



USER MANUAL

# ALTA DS 4K

Fanless ultra-compact  
Android digital signage system



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### FCC-A Radio Frequency Interference Statement

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his personal expense.

### Notice 1

The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### Notice 2

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### Notice 3

The product described in this document is designed for general use, VIA Technologies assumes no responsibility for the conflicts or damages arising from incompatibility of the product. Check compatibility issue with your local sales representatives before placing an order.

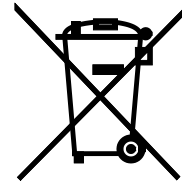


Tested To Comply  
With FCC Standards  
FOR HOME OR OFFICE USE



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- Do not re-use, recharge, or reheat an old battery.
- Do not attempt to force open the battery.
- Do not discard used batteries with regular trash.
- Discard used batteries according to local regulations.



## Safety Precautions

- Always read the safety instructions carefully.
- Keep this User's Manual for future reference.
- All cautions and warnings on the equipment should be noted.
- Keep this equipment away from humidity.
- Lay this equipment on a reliable flat surface before setting it up.
- Make sure the voltage of the power source and adjust properly 110/220V before connecting the equipment to the power inlet.
- Place the power cord in such a way that people cannot step on it.
- Always unplug the power cord before inserting any add-on card or module.
- If any of the following situations arises, get the equipment checked by authorized service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated into the equipment.
  - The equipment has been exposed to moisture.
  - The equipment has not worked well or you cannot get it work according to User's Manual.
  - The equipment has dropped and damaged.
  - The equipment has obvious sign of breakage.
- Do not leave this equipment in an environment unconditioned or in a storage temperature above 70°C (158°F). The equipment may be damaged.
- Do not leave this equipment in direct sunlight.
- Never pour any liquid into the opening. Liquid can cause damage or electrical shock.
- Do not place anything over the power cord.
- Do not cover the ventilation holes. The openings on the enclosure protect the equipment from overheating



## Box Content

- 1 x ALTA DS 4K system
- 1 x Stand holder
- 1 x AC-to-DC adapter
- 1 x Power cord (USA type)
- 1 x Wi-Fi antenna (VT60910017002-T sku only)

## Ordering Information

Part Number	Description
VT60910016001-T	1.4GHz ZX-2000M Cortex-A17 quad-core SoC, 2GB DDR3 SDRAM, 8GB eMMC, HDMI, USB 3.0, 2 USB 2.0, Mini USB 2.0 for COM (TX/RX), CIR, Gigabit Ethernet, 10/100Mbps Ethernet, SD card slot, Stand holder, US power cord, 12V DC-in
VT60910017002-T (US Only)	Android system with 1.4GHz ZX-2000M Cortex-A17 quad-core SoC, 2GB DDR3 SDRAM, 8GB eMMC, HDMI, USB 3.0, 2 USB 2.0, Mini USB 2.0 for COM (TX/RX), CIR, Gigabit Ethernet, 10/100Mbps Ethernet, Wi-Fi, Bluetooth 4.0, SD card slot, Stand holder, US power cord, 12V DC-in

## Optional Accessories

### Wireless Accessories

Part Number	Description
EMIO-5531-00A1	VAB-820-W IEEE 802.11b/g/n USB Wi-Fi & Bluetooth module with assembly kit and antenna

### Mounting Options

Part Number	Description
VT6076-C0000A1	VESA mount cradle

### Cable Accessories

Part Number	Description
99G33-192458	COM (TX/RX) Cable (Mini USB 2.0 male to 9-pin D-SUB male)
99G33-080297	Debug cable (TX/RX)

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# 1. Product Overview

The VIA ALTA DS 4K is an ultra-compact and completely fanless Android digital system measuring 175mm (H) x 25mm (H) x 118mm (D). It offers dual independent Full UHD screen support for a host of digital signage applications ranging from kiosks, POS systems, and menu boards to TVOIP, cloud streaming, and Out of Home Advertising across a broad spectrum of retail, hospitality, education, corporate, and entertainment environments.

The VIA ALTA DS 4K is powered by a 1.4GHz ZX-2000M Cortex-A17 quad core SoC with a high-performance 3D/2D graphics and video engine that supports OpenGL® ES 3.0 and OpenVG™ 1.1 hardware acceleration for one UHD and one Full HD video playback simultaneously.

The VIA ALTA DS 4K system features dual coastline I/O including one USB 3.0 port, two USB 2.0 ports, one Mini USB 2.0 port for COM (TX/RX), one 1.4 HDMI port with CEC support, one Gigabit Ethernet port, one 10/100Mbps Ethernet port, one SD card slot, one CIR receiver, audio jacks for Line-in and Mic-in, and 12V DC-in. Onboard features include 8GB eMMC Flash memory, 2GB DDR3 SDRAM and a USB 2.0 connector for adding the optional VIA EMIO-5531 USB Wi-Fi & Bluetooth module.

## 1.1 Key Features

### 1.1.1 ARM Based System

The ARM based ALTA DS 4K system is powered by a power-efficient 1.4GHz ZX-2000M Cortex-A17 quad core SoC that provides a full range of rich features including superb multi-tasking performance.

### 1.1.2 Fanless and Space Saving

The ALTA DS 4K features fanless operation in a slim chassis designed to save space, making it ideal for installation in a wide range of environments.

### 1.1.3 Optimized Integration with Multiple I/O Access

With front and back panel I/O access, the VIA ALTA DS 4K can be easily be configured to support a wide variety of applications with easy integration and quick setup.

### 1.1.4 4K Display Support

The ALTA DS 4K supports three independent integrated GPUs for 3D/2D graphic acceleration that provides support for 4K UHD screen resolution with a maximum display of 3840x2160.

### 1.1.5 Storage Expansion

The ALTA DS 4K has an onboard 8GB eMMC flash storage and a SD card slot for a maximum expandable storage of up to 32GB.

### 1.1.6 Networking Support

The ALTA DS 4K is equipped with two RJ-45 ports that support high speed Gigabit Ethernet and 10/100Mbps Ethernet. Wireless connectivity can be added through the optional VIA EMIO-5531 USB Wi-Fi & Bluetooth module.

### 1.1.7 Mounting Solution

The ALTA DS 4K supports multiple methods for mounting the chassis securely. It can be mounted to any flat surface using the stand holder or even to VESA mountable surfaces with a VESA mounting kit.

### 1.1.8 Embedded Operating System Ready

The ALTA DS 4K features a complete signage software evaluation image featuring Android 5.1 as well as the VIA Smart ETK including Wake-On-LAN, Watchdog timer and UART access.



