

W 1 3 0

SERVICE MANUAL



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1 General system Description

1.1 System Overview

The LightNote W130 is a rugged and high portability industrial computer. The W130 also can connect with a docking to the capability of FLOPPY and CD-ROM and I/O device. The W130 model will support Intel Centrino mobile technology with Pentium-M Processors LV 1.1G, 1.2G with Micro-FCBGA, 12W in TDP and 1Mb L2 Cache.

This system is based on PCI architecture, which have standard hardware peripheral interface. The power management complies with Advanced Configuration and Power Interface (ACPI 2.0). It also provides easy configuration through CMOS setup, which is built in system BIOS software and **can be pop-up by pressing F2 at system start up or warm reset.** System also provides icon LEDs to display system status, such as Power indicator, HDD/CDROM, NUM LOCK, CAP LOCK, SCROLL LOCK, SUSPEND MODE and Battery charging status. It also one USB port.

The memory subsystem supports One JEDEC-standard 200-pin, small-outline, dual in-line memory module (SODIMM), support PC2100 and up to 1GB DDR SDRAM.

The W130 includes the 855GM chipset components GMCH and the ICH4-M. The Accelerated Hub Architecture interface (the chipset component interconnect) is designed into the chipset to provide an efficient, high bandwidth, communication channel between the GMCH and the ICH4-M.

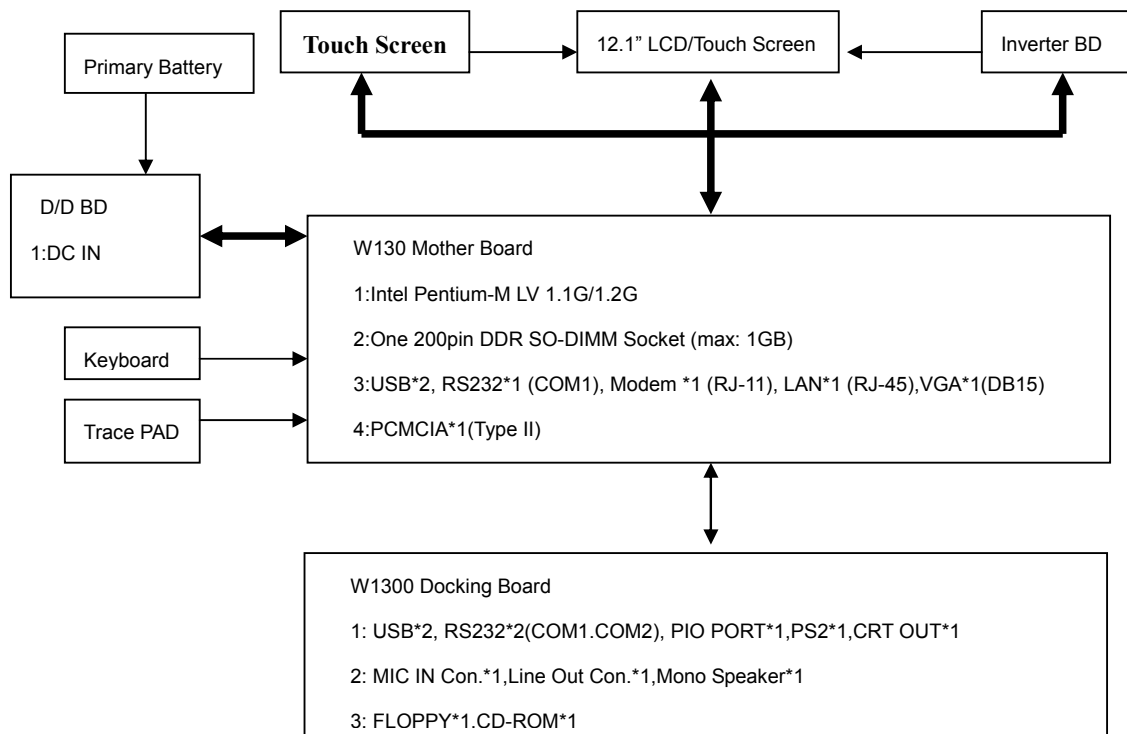
The GMCH component contains a processor system bus (PSB) controller, a graphics controller, and a memory controller, while providing an LVDS interface and two DVO ports. The ICH4-M component integrates USB host controllers (supporting the USB 1.1 and USB 2.0 specification), an Ultra ATA 100/66/33 controller, a LAN controller, and an AC'97 digital controller, while providing interfaces for PCI and LPC devices,.

To provide for the increasing number of multimedia applications, the AC97 CODEC ALC201 is integrated onto the motherboard.

A full set of software drivers and utilities are available to allow advanced operating systems such as Windows2000 and WindowsXP to take full advantage of the hardware capabilities such as bus mastering IDE, Windows2000-ready Plug & Play, and Advance configuration and power interface (ACPI 2.0).

Following chapters will have more detail description for each individual sub-systems and functions.

W130 System Diagram:



1.2 System Hardware Parts

Internal Marketing Specifications

CPU	Intel Pentium M Processor LV1.1GHz in μ -FCBGA package FSB 400MHz CPU Thermal ceiling: 12W
Core logic	Intel 855GM Chipset + ICH4-M
L2 Cache	On-die 1MB L2 Cache
System BIOS	512KB Flash EEPROM Includes System BIOS, VGA BIOS, plug & play, and ACPI 2.0 capability Boot from IDE devices and LAN, USB CD-ROM Suspend to DRAM / HDD PC2001 compliance
Memory	One 200-pin PC2100 DDR SODIMM socket for memory expansion Supports 200MHz and 266MHz DDR devices Standard: 256MB Max: 1GB
VGA	855GM integrate graphics controller Integrated 32-bit 3D/2D gfx core with Dynamic Video Memory Technology Support DirectX® 8.1 Support AGP 4X Dual View function LCD/CRT simultaneous display capability
Video Memory	Shared system memory 64MB
Display	12.1" TFT XGA (1024x768) LCD 12.1" touch screen (Optional) Optional Sunlight Readable Panel (Transflective LCD)
Structure	1-spindle
HDD	Standard: 40GB, Integrated, Support Ultra DMA-33/66/100 2.5" 9.5mm height with damper protect
Keyboard	Water-proof membrane keyboard, Backlight function (Optional) Rubber keyboard with back-light (Optional)
Pointing Device	A touch-sensitive control pad with Microsoft Win Mouse function coexist
PCMCIA	Type II x 1 - Card Bus support
Communication	10/100 Base-T LAN 56K, V90. Modem 802.11b Wireless LAN (Optional) (Supports Intel PRO/Wireless 2100 LAN mini-PCI type 3B adapter and Intel PROset software) Wireless Modem (DataTAC/PRM240 or GPRS/GSM or CDMA or IDEN(5mm)) (Optional)
Audio	AC97 audio support

	MS-Sound compatible Built-in one speaker (Mono) Microphone-in Earphone-out
I/O Port	Serial port × 1 VGA port x 1 USB 2.0 port x 2 DC input x1 Docking Port x1 RJ-11x1 for 56Kbps Software Modem port RJ-45 100 Base-T LAN port Microphone-in & Earphone out ports
Battery	- Support 9 cells Li-Ion Battery
AC adapter	- Universal AC adapter -Input: 100-240v, 50/60Hz AC.
Dimensions	10.8" * 9.4" * 1.7" / 276mm * 239mm * 43mm
Weight	Goal is under 7.2 lbs
Software	Support Windows 2000 / Windows XP
Environmental Standard (Main System)	
Temperature	IEC 68-2-1,2,14 / MIL-STD-810F, Method 501.4, 502.4 Operating: 0°C to 50°C -20 °C to 50 °C (Optional) Non-operating: -40°C to 70° C
Humidity	According to IEC 68-2-30 / MIL-STD-810F, Method 507.4 5% to 95% RH, non-condensing
Altitude	According to IEC 68-2-13 / MIL-STD-810F, Method 500.4 Operating: 15,000ft Non-operating: 40,000ft; altitude change rate: 2,000 ft/min
Shock	According to IEC 68-2-27 / MIL-STD-810F, Method 516.5 Operating: 15g, 11 ms, half sine wave Non-operating: 50g, 11 ms, half sine wave
Vibration	According to IEC 68-2-6 Sinusoidal wave vibration: Operating: 10~55Hz/0.075, 55~500Hz/1.0g Non-operating: 10~55Hz/0.15, 55~500Hz/2.0g Random vibration: MIL-STD-810F, 514.5 - high way truck vibration exposure
Drop	According to IEC 68-2-32 / MIL-STD-810F, Method 516.5 3 Feet height free drop Test surface: steel plate
ESD	According to IEC1000-4-2 Air Discharge: 0KV~8KV(included), no any error 8KV~15KV, allow soft error Contact Discharge: 0KV~4KV(included), no any error 4KV~ 8KV, allow soft error
Enclosure	According to IEC 529, MIL-STD-810F, IP 51
Regulation	FCC part 15, Subpart B, Class B, UL, CUL, TUV, Win key
Options	Removable Options:

	Docking board (Serial Port x2, USB2.0 x2, Parallel x1, VGA Port x1, DB26 (Male) x1) External Battery charger Factory Options: HDD heater for low temp. -4°F (-20°C) to 122°F (50°C) Membrane keyboard with backlight Rubber keyboard with backlight Wireless LAN (802.11b) Wireless Modem (DataTAC/PRM240 or GPRS/GSM or CDMA or IDEN (5mm)) 12.1" transfective LCD 12.1" touch screen
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1.3 Major Component Introduction

1.3.1 CPU Module

- Intel Pentium-M Processors with Micro-FCBGA package.
- The first Intel mobile processor with the Intel NetBurst micro-architecture which features include hyper-pipelined technology, a rapid execution engine, a 400MHz system, an execution trace cache, advanced dynamic execution, advanced transfer cache, enhanced floating point and multi-media unit, and Streaming SIMD Extensions 2 (SSE2).
- The Streaming SIMD Extensions 2 (SSE2) enable break-through levels of performance in multimedia applications including 3-D graphics, video decoding/encoding, and speech recognition.
- Use Source-Synchronous Transfer (SST) of address and data to improve performance by transferring data four times per bus clock.
- Support Enhanced Intel SpeedStep technology, which enables real-time dynamic switching of the voltage and frequency between two performance modes.

1.3.2 System frequency ICS950810

- Programmable output frequency, divider ratios, output rise/fall time, output skew.
- Programmable spread percentage for EMI control.
- Watchdog timer technology to reset system if system malfunctions.
- Programmable watchdog safe frequency.

- Support I2C Index read/write and block read/write operations.
- Use external 14.318MHz crystal.

1.3.3 Intel 855-GM GMCH IGUI 3D Graphic DDR/SDR Chipset

- Intel 855-GM GMCH IGUI Host Memory Controller integrates a high performance host interface for Intel Banias processor, a high performance 2D/3D Graphic Engine, a high performance memory controller, an AGP 4X interface, and Intel® I/O Hub architecture INTEL 82801DBM ICH4-M.
- Intel 855-GM GMCH Host Interface features the AGTL & AGTL+ compliant bus driver technology with integrated on-die termination to support Intel Pentium-M processors. 855-GM GMCH provides a 12-deep In-Order-Queue to support maximum outstanding transactions up to 12. It integrated a high performance 2D/3D Graphic Engine, Video Accelerator and Advanced Hardware Acceleration MPEG1/MPEG2 Video Decoder for the Intel Pentium-M series based PC systems. It also integrates a high performance 2.1GB/s DDR266 Memory controller to sustain the bandwidth demand from the integrated GUI or external AGP master, host processor, as well as the multi I/O masters. In addition to integrated GUI, 855-GM GMCH also can support external AGP slot with AGP 1X/2X/4X capability and Fast Write Transactions. A high bandwidth and mature Intel® I/O Hub architecture is incorporated to connect 855-GM GMCH and INTEL 82801DBM ICH4-M together. Intel® I/O Hub architecture is developed into three layers, the Multi-threaded I/O Link Layer delivering 1.2GB bandwidth to connect embedded DMA Master devices and external PCI masters to interface to Multi-threaded I/O Link layer, the Multi-threaded I/O Link Encoder/Decoder in INTEL 82801DBM ICH4-M to transfer data w/ 533 MB/s bandwidth from/to Multi-threaded I/O Link layer to/from 855-GM GMCH, and the Multi-threaded I/O Link Encoder/Decoder in 855-GM GMCH to transfer data w/ 533 MB/s from/to Multi-threaded I/O Link layer to/from INTEL 82801DBM ICH4-M.
- An Unified Memory Controller supporting DDR266 DRAM is incorporated, delivering a high performance data transfer to/from memory subsystem from/to the Host processor, the integrated graphic engine or external AGP master, or the I/O bus masters. The memory controller also supports the Suspend to RAM function by retaining the CKE# pins asserted in ACPI S3 state in which only AUX source deliver power. The 855-GM GMCH adopts the Shared Memory Architecture, eliminating the need and thus the costs

of the frame buffer memory by organizing the frame buffer in the system memory. The frame buffer size can be allocated from 8MB to 64MB.

- Features
- Processor/Host Bus Support
- Intel® Pentium-M processor
- 2X Address, 4X data
- Support host bus Dynamic Bus Inversion (DBI)
- Supports system bus at 400MT/s (100 MHz)
- Supports 64-bit host bus addressing
- 8-deep In-Order-Queue
- AGTL+ bus driver technology with integrated GTL termination resistors and low voltage operation (1.05V)
- Supports Enhanced Intel® SpeedStep™ Technology (EIST) and Geyserville III
- Support for DPWR# signal to Pentium-M processor for PSB power management

1.3.4 Memory System

- Directly supports one DDR channel, 64-bits wide (72-b with ECC).
- Supports 200-MHz and 266-MHz DDR devices with unbuffered. PC1600/PC2100 DDR(with ECC).
- Supports 128-Mb, 256-Mb and 512-Mbit technologies providing maximum capacity of 1-GB with only x 16 devices.
- All supported devices have 4 banks.
- Supports up to 16 simultaneous open pages.
- Supports page sizes of 2KB, 4KB, 8KB, and 16KB. Page size is individually selected for every row.
- UMA support only.

1.3.5 Display

- Analog Display Support
- 350 MHz integrated 24-bit RAMDAC that can drive a standard progressive scan analog monitor up to 1800x1350 @ 85 Hz.
- Accompanying I2C and DDC channels provided through multiplexed interface Hotplug and display support
- Dual independent pipe with single display support Simultaneous: Same

images and native display timings on each display device

- DVO (DVOB) support
- Digital video out port DVOB with 165-MHz dot clock on 12-bit interface
- Variety of DVO devices channel
- Compliant with DVI Specification 1.0, thereby providing support for a flat panel up to 2048x1536 pixel resolution, or digital CRT up to 1920x1080 pixel resolution
- Dedicated LFP (local flat panel) interface
- Single or dual channel LVDS panel support up to SXGA+ panel resolution with frequency range from 25MHz to 112MHz per channel
- SSC support of 0.5%, 1.0%, and 2.5% center and down spread with external SSC clock
- Supports data format of 18 bpp
- LCD panel power sequencing compliant with SPWG timing specification
- Compliant with ANSI/TIA/EIA –644-1995 spec
- Integrated PWM interface for LCD backlight inverter control
- Bi-linear Panel fitting
- Tri-view support through LFP interface, DVO ports and CRT
- Internal Graphics Features
 - Core Frequency
 - Display Core frequency of 133MHz
 - Render Core frequency of 133MHz
 - 2D Graphics Engine
 - Optimized 128 bit BLT engine
 - Ten programmable and predefined monochrome patterns
 - Alpha Stretch Blt (via 3D pipeline)
 - Anti-aliased lines
 - Hardware-based BLT Clipping & Scissoring
 - 32-bit Alpha Blended cursor
 - Programmable 64*64 3-color Transparent cursor
 - Color Space Conversion
 - 3 Operand Raster BLTs
 - 8-bit, 16-bit, and 32-bit color
 - ROP support
 - DIB translation and Linear/Tile addressing
 - 3D Graphics Engine
 - 3D Setup and Render Engine
 - Viewpoint Transform and Perspective Divide

- Triangle Lists, Strips and Fans support
- Indexed Vertex and Flexible Vertex formats
- Pixel accurate Fast Scissoring and Clipping operation
- Backface Culling support
- DirectX™ and OGL Pixelization rules
- Anti-Aliased Lines support
- Sprite Points support
- Zone Rendering
- Provides the highest sustained fill rate performance in 32-bit color and 24-bit W mode
- High quality performance Texture Engine
- 266 MegaTexel/speak performance
- Per Pixel Perspective corrected Texture Mapping
- Single Pass Texture Compositing (Multi-Texture) at rate
- Enhanced Texture Blending functions
- Twelve Level of Detail MIP Map Sizes from 1x1 to 2Kx2K
- Numerous Texture formats including 32-bit RGBA
- Alpha and Luminance Maps
- Texture Chromakeying
- Bilinear, Trilinear, Anisotropic MIP-Mapped Filtering
- Cubic Environment Reflection Mapping
- Embossed Bump-mapping
- DXTn Texture Decompression
- 3D Graphics Rasterrization enhancements
- One Pixel per Clock
- Flat and Gouraud Shading
- Color Alpha Blending for Transparency
- Vertex and Programmable Pixel Fog and Atmospheric effects
- Color Specular Lighting
- Vertex and Programmable Pixel Fog and Atmospheric effects
- Z Bais support
- Dithering
- Line and Full-Scence Anti-Aliasing
- 16 and 24-bit Z Buffering
- 16 and 24-bit W Buffering
- 8-bit Stencil Buffering
- Double and Triple Render Buffer support
- 16 and 32 –bit color

- Destination Alpha
- Vertex Cahec
- Maximum 3D resolution of 1600x1200 x32 bpp at 85 Hz
- Optimal 3D resolution supported
- Fast Clear support
- ROP support

1.3.6 HUB Interface for ICH4

- 266 MB/s point to point hub interface to ICH4-M
- 66-M Hz base clock
- Supports the following traffic types to the ICH4-M
- Hub interface-to DRAM
- CPU-to-Hub interface
- Messaging
- MSI interrupt messages
- Power Management state change
- SMI, SCI, and SERR error indication
- Power Management
- SMRAM space remapping to A0000h (128-KB)
- Supports extended SMRAM space above 256- MB ,additional 1 MB TSEG from top of Memory, cacheable (cacheability controlled by CPU)
- APM rev 1.2 compliant power management
- Supports Suspend to System Memory(S3),Suspend to Disk(S4) and Hard Off/Total Reboot(S5)
- ACPI 1.0b 2.0 Support

1.3.7 I/O Controller Hub: INTEL 82801DBM

- The INTEL 82801DBM ICH4-M integrates three Universal Serial Bus 2.0 Host Controllers, the Audio Controller with AC 97 Interface, the IDE Master/Slave controllers, and Intel® I/O Hub architecture. The PCI to LPC Bridge, I/O Advanced Programmable Interrupt Controller, legacy system I/O and legacy power management functionalities are integrated as well.
- The integrated Universal Serial Bus Host Controllers features Dual Independent UHCI Compliant Host controllers with six USB ports delivering 480 Mb/s bandwidth and rich connectivity. Besides, Legacy USB devices as well as over current detection are also implemented.

