ARD-RS2860

User's Manual

Onboard Passenger Information Display System



Manual Rev.: Rev. 0.1 Preliminary
Revision Date: May 15, 2026
Part Number: 50M-41066-1000

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Leading EDGE COMPUTING

Revision History

Revision	Description	Date
0.1	Preliminary release	05-14-2026

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Preface

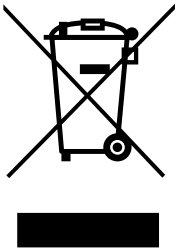
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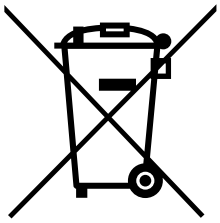
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Battery Labels (for products with battery)









California Proposition 65 Warning



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.

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Conventions

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



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



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

ATTENTION: Informations destinées à prévenir les blessures corporelles mineures, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécu- tion d'une tâche.



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

AVERTISSEMENT: Informations destinées à prévenir les bles- sures corporelles graves, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche spécifique.

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Introduction

1.1 Overview

The PIDS (Passenger Information Display System) is a system that provides real-time train-related information for railways, including arrivals, delays, and alerts. The system supports 28.6" stretched LCDs with AUO's TARTAN technology and offers brightness reaching up to 1,000 nits. All systems are EN 50155 certified, support operating temperature from -25 °C to 55 °C, and are tested for reliability under harsh conditions. The system is powered by the energy-efficient Intel Atom platform.

1.2 Features

- 28.6" stretched type TFT LCD, 1920 x 540 resolution
- AUO TARTAN display technology
- EN50155 compliant for railway
- Sunlight readable & High Brightness: 1000 nits
- Intel Atom® Amston Lake processor with Debian
- Wide-range DC 24-110V power input
- EN50155 -25°C to 55°C OT1 level / EN45545-2
- Auto-dimming for readability and eco-friendliness
- Anti-shock and vibration

1.3 Packing List

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

ARD-RS2860/ASL

- Railway onboard 28.6" PIDS with Intel Atom® x7211RE, 2-core, 1000 nits



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.

1.4 Optional Accessories

ARD PIDS cable kit

- 2x M12 D-code Ethernet to RJ45 cables

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Specifications

1.5 ARD-RS2860 Product Specifications

ARD-RS2860		
Display	Active Screen Size	28.6" TFT LCD panel (AUO Tartan Technology)
	Resolution	1920 x 540
	Brightness	1000 nits
	Contrast Ratio	5000:1
	Backlight Lifetime	50,000 hrs
	Viewing Angle (U/D/R/L)	89/89/89/89
	Color	16.7M
	Display Area	698.4 (W) × 196.425 (V) mm
System	Processor	Default: Intel Atom ® x7211RE Processor, 2-core, 1.0GHz (up to 3.2GHz), 6W TDP Option: Intel Atom ® x7433RE Processor, 4-core, 1.0GHz (up to 3.4GHz), 9W TDP
	Memory	4GB LPDDR
	Storage	32GB eMMC
	Expansion	1x M.2 2242 M-Key socket for SSD *(M.2 SSD Card is not included)*
	External I/O	2x M12 D-code Ethernet 10/100 Mbit/s
	Maintenance I/O (Screwed Panel)	1x USB 3.0 Type A 1x USB 3.0 Type C (DP Out) 1x HDMI-in 1x Reset button
	Sensor	1x Built-in ambient light sensor
Mechanical	Dimensions	749 (W) x 247 (H) x 60 (D) mm ±1 mm
	Weight	9.2 kg
	Mounting	Panel mount with threaded inserts on four sides and back cover
	Cooling	Fanless design with passive cooling
	Housing	Metal
	Ingress Protection	IP65 Front
	Glass	3mm enhanced glass, IK08 grade glass Coating options: Anti-glare/Anti-reflection/SRF surface coating (available upon request)
Operating System	Supported OS	Debian (Windriver eLxr 12)
		Windows® 11 IoT Enterprise LTSC 2024
Miscellaneous	Power Connector	1x M12 A-code connector
	Power	24 - 110V DC
	Battery	CR2032X coincell battery by default
	GND	M6 threaded stainless steel stud for protective grounding

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ARD-RS2860		
Environmental	Operating Temperature	-25°C to 55°C
	Storage Temperature	-40°C to 85°C
	Humidity	Operating: 10% to 95% relative humidity (non-condensing) Non-Operating: 5% to 95% relative humidity (non-condensing)
	Standards	EN50155, EN45545-2 compliant

1.6 ARD-RS2860 Block Diagram

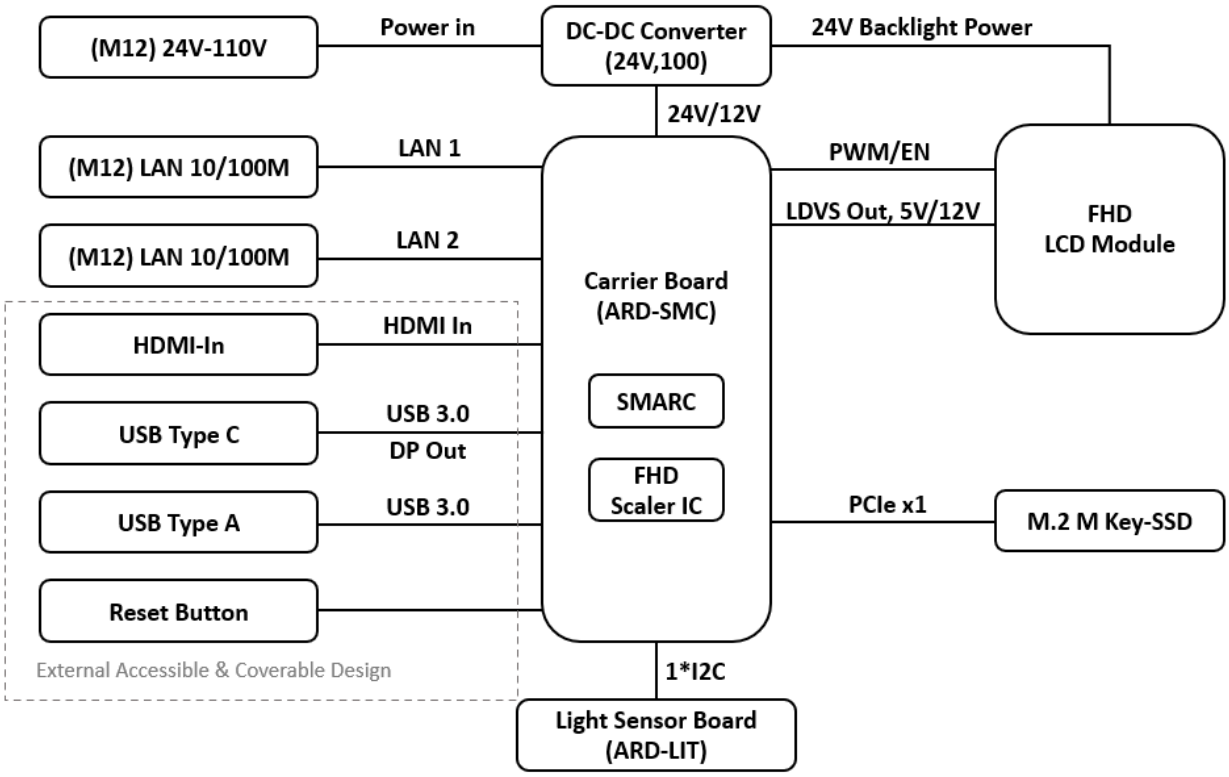


Figure 1: System functional block diagram

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1.7 Power

WARNING:

The input power as following

- Voltage / Current: 24 V / 4.59A or 110 V / 1A

The output power is 24V / 3.67A with an efficiency of 80%.

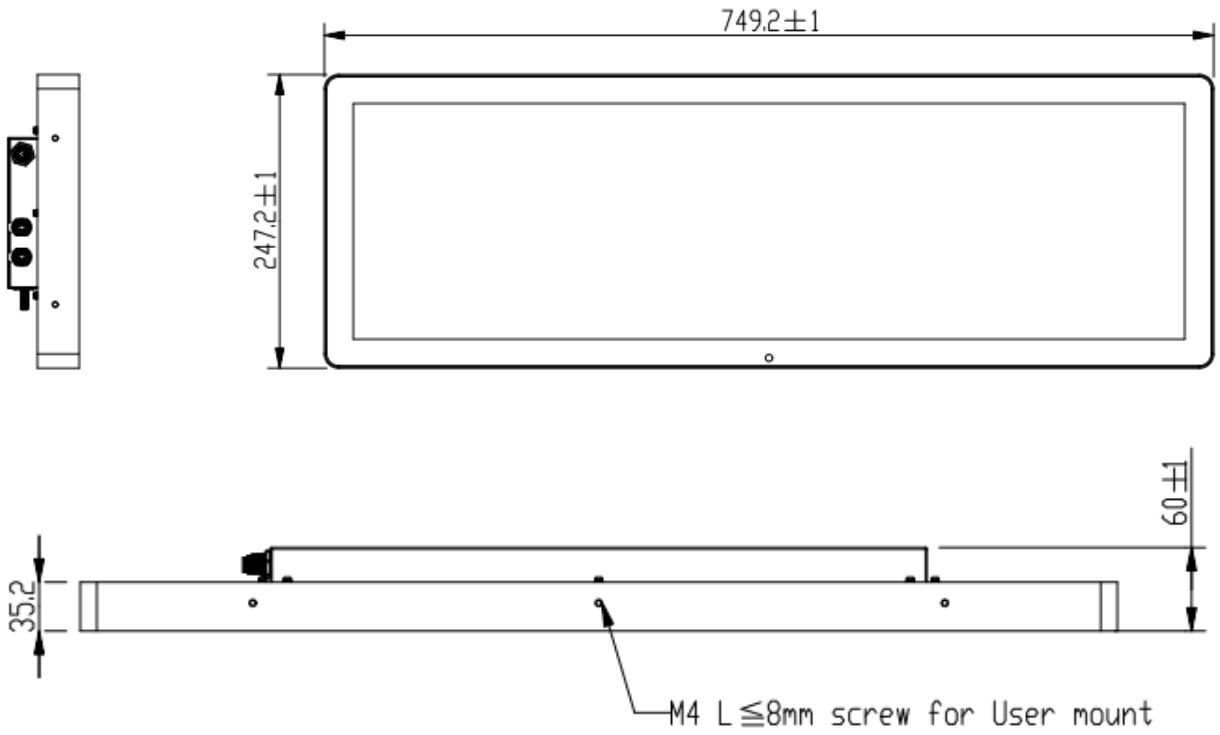
ps. This data is calculated based on the maximum output of the PSU.

Before providing DC power to the ARD-RS2860, ensure the voltage and polarity provided are compatible with the DC input. Improper input voltage and/or polarity can be responsible for system damage.

1.8 Mechanical Dimensions

NOTE:

All dimensions are in millimeters, unless noted.



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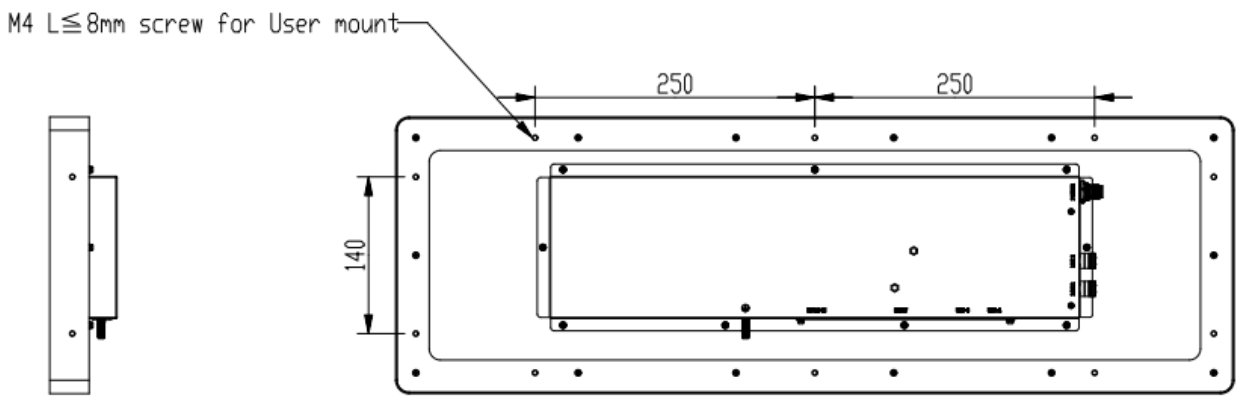
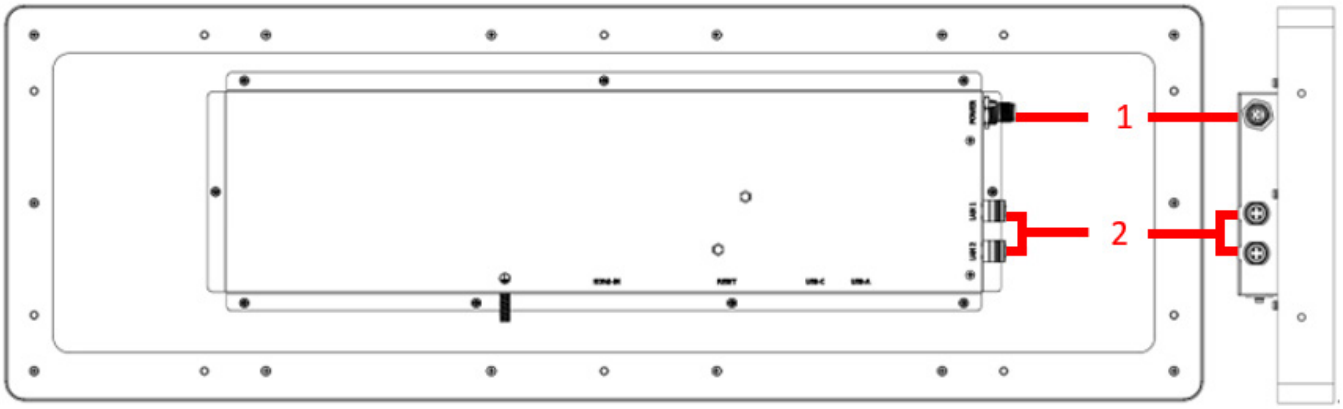


