Data Sheet

EASY EAI Nano-T

AI Development Board

V1.00 Date: 2023/08/15

Product data sheet

General description

EASY EAI Nano-T is designed based on RV1126 processor and has abundant peripheral resources. Integrated with 100M Ethernet and Wi-Fi. Camera, display screen , speaker, microphone and other interactive peripherals. 2 USB Host interfaces, 1 ADB debugging interface.Common peripherals such as protocol serial port, TF card, IO expansion interface, etc. Built-in various AI algorithms such as face recognition, dangerous driving recognition, construction site safety monitoring, smart dining table, and provide a complete Linux development kit for customers' secondary development.

Guangzhou EASY EAI Technology Co., Ltd. focuses on AI image recognition and IoT embedded solutions. The company's products are AI embedded boards, modules and edge computing gateways. Provide customized services for hardware and AI algorithms to accelerate customer product development.

Features

- Quad-core ARM Cortex-A7 32-bit core which integrates NEON and FPU
- The build-in NPU supports INT8/INT16 hybrid operation and computing power is up to 2.0TOPs
- 1GB DDR4 + 8GB EMMC
- Fast Ethernet；
- 2.4GHz WiFi and Bluetooth 4.1
- Two MIPI CSI/ LVDS/SubLVDS interfaces
- One 4 lane MIPI DSI interface
- Microphone, headphone and speaker outputs
- Two USB HOST2.0 and ADB
- One serial port with protocol
- Micro SD
- 40-pin expansion interface
- three buttons
- External independent watchdog
- The power supply is 9~18V

