

DMI-1040

10.4" Driver Machine Interface

User's Manual



Manual Rev.: 1.0

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Part No: 50M-00018-1000

Revision History

Revision	Release Date	Description of Change(s)
1.0	2021-04-15	Initial release

Preface

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Battery Labels



Li-ion



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WARNING: This product can expose you to chemicals including acrylamide, arsenic, benzene, cadmium, Tris(1,3-dichloro-2-propyl)phosphate (TDCPP), 1,4-Dioxane, formaldehyde, lead, DEHP, styrene, DINP, BBP, PVC, and vinyl materials, which are known to the State of California to cause cancer, and acrylamide, benzene, cadmium, lead, mercury, phthalates, toluene, DEHP, DIDP, DnHP, DBP, BBP, PVC, and vinyl materials, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Trademarks Product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



NOTE:

Additional information, aids, and tips that help users perform tasks.



CAUTION:

Information to prevent *minor* physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



WARNING:

Information to prevent *serious* physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

1.1 Overview

The DMI-1040 is a 10.4" Driver Machine Interface panel PC designed specifically for the railway industry, equipped with Intel Atom® x5-E3930 processor (formerly Apollo Lake), resistive touch, and EN50155 compliance power module. It can be applied as an HMI unit for driver's desks, control panel for passenger information systems, surveillance system control/display unit or in railway diagnostics and communications applications.

1.2 Features

- ▶ Intel Atom® x5-E3930 processor, 1.8GHz
- ▶ 10.4" color display: 4:3, 1024x768 pixels, 1000cd/m2,
- ▶ 5-wire resistive touch
- ▶ Software controlled backlight
- ▶ One Mini PCIe card slot for MVB Module or USB to dual isolated RS-232 module
- ▶ +24/+36/+72/+110 VDC nominal power input (EN50155 compliant)
- ▶ IP65 front and IP20 rear ingress ratings

1.3 Package Contents

Please check that your package contains the items below. If you discover damaged or missing items, please contact your vendor.

- ▶ **DMI-1040 Driver Machine Interface Panel PC**
(features dependent on specific model ordered)
- ▶ **Mounting Screw Kit**

Optional Accessories

- ▶ **Starter Cable Kit** (P/N: 91-95239-700E)
- ▶ **MVB Mini PCIe Card Kit** (P/N: 91-95239-1000)
- ▶ **CAN bus PCIe Card Kit** (P/N: 91-95239-300E)
- ▶ **Mini PCIe Cellular Kit - TW, China** (P/N: 91-95247-400E)
- ▶ **Mini PCIe Cellular Kit - EU** (P/N: 91-95247-5000)
- ▶ **Mini PCIe Wi-Fi/Bluetooth Kit** (P/N: 91-95227-1000)



DO NOT install or apply power to equipment that is damaged or if there is missing/incomplete equipment. Retain the shipping carton and packing materials for inspection. Please contact your ADLINK dealer/vendor immediately for assistance. Obtain authorization from your dealer before returning any product to ADLINK.

2 System Description

2.1 DMI-1040 Specifications

Display	
Display Size	10.4" color display
Resolution	1024x768 pixels (4:3)
Brightness	1000 cd/m ²
Contrast Ratio	1000:1 typical
Touchscreen	5-wire resistive touch
System Components	
Processor	Intel Atom® x5-E3930 processor, 1.3GHz dual-core supporting ECC (TDP 6.5W)
Memory	DDR3L-1600GHz 2GB by SODIMM (optional 8GB)
Storage	64GB eMMC 5.0 (onboard) 1x CFast slot, externally accessible with cover
Input/Output	
Ethernet	3x external GbE ports via M12 connector based on Intel® I210-IT 2kV isolation Supports WOL and teaming
USB	1x USB 2.0 port, M8 connector, 600Vrms isolation (supports up to USB 1.1 speeds) 1x USB 3.0 port, Type A connector with dust cover, supports 1600mA
Serial	1x RS-422 serial port, 1KVrms isolation, DB-9 female connector 1x RS-232 serial port, 1KVrms isolation, DB-9 male connector 2x RS-232 serial ports, DB-9 male connectors, 2.5kVDC isolation (optional)
Internal Expansion	1x Full-size Mini PCIe slots 2x SIM card slots
Antennas	TBD
Light Sensor	Sensor on front bezel to detect ambient illuminance
Speakers	2x speakers on rear panel
Status LEDs	
Power	1x power status LED

Table 2-1: DMI-1040 Specifications

Power	
Input	1x 12-pin aviation connector +24V/+36V/+72V/+110VDC nominal power input (16.8V to 137.5V, EN50155 compliant)
Power Consumption	TBD
Mechanical	
Dimensions	300 x 250 x 80 mm (w/o power connector)
Weight	TBD
Ingress Rating	IP65 front, IP20 rear
Mounting	Panel mount
Environmental	
Operating Temperature	-25°C to +70°C, EN50155 T3 class
Storage Temperature	-30°C to +85°C
Humidity	10-90% RH operating, non-condensing 5-95% RH storage, EN 60068-2-30, EN 50155
Vibration	5 Grms, 5-500Hz (with SSD), EN61373 Class 1B
Shock	EN50155 standard, method EN61373: 2010, Category 1 Class B
Safety	EN50153
Fire Protection	EN 45545-2, HL3
Altitude	4572 m (15000 ft) at 25°C (MIL-STD-810G Method 500.5, Procedure II2)
Software	
BIOS	AMI BIOS
Board Management	ADLINK SEMA 3.5 for WDT, hardware monitor, and fail-safe dual BIOS
Operating System	Linux Ubuntu 16.04 LTS, 64-bit Windows 10 64-bit

Table 2-1: DMI-1040 Specifications

2.2 Block Diagram

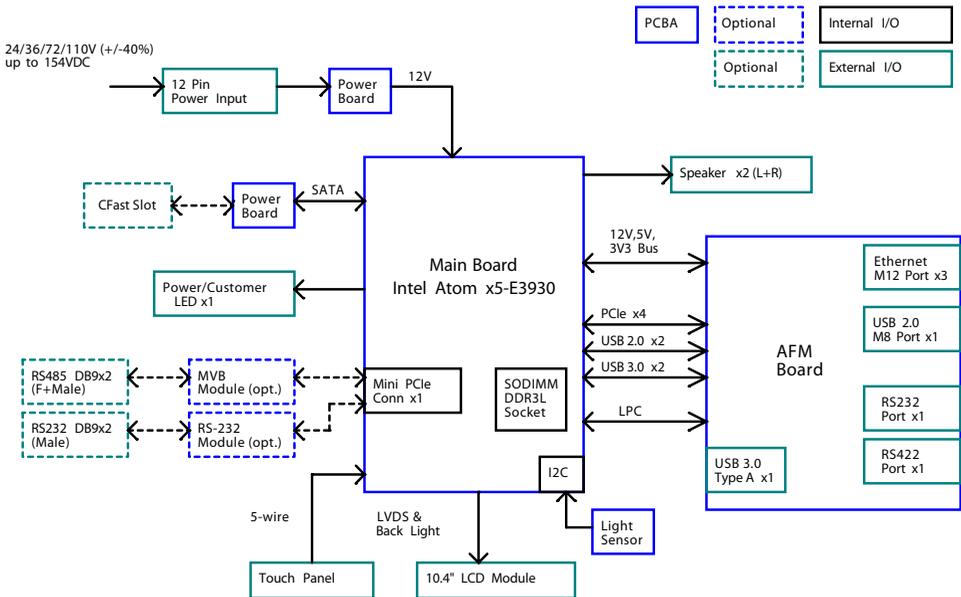


Figure 2-1: DMI-1040 Block Diagram

2.3 Mechanical Layout

Front View

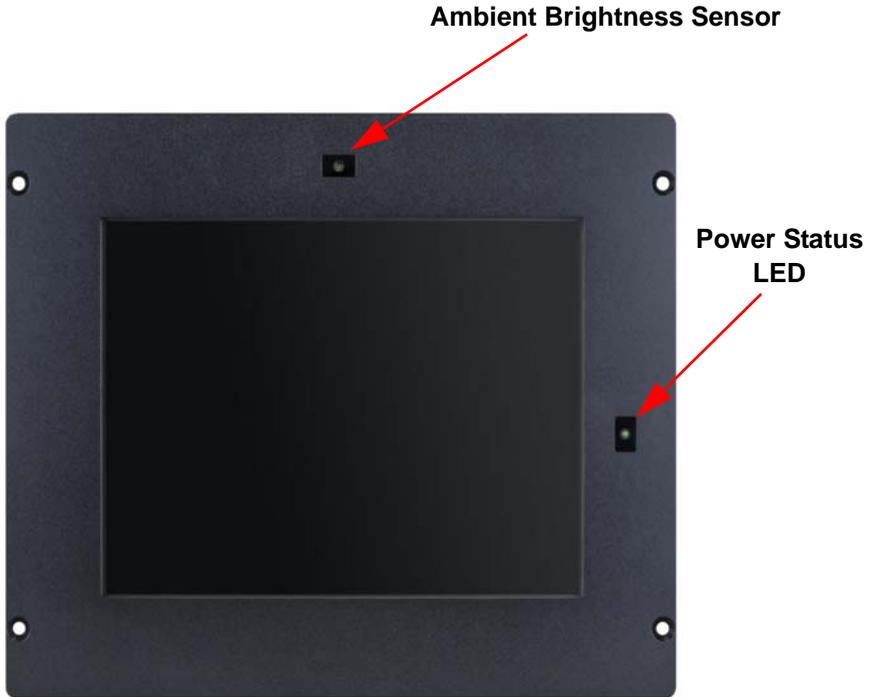


Figure 2-2: DMI-1040 Front Layout

Rear, Side and Bottom Views

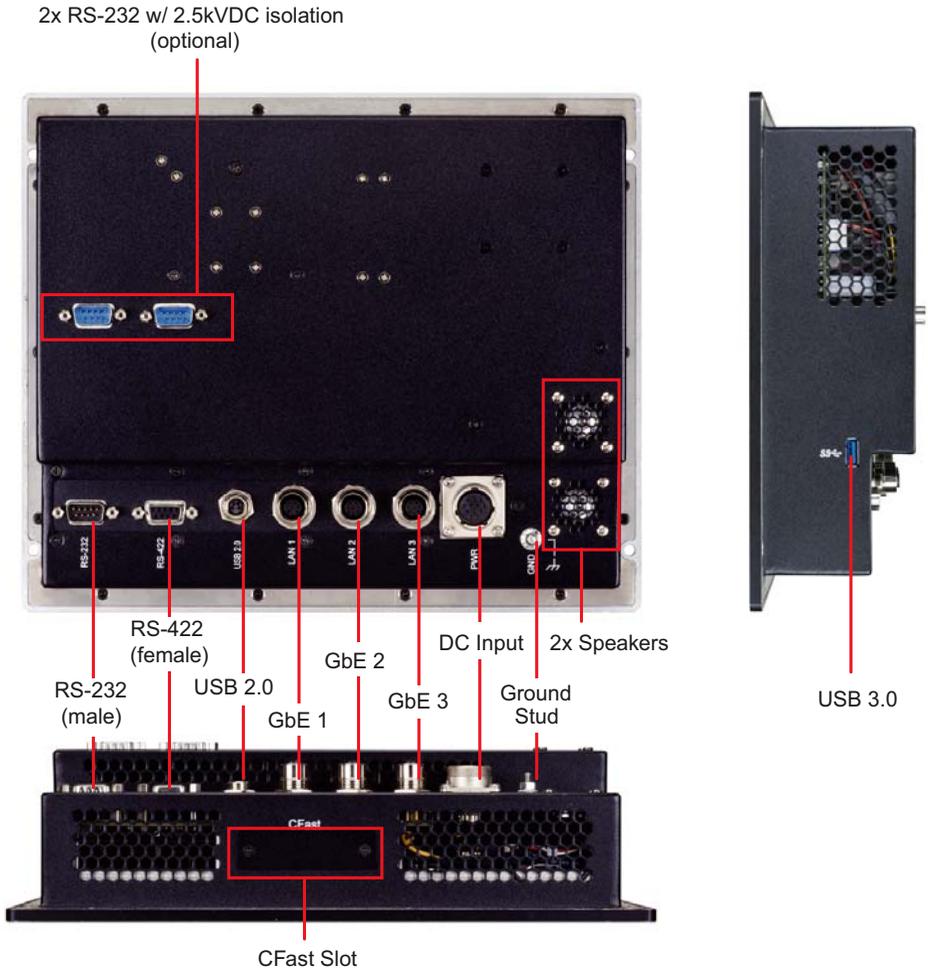
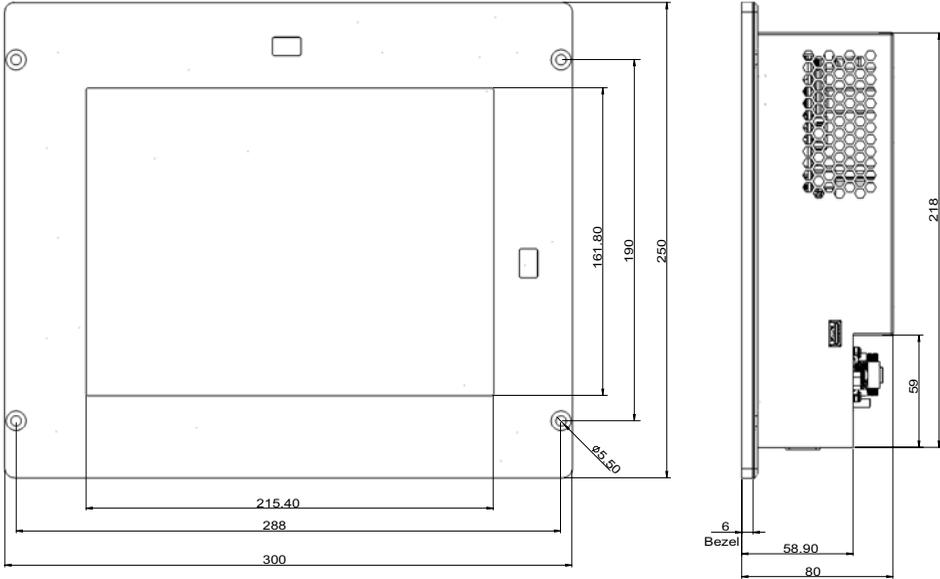


Figure 2-3: DMI-1040 Rear, Side and Bottom I/O Layout

2.4 Mechanical Dimensions



Dimensions in mm

Figure 2-4: DMI-1040 Dimensions

2.5 Power Specifications

2.5.1 Power Consumption

The following table shows the DMI-1040 power consumption data at room temperature.

Input Voltage	Loading	Setup	Voltage	Current	Power Cons.
24VDC	Stress	Linux max mode/ Enable EIST	23.996V	1.5144A	36.339W
	Stress	Linux typical mode/ Enable EIST	23.996V	1.186A	28.45W
	S3 mode	-	23.997V	0.295A	7.709W
	S4 mode	-	23.997V	0.289A	6.95W
	S5 mode	Eco enabled	23.997V	0.288A	6.92W
110VDC	Stress	Linux max mode/ Enable EIST	110.50V	0.3202A	35.38W
	Stress	Linux typical mode/ Enable EIST	110.50V	0.3308A	36.55W
	S3 mode	-	110.49V	0.0690A	7.6246W
	S4 mode	-	110.49V	0.0678A	7.4921W
	S5 mode	Eco enabled	110.49V	0.0676A	7.4701W

2.5.2 System Power Features

Operating Voltage Range

The system is equipped with a wide DC input range from 16.8V to 137.5V.