Figure 2: Mechanical dimensions

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System Layout

1.9 External I/O Connectors



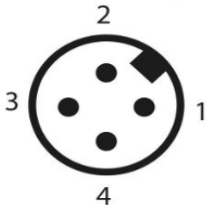
External I/O connector locations

No #	Function
1	M12 24-110VDC
2	M12 LAN 10/100M

Figure 3: External I/O connector locations

1.9.1 Connector Pinouts or Jumper Settings

- M12 24-110 VDC Connector



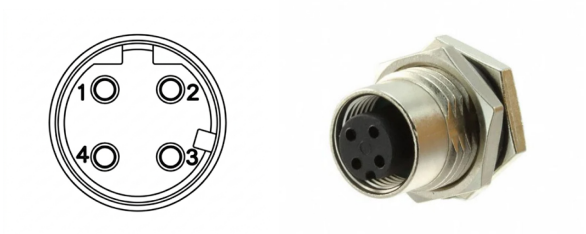


Male

Pin #	Signal Name
1	V+
2	V+
3	V-
4	V-

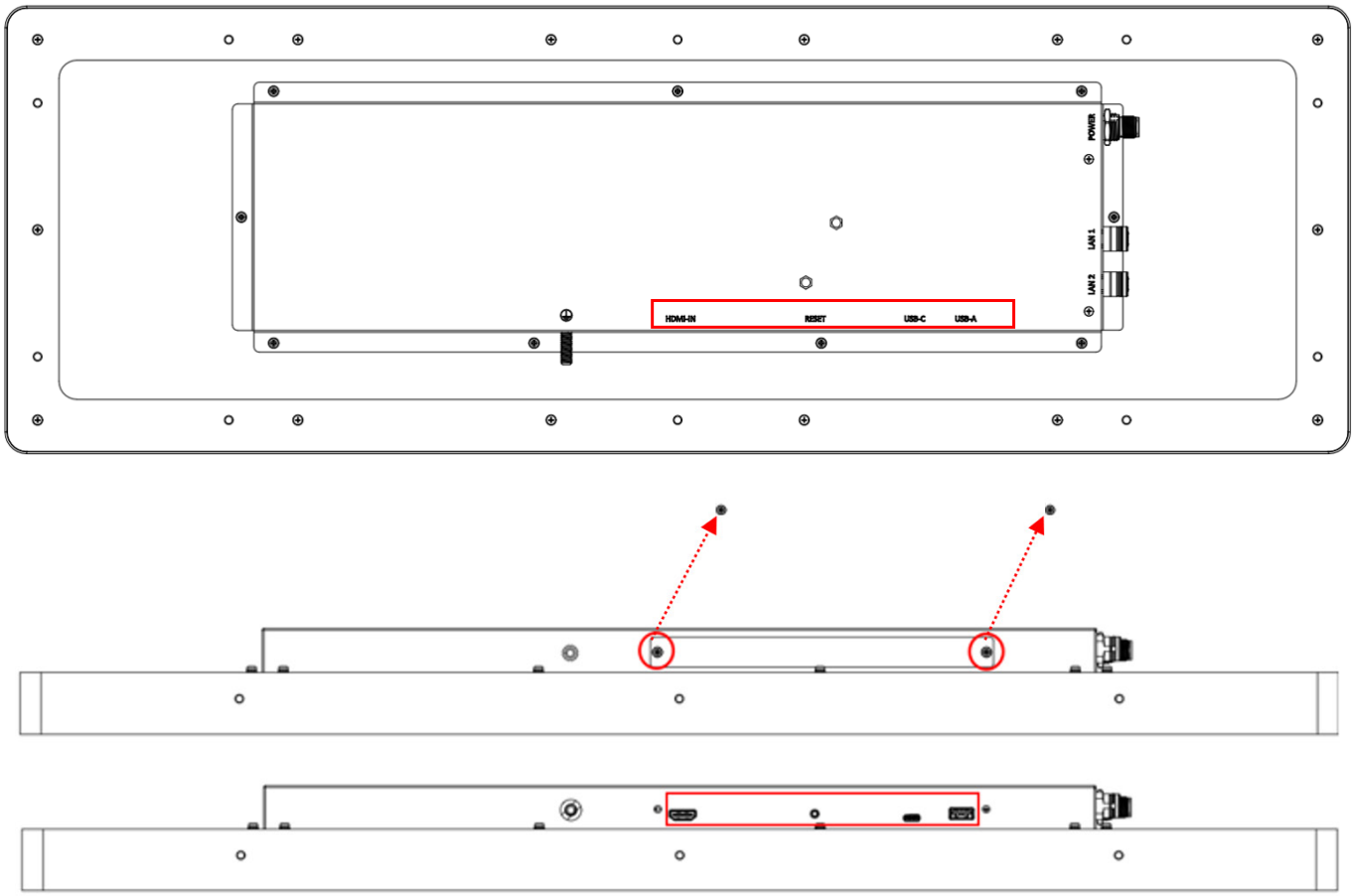
- M12 D-Coded Ethernet Connectors

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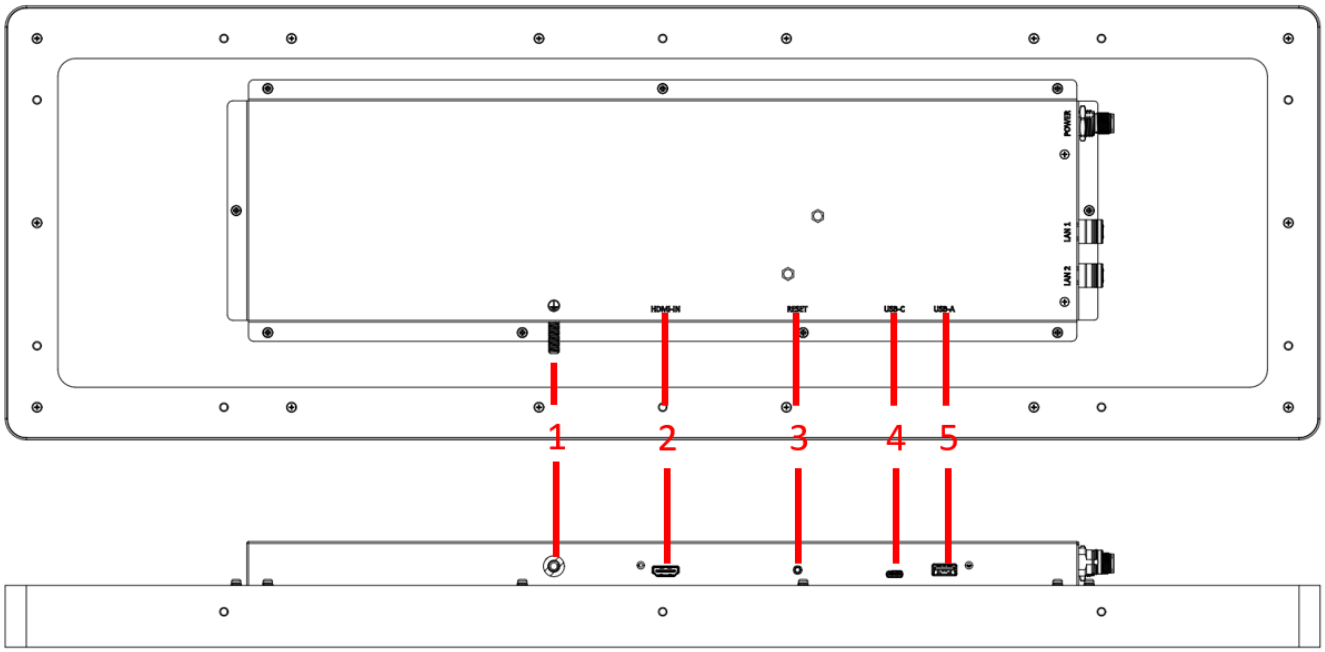
Pin #	Signal Name
1	GBE_MDI_TF_M12_P0
2	GBE_MDI_TF_M12_P1
3	GBE_MDI_TF_M12_N0
4	GBE_MDI_TF_M12_N1

1.10 Internal I/O Connectors



Internal I/O connector locations

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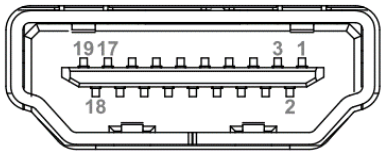


No #	Function
1	M6 Stud GND
2	HDMI in
3	Reset Button
4	USB Type C (USB3.0 & Video output)
5	USB Type A (USB3.0)

Figure 4: Internal I/O connector locations

1.10.1 Connector Pinouts or Jumper Settings

- HDMI Connector

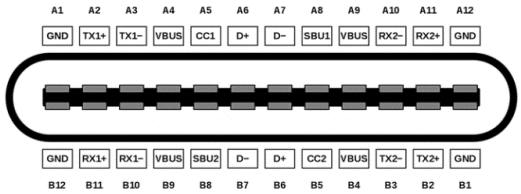


Pin	Signal Name
1	HDMIA_DATA2_P_CN
2	GND
3	HDMIA_DATA2_N_CN
4	HDMIA_DATA1_P_CN
5	GND
6	HDMIA_DATA1_N_CN
7	HDMIA_DATA0_P_CN

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8	GND
9	HDMIA_DATA0_N_CN
10	HDMIA_CLK_P_CN
11	GND
12	HDMIA_CLK_N_CN
13	HDMIA_CEC_CN
14	n/c
15	HDMIA_SCL_CN
16	HDMIA_SDA_CN
17	GND
18	HDMIA_CABLE5V0
19	HDMIA_HPD_CN

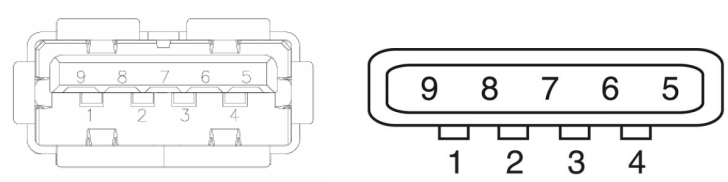
- USB Type C Connector (USB 3.0 & Video output)



Pin #	Signal Name	Pin #	Signal Name
A1	GND	B1	GND
A2	UC_SW_TX1_C_P	B2	UC_SW_TX2_C_P
A3	UC_SW_TX1_C_N	B3	UC_SW_TX2_C_N
A4	P_USB_C	B4	P_USB_C
A5	UC_ESD_CC1	B5	UC_ESD_CC2
A6	USB2_CN_DP0	B6	USB2_CN_DP0
A7	USB2_CN_DN0	B7	USB2_CN_DN0
A8	UC_ESD_SBU1	B8	UC_ESD_SBU2
A9	P_USB_C	B9	P_USB_C
A10	UC_SW_RX2_C_N	B10	UC_SW_RX1_C_N
A11	UC_SW_RX2_C_P	B11	UC_SW_RX1_C_P
A12	GND	B12	GND

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- USB 3.0 Type A Connector



Pin #	Signal Name
1	P_+5V_VUSB1
2	USB3_DN_CN
3	USB3_DP_CN
4	GND
5	USB3_RXN_CN
6	USB3_RXP_CN
7	GND
8	USB3_TXN_CN
9	USB3_TXP_CN

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Installation & Service Access

1.11 Safety Instructions

Before accessing the internal components of the system, please read and follow the safety instructions below.

Power-Off Requirement
Ensure the system is completely powered off and disconnected from the power source before opening the rear cover or accessing any internal components. Failure to disconnect the power may result in electrical shock or damage to the equipment.