Applications

Revision History

Revision	Data	Description
V1.00	2023/08/15	Initial released

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1. Description

1.1 General description

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1.2 Product Photos

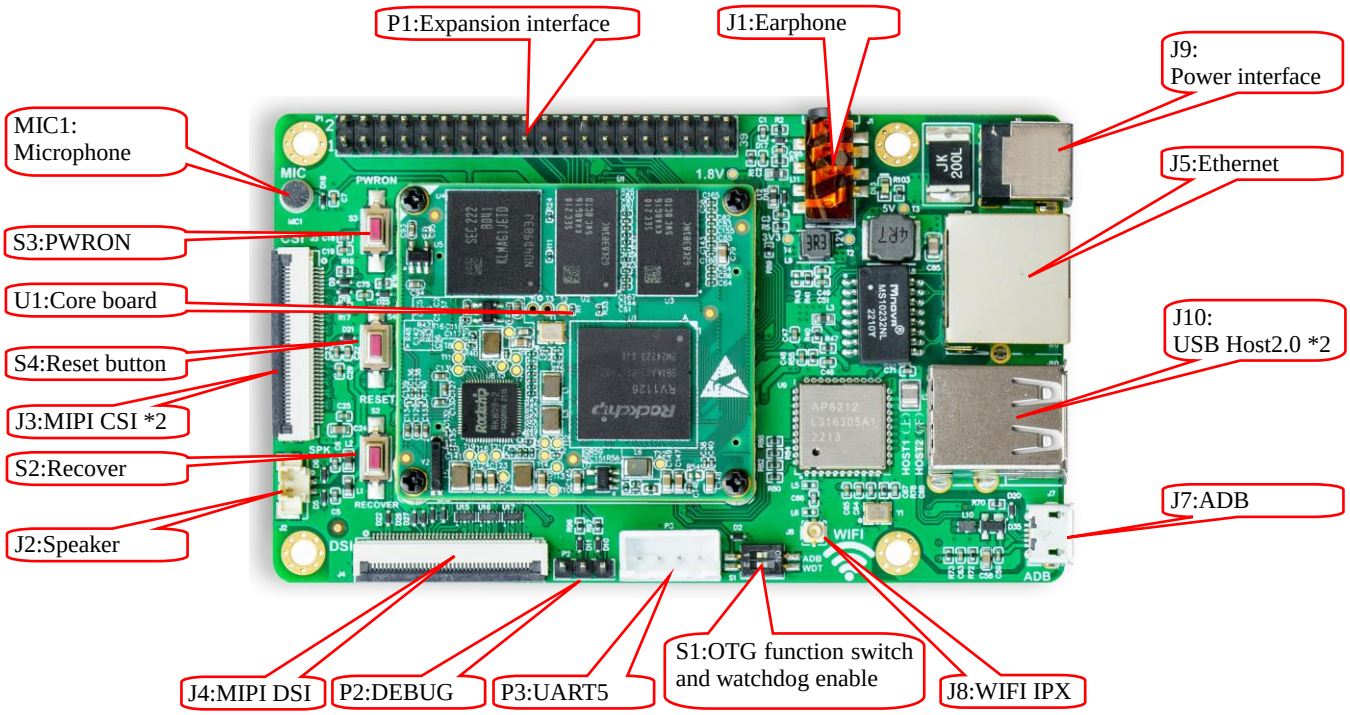

Fig 1. Product front photo

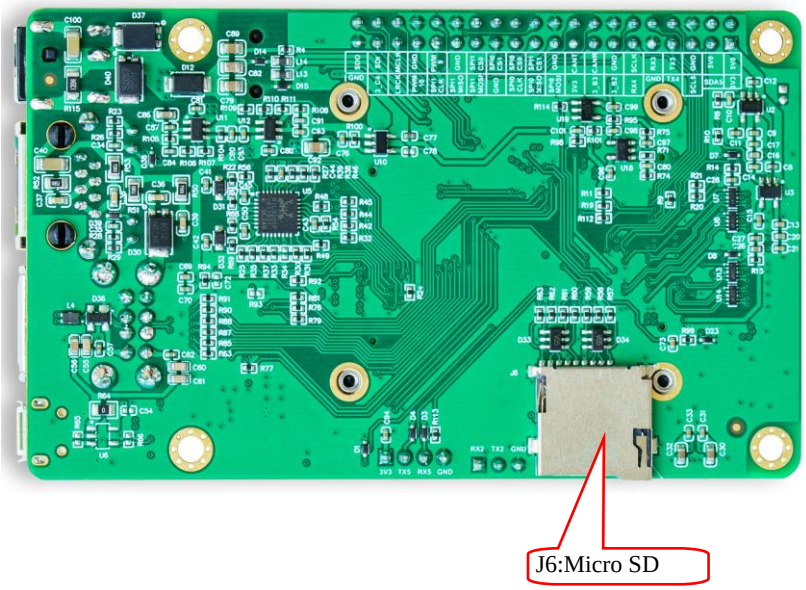

Fig 2. Product back photo

1.3 Ordering information

Table 1. Ordering information

Type number	EASY EAI Nano-T	EASY EAI Nano-TI
CPU	RV1126	RV1126K
kernel	Quad-core ARM Cortex-A7 32-bit core which integrates NEON and FPU	Quad-core ARM Cortex-A7 32-bit core which integrates NEON and FPU
NPU	The build-in NPU supports INT8/INT16 hybrid operation and computing power is up to 2.0TOPs	The build-in NPU supports INT8/INT16 hybrid operation and computing power is up to 2.0TOPs
Frequency	1.5GHz	1.5GHz
OS	Linux	Linux
DDR	1GB/2GB DDR4	1GB/2GB DDR4
EMMC	8GB/16GB EMMC	8GB/16GB EMMC
Display	One 4 lane MIPI DSI interface, up to 1Gbps per lane. Up to 1920x1080 @60fps	One 4 lane MIPI DSI interface, up to 1Gbps per lane. Up to 1920x1080 @60fps
TP	I2C	I2C
Audio	Integrated sound card, a 1.3W@8ohm speaker jack, a 3.5mm headphone jack, a microphone	Integrated sound card, a 1.3W@8ohm speaker jack, a 3.5mm headphone jack, a microphone
Wi-Fi	2.4GHz	2.4GHz
BLE	Bluetooth 4.1	Bluetooth 4.1
Ethernet	Fast Ethernet	Fast Ethernet
USB2.0	1 USB Device(ADB)、2 USB Host2.0	1 USB Device(ADB)、2 USB Host2.0
MIPI CSI-2	Two 2 lane MIPI CSI-2 interface, up to 2Gbps per lane	Two 2 lane MIPI CSI-2 interface, up to 2Gbps per lane
Micro SD	1 Micro SD, the maximum capacity is 256GB	1 Micro SD, the maximum capacity is 256GB
Button	Reset , PWRON ,RECOVER	Reset , PWRON ,RECOVER
Protocol serial port	UART5	UART5
Expansion interface	40Pin expansion interface, including I2C, UART, SPI, PWM, CAN, I2S, GPIO, etc.	40Pin expansion interface, including I2C, UART, SPI, PWM, CAN, I2S, GPIO, etc.
Supply voltage	DC 9~18V, typical voltage is 12V	DC 9~18V, typical voltage is 12V
Size	100 * 60mm	100 * 60mm
Operating temperature	0℃ ~ +70℃	-40℃ ~ +85℃

2. Peripherals Introduction

2.1 Display

EASY EAI Nano-T is equipped with a 5-inch display (with capacitive touch screen) by default, with a resolution of 1280*720; 5-inch/7-inch/8-inch/10.1-inch display (with capacitive touch screen) can be selected. The backlight driver of the display screen is integrated on an independent PCB board, connected to the main board through a 40Pin, 0.5mm pitch FPC socket, and the station is J4. The pin description of the seat is shown in Table 2. Please contact FAE if other sizes of displays are required.

