

2I390CW

**Intel Apollo Lake N4200 / N3350 / E3950 SoC CPU,
On board DDR3L memory, 2 x LAN / DVI / HDMI / USB /
COM / PCIe mini card**

All-In-One eIO extension SBC

**Intel Apollo Lake N4200 / N3350 / E3950 SoC CPU
eDP, DVI, HDMI, 2 x mini PCIe, 2 x LAN, Audio
SATA, USB, COM, eIO, Wide Range DC-IN**

CAUTION

**RISK OF EXPLOSION IF BATTERY IS REPLACED
BY AN INCORRECT TYPE.
DISPOSE OF USED BATTERIES ACCORDING
TO THE INSTRUCTIONS**

NO. 2I390CW

Release date: June 14th 2017

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User Manual edition 0.1, JUN. 30. 2017

Warning !

1. Battery
Batteries on board are consumables.
The life time of them are not guaranteed.
2. Fless solution with HDD
The specification & limitation of HDD should be considered carefully when the fanless solution is implemented.
3. We will not give further notification in case of changes of product information and manual.
4. SATA interface does not support Hot SWAP function.
5. There might be a 20% inaccuracy of WDT at room temperature.
6. Please make sure the voltage specification meets the requirement of equipment before plugging in.
7. There are two types of SSD, commercial grade and industrial grade, which provide different read/write speed performance, operation temperature and life cycle. Please contact sales for further information before making orders.
8. Caution! Please notice that the heat dissipation problem could cause the MB system unstable. Please deal with heat dissipation properly when buying single MB set.
9. Please avoid approaching the heat sink area to prevent users from being scalded with fanless products.
10. If users repair, modify or destroy any component of product unauthorizedly, We will not take responsibility or provide warranty anymore.
11. DO NOT apply any other material which may reduce cooling performance onto the thermal pad.
12. It is important to install a system fan toward the CPU to decrease the possibility of overheating / system hanging up issues, or customer is suggested to have a fine cooling system to dissipate heat from CPU.

* Hardware Notice Guide

1. Before linking power supply with the motherboard, please attach DC-in adapter to the motherboard first. Then plug the adapter power to AC outlet.
Always shut down the computer normally before you move the system unit or remove the power supply from the motherboard. Please unplug the DC-in adapter first and then unplug the adapter from the AC outlet.
Please refer photo 1 as standard procedures.
2. In case of using DIRECT DC-in (without adapter), please check the allowed range for voltage & current of cables. And make sure you have the safety protection for outer issues such as short/broken circuit, overvoltage, surge, lightning strike.
3. In case of using DC-out to an external device, please make sure its voltage and current comply with the motherboard specification.
4. The total power consumption is determined by various conditions (CPU/motherboard type, device, application, etc.). Be cautious to the power cable you use for the system, one with UL standard will be highly recommended.
5. It's highly possible to burn out the CPU if you change/ modify any parts of the CPU cooler.
6. Please wear wrist strap and attach it to a metal part of the system unit before handling a component. You can also touch an object which is ground connected or attached with metal surface if you don't have wrist strap.
7. Please be careful to handle & don't touch the sharp-pointed components on the bottom of PCBA.
8. Remove or change any components from the motherboard will VOID the warranty of the motherboard.
9. Before you install/remove any components or even make any jumper setting on the motherboard, please make sure to disconnect the power supply first. (follow the aforementioned instruction guide)
10. "POWERON after PWR-Fair" function must be used carefully as below:
When the DC power adaptor runs out of power, unplug it from the DC current;
Once power returns, plug it back after 5 seconds.
If there is a power outage, unplug it from the AC current, once power returns, plug it back after 30 seconds. Otherwise it will cause system locked or made a severe damage.

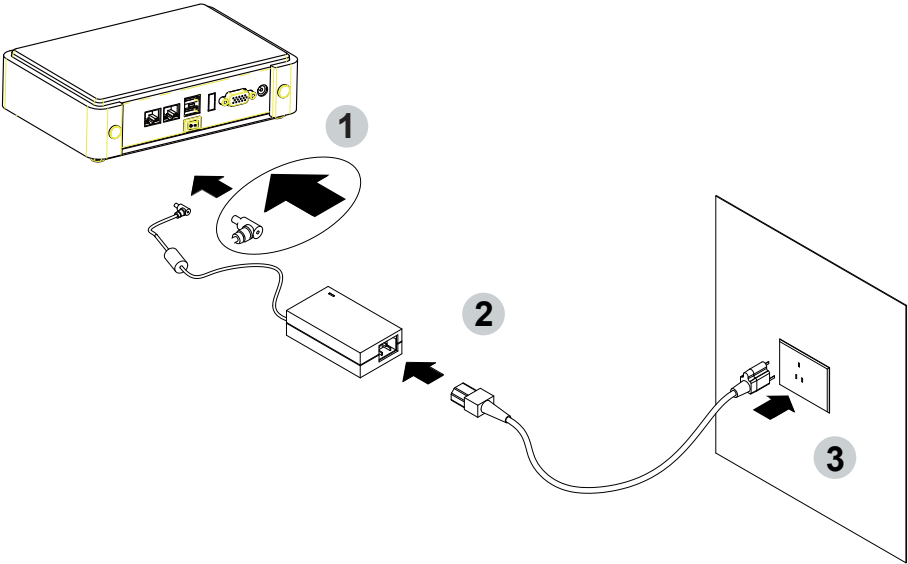
Remark 1:

Always insert / unplug the DC-in horizontally & directly to / from the motherboard. DO NOT twist, it is designed to fit snugly.

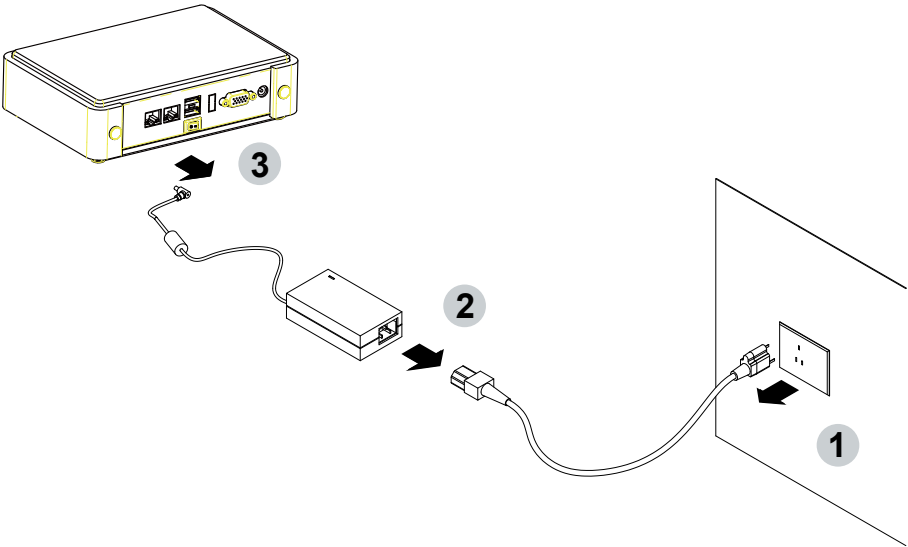
Moreover, erratic pull / push action might cause an unpredictable damage to the component & system unit.

Photo 1

Insert



Unplug



Chapter-1

General Information

The 2I390CW is a Pico-ITX SBC with LEX eIO (2 x PCIe + USB) expansion function offer the ideal & reliable platforms for high performance applications in Digital Signage, medical devices, POS / Kiosk, gaming machines, automation, military & industrial facilities. 2I390CW is powered by the latest Apollo Lake SoC 14nm quad-core Mobile Intel® Pentium processor N4200 or dual-core Mobile Intel® Celeron processor N3350 with on board DDR3L memory as well as triple independent display and fully 4K media playback capable with on-board HDMI output, making it ideal for deployment in transportation, digital signage and multi-display applications. 2I390CW also supports with two 10/100/1000 Mbps Ethernet for seamless broadband connectivity. With Wake-On LAN function and the PXE function in BIOS, these are perfect control boards for networking devices.

The embedded motherboard 2I390CW is specially designed with the sizeable DDR3L 1600MT/s 4GB on board memory which is steady more than SO-DIMMs and expend more IO by dual type connectors which makes it to be ideal stable, wireless, anti-vibration for transportation and mobile applications. Wide-Range Voltage DC in (9~36V) designed for widely varying input voltage requirement. This integrated platform offers superb performance and PC specification in the industry. It supports up to two serial ports RS232 / RS485 / RS422 jumper free auto switch, and 5 ports of USB (1 port of USB 3.0 and 1 port of USB 2.0 in rear side, 1 internal port of USB 3.0 & 2 internal ports of USB 2.0). The expandable interfaces include 1 full-size PCIe Mini card for PCIe x 1 or mSATA (auto-detection) and USB interface, and 1 half-size PCIe Mini card for mSATA and USB interface.

2I390CW with LEX eIO (2 x PCIe + USB) expansion function to pair with LEX multi-function compact size eIO extension cards such as L2L001, L2L002, L2L003, L2L004, L2M001 etc. to expand more LAN ports, PCIe Mini cards or fiber optic LAN port. Please visit our website to find the Compact solution with Rich Expansion for vertical application.

Please kindly contact LEX (info@lex.com.tw) if you have any further query or want to get the detail information.

1-1 Major Feature

1. Mobile Intel® Pentium N4200 1.1GHz / 2.5GHz, (Quad core), Mobile Intel® Celeron N3350 1.1GHz / 2.4GHz (Dual core)
2. Apollo-Lake Integrated Graphics chipset, Mobile Intel® Pentium N4200 200MHz / 700MHz, Mobile Intel® Celeron N3350 200MHz / 650MHz
3. Support eDP 1.3 2 Lanes up to 1920 x 1200, DVI 1.2 1920 x 1080, HDMI 1.4b up to 3840 x 2160
4. On board DDR3L SDRAM 4GB Memory, data transfer rate of 1600MT/s
5. Support 2 x 10 / 100 / 1000 Mbps Intel LAN port.
6. Support 2 x RS232 auto switch to RS485 / RS422 by BIOS, 2 port internal
7. 1 x type A USB 3.0 and 1 x type A USB 2.0 external, 1 x USB 3.0 internal and 2 x USB 2.0 internal
8. ALC886 HD Audio Specification 1.0 Two channel sound
9. Support extended 1 x full-size Mini PCIe card for PCIe x 1, mSATA (shared with SATA port) and USB interface, 1 x half-size Mini PCIe card for mSATA and USB interface
10. Support 1 SATA port (signal shared with full-size mini card)
11. Hardware digital Input & Output, 4 x DI / 4 x DO, Hardware Watch Dog Timer, 0~255 sec programmable
12. Wide Range DC IN +9V~36V
13. PCB Dimension: 102 x 73 mm

1-2 Specification

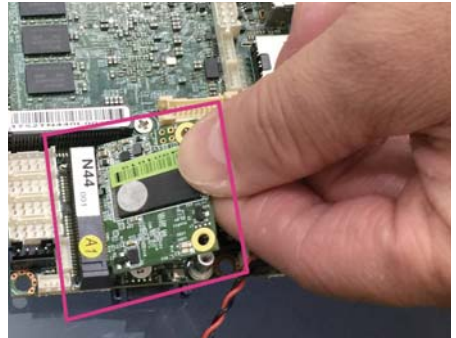
1. **SOC:** Mobile Intel® Pentium N4200 1.1GHz / 2.5GHz, (Quad core),
Mobile Intel® Celeron N3350 1.1GHz / 2.4GHz (Dual core)
2. **Memory:** DDR3L SDRAM 4GB Memory, data transfer rate of 1600MT/s
3. **Graphics:** Apollo-Lake Integrated Graphics chipset, Mobile Intel® Pentium N4200
200MHz / 700MHz, Mobile Intel® Celeron N3350 200MHz / 650MHz, eDP 1.3 2 Lanes
up to 1920 x 1200, DVI 1.2 1920 x 1080, HDMI 1.4b up to 3840 x 2160
4. **SATA:** Integrated Serial ATA Host Controller 1 SATA port, SATA Gen3 Data transfer
rates up to 6.0 Gb/s (600 MB/s). SATA signal shared with PCIe Mini card 1
5. **LAN:** Intel I211-AT LAN chipset with 10 / 100 / 1000 Mbps for PCIe x 1 V2.1
6. **I/O Chip:** F81801U I/O chipset for 2 ports RS232
7. **USB:** 1 type A USB 3.0 and 1 type A USB 2.0 connector onboard, 1 USB 3.0 and 2
USB 2.0 (internal)
8. **Sound:** Support line in, line out and MIC in
9. **WDT / DIO:** Hardware digital Input & Output, 4 x DI / 4 x DO (Option) / Hardware
Watch Dog Timer, 0~255 sec programmable
10. **Expansion interface:** one full-size PCIe Mini card for PCIe x 1, mSATA and USB
interface, one half-size Mini PCIe card for mSATA and USB interface
11. **BIOS:** Insyde UEFI BIOS
12. **Dimension:** 102 x 73 mm
13. **Power:** DC IN +9V~36V

1-3 Directions for installing the Mini PCI-e Card

1. Unscrew the screw on the board



2. Plug in the Mini Card in a 45 angle



3. Gently push down the Mini Card and screw the screw back.

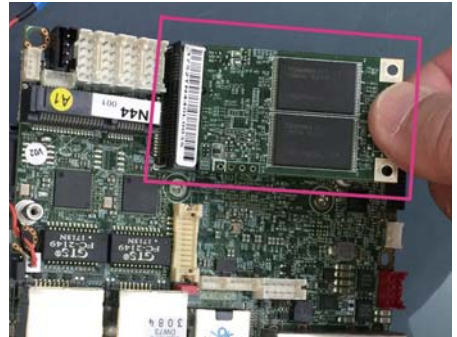


1-4 Directions for installing the Mini PCI-e Card (Full Size)

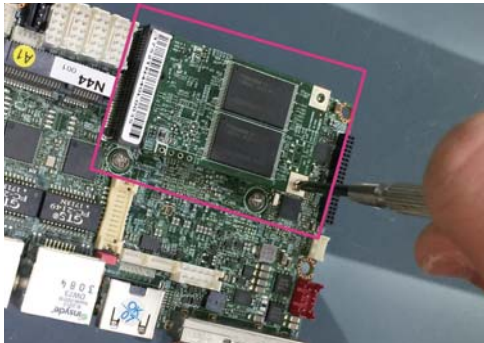
1. Unscrew the screw on the board



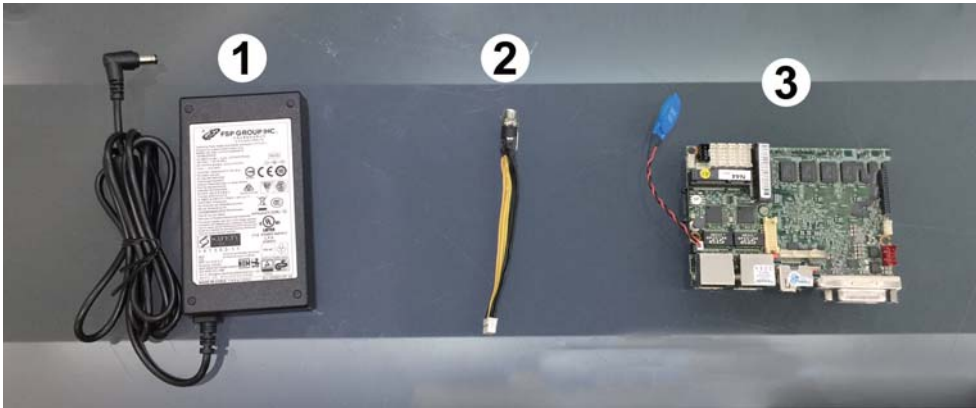
2. Plug in the Mini Card in a 45 angle



3. Gently push down the Mini Card and screw the screw back.



1-5 Packing List



	Material Code	Description	Detail Specification	Quantity
1	6G5212-0620-0100	60W Power Adapter, 12V / 5A, 2.5Ø	LF, L Type, FSP060-DIBAN2, FSP	1
2	6G6003-7350-0100	Power Cable	LF, 2.0 2*4 / DC JK, L=9cm	1
3	7G1901-1681001-0	MB-2I390CW-N44-001	LF, 2I390CW-N44, Rev.:001	1

*The packing list above is for the users who purchase single motherboard. The users who purchase the board with chassis may refer to the packing list in the Assembly Guide.