- The Integrated AC97 v2.3 compliance Audio Controller that features a 7-channels of audio speaker out and HSP v.90 modem support. Additionally, the AC97 interface supports 4 separate SDATAIN pins that is capable of supporting multiple audio code with one separate modem code.
- The integrated IDE Master/Slave controllers features Dual Independent IDE channels supporting PIO mode transfers up to 16 Mbytes/sec and Ultra DMA 33/66/100. It provides two separate data paths for the dual IDE channels that sustain the high data transfer rate in the multitasking environment.
- INTEL 82801DBM ICH4-M supports 6 PCI masters and complies with PCI 2.2 specification. It also incorporates the legacy system I/O like: two 82C37 compatible DMA controllers, Channels 0-3 are hardwired to 8 bit, three 8254 compatible programmable 16-bit counters channels 5-7, hardwired keyboard controller and PS2 mouse interface(not use in MiTAC 8080 model), Real Time clock with 512Bytes CMOS SRAM and two 82C59 compatible Interrupt controllers. Besides, the I/O APIC managing up to 14 interrupts with both Serial and FSB interrupt delivery modes is supported.
- The integrated power management module incorporates the ACPI 1.0b compliance functions, the APM 1.2 compliance functions, and the PCI bus power management interface spec. v1.1. Numerous power-up events and power down events are also supported. 21 general purposed I/O pins are provided to give an easy to use logic for specific application. In addition, the INTEL 82801DBM ICH4-M supports Deeper Sleep power state for Intel Mobile processor.
- A high bandwidth and mature Intel® I/O Hub architecture is incorporated to connect Montara and Intel 82801DBM ICH4-M Hub interface together. Intel® I/O Hub architecture is developed
 - Features
 - PCI Bus Interface
 - Supports PCI Revision 2.2 Specification at 33 MHz
 - 133 MB/sec maximum throughput
 - Supports up to six master devices on PCI
 - One PCI REQ/GNT pair can be given higher arbitration priority (intended for external 1394 host controller)
 - Support for 44-bit addressing on PCI using DAC protocol Integrated LAN Controller

- WfM 2.0 and IEEE 802.3 compliant
- LAN Connect Interface (LCI)
- 10/100 Mbit/sec Ethernet support_ Integrated IDE Controller
- Supports “Native Mode” register and interrupts
- Independent timing of up to 4 drives, with separate primary and secondary IDE cable connections
- Ultra ATA/100/66/33, BMIDE and PIO modes
- Tri-state modes to enable swap bay
- USB
- Includes three UHCI host controllers that support six external ports
- New: Includes one EHCI high-speed USB 2.0 Host Controller that supports all six ports
- New: Supports a USB 2.0 high-speed debug port
- Supports wake-up from sleeping states S1–S5
- Supports legacy keyboard/mouse software AC-Link for Audio and Telephony CODECs
- Supports AC '97 2.3
- New: Third AC_SDATA_IN line for three code support
- New: Independent bus master logic for seven channels (PCM In/Out, Mic 1 input, Mic 2 input, modem in/out, S/PDIF out)
- Separate independent PCI functions for audio and modem
- Support for up to six channels of PCM audio output (full AC3 decode)
- Supports wake-up events Interrupt Controller
- Support up to eight PCI interrupt pins
- Supports PCI 2.2 message signaled interrupts
- Two cascaded 82C59 with 15 interrupts
- Integrated I/O APIC capability with 24 interrupts
- Supports serial interrupt protocol
- Supports processor system bus interrupt delivery New: 1.5 V operation with 3.3 V I/O
- 5 V tolerant buffers on IDE, PCI, USB overcurrent and legacy signals Timers Based on 82C54
- System timer, refresh request, speaker tone output Power Management Logic
- ACPI 2.0 compliant
- ACPI-defined power states (C1–C2, S3–S5)
- Supports Desktop S1 state (like C2 state, only STPCLK# active)
- ACPI power management timer

- PCI PME# support
 - SMI# generation
 - All registers readable/restorable for proper resume from 0 V suspend states External Glue Integration
 - Integrated pull-up, pull-down and series termination resistors on IDE, processor interface
 - Integrated Pull-down and Series resistors on
-
- 1.3.8 Super I/O_NS PC87393
 - National Semiconductor's PC8739x family of LPC Super I/O devices is targeted for a wide range of portable applications. PC99 and ACPI compliant, the PC8739x family features an X-Bus Extension for read and write operations over the X-Bus, a full IEEE 1284 Parallel Port with a Parallel Port Multiplexer (PPM) for external Floppy Disk Drive (FDD) support, a Musical Instrument Digital Interface (MIDI) port, and a Game port. Like all National LPC Super I/O devices, the PC8739x offers a single-chip solution to the most commonly used PC I/O peripherals.
 - The PC8739x family also incorporates: a Floppy Disk Controller (FDC), two enhanced Serial Ports (UARTs), one with Fast Infrared (FIR, IrDA 1.1 compliant), General-Purpose Input/Output (GPIO) support for a total of 32 ports, Interrupt Serializer for Parallel IRQs and an enhanced WATCH DOG timer.

1.3.9 Keyboard controller Hitachi H8/3437

- The H8/3437 Series is a series of high-performance microcontrollers with a fast H8/300 CPU core and a set of on-chip supporting functions optimized for embedded control. These include ROM, RAM, four types of timers, a serial communication interface, optional I2C bus interface, host interface, A/D converter, D/A converter, I/O ports, and other functions needed in control system configurations, so that compact, high-performance systems can be implemented easily. The series includes the H8/3437 with 60-kbyte ROM and 2-kbyte RAM, the H8/3436 with 48-kbyte ROM and 2-kbyte RAM, and the H8/3434 with 32-kbyte ROM and 1-kbyte RAM.
- The H8/3437, H8/3436, and H8/3434 are available in mask-ROM versions. The H8/3437 and H8/3434 are also available in ZTAT™*1 (zero turn-around time) versions, providing a quick and flexible response to

conditions from ramp-up through full-scale volume production, even for applications with frequently changing specifications. In addition, the H8/3434 and H8/3437 have F-ZTAT™*2 (flexible-ZTAT) versions with on-board programmability.

1.3.10 Fax/Modem module

The PCT2303W chipset is designed to meet the demand of this emerging worldwide AMR/MDC market. The combination of PC-TEL's well proven PCT2303W chipset and the HSP56™ MR software modem driver allows systems manufacturers to implement modem functions in PCs at a lower bill of materials (BOM) while maintaining higher system performance.

PC-TEL has streamlined the traditional modem into the Host Signal Processing (HSP) solution. Operating with the Pentium class processors, HSP becomes part of the host computer's system software. It requires less power to operate and less physical space than standard modem solutions. PC-TEL's HSP modem is an easily integrated, cost-effective communications solution that is flexible enough to carry you into the future.

The PCT2303W chip set is an integrated direct access arrangement (DAA) and Codec that provides a programmable line interface to meet international telephone line requirements. The PCT2303W chip set is available in two 16-pin small outline packages (AC'97 interface on PCT303A and phone-line interface on PCT303W). The chip set eliminates the need for an AFE, an isolation transformer, relays, opto-isolators, and 2-to 4-wire hybrid. The PCT2303W chip set dramatically reduces the number of discrete components and cost required to achieve compliance with international regulatory requirements. The PCT2303W complies with AC'97 Interface specification Rev. 2.1. The chip set is fully programmable to meet worldwide telephone line interface requirements including those described by CTR21, NET4, JATE, FCC, and various country-specific PTT specifications. The programmable parameters of the PCT2303W chip set include AC termination, DC termination, ringer impedance, and ringer threshold. The PCT2303W chip set has been designed to meet stringent worldwide requirements for out-of-band energy, billing-tone immunity, lightning surges, and safety requirements

1.3.11 FAST ETHERNET CONTROLLER integrated ICH-4M

- Built-in ICH-4M
- Use INTEL 82562ET highly integrated platform LAN connect devices combining 10base-t and 100base-tx physical layer capabilities.

1.3.12 PCMCIA controller_ ENE CB1410 + ENE CP2211

- CP2211 is a single slot PCMCIA and CardBus power switch. It integrates control logic, low switching resistance MOSFET, over current alarm and over temperature auto shutdown circuits. It can deliver 3.3V or 5V to PC Card xVCCOUT and 3.3V, 5V or 12V to PC Card xVPPOUT. The output current is up to 1A for xVCCOUT and 250mA for xVPPOUT. The power is controlled by 4-wire parallel data interface VCCD0Z, VCCD1Z, VPPD0 and VPPD1.
- Low Switching Resistance (100mΩ for VCC Switch)
- Over current alarm via OC#
- Over temperature auto shutdown
- 1A output current for xVCCOUT
- 150mA output current for xVPPOUT
- Only 3.3V is required for chip normal operation
- 12V is not required for 3.3V or 5V Output
- Break-Before-Mask Switching
- 16-Pin SSOP Package (209 mil)

1.3.13 AC'97 Code ALC202

- Single chip audio CODEC with high S/N ratio (>90dB)
- Compliant with AC'97 2.2 & WHQL specifications
- Support of S/PDIF out is compliant with AC'97 rev2.2 specifications
- Meets performance requirements for audio on PC2001 systems
- Meets Microsoft PC99 & WLP 2.0 audio requirements
- 18-bit Stereo full-duplex CODEC with independent and variable sampling rate
- 18-bit ADC and 20-bit DAC resolution
- Four analog line-level stereo inputs with 5-bit volume control: LINE_IN, CD, IDEO, AUX
- High quality differential CD input Two analog line-level mono input: PC_BEEP,PHONE_IN

- Supports double sampling rate (96KHz) of DVD audio playback
- Two software selectable MIC inputs +30dB boost preamplifier for MIC input
- Stereo output with 6-bit volume control Mono output with 5-bit volume control
- Headphone output with 50mW/8. driving capability (ALC202)
- Line output with 50mW/8. driving capability
- (ALC202A) Headphone jack-detect function to mute LINE/MONO/HP output, and to control S/PDIF output
- 3D Stereo Enhancement
- Multiple CODEC extension capability
- External Amplifier Power Down (EAPD) capability
- High performance converter technology
- Power management and enhanced power saving
- 2 GPIO pins
- No external crystal/clock required
- 14.318MHz 24.576MHz PLL saves crystal
- DC Voltage volume control
- Auxiliary power (VAUX) to support Power Off
- CD function
- Power support: Digital: 3.3V; Analog: 3.3V/5V
- Standard 48-Pin LQFP Package

1.3.14 Thermal sensor_ ADM1021A

- On-Chip and Remote Temperature Sensing
- No Calibration Necessary
- 1_C Accuracy for On-Chip Sensor
- 3_C Accuracy for Remote Sensor
- Programmable Over/Under Temperature Limits
- Programmable Conversion Rate
- 2-Wire SMBus Serial Interface
- Supports System Management Bus (SMBus) Alert
- 200_ A Max Operating Current
- 1_ A Standby Current
- 3 V to 5.5 V Supply
- Small 16-Lead QSOP Package

2 Motherboard Function Description

2.1 Hot Key Function

Keys Combination	Feature	Meaning
Fn + F1	Reserve	
Fn + F2	Reserve	
Fn + F3	Volume Down	
Fn + F4	Volume Up	
Fn + F5	Brightness Down	Decreases LCD brightness
Fn + F6	Brightness Up	Increases LCD brightness
Fn + F7	Reserve	
Fn + F8	LCD On/Off	Toggle LCD On or Off
Fn + F9	LCD/CRT Switching	Switch display mode of LCD only, CRT only, and simultaneously display.
Fn + F10	Suspend	Force system into either Suspend to DRAM (S3) or Suspend to HDD (S4) mode based on BIOS Setting

2.2 Power on/off/suspend/resume button

APM mode

At APM mode, Power button is on/off system power.

ACPI mode

At ACPI mode. Windows power management control panel set power button behavior.

You could set "standby", "power off" or "hibernate"(must enable hibernate function in power

Management) to power button function.

Continue pushing power button over 4 seconds will force system off at ACPI mode.

2.3 Cover Switch

System automatically provides power saving by monitoring Cover Switch. It will save battery power and prolong the usage time when user closes the notebook cover.

At ACPI mode there are four functions to be chosen at windows power management control panel.

None

Standby

Off

Hibernate (must enable hibernate function in power management)

2.4 LED Indicators

ON M/B LED:

D21 -> HDD/CD-ROM/FLOPPY Active LED (orange).

D17 -> LAN detect and active LED (100M – green, 10M- orange).

D12 -> SCROLL LOCK LED (green).

D15 -> NUM LOCK LED (green).

D16-> CAPS LOCK LED (green).

SIDE LED:

D12 -> Adapter in LED (green).

D10 -> Battery states LED.

Ac in and Power on -> (Charge ok – green, Charging – orange, Battery dead – LED Dark).

Ac in and Power off -> (Charge ok –Led dark, Charging – orange).

D11 ->POWER/SUSPEND States LED (Power on – green, Suspend – orange)

D13 -> Battery LOW (orange).

2.5 Battery status

Battery Warning

- System also provides Battery capacity monitoring and gives user a warning so that user has chance to save his data before battery dead. Also, this function protects system from mal-function while battery capacity is low.
- Battery Warning: Capacity below 10%, Battery Capacity LED flashes per second, system beeps per 2 seconds.
- System will suspend to HDD after 2 Minutes to protect user data.

Battery Low State

- After Battery Warning State, and battery capacity is below 4%, system will generate beep for twice per second.

Battery Dead State

- When the battery voltage level reaches 9.32 volts, system will shut down automatically in order to extend the battery packs' life.

2.6 CMOS Battery

- CR2032 3V 220mAh lithium battery
- When AC in or system main battery inside, CMOS battery will consume no power.
- AC or main battery not exists, CMOS battery life at less (220mAh/5.8uA) 4 years.
- Battery was put in battery holder, can be replaced.

2.7 I/O Port

- I/O Port – USB #1

One USB 2.0 Port

Supports UHCI Design Guide

Connector: Foxconn UB5112C-S1, 4 pin SMT type, male, R/A & Shroud connector

Power supply for device: 5Vdc, 0.5Amp.

Support USB FDD Boot up function.

■ Microphone Input Jack

Mono input.

Input Voltage: 1 Vrms max.

Connector : SMK LGY2313-0200, ψ 3.5MM

■ Earphone Output Jack

Stereo output, 200mW maximum.

Allow Load Impedance = Min. 8Ω .

Connector : Sharp GP1F562T, ψ 3.5MM, with Optic transmitter.

■ I/O Port - RS232 COM1

Connector: SUYIN 7321P-09G2, 9 pins D-SUB Connector, male, R/A type.

RS232 Buffer: Analog Device ADM3311ARU.

■ D/C Input

Connector: 伸銘 955-853, 3- pin Power jack connector.

■ PCMCIA Socket

Single slot, support one type-II PC Card.

Socket Type: Bottom Side of PCB.

Card type: R2 or Card bus support.

■ RJ-11 Fax/Modem Port

56 kbps data rate.

Support telephone answering machine (TAM) function.

Support V.90 function via software.

Support power down (sleep) mode.

One RJ-11 phone jack output.

■ Docking Interface

Interface included: USB*2, COM1/2, CRT, PIO, PS/2, Microphone, Earphone, IDE and FDD.

Connector: BERG 91294-002, MICROPAX SMT 160 pins plug connector.

Mating connector: BERG 91403-002, 0.25mm MICROPAX SMT 160 pins receipt connector.

Contact life: 2500 times guaranteed.

■ Touch Screen Pen

Material & Color: plastic, black.