Table 2. Pin Description of Display Interface

Pin	Symbol	Description		Pin	Symbol	Description
1	VCC5V	5V supply voltage		2	VCC5V	5V supply voltage
3	GND	Ground		4	VDD_3V3	3.3V supply voltage
5	VDD_3V3	3.3V supply voltage		6	NC	NC
7	NC	NC		8	NC	NC
9	NC	NC		10	NC	NC
11	NC	NC		12	GND	Ground
13	RST_TOUCH	Touch screen interrupt signal		14	INT_TOUCH	Touch screen reset signal
15	I2C_SCL	I2C clock signal		16	I2C_SDA	I2C data signal
17	PWM_LCD	Backlight brightness control signal		18	RST_LCD	Display reset signal
19	GND	Ground		20	NC	NC
21	NC	NC		22	NC	NC
23	NC	NC		24	GND	Ground
25	MIPI_DSI_D0N	Negative pole of differential data0		26	MIPI_DSI_D0P	Positive pole of differential data0
27	GND	Ground		28	MIPI_DSI_D1N	Negative pole of differential data1
29	MIPI_DSI_D1P	Positive pole of differential data1		30	GND	Ground
31	MIPI_DSI_D2N	Negative pole of differential data2		32	MIPI_DSI_D2P	Positive pole of differential data2
33	GND	Ground		34	MIPI_DSI_CLKN	Negative pole of differential clock
35	MIPI_DSI_CLKP	Positive pole of differential clock		36	GND	Ground
37	MIPI_DSI_D3N	Negative pole of differential data3		38	MIPI_DSI_D3P	Positive pole of differential data3
39	GND	Ground		40	GND	Ground

2.2 Expansion interface

EASY EAI Nano-T has a function expansion interface, the physical interface is 40Pin, 2.54mm pitch double-row pin leads, and the station is P1. The pin sequence of the expansion interface is shown in Table 3.

Table 3. Function expansion interface pin description

Pin	Symbol	Description	GPIO
1	VCC_3V3	3.3V supply voltage	--
2	VCC5V0_BASE	5V supply voltage	--
3	I2C5_SDA_M1	I2C5 data signal	GPIO3_B1
4	VCC5V0_BASE	5V supply voltage	--
5	I2C5_SCL_M1	I2C5 clock signal	GPIO3_B0
6	GND	Ground	--
7	UART4_TX_M0	UART4 TX signal	GPIO3_A4
8	UART3_TX_M0	UART3 TX signal	GPIO3_C6
9	GND	Ground	--
10	UART3_RX_M0	UART3 RX signal	GPIO3_C7
11	UART4_RX_M0	UART4 RX signal	GPIO3_A5
12	I2S1_SCLK_M2	Serial Clock of the I2S	GPIO2_D1
13	GPIO3_B2	GPIO3_B2	GPIO3_B2
14	GND	Ground	--
15	GPIO3_B3	GPIO3_B3	GPIO3_B3
16	CAN_RXD_M0	Can bus RX data	GPIO3_A0
17	VCC_3V3	3.3V supply voltage	--
18	CAN_TXD_M0	Can bus TX data	GPIO3_A1
19	SPI0_MOSI_M2	Data output of SPI0	GPIO2_B0
20	GND	Ground	--
21	SPI0_MISO_M2	Data input of SPI0	GPIO2_B1
22	SPI1_CS1n_M0	CS signal1 of SPI1	GPIO3_B4
23	SPI0_CLK_M2	Clock signal of SPI0	GPIO2_B2
24	SPI0_CS0n_M2	CS signal0 of SPI0	GPIO2_A7
25	GND	Ground	--
26	SPI0_CS1n_M2	CS signal1 of SPI0	GPIO2_B3
27	SPI1_MOSI_M0	Data output of SPI1	GPIO3_B6
28	SPI1_CS0n_M0	CS signal0 of SPI1	GPIO3_B5
29	SPI1_MISO_M0	Data input of SPI1	GPIO3_B7
30	GND	Ground	--
31	SPI1_CLK_M0	Clock of SPI1	GPIO3_C0
32	PWM9_M1	Pulse Width Modulation input or output	GPIO2_D6
33	PWM10_M1	Pulse Width Modulation input or output	GPIO2_D5
34	GND	Ground	--