- ▶ Input range: 16.8V to 137.5V
- ▶ Max. input current: 0.35A by 137.5V

Input Over-Voltage Protection

When the input voltage exceeds the 160V, the module will shut down, and try to restart every 6 seconds until the over current condition is corrected.

Input Over-Temperature Protection

Power will automatically shut down when the operating temperature of the power module exceeds 125°C and automatically restart when temperature is below 119°C.

Under Voltage Lockout (UVLO)

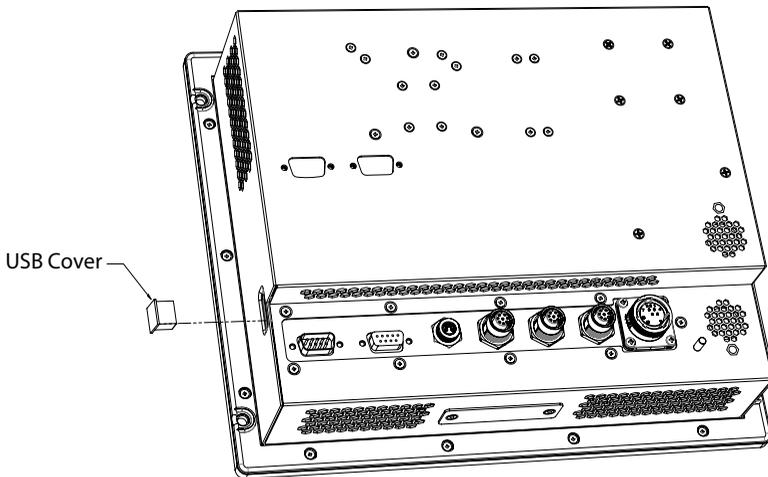
The under voltage lockout feature will shut down the power if the input voltage is below 14V \pm 0.4V and automatically restart when the input voltage is above 16 \pm 0.4V.

3 Getting Started

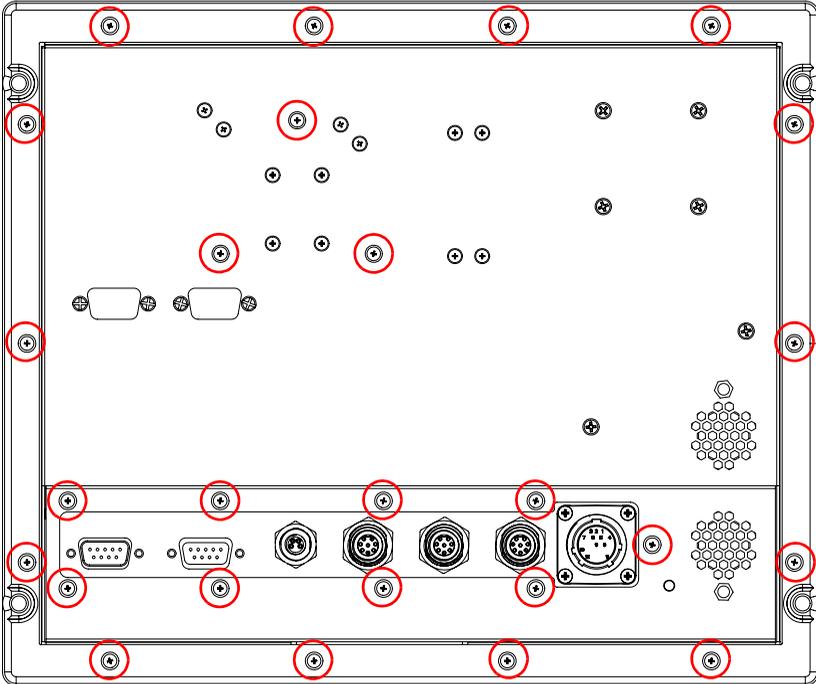
3.1 Removing the Rear Cover

To install the optional modules, first remove the rear cover as described below.

1. Remove the cover on the USB 3.0 slot as shown.



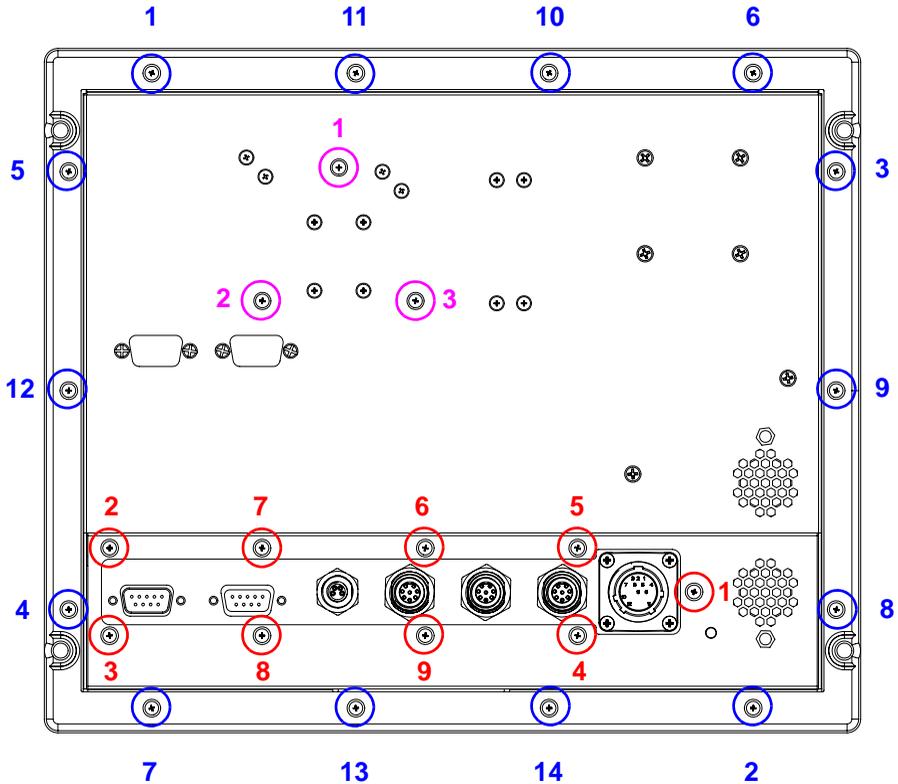
2. Remove all the screws indicated (14 screws around the edge, 9 screws on the I/O panel, 3 screws on the cover).



NOTE:

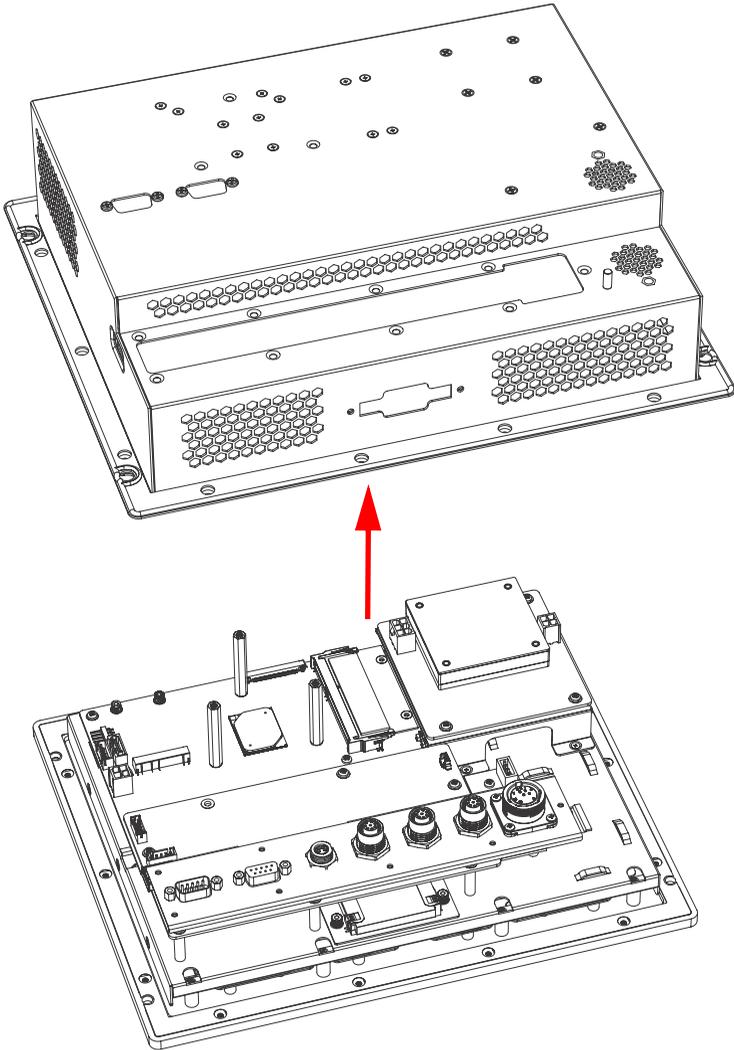
Do **NOT** remove the unmarked screws on the back cover. They are used to secure the heat spreaders inside the cover.

- When reinstalling the cover, gradually tighten the screws in the order shown in the diagram below to a torque of 3.5 kgf-cm (first blue, then red, then magenta).

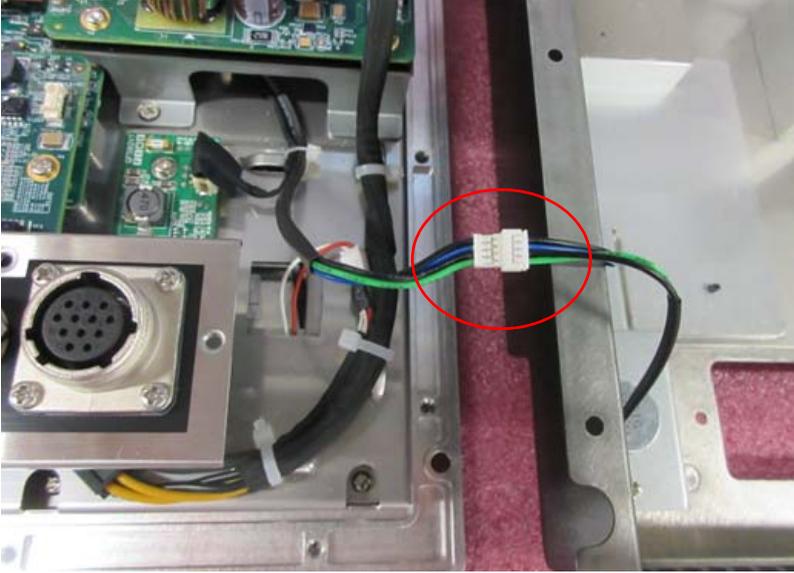


- Replace the cover on the USB 3.0 slot removed in Step 1 above.

5. Remove the rear cover. It may be necessary to use a tool such as a flat-head screwdriver to lift the cover away from the display frame.



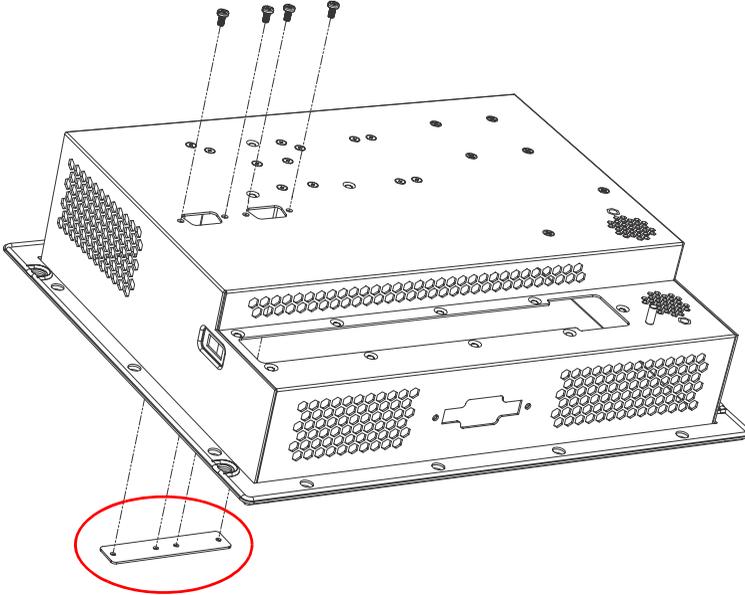
6. Disconnect the cable connecting the speakers to the main board.



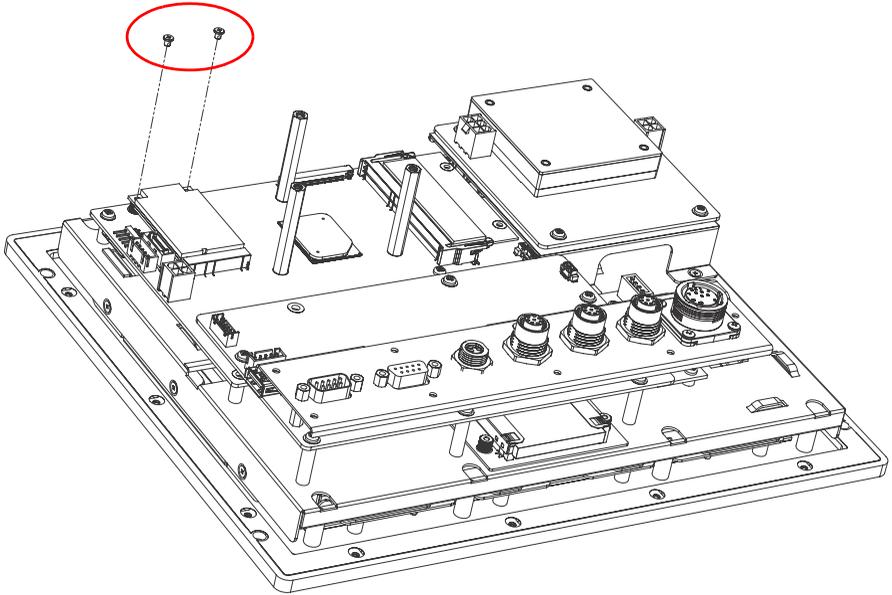
3.2 Installing a Mini PCIe MVB Module (optional)

Follow the instructions below to install a Mini PCIe MVB module.

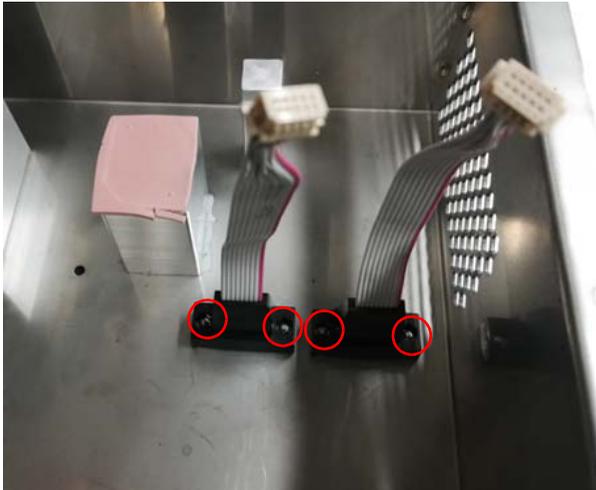
1. Remove the cover on the D-SUB port openings.



2. Install the Mini PCIe MVB module and secure it with two screws as shown.



3. Secure the two D-SUB cables to the D-SUB port openings on the rear cover with screws as shown.



4. Place the rear cover over the device as shown and connect the D-SUB cables to the Mini PCIe MVB module.



5. Reconnect the cable connecting the speakers to the main board, reinstall the rear cover onto the device, and secure the cover by replacing the screws. Replace the USB slot cover.



