SE-602-N

User Manual

Revision	Release Date
V1.0	2016/01/18

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Safety Information

Your SE-602-N is designed and tested to meet the latest standards of safety for information technology equipment. However, to ensure your safety, it is important that you read the following safety instructions

Setting up your system

- Read and follow all instructions in the documentation before you operate your system.
- Do not use this product near water.
- Set up the system on a stable surface. Do not secure the system on any unstable plane.
- Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
- Slots and openings on the chassis are for ventilation. Do not block or cover these openings. Make sure you leave plenty of space around the system for ventilation. ***Never insert objects of any kind into the ventilation openings***.
- This system should be operated from the type of power indicated on the marking label. If you are not sure of the type of power available, consult your dealer or local power company.
- Use this product in environments with ambient temperatures between -40˚C and 75˚C.
- If you use an extension cord, make sure that the total ampere rating of the devices plugged into the extension cord does not exceed its ampere rating.
- DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -50° C (-58° F) OR ABOVE 85° C (185° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.

Care during use

- Do not walk on the power cord or allow anything to rest on it.
- Do not spill water or any other liquids on your system.
- When the system is turned off, a small amount of electrical current still flows. Always unplug all power, and network cables from the power outlets before cleaning the system.
- If you encounter the following technical problems with the product, unplug the power cord and contact a qualified service technician or your retailer.
  - The power cord or plug is damaged.
  - Liquid has been spilled into the system.
  - The system does not function properly even if you follow the operating instructions.
  - The system was dropped or the cabinet is damaged.

Lithium-Ion Battery Warning

CAUTION: Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

NO DISASSEMBLY

The warranty does not apply to the products that have been disassembled by users

WARNING
HAZARDOUS MOVING PARTS
KEEP FINGERS AND OTHER BODY PARTS AWAY

Equipment Location

This equipment can only be accessed by SERVICE PERSONNEL or by USERS who have been instructed about the reasons for the restrictions applied to the location. Access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location.

Acknowledgments

CHAPTER 1 INTRODUCTION

1.1 General Description

The “Signature Book™” SE-602-N is a professional fanless digital signage system powered by 5th Gen. Intel® Core™ i7/i5 ULT Processors with Intel® HD graphics engine integrated. Featuring a wide-operating temperature range from -40°C to 75°C and 7V to 36V wide-range DC input, the SE-602-N is built specifically for harsh environments in-vehicle applications. The integrated dual DVI-I interface supports either a DVI-D or VGA display and has built-in EDID emulation function(**). Additionally, SE-602-N has two dual-channel DDR3L-1600 sockets to provide up to 16GB of memory, dual Gigabit Ethernet, a SIM card slot and an extended temp SSD drive for fast system boot and low heat emissions. It also comes with Intel AMT for the remote control and power management for power on/off scheduling and power resume functions. The ruggedized design player comes with a chassis that provides passive cooling for better system reliability and quiet operation.

SE-602-N overview

***** The integrated dual DVI I interface supports either a DVI D or VGA display and has built in EDID emulation function. To use the EDID function, turn off the power first. Then, connect the new display port. After you turn on the power, SE 602 N will detect new EDID data.*

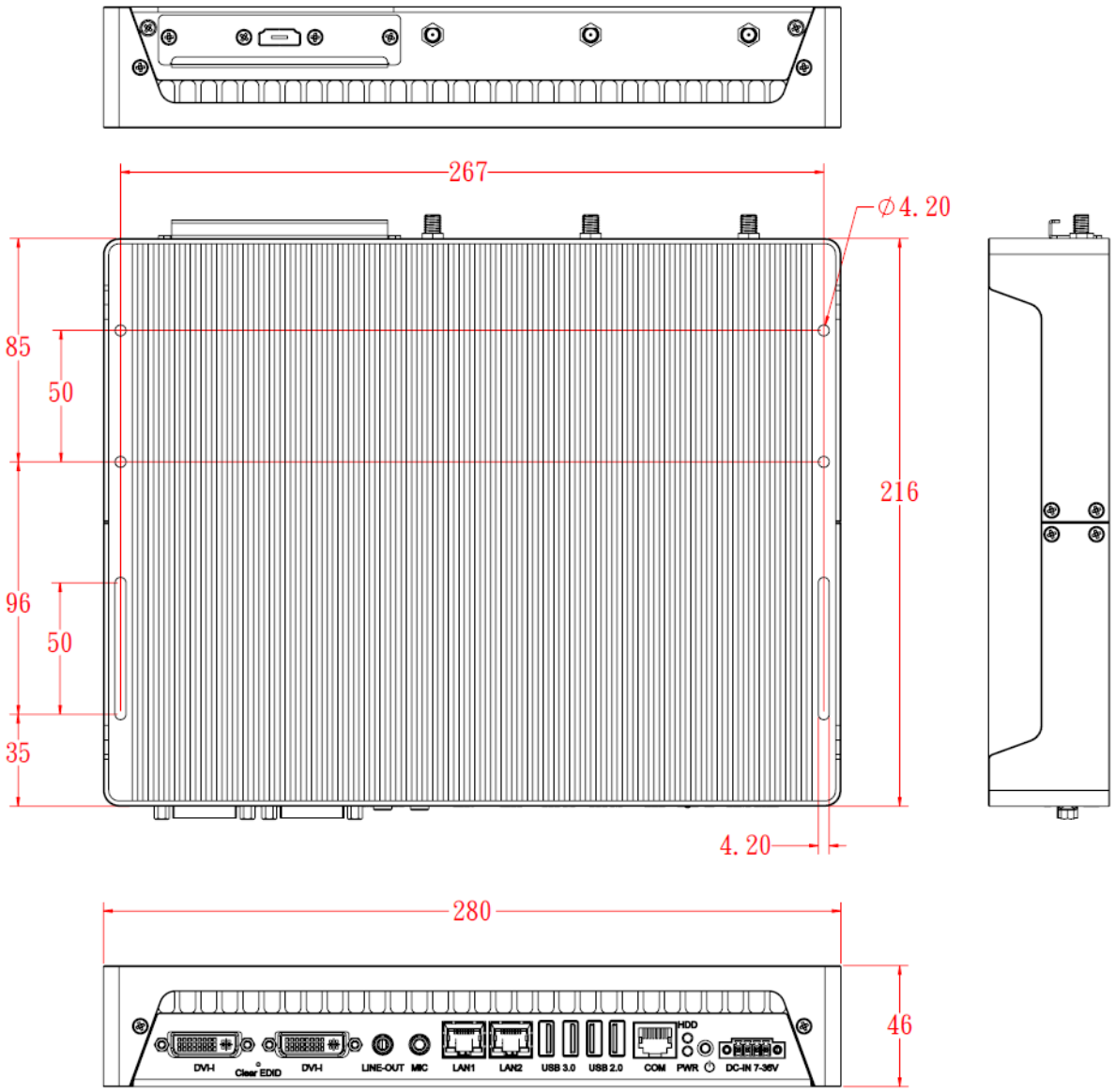
1.2 System Specifications

1.2.1 Hardware Specifications

Model Name	SE-602-N
System Mainboard	MBD602
CPU	5th Generation Intel® Core™ i7-5650U ULT 2.2GHz 5th Generation Intel® Core™ i5-5350U ULT 1.8GHz
Memory	2x DDR3L-1600 SO-DIMM Max. 16GB
I/O Interface	2x DVI-I with EDID emulation function 2x USB 2.0 2x USB 3.0 2x RJ45 for Gigabit LAN 1x RJ45 for RS-232 serial port 2x Microjack audio connectors for Mic-in / Line-out Power / HDD LED, 1x Power on/off button 1x 4 pin 7-36V DC terminal block 1x clear EDID switch
Storage	1x 2.5” HDD/SSD 1x mSATA 1x NGFF M key 22 x 80mm (2280)
Expansion Slots	1x Mini PCI-E(x1) slot for Wi-Fi/ Bluetooth/ TV Tuner/ 3G / LTE Wireless options 1x SIM card slot 2x M2(NGFF) slots for Solid State Storage Devices (SSD)/ Wi-Fi/ Bluetooth/ 3G/LTE/ TV tuner options
Power Supply	7V-36V DC-in
Construction	Aluminum + SGCC
Mounting	Standard system bracket
Dimensions	280mm(W) x 216mm(D) x 46mm(H) 10.7”(W) x 8.6”(D) x 1.8”(H)
Operating Temperature	-40°C~ 75°C (-40°F~166°F)
Storage Temperature	-50° ~ 85°C (-58°F~185°F)
Relative Humidity	5~90% @ 45°C, (non-condensing)
Vibration	mSATA: 5 grms / 5~500Hz / random operation
RoHS	Available
Certification	CE, FCC, CCC, UL & e24 Mark

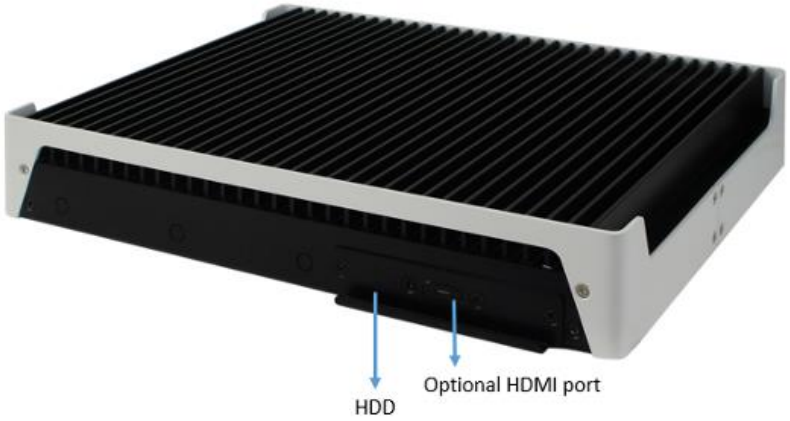
·This specification is subject to change without prior notice.

