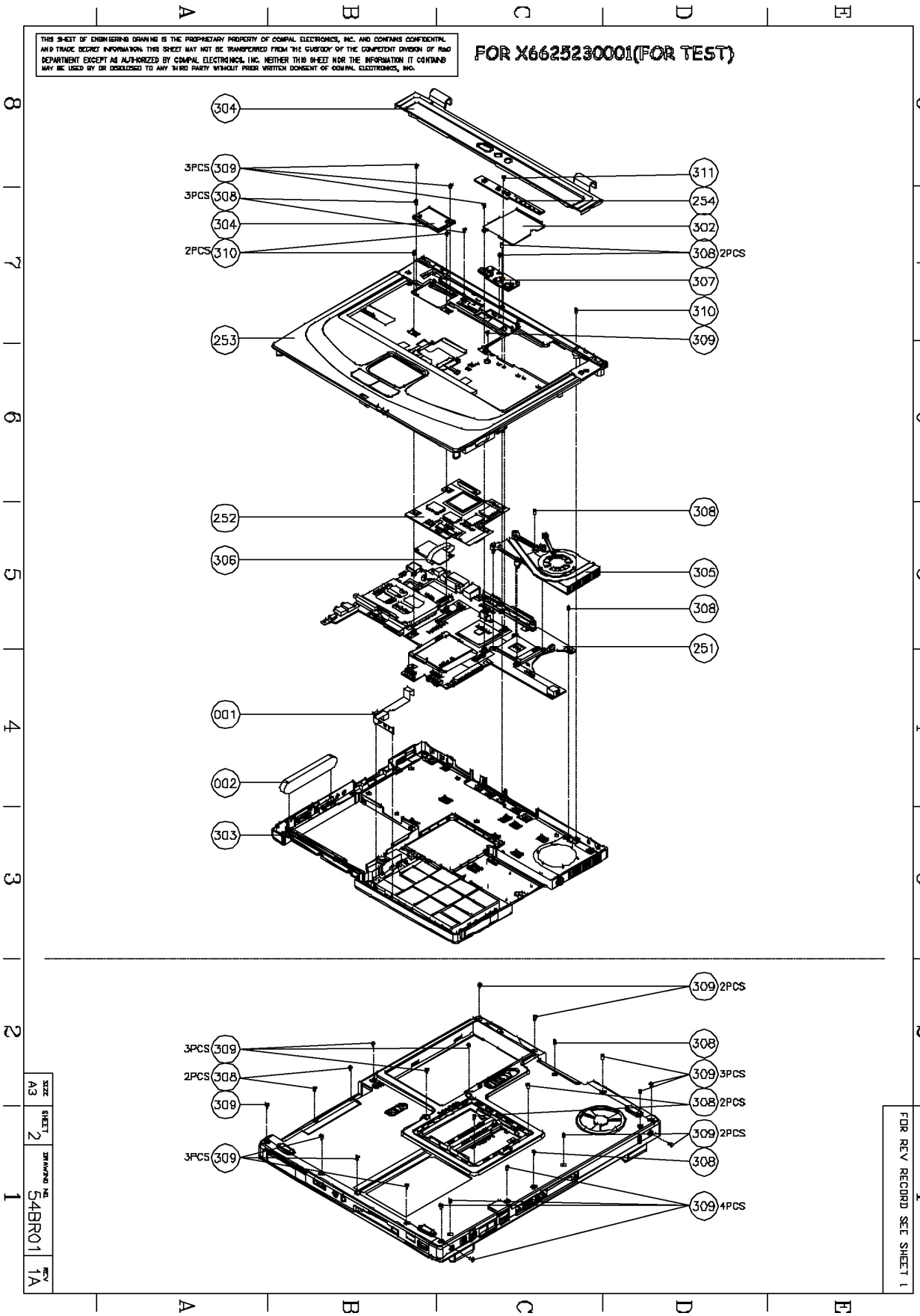
END OF REPORT

Material List by Single-Item/Single-Level

Date : 04-24-2003
Time : 16:24:07 Drawing No: X66899
Plant: TW01 Revision: 1C
Report by UID: 8745064