## 1.2 Product Specification

### Processor

- 1.4GHz ZX-2000M Cortex-A17 quad-core SoC

### System Memory

- 2GB DDR3 1600MHz SDRAM onboard

### Storage

- 8GB eMMC Flash memory
- Up to 16GB eMMC (optional)

### Boot Loader

- 4MB SPI Flash ROM

### Graphic

- Three independent, integrated 3D/2D and video graphic processing units.
- Graphics engine supporting OpenGL® ES 3.0 and OpenVG™ 1.1 hardware acceleration
- Supports H.264, and H.265 (HEVC) video decoding up to 3840x2160p30
- Supports VP8 and MJPEG video decoding up to 1080p
- Supports VC-1 and MPEG-2 video decoding up to 1080p (by request only)
- Supports H.264 encoding

### LAN

- Realtek RTL8211FS-CG

### Wi-Fi & Bluetooth

- IEEE 802.11 b/g/n Wi-Fi (optional)
- Bluetooth 4.0 (optional)

### Audio

- Wolfson WM8960 Audio Codec

### HDMI

- Integrated HDMI 1.4 with CEC support

### Front Panel I/O

- 1 x Power on/off button with power indicator LED
- 1 x SD card slot
- 2 x USB 2.0 ports
- 2 x Audio jacks: Line-out and Mic-in

**Back Panel I/O**

- 1 x DC-in jack
- 1 x Gigabit Ethernet port
- 1 x 10/100Mbps Ethernet port
- 1 x USB 3.0 port
- 1 x CIR receiver
- 1 x HDMI (HDMI 1.4 4Kx2K @30Hz, with CEC support)
- 1 x Mini USB 2.0 port for COM (TX/RX)
- 1 x Antenna hole for Wi-Fi
- 1 x Kensington Lock

**Onboard Connector**

- 1 x USB 2.0 connector (for optional EMIO-5531 USB Wi-Fi & Bluetooth module)
- 1 x COM debug connector (for debugging only)

**Power Supply**

- 12V DC-in

**Operating System**

- Android 5.1

**VIA Smart ETK**

- Restart, RTC-Wake-up, Suspend, Wake-On-LAN, Watchdog timer, UART

**Operating Temperature**

- 0°C ~ 40°C

**Operating Humidity**

- 0% ~ 90% @ 40°C (non-condensing)

**Storage Temperature**

- - 20°C ~ 70°C

**Mechanical Construction**

- Plastic frame
- Metal bracket
- Metal mesh cover on top and bottom

**Mounting**

- Stand holder, VESA mount (optional)

**Dimension**

- 175mm (H) x 25mm (H) x 118mm (D) (6.88" x 0.98" x 4.64")

**Weight**

- 0.5kg (1.10lbs)

**Compliance**

- BSMI
- CE
- FCC
- NCC

**Notes:**

1. As the operating temperature provided in the specifications is a result of the test performed in VIA's chamber, a number of variables can influence this result. Please note that the working temperature may vary depending on the actual situation and environment. It is highly recommended to execute a solid testing program and take all the variables into consideration when building the system. Please ensure that the system runs well under the operating temperature in terms of application.

2. Please note that the lifespan of the onboard eMMC memory chip may vary depending on the amount of access. More frequent and larger data access on the eMMC memory makes its lifespan shorter. Therefore, it is highly recommended to use a replaceable external storage (e.g., Micro SD card) for large data access.

## 1.3 Layout Diagram

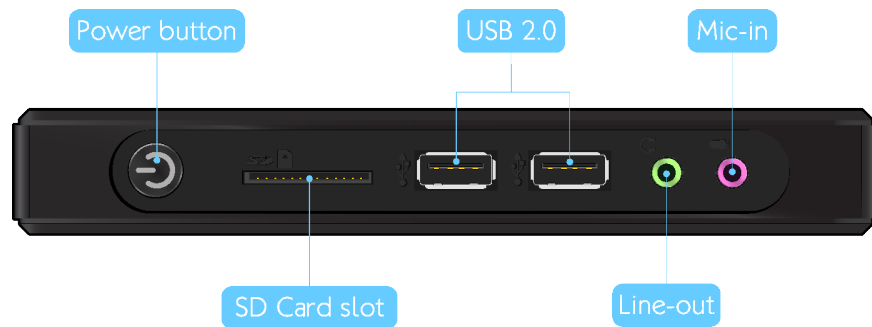


Figure 1: Front panel I/O layout

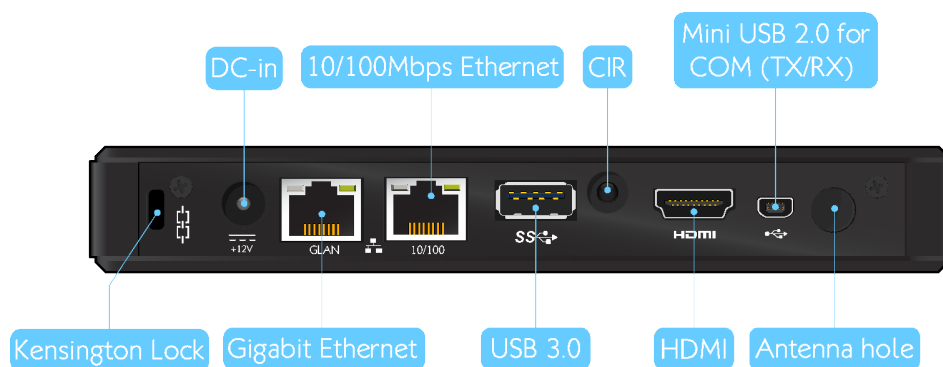


Figure 2: Back panel I/O layout

## 1.4 Dimensions

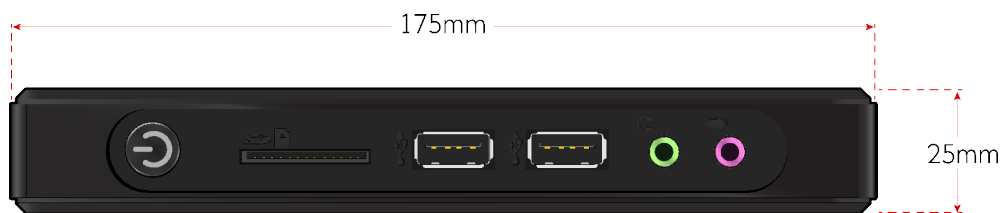


Figure 3: Dimensions of ALTA DS 4K (Front view)

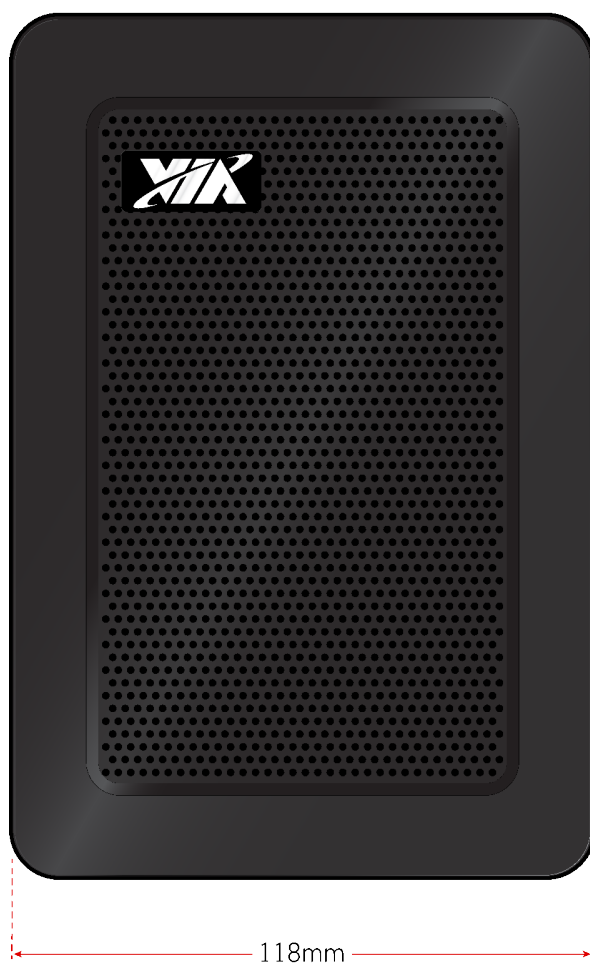


Figure 4: Dimensions of ALTA DS 4K (Top view)

