



DeviceEdge_Mini Series

AIE-CN11/AIE- CN21/AIE-CT41

USER MANUAL

Document Change History

Version	Date	Description	Authors
V1.0	2022/02/14	Initial Release.	Rick Chiu
V.1.1	2022/08/31	Initial Release.	Joann Tung
V.1.2	2022/10/20	Initial Release.	Joann Tung

Disclaimer

The information presented in this document is for informational purposes only and may contain technical inaccuracies, omissions and typographical errors.

The information contained herein is subject to change and may be rendered inaccurate for many reasons, including but not limited to product and roadmap changes, component and motherboard version changes, new model and/or product releases, product differences between differing manufacturers, software changes, BIOS flashes, firmware upgrades, or the like. Aetina assumes no obligation to update or otherwise correct or revise this information. However, Aetina reserves the right to revise this information and to make changes from time to time to the content hereof without obligation of Aetina to notify any person of such revisions or changes.

Aetina makes no representations or warranties with respect to the contents hereof and assumes no responsibility for any inaccuracies, errors or omissions that may appear in this information. Aetina specifically disclaims any implied warranties of merchantability or fitness for any particular purpose. in no event will Aetina be liable to any person for any direct, indirect, special or other consequential damages arising from the use of any information contained herein, even if nvidia is expressly advised of the possibility of such damages.

Copyright Notice

No part of this manual may be reproduced, copied, translated, or transmitted in any form or by any means without the prior written permission of the original manufacturer. Information provided in this manual is intended to be accurate and reliable. However, the original manufacturer assumes no responsibility for its use, or for any infringements upon the rights of third parties that may result from its use.

The material in this document is for product information only and is subject to change without notice. While reasonable efforts have been made in the preparation of this document to assure its accuracy, Aetina assumes no liabilities resulting from errors or omissions in this document, or from the use of the information contained herein.

Aetina reserves the right to make changes in the product design without notice to its users.

Version 1.0

Copyright©2022 by Aetina, Inc. All rights reserved.

Acknowledgements

All other products' name or trademarks are properties of their respective owners.

- NVIDIA®, the NVIDIA logo, Jetson™ and Jetson Xavier™ are trademarks of the NVIDIA Corporation
- Intel®, Core™ are trademarks of Intel®, Corporation.
- Microsoft Windows® is a registered trademark of Microsoft Corp
- IBM and VGA are trademarks of International Business Machines Corporation.
- Ubuntu is a registered trademark of Canonical
- ESS is a trademark of ESS Technology, Inc.

All other product names or trademarks are properties of their respective owners. No ownership is implied or assumed for products, names or trademarks not herein listed by the publisher of this document. For more information about this and other Aetina products, please visit our web-site at: <http://www.Aetina.com/>

Customer Support Overview

Contact your distributor, sales representative, or Aetina's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

Visit the Aetina website at <https://www.Aetina.com/support-warranty-policy.php> where you can find the latest information about the product.

Contact Information

Aetina Corporation | Headquarters

2F-1, No.237, Sec.1, Datong Rd., Xizhi Dist., New Taipei City 221, TAIWAN

Phone +886-2-7709 2568

Fax +886-2-7746 1102

Mail sales@Aetina.com

Product Warranty (2 years)

Aetina warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Aetina, or which have been subject to misuse, abuse, accident or improper installation. Aetina assumes no liability under the terms of this warranty as a consequence of such events.

Because of Aetina's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Aetina product is defective, it will be repaired or replaced at no charge during the warranty period. For out of warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Aetina products used other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy of the proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

ESD Warning

This product, like all electronic products, uses the product that can be damaged by electrostatic discharge (ESD). When handling, care must be taken so that the devices are not damaged. Damage due to inappropriate handling is not covered by the warranty. The following precautions must be taken:

- Do not open the protective conductive packaging until you have read the following and are at an approved anti-static workstation.
- If working on a prototyping board, use a soldering iron or station that is marked as ESD-safe.
- Always disconnect the product from the prototyping board when it is being worked on.
- Always discharge yourself by touching a grounded bare metal surface or approved anti-static mat before picking up an ESD - sensitive electronic component.
- Use an approved anti-static mat to cover your work surface.

Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references:

1. All cautions and warnings on the equipment should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
6. Always completely disconnect the power before working on the system's hardware.
7. Keep this equipment away from humidity.
8. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
9. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
10. Be sure that the room in which you choose to operate your system has adequate air circulation. Ensure that the chassis cover is secure.
11. The chassis design allows cooling air to circulate effectively. An open chassis permits air leaks, which may interrupt and redirect the flow of cooling air from internal components.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If any of the following situations arises, please contact our service personnel:
 - Damaged power cord or plug
 - Liquid intrusion to the device
 - Exposure to moisture
 - Device is not working as expected or in a manner as described in this manual
 - The device is dropped or damaged
 - vi. Any obvious signs of damage displayed on the device

Contents

- 1. Product Specification 7**
 - 1.1 Features7
 - 1.2 Configuration8
- 2. Hardware Information..... 9**
 - 2.1 I/O Interface.....9
 - 2.2 External Connector Summary.....9
 - 2.2.1 External I/O Interface 10
 - 2.3 Power Consumption 13
 - 2.4 Mechanical Dimensions..... 14
- 3. Software Installation 15**
- 4. Initial Setup..... 16**
 - 4.1 Prepare the Materials 16
 - 4.2 Hardware Connection..... 16
 - 4.3 Setup Details 16
 - 4.4 Recovery Mode 17
- 5. EdgeEye 18**
 - 5.1 Aetina 360 Edge Administration Platform 18
 - 5.2 Feature 19
 - 5.3 System Requirements 19
 - 5.4 Order Information20

1. Product Specification

DeviceEdge Mini series – M1 is a standard system, supporting for NVIDIA® Jetson Xavier™ NX and NVIDIA® Jetson™ TX2 NX. It features build-in PoE Powered Devices function which simplifies design and installation, reducing cost of materials and labor. Its palm-size appearance specifically designed for high performance and low power consumption to fit in limited space. With smart button for one-key recovery function to address critical system failure and real-time monitoring for status of device through the AIM (Aetina Intelligent Management), M1 is suitable for diverse applications such as smart city, AGV in intelligent warehousing and so on.



1.1 Features

- Support NVIDIA Jetson Module at Jetson Xavier™ NX and NVIDIA® Jetson™ TX2 NX.
- DC 12~19V power input.
- 1 x GbE LAN port and 1 x PoE/PD port
- Built-in M.2 M-key 2242 NVMe 128G SSD and support M.2 E-key 2230 for Wifi/BT Function
- Operating temperature range from -20°C~50°C
- Fanless and compact design

1.2 Configuration

Table 1.1 Lists the SKU configuration currently available for the AIE-CN11/AIE-CN21/AIE-CT41.

■ System configuration

Specification	AIE-CN11	AIE-CN21	AIE-CT41
Module Compatibility	Nvidia Jetson Xavier NX 8G / 16G		Nvidia Jetson TX2 NX
Storage	16GB eMMC 5.1 Flash		
Display	1 x HDMI 2.0 With Micro HDMI D Type Connector		
Audio	HDMI Integrated		
LAN	2 x RJ-45 for GbE (1 For PoE PD 802.3 at)		
USB	2 x USB 3.2 Gen1 Type A / 1 x USB Type-C (OTG Only)		
I/O Interfaces	5 x GPIO, 1 x UART, 1 x I ² C, 1 x CAN Bus		
Expansion	1 x M.2 M-key 2242: NVMe 128G SSD (Build-in) / 1 x M.2 E-key 2230: Wifi/BT GPS Function		
MISC. Function	1 x AI Button (iTons) / 1 x Power Button / 1 x Recovery Button / 1 x Reset Button / 2 x Antenna (Optional)		
Power Input /Connector	DC-in 12V~19V / 4 Pin DC Jack		
Dimension (Wx Dx H)	132.6 x 88.7 x 63.6mm		
Mounting	VESA Mount / Din Rail		
Net Weight	970g		
Vibration			
Shock			
Temperature	Operating Temperature: -20°C ~ +50°C Storage Temperature: -40°C ~ +85°C		
Humidity	5 to 90% @ 40°C Related Humidity, Non-condensing		
Certification	CE/FCC Class A		

