Chapter 1

Hardware Overview

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1.1 Features

Taikan10 is a Slim and Light entry notebook PC based on the mobile Intel Gemini lake series Processor, providing high-speed processing capabilities and advanced features. The computer employs a Lithium Ion battery that allows it to be battery-operated for a longer period of time. The display uses 11.6-inch HD panel, at a resolution of 1366x768. The CPU package is BGA type.

The computer has the following features:

❑ Processor

CPU is mobile Intel Gemini lake Processor:

Intel Celeron Gemini lake CPU

Celeron N4020 (1.1G) Hz

❑ Host Bridge System Controller
System Controller: Intel integrated Host bridge system into CPU.

❑ Graphics
Intel Gemini Lake Ultra HD graphics card 600
V-RAM 128MB

❑ Memory

DDR4 is driven at 1.2V. The memory is 4GB/8GB.

Use the following memory modules:
SPECTEK:4GB (512MB×8) / DDR4-2400MHz
SPECTEK:8GB (1GB×8) / DDR4-2400MHz
SAMSUNG:8GB (1GB×8) / DDR4-2400MHz

❑ Storage

The computer accommodates storage with following types:

SATA SSD M.2 128GB/256GB

EMMC FPGA153 64GB/128GB

❑ Display

The resolution of LCD is 1366 * 768

11.6" TN 220nits DP 1366x768 HD display

❑ On-Board LAN

The internal LAN supports 10/100/1000M G/bit Ethernet, enabling connection to a LAN at up to 1Gbps. It supports Wake-up on LAN from S3/S4/S5 and PXE boot support. This internal LAN has RJ45 jack to directly accommodate a LAN cable.

❑ Wireless LAN

802.11AC+BT4.2(1x1) – On board

802.11AC+BT5.0(1x1) – On board

802.11AX+BT5.1(2x2) - On board: Yes(Design ready)

The Antenna has two wires dual band.

❑ Sound System

REALTEK ALC897 integrated audio controller supports multimedia. The sound system contains the following:

• Stereo speakers

• Headphone/Microphone jack

• Integrated microphone (with Webcam)

❑ Keyboard
   No backlight keyboard, black keyboard, 82 key layout

❑ USB Port

The computer has three USB ports, two for USB3.0 type A Another One is USB type C . High-Speed USB3.0/3.1 allows data transfers up to 5Gbps,

❑ HDMI Out Port

A HDMI monitor can be connected to HDMI Out Port on the computer.

❑ Micro-SD Slot

This slot is for your memory card requirements like SD/Mini SD /Micro SD /SDHC/SDXC and MMC Cards to provide memory card read on your computer.

❑ Webcam with embedded internal microphone

The computer has an internal camera. The parameter is HD 720p, The internal microphone is embedded in this camera module.

❑ Battery

The computer has a 2 Cell (6000mAh) Lithium Ion battery

1.2 System Unit Components

Figures 1-1/1-2/1-3 and 1-4 show the computer and its system unit configuration,respectively.

No.	Part Description パーツ/部品名
1	A cover
2	A cover side parts
3	A cover top logo
4	
5	
6	LCD Bezel
7	LCD Bezel logo
8	Camera mylar
9	Hinge Cap Back
10	
11	
12	
13	C cover
14	C cover side parts
15	Sub logo
16	Keyboard
17	Keyboard text
18	Touchpad mylar
19	C cover icon
20	Power Button
21	Power LED
22	Charge LED
23	Caps Lock LED
24	
25	
26	
27	D Cover
28	Rubber foot
29	Speaker hole
30	Screw
31	Rating Label
32	Rating Contents
33	
34	
35	Touch Glass
36	Touch Glass logo
37	Touch Bezel Cap
38	Convertible Hinge Cap

Figure 1-1 ID Parts Description Placement

K-Lock
DC-IN
HDMI
USB
Type-C
Speaker
Wifi Aux

RJ45
Audio
USB
Micro-SD
Power Button
Battery
Speaker
Wifi main

RTC
WIFI
SSD
Sub board
Power Button
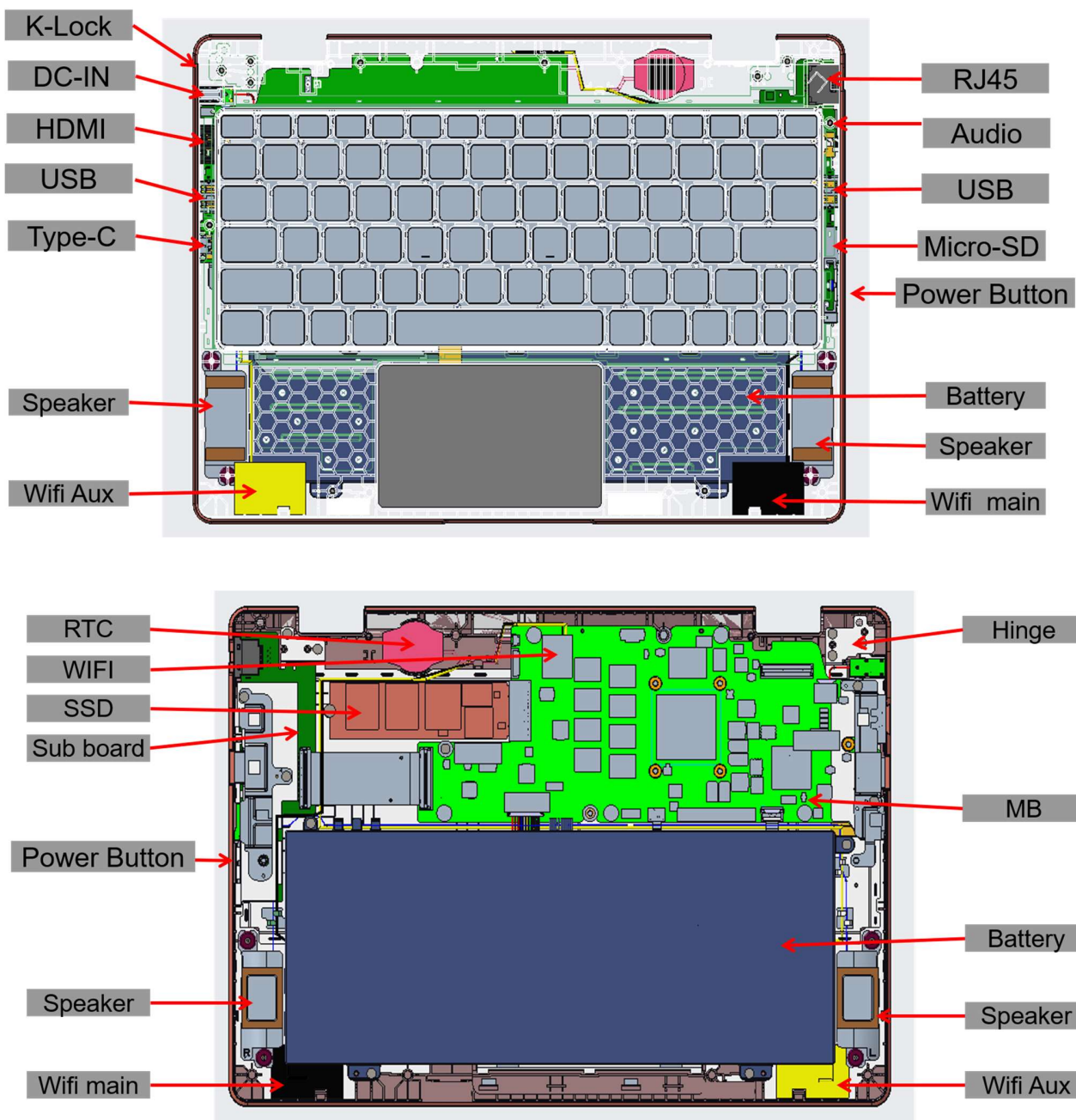Speaker
Wifi main

Hinge
MB
Battery
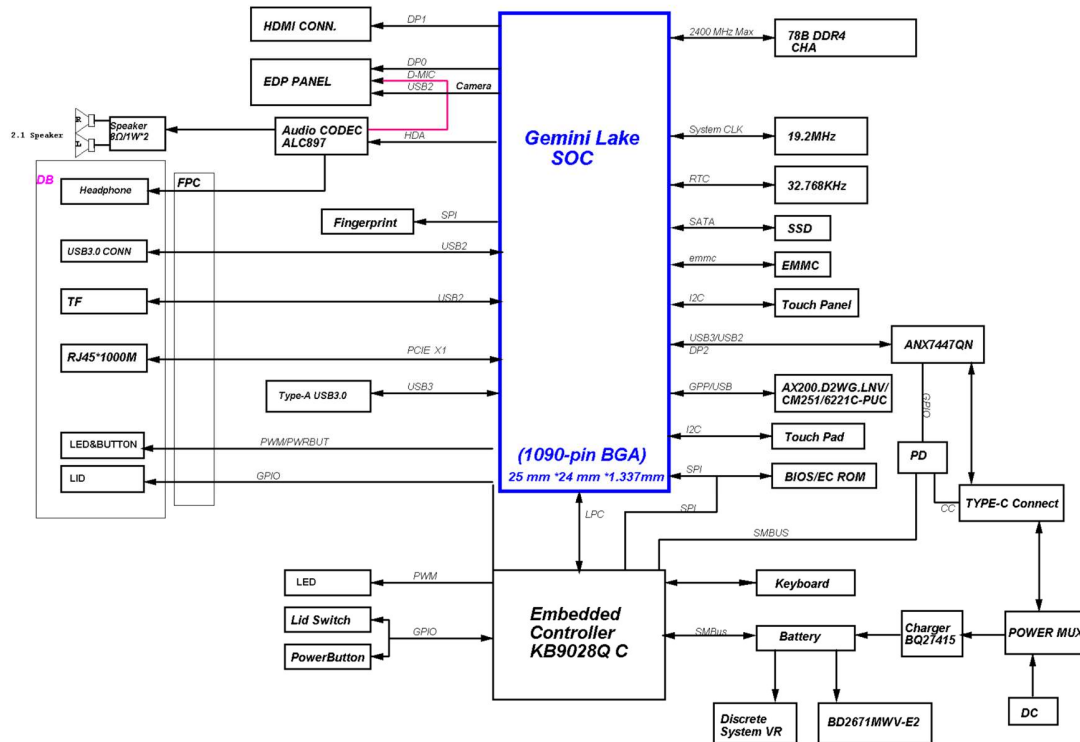Speaker
Wifi Aux

Figure 1-2 System Board Configurations

Figure 1-3 System Unit Block Diagram

The system unit of the computer consists of the following components:

❑ Processor: Mobile Intel Gemini lake Processor.

- Intel Gemini lake N4020 Processor

    − Core Speed: 1.10 GHz
    − CPU Core: two core
    − Intel smart Cache: 4MB

❑ Memory: The memory is soldered to the motherboard,4GB/ 8GB capacity

- PC4-2400(2400MHz) DDR4 SDRAM supported

- 8GB modules supported –   8GB (1GB x 8)

- 4GB modules supported –   4GB (512MB x 8)
- DDR4   1.2V operation

- 16 internal Banks (4 Bank Groups)

- Data transfer rates: PC4-2400 on CPU Celeron N4020.

❑ BIOS ROM (Flash memory)

- Storage Size 8MB

❑   System Controller

- Mobile Intel integrated Gemini lake into CPU.
  - System Memory Interface
  - Technology Enhancements of Intel Fast Memory Access
  - System Memory Frequency
  - DRAM Clock Generation
  - Processor Graphics Controller(GT)
  - Digital Display Interface(DDI)
  - Advanced Configuration and Power Interface (ACPI) states supported
  - Processor Core Power Management
  - Graphics Power Management
  - Configurable TDP (TDP) and Low Power Mode
  - Adaptive Thermal Monitor
  - Digital Thermal Sensor
  - Intel Memory Thermal Management

❑ Card Bus Controller

- REALTEK RTS5176E-GR
  - Memory Card Reader Controller

❑ Audio Controller

REALTEK ALC897 integrated audio controller supports multimedia. The sound system features contain the following:

• 10-channel DAC supports 16/20/24-bit PCM format for independent two stereo channelor 7.1 audio playback. All DAC support 44.1k/48k/96k/192kHz sample rate.

• 2-channel ADC that supports 16/20/24-bit PCM format for independent two stereo channel audio inputs. All ADC support 44.1K/48K/96/192KHz sample rates.

• 3 GPIO for customized applications (pin-shared with digital microphone interface and other digital functions).

• Four jack detection pins; each designed to detect up to 2 jacks.

• Supports stereo digital Microphone input, and programmable boost gain and volume control.

• Intel low power ECR compliant, and power status control for each analog/digital converter and pin widget.

❑ KBC/EC (Keyboard Controller/Embedded Controller)

ENE KB9028Q C chip is used to serve as KBC/EC :

• KBC

        – Scan controller function
        – Interface controller function

• EC

        – Power supply sequence control
        – Overheat shutdown support
        – LED control
        – Device ON/OFF
        – Universal I/O port
        – Battery capacity check

        Flash memory reprogramming function
        EC access interface
        I2C communication control

❑ Clock Generator

- Mobile Intel Gemini lake CPU integrated Clock Generator

    – Generating the clock signal required for the system

❑ LAN Controller

- REALTEK _ RTL8111H-CG 10/100M/1000M

    – Fully compliant with IEEE 802.3,IEEE 802.3u,IEEE
       802.3ab,supports IEEE 802,3az-2010(EEE),supports
       Full duplex flow control(IEEE 802.3x)
    – Supports PCI Express 1.1
    – Transmit/Receive on-chip buffer support
    – Supports PCI MSI (Message Signaled Interrupt) and MSI -X
    – Wake-On LAN and "Real WoW!" Technology (remote wake-up)
       support
    – Supports 32-set 128-byte Wake-Up Frame pattern exact
       matching
    – Supports Microsoft WPI (Wake Packet Indication)
    – Supports PCI e L1.Off and L1.Snooze

❑ Wireless LAN Controller

- Support following 3 kinds of PCI-e interface wireless LAN cards

    IEEE 802.11ac+BT4.2
    IEEE 802.11ac+BT5.0
    IEEE 802.11ax+BT5.1

- Data Rate

    – IEEE 802.11a/g: Standard 54M bps
    – IEEE 802.11ac : Standard 433.3M bps
    – IEEE 802.11ax : Standard 1201M bps

- Frequency Channel

    IEEE802.11a/g: 2.4GHz
    – IEEE802.11ac : 5GHz

1.3 Solid State Drive (SSD)

M.2 SSD is composed of semiconductor devices and NAND flash memory. NAND flash memory has high reliability, high technology and small volume
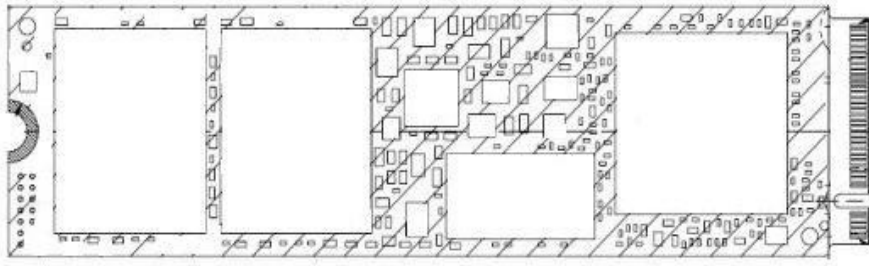
The SSD is shown in Figure 1-6

Figure 1-6 *Solid state driver*

1.4 Power Supply

The power supply unit provides many different voltages for the system board and performs the following functions:

1. Power input monitor

    - Checks whether the DC power supply (AC adapter) is connected to the computer.
    - Checks whether the battery pack is connected to the computer.
    - Monitors the DC power supply input voltage (AC Adapter output voltage).

2. Power supply's internal control

    - Turns on and off the battery pack charging power supply.
    - Issues a charging current instruction to the PWM control IC of the battery pack charging power supply.
    - Controls the supply of DC power supply input (AC Adapter output) to the power supply unit.
    - Controls the supply of power to the system block (load/logic circuit side).
    - Controls forced shutdown if the power supply malfunctions.

3. Logic circuit control

    - Instructs the gate array to enable/disable tuning the power on.
    - Controls power-on/off operation.

4. Status display

    - Turns on the Power.
    - Battery indicator (white).

5. External interface

    - Performs communication through the I2C bus (via the internal EC/KBC).
    - Transfers the power supply operation mode.

6. Output monitor

    - Monitors the voltage output to the system block (load/logic circuit side).
    - Monitors the voltage, over voltage, input/output current of the battery pack.
    - Monitors the internal temperature of the battery pack.
    - Monitors the supply voltage from the AC adapter.

1.5 Batteries

The computer has the following type of battery:

❑   Main Battery Pack

Table 1-4 list the specifications of battery.

Table 1-3 Battery Specifications

Battery Type		Material	Output voltage	Capacity
Main Battery Pack	2 Cell	Lithium Ion	7.6 V	6000 ma h

1.51   Main Battery

The main battery pack serves as the computer's main power source when the AC adapter is not attached.   The main battery maintains the state of the computer so that it can resume it.

1.52   Battery Charging Control

Battery charging is controlled by TI BQ24715/BD99950. When AC adapter and battery pack are attached to the computer, BQ24715/BD99950 controls the charge on/off state and detects a full charge.

❑   Battery Charge

When the AC adapter is attached, the battery is charged by off-state charge when the system is powered off or by on-state charge when it is powered on.

Table 1-4 Quick/Normal Charging Time

State	Charge Time	
Europe Charge	2 Cell	over 4 hours
Asia Charge	2 Cell	over 4 hours

NOTE: The time required for normal charge depends on the power consumption by the system. Using the fluorescent lamp and frequently accessing the disk consume much power and lengthen the charge time.

Any of the following cases stops battery charge:

1.   The battery becomes fully charged.

2.   The AC adapter or battery pack is removed.

3.   The battery or AC adapter voltage is abnormal.

❑   Detection of full charge

A full charge is detected only when the battery is being charged by quick or normal charge. A full charge is detected when either of the following conditions is met:

1.   The current in the battery charging circuit drops below the predetermined value.

2.   The charging time exceeds the fixed

Chapter 2

Troubleshooting

Chapter 2   Contents

Figures

2.1 Outline

This chapter describes the fault diagnostic procedures for field replaceable units (FRUs) in the computer.

The FRUs covered here are as follows:

1. System Board	2. Keyboard	3. Display
4. SSD	5. Audio	6. Touch pad
7. USB Port	8. Headphone / Microphone port	9. HDMI Port
10. SD Card Port	11. Camera	12. Wireless LAN
13. Battery Pack	14. Finger Print	15. Bluetooth
16. LAN(RJ45)		

This Model support Intel Gemini lake with GPU. See Chapter 4 for the procedures to replace FRU and Chapter 3 for the procedures to use test programs.

The following tools are required to perform the diagnostic procedures:
1. USB Memory
2. Screwdrivers (2.0mm, 2.5mm)
3. Multi-meter
4. External monitor with HDMI In Port
5. Headphone
6. SD card

2.2 Basic Flowchart

The basic flowchart in Figure 2-1 serves as a guide for identifying a possibly faulty FRU.

Before going through the diagnostic flowchart steps, verify the following:

❑ Ask the user if a password has been registered and, if so, ask him or her to enter the password. If the user has forgotten the system password, please follow below erase password process. The computer will override password protection and automatically erases the current password.

     1.   press Power button to turn the computer power on

     2.   password will erase when computer booted

❑ Make sure Windows® 10 has been installed on the HDD. Any other operating system can cause the computer to malfunction.

Start

Connect the AC Adapter

DC IN/Battery Charge LED is on? — No → Follow the power supply Diagnostic Procedure in Section 2.3

Yes

Turn the power on.

Any error message is displayed? — Yes → Follow the system board diagnostic Procedure in Section 2.4

No

Message "dynabook" is displayed? — No → Follow the display diagnostic Procedure in Section 2.6

Yes

"Password=" is displayed?? — Yes → See the previous page to Delete the password.

No

OS has started?? — No → Follow the HDD diagnostic Procedure in Section 2.8
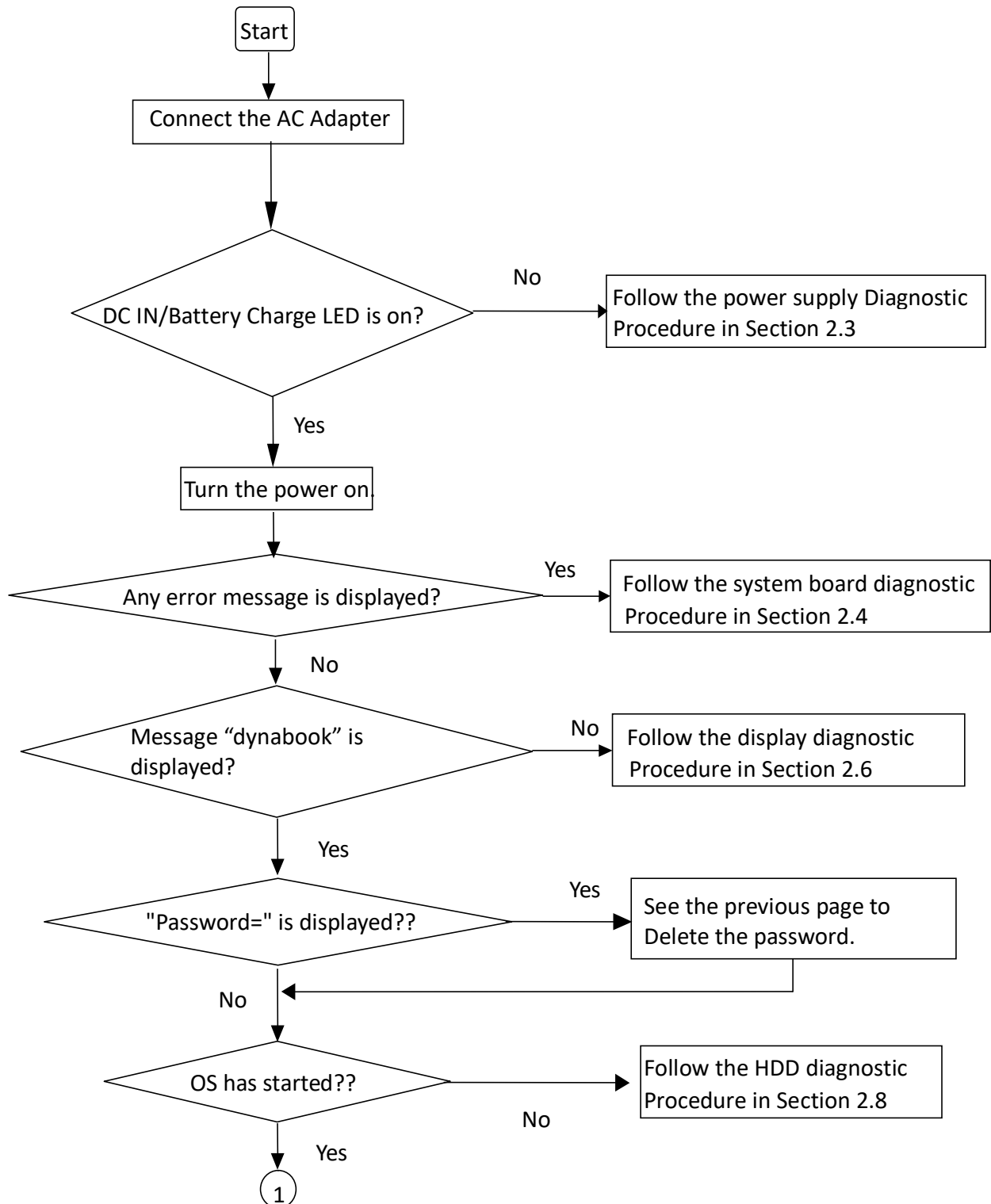
Yes

①

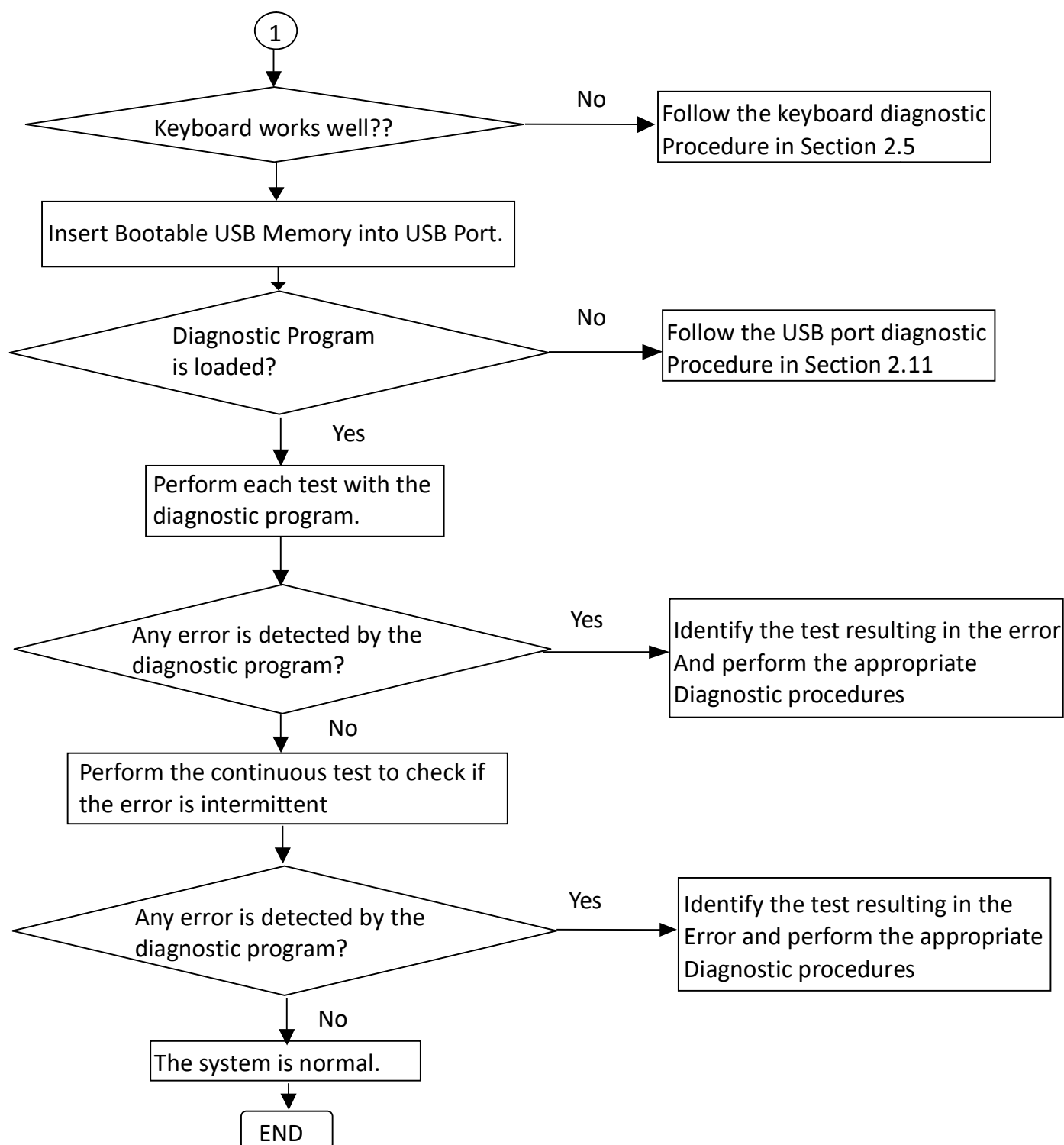*Figure 2-1   Basic Flowchart (1/2)*

Figure 2-1   Basic Flowchart (2/2)

If diagnostic program cannot detect an error, the error may be intermittent. Run continuous test program repeatedly to isolate problem. Check log utility function to confirm which diagnostic test detects error, and perform appropriate troubleshooting procedures as below:

1. If an error is detected by CPU Test, follow the system board troubleshooting procedures in Section 2.4.
2. If an error is detected by SSD Test, follow the SSD troubleshooting procedures inSection 2.8.
3. If an error is detected by Keyboard Test, follow the keyboard troubleshootingprocedures in Section 2.5.
4. If an error is detected by Display Test, follow the display troubleshooting proceduresin Section 2.6.
5. If an error is detected by Memory Test, follow the memory troubleshootingprocedures in Section 2.7
6. If Audio error is detected by Windows application, please follow the audiotroubleshooting procedures in Section 2.9
7. If Touch pad error is detected by Windows application, please follow the touchpad trouble shooting procedures in Section 2.10.
8. If USB error is detected by Windows application, please follow the USB port troubleshooting procedures in Section 2.11.
9. If Headphone/Microphone error is detected by Windows application, please follow the headphoneport troubleshooting procedures in Section 2.12.
10. If HDMI error is detected by Windows application, please follow the HDMI porttroubleshooting procedures in Section 2.13
11. If Micro SD Card error is detected by Windows application, please follow the SD Card Porttroubleshooting procedures in Section 2.14
12. If Camera error is detected by Windows application, please follow the Cameratroubleshooting procedures in Section 2.15
13. If Wireless LAN error is detected by Windows application, please follow the WirelessLAN troubleshooting procedures in Section 2.16
14. If Battery error is detected by Windows application, please follow the Batterytroubleshooting procedures in Section 2.17
15. If Finger Print error is detected by Windows application, please follow the FingerPrint troubleshooting procedures in Section 2.18
16. If Bluetooth error is detected by Windows application, please follow the Bluetoothtroubleshooting procedures in section 2.19
17. If LAN Port error is detected by Windows application, follow the LAN Port troubleshooting procedures in section 2.20.