Structure: 3 segments, length expansible from 75~130 ±3mm.

3 Peripheral

3.1 LCD PANEL

Support 12.1" TFT XGA LCD display, Resolution up to XGA (1024*768), 18-bit color.

Brightness: 100 ±10 lux

Interface: LVDS

3.2 HDD

Toshiba 40GB

Height: 9.5 mm, 2.5"

3.3 Keyboard

Windows 82 Keyboard, 1 color, multi languages support, US and Europe Keyboard

3.4 Track Pad Synaptic

- Accurate positioning
- Low fatigue pointing action
- Low profile
- No moving part, high reliability
- Low power consumption
- Environmentally sealed
- Compact size.
- Software configurable
- Low weight
- Operating humidity: 5%-95% relative humidity, non condensing
- Storage temperature: -40 to +65 degree C

- ESD: 15KV applied to front surface
- Power supply voltage: 5.0Voltage \pm 10%
- Power supply current: 4.0mA max operating.

3.5 Memory

DDR-RAM/ATP//128M/256M

DDR-RAM/Apacer//128M/256M

DDR-RAM/Unidorsa//128M/256M

3.6 Modem MDC

Askey

4 Power Management

The Tetra system has built in several powers saving modes to prolong the battery usage. User can enable and configure different degrees of power management modes via ROM CMOS setup (booting by pressing F2 key). Following are the descriptions of the power management modes supported.

4.1 System Management Mode

Full on mode

In this mode, each device is running with the maximal speed. CPU clock is up to its maximum.

Doze Mode

In this mode, CPU will be toggling between on & stop grant mode either. The technology is clock throttling. This can save battery power without loosing much computing capability.

The CPU power consumption and temperature is lower in this mode.

Standby mode

For more power saving, it turns of the peripheral components. In this mode, the following is the status of each device:

- CPU: Stop grant
- LCD: backlight off
- HDD: spin down

Suspend to DRAM

The most chipset of the system is entering power down mode for more power saving. In this mode, the following is the status of each device:

- CPU: off
- Twister K: Partial off

- VGA: Suspend
- PCMCIA: Suspend
- Audio: off
- SDRAM: self refresh

Suspend to HDD

- All devices are stopped clock and power-down
- System status is saved in HDD
- All system status will be restored when powered on again

4.2 Battery Life

Power Consumption & Battery Lift

Battery	Watts	Test program	Full Run Battery Life
Primary	66.6WHR	Battery Mark4.01	Around 150 minutes

Battery Life of -20°C ambient (Optional)

Battery	Watts	Test program	Full Run Battery Life
Primary	66.6WHR	Battery Mark4.01	At least 90 minutes (charge above 25°C, discharge at -20°C)

The maximum battery capacity on -20degrees C is 60% of 25 degrees C.

4.3 Other power management functions

HDD & Video access

System has the ability to monitor video and hard disk activity. User can enable monitoring function for video and/or hard disk individually. When there is no video and/or hard disk activity, system will enter next PMU State depending on the application. When the VGA activity monitoring is enabled, the performance of the system will have some impact.

5 Connector and Switch Definition

Table 5-1 D/D Board Connector (J3) Pin Assignments

Pin Name	Pin No	Description
VDOCK	1,3,5,7	AC Adapter input(From Docking BD to D/D BD), 19Vdc, max. 3.16A input.
VMAIN	19,21,23,25	CPU Vdc, Max. 25W Output, +12.6~+19Vdc, Ripple & Noise below 1%.
VDD5	35	Uninterrupt +5Vdc, Max. 100mA, +4.75~+5.25Vdc
+12V	37	+12Vdc, Max. 120mA Output, +11.4~+12.6Vdc, Ripple & Noise below 1%.
+5V	27,29,31,33	+5Vdc, Max. 3A Output, +4.75~+5.25Vdc, Ripple & Noise below 1%.
+3V	9,11,13,15,17	+3Vdc, Max. 3A Output, +3.135~+3.465Vdc, Ripple & Noise below 1%.
BAT_TEST	49	TEST Battery on boot to charge and discharge states
DC_IN	43	AC adapter input power present, HI active, TTL output.
D/BAT/CHG#	47	Detect Battery charge states
BAT_DEAD	45	Primary Battery Power reach to Dead level, (Battery power can't keep the 12/5/3V output). High active, TTL output.
VBAT	41	Reflect the current Primary Battery Voltage for host Primary Battery low detects.
SMC_H8	44	Smart battery clock signal of Primary Battery, pass from Primary Battery.
SMD_H8	46	Smart battery data signal of Primary Battery, pass from Primary Battery.
PWR_ON	48	Turn on +12/+5/+3Vdc output, high active, TTL output.
POWERBTN#	50	Power Button Signal, Low active.
KBGPIO1,2	39,40	KB Backlight control GPIO pin
GND	2,4,6,8,10,12,14,16,18,20,22,24,26,28,30,32,34,36,38,40	Ground

Table 5-2 HD Connector (J501) Pin Assignment

Pin Name	Pin No	Description
IDEPD0	17	IDE Device data 0
IDEPD1	15	IDE Device data 1
IDEPD2	13	IDE Device data 2
IDEPD3	11	IDE Device data 3
IDEPD4	9	IDE Device data 4
IDEPD5	7	IDE Device data 5
IDEPD6	5	IDE Device data 6
IDEPD7	3	IDE Device data 7
IDEPD8	4	IDE Device data 8
IDEPD9	6	IDE Device data 9
IDEPD10	8	IDE Device data 10
IDEPD11	10	IDE Device data 11
IDEPD12	12	IDE Device data 12
IDEPD13	14	IDE Device data 13

IDEPD14	16	IDE Device data 14
IDEPD15	18	IDE Device data 15
IDE_RST#	1	IDE Reset signal
PDREQ	21	IDE Device DMA Request
PIOW#	23	Disk I/O Write
PIOR#	25	Disk I/O Read
PIORDY	27	I/O Channel Ready
PCSEL	28	Cable Select
PDACK#	29	IDE Device DMA Acknowledge
PIRQ14	31	Interrupt Requests 14
PIOCS16#	32	16-BIT I/O Chip Select
IDEPA0	35	IDE Device Address 0
IDEPA1	33	IDE Device Address 1
IDEPA2	36	IDE Device Address 2
IDEPDIAG	34	Passed Diagnostic
PCS#1	37	IDE Device Chip Select for 100 Range
PCS#3	38	IDE Device Chip Select for 300 Range
HD/CD_LED	39	HDD AND CD ROM Active LED
HDD_+5V	41,42	HDD POWER
GND	2,19,22,24,26,30,40,43	Ground

Table 5-3 PCMCIA Connector (J7) Pin Assignment

Pin Name	Pin No	Description
CAD0	2	CardBus address/data bus
CAD1	3	CardBus address/data bus
CAD2	37	CardBus address/data bus
CAD3	4	CardBus address/data bus
CAD4	38	CardBus address/data bus
CAD5	5	CardBus address/data bus
CAD6	39	CardBus address/data bus
CAD7	6	CardBus address/data bus
CAD8	41	CardBus address/data bus
CAD9	8	CardBus address/data bus
CAD10	42	CardBus address/data bus
CAD11	9	CardBus address/data bus
CAD12	10	CardBus address/data bus
CAD13	44	CardBus address/data bus
CAD14	11	CardBus address/data bus
CAD15	45	CardBus address/data bus
CAD16	46	CardBus address/data bus
CAD17	55	CardBus address/data bus
CAD18	22	CardBus address/data bus

CAD19	56	CardBus address/data bus
CAD20	23	CardBus address/data bus
CAD21	24	CardBus address/data bus
CAD22	25	CardBus address/data bus
CAD23	26	CardBus address/data bus
CAD24	27	CardBus address/data bus
CAD25	28	CardBus address/data bus
CAD26	29	CardBus address/data bus
CAD27	30	CardBus address/data bus
CAD28	64	CardBus address/data bus
CAD29	31	CardBus address/data bus
CAD30	65	CardBus address/data bus
CAD31	66	CardBus address/data bus
CC/BE0#	7	CardBus bus commands and byte enables.
CC/BE1#	12	CardBus bus commands and byte enables.
CC/BE2#	21	CardBus bus commands and byte enables.
CC/BE3#	61	CardBus bus commands and byte enables.
CPAR	13	CardBus bus parity
CPERR#	14	CardBus parity error indicator
CGNT#	15	CardBus bus grant
CINT#	16	CardBus interrupt
CIRDY#	20	CardBus initiator ready
CCLKRUN#	33	CardBus clock run
CCD1#	36	CardBus detect 1
CVS1,CVS2	43,57	CardBus voltage sense 1 and CardBus detect 2
CBLOCK#	48	CardBus lock
CSTOP#	49	CardBus stop
CDEVSEL#	50	CardBus device select
CTRDY#	53	CardBus target ready
CFRAME#	54	CardBus cycle frame
CRST#	58	CardBus reset
CSERR#	59	CardBus system error
CREQ#	60	CardBus request
CAUDIO	62	CardBus audio
CSTSCHG	63	CardBus states change
CCD2#	67	CardBus detect 1
CCLK	19	CardBus clock
CARD_VCC	17,51	Switched output that delivers 0 V, 3.3-V, 5-V, or high impedance to card
VPPOUT	18,52	Switched output that delivers 0 V, 3.3-V, 5-V, 12-V, or high impedance to card
GND	1,34,35,68	Ground

Wireless Modem Connector (J8,J10)

Table 5-4 Keyboard Connector (J5) Pin Assignment

Pin Name	Pin No	Description
KI0	8	Keyboard Matrix Scan Input Line 0
KI1	7	Keyboard Matrix Scan Input Line 1
KI2	6	Keyboard Matrix Scan Input Line 2
KI3	5	Keyboard Matrix Scan Input Line 3
KI4	4	Keyboard Matrix Scan Input Line 4
KI5	3	Keyboard Matrix Scan Input Line 5
KI6	2	Keyboard Matrix Scan Input Line 6
KI7	1	Keyboard Matrix Scan Input Line 7
KO0	9	Keyboard Matrix Scan Output Line 0
KO1	10	Keyboard Matrix Scan Output Line 1
KO2	22	Keyboard Matrix Scan Output Line 2
KO3	11	Keyboard Matrix Scan Output Line 3
KO4	12	Keyboard Matrix Scan Output Line 4
KO5	16	Keyboard Matrix Scan Output Line 5
KO6	13	Keyboard Matrix Scan Output Line 6
KO7	15	Keyboard Matrix Scan Output Line 7
KO8	20	Keyboard Matrix Scan Output Line 8
KO9	17	Keyboard Matrix Scan Output Line 9
KO10	18	Keyboard Matrix Scan Output Line 10
KO11	14	Keyboard Matrix Scan Output Line 11
KO12	19	Keyboard Matrix Scan Output Line 12
KO13	21	Keyboard Matrix Scan Output Line 13
KO14	23	Keyboard Matrix Scan Output Line 14
KO15	24	Keyboard Matrix Scan Output Line 15

Table 5-5 CMOS Connector (J512) Pin Assignment

Pin Name	Pin No	Description
VCC_RTC	1	CMOS POWER
GND	2	Ground

Table 5-6 MONO SPEAKER Connector (J507) Pin Assignment

Pin Name	Pin No	Description
SPEAKER+	1	Speaker + Signal
SPEAKER-	2	Speaker - Signal

Table 5-7 MDC TRANSFER BD Connector (J509) Pin Assignment

Pin Name	Pin No	Description
MONO_OUT	1	AC'97 Audio Mono Output
AC97_SDOUT	23	AC'97 Serial Data Out
AC97_RESET#	25	AC'97 Reset
MODEM_SPK	4	Modem Speaker Signal
AC97_SYNC	22	AC'97 Sync.
AC97_SDIN1	24	AC'97 Serial Data In
AC97_BITCLK	30	AC'97 Bit Clock
+3V	17,21	+3V Power
+5V	10,18	+5V Power
GND	3,15,19,27,29,8,20,28,30	Ground

Table 5-8 FRONT LED Connector (J505) Pin Assignment

Pin Name	Pin No	Description
+5V	1	+5V Power
VDD5	2	VDD5 Power(+5V)
BAT_LOW#	3	Battery Low LED Signal
BAT_CHG#	4	Battery Charge LED Signal
BAT_COMP#	5	Battery Charge Complete LED Signal
SUS_LED#	6	System Suspend LED Signal
PWR_LED#	7	System Power On LED Signal
ADEN#	8	Adapter In LED Signal
COVERSW#	9	Cover Switch Signal
GND	10	Ground

Table 5-9 TOUCH PAD Connector (J504) Pin Assignment

Pin Name	Pin No	Description
T_CLK	5,6	Touch Pad Clock Signal
T_DATA	7,8	Touch Pad Data Signal
+5V	1,2,3,4	+5V Power
GND	9,10,11,12	Ground

Table 5-10 LCD/INV/TOUCH SCREEN Connector (J508) Pin Assignment

Pin Name	Pin No	Description
TOUT0-	3	Transmission Data of Pixels 0(Negative : -)
TOUT0+	4	Transmission Data of Pixels 0(Positive : +)
TOUT1-	6	Transmission Data of Pixels 1(Negative : -)
TOUT1+	7	Transmission Data of Pixels 1(Positive : +)
TOUT2-	9	Transmission Data of Pixels 2(Negative : -)

TOUT2+	10	Transmission Data of Pixels 2(Positive : +)
TCLKOUT-	12	Sampling Clock(Negative : -)
TCLKOUT+	13	Sampling Clock(Positive : +)
COM3TXD	20	COM3 Transmitted data signal
COM3RXD	21	COM3 Received data signal
COM3RTS#	22	COM3 Request to send signal
COM3CTS#	23	COM3 Clear to send signal
COM3DTR#	24	COM3 Data terminal ready signal
COM3DCD#	25	COM3 Carrier detector signal
COM3DSR#	26	COM3 Data set ready signal
BLADJ	32	Adjust LCD Brightness Signal
ENABKL_VGA	33	Controls Backlight Signal
LCD_VCC	15,16	LCD POWER
+5V	18,19,34,35	+5V Power
GND	1,2,5,8,11,14,27,28, 29,30,31	Ground

Table 5-11 DOCKING Connector (J503) Pin Assignment

Pin Name	Pin No	Description
DOCK_SEN1	1	Detect M/B AND Docking whether match
DOCK_SEN2	160	Detect M/B AND Docking whether match
VDOCK	2,3,4,5,6	AC Adapter input(From Docking BD to D/D BD), 19Vdc, max. 3.16A input.
+3V	8,9,10,11	+3V Voltage
+5V	13,14,15,16,20, 21,22	+5V Voltage
VDD5	18	Uninterrupt +5Vdc, Max. 100mA, +4.75~+5.25Vdc
+12V	19	+12V Voltage
COM1RI#	44	COM1 Ring indicator signal
COM1CTS#	45	COM1 Clear to send signal
COM1RXD	46	COM1 Received data signal
COM1DSR#	47	COM1 Data set ready signal
COM1DCD#	48	COM1 Carrier detector signal
COM1DTR#	49	COM1 Data terminal ready signal
COM1TXD	50	COM1 Transmitted data signal
COM1RTS#	51	COM1 Request to send signal
COM2RTS#	53	COM2 Request to send signal
COM2TXD	54	COM2 Transmitted data signal
COM2DTR#	55	COM2 Data terminal ready signal
COM2DCD#	56	COM2 Carrier detector signal
COM2DSR#	57	COM2 Data set ready signal
COM2RXD	58	COM2 Received data signal
COM2CTS#	59	COM2 Clear to send signal
COM2RI#	60	COM2 Ring indicator signal
CD_PWR#	61	CD ROM POWER

FPC_PWR#	62	Floppy POWER
FDD_CTL#	63	Detect external Floppy
RDATA#	64	Floppy Drive Read Data
WDATA#	65	Floppy Drive Write Data
WGATE#	66	Floppy Drive Write Gate Enable signal
HDSEL#	67	Floppy Drive Hi Density Select signal
DIR#	68	Floppy Drive Head Move Direction Control signal
STEP#	69	Floppy Drive Head Step Move Control signal
TRK0#	70	Floppy Drive 0 Motor Enable signal
INDEX#	71	Floppy Drive Index Indicate signal
DSKCHG#	72	Floppy Diskette Change signal
WPORT#	73	Floppy Drive Write Protect signal
MTR0#	74	Floppy Drive 0 Mote Enable signal
DRV0#	75	Floppy Drive 0 Enable signal
GREEN	78	CRT GREEN SIGNAL
RED	79	CRT RED SIGNAL
BLUE	80	CRT BLUE SIGNAL
VOLADJ	81	Adjust Speaker Volume
SPIDFOUT	82	SPIDFOUT Signal
D_MIC_IN	83	Microphone Input Signal
AOUT_L	84	Line Out Left Signal
AOUT_R	85	Line Out Right Signal
CDROM_PLUG#	87	Detect CD ROM at Power On
CD_L	88	CD ROM Left Output
CD_COM	89	CD ROM Command
CD_R	90	CD ROM Right Output
HD/CD_LED#	91	HDD And CD ROM Active LED
QIDEPD0~ QIDEPD15	93~108	CD ROM Data Line 0~15
Q_PIOW#	110	Buffered ISA Bus I/O Write Signal
Q_PIOR#	111	Buffered ISA Bus I/O Reade Signal
Q_PDACK#	112	CD ROM Acknowledge Signal
Q_IDEPA2	113	CD ROM Address Line 2
Q_IDEPA1	114	CD ROM Address Line 1
Q_IDEPA0	115	CD ROM Address Line 0
Q_PCS#1	116	CD ROM DMA I/O Chip Select1
Q_PCS#3	117	CD ROM DMA I/O Chip Select3
Q_IORDY	118	CD ROM DMA Signal
Q_PDREQ	119	CD ROM Requist
Q_IDEPDIAG	120	Passed Diagnostic
Q_PIRQ14	121	CD ROM IRQ 14
Q_IDE_RST#	122	CD ROM Reaet
HUB_SUSPEND	124	USB Hub Suspend Signal
48MHZ_USBHUB	125	48MHz Clock Signal
SPK_OFF	126	Speaker OFF Control Signal
Reserve	127	Reserve

