3onedata



IEM6200-8T2G-4D2C

Layer 2 Managed Industrial Ethernet Switch Module

Hardware Quick Installation Manual

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Preface

Managed industrial Ethernet switch module manual has introduced this module:

- Product Overview
- Encapsulation and size
- Pin definition
- Reference circuit

Audience

This manual applies to the following engineers:

- On-site technical support and maintenance staff
- Hardware engineers

Port Convention

The port number in this manual is only an example, and does not represent the actual port with this number on the device. In actual use, the port number existing on the device shall prevail.

Text Format Convention

Format	Description
" "	Words with “” represent the interface words. Such as: “Port No.”.
>	Multi-level path is separated by ">". Such as opening the local connection path description: Open "Control Panel> Network Connection> Local Area Connection".
Light blue Font	It represents the words clicked to achieve hyperlink. The font color is as follows: ‘Light Blue’.
About this chapter	The section ‘about this chapter’ provides links to various sections of this chapter, as well as links to the

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Format	Description
	Principles/Operations Section of this chapter.

Icon Convention

Format	Description
 Notice	Remind the announcements in the operation, improper operation may result in data loss or equipment damage.
 Warning	Pay attention to the notes on the mark, improper operation may cause personal injury.
 Note	Make a necessary supplementary instruction for operation description.
 Key	Configuration, operation, or tips for device usage.
 Tip	Pay attention to the operation or information to ensure success device configuration or normal working.

Revision Record

Version No.	Revision Date	Revision Note
01	06/14/2023	Product release
02	12/15/2323	Update structure drawing and pin definition
03	10/29/2024	Maintenance

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1 Product Overview

1.1 Product Introduction

IEM6200-8T2G-4D2C is a layer 2 managed embedded industrial Ethernet switch module, which has the characteristics of high integration, small size, rich functions, simple and convenient operation. Including the following interface types:

- 8 100M Ethernet interfaces, which can be configured to 10/100Base-T(X) copper port or 100Base-FX fiber port.
- 2 Gigabit Ethernet interfaces, which can be configured to 1000Base-X fiber port or SGMII mode. The external Gigabit PHY chip in SGMII mode can be used as Gigabit copper port.
- 4 TTL UART interfaces, which can be extended to RS-232/485/422 serial port and provide serial-to-Ethernet serial server function.
- 2 TTL CAN ports, which support CAN server function of bidirectional transparent CAN-to-Ethernet transmission.
- 1 CONSOLE port, used for command line to coordinate and debug this module.
- 2 I/O alarm ports, which can be extended to relay alarm.

1.2 Product Specification

Interface	
100M copper port	10/100Base-T(X), Automatic Flow Control, Full/half Duplex Mode, MDI/MDI-X Autotunning
100M fiber port	100Base-FX
Gigabit copper port	Implemented by extending PHY chip
Gigabit fiber port	1000Base-X
CONSOLE port	CLI command management port

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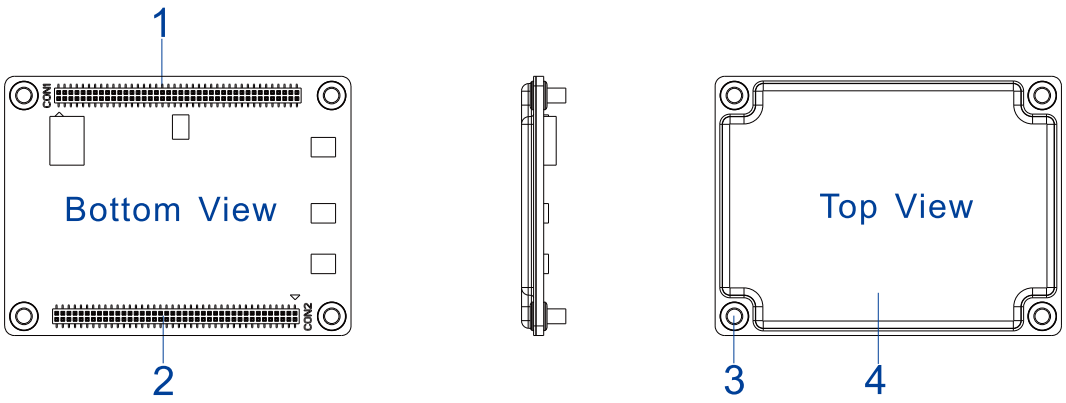
I/O port	Alarm input/output
TTL UART interface	Interface type: RS-232/RS-485/RS-422 (optional) Baud rate: 300bps-115200bps
TTL CAN port	Baud rate: 5kbps~1000kbps
Switch Property	
Backplane bandwidth	9.6G
Buffer size	2Mbit
MAC address table	4K
Power Supply	
Input power supply	Module power supply 3.3VDC
Power Consumption	
No-load	4.0W@12VDC
Full-load	5.5W@12VDC
Working Environment	
Working temperature	-40~75℃
Storage temperature	-40~85℃
Working humidity	0%~95%
Mechanical Structure	
Mounting	Embedded installation (pin and female header type)
Dimension (W x H x D)	72mm×9.2mm×54mm

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2 Dimension

2.1 Capsulation Design

The diagram of module structure is as follows:



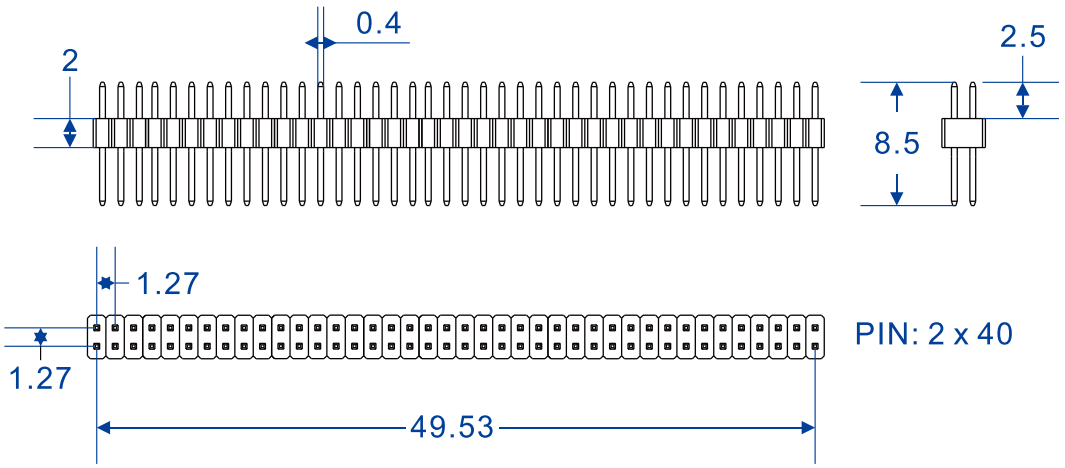
The details of each package label are shown in the following table:

Capsulation	Name	Specification	Description
1	Socket header CON1	Connector 2*40, pin spacing 1.27mm, connector height 4.6mm, square hole 0.4mm*0.4mm.	—
2	Socket header CON2	Connector 2*40, pin spacing 1.27mm, connector height 4.6mm, square hole 0.4mm*0.4mm.	—
3	location hole	The inner diameter is Φ3.0mm. Note: • 4 positioning holes can be planned on the bottom plate, and M3 screws are used to	The four positioning holes have the same specifications

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Capsulation	Name	Specification	Description
		connect the copper column of the module through the bottom plate to fix the module; • The diameter of the positioning hole of the bottom plate should be greater than Φ3.0mm to avoid the screw being unable to pass because the diameter is too small.	
4	A blade of thermal conductivity	72mm*54mm	External heat sink available

The needle specifications corresponding to connector CON1 and CON2 can refer to the following view, unit is mm:

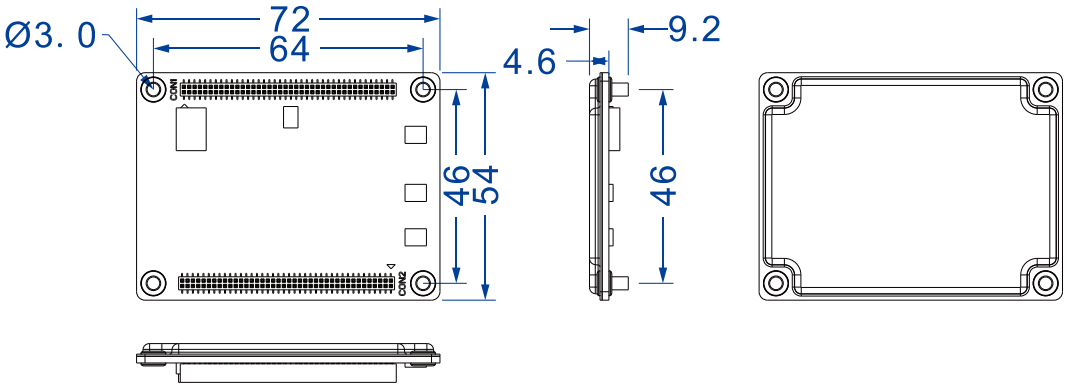


2.2 Product Dimension

The diagram of module structure dimension is as follows:

Unit: mm

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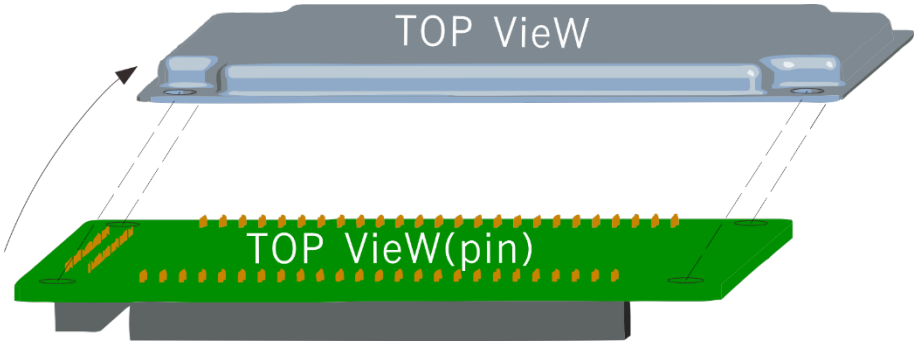