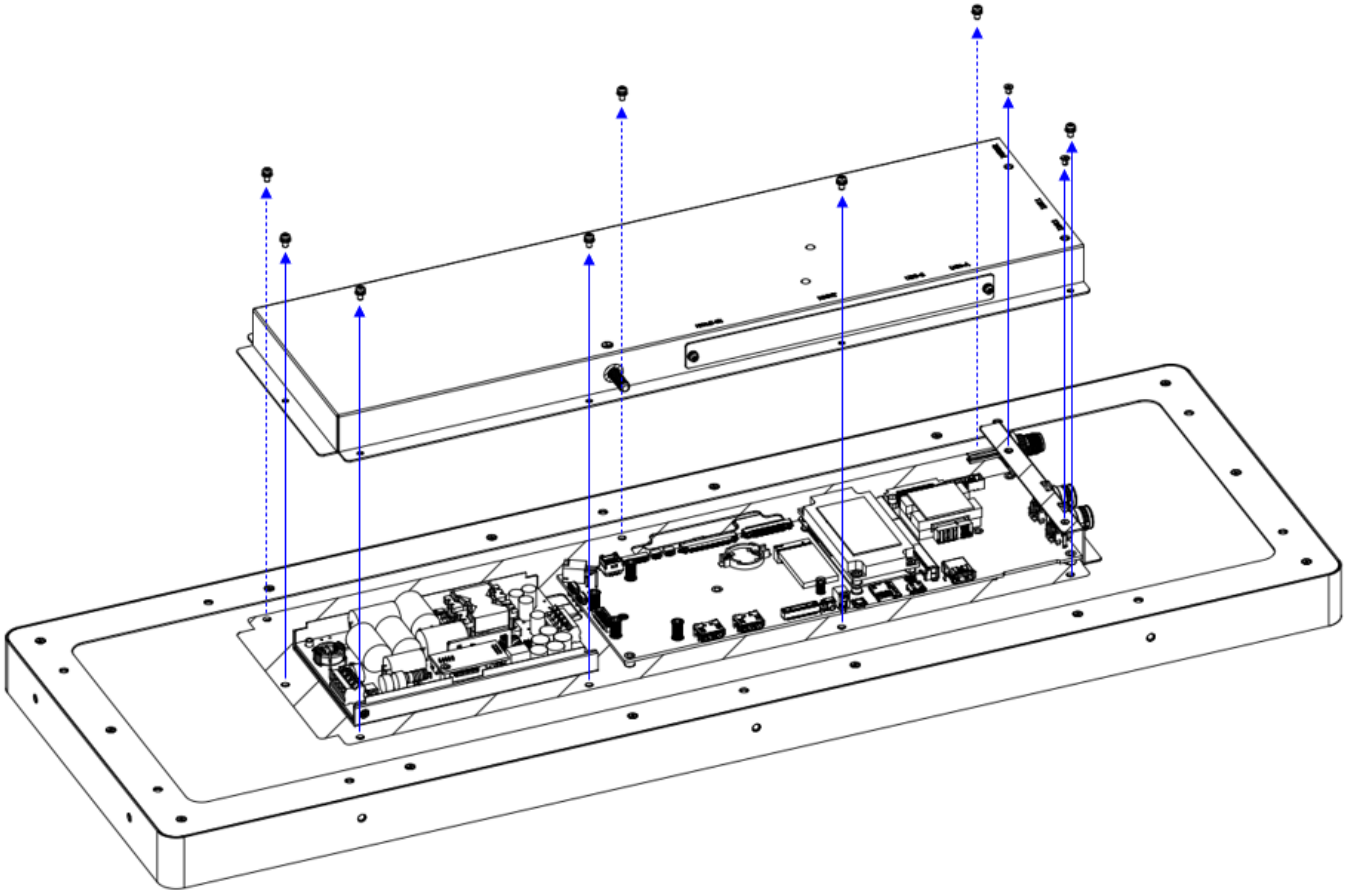
ESD Protection
When handling internal components, proper Electrostatic Discharge (ESD) protection must be used. It is recommended to wear a grounded ESD wrist strap and perform the operation in an ESD-safe environment to prevent damage to sensitive electronic components.

Service Personnel Notice
Access to internal components should only be performed by trained or authorized service personnel. Improper handling or modification may result in equipment damage or void the product warranty.

1.12 Access the Main Board (M/B)

1.12.1 Opening the Rear Cover

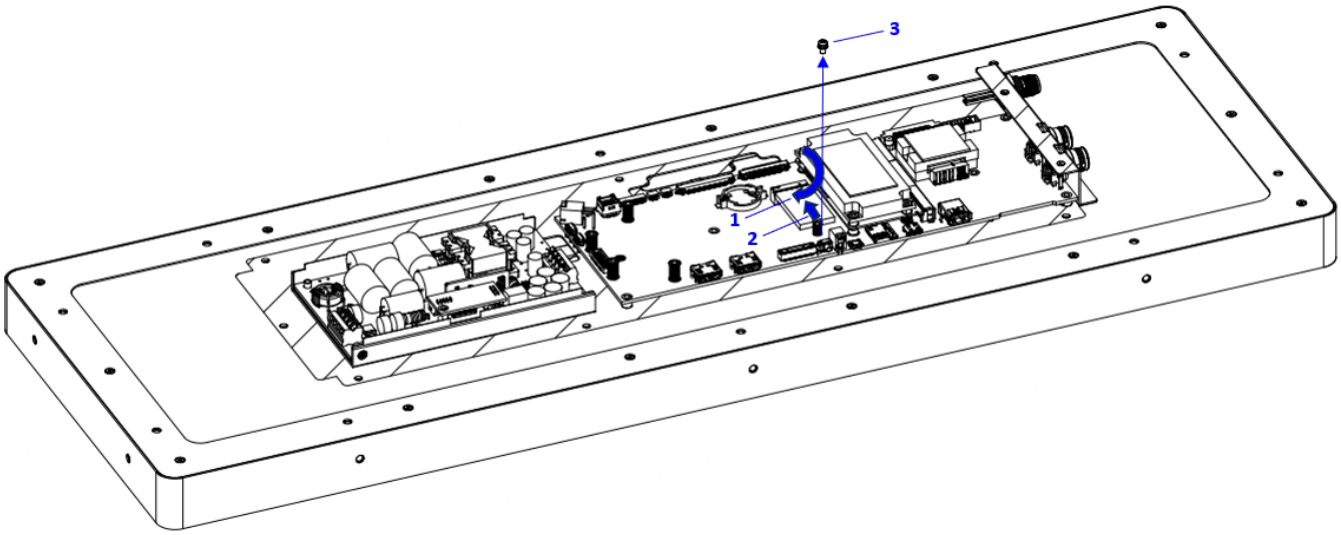
1. Remove the 10 screws that attach the rear cover to the chassis and remove the cover.



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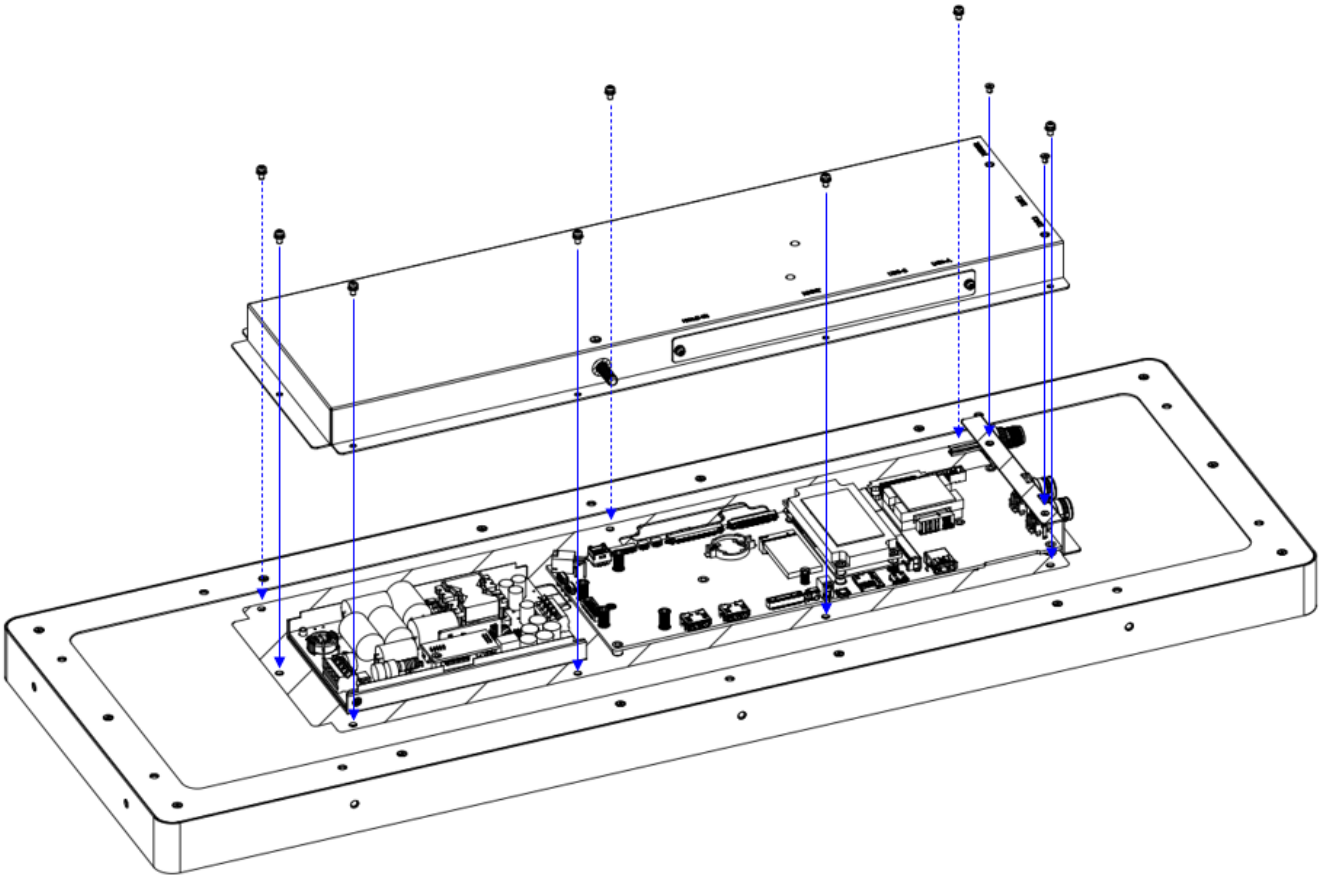
1.12.2 Internal the I/O Connections

1. Install the M.2 2242 M-Key module.



1.12.3 Closing the Rear Cover

1. Reattach the rear cover to the chassis with the previously removed screws.



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Getting Started

1.13 Connecting Power

Connect a regulated 24-110V DC power supply to the DC power port on ARD-RS2860 to power the device on. To power off the device, remove the power supply

1.14 Connecting Ground

CAUTION:

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

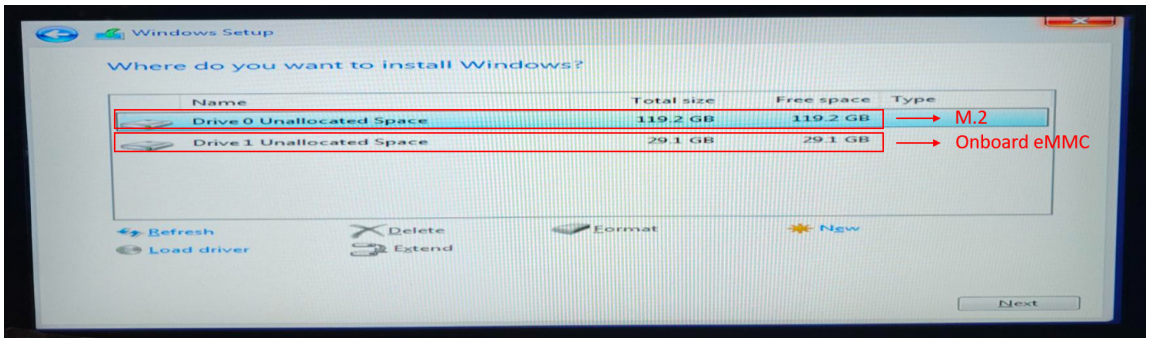
• Use a ground cable with a cross section of at least 0.823mm2 (18AWG) and an M6 size ring terminal.

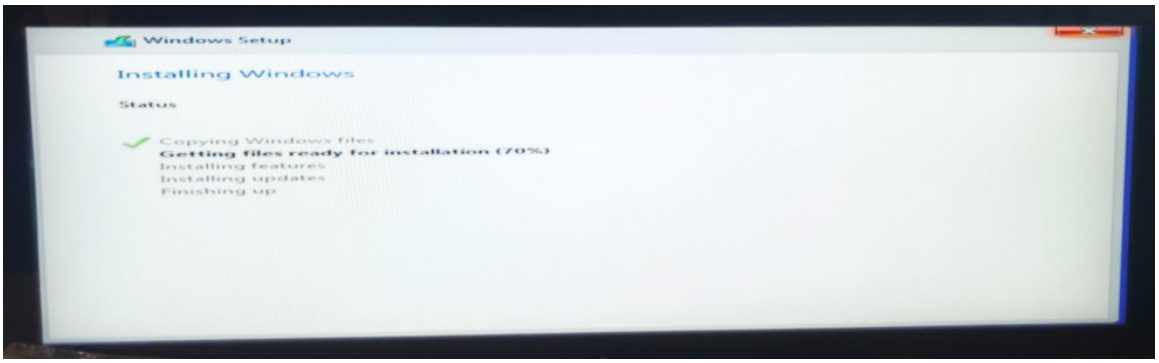
• Slide the ring terminal onto the ground stud and secure it with the locking M6 nut.

1.15 Creating and Booting from eMMC or M.2 card

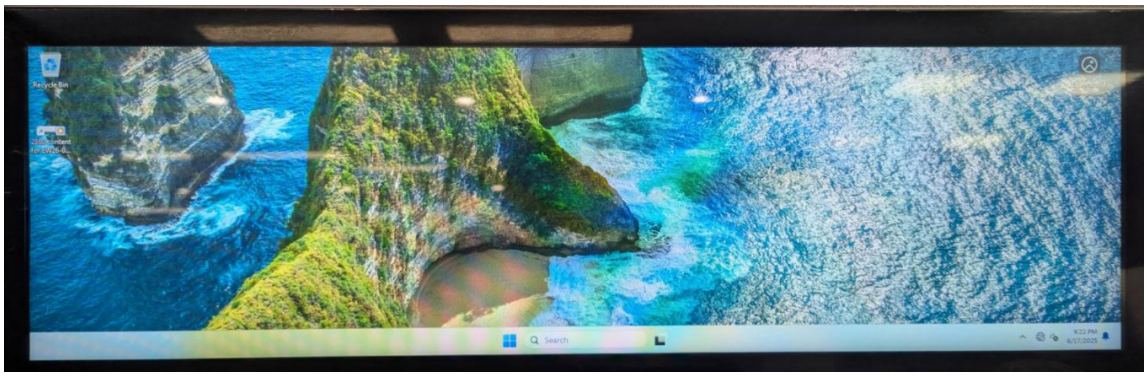
1. The ARD-RS2860 with eMMC(32GB) or empty M.2 storage and does not include a pre-built image. Please prepare a pre-built Windows/Linux-based image file(ISO).
2. Maked a bootable USB dongle.(https://rufus.ie/en/)
3. Once the image is downloaded and put the image (ISO) file to the bootable USB dongle, then USB dongle can be used to boot into a working GUI desktop install environment.
4. Please follow the installation steps of the Microsoft/Linux image (ISO) until the operating system is installed.