2. Hardware Information

2.1 I/O Interface

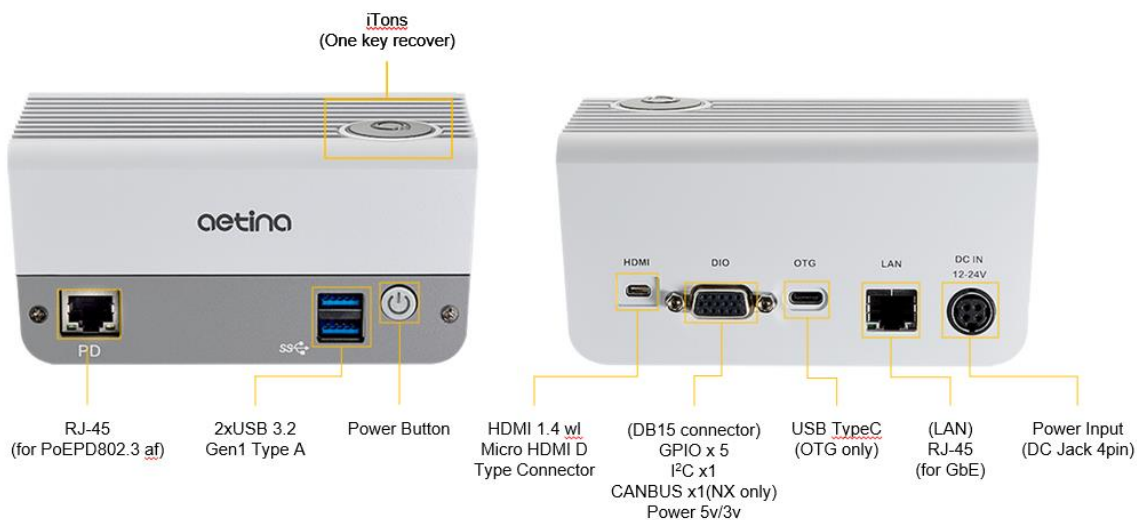


Figure 2.1 I/O Interface

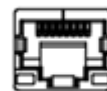
2.2 External Connector Summary

Location	External Connector	Description
Front	LAN	RJ-45 Gigabit Ethernet connector (PoE PD function)
	USB Ports	Dual USB3.2 Gen1 Type-A connector
	Power on	Power pushbutton
Back	OTG	USB Type-C OTG connector
	Expansion I/O	DB15 female connector
	HDMI	HDMI 1.4 with microHDMI Type-D connector
	LAN	RJ-45 Gigabit Ethernet connector
	Power input	12V to 19V 4pin DC Jack power input
Top	AI Button	One-key recovery pushbutton
Side	Recovery	Recovery pushbutton
	Reset	Reset pushbutton
	Antenna performed socket	Dual socket for antennas

2.2.1 External I/O Interface

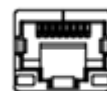
■ 10/100/1000 Ethernet connector (PoE/PD function)

Item	Detail
Location	Front
Type	RJ-45 Connector
Pin	Refer to Ethernet Standard
Description	Support for IEEE 802.3 at



■ 10/100/1000 Ethernet connector

Item	Detail
Location	Rear
Type	RJ-45 Connector
Pin	Refer to Ethernet Standard



■ Dual USB3.2 Gen1 Type-A connector

Item	Detail
Location	Front
Type	Type-A USB connector
Pin	Refer to USB Standard



■ Power pushbutton

Item	Detail
Location	Front
Type	Pushbutton



■ HDMI 1.4 with microHDMI Type-D connector

Item	Detail
Location	Rear
Type	HDMI horizontal connector
Pin	Refer to microHDMI Type-D Standard



■ GPIO connector: DB15 female connector

Item	Detail	
Location	Front	
Type	GPIO	
Pin NO.	Description	SOM Pin Assignment
1	GPIO 3	GPIO07
2	GND	GND
3	GND	GND
4	UART 1 TxD	UART1 TxD
5	CAN0L	CAN0 (not for Nano)
6	GPIO 1	GPIO01
7	GPIO 4	GPIO12
8	SCL	I2C0_SCL
9	5V (2A)	N/A
10	UART 1 RxD	UART1 RxD
11	GPIO 2	GPIO06
12	GPIO 5	GPIO13
13	SDA	I2C0_SDA
14	3V3 (2A)	N/A
15	CAN0H	CAN0 (not for Nano)



■ USB Type-C (OTG only)

Item	Detail
Location	Rear
Type	Type-C USB connector
Pin	D- / D+ / VBUS / CC1 / GND (Refer to USB Type-C standard, but only use these five pin)



■ Power input connector

Item	Detail
Location	Rear
Type	12V to 24V 4-pin DC Jack



■ AI button (One-key recovery pushbutton)

Item	Detail
Location	Top
Type	Pushbutton



■ Reset & Recovery button

Item	Detail
Location	Side
Type	Pushbutton



Reset Recovery

■ Antenna performed socket

Item	Detail
Location	Side
Type	Performed socket



2.3 Power Consumption

The power consumption shown as below is the theoretical value with Xavier NX and TX2 NX module installed on Mini M1.