D_K/M_CLK	129	PS/2 Keyboard/Mouse Clock Signal
D_M_CLK	130	PS/2 Mouse Clock Signal
D_K/M_DATA	131	PS/2 Keyboard/Mouse Data Signal
D_M_DATA	132	PS/2 Mouse Data Signal
D/LPD0~D/LPD7	134~141	PIO Data bit0~7 signal
D/SLIN#	142	PIO printer Select Input
D/STB#	143	PIO Strobe
D/AFD#	144	PIO Auto Feed
D/INIT#	145	PIO Printer Initiate
D/ACK#	146	PIO Printer Acknowledge
D/ERR#	147	PIO Printer Error
D/SLCT	148	PIO Printer Selected Status
D/PE	149	PIO Printer Paper End
D/BUSY	150	PIO Printer Busy
D/CRTIN#	152	Detect CRT Monitor
DDCK	153	DDC Clock Signal
DDDA	154	DDC Data Signal
HSYNC	155	CRT Horizontal Sync. Signal
VSYNC	156	CRT Vertical Sync. Signal
PCIRST#	157	PCI Reset
USBPD+	158	USB Differential Data Plus
USBPD-	159	USB Differential Data Minus
GND	7, 12, 17, 23~43, 52, 76, 86, 92, 109, 123, 133, 151	Ground
CRT_GND	77	CRT Ground

6 System View

6-1 Front View



6-2 Bottom View

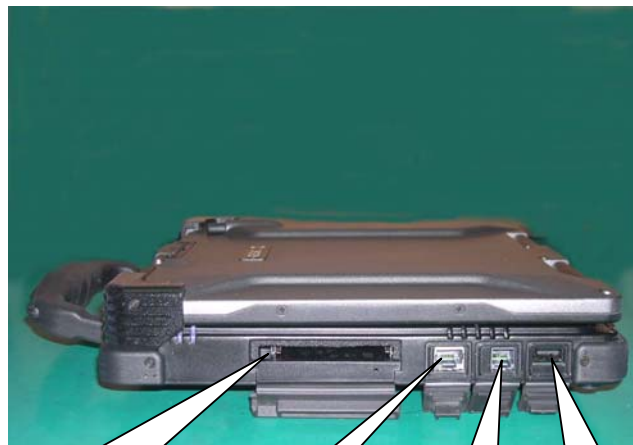


6-3 Left-Side View



**Mic Connector &
External Ear Phone
Connector**

6-4 Right-Side View



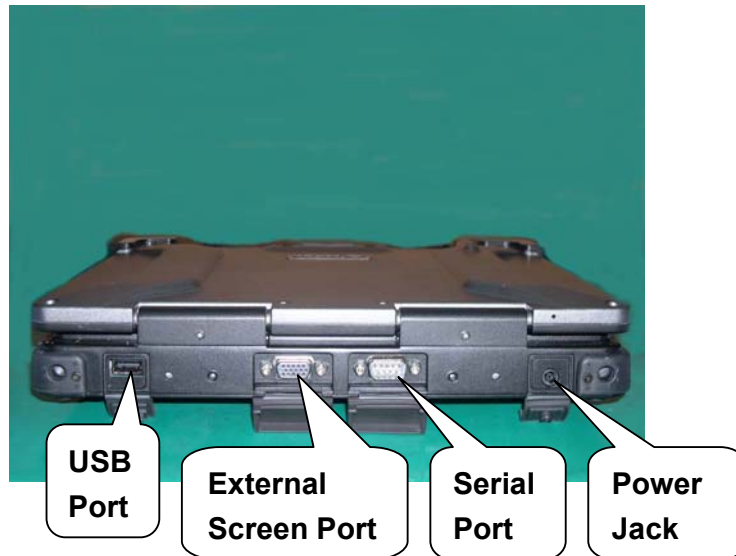
**PCMCIA Card
Slot**

RJ45

RJ11

**USB
Port**

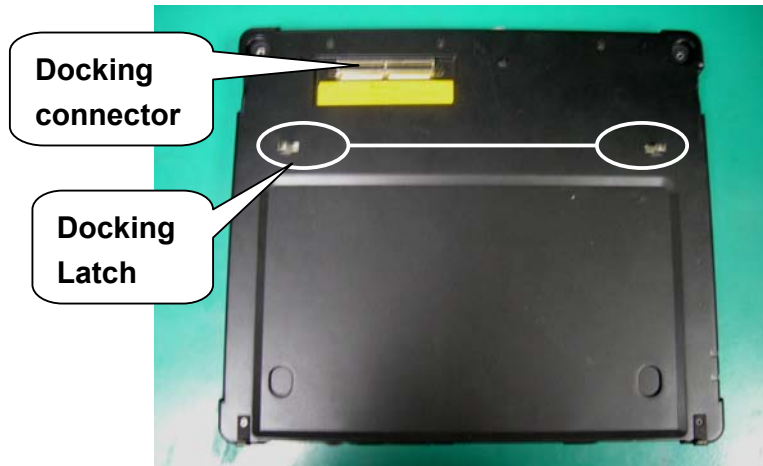
6-5 Rear View



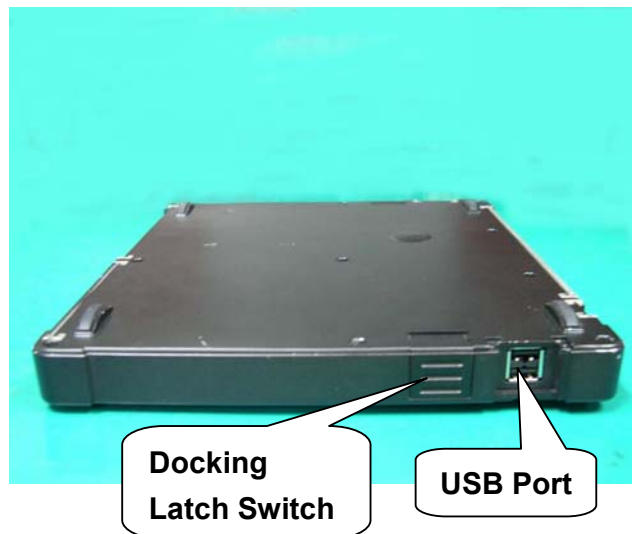
6-6 Top-open View



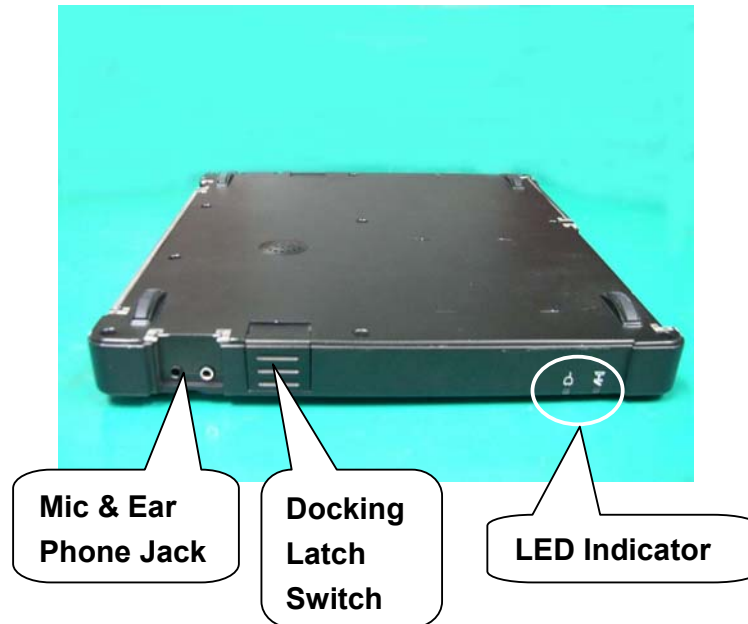
6-7 Docking Module Front View



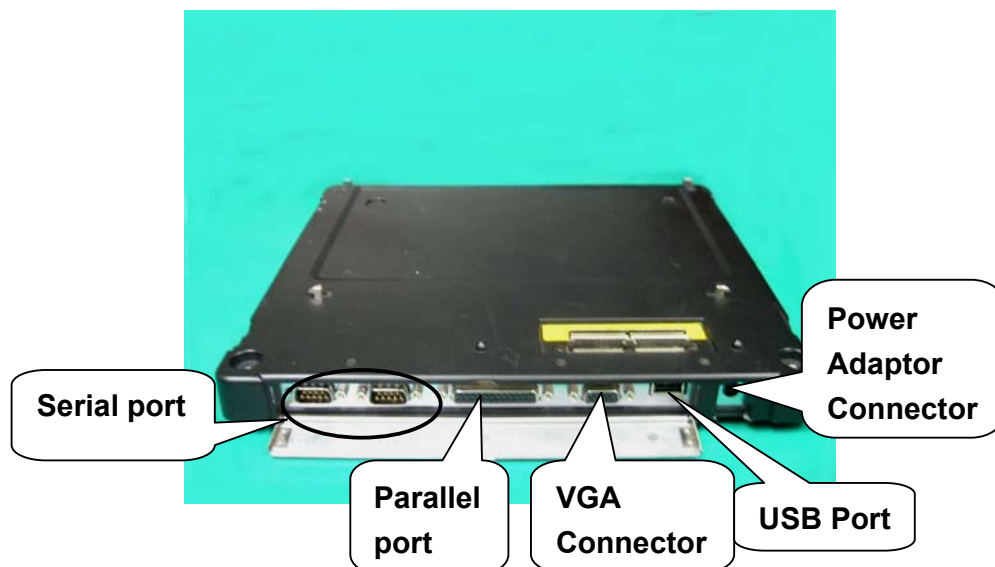
6-8 Docking Module Left-Side View



6-9 Docking Module Right-Side View



6-10 Docking Module Rear View



7 System Disassembly

7-1 Battery Pack

Disassembly Step:

1. Carefully put the notebook upside down.
2. Push the “ Press ” button , then slide the “ Battery Switch “ to “Open”
3. Lift up the Battery Cover form the notebook, then slide the Battery.
4. Slightly lift up the Battery from the housing.



Step 1



Step 2



Step 3

Reassemble:

1. Install a battery in the housing and slide the Battery.
2. Install the Battery Cover.
3. Slide the “ Battery Switch “ to lock the Battery.

7-2 Bottom Housing

Disassembly Step:

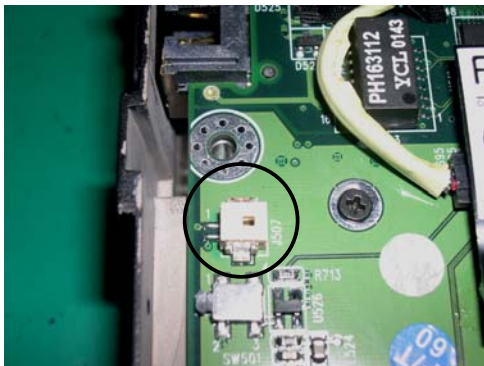
1. Remove the battery pack.
2. Remove eight screws (M3L6) and two screws (M3L4) locking on the bottom housing.
3. Slightly lift up the bottom housing.
4. Disconnected the speaker wire on the Mother Board.



Step 1



Step 2



Step 3

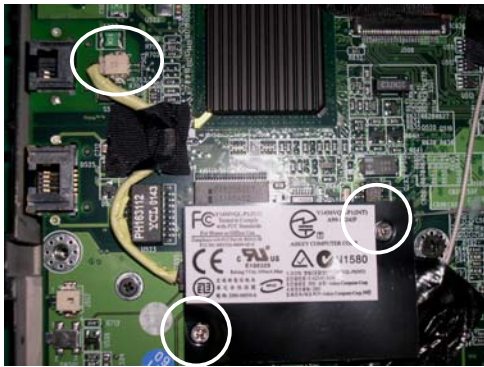
Reassemble Step:

1. Plug the speaker wire on the Mother Board.
2. Carefully put the bottom housing on the Mother Board.
3. Secured eight screws (M3L6) and two screws (M3L4) to fix the bottom housing.
4. Reassemble the battery pack.

7-3 Modem Board

Disassembly Step:

1. Remove the Bottom housing.
2. Remove two screws and disconnect the Modem cable from the Mother board.
3. Slight lift up the Modem Board from the Mother Board.



Step 1



Reassemble Step:

1. Carefully plug the Modem Board into the Mother Board.
2. Secured two screws and connect the Modem cable.

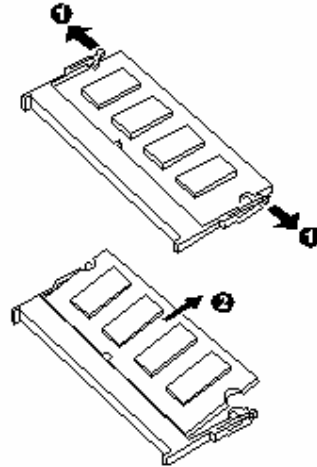
7-4 Memory

Disassembly Step:

1. Remove the bottom housing.
2. Pull the retaining chips outwards and remove the SO-DIMM.



Step 1



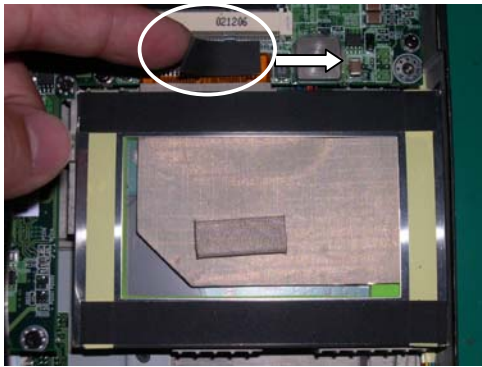
Reassemble Step:

1. Install the SO-DIMM to slot.
2. Reassemble the Bottom housing.

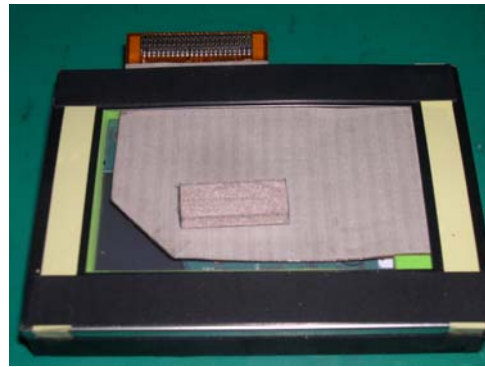
7-5 HDD Module

Disassembly Step:

1. Remove Bottom housing.
2. Carefully disconnected the IDE cable from the Mother Board and lift up the HDD module.
3. Disassembly the cable and two



Step 1



Reassemble Step:

1. Reassemble two Sponge to HDD and connect the IDE cable back to HDD.
2. Carefully connect the IDE cable to Mother Board and put the HDD module into the housing.
3. Reassemble the Bottom housing.

7-6 Keyboard

Disassembly Step:

1. Remove two screws (M2L3) that fix the hinge cover.
2. Remove block label.
3. Remove four screws (M2L3) that fix the hinge cover.
4. Lying on the LCD panel.
5. Slightly lift up the hinge cover.
6. Remove two screws (M2L3) and lift up the bracket and lift up keyboard.



Step 1



Step 2



Step 3



Step 4



Step 5

Reassemble Step:

1. Carefully connected the keyboard cable to the Mother board, then put the keyboard into the housing well.
2. Install Bracket and secured two screws.
3. Lying on LCD panel.
4. Install the hinge cover.
5. Secure four screws to fix the hinge cover.
6. Secure two screws to fix the hinge cover.

7-7 LCD Panel

Disassembly Step:

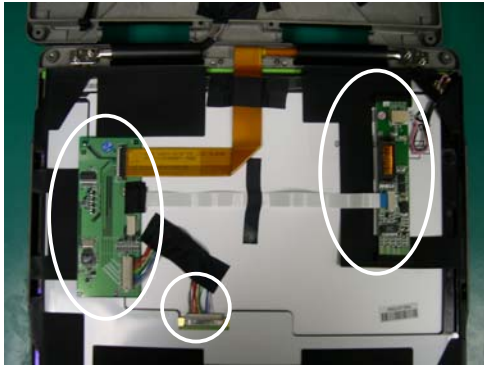
1. Remove two black rubbers and four screws.
2. Remove eight screws then open the LCD housing.
3. Remove two boards, cable and black rubber that stable LCD panel.
4. Carefully lift up the LCD panel from the cover.