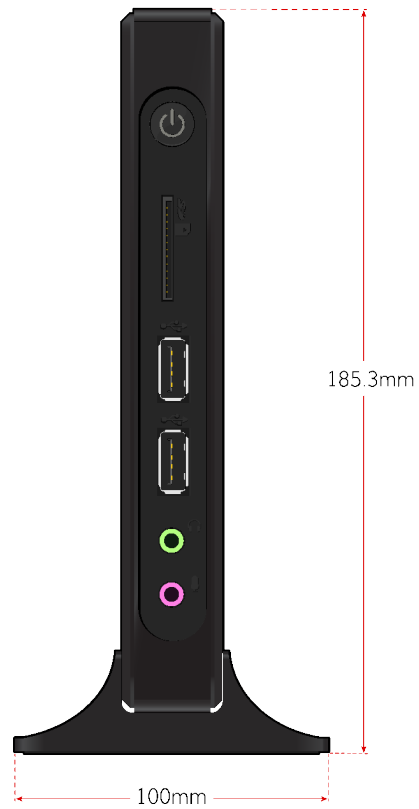


Figure 5: Dimensions of ALTA DS 4K with stand holder installed (Front view)

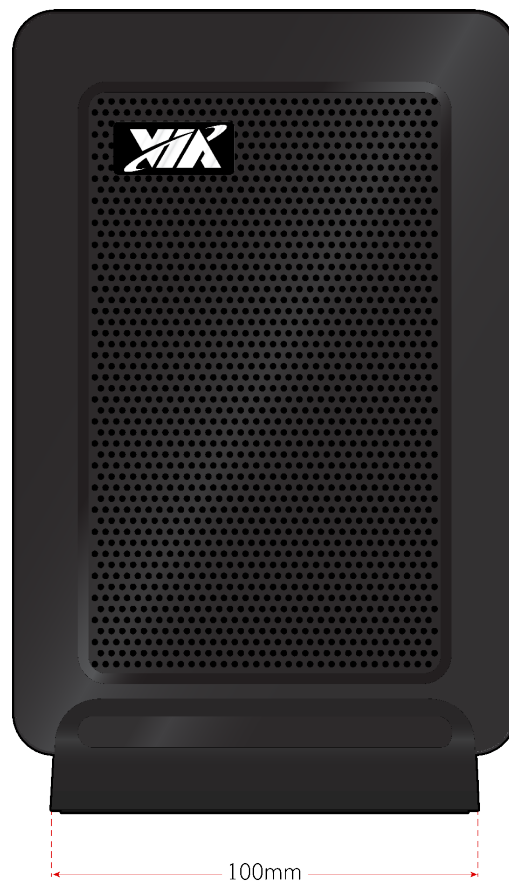


Figure 6: Dimensions of ALTA DS 4K with stand holder installed (Top view)

## 2. External I/O Pin Descriptions and Functionality

This chapter provides information about the ALTA DS 4K's external I/O ports and their functionality.

### 2.1 HDMI® Port

The ALTA DS 4K has an HDMI port on the back panel. The HDMI port uses a Type A receptacle connector to connect high definition video and digital audio using a single cable. The pinouts of the HDMI port are shown below.

Pin	Signal	Pin	Signal
1	TX2+	11	GND
2	GND	12	CLK-
3	TX2-	13	CEC
4	TX1+	14	NA
5	GND	15	SCL
6	TX1-	16	SDA
7	TX0+	17	GND
8	GND	18	VDD50
9	TX0-	19	HDP
10	CLK+		

Table 1: HDMI port pinouts

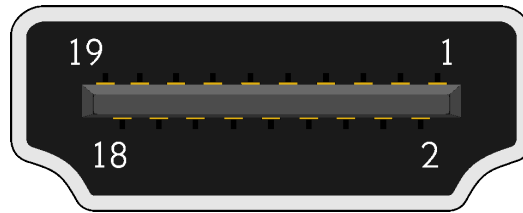


Figure 7: HDMI port diagram

### 2.2 USB 3.0 Port

The ALTA DS 4K is equipped with one USB 3.0 port on the back panel. The USB 3.0 port has a maximum data transfer rate of up to 5Gbps and is compatible with USB 2.0 specifications. This USB port gives complete Plug and Play and hot swap capability for external devices. The pinouts of the USB 3.0 port are shown below.

Pin	Signal
1	VCC_USB2
2	USB2_D-
3	USB2_D+
4	GND
5	USB2_SSRX-
6	USB2_SSRX+
7	GND
8	USB2_SSTX-
9	USB2_SSTX+

Table 2: USB 3.0 port pinouts

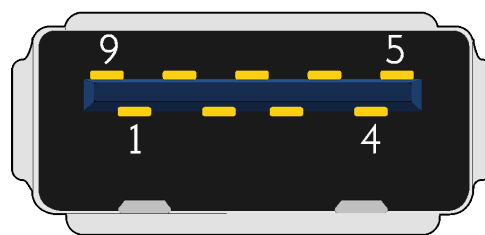


Figure 8: USB 3.0 port diagram

## 2.3 USB 2.0 Port

The ALTA DS 4K has two external USB 2.0 ports on the back panel. Each USB 2.0 ports gives complete Plug and Play and hot swap capability for external devices. The USB interface complies with USB UHCI, Rev. 2.0. The pinouts of the USB 2.0 ports are shown below.

Port 1		Port 2	
Pin	Signal	Pin	Signal
1	VCC	1	VCC
2	USB_D-	2	USB1_1-
3	USB0_D+	3	USB1_1-
4	GND	4	GND



Figure 9: USB 2.0 port diagram

Table 3: USB 2.0 ports pinouts

## 2.4 Mini USB 2.0 Port for COM (TX/RX)

The ALTA DS 4K is equipped with a Mini USB 2.0 port for COM that supports TX/RX. The Mini USB 2.0 port uses a USB type AB receptacle connector which is located on the back panel. The pinouts of the Mini USB 2.0 port are shown below.