1.2.2 Dimensions



1.2.3 I/O View

SE-602-N front side

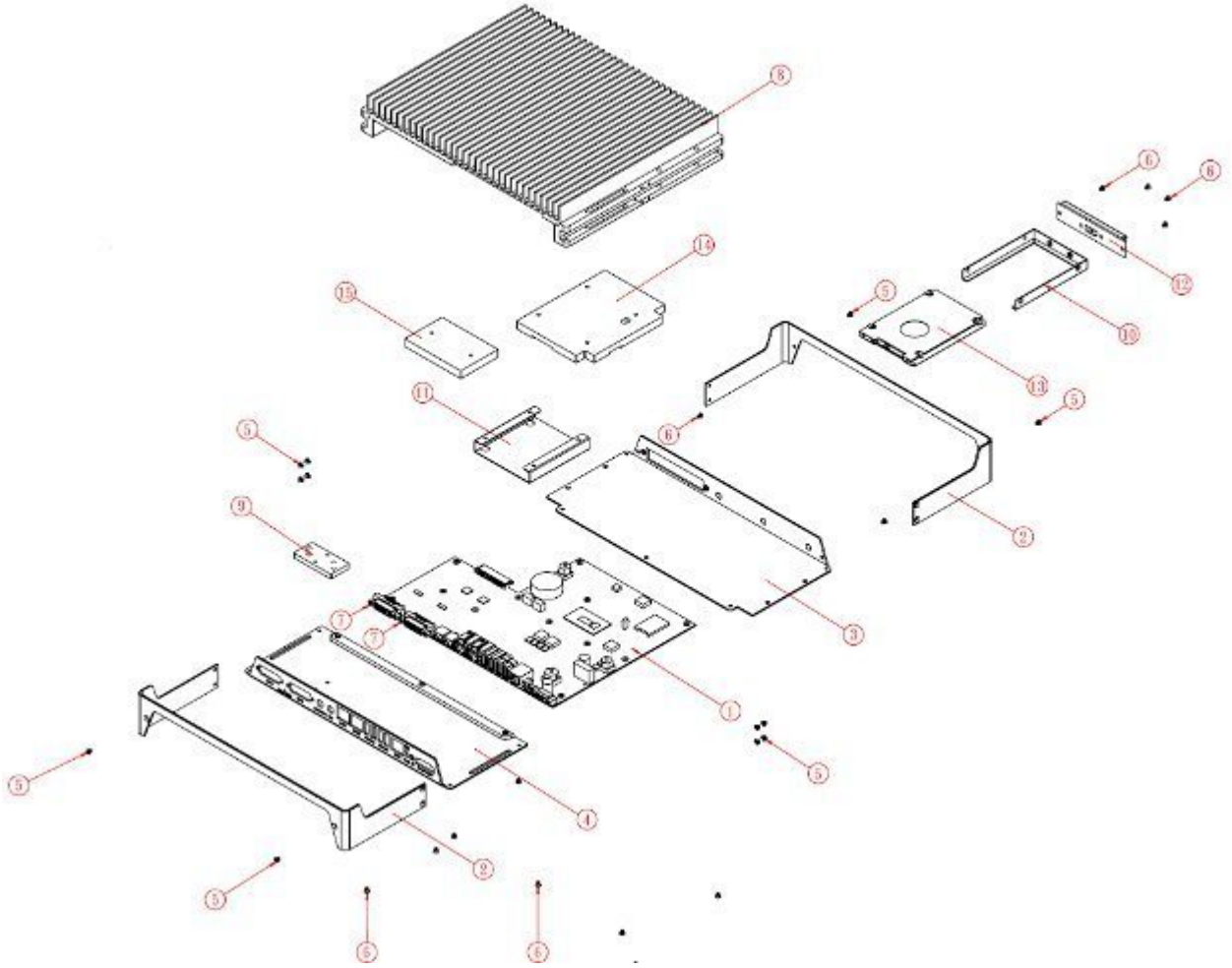


SE-602-N rear side

Based on the design of SE-602-N, the use of DVI port has certain limitations. In order to have an image on the screen, the "odd number" port should be plugged in first. If the "even number" port is plugged in first, then there will be no image on the screen. This procedure also applies when using the two ports at the same time in order to have image on the screens. The only requirement is to always plugged in first the "odd number" port.

In order to erase the EDID data, the system needs to be powered off and the DVI connector has to be removed. Afterwards, press and hold the EDID button while power is introduced for five (5) seconds; then, release the EDID button.

1.3 Exploded View of the SE-602-N Assembly



1.3.1 Parts Description

Part No.	Description	Part No.	Description
1	MBD602 motherboard	2	SE-602-N_perimeter
3	SE-602-N_rear cover	4	SE-602-N_front cover
5	SCREW-B30	6	SCREW-B30-B
7	NUTBOSS-S6	8	SE-602-N_heat sink
9	SE-602-N_ic heat sink_2	10	SE-602-N_hdd bracket
11	SE-602-N_HDD tray	12	SE-602-N_HDD cover bracket
13	SATA_25HDD	14	SE-602-N_CPU Heat Sink
15	SE-602-N_ic heat sink_4		