3 Pin Definition Description

3.1 Pin Definition View

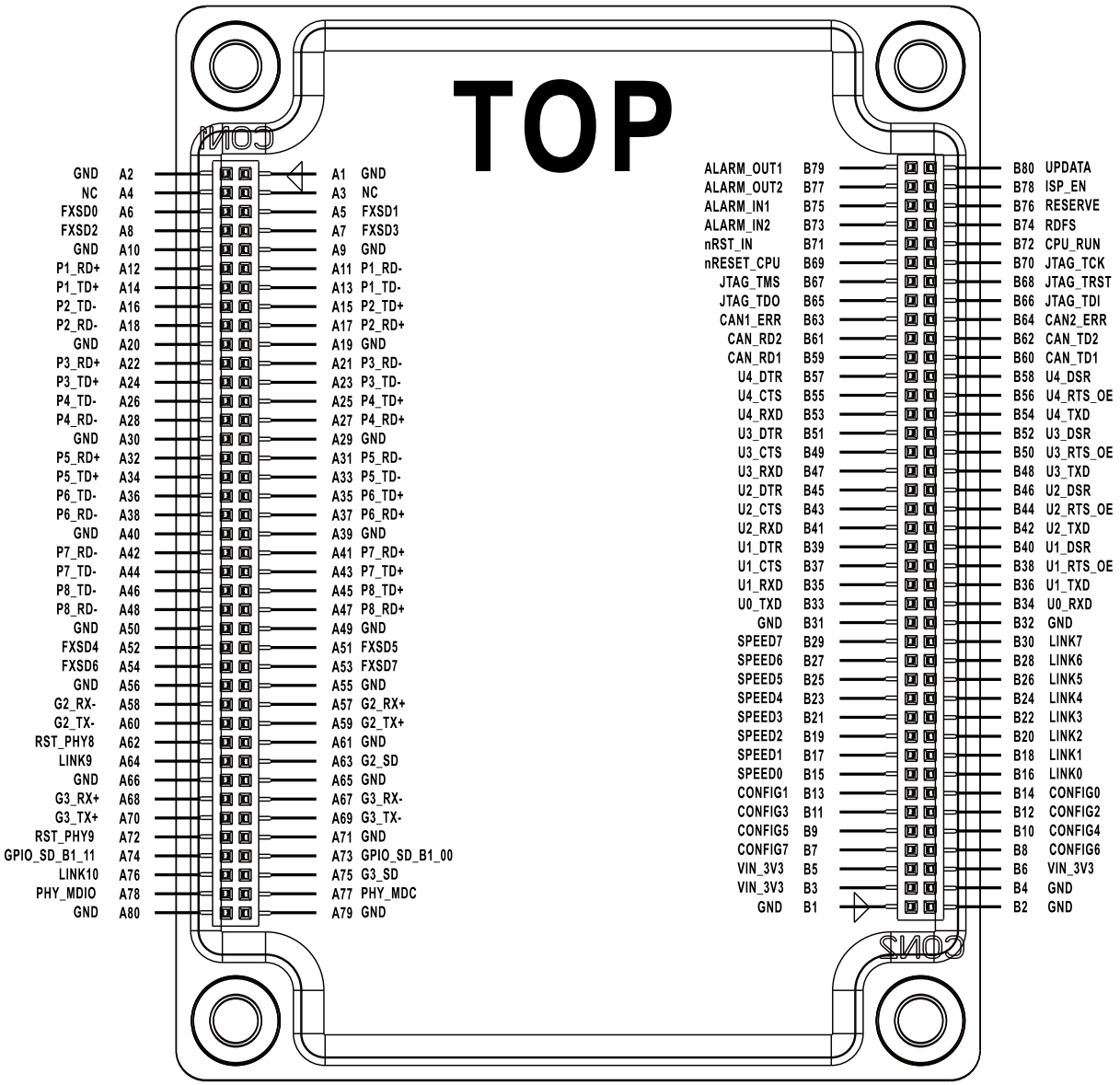
Note

In order to facilitate users to view pin definition when PCB board wiring, the pin definition diagram adopts the top view Angle as shown below.



Top view of module pin number and name is as follows:

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3.2 Pin Definition Name Description

Pin Identification	Note
RX/RD	Receive Data
TX/TD	Transmit Data
GND	Ground
FXSD	FX Signal Detection
MDC	Management Data Clock
MDIO	Management Data Input/Output
TMS	Select test mode
TDO	Data output
TDI	Data input

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RST	Reset
OUT	Output
CONFIG	Config
RDFS	Restore Default Factory Settings
ISP	In System Program
EN	Enable
IN	Input
UPDATA	Upgrade
3V3	3.3VDC
CAN	Controller LAN Network, CAN port
ERR	Error
U	UART (Universal Asynchronous Receiver/Transmitter)
VIN	Voltage Input
CTS	Clear To Send
RTS	Request To Send
DSR	Data Send Ready
DCD	Data Carrier Detect
DTR	Data Terminal Ready
RXD	Receive data
TXD	Transmit data
SPEED	Rate speed
TCK	Synchronous clock signal
TRST	Reset TAP controller

3.3 Pin Definition List

Pin Definition of Connector CON1 (A1-A80)

Pin No.	PIN Name	Pin No.	PIN Name
A1	GND	A2	GND
A3	NC (reserved)	A4	NC (reserved)
A5	FXSD1	A6	FXSD0
A7	FXSD3	A8	FXSD2
A9	GND	A10	GND
A11	P1_RD-	A12	P1_RD+

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Pin No.	PIN Name	Pin No.	PIN Name
A13	P1_TD-	A14	P1_TD+
A15	P2_TD+	A16	P2_TD-
A17	P2_RD+	A18	P2_RD-
A19	GND	A20	GND
A21	P3_RD-	A22	P3_RD+
A23	P3_TD-	A24	P3_TD+
A25	P4_TD+	A26	P4_TD-
A27	P4_RD+	A28	P4_RD-
A29	GND	A30	GND
A31	P5_RD-	A32	P5_RD+
A33	P5_TD-	A34	P5_TD+
A35	P6_TD+	A36	P6_TD-
A37	P6_RD+	A38	P6_RD-
A39	GND	A40	GND
A41	P7_RD+	A42	P7_RD-
A43	P7_TD+	A44	P7_TD-
A45	P8_TD+	A46	P8_TD-
A47	P8_RD+	A48	P8_RD-
A49	GND	A50	GND
A51	FXSD5	A52	FXSD4
A53	FXSD7	A54	FXSD6
A55	GND	A56	GND
A57	G2_RX+	A58	G2_RX-
A59	G2_TX+	A60	G2_TX-
A61	GND	A62	RST_PHY8
A63	G2_SD	A64	LINK9
A65	GND	A66	GND
A67	G3_RX-	A68	G3_RX+
A69	G3_TX-	A70	G3_TX+
A71	GND	A72	RST_PHY9
A73	GPIO_SD_B1_00	A74	GPIO_SD_B1_11
A75	G3_SD	A76	LINK10
A77	PHY_MDC	A78	PHY_MDIO
A79	GND	A80	GND