NOTE:

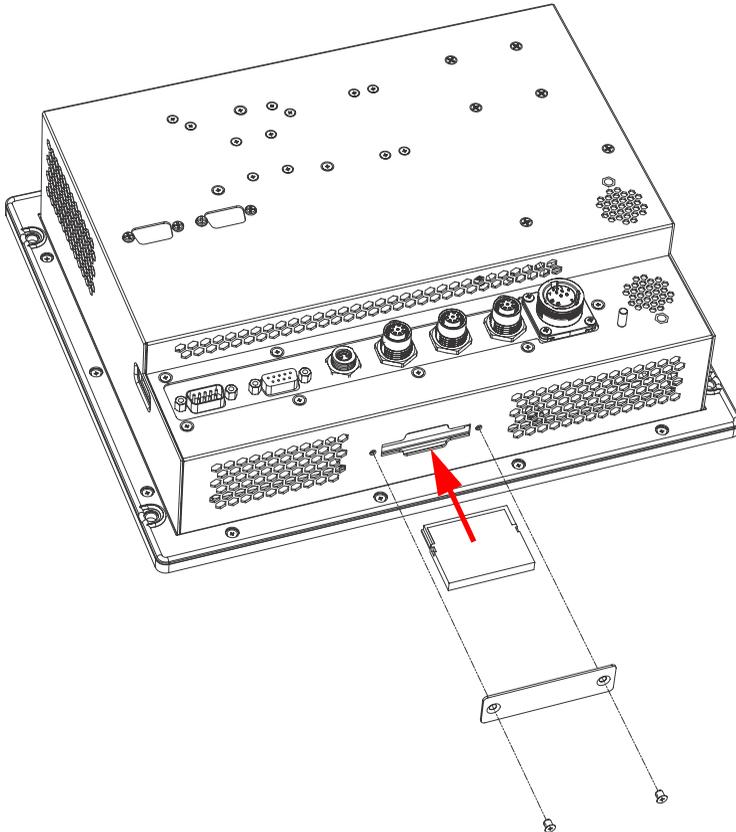
Be careful not to pinch any cables when reinstalling the cover.

3.3 Installing other Mini PCIe Modules (optional)

For instructions on installing other types of Mini PCIe modules, please contact ADLINK at <http://askanexpert.adlinktech.com>.

3.4 CFast Card Installation

To install or remove the CFast card, remove the screws securing the CFast slot cover and remove the cover. Insert the CFast card and secure the cover.



3.5 Mounting

The DMI-1040 can be panel mounted using 4 countersunk M5 screws and O-rings. Make sure there is adequate space behind the panel for ventilation and I/O connectors, and that the panel material and thickness can support the weight of the device.

1. Prepare the panel opening and screw holes as shown in the Figure 3-1 below (M5 thread or Φ 5.5 through hole).
2. Attach I/O cables to the device before installing into the panel if rear access will be limited after installation (see “Mechanical Layout” on page 6.).
3. Place the device into the panel cutout and secure with 4 countersunk M5xL40 screws and O-rings provided as shown in Figure 3-2 (torque: 10.0 Kgf-cm).



Do not overtighten the screws to prevent damaging the rubber seal on the back of the bezel.

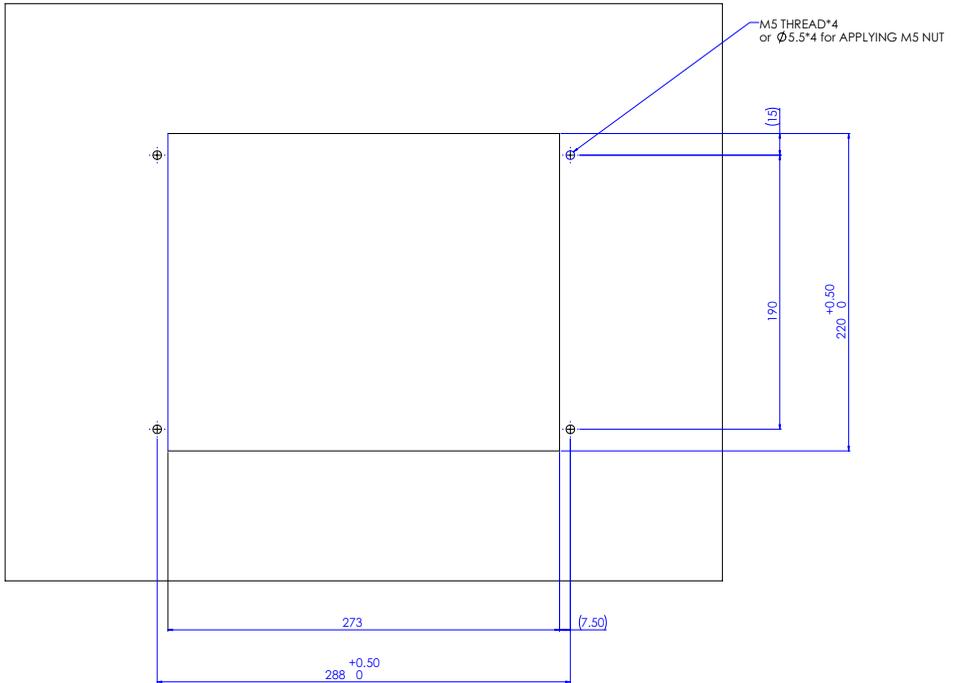


Figure 3-1: DMI-1040 Mounting Hole Locations

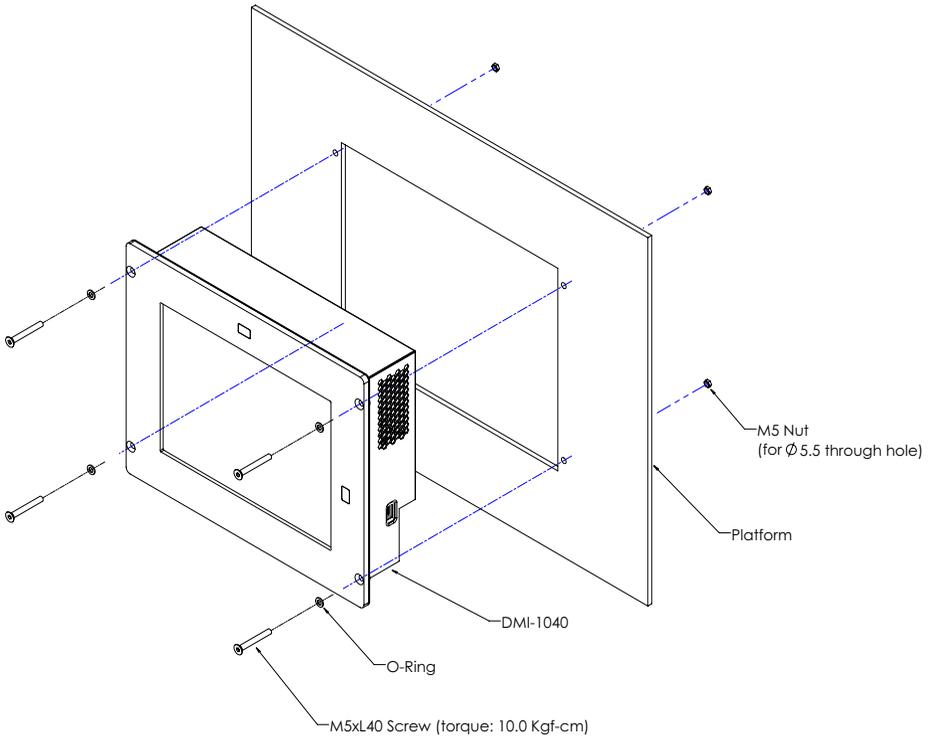


Figure 3-2: Mounting the DMI-1040

3.6 Connections

Connecting a Ground Cable



Connect the ground cable before making any other connections. When disassembling the system, always detach the ground cable last.

- ▶ Use a ground cable with a cross section of at least 0.823mm^2 (18AWG) and an M4 size ring terminal.
- ▶ Slide the ring terminal onto the ground stud and secure it with the locking M4 nut.

Connecting Peripherals

Connect all the peripheral devices needed for your system to function.

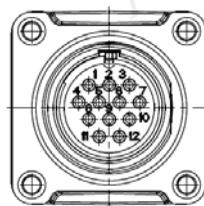
Connecting the Power Supply



- ▷ Work on the computer system may only be carried out by personnel qualified for the specific task and who have the training and experience to identify risks and avoid potential hazards.
- ▷ Make sure that a ground cable has been connected to the system before connecting an external power supply and switching on the system.
- ▷ Make sure that the voltage supplied by the external power supply conforms with specifications of the system

Connect the power supply to the 12-pin aviation plug connector (Amphenol LD20-12PMFS-SW8001). The device will power up when the power supply is turned on.

Pin #	Signal
1	NC
2	V(+)
3	V(-)
4-12	NC



3.7 Starting Up the System

The first boot device is the onboard eMMC. To enter the BIOS setup menu to change the boot device order, enter Del or Esc.

The DMI-1040 can be delivered with Linux Ubuntu 16.04 LTS 64-bit or Windows 10 64-bit already installed, or without any operating system.

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4 Driver Installation

4.1 Windows

Please download the Windows drivers from the ADLINK website at www.adlinktech.com.

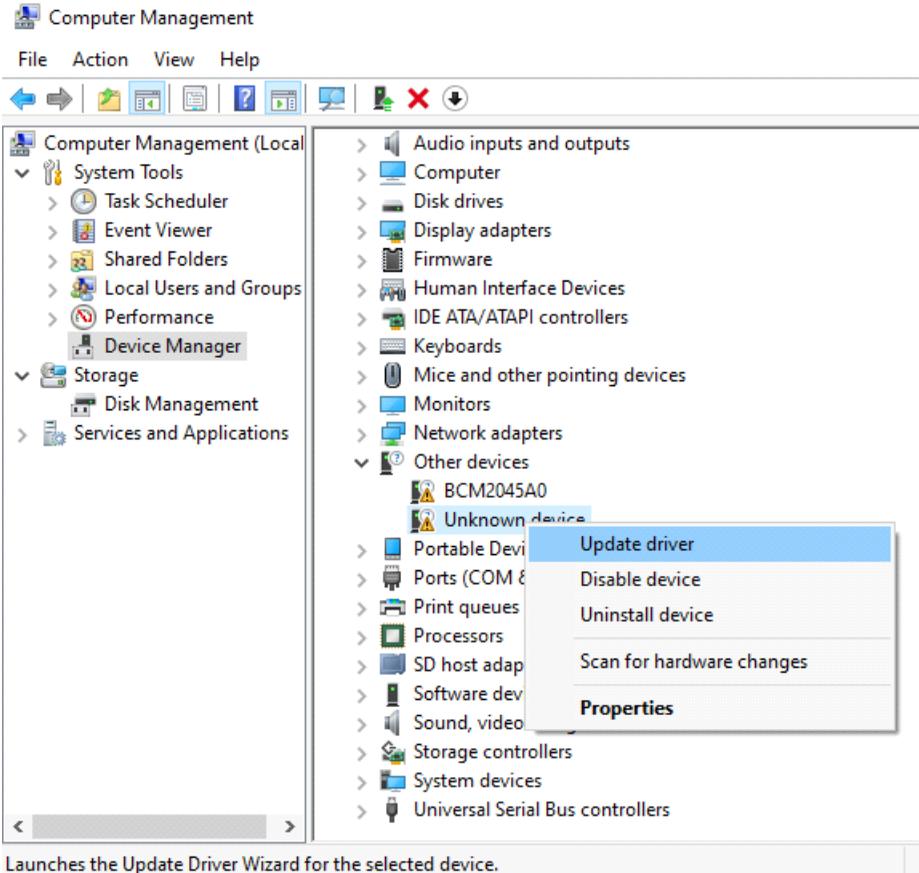
The following describes the DMI-1040 driver installation procedures for Windows 10. Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.

Extract the following files and execute the program to install the corresponding drivers:

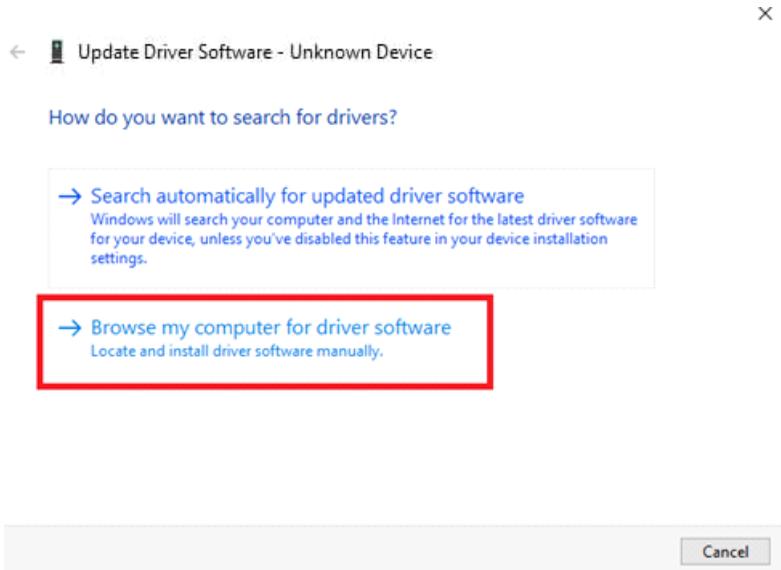
1. **Chipset:** ... \Chipset\SetupChipset.exe
2. **Graphics:** ... \Graphics\win64_15.60.01.4877.exe
3. **LAN:** ... \LAN\PROWinx64.exe
4. **Audio:** ... \Audio\0009-64bit_Win7_Win8_Win81_Win10_R282.exe
5. **PenMount Windows USB Driver:** ... \PenMount Windows Universal Driver V2.4.6.383 (WHQL)\Setup.exe
6. **GPIO:** ... \GPIO\Intel_Atom_E3900_Processor_Win10_RS1_GPIO_Driver_MR1\Intel_Processor_Win10_GPIO_Drivers_64Bits.exe
7. **Serial IO:** ... \Serial IO\SerialIO_30.100.1631.03_APL_PV_RS1\x64\SetupSerialIO.exe
8. **Auto Dimming:** ... \Auto Dimming\ADLink_ALS_Win10_64bit_Software_V1.1.exe
9. **TXE:** ... \TXE\APL-I TXE 3.0.20.1139\Installers\SetupTXE.exe
10. **4G LTE:** ... \Qualcomm SIM7100C-PCIE\SIM7100_SIM7500_SIM7600DriverInstall_V1.6_Win10.exe
11. **BT:** ... \ENLI_Ampak_AP12356_Windows 10\Win_10_32_64bit\BT\BTW12.0.1.740_Win8.1_Win10_USB_DRIVERS\Win10_12.0.1.740_USB_x86-x64_Installer\setup.exe

12. **Wi-Fi:** To install the Wi-Fi driver, download the driver package ...\\ENLI_Ampak_AP12356_Windows 10 and do the following.