Pin	Signal
1	VCC
2	RXD1
3	TXD1
4	GND
5	GND

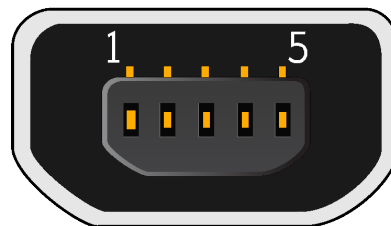


Figure 10: Mini USB 2.0 port for COM (TX/RX) diagram

Table 4: Mini USB 2.0 port for COM (TX/RX) pinouts



### 2.4.1 COM (TX/RX) Cable

The COM (TX/RX) cable is a Mini USB 2.0 to COM conversion cable which is used to plug-in to the Mini USB 2.0 port. The COM (TX/RX) cable supports TX/RX. The diagram of the COM (TX/RX) cable is shown below.



Figure 11: COM (TX/RX) cable diagram

## 2.5 Gigabit Ethernet Port

The ALTA DS 4K comes with one Gigabit Ethernet port. The Gigabit Ethernet port comes with an 8 position and 8 contact (8P8C) receptacle connector commonly known as RJ-45. It is fully compliant with IEEE 802.3 (10BASE-T), 802.3u (100BASE-TX), and 802.3ab (1000BASE-T) standards. The pinouts of the Gigabit Ethernet port are shown below.

Pin	Signal
1	GND
2	MX0+
3	MX0-
4	MX1+
5	MX1-
6	GND
7	MX2+
8	MX2-

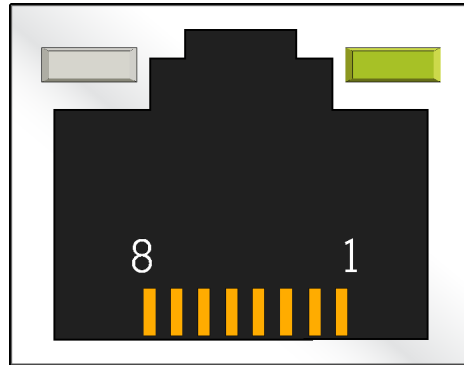


Figure 12: Gigabit Ethernet port diagram

Table 5: Gigabit Ethernet port pinouts

The Gigabit Ethernet port has two individual LED indicators located on the front side to show its Active/Link status and Speed status

	Active LED (Left LED on RJ-45 port)	Link LED (Right LED on RJ-45 port)
Link off	LED is off	LED is off
Speed_10Mbit	Orange Flash	LED is off
Speed_100Mbit	Orange Flash	The Red LED is on
Speed_1000Mbit	Orange Flash	The Green LED is on

Table 6: Gigabit Ethernet port LED color definitions

## 2.6 10/100 Mbps Ethernet Port

The ALTA DS 4K comes with a 10/100Mbps Ethernet port. The integrated 10/100Mbps Ethernet port uses an 8 Position Contact (8P8C) receptacle connector commonly referred to as RJ-45. The pinouts of the 10/100Mbps Ethernet port are shown below.

Pin	Signal
1	VDD18
2	MDI_0P
3	MDI_0N
4	MDI_1P
5	MDI_1N
6	GND
7	NA
8	NA

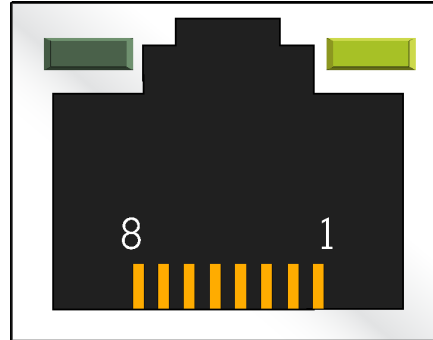


Figure 13: 10/100Mbps Ethernet port diagram

Table 7: 10/100Mbps Ethernet port pinouts

The 10/100Mbps Ethernet port has two LED indicators located on the front side to show its Active/Link status and speed status.

	Active LED (Left LED on RJ-45 port)	Link LED (Right LED on RJ-45 port)
Link off	LED is off	LED is off
Speed_10Mbit	The Green LED is off	Yellow Flash
Speed_100Mbit	The Green LED is on	Yellow Flash

Table 8: 10/100Mbps Ethernet port LED color definitions

## 2.7 CIR Receiver

The ALTA DS 4K provides a Consumer Infrared (CIR) receiver which is compatible with infrared controllers that can be used to control the multimedia player, connect to the Internet as well as wireless items such as keyboards and mice. The pinouts of the CIR receiver are shown below.

Pin	Signal
1	VDD33
2	GND
3	CIRIN

Table 9: CIR receiver pinouts



Figure 14: CIR receiver diagram

## 2.8 Audio Jacks

The ALTA DS 4K offers High Definition Audio through 3.5mm TRS jacks on the front panel: Line-out and Mic-in. The Line-out jack is for connecting to external speakers or headphones. The Mic-in jack is for connecting to a microphone. The diagram of the Audio jacks are shown below.



Figure 15: Audio jacks diagram

## 2.9 SD Card Slot

The ALTA DS 4K comes with an SD card slot located on the front panel I/O with support for a maximum storage capacity of 32GB. The pinouts of the Micro SD card slot are shown below.

Pin	Signal
1	SD_DAT3
2	SD_CMD
3	GND
4	3.3V
5	SD_CLK
6	GND
7	SD_DAT0
8	SD_DAT1
9	SD_DAT2
CD	SD_CD-
WP	None

Table 10: SD card slot pinouts

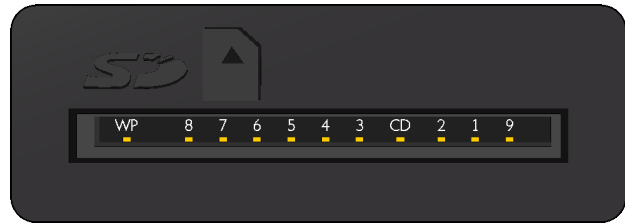


Figure 16: SD card slot diagram

## 2.10 Power Button

The ALTA DS 4K comes with a Power button with built-in power LED indicator (blue light) which is used to Suspend/Resume the system by pressing the button once. The diagram of the Power button is shown below.



Figure 17: Power button diagram

## 2.11 DC-In Jack

The ALTA DS 4K comes with a DC-in jack that carries a 12V DC external power input. The specification and pinouts of power DC-in jack are shown below.

Pin	Signal
1	VDD120_IN
2	GND

Table 11: DC-in jack pinouts

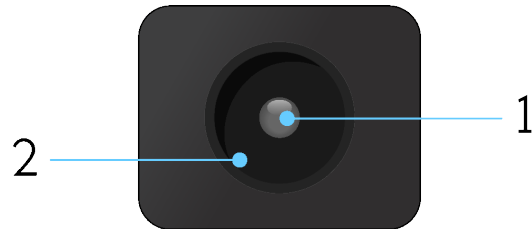


Figure 18: DC-in jack diagram

Physical Specification	
Outer Diameter	6.0mm
Inner Diameter	6.5mm
Barrel Depth	8.2mm
Electrical Specification	
Input Voltage	+12V

Table 12: DC-in jack specification

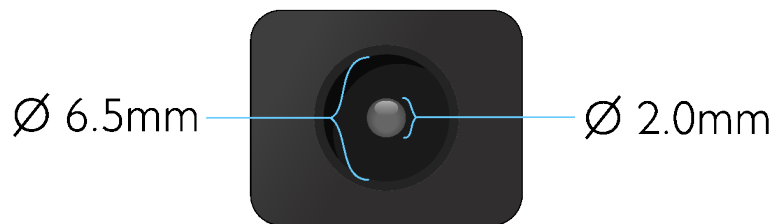


Figure 19: DC-in jack specification diagram

## 3. Onboard Connector

This chapter provides information about the onboard connectors of ALTA DS 4K system's mainboard.