Example: <Windows installation>





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NOTE:

Two installation methods are available on a 28.6” screen:

1. The above example of operating system installation only applies to BSP images (ISOs) built by ADLINK. A BSP version with driver is included and provided to customers who require it.

2. If the customer is using Pure Windows OS for installation, please use a Type-C external monitor for installation first, and then remove the external monitor after installation is complete.

1.16 USB-C Display Output (DP Alt Mode)

1. Connect a USB-C cable from the ARD-RS2860 to an external display that supports DisplayPort Alt Mode.
2. Ensure the external display is powered on and set to the correct input source.
3. The system will automatically detect the external display.
4. Configure display settings (e.g., mirror or extend mode) in the operating system if required.

1.17 Using HDMI Input (Monitor Mode)

1. Connect the HDMI-in port of the ARD-RS2860 to an external computer using an HDMI cable.
2. On the external computer, open a terminal or command prompt.
3. Download and install DDC/CI control tools (e.g., ddcutil).
4. Use the tool to set the monitor input source to HDMI-in.
5. Refer to the following sections for usage instructions on different operating systems:

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< Windows>

Download winddcutil.exe tool for windows setting.

Link:
https://www.adlinktech.com/Products/DownloadSoftData.ashx?pdNo=2293&type=DR&id=11693&isLogin=Y&MainCategory=ruggedrailwaysystems&lang=en

1. Identify Monitor

Use method:

.\winddcutil.exe detect

Example.

Display 0: Generic PnP Monitor

Display 1: Generic PnP Monitor

Display 2: Generic PnP Monitor

// Test 0~2 to find the right Display. Check the model, it should be “RS286 FHD <version>”

// In this example, the <display-id> is 0

NOTE:

If winddcutil.exe cannot detect the PIDS display device, ensure that your laptop's monitor is set to "Extended Mode”. If it is set to "Synchronize Mode", winddcutil.exe may not be able to correctly detect the PIDS.

Use method:

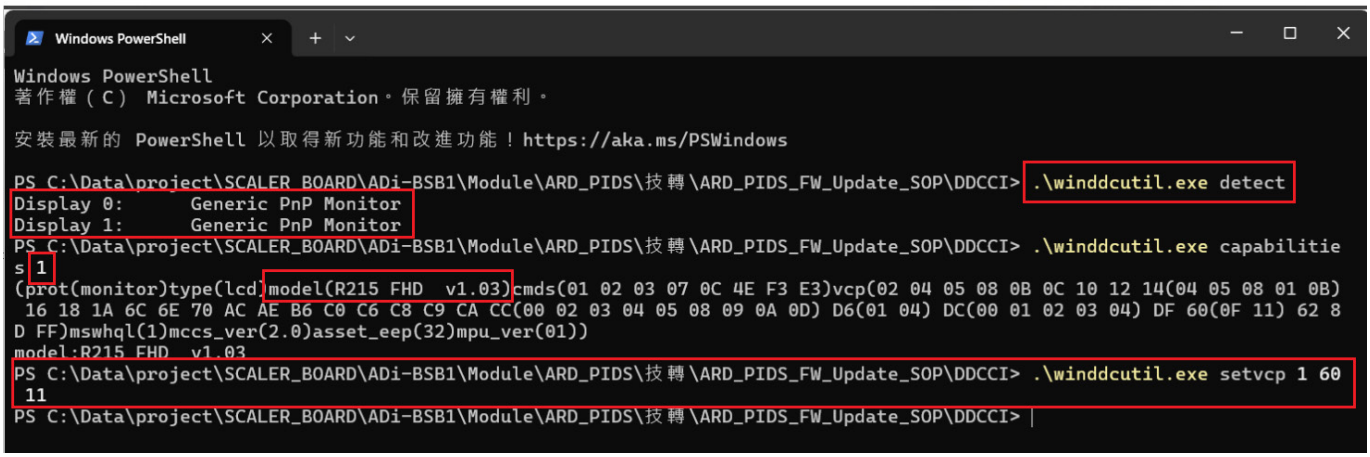
.\winddcutil.exe capabilities 0

Example.

(prot(monitor)type(lcd)model(RS2860 FHD v1.02)cmds(01 02 03 07 0C 4E F3 E3)vcp(02 04 05 08 0B 0C 10 12 14(04 05 08 01 0B) 16 18 1A 6C 6E 70 AC AE B6 C0 C6 C8 C9 CA CC(00 02 03 04 05 08 09 0A 0D) D6(01 04) DC(00 01 02 03 04) DF 60(0F 11) 62 8D FF)mswhql(1)mccs_ver(2.0)asset_eep(32)mpu_ver(01))

model: RS2860 FHD v1.02

// If the target device is “R215 FHD”, the model should be “R215 FHD <version>”



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2. Set input source to HDMI

- Syntax: winddcutil setvcp <display-id> 60 <hex value>
- Hex Value: 0x11: HDMI / 0x0F: DP

Use method:

.\winddcutil.exe setvcp 0 60 11

3. Get current input source

- Syntax: winddcutil getvcp <display-id> 60

Use method:

.\winddcutil.exe getvcp 0 60

Example.

```
PS F:\PIDS> .\winddcutil.exe setvcp 0 60 11
PS F:\PIDS> .\winddcutil.exe getvcp 0 60
VCP 60 11
PS F:\PIDS>
```

<Ubuntu >

1. Connect to the Internet. User can install ddcutil in Debian in the same way.(ddcutil.exe)

.\sudo apt install ddcutil

2. Identify Monitor

Use method:

.\sudo ddcutil detect

Example.

Display 1

< skip the information of Display 1 >

Display 2

I2C bus: /dev/i2c-16

EDID synopsis:

Mfg id: ADL

Model: PIDSFHD286

Product code: 12840

Serial number: PIDSFHD286000

Binary serial number: 0 (0x00000000)

Manufacture year: 2025, Week: 44

VCP version: 2.1

// Check the “Model”, it should be “PIDSFHD286”

// In this example, the <display-id> is 2

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If winddcutil.exe cannot detect the PIDS display device, ensure that your laptop's monitor is set to "Extended Mode”. If it is set to "Synchronize Desktop", winddcutil.exe may not be able to correctly detect the PIDS.

Use method

.\sudo ddcutil capabilities --display 2

Example.

Unparsed capabilities string: (prot(monitor)type(lcd)model(RS2860 FHD v1.02)cmds(01 02 03 07 0C 4E F3 E3)vcp(02 04 05 08 0B 0C 10 12 14(04 05 08 01 0B) 16 18 1A 6C 6E 70 AC AE B6 C0 C6 C8 C9 CA CC(00 02 03 04 05 08 09 0A 0D) D6(01 04) DC(00 01 02 03 04) DF 60(0F 11) 62 8D FF)mswhql(1)mccs_ver(2.0)asset_eep(32)mpu_ver(01))

model:RS2860 FHD v1.02

// If the target device is “R215 FHD”, the model should be “R215 FHD <version>”

3. Set input source to HDMI

- Syntax: ddcutil --dis=<display-id> setvcp 60 <hex value>

Use method:

sudo ddcutil --dis=2 setvcp 60 0x11

4. Get current input source

- Syntax: ddcutil --dis=<display-id> getvcp 60
- Value range: 0x11: HDMI / 0x0F: DP

Use method:

sudo ddcutil --dis=2 getvcp 60

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BIOS Setup

1.18 Menu Structure

This section presents the six primary menus of the BIOS Setup Utility. Use the following table as a quick reference for the contents of the BIOS Setup Utility. The subsections in this section describe the submenus and setting options for each menu item. The default setting options are presented in **bold**, and the function of each setting is described in the right-hand column of the respective table.

Main	Advanced	Chipset	Security	Boot	Save & Exit
BIOS Information System Information Board Information ► System Date System Time	CPU Configuration ► Power & Performance ► Inter(R) Time Coordinated Computing ► Power Management ► System Management ► Thermal Management ► Watchdog Timer ► Super IO Configuration ► Miscellaneous ► USB Configuration ► AMI Graphics Output Protocol Policy ► Serial Port Console Redirection ► Network Stack Configuration ► Trusted Computing ►	System Agent (SA) Configuration ► PCH-IO Configuration ►	Setup Administrator Password User Password Secure Boot	Boot Configuration FIXED BOOT ORDER Priorities UEFI USB Key Drive BBS Priorities	Save Change and Exit Discard Changes and Exit Save Changes and Reset Discard Changes and Reset Save Options Boot Override

Notes:

► indicates a submenu
Gray text indicates info only

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Main

The Main Menu provides read-only information about your system and also allows you to set the System Date and Time. Refer to the tables below the screen shot of this menu for details of the submenus and settings.

1.18.1 BIOS Information

Feature	Options	Description
BIOS Vendor	Info only	American Megatrends
BIOS Version	Info only	Display Core version
Build Date	Info only	Display compliancy information
MRC Version	Info only	Display compliancy information
GOP Version	Info only	ADLINK BIOS version.
ME FW Version	Info only	ADLINK BIOS version.

1.18.2 System Information

Board Information	Info only	Description
Project Name	Info only	Display Project Name.
CPU Board Version	Info only	Display CPU Signature.
CPU Brand String	Info only	Display CPU Brand Name.
CPU Frequency	Info only	Display CPU Frequency
Total Memory	Info only	Display installed memory size.
Memory Frequency	Info only	Display memory frequency.
PCH SKU	Info only	Display PCH Information.
Board Information	Submenu	

1.18.3 Board Information

Board Information	Info only	Description
Serial Number	Read only	Display SMC serial Number
Manufacturing Date	Read only	Display SMC manufacturing date.
Last Repair Date	Read only	Display SMC last repair date.
MAC ID	Read only	Display SMC MAC ID.
MAC ID 2	Read only	Display SMC MAC ID 2.
UUID	Read only	Display SMC UUID
Runtime Statistics	Info only	
Total Runtime	Read only	The returned value specifies the total time in minutes the system is running in S0 state.

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Board Information	Info only	Description
Current Runtime	Read 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 Cycles	Read only	The returned value specifies the number of times the external power supply has been shut down.
Boot Cycles	Read only	The Boot counter is increased after a HW- or SW-Reset or after a successful power-up.
Boot Reason	Read only	The boot reason is the event which causes the reboot of the system.

1.18.4 System Date and Time

Feature	Options	Description
System Date	Weekday, MM/DD/YYYY	Requires the alpha-numeric entry of the day of the week, day of the month, calendar month, and all 4 digits of the year, indicating the century and year (Fri XX/XX/20XX)
System Time	HH/MM/SS	Presented as a 24-hour clock setting in hours, minutes, and seconds
Access Level	Read only	It shows what access level is used to enter BIOS setup menu.

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1.19 Advanced

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

1.19.1 CPU Configuration

Feature	Options	Description
Efficient-core Information	Info only	Displays the E-core Information
Performance-core Information	Info only	
ID	Info only	Display CPU information.
Brand String	Info only	Display CPU information.
Microcode Revision	Info only	Display Microcode Revision
VMX	Info only	Display Intel Virtualization Technology support or not.
SMX/TXT	Info only	Display Intel SMX Technology support or not.
Intel (VMX) Virtualization Technology	Disabled, **Enabled**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Efficient-cores	**All**,3,2,1,0	Number of E-cores to enable in each processor package. Note: Number of Cores and E-cores are looked at together. When both are {0,0}, Pcode will enable all cores.