C	NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30001				LOCATION
	#	X6689930001	PIZZA BOX FOR MP BCL50	REF	-	-	-	
	001	GA020260000	PWR CORD LP21X1.8MXLS7 EC 2P L	1				451
	002	GA050070100	PWR CORD SP12NX1.8MXIS033 SPT-2 BLK	1	04			451
					--			
	003	GA050100000	PWR CORD LP5X1.8MXLS7C US 2P L	1	04			451
					--			
	004	PK100006020	AC ADAP LITE-ON PA-1600-07C A 19V/3.16A	1	01			452
					--			
	005	PK100009000	AC ADAP ACBEL API1AD02 60W 2P	1	01			452
					--			
	006	DC080000000	PHONE CB N51B2 RJ11-RJ11 2M 6P4C	1				453
	007	APCL503G000	BCL50_STRIP_COVER_ASSY	1				454
*	008	LC55CL50010	CL50 UTILITY DRIVERS CD VER:1.10	1				455
	009	AMCL501V000	CL50_HDD_ESD_PLATE_ASSY	1				456
	010	APCL501S000	CL50_HDD_CARRIER_ASSY	1				457
	011	AMCL5042000	BCL50_THERMAL_PLATE_ASSY	1				458
	012	ATCL5086000	CL50_THERMAL_ASSY	1				459
	013	FBCL503F000	BCL50_POWER_BTN	1				460
	014	43562530001	SMT POWER/B LS-1672 BCL50	1				461
	015	MAC925003Z0	SCREW M2.5_9_5.5*0.8_03_R00	6				462
	016	MAC925006Z0	SCREW M2.5_9_5.5*0.8_06_R00	1				463
	017	MACL509C000	CL50_HDD_SCREW	4				464
	018	MMCK25150Z0	SCREW_M2.5_K_15X0.45_NL	1				465

END OF REPORT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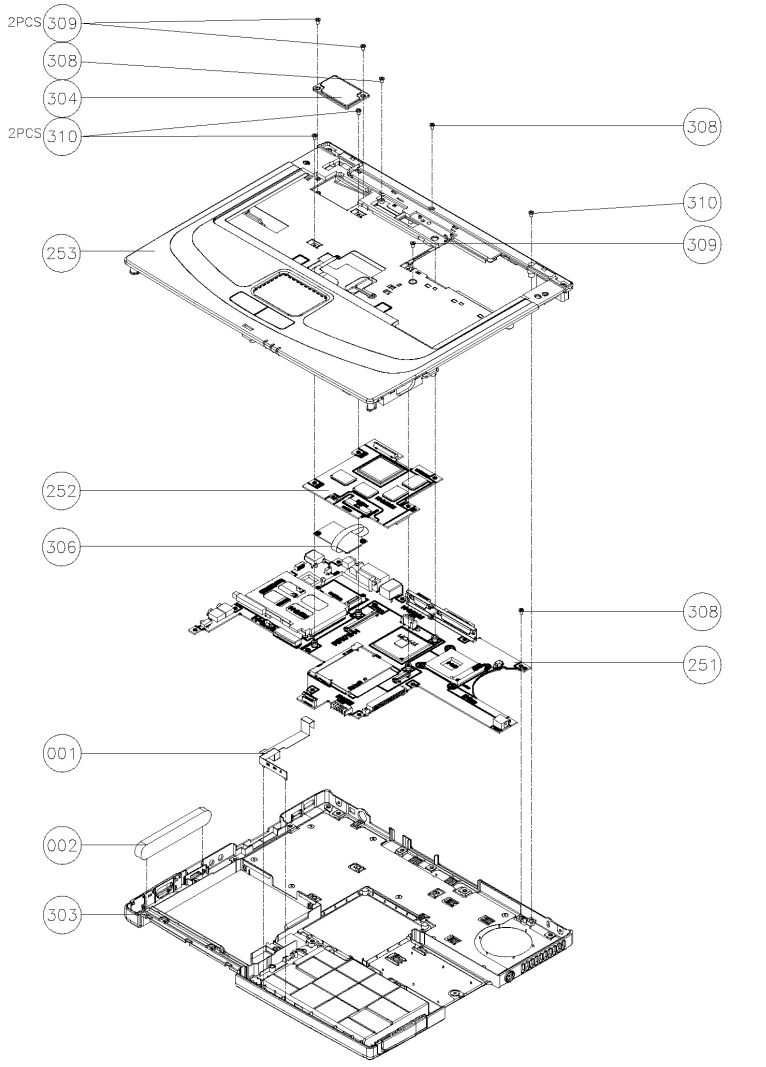
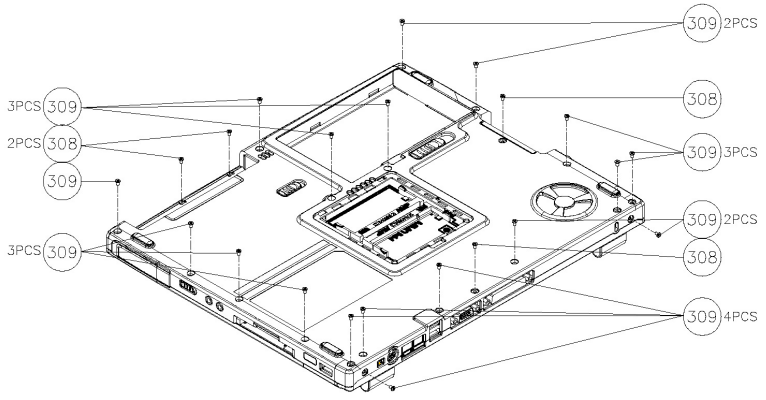
FOR X6625230001(FOR TEST)
304
3PCS 309
3PCS 308
304
2PCS 310
253
252
306
001
002
303
311
254
302
308 2PCS
307
310
309
308
305
308
251
309 2PCS
3PCS 309
2PCS 308
309
3PCS 309
308
309 3PCS
308 2PCS
309 2PCS
308
309 4PCS
FOR REV RECORD SEE SHEET 1
SIZE A3
SHEET 2
DRAWING NO. 54BR01
REV 1A