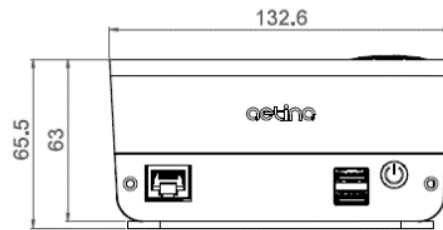
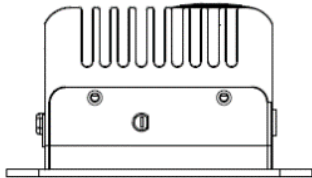
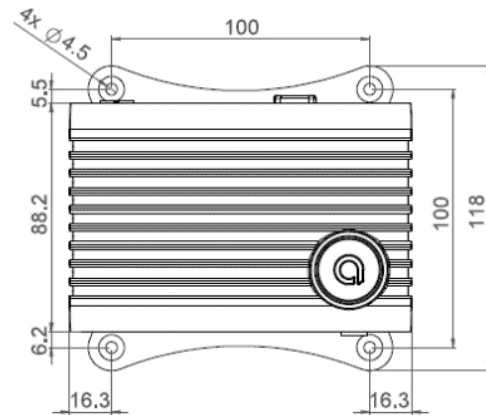
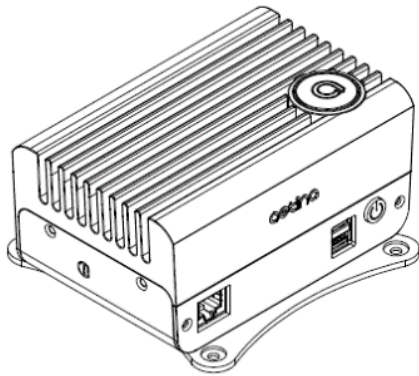
Specification	Theoretical Maximum System power
Idle	3.294W (Connect with keyboard, mouse, and HDMI display)
Full loading	26.76W (Connect with keyboard, mouse and HDMI display with CPU and GPU 100% loading)

Please refer to the following power consumption of individual I/O interface according to your use case.

Type	Theoretical Maximum System power
HDMI	2.5
M.2 M key	6.6
M.2 E key	6.6
USB 3.2 Gen1 (1 port)	9
LAN port	1.18
Dual RJ45 Extension connectors	0.81
SPI bus	0.5
CAN Bus	1
I2C	0.5

2.4 Mechanical Dimensions

■ System & Mounting Dimensions



3. Software Installation

Aetina NVIDIA Jetson products have built-in BSP so the users don't have to install it after getting the products. Since we develop our own BSP, the users may need to follow the BSP installation SOP to re-install/upgrade/downgrade the BSP. Please download the BSP installation SOP at below link.

Download link:

https://apc01.safelinks.protection.outlook.com/ap/b-59584e83/?url=https%3A%2F%2Faetina-my.sharepoint.com%2F%3Ab%3A%2Fp%2Fchris_luo%2FEcu4HzTo3TVPjirBOS__zrIBI2OkjlpbWVKDBzezXfZ1pg%3Fe%3DqK7oN9&data=05%7C01%7Caustin_lin%40aetina.com%7C2c65e12b802a486b7a5708da4db4e151%7Ceeb3fd622863430288e58bc8e4a45676%7C0%7C0%7C637907736520268414%7CUnknown%7CTWFpbGZsb3d8eyJWlloiMC4wLjAwMDAiLCJQIjoiV2luMzliLCJBTiI6IkhhaWwiLCJXVCi6Mn0%3D%7C3000%7C%7C%7C&sdata=8FvnfkuVobPENqF3KhyEh2qKppeu4pzFIF37lXr%2F3s4%3D&reserved=0

4. Initial Setup

Before using Mini M1 series, please follow the steps below to have initial setup.