1.19.2 Power & Performance Configuration

1.19.2.1 CPU - Power Management Control

Feature	Options	Description
Boot Performance Mode	Max Battery, Max Non-Turbo Performance, **Turbo Performance**	Select the performance state that the BIOS will set starting from reset vector.
Intel(R) SpeedStep(tm)	Disabled, **Enabled**	Allows more than two frequency ranges to be supported.
Race To Halt (RTH)	Disabled, **Enabled**	Enable/Disable Race to Halt feature. RTH will dynamically increase CPU frequency in order to enter pkg C-State faster to reduce overall power. (RTH is controlled through MSR 1FC bit 20)
Intel(R) Speed Shift Technology	Disabled, **Enabled**	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware-controlled P-states.
Per Core P State OS control P State	Disabled, **Enabled**	Enable/Disable Per Core P state OS control mode. Disabling will set Bit 31 = 1 command 0x06. When set, the highest core request is used for all other core requests.
HwP Autonomous Per Core P State	Disabled, **Enabled**	Disable Autonomous PCPS (Bit 30 = 1, command 0x11) Autonomous will request the same value for all cores all the time. Enable PCPS (default Bit 30 = 0, command 0x11)
HwP Autonomous EPP Grouping	Disabled, **Enabled**	Enable EPP grouping (default Bit 29 =0, command 0x11) Autonomous will request the same values for all cores with same EPP. Disable EPP grouping (Bit 29

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Feature	Options	Description
		=1, command 0x11) autonomous will not necessarily request same values for all cores with same EPP.
EPB override over PECI	**Disabled**, Enabled	Enable/Disable EPB override over PECI. Enable by sending pcode command 0x2b, subcommand 0x3 to 1. This will allow OOB EPB PECI override control
HwP Lock	Disabled, **Enabled**	Enable/Disable HWP Lock support in Misc Power Management MSR.
HDC Control	Disabled, **Enabled**	This option allows HDC configuration.
Turbo Mode	Disabled, **Enabled**	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.
View/Configure Turbo Options	Submenu	
Current Turbo Settings		
Max Turbo Power Limit	Info only	
Min Turbo Power Limit	Info only	
Package TDP Limit	Info only	
Power Limit 1	Info only	
Power Limit 2	Info only	
Turbo Ratio Limit Options	Submenu	
Energy Efficient P-state	Disabled, **Enabled**	Enable/Disable Energy Efficient P-state feature. When set to 0, will disable access to ENERGY_PERFORMANCE_BIAS MSR and CPUID Function 6 ECX[3] will read 0 indicating no support for Energy Efficient policy setting. When set to 1 will enable access to ENERGY_PERFORMANCE_BIAS MSR 1B0h and CPUID Fun
Package Power Limit MSR Lock	**Disabled**, Enabled	Enable/Disable locking of Package Power Limit settings. When enabled, PACKAGE_POWER_LIMIT MSR will be locked and a reset will be required to unlock the register.
Power Limit 1 Override	**Disabled**, Enabled	Enable/Disable Power Limit 1 override. If this option is disabled, BIOS will program the default values for Power Limit 1 and Power Limit 1 Time Window.
Power Limit 1	0	Power Limit 1 in Milli Watts. BIOS will round to the nearest 1/8W when programming. 0 = no custom override. For 12.50W, enter 12500. Overclocking SKU: Value must be between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). Other SKUs: This value must be between Min Power Limit and Processor Base Power (TDP) Limit. If value is 0, BIOS will program Processor Base Power (TDP) value.
Power Limit 1 Time Window*	**0**, 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 14, 16, 20, 24, 28, 32, 40, 48, 56, 64, 80, 96, 112, 128	Power Limit 1 Time Window value in seconds. The value may vary from 0 to 128. 0 = default value (28 sec for Mobile and 8 sec for Desktop). Defines time window which TDP value should be maintained.

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Feature	Options	Description
Power Limit 2 Override	Disabled, **Enabled**	Enable/Disable Power Limit 1 override. If this option is disabled, BIOS will program the default values for Power Limit 1 and Power Limit 1 Time Window.
Power Limit 2	15000	Power Limit 2 value in Milli Watts. BIOS will round to the nearest 1/8W when programing. If the value is 0, BIOS will program this value as 1.25*Processor Base Power (TDP). For 12.50W, enter
Energy Efficient Turbo	Disabled, **Enabled**	Enable/Disable Energy Efficient Turbo Feature. This feature will opportunistically lower the turbo frequency to increase efficiency. Recommended only to disable in overclocking situations where turbo frequency must remain constant. Otherwise, leave enabled.
CPU VR Settings	Submenu	
CPU VR Settings		
Current VccIn Aux Icc Max	108	Current VccIn Aux Icc Max
PSYS Slope	0	PSYS Slope defined in 1/100 increments. Range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. Uses BIOS VR mailbox command 0x9."
PSYS Offset	0	PSYS Offset defined in 1/1000 increments. Range is 0-63999. For an offset of 25.348, enter 25348. PSYS Uses BIOS VR mailbox command 0x4.
PSYS Prefix	**+**, -	Sets the offset value as positive or negative.
PSYS PMax Power	0	PSYS PMax power, defined in 1/8 Watt increments. Range 0-8192. For a PMax of 125W, enter 1000. 0 = AUTO. Uses BIOS VR mailbox command 0xB.
Min Voltage Override	**Disabled**, Enabled	Min Voltage Override. Enable to override minimum voltage for runtime and for C8.
VccIn Aux Icc Max	0	Sets the Max Icc VccIn Aux value defined in 1/4A increments. Range is 0-512. For an IccMax 32A, enter 128(32*4).
VccIn Aux IMON Slope	111	VccIN Aux IMON Slope defined in 1/100 increments. Range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. Uses BIOS VR mailbox command 0x18.
VccIn Aux IMON Offset	0	VccIN Aux IMON Offset defined in 1/1000 increments. Range is 0-63999. For an offset of 25.348, enter 25348. IMON Uses BIOS VR mailbox command 0x18.
VccIn Aux IMON Prefix	**+.-**	Sets the offset value as positive or negative.
Vsys/Psys Critical	**Disabled**, Psys Critical, Vsys Critical	Vsys/Psys Critical Enable or disable
Assertion Deglitch Mantissa	**1**	Assertion Deglitch Mantissa 0x4F[7-3]. Assertion Deglitch = 2µs * Mantissa * 2^(Exponent)
Assertion Deglitch Exponent	**0**	Assertion Deglitch Exponent 0x4F[3-0]. Assertion Deglitch = 2µs * Mantissa * 2^(Exponent)
De assertion Deglitch Mantissa	**13**	De Assertion Deglitch Mantissa 0x49[7-3]. Assertion Deglitch = 2µs * Mantissa * 2^(Exponent)

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Feature	Options	Description
De assertion Deglitch Exponent	**2**	De Assertion Deglitch Exponent 0x49[3-0]. Assertion Deglitch = 2µs * Mantissa * 2^(Exponent)
VR Power Delivery Design	**Auto**	Specifies the ADL Desktop board design used for the VR settings override values. By default, BIOS will override the default Desktop VR settings based on the board design. A value of AUTO(0) will use the board ID to determine the board design. Any other value will override the board id logic to provide a custom VR Power Delivery Design value. This is intended primarily for validation.
Acoustic Noise Settings	Submenu	
Acoustic Noise Mitigation	**Disabled**, Enabled	Enabling this option will help mitigate acoustic noise on certain SKUs when the CPU is in deeper C state
Pre Wake Time	0	Set the maximum Pre Wake randomization time in micro ticks. Range is 0-255. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning.
Ramp Up Time	0	Set the maximum Ramp Up randomization time in micro ticks. Range is 0-255. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning.
Ramp Down Time	0	Set the maximum Ramp Down randomization time in micro ticks. Range is 0-255. This is for acoustic noise mitigation Dynamic Periodicity Alteration (DPA) tuning.
Core/IA VR Settings	Submenu	
Core/IA VR Domain		
VR Config Enable	Disabled, **Enabled**	VR Config Enable
Current AC Loadline	500	
Current DC Loadline	500	
Current Psi1 Threshold	16	
Current Psi2 Threshold	8	
Current Psi3 Threshold	4	
Current Imon Slope	0	
Current Imon Offset	1	
Current VR Current Limit	148	
Current Tdc Current Limit	208	
Current Voltage Limit	1600	
AC Loadline	0	AC Loadline defined in 1/100 mOhms. A value of 100 = 1.00 mOhm, and 1255 = 12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0 = AUTO/HW default. Uses BIOS mailbox command 0x2.

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Feature	Options	Description
DC Loadline	0	DC Loadline defined in 1/100 mOhms. A value of 100 = 1.00 mOhm, and 1255 = 12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0 = AUTO/HW default. Uses BIOS mailbox command 0x2.
PS Current Threshold1	16	PS Current Threshold1, defined in 1/4 A increments. A value of 400 = 100A. Range 0-512, which translates to 0-128A. 0 = AUTO. Uses BIOS VR mailbox command 0x3.
PS Current Threshold2	8	PS Current Threshold2, defined in 1/4 A increments. A value of 400 = 100A. Range 0-512, which translates to 0-128A. 0 = AUTO. Uses BIOS VR mailbox command 0x3.
PS Current Threshold3	4	PS Current Threshold3, defined in 1/4 A increments. A value of 400 = 100A. Range 0-512, which translates to 0-128A. 0 = AUTO. Uses BIOS VR mailbox command 0x3.
PS3 Enable	Disabled, **Enabled**	PS3 Enable/Disable. 0 - Disabled, 1 - Enabled. Uses BIOS VR mailbox command 0x3.
PS4 Enable	Disabled, **Enabled**	PS4 Enable/Disable. 0 - Disabled, 1 - Enabled. Uses BIOS VR mailbox command 0x3.
IMON Slope	0	IMON Slope defined in 1/100 increments. Range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. Uses BIOS VR mailbox command 0x4.
IMON Offset	0	IMON Offset defined in 1/1000 increments. Range is 0-63999. For an offset of 25.348, enter 25348. IMON Uses BIOS VR mailbox command 0x4.
IMON Prefix	**+**,-	Sets the offset value as positive or negative.
VR Current Limit	0	Voltage Regulator Current Limit (IccMax). This value represents the Maximum instantaneous current allowed at any given time. The value is represented in 1/4 A increments. A value of 400 = 100A. 0 means AUTO. Uses BIOS VR mailbox command 0x6.
VR Voltage Limit	0	Voltage Limit (VMAX). This value represents the Maximum instantaneous voltage allowed at any given time. Range is 0 - 7999mV. Uses BIOS VR mailbox command 0x8.
TDC Enable	Disabled, **Enabled**	TDC Enable. 0- Disable, 1 - Enable
TDC Current Limit	0	TDC Current Limit, defined in 1/8A increments. Range 0-32767. For a TDC Current Limit of 125A, enter 1000. 0 = 0 Amps. Uses BIOS VR mailbox command 0x1A.
TDC Time Window	1 sec	VR TDC Time Window, value in seconds. 1s is default. Range from 1s to 448s.
TDC Lock	**Disabled**, Enabled	TDC Lock
IRMS	**Disabled**, Enabled	Enable/Disable IRMS – Current root mean square
GT VR Settings	Submenu	
VR Config Enable	Disabled, **Enabled**	VR Config Enable

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Feature	Options	Description
Current AC Loadline	650	
Current DC Loadline	650	
Current Psi1 Threshold	80	
Current Psi2 Threshold	20	
Current Psi3 Threshold	4	
Current Imon Slope	103	
Current Imon Offset	1	
Current VR Current Limit	116	
Current Tdc Current Limit	160	
Current Voltage Limit	1519	
AC Loadline	0	AC Loadline defined in 1/100 mOhms. A value of 100 = 1.00 mOhm, and 1255 = 12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0 = AUTO/HW default. Uses BIOS mailbox command 0x2.
DC Loadline	0	DC Loadline defined in 1/100 mOhms. A value of 100 = 1.00 mOhm, and 1255 = 12.55 mOhm. Range is 0-6249 (0-62.49 mOhms). 0 = AUTO/HW default. Uses BIOS mailbox command 0x2.
PS Current Threshold1	80	PS Current Threshold1, defined in 1/4 A increments. A value of 400 = 100A. Range 0-512, which translates to 0-128A. 0 = AUTO. Uses BIOS VR mailbox command 0x3.
PS Current Threshold2	20	PS Current Threshold2, defined in 1/4 A increments. A value of 400 = 100A. Range 0-512, which translates to 0-128A. 0 = AUTO. Uses BIOS VR mailbox command 0x3.
PS Current Threshold3	4	PS Current Threshold3, defined in 1/4 A increments. A value of 400 = 100A. Range 0-512, which translates to 0-128A. 0 = AUTO. Uses BIOS VR mailbox command 0x3.
PS3 Enable	Disabled, **Enabled**	PS3 Enable/Disable. 0 - Disabled, 1 - Enabled.Uses BIOS VR mailbox command 0x3.
PS4 Enable	Disabled, **Enabled**	PS4 Enable/Disable. 0 - Disabled, 1 - Enabled.Uses BIOS VR mailbox command 0x3.
IMON Slope	103	IMON Slope defined in 1/100 increments. Range is 0-200. For a 1.25 slope, enter 125. 0 = AUTO. Uses BIOS VR mailbox command 0x4.
IMON Offset	0	IMON Offset defined in 1/1000 increments. Range is 0-63999. For an offset of 25.348, enter 25348. IMON Uses BIOS VR mailbox command 0x4.
IMON Prefix	**+**,-	Sets the offset value as positive or negative.
VR Current Limit	0	Voltage Regulator Current Limit (IccMax). This value represents the Maximum instantaneous current

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Feature	Options	Description
		allowed at any given time. The value is represented in 1/4 A increments. A value of 400 = 100A. 0 means AUTO. Uses BIOS VR mailbox command 0x6.
VR Voltage Limit	0	Voltage Limit (VMAX). This value represents the Maximum instantaneous voltage allowed at any given time. Range is 0 - 7999mV. Uses BIOS VR mailbox command 0x8.
TDC Enable	Disabled, **Enabled**	TDC Enable. 0- Disable, 1 - Enable
TDC Current Limit	0	TDC Current Limit, defined in 1/8A increments. Range 0-32767. For a TDC Current Limit of 125A, enter 1000. 0 = 0 Amps. Uses BIOS VR mailbox command 0x1A.
TDC Time Window	1 sec	VR TDC Time Window, value in seconds. 1s is default. Range from 1s to 448s.
TDC Lock	**Disabled**, Enabled	TDC Lock
RFI Settings	Submenu	
RFI Domain		
RFI Current Frequency	139.200MHz	
RFI Frequency	0	Set desired RFI frequency, in increments of 100KHz. (For a frequency of 100.6MHz, enter 1006.)
FIVR Spread Spectrum	Disabled, **Enabled**	Enable or Disable the Spread Spectrum
RFI Spread Spectrum	0.5%, 1%, **1.5%**, 2%, 3%, 4%, 5%, 6%	Set the Spread Spectrum
Platform PL1 Enable	**Disabled**, Enabled	Enable/Disable Platform Power Limit 1 programming. If this option is enabled, it activates the PL1 value to be used by the processor to limit the average power of given time window.
Platform PL2 Enable	**Disabled**, Enabled	Enable/Disable Platform Power Limit 2 programming. If this option is disabled, BIOS will program the default values for Platform Power Limit 2.
Power Limit 4 Override	**Disabled**, Enabled	Enable/Disable Power Limit 4 override. If this option is disabled, BIOS will leave the default values for Power Limit 4.
C states	**Disabled**, Enabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Thermal Monitor	Disabled, **Enabled**	Enable/Disable Thermal Monitor
Interrupt Redirection Mode Selection	**Fixed Priority**, Round robin, Hash Vector, No Change	Interrupt Redirection Mode Select for Logical Interrupts
Timed MWAIT	**Disabled**, Enabled	Enable/Disable Timed MWAIT Support
Custom P-state Table	Submenu	
Custom P-state Table		