2.3 Power Supply

The power supply in the computer controls many functions and components. To check if the power supply is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1   Power Icon Check

Procedure 2   Connection Check

Procedure 3   Replacement Check

Procedure 4   Replacement Check

Procedure 1: Power Icon Check

The following power LED indicates the power supply status:
  ❑ Power LED

The power supply controller displays the power supply status through the DC IN/Battery Charge LED as in the table below.
  ❑ DC IN/Battery Charge LED

DC IN/Battery Charge LED	Power Supply Status
On in White	Battery is fully Charged.
On in Amber	Battery is been Charging from AC Adapter.
Blinking in Amber	Pre-Charge mode (I2C no ack). Battery not detected
All Off	Discharge mode/Stop Charge

If the Power LED and DC IN/Battery Charge LED are off, follow the steps below:
1.   Shut down the computer. Remove the AC adapter to shut off power supply to the computer. Then disassemble the computer and replace the battery. Next, assemble to check the battery.
2.   AC adapter back again.

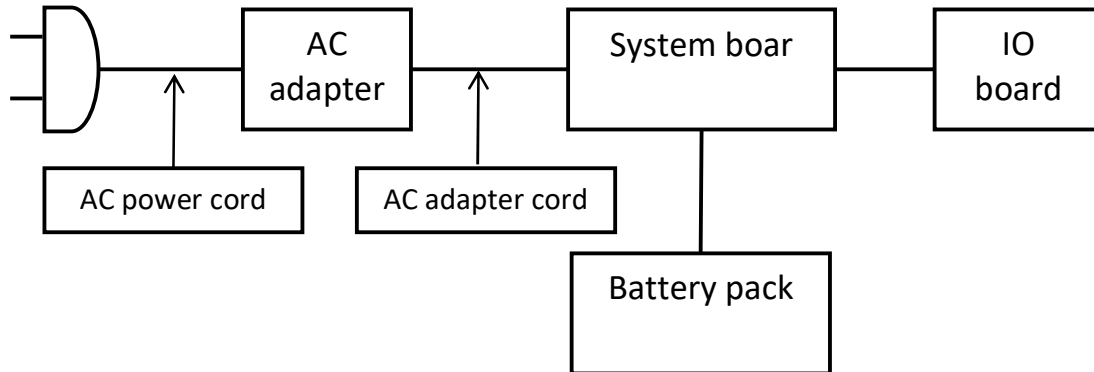If the Power LED on IO board is still off, follow the steps below.
Check 1   Turn on your computer and make sure the Power LED color is white. If it does not, go to Procedure 2.

If the DC IN/Battery Charge LED on System board is still off, follows the steps below:
Check 1   Make sure the M/B DC IN/Battery Charge LED on System board goes on in White or Amber. If it does not, go to Procedure 2.

Procedure 2: Connection Check

Power is supplied to the system board as illustrated below:

```
 ┌──┐       ┌──────────┐      ┌──────────┐      ┌────────┐
 │  )────┬──│    AC    │──┬───│ System   │──────│   IO   │
 │  )    │  │  adapter │  │   │  boar    │      │  board │
 └──┘    ↑  └──────────┘  ↑   └─────┬────┘      └────────┘
        ┌┴─────────┐  ┌───┴────────┐│
        │AC power  │  │ AC adapter ││
        │  cord    │  │   cord     ││
        └──────────┘  └────────────┘│
                              ┌──────┴──────┐
                              │ Battery pack│
                              │             │
                              └─────────────┘
```

Follow the steps below to check whether each connector has been connected correctly:

Check 1   Make sure the AC adaptor and AC power cord have been firmly plugged into the DC IN socket and wall outlet, respectively. When they have been connected correctly, perform Check 2.

Check 2   Connect a new AC adaptor and AC power cord.

Check 3   About the DC IN/Battery Charge LED on System board: Make sure the AC adapter cord is properly attached to your computer. If the LED does not light when the AC adapter cord is properly installed, go to Procedure 3.

Check 4   About the I/O board Power LED: Make sure the System board and IO board are firmly connected with the FFC cable. If the LED does not light even if the M/B and IO board are properly connected with the FFC cable, go to Procedure 4.

Procedure 3 Replacement Check

The system board may be defective. Disassemble the computer and replace the system board with a new one according to Chapter 4.

Procedure 4 Replacement Check

The IO board or FFC cable may be defective. Disassemble the computer and replace the IO board or FFC cable with a new one according to Chapter 4.

2.4 System Board

To check if the system board is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

> Procedure 1: Message Check
>
> Procedure 2: Test Program Check
>
> Procedure 3: Replacement Check

Procedure 1: Message Check

When the power is turned on, the system performs the self-diagnostic Power On Self Test (POST) embedded in the BIOS ROM. The POST tests and initializes each IC on the system board.

❑ If an error message appears on the display, perform Procedure 3.

❑ If there is no error message, go to Procedure 2.

❑ If Window 10 is loaded normally, go to Procedure 3.

Procedure 2: Test Program Check

The maintenance test program contains several programs for diagnosing the system board and CPU. Execute the following test programs using the procedures described in Chapter 3.

1. System Information Test
2. KEYBOARD Test
3. TOUCH PAD Test
4. BATTERY CAPACITY Test
5. BATTERY OFF Test (Setting)
6. HDD PHYSICAL Test
7. HDD LOGICAL Test
8. MEMORY Test
9. USB STORAGE Test
10. SD STORAGE Test
11. WIRED LAN Test
12. CPU Test
13. GRAPHICAL DISPLAY Test
14. Timer Test

If an error is detected during these tests, go to Procedure 3.

Procedure 3: Replacement Check

The system board or memory may be defective. Disassemble the computer following the steps described in Chapter 4 and replace the system board, memory module with a new one.

2.5 Keyboard

To check if the computer's keyboard is defective or malfunctioning, follow troubleshooting procedures below as instructed.

Procedure 1: Test Program Check

Procedure 2: Connector Check and Replacement Check

Procedure 1: Test Program Check

Execute the Keyboard test available as part of the maintenance test program. See Chapter 3 for information on how to perform the test. Some Keyboard have support Illumination (Backlit) function, check this function during Keyboard test when press any key.
If an error is detected in the test, go to Procedure 2. If no error is detected, the keyboard itself is normal.

Procedure 2: Connector Check and Replacement Check

The keyboard or system board may be disconnected or faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure the keyboard cable has been firmly connected to the system board.
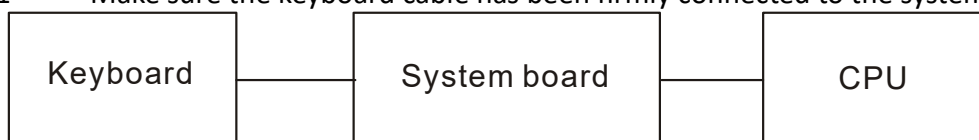
Keyboard	System board	CPU

         If the cable is loose or off, reconnect it firmly and return to Procedure 1. If there is still an error, perform Check 2.

Check 2   The keyboard may be faulty. Replace it with a new one following the instructions in Chapter 4. If the problem persists, perform Check 3.

Check 3   The System board may be faulty. Replace it with a new one following the instructions in Chapter 4. If the keyboard is still not functioning properly, perform Procedure 1

2.6 Display

To check if the computer's display is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1: External Monitor Check (Monitor with HDMI terminal)

Procedure 2: Test Program Check

Procedure 3: Connector Check and Replacement Check

Procedure 1: External Monitor Check

Connect an external monitor to the computer's external monitor port, then boot the computer. The computer automatically detects the external monitor even if resume mode is enabled.

If the external monitor works correctly, the internal LCD, or LCD cable may be faulty. Go to Procedure 3.

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

Procedure 2: Test Program Check

Insert the diagnostics USB Memory into the computer's USB Port, turn on the computer and run the test. See Chapter 3 for information on how to perform the test.
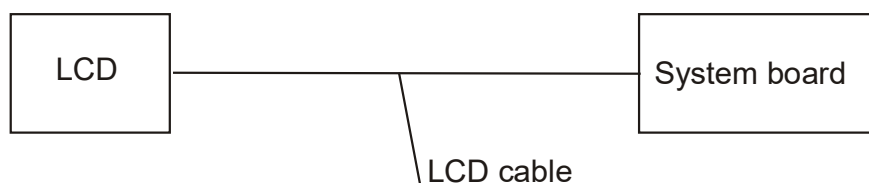
If an error is detected in the test, go to Procedure 3. If no error is detected, the display itself is normal.

Procedure 3: Connector Check and Replacement Check

The display unit has an LCD module, LED Backlight module, panel close switch. Any of the components or their connections may be defective. Disassemble the computer following steps described in Chapter 4, and then perform the following checks:

(1)   If the FL does not light, perform Check 1.
(2)   If characters or graphics are not displayed normally, perform Check 5.
(3)   If the FL remains lit when the display is closed, the panel close switch may be
        defective. Perform Check 5.

Check 1   Make sure the following cables have been firmly connected to the system
              board.

```
 ┌──────────┐                              ┌──────────────┐
 │   LCD    │─────────────────\           │ System board │
 │          │                  \          │              │
 └──────────┘                   \         └──────────────┘
                                 \ LCD cable
```

If any of the cables is loose or off, reconnect it firmly and return to Procedure

             3. If there is still an error, perform Check 2.

Check 2   The LCD cable may be faulty. Replace it with a new one and return to Procedure 3. If there is still an error, perform Check 3.

Check 3   Make sure the LCD cable has been firmly connected to the system board and LCD module, if the cable is loose or off, reconnect it firmly and return to Procedure 3. If there is still an error, perform Check 4.

Check 4   The LCD module may be faulty. Replace it with a new one and return to Procedure 3. If there is still an error, perform Check 5.

Check 5   The System board may be faulty. Replace it with a new one. If there is still an error, perform Check 1.

2.7 Memory

To check if the computer's Memory Module is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1: Test Program Check

Procedure 2: Connector Check and Replacement Check

Procedure 1: Test Program Check

Execute Memory Test Program available as part of the maintenance test program. This test program checks the memory module. Insert the diagnostics USB Memory into the computer's USB Port, turn on the computer and run the test. See Chapter 3 for information on how to perform the test.

2.8 SSD (Solid-state Drive) or eMMC

To check if the SSD is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1: Test Program Check

Procedure 2: Connector Check and Replacement Check

NOTE: The contents of the SSD or eMMC will be erased when the SSD or eMMC diagnostic test or formatting is executed. Save the required contents of the SSD or eMMC to other storage drive in advance.
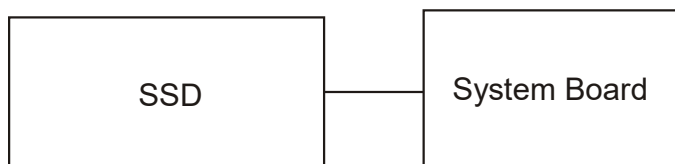

Procedure 1: Test Program Check

Run the storage test program stored on the maintenance test program disk for all test items. See Chapter 3 for details on how to use the test program.

If an error is detected during the SSD or eMMC test, go to Procedure 2.

Procedure 2: Connector Check and Replacement Check for SSD

The SSD or system board may be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks s:

Check 1   Make sure the following connectors have been firmly connected to the SSD and system board.

```
  ┌──────────────┐        ┌──────────────────┐
  │              │        │                  │
  │     SSD      │────────│   System Board   │
  │              │        │                  │
  └──────────────┘        └──────────────────┘
```

If any connector is loose or off, reconnect it firmly and return to Procedure 1.

If there is still an error, perform Check 2.

Check 2   The SSD may be faulty. Replace it with a new one following the instructions in Chapter 4. If the problem persists, perform Check 3.

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

2.9 Audio Test

To check if the computer's Speaker is defective or malfunctioning, follow troubleshooting procedures below as instructed.

Procedure 1: Windows Application Test

Procedure 2: Connector Check and Replacement Check

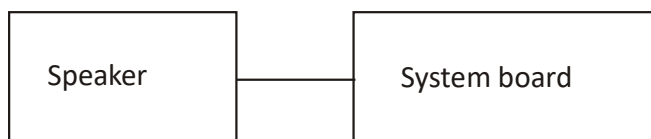### Procedure 1: Windows Application Test

Speakers are connected to System Board through cable. Please power on the computer into Windows. The computer will automatically detect these speakers.
If an error is detected in the test, go to Procedure 2. If no error is detected, the Audio itself is normal.

Procedure 2: Connector Check and Replacement Check

The system board may be disconnected or faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure the Speaker cable has been firmly connected to the system board.

```
┌──────────────┐        ┌──────────────────────┐
│              │        │                      │
│   Speaker    │────────│     System board     │
│              │        │                      │
└──────────────┘        └──────────────────────┘
```

If the cable is loose or off, reconnect it firmly and return to Procedure 1. If there is still an error, perform Check 2.

Check 2   The Speaker may be faulty. Replace it with a new one following the instructions in Chapter 4. If the problem persists, perform Check 3.

Check 3   The System board may be faulty. Replace it with a new one following the instructions in Chapter 4. If the Audio is still not functioning properly, perform Procedure 1.

2.10 Touchpad

This model has support two kind types Touch Pad. One is normal touch pad, another is secure pad.   To check if the computer's Touchpad or Secure pad is defective or malfunctioning, follow troubleshooting procedures below as instructed.

> Procedure 1: Test Program Check
>
> Procedure 2: Connector Check and Replacement Check

Procedure 1: Test Program Check

Run the test program stored on the maintenance test program disk for test items. See Chapter 3 for details on how to use the test program.

If an error is detected during the test, go to Procedure 2.

Procedure 2: Connector Check and Replacement Check

Touchpad or Secure Pad Module is connected to the system board through FFC Cable.

If Touchpad or Secure Pad Module malfunctions, there may be a bad connection between Module and System Board, or either might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure Touchpad or Secure Pad Module has been firmly connected to the connector on System Board. Also make sure the tape is not stuck to any part of Touchpad Module and Touchpad or Secure Pad Module is free of foreign matters.

```
┌─────────────────┐        ┌─────────────────────┐
│ Touchpad /       │        │                     │
│ Secure Pad       │────────│   System Board      │
│ Module           │        │                     │
└─────────────────┘        └─────────────────────┘
```
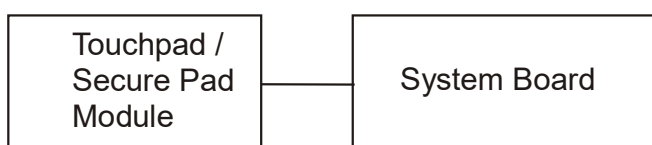
> And if connector is disconnected, connect it firmly to system board & return to Procedure 1. If the tape is stuck to any part of Touchpad or Secure pad, stick it back to the specified point and if a foreign matter is found on Touchpad or Secure pad, remove it and then return to Procedure 1. If there is still an error, perform Check 2.

Check 2   Touchpad or Secure Pad Module may be faulty. Replace it with a new one following the steps described in Chapter 4. If Touchpad or Secure Pad Module replaced is still not functioning properly, perform Check 3.

Check 3   System Board may be defective. Replace System Board with new one following steps described in Chapter 4.

2.11 USB Port

To determine if the computer's USB Port is functioning properly or malfunctions, perform following procedures. Start with Procedure 1 and continue with the other procedure as instruction below.

Procedure 1: Test Program Check

Procedure 2: Connector Check and Replacement Check

Procedure 1: Test Program Check

Run the test program stored on the maintenance test program disk for test items. See Chapter 3 for details on how to use the test program.

If an error is detected during the test, go to Procedure 2.

Procedure 2: Connector Check and Replacement Check

If USB Port on System or IO Board malfunctions, there may be a bad connection between USB device and System or IO Board, or either of System or IO Board might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure USB device cable has been firmly connected to USB Port of System Board. Also make sure USB Port on System Board is free of foreign matters.
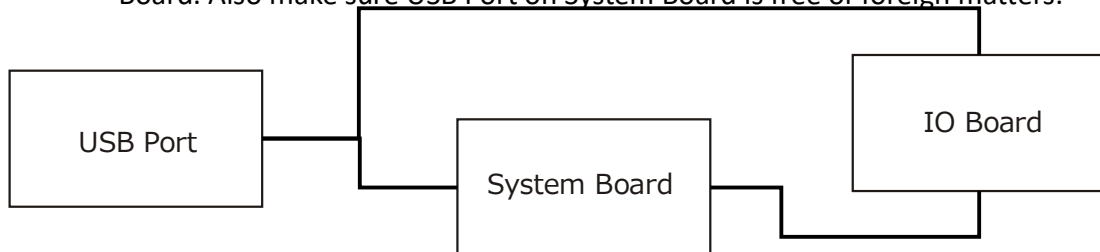
And if the connector is disconnected, connect it firmly to the system or IO board and return to Procedure 1. If a foreign matter is found on USB Port of System or IO Board, remove it and then return to Procedure 1. If the problem persists, perform Check 2.

Check 2   System or IO Board may be faulty. Replace it with a new one following the steps described in Chapter 4.

2.12 Headphone/Microphone Port

To determine if the computer's Headphone Port is functioning properly or malfunctions, perform following procedures. Start with Procedure 1 and continue with the other procedure as instruction below.

      Procedure 1: Windows Application Test

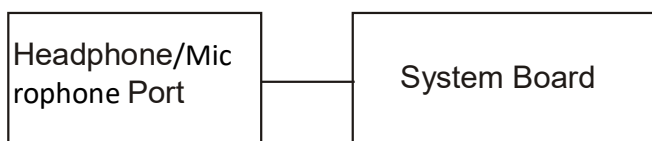   Procedure 2: Connector Check and Replacement Check

Procedure 1: Windows Application Test

Headphone/Microphone Port Connector is mounted on System Board. Connect external Headphone/Microphone with Headphone Jack interface to the computer's Headphone/Microphone Port, then power on the computer into Windows. The computer will automatically detect this Headphone device through Headphone/Microphone Port. Execute Function Programs in Windows, if the Headphone device appears to have a certain problem, go to Procedure 2. If an error is not located, Headphone/Microphone Port is functioning properly.

Procedure 2: Connector Check and Replacement Check

If Headphone/Microphone Port on System Board malfunctions, there may be a bad connection between Headphone/Microphone device and System Board, or either of System Board might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure Headphone/Microphone device cable has been firmly connected to Headphone/Microphone Port of System Board. Also make sure Headphone/Microphone Port on System Board is free of foreign matters.

```
┌─────────────────┐          ┌─────────────────────┐
│ Headphone/Mic   │          │                     │
│ rophone Port    │──────────│    System Board     │
│                 │          │                     │
└─────────────────┘          └─────────────────────┘
```

      And if the connector is disconnected, connect it firmly to the system board and return to Procedure 1. If a foreign matter is found on Headphone Port of System Board, remove it and then return to Procedure 1. If the problem persists, perform Check 2.

Check 2   System Board may be faulty. Replace it with a new one following the steps described in Chapter 4.

2.13 HDMI Port

To determine if the computer's HDMI Port is functioning properly or malfunctions, perform following procedures. Start with Procedure 1 and continue with the other procedure as instruction below

Procedure 1: Windows Application Test

Procedure 2: Connector Check and Replacement Check

Procedure 1: Windows Application Test

The HDMI Port Connector is mounted on System Board. Connect an external monitor with HDMI interface to the computer's HDMI port, then power on the computer into Windows. The computer will automatically detect this external monitor through HDMI Port. If the external monitor appears to have a certain problem, go to Procedure 2. If an error is not located, HDMI Port is functioning properly.

Procedure 2: Connector Check and Replacement Check

If HDMI Port on System Board malfunctions, there may be a bad connection between External Monitor and System Board. Or System Board might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure External Monitor HDMI Cable has been firmly connected to HDMI Port on System Board. Also make sure HDMI Port on System Board is free of foreign matters.
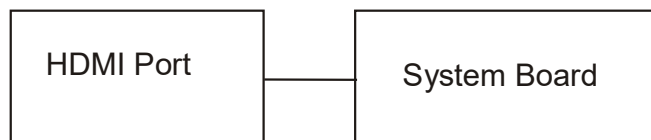
              And if the connector is disconnected, connect it firmly to the system board and return to Procedure 1. If a foreign matter is found on HDMI Port of System Board, remove it and then return to Procedure 1. If the problem persists, perform Check 2.

Check 2   System Board may be faulty. Replace it with a new one following the steps described in Chapter 4.

2.14 Micro SD card Port

IO Board or System Board may be the reason of Micro SD fault. Either of these two components may be damaged. To determine if the computer's IO Board is functioning properly, perform following procedures. Start with Procedure 1 and continue with the other procedure as instruction below.

Procedure 1: Test Program Check

Procedure 2: Connector Check and Replacement Check
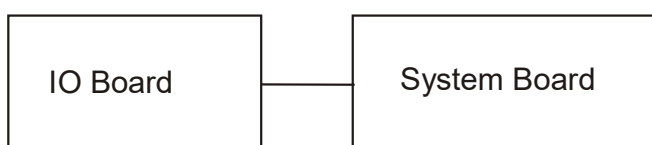
Procedure 1: Test Program Check

Run the test program stored on the maintenance test program disk for test items. See Chapter 3 for details on how to use the test program.
If an error is detected during the test, go to Procedure 2.

Procedure 2: Connector Check and Replacement Check

IO Board is connected to System Board through FFC Cable. If SD Card malfunctions, there may be a bad connection between IO Board and System Board, or either of these two components might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure IO Board FFC Cable has been firmly connected to the connectoron System Board. Also make sure IO Board is free of foreign matters.

```
┌──────────────┐       ┌──────────────────┐
│              │       │                  │
│   IO Board   │───────│   System Board   │
│              │       │                  │
└──────────────┘       └──────────────────┘
```

And if the connector is disconnected, connect it firmly to the system board and return to Procedure 1. If a foreign matter is found on IO Board, remove itand then return to Procedure 1. If the problem persists, perform Check 2.

Check 2   IO Board may be faulty. Replace it with a new one following the steps described inChapter 4. If IO Board replaced is still not functioning properly, perform Check 3.

Check 3   System Board may be defective. Replace System Board with a new one following steps described in Chapter 4.

2.15 Camera

Camera Module or System Board may be the reason of Camera fault. Either of these two components may be damaged. To determine if the computer's Camera is functioning properly, perform following procedures. Start with Procedure 1 and continue with the other procedure as instruction below.

Procedure 1: Windows Application Test
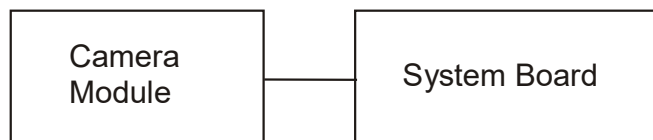
Procedure 2: Connector Check and Replacement Check

Procedure 1: Windows Application Test
Execute Function Programs in Windows, LED of Camera Module should be turned on when Camera is working, if Camera Module is not functioning properly, go to Procedure 2. If an error is not located, Camera system is functioning properly.

Procedure 2: Connector Check and Replacement Check
Camera Module is connected to System Board through FPC Cable. If Camera malfunctions, there may be a bad connection between Camera Module and System Board, or either of these two components might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure Camera Module FPC Cable has been firmly connected to the connector on System Board. Also make sure Camera Module is free of foreign matters.

```
+----------------+        +----------------+
|   Camera       |        |                |
|   Module       |--------|  System Board  |
|                |        |                |
+----------------+        +----------------+
```

And if the connector is disconnected, connect it firmly to the system board and return to Procedure 1. If a foreign matter is found on Camera Module, remove it and then return to Procedure 1. If the problem persists, perform Check 2.

Check 2   Camera Module may be faulty. Replace it with a new one following the steps described in Chapter 4. If Camera Module replaced is still not functioning properly, perform Check 3.

Check 3   System Board may be defective. Replace System Board with a new one following the steps described in Chapter 4.

2.16 Wireless LAN

Wireless Module or system board may be the reason of Wireless LAN fault. Either of these two components may be damaged. To determine if the computer's Wireless LAN module is functioning properly, perform following procedures. Start with Procedure 1 and continue with the other procedures as instruction below.

Procedure 1: Windows Application Test

Procedure 2: Connector Check and Replacement Check

Procedure 1: Windows Application Test

Place unit to location near wifi hotspot. Execute wifi applications in Windows, then active wireless connection. Check whether unit can normally connect to wifi hotspot. If connection is fail, go to Procedure 2. If error is not located, Wireless LAN system is functioning properly.

Procedure 2: Connector Check and Replacement Check

Wireless LAN Module is connected to the system board. If Wireless LAN malfunctions, there may be a bad connection between Wireless LAN Module and the system board, or either might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure Wireless LAN module has been firmly connected to the connector on the system board. Also make sure Wireless LAN module is free of foreign matters.
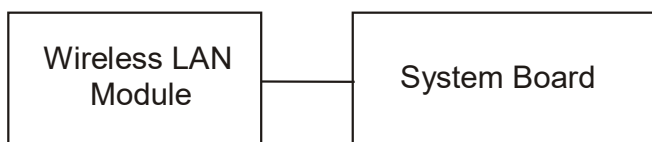
```
┌─────────────────┐        ┌─────────────────────┐
│  Wireless LAN   │        │                     │
│     Module      │────────│    System Board     │
│                 │        │                     │
└─────────────────┘        └─────────────────────┘
```

And if the connector is disconnected, connect it firmly to the system board and return to Procedure 1. If a foreign matter is found on Wireless LAN Module, remove it and then return to Procedure 1. If there is still an error, perform Check 2.

Check 2   Wireless LAN Module may be faulty. Replace it with a new one following the steps described in Chapter 4. If Wireless LAN Module replaced is still not functioning properly, perform Check 3.

Check 3   System Board may be defective. Replace System Board with a new one following the steps described in Chapter 4.

2.17 Battery Pack(RTC)

Battery Pack or system board may be the reason of Battery fault. Either of these two components may be damaged. To determine if the computer's Battery Pack is functioning properly, perform following procedures. Start with Procedure 1 and continue with the other procedures as instruction below.

Procedure 1: Windows Application discharge Test

Procedure 2: Test Program Check

Procedure 3: Connector Check and Replacement Check

Procedure 1: Windows Application discharge Test
Boot up unit from Battery only, make sure AC adaptor power cable doesn't connect to unit.
If unit can't boot up after pressing power button, connect AC adaptor power cable to unit to charge battery.
After 10 minus, remove AC adaptor power cable then press power button.
If unit can boot up after pressing power button, go to Procedure 2.
If it cannot boot up, go to Procedure 3.

Procedure 2: Test Program Check
Run the test program stored on the maintenance test program disk for test items. See Chapter 3 for details on how to use the test program.
If an error is detected during the test, go to Procedure 2.

Procedure 3: Connector Check and Replacement Check
Battery Pack is connected to the system board. If Battery Pack malfunctions, there may be a bad connection between Battery Pack and the system board, or either might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure Battery Pack has been firmly connected to the connector on the system board. Also make sure Battery Pack is free of foreign matters.
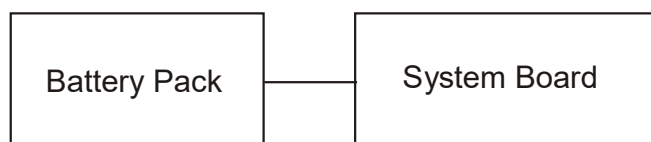
```
┌──────────────┐        ┌──────────────────┐
│              │        │                  │
│ Battery Pack │────────│  System Board    │
│              │        │                  │
└──────────────┘        └──────────────────┘
```

And if the connector is disconnected, connect it firmly to the system board and return to Procedure 1 or 2. If a foreign matter is found on Battery Pack,

remove it and then return to Procedure 1 or 2. If there is still an error, perform Check 2.

Check 2   Battery Pack may be faulty. Replace it with a new one following the steps described in Chapter 4. If Battery Pack replaced is still not functioning properly, perform Check 3.