FOR X6625230002(FOR MP)





SIZE	SHEET	DRAWING NO.	REV
A3	3	54BR01	1A

FOR REV RECORD SEE SHEET 1

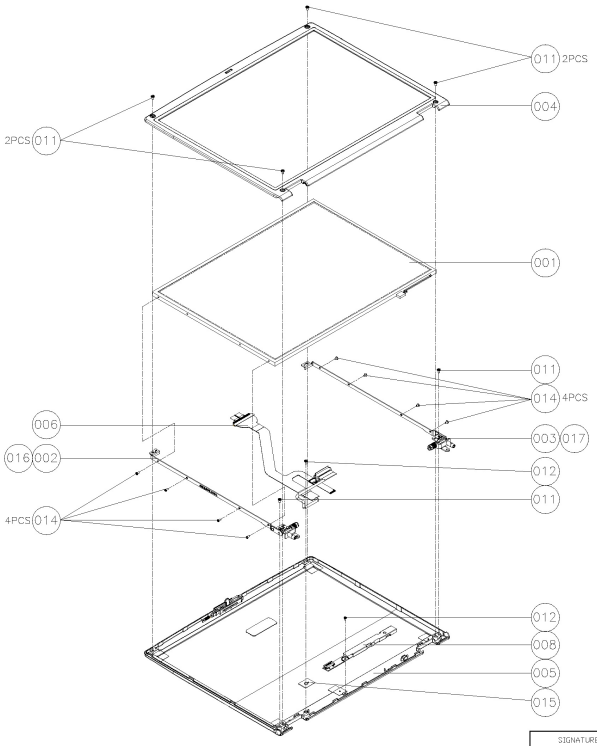
Material List by Single-Item/Single-Level

Date : 03-25-2003
Time : 17:37:06 Drawing No: 54BR01
Plant: TW01 Revision: 1A
Report by UID: 8745064

C NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30001	30002				LOCATION
#	54BR0130001	SYS.BCL50 W/BT & WLAN	REF	-	-	-	-	
#	54BR0130002	SYS.UNIT FOR MP BCL50	-	REF	-	-	-	
* 001	DA3CL50L110	FPC BCL50 LF-1672 REV1 LED	1	1				001
002	GCA20080500	BATT SET 6/V80H NI-MH 80MAH BCL50	1	1				002
003	46124030001	PCBA M/B LA-1671 BCL50 W/BT & WLAN	1	1				251
* 004	45562430001	PCBA VGA/B LS-1671 BCL50	1	1				252
005	51099430001	LOGIC UPPER ASSY BCL50	1	1				253
006	43562530001	SMT POWER/B LS-1672 BCL50	1	-				254
007	X6625230001	MEC PARTS BCL50	1	-				300
008	X6625230002	MEC PARTS FOR MP BCL50	-	1				300

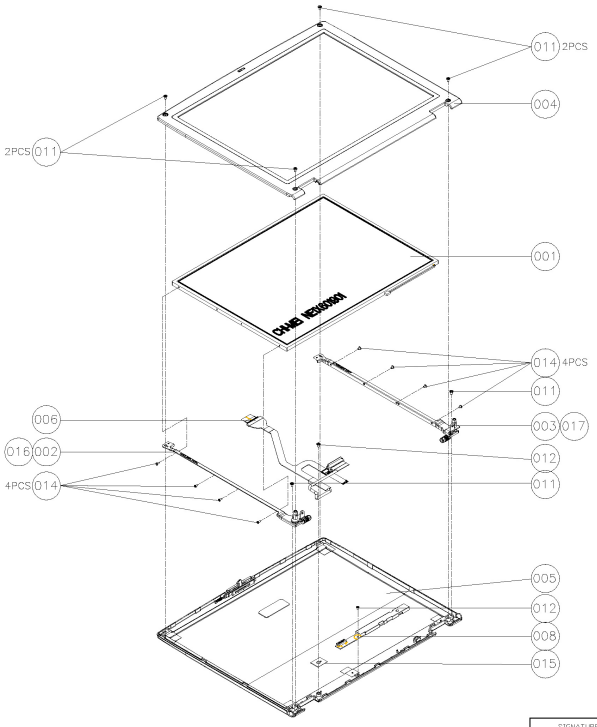
END OF REPORT

FOR 15"