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Feature	Options	Description
Number of P states	**0**	Sets the number of custom P-states. At lease 2 states must be present.
EC Turbo Control Mode	**Disabled**, Enabled	Enable/Disable EC Turbo Control mode
Energy Performance Gain	**Disabled**, Enabled	Enable/Disable Enerfy Performance Gain.
EPG DIMM Idd3N	**26**	
EPG DIMM Idd3P	**11**	
Power Limit 3 Settings	Submenu	
Power Limit 3 Override	**Disabled**, Enabled	Enable/DisablePower Limit 3 override. If this option is disabled, BIOS will leave the hardware default values for Power Limit 3 and Power Limit 3 Time Window.
CPU Lock Configuration	Submenu	Enable/DisablePower Limit 3 override. If this option is disabled, BIOS will leave the hardware default values for Power Limit 3 and Power Limit 3 Time Window.
CFG Lock	Disabled, **Enabled**	Configure MSR 0Xe2[15], CFG Lock bit
Overclocking Lock	Disabled, **Enabled**	Enable/Disable Overclocking Lock (BIT 20) in FLEX_RATIO(194) MSR

1.19.2.2 GT Power Management Control

Feature	Options	Description
RC6 (Render Standby) *	Disabled, **Enabled**	Check to enable render standby support.
Maximum GT frequency	**Default Max Frequency**, 100Mhz, 150Mhz, 200Mhz, 250Mhz, 300Mhz, 350Mhz, 400Mhz, 450Mhz, 500Mhz, 550Mhz, 600Mhz, 650Mhz, 700Mhz, 750Mhz, 800Mhz, 850Mhz, 900Mhz, 950Mhz, 1000Mhz, 1050Mhz, 1100Mhz, 1150Mhz, 1200Mhz	Maximum GT frequency limited by the user. Choose between 100MHz (RPN) and 1350MHz (RP0). Value beyond the range will be clipped to min/max supported by SKU
Disable Turbo GT frequency	Enabled, **Disabled**	Enabled: Disables Turbo GT frequency. Disabled: GT frequency is not limited

1.19.3 Intel® Time Coordinated Computing

Feature	Options	Description
#AC Split Lock*	Enabled, **Disabled**	Enable or Disable Alignment Check Exception (#AC). When enabled, this will assert an #AC when any atomic operation has an operand that crosses two cache lines.
#GP Fault UC Lock	Enabled, **Disabled**	Enable or Disable GP Fault Exception (GP#). When enabled, this will assert an GP# when encountering a Lock to un-cacheable memory before the bus is locked.

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Intel(R) TCC Authentication*	**OEM Enrolled Key**	Intel(R) TCC Authentication determines the key to be used. OEM Enrolled Key is built in by OEM. Non-OEM Enrolled Key can be added by user.
Intel(R) TCC Mode*	Enabled, **Disabled**	Enable or Disable Intel(R) TCC Mode. When enabled, this will modify system settings to improve real-time performance. The full list of settings and their current state are displayed below when Intel(R) TCC mode is enabled.
Intel(R) TCC Mode Affected Settings		
IO Fabric Low Latency*	**Disabled**, Enabled	Enable or Disable IO Fabric Low Latency. This will turn off some power management in the PCH IO fabrics. This option provides the most aggressive IO Fabric performance setting. S3 state is NOT supported.
GT CLOS*	**Disabled**, Enabled	Enable or Disable Graphics Technology (GT) Class of Service. Enable will reduce Gfx LLC allocation to minimize impact of Gfx workload on LLC
C states*	**Disabled**, Enabled	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Intel(R) Speed Shift Technology*	Disabled, **Enabled**	Enable/Disable Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware-controlled P-states.
Intel(R) SpeedStep(tm)*	Disabled, **Enabled**	Allows more than two frequency ranges to be supported.
ACPI D3Cold Support*	**Disabled**, Enabled	Enable/Disable ACPI D3Cold support to be executed on D3 entry and exit
Low Power S0 Idle Capability*	**Disabled**, Enabled	This variable determines if we enable ACPI Lower Power S0 Idle Capability (Mutually exclusive with Smart connect). While this is enabled, it also disables 8254 timers for SLP_S0 support.
SA GV*	Disabled, Fixed to 1st Point,Fixed to 2nd Point, Fixed to 3rd Point, Fixed to 4th Point, **Enabled**	System Agent Geyserville. Can disable, fix to a specific point, or enable frequency switching.
Page Close Idle Timeout*	**Enabled**, Disabled	Page Close Idle Timeout Control
Power Down Mode*	**Auto**, No Power Down, APD, PPD-DLLoff	CKE Power Down Mode Control
RC6(Render Standby) *	Disabled, **Enabled**	Check to enable render standby support.
DMI Link ASPM Control*	**Disabled**, L0s, L1, Auto	The control of Active State Power Management of the DMI Link.
Legacy IO Low Latency*	Disabled, **Enabled**	Set to enable low latency of legacy IO. Some systems require lower IO latency irrespective of power. This is a tradeoff between power and IO latency.
CPU PCI Express Configuration	Submenu	
PCI Express Root Port 1		
ASPM	**Disabled** L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM

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L1 Substates	Disabled L1.1 **L1.1 & L1.2**	PCI Express L1 Substates settings.
PTM	**Enabled**, Disabled	Enable/Disable Precision Time Measurement
Multi-VC	Enabled, **Disabled**	Enable/Disable Multi Virtual Channel
PCI Express Clock Gating	Enabled, **Disabled**	PCI Express Clock Gating Enable/Disable for each root port.
PCI Express Root Port 2		
ASPM	Disabled L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM
L1 Substates	Disabled L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
PTM	Enabled, Disabled	Enable/Disable Precision Time Measurement
Multi-VC	Enabled, Disabled	Enable/Disable Multi Virtual Channel
PCI Express Clock Gating	Enabled, Disabled	PCI Express Clock Gating Enable/Disable for each root port.
PCI Express Root Port 3		
ASPM	Disabled L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM
L1 Substates	Disabled L1.1 L1.1 & L1.2	PCI Express L1 Substates settings.
PTM	Enabled, Disabled	Enable/Disable Precision Time Measurement
Multi-VC	Enabled, Disabled	Enable/Disable Multi Virtual Channel
PCI Express Clock Gating	Enabled, Disabled	PCI Express Clock Gating Enable/Disable for each root port.
PCH PCI Express Configuration	Submenu	
PCI Express Root Port 3		
ASPM	**Disabled** L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM
L1 Substates	Disabled L1.1 **L1.1 & L1.2**	PCI Express L1 Substates settings.
PTM	**Enabled**, Disabled	Enable/Disable Precision Time Measurement

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PCI Express Root Port 4		
ASPM	**Disabled** L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM
L1 Substates	Disabled L1.1 **L1.1 & L1.2**	PCI Express L1 Substates settings.
PTM	**Enabled**, Disabled	Enable/Disable Precision Time Measurement
PCI Express Root Port 7		
ASPM	**Disabled** L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM
L1 Substates	Disabled L1.1 **L1.1 & L1.2**	PCI Express L1 Substates settings.
PTM	**Enabled**, Disabled	Enable/Disable Precision Time Measurement
PCI Express Root Port 9		
ASPM	**Disabled** L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM
L1 Substates	Disabled L1.1 **L1.1 & L1.2**	PCI Express L1 Substates settings.
PTM	**Enabled**, Disabled	Enable/Disable Precision Time Measurement
PCI Express Root Port 10		
ASPM	**Disabled** L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM
L1 Substates	Disabled L1.1 **L1.1 & L1.2**	PCI Express L1 Substates settings.
PTM	**Enabled**, Disabled	Enable/Disable Precision Time Measurement
PCI Express Root Port 11		

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ASPM	**Disabled** L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM
L1 Substates	Disabled L1.1 **L1.1 & L1.2**	PCI Express L1 Substates settings.
PTM	**Enabled**, Disabled	Enable/Disable Precision Time Measurement
PCI Express Root Port 12		
ASPM	**Disabled** L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM
L1 Substates	Disabled L1.1 **L1.1 & L1.2**	PCI Express L1 Substates settings.
PTM	**Enabled**, Disabled	Enable/Disable Precision Time Measurement

1.19.4 Graphic Configuration

Feature	Options	Description
Nxp configuration	Info Only	
Data format and Color Depth	VESA 24 bpp JEIDA 24 bpp **JEIDA/vesa 18 bpp**	Data format and Color Depth select
LVDS Output Mode	Dual LVDS bus **Single LVDS bus**	Single/Dual mode select
DE Polarity	**Active High** Active Low	DE Polarity select
Vsync Polarity	**Active High** Active Low	Vsync Polarity select
Hsync Polarity	**Active High** Active Low	Hsync Polarity select
Spreading depth	**No Spreading** 0.5% 1.0% 1.5% 2.0% 2.5%	Clock frequency center spreading depth.
Integrated Display Configuration	Info only	
eDP/LVDS	**Disabled** Enabled	Enable/Disable eDP/LVDS
LFP Panel Type	**VBIOS Default**	Select LFP panel used by Internal Graphics Device by

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	640x480 800x600 1024x768 1280x1024 1400x1050 LVDS1 1400x1050 LVDS2 1600x1200 1366x768 1680x1050 1920x1200 1440x900 1600x900 1024x768 1280x800 1920x1080 2048x1536	selecting the appropriate setup item.
LVDS Backlight Mode	**EC Mode** GTT Mode	Select LVDS Backlight control function.
LVDS Backlight	Submenu	
LVDS Backlight Brightness	Value Range(0-255)	A change takes effect immediately. The value range starts by 0 and ends of 255.
DDI port 1	No Device Display Port HDMI **DisplayPort With HDMI/DVI Compatible**	DDI port 1 function choose to DisplayPort or HDMI
DDI port 2	No Device Display Port HDMI **DisplayPort With HDMI/DVI Compatible**	DDI port 2 function choose to DisplayPort or HDMI

1.19.5 Power Management

Feature	Options	Description
Enable ACPI Auto Configuration	**Disabled**, Enabled	Enables or Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled, **Enabled**	Enables or Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
ACPI Sleep State*	Suspend Disabled, **S3 (Suspend to RAM)**	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
LID Function	**Disabled**, Enabled	Enable/Disable LID Function
Sleep Function	Disabled, **Enabled**	Enable/Disable Sleep Button Function
ECO Mode*	**Disabled**, Enabled	Reduces the power consumption of the system, but after a shut down, you have to wait at least 5 seconds before you can restart the system.
Power-Up Mode*	**Turn On,** Remain Off, Last State	Turn On:
ATTENTION: The Power-Up Mode only has effect,		
if the module is in ATX-Mode.		

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Power Consumption	Submenu	

1.19.5.1 Power Management > Power Consumption

Feature	Options	Description
Power Consumption	Info only	
Main Current	Read only	Display input current.
Current Input Power	Read only	Display input power.
RTC	Read only	Display the sensed voltage based on hardware design.
5VSB	Read only	Display the sensed voltage based on hardware design.
VIN	Read only	Display the sensed voltage based on hardware design
3.3V	Read only	Display the sensed voltage based on hardware design
VMEM	Read only	Display the sensed voltage based on hardware design
3.3VSB	Read only	Display the sensed voltage based on hardware design
VCORE	Read only	Display the sensed voltage based on hardware design

1.19.6 System Management

Feature	Options	Description
System Management	Info Only	
Version	Info Only	Display SEMA Module Version.
SEMA Firmware	Info Only	Display SEMA Firmware Version.
SEMA Flags	Submenu	Display SEMA Flags
SEMA Features	Info	Display SEMA Supported Features

1.19.6.1 System Management > SEMA Flags

Feature	Options	Description
SEMA Flags	Info Only	
BIOS Select	Info Only	
ATX/AT-Mode	Info Only	

1.19.7 Thermal Management

Feature	Options	Description
Thermal Management	Info Only	
Critical Trip Point	**Disabled** 80 C 90 C 95 C	The value is the temperature threshold of the Critical Trip Point.
Passive Cooling Trip Point	**Disabled** 70 C	The value is the temperature threshold of the Passive Cooling Trip Point.

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Feature	Options	Description
	80 C 90 C 100 C	
Watchdog ACPI Event Shutdown	**Disabled** Enabled	Watchdog ACPI Event Shutdown Enabled/Disabled
Temperature and Fan Speed	Submenu	

1.19.7.1 Thermal Management-> Temperature and Fan Speed

Feature	Options	Description
Temperatures and Fan Speed	Info Only	
CPU Temperature	Info Only	
Current	Info Only	Display Current CPU Temperature
Startup	Info Only	Display Startup Board Temperature
Min	Info Only	Display Min Board Temperature
Max	Info Only	Display Max Board Temperature
Board Temperature	Info Only	
Current	Info Only	Display Current Board Temperature
Startup	Info Only	Display Startup Board Temperature
Min	Info Only	Display Min Board Temperature
Max	Info Only	Display Max Board Temperature

1.19.8 Watchdog Timer

Feature	Options	Description
Watchdog Timer	Info only	
Power-Up Watchdog	**Disabled** Enabled	The Power Up Watchdog resets the system after a certain amount of time after power up. Pressing F12 during start up disables the Power Up Watchdog
Timeout	**65535**	Here you can enter the time the Power Up Watchdog should wait until it resets the system. The value range starts by 24 and ends by 65535
Runtime Watchdog	**Disabled** Enabled	The Runtime Watchdog resets the system after a certain amount of time after power up.
Timeout	**24**	Here you can enter the time the Runtime Watchdog should wait until it resets the system. The value range starts by 30 and ends by 65535.