Pin	Symbol	Description	GPIO
35	I2S1_LRCK_M2	I2S/PCM left & right channel signal for receiving serial data, synchronous left & right channel in I2S mode and the beginning of a group of left & right channels in PCM mode	GPIO2_D2
36	I2S1_MCLK_M2	I2S/PCM clock to external device	GPIO2_C7
37	GPIO3_C4	GPIO3_C4	GPIO3_C4
38	I2S1_SDI_M2	Serial input data of I2S1	GPIO2_D3
39	GND	Ground	--
40	I2S1_SDO_M2	Serial data output of I2S	GPIO2_D0

2.3 Audio

2.3.1 Headphones, microphones and speakers

The RK809-2 chip on the EASY EAI Nano-T integrates an audio codec unit, which can encode analog audio and decode digital audio signals. The chip communicates with the CPU via I2S.

The 3.5mm standard headphone interface integrated on the substrate is connected to the audio input and output pins of the RK809-2 chip, and the station number is J1, which can be connected to an external headphone for recording and playback.

The substrate integrates a microphone MIC4020, and the station number is MIC1.

The substrate integrates a speaker output interface, the interface uses a 1.25mm pitch socket, and the station number is J2. The output power is 1.3W@8ohm.

2.4 Ethernet

EASY EAI Nano-T integrates a 10/100M Ethernet, the physical interface of the Ethernet is RJ45, and the station number is J5.

2.5 Wi-Fi and Bluetooth

EASY EAI Nano-T integrates the wireless module AP6212, which can support Wi-Fi and Bluetooth functions. The operating frequency of Wi-Fi and Bluetooth is 2.4GHz, and both transmit and receive wireless signals through the IPX socket integrated on the board. The number is J8. Various types of antennas can be connected externally. The characteristics of WiFi are shown in Table 4. The characteristics of Bluetooth are shown in Table 5.

Table 4. Wi-Fi characteristics

WLAN Standard	IEEE 802.11b/g/n
Frequency Range	2.412GHz ~ 2.462GHz (2.4GHz ISM Band)
Number of Channels	2.4GHz: Ch1 ~ Ch11
Modulation	802.11b: DQPSK, DBPSK, CCK 802.11 g/n: OFDM /64-QAM,16-QAM, QPSK, BPSK
Output Power	802.11b /11Mbps: 20dBm±1dB@EVM≤ -9dB
	802.11g /54Mbps: 19dBm±1dB@EVM ≤ -25dB
	802.11n /65Mbps: 19dBm±1dB@EVM ≤ -28dB
Receive Sensitivity (11n，20MHz) @10% PER	MCS=0 PER @ -85 dBm, typical
	MCS=1 PER @ -84 dBm, typical
	MCS=2 PER @ -82 dBm, typical
	MCS=3 PER @ -80 dBm, typical
	MCS=4 PER @ -77 dBm, typical
	MCS=5 PER @ -73 dBm, typical
	MCS=6 PER @ -71 dBm, typical
	MCS=7 PER@ -68 dBm, typical
Receive Sensitivity (11g) @10% PER	6Mbps PER@ -86 dBm, typical
	9Mbps PER@ -85 dBm, typical
	12Mbps PER@ -85 dBm, typical
	18Mbps PER@ -83 dBm, typical
	24Mbps PER@ -81 dBm, typical
	36Mbps PER@ -78 dBm, typical
	48Mbps PER@ -73 dBm, typical
	54Mbps PER@ -71 dBm, typical
Receive Sensitivity (11b) @8% PER	1Mbps PER@ -90 dBm, typical
	2Mbps PER@ -88 dBm, typical
	5.5Mbps PER@ -87 dBm, typical
	11Mbps PER@ -84 dBm, typical
Host Interface	SDIO
Data Rate	802.11b：1, 2, 5.5, 11Mbps
	802.11g：6, 9, 12, 18, 24, 36, 48, 54Mbps

Data Rate (20MHz,Long GI,800ns)	802.11n：6.5, 13, 19.5, 26, 39, 52, 58.5, 65Mbps
Data Rate (20MHz ,short GI,400ns)	802.11n：7.2, 14.4, 21.7, 28.9, 43.3, 57.8, 65,72.2Mbps
Maximum Input Level	802.11b：-10 dBm
	802.11g/n：-20 dBm
Antenna Reference	Small antennas with 4.14 dBi peak gain

Table 5. Bluetooth characteristics

Bluetooth Standard	Bluetooth 4.1 of 1, 2 and 3 Mbps
Frequency Band	2402MHz ~ 2480MHz
Number of Channels	79 channels
Modulation	FHSS, GFSK, DPSK, DQPSK
Output Power (Class 1.5)	7 dBm
Sensitivity @ BER=0.1% for GFSK (1Mbps)	-86 dBm
Sensitivity @ BER=0.01% for π/4-DQPSK (2Mbps)	-86 dBm
Sensitivity @ BER=0.01% for 8DPSK (3Mbps)	-80 dBm
Maximum Input Level	GFSK (1Mbps):-20dBm
	π /4-DQPSK (2Mbps) :-20dBm
	8DPSK (3Mbps) :-20dBm
Host Interface	UART
Antenna Reference	Small antennas with 4.24 dBi peak gain

2.6 USB

EASY EAI Nano-T integrates multiple USB interfaces, including 2 USB2.0 Hosts and 1 USB2.0 Device.