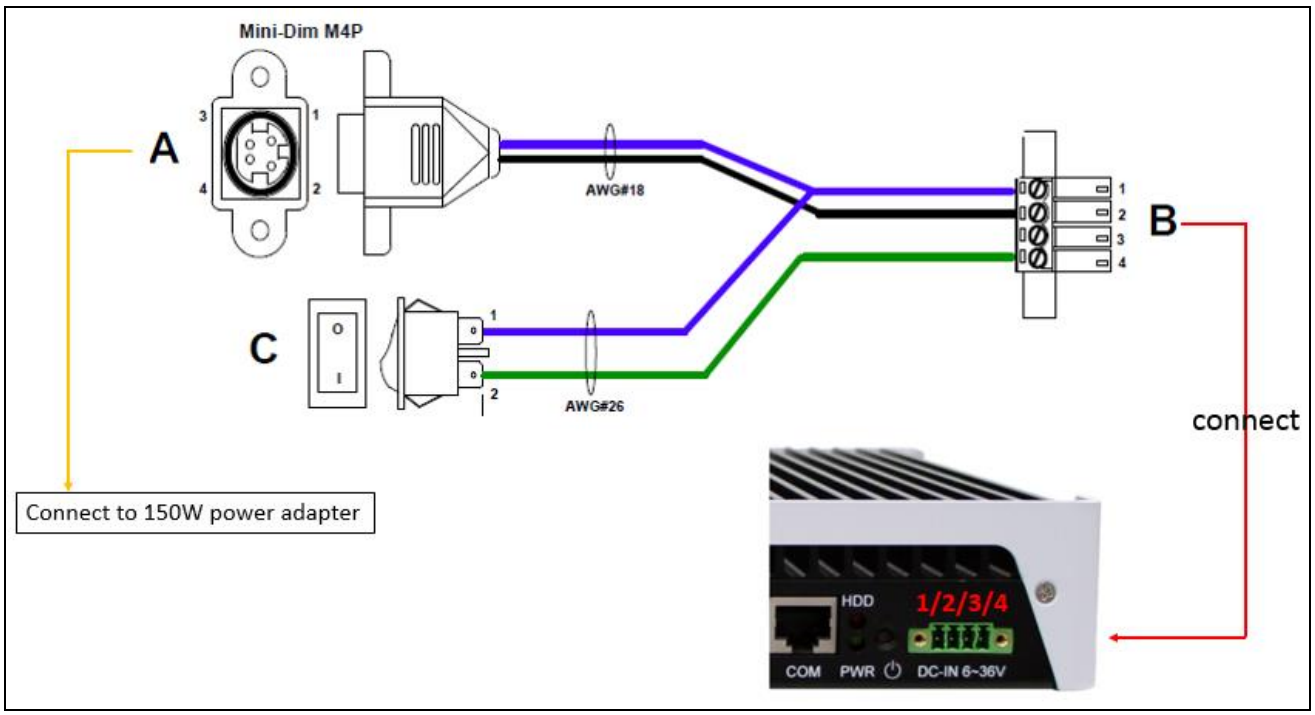
1.4 Packing List

Item No.	Description	Qty
1	Driver CD	1

1.4.1 Optional Items module

WiFi Solution	Description
WiFi module	Wireless Card;Mini PCI 802.11 A/B/G/N WT [WPEA-252NI] RoHS (A008WIRELESS00840P)
WIFI CABLE KIT-6	Internal cable / Antenna / Bracket / Screws Kit (SC2WIFI----A10600P)
3G Solution	**Description**
3G	Wireless; 3.75G UMTS/HSPA [ZU202] RoHS (A008WIRELESS00520P)
3G+GPS	Wireless; 3.75G UMTS/HSPA & GPS Module [ZU200] RoHS (A008WIRELESS00510P)
WW-350U	Wireless; 3.75G UMTS/HSPA [NAVISYS WW-350U] RoHS (A008WIRELESS00530P)
Cable	Cable; SMA IPX Cable For 3G 30CM [RF11030A] RoHS (A012INTENAL010000P)
Antenna	3G [ANT0921Q2P] RoHS (A055ANT0921Q2P000P)
COM Port Cable	**Description**
EXT-311	Cable; EXT-311 2-HD 10C 150CM; DSUB-9F => RJ45-10M RoHS (C501EXT3110A12000P)
EXT-312	Cable; EXT-312 2-HD 10C 150CM; DSUB-9M => RJ45-10M RoHS (C501EXT3120A12000P)
Power adapter/cable	**Description**
150W power adapter	P/S;ADAPTER 150W 12V 4PIN W/LOCK [FSP150-AHAN2] RoHS (A005PS150W0313000P)
4 pin external power cable	CABLE;EXT-532 2-HD 30CM MINI-DIN 4-pin => EC350VM 04P+SW RoHS (C501EXT5320302000P)

**** Power adapter connection**

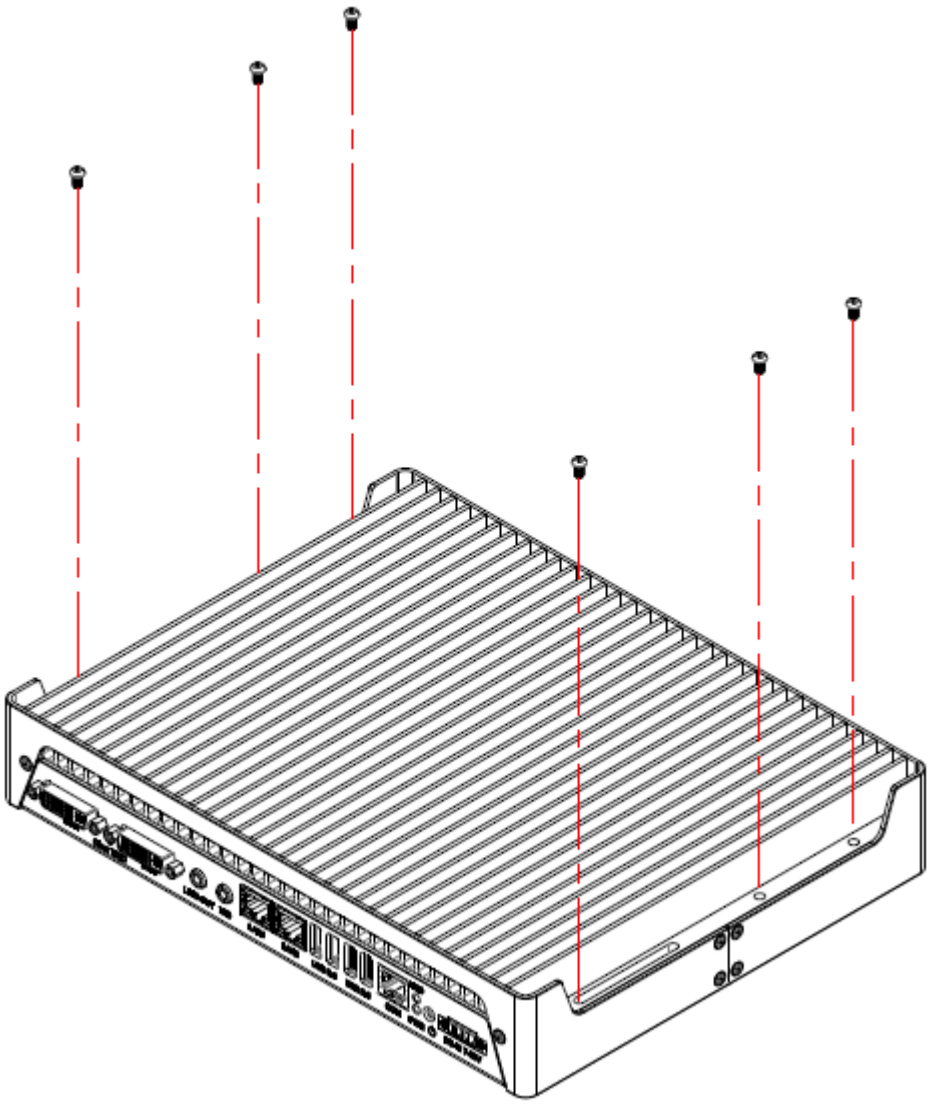


[Important] If you shutoff the electric switch, DO NOT push the power button of the external power cable at the same time. Otherwise, it will send a wrong signal.

1.5 HARDWARE INSTALLATION

1.5.1 Mounting Installation

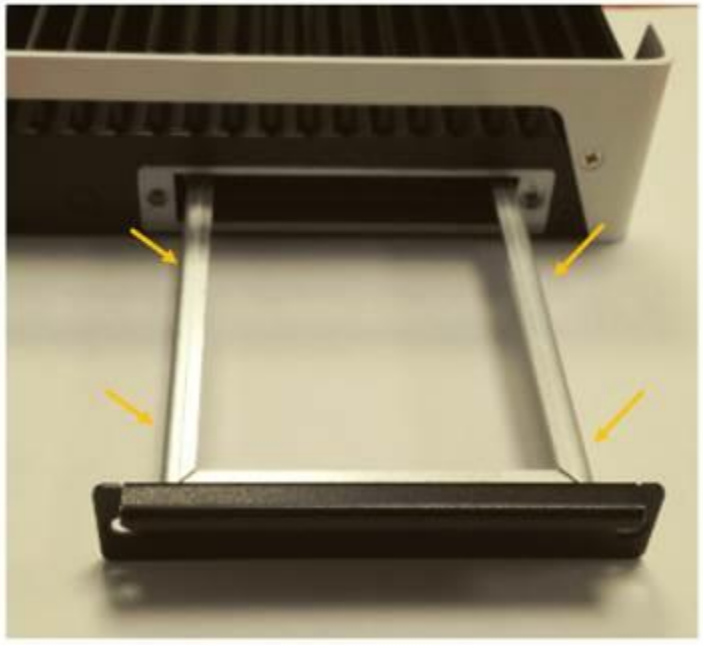
1. Please install SE-602-N to the desired location using 6 screws, as shown in the picture.