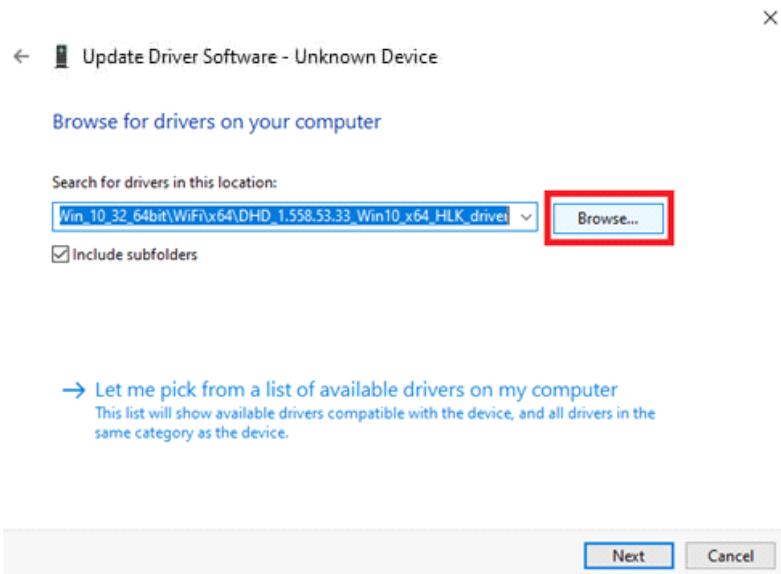
Open the **Device Manager**, R-click on *Other Devices* > *Unknown Device* and select *Update Driver*.



Launches the Update Driver Wizard for the selected device.

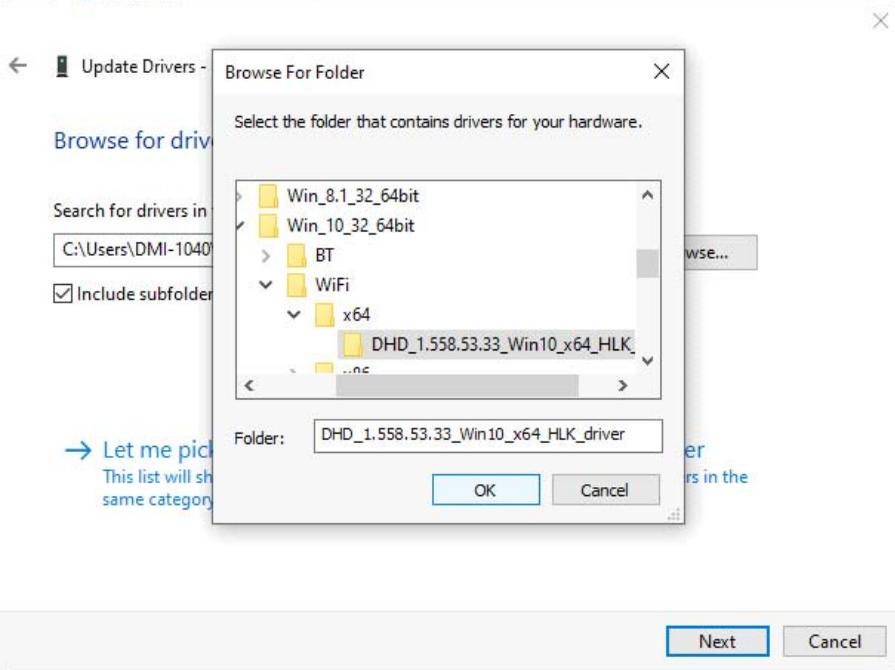
Select *Browse my computer for driver software*

Under “Search for drivers in this location”, click the *Browse* button.

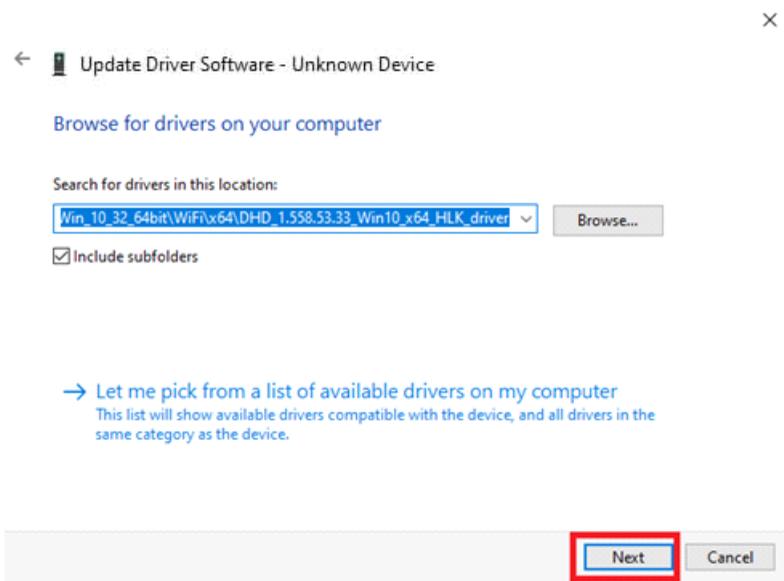


Navigate to the folder where you saved the driver package, go to the path for your OS, then click **OK**

- ▶ Windows 10 (x64): ...\\ENLI_Ampak_AP12356_Windows 10\\Win_10_32_64bit\\WiFi\\x64\\DHD_1.558.53.33_Win10_x64_HLK_driveronly
- ▶ Windows 10 (x86): ...\\ENLI_Ampak_AP12356_Windows 10\\Win_10_32_64bit\\WiFi\\x86\\DHD_1.558.53.33_Win10_x86_HLK_driveronly



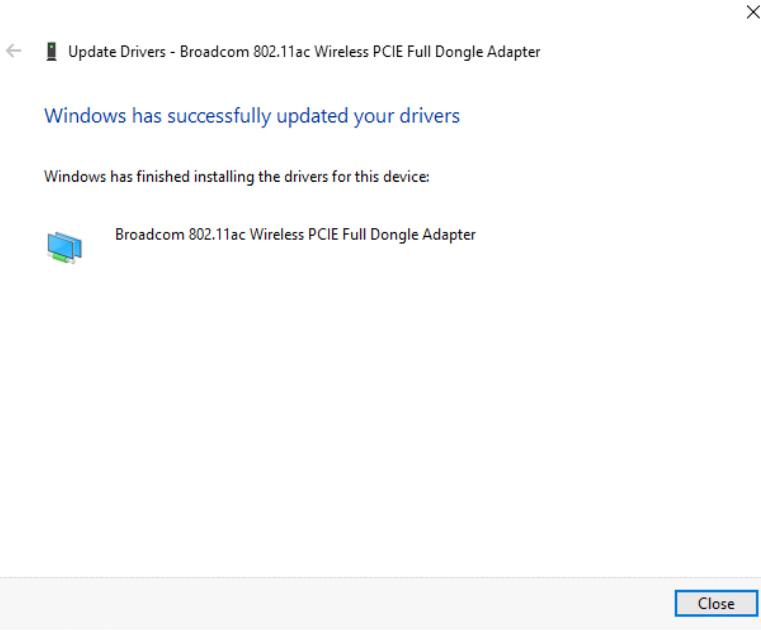
Click *Next*.



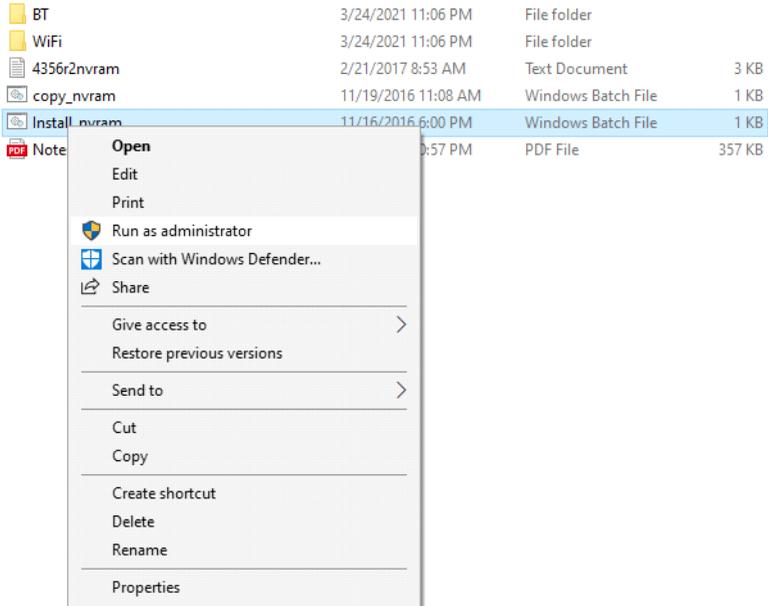
The system will begin installing the Wi-Fi driver.



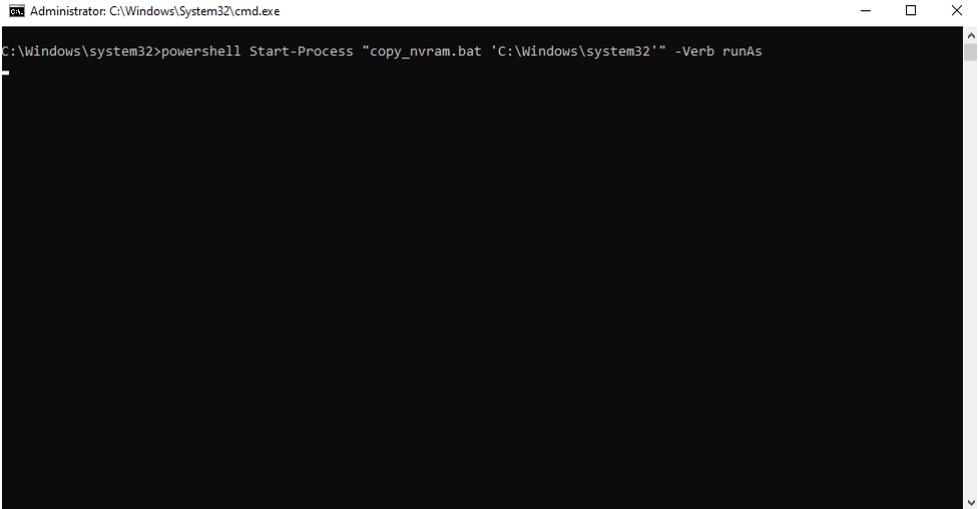
After the driver has finished installation, click *Close*. (Note: the AP12356 module is equipped with a Broadcom chip and has the device name *Broadcom 802.11ac Wireless PCI Full Dongle Adapter*.)



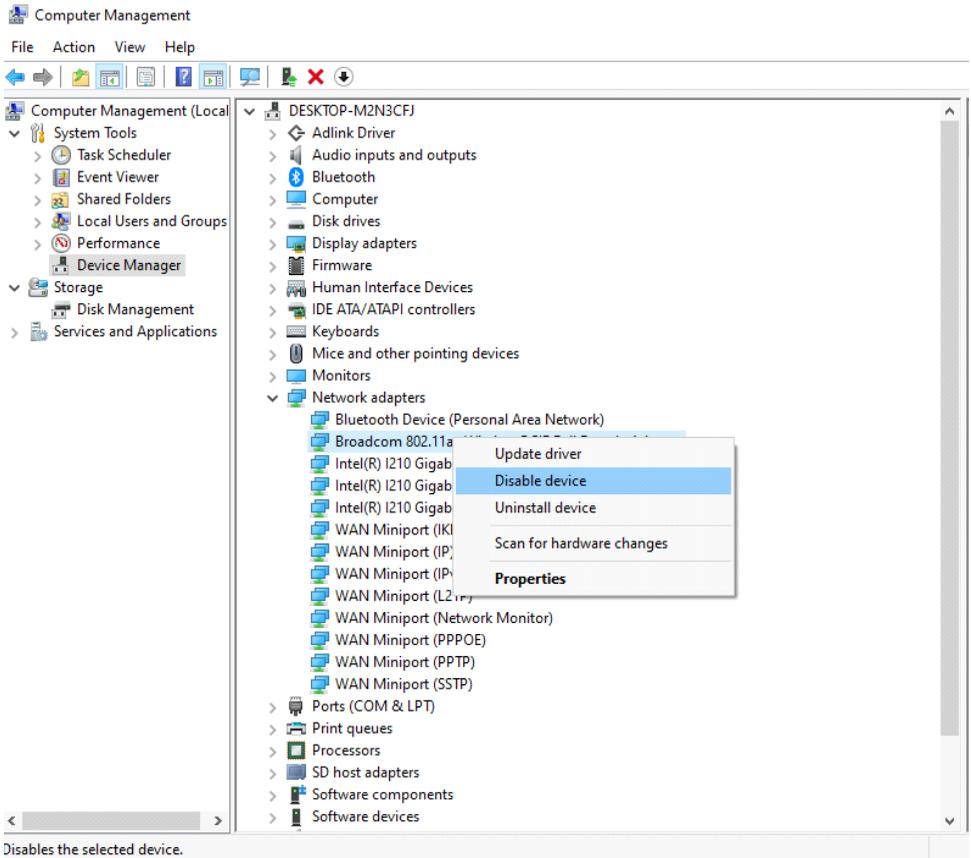
Navigate to the path ...\\ENLI_Ampak_AP12356_Windows 10\\Win_10_32_64bit. Right click on the file *Install_nvram.bat* and click *Run as Administrator*.



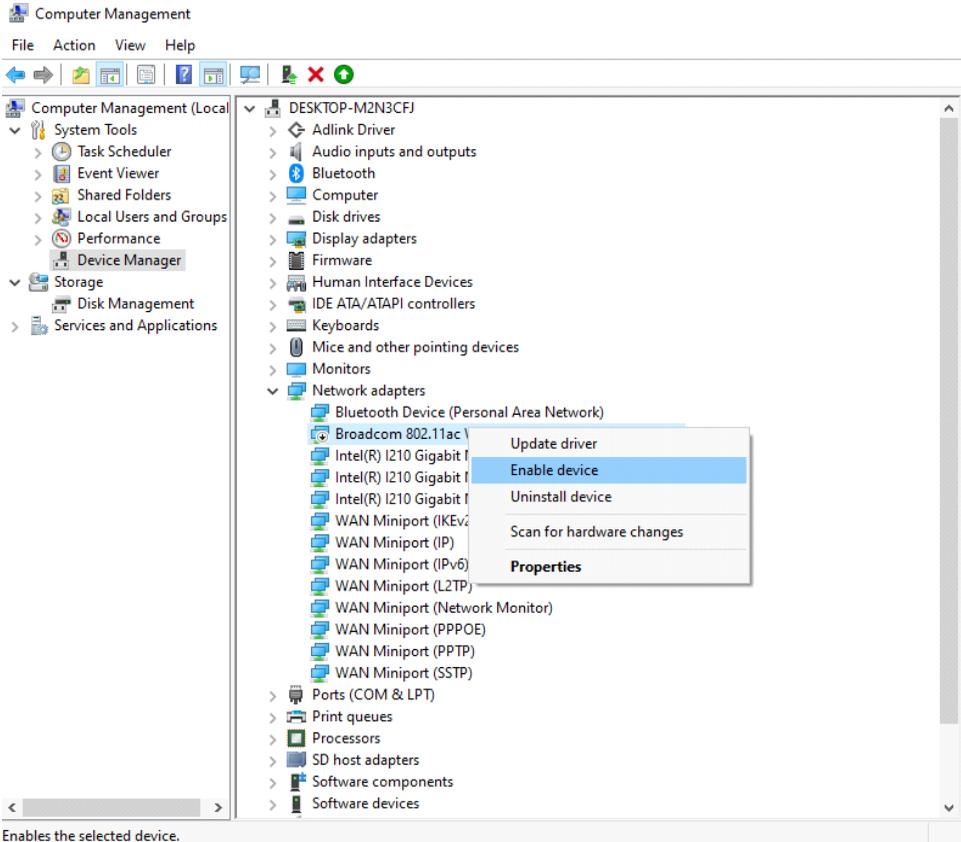
Click Yes in the User Account Control pop-up. This will copy the file 4356r2nvram.txt into C:\Windows\System32\drivers.