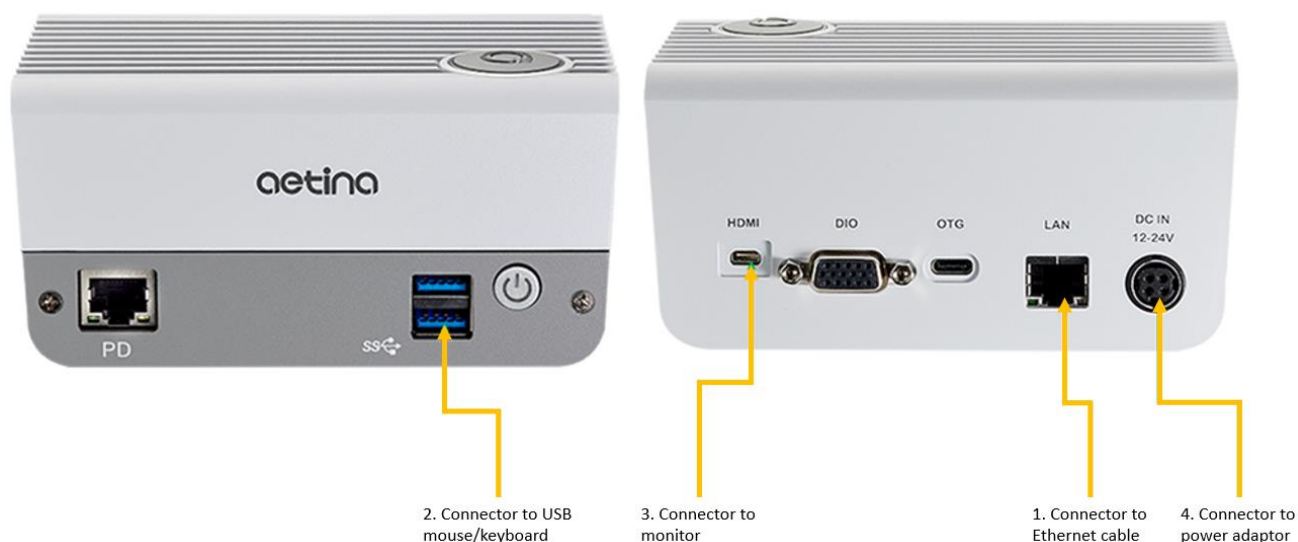
4.1 Prepare the Materials

Please prepare the materials list below.

- A monitor with HDMI and respective cables
- USB keyboard and mouse
- Ethernet cable

4.2 Hardware Connection

Here is the Mini M1 below and for the initial setup, users will need to connect LAN port, keyboard and mouse via USB interface, HDMI interface, and power connector.



4.3 Setup Details

1. Connect to the monitor while powering off
2. Power on and automatically enter the OS
3. Log in to the Ubuntu 18.04 OS via credentials below
Username: nvidia
Password: nvidia

For more information on how to use Ubuntu and NVIDIA Jetson modules, please visit Ubuntu and NVIDIA website.

4.4 Recovery Mode

Mini series supports one-key recovery function with to recover the image and here are the following steps.

a) Press the iTons (AI button) first and hold it before the device is on.



b) Press the power button to power on the device and boot up when plugging in the power cable.

c) Hold the iTons (AI button) continually and wait for seconds to see the information as shown below.

```
Starting to restore image (-) to device (/dev/nvme0n1p1)
Calculating bitmap... Please wait... done!
File system: EXTFS
Device size: 109.2 GB = 26657280 Blocks
Space in use: 7.5 GB = 1832041 Blocks
Free Space: 101.7 GB = 24825239 Blocks
Blocks size: 4096 Byte
Elapsed: 00:00:36, Remining: 00:01:18, Completed: 31.52%, 3.94GB/min,
Current Block: 5247659, total block: 26657280, Complete: 19.69%
```

d) Wait for completion and the system will reboot.

```
Starting to restore image (-) to device (/dev/nvme0n1p1)
Calculating bitmap... Please wait... done!
File system: EXTFS
Device size: 109.2 GB = 26657280 Blocks
Space in use: 7.5 GB = 1832041 Blocks
Free Space: 101.7 GB = 24825239 Blocks
Blocks size: 4096 Byte
Elapsed: 00:00:36, Remining: 00:01:18, Completed: 31.52%, 3.94GB/min,
Current Block: 5247659, total block: 26657280, Complete: 19.69%
```

After that, Mini series will be recovered to the default setting.