Please contact with your dealer if any of these items is missing or damaged on delivery. And please keep all parts of the delivery package with packing materials in case if you need to deliver or store the product in the future.

Chapter-2

Hardware Installation

2-1 Unpacking Precaution

This chapter provides the information how to install the hardware of 2I390CW. Please follow section 1-5, 2-1 and 2-2 to check the delivery package and unpack carefully. Please follow the jumper setting procedure.

NOTE!

1. Do not touch the board or any other sensitive components without all necessary anti-static protection.
2. Please pay attention to the voltage limitation of DC-IN12V 5%.
Overuse of DC-IN voltage limitation or change to another power adapter (not provided with this system) will VOID warranty.

You should follow these steps to protect the board from the static electric discharge whenever you handle the board:

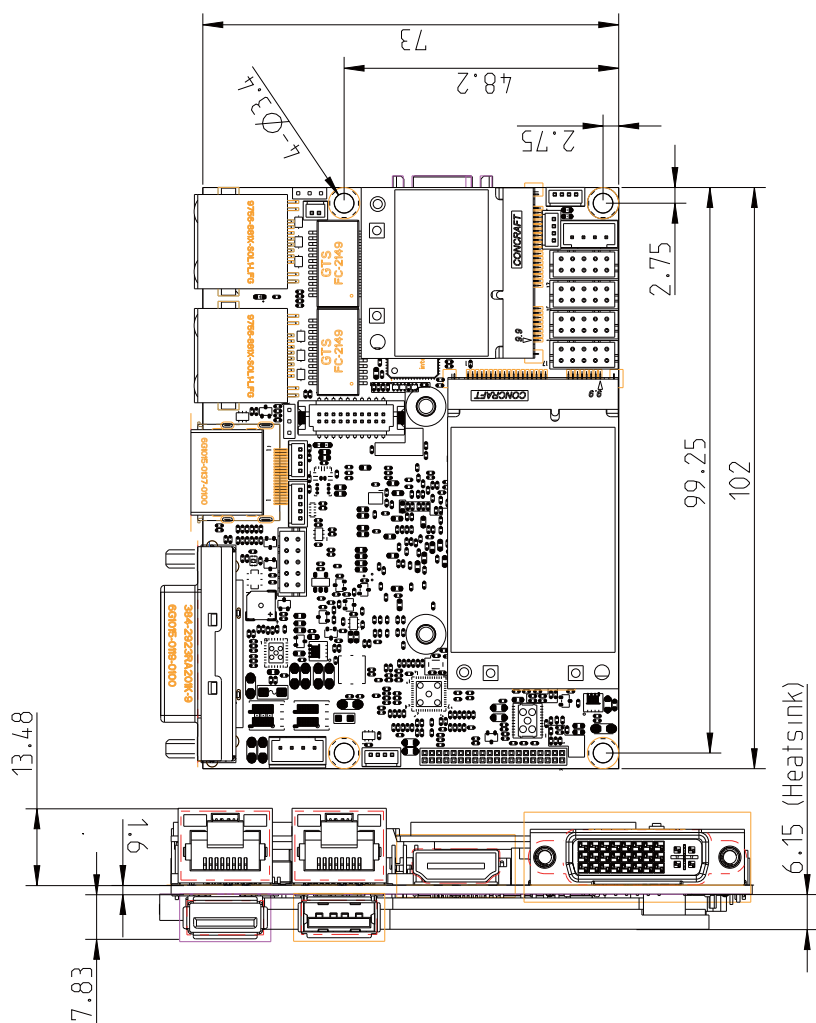
1. Ground yourself by a grounded wrist strap at all times when you handle the 2I390CW.
Well secure the ALLIGATOR clip of the strap to the end of the shielded wire lead from a grounded object. Please put on and connect the strap before handling the 2I390CW for harmlessly discharge any static electricity through the strap.
2. Please use anti-static pad to put any components, parts, or tools on the pad whenever you work on them outside the computer. You may also use the anti-static bag instead of the pad. Please ask your local supplier for necessary parts on anti-static requirement.
3. Do not plug any connector or set any jumper when the power is on.

2-2 Unpacking checkup

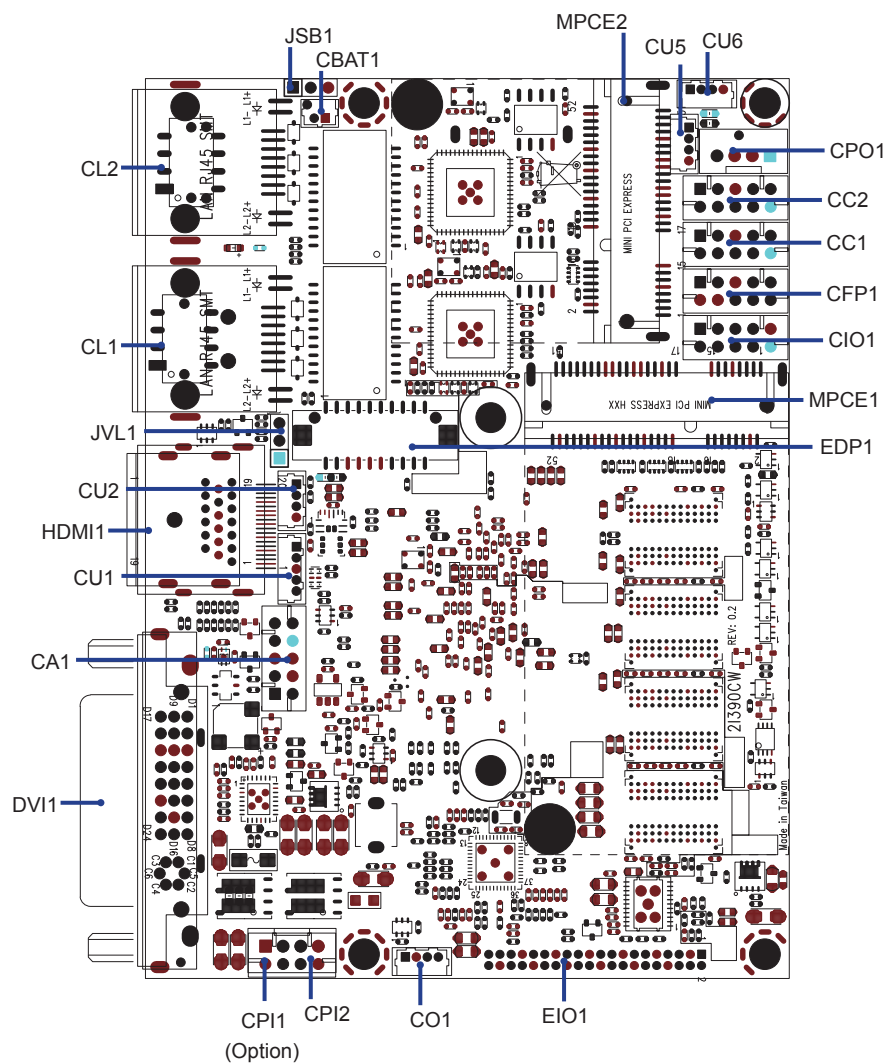
First of all, please follow all necessary steps of section 2-1 to protect 2I390CW from electricity discharge. With reference to section 1-5 please check the delivery package again with following steps:

1. Unpack the 2I390CW board and keep all packing material, manual and driver disc etc, do not dispose !
2. Is there any components lose or drops from the board?
DO NOT CONTINUE TO INSTALL THIS BOARD!
CONTACT THE DEALER YOU PURCHASED THIS BOARD FROM, IMMEDIATELY.
3. Is there any visible damage on the board?
DO NOT CONTINUE TO INSTALL THIS BOARD!CONTACT THE DEALER YOU PURCHASED THIS BOARD FROM, IMMEDIATELY.
4. Check your optional parts (i.e. DDR, CF etc.), all necessary jumpers setting to jumper pin-set, and CMOS setup correctly.
Please also refer to all information of jumper settings in this manual.
5. Check your external devices (i.e. Add-On-Card, Driver Type etc.) for complete add-in or connection and CMOS setup correctly.
Please also refer to all information of connector connection in this manual.
6. Please keep all necessary manual and driver disc in a good condition for future re-installation if you change your Operating System.