1.5.2 Installing the storage

1. Remove the two screws on the HDD cover and draw it out.

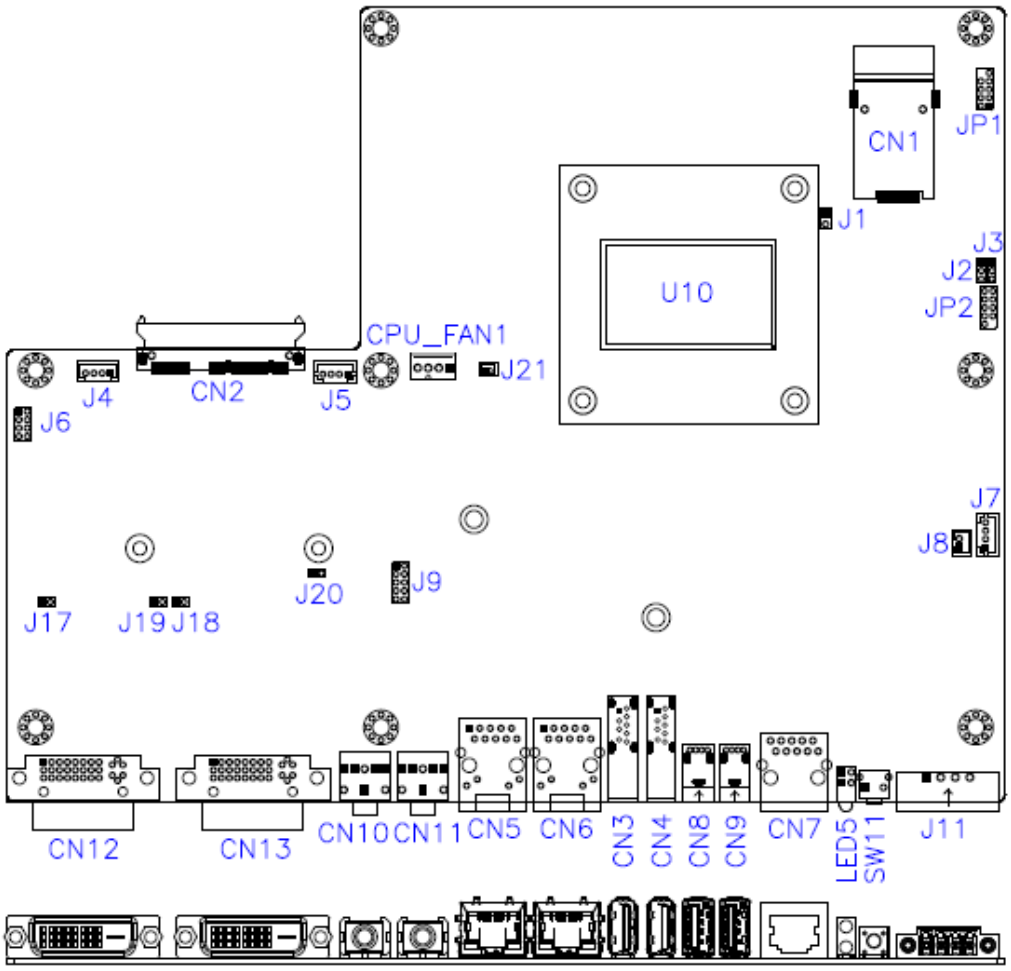
2. Install the HDD/SSD to the HDD bracket with 4 screws.



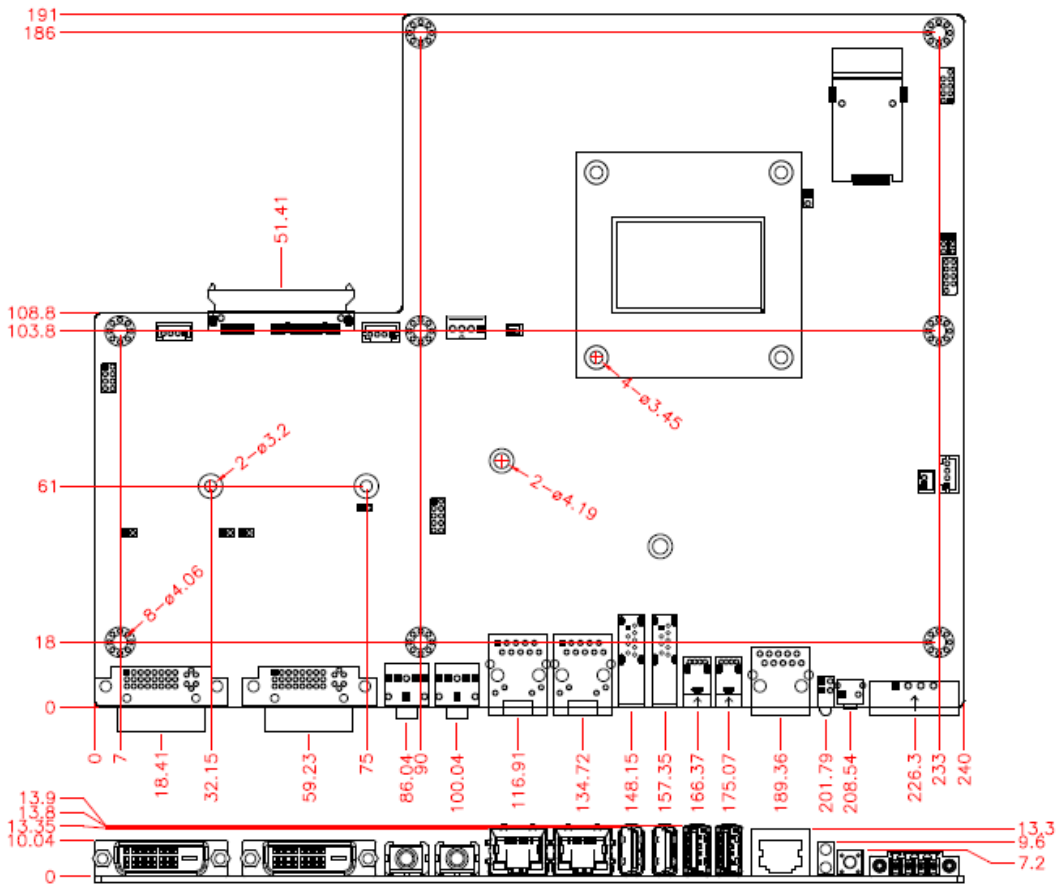
CHAPTER 2 MOTHERBOARD INTRODUCTION

2.1 Introduction

MBD602 Jumpers and Connectors



MBD602 Board Dimensions



2.2 Installations

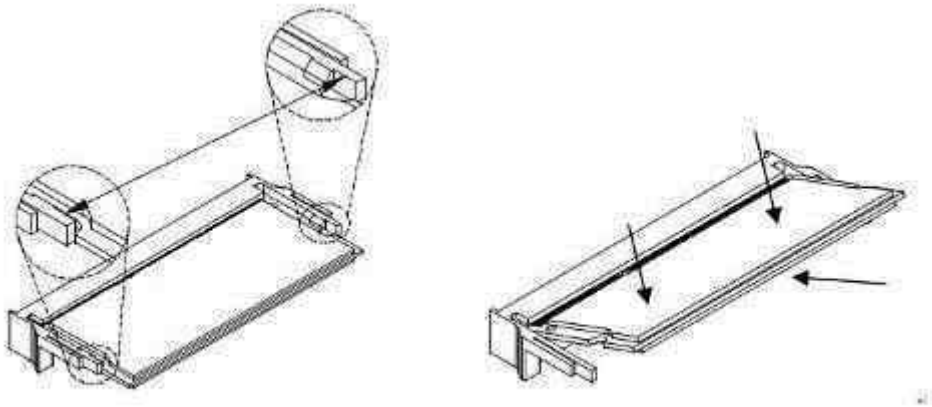
2.2.1 Installing the Memory

The MBD602 board supports two DDR3 memory sockets for a maximum total memory of 16GB DDR3 memory type.

Installing and Removing Memory Modules

To install the DDR3 modules, locate the memory slot on the board and perform the following steps:

1. Hold the DDR3 module so that the key of the DDR3 module aligned with that on the memory slot.
2. Gently push the DDR3 module in an upright position until the clips of the slot close to hold the DDR3 module in place when the DDR3 module touches the bottom of the slot.
3. To remove the DDR3 module, press the clips with both hands.



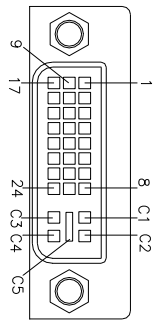
2.3 Jumpers and Connectors

CN3: USB3 #2
CN4: USB3 #1
CN5: I210 Gigabit LAN
CN6: I218LM Gigabit LAN
CN7: COM1
CN8: USB2 #4
CN9: USB2 #5
CN10: LINE OUT
CN11: MIC IN
CN12: DVI-I
CN13: DVI-I
LED5: Power LED
SW1: Power Button
SW2: Clear EDID data
J1: Flash Descriptor Security Override (Factory use only)
J2: Clear COMS
J3: Clear ME
J11: Power Connector
JP1: LPC debug Connector (Factory use only)
JP5: SPI Flash connector (Factory use only)

CN7: COM1 Serial Ports

Pin#	Signal Name
1	DSR#
2	GND
3	GNS
4	SOUT
5	SIN
6	DCD
7	DTR
8	CTS#
9	RTS#
10	RI#

CN12/CN13: DVI-I Connector

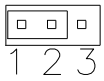
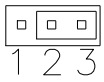


Signal Name	Pin #	Pin #	Signal Name
DATA 2-	1	16	HOT POWER
DATA 2+	2	17	DATA 0-
Shield 2/4	3	18	DATA 0+
DATA 4-	4	19	SHIELD 0/5
DATA 4+	5	20	DATA 5-
DDC CLOCK	6	21	DATA 5+
DDC DATA	7	22	SHIELD CLK
N.C	8	23	CLOCK -
DATA 1-	9	24	CLOCK +
DATA 1+	10	C1	N.C
SHIELD 1/3	11	C2	N.C
DATA 3-	12	C3	N.C
DATA 3+	13	C4	N.C
DDC POWER	14	C5	A GROUND2
A GROUND 1	15	C6	A GROUND3

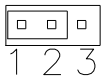
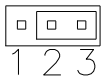
J11: Power Connector

Pin #	Signal Name
1	DC-IN
2	GND
3	EARTH GND
4	IGS-IN

J3: Clear ME Contents

J3	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

J2: Clear CMOS Contents

J2	Setting	Function
	Pin 1-2 Short/Closed	Normal
	Pin 2-3 Short/Closed	Clear CMOS

J1: Flash Descriptor Security Override (Factory use only)

J1	Flash Descriptor Security Override
Open	Disabled (Default)
Close	Enabled

CHAPTER 4 DRIVERS INSTALLATION

The Intel Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation.