5. EdgeEye

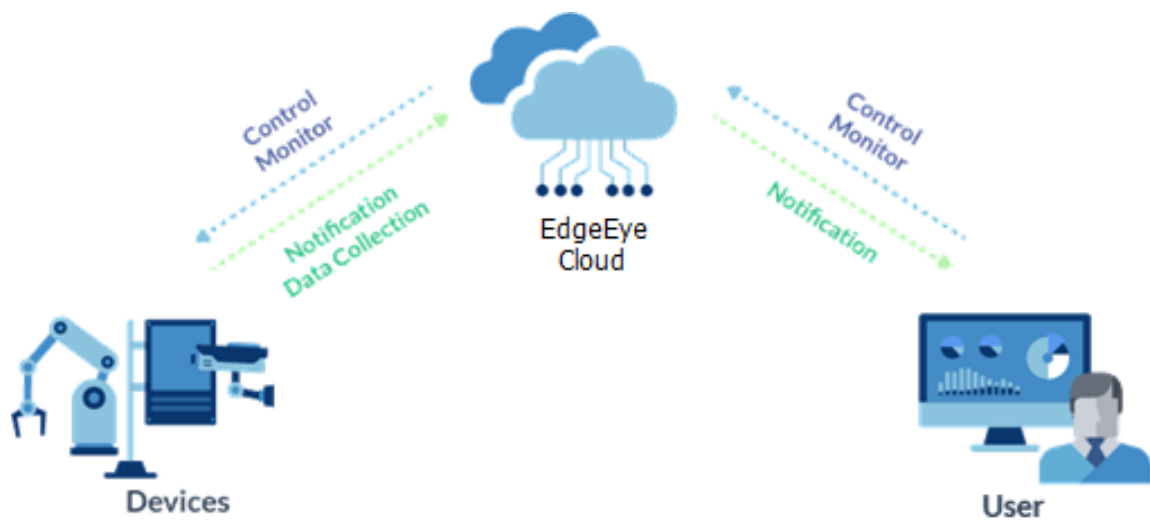
5.1 Aetina 360 Edge Administration Platform

Introduction

EdgeEye, the Aetina 360 Edge Administration Platform, is a browser-accessed management platform that allows you to monitor and manage edge IOT device around the world. EdgeEye can monitor device’s hardware components’ utilization and capacity and send notifications immediately. EdgeEye accomplishes this by gathering data from all connected devices and storing it on a central server, either in the cloud or on one’s intranet. From there, the data is easily accessible from internet-connected cell phones, tablets, or laptops anywhere.

EdgeEye also can remote control edge device, reboot and shutdown device remotely.

Using EdgeEye can reduce management labor and time. Control and manage edge IOT devices anytime and anywhere.



5.2 Feature

Edge Device Management

Monitor edge devices' hardware status, such as CPU, GPU, Memory' s utilization and capacity.

Alert Notification

Customized alert threshold and when getting abnormal data from edge devices, send warning notification immediately.

Remote Controlling

Reboot and shut down edge device through the operating system's command from server when needs.

User-Friendly Operation Interface

User can set and arrange monitoring data format by their needs.

Group devices control and Scheduler

5.3 System Requirements

Web Service

Web browsers support HTML5, CSS3, JavaScript:

Microsoft Edge 103.0+

Google Chrome:9.0+

Firefox:15.0+

Safari:5.1+

Server

Hardware Minimum Requirements:

Intel® Core™ i3 2.3 Ghz CPU or above | 4 GB RAM | 20 GB root partition for the system | 100 GB data storage

Operating System:

Ubuntu 14.04+ | Docker 17.03+

Client

Support all Aetina products

5.4 Order Information

Model name	Description
AIE-CN11-1-A1	AIE-CN11 Fanless system with Jetson Xavier NX 8G including DB15 Cable, 128G SSD, -20°C to +50°C
AIE-CN21-1-A1	AIE-CN21 Fanless system with Jetson Xavier NX 16G including DB15 Cable, 128G SSD, -20°C to +50°C
AIE-CT41-1-A1	AIE-CT41 Fanless system with Jetson TX2 NX including DB15 Cable, 128G SSD, -20°C to +50°C



Aetina Corporation | Headquarters

2F-1, No.237, Sec.1, Datong Rd., Xizhi Dist., New Taipei City 221, TAIWAN

Phone: +886-2-7709 2568

Fax : +886-2-7746 1102

Mail : sales@Aetina.com

www.Aetina.com