2-3 Dimension-2I390CW

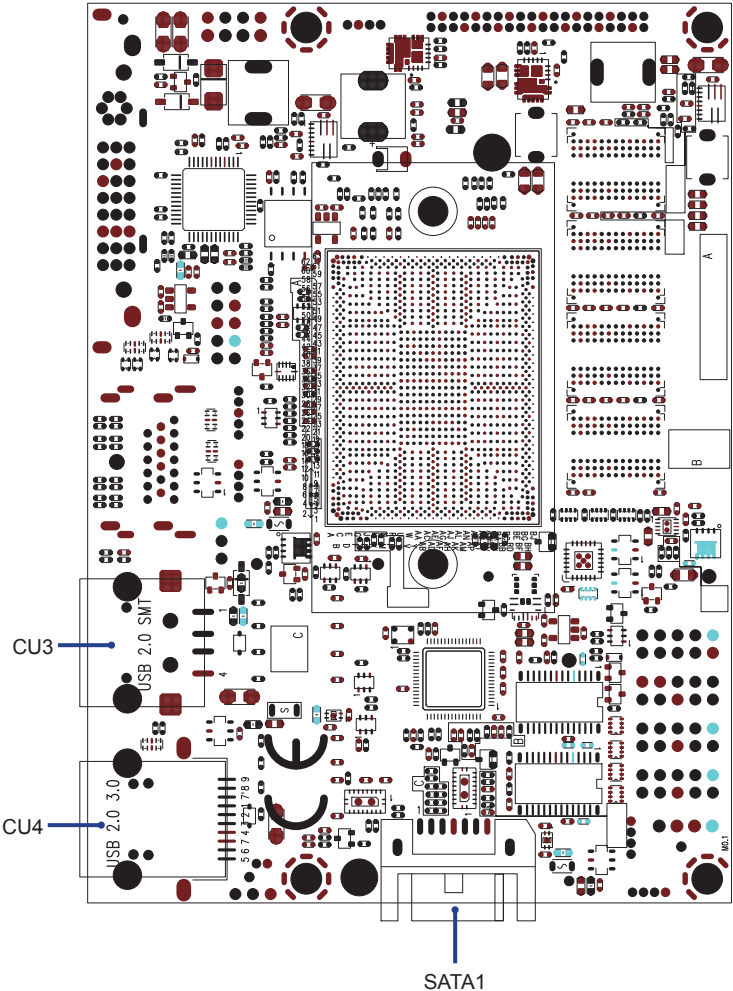


TOP

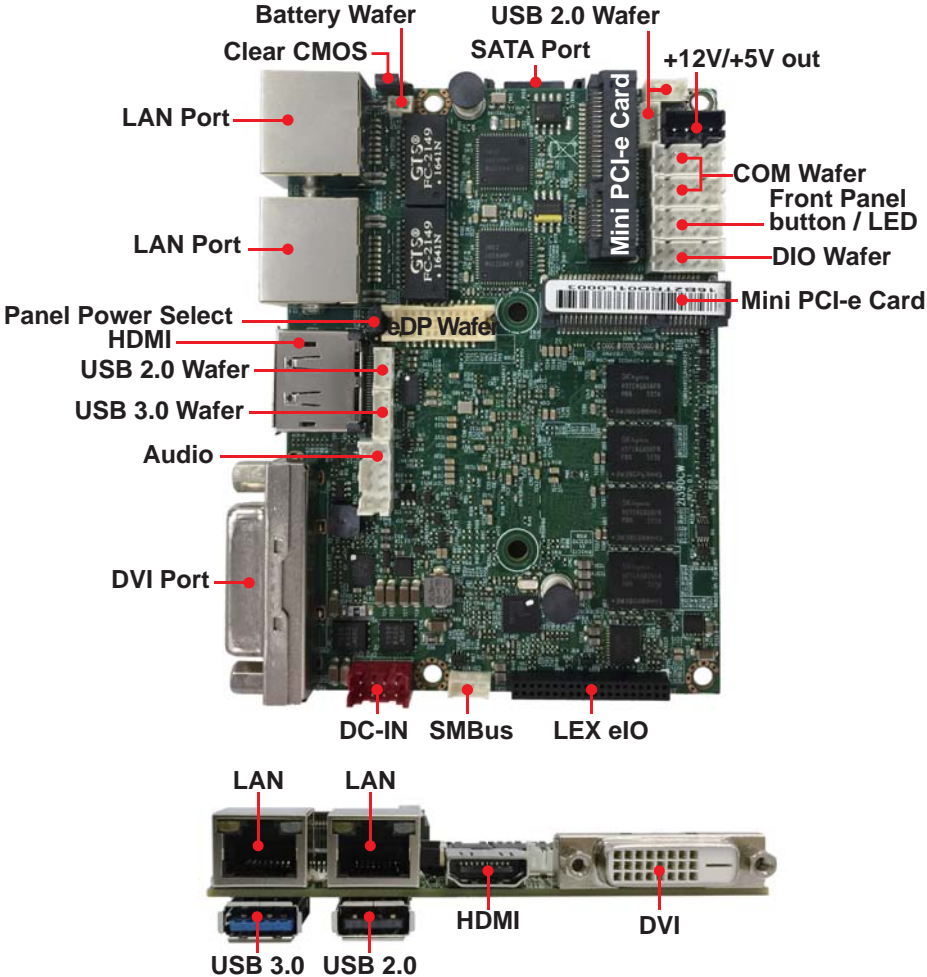


2-4-1 LAYOUT-2I390CW-CONNECTOR MAP

BOT

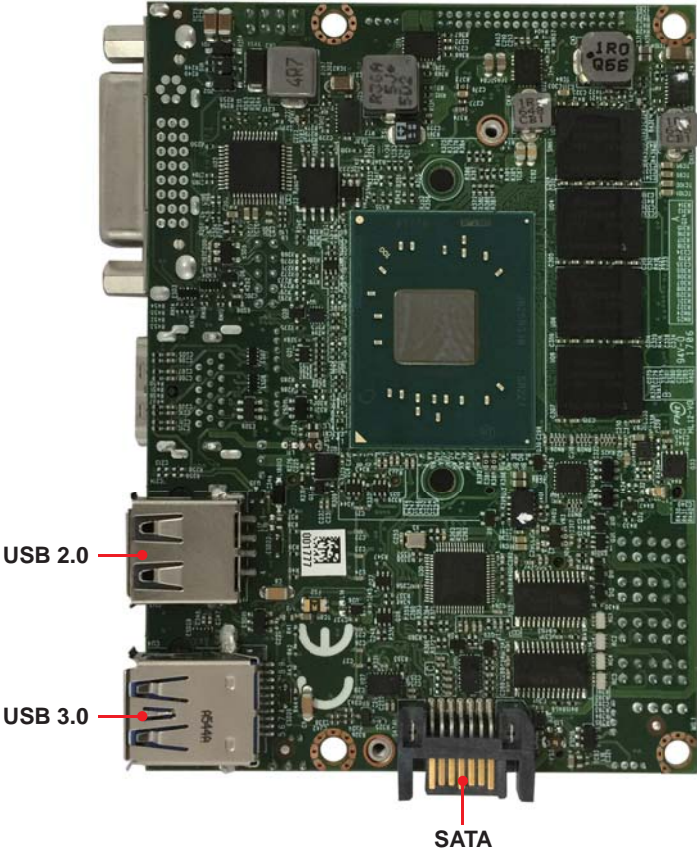


2-5 FUNCTION MAP-2I390CW
TOP

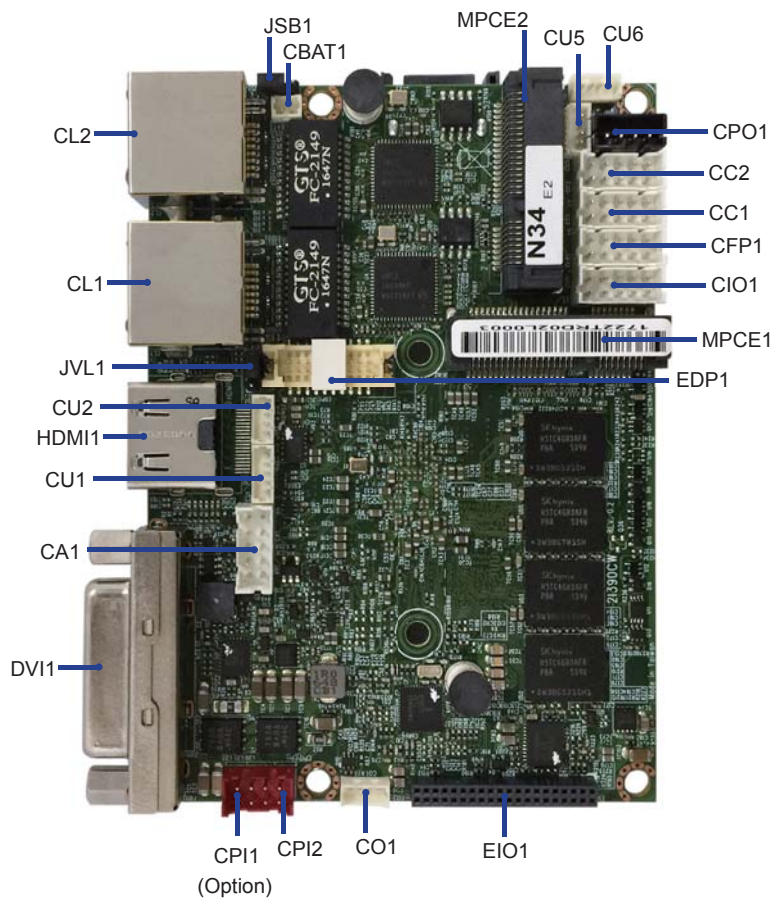


2-5-1 FUNCTION MAP-2I390CW

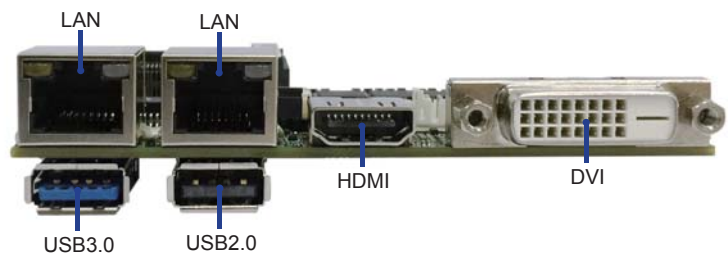
BOT



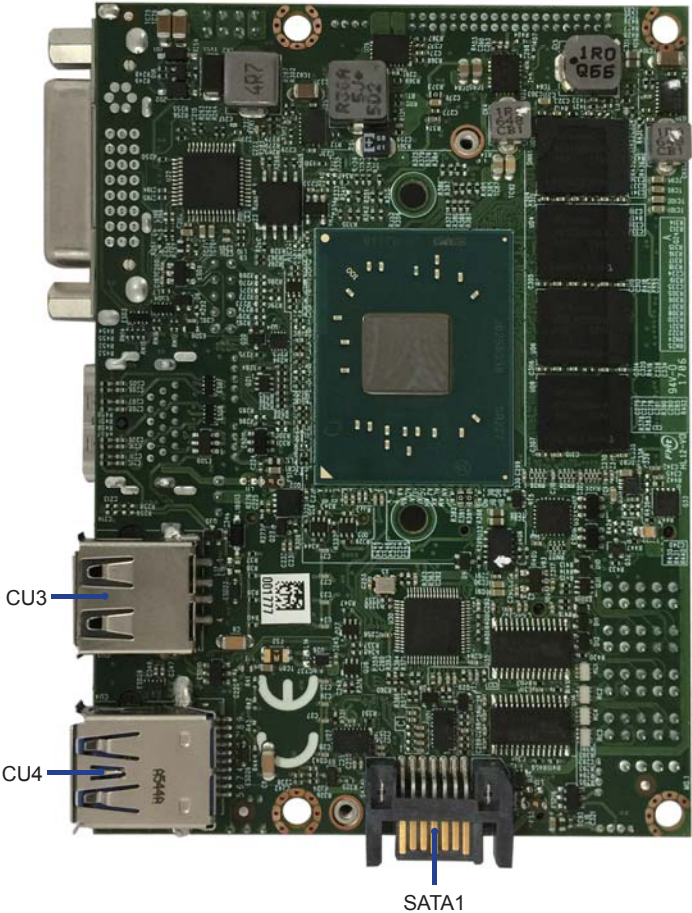
2-6 Diagram- 2I390CW
TOP



BACK Panel- 2I390CW



2-6-1 Diagram- 2I390CW
BOT



2-7 List of Jumpers

JSB1: CMOS DATA Clear

JVL1: LCD panel power select

2-8 Jumper Setting Description

A jumper is ON as a closed circuit with a plastic cap covering two pins. A jumper is OFF as an open circuit without the plastic cap. Some jumpers have three pins, labeled 1, 2, and 3. You could connect either pin 1 and 2 or 2 and 3.

The below figure 2.2 shows the examples of different jumper settings in this manual.

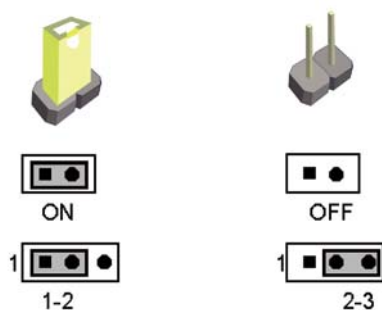


Figure 2.2

All jumpers already have its default setting with the plastic cap inserted as ON, or without the plastic cap as OFF. The default setting may be referred in this manual with a " * " symbol .

2-9 Quick List of jumper setting

A battery must be used to retain the motherboard configuration in CMOS RAM.
Close Pin1 and pin 2 of JSB1 to store the CMOS data.

To clear the CMOS, follow the procedures below:

1. Turn off the system and unplug the AC power.
2. Make sure there is no AC & DC power connect to the system or MB.
3. Close pin 2-3 of JSB1 for a few seconds.
4. Return to default setting by close pin 1-2
5. Connect DC IN power cable back to DC IN Power connector

● **JSB1: CMOS DATA Clear**

JSB1	Description
*1-2	Normal set
2-3	CMOS data clear

Note: Normal work is open jumper

Note: Do not clear CMOS unless

- 1. **Troubleshooting**
- 2. **Forget password**
- 3. **You fail over-clocking system**

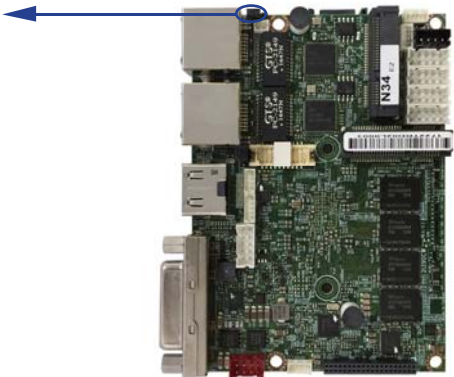
JSB1



*Normal



COMS

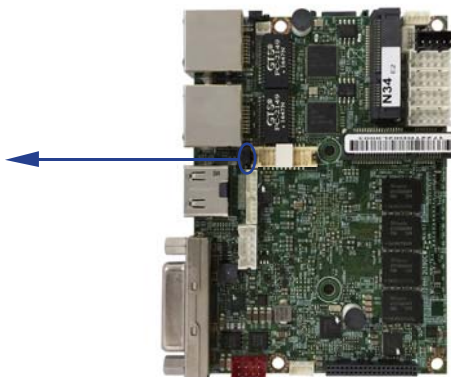
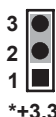


• JVL1: LCD panel power select

JVL1	Description
1-2	+5V
*2-3	+3.3V

Note: Attention! Check Panel Power in spec

JVL1



Chapter-3

Connection

This chapter provides all necessary information of the peripheral's connections, switches and indicators. Always power off the board before you install the peripherals.

3-1 List of Connectors

CBAT1:	Li 3V Battery 1x2pin (1.25mm) Wafer
CA1:	Line-out / Line-in / Mic-in 2x5 pin (2.0mm) Wafer
CC1 :	COM 2x5pin (2.0mm) wafer
CC2 :	COM 2x5pin (2.0mm) wafer
CFP1:	Front Panel connector 2x5pin (2.0mm) wafer
CIO1:	DIO 2x5pin (2.0mm) Wafer
CL1 :	LAN port 1 RJ45 Connector
CL2 :	LAN port 2 RJ45 Connector
CL11 :	LAN port 1 RJ45 2x4pin (2.0mm) wafer (option)
CL21 :	LAN port 2 RJ45 2x4pin (2.0mm) wafer (option)
CO1:	I ² C Bus 1x4pin (1.25mm) Wafer
CPI1:	DC 12V-IN 1x4pin (2.0mm) Red wafer connector (option)
CPI2:	DC 12V-IN 2x4pin (2.0mm) Red wafer connector
CPO1:	+12V / +5V power output 1x4pin (2.0mm) Black wafer connector
CU1:	USB 3.0 port 1x5pin (1.25mm) Wafer
CU2:	USB 2.0 port 1x4pin (1.25mm) Wafer
CU3:	USB 2.0 Type A connector
CU4:	USB 3.0 Type A connector
CU5:	USB 2.0 port 1x4pin (1.25mm) Wafer
CU6:	USB 2.0 port 1x4pin (1.25mm) Wafer
EDP1:	eDP 2x10pin (1.25mm) connector
SATA1:	One SATA connector 7pin
MPCE1:	Full size mini card port 1 sockets 52pin
MPCE2:	Half size mini card port 2 sockets 52pin
DVI1:	DVI-D connector
HDMI1:	HDMI connector
EIO1:	eIO port 2x20pin (1.27mm) Wafer

3-2 CMOS battery connector

● **CBAT1: 3V Battery wafer connector (1x2pin 1.25mm)**

PIN NO.	Description
1	GND
2	+3V

* Batter use Li 3V / 220mA (CR2032)

Note :

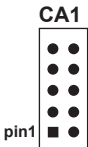
- 1. When board without Adaptor plug in, this board power RTC consumption 2.7uA
- 2. If adaptor always plug in RTC power consumption 0.1uA



3-3 Audio interface

● **CA1: Line-out / Line-in / Mic-in wafer connector (2x5pin 2.0mm)**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Line-out-R	2	MIC-IN
3	Line-in-R	4	GND
5	GND	6	GND
7	Line-in-L	8	+5V
9	Line-out-L	10	MIC-IN



3-4 COM interface

●COM1/2 RS232 or RS485 or RS422 form BIOS select.
COM1, COM2 default support RS232.

●CC1/2 wafer connector (2x5pin 2.0mm) (RS232 Mode)

PIN NO.	Description	PIN NO.	Description
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI /Voltage
5	GND		

Note: The CC1 pin9 RI can be modify to Power to supply device. The power voltage can be set +12V or +5V. The RI change Voltage function is OEM need change BOM. Default is RI signal.

● CC1/2 wafer connector (2x5pin 2.0mm) (RS485 Mode)

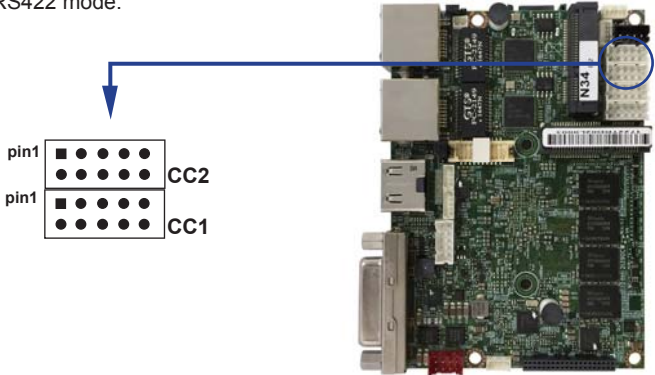
PIN NO.	Description	PIN NO.	Description
1	RS485 Data+	6	NC
2	RS485 Data-	7	NC
3	NC	8	NC
4	NC	9	NC
5	GND		

Note: 1. BIOS need setting to RS485 mode.

● CC1/2 wafer connector (2x5pin 2.0mm) (RS422 Mode)

PIN NO.	Description	PIN NO.	Description
1	RS422 TX-	6	NC
2	RS422 TX+	7	NC
3	RS422 RX+	8	NC
4	RS422 RX-	9	NC
5	GND		

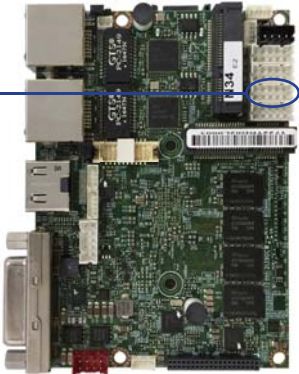
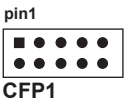
Note: 1. BIOS need setting to RS422 mode.



3-5 Front Panel Pin Header

● CFP1: Front Panel wafer connector (2x5pin 2.0mm)

PIN NO.	Description	PIN NO.	Description
1	Power button pin	2	Power button GND
3	Reset pin	4	Reset GND
5	Power LED-	6	Power LED+
7	HDD LED-	8	HDD LED+
9	LAN LED-	10	LAN LED+



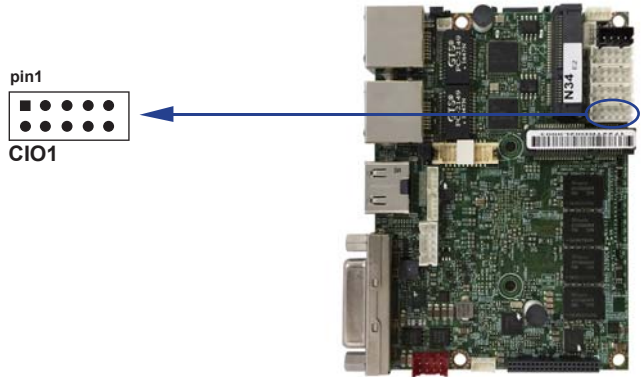
3-6 Digital Input / Output / Watch Dog Time

• CIO1 DIO 0~3 wafer connector (2x5pin 2.0mm)

PIN NO.	Description	PIN NO.	Description
1	DI-0	2	DO-3
3	DI-1	4	DO-2
5	DI-2	6	DO-1
7	DI-3	8	DO-0
9	GND	10	+5V

Note:

- 1. DI pin default pull up 10KΩ to +5V
- 2. If use need isolate circuit to control external device
- 3. F75111N-1 I²C bus address 0x9c



For F75111N I²C watch dog timer device:

DC spec:

Input low Voltage (VIL): +0.8 Max,

Input High Voltage (VIH): +2V Min

Output low Current (IOL): 10mA (Min) VOL=0.4V

Output High Current (IOH): -10mA (Min) VOL=2.4V

Watch Dog Time value 0~255 sec

The system will be issued reset. When WDT is enable the hardware start down counter to zero.