Step 1



Step 2



Step 3

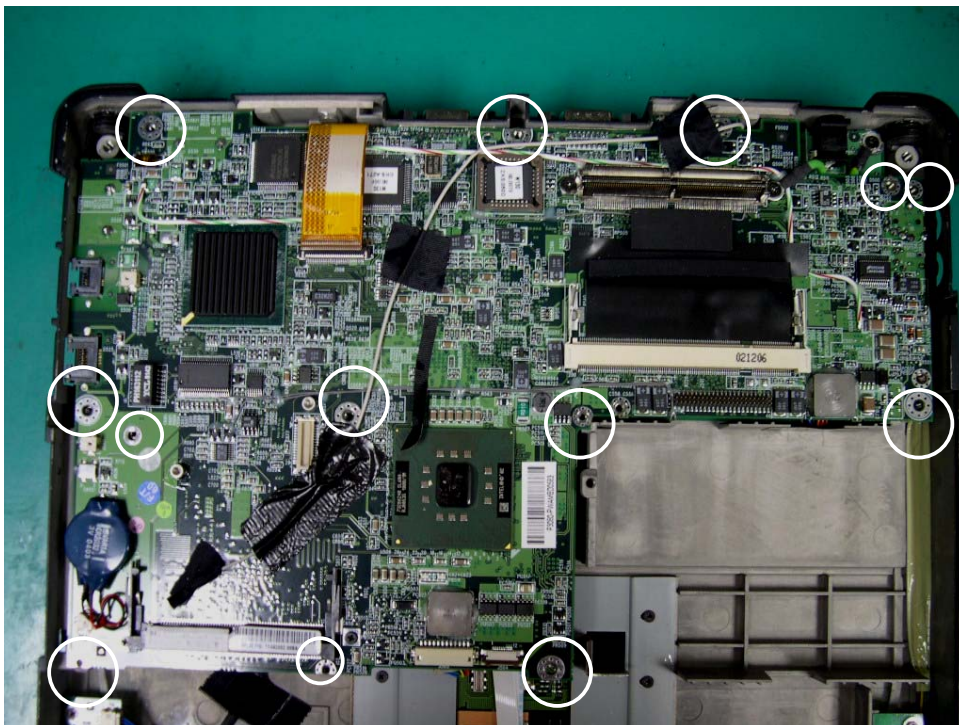
Reassemble Step:

1. Carefully put the LCD panel on the cover then stable LCD panel with black rubber.
2. Place two boards well and connect cable of LCD panel.
3. Close LCD housing then secure eight screws.
4. Secure two black rubbers and four screws.

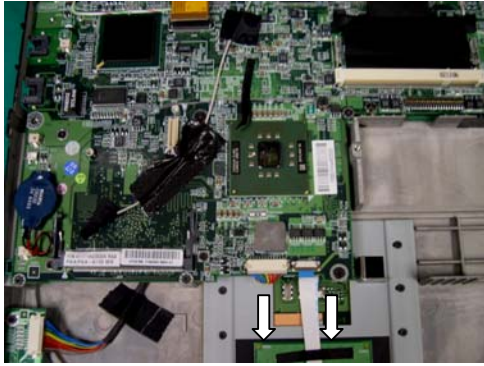
7-8 System Board

Disassembly Step:

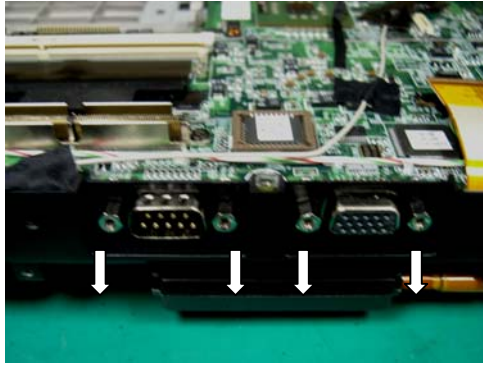
1. Remove HDD module.
2. Remove Keyboard.
3. Remove LCD module.
4. Remove thirteen screws that fasten the Mother Board & Charge Board on the housing.
5. Disconnect the touch pad cable & LED cable from the Mother Board.
6. Remove four screws.
7. Disconnected the Battery wire from the Charge Board.



Step 1



Step 2



Step 3

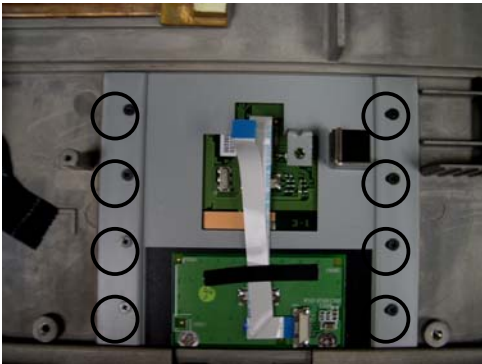
Reassemble Step:

1. Connect the Battery wire to Charge Board.
2. Carefully connected the Charge Board to Mother Board and place the Mother Board to the housing.
3. Secured thirteen screws to fix the Mother Board and Charge Board.
4. Secured four screws.
5. Connected touch pad cable and LED wire back to Mother Board.
6. Reassemble the LCD module.
7. Reassemble keyboard.
8. Reassemble HDD module.

7-9 Touch Pad

Disassembly Step:

1. Remove System Board.
2. Remove eight screws (M2L3) and lift up the Bracket.
3. Lift up the switch and track pad.



Step 1

Reassemble Step:

1. Install the track pad & switch then put the bracket. Secured eight screws to fix the Bracket.
2. Reassemble System Board.

7-10 Docking Mother Board

Disassembly Step:

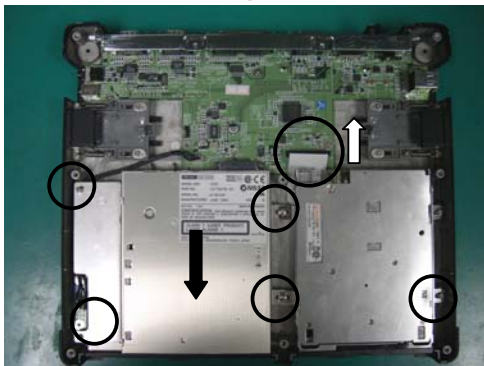
1. Remove ten screws (M2.5L6) that fix the docking bottom cover.
2. Carefully lift up the Docking Bottom cover then disconnected the speaker wire.
3. Remove six screws (M2.5L6) that fix CD-ROM driver and Floppy.
4. Disconnect the CD-ROM and Floppy from the docking Mother Board.
5. Remove three screws (M2.5L6) and seven screws (M2L4) that fix the docking Mother board and docking housing.



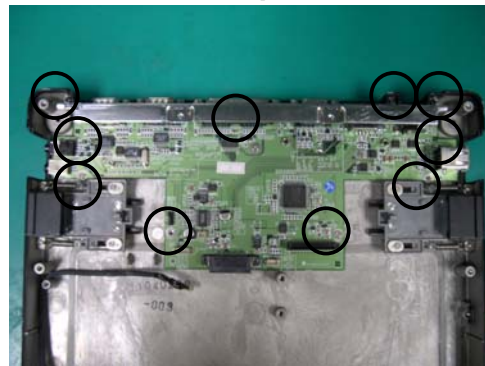
Step1



Step2



Step3



Step4

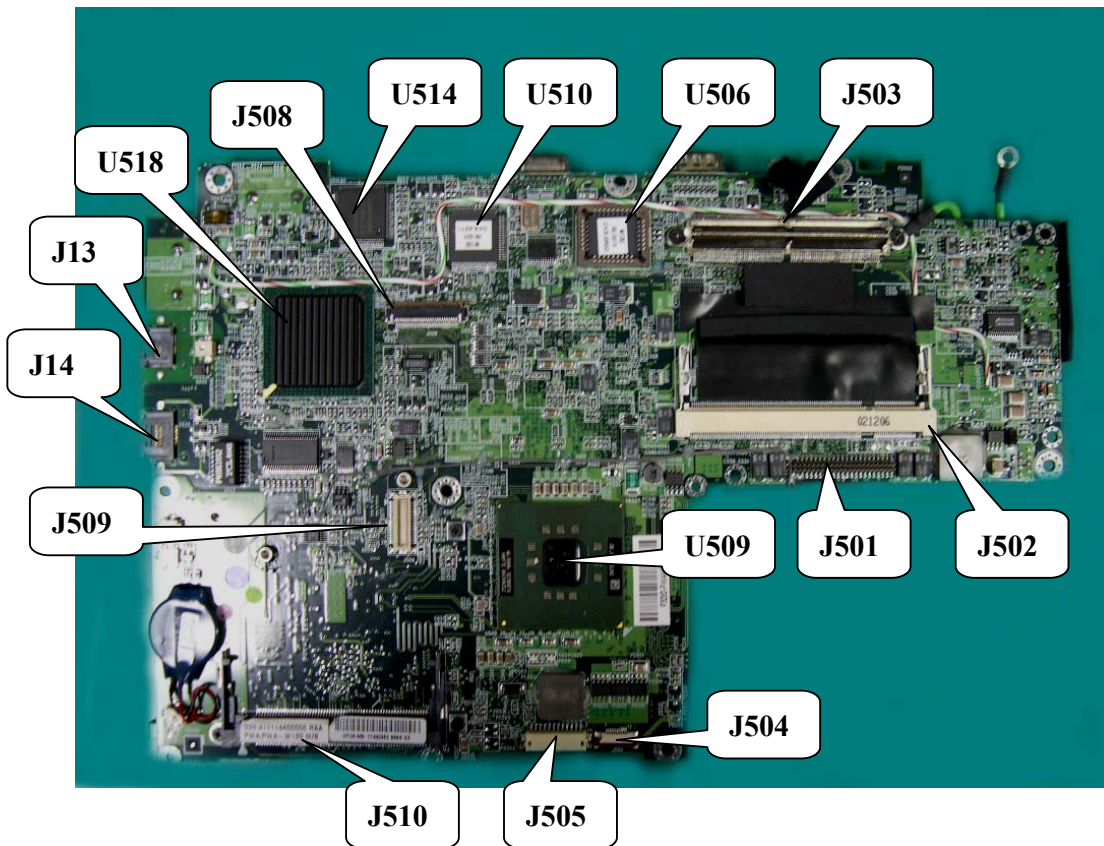
Reassemble Step:

1. Place the docking Mother Board to docking housing and secured three screws (M2.5L6) and seven screws(M2L4) to fix the docking Mother Board
2. Reassemble the CD-ROM and Floppy driver.

3. Reassemble Docking Bottom Cover.

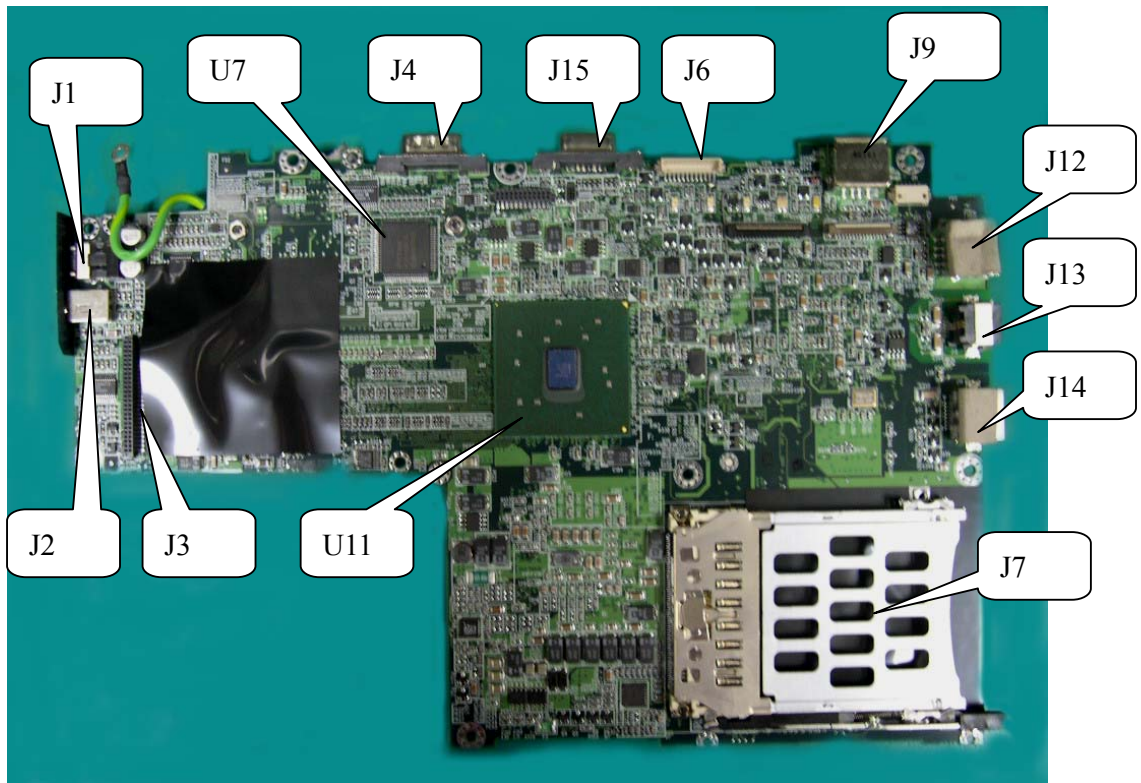
8 Location of Connectors / Major Components

8-1 Mother Board –A



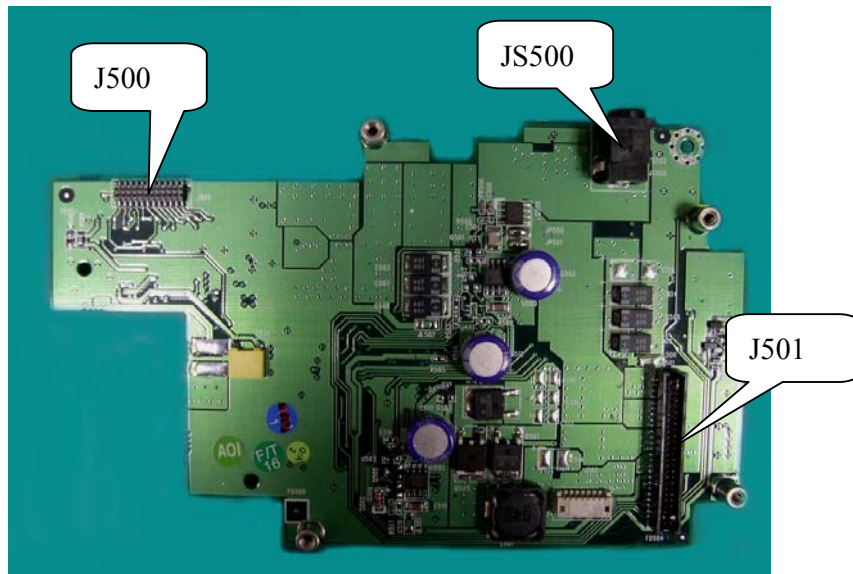
- J503: Docking connector.
- U506: System bios
- U510: H8/3437 keyboard controller
- U514: super I/O
- J508: LCD panel connector.
- U518:
- J13: Phone connector.
- J14: LAN port.
- J509: Modem board connector.
- J510: Mini PCI slot.
- J505: Front LED connector.
- J504: Touch pad module connector.
- U509: Intel pentium-M CPU.
- J501: HDD connector.
- J502: memory slot.

8-2 Mother Board –B



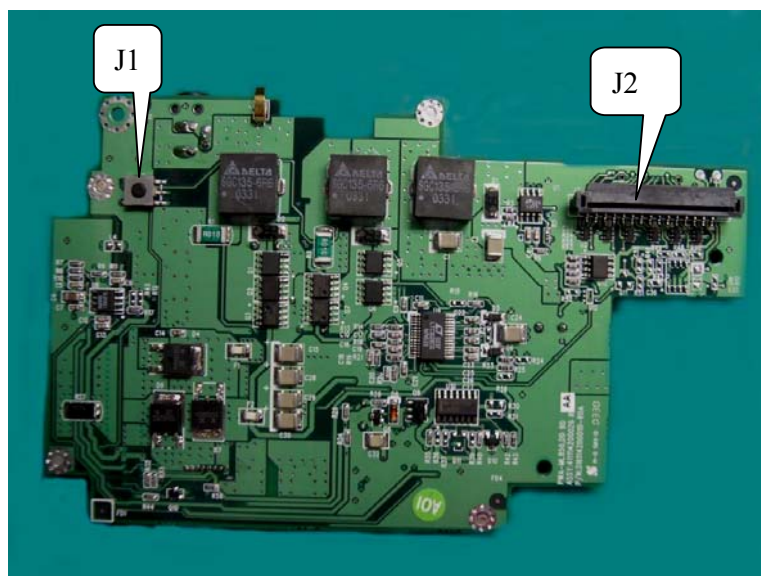
- J9: USB2.0 connector.
- J6: Inverter board connector.
- J15: Extension monitor port.
- J4: SIO port.
- U7: Super I/O.
- J1: Speaker out connector.
- J3: D/D board connector.
- U11: North bridge
- J7: PCMCIA slot.
- J14: LAN port.
- J13: Phone connector.
- J12: USB2.0 connector.