Check 3   System Board may be defective. Replace System Board with a new one following the steps described in Chapter 4.

RTC Battery

If the system time is delayed or stopped, the RTC battery may be defective.

Procedure 1: Check the System date and time

Procedure 2: Connector Check and Replacement Check

Procedure 1: Check the System date and time

If the system time is delayed or stopped, go to Procedure 2.

Procedure 2: Connector Check and Replacement Check

The RTC battery is connected to the system board. If the RTC battery malfunctions, the connection between the RTC battery and the system board may be poor or the RTC battery may be defective. Disassemble the computer following the steps described in Chapter 4 and replace them.

2.18 Finger Print

To check if the computer's Finger Print is defective or malfunctioning, follow the troubleshooting procedures below as instructed.

Procedure 1: Windows Application Test
Procedure 2: Connector Check

Procedure 1: Windows Application

Execute Applications in Windows, move finger above Finger Print Reader.
If it can detect finger print, Finger Print is functioning properly.
If it cannot detect finger print, go to Procedure 2.

Procedure 2: Connector Check and Replacement Check

Finger Print is on Secure Pad, and is connected to System Board through FFC cable. If the Finger Print malfunctions, the system board or Secure Pad might be faulty.
Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   The Secure Pad may be faulty. Replace it with a new one following the instructions in Chapter 4. Then go through procedure 1 again. If the Finger Print is still not functioning properly, perform Check 2.

Check 2   The system board may be defective. Replace the system board with a new one following the steps described in Chapter 4. Then go through procedure 1 again.

2.19 Bluetooth

Bluetooth is combo module with Wireless LAN on this model. Bluetooth Module or system board may be the reason of Bluetooth fault. Either of these two components may be damaged. To determine if the computer's Bluetooth module is functioning properly, perform following procedures. Start with Procedure 1 and continue with the other procedures as instruction below.

Procedure 1: Windows Application Test

Procedure 2: Connector Check and Replacement Check

Procedure 1: Windows Application Test

Place unit to location near Bluetooth device. Execute Bluetooth applications in Windows, then active Bluetooth connection. Check whether unit can normally connect to Bluetooth device. If connection is fail, go to Procedure 2. If error is not located, Bluetooth is functioning properly.

Procedure 2: Connector Check and Replacement Check

Bluetooth Module is connected to the system board. If Bluetooth malfunctions, there may be a bad connection between Bluetooth Module and the system board, or either might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure Bluetooth module has been firmly connected to the connector on the system board. Also make sure Bluetooth module is free of foreign matters.
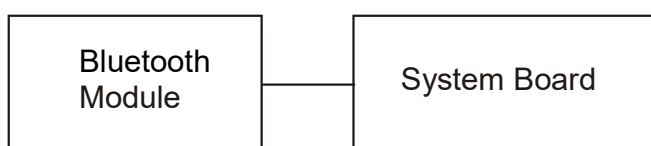
```
┌──────────────┐        ┌──────────────────┐
│   Bluetooth  │        │                  │
│   Module     │────────│   System Board   │
│              │        │                  │
└──────────────┘        └──────────────────┘
```

And if the connector is disconnected, connect it firmly to the system board and return to Procedure 1. If a foreign matter is found on Bluetooth Module, remove it and then return to Procedure 1. If there is still an error, perform Check 2.

Check 2   Bluetooth Module may be faulty. Replace it with a new one following the steps described in Chapter 4. If Bluetooth Module replaced is still not functioning properly, perform Check 3.

Check 3   System Board may be defective. Replace System Board with a new one following the steps described in Chapter 4.

2.20 LAN Port

To determine if the computer's LAN Port is functioning properly or malfunctions, perform following procedures. Start with Procedure 1 and continue with the other procedure as instruction below.

Procedure 1: Windows Application Test
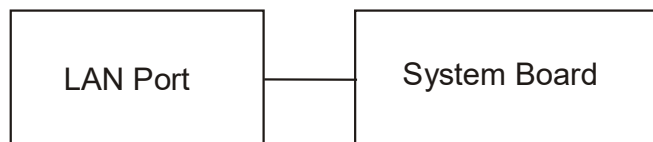
Procedure 2: Connector Check and Replacement Check

Procedure 1: Windows Application Test

The LAN Port Connector is mounted on System Board. Connect an LAN Cable with Internet interface to the computer's LAN port, then power on the computer into Windows. Execute Function Programs in Windows, which will display the LAN Test Result. If the test and diagnostics result is abnormal, go to Procedure 2. If an error is not located, LAN system is functioning properly.

Procedure 2: Connector Check and Replacement Check

If LAN Port on System Board malfunctions, there may be a bad connection between LAN Cable and System Board. Or System Board might be faulty. Disassemble the computer following the steps described in Chapter 4 and perform the following checks:

Check 1   Make sure LAN Cable has been firmly connected to LAN Port on System Board. Also make sure LAN Port on System Board is free of foreign matters.

```
+----------------+      +----------------+
|                |      |                |
|   LAN Port     |------|  System Board  |
|                |      |                |
+----------------+      +----------------+
```

And if the connector is disconnected, connect it firmly to the system board and return to Procedure 1. If a foreign matter is found on LAN Port on System Board, remove it and then return to Procedure 1. If the problem persists, perform Check 2.

Check 2   System Board may be faulty. Replace it with a new one following the steps described in Chapter 4.

Chapter 3
Diagnostic Programs

Chapter 3 Contents

1. Outline

This document describes the specification of "Windows PE Test & Diagnostics" (Hereafter referred to as "WPETD") for Taikan series product.

1-1 Target Model

The target model(s) are as follows:
21A model(s): Emdoor Taikan10

1-2 Target OS

WPETD can run on the Windows Pre-installation Environment as follows:
Windows PE 10 19H1 X64

2. Preparation

2-1 Creating WPETD USB memory

Get the ISO image of WPETD released from Dynabook Inc., usually by NEXTCloud system.
Burn the ISO image to USB memory. The USB memory will be Windows PE bootable media.
Regarding the USB, use a USB Memory the size of which is 1GB or more.

1) Format USB memory to FAT32 file system.
2) Copy all files of ISO image to USB memory.

2-2 Equipment Configuration for Tests

The following table indicates the equipment configuration necessary for WPETD's test items.

Test Item	Equipment required	Remarks
USB PORT	USB Memory	Free space: More than 12MB During the test WPETD creates a file in the USB Memory.
WIRED LAN	Wired router, LAN cable	The router must have the DHCP server function.
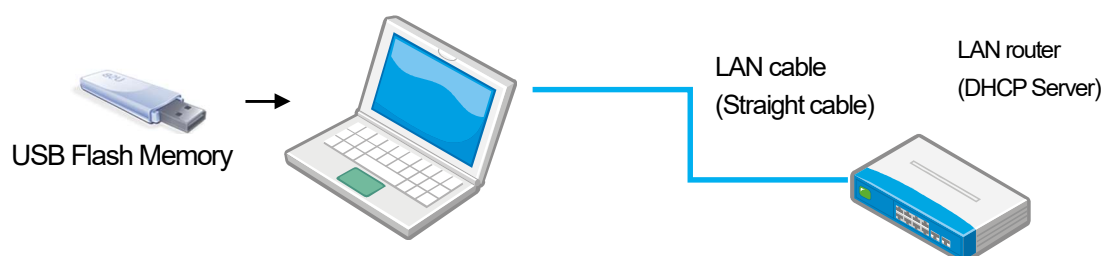
Fig.1 Equipment Configuration

3. dynabook WPETD Operation

3-1 Launch WPETD in Windows PE

Boot up the target PC by WPETD USB memory created in "2-1 Creating WPETD USB memory". Windows PE starts then dynabook WPETD will launch.

3-2 System Information Menu

When you launch WPETD in Windows PE, you see "System Information" menu first.

There are 2 tabs as "System Information" and "Diagnostics", you can switch each other by clicking the tab name.
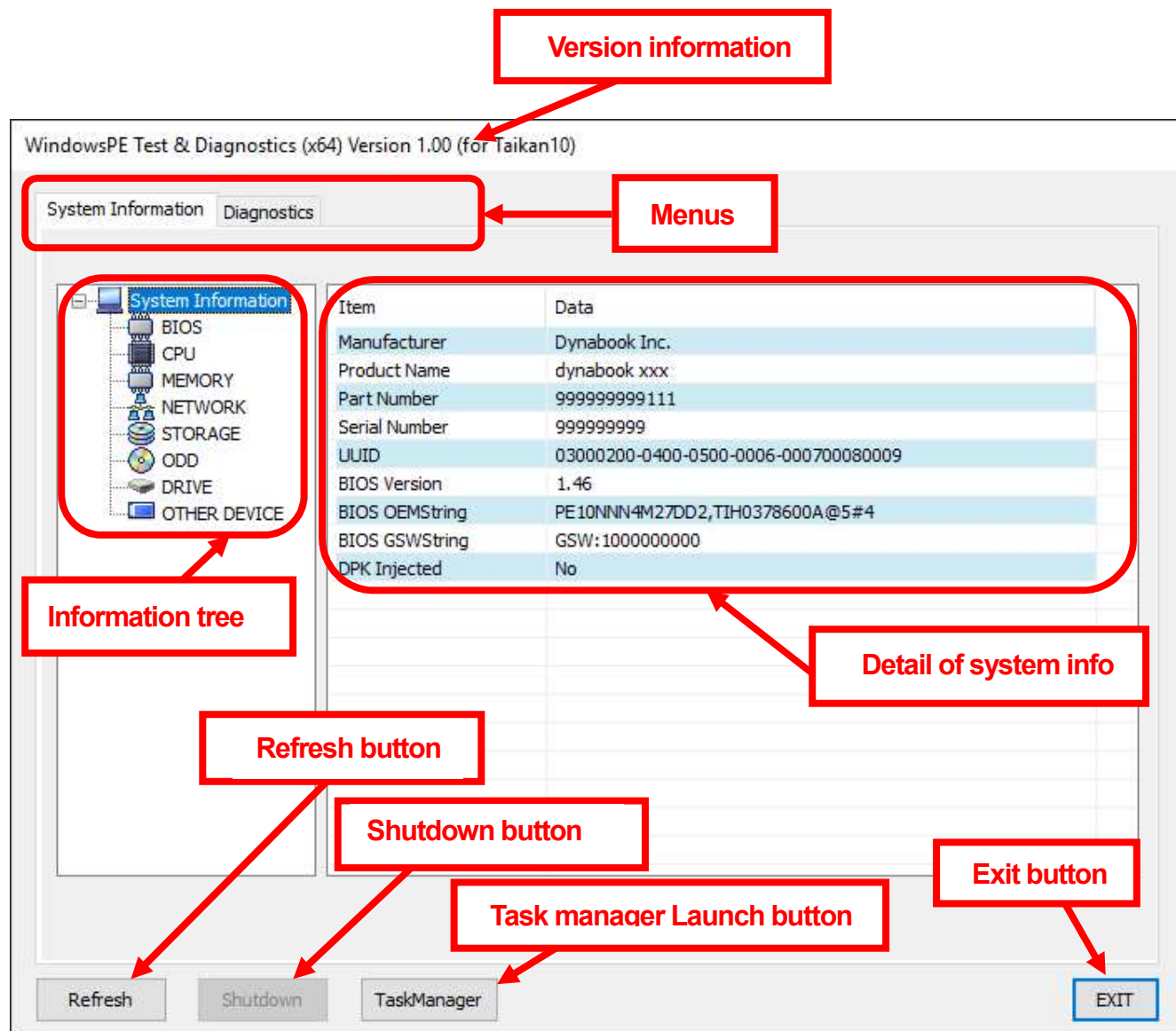
3-2-1 Each item

✓ [Refresh] button   This obtains the system information again.

                                             If you have some grayed-out test items by missing something for example "missing test medium", recover the situation then click this button and check if it turns to enable.

✓ [Shutdown] button   It shuts down Windows PE.

✓ [TaskManager] button   Launches Task Manager

✓
✓   [EXIT] button   Terminates WPETD
✓   Version information   The version of WPETD
✓   Menus   Tabs for the menus that WPETD supports.
✓   Information tree   You can select the device that you want to check its system information
✓   Detail of system information   Detailed information of the item selected in Information tree.
                                           Refer the section 3-2-2 below.

3-2-2 Details of the system information

The following tables list the system information items for each device of the "Information tree" structure.

If the multiple components exist, index will be added after the Item like "CPU0"。

- BIOS

The following items show DMI and BIOS information.

Item	Description	WMI
Manufacturer	Manufacturer of the PC	Win32_ComputerSystem
Product Name	Product Name of the PC	Win32_ComputerSystemProduct
Part Number	Part Number of the PC	Win32_ComputerSystemProduct
Serial Number	Serial Number of the PC	Win32_ComputerSystemProduct
UUID	UUID of the PC	Win32_ComputerSystemProduct
BIOS Version	BIOS Version of the PC	Win32_BIOS
BIOS OEMString	OEMString of the PC	Win32_ComputerSystem
BIOS GSWString	GSWString (Baseboard ConfigOptions) of the PC	Win32_BaseBoard
DPK Injected	Yes/No (Whether DPK is injected into BIOS)	N/A (it uses Win32 APIs)

- CPU

The following items show CPU information.

Item	Description	WMI
CPU Name0 - 3	CPU's name mounted on the PC	Win32_Processor
CPU Clock0 - 3	Current Clock(MHz) and Max Clock(MHz) of the CPU	Win32_Processor
CPU Socket0 - 3	Socket Name of the CPU	Win32_Processor
CPU Description0 - 3	Processor Name of the CPU and CPUID(Family, Model, Stepping)	Win32_Processor
L2 Cache0 - 3	The second cache (KB) of the CPU	Win32_Processor

- MEMORY

The following item shows memory information.

Item	Description	WMI
Physical Memory	The size of the memory	Win32_PhysicalMemory
Memory Device0 - 7	The memory device	Win32_PhysicalMemory

- NETWORK

The following items show network card information.

Item	Description	WMI
Network0 - 7	The name of the LAN device connected to the PC	Win32_NetworkAdapter
MAC Address0 - 7	MAC address of the LAN device	Win32_NetworkAdapter

- STORAGE

The following items show IDE, SCSI, and USB memory storage information.

Item	Description	WMI
IDE HDD/SSD0 - 1	The name and the capacity of IDE HDD/SSD connected to the PC.	Win32_DiskDrive
SCSI HDD/SSD0 - 1	The name and the capacity of SCSI HDD/SSD connected to the PC.	Win32_DiskDrive
USB Flash Disk0 - 7	The name and the capacity of USB Flash Disk connected to the PC.	Win32_DiskDrive
Other Disk0	The name and the capacity of the HDD other than the above types which is connected to the PC	Win32_DiskDrive

Note:

This tool does not check whether it is HDD disk or SSD/eMMC disk, "HDD/SSD" is common description for all the fixed hard disk media including HDD, SSD and eMMC.

- ODD

The following item shows ODD information.

Item	Description	WMI
ODD0 - 1	The name and the media type of the ODD connected to the PC. Media type is information of the medium, such as CD-ROM, DVD-RW and etc.	Win32_CDROMDrive

Note:

Please ignore this item for Taikan products, it will show nothing for Taikan since it does not have ODD device.

- DRIVE

The following item shows the information on logical drives from A: to Z: on the PC.

Item	Description
DRIVE	The type, volume name, size of the free space and the used space for each assigned logical drive

- OTHER DEVICE

The following items show other device information of the PC.

Item	Description	WMI
Key Board0 - 3	The name of the Keyboard connected to the PC. If more than one keyboard is connected, the information of up to 4 keyboards are displayed.	Win32_Keyboard
Mouse0 - 3	The name of the mouse connected to the PC.	Win32_PointingDevice

3-3 Diagnostics Test Item Menu

This section explains the Diagnostics screen.
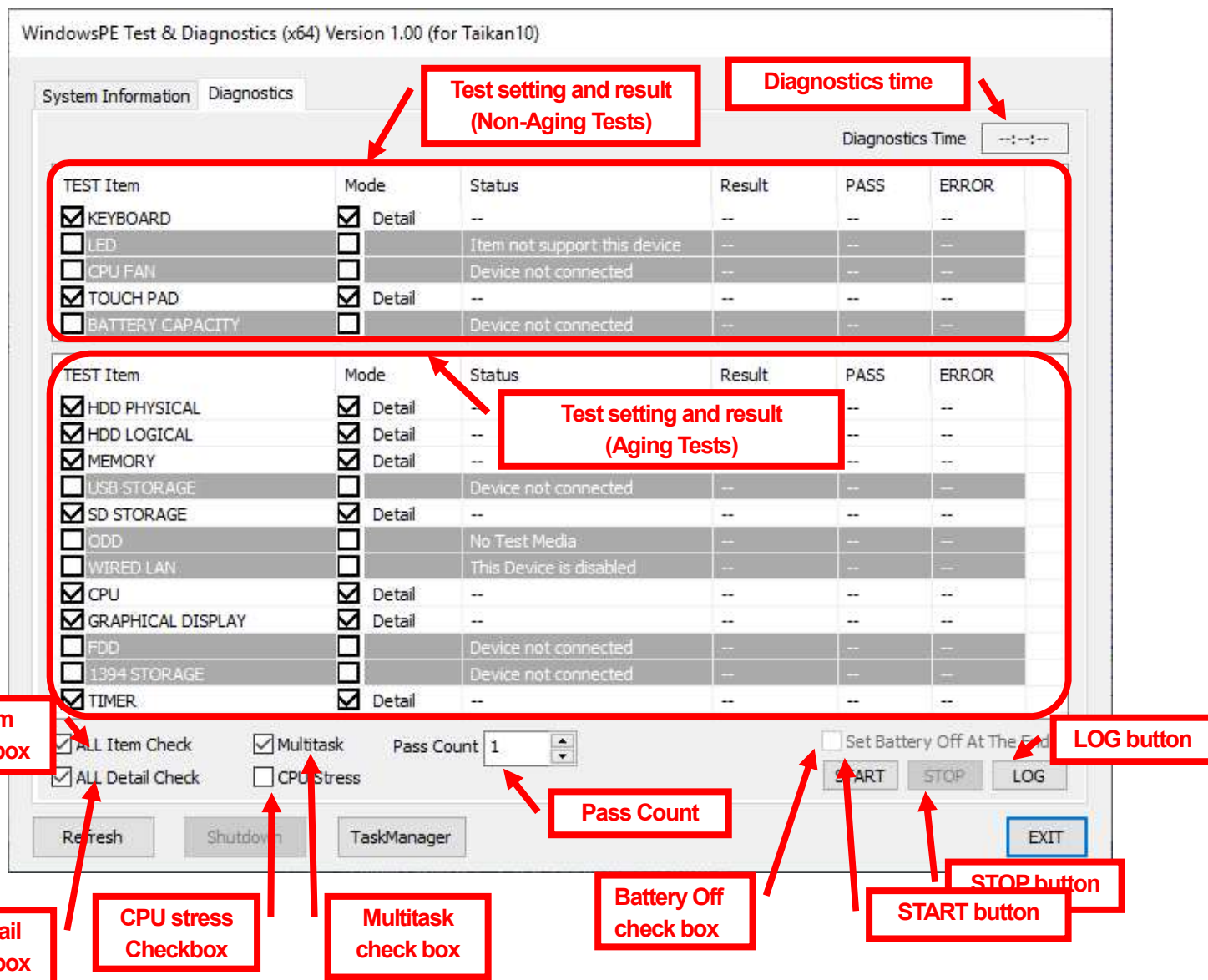
On this dialog, you can select which tests you run and how you run them, then you can start the tests.

You can stop the tests during their running when you need.

You can also save log files for the tests in the external media such as a USB Memory.

3-3-1 Aging tests and Non-aging tests

The following items are grouped as Aging tests. If you like you can run them simultaneously, repeatedly and with "CPU Stress".

Aging Tests: HDD PHYSICAL, HDD LOGICAL, MEMORY, USB STORAGE, SD STORAGE, WIRED LAN, CPU, GRAPHYCAL DISKPLAY, TIMER.

Other than those, we call them "Non-Aging tests". Each Non-Aging test is executed only once, and most of the tests require the user's intervention.

When you start the test items on "Diagnostic" by clicking [START] button and [Multitask] checkbox is checked, Non-Aging tests you selected are executed first. Each Non-Aging test runs once in order. When all Non-Aging tests are done, Aging tests you selected will start.

3-3-2 Each item for the operations

✓	[All Items Check] check box	Check this box, you can select or deselect all test items.
✓	[All Detail Check] check box	Check this box, you can select or deselect all test items in detail.
✓	[Multitask] check box	Only for Aging tests.
		If you check this box, the selected Aging-tests will run simultaneously.
		If you uncheck it, the selected Aging tests are executed one by one.
✓	[Pass Count] edit box	Only for Aging tests
		Set the number of times for a test, which allows you to specify from 1 to 999.
		Each Aging test runs until reaching "Pass Count" you set.
		If you also set "Multitask" option, all selected Aging tests will keep running until when the last one reaches the "Pass Count".
		However, if an Aging test gets error 10 times, the test item will be terminated.
✓	[CPU Stress] check box	Only for Aging tests
		Checking this box applies some stress to the CPU during the test.
✓	[Set Battery Off At the End] check box	if you check this box, it will run battery off test/setting once at the end of all tests. Default is checked. And it will be grayed out and unchecked if no battery or the running PC cannot be supported (Currently only Taikan10 model is supported) by this item [Set Battery Off At the End].
✓	[START] button	Start the test.
✓	[LOG] button	Shows the detailed test result or to save it.
✓	[STOP] button	Stops the test during the execution.
		This button is effective for each Aging test and at the interval between two Non-Aging tests.
✓	Diagnostics Time	The elapsed time for the test

3-3-3 Test setting and Result

✓   TEST Item   Select the check boxes for the items to be tested.

✓   Status   The following table explains the status of each test item (test device).

Status	Explanation
--	Ready for the test prior to the start of it.
TESTING	The test is running.
SKIP	The test was skipped.
DONE	The test finished
**************	Grayed out. The test item cannot launch as the current environment is not suitable for running the item. Refer to the table below for details.

Note: Grayed-out test items

A test item will be grayed out if the environment is not good enough for the test.

In that case, the "Status" will be shown as follows:

Status (when grayed out)	Explanation
Device is not equipped	The PC does not equip the device for the test.

IP Address cannot be acquired	The IP address is not able to be obtained. The LAN cable may not be connected.
No Intel PRO Set found	For WIRELESS LAN test, Intel Pro Set utility is necessary to be installed in the system.
No executable file	The program file (executable file) for the test is missing.
Device not connected	The device necessary for the test is not connected/existed (Taikan10 will have this status for CPU FAN, ODD, FDD and 1394 STORAGE test item since this machine has no these devices).
Device has a problem	Some failure occurred in the device driver.
This Device is disabled	The device has been removed.
This Device is currently stopped	The device is in the STOPPED state.
Space Size Error	There is not enough space for test in the test device
No partition or file	There is no partition in HDD (includes SSD/eMMC) or USB/SD storage, or no file exists in HDD (includes SSD/eMMC) storage.
Item not support this device	The test item not support this device (Taikan10 will have this status for LED test item since currently this test cannot be supported under WinPE).

✓   Test result ... The test results to be shown on the screen are as follows:

Result	Explanation
--	This means that the test has not started yet or the test has been skipped.
OK	The test was successful
NG	The test failed

✓   PASS ...   Shows the current PASS count for the test.

3-3-4 Test Procedure

This section describes the general procedure for executing the test items.

1) Select the test items to run from Test Item and check it.

   If you check or un-check "Check all Items", you can select or deselect the all test items.

2) Set the LOOP count, and check or un-check Multitask and CPU Stress for the Aging tests.

4) Click the [START] button and the test starts.

5) If Multitask is checked, after all Non Aging tests are done, Aging tests you selected will run simultaneously.

6) If each test's pass count reaches the "LOOP count" you set or if the [STOP] button is clicked, the test will terminate.

3-3-5 Test Result

If the all tests you selected ends or the [STOP] button is clicked, the following Result windows will come up.
After confirming the result, click the [CLOSE] button to close the "Diagnostics Result" window.

3-3-6 Log Management Screen

When you click the [LOG] button on the "Diagnostics" dialog, the following "Log Management "screen will open.

1) To show a log file
    If you click on a log file name, the file will be opened in the text format.

2) How to save log files

> **Note:**
> Currently log files are already saved under "\Logs" folder of WPETD tool's USB storage root automatically,
> so you don't need to use this function any more unless you want to save them to another USB storage (not
> the USB storage of WPETD tool).

2-1) Make sure that you have plugged an external storage device such as a USB Memory into the PC.
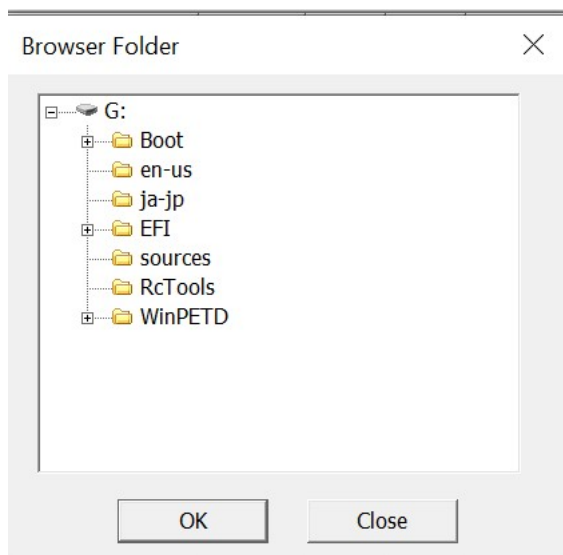
2-2) select the log file that you save.

For each log you select, Text and HTML format files will be saved.

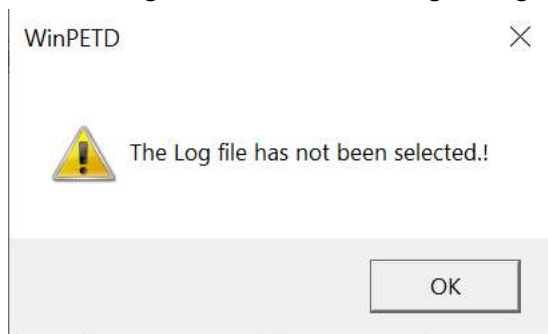By the [All Select] button, you can select all log files.

By the [All Clear] button, you can un-check all log files.

2-3) Click [Save] button and "Browser Folder" dialog box will open.

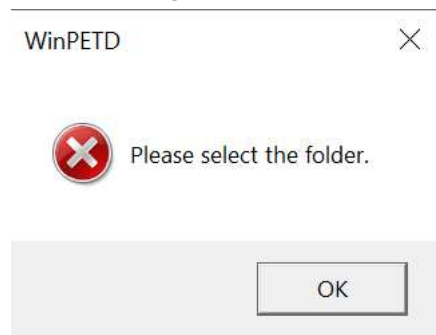**Note:** Only the drives that have "Removable" attribute will be shown such as USB Memory, etc.

When you click [Save] button, if no log file is selected, the following warning message will be shown.

2-4) Select a folder for saving the logs, then click [OK] button

When you click [OK] button without selecting a destination folder, the following warning message will be shown.
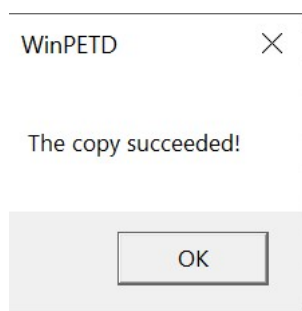
2-5) The confirmation message will pop up as follows.

If the destination folder is OK, click the [OK] button.

WinPETD ✕

⚠ May I begin copying?(G:\)

OK   Cancel

2-6) If the log files are saved successfully, the following message will come.
  Click the [OK] button.

WinPETD ✕

The copy succeeded!

OK

2-7) Click the [Close] button on the "Log Management" screen.

3) The location of Log files created
When you have run the diagnostics one cycle (*1) or even when you stop the diagnostics by [STOP] button during they are running, log files for the execution will be created at the following location (under "¥Logs" folder of WPETD tool's USB storage root).

> BIOS_DMI_UP (H:) > Logs

☐ Name	Date modified	Type	Size
OK.21172643H.20210512045552petd.html	5/12/2021 4:55 AM	Firefox Document	15 KB
OK.21172643H.20210512045552petd.log	5/12/2021 4:55 AM	Text Document	2 KB

*1) "the diagnostics one cycle" means from selecting test items, click [START] button to getting the results.

4. Diagnostics Test Items

This chapter explains each test item you launch from the "Diagnostics" dialog.

4-1 Non Aging Tests

When you click [START] button on the "Diagnostics" dialog, Non Aging Tests you selected run first.