The reset timer have 10~20% tolerance upon the Temperature.

Note: If want to SDK support. Please contact to sales window.

Appendix C: F75111N I²C DIO device

3-6-1 IO Device: F75111 under DOS

The Sample code source you can download from

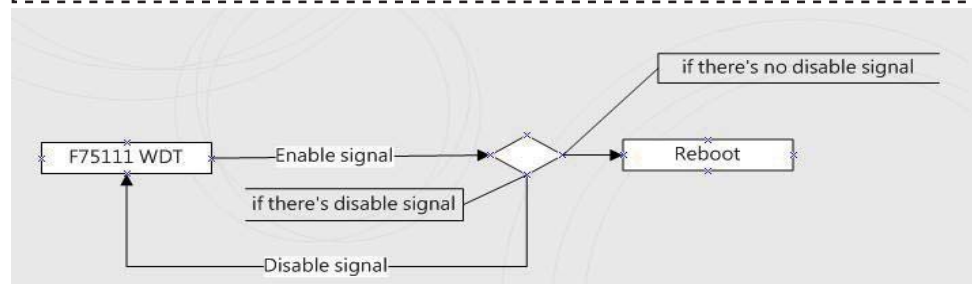
Source file: F75111_Dos_Src.rar http://tprd.info/lexwiki/index.php/IO_Device:F75111_under_DOS

Binary file: F75111_Dos_Bin.rar

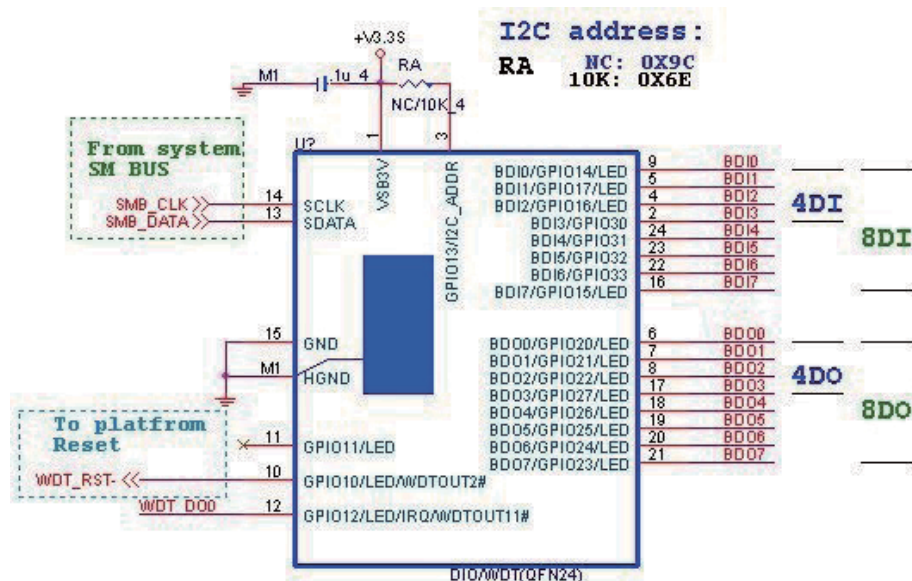
USERNAME & PASSWORD: sf

How to use this Demo Application

- 1.Boot Ms-Dos Operating System
- 2.execute "75WDT.EXE" binary file
- 3.Input 1 to Enable WDT timer or input 0 to Disable it.
- 4.input numbers of second for chip countdown and Reset Computer



F75111 Layout Picture



Introduction

How to use this Demo Application

```
WriteI2CByte(I2CADDR, CONFIG, 0x03);//Set Watch Dog Timer function
WriteI2CByte(I2CADDR, WDT_TIMER, timer);//Set Watch Dog Timer range from 0-255.
WriteI2CByte(I2CADDR, WDT_TIMER_CTL, 0x73);//Enable Watch Dog Timer in second and pulse mode
```

How to use this Demo Application

```
WriteI2CByte(I2CADDR, WDT_TIMER_CTL, 0x00);
```

How to use this Demo Application

```
void pause(int time)
{
    asm mov ah,0h;    //Ah = 00 Read System Time Counter
    asm int 1ah;      //read time from Time Counter and store it in DX register
    asm add dx,time;
    asm mov bx,dx;
    label:
    asm int 1ah;
    asm cmp bx,dx;
    asm jne label;
}
```

3-6-2 IO Device: F75111 under Windows

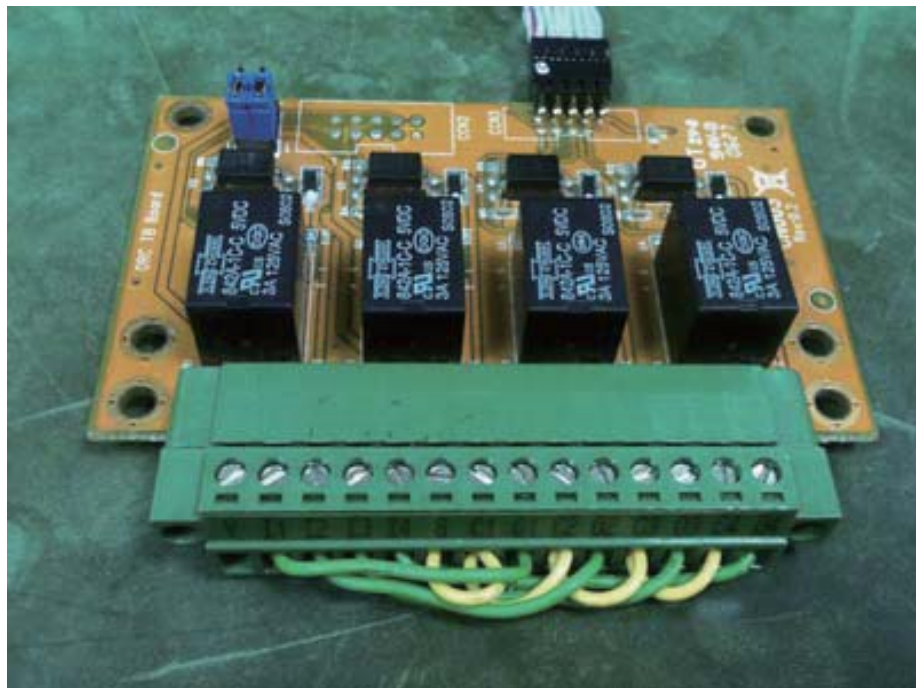
The Sample code source you can download from

Source file: F75111_DIO_Src_v2.8W(32bit).zip http://tprd.info/lexwiki/index.php/IO_Device:F75111

Binary file: F75111_DIO_Bin_v2.8W(32bit).zip

USERNAME & PASSWORD: sf

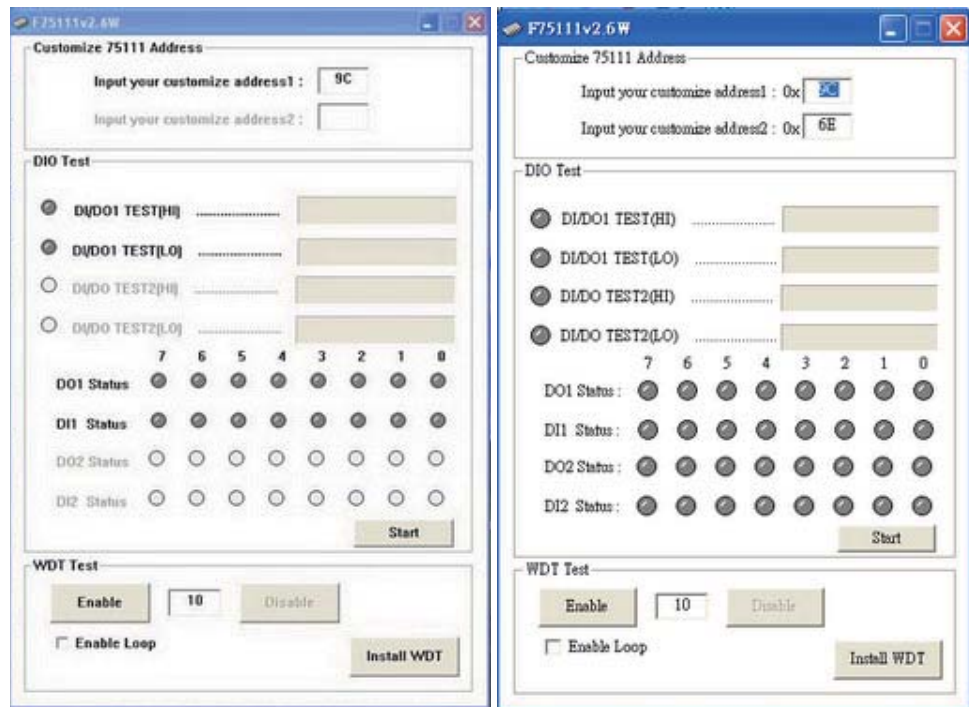
We do the demo test with a test tool which Dlx connect to DOx with Relay.



How to use this Demo Application



one F75111

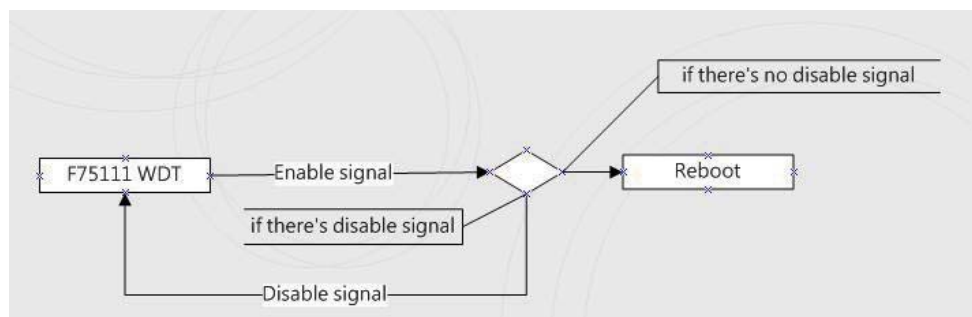
two F75111



Attention Please: You must be install vcredist_x86.exe when first time you run the F75111_DIO.exe DEMO AP, The vcredist_x86.exe include all required DLL file.

WARNING: win7 system architecture, use the system administrator to open DIO utility

1. Press the "Start" button to test DIO function
2. Press the "Enable" button to test WDT function
3. Press the "Disable" button to disable WDT
4. Check the "Enable Loop" box and press "Enable" to do WDT loop test
5. Press "Install WDT" to set the system to autorun this application when booting, press again to remove this application when booting.
6. If WDT enable, system icon will be . if disable, system icon will be .



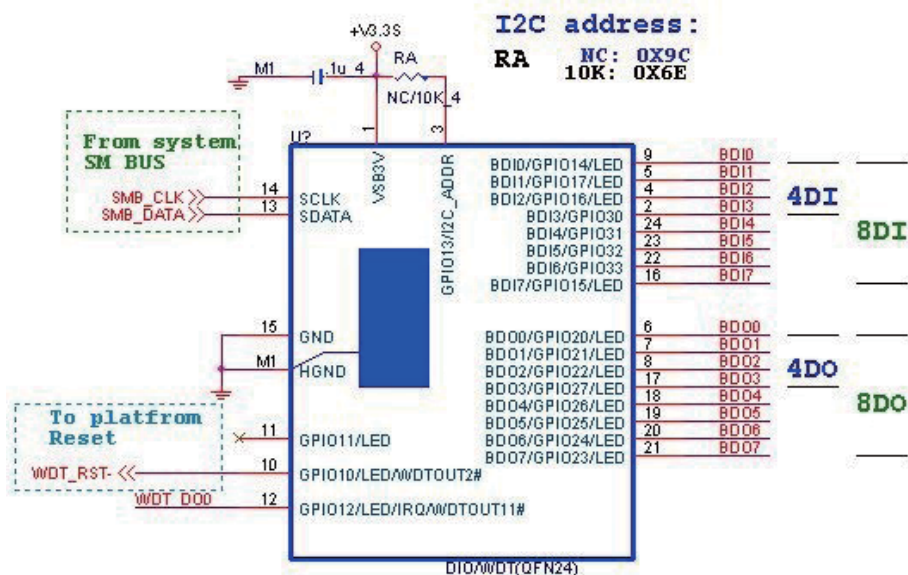
p.s.

f75111 send "F75111_SetWDTEnable(BYTE byteTimer)" including a parameter "timer",

if there's no disable signal (F75111_SetWDTDisable()) to stop it before timer countdown to 0, System will reboot.

if there's disable signal received, resent Enable WDT signal, for a loop to prevent from reboot

F75111 Layout Picture



Introduction

Initial Internal F75111 port address (0x9c)

define GPIO1X, GPIO2X, GPIO3X to input or output
and Enable WDT function pin

Set F75111 DI/DO (sample code as below Get Input value/Set output value)

DO: InterDigitalOutput(BYTE byteValue)

DI: InterDigitalInput()

Enable/Disable WDT

```
Enable : F75111_SetWDTEnable (BYTE byteTimer)
Disable: F75111_SetWDTDisable ()
```

PULSE mode

Sample to setting GP33, 32, 31, 30 output 1mS low pulse signal.

```
{
this->Write_Byte(F75111_INTERNAL_ADDR, GPIO3X_PULSE_CONTROL,      0x00); //This is setting low pulse output
this->Write_Byte(F75111_INTERNAL_ADDR, GPIO3X_PULSE_WIDTH_CONTROL, 0x01); //This selects the pulse width to 1mS
this->Write_Byte(F75111_INTERNAL_ADDR, GPIO3X_CONTROL_MODE,       0x0F); //This is setting the GP33, 32, 31, 30 to output function.
this->Write_Byte(F75111_INTERNAL_ADDR, GPIO3X_Output_Data ,       0x0F); //This is setting the GP33, 32, 31, 30 output data.
}
```

Initial internal F75111

```
void F75111::InitInternalF75111()
{
this->Write_Byte(F75111_INTERNAL_ADDR,GPIO1X_CONTROL_MODE ,0x00); //set GPIO1X to Input function
this->Write_Byte(F75111_INTERNAL_ADDR,GPIO3X_CONTROL_MODE ,0x00); //set GPIO3X to Input function
this->Write_Byte(F75111_INTERNAL_ADDR,GPIO2X_CONTROL_MODE ,0xFF); //set GPIO2X to Output function

this->Write_Byte(F75111_INTERNAL_ADDR,F75111_CONFIGURATION, 0x03); //Enable WDT OUT function
}
```

Set output value

```
void F75111::InterDigitalOutput(BYTE byteValue)
{
BYTE byteData = 0;
byteData = (byteData & 0x01 )? byteValue + 0x01 : byteValue;
byteData = (byteData & 0x02 )? byteValue + 0x02 : byteValue;
byteData = (byteData & 0x04 )? byteValue + 0x04 : byteValue;
byteData = (byteData & 0x80 )? byteValue + 0x08 : byteValue;
byteData = (byteData & 0x40 )? byteValue + 0x10 : byteValue;
byteData = (byteData & 0x20 )? byteValue + 0x20 : byteValue;
byteData = (byteData & 0x10 )? byteValue + 0x40 : byteValue;
byteData = (byteData & 0x08 )? byteValue + 0x80 : byteValue; // get value bit by bit

this->Write_Byte(F75111_INTERNAL_ADDR,GPIO2X_OUTPUT_DATA,byteData); // write byteData value via GPIO2X output pin
}
```