IMPORTANT NOTE:

After installing your Windows operating system, you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

4.1 Intel Chipset Software Installation Utility

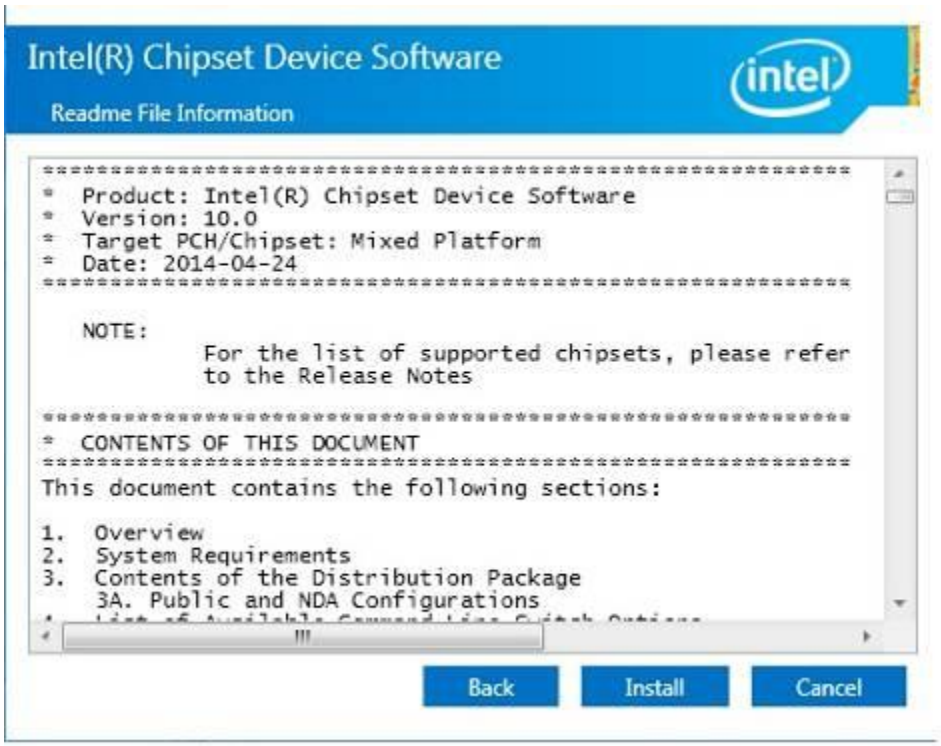
1. Insert the DVD that comes with the board. Click ***System*** and then ***SE-602-N Series Products***.

2. Click ***Intel(R) Chipset Software Installation Utility.***

3. When the Welcome screen to the Intel® Chipset Device Software appears, click ***Next*** to continue.

4. Click ***Accept*** to accept the software license agreement and proceed with the installation process.

5. On the Readme File Information screen, click ***Install*** to continue the installation.



6. The Setup process is now complete. Click ***Finish*** to restart the computer and for changes to take effect.

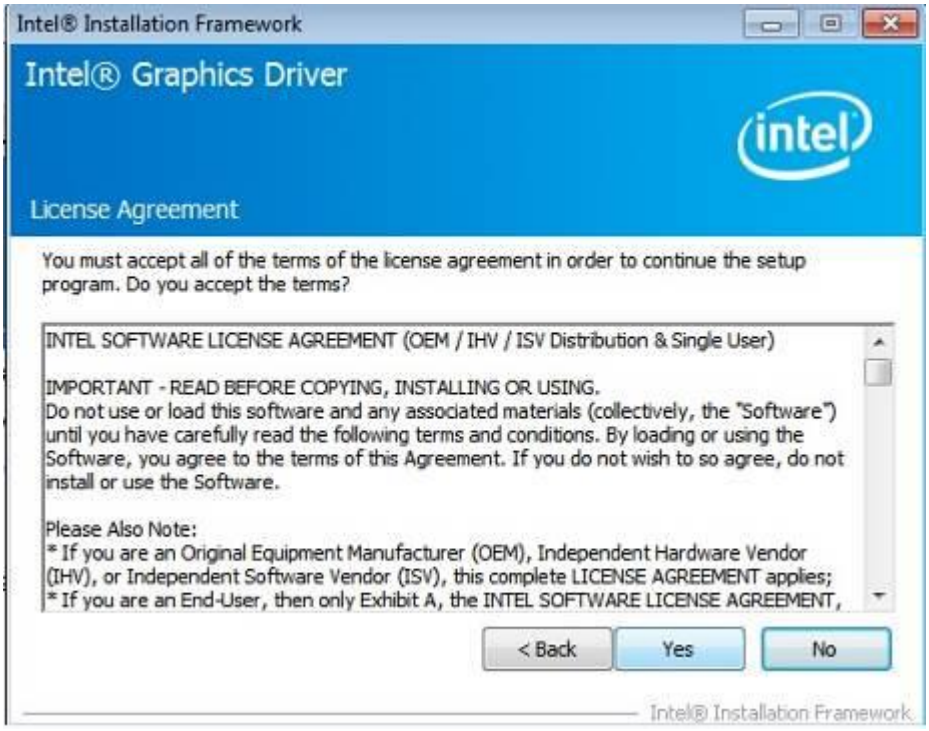
4.2 VGA Drivers Installation

1. Insert the DVD that comes with the board. Click ***System*** and then ***SE-602-N Series Products***.

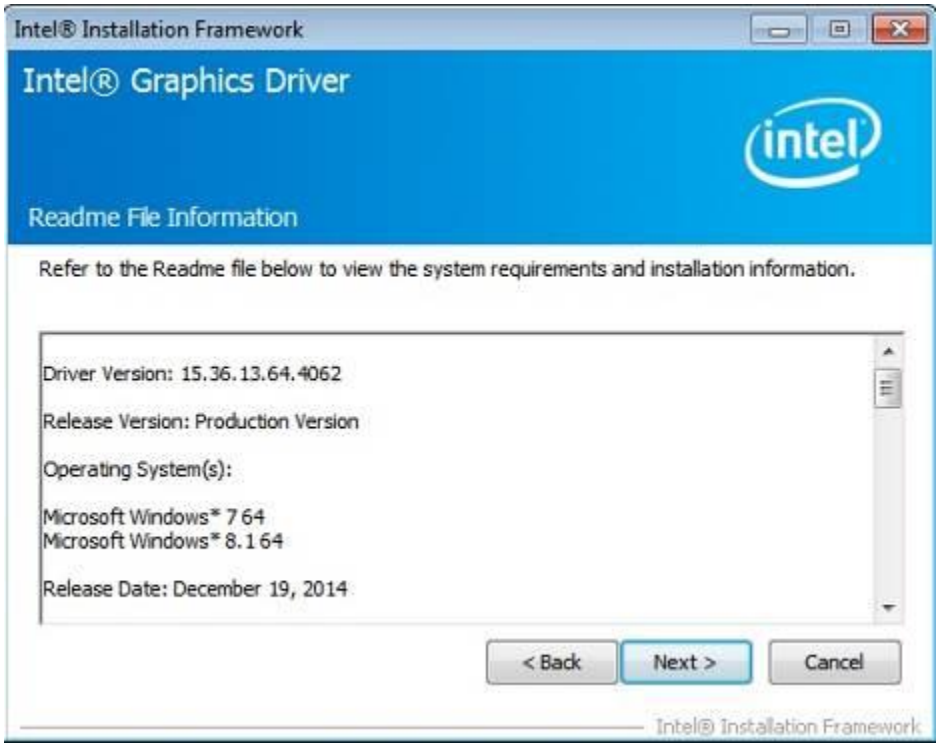
2. Click *Intel(R) Broadwell Graphics Driver.*