2.6.1 USB2.0 Host

There are two USB2.0 Host interfaces on the EASY EAI Nano-T, the interface is a double-layer flat A port, and the station number is J10. The interface on the lower layer of the socket is connected to the USB_Host interface of RV1126. The interface on the upper layer of the socket is connected to the USB_OTG interface of the RV1126, so only one of the USB Host and the USB Device (ADB) can be used at the same time, and the function can be switched through the DIP switch (station S1). When the "ADB" of the DIP switch is turned to "ON", the USB Device (ADB) function is available; when the "ADB" of the DIP switch is turned to "1", the USB2.0 Host function is available. Pay special attention!

2.6.2 USB Device(ADB)

There is one USB Device interface on EASY EAI Nano-T, the interface form is a Micro USB socket, and the station number is J7, which is used for ADB application debugging，But it conflicts with the signal of the upper interface of the USB socket (J10), and the switching of the two functions is through the dial switch S1.When the "ADB" of the DIP switch is turned to "ON", the USB Device (ADB) function is available; when the "ADB" of the DIP switch is turned to "1", the USB2.0 Host function is available. Pay special attention!

2.7 Camera

EASY EAI Nano-T has two MIPI CSI-2 interfaces, each of which supports 2 Lines, and the maximum rate of each Line is 2.0Gbps, which can be directly connected to an external binocular camera. The physical form of the MIPI CSI interface is a 40Pin, 0.5mm pitch FPC socket, and the station number is J3. The pin description of the socket is shown in Table 6.

Table 6. Pin Description of Camera Interface

Pin	Symbol	Description		Pin	Symbol	Description
1	IR-AVDD_2.8V	2.8V supply voltage (infrared camera)		2	RGB-AVDD_3.3V	3.3V supply voltage (color camera)
3	IR-PWDN	Power enable (infrared camera)		4	IR-RESET	RESET (infrared camera)
5	IR+RGB_SCL	I2C1 clock signal		6	IR+RGB_SDA	I2C1 data signal
7	GND	Ground		8	IR_MCIK	clock output for sensor (infrared camera)
9	GND	Ground		10	IR_MCP	Positive pole of differential clock (infrared camera)
11	IR_MCN	Negative pole of differential clock (infrared camera)		12	GND	Ground
13	IR-MDP0	Positive pole of differential data0 (infrared camera)		14	IR-MDN0	Negative pole of differential data0 (infrared camera)
15	GND	Ground		16	IR-MDP1	Positive pole of differential data01 (infrared camera)
17	IR-MDN1	Negative pole of differential data1 (infrared camera)		18	GND	Ground
19	IR-RGB_DOVD1V8	1.8V supply voltage		20	NC	NC
21	LED-GPIO	Infrared fill light control signal		22	IR_DVDD_1.2V	1.2V supply voltage (infrared camera)
23	RGB_DVDD_1.2V	1.2Vsupply voltage (color camera)		24	RGB-PWDN	Power enable (color camera)
25	RGB-RESET	RESET (color camera)		26	GND	Ground
27	RGB-MCLK	clock output for sensor (color camera)		28	GND	Ground
29	RGB-MCP	Positive pole of differential clock (color camera)		30	RGB-MCN	Negative pole of differential clock (color camera)
31	GND	Ground		32	RGB-MDP0	Positive pole of differential data0 (color camera)

33	RGB-MDN0	Negative pole of differential data0 (color camera)		34	GND	Ground
35	RGB-MDP1	Positive pole of differential data1 (color camera)		36	RGB-MDN1	Negative pole of differential data1 (color camera)
37	GND	Ground		38	5V	5V supply voltage (For Infrared fill light)
39	5V	5V supply voltage (For Infrared fill light)		40	5V	5V supply voltage (For Infrared fill light)

2.8 Micro SD

EASY EAI Nano-T is integrated with a Micro SD interface, which can be inserted into a Micro SD card for data storage, and the station is J6。

2.9 Key

EASY EAI Nano-T has 3 buttons, and the description of the buttons is shown in Table 7. Button 1 (the station is SW1) is the software power-on/off button. When the system is started, it is not necessary to operate this button, and the main board turned on directly. Button 2 (station number is SW2) is the download mode selection button. Button 3 (station is SW3) is the system reset button.