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Pin Definition of Connector CON2 (B1-B80)

Pin No.	PIN Name	Pin No.	PIN Name
B1	GND	B2	GND
B3	VIN_3V3	B4	GND
B5	VIN_3V3	B6	VIN_3V3
B7	CONFIG7	B8	CONFIG6
B9	CONFIG5	B10	CONFIG4
B11	CONFIG3	B12	CONFIG2
B13	CONFIG1	B14	CONFIG0
B15	SPEED0	B16	LINK0
B17	SPEED1	B18	LINK1
B19	SPEED2	B20	LINK2
B21	SPEED3	B22	LINK3
B23	SPEED4	B24	LINK4
B25	SPEED5	B26	LINK5
B27	SPEED6	B28	LINK6
B29	SPEED7	B30	LINK7
B31	GND	B32	GND
B33	U0_TXD	B34	U0_RXD
B35	U1_RXD	B36	U1_TXD
B37	U1_CTS	B38	U1_RTS_OE
B39	U1_DTR	B40	U1_DSR
B41	U2_RXD	B42	U2_TXD
B43	U2_CTS	B44	U2_RTS_OE
B45	U2_DTR	B46	U2_DSR
B47	U3_RXD	B48	U3_TXD
B49	U3_CTS	B50	U3_RTS_OE
B51	U3_DTR	B52	U3_DSR
B53	U4_RXD	B54	U4_TXD
B55	U4_CTS	B56	U4_RTS_OE
B57	U4_DTR	B58	U4_DSR
B59	CAN_RD1	B60	CAN_TD1
B61	CAN_RD2	B62	CAN_TD2
B63	CAN1_ERR	B64	CAN2_ERR
B65	JTAG_TDO	B66	JTAG_TDI
B67	JTAG_TMS	B68	JTAG_TRST

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Pin No.	PIN Name	Pin No.	PIN Name
B69	nRESET_CPU	B70	JTAG_TCK
B71	nRST_IN	B72	CPU_RUN
B73	ALARM_IN2	B74	RDFS
B75	ALARM_IN1	B76	RESERVE
B77	ALARM_OUT2	B78	ISP_EN
B79	ALARM_OUT1	B80	UPDATA

3.4 Detailed Pin Definition Description

3.4.1 100M Ethernet Port

Port 1-8 can be configured to 100M fiber port or 100M copper port. Description of 100M Ethernet interface pin definition:

PIN Name	Pin No.	Type	Function Description
P1_RD+	A12	Input	Positive end of 100M Ethernet interface data receiving. • When the port is configured to 100M copper port, RDP[1:8] is directly connected to the receiving network transformer. • When the port is configured to a 100M fiber port, RDP[1:8] is directly connected to the positive output end of the fiber receiver. • Grounding is recommended when this pin is not in use.
P2_RD+	A17		
P3_RD+	A22		
P4_RD+	A27		
P5_RD+	A32		
P6_RD+	A37		
P7_RD+	A41		
P8_RD+	A47		
P1_RD-	A11	Input	Negative end of 100M Ethernet interface data receiving. • When the port is configured to 100M copper port, RDN[1:8] is directly connected to the receiving network transformer. • When the port is configured to 100M fiber port, RDN[1:8] is directly connected to the negative output end of the fiber receiver. • Grounding is recommended when this pin is not in use.
P2_RD-	A18		
P3_RD-	A21		
P4_RD-	A28		
P5_RD-	A31		
P6_RD-	A38		
P7_RD-	A42		
P8_RD-	A48		
P1_TD+	A14	Input	Positive end of 100M Ethernet interface data

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PIN Name	Pin No.	Type	Function Description
P2_TD+	A15		transmission. • When the port is configured to 100M copper port, TDP[1:8] is directly connected to the sending network transformer. • When the port is configured to 100M fiber port, TDP[1:8] is directly connected to the positive input end of the fiber transmitter. • Grounding is recommended when this pin is not in use.
P3_TD+	A24		
P4_TD+	A25		
P5_TD+	A34		
P6_TD+	A35		
P7_TD+	A43		
P8_TD+	A45		
P1_TD-	A13	Output	Negative end of 100M Ethernet interface data transmission. • When the port is configured to 100M copper port, TDN[1:8] is directly connected to the sending network transformer. • When the port is configured to 100M fiber port, TDN[1:8] is directly connected to the negative input end of the fiber transmitter. • Grounding is recommended when this pin is not in use.
P2_TD-	A16		
P3_TD-	A23		
P4_TD-	A26		
P5_TD-	A33		
P6_TD-	A36		
P7_TD-	A44		
P8_TD-	A46		
FXSD0	A6	Input	100M Ethernet interface optical signal detection input. • When Port 1-8 are configured to 100M fiber ports, FXSD is used to detect whether the optical module detects a valid signal. A high level indicates that an optical signal is detected. • When Port 1-8 are configured to 100M copper ports, FXSD cannot be suspended, and it is recommended to be grounded through a 0 ohm resistor.
FXSD1	A5		
FXSD2	A8		
FXSD3	A7		
FXSD4	A52		
FXSD5	A51		
FXSD6	A54		
FXSD7	A53		
CONFIG0	B14	Input	100M Ethernet interface configuration pin. • When CONFIG is grounded, Port 1-8 are configured to 100M copper ports. • When CONFIG is connected to +3.3V through a 4.7K resistor, Port 1-8 are configured to 100M fiber ports. • When this pin is not used, it can be left suspended.
CONFIG1	B13		
CONFIG2	B12		
CONFIG3	B11		
CONFIG4	B10		
CONFIG5	B9		
CONFIG6	B8		
CONFIG7	B7		

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3.4.2 Gigabit Ethernet Port

Port G2-G3 can be configured to Gigabit fiber ports or Gigabit copper ports. In the SGMII mode, the port is configured to a Gigabit copper port, and a Gigabit PHY chip needs to be connected externally, and the PHY chip is connected and managed through MDIO and MDC pins.