Get Input value

```
BYTE F75111::InterDigitalInput()
{
    BYTE byteGPIO1X = 0;
    BYTE byteGPIO3X = 0;
    BYTE byteData    = 0;

    this->Read_Byte(F75111_INTERNAL_ADDR,GPIO1X_INPUT_DATA,&byteGPIO1X); // Get value from GPIO1X
    this->Read_Byte(F75111_INTERNAL_ADDR,GPIO3X_INPUT_DATA,&byteGPIO3X); // Get value from GPIO3X

    byteGPIO1X = byteGPIO1X & 0xF0; // Mask unuseful value
    byteGPIO3X = byteGPIO3X & 0x0F; // Mask unuseful value

    byteData = ( byteGPIO1X & 0x10 )? byteData + 0x01 : byteData;
    byteData = ( byteGPIO1X & 0x80 )? byteData + 0x02 : byteData;
    byteData = ( byteGPIO1X & 0x40 )? byteData + 0x04 : byteData;
    byteData = ( byteGPIO3X & 0x01 )? byteData + 0x08 : byteData;

    byteData = ( byteGPIO3X & 0x02 )? byteData + 0x10 : byteData;
    byteData = ( byteGPIO3X & 0x04 )? byteData + 0x20 : byteData;
    byteData = ( byteGPIO3X & 0x08 )? byteData + 0x40 : byteData;
    byteData = ( byteGPIO1X & 0x20 )? byteData + 0x80 : byteData; // Get correct DI value from GPIO1X & GPIO3X

    return byteData;
}
```

Enable WatchDog

```
void F75111_SetWDTEnable (BYTE byteTimer)
{
    WriteByte(F75111_INTERNAL_ADDR,WDT_TIMER_RANGE ,byteTimer); // set WatchDog range and timer
    WriteByte(F75111_INTERNAL_ADDR,WDT_CONFIGURATION,WDT_TIMEOUT_FLAG | WDT_ENABLE | WDT_PULSE | WDT_PSWIDTH_100MS);
    // Enable WatchDog, Setting WatchDog configure
}
```

Disable WatchDog

```
void F75111_SetWDTDisable ()
{
    WriteByte(F75111_INTERNAL_ADDR,WDT_CONFIGURATION,0x00); // Disable WatchDog
}
```

define F75111 pin in F75111.h

```
//-----
#define F75111_INTERNAL_ADDR 0x9C // OnBoard F75111 Chipset
#define F75111_EXTERNAL_ADDR 0x6E // External F75111 Chipset
//-----
#define F75111_CONFIGURATION 0x03 // Configure GPIO13 to WDT2 Function
//-----
#define GPIO1X_CONTROL_MODE 0x10 // Select Output Mode or Input Mode
#define GPIO2X_CONTROL_MODE 0x20 // Select GPIO2X Output Mode or Input Mode
#define GPIO3X_CONTROL_MODE 0x40 // Select GPIO3X Output Mode or Input Mode
```

```

//-----
#define GPIO1X_INPUT_DATA                                0x12 // GPIO1X Input
#define GPIO3X_INPUT_DATA                                0x42 // GPIO3X Input
//-----
#define GPIO2X_OUTPUT_DATA                                0x21 // GPIO2X Output
//-----
#define GPIO1X_PULSE_CONTROL                              0x13 // GPIO1x Level/Pulse Control Register
// 0:Level Mode
// 1:Pulse Mode
#define GPIO1X_PULSE_WIDTH_CONTROL                       0x14 // GPIO1x Pulse Width Control Register
#define GP1_PSWIDTH_500US                                0x00 // When select Pulse mode: 500 us.
#define GP1_PSWIDTH_1MS                                  0x01 // When select Pulse mode: 1 ms.
#define GP1_PSWIDTH_20MS                                 0x02 // When select Pulse mode: 20 ms.
#define GP1_PSWIDTH_100MS                                0x03 // When select Pulse mode: 100 ms.
//-----
#define GPIO2X_PULSE_CONTROL                              0x23 // GPIO2x Level/Pulse Control Register
// 0:Level Mode
// 1:Pulse Mode
#define GPIO2X_PULSE_WIDTH_CONTROL                       0x24 // GPIO2x Pulse Width Control Register
#define GP2_PSWIDTH_500US                                0x00 // When select Pulse mode: 500 us.
#define GP2_PSWIDTH_1MS                                  0x01 // When select Pulse mode: 1 ms.
#define GP2_PSWIDTH_20MS                                 0x02 // When select Pulse mode: 20 ms.
#define GP2_PSWIDTH_100MS                                0x03 // When select Pulse mode: 100 ms.
//-----
#define GPIO3X_PULSE_CONTROL                              0x43 // GPIO3x Level/Pulse Control Register
// 0:Level Mode
// 1:Pulse Mode
#define GPIO3X_Output_Data                                0x41 // GPIO3x Output Data Register
#define GPIO3X_PULSE_WIDTH_CONTROL                       0x44 // GPIO3x Pulse Width Control Register
#define GP3_PSWIDTH_500US                                0x00 // When select Pulse mode: 500 us.
#define GP3_PSWIDTH_1MS                                  0x01 // When select Pulse mode: 1 ms.
#define GP3_PSWIDTH_20MS                                 0x02 // When select Pulse mode: 20 ms.
#define GP3_PSWIDTH_100MS                                0x03 // When select Pulse mode: 100 ms.
//-----
#define WDT_TIMER_RANGE                                  0x37 // 0-255 (second or minute program by WDT_UNIT)
#define WDT_CONFIGURATION                                0x36 // Configure WDT Function
#define WDT_TIMEOUT_FLAG                                  0x40 // When watchdog timeout.this bit will be set to 1.
#define WDT_ENABLE                                        0x20 // Enable watchdog timer
#define WDT_PULSE                                         0x10 // Configure WDT output mode
// 0:Level Mode
// 1:Pulse Mode
#define WDT_UNIT                                           0x08 // Watchdog unit select.
// 0:Select second.
// 1:Select minute.
#define WDT_LEVEL                                           0x04 // When select level output mode:
// 0:Level low
// 1:Level high
#define WDT_PSWIDTH_1MS                                    0x00 // When select Pulse mode: 1 ms.
#define WDT_PSWIDTH_20MS                                   0x01 // When select Pulse mode: 20 ms.
#define WDT_PSWIDTH_100MS                                  0x02 // When select Pulse mode: 100 ms.
#define WDT_PSWIDTH_4000MS                                 0x03 // When select Pulse mode: 4 s.

```

3-6-3 IO Device: F75111 VB6 under Windows

The Sample code source you can download from

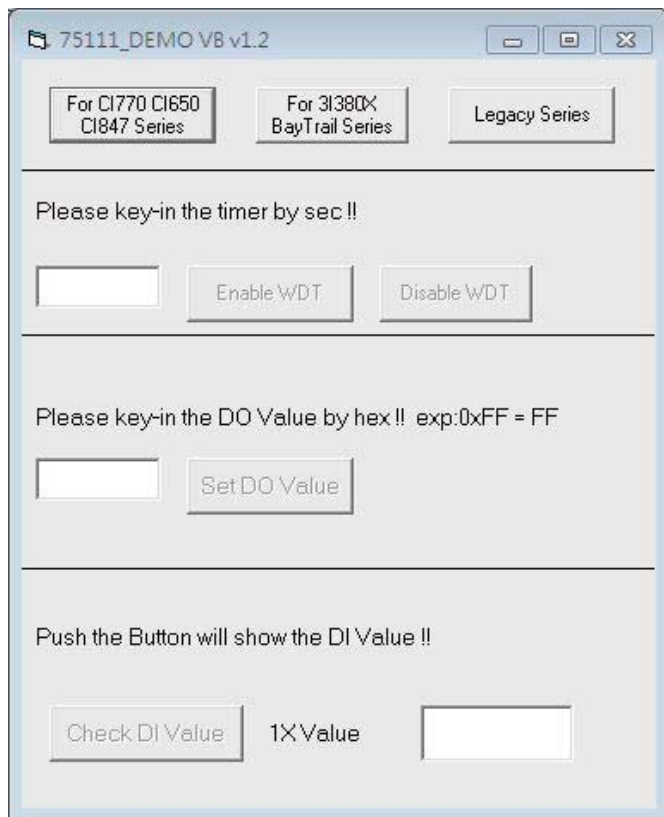
Source file: 75111_VB_v1.2.rar

http://tprd.info/lexwiki/index.php/IO_Device:F75111_VB6

Binary file: 75111_VB_Src1.2.rar

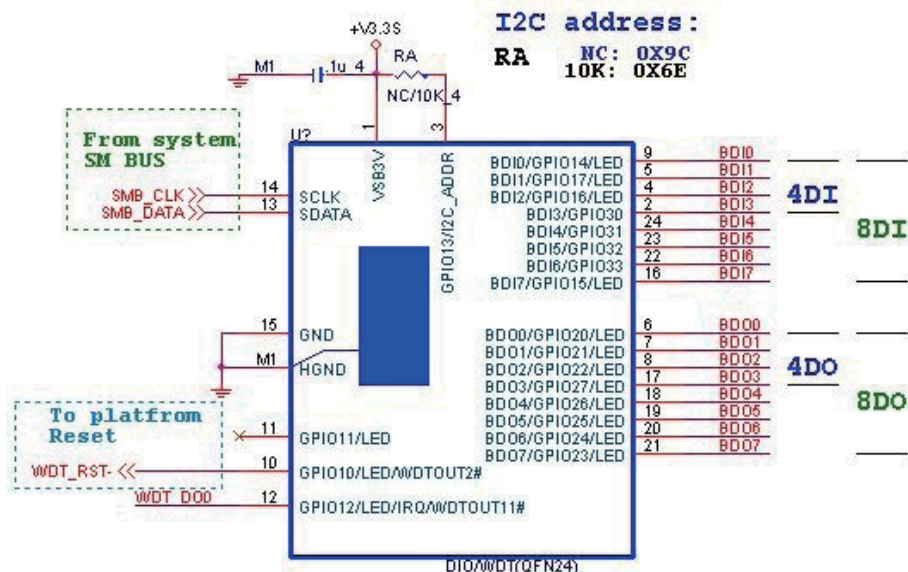
USERNAME & PASSWORD: sf

How to use this Demo Application



- A Function - Choose your motherboard model
- B Function - Enable WDT timer ,Key-in the value by seconds then system will reboot after value which you key-in in left text box !!
- C Function - Disable WDT timer ,Push down the button then WDT timer value will be clear !!
- D Function - Set DO Value ,Key-in the DO value by hex then push the button !!
- E Function - Check DI Value ,The right side two text box will display DI 1X & 2X Value when you push down the button!!

F75111 Layout Picture



SDK Function Introduction

Function EnableWDT

Function EnableWDT(timer As Integer)

Call WriteI2CByte(&H3, &H3)
 Call WriteI2CByte(&H37, timer)
 Call WriteI2CByte(&H36, &H73)

End Function

Function DisableWDT

Function DisableWDT()

Call WriteI2CByte(&H36, &H0)

End Function

Function SetDOValue

```
Function SetDOValue(dovalue As Integer)
```

```
Dim Data As Integer
```

```
Dim Value As Integer
```

```
Data = 0
```

```
Value = dovalue
```

```
If (Value And &H1) <> 0 Then
```

```
    Data = Data + &H1
```

```
End If
```

```
If (Value And &H2) <> 0 Then
```

```
    Data = Data + &H2
```

```
End If
```

```
If (Value And &H4) <> 0 Then
```

```
    Data = Data + &H4
```

```
End If
```

```
If (Value And &H80) <> 0 Then
```

```
    Data = Data + &H8
```

```
End If
```

```
If (Value And &H40) <> 0 Then
```

```
    Data = Data + &H10
```

```
End If
```

```
If (Value And &H20) <> 0 Then
```

```
    Data = Data + &H20
```

```
End If
```

```
If (Value And &H10) <> 0 Then
```

```
    Data = Data + &H40
```

```
End If
```

```
If (Value And &H8) <> 0 Then
```

```
    Data = Data + &H80
```

```
End If
```

```
Call WriteI2CByte(&H23, &H0)
```

```
Call WriteI2CByte(&H20, &HFF)
```

```
Call WriteI2CByte(&H2B, &HFF)
```

```
Call WriteI2CByte(&H21, Data)
```

```
End Function
```

Function CheckDIValue

```
Function CheckDIValue()  
Dim GPIO1X As Integer  
Dim GPIO3X As Integer  
Dim DI1Xhex As String  
Dim DI3Xhex As String  
  
Dim Data As Long  
  
Data = 0  
  
Call ReadI2CByte(&H12, GPIO1X)  
Call ReadI2CByte(&H42, GPIO3X)  
  
GPIO1X = GPIO1X And &HF0  
GPIO3X = GPIO3X And &HF  
  
If (GPIO1X And &H10) <> 0 Then  
    Data = Data + &H1  
End If  
  
If (GPIO1X And &H80) <> 0 Then  
    Data = Data + &H2  
End If  
  
If (GPIO1X And &H40) <> 0 Then  
    Data = Data + &H4  
End If  
  
If (GPIO3X And &H1) <> 0 Then  
    Data = Data + &H8  
End If  
  
If (GPIO3X And &H2) <> 0 Then  
    Data = Data + &H10  
End If  
  
If (GPIO3X And &H4) <> 0 Then  
    Data = Data + &H20  
End If  
  
If (GPIO3X And &H8) <> 0 Then  
    Data = Data + &H40  
End If  
  
If (GPIO1X And &H20) <> 0 Then  
    Data = Data + &H80  
End If  
  
DI1Xhex = Hex(Data)  
  
Text3.Text = "0x" + DI1Xhex  
  
End Function
```

3-6-4 IO Device: F75111 under linux

The Sample code source you can download from

Source file: F75111v2.4L_SRC.tar.gz http://tprd.info/lexwiki/index.php/IO_Device:F75111_under_linux

Binary file: F75111v2.4L_BIN.tar.gz

USERNAME & PASSWORD: sf

How to compile source code

1. Compile source code with Code::Blocks

download and install the Code::Block with command "apt-get install codeblocks"

Open an exist project(F75111.cbp) in Code::Blocks, click the compile button

(add an option 'pkg-config --libs gtk+-2.0 gthread-2.0' in "Project->Build Option->Linker Setting->Other linker option")

2. Compile source code with "make"

1. cd F75111

1. make

1. src/f75111 // execute the binary file

How to use this Demo Application

F75111v2.3L

Customize F75111 Address : 0x

DIO Test

DI / DO Test (Low)

DI / DO Test (High)

7 6 5 4 3 2 1 0

DO Status ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

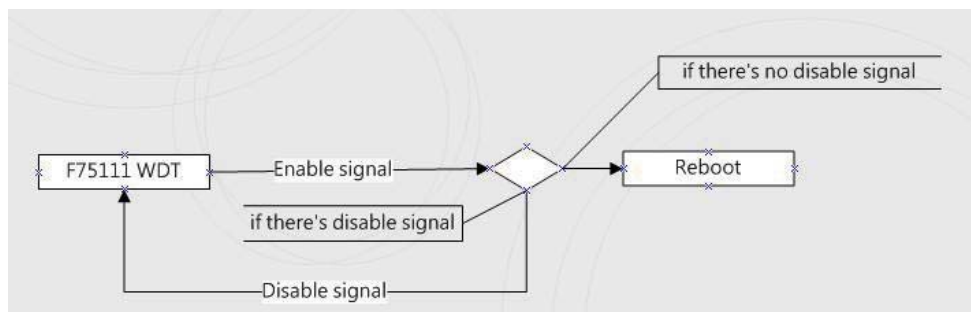
DI Status ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

WDT Test

☐ Enable Loop Test

WDT Stand by

1. Press the "Start" button to test DIO function
2. Press the "Enable" button to test WDT function
3. Press the "Disable" button to disable WDT
4. Check the "Enable Loop" box and press "Enable" to do WDT loop test
5. Press "Install" to set the system to autorun this application when booting, press "Uninstall" to remove this application when booting.
6. If WDT enable, system icon will be blinking.