SIGNATURE	DATE	Compal Electronics,Inc.	
DRN BY Huamei HU	92-04-01	TITLE	LCD ASSY
CHK BY			
PRJ ENGR			
ENGR APPD			
FIRST APPLICATION		DRAWING NO.	510986 REV 1B
MODEL NAME BCL50	SIZE A4 SHEET 2		

FOR 14.1"



SIGNATURE	DATE	Compal Electronics,Inc.	
DRN BY Huamei HU	92-04-01	TITLE	LCD ASSY
CHK BY			
PRJ ENGR			
ENGR APPD			
FIRST APPLICATION		DRAWING NO.	510986 REV 1B
MODEL NAME BCL50	SIZE A4 SHEET 3		

Material List by Single-Item/Single-Level

Date : 04-10-2003
Time : 17:19:39 Drawing No: 510986
Plant: TW01 Revision: 1B
Report by UID: 8745064

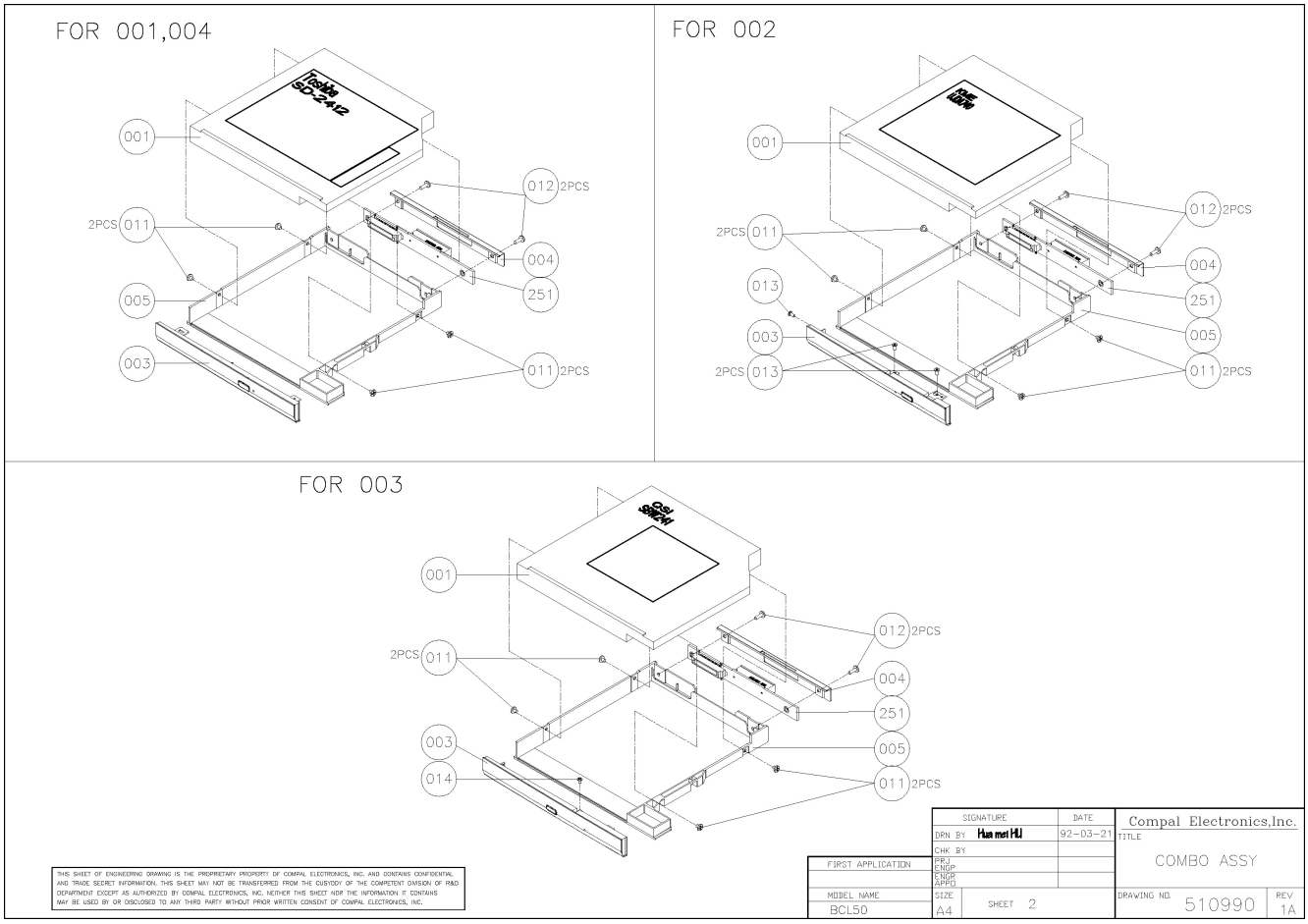
C	NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30001	30002	30003	30004	30005	LOCATION
	#	51098630001	LCD ASSY-AU 14" XGA BCL50	REF	-	-	-	-	
	#	51098630002	LCD ASSY-CPT 14" XGA BCL50	-	REF	-	-	-	
	#	51098630003	LCD ASSY-CMO 14" XGA BCL50	-	-	REF	-	-	
	#	51098630004	LCD ASSY-LG 15" XGA BCL50	-	-	-	REF	-	
	#	51098630005	LCD ASSY-SAY 15" XGA BCL50	-	-	-	-	REF	
	001	AC600019310	LCD MODU N141X6-L01 14.1" (CMO)	-	-	1	-	-	001
	002	AC600024010	LCD MODU CLAA141XF01 REV2 14.1" (CPT)	-	1	-	-	-	001
	003	AC600024130	LCD MODU LP150X05-A2M2 15.0" LG	-	-	-	1	-	001
	004	AC600024730	LCD MODU B141XN04 V.2 5AXXX 14.1" AU	1	-	-	-	-	001
	005	AC600025900	LCD MODU TM150XG-02L11 15.0" (SANYO)	-	-	-	-	1	001
*	006	AMCL505J000	CL50_141_LCD_BRK_L_ASSY	1	1	1	-	-	002
*	007	AMCL505L000	CL50_150_LCD_BRK_L_ASSY	-	-	-	1	1	002