Table 7. KEY

Key	Station	Description
PWRON	S3	Switch control
RECOVER	S2	Enter download mode
RESET	S4	System reset

2.10 LED

EASY EAI Nano-T has a power indicator light, which is used as a sign of system power-on, and the station is D13.

2.11 UART5

EASY EAI Nano-T integrates a protocol serial port. The external processor can communicate with EASY EAI Nano-T through this serial port, the interface form is 4Pin, 2.54mm pitch socket, and the station is P3. The pin descriptions are shown in Table 8.

Table 8. UART5

Pin	Symbol	Description	GPIO
1	3.3V	3.3V supply voltage	--
2	UART5_TX	UART5 TX data	GPIO3_A6
3	UART5_RX	UART5 RX data	GPIO3_A7
3	GND	Ground	--

2.12 DEBUG

The DEBUG interface of EASY EAI Nano-T is UART2, the interface connector is a 3Pin, 2.54mm spacing pin header, the station is P1, and the pin description is shown in Table 9.

Table 9. DEBUG

Pin	Symbol	Description
1	UART2_RX	UART2 RX data
2	UART2_TX	UART2 TX data
3	GND	Ground

2.13 WDT

EASY EAI Nano-T integrates an external hardware watchdog chip. The feeding frequency of the hardware watchdog is 1.6s. If the dog is not fed within 1.6s, the watchdog will generate a reset signal to reset the system. The RV1126 system performs a dog feeding operation on the watchdog in 0.8s. If you need to stop the watchdog, you can turn the "WDT" of the DIP switch to "1"; when the "WDT" of the DIP switch is turned to "ON", the watchdog will work.

2.14 Supply voltage

The EASY EAI Nano-T power supply interface is a DC socket with a diameter of 5.5mm, and the working position is J4. The power supply voltage is 9~18V, and the typical value is 12V. When the display is working, it is recommended to use a 12V 2A power adapter.

3. Electrical parameters

3.1 Power supply parameters

Table 10. Power supply

Item	Symbol	Description			
		Min	Typ	Max	Unit
Supply voltage	U	9	12	18	V
supply current (during startup/12V)	I	--	--	145	mA
supply current (Stable operation/12V)	I	--	52	--	mA
supply current (NPU is working/12V)	I	--	190	--	mA

3.2 DC Specifications

Table 11. I/O characteristics(3.3V)

Item	Symbol	Description			
		Min	Typ	Max	Unit
Input high voltage	V_{IH}	2.3	3.3	3.6	V
Input low voltage	V_{IL}	-0.3	0	1.0	V
Output high voltage	V_{OH}	2.64	3.3	--	V
Output low voltage	V_{OL}	--	0	0.66	V

Table 12. I/O characteristics(1.8V)

Item	Symbol	Description			
		Min	Typ	Max	单位
Input high voltage	V_{IH}	1.26	1.8	2.2	V
Input low voltage	V_{IL}	-0.3	0	0.63	V
Output high voltage	V_{OH}	1.4	1.8	--	V
Output low voltage	V_{OL}	--	0	0.4	V