8-3 D/D Board-A



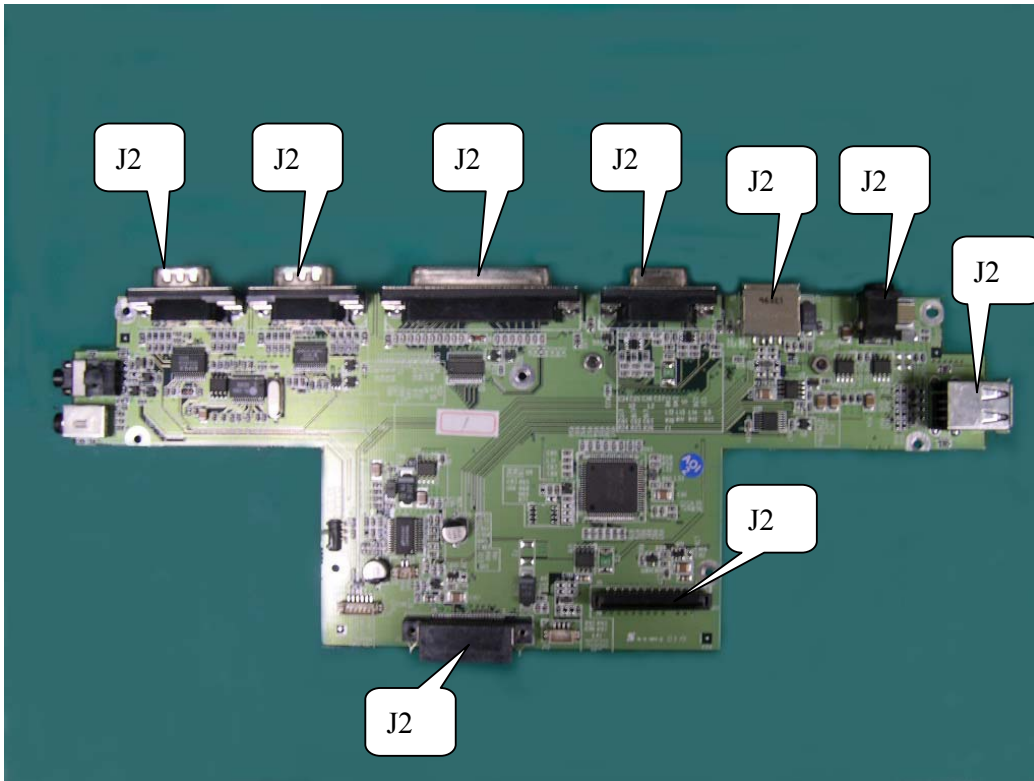
- JS500: Power Jack
- J501:
- J500: D/D BD to M/B keyboard connector

8-4 D/ D Board-B



- J2: Keyboard
- J1: Power bottom

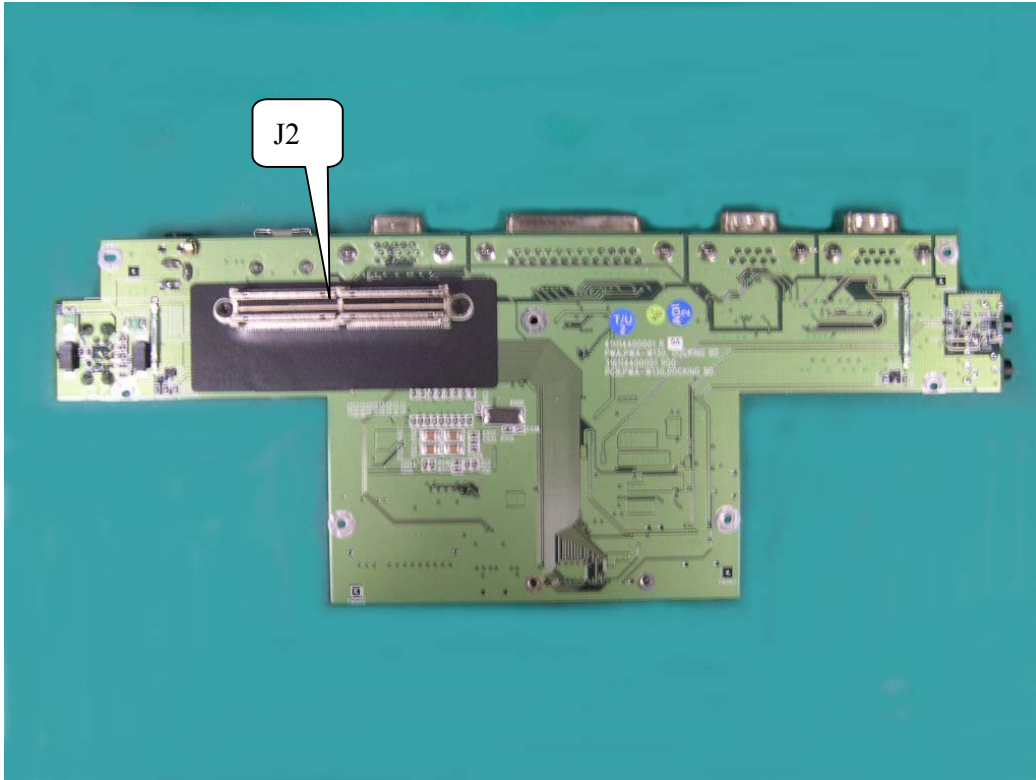
8-5 Docking Main Board-A



■ J9:

■ J9:

8-6 Docking Main Board-B



- J2: Docking connector.

9 Maintenance Diagnostics & Trouble Shooting

9-1 Introduction

Each time the computer is turned on, the system bios runs a series of internal checks on the hardware. This power on self test(POST)allows the computer to detect problems as early as the power on stage. Error messages of post can alert you to the problem of your computer.

If an error is detected during these tests, you will see an error message displayed on the screen. If the error occurs before the display is initialized, then the screen cannot display the error message. Error codes or system beeps are used to identify a post error that occurs when the screen is not available.

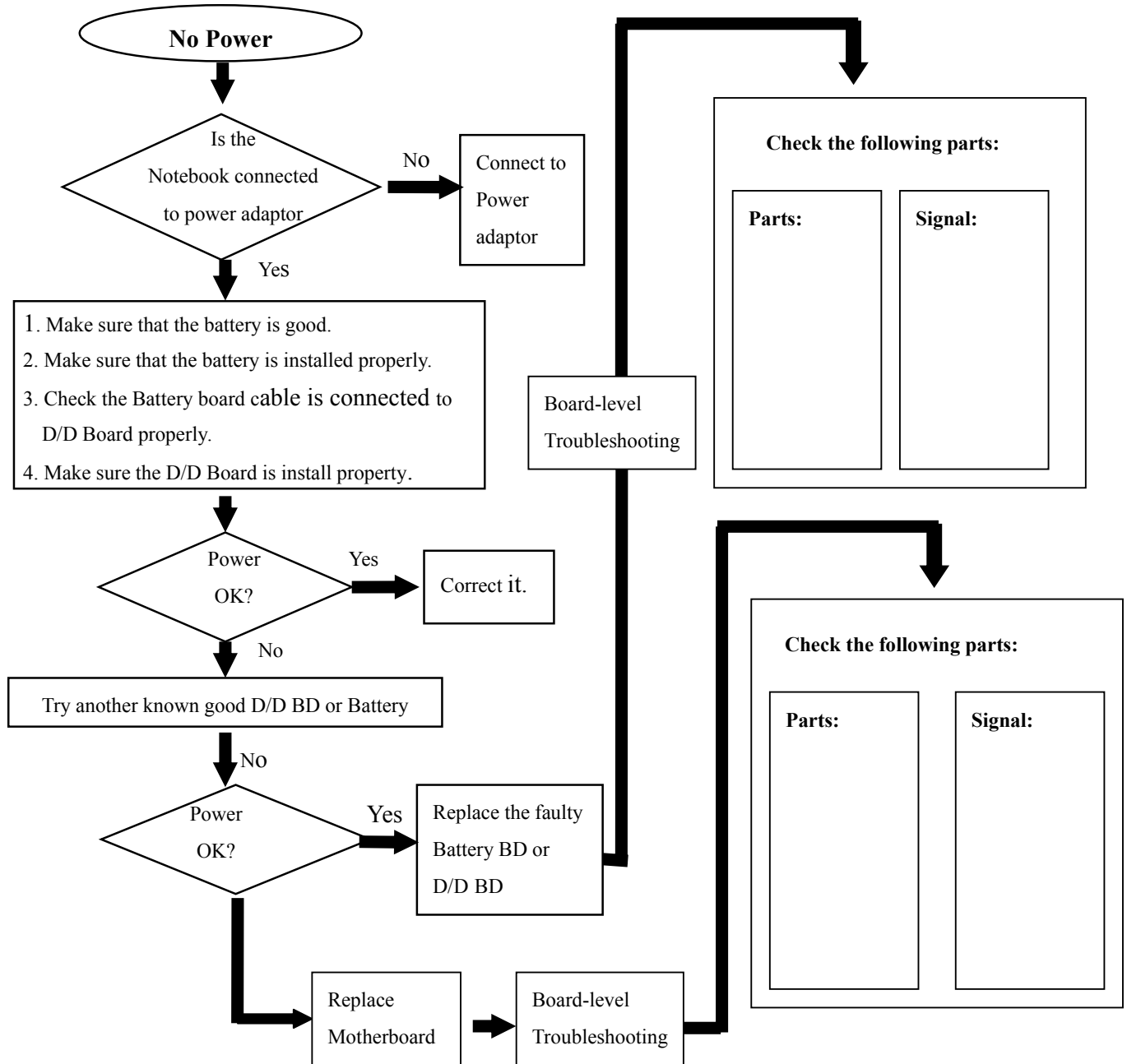
The value for the diagnostic port (378H) is written at the beginning of the test. Therefore, if the test failed, the user can determine where the problem occurred by reading the last value written to port 378H by the docking station or port Replicator PIO port.

9.2 Error Codes

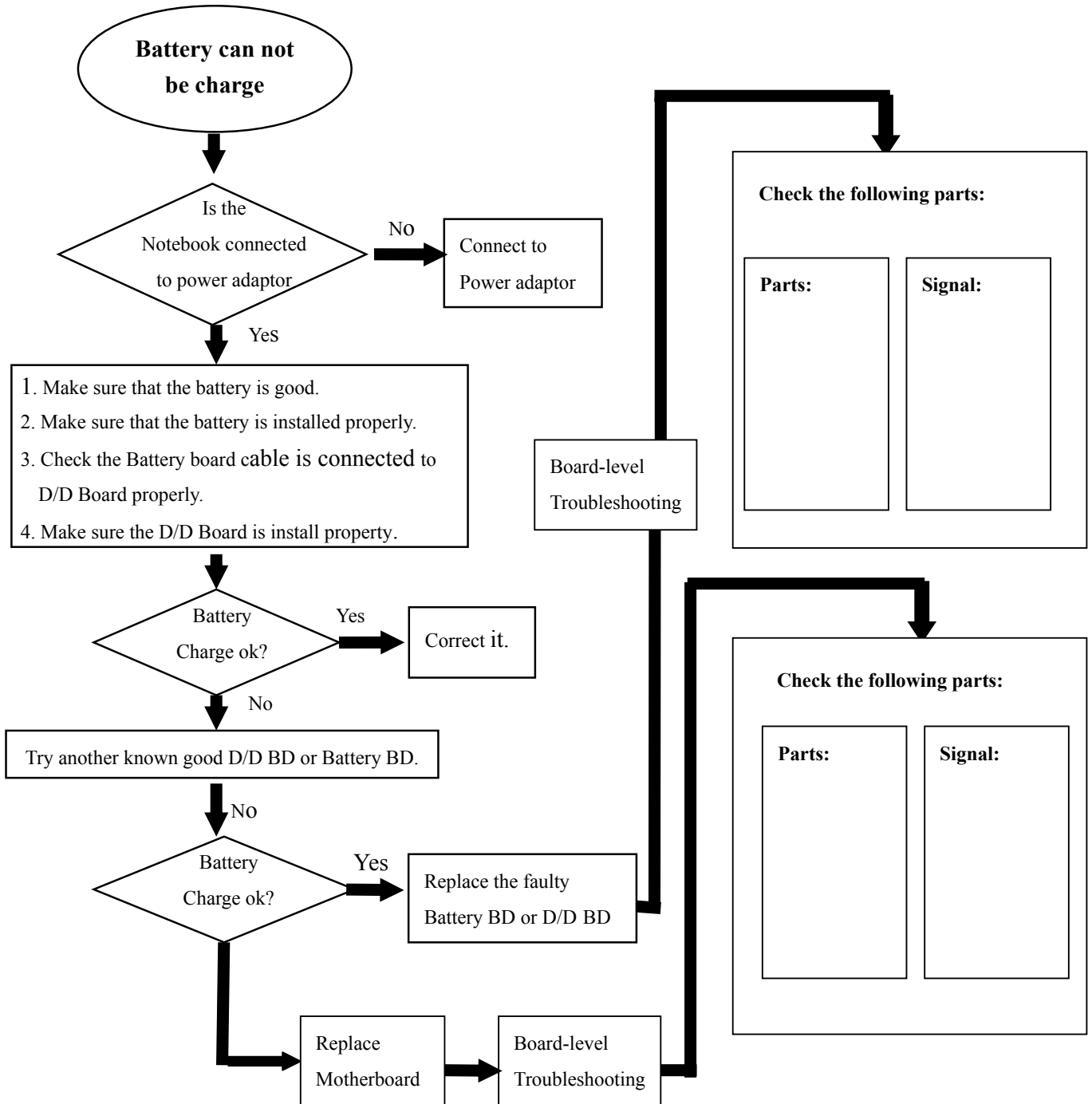
Following is a list of error codes in sequent display on the 378H port debug board.

9-3 No Power

When the power button is pressed, nothing happens, and power indicator is not light up.