Pin definition description of Gigabit Ethernet port:

PIN Name	Pin No.	Type	Function Description
G2_TX+	A59	Output	Positive end of 1000M Ethernet interface (SGMII) data transmission • When Port G2-G3 are configured to 1000M fiber ports, they are directly connected to the positive input end of the optical module. • When Port G2-G3 are configured to 1000M copper ports, they are directly connected to the positive input end of SGMII interface on the external Gigabit PHY chip. • When this pin is not used, it is recommended to be suspended.
G3_TX+	A70		
G2_TX-	A60	Output	Negative end of 1000M Ethernet interface (SGMII) data transmission. • When Port G2-G3 are configured to 1000M fiber ports, they are directly connected to the negative input end of the optical module. • When Port G2-G3 are configured to 1000M copper ports, they are directly connected to the negative input end of SGMII interface on the external Gigabit PHY chip. • When this pin is not used, it is recommended to be suspended.
G3_TX-	A69		
G2_RX+	A57	Input	Positive end of 1000M Ethernet interface (SGMII) data receiving • When Port G2-G3 are configured to 1000M fiber ports, they are directly connected to the positive output end of
G3_RX+	A68		

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PIN Name	Pin No.	Type	Function Description
			the optical module. • When Port G2-G3 are configured to 1000M copper ports, they are directly connected to the positive output end of SGMII interface on the external Gigabit PHY chip. • When this pin is not used, it is recommended to be suspended.
G2_RX-	A58	Input	Negative end of 1000M Ethernet interface (SGMII) data receiving. • When Port G2-G3 are configured to 1000M fiber ports, they are directly connected to the negative output end of the optical module. • When Port G2-G3 are configured to 1000M copper ports, they are directly connected to the negative output end of SGMII interface on the external Gigabit PHY chip. • When this pin is not used, it is recommended to be suspended.
G3_RX-	A67		
G2_SD	A63	Input	1000M Ethernet interface optical signal detection input. • When Port G2-G3 are configured to fiber ports, SD is used to detect whether the optical module detects a valid signal. A high level indicates that an optical signal is detected. • When Port G2-G3 are configured to copper ports, SD cannot be suspended, and it is recommended to connect to 3.3V power supply through a 4.7K resistor.
G3_SD	A75		
LINK9	A64	Output	Port G2 signal indicator
LINK10	A76	Output	Port G3 signal indicator
GPIO_SD_B1_00	A73	Input	Working mode configuration pins of Gigabit Ethernet Port G2-G3. When the pin is suspended, it is configured to 0; When the pin is connected to the 3.3VDC power supply
GPIO_SD_B1_11	A74		

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PIN Name	Pin No.	Type	Function Description
			through a 4.7kΩ resistor, it is configured to 1. GPIO_SD_B1_00 corresponds to G2, and GPIO_SD_B1_11 corresponds to G3. The configuration methods are as follows: • 0: SGMII mode (1000BASE-T copper port, external PHY required) • 1: 1000BASE-X mode (fiber port)
PHY_MDIO	A78	Input / output	SMI (serial management interface) includes MDIO and MDC signal lines, MDIO is the external PHY chip management data input/output pin, and MDC is the external PHY chip management data clock pin.
PHY_MDC	A77	Output	
RST_PHY8	A62	Output	Software reset pin of external PHY chip, and active low level. When Gigabit Ethernet Port G2-G3 are configured to copper ports, the corresponding RST_PHY[8:9] can be connected with the external PHY chip reset signal pin.
RST_PHY9	A72		

3.4.3 Power Supply Interface

Pin definition description of power supply interface:

PIN Name	Pin No.	Type	Function Description
VIN_3V3	B3, B5, B6	Input	3.3VDC voltage input, which supplies power to the module.
GND	A1, A2, A9, A10, A19, A20, A29, A30, A39, A40, A49, A50, A55, A56, A61, A65, A66, A71, A79, A80, B1, B2, B4, B31, B32	Ground	Ground signal

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3.4.4 TTL UART Interface

TTL UART can be extended to RS-232/RS-485/RS-422 serial port.

TTL UART pin definition description:

PIN Name	Pin No.	Type	Function Description
U1_RXD	B35	Input	UART1 receive signal
U1_TXD	B36	Output	UART1 send signal
U1_CTS	B37	Input	UART1 clear to send signal
U1_RTS_OE	B38	Output	UART1 request to end signal Note: When UART1 is extended to RS-485 serial port, this pin is used as RS-485 transmit enable, and the high level is active.
U1_DTR	B39	Output	UART1 device ready signal
U1_DSR	B40	Input	UART1 peer device ready signal
U2_RXD	B41	Input	UART2 received data signal
U2_TXD	B42	Output	UART2 transmitted data signal
U2_CTS	B43	Input	UART2 clear to send signal
U2_RTS_OE	B44	Output	UART2 request to send signal Note: When UART2 is extended to RS-485 serial port, this pin is used as RS-485 transmit enable, and the high level is active.
U2_DTR	B45	Output	UART2 device ready signal
U2_DSR	B46	Input	UART2 peer device ready signal
U3_RXD	B47	Input	UART3 receive signal
U3_TXD	B48	Output	UART3 send signal
U3_CTS	B49	Input	UART3 clear to send signal
U3_RTS_OE	B50	Output	UART3 request to send signal Note: When UART3 is extended to RS-485 serial port, this pin is used as RS-485 transmit enable, and the high level is active.
U3_DTR	B51	Output	UART3 device ready signal
U3_DSR	B52	Input	UART3 peer device ready signal
U4_RXD	B53	Input	UART4 receive signal
U4_TXD	B54	Output	UART4 send signal
U4_CTS	B55	Input	UART4 clear to send signal
U4_RTS_OE	B56	Output	UART4 request to send signal Note:

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PIN Name	Pin No.	Type	Function Description
			When UART4 is extended to RS-485 serial port, this pin is used as RS-485 transmit enable, and the high level is active.
U4_DTR	B57	Output	UART4 device ready signal
U4_DSR	B58	Input	UART4 peer device ready signal

3.4.5 TTL CAN Port

Pin definition description of 2 TTL CAN ports:

PIN Name	Pin No.	Type	Function Description
CAN_TD1	B60	Output	CAN1 send signal
CAN_RD1	B59	Input	CAN1 receive signal
CAN_TD2	B62	Output	CAN2 send signal
CAN_RD2	B61	Input	CAN2 receive signal

3.4.6 CONSOLE Port (Debugging Port)

Pin definition description of CONSOLE port:

PIN Name	Pin No.	Type	Function Description
U0_RXD	B34	Input	UART0 receiving signal, which is only used for debugging this module by CONSOLE port.
U0_TXD	B33	Output	UART0 transmitting signal, which is only used for debugging this module by CONSOLE port.

3.4.7 I/O Alarm Interface

Pin definition description of I/O alarm port:

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PIN Name	Pin No.	Type	Function Description
ALARM_IN1	B75	Input	2 alarm signal input pins, which can configure alarm input types by yourself, such as power alarm information detection. The default configuration is low-level alarm, and high-level alarm is not available.
ALARM_IN2	B73		
ALARM_OUT1	B79	Output	ALARM_OUT1 can be extended to alarm indicator and low-level alarm.
ALARM_OUT2	B77	Output	ALARM_OUT2 can be extended to relay, and the default is high level; The high and low levels can be configured by software.

3.4.8 Indicator

Pin definition description of indicator:

PIN Name	Pin No.	Type	Function Description
LINK0	B16	Output	100M Ethernet Port 1-8 connection and data transceiving indication pin LINK [0:7]. • When this pin outputs high level, it indicates that the corresponding 100M Ethernet Port 1-8 are not connected. • When this pin outputs low level, it indicates that the corresponding 100M Ethernet Port 1-8 have established a valid connection. • When this pin outputs alternating high and low levels, it indicates that the corresponding 100M Ethernet Port 1-8 have data transmission.
LINK1	B18		
LINK2	B20		
LINK3	B22		
LINK4	B24		
LINK5	B26		
LINK6	B28		
LINK7	B30		
LINK9	A64	Output	Port G2 signal indicator
LINK10	A76	Output	Port G3 signal indicator
SPEED0	B15	Output	100M Ethernet interface 1-8 speed indicator pin SPEED [0: 7]. • When the 100M Ethernet port is configured to 10BASE-T, that is, 10M rate, this pin outputs high levels. • When the 100M Ethernet port is configured
SPEED1	B17		
SPEED2	B19		
SPEED3	B21		
SPEED4	B23		
SPEED5	B25		

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PIN Name	Pin No.	Type	Function Description
SPEED6	B27		to 100BASE-TX, that is, 100M rate, this pin outputs low levels.
SPEED7	B29		
CPU_RUN	B72	Output	Output pin of CPU running indicator, active low level. The indicator status is as follows: • Blinking, it indicates that the system is running normally; • ON, it indicates that the system is starting or the device is running abnormally; • OFF, it indicates that the device is powered off or the device is abnormal.
CAN1_ERR	B63	Output	CAN1 error indicator, which is active at low level.
CAN2_ERR	B64	Output	CAN2 error indicator, which is active at low level.

3.4.9 Other Pins

PIN Name	Pin No.	Type	Function Description
NC (reserved)	A3, A4	Suspended	—
nRST_IN	B71	Input	Input pin of manual reset, active low level, and it is recommended to pull high. When the input low level of this pin lasts longer than 200ms, the system enters the reset state.
RDFS	B74	Input	Restore the factory settings. Active low level, it is recommended to pull high. When the module is powered on, it samples the pin signal. When the pin is connected to low level, the module restores the factory setting after about 1s.
ISP_EN	B78	Input	Program upgrade, active low level, it is recommended to pull high.
UPDATA	B80	Input	Program upgrade, active low level, it is recommended to pull high. When the

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PIN Name	Pin No.	Type	Function Description
			module is powered on, it samples the pin signal. When the pin is connected to low level, the module program starts to upgrade.
nRESET_CPU	B69	Input	CPU reset pin
JTAG_TDO	B65	Output	JIAG Debugging
JTAG_TDI	B66	Input	
JTAG_TMS	B67	Input	
JTAG_TRST	B68	Input	
JTAG_TCK	B70	Input	
RESERVE	B76	Reserved	

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4 Reference circuit

Note

The ground signal in the reference circuit is identified as follows:

- ⏚: GND, ground signal;
- ⏥: FG, frame grounding.