They are executed one by one from the top to the bottom in the list.
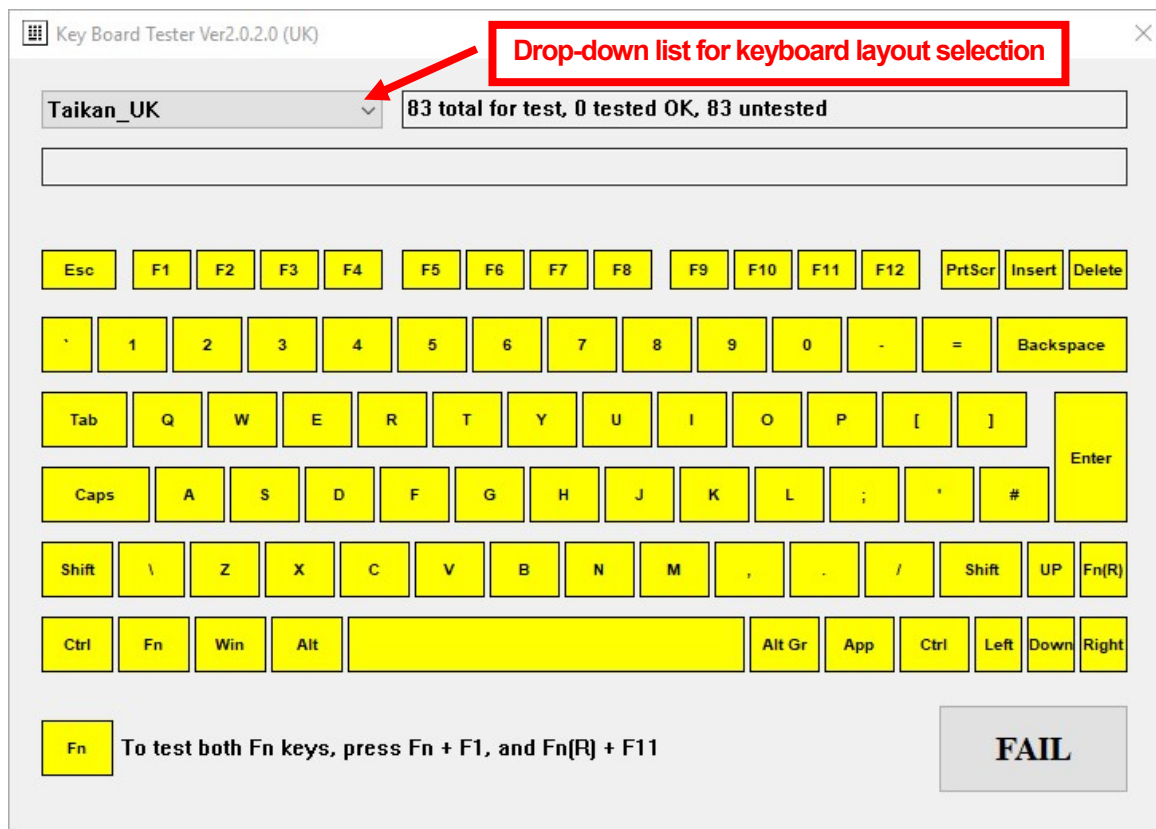
4-1-1 KEYBOARD Test

1) Test contents

This test checks if each key on the keyboard works properly.

> **Note:** To test both Fn keys, press Fn + F1, and Fn(R) + F11 (It cannot only capture Fn/Fn(R) key).

2) Test screen

2-1) - it is "Taikan_UK" layout as an example

The keyboard layout is shown as above. This is the initial state.

> **Note:**
> 1. This test supports different keyboard layouts, you can switch each layout at any time using the drop-down list. You need to select the one that matched the actual keyboard layout of current running PC by yourself.
> 2. If you selected a wrong keyboard layout or you use the default keyboard layout that doesn't matched the running PC, you may not be able to test all the keys fully, so please select the right one.
> 3. When you switch a keyboard layout, the keyboard test is started over. Please refer to 5-2 Keyboard layouts for total 2 supported keyboard layouts.
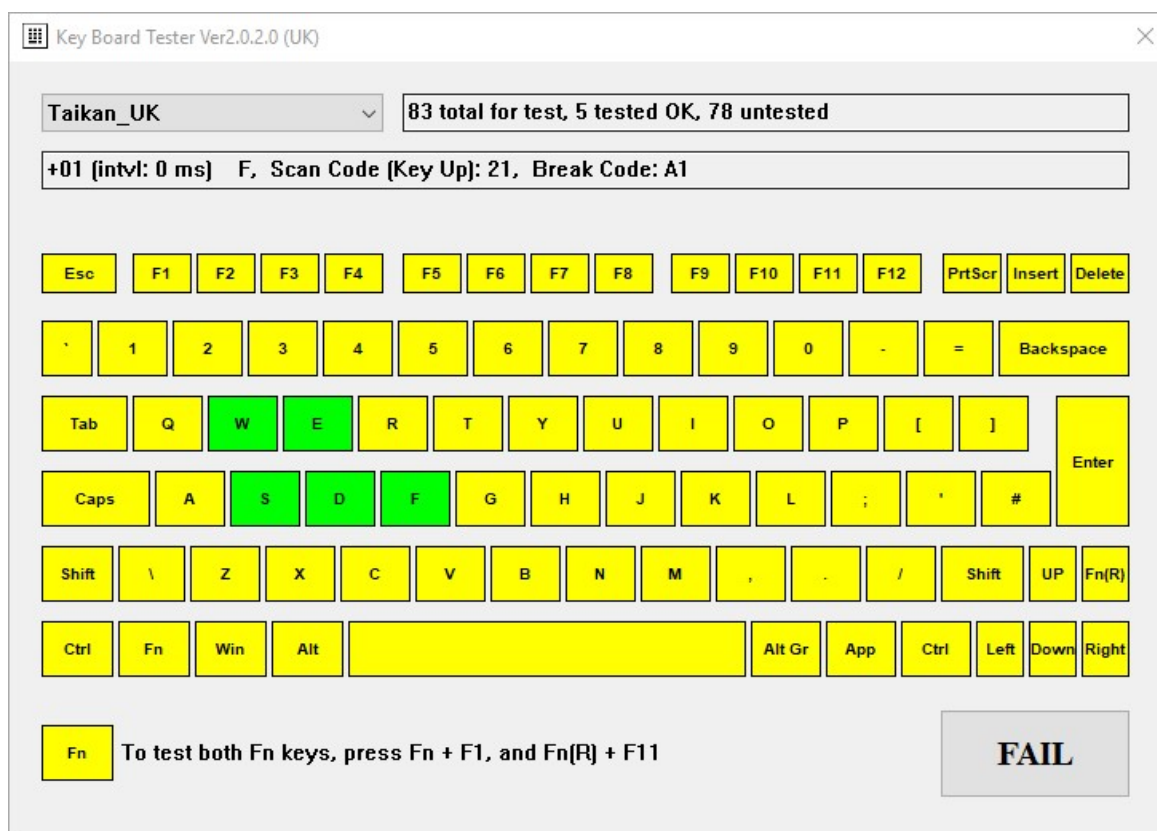
Check method:

Press all the keys to test the keyboard, and when you presses the Key board, it marks like below:

(Yellow: waiting for test; Green: Tested OK; Red: NG (Break code NOT paired with make code); Blue: Key Down)

3) Test result

If you want to end current test as a result of NG, you can click FAIL button or just close (X) the KB Test module.

After clicking FAIL button, it will be display like below:

(Click the "Cancel" button to exit this KB test as a result of NG, or you can also click "Retry" to reset/start over the KB test)

If all the keys are tested OK, this module will automatically exit and has a result of OK.

■ In case of PASS

"OK" is shown in the "Result" field on the "Diagnostics" dialog.

■ In case of FAIL

"NG" is shown in the "Result" field on the "Diagnostics" dialog.

4) Test file

Keyboard.exe: Test program.

4-1-3 TOUCH PAD Test

1) Test contents

This test checks if the touch pad works properly.

2) Test screen

Left-click the other circle with the Touch PAD.
Right-click will display an end window.

OK
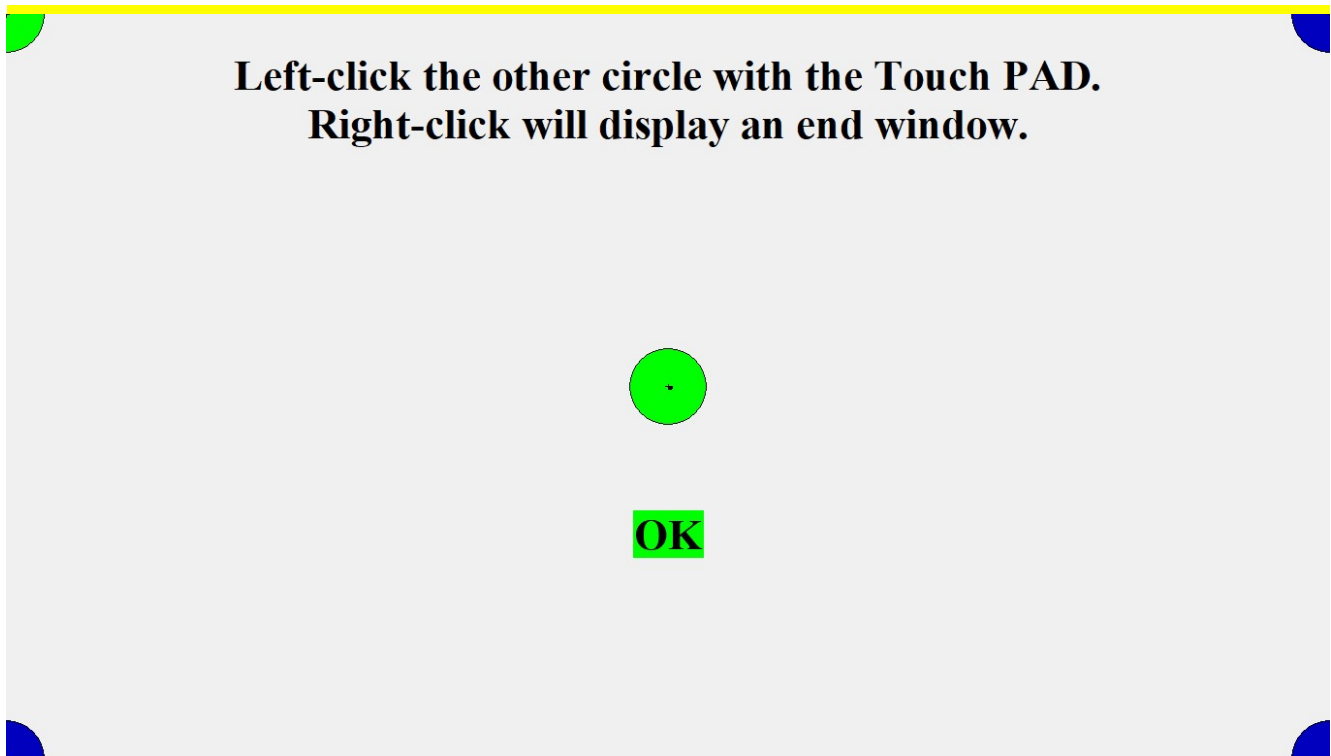
Check method:

a.   Left-click all the circles with the touch pad.

b.   Right-click to display an end window when you clicked all the circles.

c.   Click OK or NG button depending on your judgment.

3) Test Result

Select [OK] or [NG] button depending on your judgment based on the result on the "TOUCH PAD Test" window.
If you click [OK] here, the test will be "Pass". If you click [NG], the "TOUCH PAD Test" will be recognized by "ERR".

■ In case of PASS

"OK" is shown in the "Result" field on the "Diagnostics" dialog.

■ In case of FAIL

"NG" is shown in the "Result" field on the "Diagnostics" dialog.

4) Test file

TouchPad.exe: Test program.

4-1-4 BATTERY CAPACITY Test

1) Test contents

This test checks if the Battery Capacity is OK or not.

2) Test screen

Check method:

a.   If current battery is charging, you can click refresh to get an updated capacity (currently charged capacity)

b.   Click OK or NG button depending on your judgment.

> **Note: About confirmation of charge/discharge function**
>
> We can get the current capacity of the battery by pressing the refresh button. it means that we can check the discharge/charge function of the battery. If we want to check the discharge/charge function, we need to control the time of DC in/out for testing by ourselves.
>
> a.   To check the discharge function of the battery: unplug the DC, wait some times and then click the refresh button to see if the battery capacity reduced by 1%, wait and click again if it hasn't reduced.
>
> b.   To check the charge function of the battery: when above discharge function checked OK (battery capacity reduced), you can plug-in the DC back, wait some times and then click the refresh button to see if the battery capacity increased by 1%, wait and click again if it hasn't increased. Charge function is OK if the battery capacity can be increased.

3) Test Result

  Select [OK] or [NG] button depending on your judgment based on the result on the "Battery Capacity Test" window. If you click [OK] here, the test will be "Pass". If you click [NG], the "Battery Capacity Test" will be recognized by "ERR".

■ In case of PASS
  "OK" is shown in the "Result" field on the "Diagnostics" dialog.
■ In case of FAIL
  "NG" is shown in the "Result" field on the "Diagnostics" dialog.

4) Test file
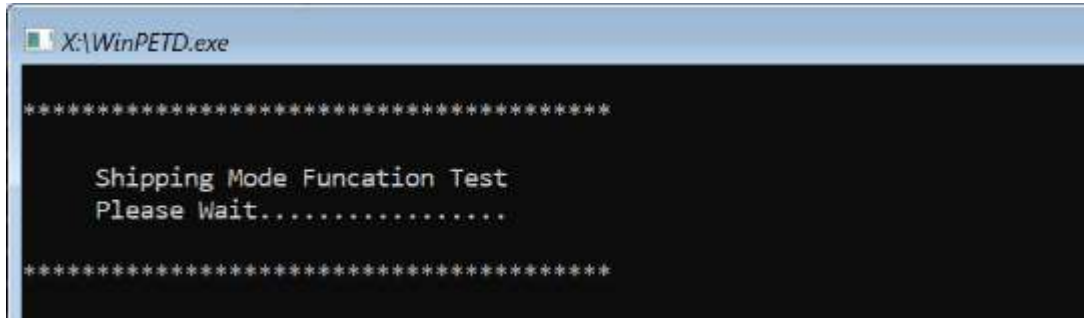 BatteryCapacity.exe: Test program.

4-1-6 BATTERY OFF Test (Setting)

1) Test contents

This test sets the battery off. And it run only once at the end of all other tests.

> **Note:** After the test/setting, you can only turn on the PC after power adapter (AC) plugged-in, and this is what "Shipping Mode" for.

2) Test screen

Check method:

a. Check the [Set Battery Off At the End] check box as introduced in "3-3-2 Each item for the operations".

b. The battery off (Shipping Mode) test/setting starts as above at the end of all other tests, and it will exit automatically when finished.

3) Test Result

If the test finished and exit automatically, then the test/setting result is OK.

If there is error, then the test/setting will pause and the result is NG.

■ In case of PASS

"OK" is shown in the "Result" field on the "Diagnostics" dialog.

■ In case of FAIL

"NG" is shown in the "Result" field on the "Diagnostics" dialog.

4) Test file

BatteryOff.exe: Test program.

4-2 Aging Tests

The following items are grouped as the Aging tests.

Aging Tests: HDD PHYSICAL, HDD LOGICAL, MEMORY, USB STORAGE, SD STORAGE, WIRED LAN, CPU, GRAPHICAL DISPLAY, Timer

These "Aging Tests" are integrated in WPETD (WinPETD.EXE) itself.

Aging Tests start when the all selected Non Aging Tests have finished.

You can run these Aging Tests more than once by setting the "LOOP COUNT".

If you check "Multitask" check box, all Aging Tests you select run simultaneously. The tests run repeatedly until the last one reaches the "LOOP COUNT".

If you un-check "Multitask", the Aging Tests you select run one by one from the top to the bottom in the list.

Then the cycle will repeat the number of times you set in the "LOOP COUNT".

Regardless the "LOOP COUNT" you set, if an aging test encounters total 10 errors during the execution, the aging test will terminate.

4-2-1 HDD PHYSICAL Test

1) Test contents

This test treats PC's each HDD/SSD/eMMC as a physical unit, and reads the sectors on the disk to check if the device works correctly. The test never writes any data on the HDD/SSD/eMMC.

The Test checks up to the first 16 built-in ATA/SATA/SCSI/iSCSI/NVMe/MMC/SD bus type's HDD/SSD/eMMC.

The test reads a data chunk at a time, which consists of consecutive sectors the size of which equals to 64K bytes. Hereafter, the data chunk is called "64KB-Sectors".

Depending on the test mode (Detail or Simple), the test defines "Division number" as follows:

■ In case of Simple mode: Division number = 1000
■ In case of Detail mode: Division number = 5000

The test divides the HDD/SSD/eMMC virtually to "Division counts" of the fragments. Then, it reads 64KB-Sectors in each fragment of HDD/SSD/eMMC from low LBA (Logical Block Address of HDD/SSD/eMMC) to high. If the test reads the 64KB-Sectors from all of the fragments successfully, it will get 1 Pass.

This is the one cycle of the test. If you set the pass count more than one, the test runs more than one cycle.

The test reads 64KB-Sectors (it is part of one fragment) at same LBA for each cycle.
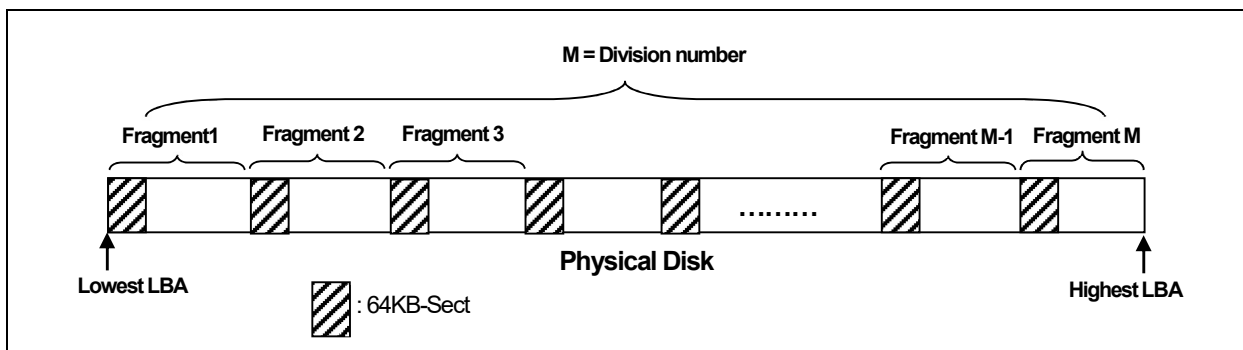
2) Test screen

▼ Test address ...The LBA (Logical Block Address) of HDD/SSD/eMMC being tested now
▼ Drive information ... The drive number currently being tested
▼ Progress status ... The test progress by the progress bar

3) Test result

If the test runs successfully with all equipped HDD/SSD/eMMC, it will get a pass count. However, if an error occurs with one of the HDD/SSD/eMMC, the test is regarded as an error and it will get an error count.

■ In case of PASS
"OK" is shown in the "Result" field on the "Diagnostics" dialog.
  The pass count is shown in the "PASS" field.

■ In case of FAIL
"NG" is shown in the "Result" field on the "Diagnostics" dialog.
  The pass and error count are shown in the "pass" and" error" fields respectively.

The detail of the error is recorded in the log file as follows.

Message	Explanation	Remarks
Read Hdd Create File Error.Address=XX	Failed in opening of HDD/SSD/eMMC driver. XX is LAB value.	The HDD/SSD/eMMC driver may not be normal or installed.
Read Hdd Set File Pointer Error.Address=XX	Failed in the HDD/SSD/eMMC file pointer setting command. XX is LAB value.	It indicates that a read error occurred at the specified LBA.
Read Hdd Command Error. Address=XX	Failed in the HDD/SSD/eMMC read command. XX is LAB value.	
Read Hdd Check Size Error. Address=XX	The size read by the HDD/SSD/eMMC read command does not equal to the specified size. XX is LAB value.	

4-2-2 HDD LOGICAL Test

1) Test contents

This test checks if it can read the files on the first built-in HDD/SSD/eMMC successfully.

> **Note:** The test is only checking those files that have a file size greater than 0 Bytes and less than 1 MBytes.

■ In case of Simple mode

The simple test mode performs a read test on the first 400 files.

■ In case of Detail mode

The detailed test mode performs read test on the first 2000 files.

The status is updated sequentially (the file name being verified is displayed in "File Name" dynamically) during the test, the test finished until it reads last file (400th file for Simple mode, 2000th file for Detail mode) successfully. This is the one cycle of the test. If you set the pass count more than one, the test runs more than one cycle.

2) Test screen

▼ File Name ... The name of the file being verified with full path

3) Test result

■ In case of PASS

"OK" is shown in the "Result" field on the "Diagnostics" dialog.

The pass count is shown in the "PASS" field.

■ In case of FAIL

"NG" is shown in the "Result" field on the "Diagnostics" dialog.

The pass and error count are shown in the "pass" and "error" fields respectively.

The detail of the error is recorded in the log file as follows.

(The following example indicates the case where an error was found in file-A.)

```
[HDDL]
ERROR0000=(2008/09/10, 12:00:00)C:¥file-A
```

4-2-3 MEMORY Test

1) Test contents

This test allocates a test area in the free space in the system memory and performs Write, Read and Compare operations in the area.

1-1) Allocate the test area

First, MEMORY Test allocates the test area in the free memory space in the system memory.

MEMORY Test tries to allocate 50% of the free space as the test area.

If it succeeds in allocating the test area, the test will go to MEMORY Test: Address Test, High/Low Test, and Burst Transfer Test.

If the test fails the memory allocation, it will try again decreasing of 1M bytes from the previous size.

The process will be repeated until it succeeds in the allocation.

However, if the allocation size comes down to 256M bytes before success, the test will recognize that it cannot acquire enough memory for the test and the MEMORY Test will end without proceeding to the tests.

2) Test screen
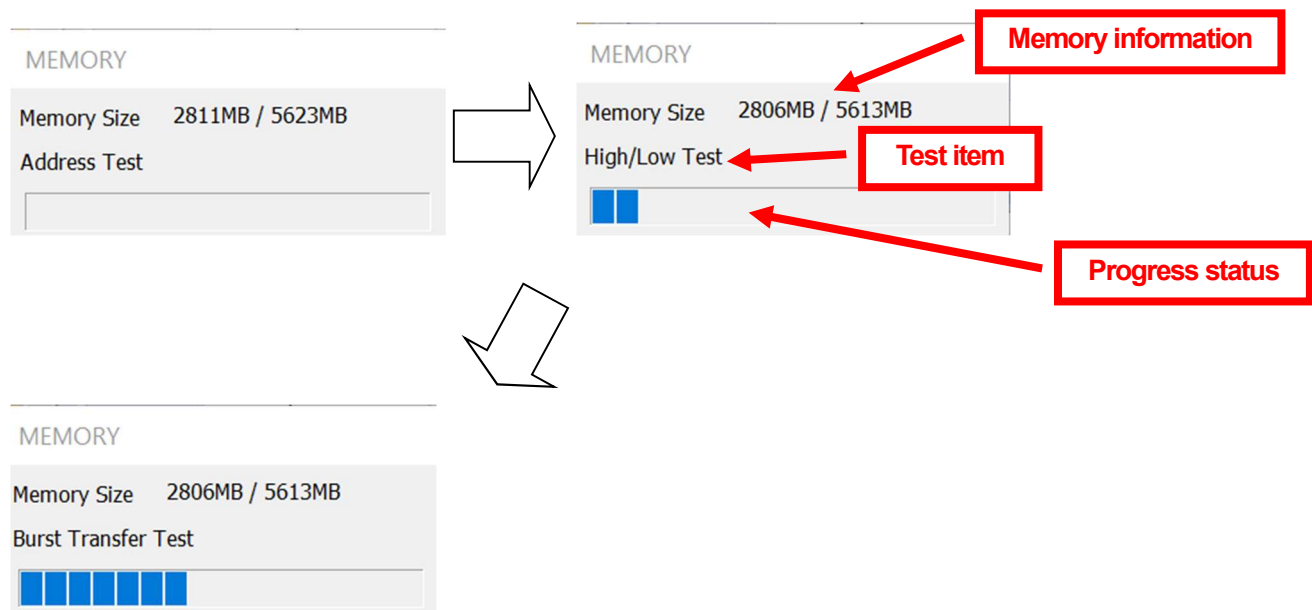
▼Memory information ... The test area's memory size/ The total free memory size (at most 2GB)

▼Test item ... The test item being executed:　Address Test(1), High/Low Test(2), Burst Transfer Test(3).

▼Progress status ... The test progress

3) Test result

If the test cannot allocate the test area or if a compare error occurs, the test will get an error count.

■　In case of PASS

"OK" is shown in the "Result" field on the "Diagnostics" dialog.

The pass count is shown in the "PASS" field.

■ In case of FAIL

"NG" is shown in the "Result" field on the "Diagnostics" dialog.

The pass and error count will be shown in the "pass" and "error" fields respectively.

The detail of the error will be recorded to the WPETD log file as below.

Message	Explanation
Memory compareerror(MEMORY Test 1)	An error occurred during MEMORY Test 1.
Memory compareerror(MEMORY Test 2)	An error occurred during MEMORY Test 2
Memory compareerror(MEMORY Test 3)	An error occurred during MEMORY Test 3

4-2-4 USB STORAGE Test

This test checks if the connection of the USB Ports on the PC works by using a USB Memory.

You need to prepare a USB Memory.

The test writes some data to the USB memory. The USB memory needs at least 12 MB free space.

> **Note:**
> The current version of the test does not check if the connection level is whether USB3.0 or USB2.0/1.0.
> We recommend you to use a USB2.0 Memory for this test.

1) Test contents

The test detects a USB Memory plugged to one of the USB ports on your PC. Then the test copies some data to the USB Memory, read the data back from the memory and compare it to the original data. If the comparison is OK, the test will say that the port is passed.

> **Important Note:**
> Do not take WPETD USB Memory out during USB STORAGE Test trying to check the port that WPETD USB Memory plugged in. Recognize that the USB port works fine as long as WPETD has launched.
> Again, when you launch WPETD from WPETD USB Memory, you must not take the USB Memory out of the USB port. If you do so, the WPETD's behavior will be unstable and it will not be guaranteed.

2) Test screen
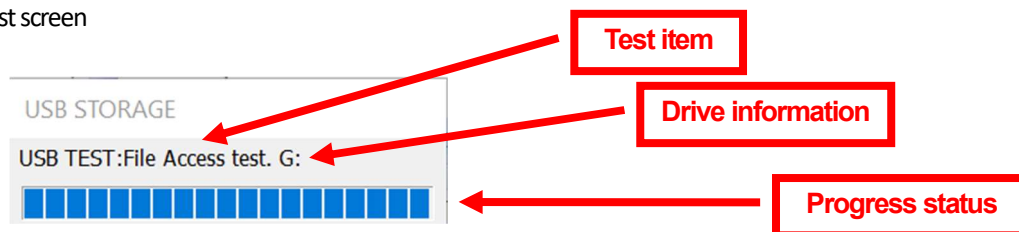
- ▼ Drive information ... The drive letter of the USB being tested
- ▼ Test item ... The test item being executed: File Access test.
- ▼ Progress status ... The test progress

3) Test result

■ In case of PASS

"OK" is shown in the "Result" field on the "Diagnostics" dialog.

■ In case of FAIL

"NG" is shown in the "Result" field on the "Diagnostics" dialog.

The detail of the error will be recorded to the WPETD log file as below.

Message	Explanation	Remarks
File Access Error. xx:.	Failed in accessing the file. XX is the USB drive letter.	
Space Size Error. xx:	There is no free space for creating the file. XX is the USB drive letter.	

Note:
If you need to test USB storage on different USB port, before the test, please prepare some USB storage and then insert them into all the USB ports you want to test, or insert it into different USB port and start over the test if you have only one USB storage.

4) Test file

WinPETD.exe: Test program.

4-2-5 SD STORAGE Test

This test checks if the connection of the SD Port on the PC works by using a SD storage card.
You need to prepare a SD storage card.
The test writes some data to the SD storage card. The SD storage card needs at least 12 MB free space.

1) Test contents

The test detects a SD storage card plugged to the SD port on your PC. Then the test copies some data to the SD storage card, read the data back from the SD storage card and compare it to the original data. If the comparison is OK, the test will say that the port is passed.

Important Note:
Do not take SD storage card out during SD STORAGE Test trying to check the port that SD storage card plugged in.