Open the **Device Manager**, R-click on *Broadcom 802.11ac Wireless PCI Full Dongle Adapter* and disable it. Click Yes when asked to confirm.



R-click on *Broadcom 802.11ac Wireless PCI-E Full Dongle Adapter* and enable it.



Restart the system to complete Wi-Fi module installation.

4.2 Linux Drivers

To install the Linux drivers, please download drivers from the ADLINK website at www.adlinktech.com and follow the instructions below.

4.2.1 GPS

By default, GPS uses the legacy UART driver, and its interface is "/dev/ttyS2" (dependent on BIOS settings), baud rate 115200.

```
# cat /dev/ttySx // read all NEMA string from COM port

//NEMA string output from console
$GNRMC,,V,,,,,,,,,N*4D

$GNVTG,,,,,,,,N*2E

$GNGGA,,,,,0,00,99.99,,,,,*56

$GNGSA,A,1,,,,,,,,,99.99,99.99,99.99*2E

$GNGSA,A,1,,,,,,,,,99.99,99.99,99.99*2E

$GPGSV,1,1,00*79

$GLGSV,1,1,00*65

$GNGLL,,,,,V,N*7A

// test by gps_parser
// build tool
# gcc gps_parser.c -o gps_parser
# ./gps_parser /dev/ttyS2
```

4.2.2 Cold & Warm Boot Test

```
//Cold Boot Test
#cd ~/Desptop/DMI-1210/applications/GPS/
#chmod +x *.sh
#./gps_logger.sh cold /dev/ttyS2

//Warm Boot Test
#./gps_logger.sh warm /dev/ttyS2
```

4.2.3 CAN Bus

To install the vendor provided SDK package (v2.1.8), first make sure the cp210x.c driver is enabled on your platform. It will export two interfaces under /dev/. Only first interface is meaningful for the user.

```
//build SDK library and sample applications
# sudo apt-get update
# sudo apt-get install cmake
# cd $CAN_SDK/faro_can_sdk_v2.1.8
# cmake CMakeLists.txt
# make
# cp ./lib/* /lib

//get firmware version; please make sure you library in /lib/
# cd $CAN_SDK/adlink_sample
# ./build_files.sh
# ./adlink_get_can_fw /dev/ttyUSBx

//test port A transfer data to port B
# cd $CAN_SDK/bin
# ./faro_can_sdk_demo -p /dev/ttyUSB0 -r -t 10 -d 20
//open another terminal and issue the following command
#./faro_can_sdk test -c
```

4.2.4 Multifunction Vehicle Bus (MVB)

Duagon D017M

Enable the drivers.

```
// build driver and loading
# cd $MVB_SDK/Mini_PClE/linux/x86_linux/io/src/
# make && make load
# lspci -k
// check driver loaded
```

```
08:00.0 Unassigned class [ff00]: Device 1bfc:d017 (rev 01)
Subsystem: Device 1bfc:d017
Kernel driver in use: pci_drv_duagon
root@adlink-SP-AL:/home/adlink/DMI-1210/sdk/MVB/d-010907-019128_encrypt/d-010907-019128/x86_linux# ls -l /dev/d716m0
crw-rw-r-- 1 root staff 241, 0  30 09:20 /dev/d716m0
```

```
# cd $MVB_SDK/Mini_PClE/linux/x86_linux/devel
//compiler library file libhost.a
# make

//copy libhost to $MVB_SDK/Mini_PClE/linux/x86_linux/api/lib/
# cp -rf lib* ../api/lib/
// test via srvloopback
# cd $MVB_SDK/Mini_PClE/linux/x86_linux/app/srvloopback
# make
# ./srvloopback -t 0
```

```
root@adlink-SP-AL:/home/adlink/DMI-1210/sdk/MVB/d-010907-019128_encrypt/d-010907-019128/x86_linux/app/srvloopback# ./srvloopback -t 0
Starting Thread@ card index 0
CARD (0)
0x00000000: 0x00 0x00000000: 0x00 0x00000010: 0x00
0x00000001: 0x00 0x00000009: 0x00 0x00000011: 0x00
0x00000002: 0x00 0x00000004: 0x00 0x00000012: 0x00
0x00000003: 0x00 0x0000000B: 0xFF 0x00000013: 0xFF
0x00000004: 0x00 0x0000000C: 0x00 0x00000014: 0x00
0x00000005: 0x00 0x0000000D: 0x00 0x00000015: 0x00
0x00000006: 0x00 0x0000000E: 0x00 0x00000016: 0x00
0x00000007: 0x00 0x0000000F: 0x04 0x00000017: 0x04

CARD (0) - *****Start service protocol loopback test*****
CARD (0) - *****End of service protocol loopback test*****
CARD (0) - Test OK.
```

```
// test via tcn_pd_demo (Process Data)
# cd $MVB_SDK/Mini_PClE/linux/x86_linux/app/tcn_pd_demo
# make
# ./tcn_pd_demo -t 0
//Hint: if you want to enable BA function, please add "#define
TCN_DEMO_BA_D2000" in tcn_pd_demo.c
```

```
// test by tc_n_md_demo (Message Data)
# cd $MVB_SDK/Mini_PCle/linux/x86_linux/app/tc_n_md_demo
# make
# ./tc_n_md_demo -t 0
root@adlink-SP-AL:/home/adlink/DML-1210/sdk/MVB/d-010907-019128_encrypt/d-010907-019128/x86_linux/app/tc_n_md_demo# ./tc_n_mvb_md_demo -t 0
CARD 0 -
CARD 0 -Demo of TCN MD Driver API
CARD 0 -=====
CARD 0 -- as_init()
0x00000000: 0x00 0x00000008: 0x00 0x00000010: 0x00
0x00000001: 0x00 0x00000009: 0x00 0x00000011: 0x00
0x00000002: 0x00 0x0000000A: 0x00 0x00000012: 0x00
0x00000003: 0x00 0x0000000B: 0xFF 0x00000013: 0xFF
0x00000004: 0x00 0x0000000C: 0x00 0x00000014: 0x00
0x00000005: 0x60 0x0000000D: 0x60 0x00000015: 0x60
0x00000006: 0x00 0x0000000E: 0x00 0x00000016: 0x00
0x00000007: 0x00 0x0000000F: 0x04 0x00000017: 0x04
CARD 0 -- ap_init()
CARD 0 -- ap_ts_config()
CARD 0 -- md_init()
CARD 0 -am_init()
CARD 0 -am_announce_device()
CARD 0 -am_bind_replier()
CARD 0 -- as_service_handler(SV_MVB_SERVICE_WRITE_CONTROL)
CARD 0 -
```

```

CARD 0_*****
CARD 0_* TCN MVB MD demo application Loop *
CARD 0_*****
CARD 0 -am_receive_request()
CARD 0 -- replier_function=200
CARD 0 -- in_msg_size      =200
CARD 0 -- replier_ref      =0x0061320C
CARD 0 -am_call_request()
CARD 0 -- caller_function =100
CARD 0 -- out_msg_adr      ="duagon is cool!"
CARD 0 -- out_msg_size    =175
CARD 0 -- in_msg_size     =200
CARD 0 -- replier_ref     =0x006134A8
CARD 0 -md_receive_confirm()
CARD 0 -- replier_function=200
CARD 0 -- in_msg_adr      ="duagon is cool!"
CARD 0 -- in_msg_size    =175
CARD 0 -- replier_ref     =0x0061320C
CARD 0 -am_reply_request()
CARD 0 -- replier_function=200
CARD 0 -- out_msg_adr     ="It's really true! (0)"
CARD 0 -- out_msg_size   =185
CARD 0 -- replier_ref    =0x0061320C
CARD 0 -- status        =32
CARD 0 -md_reply_confirm()
CARD 0 -- replier_function=200
CARD 0 -- replier_ref    =0x0061320C
CARD 0 -am_receive_request()
CARD 0 -- replier_function=200
CARD 0 -- in_msg_size    =200
CARD 0 -- replier_ref    =0x0061320C
CARD 0 -md_call_confirm()
CARD 0 -- caller_function =100
CARD 0 -- am_caller_ref   =0x006134A8
CARD 0 -- in_msg_adr     ="It's really true! (0)"
CARD 0 -- in_msg_size    =185
CARD 0 -- status        =32

```

Duagon D113

SERVER mode preferred option set combinations are as follows (source: Duagon D113 Datasheet.).

SERVER Preferred Option Set Combinations

The functionality as described (no customer specific changes) can be identified with the following document numbers:

Intended for hardware	Document number downloadable options (also known as "OP")	Description
D113.D	d-000723-nnnnnn	Supports MVB Server with 4096 PD ports of 32-byte length each, MD support, no MVB bus administrator. ▷ standard 8-bit PC/104 (ISA) bus ▷ IO-mapped UART device at 0x4F8
D113.T	d-000724-nnnnnn	▷ full UART register set (i.e. COM emulation) ▷ interrupt 9 ▷ Big Endian data representation for internal UART Emulation
D113F.D	d-000773-nnnnnn	Supports MVB Server with 4096 PD ports of 32-byte length each, MD support, with MVB bus administrator. ▷ standard 8-bit PC/104 (ISA) bus ▷ IO-mapped UART device at 0x4F8
D113F.T	d-000774-nnnnnn	▷ full UART register set (i.e. COM emulation) ▷ interrupt 9 ▷ Big Endian data representation for internal UART Emulation

Please use the package "d-013928-039917" to enable the D013 PC-104 module.

```
// build libraries
# cd d-013928-039917/linux/devel
# make && make copy

//test PD with its sample app
# cd d-013928-039917/linux/app/tcn_pd_demo
# make
# ./tcn_pd_demo -t 0

// get the following result
root@adlink-SP-AL:~/d-013928-039917/linux/app/tcn_pd_demo# ./tcn_pd_demo -t 0
Starting Thread0 card index 0

Test TCN Driver API
=====
=Thread 0D260700=====

Demo of TCN Driver API
=====
- as_init()
0x000004F8: 0x00 0x00000500: 0x04 0x00000508: 0x00
0x000004F9: 0x00 0x00000501: 0x00 0x00000509: 0x00
0x000004FA: 0x00 0x00000502: 0x00 0x0000050A: 0x08
0x000004FB: 0x00 0x00000503: 0x00 0x0000050B: 0x00
0x000004FC: 0x00 0x00000504: 0x00 0x0000050C: 0x00
0x000004FD: 0x60 0x00000505: 0x00 0x0000050D: 0x00
0x000004FE: 0x00 0x00000506: 0x00 0x0000050E: 0x00
0x000004FF: 0x60 0x00000507: 0x00 0x0000050F: 0x00
- ap_init()
- ap_ts_config()
- ap_port_manage(PD_PRT_CMD_CONFIG)
- as_service_handler(SV_MVB_SERVICE_WRITE_CONTROL)
- ap_get_dataset(0x010)
-> result = 0
-> port_data = 0x00 0x00
```

```
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x00 0x00
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
- ap_get_dataset(0x010)
  -> result    = 0
  -> port_data = 0x00 0x00
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
- ap_get_dataset(0x010)
  -> result    = 0
  -> port_data = 0x00 0x00
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
- ap_get_dataset(0x010)
  -> result    = 0
  -> port_data = 0x00 0x00
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
- ap_get_dataset(0x010)
  -> result    = 0
  -> port_data = 0x00 0x00
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
- ap_get_dataset(0x010)
  -> result    = 0
  -> port_data = 0x00 0x00
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
- ap_get_dataset(0x010)
  -> result    = 0
  -> port_data = 0x00 0x00
```

```
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
- ap_get_dataset(0x010)
  -> result    = 0
  -> port_data = 0x00 0x00
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
- ap_get_dataset(0x010)
  -> result    = 0
  -> port_data = 0x00 0x00
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
- ap_get_dataset(0x010)
  -> result    = 0
  -> port_data = 0x00 0x00
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
- ap_get_dataset(0x010)
  -> result    = 0
  -> port_data = 0x00 0x00
- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
- ap_put_dataset(0x018)
  -> port_data = 0x12 0x34
t2-t1= 4682- ap_get_dataset(0x018)
  -> result    = 0
  -> port_data = 0x12 0x34
```

** TCN demo application terminates successfully! **

** Test of TCN Driver API 0 terminates successfully!**

```
//test MD with its sample app
# cd d-013928-039917/linux/app/tcn_md_demo
# make
# ./tcn_md_demo -t 0
root@adlink-SP-AL:/home/adlink/DMI-1210/sdk/MVB/d-010907-019128_encrypt/d-010907-019128/x86_linux/app/tcn_md_demo# ./tcn_mvb_md_demo -t 0
CARD 0 -
CARD 0 -Demo of TCN MD Driver API
CARD 0 -=====
CARD 0 -- as_init()
0x00000000: 0x00 0x00000008: 0x00 0x00000010: 0x00
0x00000001: 0x00 0x00000009: 0x00 0x00000011: 0x00
0x00000002: 0x00 0x0000000A: 0x00 0x00000012: 0x00
0x00000003: 0x00 0x0000000B: 0xFF 0x00000013: 0xFF
0x00000004: 0x00 0x0000000C: 0x00 0x00000014: 0x00
0x00000005: 0x60 0x0000000D: 0x60 0x00000015: 0x60
0x00000006: 0x00 0x0000000E: 0x00 0x00000016: 0x00
0x00000007: 0x00 0x0000000F: 0x04 0x00000017: 0x04
CARD 0 -- ap_init()
CARD 0 -- ap_ts_config()
CARD 0 -- md_init()
CARD 0 -am_init()
CARD 0 -am_announce_device()
CARD 0 -am_bind_replier()
CARD 0 -- as_service_handler(SV_MVB_SERVICE_WRITE_CONTROL)
CARD 0 -
```

```

CARD 0 *****
CARD 0 -* TCN MVB MD demo application Loop *
CARD 0 *****
CARD 0 -am_receive_request()
CARD 0 -- replier_function=200
CARD 0 -- in_msg_size      =200
CARD 0 -- replier_ref      =0x0061320C
CARD 0 -am_call_request()
CARD 0 -- caller_function =100
CARD 0 -- out_msg_adr      ="duagon is cool!"
CARD 0 -- out_msg_size     =175
CARD 0 -- in_msg_size     =200
CARD 0 -- replier_ref     =0x006134A8
CARD 0 -md_receive_confirm()
CARD 0 -- replier_function=200
CARD 0 -- in_msg_adr      ="duagon is cool!"
CARD 0 -- in_msg_size     =175
CARD 0 -- replier_ref     =0x0061320C
CARD 0 -am_reply_request()
CARD 0 -- replier_function=200
CARD 0 -- out_msg_adr     ="It's really true! (0)"
CARD 0 -- out_msg_size    =185
CARD 0 -- replier_ref     =0x0061320C
CARD 0 -- status         =32
CARD 0 -md_reply_confirm()
CARD 0 -- replier_function=200
CARD 0 -- replier_ref     =0x0061320C
CARD 0 -am_receive_request()
CARD 0 -- replier_function=200
CARD 0 -- in_msg_size     =200
CARD 0 -- replier_ref     =0x0061320C
CARD 0 -md_call_confirm()
CARD 0 -- caller_function =100
CARD 0 -- am_caller_ref   =0x006134A8
CARD 0 -- in_msg_adr     ="It's really true! (0)"
CARD 0 -- in_msg_size    =185
CARD 0 -- status         =32