*	008	AMCL505K000	CL50_141_LCD_BRK_R_ASSY	1	1	1	-	-	003
*	009	AMCL505M000	CL50_150_LCD_BRK_R_ASSY	-	-	-	1	1	003
	010	FACL5054000	CL50_141_LCD_BEZEL	1	1	1	-	-	004
	011	FACL5055000	CL50_150_LCD_BEZEL	-	-	-	1	1	004
*	012	AMCL506T000	CL50_LCD_COVER_GRAYBLUE_ASSY	1	1	1	1	1	005
	013	DC025044700	H-CON SET BCL50 M/B-LCD AU 14.1 COAX	1	-	-	-	-	006
	014	DC025044800	H-CON SET BCL50 M/B-LCD CPT 14.1 COAX	-	1	-	-	-	006
	015	DC025044900	H-CON SET BCL50 M/B-LCD CMO 14.1 COAX	-	-	1	-	-	006
	016	DC025045100	H-CON SET BCL50 M/B-LCD LG 15 XGA COAX	-	-	-	1	-	006
	017	DC025046300	H-CON SET BCL50 M/B-LCD SANYO 15 XGA COA	-	-	-	-	1	006
	018	PK070015200	INVERTER BCL50 TWS-442-131	1	11 1 --	11 1 --	11 1 --	11 1 --	11 008
	019	PK070015210	INVERTER BCL50 DAC-07B032	1	11 1 --	11 1 --	11 1 --	11 1 --	11 008
	020	MAC925006Z0	SCREW M2.5_9_5.5*0.8_06_R00	6	6	6	6	6	011
	021	MAC925003Z0	SCREW M2.5_9_5.5*0.8_03_R00	2	2	2	2	2	012
	022	MAAA0015320	SCREW M2.0X0.4P+3FP-ZK(NL)	8	8	8	8	8	014
	023	ELCL506F000	CL50_LCD_COAXIAL_FIX_MYLAR	1	1	1	1	1	015
*	024	AMCL506U000	CL50_141_LCD_BRK_L_ASSY_H	1	1	1	-	-	016
*	025	AMCL506X000	CL50_150_LCD_BRK_L_ASSY_H	-	-	-	1	1	016
*	026	AMCL506V000	CL50_141_LCD_BRK_R_ASSY_H	1	1	1	-	-	017
*	027	AMCL506Y000	CL50_150_LCD_BRK_R_ASSY_H	-	-	-	1	1	017

Material List by Single-Item/Single-Level

Date : 04-10-2003
Time : 17:19:39 Drawing No: 510986
Plant: TW01 Revision: 1B
Report by UID: 8745064

C NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30006	30007	30008			LOCATION
#	51098630006	LCD ASSY-HIT 15" XGA BCL50	REF	-	-	-	-	
#	51098630007	LCD ASSY-HIT 15" SXGA BCL50	-	REF	-	-	-	
#	51098630008	LCD ASSY-AU 15" SXGA BCL50	-	-	REF	-	-	
001	AC600020540	LCD MODU B150PG01 15.0" (AU)	-	-	1			001
002	AC600022100	LCD MODU TX38D91VC1FAC 15.0" SXGA+ HIT	-	1	-			001
003	AC600026800	LCD MODU TX38D81VC1CAB 15.0" (HITACHI)	1	-	-			001
* 004	AMCL505L000	CL50_150_LCD_BRK_L_ASSY	1	1	1			002
* 005	AMCL505M000	CL50_150_LCD_BRK_R_ASSY	1	1	1			003
006	FACL5055000	CL50_150_LCD_BEZEL	1	1	1			004
* 007	AMCL506T000	CL50_LCD_COVER_GRAYBLUE_ASSY	1	1	1			005
008	DC025045200	H-CON SET BCL50 M/B-LCD AU 15 SXGA COAX	-	-	1			006
009	DC025045300	H-CON SET BCL50 M/B-LCD HITACHI15SXGA CO	-	1	-			006
010	DC025047200	H-CON SET BCL50 M/B-LCD HITACH 15 XGA CO	1	-	-			006
* 011	PK070015200	INVERTER BCL50 TWS-442-131	1	11	1	1	11	008
				--			--	
012	PK070015210	INVERTER BCL50 DAC-07B032	1	11	-	1	11	008
				--			--	
013	MAC925006Z0	SCREW M2.5_9_5.5*0.8_06_R00	6	6	6			011
014	MAC925003Z0	SCREW M2.5_9_5.5*0.8_03_R00	2	2	2			012
015	MAAA0015320	SCREW M2.0X0.4P+3FP-ZK(NL)	8	8	8			014
016	ELCL506F000	CL50_LCD_COAXIAL_FIX_MYLAR	1	1	1			015
* 017	AMCL506X000	CL50_150_LCD_BRK_L_ASSY_H	1	1	1			016
* 018	AMCL506Y000	CL50_150_LCD_BRK_R_ASSY_H	1	1	1			017