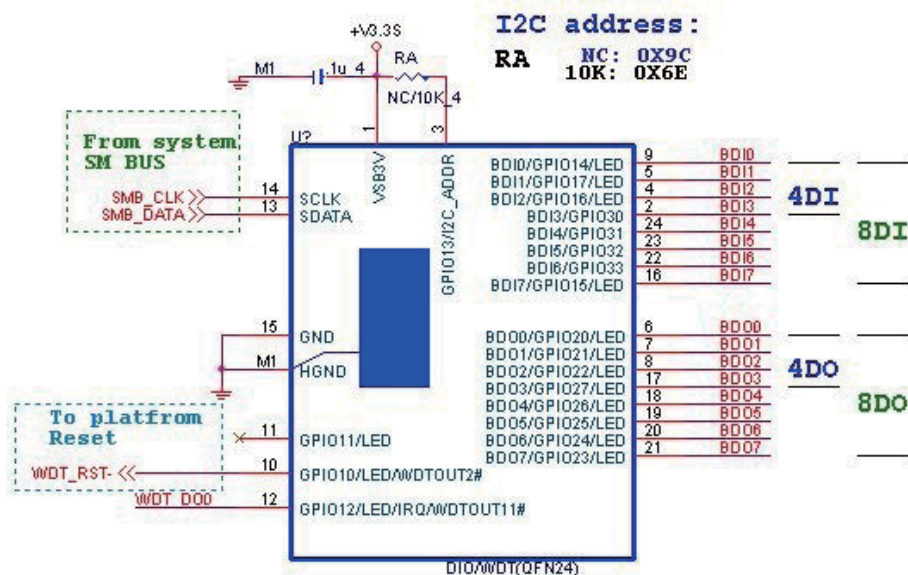
p.s.

f75111 send "F75111_SetWDTEnable(BYTE byteTimer)" including a parameter "timer",

if there's no disable signal (F75111_SetWDTDisable()) to stop it before timer countdown to 0, System will reboot.

if there's disable signal received, resent Enable WDT signal, for a loop to prevent from reboot p.s.

F75111 Layout Picture



Introduction

IO function In file SMBus.c

```
void SMBusIoWrite(BYTE byteOffset,BYTE byteData)
{
    outb( byteData , m_SMBusMapIoAddr + byteOffset);
}

BYTE SMBusIoRead(BYTE byteOffset)
{
    DWORD dwAddrVal;

    dwAddrVal = inb(m_SMBusMapIoAddr + byteOffset);
    return (BYTE)(dwAddrVal & 0xFF);
}
```

Initial internal F75111

```
void F75111::InitInternalF75111()
{
    this->Write_Byte(F75111_INTERNAL_ADDR,GPIO1X_CONTROL_MODE ,0x00);    //set GPIO1X to Input function
    this->Write_Byte(F75111_INTERNAL_ADDR,GPIO3X_CONTROL_MODE ,0x00);    //set GPIO3X to Input function
    this->Write_Byte(F75111_INTERNAL_ADDR,GPIO2X_CONTROL_MODE ,0xFF);    //set GPIO2X to Output function

    this->Write_Byte(F75111_INTERNAL_ADDR,F75111_CONFIGURATION, 0x03);    //Enable WDT OUT function
}
```

Set output value

```
void F75111::InterDigitalOutput(BYTE byteValue)
{
    BYTE byteData = 0;
    byteData = (byteData & 0x01 )? byteValue + 0x01 : byteValue;
    byteData = (byteData & 0x02 )? byteValue + 0x02 : byteValue;
    byteData = (byteData & 0x04 )? byteValue + 0x04 : byteValue;
    byteData = (byteData & 0x08 )? byteValue + 0x08 : byteValue;
    byteData = (byteData & 0x10 )? byteValue + 0x10 : byteValue;
    byteData = (byteData & 0x20 )? byteValue + 0x20 : byteValue;
    byteData = (byteData & 0x40 )? byteValue + 0x40 : byteValue;
    byteData = (byteData & 0x80 )? byteValue + 0x80 : byteValue;    // get value bit by bit

    this->Write_Byte(F75111_INTERNAL_ADDR,GPIO2X_OUTPUT_DATA,byteData);    // write byteData value via GPIO2X output pin
}
```

Get Input value

```
BYTE F75111::InterDigitalInput()
{
    BYTE byteGPIO1X = 0;
    BYTE byteGPIO3X = 0;
    BYTE byteData = 0;

    this->Read_Byte(F75111_INTERNAL_ADDR,GPIO1X_INPUT_DATA,&byteGPIO1X); // Get value from GPIO1X
    this->Read_Byte(F75111_INTERNAL_ADDR,GPIO3X_INPUT_DATA,&byteGPIO3X); // Get value from GPIO3X

    byteGPIO1X = byteGPIO1X & 0xF0; // Mask unuseful value
    byteGPIO3X = byteGPIO3X & 0x0F; // Mask unuseful value

    byteData = ( byteGPIO1X & 0x10 )? byteData + 0x01 : byteData;
    byteData = ( byteGPIO1X & 0x80 )? byteData + 0x02 : byteData;
    byteData = ( byteGPIO1X & 0x40 )? byteData + 0x04 : byteData;
    byteData = ( byteGPIO3X & 0x01 )? byteData + 0x08 : byteData;

    byteData = ( byteGPIO3X & 0x02 )? byteData + 0x10 : byteData;
    byteData = ( byteGPIO3X & 0x04 )? byteData + 0x20 : byteData;
    byteData = ( byteGPIO3X & 0x08 )? byteData + 0x40 : byteData;
    byteData = ( byteGPIO1X & 0x20 )? byteData + 0x80 : byteData; // Get correct DI value from GPIO1X & GPIO3X

    return byteData;
}
```

Enable WatchDog

```
void F75111_SetWDTEnable (BYTE byteTimer)
{
    WriteByte(F75111_INTERNAL_ADDR,WDT_TIMER_RANGE ,byteTimer); // set WatchDog range and timer
    WriteByte(F75111_INTERNAL_ADDR,WDT_CONFIGURATION,WDT_TIMEOUT_FLAG | WDT_ENABLE | WDT_PULSE | WDT_PSWIDTH_100MS);
    // Enable WatchDog, Setting WatchDog configure
}
```

Disable WatchDog

```
void F75111_SetWDTDisable ()
{
    WriteByte(F75111_INTERNAL_ADDR,WDT_CONFIGURATION,0x00); // Disable WatchDog
}
```

```

//-----
#define F75111_INTERNAL_ADDR          0x9C  //   OnBoard F75111 Chipset
#define F75111_EXTERNAL_ADDR         0x6E  //   External F75111 Chipset
//-----
#define F75111_CONFIGURATION          0x03  //   Configure GPIO13 to WDT2 Function
//-----
#define GPIO1X_CONTROL_MODE           0x10  //   Select Output Mode or Input Mode
#define GPIO2X_CONTROL_MODE           0x20  //   Select GPIO2X Output Mode or Input Mode
#define GPIO3X_CONTROL_MODE           0x40  //   Select GPIO3X Output Mode or Input Mode
//-----
#define GPIO1X_INPUT_DATA              0x12  //   GPIO1X Input
#define GPIO3X_INPUT_DATA              0x42  //   GPIO3X Input
//-----
#define GPIO2X_OUTPUT_DATA             0x21  //   GPIO2X Output
//-----
#define GPIO2X_OUTPUT_DRIVING          0x2B  //   Select GPIO2X Output Mode or Input Mode
//-----
#define WDT_TIMER_RANGE                0x37  //   0-255 (second or minute program by WDT_UNIT)
//-----
#define WDT_CONFIGURATION              0x36  //   Configure WDT Function
#define WDT_TIMEOUT_FLAG               0x40  //   When watchdog timeout.this bit will be set to 1.
#define WDT_ENABLE                     0x20  //   Enable watchdog timer
#define WDT_PULSE                      0x10  //   Configure WDT output mode
//                                     //   0:Level Mode
//                                     //   1:Pulse Mode
#define WDT_UNIT                      0x08  //   Watchdog unit select.
//                                     //   0:Select second.
//                                     //   1:Select minute.
#define WDT_LEVEL                     0x04  //   When select level output mode:
//                                     //   0:Level low
//                                     //   1:Level high
#define WDT_PSWIDTH_1MS               0x00  //   When select Pulse mode: 1 ms.
#define WDT_PSWIDTH_20MS              0x01  //   When select Pulse mode: 20 ms.
#define WDT_PSWIDTH_100MS             0x02  //   When select Pulse mode: 100 ms.
#define WDT_PSWIDTH_4000MS            0x03  //   When select Pulse mode: 4 s.
//-----
typedef struct F75111_Address
{
    BYTE bAddress;
}F75111_Address;
F75111_Address m_F75111;

bool      F75111_Init();
BYTE      F75111_GetDigitalInput ();
void      F75111_SetDigitalOutput(BYTE byteValue);

BYTE      F75111_GetWDTMode();
void      F75111_SetWDTMode(BYTE dwvalue);

void      F75111_SetWDTEnable (BYTE byteTimer);
void      F75111_SetWDTDisable ();

```

3-7 LAN Connector

● CL1 / CL2: RJ45 LAN port Giga / 100Mb (RJ45 Jack)

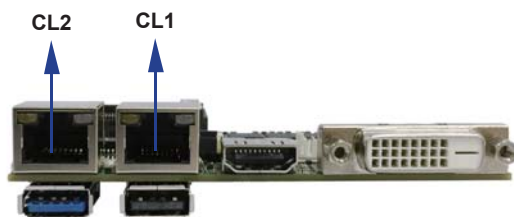
PIN NO.	Description	PIN NO.	Description
1	TD0+/TX+	5	TD2-/NC
2	TD0-/TX-	6	TD1-/RX-
3	TD1+/RX+	7	TD3+/NC
4	TD2+/NC	8	TD3-/NC

● CL11 / CL21 : LAN port Giga / 100Mb wafer connector (2x4pin 2.0mm) (Option)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	TR0-/TX+	2	TR0+/TX-
3	TR2-/NC	4	TR1+/RX-
5	TR1-/RX+	6	TR2-/NC
7	TR3-/NC	8	TR3+/NC

● CL11 / CL21 : LAN port Giga / 100Mb wafer connector (2x4pin 2.0mm) (Option)

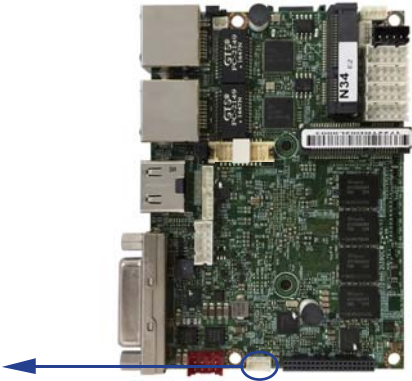
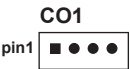
SPEED		10 Mbps			100 Mbps			1000 Mbps		
Indicate	Side	Back		Front	Back		Front	Back		Front
	LED	Link	ACT	ACT	Link	ACT	ACT	Link	ACT	ACT
LAN Light			Orange	Orange	Green	Orange	Orange	Red	Orange	Orange



3-8 I²C Bus Interface

- CO1: I²C-Bus wafer connector (1x4pin 1.25mm)

PIN NO.	DESCRIPTION
1	+3.3V
2	GND
3	I ² C Clock
4	I ² C DATA

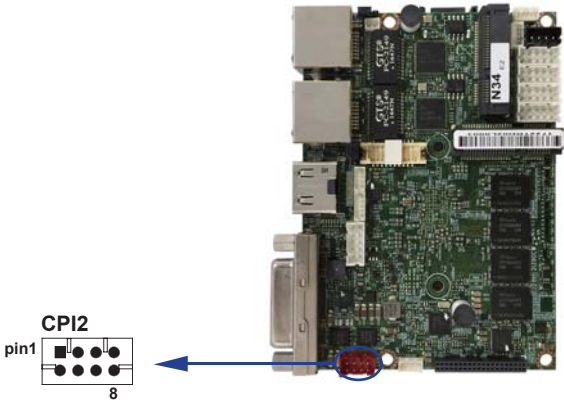


3-9 DC Power Input

● **CPI2: DC-in wafer connector (Red) (2x4pin 2.0mm)**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	DC-IN (12V)	4	DC-IN (12V)
5	DC-IN (12V)	6	DC-IN (12V)
7	GND	8	GND

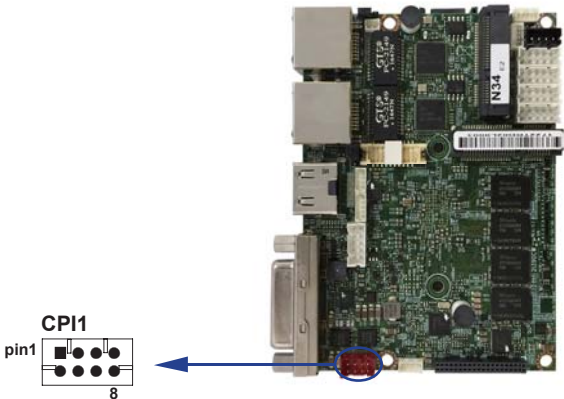
Note: 1. Very important check DC-in Voltage type for 12V or 9~36V model spec



● **CPI1: DC-in wafer connector (Red) (1x4pin 2.0mm) (Option)**

PIN NO.	DESCRIPTION
2,3	DC-IN (12V)
1,4	GND

Note: 1. Very important check DC-in Voltage type for 12V or 9~36V model spec

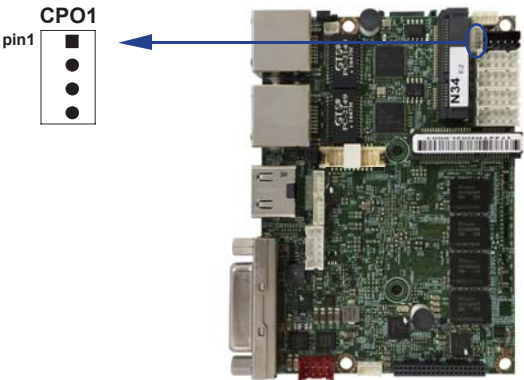


3-10 DC +12V / +5 Voltage Power Output

- CPO1: +12V / +5V DC voltage output wafer connector (Black) (1x4pin 2.0mm)

PIN NO.	DESCRIPTION
1	+5V
2	GND
3	GND
4	+12V *

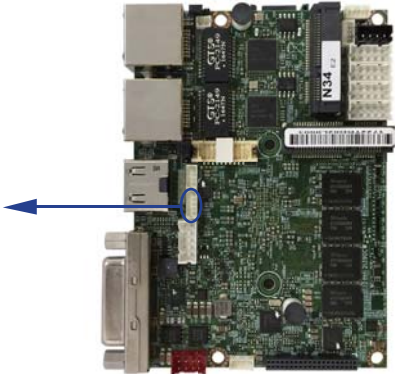
* Note: Attention! Check Device Power in spec