4. Size

Table 13. Size

Parameter	Description
Length	100mm
Width	60mm

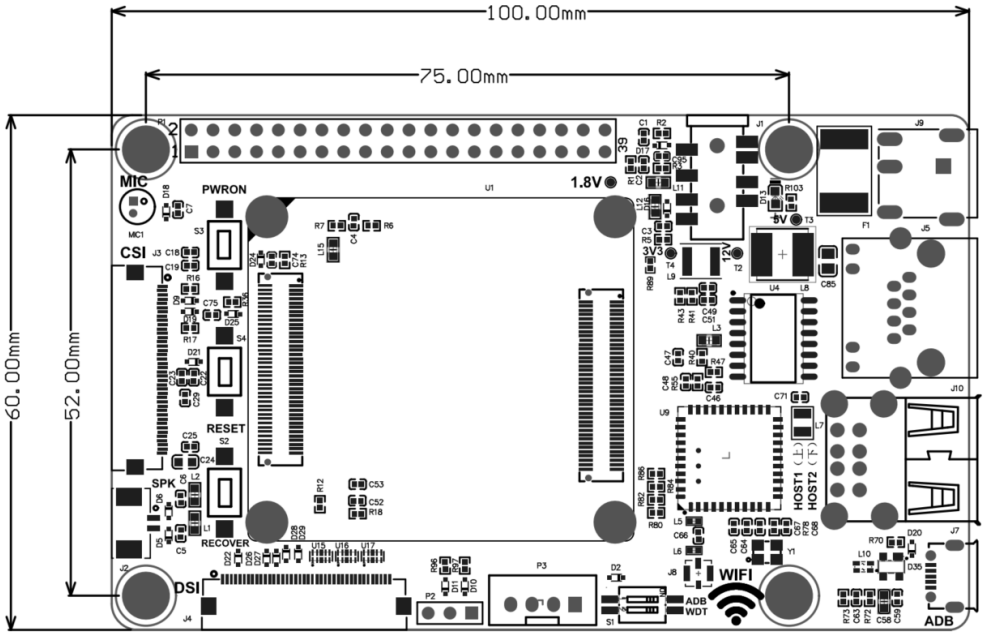

Fig 1. Size

FCC WARNING

FCC WARNING

FCC WARNING

5. Disclaimer

Based on the principle of providing better service to users, Guangzhou Easy EAI Technology Co., Ltd. will try its best to present detailed and accurate product information to users in this manual. However, due to the timeliness of the contents of this manual, we cannot guarantee the timeliness and applicability of this document at any time. The company reserves the right to update the contents of this manual without prior notice. In order to get the latest version of information, please respect the user regularly visit the official website or contact the staff. Thank you for your tolerance and support.

Sales and Service

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Telephone: 18617322361 (Mr. Liu)

Please use the above methods to contact us, we will arrange a live demonstration of the prototype for you, thank you for your attention to our products.

FCC WARNING

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules.
Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

15.105 Information to the user.
(b) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and usedin

accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.
This equipment complies with FCC radiation exposure limits set forth for an uncon- trolled environment. This equipment should be installed and operated with minimum distance 20

cm between the radiator and your body.
Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

The availability of some specific channels and/or operational frequency bands are country dependent and are firmware programmed at the factory to match the intended destination.

The firmware setting is not accessible by the end user.

The final end product must be labelled in a visible area with the following:

“Contains Transmitter Module “FCC ID: 2BCS8-EASYEAI”

Requirement per KDB996369 D03

2.2 List of applicable FCC rules

List the FCC rules that are applicable to the modular transmitter. These are the rules that specifically establish the bands of operation, the power, spurious emissions, and operating fundamental frequencies. DO NOT list compliance to unintentional-radiator rules (Part 15 Subpart B) since that is not a condition of a module grant that is extended to a host manufacturer. See alsoSection

2.10 below concerning the need to notify host manufacturers that further testing is required.3

Explanation: This module meets the requirements of FCC part 15C (15.247).it Specifically identified AC Power Line Conducted Emission, Radiated Spurious emissions, Band edge and RF Conducted Spurious Emissions, Conducted Peak Output Power, Bandwidth, Power Spectral Density, Antenna Requirement.

2.3 Summarize the specific operational use conditions

Describe use conditions that are applicable to the modular transmitter, including for example any limits on antennas, etc. For example, if point-to- point antennas are used that require reduction in power or compensation for cable loss, then this information must be in the instructions. If the use condition limitations extend to professional users, then instructions must state that this information also extends to the host manufacturer's instruction manual. In addition, certain information may also be needed, such as peak gain per frequency band and minimum gain, specifically for master devices in 5 GHz DFS bands.

Explanation: The product antenna uses an irreplaceable antenna with a gain of WIFI:4.14dBi ,BT:4.24dBi

2.4 Single Modular

If a modular transmitter is approved as a "Single Modular," then the module manufacturer isresponsible for approving the host environment that the Single Modular is used with. The manufacturer of a Single Modular must describe, both in the filing and in the installation instructions, the alternative means that the Single Modular manufacturer uses to verify that the host meets the necessary requirements to satisfy the module limiting conditions.

A Single Modular manufacturer has the flexibility to define its alternative method to address the conditions that limit the initial approval, such as: shielding, minimum signaling amplitude, buffered modulation/data inputs, or power supply regulation. The alternative method could include that the limited

module manufacturer reviews detailed test data or host designs prior to giving the host manufacturer approval.

This Single Modular procedure is also applicable for RF exposure evaluation when it is necessary to demonstrate compliance in a specific host. The module manufacturer must state how control of the product into which the modular transmitter will be installed will be maintained such that full compliance of the product is always ensured. For additional hosts other than the specific host originally granted with a limited

module, a Class II permissive change is required on the module grant to register the additional host as a specific host also approved with the module. **Explanation:** The module is a single module.