2) Test screen
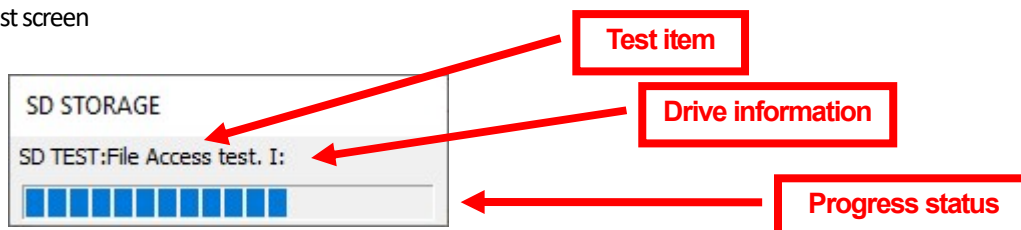
▼ Drive information ... The drive letter of the SD storage card being tested
▼Test item ... The test item being executed: File Access test.
▼ Progress status ... The test progress

3) Test result

■ In case of PASS

"OK" is shown in the "Result" field on the "Diagnostics" dialog.

■ In case of FAIL

"NG" is shown in the "Result" field on the "Diagnostics" dialog.
The detail of the error will be recorded to the WPETD log file as below.

Message	Explanation	Remarks
File Access Error. xx:.	Failed in accessing the file. XX is the SD storage card drive letter.	
Space Size Error. xx:	There is no free space for creating the file. XX is the SD storage card drive letter.	

4) Test file

　WinPETD.exe: Test program.

4-2-6 WIRED LAN Test

1) Test content

This test checks if the data is sent and received without timeout between the built-in LAN device and DHCP server. The 32-packet sized data is sent from the PC and will confirm to get the response from the server.

The check is executed 5 times for 1 Pass.

> **Note:**
> It is necessary that the IP Address has to be assigned to the Wired LAN adapter by a DHCP server for executing the test.
> If you use an attached Wired LAN adapter such as a USB LAN adapter, remove it from the PC as WPETD cannot detect the built-in adapter correctly.

2) Test Screen

LAN Card information

Progress status

WIRED LAN
LAN TEST: Bound IP: 192. 168. 3. 225

▼LAN Card information ...IP address.
▼Progress status ... Test progress by the progress bar.

3) Test result

■　In case of PASS

　"OK" is shown in the "Result" field on the "Diagnostics" dialog.

　The pass count is shown in the "PASS" field.

■　In case of FAIL

　"NG" is shown in the "Result" field on the "Diagnostics" dialog.

　The pass and error count are shown in the "PASS" and "ERROR" fields respectively.

The detail of the error is recorded in the log file as follows.

Message	Explanation	Remarks
An IP address has not been assigned.	IP address cannot be obtained.	This error occurs when the test is conducted with a LAN card to which IP is not assigned.
WSAStartup failed: xx	In-use API error xx is the error code.	This is a message that is caused by an error of Windows Socket API used in the

failed to set recv timeout: xx	In-use API error	test.
	xx is the error code.	
failed to set send timeout: xx	In-use API error	
	xx is the error code.	
Invalid in-address: xx	In-use API error	
	xx it the IP address	
sendto failed: xx	In-use API error	
	xx is the error code.	
Wrote xx bytes	Communication data size unmatched	
	xx is the reception size	
recvfrom failed: xx	In-use API error	
	xx is the error code.	
timed out.	Time out occurred.	

4-2-7 CPU Test

1) Test contents
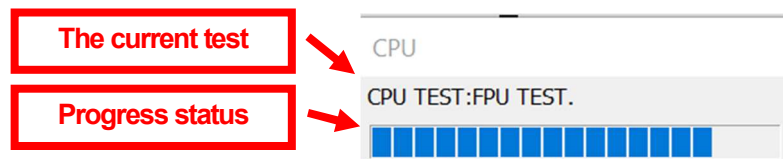
1-1) The test gets how many CPU cores exist on the PC.

1-2) The test executes ALU (Arithmetic Logic Unit) test and FPU (Floating Point Unit) test five times on the process.

1-3) The executes ALU test and FPU test five times on the each CPU core.

　　　WPETD supports to test up to 8 cores.

If there is no problem with test 1-2 and 1-3, the test will get 1 Pass.

2) Test screen

▼The current test … ALU or FPU

▼Progress status … Test progress by the progress bar.

3) Test result

■　In case of PASS

　　"OK" is shown in the "Result" field on the "Diagnostics" dialog.

　　The pass count is shown in the "PASS" field.

■　In case of FAIL

　　"NG" is shown in the "Result" field on the "Diagnostics" dialog.

　　The pass and error count are shown in the "pass" and "error" fields respectively.

The detail of the error is recorded in the log file as follows.

Message	Explanation
The ALU test made an error.	An error occurred during ALU test.
The FPU test made an error.	An error occurred during FPU test.

4-2-8 GRAPHICAL DISPLAY Test

1) Test contents

   This test will go through a series of solid color screen test followed by H pattern test and circles/line-gradation/ASCII-characters test and as follows:
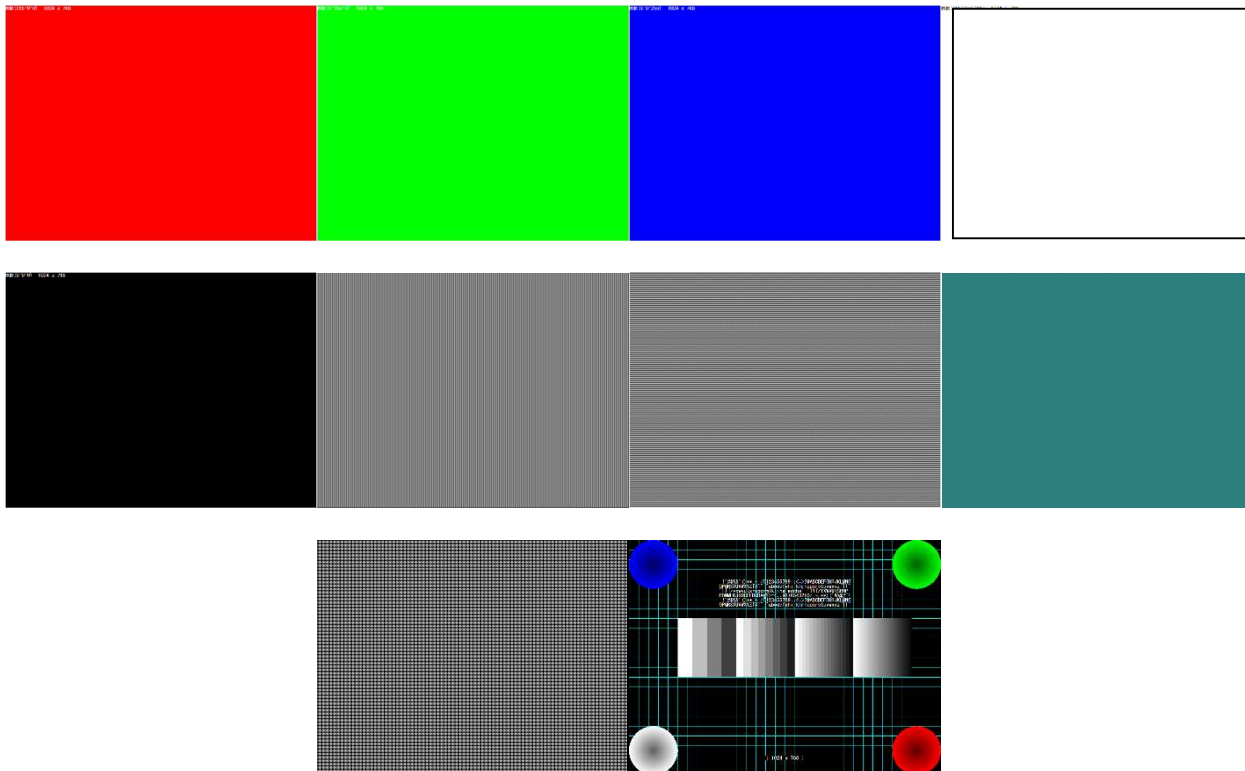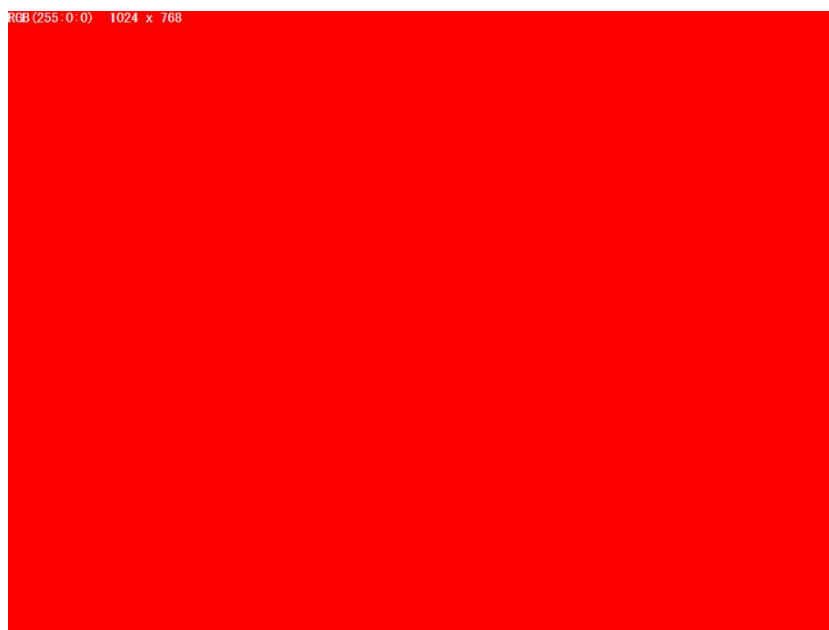

> **Note:** During the test you can press "ESC" or "STOP" key if you need to stop the test. For example, in case the test somehow takes too long time.

3) Test file

"GRAPHICAL DISPLAY Test" is integrated in WPETD (WinPETD.EXE) itself.
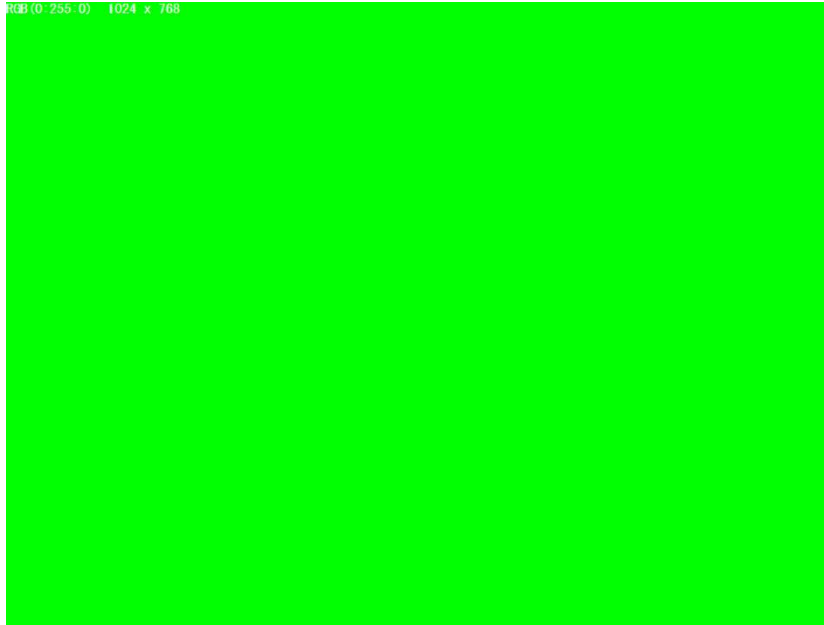
4) Test Screens

4-1) Red screen

(1) The screen will turn all red "RGB(255, 0, 0)" color.

(2) The white text "RGB(255:0:0)   <Screen width> x <Screen height>" will be shown at the upper left corner of the screen

(3) It will pause for 3 seconds

4-2) Green Screen

(1) The screen will turn all green "RGB(0, 255, 0)"color.

(2) The white text "RGB(0:255:0)   <Screen width> x <Screen height>" will be shown at the upper left corner of the screen

(3) It will pause for 3 seconds

4-3) Blue Screen

RGB(0:0:255) 1024 x 768

(1) The screen will turn all blue "RGB(0, 0, 255)"color.

(2) The white text "RGB(0:0:255)   <Screen width> x <Screen height>" will be shown at the upper left corner of the screen

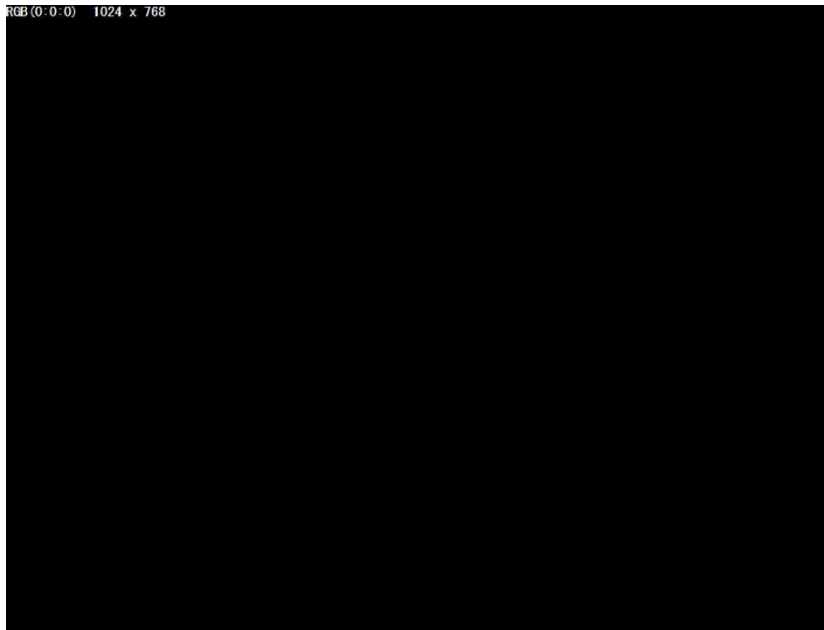(3) It will pause for 3 seconds

4-4) White Screen

RGB(255:255:255) 1024 x 768

Note:

Any border lines of the white screen are not displayed during the test.

This rectangle is just for the explanation here.

(1) The screen will turn all white "RGB(255,255,255)"color.

(2) The black text "RGB(255:255:255)   <Screen width> x <Screen height>" will be shown at the upper left corner of the screen

(3) It will pause for 3 seconds

4-5) Black Screen

RGB(0:0:0)   1024 x 768

(1) The screen will turn all black "RGB(0, 0, 0)"color.
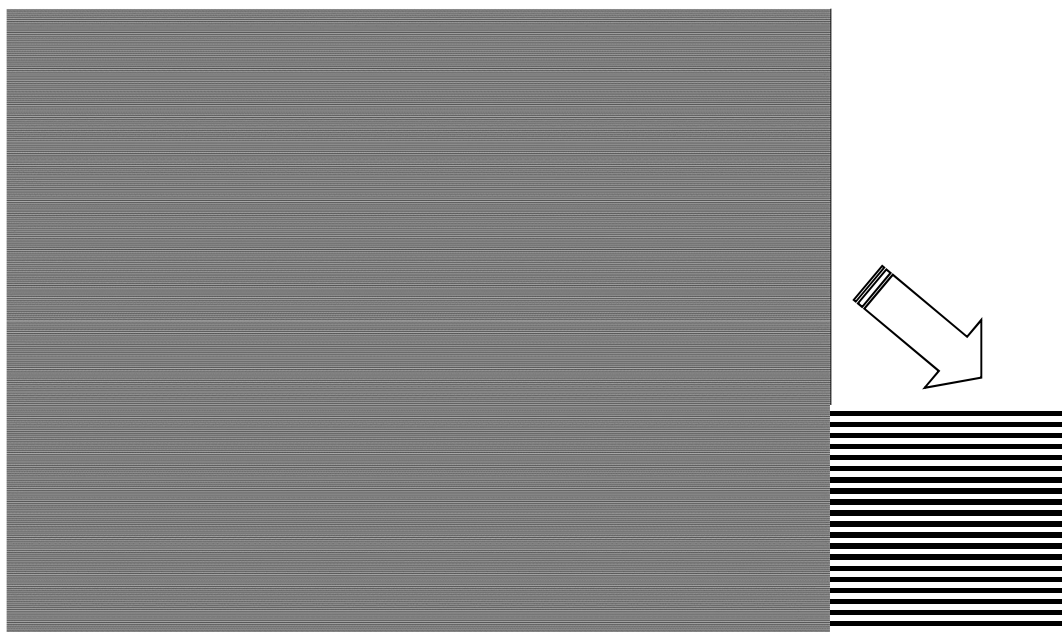
(2) The white text "RGB(0:0:0)   <Screen width> x <Screen height>" will be shown at the upper left corner of the screen

(3) It will pause for 3 seconds

4-6) Vertical Lines Screen

(1) The screen will turn all black "RGB(0, 0, 0)"color.

(2) 1 pixel wide white vertical lines will be drawn with every 2 pixels.
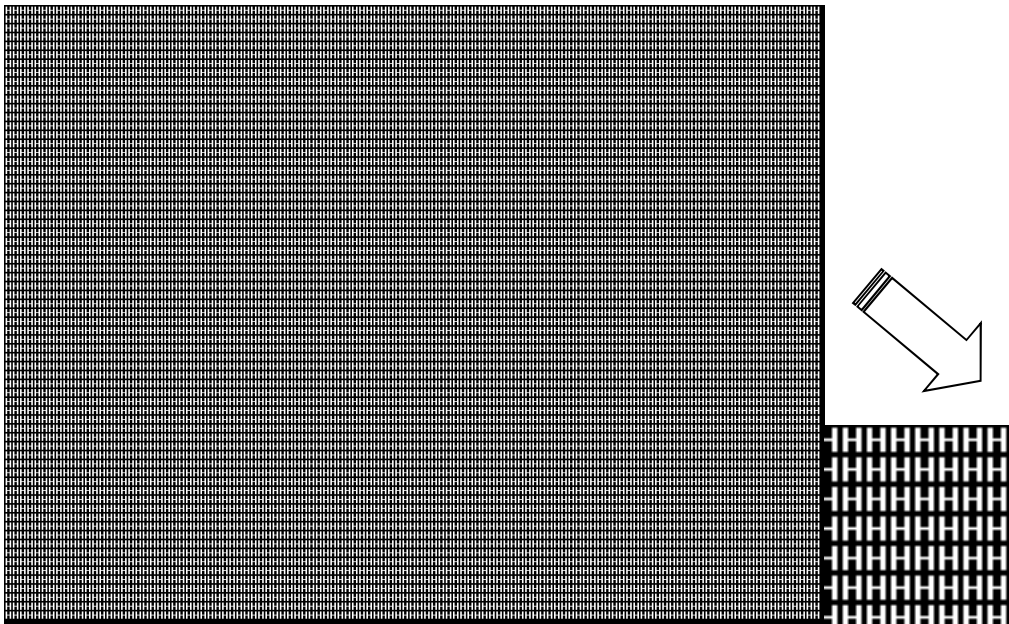
(3) It pause for 3 seconds

4-7) Horizontal Lines Screen

(1) The screen will turn all black "RGB(0, 0, 0)"color.

(2) 1 pixel wide white horizontal lines will be drawn with every 2 pixels.

(3) It pause for 3 seconds

4-8) Cyan and Black Screen

(1) The screen will turn all black "RGB(0, 0, 0)"color.

(2) Alternate cyan1and black, 1 x 1 pixel dots will be drawn in a check pattern.

   WPETD uses 1 x 1 pixel / 24bit color bitmap for "a cyan point" and "a black point" here.

   Even line (including line 0 (the most upper line)) : Cyan, Black, Cyan, Black, ...

   Odd line: Black, Cyan, Black, Cyan, ...

(3) It pause for 5 seconds

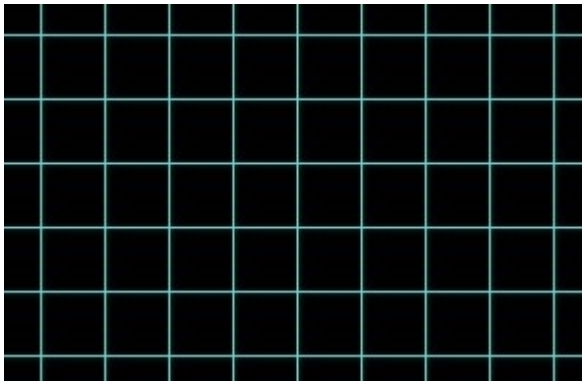4-9) H patterns Screen

(1) The screen will turn all black "RGB(0, 0, 0)"color.

(2) An "H" bitmap (; 9 x 11 pixel / 4 bit color) will uniformly fill the screen.

(3) It pause for 5 seconds

4-10) Circles/Line-gradation/ASCII-characters Screen
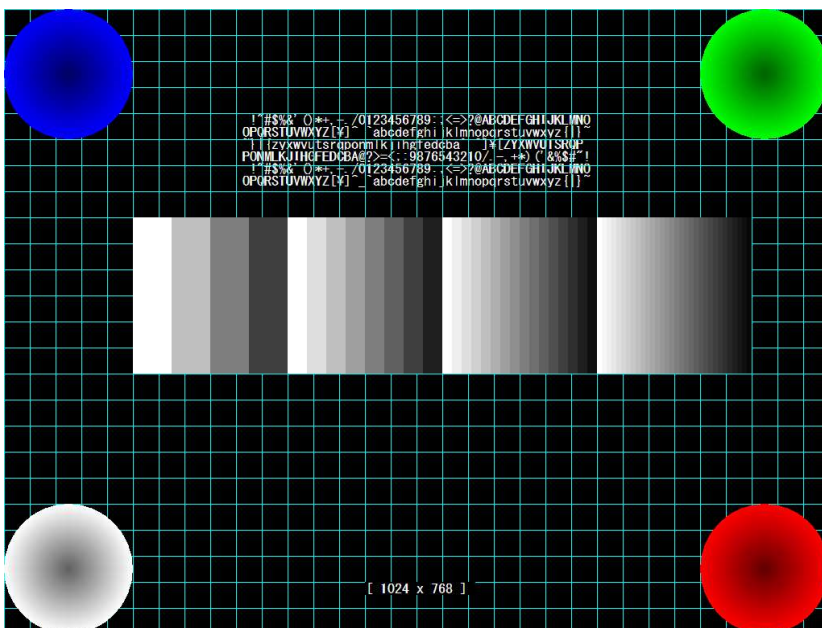
Before describing how to display each element on the screen, how the interval of the vertical lines and the horizontal lines derived will be explained.

As you see this figure, the vertical lines and horizontal lines are drawn with equal intervals.

Additionally, the vertical and horizontal intervals are identical. It means that every grid made by two pair of the adjacent vertical and horizontal lines is a square.

The interval's value or the grid side's length, which is referred as "Z" in this section 4-10, is calculated as follows.

"Z" is calculated based on the Greatest Common Measure (GCM) of the Full screen's width and height.

Suppose that X = Full screen's width, Y = Full screen's height and "z" is the GCM of X and Y.

Hence,

    z = GCM(X, Y);   // z is calculated by Euclidean algorithm for GCM.

Usually, as "z" is a large integer value, it will be adjusted by the following logic to get a factor of "z" that is approximately equal to X/40. The factor will be defined as "Z".

```
    z = GCM(X, Y);                    // X = Full screen's width, Y = Full screen's height.
for (d = 2; d<= z; d++)
 {
      if (z % d == 0)
      { // "z" is dividable by "d"
      z = z / d;
      if (X<= 1000) {if (z <= 25)break;}
      else if (X<= 2000) {if (z <= 50)break; }
      else if (X<= 3000) {if (z <= 75)break; }
      else if (X<= 4000) {if (z <= 100)break;}
      else if (X<= 5000) {if (z <= 125)break;}
      else if (X<= 6000) {if (z <= 150)break; }
      else if (X<= 7000) {if (z <= 175)break;}
      else {if (z <= 200)break;}

          d = 1; // to find the next factor of "z
      }
      }
```

Z = z;   // "Z" will be the interval for both of the vertical and horizontal lines

            // In case that z=GCM(X, Y) is a prime number, Z = GCM(X, Y), too.

Note for this logic

The logic to define "Z" above does not seem to be very good because "z" is always divided by the smallest factor.

Although the logic can be acceptable for a while as long as there is no problem with the target PCs for this time, it is better to modify the logic sometime in future as follows for example:

    First, factorize "z" into prime factors:
        $z = S_1{}^{t_1}*S_2{}^{t_2}*....*S_n{}^{t_n}$ where $S_1, S_2, ..., S_n$ are prime numbers with $S_1 < S_2 < .... < S_n$ and $0 < t_1, t_2, ... t_n$

Next, based on the factorization, calculate all factors of "z" and choose the one that is the nearest to X/40. The one will be defined as "Z".

Additionally as commented in the logic above, it might be better to consider the case that z=GCM(X, Y) is a prime number.

Another Important Note: If a new PC is added as a target, check its screen resolution out.

Usually, the value "Z" derived from z = GCM(X, Y) is large enough.
However, if "z" itself is too small, we have no choice but to use "z" as "Z".
For example, when the screen resolution is 1366 x 768, GCM (1366, 786) =2 that is too small.
If you draw the vertical and horizontal lines with the very small interval, no other graphics components can be seen.
After checking the target PC's screen resolutions, it was found that this happens only when the screen resolution is 1366 x 768.
Therefore, the work around, in case of the resolution 1366x768, WPETD treats it as 1280x768 where GCM (1280, 768) = 256 that is large enough, has been taken.
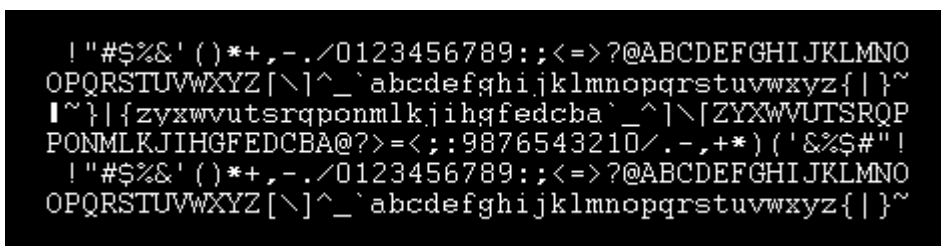
Regarding the target PCs, refer "1. Outline".
If a new PC is added in the target PCs, you must check its screen resolution for this thing.

Drawing procedure

(1) Fill the full screen with black "RGB (0, 0, 0)"color.
(2) Draw texts as follows:

Draw 48 1byte-chracters a line as follows:

Font = Courier, standard (non-bold, non-italic), Fixed pitch, Width = 9, Height = 16,
Character color = White RGB (255, 255, 255), Background color = Black RGB (0, 0, 0)

- 1st line: Position (X/2-9*24, 4*Z), 48 characters
  0x20 (Space), 0x21('!'), ... up to 0x4F ('O')

- 2nd line: Position (X/2-9*24, 4*Z + 15), 48 characters
  0x4F ('O'), 0x50 ('P'), ... up to 0x7E ('~');

- 3rd line: Position (X/2-9*24, 4*Z + 30), 48 characters
  0x7F, 0x7E ('~'), ... down to 0x50 ('P')

- 4th line: Position (X/2-9*24, 4*Z + 45), 48 characters
  0x50 ('P'), 0x4F ('O'), ... down to 0x21('!')

- 5th line: Position (X/2-9*24, 4*Z + 60), 48 characters
  0x20 (Space), 0x21('!'), ... up to 0x4F ('O')

- 6th line: Position (X/2-9*24, 4*Z + 75), 48 characters
    0x4F ('O'), 0x50 ('P'), ... up to 0x7E ('~')

(3) Vertical lines are drawn then Horizontal lines.
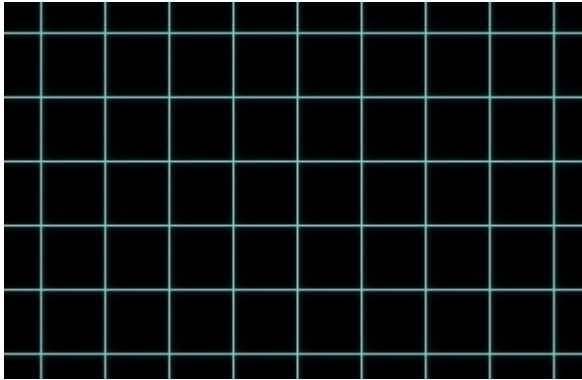
As described above, the intervals of vertical lines and horizontal lines are identical "Z".

All grids made by adjacent vertical lines and horizontal lines are congruent squares.