```

4.2.5 Touch Panel

The touch panel driver is built-in by default. A resistance touch panel calibration tool is provided.

```
// install PenMount calibration tool
# cd $PENMOUNT/pmLinux-Debian8/
// at this step, it will take a while, please patient
# ./install.sh
// after finished installation, please reboot system
# reboot
```

4.2.6 Ambient Light Sensor

The system can connect to the Everlight DCDIC-17 ambient light sensor. A sample application is provided to read out two channels ADC value and calculate the lux value.

```
// visit folder to compile application
# cd $APP_ALS/
# gcc als_read.c -o als_read

//perform test application to read out Lux value
# ./als_read

//sample logs
root@adlink-SP-AL:/home/adlink/ALS# ./als_read
[DBG] :seeking /dev/i2c-1
[DBG] :write data 0x00 fail

[DBG] :read data failure
[DBG] :seeking /dev/i2c-2
[DBG] :write data 0x00 fail

[DBG] :read data failure
[DBG] :seeking /dev/i2c-3
[DBG] :write data 0x00 fail

[DBG] :read data failure
[DBG] :seeking /dev/i2c-4
[DBG] :write data 0x00 fail
```

```
[DBG] :read data failure  
[DBG] :seeking /dev/i2c-5  
[DBG] :write data 0x00 fail  
  
[DBG] :read data failure  
[DBG] :seeking /dev/i2c-6  
[DBG] :write data 0x00 fail  
  
[DBG] :read data failure  
[DBG] :seeking /dev/i2c-7  
[DBG] :write data 0x00 fail  
  
[DBG] :read data failure  
[DBG] :seeking /dev/i2c-8  
[DBG] :write data 0x00 fail  
  
[DBG] :read data failure  
[DBG] :seeking /dev/i2c-9  
[DBG] :write data 0x00 fail  
  
[DBG] :read data failure  
[DBG] :seeking /dev/i2c-10  
[DBG] :write data 0x00 fail  
  
[DBG] :read data failure  
[DBG] :seeking /dev/i2c-11  
[DBG] :found  
[DBG] :UPDATE=0x01  
CH0=3092  
CH1=962  
LUX=19.170000  
[DBG] :UPDATE=0x01  
CH0=3104  
CH1=966  
LUX=19.241999
```

4.2.7 Wi-Fi and Bluetooth

Wi-Fi and Bluetooth functionality are supported by the Mini PCIe AP12356 module.

Wi-Fi Function Install

```
//install Wifi module  
$sudo su  
#./install.sh
```

Bluetooth Function Install

If your kernel is default version (linux-4.13.0-43-generic), you can run `install_bt.sh` to install the Bluetooth module directly.

```
//install Bluetooth module  
$sudo su  
#./install_bt.sh
```

If your kernel is not linux-4.13.0-43-generic, you need to re-compile the Bluetooth driver and install as below.

```
//Compile Bluetooth module and install  
$sudo su  
#cd /home/adlink/Desktop/DMI-1210/external_driver/bluetooth_4_13  
# make -C /lib/modules/`uname -r`/build M=`pwd` clean  
# make -C /lib/modules/`uname -r`/build M=`pwd` modules  
#insmod btbcm.ko  
#insmod btintel.ko  
#insmod btrtl.ko  
#insmod btusb.ko
```

4.2.8 USB Wakeup Function (optional)

For customers who need the mouse and touch screen to wake up from S3, S4 and S5, the software BSP provides a driver (usbhid) patch for this function.

Download the kernel source as shown below.

```
#cd ~/kernel_src
//Assume the kernel is 4.13.16
#wget https://mirrors.edge.kernel.org/pub/linux/kernel/v4.x/linux-4.13.16.tar.gz
#tar -zxvf linux-4.13.16.tar.gz
#cp /boot/config-`uname -r` kernel_src/
//Mark Red words for wake up
#vim drivers/hid/usbhid/hid-core.c

...
    if (interface->desc.bInterfaceSubClass == USB_INTERFACE_SUBCLASS_BOOT /*&&
        interface->desc.bInterfaceProtocol ==
            USB_INTERFACE_PROTOCOL_KEYBOARD*/){
        usbhid_set_leds(hid);
        device_set_wakeup_enable(&dev->dev, 1);
    }

...

//make kernel
#make dep-pkg
//Wait a moment depend by your system performance
#cd ../
#dpkg -i *.deb
```

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5 Display Utilities

5.1 Calibrating the Touch Panel - Ubuntu

Download the PenMount touchscreen calibration tool *PenMount-Ubuntu 12.04-18.04 32_64bit Driver* from the manufacturer's website by using the following search.

<http://www.amtouch.com.tw/downloads/penmount-drivers/>

PenMount Drivers

Controller All	Operating System Linux Ubuntu
Linux Ubuntu Platform x86 64bit	Linux Ubuntu Ubuntu 16.04
Search	

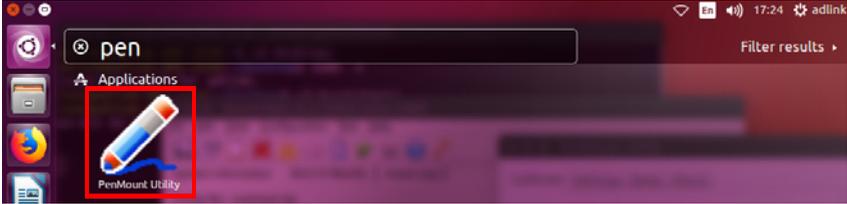
Driver Title **	PenMount Controller **	Operating System **	Platform **
PenMount-Ubuntu 12.04-18.04 32_64bit Driver	PenMount 9000, PenMount 6000 RS-232, PenMount 6000 USB, PenMount PCI USB, PenMount PCI RS-232	Linux Ubuntu, Ubuntu 12.04 LTS, Ubuntu 12.10, Ubuntu 13.04, Ubuntu 13.10, Ubuntu 14.04 LTS, Ubuntu 14.10, Ubuntu 15.04, Ubuntu 15.10, Ubuntu 16.04, Ubuntu 16.10, Ubuntu 17.04, Ubuntu 17.10, Ubuntu 18.04, Linux (X11), Xorg X Server 1.13.x, Xorg X Server 1.14.x, Xorg X Server 1.15.x, Xorg X Server 1.16.x, Xorg X Server 1.17.x, Xorg X Server 1.18.x, Xorg X Server 1.19.x	x86 64bit, x86 32bit

Uncompress the package and install it by doing the following:

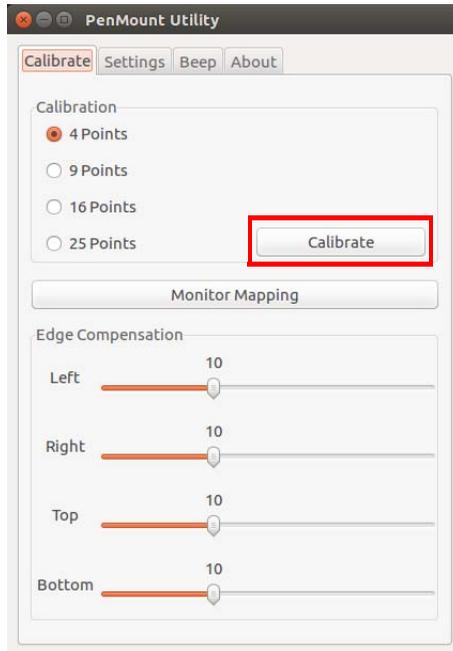
```
// Uncompress PenMount calibration tool
# tar -jxvf pmLinux-Ubuntu_12.04-18.04_32_64bit_Driver_V4.5.6.tar.bz2
// install PenMount calibration tool
# cd pmLinux-Ubuntu_12.04-18.04_32_64bit_Driver_V4.5.6/
// at this step, it will take a while, please patient
# ./install.sh
// after finished installation, please reboot system
# reboot
```

To calibrate the touchscreen, perform the following steps.

1. Select “*Filter*” and search for “Pen” to find the **PenMount Utility**.



2. Open the utility, select the number of points you wish to calibrate and click on “*Calibrate*” to start.



3. Press the red dot to start the calibration process.



5.2 Reading the Ambient Light Sensor

The DMI-1040 is equipped with an Everlight DCDIC-17 ambient light sensor. Below is a sample application to read out the ADC values and calculate the illuminance in lux.

```
// visit folder to compile application
# cd $APP_ALS/
# gcc als_read.c -o als_read

//perform test application to read out Lux value
# ./als_read

//sample logs
root@adlink-SP-AL:/home/adlink/ALS# ./als_read
[DBG] :seeking /dev/i2c-1
[DBG] :write data 0x00 fail

[DBG] :read data failure
[DBG] :seeking /dev/i2c-2
[DBG] :write data 0x00 fail

...

[DBG] :read data failure
[DBG] :seeking /dev/i2c-10
[DBG] :write data 0x00 fail

[DBG] :read data failure
[DBG] :seeking /dev/i2c-11
[DBG] :found
[DBG] :UPDATE=0x01
CH0=3092
CH1=962
LUX=19.170000
[DBG] :UPDATE=0x01
CH0=3104
CH1=966
LUX=19.241999
```

5.3 Display Brightness Control

The LCD backlight can be controlled using the following command:

```
echo $1>
    /sys/devices/pci0000\:00/0000\:00\:02.0/drm/
    card0/card0-eDP-1/intel_backlight/brightness
$1= 0~96000 (0=dark, 96000= max. brightness)

#Set brightness to min
echo
    0>/sys/devices/pci0000:00/0000:00:02.0/drm/
    card0/card0-eDP-1/intel_backlight/brightnes
    s
#Set brightness to max
echo
    96000>/sys/devices/pci0000:00/0000:00:02.0/drm
    /card0/card0-eDP-1/intel_backlight/brightness
```

Users can build into their own application to enable auto dimming by reading the ambient light sensor and setting the LCD backlight brightness accordingly. Or contact your ADLINK representative for assistance.

6 Interfaces

6.1 Status LEDs

Please refer to Figure 2-2 DMI-1040 Front Layout on page 6 for status LED locations.

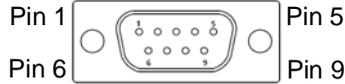
LED	Function
Power Status	LED is on when DC Power is connected and system is powered on

Table 6-1: Status LED Definitions

6.2 Pin Definitions

Please refer to Figure 2-3 DMI-1040 Rear, Side and Bottom I/O Layout on page 7 for connector locations.

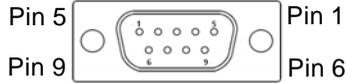
COM RS-232 DB9 Connector (male)



Pin #	RS-232 (male)
1	COM3_RX_Console_R
2	COM1_RXD_CN_R
3	COM1_TXD_CN_R
4	COM3_TX_Console_R
5	GND_COM_ISO
6	COM1_DSR-L_CN_R
7	COM1_RTS-L_CN_R
8	COM1_CTS-L_CN_R
9	COM1_RI-L_CN_R

Table 6-2: COM RS-232 DB9 Pinout (male)

COM RS-422 DB9 Connector (female)



Pin #	RS-422 (female)
1	CH_COM_GND
2	COM2_TXD_CN
3	NC
4	COM2_RXD_CN
5	GND_COM_ISO
6	COM2_DTR-L_CN
7	NC
8	COM2_DCD-L_CN
9	NC

Table 6-3: COM RS-422 DB9 Pinout (female)

USB 2.0 M8 Connector

Pin #	Signal Name
1	+5V
2	USB_P2_CN
3	USB_P2_CP
4	GND

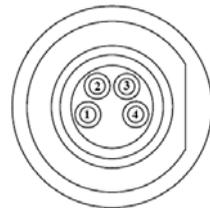


Table 6-4: USB 2.0 M8 Connector Pinout

GbE1/GbE2/GbE3 M12 Connectors

Pin #	Signal Name
1	MDO0P
2	MDO0N
3	MDO1P
4	MDO1N
5	MDO3P
6	MDO3N
7	MDO2N
8	MDO2P

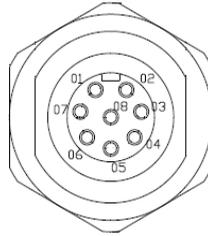


Table 6-5: GbE1/GbE2/GbE3 M12 Connector Pinout

DC Power Input Connector

Pin #	Signal
1	NC
2	V(+)
3	V(-)
4-12	NC

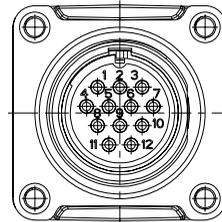


Table 6-6: DC Power Input Pinout

USB2 Connector (USB 3.0)

Pin #	Signal Name
1	+5V
2	USB2_P0_DN
3	USB2_P0_DP
4	GND
5	USB3_P0_RXN
6	USB3_P0_RXP
7	GND
8	USB3_P0_TXN
9	USB3_P0_TXP

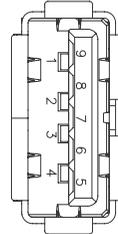


Table 6-7: USB2 (USB 3.0) Pinout

CFast Socket

Pin #	Signal Name
Ground	S1
SATA_TX-P	S2
SATA_TX-N	S3
Ground	S4
SATA_RX-N	S5
SATA_RX-P	S6
Ground	S7
CFast_CDI	P1
Ground	P2
NC	P3
NC	P4
NC	P5
NC	P6
Ground	P7
CFast_LED1	P8
CFast_LED2	P9
NC	P10
NC	P11
NC	P12
P3V3	P13
P3V3	P14
Ground	P15
Ground	P16
CFast_CDO	P17

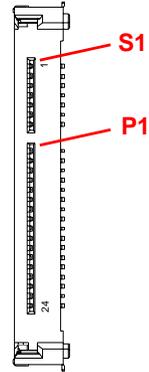


Table 6-8: CFast Socket Pin Definition

7 BIOS

7.1 Introduction

The following chapter describes basic navigation for the AMI EFI BIOS setup utility.

7.2 Entering BIOS Setup

To enter the setup screen, follow these steps:

1. Power on the motherboard
2. Press the < Delete > key on your keyboard when you see the following text prompt:
< Press DEL to run Setup >
3. After you press the < Delete > key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as Chipset and Power menus.



NOTE:

In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

Setup Menu

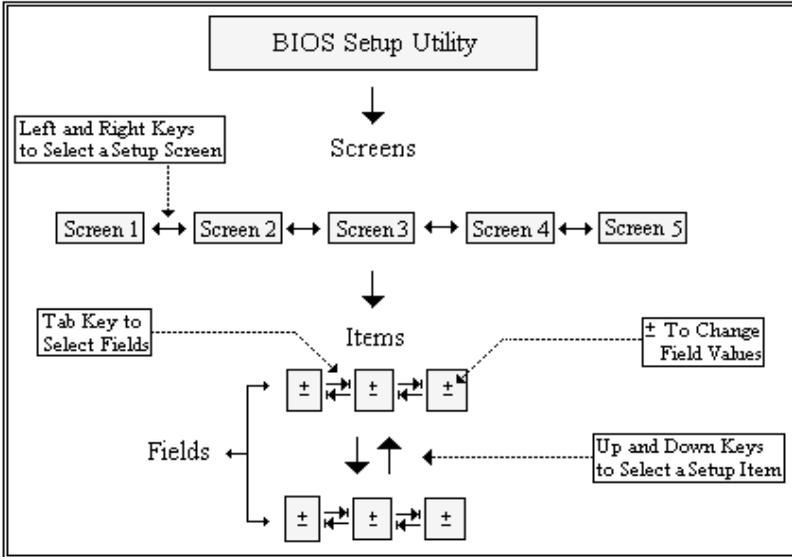
The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed" options cannot be configured, "Blue" options can be.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

Navigation

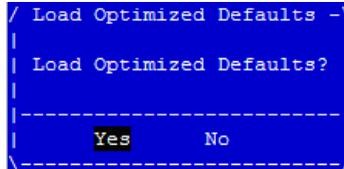
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.