### 3.1 USB 2.0 Connector

The ALTA DS 4K mainboard has an onboard USB 2.0 connector designed for connecting the EMIO-5531 USB Wi-Fi & Bluetooth module. The USB 2.0 connector is labeled as "WIFI1". The pinouts of the connector are shown below.

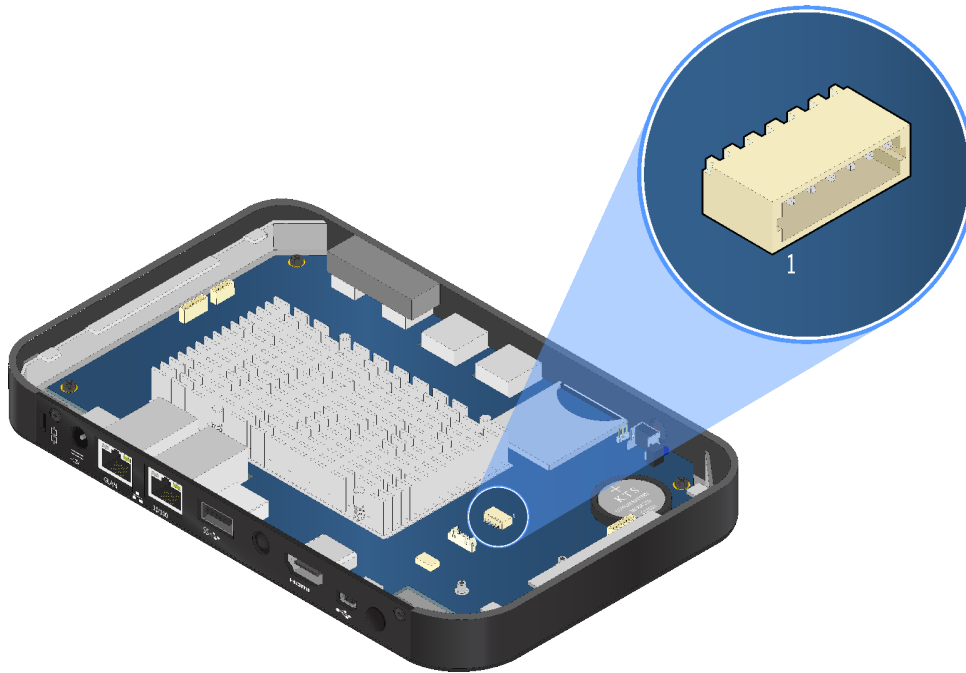


Figure 20: USB 2.0 connector diagram

Pin	Signal
1	NA
2	NA
3	GND
4	USB1_3_DP
5	USB1_3_DM
6	VCC

Table 13: USB 2.0 connector pinouts

## 3.2 COM Debug Connector

The ALTA DS 4K system is equipped with an onboard COM debug connector located inside the system. The COM debug connector is used to connect the debug cable for debugging purposes. The pinouts of the COM debug connector are shown below.

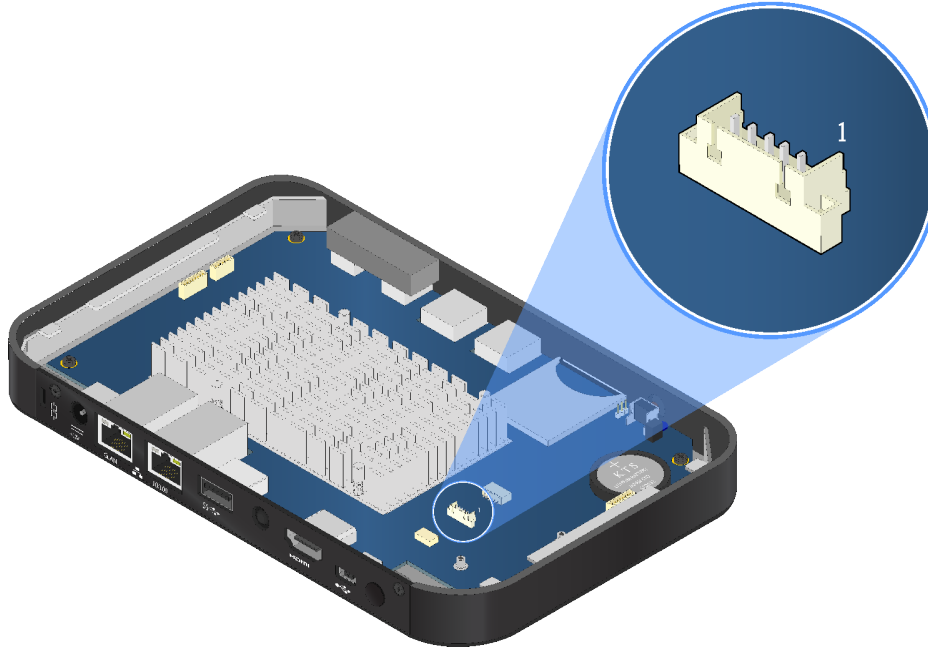


Figure 21: COM debug connector diagram

Pin	Signal
1	TX
2	RX
3	GND
4	NA
5	NA

Table 14: COM debug connector pinouts



## 4. Hardware Installation

This chapter provides you with information on the hardware installation procedures. It is recommended to use a grounded wrist strap before handling computer components. Electrostatic discharge (ESD) can damage some components.

### 4.1 Opening the Chassis

#### Step 1

Remove the two screws on the back panel I/O plate.



Figure 22: Unscrewing the back panel I/O plate

#### Step 2

Gently pull out the back panel I/O plate.



Figure 23: Removing the back panel I/O plate

### Step 3

Gently slide the top cover horizontally to disengage it from the chassis and pull up to remove it completely.



Figure 24: Removing top cover

## 4.2 Installing the Stand Holder

The stand holder is designed to hold the ALTA DS 4K system in an upright position.

### Step 1

Align the pre-installed screw of the stand holder with the mounting hole at the right side of the chassis and then gently attach the stand holder to the chassis.



Figure 25: Installing the stand holder

## Step 2

Once the stand holder has been fully attached, secure it with the pre-installed screw located on the bottom side of the stand holder.