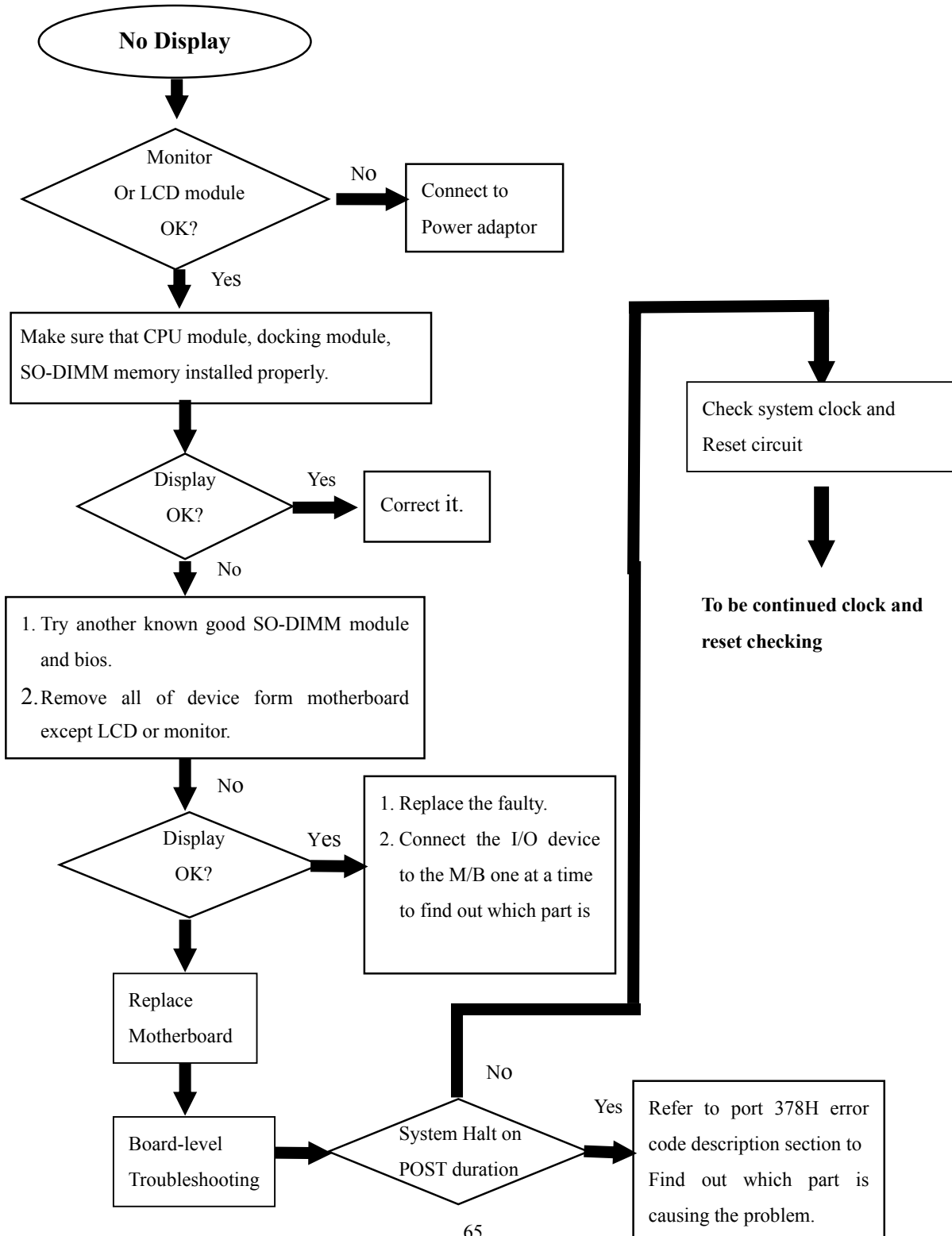


9-4 Battery Can Not Be Charged

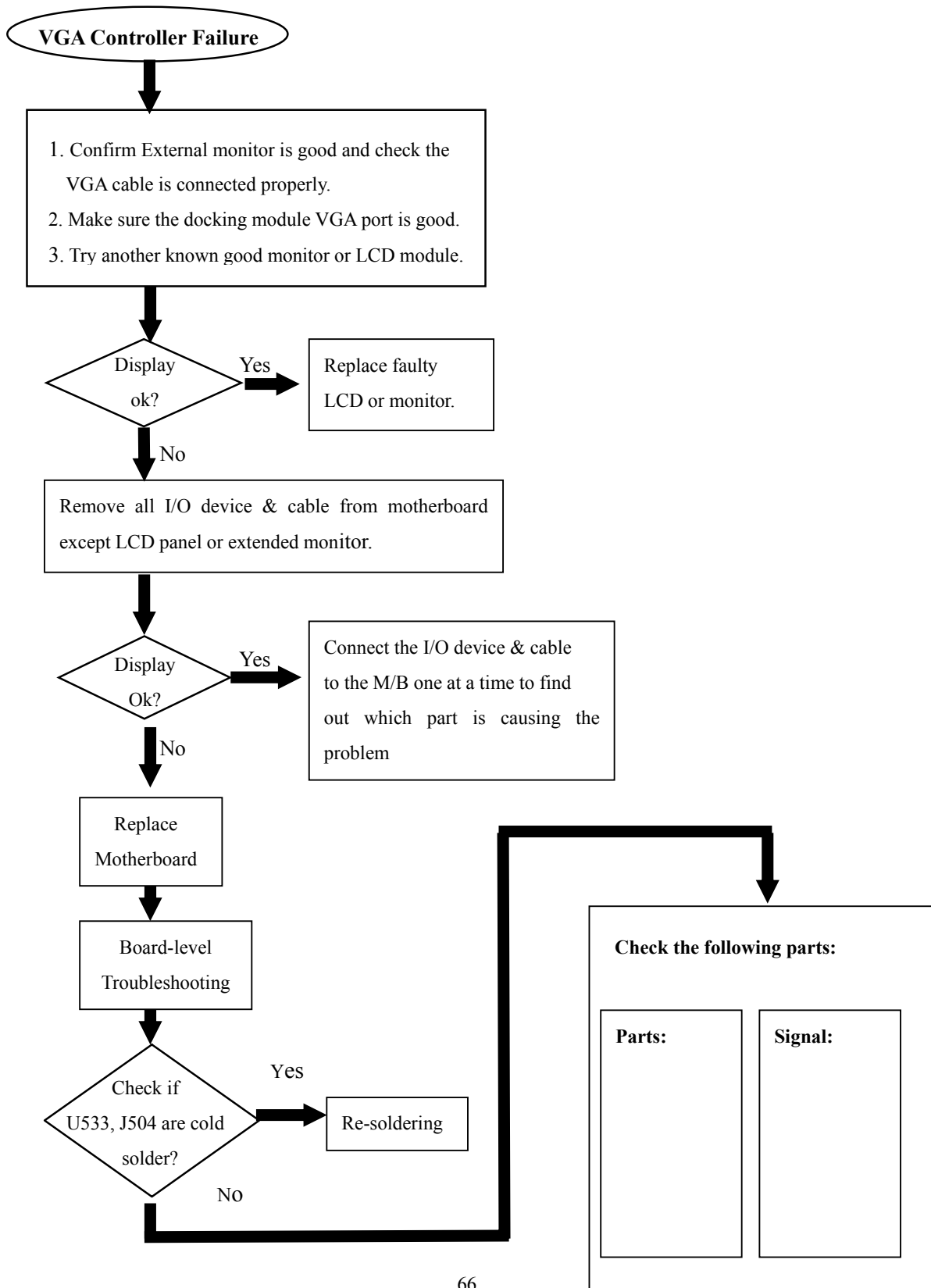


9-5 No display

There is no display on both LCD and VGA monitor after power on although the LCD and monitor is known good.

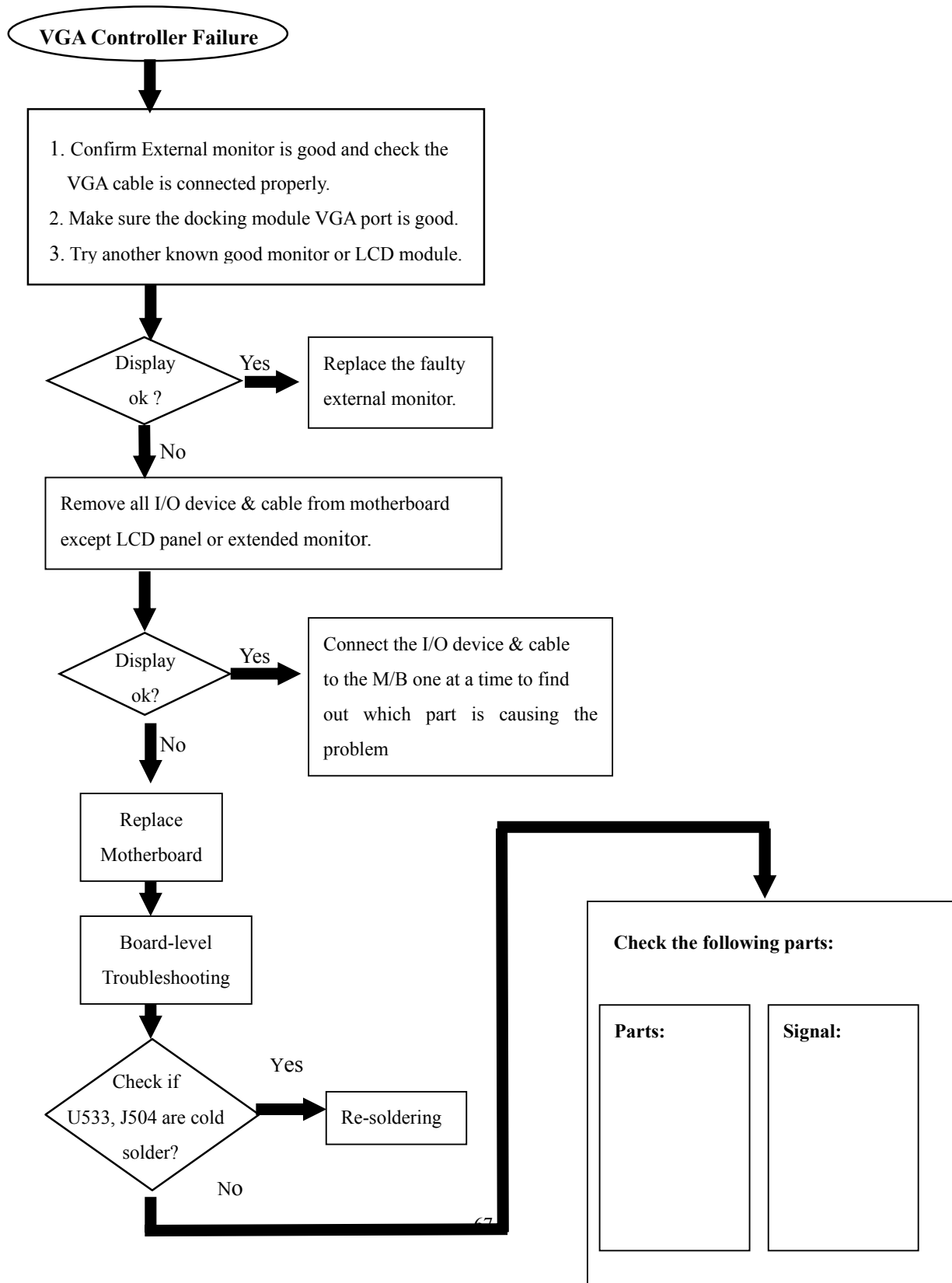


9-6 LCD No Display or Picture Abnormal



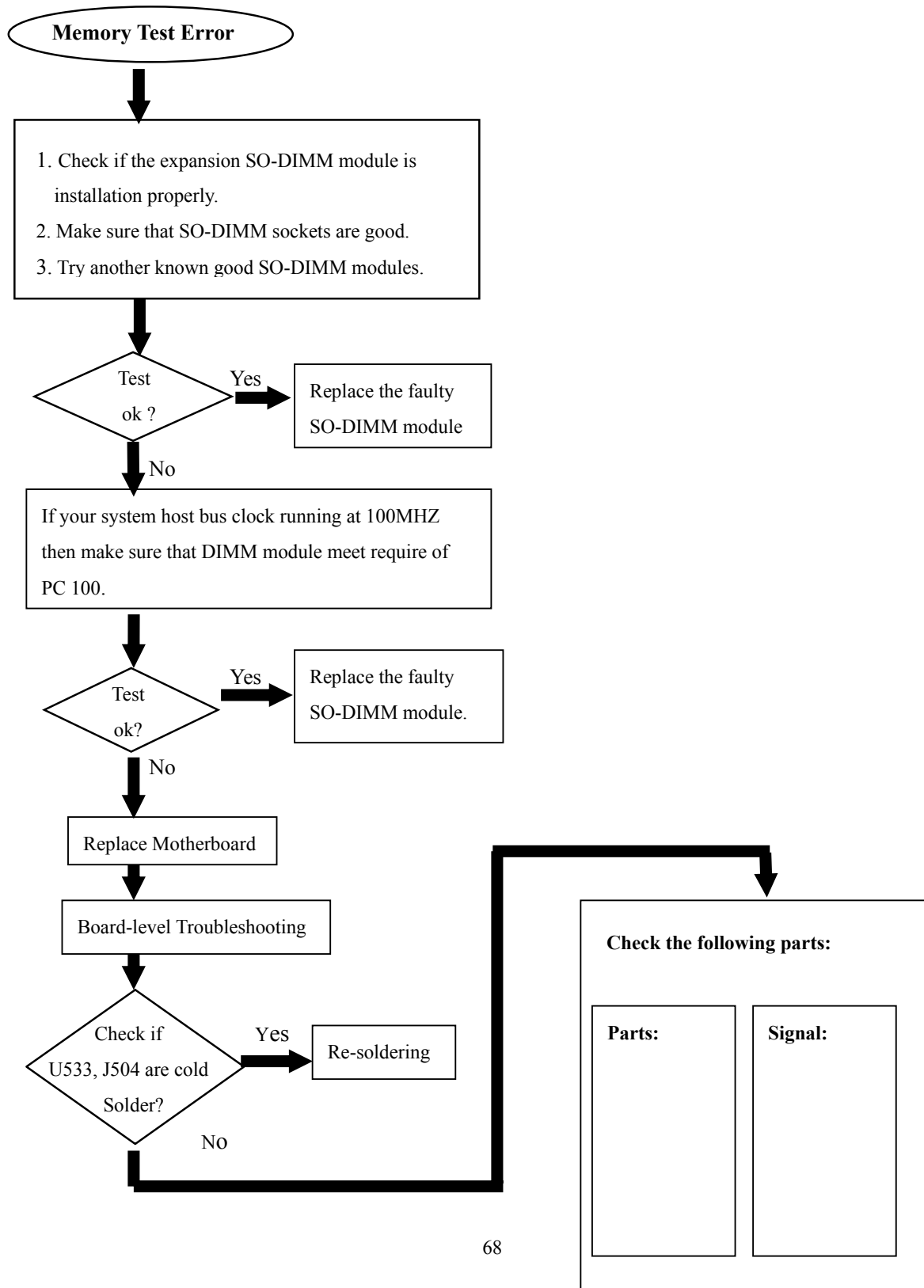
9-7 External Monitor No Display or Color Abnormal

The CRT monitor shows nothing or abnormal color, but it is OK for LCD.



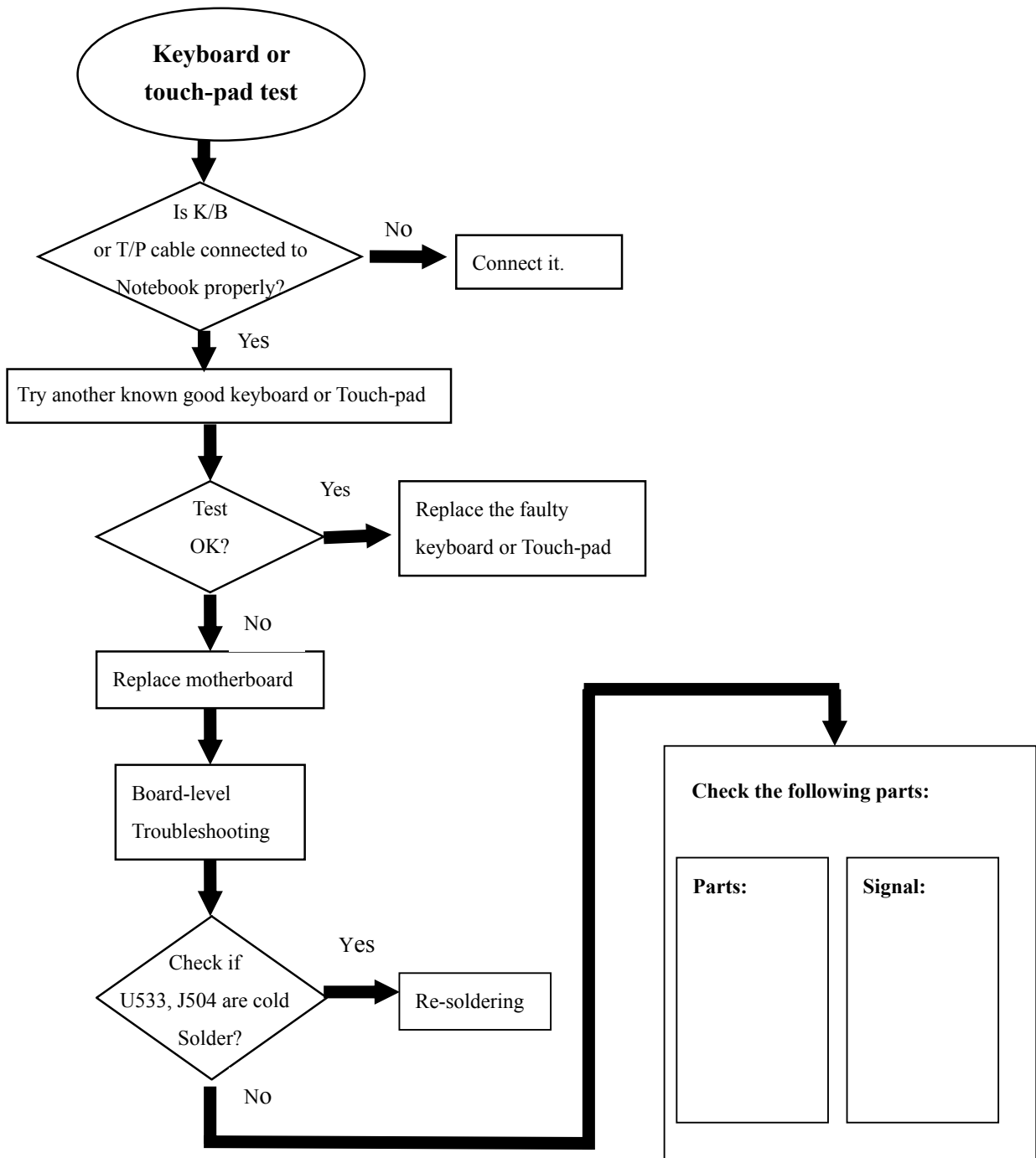
9-8 Memory Test Error

The extend SO-DIMM SDRAM is failure or system hangs up.



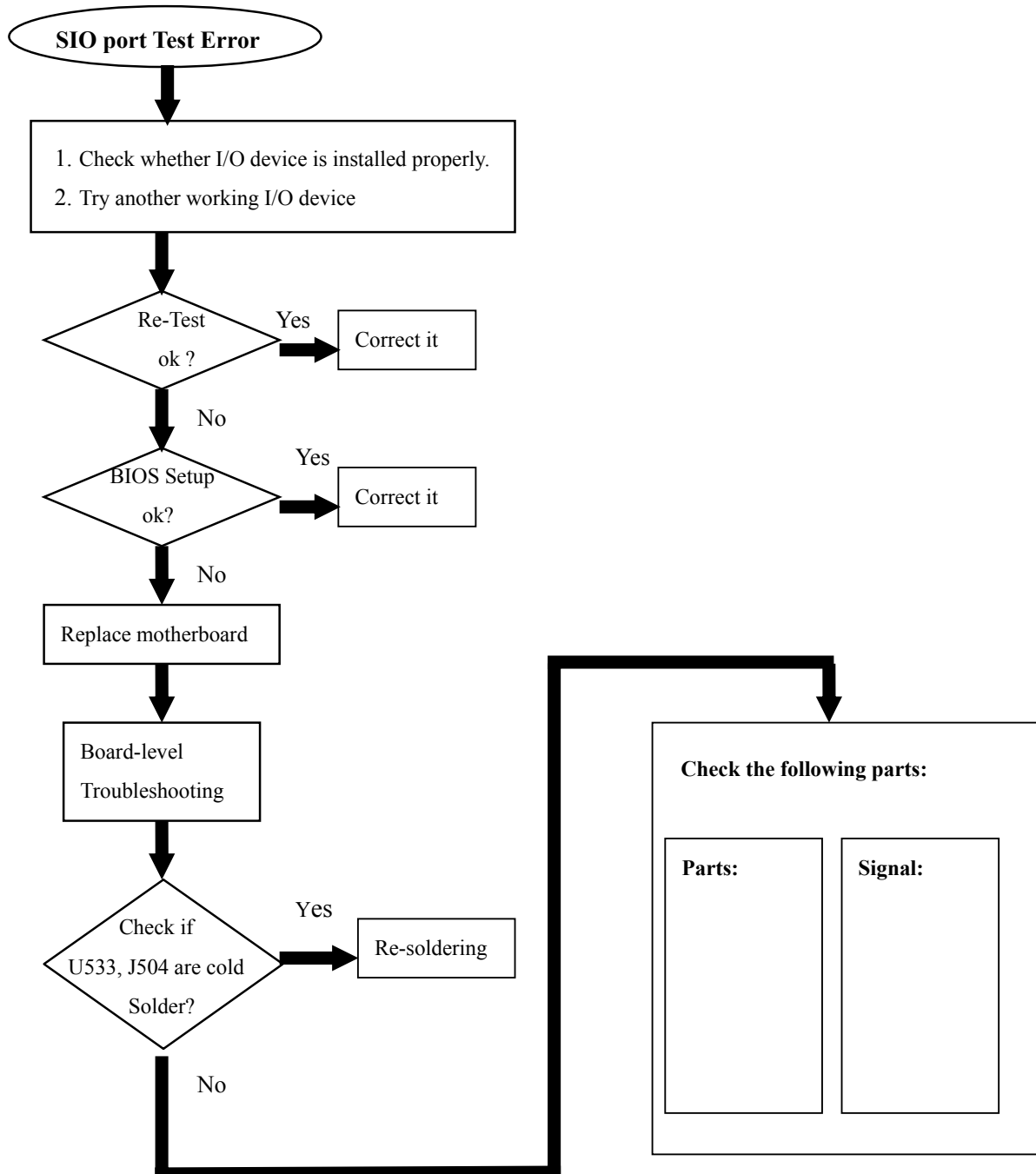
9-9 Keyboard and Touch –pad Test Error

Error message of keyboard or touch-pad is failure or any keys does not working properly.