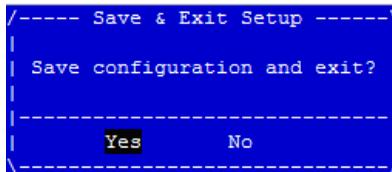
NOTE:

There is a hot key legend located in the right frame on most setup screens.

- F3** The < F3 > key on your keyboard is the optimized defaults key. To set the optimized defaults settings of the BIOS, press the < F3 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The optimized defaults settings allow the motherboard to boot up with the optimized defaults of options set. This can lessen the probability of conflicting settings.

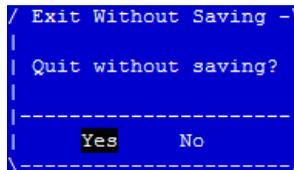


- F4** The < F4 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:



Press the < Enter > key to save the configuration and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

- ESC** The < Esc > key allows you to discard any changes you have made and exit the Setup. Press the < Esc > key to exit the setup without saving your changes. The following screen will appear:



Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

7.3 Main Setup

The Main Menu provides read-only information about system and also allows to set system's date and time.

7.3.1 BIOS Information

BIOS Item	Options	Description
BIOS Vendor	Info only American Megatrends	Display vendor name of system BIOS.
BIOS Version	Info only x.yy.zz	Display version of booting BIOS.
Build Date	Info only MM/DD/YYYY	Display the date that the BIOS was built.
MRC Version	Info only w.x.y.z	Display the revision of MRC code which is implemented in BIOS.
GOP Version	Info only x.y.zzzz	<i>VBIOS Version:</i> When video option ROM is set to "Legacy Only", this will display. <i>GOP Version:</i> When video option ROM is set to "UEFI Only", this will display.
TXT FW Version	Info only ww.x.yy.zzzz	Display the version of Intel manageability firmware which is implemented in BIOS.
BIOS Boot Source	Info only Primary BIOS/ Backup BIOS	Display which BIOS flash boots the system. <i>Primary BIOS:</i> usually means that boots from SPI0 <i>Backup BIOS:</i> usually means that boots from SPI1

7.3.2 System Information

BIOS Item	Options	Description
Project Name	Info only DMI-1040	Display the project name.
CPU Board Version	Info only A1/A2/A3/...	Display the CPU board HW version.
CPU Brand String	Info only Intel(R) Core, ...	Display what CPU is booting the system.
CPU Frequency	Info only XXXX MHz	Display CPU frequency.
Total Memory	Info only XXXX MB (DDRx)	Display total memory size used on the motherboard and memory type.
Memory Frequency	Info only XXXX MHz	Display memory's frequency.
SOC SKU	Info only xx	Display what PCH SKU is designed on motherboard.

7.3.3 System Time/System Date

Use this option to change the system time and date. Highlight System Time or System Date using the < Arrow > keys. Enter new values using the keyboard. Press the < Tab > key or the < Arrow > keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

BIOS Item	Options	Description
System Date	MM/DD/YYYY	For configuring/showing system date. When setting the Date, use <Tab> key to switch between Date elements.
System Time	HH:MM:SS	For configuring/showing system time. When setting the Time, use <Tab> key to switch between Time elements.
Access Level	Info only Administrator/User	Display what access level is used to enter BIOS setup menu.



NOTE:

The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

7.3.4 Board Information

BIOS Item	Options	Description
Serial Number	Info only	Display board's serial number.
Manufacturing Date	Info only	Display manufacturing date.
Last Repair Date	Info only	Display Last Repair Date.
MAC ID	Info only	Display onboard Ethernet MAC ID.
Total Runtime	Info only	The returned value specifies the total time in minutes the system is running in S0 state.
Current Runtime	Info only	The returned value specifies the time in seconds the system is running in S0 state. This counter is cleared when the system is removed from the external power supply.
Power Cycle	Info only	The returned value specifies the number of times the external power supply has been shut down.
Boot Cycles	Info only	The boot cycle is increased after a HW or SW reset or after a successful power-up.
Boot Reason	Info only	The boot reason is the event which causes the reboot of the system.

7.4 Advanced Menu

This menu contains the settings for most of the user interfaces in the system.

BIOS Item	Options	Description
CPU Configuration	Submenu	For configuring CPU features/ functions.
Graphic Configuration	Submenu	For setting graphic controller parameters.
Power Management	Submenu	
System Management	Submenu	
Thermal Management	Submenu	
Watchdog Timer	Submenu	
Super IO Configuration	Submenu	
Serial Console Redirection	Submenu	
Network Stack Configuration	Submenu	
Trusted Configuration	Submenu	
USB Configuration	Submenu	
Intel(R) I210 Gigabit Network Connection	Submenu	

7.4.1 CPU Configuration

BIOS Item	Options	Description
EIST	Disable Enable	Enables/disables Intel SpeedStep
Turbo Mode	Disable Enable	Enables/disables Turbo mode
Intel Virtualization Technology	Disable Enable	When enabled, VMM can utilize the additional hardware capabilities provided by Vanderpool Technology
C-States	Disable Enable	Enables/disables C-States
Enhanced- C-status	Disable Enable	Enables/disables C1E, where, when enabled, CPU will switch to minimum speed when all cores enter CStates.
Max Package C Status	PC2 PC1 C0	Sets the Max Package C State supported by the processor, from among PC2, PC1, and C0.
Max Core C State	Core C6 Core C1 Unlimited	Sets the Max Core C State supported by the cores, from among Fused value, Core C6, Core C1, Unlimited
C-State Auto Demotion	C1 Disable	Configures C-State Auto Demotion.
C-State Un-demotion	C1 Disable	Configures C-State Auto Un-demotion.
DTS	Disable Enable	Enables/disables Digital Thermal Sensor.

7.4.2 Graphic Configuration

BIOS Item	Options	Description
Data format and Color Depth	Auto VESA 24 bpp JEIDA 24 bpp JEIDA/vesa 18 bpp	Select the data format and color depth.
LVDS Output Mode	Auto Single LVDS bus Dual LVDS bus	Set single/dual LVDS bus mode.
DE Polarity	Active High Active Low	Configure DE Polarity.
Vsync Polarity	Active High Active Low	Configure Vsync Polarity.
Hsync Polarity	Active High Active Low	Configure Hsync Polarity
Active LFP Config	No LFP eSP/LVDS	Configures active local flat panel
LEP Panel Type	640x480 800x600 1024x768 1280x1024 1400x1050 1024x600 1600x1200 1366x768 1680x1050 1920x1200 1440x900	Selects display resolution

7.4.3 Power Management

BIOS Item	Options	Description
Enable ACPI Auto Configuration	Disabled Enabled	Enable/disable BIOS ACPI auto configuration function.
Enable Hibernation	Disabled Enabled	Enable/disable system ability to hibernate. This option may be not effective with some OSES.
ACPI Sleep State	S3 (Suspend to RAM) Suspend Disabled	Select ACPI sleep state the system will enter when the "suspend" button is pressed.
Lock Legacy Resources	Disabled Enabled	Enables or disables lock of legacy resource.
mPCIe Slot Wake	Disabled Enabled	Enables/disables PCI Express slot wake capability.
FM Board Wake	Disabled Enabled	Enables/disables FM Board wake capability.
RTC Wake system from S5	Disabled Fixed Time Dynamic Time	Enables/disables system wake on alarm event, from among Fixed Time: system wakes on the hr::min::sec specified Dynamic Time: system wakes on the current time + increase in minutes
Emulation AT/ATX	Emulation AT ATX	Selects Emulation AT or ATX function, where, if set to [Emulation AT], BIOS will report no suspend functions to ACPI OS, and in Windows XP, OS displays shutdown message during system shutdown.
Power Consumption	Submenu	

7.4.4 Power Consumption

BIOS Item	Options	Description
Current Input Current	Read only	Display current input current.
Current Input Power	Read only	Display current input power.
voltage	Read only	Display the sensed voltage based on hardware design.

7.4.5 System Management

BIOS Item	Options	Description
Version xxx	Info only	Show the BIOS design of system management.
SEMA Firmware	Read only	Show SEMA firmware version installed on system.
Build Date	Read only	Show when SEMA firmware was built.
SEMA Bootloader	Read only	Show SEMA bootloader's version.
Build Date	Read only	Show when SEMA bootloader was built.
SEMA Features	Submenu	
Flags	Submenu	

SEMA Features

BIOS Item	Options	Description
SEMA Supported Features	Info only	SEMA provides many features for selection. Following reported feature is to indicate that the feature is implemented on system.
Uptime & Power Cycles Counter	Info only	If this item is shown, it means SEMA supports "Uptime & Power Cycles counter".
System Reset Event	Info only	If this item is shown, it means SEMA supports "System Reset Event".
User-Flash size	Info only	It will show 512 bytes or 1024 bytes depends on the design.
Watchdog	Info only	If this item is shown, it means SEMA supports "Watchdog".

BIOS Item	Options	Description
Temperatures	Info only	If this item is shown, it means SEMA supports "Temperature".
Voltage Monitor	Info only	If this item is shown, it means SEMA supports "Voltage Monitor".
Power-up Watchdog	Info only	If this item is shown, it means SEMA supports "Power-up Watchdog".
Power Monitor (current sense)	Info only	If this item is shown, it means SEMA supports "Power Monitor (current sense)".
Boot Counter	Info only	If this item is shown, it means SEMA supports "Boot Counter".
Dual BIOS	Info only	If this item is shown, it means SEMA supports "dual BIOS".
Programable CPU Fan	Info only	If this item is shown, it means SEMA supports "System Fan 1".
DTS register	Info only	If this item is shown, it means SEMA supports "DTS register".
DTS offset registers	Info only	If this item is shown, it means SEMA supports "DTS offset registers".
TVIA BMC	Info only	If this item is shown, it means SEMA supports "TVIA BMC".
Board2 Temperature	Info only	If this item is shown, it means SEMA supports "Board2 Temperature".
PEC protocol	Info only	If this item is shown, it means SEMA supports "PEC protocol".

Flags

BIOS Item	Options	Description
BMC Flags	Read only	Show current BMC settings.
BMC Select	Read only	Display current boot BIOS ROM chip.
ATX/AT-Mode	Read only	Display current power mode setting, AT or ATX mode.
Exception Code	Read only	Display system exception reason.

7.4.6 Thermal Management

BIOS Item	Options	Description
Temperature and Fan Speed		
CPU Temperature	Info only	
Current	Read only	Show current CPU temperature gotten from sensor.
Startup	Read only	Show the CPU temperature at system power up.
Min	Read only	Show the minimum CPU temperature after system boot.
Max	Read only	Show the maximum CPU temperature after system boot.
Board Temperature		
Current	Read only	Show current board temperature gotten from sensor.
Startup	Read only	Show the board temperature at system power up.
Min	Read only	Show the minimum board temperature after system boot.
Max	Read only	Show the maximum board temperature after system boot.
Board2 Temperature		
Current	Read only	Show current board2 temperature gotten from sensor.
Startup	Read only	Show the board2 temperature at system power up.
Min	Read only	Show the minimum board2 temperature after system boot.
Max	Read only	Show the maximum board2 temperature after system boot.
Critical Trip Point	Disabled Enabled	Temperature threshold of critical trip point.
Passive Cooling Trip Point	Disabled Enabled	Temperature threshold of passive cooling trip point.

7.4.7 Watchdog Timer

BIOS Item	Options	Description
Power-Up Watchdog	Enabled Disabled	The Power-Up Watchdog resets the system after a certain amount of time after power-up. Pressing F12 key during startup will disable the power-up watchdog timer.
RunTime Watchdog	Enabled Disabled	Enables/disables RunTime watchdog, which, when enabled, resets the system a certain amount of time after power up.

7.4.8 Super IO Configuration

BIOS Item	Options	Description
Serial Port 1 Configuration	Submenu	
Serial Port 2 Configuration	Submenu	
Serial Port 4 Configuration	Submenu	

7.4.9 Serial Port x Configuration

BIOS Item	Options	Description
Serial Port	Disabled Enabled	Enable or disable serial port (COMx).
Device Setting	Info only	It will show current resource assignment of serial port (COMx).
Change Settings	Auto IO=3F8;IRQ=4; IO=3F8;IRQ=3,4,5,7,9,10,11,12 IO=2F8;IRQ=3,4,5,7,9,10,11,12 IO=3E8;IRQ=3,4,5,7,9,10,11,12 IO=2E8;IRQ=3,4,5,7,9,10,11,12	Select an optimal setting for Super IO device.
Serial Port x Control	RS232 RS422 RS485	Select serial port mode

7.4.10 Serial Console Redirection

BIOS Item	Options	Description
Console Redirection	Disabled Enabled	To enable or disable console redirection of COMx.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

Console Redirection Settings

BIOS Item	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	Configure the type of console emulation. Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speed.
Data Bits	7 8	Configure the number of data bits in each transmitted or received serial character for both serial ports.
Parity	None Even Odd	Configures if parity bit is generated (transmit data) or checked. A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.

BIOS Item	Options	Description
Stop Bits	1 2	Configures the number of stop bits transmitted and received in each serial character for both serial ports. Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	None Hardware Software	Configures flow control for console redirection. Hardware flow control uses RTC/CTS. Software flow control uses XON/XOFF.
VT-UTF8 Combo Key Support	Disabled Enabled	Enable VT-UTF8 combination key support for ANSI/VT100 terminals.
Recorder Mode	Disabled Enabled	With this mode enabled only text will be sent. This is to capture terminal data.
Resolution 100x31	Disabled Enabled	Enables or disables extended terminal resolution.
Legacy OS Redirection Resolution	80x24 80x25	Set console display resolution.
Putty KeyPad	VT100 LINUX XTERMR6 SCO ESCN VT400	Select Function Keys and Key Pad on Putty.
Redirection After BIOS POST	Always Enabled BootLoader	The setting specifies if BootLoader is selected, then legacy console redirection is disabled before booting to legacy OS.

7.4.11 Network Stack Configuration

BIOS Item	Options	Description
Network Stack	Disabled Enabled	To enable or disable network stack.
Ipv4 PXE Support	Disabled Enabled	To enable or disable Ipv4 PXE boot.
Ipv6 PXE Support	Disabled Enabled	To enable or disable Ipv6 PXE boot.
PXE boot wait time	Value Range	Set wait time to press ESC key to abort the PXE boot

7.4.12 Trusted Computing

BIOS Item	Options	Description
Security Device Support	Disabled Enabled	Enables/disables BIOS support for security device. When enabled, OS will not show the security device, and TCG EFI protocol and INT1A interface will not be available.

7.4.13 USB Configuration

BIOS Item	Options	Description
XHCI Hand-off	Disabled Enabled	Enables/disables XHCI hand-off, as a workaround for OS with no XHCI hand-off support, where XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Disabled Enabled	Enables/disables mass storage driver support.
USB transfer time-out	1 sec 5 sec 10 sec 20 sec	Time-out value for control, bulk, and interrupt transfers.
Device reset time-out	10 sec 20 sec 30 sec 40 sec	USB mass storage device Start Unit command time-out.