END OF REPORT

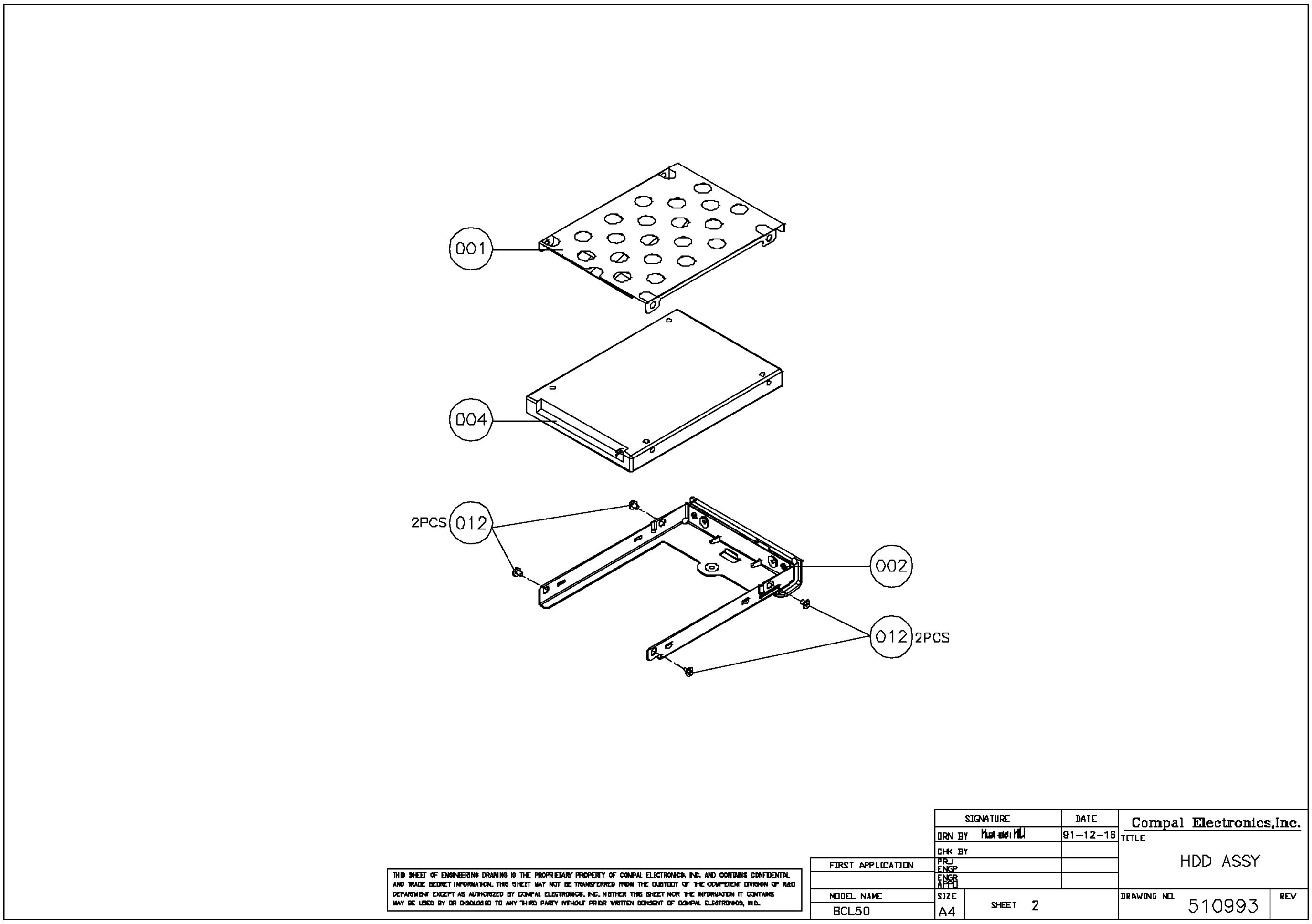


Material List by Single-Item/Single-Level

Date : 04-23-2003
Time : 13:48:58 Drawing No: 510990
Plant: TW01 Revision: 1B
Report by UID: 8745064

C NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30001	30002	30003	30004	LOCATION
#	51099030001	COMBO ASSY-TOS 24X (SHA) BCL50	REF	-	-	-	
#	51099030002	COMBO ASSY-KME 24X BCL50	-	REF	-	-	
#	51099030003	COMBO ASSY-QSI 24X BCL50	-	-	REF	-	
#	51099030004	COMBO ASSY-TOS 24X (MTM) BCL50	-	-	-	REF	
001	DD500001800	COMBO DRV 650/4.7 .5"H UJDA740	-	1	-	-	001
002	DD500001910	COMBO DRV 650/4.7 .5"H SD-R2412 MIT	-	-	-	1	001
* 003	DD500001920	COMBO DRV 650/4.7 SD-R2412 SHARP NEW	1	-	-	-	001
004	DD500002400	COMBO DRV 650/4.7 .5"H SBW-242	-	-	1	-	001
005	APCL507H000	CL50_TOSH_COMBO_PANEL_ASSY	1	-	-	1	003
006	APCL507K000	CL50_KME_COMBO_PANEL_ASSY	-	1	-	-	003
007	APCL507P000	CL50_QSI_COMBO_PANEL_ASSY	-	-	1	-	003
008	ECCL5078000	CL50_XDROM_BTK	1	1	1	1	004
009	FACL5077000	CL50_XDROM_BOX	1	1	1	1	005
010	MACF20001Z0	SCREW M2.0X0.4P+2.3(NL)	4	4	4	4	011
011	MMCK20060Z0	SCREW M2X0.4P+6FP-ZK (NL)	2	2	2	2	012
012	MAAAA173500	SCREW TPB-1.7 3.5P-ZK	-	3	-	-	013
013	MAA00002800	SCREW M1.7X0.35+2.5P-ZK	-	-	1	-	014
014	43562630001	SMT CD-SW/B LS-1673 BCL50	1	1	1	1	251

END OF REPORT



Material List by Single-Item/Single-Level

Date : 03-24-2003
Time : 15:18:36 Drawing No: 510993
Plant: TW01 Revision: 1A
Report by UID: 8745064

C NO	PART NO	DESCRIPTION	30001	30002	30003	30004	30005	LOCATION
			QUANTITY REQUIRED					
#	51099330001	HDD ASSY 20G TOS (2.5) BCL50	REF	-	-	-	-	
#	51099330002	HDD ASSY 30G TOS (2.5) BCL50	-	REF	-	-	-	
#	51099330003	HDD ASSY 40G TOS (2.5)BCL50	-	-	REF	-	-	
#	51099330004	HDD ASSY 60G TOS (2.5) BCL50	-	-	-	REF	-	
#	51099330005	HDD ASSY 20G IBM (2.5) BCL50	-	-	-	-	REF	
001	AMCL501V000	CL50_HDD_ESD_PLATE_ASSY	1	1	1	1	1	001
002	APCL501S000	CL50_HDD_CARRIER_ASSY	1	1	1	1	1	002
003	DD100020900	HDD 20G .37"H IC25N020ATCS04-0	-	-	-	-	1	004
004	DD100021620	HDD 20G 2.75"W .37"H MK2018GAS	1	-	-	-	-	004
005	DD100022500	HDD 30G 2.75"W .37"H MK3021GAS	-	1	-	-	-	004
006	DD100022600	HDD 60G 2.75"W .37"H MK6021GAS	-	-	-	1	-	004
007	DD100023220	HDD 40G 2.75"W .37"H MK4021GAS	-	-	1	-	-	004
008	MACL509C000	CL50_HDD_SCREW	4	4	4	4	4	012

Material List by Single-Item/Single-Level

Date : 03-24-2003
Time : 15:18:36 Drawing No: 510993
Plant: TW01 Revision: 1A
Report by UID: 8745064