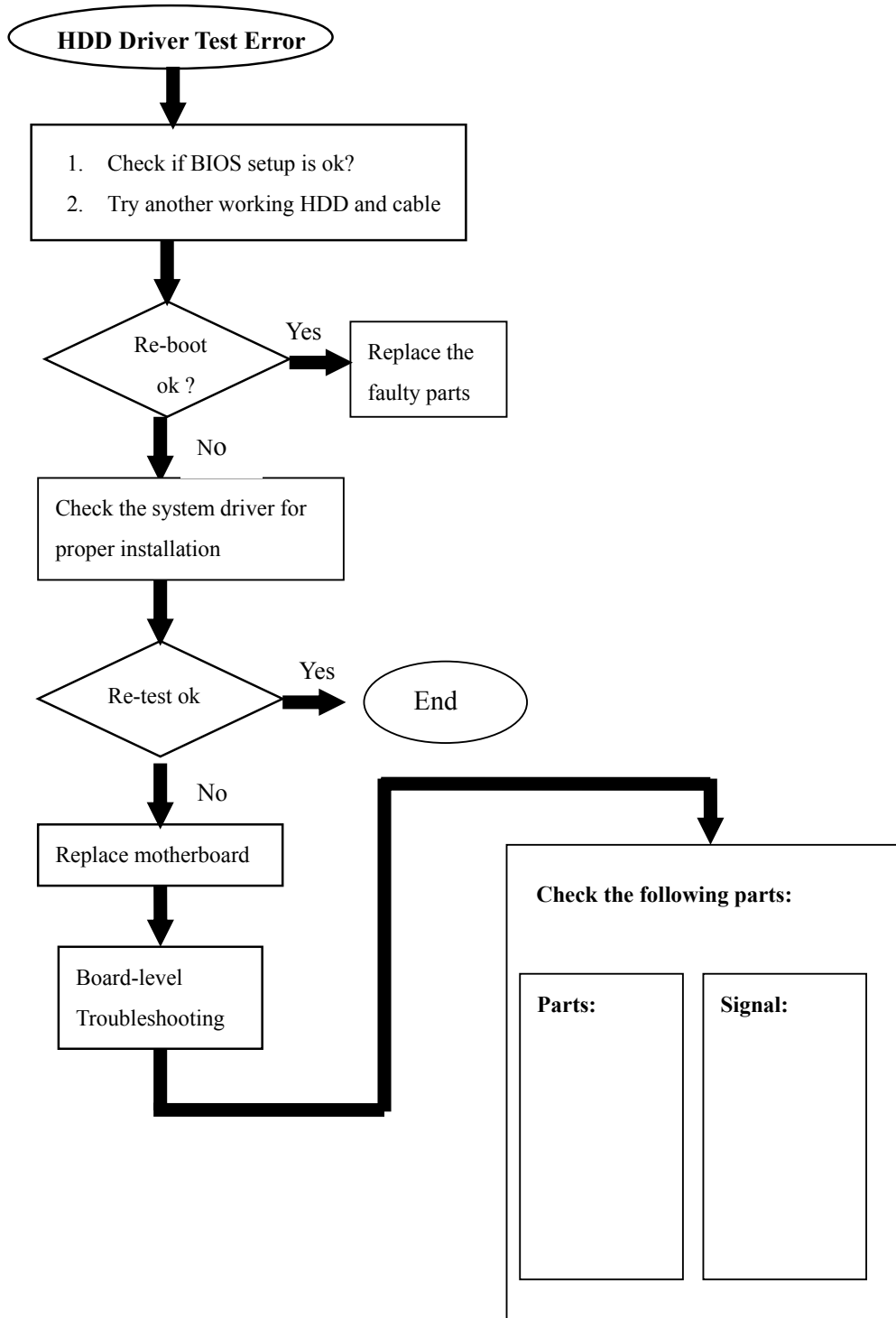
9-10 System SIO Test Error

Error message is shown or SIO Function does not working properly when SIO device is installed.



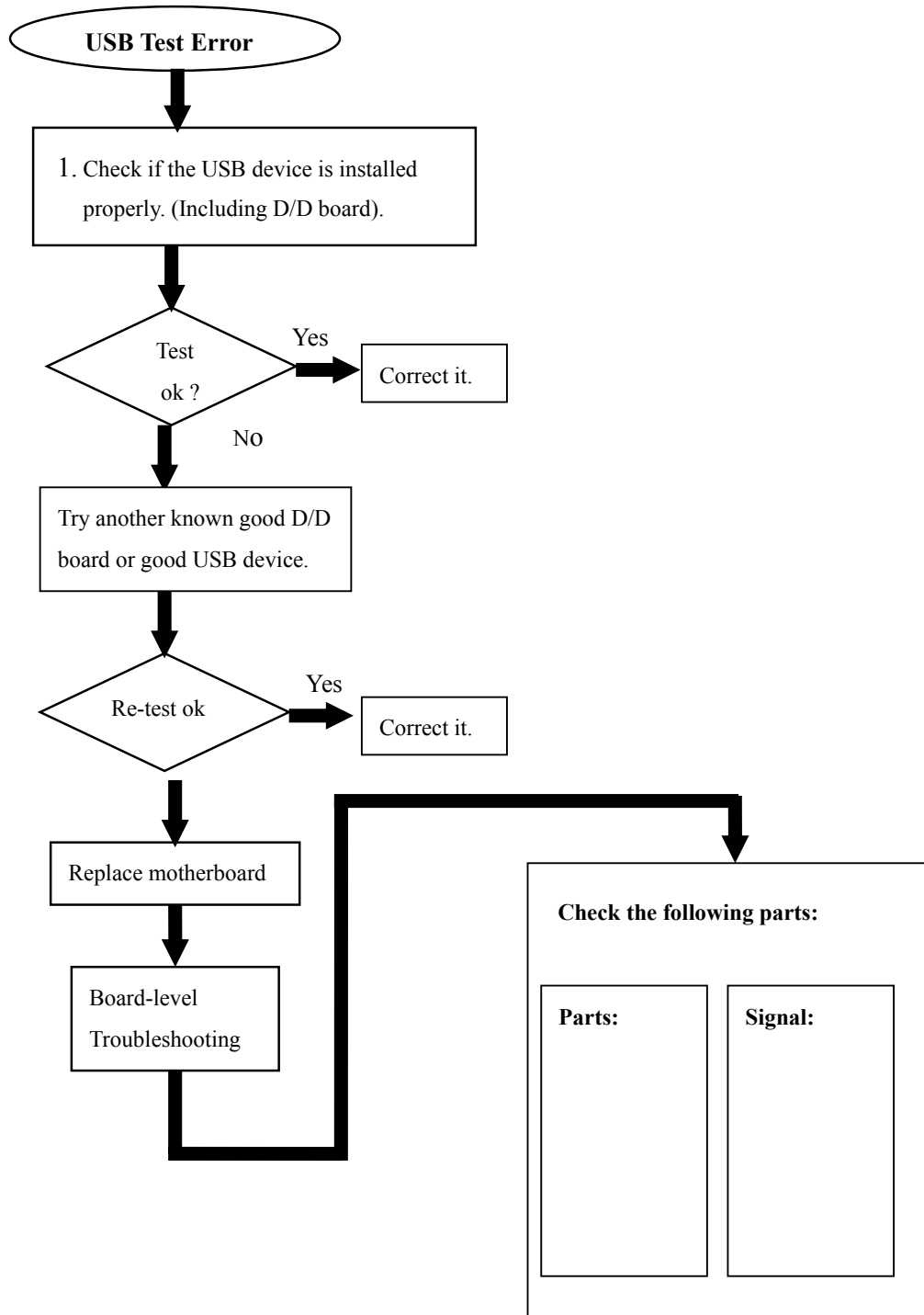
9-11 Hard Drive Test Error

Either an error message is shown, or the drive motor spins non- stop, while reading data from or writing data to hard disk.



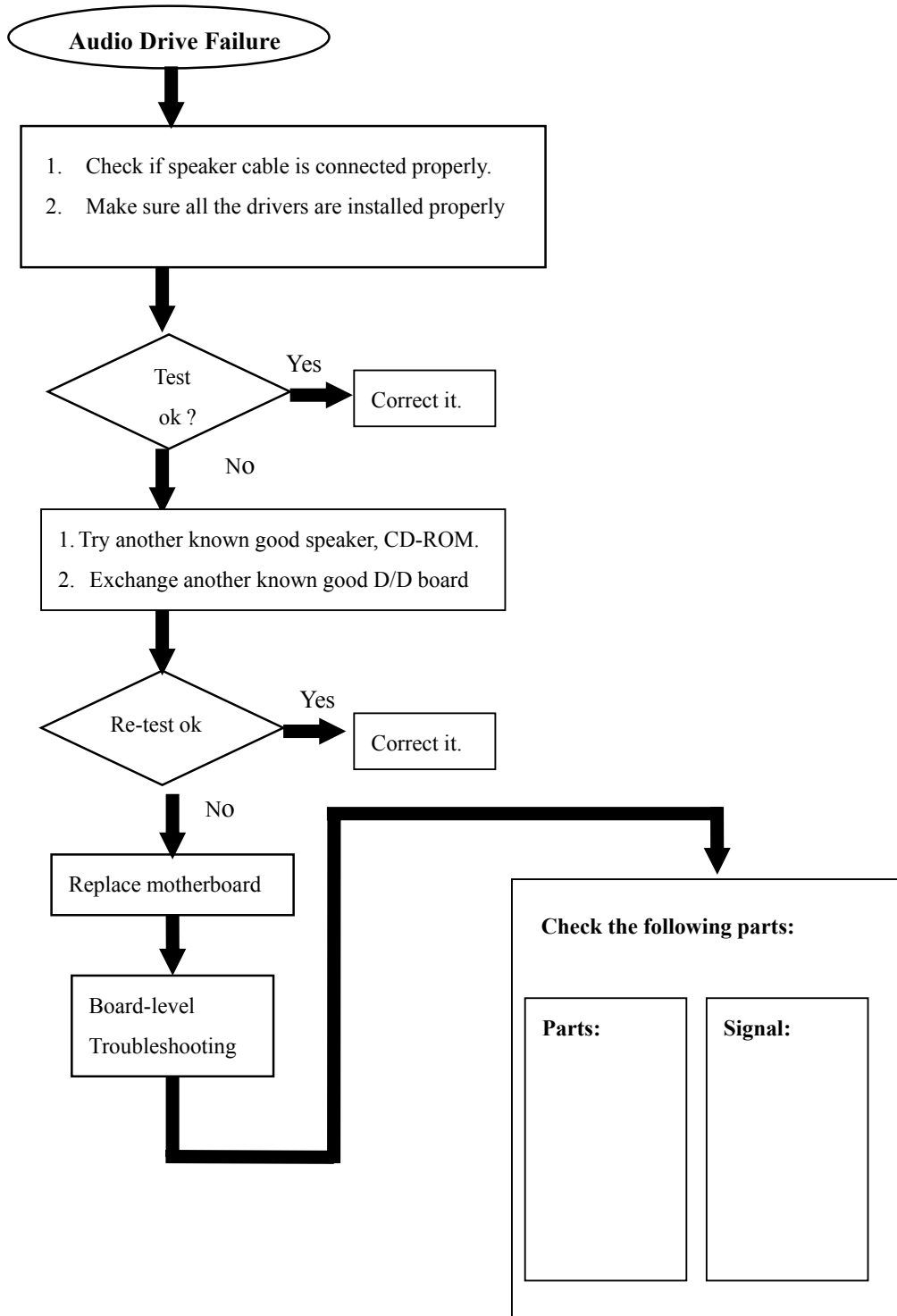
9-12 System USB Port Test Error

An error occurs when a USB device is installed



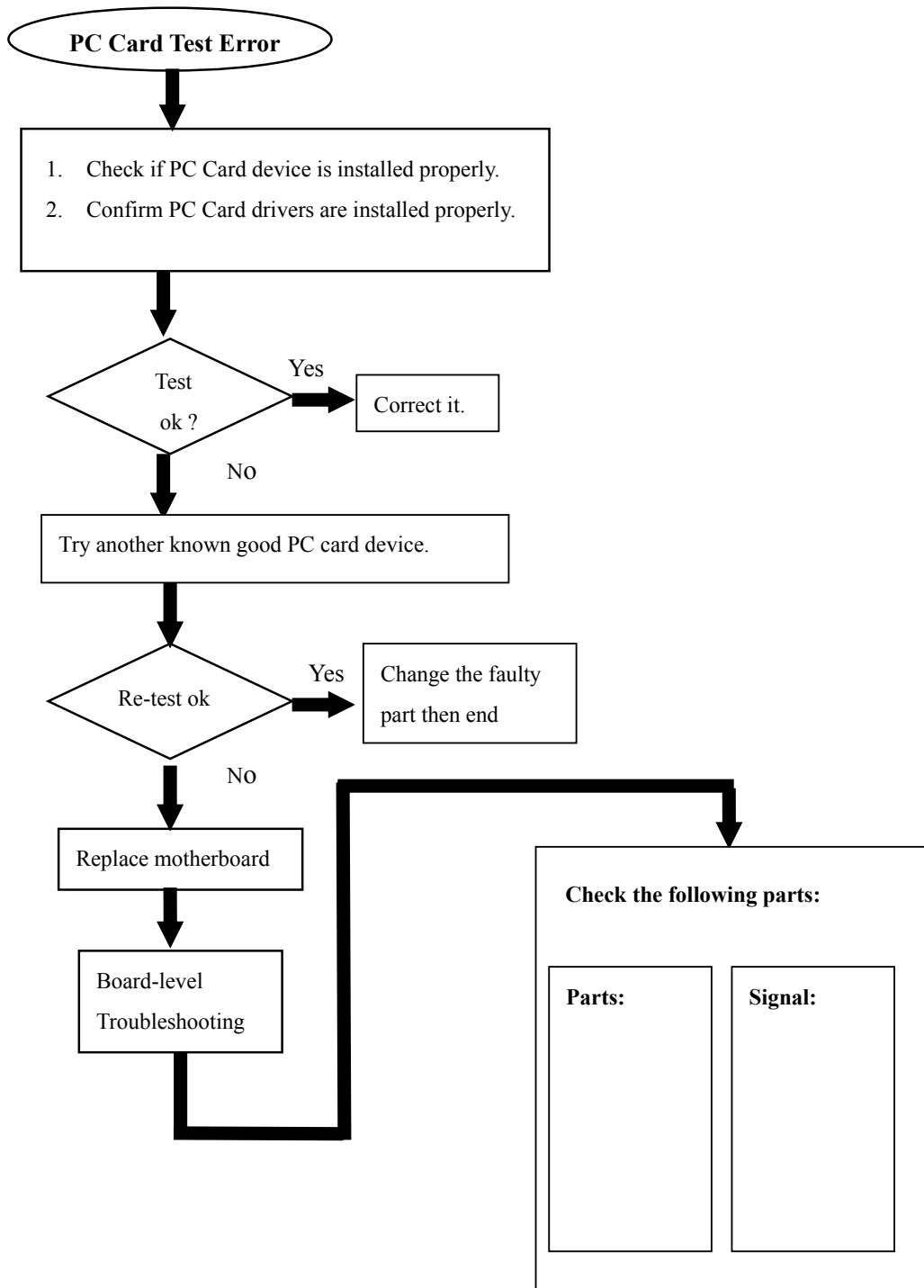
9-13 System Audio Failure

No sound or sound abnormal from speaker when audio driver & A/P is installed properly.



9-14 PC-Card Socket Failure

An error occurs when a PC card device is installed.



10 System Exploded views & Circuit Diagram