(4) Gradational colored circles are drawn at each corner as the following order:
    Blue circle at the upper left corner
    Green circle at the upper right corner
    Red circle at the lower right corner
    White circle at the lower left corner

  For the blue circle, it is drawn gradually smaller and less brightly as follows:

        across = diagram of the circle = 5*Z;

        (x1, y1) = (0, 0); , (x2, y2) = (across, across);

        blue = 255;   ..... (A)

        for (I = across/2; I > 1; I--)

        {

            Pen_Color = RGB (0, 0, blue--);   ....(B)

            Brush_Color = RGB (0, 0, blue--);   ....(C)

            Ellipse(x1++, y1++, x2--, y2--);

        }

  (0, 0)
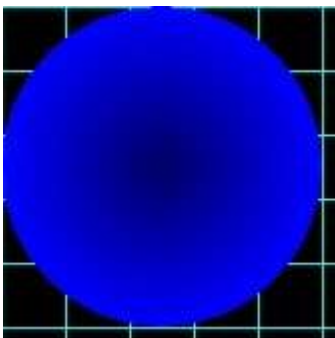
(across, across)

For other color circled circles, the followings are for "(A)", "(B)" and "(C)" besides the positions:

Green : green = 255; , Pen_Color = RGB(0, green--, 0); , Brush_Color = RGB(0, green--, 0);

Red   : red = 255; , Pen_Color = RGB(red--, 0, 0); , Brush_Color = RGB(red--, 0, 0);

White: red = green = blue = 255; ,

        Pen_Color = RGB(red--, green--, blue--); , Brush_Color = RGB(red--, green--, blue--);

(5) White gradational rectangles are drown

4-level gradational rectangle is drawn first followed by 8-level, 16-level and 32-level rectangles.

(5*Z, 8*Z)   (13*Z, 8*Z)   (21*Z, 8*Z)   (29*Z, 8*Z)

(5*Z, 14*Z)   (13*Z, 14*Z)   (21*Z, 14*Z)   (29*Z, 14*Z)

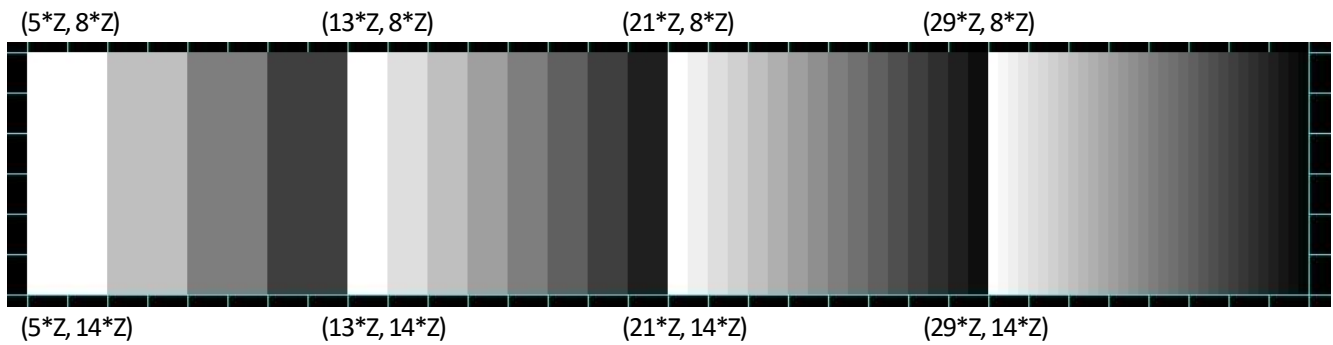| 4-level gradational rectangle:	8-level gradational rectangle:	16-level gradational rectangle:	32-level gradational rectangle:
- Position: (5*Z, 8*Z)	- Position: (13*Z, 8*Z)	- Position: (21*Z, 8*Z)	- Position: (29*Z, 8*Z)
- Width: 8*Z, Height: 6*Z	- Width: 8Z, Height: 6*Z	- Width: 8*Z, Height: 6*Z	- Width: 8*Z, Height: 6*Z
- Co-rectangle width: 2*Z	- Co-rectangle width: Z	- Co-rectangle width: Z/2	- Co-rectangle width: Z/4
- Gradation: 4 levels	- Gradation: 8 levels	- Gradation: 16 levels	- Gradation: 32 levels
red=green=blue= 255-64*L	red=green=blue= 255-32*L	red=green=blue= 255-16*L	red=green=blue= 255-8*L
where L = 0,1,2,3	where L = 0,1,2,..., 7	where L = 0,1,2,..., 15	where L = 0,1,2,..., 31
0: RGB(255,255,255)	0: RGB(255,255,255)	0: RGB(255,255,255)	0: RGB(255,255,255)
1: RGB(191,191,191)	1: RGB(223, 223, 223)	1: RGB(239, 239, 239)	1: RGB(247, 247, 247)
2: RGB(127,127,127)	2: RGB(191, 191, 191)	2: RGB(223, 223, 223)	2: RGB(239, 239, 239)
3: RGB(63, 63, 63)	3: RGB(159, 159, 159)	3: RGB(207, 207, 207)	3: RGB(231, 231, 231)
	4: RGB(127, 127, 127)	4: RGB(191, 191, 191)	4: RGB(223, 223, 223)
	5: RGB(95, 95, 95)	:	:
	6: RGB(63, 63, 63)	: -16, -16, -16	: -8, -8, -8
	7: RGB(31, 31, 31)	:	:
		14: RGB(31, 31, 31)	30: RGB(15, 15, 15)
		15: RGB(15, 15, 15)	31: RGB(7, 7, 7)

4-2-9 Timer Test

1) Test contents

Adjust internal time to verify timer accuracy after a year.

In the simple test mode, the test is carried out at intervals of 5 seconds before and after 10 seconds in advanced test mode.
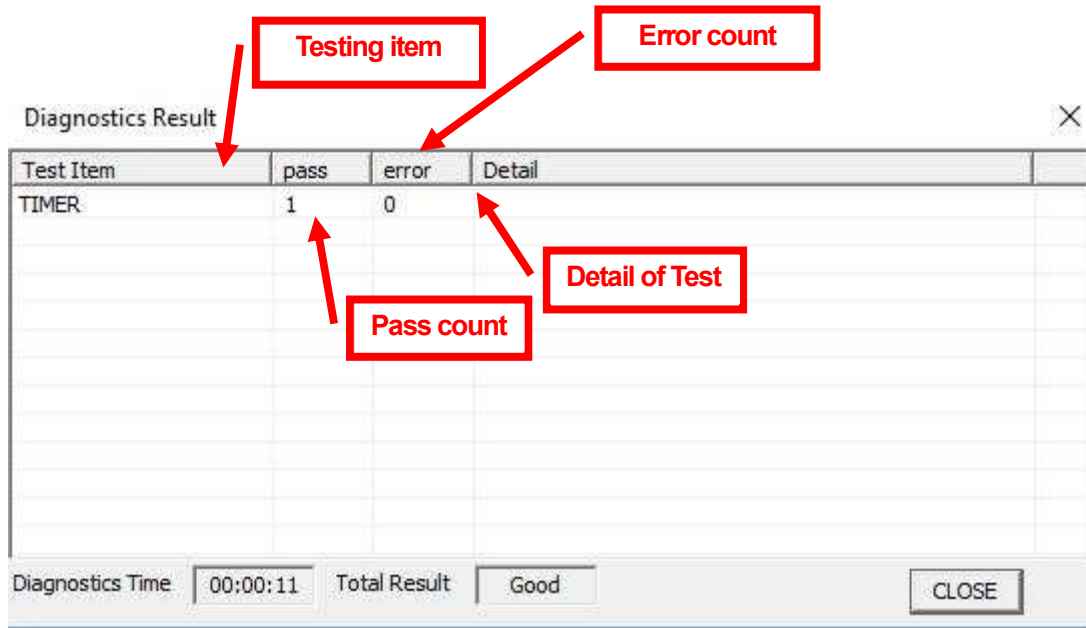
It verifies that there is no deviation between the estimated time of calculation and the actual acquisition time.

2) Test screen

End time

3) Test result

Testing item

Error count

Detail of Test
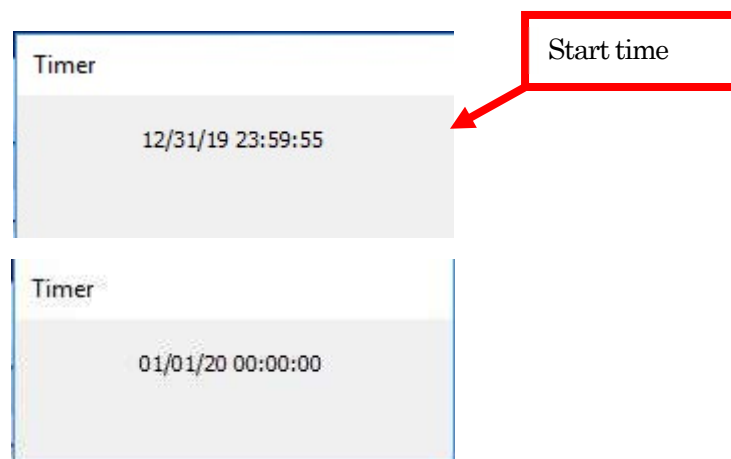
Pass count

5. Appendix

5-1 Log file samples

Log files includes text log and html log, and they will be saved under "¥Logs" folder of WPETD tool's USB storage root.

And the log file names will be format as:

<OK or NG>.<SN>.<date time>petd.<html/log>

5-1-1 Text log file sample

```
[System Information]
Manufacturer=Dynabook Inc.
Product Name=SATELLITE PRO E10-S
Part Number=PYT00E-AAA14
Serial Number=21172643H
UUID=03000200-0400-0500-0006-000700080009
BIOS Version=1.30
BIOS OEMString=PYT00E-AAA14,R20700H2Z00#B
BIOS GSWString=GSW:1000000000
DPK Injected=No
CPU Name0=Intel(R) Celeron(R) N4020 CPU @ 1.10GHz
CPU Clock0=Current Clock=1101 MHz Max Clock=1101 MHz
CPU Socket0=SOCKET 0
CPU Description0=Intel64 Family 6 Model 122 Stepping 8
L2Cache0=4096 KB
```

Physical Memory=8192 MB

Memory Device0=Locator=A1_DIMM0 Size=8192 MB

Network0=Realtek PCIe GbE Family Controller

MAC Address0=50:A1:32:01:7C:30

USB Flash Disk0=ADATA USB Flash Drive USB Device Capacity=7.77   GByte

SCSI HDD/SSD0=Generic MMC64G Capacity=62.81   GByte

Key Board0=Standard PS/2 Keyboard

Mouse0=Microsoft PS/2 Mouse(Touchpad)

Mouse1=HID-compliant mouse

C:¥=DriveType=HDD/SSD VolumeName=TIH0566900A FreeSize= 34.00 GB UseSize=27.48 GB

D:¥=DriveType=USB Flash VolumeName=BIOS_DMI_UP FreeSize= 6.66 GB UseSize=1.10 GB

X:¥=DriveType=OTHER VolumeName=Boot FreeSize= 513.76 MB UseSize=2.55 MB

[STATISTIC]

T&D Version=1.00 (for Taikan10)

Start Time=2021/05/12 04:52:51

Finish Time=2021/05/12 04:55:52

Diagnostics Time=00:02:59

test mode=Multitask

limit pass=1

CPU stress=No

Set Battery Off At The End=Yes

Test Result=Good

[HDD PHYSICAL]

pass count=13

error count=0

test mode=Detail

[HDD LOGICAL]

pass count=10

error count=0

test mode=Detail

[USB STORAGE]

pass count=9

error count=0

test mode=Detail

[CPU]

pass count=9

error count=0

test mode=Detail

[GRAPHICAL DISPLAY]

pass count=1

error count=0

test mode=Detail

[TIMER]

pass count=5

error count=0

test mode=Detail

[KEYBOARD]

pass count=1

error count=0

test mode=Detail

[TOUCH PAD]

pass count=1

error count=0

test mode=Detail

[BATTERY CAPACITY]

pass count=1

error count=0

test mode=Detail

[BATTERY OFF]

pass count=1

error count=0

test mode=Detail

Note: About Start Time, Finish Time and Diagnostics Time, please see below.

```
       :
   [STATISTIC]
       :
   Start Time=2019/03/24 23:45:07
   Finish Time=2019/03/24 23:46:55
   Diagnostics Time=00:01:44
       :
       :
```

As you see in the example above, "Finish Time - Start Time" does not equal to "Diagnostics Time" usually.

Start Time: The time when you push the [START] button.

   Finish Time: The time when all tests you selected finish

Diagnostic Time: The time shown at the top-right on the Diagnostics dialog.

Diagnostic time starts when the first test starts and ends when all selected tests finish.

There is some time interval between being pushed the [START] button and the first test starts.

That is why the value "End Time - Start Time" is usually bigger than "Diagnostic Time".

5-1-2 Html log file sample

Test report

2021/04/25

dynabook

1.System Information

System Name	Information
Manufacturer	Dynabook Inc.
Product Name	dynabook xxx
Part Number	999999999111
Serial Number	999999999
UUID	03000200-0400-0500-0006-000700080009
BIOS Version	1.46
BIOS OEMString	PE10NNN4M27DD2.TIH0378600A@5#4
BIOS GSWString	GSW:1000000000
DPK Injected	No
##### CPU #####	
CPU Name0	Intel(R) Core(TM) i7-8700 CPU @ 3.20GHz
CPU Clock0	Current Clock=3192 MHz Max Clock=3192 MHz
CPU Socket0	U3E1
CPU Descripsion0	Intel64 Family 6 Model 158 Stepping 10
L2 Cache0	1536 KB
##### Memory #####	
Memory Device0	Locator=ChannelA-DIMM0 Size=16384 MB
Memory Device1	Locator=ChannelB-DIMM0 Size=16384 MB
##### Network #####	
NetWork0	ASIX AX88178 USB2.0 to Gigabit Ethernet Adapter
MAC address0	00:0E:C6:88:25:44
NetWork1	WAN Miniport (IP)
MAC address1	6A:88:20:52:41:53
NetWork2	WAN Miniport (IPv6)
MAC address2	6C:24:20:52:41:53
NetWork3	WAN Miniport (Network Monitor)
MAC address3	6C:E9:20:52:41:53
NetWork4	Realtek PCIe GBE Family Controller
MAC address4	E8:9D:87:13:F0:34
##### IDE HDD/SSD device #####	
IDE HDD/SSD0	TOSHIBA MQ01ABD100 Capacity=1.00 TByte
IDE HDD/SSD1	No Device
##### SCSI HDD/SSD device #####	
SCSI HDD/SSD0	SAMSUNG MZVLB512HAJQ-00000 Capacity=512.11 GByte
SCSI HDD/SSD1	No Device
##### USB Flash Device #####	
USB Flash Disk0	No Device
##### SD Card Device #####	
SD Card Disk0	No Device
##### ODD Device #####	
ODD0	HL-DT-ST DVDROM DUD0N MediaType=DVD-ROM
##### Others Device #####	
Key Board0	USB Input Device
Mouse0	USB Input Device
Other Disk0	No Device
##### Drive Information #####	
C:¥	DriveType=HDD/SSD VolumeName=--- FreeSize= 303.13 GB UseSize189.31 GB
D:¥	DriveType=HDD/SSD VolumeName=DEV_TI80142600A FreeSize= 502.31 GB UseSize497.89 GB
E:¥	DriveType=HDD/SSD VolumeName=EFI_PAR FreeSize= 1.04 GB UseSize24.58 KB
F:¥	DriveType=HDD/SSD VolumeName=WINPETD FreeSize= 2.09 GB UseSize24.58 KB
G:¥	DriveType=ODD VolumeName=-- FreeSize=-- UseSize--

2.Test conditions

Item Name	Information
T&D Version	1.00 (for Taikan10)
Test mode	Multitask
CPU Stress	No
Limit pass count	1
Set Battery Off At The End	No

3.Test Result

Test Name	Test Information	Pass Count	Error Count	Simple Mode	Detail Mode	Heart Run	Comment
HDD PHYSICAL	Hard disk physical Read test	0000	0000	★	★	-	
HDD LOGICAL	Hard disk logical Read test	0001	0000	★	●	-	
MEMORY	Memory allocate Read/Write /Compare	0000	0000	★	★	-	
USB STORAGE	Usb flash disk file access test	0000	0000	★	★	-	
SD STORAGE	SD card disk file access test	0000	0000	★	★	-	
ODD	ODD data file Read/Compare	0000	0000	★	★	-	
WIRED LAN	Loopback test	0000	0000	★	★	-	
CPU	CPU Operation test	0000	0000	★	★	-	
GRAPHICAL DISPLAY	Gradation test	0000	0000	★	★	-	
FDD	Floppy disk file access test	0000	0000	★	★	-	
1394 STORAGE	IEEE1394 disk file access test	0000	0000	★	★	-	
TIMER	Timer clock test	0000	0000	★	★	-	
KEYBOARD	Keyboard push test	0000	0000	★	★	-	
LED	LED test	0000	0000	★	★	-	
CPU FAN	CPU fan test	0000	0000	★	★	-	
TOUCH PAD	Touch pad test	0000	0000	★	★	-	
BATTERY CAPACITY	Battery capacity test	0000	0000	★	★	-	
BATTERY OFF	Battery off setting	0000	0000	★	★	-	

Over-all judgement   ●

●Not problem   ▲Conditioned pass   ★Not prepared

■reservation   ◆reservation

5-2 Keybaord layouts

5-2-1 Taikan_UK

5-2-2 Taikan_US

Chapter 3　　　　Contents

1   Overview

This document describes the specification of the Taikan Maintenance Tool, which is a maintenance tool for Taikan series, mainly for flashing/updating BIOS and DMI.

1.1 Supported Functions

Function Name	Function Contents	Note
BIOS Ver. & DMI info display	Display current PC's BIOS Ver. & DMI info	The BIOS Ver. & DMI info is displayed automatically.
BIOS Update (when motherboard is replaced)	Flash BIOS	After update BIOS, the DMI data need to be updated.
DMI Update	Update DMI	
BIOS Update (when motherboard is NOT replaced)	Update BIOS	

1.2 Target Models

Target Model	Note
Emdoor Taikan10	21A model

1.3 Tool History & Supported FW Versions

Tool Ver.	BIOS Ver.	EC Ver.	Note
1.00	1.40	N/A	New release for Taikan10.

2   Data File used for Maintenance

2.1 Writeable BIOS FW File

2.1.1   File Path & Purpose

The "TAIKAN10_GLK_V*.**_********.bin" (V*.** is BIOS version) file in "\data" folder is used as the writeable BIOS FW file for <u>BIOS Update (when motherboard is replaced)</u> and also for <u>BIOS Update (when motherboard is NOT replaced)</u>.

2.1.2   File Name Format

Regular expression (file names do not match will be ignored): "TAIKAN10_GLK_V[\d\.]+_.+\.bin"

2.1.3   File Update

About How to update BIOS file (to use a BIOS file of the newest one for updating), you can simply copy the new BIOS file (TAIKAN10_GLK_V*.**_********.bin) into \data folder. This tool can auto select & use the newest one that applicable for target machine (Taikan10), and you can also remove the old one if you want.

2.1.4   File Select & Use

This tool can automatically select & use the latest BIOS FW file, you can also remove the old one if you want.

If there are more than one of "TAIKAN10_GLK_V*.**_********.bin" files, the latest one is selected by below rule:

1.   Select the one that has the maximum version (V*.** in file name) from all of the "TAIKAN10_GLK_V*.**_********.bin" files.

> **Note:**
> If "TAIKAN10_GLK_V*.**_********.bin" file has a ROM GUID that does not matched to the running PC (BIOS ROM unmatched to the running PC, this is not likely, like you use a BIOS ROM file of other product and rename it as "TAIKAN10_GLK_V*.**_********.bin"), it will be shown like below:
> (It is by comparing the ROM GUID that read from machine and the one that read from ROM file)

```
Reading this machine's BIOS ROM GUID ...
This machine's BIOS ROM GUID = ee86c491-babf-459c-8edc32ba16f501f2
Current X:\TAIKAN10_GLK_V1.30_20210423.bin file's ROM ID = 3BAPS08, ROM GUID =ee86c491-babf-459c-8edc32ba16f501f2
Current  X:\TAIKAN10_GLK_V0.20_20210423.bin  file's  ROM  ID  =  CN16SV10,  ROM  GUID  =721266be-391d-4b6d-
b910ce9c9b9034f0

Current X:\TAIKAN10_GLK_V0.20_20210423.bin file's ROM GUID does NOT match this machine's BIOS ROM GUID!

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
X               No target (applicable) BIOS found at \data folder!          X
X                   Please check machine is target or not!                  X
X                                                                           X
X                       Hit any key to shutdown.                            X
```

3   Maintenance Functions

3.1 BIOS Ver. & DMI Info Display

3.1.1   Function Description

BIOS version & DMI info of the PC will be displayed on the initial (WinPE booted up) screen like below, above the maintenance menu:

```
This PC's info:
 Name                         Information
 -----------------------      ------------------------------------------------
 BIOS version                 "1.30"
 System manufacture           "Dynabook Inc."
 System product               "SATELLITE PRO E10-S"
 System version               "PYTPPE-AAA14"
 System Serial number         "21172643H"
 System UUID                  "0002000300040005000600070008009h"
 System SKU number            "PYT00E"
 OEM String                   "PTY00E-AAA14,R20700H2Z00#B"
 GSW String                   "GSW:1000000000"
 System date & time            2021/05/10 03:37
 ****************************************************************************
 * Replacing the motherboard                                               *
 * 1 – BIOS Update for DBIEMD00 (Using BIOS Ver.: 1.30)                    *
 * 2 – DMI Update                                                          *
 * ---------------------------------------------------------------------- *
 * Not Replacing the motherboard                                           *
 * 3 – BIOS Update for DBIEMD00 (Using BIOS Ver.: 1.30)                    *
 * ---------------------------------------------------------------------- *
 * 40 – Reboot & Enter BIOS Setup                                          *
 * 50 – Shutdown                                                           *
 ********************************************* Ver. 1.00 (for Taikan10) **********
 Input Number & Press [Enter] key:
```

> **Note:** In above menu 1 and 3, "DBIEMD00" is the value read from "Win32_BaseBoard.Product", you can check it by "wmic baseboard get product" command, it will be "DBIEMD00" for Taikan10 (if this value is set incorrectly, it will appeared as an issue occurred as described in "Not Support System").

3.1.2   Display Items

Name	Information
BIOS version	BIOS version in Type 0
System manufacture	System manufacture in Type 1
System product	System product in Type 1
System version	System version in Type 1
System Serial number	System Serial number in Type 1
System UUID	System UUID in Type 1
System SKU number	System SKU number in Type 1
OEM string	OEM string in Type 11
GSW string	GSW string in Type 12
System date & time	The PC's date time

3.1.3 Maintenance Tips for BIOS Ver. & DMI Info

When the BIOS version of the PC differs from the BIOS that can be rewritten (writeable BIOS Ver. is shown in the menu line) by this tool, or when DMI info is not written (in case of "Default string" or "To Be Filled"), the corresponding portion will be displayed in red like below:

```
This PC's info:
 Name                         Information
 ------------------------     -------------------------------------------------
 BIOS version                 "1.10" <-- Please Update!
 System manufacture           "Dynabook Inc."
 System product               "Default String"
 System version               "Default String"
 System Serial number         "Default String"
 System UUID                  "000200030004000500060007000800009h"
 System SKU number            "Default String"
 OEM String                   "Default String"
 GSW String                   "Default String"
 System date & time            2021/05/10 03:37
```

3.2 BIOS Update (when motherboard is replaced)

3.2.1 Function Description

When motherboard is replaced for maintenance parts, BIOS & DMI info needs to be updated. If you replaced the motherboard, please use this menu to flash the BIOS FW first.

> **Note:**
> a. When motherboard is replaced, BIOS setting value is standard/defualt value. Make a note of the BIOS setting before replacing the motherboard.
> b. After BIOS updated, please update DMI info as described in next section "DMI Update".

3.2.2 Update Procedure

1) Startup the Taikan Maintenance Tool, on the initial screen, input **[1]** and press the **[Enter]** key.
   (Below "BIOS Ver.: 1.30" indicated current menu's writeable BIOS selected by this tool)

```
 * Replacing the motherboard                                              *
 * 1 – BIOS Update for DBIEMD00 (Using BIOS Ver.: 1.30)                   *
 * 2 – DMI Update                                                         *
```

2) The following confirmation message will be displayed, input **[y]** and press the **[Enter]** key to continue BIOS Update.
   (Input **[n]** and press the **[Enter]** key to return to the initial screen if you do not want to update BIOS.)

```
 **************************************************************************
 *                       BIOS update (to 1.30) OK?                       *
 * Note:                                                                 *
 * - Don't interrupt/press Power(or un-plug AC) when it is being updated. *
 * - Don't remove/plug-in external devices when it is being updated.      *
 **************************************************************************
 Input [y] or [n] & Press [Enter] key:
```

3) BIOS update is started like below.

```
Intel (R) Flash Programming Tool. Version:  4.0.0.1239
Copyright (c) 2007 - 2017, Intel Corporation. All rights reserved.
Reading HSFSTS register... Flash Descriptor: Valid

        --- Flash Devices Found ---
        MX25U6473F       ID:0xC22537     Size: 8192KB (65536Kb)


- Reading Flash [0x0800000]  8192KB of  8192KB - 100 percent complete.
- Erasing Flash Block [0x003000] - 100 percent complete.
- Programming Flash [0x0003000]     4KB of     4KB - 100 percent complete.
- Erasing Flash Block [0x07E000] - 100 percent complete.
- Programming Flash [0x007E000]     4KB of     4KB - 100 percent complete.
- Erasing Flash Block [0x0A6000] - 100 percent complete.
- Programming Flash [0x00A6000]     4KB of     4KB - 100 percent complete.
- Erasing Flash Block [0x11A000] - 100 percent complete.
- Programming Flash [0x011A000]     4KB of     4KB - 100 percent complete.
- Erasing Flash Block [0x126000] - 100 percent complete.
- Programming Flash [0x0126000]     4KB of     4KB - 100 percent complete.
- Erasing Flash Block [0x190000] - 100 percent complete.
- Programming Flash [0x0190000]   196KB of   196KB - 100 percent complete.
- Erasing Flash Block [0x23C000] - 100 percent complete.
- Programming Flash [0x023C000]   192KB of   192KB - 100 percent complete.
- Erasing Flash Block [0x344000] - 100 percent complete.
- Programming Flash [0x0344000]     8KB of     8KB - 100 percent complete.
- Erasing Flash Block [0x365000] - 100 percent complete.
- Programming Flash [0x0365000]     4KB of     4KB - 100 percent complete.
- Erasing Flash Block [0x67E000] - 100 percent complete.
- Programming Flash [0x067E000]  2924KB of  2924KB - 100 percent complete.
- Erasing Flash Block [0x681000] - 100 percent complete.
- Programming Flash [0x0681000]     8KB of     8KB - 100 percent complete.
- Erasing Flash Block [0x683000] - 100 percent complete.
- Programming Flash [0x0683000]     4KB of     4KB - 100 percent complete.
- Erasing Flash Block [0x685000] - 100 percent complete.
- Programming Flash [0x0685000]     4KB of     4KB - 100 percent complete.
- Erasing Flash Block [0x687000] - 100 percent complete.
- Programming Flash [0x0687000]     4KB of     4KB - 100 percent complete.
- Erasing Flash Block [0x70E000] - 100 percent complete.
- Programming Flash [0x070E000]   532KB of   532KB - 100 percent complete.
- Erasing Flash Block [0x779000] - 100 percent complete.
- Programming Flash [0x0779000]   424KB of   424KB - 100 percent complete.
- Verifying Flash [0x0800000]  8192KB of  8192KB - 100 percent complete.
RESULT: The data is identical.

FPT Operation Successful.

Intel (R) Flash Programming Tool. Version:  4.0.0.1239
Copyright (c) 2007 - 2017, Intel Corporation. All rights reserved.

FPT Operation Successful.
```

4) Once update is completed, the system will be automatically rebooted.
   (Next, please remember to update DMI info if you replaced the motherboard.

3.3 DMI Update

3.2.3   Function Description

When motherboard is replaced for maintenance parts, BIOS & DMI info needs to be updated. After BIOS updated, please use this menu to update DMI info.