3-11 USB Interface

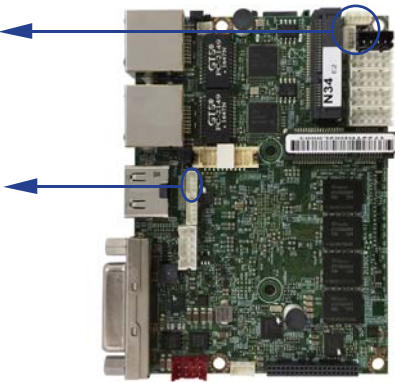
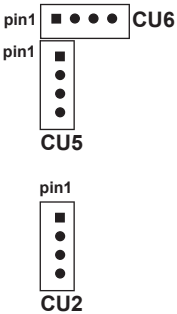
● **CU1: USB 3.0 port wafer (1x4pin 1.25mm)**

PIN NO.	DESCRIPTION
1	DATA_TX+
2	DATA_TX-
3	GND
4	DATA_RX+
5	DATA_RX-



● **CU2 / CU5 / CU6: USB 2.0 port wafer (1x4pin 1.25mm)**

PIN NO.	DESCRIPTION
1	+5V
2	DATA-
3	DATA+
4	GND

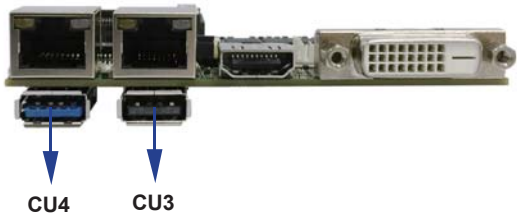


● **CU3: USB 2.0 Port Type A connector**

PIN NO.	DESCRIPTION
1	+5V
2	DATA-
3	DATA+
4	GND

● **CU4: USB3.0 / 2.0 Type A Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
		10	GND
1	+5V	9	USB3.0 TX+
2	USB 2.0 D-	8	USB3.0 TX-
		7	GND
3	USB 2.0 D+	6	USB3.0 RX+
4	GND		
		5	USB3.0 RX-



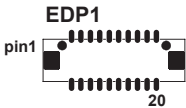
3-12 eDP Display interface

●EDP1: eDP wafer connector (2x10pin 1.25mm)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Lane-0-DATA-	2	+12V or +5V
3	Lane-0-DATA+	4	+12V or +5V
5	Lane-1-DATA-	6	GND
7	Lane-1-DATA+	8	GND
9	Backlight Enable	10	GND
11	PWM dimming for eDP	12	GND
13	I ² C Data	14	+LCD(5V or 3.3V)
15	I ² C Clock	16	+LCD(5V or 3.3V)
17	eDP Aux+	18	+LCD(5V or 3.3V)
19	eDP Aux-	20	GND

Note:

- 1. eDP interface support 2 lanes.
- 2. JVL1 eDP panel +5V / +3.3V (default) Voltage select.
- 3. eDP1 PIN 9 for panel backlight enable. +3.3V Level
- 4. eDP1 PIN 11 for panel backlight SOC dimming control
- 5. eDP1 PIN 2, 4 backlight power default set +12V



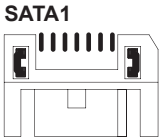
3-13 SATA interface

●SATA1: SATA port 1x7pin Connector

PIN NO.	DESCRIPTION
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Note:

- 1. SATA1 support SATA 2.0 spec update 3Gb/sec.
- 2. CPO1 provide SATA HDD power +12V, GND, +5
- 3. The SATA signal share with mSATA of MPCE1, but just one can be worked in same time.



3-14 HDMI interface

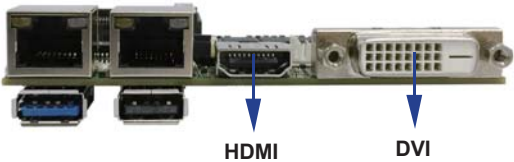
● HDMI1: HDMI Connector (Type A)

PIN NO.	Description	PIN NO.	Description	PIN NO.	Description	PIN NO.	Description
1	TMDS2(p)	2	GND	3	TMDS2(n)	4	TMDS1(p)
5	GND	6	TMDS1(n)	7	TMDS0(p)	8	GND
9	TMDS0(n)	10	TMDS CLK(p)	11	GND	12	TMDSCLK(n)
13	NC	14	NC	15	DDC CLK	16	DDC DATA
17	GND	18	+5V	19	HPD		

3-15 DVI

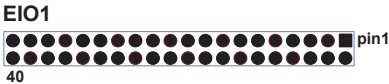
● DVI: DVI 12bit connector down side (DB Connector)

PIN NO.	Description	PIN NO.	Description	PIN NO.	Description
1	Data 2-	9	Data 1-	17	Data 0-
2	Data 2+	10	Data 1+	18	Data 0+
3	GND	11	GND	19	GND
4	NC	12	NC	20	NC
5	NC	13	NC	21	NC
6	I ² C-CLK	14	+5V	22	GND
7	I ² C-DATA	15	GND	23	CLK+
8	NC	16	DVI-DETECT	24	CLK-



3-16 LEX eIO connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+12V	2	+12V
3	GND	4	RESET
5	PCle_TX0_P	6	RESERVED
7	PCle_TX0_N	8	GND
9	GND	10	PCle_P0_RX_N
11	PCle_CLK0_P	12	PCle_P0_RX_P
13	PCle_CLK_0_N	14	GND
15	GND	16	PCle_P1_RX_N
17	PCle_TX1_P	18	PCle_P1_RX_P
19	PCle_TX1_N	20	GND
21	GND	22	RESERVED
23	PCle_CLK1_P	24	RESERVED
25	PCle_CLK1_N	26	GND
27	GND	28	SMB_CLK
29	USB_P	30	SMB_DATA
31	USB_N	32	GND
33	GND	34	SLP_S3_N
35	+12V	36	RESERVED
37	+12V	38	GND
39	+12V	40	+12V



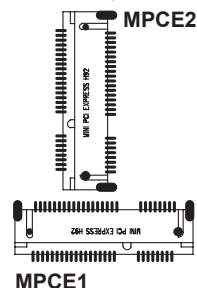
3-17 PCI Express Mini card

- MPCE1 / MPCE2: Support USB and PCIe by one Interface (Mini card socket 52pin)

MPCE1: Full size mini card

MPCE2: Half size mini card

PIN NO.	Description	PIN NO.	Description
1	NC	2	+3.3V
3	NC	4	GND
5	NC	6	+1.5V
7	NC	8	NC
9	GND	10	NC
11	PCIe-CLK-	12	NC
13	PCIe-CLK+	14	NC
15	GND	16	NC
KEY			
17	NC	18	GND
19	NC	20	NC
21	GND	22	Reset
23	PCIe-RX-/mSATA-RX+	24	+3.3V
25	PCIe-RX+/mSATA-RX-	26	GND
27	GND	28	+1.5V
29	GND	30	SMB-CLK
31	PCIe-TX-/mSATA-TX-	32	SMB-DATA
33	PCIe-TX+/mSATA-TX+	34	GND
35	GND	36	USB-DATA-
37	GND	38	USB-DATA+
39	+3.3V	40	GND
41	+3.3V	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	+1.5V
49	NC	50	GND
51	mSATA/PCIe detect	52	+3.3V



Note:

1. MPCE1 Pin51 mSATA / PCIe auto detect function, The mSATA signal share with SATA of SATA1, but just one can be worked in same time.

3-18 Connector wafer of Compatible Brand and part number list

Location	CKTS	PITCH	Brand Name	Mating connector	Cable housing
CA1	2x5 10Pin	2.0mm	JST	B10B-PHDSS	PHDR-10VS
CC1	2x5 10Pin	2.0mm	JST	B10B-PHDSS	PHDR-10VS
CC2	2x5 10Pin	2.0mm	JST	B10B-PHDSS	PHDR-10VS
CBAT1	1x2 2Pin	1.25mm	MOLEX	53047-0210	51021-0200
CFP1	2x5 10Pin	2.0mm	JST	B10B-PHDSS	PHDR-10VS
CIO1	2x5 10Pin	2.0mm	JST	B10B-PHDSS	PHDR-10VS
CL11	2x4 8Pin	2.0mm	JST	B8B-PHDSS	PHDR-08VS
CL21	2x4 8Pin	2.0mm	JST	B8B-PHDSS	PHDR-08VS
CO1	1x4 4Pin	1.25mm	MOLEX	53047-0410	51021-0400
CPI1	1x4 4Pin	2.0mm	JST	B4B-PH-KL	PHR-4
CPI2	2x4 8Pin	2.0mm	JST	B8B-PHDSS	PHDR-08VS
CPO1	1x4 4Pin	2.0mm	JST	B4B-PH-KL	PHR-4
CU1	1x5 5Pin	1.25mm	MOLEX	53047-0510	51021-0500
CU2	1x4 4Pin	1.25mm	MOLEX	53047-0410	51021-0400
CU5	1x4 4Pin	1.25mm	MOLEX	53047-0410	51021-0400
CU6	1x4 4Pin	1.25mm	MOLEX	53047-0410	51021-0400
EDP1	2x10 20Pin	1.25mm	HIROSE	DF13-20DS-1.25C	DF13-20DP-1.25V
EIO1	2x20 20Pin	1.27mm			

Chapter-4

Introduction of BIOS

The BIOS is a program located in the Flash Memory on the motherboard.

This program is a bridge between motherboard and operating system.

When you start the computer, the BIOS program gains control.

The BIOS first operates an auto-diagnostic test called POST (Power on Self Test) for all the necessary hardware, it detects the entire hardware devices and configures the parameters of the hardware synchronization. After these tasks are completed, BIOS will give control of the computer back to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate with, it is the key factor of system stability and of ensuring your system performance at best.

In the BIOS Setup main menu, you can see several options. We will explain these options in the following pages. First, let us see the function keys you may use here:

Press <Esc> to quit the BIOS Setup.

Press ↑↓←→(up, down, left, right) to choose the option you want to confirm or modify.

Press <F10> to save these parameters and to exit the BIOS Setup menu after you complete the setup of BIOS parameters.

Press Page Up/Page Down or +/- keys to modify the BIOS parameters for the active option.

4-1 Enter Setup

Power on the computer and press key immediately to enter Setup.

If the message disappears before your respond but you still wish to enter Setup, restart the system by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart the system by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys.

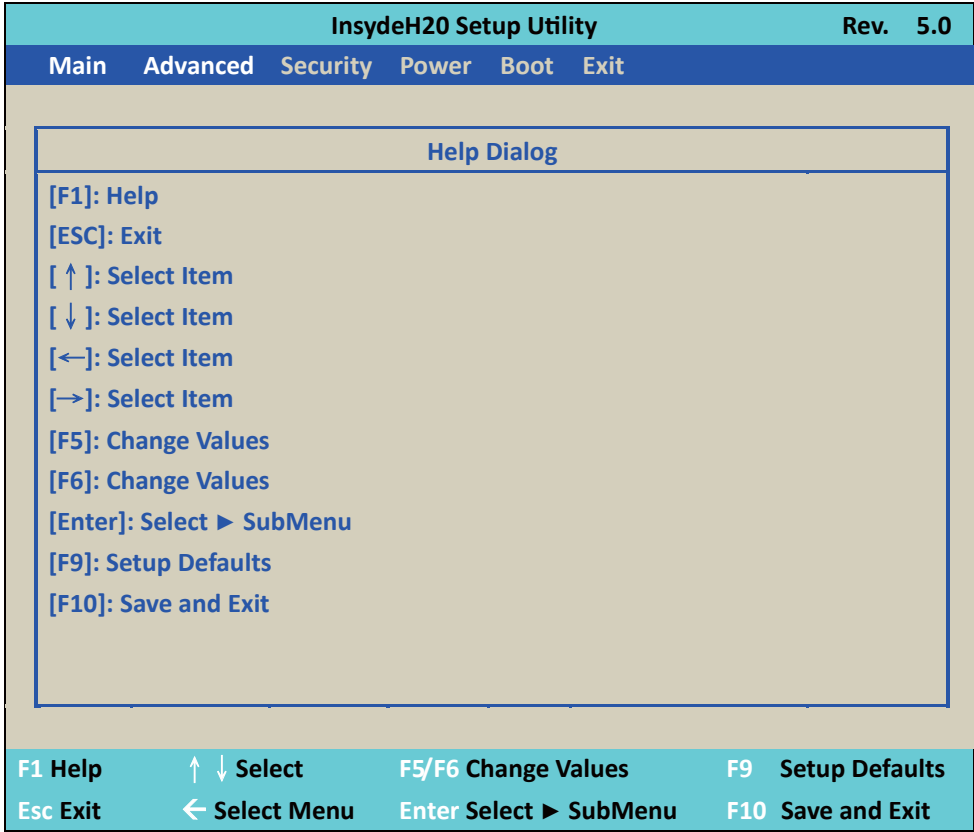
4-2 BIOS Menu Screen & Function Keys

InsydeH20 Setup Utility		Rev. 5.0			
Main	Advanced	Security	Power	Boot	Exit
BIOS Version		2I390CW A1			
Build Date		04 / 07 / 2017 13:59:25			
Processor Type		Intel(R) Celeron(R) CPU N3350 @ 1.10GHz			
System Bus Speed		100 MHz			
System Memory Speed		1600MHz			
Cache RAM		1024 KB			
Total Memory		4096 MB			
Platform firmware information					
BXT SOC		B1 Stepping			
System Time		[00:00:00]			
System Date		[01 / 01 / 2017]			
F1 Help	↑ ↓ Select	F5/F6 Change Values	F9	Setup Defaults	
Esc Exit	← Select Menu	Enter Select ► SubMenu	F10	Save and Exit	

In the above BIOS Setup main menu of, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press ←→ (left, right) to select screen;
- Press ↑↓ (up, down) to choose, in the main menu, the option you want to confirm or to modify.
- Press <Enter> to select.
- Press <+>/<-> or <F5>/<F6> keys when you want to modify the BIOS parameters for the active option.
- [F1]: General help.
- [F9]: Optimized defaults.
- [F10]: Save & Exit.
- Press <Esc> to quit the BIOS Setup.

4-3 Getting Help



Status Page Setup Menu / Option Page Setup Menu

Press F1 to pop up a help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc>.

4-4 Menu Bars

There are six menu bars on top of BIOS screen:

- Main** To change system basic configuration
- Advanced** To change system advanced configuration
- Security** Password settings
- Power** PME & Power button settings
- Boot Exit** Save setting, loading and exit options.

User can press the right or left arrow key on the keyboard to switch from menu bar. The selected one is highlighted.

4-5 Main

InsydeH2O Setup Utility

Rev. 5.0

MainAdvancedSecurityPowerBootExit

BIOS Version2I390CW A1

Build Date04 / 07 / 2017 13:59:25

Processor TypeIntel(R) Celeron(R) CPU N3350 @ 1.10GHz

System Bus Speed100 MHz

System Memory Speed1600MHz

Cache RAM1024 KB

Total Memory4096 MB

Platform firmware information

BXT SOC B1 Stepping

System Time [00:00:00]

System Date [01 / 01 / 2017]

F1 Help↑ ↓ SelectF5/F6 Change ValuesF9 Setup Defaults

Esc Exit← Select MenuEnter Select ► SubMenuF10 Save and Exit

Main menu screen includes some basic system information. Highlight the item and then use the <+> or <-> and numerical keyboard keys to select the value you want in each item.