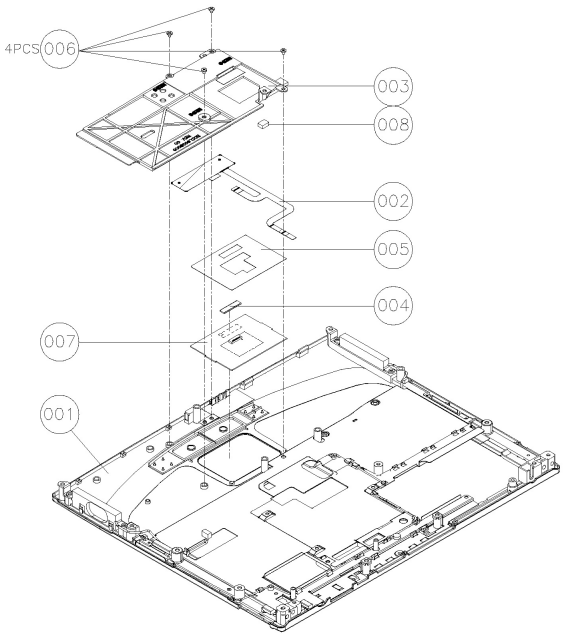
C NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30006	30007	30008	30009	30010	LOCATION
#	51099330006	HDD ASSY 30G IBM (2.5) BCL50	REF	-	-	-	-	
#	51099330007	HDD ASSY 40G IBM (2.5) BCL50	-	REF	-	-	-	
#	51099330008	HDD ASSY 60G IBM (2.5) BCL50	-	-	REF	-	-	
#	51099330009	HDD ASSY 20G HIT (2.5) BCL50	-	-	-	REF	-	
#	51099330010	HDD ASSY 30G HIT (2.5) BCL50	-	-	-	-	REF	
001	AMCL501V000	CL50_HDD_ESD_PLATE_ASSY	1	1	1	1	1	001
002	APCL501S000	CL50_HDD_CARRIER_ASSY	1	1	1	1	1	002
003	DD100021000	HDD 30G .37"H IC25N030ATCS04-0	1	-	-	-	-	004
004	DD100021100	HDD 40G .37"H IC25N040ATCS04-0	-	1	-	-	-	004
005	DD100022600	HDD 60G 2.75"W .37"H MK6021GAS	-	-	1	-	-	004
006	DD100022700	HDD 30G 2.75"W DK23EA-30	-	-	-	-	1	004
007	DD100023410	HDD 20G 2.75"W DK23EA-20	-	-	-	1	-	004
008	MACL509C000	CL50_HDD_SCREW	4	4	4	4	4	012

Material List by Single-Item/Single-Level

Date : 03-24-2003
Time : 15:18:36 Drawing No: 510993
Plant: TW01 Revision: 1A
Report by UID: 8745064

C NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30011	30012	LOCATION
#	51099330011	HDD ASSY 40G HIT (2.5) BCL50	REF	-	
#	51099330012	HDD ASSY 60G HIT (2.5) BCL50	-	REF	
001	AMCL501V000	CL50_HDD_ESD_PLATE_ASSY	1	1	001
002	APCL501S000	CL50_HDD_CARRIER_ASSY	1	1	002
003	DD100022800	HDD 40G 2.75"W DK23EA-40	1	-	004
004	DD100022950	HDD 60G 2.75"W DK23EA-60 F/C	-	1	004
005	MACL509C000	CL50_HDD_SCREW	4	4	012

END OF REPORT



	SIGNATURE	DATE	Compal Electronics,Inc.
	DRN BY Hua mei HU	92-04-10	TITLE
	CHK BY		LOGIC UP ASSY
FIRST APPLICATION	PRJ ENGP ENGR APPD		
MODEL NAME	SIZE A4	SHEET 2	DRAWING NO. 510994 REV. 1B
BCL50			

Material List by Single-Item/Single-Level

Date : 04-10-2003
Time : 17:16:54 Drawing No: 510994
Plant: TW01 Revision: 1B
Report by UID: 8745064

C NO	PART NO	DESCRIPTION	QUANTITY REQUIRED 30001	LOCATION
#	51099430001	LOGIC UPPER ASSY BCL50	REF - - - -	
001	APCL5032000	BCL50_LOG_UP_SUB_ASSY	1	001
002	DA3CL50L010	FPC BCL50 LF-1671 REV1 T/P	1	002
003	ECCL503B000	BCL50_UP_SUPPORT	1	003
004	FHCL5041000	BCL50_GASKET_005_05_22	1	004
005	ELCL5043000	BCL50_TP_MYLAR	1	005
006	MAC925003Z0	SCREW M2.5_9_5.5*0.8_03_R00	4	006
007	PK090004700	TRACK PAD ALPS KGDDFR014A	1	007
* 008	FHCL504E000	BCL50_TP_FOAM	1	008

END OF REPORT