> **Note:**
> a. This function will try to write Manufacture Name as "Dynabook Inc." first directly in case of it is not (for the first time). And if current UUID is invalid (all 0 or 1), it will generate a System UUID automatically and write it to the PC.
> b. When the BIOS version of the PC differs from the BIOS that can be rewritten (writeable BIOS Ver. is shown in the menu line) by this tool, DMI update function cannot be proceed and message will be displayed like below:
> (Please press any key to return to the initial screen, update BIOS first then update DMI info.)

```
BIOS is not target version!

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
X                        BIOS is not updated yet!                     X
X                        Please update BIOS first!                    X
X                                                                     X
X                        Hit any key to main menu.                    X
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

3.2.4   Update Procedure

1) <u>Startup the Taikan Maintenance Tool</u>, on the initial screen, input **[2]** and press the **[Enter]** key.

   (The DMI update program will be executed.)

```
* Replacing the motherboard                                          *
* 1 – BIOS Update for DBIEMD00 (Using BIOS Ver.: 1.30)               *
* 2 – DMI Update                                                     *
```

2) The program can update Product Name/Version Number/Serial Number/SKU Number/OEM String/GSW String as shown like below.

```
   dynabook DMI Information data maintenance program Ver. 1.0.1.0

Manufacturer Name         : Dynabook Inc.
Product Name              : SATELLITE PRO E10-S
Version Number            : PYT00E-AAA14
Serial Number             : 21172643H
SKU Number                : PYT00E
OEM String                : PYT00E-AAA14,R20700H2Z00#B
GSW String                : GSW:1000000000
-------------------------------------------------------------------

New Product Name          : _
New Version Number        :
New Serial Number         :
New SKU Number            :
New OEM String            :
New GSW String            :
```

3) Enter the new DMI data that you wish to update, it will show like below when updated successfully.

```
    dynabook DMI Information data maintenance program Ver. 1.0.1.0

Manufacturer Name         : Dynabook Inc.
Product Name              : SATELLITE PRO E10-S
Version Number            : PYT00E-AAA14
Serial Number             : 21172643H
SKU Number                : PYT00E
OEM String                : PYT00E-AAA14,R20700H2Z00#B
GSW String                : GSW:1000000000
---------------------------------------------------------------------
5/11/2021 12:22:49 AM DMI Data SATELLITE PRO E10-S written successfully
New Product Name          : SATELLITE PRO E10-S
New Version Number        :
New Serial Number         :
New SKU Number            :
New OEM String            :
New GSW String            :
```

4) And you can skip updating current DMI data by pressing **[Enter]** directly like below:
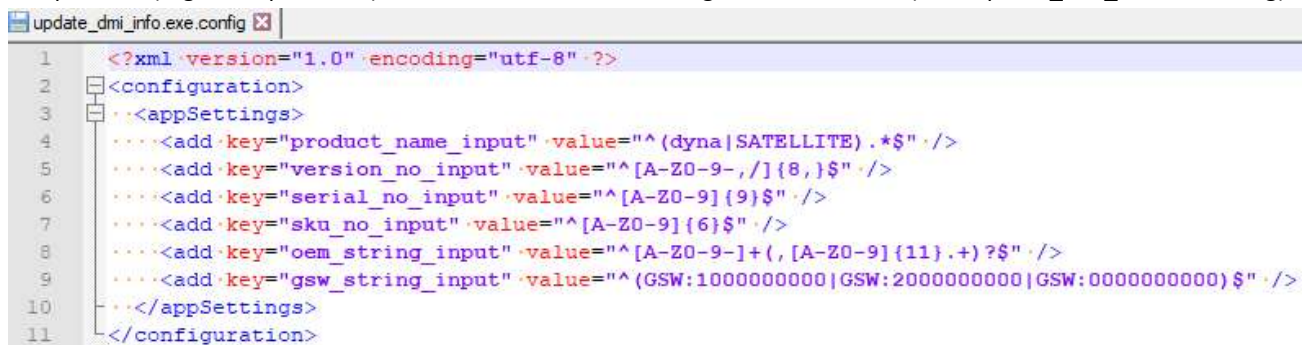
```
    dynabook DMI Information data maintenance program Ver. 1.0.1.0

Manufacturer Name         : Dynabook Inc.
Product Name              : SATELLITE PRO E10-S
Version Number            : PYT00E-AAA14
Serial Number             : 21172643H
SKU Number                : PYT00E
OEM String                : PYT00E-AAA14,R20700H2Z00#B
GSW String                : GSW:1000000000
---------------------------------------------------------------------
5/11/2021 12:24:33 AM Skip updating DMI Data
New Product Name          : SATELLITE PRO E10-S
New Version Number        :
New Serial Number         : _
New SKU Number            :
New OEM String            :
New GSW String            :
```

5) If you enter a DMI data that does not match the pattern (regular expression), it will show prompt like below.

```
    dynabook DMI Information data maintenance program Ver. 1.0.1.0

Manufacturer Name          : Dynabook Inc.
Product Name               : SATELLITE PRO E10-S
Version Number             : PYT00E-AAA14
Serial Number              : 21172643H
SKU Number                 : PYT00E
OEM String                 : PYT00E-AAA14,R20700H2Z00#B
GSW String                 : GSW:1000000000
-------------------------------------------------------------------
5/11/2021 12:25:12 AM Not pattern ^[A-Z0-9]{9}$
New Product Name           : SATELLITE PRO E10-S
New Version Number         :
New Serial Number          : XX
New SKU Number             :
New OEM String             :
New GSW String             :
```

6) The patterns (regular expressions) for the DMI data can be configured in below file (\bin\update_dmi_info.exe.config).

```xml
update_dmi_info.exe.config
1    <?xml version="1.0" encoding="utf-8" ?>
2    <configuration>
3      <appSettings>
4        <add key="product_name_input" value="^(dyna|SATELLITE).*$" />
5        <add key="version_no_input" value="^[A-Z0-9-,/]{8,}$" />
6        <add key="serial_no_input" value="^[A-Z0-9]{9}$" />
7        <add key="sku_no_input" value="^[A-Z0-9]{6}$" />
8        <add key="oem_string_input" value="^[A-Z0-9-]+(,[A-Z0-9]{11}.+)?$" />
9        <add key="gsw_string_input" value="^(GSW:1000000000|GSW:2000000000|GSW:0000000000)$" />
10     </appSettings>
11   </configuration>
```

3.4 BIOS Update (when motherboard is NOT replaced)

3.2.5   Function Description

If you do not replace the motherboard, please use this menu to update the BIOS.

> **Note:** DMI info and OA 3.0 key will be preserved (won't be initialized).

3.2.6   Update Procedure

1) <u>Startup the Taikan Maintenance Tool</u>, on the initial screen, input **[3]** and press the **[Enter]** key.

   (Below "BIOS Ver.: 1.30" indicated current menu's writeable BIOS selected by this tool)

```
* Not Replacing the motherboard                                      *
* 3 – BIOS Update for DBIEMD00 (Using BIOS Ver.: 1.30)               *
```

2) The following confirmation message will be displayed, input **[y]** and press the **[Enter]** key to continue BIOS Update.

   (Input **[n]** and press the **[Enter]** key to return to the initial screen if you do not want to update BIOS.)

```
************************************************************************
*                     BIOS update (to 1.30) OK?                       *
* Note:                                                               *
* - Don't interrupt/press Power(or un-plug AC) when it is being updated. *
* - Don't remove/plug-in external devices when it is being updated.   *
************************************************************************
Input [y] or [n] & Press [Enter] key:
```

3) BIOS update is started.

   (Once the update is completed, press **any** key to reboot the system.)

```
+----------------------------------------------------------------------+
|             AMI Firmware Update Utility v5.12.03.2074                 |
|                          APL Normal Mode                             |
|      Copyright (c) 1985-2019, American Megatrends International LLC.  |
|          All rights reserved. Subject to AMI licensing agreement.    |
+----------------------------------------------------------------------+
 Reading flash ...................... Done
 - System Secure Flash .............. Enabled
 - FFS Checksums .................... Pass
 - Check RomLayout .................. Pass
 Loading File To Verify Memory ...... Done
 Erasing Main Block ................. Done
 Updating Main Block ................ Done
 Verifying Main Block ............... Done
 Erasing NVRAM Block ................ Done
 Updating NVRAM Block ............... Done
 Verifying NVRAM Block .............. Done
 Erasing RomHole Block .............. Done
 Updating RomHole Block ............. Done
 Verifying RomHole Block ............ Done

 Process completed.
 Press any key to continue . . .
```

3.5 Others

3.5.1   Reboot into BIOS

On the initial screen, input **[40]** and press the **[Enter]** key to reboot & enter BIOS Setup.

(You can use this menu handily to reboot into BIOS & to do some confirmation or BIOS settings if you want.)

```
* 40 – Reboot & Enter BIOS Setup                                            *
* 50 – Shutdown                                                             *
```

3.5.2   Shutdown

On the initial screen, input **[50]** and press the **[Enter]** key to shut down the system.

```
* 40 – Reboot & Enter BIOS Setup                                            *
* 50 – Shutdown                                                             *
```

4   Appendix

4.1 How to create a bootable Taikan Maintenance Tool

4.1.1   Create Procedure

1) Prepare a USB flash media and insert it to a PC that running Windows 10.

2) Search cmd.exe (Command Prompt), right-click on it and select [Run as administrator].

3) Enter diskpart, and then enter below commands:

> **Note:** Please make sure you format the correct drive (select a correct disk number of the USB media in below step 2), because all the data of that drive will be lost!

1.	List disk	// Check the disk number for the USB media inserted.
2.	Select disk **2**	// Select the USB media (number **2** in this case as an example).
3.	Clean	// Clean the partition table of USB media
4.	Convert gpt	// Convert the disk to GPT format.
5.	Create partition primary	// Create a primary partition.
6.	Format fs=fat32 label=BIOS_DMI_UP quick	// Format it to a FAT32 file system partition
7.	Exit	// Exit the diskpart program.

```
C:\Windows\system32>diskpart

Microsoft DiskPart version 10.0.17763.1

Copyright (C) Microsoft Corporation.
On computer: SCD-LIZC-P01

DISKPART> list disk

  Disk ###  Status         Size     Free     Dyn  Gpt
  --------  -------------  -------  -------  ---  ---
  Disk 0    Online          931 GB      0 B        *
  Disk 1    Online          476 GB  5120 KB        *
  Disk 2    Online         7415 MB  7413 MB        *

DISKPART> sel disk 2   ──▶  Make sure here select the correct USB disk number
                            (Below "clean" command will erase the disk)
Disk 2 is now the selected disk.

DISKPART> clean

DiskPart succeeded in cleaning the disk.

DISKPART> convert gpt

DiskPart successfully converted the selected disk to GPT format.

DISKPART> create partition primary

DiskPart succeeded in creating the specified partition.

DISKPART> format fs=fat32 label=BIOS_DMI_UP quick

  100 percent completed

DiskPart successfully formatted the volume.

DISKPART> exit

Leaving DiskPart...

C:\Windows\system32>
```

4) Mount the Taikan**_Maintenance_Tool_V*.**.iso image to a virtual drive.
   (On windows 10, you can right-click it and select "Mount" menu. Here V*.** is the tool version.)

5) Copy all the image files from the mounted virtual drive to the USB flash media.
   (You can press Ctrl +A to select all, right-click it and "Send to" the USB flash media.)

6) Right-click the drive of USB flash media, select "Eject" menu to get a bootable USB flash media of this tool.

4.2 How to startup the Taikan Maintenance Tool

4.2.1 Startup Procedure

1) Create a bootable USB flash media of the WinPE Maintenance Tool according to the Create Procedure above.

2) Insert the created USB flash media to the target PC that needs maintenance and then turn on the power.

3) After turning on the power, immediately press the **[F12]** key several times to show the boot device selection screen.

4) Select "UEFI: <USB flash media name>" and press the **[Enter]** key.

   (Below "UEFI: ADATA USB Flash Drive 0.00, Partition 1" is the created USB flash media as an example.)
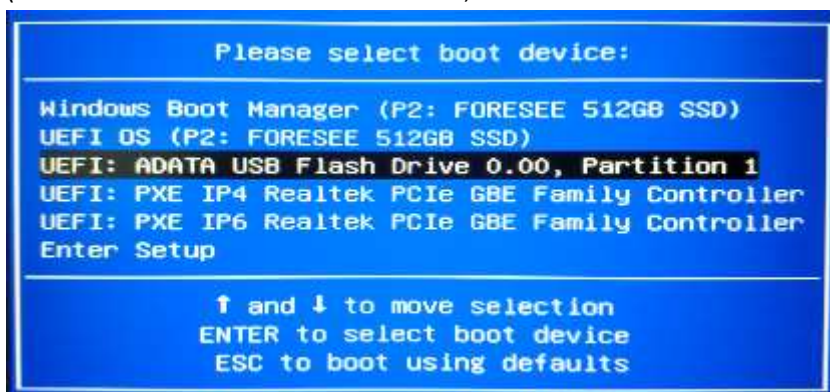
5) The Taikan Maintenance Tool starts up.

6) After WinPE booted up, the initial screen (main menu) is shown like below:

```
This PC's info:
 Name                          Information
 ----------------------        -----------------------------------------------
 BIOS version                  "1.30"
 System manufacture            "Dynabook Inc."
 System product                "SATELLITE PRO E10-S"
 System version                "PYTPPE-AAA14"
 System Serial number          "21172643H"
 System UUID                   "0002000300040005000600070008000

9h"
 System SKU number             "PYT00E"
 OEM String                    "PTY00E-AAA14,R20700H2Z00#B"
 GSW String                    "GSW:1000000000"
 System date & time             2021/05/10 03:37
 ****************************************************************************
 * Replacing the motherboard                                               *
 * 1 – BIOS Update for DBIEMD00 (Using BIOS Ver.: 1.30)                    *
 * 2 – DMI Update                                                          *
 * ---------------------------------------------------------------------- *
 * Not Replacing the motherboard                                          *
 * 3 – BIOS Update for DBIEMD00 (Using BIOS Ver.: 1.30)                    *
 * ---------------------------------------------------------------------- *
 * 40 – Reboot & Enter BIOS Setup                                         *
 * 50 – Shutdown                                                          *
 ****************************************** Ver. 1.00 (for Taikan10) **********
 Input Number & Press [Enter] key:
```

4.3 Issues may occurred

4.3.1   Not Support System

When the maintenance tool boot from a PC that the motherboard is not supported (which is a machine that has no applicable BIOS rom file), it will be displayed like below:

```
Mother board "DBIIP301" is not a target of: ^DBIEMD00$

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
X               No target (applicable) BIOS found at \data folder!       X
X                     Please check machine is target or not!             X
X                                                                        X
X                          Hit any key to shutdown.                      X
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
```

Chapter 4

Replacement Procedures

Chapter 4   Contents

Figures

4.1   General

This chapter explains how to disassemble the computer and replace Field Replaceable Units (FRU). Some replacement procedures may not require you to remove all the surrounding FRU to replace only one FRU. The chart below shows the FRU in the order in which they should be removed in a top-down manner, irrespective of their physical locations. The FRU shown in the top area of the chart should normally be removed before removing the FRU shown in the bottom area. To replace the FRU, first identify the suspect FRU for the system failure. Next, according to this chart, determine the FRU that need to be removed before removing the suspect FRU. After you determine those FRU, go to the appropriate sections according to the section numbers shown in the boxes. Then start removal and replacement.

4.2 Base Enclosure		
4.3 Battery Pack	4.4 SSD	4.5 Rotating shaft & LCD Module
4.6 Heat sink	4.7 System Board	4.8 I/O Board
4.9 Speaker	4.10 Touch pad	4.11 RTC Battery
4.12 LCD Panel		
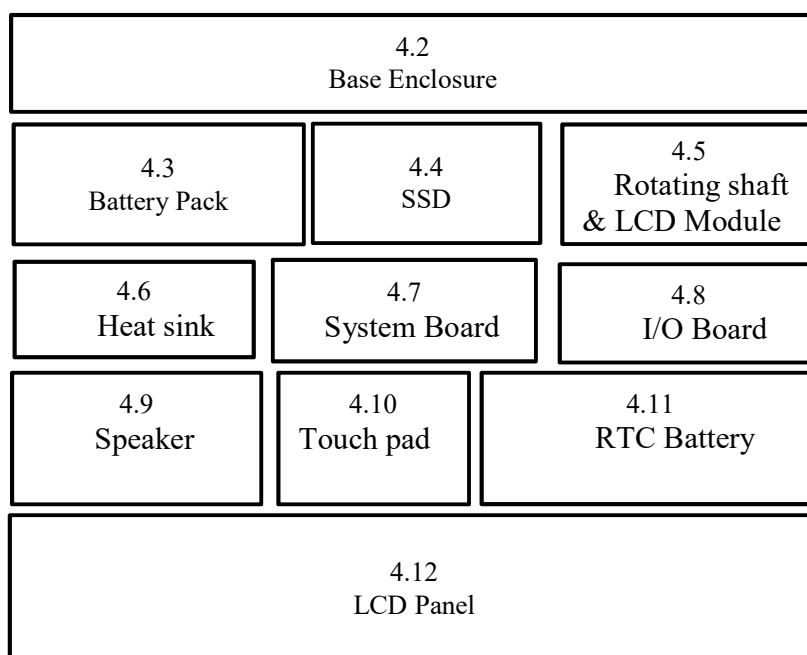
Safety Precautions

   Before you begin to Removing read the following safety precautions carefully. Be sureto follow them while you are working.

DANGER:

*1.   Always use the genuine batteries or replacement batteries authorized by .
        Batteries other than those differ in specifications and are incompatible with the
        computer. They may burst or explode. To avoid leakage of alkaline solutions,
        never heat or disassemble the battery packs. Never throw the battery packs into a
        fire. If this is violated, they will explode.*

*2.   The components such as the power supply and carry high voltages.When you
        partially disassemble the computer and turn on the components, useextreme
        care not to touch the connectors and components to avoid the risk of electrical
        shock. Do not disassemble individual components during first-level
        maintenance.*

WARNING:

*1.   To avoid the risk of electrical shock, turn the computer off and remove the AC
        adapter from the electrical outlet.*

*2.   Because the battery in the computer is left charged, the risk of electrical shock
        remains even after the AC adapter is removed from the electrical outlet. To avoid
        the risk of electrical shock, be sure to remove any metal jewelry or accessories
        such as necklaces, bracelets, and rings before starting work. Never work with
        damp or wet hands.*

*3.   To avoid personal injury, use care to avoid the sharp edges or corners of the
        components.*

CAUTION:

1.   *Before replacing a component, make sure that the replacement component meets the required specifications. To avoid computer failures, never use components that do not meet the specifications.*

2.   *To avoid internal damage such as short circuits and fire, never drop metal objects such as screws, pins, paper clips, etc. into the components. When a screw is removed, be sure to replace a screw that is the same size as the original screw. Make sure that all the screws are fastened securely. Loose screws can cause short circuits, overheating, smoke, or fire.*

3.   *Before raising a FRU or other component, make sure that all the component cables have been disconnected to avoid the risk of electrical shock caused by accidental contact with the energized components.*

4.   *For AC input, be sure to use the AC adapter and AC power cable that come with your computer or DBH - recommended equivalents.*

5.   *To avoid the risk of electrical shock, make sure that all the replacement components meet the specifications of the computer and that all the cables and connectors are fastened securely.*

6.   *Inside the PC are components that become hot during operation (such as the CPU and cooling module). To avoid burns, let the hot components cool down before starting inspection or repair task.*

Before You Begin

Before you begin to Removing the computer, keep in mind the precautions and advicein this section. Always begin Removing by removing the AC adapter and battery pack. Remove the optional parts and accessories as well. The procedures for removing the batteries will be explained later.

Disassemble the computer only when an abnormality has occurred.

Use only the recommended tools.

To run and store the computer, be sure to prepare a working environment that is free from:

❑ Dust and contaminants
❑ Static electricity
❑ Extremely high or low temperatures and extremely high humidity

Run the diagnostic tests explained in Chapter 3 of this manual to identify the FRU that has probably caused the system failure.

Perform only the required machine operations. Use only the Removing and installation procedures described in this manual.

Place the removed components in a safe place away from the computer so that they are not damaged or get in the way of you doing your work.

Normally, a number of screws need to be removed or replaced during disassembling. Place the removed screws in a safe place so that you can easily find the right screws for the right components.

When assembling the computer, use the specified screws to fasten the parts to the specified locations. See the appropriate explanations and figures for screw sizes.

To avoid personal injury, use care to handle components that have sharp edges or corners.

After you have replaced a FRU, check that the FRU works correctly to ensure normal computer operation.

Removing Procedures

The cable connectors come in these two basic types:

❑ Pressure plate connectors
❑ Normal pin connectors

To remove a pressure plate connector, pull up the tabs on either side of the connector's plastic pressure plate and gently pull the cable out of the connector. To reconnect the cable to the pressure plate's connector, raise the pressure plate up to a satisfactory height and slide the cable into the connector. Secure the cable in the correct position by pressing down the sides of the pressure plate so that the plate is flush with the sides of the connector. Grasp and pull the cable gently to check that the cable is connected firmly. If the cable comes off the connector, reinsert the cable by raising the pressure plate up to a satisfactory height.

Normal pin connectors are used for all the other types of cables. These connectors can be installed or removed by simply inserting them or pulling them out.

Assembly Procedures

You have to reassemble the computer after you have disassembled the computer and fixed the component that caused the problem.

When reassembling the computer, keep the following general guidelines in mind:

❑ Take your time to carry out the suggested instructions completely. Hurried reassembly can often cause problems.
❑ Check that all the cable and connectors are fastened securely.
❑ Before securing the FRU or other parts, check that the cables are not caught by the screws or FRU.
❑ Check that all the latches are closed securely.
❑ Check that all the required screws are used to secure the FRU. Using wrong screws can damage the threads or heads of the screws or does not ensure that the FRU are secure.

After installing a FRU, make sure that the FRU and computer work normally.

Tools and Equipment

For your safety and that of other people in the working environment, it is strongly recommended that you use electrostatic discharge (ESD) equipment. The proper use of this equipment will ensure successful repair work and reduce the costs for repairing damaged components. The equipment and tools required for Removing and reassembly are:

- ❑ 1.7kg/f screwdriver,For removing screws
- ❑ Tweezers (for pulling out screws)
- ❑ ESD mats (for the floor and work desks)
- ❑ An ESD wrist strap or heel grounder
- ❑ Anti-static carpets or flooring
- ❑ A plastic card (in credit card size)

Screw Tightening Torque

To secure screws, follow the torque values listed below. Over tightening can damage components and screws. Under tightening can loosen the screw or cause screws to come off, which may result in short circuits or other damage.

- ❑ CM2.0 X 2.0   0.15 N·m
- ❑ CM2.0 X 2.5   0.18 N·m
- ❑ CM2.0 X 4.0   0.27 N·m
- ❑ CM2.0 X 5.5   0. 36 N·m

4.2   Base Enclosure

Removing Base Enclosure

Remove Base Enclosure according to the following procedures and Figure 4-2.

1. Remove the 11 screws fixing the Base Enclosure   CM2.0X5.5Xφ4.0X0.5
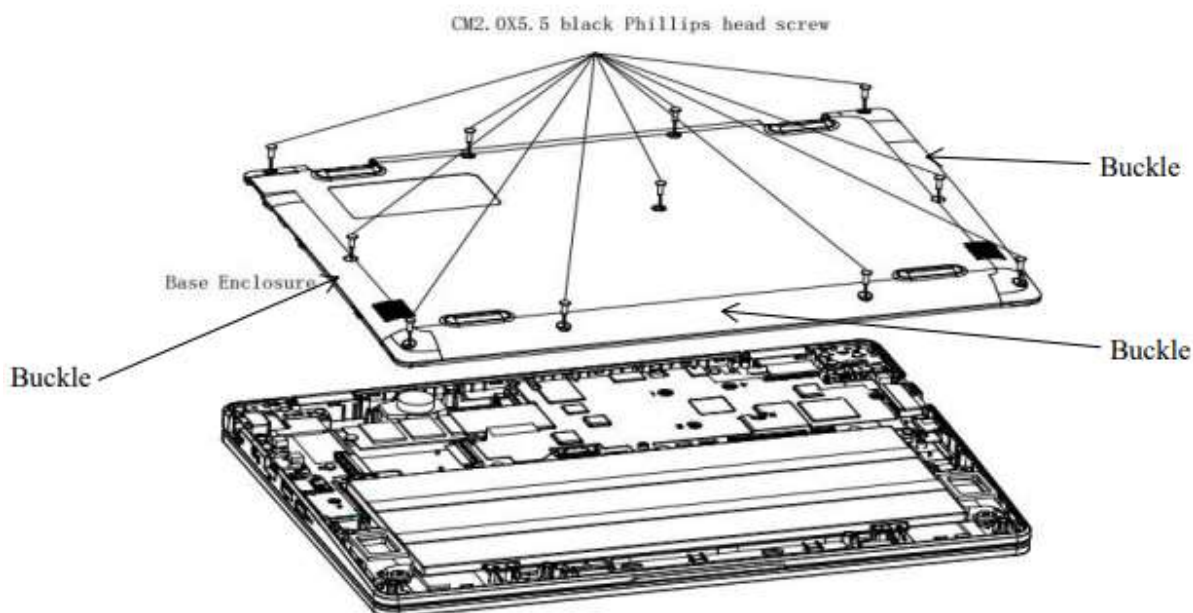
2. Remove Base Enclosure

Figure 4-2 Removing Base Enclosure

Install Base Enclosure

Install Base Enclosure according to the following procedures and Figure 4-2.

1. Check whether the connecting line is blocked above the screw hole

2. Place Base Enclosure in correct position.

3. Lock all buckles

4.   Install the 11 screws fixing the Base Enclosure   CM2.0X5.5Xφ4.0X0.5.

4.3   Battery Pack

Removing Battery Pack

Remove battery pack according to the following procedures and Figure 4-3.

CAUTION: When handling the battery packs, use care not to short circuit the terminals. Do not drop, hit, twist, or bend the battery packs. Do not scratch or break up their casing.

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1. Disconnect the battery interface (J2) cable

2. Remove four CM2.0X4.0Xφ4.0X0.5 silvery Phillips head screws securing Battery.
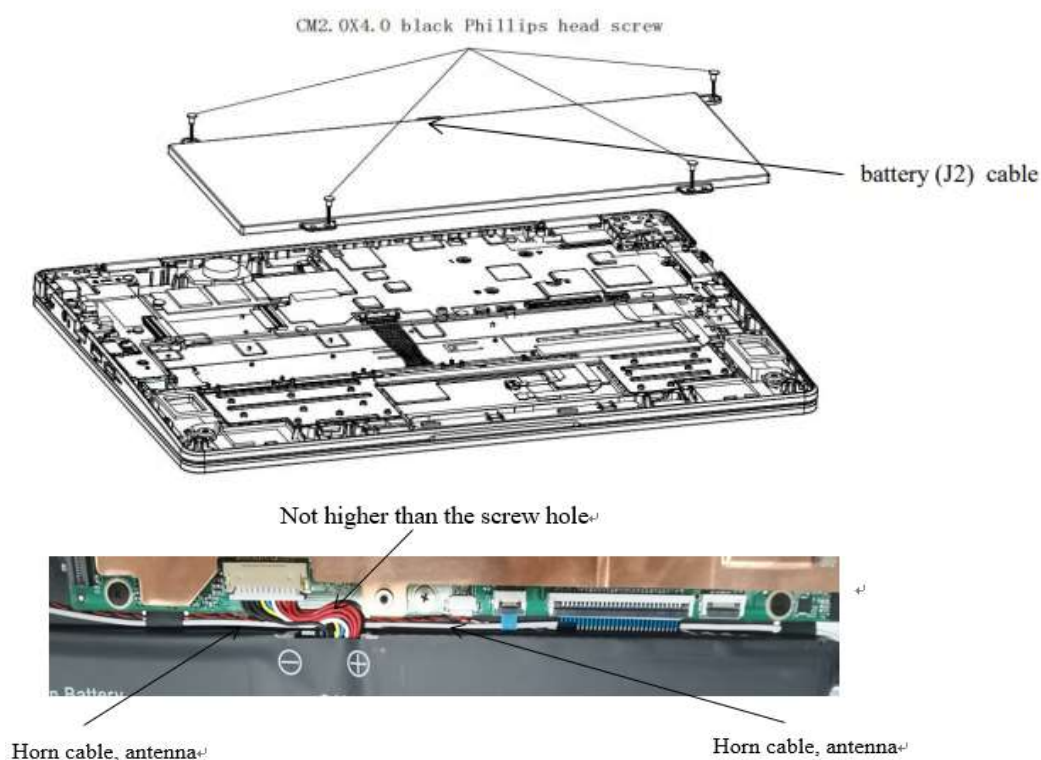
3. Remove Battery.

Figure 4-3 Removing battery pack

CAUTION: The battery packs contain a lithium ion battery, which can explode due to improper replacement, use, handling, or disposal. Always dispose of the battery packs as required by local ordinances or regulations. Use only replacement batteries recommended by DBH.

NOTE: Visually check the battery's terminals. If they are dirty, clean them with a dry cloth.

NOTE: Dispose of the used battery packs as required by local ordinances or regulations.

Install Battery Pack

Install battery pack according to the following procedures and Figure 4-3.

1. Check whether the cable is pressed by the battery.

2. Place Battery Pack in correct position.

3. Secure Battery with four CM2.0X4.0Xφ4.0X0.5 silvery Phillips head screws.

4. Connect Connect the battery interface (J2) cable

5.   battery interface (J2) cable Not higher than the screw hole

4.4 SSD

Removing SSD

Remove SSD according to the following procedures and Figures 4-4

CAUTION: Do not touch the connectors on SSD and in the computer with your bare hands. SSD can fail if they are contaminated with sweat, natural oils, etc. from your hands.

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2. Remove one CM2.0X2.0Xφ5.0X0.5 black Phillips head screw securing the SSD.
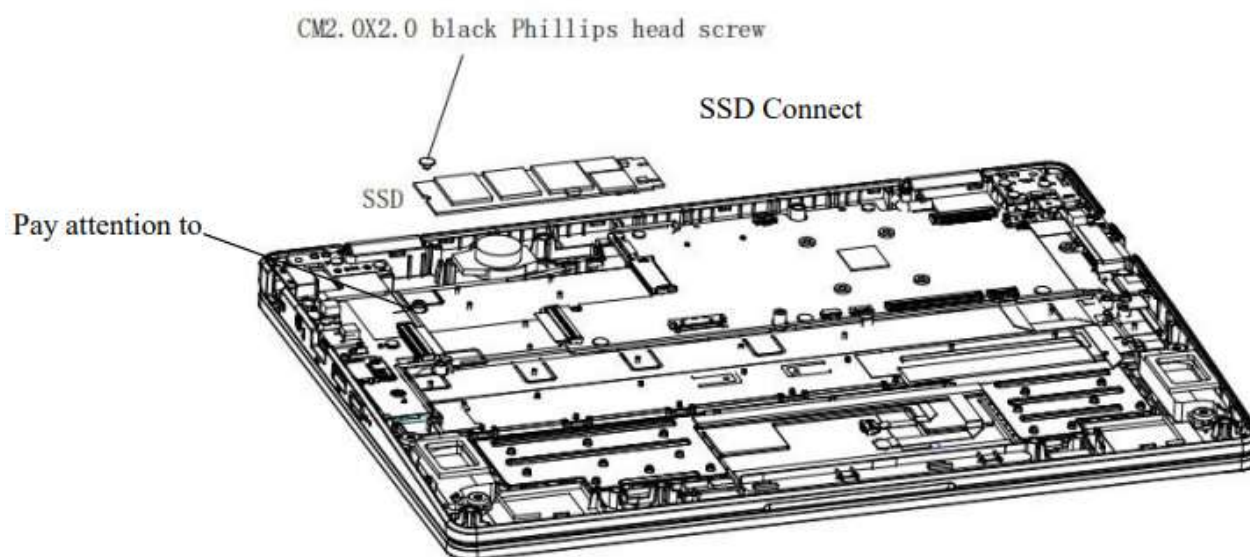
3. Pull the SSD out of the system board (J4)

Figure 4-4 Removing SSD

Install SSD

Install SSD according to the following procedures and Figures 4-4.

1. Insert the SSD into the system board (J4)

2. Check if the SSD is pressed onto the cable

3. Secure it with one CM2.0X2.0Xφ5.0X0.5 black Phillips head screw

---

4.5 Rotating Shaft & LCD Module

Removing Rotating Shaft & LCD Module

Remove Rotating Shaft & LCD Module according to the following procedures and Figures 4-5.

4. Remove the six screws of the left and right shafts CM2.0X5.5X ϕ 4.0X0.5.

5. Remove the one screws of the right shafts, CM2.0X4.0X ϕ 4.0X0.5.

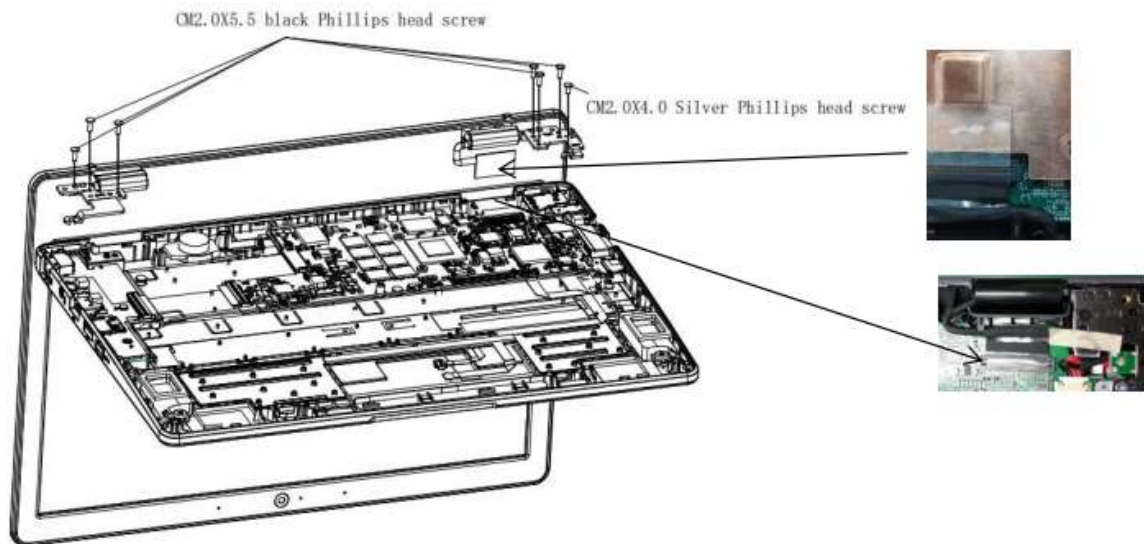6. Tear off the LCD interface adhesive and remove the LCD interface(CON3)

7. Remove LCD module

Figure 4-5 Removing Rotating Shaft & LCD Module

Install Rotating Shaft & LCD Module

Install Rotating Shaft & LCD Module according to the following procedures and Figures 4-5.

1. Turn the shaft bracket to the correct fixed position

2. Install the six screws of the left and right shafts CM2.0X5.5X ϕ 4.0X0.5

3. Install the one screws of the right shafts, CM2.0X4.0X ϕ 4.0X0.5

4. Parallel insertion of LCD cable,Fit the LCD connecting and fixing glue well

4.6   Heat sink

Removing Heat sink

Remove heat sink according to the following procedures and Figures 4-6.

4.6.1 Remove six fixing screws from the radiator CM2.0X2.5X ϕ 4.0X0.5
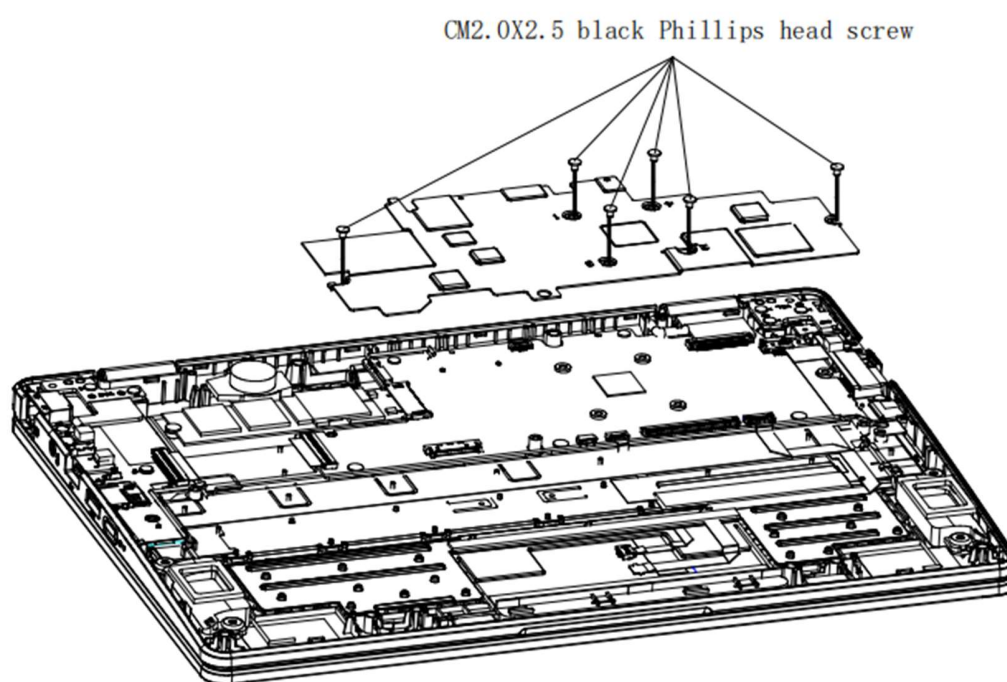
4.6.2 Remove the heat sink.

*Figure 4-6 Removing H*eat sink

Install Heat sink

Install heat sink according to the following procedures and Figures 4-6.

1. Place the Heat sink in the correct fixed position

2. Install the radiator with 6 fixing screws CM2.0X2.5X ϕ 4.0X0.5

4.7   System Board

Removing system Board

Remove system Board according to the following procedures and Figures 4-7

    4.7.1   Remove three system board fixing screws CM2.0X4.0X ϕ 5.0X0.5

    4.7.2   Remove two system board fixing screws CM2.0X2.0X ϕ 4.0X0.5

    4.7.3 Remove the following connection cables
(I/O FPC J10 , Speaker cables J6 , keyboard FPC J1 , Touch Pad FPC CON2 , DC cables
CON1 ,antenna EU2)

    4.7.4 Remove system Board Support plate,Remove system Board
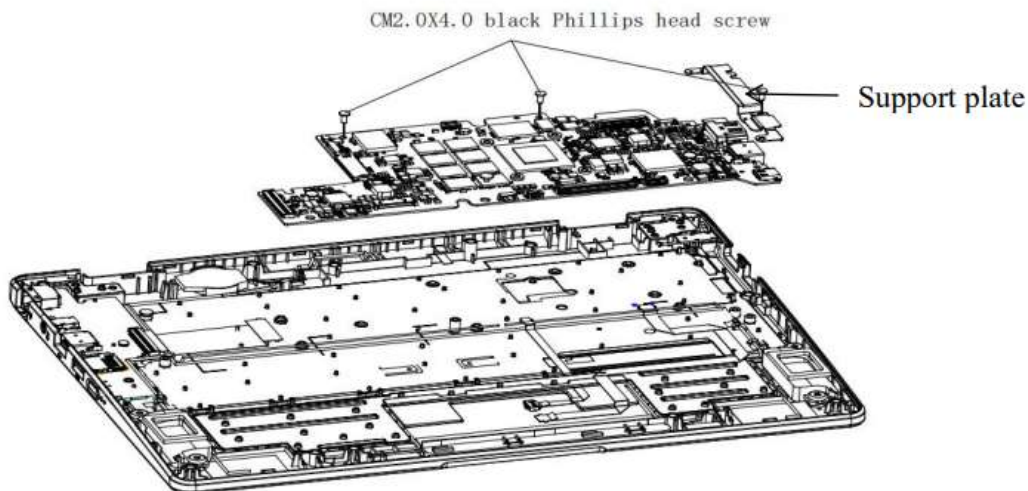

Figure 4-7 Removing system Board

Install system Board

Install system Board according to the following procedures and Figures 4-7
  1. Place the motherboard in the correct fixed position

  2. Install three system board fixing screws CM2.0X4.0X ϕ 5.0X0.5

  3. Install two system board fixing screws CM2.0X2.0X ϕ 4.0X0.5

  4. Install the following connection cables(I/O FPC J10 , Speaker cables J6 ,
keyboard FPC J1 , Touch Pad FPC CON2 , DC cables CON1 ,antenna EU2)

4.8   I/O Board

Removing I/O Board

Remove I/O Board according to the following procedures and Figures 4-8

4.8.1 Remove one I/O board fixing screws CM2.0X2.5X φ 4.0X0.5

4.8.2 Removing the I / O board support
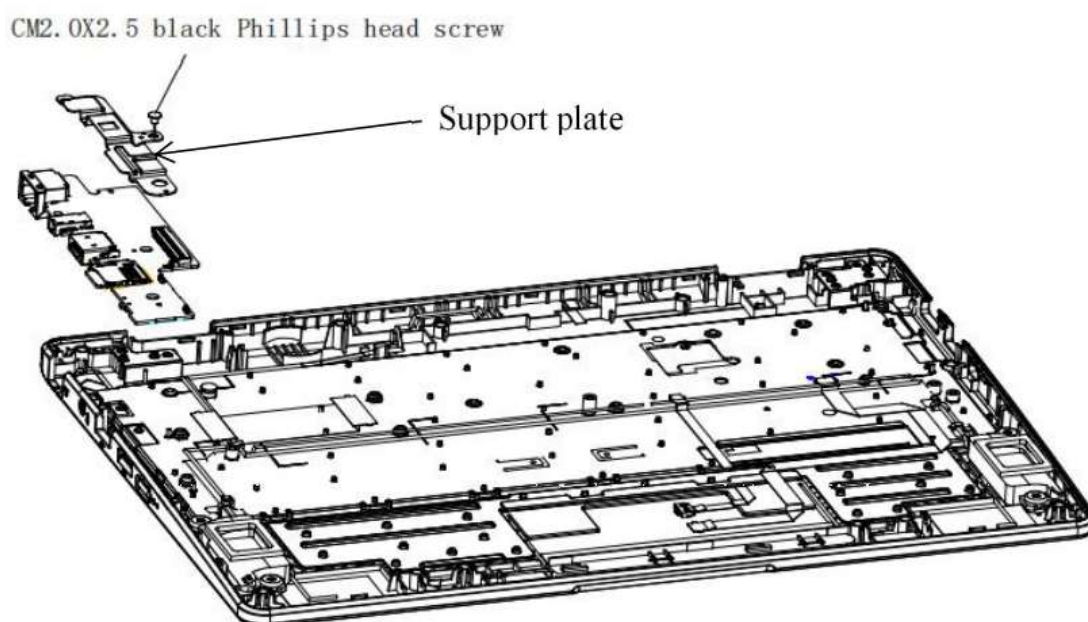
4.8.3 Removing the I / O board

Figure 4-8 Removing I/O Board

Installing I/O Board

 Install I/O Board according to the following procedures and Figures 4-8

1. Place the I/O board in the correct fixed position

2. Install the I / O board bracket

3. Install one I / O board fixing screw CM2.0X2.5X φ 5.0X0.5

4.9   Speaker

Removing Speaker

Remove Speaker according to the following procedures and Figures 4-9

1. Remove the left Speaker

2. Remove the right Speaker
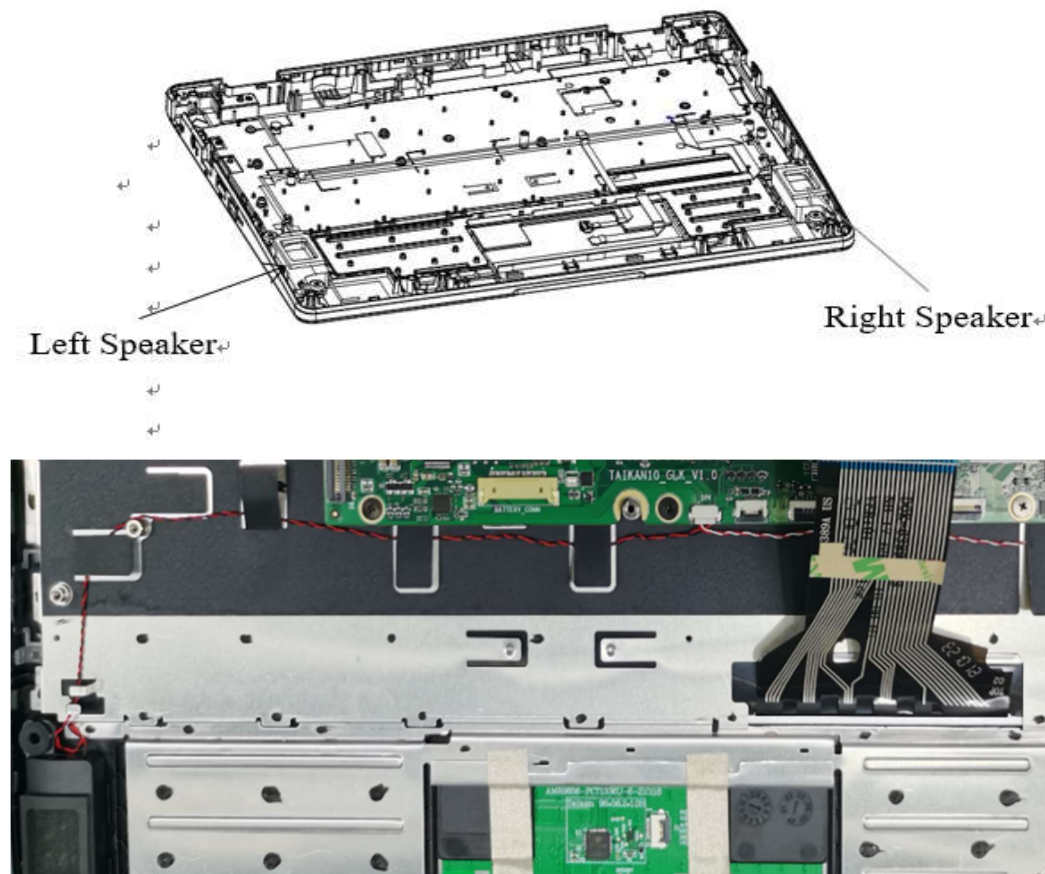
3. According to order Remove Speaker Connects Cables

Figure 4-9 Removing Speaker

Install Speaker
Install Speaker according to the following procedures and Figures 4-9

1. Install   the left Speaker

2. Install   the right Speaker

3. According to order Install speaker cables in order

4.10 Touch pad

Removing Touch pad
Remove Touch pad according to the following procedures and Figures 4-10

1. Remove the 2PCS touch pad conductive cloth

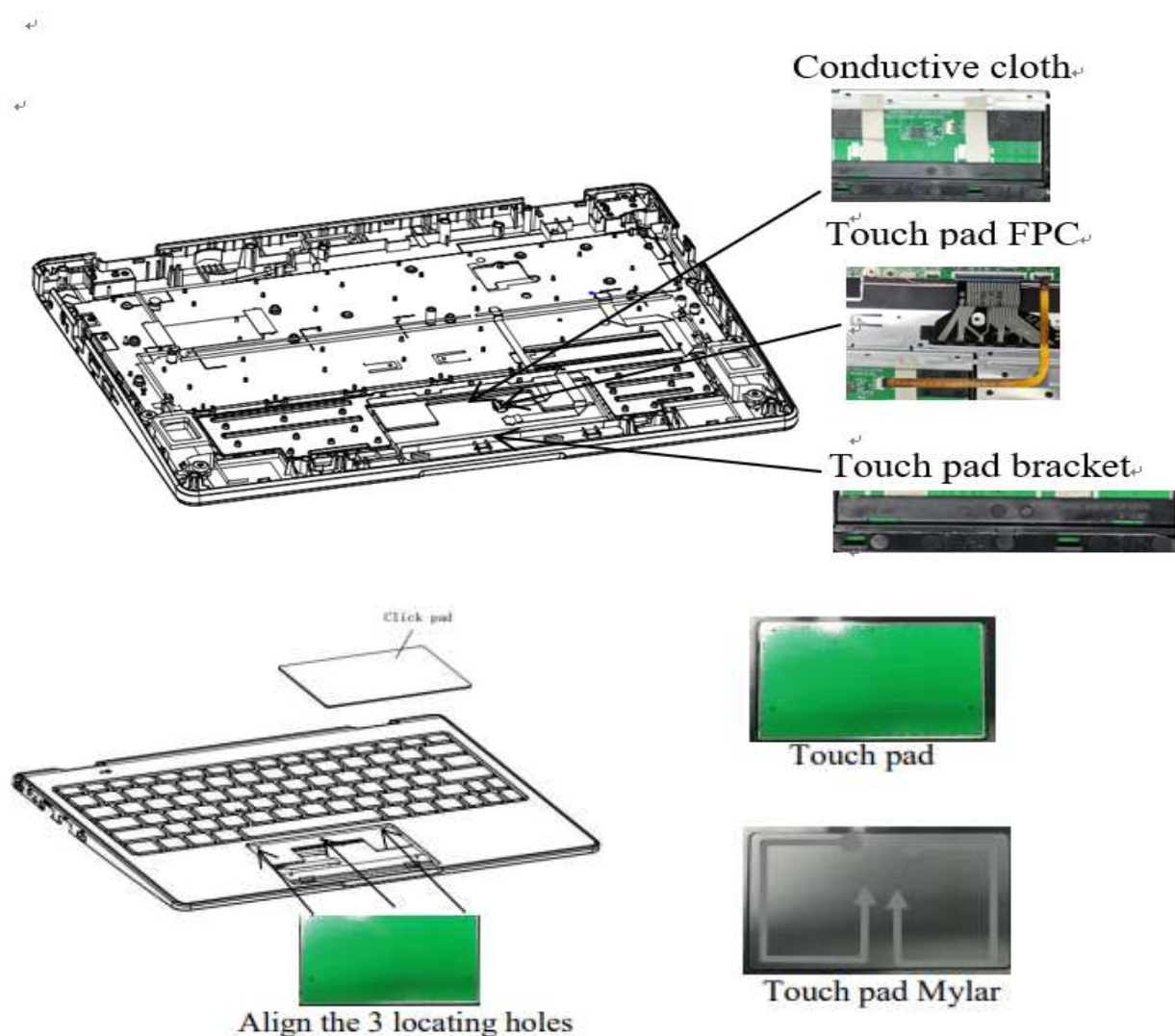2. Remove FPC cable of touch pad

3. Remove touch pad bracket

Conductive cloth

Touch pad FPC

Touch pad bracket

Click pad

Touch pad

Touch pad Mylar

Align the 3 locating holes

Figure 4-10 Removing Touch Pad

Install Touch pad

Install Touch pad according to the following procedures and Figures 4-10

4. Remove the double-sided paper on the back of the touch pad

5. Align the 3 locating holes

6. Place Touch pad in correct position (Keep the interval consistent)

7. Installing the touch pad Mylar (Keep the interval consistent)

8. Install Touch pad bracket

9. Parallel insertion touch pad FPC

10. Install 2pcs touch pad conductive cloth

4.11 RTC Battery

Removing RTC Battery

Remove RTC Battery according to the following procedures and Figures 4-11

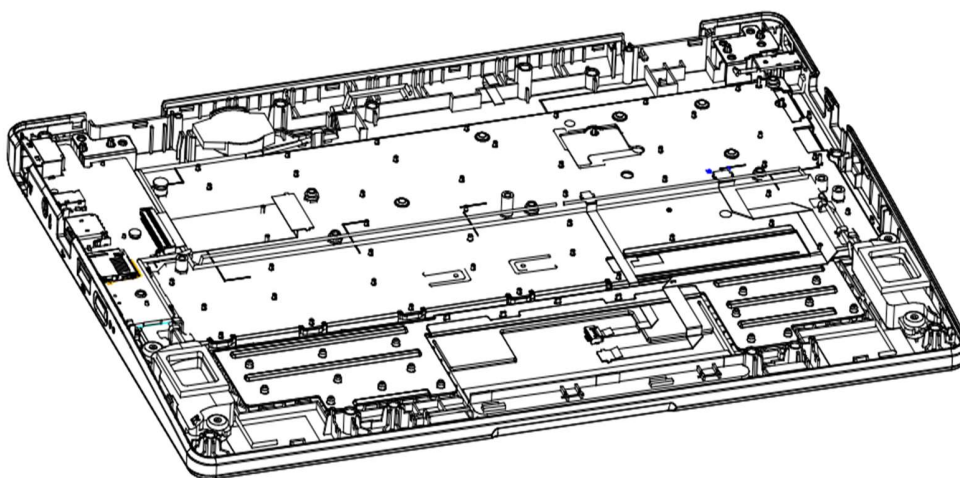   1. Remove RTC battery interface(J20)

    2. Remove the RTC Battery

Figure 4-11 Removing RTC Battery

Installing RTC Battery

Instal RTC Battery according to the following procedures and Figures 4-11

    1. Place RTC battery in corresponding position

    2. Installing   the RTC Battery

    3. Plug RTC battery interface(J20)

4.12   LCD Panel

Removing LCD Panel

Remove LCD Panel according to the following procedures and Figures 4-12

1. Start at the edges Remove the B cover

2. Remove two LCD panel screws   CM2.0X2.0X ϕ 4.0X0.5

3. Remove the six shaft screws   CM2.0X5.5X ϕ 4.0X0.5

4. Remove the shaft support

5.   Remove the LCD Panel fixed easy pull adhesive

6. Remove LCD
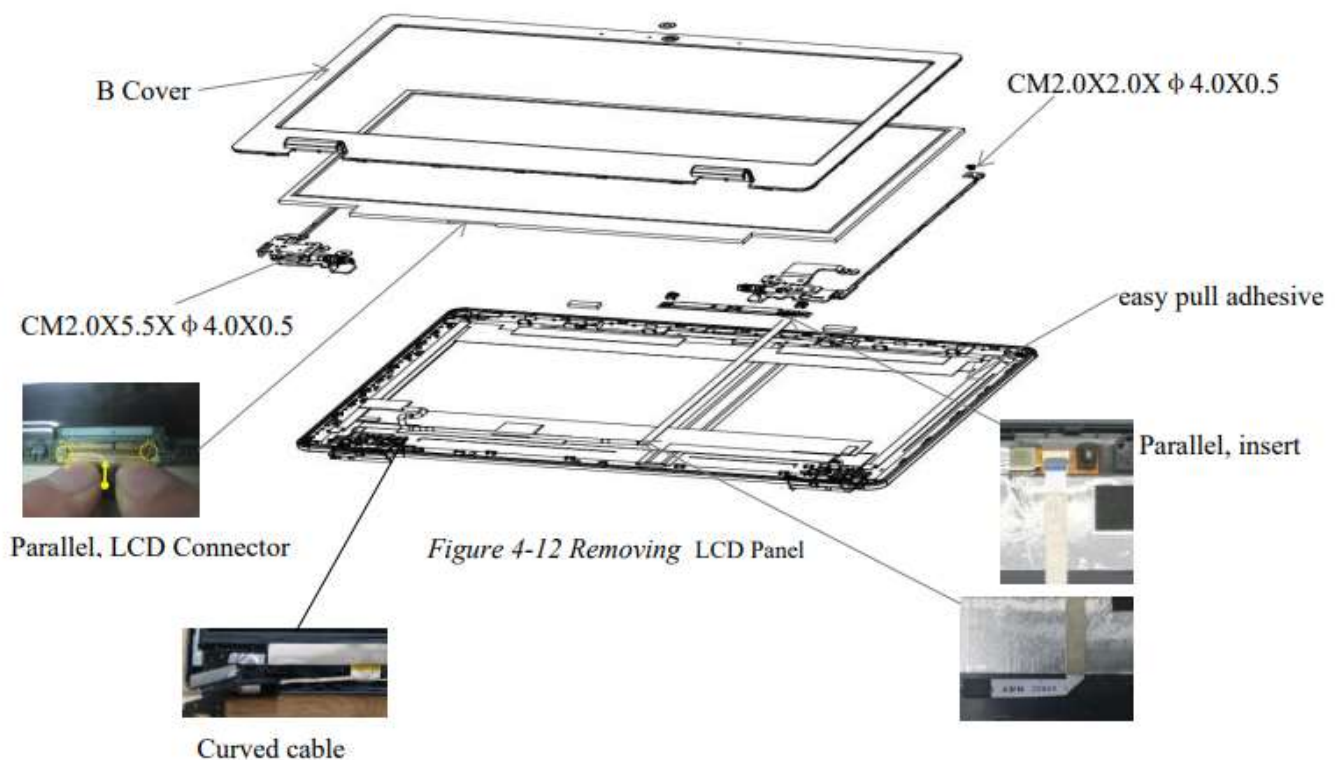
7. Remove the cable between LCD and Camera cable

Figure 4-12 Removing LCD Panel

Installing LCD Panel

Install LCD Panel according to the following procedures and Figures 4-12

1. Install the easy pull adhesive to the corresponding position

2. Insert LCD cables in parallel and arrange them in order

3. Fix the LCD panel to the corresponding position

4. Install the six shaft screws   CM2.0X5.5X ϕ 4.0X0.5

5. Install two screws to fix the LCD panel   CM2.0X2.0X ϕ 4.0X0.5

6. Pay attention to adjust the LCD and cable

7. Install the B cover