3. When the Welcome screen appears, click ***Next*** to continue.

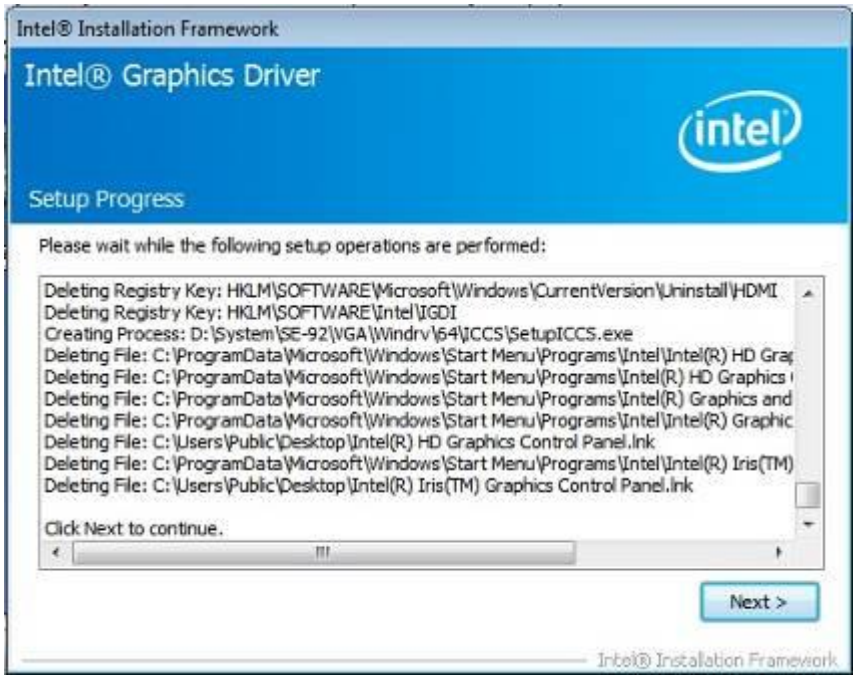
4. When the License Agreement, click ***Next*** to continue.



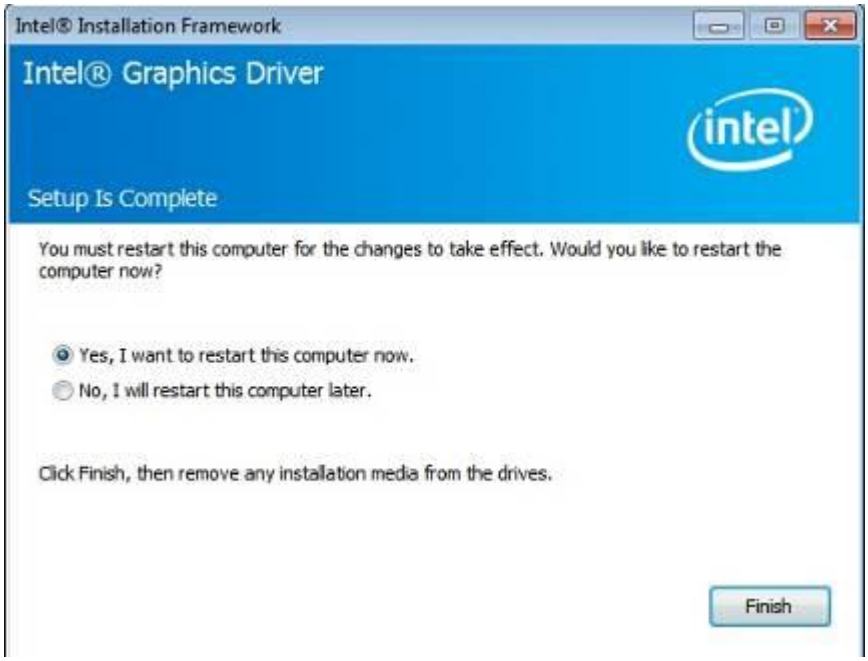
5. Click ***Next*** to to agree with the license agreement and continue the installation.



6. Setup Progress. Click ***Next*** to restart the computer and for changes to take effect.



7. Setup complete. Click ***Finish*** to restart the computer and for changes to take effect



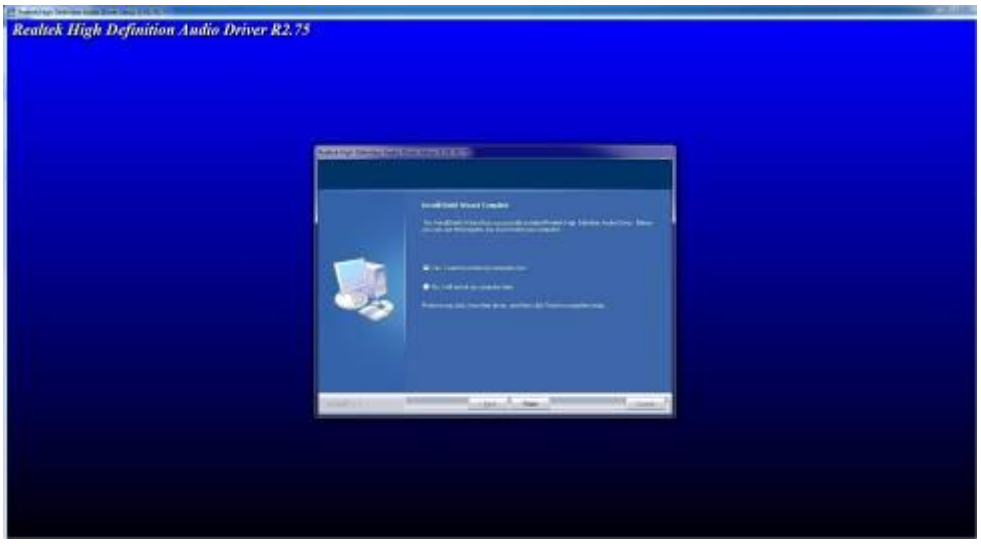
4.3 Realtek HD Audio Driver Installation

1. Insert the DVD that comes with the board. Click ***System*** and then ***SE-602-N Series Products***.

2. Click ***Realtek High Definition Audio Driver.***

3. On the Welcome to the InstallShield Wizard screen, click ***Yes*** to proceed with and complete the installation process.

4. The InstallShield Wizard Complete. Click ***Finish*** to restart the computer and for changes to take effect.



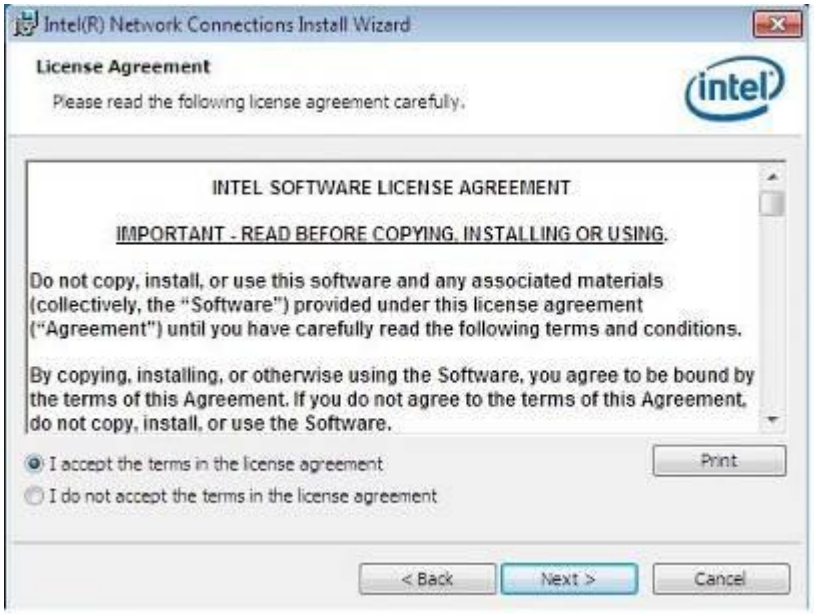
4.4 LAN Drivers Installation

1. Insert the DVD that comes with the board. Click ***System*** and then ***SE-602-N Series Products***.

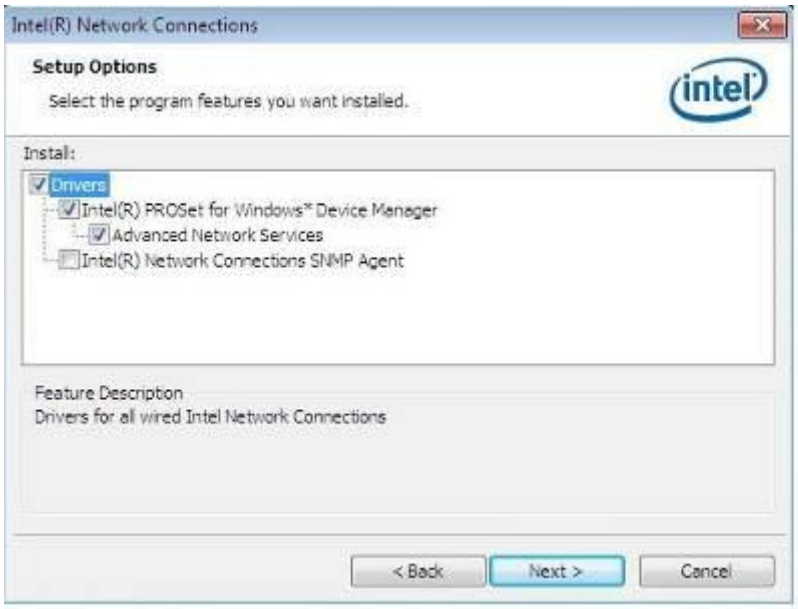
2. Click ***Intel(R) PRO LAN Network Driver.***