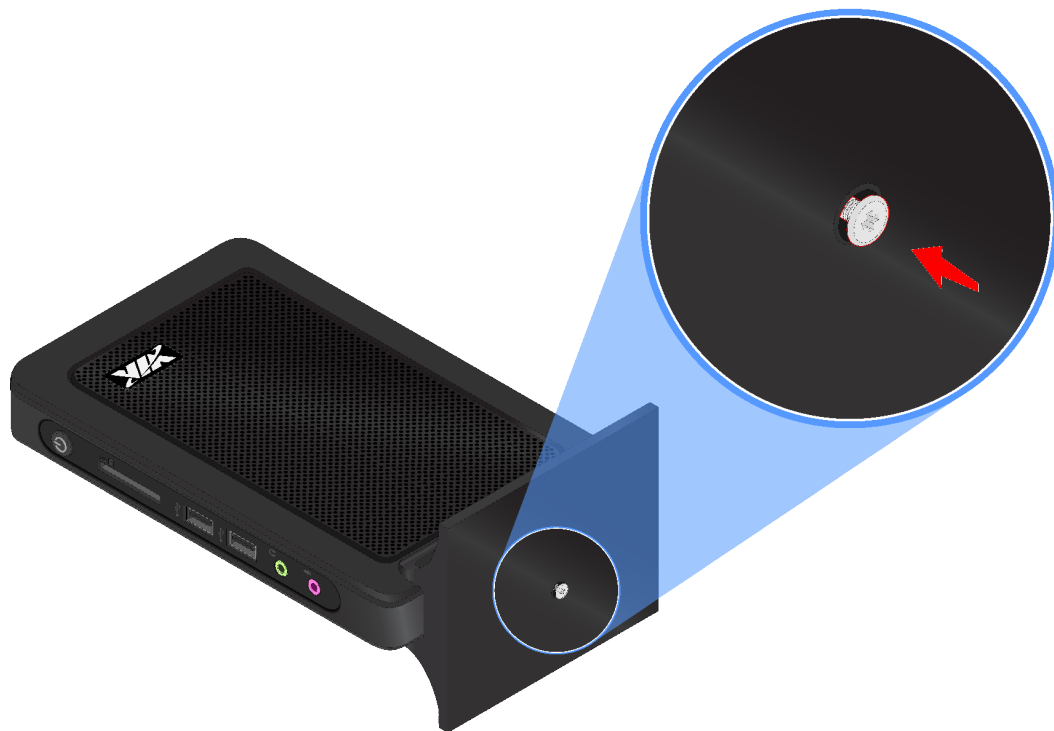


Figure 26: Securing the stand holder

## 5. Software and Technical Support

### 5.1 Android Support

The ALTA DS 4K features a complete signage software evaluation image featuring Android 5.1 operating system.

### 5.2 Technical Supports and Assistance

- For utilities downloads, latest documentation and new information about the ALTA DS 4K, please visit our website at <https://www.viatech.com/en/systems/android-signage-players/alta-ds-4k>
- For technical support and additional assistance, always contact your local sales representative or board distributor, or go to <https://www.viatech.com/en/support/driver-support-faq/technical-support/> for technical support.
- For OEM clients and system integrators developing a product for long term production, other code and resources may also be made available. Please visit our website at <https://www.viatech.com/en/about/contact/> to submit a request.

## Appendix A. Installing Wireless Accessories

This chapter provides you with information on how to install the EMIO-5531 USB Wi-Fi & Bluetooth module in the ALTA DS 4K system. It is recommended to use a grounded wrist strap before handling computer components. Electrostatic discharge (ESD) can damage some components.

### A.1. Installing the EMIO-5531 USB Wi-Fi & Bluetooth module

#### Step 1

Follow the instructions in [section 4.1](#) above to open the chassis.

#### Step 2

Locate the pre-mounted standoffs for the EMIO-5531 module on the board.

#### Step 3

Mount the EMIO-5531 module on the board. Align the two mounting holes on the EMIO-5531 module with the mounting holes on the standoffs. And then secure the EMIO-5531 module in place with two screws.



Figure 27: Installing the EMIO-5531 USB Wi-Fi & Bluetooth module

#### Step 4

Connect one end of the USB Wi-Fi cable to the onboard USB 2.0 connector (WIFI1) and connect the other end of the cable to the USB Wi-Fi connector on the EMIO-5531 module.

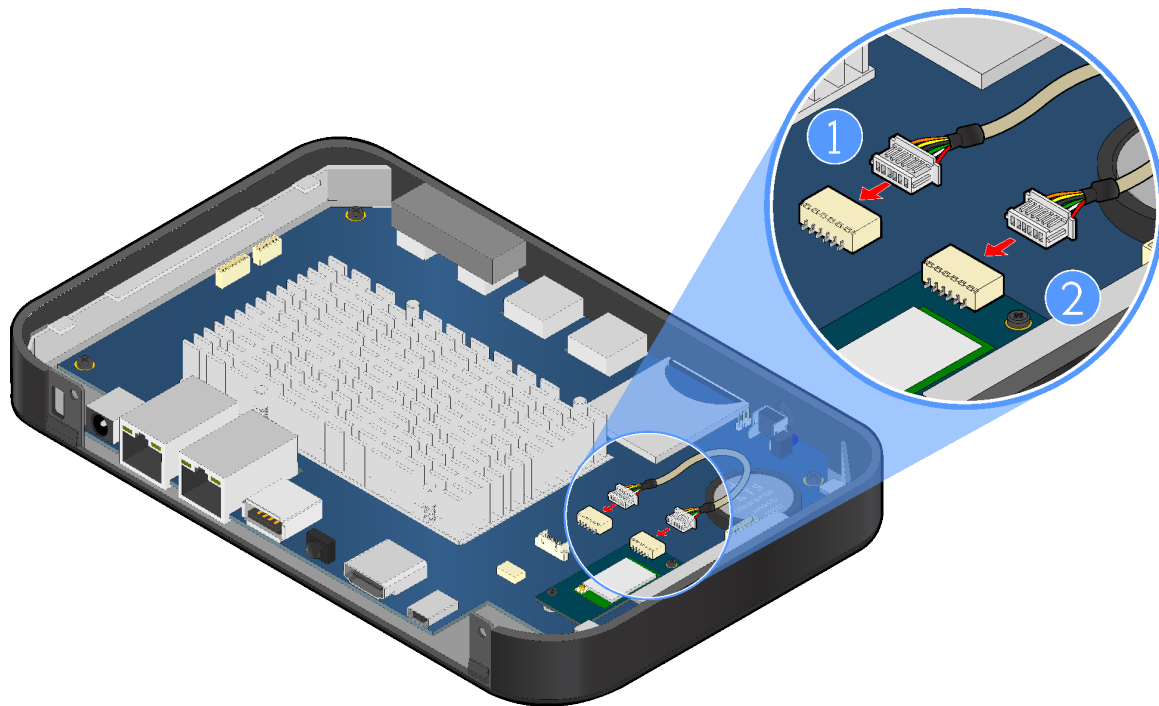


Figure 28: Connecting the USB Wi-Fi cable

#### Step 5

Remove the Wi-Fi antenna hole cover from the back panel I/O plate. To facilitate removing the cover use a pair of needle-nose pliers to depress both locking clips simultaneously.