1.19.9 Super IO Configuration

Feature	Options	Description
Super IO Configuration	Info only	

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Feature	Options	Description
IT5121E Super IO Configuration	Submenu	System Super IO Chip Parameters.

1.19.9.1 Super IO Configuration > IT5121E Super IO Configuration

Feature	Options	Description
IT5121E Super IO Configuration		
Serial Port 1 Configuration	Submenu	
Serial Port 2 Configuration	Submenu	

Submenu: Super IO Configuration → Serial Port x Configuration

Feature	Options	Description
Serial Port 1 Configuration		
Serial Port 1 Configuration	Disabled, **Enabled**	Set Parameters of Serial Port 1
Device Settings	4;	
Change Settings	Auto, IO=3F8h; IRQ=4;, IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;	Select an optimal setting for Super IO Device
Change Settings	Normal, High Speed	Select an optimal setting for Super IO Device
Serial Port 2 Configuration		
Serial Port 2 Configuration	Disabled, **Enabled**	Set Parameters of Serial Port 2
Device Settings	3;	
Change Settings	Auto, IO=2F8h; IRQ=3;, IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;, IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;, Normal, High Speed	Select an optimal setting for Super IO Device

1.19.10 Miscellaneous

Feature	Options	Description
Power Supply Unit	Emulate AT Mode **ATX Mode**	Select Emulation AT or ATX function. If this option set to [Emulation AT], BIOS will report no suspend functions (S3 & S4) to ACPI OS. In windows XP, it will make OS show shutdown message during system shutdown. ATX: OS will turn off system power when shutdown.
I2C Speed Control	**100 kbps** 400 kbps	I2C Speed Control
WOL From S5	OFF **ON**	This Config to control power on/off LAN in S5 State by SEMA(EC).
LID Function	**Disabled**	Enable/Disable LID function.

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	Enabled	
Sleep Function	Disabled **Enabled**	Enable/Disable Sleep Function.
Power Ignition Power-off delay	**1 Minute** 4 Minute 10 Minute 15 Minute	Sets the power-off delay time for power ignition
Serial Port Mode	**RS232 Mode** RS485 Mode RS422 Mode	Change the Serial Port mode.

1.19.11 USB Configuration

Feature	Options	Description
USB Configuration	Info Only	
USB Module Version	Info Only	Display USB Module Version
USB Controllers:	Info Only	Display USB Controllers is XHCI or EHCI.
USB Devices:	Info Only	Display attachment USB devices.
Legacy USB Support	**Enabled** Disabled Auto	Enables Legacy USB support. Auto option disables legacy support if no USB devices are connected. Disable option will keep USB devices available only for EFI applications.
XHCI Hand-off	**Enabled** Disabled	This is a workaround for Os's without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Disabled **Enabled**	Enable / Disable USB Mass Storge Driver Support.
USB hardware delays and time-outs:	Info Only	
USB transfer rime-out	1 sec 5sec 10sec **20 sec**	The 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.
Device power-up delay	**Auto** Manual	Maximum time the device will take before it properly reports itself to the Hot Controller. 'Auto' uses default value: for a Root po\rt it is 100ms, for a Hub port the delay is taken form Hub descriptor.
Mass Storage Device	Info Only	

1.19.12 AMI Graphics Output Protocol Policy

Feature	Options	Description
Intel(R) Graphics Controller		

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Intel(R) GOP Driver [21.0.10XX]		
Output Select	HDMI[ACTIVE]	Output Interface

1.19.13 Serial Console Redirection

Feature	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.

6.3.13.1 Serial Console Redirection → Console Redirection Settings

Feature	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.
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.
Putty KeyPad	**VT100** LINUX XTERMR6	Select Function Keys and Key Pad on Putty.

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	SCO ESCN VT400	

1.19.14 Network Stack Configuration

Feature	Options	Description
Network Stack	**Disabled**, Enabled	Enable/Disable UEFI Network Stack
IPv4 PXE Support	**Disabled**, Enabled	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
IPv4 HTTP Support	**Disabled**, Enabled	Enable/Disable IPv4 HTTP boot support. If disabled, IPv4 HTTP boot support will not be available.
IPv6 PXE Support	**Disabled**, Enabled	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
IPv6 HTTP Support	**Disabled**, Enabled	Enable/Disable IPv6 HTTP boot support. If disabled, IPv6 HTTP boot support will not be available.
PXE boot wait time	[Max-Value, Min-Value, Step-Value] =[0x05, **0x00**, 0x01]	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.
Media detect count	[Max-Value, Min-Value, Step-Value] =[0x32, **0x01**, 0x01]	Number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

1.19.15 Trusted Computing

Feature	Options	Description
Security Device Support	**Disable**, Enable	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
NO Security Device Found		

1.19.16 Intel(R) Ethernet Controller I226-V – 00:00:00:00:00:00

Feature	Options	Description
UEFI Driver	Info Only	
Device Name	Info Only	
Link Statue	Info Only	
MAC Address	Info Only	

1.19.17 Intel(R) Ethernet Controller I226-V – 00:00:00:00:00:00

Feature	Options	Description
UEFI Driver	Info Only	
Device Name	Info Only	
Link Statue	Info Only	
MAC Address	Info Only	

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1.20 Chipset

Feature	Options	Description
System Agent (SA) Configuration	submenu	
PCH-IO Configuration	submenu	

1.20.1 Chipset > System Agent (SA) Configuration

Feature	Options	Description
VT-d	Info Only	
Memory Configuration	submenu	
Stop Grant Configuration	Auto	Automatic/Manual stop grant configuration
VT-d	**Enabled,** Disabled	VT-d capability
Control Iommu Pre-boot Behavior	**Disable IOMMU** Enable IOMMU during boot	Enable IOMMU in Pre-boot environment (If DMAR table is installed in DXE and If VTD_INFO_PPI is installed in PEI.)
X2APIC Opt Out	Enabled**, Disabled**	Enable/Disable X2APIC_OPT_OUT bit
DMA Control Guarantee	**Enabled,** Disabled	Enable/Disable DMA_CONTROL_GUARANTEE bit
WRC Feature	Enabled**, Disabled**	Enable/Disable SA WRC(Write Cache) Feature of IOP. When enabled, supports IO devices allocating onto the ring and into LLC.
Above 4GB MMIO BIOS assignment	**Enabled,** Disabled	Enable/Disable above 4GB MemoryMappedIO BIOS assignment\n\nThis is enabled automatically when Aperture Size is set to 2048MB.

1.20.1.1 Chipset > System Agent (SA) Configuration > Memory Configuration

Feature	Options	Description
Memory RC Version	**Info-only**	
Memory Frequency	**Info-only**	
Memory Timings (tCL-tRCD-tRP-tRAS)	**Info-only**	
Controller x Channel x Slot x	**Info-only**	
Size	**Info-only**	
Number of Ranks	**Info-only**	
Manufacturer	**Info-only**	
Memory Test on Warm Boot	**Enabled,** Disabled	Enable Or Disable Base Memory Test Run on Warm Boot
Maximum Memory Frequency	**Auto** 1067 1333 1400 1600 1800 1867 2000 2133 2200 2400	Maximum Memory Frequency Selections in Mhz. Valid values should match the refclk, i.e. divide by 133 or 100

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	2600 2667 2800 2933 3000 3200	
Max TOLUD	**Dynamic** 1 GB 1.25 GB 1.5 GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB 3.25 GB 3.5 GB	Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller
SA GV	**Enabled,** Disabled	System Agent Geyserville. Can disable, fix to a specific point, or enable frequency swithing.
Controller 0, Channel X DIMM Control	**Enabled,** Disabled	Controller 0, Channel X DIMM Control Support - Enable or Disable Dimms on Controller 0, Channel X.
Controller 1, Channel X DIMM Control	**Enabled,** Disabled	Controller 1, Channel X DIMM Control Support - Enable or Disable Dimms on Controller 1, Channel X.
Force Single Rank	**Disabled,** Enabled	When enabled, only Rank 0 will be used in each DIMM
In-Band ECC Support (Industrial SKU only)	**Enabled,** Disabled	Enable/Disable In-Band ECC. Either the IBECC or the TME can be enabled.

1.20.2 Chipset > PCH-IO Configuration

Feature	Options	Description
PCI Express Configuration	Submenu	
USB Configuration	Submenu	
Security Configuration	Submenu	
HD Audio Configuration	Submenu	
Seriallo Configuration	Submenu	
TSN GBE Configuration	Info Only	
PCH LAN Controller	Info-Only	No GbE Region
Port 80h Redirection	**LPC Bus** PCIE Bus	Control where the Port 80h cycles are sent.
Enhance Port 80h LPC Decoding	**Enabled**, Disabled	Support the word/dword decoding of port 80h behind LPC
Enable TCO Timer	**Disabled**, Enabled	Enable/Disable TCO timer. When disabled, it disables PCH ACPI timer, stops TCO timer, and ACPI WDAT table will not be published.
Pcie Ref Pll SSC	**Auto**, 0.0%, 0.1%, 0.2%, 0.3%, 0.4%, 0.5%, 0.6%, 0.7%, 0.8%, 0.9%, 1.0%, 1.1%, 1.2%, 1.3%, 1.4%, 1.5%, 1.6%, 1.7%, 1.8%, 1.9%, 2.0%, Disable	Pcie Pll SSC percentage. AUTO - Keep hw default, no BIOS override. Range is 0.0%-2.0%.

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SPD Write Disable	**TRUE**, FALSE	Enable/Disable setting SPD Write Disable. For security recommendations, SPD write disable bit must be set.

1.20.2.1 Chipset > PCH-IO Configuration > PCI Express Configuration

Feature	Options	Description
DMI Link ASPM Control	**Disabled**, L0s, L1, L0sL1, Auto	The control of Active State Power Management of the DMI Link.
Port8xh Decode	**Disabled**, Enabled	PCI Express Port8xh Decode Enable/Disable.
PCIE Ports 9-12 Configuration	**4x1 Port,** 1x2 2x1 Port, 2x2 Port, 1x4 Port	To configure PCI-E Port 9-12 of PCH. [4X1]: Port 1-4 (x1) and Port 8 (x1) / [1x2 2x1]: Port 1 (x2), Port 2 (disabled), Ports 3 and Port 4 (x1) / [2x2]: Port 1-2 (x2) and Port 3-4 (x2) / [1x4]: Port 1 (x4), Ports 2-4 (disabled)
Select PCIE/SATA Combo port 1	**PCIE port** SATA port	Notes: Please make sure the system boots completed after changing the configuration. \r\n Do Not Attempt to Shut Down Your Computer, doing that may lead to system malfunction.
PCI Express Root Port 3	Submenu	
PCI Express Root Port 4	Submenu	
PCI Express Root Port 7	Submenu	
PCI Express Root Port 9	Submenu	
PCI Express Root Port 10	Submenu	
PCI Express Root Port 11	Submenu	.
PCI Express Root Port 12	Submenu	

1.20.2.2 Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express Root Port#

Feature	Options	Description
PCI Express Root Port	Disabled **Enable**	Control the PCI Express Root Port.
Connection Type	Built-in **Slot**	Built-In: a built-in device is connected to this root port. Slot Implemented bit will be clear. Slot: this root port connects to user-accessible slot. Slot Implemented bit will be set.
ASPM	**Disabled** L0s L1 L0sL1 Auto	Set the ASPM Level. Force L0s - Force all links to L0s State Auto - BIOS auto configure; Disabled - Disables ASPM
L1 Substates	Disabled L1.1 **L1.1 & L1.2**	PCI Express L1 Substates settings.
L1 Low	Disabled **Enable**	PCI Express L1 Low Substate Enable/Disable.
ACS	Disabled **Enable**	Enable/Disable Access Control Services Extended Capability

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Feature	Options	Description
PTM	Disabled **Enable**	Enable/Disable Precision Time Measurement
DPC	**Disabled** Enable	Enable/Disable Downstream Port Containment
EDPC	Disabled **Enable**	Enable/Disable Root port extensions for Downstream Port Containment
URR	**Disabled** Enable	PCI Express Unsupported Request Reporting Enable/Disable.
FER	**Disabled** Enable	PCI Express Device Fatal Error Reporting Enable/Disable.
NFER	**Disabled** Enable	PCI Express Device Non-Fatal Error Reporting Enable/Disable.
CER	**Disabled** Enable	PCI Express Device Correctable Error Reporting Enable/Disable.
CTO	**Disabled** Enable	PCI Express Completion Timer TO Enable/Disable
SEFE	**Disabled** Enable	Root PCI Express System Error on Fatal Error Enable/Disable.
SENFE	**Disabled** Enable	Root PCI Express System Error on Non-Fatal Error Enable/Disable.
SECE	**Disabled** Enable	Root PCI Express System Error on Correctable Error Enable/Disable.
PME SCI	Disabled **Enable**	PCI Express PME SCI Enable/Disable.
Hot Plug	**Disabled** Enable	PCI Express Hot Plug Enable/Disable.
Advanced Error Reporting	Disabled **Enable**	Advanced Error Reporting Enable/Disable.
PCIe Speed	**Auto** Gen1 Gen2 Gen3	Configure PCIe Speed.
Transmitter Half Swing	**Disabled** Enabled	Transmitter Half Swing Enable/Disable.
Detect Non-Compliance	**Disabled** Enable	Detect Non-Compliance PCI Express Device. If enabled, it will take more time at POST time.
Detect Timeout	**0**	The number of milliseconds reference code will wait for link to exit Detect state for enabled ports before assuming there is no device and potentially disabling the port.
Extra Bus Reserved	**0**	Extra Bus Reserved (0-7) for bridges behind this Root Bridge.
Reserved Memory	**10**	Reserved Memory for this Root Bridge (1-20) MB.
Reserved I/O	**4**	Reserved I/O (4K/8K/12K/16K/20K) Range for this Root Bridge.
PCH PCIe LTR Configuration	Info only	