3. When the Welcome screen appears, click ***Next***.

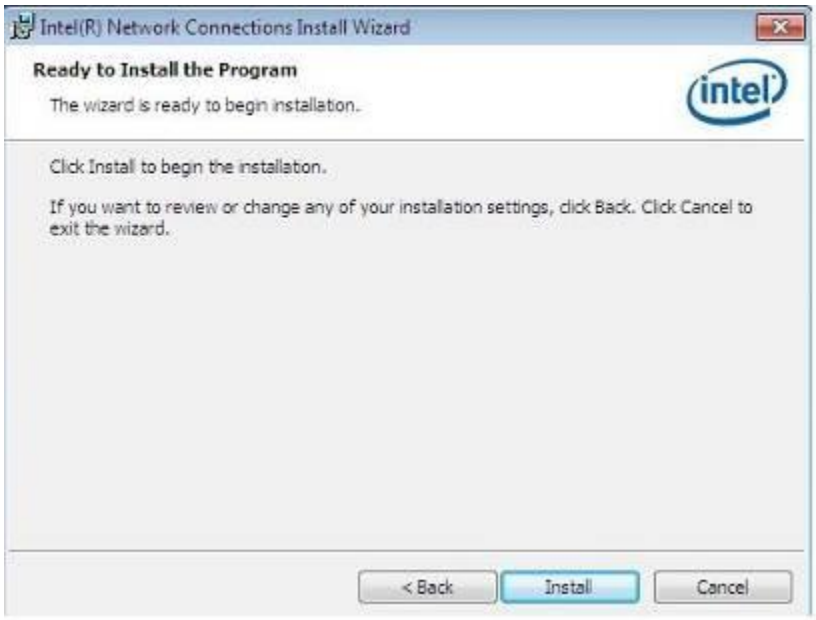
4. Click ***Next*** to to agree with the license agreement.



5. Click the checkbox for **Drivers** in the Setup Options screen to select it and click **Next** to continue.



6. The wizard is ready to begin installation. Click ***Install*** to begin the installation.



7. When InstallShield Wizard is complete, click ***Finish***.

4.5 Intel® Management Engine Interface

IMPORTANT NOTE:

After installing your Windows operating system, you must install first the Kernel-Mode Driver Framework (KMDF) 1.11 KB2685811 patch before installing Intel(R) Management Engine(ME) Driver.

1. Insert the DVD that comes with the board. Click ***System*** and then ***SE-602-N Series Products***.

2. Click ***Intel(R) Management Engine(ME) Driver***

3. When the Welcome screen to the InstallShield Wizard for Intel® Management Engine Components, click the checkbox for **Install Intel® Control Center** & click ***Next***.

4. Click ***Next*** to to agree with the license agreement.

5. When the Destination Folder, click ***Next***. Then, click ***Finish*** when the setup progress has been successfully installed.

4.6 Intel® USB 3.0 Drivers

1. Insert the DVD that comes with the board. Click ***System*** and then ***SE-602-N Series Products***.

2. Click ***Intel(R) USB3.0 eXtensible Host Controller Driver***

3. When the Welcome screen to the InstallShield Wizard for Intel® USB 3.0 eXtensible Host Controller Driver, click ***Next***.

4. Click ***Yes*** to to agree with the license agreement and continue the installation.

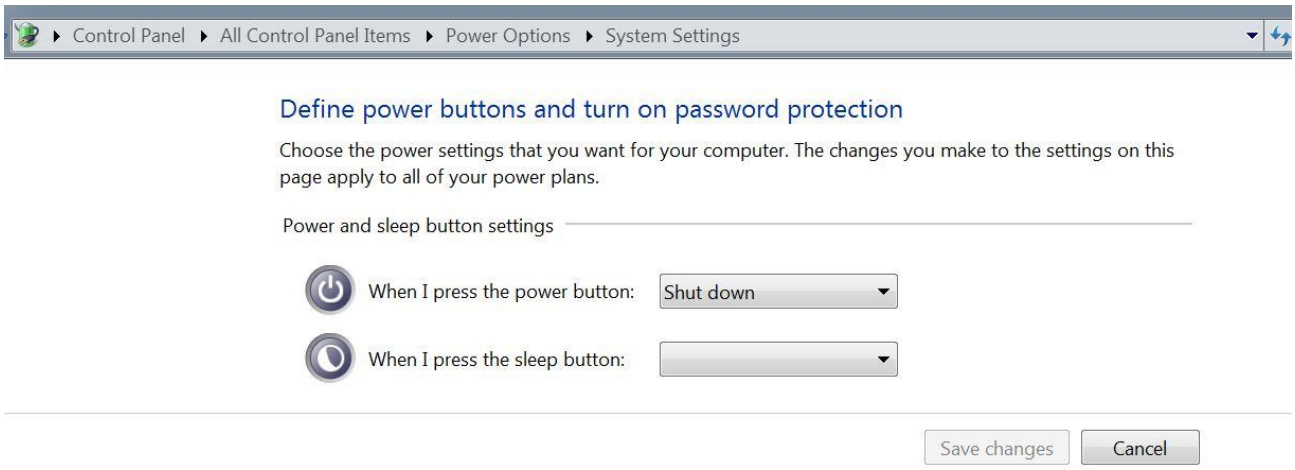
5. On the Readme File Information screen, click ***Next*** to continue the installation of the Intel® USB 3.0 eXtensible Host Controller Driver.

6. Setup complete. Click ***Finish*** to restart the computer and for changes to take effect.

[Important]

After installing the driver, please go to the page "Windows Control Panel -> All Control Panel Items -> Power Options -> System Settings".

Please set the "When I press the power button" item default to "shutdown".



Appendix

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
000h - 01Fh	DMA Controller #1
020h - 021h	Interrupt Controller #1
040h - 043h	System Timer
070h - 077h	System/CMOS Real Time Clock
081h - 091h	DMA Controller #2
0A0h – 0A1h	Interrupt Controller #2
081h - 091h	DMA Controller #3
2F8h - 2FFh	Serial Port #2(COM2)
3C0h- 3DFh	Graphics adapter Controller
3F8h - 3FFh	Serial Port #1(COM1)
D000 - FFFh	PCI Root Ports

B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	SMBus Controller
IRQ8	Real Time Clock
IRQ19	SATA AHCI Controller

C. Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

SAMPLE CODE:

```
//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "6106"
//---------------------------------------------------------------------------
int main (int argc, char *argv[]);
void EnableWDT(int);
void DisableWDT(void);
//---------------------------------------------------------------------------
int main (int argc, char *argv[])
{
                                                    unsigned char bBuf;
                                                   unsigned char bTime;
                                                      char **endptr;

//                                                      char SIO;

                                                  printf("6106 watch dog program\n");


                                                      bTime = strtol (argv[1], endptr, 10);
                                              printf("System will reset after %d seconds\n", bTime);

                                                      if (bTime)
                                                        {
                                                       else
                                                        {

                                                  if (bTime > 0 && bTime < 256)
                                                        {

                    A=2;

                      unsigned char result;
                      Set_6106_LD(0x08);
                      gotoxy(1,12);

                                                                                                    }
```

```
                                                    return 0;
}
//---------------------------------------------------------------------------
void EnableWDT(int interval)
{
                                                    unsigned char bBuf;

                                                    Set_6106_LD(0x08);
                                                  Set_6106_Reg(0x30, 0x01);
                                                 Set_6106_Reg(0xF1, interval);

}
//---------------------------------------------------------------------------
void DisableWDT(void)
{
                                                    unsigned char bBuf;

                                                    Set_6106_LD(0x08);
                                                  Set_6106_Reg(0x30, 0x00);

}
//---------------------------------------------------------------------------




//---------------------------------------------------------------------------
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//---------------------------------------------------------------------------
#include "6106.H"
#include <dos.h>
//---------------------------------------------------------------------------
unsigned int 6106_BASE;
void Unlock_6106 (void);
void Lock_6106 (void);
//---------------------------------------------------------------------------
unsigned int Init_6106(void)
{
                                                    unsigned int result;
                                                    unsigned char ucDid;

                                                    6106_BASE = 0x4E;
                                                    result = 6106_BASE;

                                                    ucDid = Get_6106_Reg(0x20);
                                                    if (ucDid == 0x07)



                                                    //6106
{goto Init_Finish;}

6106_BASE = 0x2E;
result = 6106_BASE;

ucDid = Get_6106_Reg(0x20);
if (ucDid == 0x07)                                  //6106
{ goto Init_Finish; }

6106_BASE = 0x00;
result = 6106_BASE;

Init_Finish:
      return (result);
```

```
}
//-----------------------------------------------------------------------
void Unlock_6106 (void)
{
                                                    outportb(6106_INDEX_PORT, 6106_UNLOCK);
                                                    outportb(6106_INDEX_PORT, 6106_UNLOCK);
}
//-----------------------------------------------------------------------
void Lock_6106 (void)
{
                                                    outportb(6106_INDEX_PORT, 6106_LOCK);
}
//-----------------------------------------------------------------------
void Set_6106_LD( unsigned char LD)
{
                                                    Unlock_6106();
                                                    outportb(6106_INDEX_PORT, 6106_REG_LD);
                                                    outportb(6106_DATA_PORT, LD);
                                                    Lock_6106();
}
//-----------------------------------------------------------------------
void Set_6106_Reg( unsigned char REG, unsigned char DATA)
{
                                                    Unlock_6106();
                                                    outportb(6106_INDEX_PORT, REG);
                                                    outportb(6106_DATA_PORT, DATA);
                                                    Lock_6106();
}
//-----------------------------------------------------------------------
unsigned char Get_6106_Reg(unsigned char REG)
{
                                                    unsigned char Result;
                                                    Unlock_6106();
                                                    outportb(6106_INDEX_PORT, REG);
                                                    Result = inportb(6106_DATA_PORT);
                                                    Lock_6106();
                                                    return Result;
}
//-----------------------------------------------------------------------
```