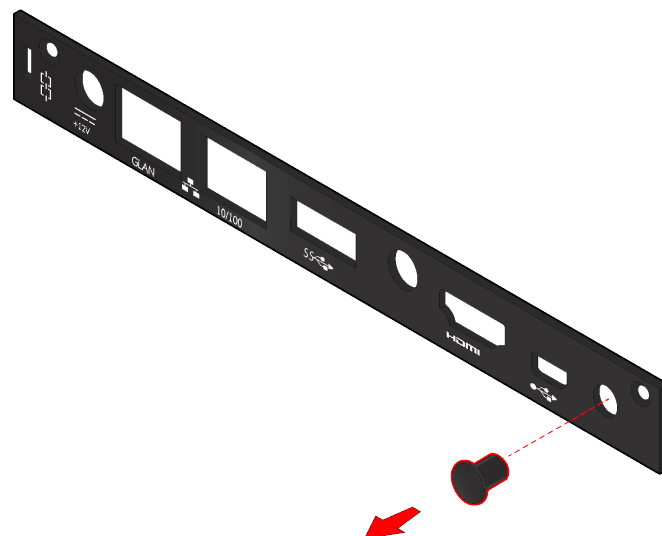


Figure 29: Removing the antenna hole cover

### Step 6

Insert the Wi-Fi antenna cable into the antenna hole from inside of the back panel I/O plate. Insert the toothed washer, fasten it with the nut and install the external antenna.

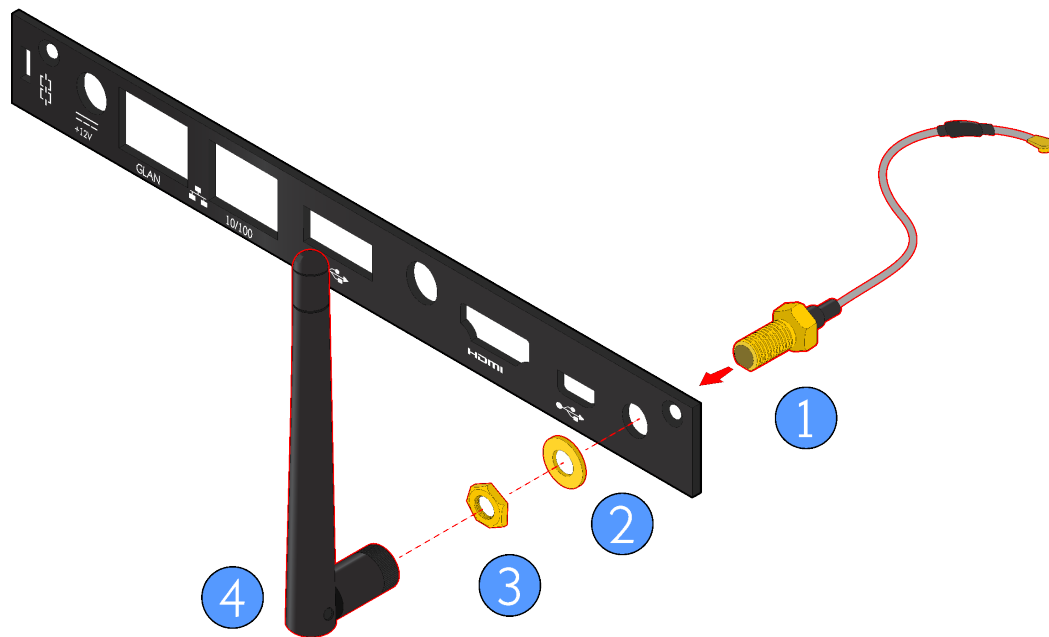


Figure 30: Installing the Wi-Fi antenna cable

### Step 7

Connect the other end of the Wi-Fi antenna cable to the micro-RF connector labeled “MAIN” on the EMIO-5531 module.

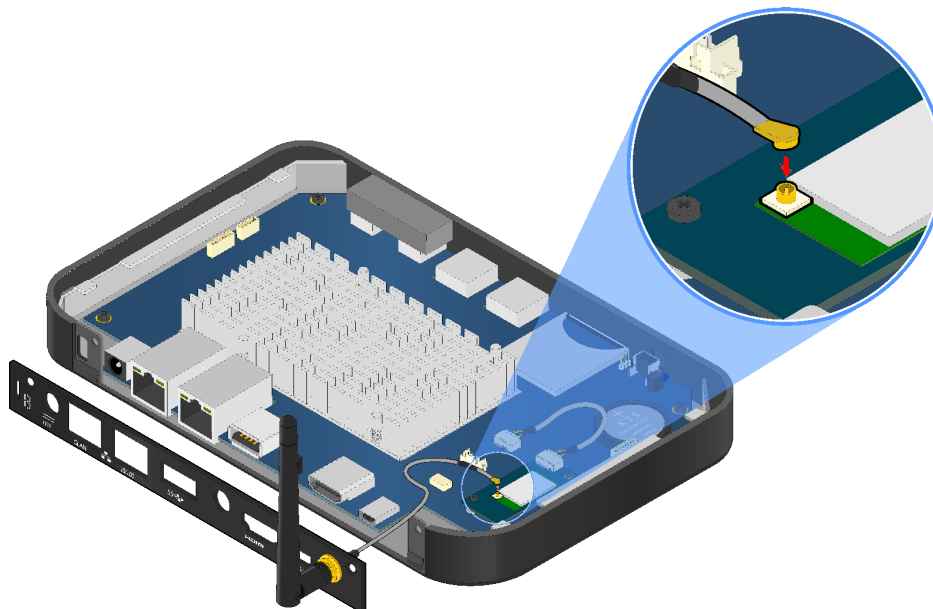


Figure 31: Connecting the Wi-Fi antenna cable to the EMIO-5531 module



### Step 8

Reinstall the top cover and back panel I/O plate and then secure it with the two screws.



Figure 32: Reinstalling the top cover and back panel I/O plate

## Appendix B. Connecting the Debug Cable

The section explain how to connect the debug cable to the ALTA DS 4K system.

### Step 1

Follow the instructions in [section 4.1](#) above to open the chassis.

### Step 2

Gently attach the debug cable onto the onboard COM debug connector (CON1).