BIOS Item	Options	Description
Device power-up delay	Auto Manual	Maximum time the device will take before properly reporting itself to the Hot Controller, with 'Auto' using default value, for a Root port 100 ms, and for a Hub port the delay is taken from the Hub descriptor.

7.4.14 Intel I210 Gigabit Network Connection

BIOS Item	Options	Description
NIC Configuration	Submenu	For configuring link speed and wake function.
Blink LEDs	Value Range	Identifies the physical network port by blinking the associated LED.

NIC Configuration

BIOS Item	Options	Description
Link Speed	Auto Negotiated 10 Mbps Half 10 Mbps Full 100 Mbps Half 100 Mbps Full	For setting link speed of Ethernet.
Wake On LAN	Enabled Disabled	For enabling/disabling wake on LAN function.

7.5 Chipset Menu

BIOS Item	Options	Description
North Bridge	Submenu	
South Bridge	Submenu	
Uncore Configuration	Submenu	
South Cluster Configuration	Submenu	

7.5.1 North Bridge

Displays memory information, sets maximum value for TOLUD and enables/disables BIOS assignment and PCIe VGA work-around.

BIOS Item	Options	Description
Memory Information	Info only	
Total Memory	Info only	Display Total Memory Size.
Memory Voltage	Info only	Display Memory Voltage.
Memory Slot0	Info only	Display Installed Memory Slot0 Information.
Max TOLUD	2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB	Maximum Value of TOLUD.
PCIe VGA Workaround	Disable Enable	Enable if your PCIe card cannot boot to DOS. This is for testing only.

7.5.2 South Bridge

Sets IRQ mode and enables/disables SMBUs and PCI clock run.

BIOS Item	Options	Description
Serial IRQ Mode	Quiet Continuous	Configure Serial IRQ Mode.
SMBus Support	Disable Enable	Enable / Disable SMBus Support.
PCI CLOCK RUN	Disable Enable	Display Installed Memory Slot0 Information.

7.5.3 Uncore Configuration

Enables/disables Integrated Graphic Device and RC6 (Render-Standb), sets size for GTT, aperture size, DVMT pre-allocation, DVMT total Gfx Mem and CD clock frequency.

BIOS Item	Options	Description
Integrated Graphics Devices	Disable Enable	Enable: Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor. Disable: Always disable IGD.
Primary Display	IGD PCIe HG	Select which of IGD / PCI Graphics device should be Primary Display.
Aperture Size	128MB 256MB 512MB	Select the Aperture Size.
DVMT Pre-Allocated	64M 96M 128M 160M 192M 224M 256M 288M 320M 352M 384M 416M 448M 480M 512M	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device
DVMT Total Gfx Mem	128M 256M MAX	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device

7.5.4 South Cluster Configuration

BIOS Item	Options	Description
HD-Audio Configuration	Submenu	
LPSS Configuration	Submenu	
PCI Express Configuration	Submenu	
SATA Drives	Submenu	
SCC Configuration	Submenu	
USB Configuration	Submenu	
Miscellaneous Configuration	Submenu	

7.5.5 HD-Audio Configuration

BIOS Item	Options	Description
HD-Audio Support	Disabled Enabled	Enables/disables HDA Audio
Audio Output Selection	Enabled Disabled	Selects audio output, from speaker out or line out.

LPSS Configuration

Selects I2C support mode

BIOS Item	Options	Description
LPSS I2C #X Support	PCI Mode ACPI Mode Disabled	Set LPSS I2C Device Mode.
Set LPSS I2C #X Speed	Fast Mode	Set LPSS I2C #X Speed Mode.

PCI Express Configuration

Enables/disables PCI Express clock gating, Port 8xh Decode, Peer Memory Write and Compliance mode, and configures PCI Express Root Port.

BIOS Item	Options	Description
PCIe Port assigned to LAN	Info only	Display PCIe Port assigned to LAN Information.
Compliance Mode	Disable Enable	Compliance Mode Enable / Disable.
PCI ExpressRoot Port X	Submenu	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port Disable: Disable PCIe root port

PCI Express Configuration-> PCI Express Root Port x

BIOS Item	Options	Description
PCI Express Root Port X	Disable Enable Auto	Control the PCI Express Root Port. AUTO: To disable unused root port automatically for the most optimum power savings. Enable: Enable PCIe root port. Disable: Disable PCIe root port.
ASPM	Disable Enable	PCI Express Active State Power Management settings
L1 Substates	Disable L1.1 L1.2 L1.1 & L1.2	PCI Express L1 Substate setting.
ACS	Disable Enable	Enable/Disable Access Control Services Extended Capability
URR	Disable Enable	PCI Express Unsupported Request Reporting Enable/Disable
FER	Disable Enable	PCI Express Device Fatal Error Reporting Enable/Disable

BIOS Item	Options	Description
NFER	Disable Enable	PCI Express Device Non-Fatal Error Reporting Enable/Disable
CER	Disable Enable	PCI Express Device Correctable Error Reporting Enable/Disable
CTO	Default Setting 16-15 ms 65-210 ms 260-900 ms 1-3.5 s Disable	PCI Express Completion Timer TO Enable/Disable.
SEFE	Disable Enable	Root PCI Express System Error on Fatal Error Enable/Disable
SENF	Disable Enable	Root PCI Express System Error on Non-Fatal Error Enable/Disable
SECE	Disable Enable	Root PCI Express System Error on Correctable Error Enable/Disable
PME SCI	Disable Enable	PCI Express PME SCI Enable/Disable
Hot Plug	Disable Enable	PCI Express Hot Plug Enable/Disable
PCIe Speed	Auto Gen1 Gen2	Configure PCIe Speed
Transmitter Half Swing	Disable Enable	Transmitter Half Swing Enable/Disable.
Extra Bus Reserved	0	Extra Bus Reserved (0-7) for bridges behind this Root Bridge
Reserved Memory	10	Reserved Memory and Prefetchable Memory (1-20MB) Range for this Root Bridge
Reserved I/O	4	Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge
PCH PCIe LTR Configuration	Info only	
PCH PCIE LTR	Disable Enable	PCH PCIE Latency Reporting Enable/Disable

BIOS Item	Options	Description
Snoop Latency Override	Disabled Manual Auto	Snoop Latency Override for PCH PCIE. Disabled: Disable override. Manual: Manually enter override values. Auto (default): Maintain default BIOS flow.
Non Snoop Latency Override	Disabled Manual Auto	Non Snoop Latency Override for PCH PCIE. Disabled: Disable override. Manual: Manually enter override values. Auto (default): Maintain default BIOS flow
PCIE LTR Lock	Disable Enable	PCIE LTR Configuration Lock
PCIe Selection De-emphasis	Disable Enable	When the Link is operating at 5.0 GT/s speed, this bit selects the level of de-emphasis for an Upstream component. 1b -3.5 dB 0b -6 dB

SATA Drives

Enables/disables Chipset SATA Controller, which supports the 2black internal SATA ports (up to 3Gb/s supported per port), and configures SATA.

BIOS Item	Options	Description
Chipset- SATA Controller Configuration	Info only	PCI Express Active State Power Management settings
Chipset SATA	Disable Enable	Enables or Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).
SATA Mode Selection	AHCI	Determines how SATA controller(s) operate.
SATA Interface Speed	Gen1 Gen2	Select SATA Interface Speed.

BIOS Item	Options	Description
SATA Test Mode	Disable Enable	Test Mode Enable / Disable.
Aggressive LPM Support	Disable Enable	Enable PCH to Aggressively enter link power state.
SATA0	Info only	
Software Preserve	Info only	
Port 0	Disabled Enabled	Enable / Disable SATA Port
SATA Port 0 Hot Plug Capability	Disabled Enabled	If enabled, SATA port will be reported as Hot Plug capable.
Configured as eSATA	Info only	Display Configured as eSATA support.
Mechanical Presence Switch	Disabled Enabled	Controls reporting if this port has a Mechanical Presence Switch. Note. Request Hardware support.
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify if the SATA port is connected to Solid State Drive or Hard Disk Drive.
SATA Port 0 DevSlp	Disabled Enabled	Enable/Disable SATA Port 0 DevSlp. Board rework for LP needed before enable.
DITO Configuration	Disabled Enabled	Enable/Disable DITO Configuration
DITO Value	625	DITO Value. Note. DITO Value can be accessed if DITO Configuration item is enabled.
DM Value	15	DM Value. Note. DM Value can be accessed if DITO Configuration item is enabled.
SATA1	Info only	
Software Preserve	Info only	
Port 1	Disabled Enabled	Enable / Disable SATA Port

BIOS Item	Options	Description
SATA Port 1 Hot Plug Capability	Disabled Enabled	If enabled, SATA port will be reported as Hot Plug capable.
Configured as eSATA	Info only	Display Configured as eSATA support.
Mechanical Presence Switch	Disabled Enabled	Controls reporting if this port has a Mechanical Presence Switch. Note. Request Hardware support.
Spin Up Device	Disabled Enabled	If enabled for any of ports Staggered Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
SATA Port 1 DevSlp	Disabled Enabled	Enable/Disable SATA Port 0 DevSlp. Board rework for LP needed before enable.
DITO Configuration	Disabled Enabled	Enable/Disable DITO Configuration
DITO Value	625	DITO Value. Note. DITO Value can be accessed if DITO Configuration item is enabled.
DM Value	15	DM Value. Note. DM Value can be accessed if DITO Configuration item is enabled.

SCC Configuration

Enables/disables SCC eMMC support and selects eMMC max speed.

BIOS Item	Options	Description
SCC eMMC Support (D28:F0)	Disabled Enabled	Enable / Disable SCC eMMC Support.
eMMC Max Speed	HS400 HS200 DDR50	Select the eMMC max Speed allowed.

USB Configuration

BIOS Item	Options	Description
XHCI Pre-boot Driver	Disabled Enabled	Enables/disables XHCI pre-boot driver support.
XHCI Mode	Disabled Enabled	Enables/disables XHCI mode.
USB VBUS	Off ON	Turns USB VBUS on/off.
USB HSIC1 Support	Disabled Enabled	Enables/disables USB HSIC1 support
USB SSIC1 Support	Disabled Enabled	Enables/disables USB SSIC1 support.
USB Port Disable Override	Disabled Enabled	Enables USB disable override.
XDCI Support	Disabled Enabled	Enables/disables XDCI support.
XHCI Disable Compliance Mode	Disabled Enabled	Selects XHCI Disable Compliance Mode.
USB HW Mode AFE Comparators	Disabled Enabled	Enables/disables mode AFE comparators.

Miscellaneous Configuration

BIOS Item	Options	Description
State After G3	S0 State S5 State Last State	Specifies the state to be entered when power is re-applied after a power failure (G3 state), from S0 state, in which the system boots directly when power is applied, and S5 state, in which the system remains powered down until the power button is pressed.
BIOS Lock	Disable Enable	Enable/Disable the SC BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

7.6 Security Menu

This menu contains the settings for security in the system.

BIOS Item	Options	Description
Administrator Password	Enter to set password	Configure/Clear Administrator Password. When pressing enter, a menu will be popped up for creating new password. When password installed, press enter without inputting password, it will clear password.
User Password	Enter to set password	Configure/Clear User Password. When pressing enter, a menu will be popped up for creating new password. When password installed, press enter without inputting password, it will clear password.
Secure Boot menu	Submenu	
P1:xxxx	Submenu	For HDD security, it will list all HDD detected on motherboard. Select the HDD and then press enter can figure/clear HDD password.

When selecting a HDD to configure passwords, BIOS will enter a new BIOS setup (shown below). The method of configuring HDD password is the same as that for BIOS passwords. Once password the is set, the status will be shown on the screen, such as 'INSTALLED' for 'HDD User Pwd Status'. When there is no HDD user password installed, you can always change the master password without confirming the latest installed password. Once the HDD user password is installed, the HDD master password is cannot be changed.

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Security

HDD Password Description		
Allows Access to Set, Modify and Clear HardDisk User and Master Passwords. User Password need to be installed for Enabling Security. Master Password can be Modified only when successfully unlocked with Master Password in POST		
HDD PASSWORD CONFIGURATION		
Security Supported	Yes	
Security Enabled	Yes	
Security Locked	No	
Security Frozen	No	
HDD User Pwd Status	INSTALLED	><: Select Screen
HDD Master Pwd Status	INSTALLED	^v: Select Item
		Enter: Select
		+/-: Change Opt.
		F1: General Help
		F8: Previous Values
		F9: Optimized Default
		F10: Save & Exit
		ESC: Exit
Set User Password		
Set Master Password		

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7.6.1 Secure Boot

BIOS Item	Options	Description
System Mode	Info only	
Secure Boot	Info only	
Secure Boot Control	Disabled Enabled	Secure Boot can be enabled if: 1. System running in User mode with enrolled Platform Key (PK) 2. CSM function is disabled.

7.7 Boot Menu

This menu contains the settings for bootable devices in the system.

BIOS Item	Options	Description
Setup Prompt Timeout	1	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state after system boot.
Quiet Boot	Disabled Enabled	Enabled: will show splash screen during POST. Disabled: will show boot message during POST.
Fast Boot	Disabled Enabled	Enable or disabled Fast boot feature. Most probes are skipped to reduce time cost during boot.
Boot mode select	LEGACY UEFI	Select boot mode, LEGACY/UEFI.
Boot Option #1~#8	Hard Disk CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disabled	Set system boot order.

7.8 Save & Exit Menu

BIOS Item	Options	Description
Save Changes and Exit	Enter	Save changed settings and exit BIOS setup utility.
Discard Changes and Exit	Enter	Skip changed setting and exit BIOS setup utility.
Save Changes and Reset	Enter	Save all changed settings and let system do reset to boot system.
Discard Changes and Reset	Enter	Discard all changed settings and let system do reset to boot system.
Save Changes	Enter	Save all changed settings.
Discard Changes	Enter	Discard changes done so far to any of the setup options.
Restore Default	Enter	Load the default made when BIOS was built.
Save as User Default	Enter	Save all changed done so far as User Defaults.
Restore User Default	Enter	Load the default that user save as user defaults.
Boot Override	Info only	

Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS**, and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- ▶ Read these safety instructions carefully.
- ▶ Keep this user's manual for future reference.
- ▶ Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- ▶ When installing/mounting or uninstalling/removing equipment:
 - ▷ Turn off power and unplug any power cords/cables.
- ▶ To avoid electrical shock and/or damage to equipment:
 - ▷ Keep equipment away from water or liquid sources;
 - ▷ Keep equipment away from high heat or high humidity;
 - ▷ Keep equipment properly ventilated (do not block or cover ventilation openings);
 - ▷ Make sure to use recommended voltage and power source settings;
 - ▷ Always install and operate equipment near an easily accessible electrical socket-outlet;
 - ▷ Secure the power cord (do not place any object on/over the power cord);
 - ▷ Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
 - ▷ If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

A Lithium-type battery may be provided for backup power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries appropriately.

- ▶ Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.
- ▶ Equipment must be serviced by authorized technicians when:
 - ▷ The power cord or plug is damaged;
 - ▷ Liquid has penetrated the equipment;
 - ▷ It has been exposed to high humidity/moisture;
 - ▷ It is not functioning or does not function according to the user's manual;
 - ▷ It has been dropped and/or damaged; and/or,
 - ▷ It has an obvious sign of breakage.

Getting Service

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