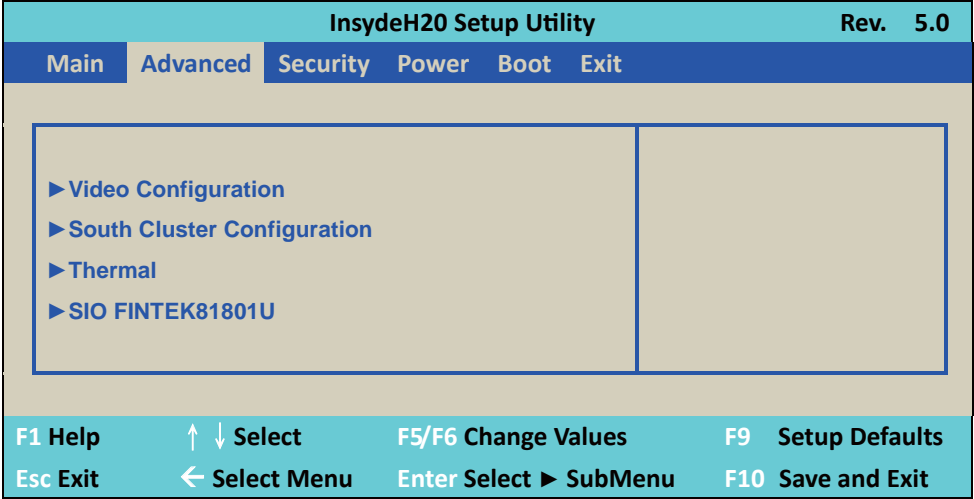
System Date

Set the Date. Please use [Tab] to switch between data elements.

System Time

Set the Time. Please use [Tab] to switch between data elements.

4-6 Advanced



Video Configuration

Please refer section 4-6-1

South Cluster Configuration

Please refer section 4-6-2

Thermal

Please refer section 4-6-4

SIO FINETEK 81801U

Please refer section 4-6-5

4-6-1 Video Configuration

InsydeH20 Setup Utility		Rev. 5.0
Advanced		
IGD Configuration		Selects the Aperture Size
Aperture Size	<256MB>	
DVMT Pre-Allocated	<64M>	
DVMT Total Gfx Mem	<256M>	
F1 Help	↑ ↓ Select	F5/F6 Change Values
Esc Exit	← Select Menu	Enter Select ► SubMenu
		F9 Setup Defaults
		F10 Save and Exit

Aperture Size

The optional settings are: 128MB, 256MB (default), 512MB.

IGD-DVMT Pre-Allocated

Use this item to select DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device.

The optional settings are: 64 (default) / 128 / 256 / 512MB

IGD - DVMT Total Gfx Mem

Use this item to select DVMT 5.0 total graphics memory size used by the internal graphics device

The optional settings are:128M, 256M (default), MAX

4-6-2 South Cluster Configuration

InsydeH20 Setup Utility		Rev. 5.0
Advanced		
► HD-Audio Configuration ► PCI Express Configuration ► SATA Drives		
F1 Help	↑ ↓ Select	F5/F6 Change Values
Esc Exit	← Select Menu	Enter Select ► SubMenu
		F9 Setup Defaults
		F10 Save and Exit

4-6-2-1 ► HD-Audio Configuration

InsydeH20 Setup Utility		Rev. 5.0
Advanced		
HD-Audio Configuration HD-Audio Support <Enabled>		Enable / Disable HD-Audio Support
F1 Help	↑ ↓ Select	F5/F6 Change Values
Esc Exit	← Select Menu	Enter Select ► SubMenu
		F9 Setup Defaults
		F10 Save and Exit

HD-Audio Support.
The optional settings are: Enabled (default), Disabled.

4-6-2-2 ► PCI Express Configuration

InsydeH20 Setup Utility		Rev. 5.0
Advanced		
PCI Express Configuration ► Mini PCI Express 1		
F1 Help	↑ ↓ Select	F5/F6 Change Values
Esc Exit	← Select Menu	Enter Select ► SubMenu
		F9 Setup Defaults
		F10 Save and Exit

4-6-2-2-1 ► Mini PCI Express 1

InsydeH20 Setup Utility		Rev. 5.0
Advanced		
Mini PCI Express 1		<Enabled>
PCIe Speed		<Auto>
F1 Help	↑ ↓ Select	F5/F6 Change Values
Esc Exit	← Select Menu	Enter Select ► SubMenu
		F9 Setup Defaults
		F10 Save and Exit

Mini PCI Express 1

The optional settings are: Disabled, Enabled (default) for MPCE1.

PCIe speed.

This item that setting PCIe speed: Auto (default), Gen1, Gen2

4-6-2-3 ► SATA Drives Configuration

InsydeH20 Setup Utility		Rev. 5.0
Advanced		
Chipset-SATA Controller configuration		
Chipset SATA	<Enabled>	
SATA Mode Selection	<AHCI>	
SATA Interface Speed	<Gen3>	
SATA Port 0	[Not Installed]	
SATA Port 1	[Not Installed]	
F1 Help	↑ ↓ Select	F5/F6 Change Values
Esc Exit	← Select Menu	Enter Select ► SubMenu
		F9 Setup Defaults
		F10 Save and Exit

Chipset SATA

Use this item to Enable or Disable SATA function.
The optional settings are: Enabled (default) or Disabled

SATA Mode Select

This does not selected item, it will always work in ACHI mode.

SATA Interface Speed

This item will determine the SATA speed.
The optional settings are: Gen1, Gen2, Gen3 (default)

4-6-3 Thermal

InsydeH20 Setup Utility

Rev. 5.0

Advanced

Thermal Configuration Parameters

Critical Trip Point<110 °C>

Passive Trip Point<105 °C>

This value controls the temperature of The ACPI Critical Trip Point – the point in Which the OS will Shut the system off.

NOTE: 100C is the Plan of Record (POR) For all Intel mobile processors.

F1 Help

↑ ↓ Select

F5/F6 Change Values

F9 Setup Defaults

Esc Exit

← Select Menu

Enter Select ► SubMenu

F10 Save and Exit

Thermal Configuration Parameters

This Value controls the temperature of the ACPI Critical Trip Point, the point in which the OS will shutdown the system.

Critical Trip point is the shutdown temperature, the default value is 110°

The CPU frequency will auto reduce when CPU temperature arrived to passive Trip point.

The default of the passive trip point is 105°

4-6-4 SIO FINTEK81801U configuration

InsydeH2O Setup Utility		Rev. 5.0
Advanced		
Serial Port A	<Enable>	
Base I/O Address	<3F8>	
Interrupt	<IRQ4>	
Serial Mode	<RS232>	
Serial Port B	<Enable>	
Base I/O Address	<2F8>	
Interrupt	<IRQ3>	
Serial Mode	<RS232>	
Power Fail	<Keep State>	
► Hardware Monitor		
F1 Help	↑ ↓ Select	F5/F6 Change Values
Esc Exit	← Select Menu	Enter Select ► SubMenu
		F9 Setup Defaults
		F10 Save and Exit

Serial Port A/B

Use this item to enable or disable serial port (COM1 or COM2).
The optional settings are: Enabled (default), Disabled.

Serial Port A/B Base IO Address/Interrupt

Use this item to select an optimal setting for super IO device.
These optional settings are:

IO=3F8h; IRQ=3,4

IO=3E8h; IRQ=3,4

IO=2E8h; IRQ=3,4

IO=2F8h; IRQ=3,4

The port A default value as IO=3F8h; IRQ=4

The port B default value as IO=2F8h; IRQ=3

Serial Mode

RS232 driver (default): When hardware select to RS232 or RS422 mode, please enter to RS232 driver.
RS485 driver: When hardware select to RS485 mode, please enter to RS485 driver. It is the auto flow function for RS485.

Power Failure

This item specifies whether your system will reboot after a power failure or interrupt occurs.
[Keep state] Restores the system to the status before power failure or interrupt occurred. (default)
[Always on] Leaves the computer in the power on state.
[Always off] Leaves the computer in the power off state.

Hardware Monitor

These are system voltage and temperature message.
The voltage shows the 3 type: VCC3, VCORE, VNN
The Temperature is sense from system not CPU.

4-7 Security

InsydeH20 Setup Utility					Rev. 5.0
Main	Advanced	Security	Power	Boot	Exit
Supervisor Password		Not Install		Install or Change the password and the length of password must be greater than one character.	
Set Supervisor Password					
F1 Help	↑ ↓ Select	F5/F6 Change Values		F9	Setup Defaults
Esc Exit	← Select Menu	Enter Select ► SubMenu		F10	Save and Exit

Supervisor Password

To set up an Supervisor password

1. Select Supervisor Password.
The screen then pops up an Create New Password dialog.
2. Enter your desired password that is no less than 3 characters and no more than 10 characters.
3. Hit [Enter] key to submit.

4-8 Power

InsydeH2O Setup Utility				Rev. 5.0							
Main		Advanced		Security		Power		Boot		Exit	
Wake On USB						<Disabled>					
Wake on LAN						<Disabled>					
ACPI S3						<Disabled>					
F1 Help		↑ ↓ Select		F5/F6 Change Values		F9 Setup Defaults					
Esc Exit		← Select Menu		Enter Select ► SubMenu		F10 Save and Exit					

Wake On USB

Wake On USB form mouse or keyboard when system in S3 state.
The optional settings: S3, Disabled (default)

Wake on LAN

Wake On LAN from LAN1 when system in S3 or S5 state or both.
The optional settings: S3, S5, S3 / S5, Disabled (default)

ACPI S3

Select ACPI sleep state (S3) support.
The optional settings: Enabled or Disabled (default)

4-9 Boot

InsydeH2O Setup Utility			Rev. 5.0		
Main	Advanced	Security	Power	Boot	Exit
Boot Type		<UEFI Boot Type>			
Quiet Boot		<Enabled>			
Network Stack		<Disabled>			
PXE Boot capability		<Disabled>			
► EFI					
F1 Help	↑ ↓ Select	F5/F6 Change Values	F9 Setup Defaults		
Esc Exit	← Select Menu	Enter Select ► SubMenu	F10 Save and Exit		

Boot type

The boot type only work in UEFI Boot mode.

Quiet Boot

The optional settings are: Enabled (default), Disabled.

Network Stack

If use PXE function need enable otherwise disable (default)

PXE Boot capability

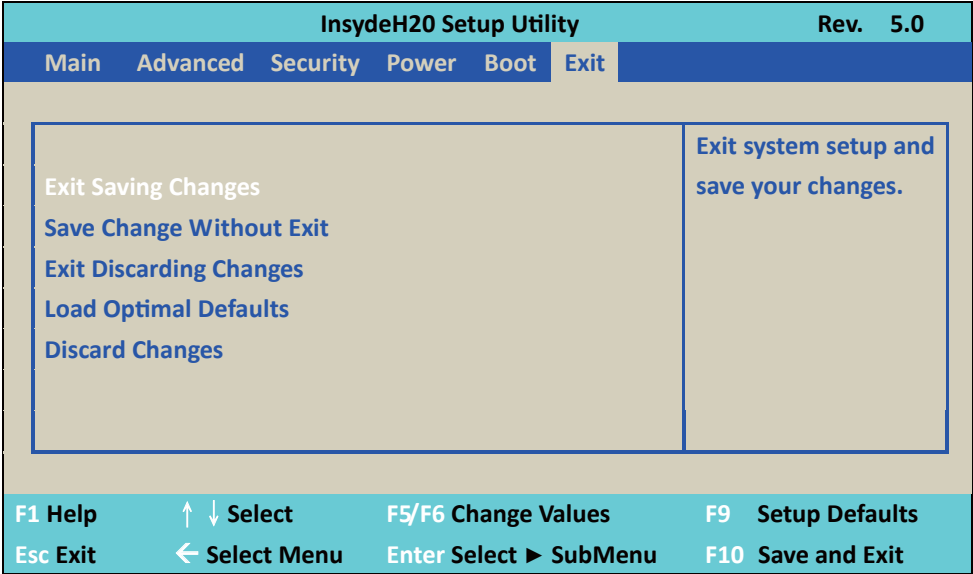
The item determines what protocol operation in PXE, these values are: Disabled (default), UEFI: IPv4, UEFI: IPv6

This is not modifying item. When above item settings disable.

EFI

Determine which EFI storage device too booting. If storage no EFI system that will not shows on the page.

4-10 EXIT



Exit Saving Changes

This item allows user to reset the system after saving the changes.

Save Change Without Exit

This item allows user to saving the changes but doesn't restart.

Exit Discard Changes

This item allows user restart the system but no saving the changes

Load Optimal Default

Use this item to restore the optimal default for all the setup options.

Discard Changes

Use this item to cancel all the setup options.

4-11 How to update Insyde BIOS

Under DOS Mode

STEP 1. Prepare a bootable disc.

(Storage device could be USB FDD or USB pen drive.)

STEP 2. Copy utility program to your bootable disc. You may download it from our website.

STEP 3. Copy the latest BIOS for your LEX motherboard from our website to your bootable disc.

STEP 4. (Here take 2I390CW as an example, please enter your motherboard's name)

Insert your bootable disc into X: (X could be C:, A: or others.

It depends on which type of storage device you use.)

Start the computer and type

X:\: H2OFFT-D.EXE 2I390CWA2.BIN-BIOS-ALL

2I390CWDA2.BIN is the file name of the latest BIOS.

It may be 2I390CWA1.BIN or 2I390CWA2.BIN, etc.

Please leave one space between .BIN & -BIOS -ALL

By Bay Trail series mainboard, please type

X:\: H2OFFT-D.EXE 2I390CWA2.BIN-BIOS-ALL

-BIOS: Flash BIOS region

-ALL: Flash all

STEP 5. Press ENTER and the BIOS will be updated,
Computer will restart automatically.

Appendix A: Power Consumption Test

Condition

Item	Spec
CPU	Intel Pentium N4200 1.10Ghz / Celeron N3350 1.10Ghz
Memory	DDR3L 1600 4GB
Operating System	Windows 10
Test Program	3D Mark 06
HDD 2.5" SATA	Slim Type HDD
mSATA	32GB

Test Result for reference only !

Hard Disk	Processor	Power off	Start up		Operation Maximum	Shut down Maximum	In Put Voltage
			Maximum	Stable			
Slim Type HDD	N4200	0.14A	1.17A	0.55A	1.64A	0.95A	12V
		0.13A	0.63A	0.34A	0.88A	0.54A	24V
	N3350	0.14A	1.03A	0.62A	1.48A	0.92A	12V
		0.13A	0.57A	0.36A	0.79A	0.49A	24V
mSATA	N4200	0.13A	1.05A	0.52A	1.42A	0.79A	12V
		0.13A	0.57A	0.32A	0.75A	0.48A	24V
	N3350	0.14A	0.89A	0.57A	1.39A	0.79A	12V
		0.13A	0.51A	0.34A	0.74A	0.46A	24V

The power consumption depends on your device choice!

Appendix B: Resolution list

640 x 480 x (256 / 16bit / 32bit)
800 x 600 x (256 / 16bit / 32bit)
1024 x 768 x (256 / 16bit / 32bit)
1152 x 864 x (256 / 16bit / 32bit)
1280 x 600 x (256 / 16bit / 32bit)
1280 x 720 x (256 / 16bit / 32bit)
1280 x 768 x (256 / 16bit / 32bit)
1280 x 800 x (256 / 16bit / 32bit)
1280 x 960 x (256 / 16bit / 32bit)
1280 x 1024 x (256 / 16bit / 32bit)
1400 x 1050 x (256 / 16bit / 32bit)
1440 x 900 x (256 / 16bit / 32bit)
1600 x 900 x (256 / 16bit / 32bit)
1600 x 1200 x (256 / 16bit / 32bit)
1680 x 1050 x (256 / 16bit / 32bit)
1920 x 1080 x (256 / 16bit / 32bit)
1920 x 1200 x (256 / 16bit / 32bit)