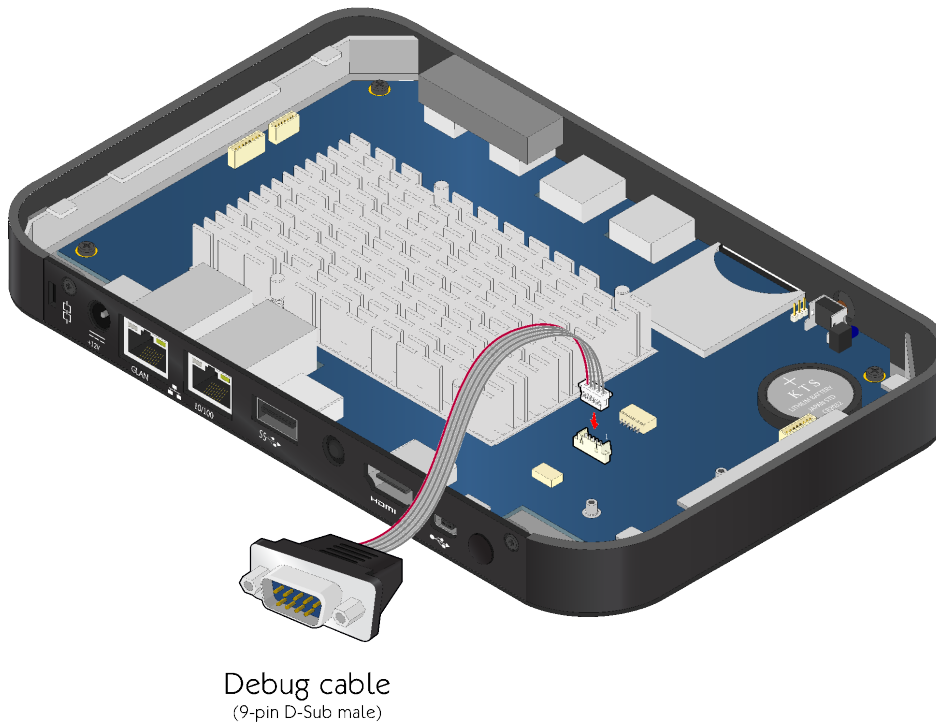


Figure 33: Connecting the debug cable

### Step 3

After debugging, remove the debug cable then reinstall the top cover.

## Appendix C. Installing VESA Mount Cradle

An optional VESA mount cradle is available for mounting the ALTA DS 4K behind the monitor.

### Step 1

Align the VESA mounting hole of the VESA mount cradle on the back of the monitor. Then secure the VESA mount cradle with the four screws included.

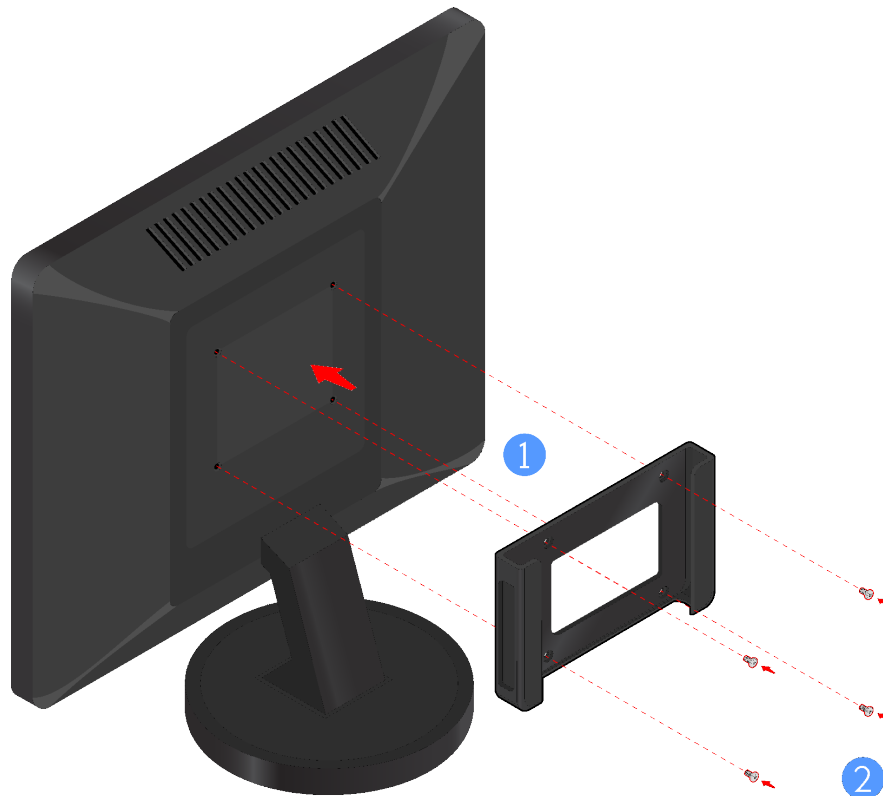
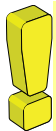


Figure 34: Installing VESA mount cradle diagram



#### Caution:

Do not use any other types of screws for the VESA mount cradle because they might cause damage to the internal board of the monitor and VESA mount cradle. Please use the screws which are provided in the package.

## Step 2

Slide the ALTA DS 4K system into the VESA mount cradle.

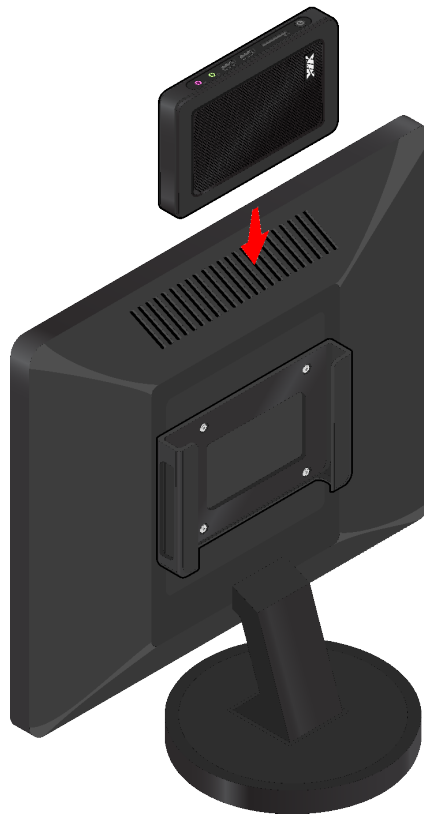


Figure 35: Inserting ALTA DS 4K to the VESA mount cradle

## Step 3

Connect all the necessary cables on the back panel of the ALTA DS 4K system.



Figure 36: Connecting necessary cables to ALTA DS 4K diagram



#### **Taiwan Headquarters**

1F, 531 Zhong-zheng Road,  
Xindian Dist., New Taipei City 231  
Taiwan

Tel: 886-2-2218-5452  
Fax: 886-2-2218-9860  
Email: [embedded@via.com.tw](mailto:embedded@via.com.tw)



#### **USA**

940 Mission Court  
Fremont, CA 94539,  
USA

Tel: 1-510-687-4688  
Fax: 1-510-687-4654  
Email: [embedded@viatech.com](mailto:embedded@viatech.com)



#### **Japan**

3-15-7 Ebisu MT Bldg. 6F,  
Higashi, Shibuya-ku  
Tokyo 150-0011  
Japan

Tel: 81-3-5466-1637  
Fax: 81-3-5466-1638  
Email: [embedded@viatech.co.jp](mailto:embedded@viatech.co.jp)



#### **China**

Tsinghua Science Park Bldg. 7  
No. 1 Zongguancun East Road,  
Haidian Dist., Beijing, 100084  
China

Tel: 86-10-59852288  
Fax: 86-10-59852299  
Email: [embedded@viatech.com.cn](mailto:embedded@viatech.com.cn)



#### **Europe**

Email: [embedded@via-tech.eu](mailto:embedded@via-tech.eu)