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Feature	Options	Description
LTR	Disabled **Enable**	PCH PCIE Latency Reporting Enable/Disable.
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.
LTR Lock	**Disabled** Enable	PCIE LTR Configuration Lock

1.20.2.3 Chipset > PCH-IO Configuration >USB Configuration

Feature	Options	Description
xDCI Support	Disabled, **Enabled**	Enable/Disable xDCI (USB OTG Device).
USB2 PHY Sus Well Power Gating	Disabled, **Enabled**	Select 'Enabled' to enable SUS Well PG for USB2 PHY. This option has no effect on PCH-H
USB PDO Programming	Disabled, **Enabled**	Select 'Enabled' if Port Disable Override functionality is used.
USB Overcurrent	Disabled, **Enabled**	Select 'Disabled' for pin-based debug. If pin-based debug is enabled but USB overcurrent is not disabled, USB DbC does not work.
USB Overcurrent Lock	Disabled, **Enabled**	Select 'Enabled' if Overcurrent functionality is used. Enabling this will make xHCI controller consume the Overcurrent mapping data
USB Audio Offload	Disabled, **Enabled**	Enable/Disable USB Audio Offload functionality
Enable HSII on xHCI	Disabled, **Enabled**	Enable/Disable HSII feature. It may lead to increased power consumption.
USB3.1 Portx Speed Selection	0	Port Selection value in decimal for Gen1; Default - Gen2; Bit 0 corresponds to Port 0 and so on
USB Port Disable Override	**Disabled**, Select Per-Pin	Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.

1.20.2.4 Chipset > PCH-IO Configuration > Security Configuration

Feature	Options	Description
RTC Memory Lock	Disabled, **Enabled**	Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM
BIOS Lock	**Disabled**, Enabled	Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.
Force unlock on all GPIO pads	Disabled, **Enabled**	If Enabled BIOS will force all GPIO pads to be in unlocked state

1.20.2.5 Chipset > PCH-IO Configuration > HD Audio Configuration

Feature	Options	Description
HD Audio	Disabled	Control Detection of the HD-Audio device.

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Feature	Options	Description
	Enabled	

1.20.2.6 Chipset > PCH-IO Configuration > Serial IO Configuration

Feature	Options	Description
I2C0 Controller	Disabled**, Enabled**	Enables/Disables Serial Controller
I2C1 Controller	Disabled**, Enabled**	Enables/Disables Serial Controller
I2C5 Controller	Disabled**, Enabled**	Enables/Disables Serial Controller
SPI0 Controller	Disabled**, Enabled**	Enables/Disables Serial Controller
UART0 Controller	**Disabled,** Enabled, Communication port (COM)	Enables/Disables Serial Controller
UART1 Controller	**Disabled,** Enabled, Communication port (COM)	Enables/Disables Serial Controller
UART2 Controller	**Disabled,** Enabled, Communication port (COM)	Enables/Disables Serial Controller
GPIO IRQ Route	**IRQ14,** IRQ15	Route all GPIOs to one of the IRQ.
Serial IO UART0 Settings	Submenu	
Serial IO UART2 Settings	Submenu	

1.20.2.7 Chipset > PCH-IO Configuration > SCS Configuration

Feature	Options	Description
eMMC 5.1 Controller	Disabled**, Enabled**	Enables/Disables eMMC Controller
eMMC 5.1 HS400 Mode	Disabled**, Enabled**	Enables/Disables SCS eMMC 5.1 HS400 Mode
Enable HS400 software tuning	**Disabled,** Enabled	Software tuning should improve eMMC HS400 stability at the expense of boot time.
Driver Strength	**33 Ohm,** 40 Ohm, 50 Ohm	Set I/O driver strength
UFS 2.0 Controller 1	**Disabled,** Enabled	Enable or Disable UFS 2.0 Controller

1.21 Security

Feature	Options	Description
Password Description	Info only	
Administrator Password	Enter password	Set Administrator Password
User Password	Enter password	Set User Password
Secure Boot menu	submenu	

1.21.1 Secure Boot menu

Feature	Options	Description
Secure Boot	**Disabled** Enabled	Secure Boot feature is Active if Secure Boot is Enabled, platform Key (PK) is enrolled and the System is in User mode, The mode change requires platform reset
Secure Boot Mode	**Standard** Custom	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be

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Feature	Options	Description
Secure Boot	**Disabled** Enabled	Secure Boot feature is Active if Secure Boot is Enabled, platform Key (PK) is enrolled and the System is in User mode, The mode change requires platform reset
		configured by a physically present user without full authentication
Restore Factory Keys		Force System to User Mode. Install factory default Secure Boot key databases
Reset To Setup Mode		Delete all Secure Boot Key databases from NVRAM.
Key Management	**Submenu**	Enables expert users to modify. Secure Boot Policy variables without variable authentication.

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1.22 Boot

1.22.1 Boot Configuration

Feature	Options	Description
Boot Configuration	Info only	
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
Quiet Boot	Disabled **Enabled**	Enables or disables Quiet Boot option
Fast Boot	Disabled **Enabled**	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
SATA Support	**Last Boot SATA Devices Only** All Sata Devices	If Last Boot SATA Devices Only, only last boot SATA device will be available in Post. If All Sata Devices, all SATA devices will be available in OS and Post.
VGA Support	Auto **EFI Driver**	If Auto, only install Legacy OpRom with Legacy OS and logo would NOT be shown during post. Efi driver will still be installed with EFI OS.
USB Support	Disabled **Full Initial** Partial Initial	If disabled, all USB devices will NOT be available until after OS boot. If Partial Initial, USB Mass Storage and specific USB port/device will NOT be available before OS boot. If enabled, all USB devices will be available in OS and Post.
PS2 Devices Support	**Disabled** Enabled	If disabled, PS2 devices will be skipped.
Network Stack Driver Support	**Disabled** Enabled	If Disabled, Network Stack Driver will be skipped.
Redirection Support	Disabled **Enabled**	If disable, Redirection function will be disabled.
Boot Mode select	**UEFI** LEGACY	Select boot mode LEGACY/UEFI
FIXED BOOT ORDER Priorities	Info only	
UEFI Hard Disk Drive BBS Priorities	**Submenu**	
UEFI Application Boot Priorities	**Submenu**	

1.23 Save & Exit

Feature	Options	Description
Save Changes and Exit		Exit system setup after saving the changes.
Discard Changes and Exit		Exit system setup without saving any changes.
Save Change and Reset		Reset the system after saving the changes.
Save Changes and Exit		Exit system setup after saving the changes.
Discard Changes and Exit		Exit system setup without saving any changes.

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Feature	Options	Description
Save Changes and Reset		Reset the system after saving the changes.
Discard Changes and Reset		Reset system setup without saving any changes.
Save Options	Info only	
Save Changes		Save Changes done so far to any of the setup options.
Discard Changes		
Restore Defaults		
Save as User Defaults		Save the changes done so far as User Defaults.
Restore User Defaults		Restore the User Defaults to all the setup options.
Boot Override	Info only	

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Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil , pour éviter des blessures ou des dommages.

- Read these safety instructions carefully.
- Keep the User's Manual for future reference.
- Read the Specifications section of this manual for detailed information on the recommended operating environment.
- When installing/mounting or uninstalling/removing device; or when removal of a chassis cover is required for user servicing:
  [> Turn off power and unplug any power cords/cables.
  [> Reinstall all chassis covers before restoring power.
- To avoid electrical shock and/or damage to device:
  [> Keep device away from water or liquid sources.
  [> Keep device away from high heat or humidity.
  [> Keep device properly ventilated (do not block or cover ventilation openings).
  [> Always use recommended voltage and power source settings.
  [> Always install and operate device near an easily accessible electrical outlet.
  [> Secure the power cord (do not place any object on/over the power cord) and connect it to a socket-outlet with earthing connection.
  [> Only install/attach and operate device on stable surfaces and/or recommended mountings.
- If the device will not be used for long periods of time, turn off and unplug from its power source.
- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools.
- A Lithium-type battery may be provided for uninterrupted backup or emergency power.



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

Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- The device must be serviced by authorized technicians when:
  [> The power cord or plug is damaged.
  [> Liquid has entered the device interior.
  [> The device has been exposed to high humidity and/or moisture.
  [> The device is not functioning or does not function according to the User's Manual.
  [> The device has been dropped and/or damaged and/or shows obvious signs of breakage.
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up.
  [> The equipment is not intended to be installed or used in a home, school, or public area accessible to the general population.
  [> The knurled thumb screws with slotted heads for each Node module should be tightened with a tool after both initial installation and subsequent use.
- It is recommended that the device be installed only in a server room or computer room where access is:
  [> Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefore, and any precautions required.
  [> Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location.
- Please use an approved power source certified by IEC or UL. If you need an adapter, optional accessories, or further assistance, please contact ADLINK for more information.

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BURN HAZARD
Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching.

RISQUE DE BRÛLURES
Ne touchez pas cette surface, cela pourrait entraîner des blessures. Pour éviter tout danger, laissez la surface refroidir avant de la toucher.

- Lisez attentivement ces consignes de sécurité
- *Conservez le manuel de l'utilisateur pour pouvoir le consulter ultérieurement*
- *Lisez la section Spécifications de ce manuel pour des informations détaillées sur l'environnement d'exploitation recommandé*
- Lors de l'installation/montage ou de la désinstallation/retrait de l'appareil ; ou lorsque le retrait d'un boîtier est nécessaire pour l'entretien par l'utilisateur (voir Mise en route) :
  - Éteignez l'alimentation et débranchez tous les cordons/câbles d'alimentation.
  - Réinstallez tous les panneaux du boîtier avant de remettre l'alimentation sous tension.
- *Pour éviter les chocs électriques et/ou d'endommager l'appareil :*

  - *Tenez l'appareil à l'écart de toute source d'eau ou de liquide*
  - *Tenez l'appareil à l'écart d'une forte chaleur ou d'une humidité élevée*
  - *Maintenez l'appareil correctement ventilé (n'obstruer ou ne couvrez pas les ouvertures de ventilation)*
  - *Utilisez toujours les réglages de tension et de source d'alimentation recommandés*
  - *Installez et utilisez toujours l'appareil près d'une prise de courant facilement accessible*
  - Fixez le cordon d'alimentation (ne placez aucun objet sur/au-dessus du cordon d'alimentation) et connectez-le à une prise de courant avec mise à la terre
- N'essayez jamais de réparer l'appareil, qui doit être réparé uniquement par du personnel technique qualifié *et utilisant des outils appropriés.*
  - *Lors de l'installation/montage ou de la désinstallation/retrait d'un périphérique, ou lorsque le retrait d'un couvercle de châssis est requis pour l'entretien par l'utilisateur :*
  - *Coupez l'alimentation et débranchez tous les cordons/câbles d'alimentation.*
- *Réinstallez tous les capots du châssis avant de rétablir l'alimentation. Installez/fixez et utilisez l'appareil uniquement sur des surfaces stables et/ou des supports recommandés.*
- *Si l'appareil n'est pas utilisé pendant une longue période, éteignez-le et débranchez-le de sa source d'alimentation.*
- *Une batterie de type lithium peut être fournie pour une alimentation de secours ou de secours ininterrompue.*

  - *L'appareil doit être réparé par des techniciens agréés lorsque :*
  - *Le cordon d'alimentation ou la fiche est endommagé.*
  - *Du liquide est entré dans l'appareil. € L'appareil a été exposé à une humidité élevée et/ou à l'humidité.*
  - *L'appareil ne fonctionne pas ou ne fonctionne pas conformément au manuel de l'utilisateur.*

- *L'appareil est tombé et/ou a été endommagé et/ou présente des signes évidents de casse.*
- *Débranchez le cordon d'alimentation avant de desserrer les vis moletées et fixez toujours les vis moletées avec un tournevis avant de démarrer le système.*
  - *L'équipement n'est pas destiné à être installé ou utilisé dans une maison, une école ou une zone publique accessible au grand public.*
  - *Les vis à molette avec têtes fendue pour chaque module Node doivent être serrées avec un outil après l'installation initiale et lors de l'utilisation suivante.*
- *Il est recommandé d'installer l'appareil uniquement dans une salle de serveurs ou une salle informatique dont l'accès est :*

  - *Réservé au personnel de service qualifié ou aux utilisateurs familiers avec les restrictions appliquées à l'emplacement, les raisons de celles-ci et les précautions requises.*
  - *Autorisé uniquement par l'utilisation d'un outil ou d'une serrure et d'une clé, ou d'autres moyens de sécurité, et contrôlé par l'autorité responsable du lieu.*

Veuillez utiliser une source d'alimentation approuvée et certifiée par la norme IEC ou UL. Si vous avez besoin d'un adaptateur, d'accessoires en option ou d'une assistance supplémentaire, veuillez contacter ADLINK pour plus d'informations.

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EMC Compliance

CE Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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Getting Services

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