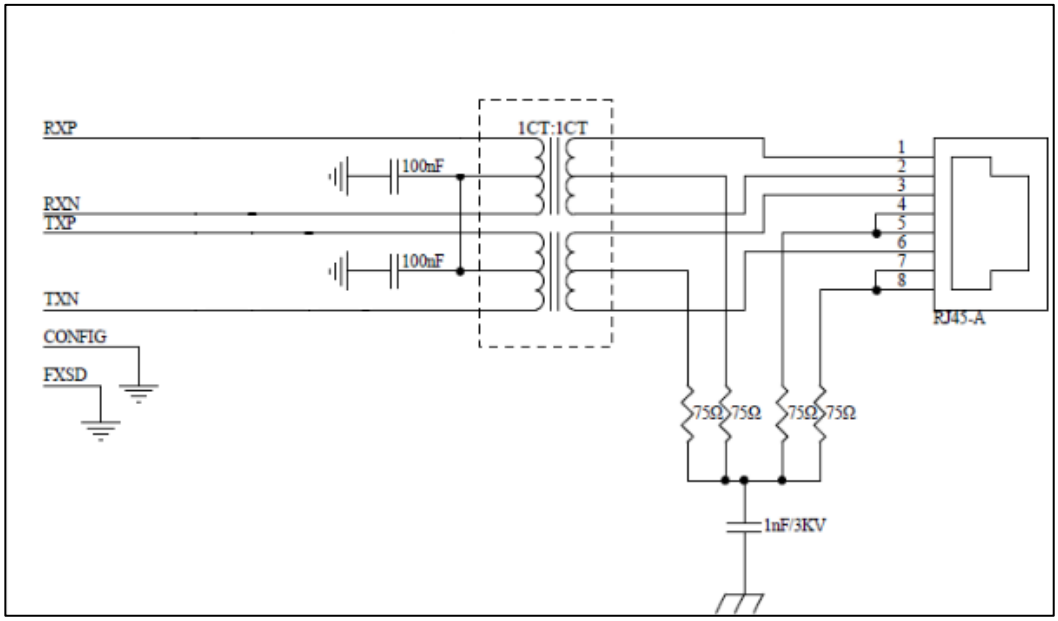
4.1 100M Ethernet Port

PIN Name	Type	Configuration Method
RD+[1:8]	Positive input end of data receiving	100M Ethernet interface configuration pin CONFIG[0:7]. • When CONFIG [0:7] is grounded, the corresponding 100M Ethernet Port 1-8 are configured to 100M copper ports. • When CONFIG [0:7] is connected to the +3.3VDC power supply through a 4.7kΩ resistor, the corresponding 100M Ethernet Port 1-8 are configured to 100M fiber ports. • Grounding is recommended when this pin is not in use.
RD-[1: 8]	Negative input end of data receiving	
TD+[1:8]	Positive output end of data transmission	
TD-[1:8]	Negative output end of data transmission	
FXSD[0:7]	Detection input of optical signal	
CONFIG[0:7]	Configure port	

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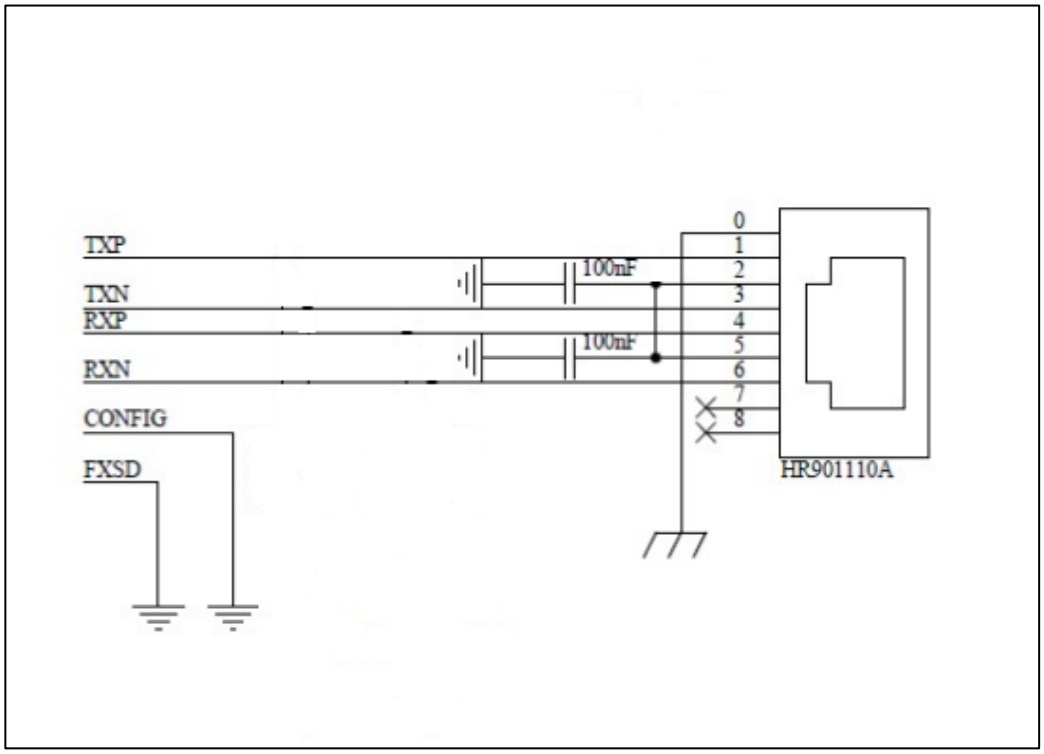
Reference Circuit of 100M Copper Port (with Independent Network Transformer)

The dotted line in the reference circuit diagram of the 100M copper port is a 1: 1 network transformer, and the recommended models are H1102, H1200, H1164, XFMR-H4001CG or other compatible products. When the port is used as a copper port, the CONFIG and FXSD pins of the module need to be grounded.