2.5 Trace antenna designs

For a modular transmitter with trace antenna designs, see the guidance in Question 11 of KDB Publication 996369 D02 FAQ – Modules for Micro-Strip Antennas and traces. The integration information shall include for the TCB review the integration instructions for the following aspects: layout of trace design, parts list (BOM), antenna, connectors, and isolation requirements.

Information that includes permitted variances (e.g., trace boundary limits, thickness, length, width, shape(s), dielectric constant, and impedance as applicable for each type of antenna); b) Each design shall be considered a different type (e.g., antenna length in multiple(s) of frequency, the wavelength, and antenna shape (traces in phase) can affect antenna gain and must be considered); c) The parameters shall be provided in a manner permitting host manufacturers to design the printed circuit (PC) board layout; d) Appropriate parts by manufacturer and specifications; e) Test procedures for design verification; and f) Production test procedures for ensuring compliance

The module grantee shall provide a notice that any deviation(s) from the defined parameters of the antenna trace, as described by the instructions, require that the host product manufacturer must notify the module grantee that they wish to change the antenna trace design. In this case, a Class II permissive change application is required to be filed by the grantee, or the host manufacturer can take responsibility through the change in FCC ID (new application) procedure followed by a Class II permissive change application

2.6 **RF exposure considerations**

It is essential for module grantees to clearly and explicitly state the RF exposure conditions that permit a host product manufacturer to use the module. Two types of instructions are required for RF exposure information: (1) to the host product manufacturer, to define the application conditions

(mobile, portable – xx cm from a person's body); and (2) additional text needed for the host product manufacturer to provide to end users in their end-product manuals. If RF exposure statements and use conditions are not provided, then the host product manufacturer is required to take responsibility of the module through a change in FCC ID (new application).

Explanation: The module complies with FCC radiofrequency radiation exposure limits for uncontrolled environments. The device is installed and operated with a distance of more than 20 cm between the radiator and your body." This module follows FCC statement design,

FCC ID: 2BCS8-EASYEAI

2.7Antennas

A list of antennas included in the application for certification must be provided in the instructions. For modular transmitters approved as limited modules, all applicable professional installer instructions must be included as part of the information to the host product manufacturer. The antenna list shall also identify the antenna types (monopole, PIFA, dipole, etc. (note that for example an “omni-directional antenna” is not considered to be a specific “antenna type”).

For situations where the host product manufacturer is responsible for an external connector, for example with an RF pin and antenna trace design, the integration instructions shall inform the installer that unique antenna connector must be used on the Part 15 authorized transmitters used in the host product.

The module manufacturers shall provide a list of acceptable unique connectors.

Explanation: The product antenna uses an irreplaceable antenna with a gain of WIFI:4.14dBi ,BT:4.24dBi

2.7 Label and compliance information

Grantees are responsible for the continued compliance of their modules to the FCC rules. This

includes advising host product manufacturers that they need to provide a physical or e-label stating “Contains FCC ID” with their finished product. See Guidelines for Labeling and User Information for RF Devices – KDB Publication 784748.

Explanation: The host system using this module, should have label in a visible area indicated the following texts: "Contains FCC ID: 2BCS8-EASYEAI

2.8 Information on test modes and additional testing requirements5 Additional guidance for testing host products is given in KDB Publication 996369 D04 Module Integration Guide. Test modes should take into consideration different operational conditions for a stand-alone modular transmitter in a host, as well as for multiple simultaneously transmitting modules or other transmitters in a host product.

The grantee should provide information on how to configure test modes for host product evaluation for different operational conditions for a stand-alone modular transmitter in a host, versus with multiple, simultaneously transmitting modules or other transmitters in a host.

Grantees can increase the utility of their modular transmitters by providing special means, modes, or instructions that simulates or characterizes a connection by enabling a transmitter. This can greatly simplify a host manufacturer’s determination that a module as installed in a host complies with FCC requirements.

Explanation: Guangzhou EASY EAI Technology Co.,Ltd can increase the utility of our modular transmitters by providing instructions that simulates or characterizes a connection by enabling a transmitter.

2.9 Additional testing, Part 15 Subpart B disclaimer

The grantee should include a statement that the modular transmitter is only FCC authorized for the specific rule parts (i.e., FCC transmitter rules) listed on the grant, and that the host product manufacturer is responsible for compliance to any other FCC rules that apply to the host not covered by the modular transmitter grant of certification. If the grantee markets their product

as being Part 15

Subpart B compliant (when it also contains unintentional-radiator digital circuity), then the grantee shall provide a notice stating that the final host product still requires Part 15 Subpart B compliance testing with the modular transmitter installed.

Explanation: The module without unintentional-radiator digital circuity, so the module does not require an evaluation by FCC Part 15 Subpart B. The host shoule be evaluated by the FCC Subpart B.