D. MBD602 MCU ISP Specification

1. Software Requirements

1.1 Description

Security MCU provides following functionality

1.1.1 Get Firmware Version

Software can get the firmware version, MCU provides commands to get current Major Version, Minor version and build version**.**

1.1.2 High Voltage Protection

While car battery is higher than the high voltage protection value, MCU will cut off system power after 10 seconds.

1.1.3 Low Voltage Protection

While car battery is lower than the low voltage protection value, MCU will cut off system power after 30 seconds.

1.1.4 Set Power On Delay Timer

MCU provides command to set power on delay timer, when arrived the setting time, MCU will send power button to let the system power on**.**

1.1.5 Set Power Off Delay Timer

MCU provides command to set power off delay timer, when arrived the setting time, MCU will send power button to let the system power off**.**

1.1.6 Set DC Off Delay Timer

MCU provides command to set DC off delay timer, when arrived the setting time, MCU will cut off system power**.**

1.1.7 Get status

MCU provides command to get current status which includes the high voltage protection value, low voltage protection value, power on delay timer setting value, power off delay timer setting value and DC off delay timer setting value**..**

Note : Before using the ISP, the software engineer have to make sure the firmware version (GET_FORMWARE_VERSION) MUST be major version is 0 and minor version is 0 and build version is 1(or above), otherwise the ISP function will not works.

1.2 Protocol

1.2.1 Signal transmit format

Bandwidth
Baud rate: 19200 bps.

Data Format
Parity: No Parity
1 start bit
8 data bits
1 stop bit

1.2.2 Packet Format

Header	Size	Command	Data	CRC
2 bytes	1 byte	1 byte	0 – 64 bytes	2 bytes

Header bytes indicate start of the packet.
Size specifies number of bytes for data field.
Command identifies action, which is required to be performed on the data.
CRC verifies data integrity for header, size, command and data bytes.

1.2.3 CRC

Protocol uses 16-bit CCITT CRC to verify data integrity.
$P(x) = X^{16}+X^{12}+X^{5}+1$.

```
unsigned calc_crc(unsigned char *data, unsigned n, unsigned start) {
	unsigned I, k, q, c, crcval;
	crcval=start;
	for (I=0; I<n; I++) {
		c=data(I) & 0xFF;
		q=(crcval^c) & 0x0F;
		crcval=(crcval>>4)^(q*0x1081);
	}
	return crcval;
}
```

1.2.4 Communications flow

Communication between PC and Security MCU utilizes Master-Slave model, where PC is a master, and Security MCU is a slave. Master sends requests to the slave, and slave has to reply to them. Slave acts like a passive device and cannot send any requests to the master.

1.3 Command and Reply Codes

1.3.1 Summary

Code	Value	Description
GET_FIRMWARE_VERSION	0x01	Get Firmware version
SET_HYSTERSIS_HIGH	0x02	Hysteresis High Voltage setting
SET_HYSTERSIS_LOW	0x03	Hysteresis Low Voltage setting
SET_POWER_ON_DELAY_TIMER	0x04	Power on delay timer setting
SET_POWER_OFF_DELAY_TIMER	0x05	Power off delay timer setting
SET_DC_OFF_DELAY_TIMER	0x06	DC off delay timer setting
GET_STATUS	0x07	Get Current Status

1.3.2 Get Firmware Version
GET_FIRMWARE_VERSION

Read version number of the security MCU firmware.

Request

Header	Size	Command	Data	CRC
0xFF 0xEE	0x00	GET_FIRMWARE_VERSION	None	

Reply

Header	Size	Command	Data	CRC
0xFF 0xEE	Size of Version structure	GET_FIRMWARE_VERSION	BSL Version Structure	

BSL Version Structure

Field	Type	Description
Major Version	Byte	Major version number
Minor Version	Byte	Minor version number
Build	Byte	Build version number

1.3.3 Set hysteresis high voltage
SET_HYSTERESIS_HIGH_VOLTAGE

Hysteresis High Voltage setting .

Request

Header	Size	Command	Data0	Data1	CRC
0xFF 0xEE	0x02	SET_HYSTERSIS_HIGH	High Byte	Low Byte	

Round off to the 1st decimal place.

Ex. Setting 11.2V mapping to 11200 (11.2x1000) = 2BC0(hex)

Data0 = 2B(hex)

Data1 = C0(hex)

The tolerance for the temperature measurement is plus and minus 0.3 Volts.

Reply

Header	Size	Command	Data	CRC
0xFF 0xEE	0x00	SET_HYSTERSIS_HIGH	None	

1.3.4 Set hysteresis low voltage
SET_HYSTERESIS_LOW_VOLTAGE

Hysteresis Low Voltage setting .

Request

Header	Size	Command	Data0	Data1	CRC
0xFF 0xEE	0x02	SET_HYSTERSIS_LOW	High Byte	Low Byte	

Round off to the 1st decimal place.
Ex. Setting 11.2V mapping to 11200 (11.2x1000) = 2BC0(hex)
Data0 = 2B(hex)
Data1 = C0(hex)
The tolerance for the temperature measurement is plus and minus 0.3 Volts.

Reply

Header	Size	Command	Data	CRC
0xFF 0xEE	0x00	SET_HYSTERSIS_LOW	None	

1.3.5 Set Power On Delay Timer
SET_POWER_ON_DELAY_TIMER
Power on delay timer setting.

Request

Header	Size	Command	Data0	Data1	CRC
0xFF 0xEE	0x02	SET_POWER_ON_DELAY_TIMER	N (Minutes)	N (seconds)	

Reply

Header	Size	Command	Data	CRC
0xFF 0xEE	0x00	SET_POWER_ON_DELAY_TIMER	None	

1.3.6 Set Power Off Delay Timer

SET_POWER_OFF_DELAY_TIMER

Power off delay timer setting.

Request

Header	Size	Command	Data0	Data1	CRC
0xFF 0xEE	0x02	SET_POWER_OFF_DELAY_TIMER	N (Minutes)	N (seconds)	

Reply

Header	Size	Command	Data	CRC
0xFF 0xEE	0x00	SET_POWER_OFF_DELAY_TIMER	None	

1.3.7 Set DC Off Delay Timer

SET_DC_OFF_DELAY_TIMER

DC off delay timer setting.

Request

Header	Size	Command	Data0	Data1	CRC
0xFF 0xEE	0x02	SET_DC_OFF_DELAY_TIMER	N (Minutes)	N (seconds)	

Reply

Header	Size	Command	Data	CRC
0xFF 0xEE	0x00	SET_DC_OFF_DELAY_TIMER	None	

1.3.8 Get Status

Get the current hysteresis high voltage, hysteresis low voltage, power_on_delay_timer, power_off_delay_timer and power_off_delay_timer.

Request

Header	Size	Command	Data	CRC
0xFF 0xEE	0x00	GET_STATUS	None	

Reply

Header	Size	Command	Data	CRC
0xFF 0xEE	0x0 A	GET_STATUS	Status structure	

Status Structure

Field	Type	Description
Hysteresis high voltage	Word	Byte0+ Byte1
Hysteresis low voltage	Word	Byte2+ Byte3
Power on delay timer	Word	Byte4+ Byte5
Power off delay timer	Word	Byte6+ Byte7
DC off delay timer	Word	Byte8+ Byte9