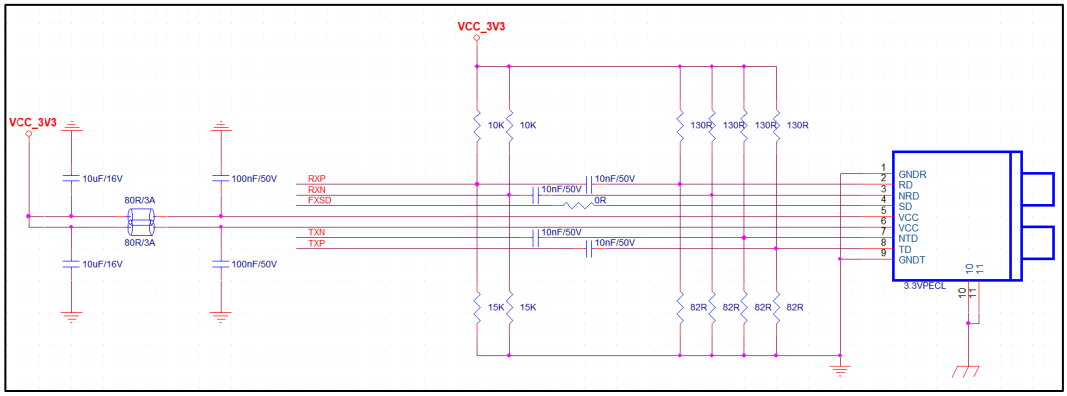
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Reference Circuit of 100M Copper Port (with Built-in Network Port Transformer)



Reference Circuit of 100M Fiber Port

100M optical module is used in the reference circuit: 1X9 welding transceiver optical module, generally with a speed not higher than Gigabit, and SC interface is mostly used. The optical module adopts positive emitter coupling logic with 3.3V and 5V power supply. If a 5V optical module is used, the matching resistance in the box in the figure needs to refer to the circuit of the optical module manufacturer. CONFIG is connected to +3.3V(DC) through 4.7K resistor, and FXSD is connected to SD signal of optical module as shown in the figure.



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4.2 Gigabit Ethernet Port

Port G2-G3 can be configured to Gigabit fiber ports or Gigabit copper ports. In the SGMII mode, the port is configured to a Gigabit copper port, and a Gigabit PHY chip needs to be connected externally, and the PHY chip is connected and managed through MDIO and MDC pins. The configuration of PHY address is: Port G2: PHY address 6; Port G3: PHY address 7.

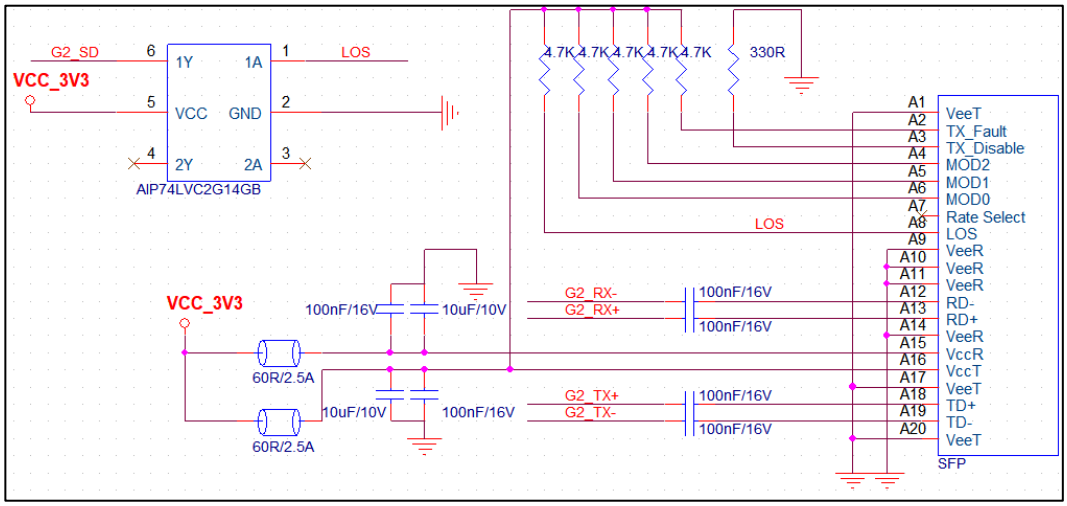
PIN Name	Type
G2_TX，G3_TX+	Positive output end of data transmission
G2_TX-，G3_TX-	Negative output end of data transmission
G2_RX+，G3_RX+	Positive input end of data receiving
G2_RX-，G3_RX-	Negative input end of data receiving
G2_SD，G3_SD	Detection input of optical signal
LINK9	Port G2 signal indicator output
GPIO_SD_B1_00	Working mode configuration pins of Gigabit Ethernet Port G2-G3. When the pin is suspended, it is configured to 0; When the pin is connected to the 3.3VDC power supply through a 4.7kΩ resistor, it is configured to 1. GPIO_SD_B1_00 corresponds to G2, and GPIO_SD_B1_11 corresponds to G3. The configuration methods are as follows: • 0: SGMII mode (1000BASE-T copper port, external PHY required) • 1: 1000BASE-X mode (fiber port)
GPIO_SD_B1_11	
LINK10	Port G3 signal indicator output
PHY_MDIO	SMI Interface
PHY_MDC	
RST_PHY[8:9]	Software reset pin of external PHY chip, and active low level. When Gigabit Ethernet Port G2-G3 are configured to copper ports, the corresponding RST_PHY[8:9] can be connected with the external PHY chip reset signal pin.

Gigabit Fiber Port Reference Circuit of Port G2

The 1000M fiber port adopts SFP optical module (SFP-encapsulated-hot-plug small encapsulated module, currently the highest speed can reach 10G, and LC interface is

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mostly used), and the connection line is shown in the above figure. VccT and VccR are the transmitting and receiving part power supplies, respectively, which require 3.3V±5% and the maximum power supply current is over 300mA. The LOS valid signal of SFP optical module is low level, which needs to be changed to high level through an inverter, and the high level of G2_SD and G3_SD indicates that the optical signal is detected.



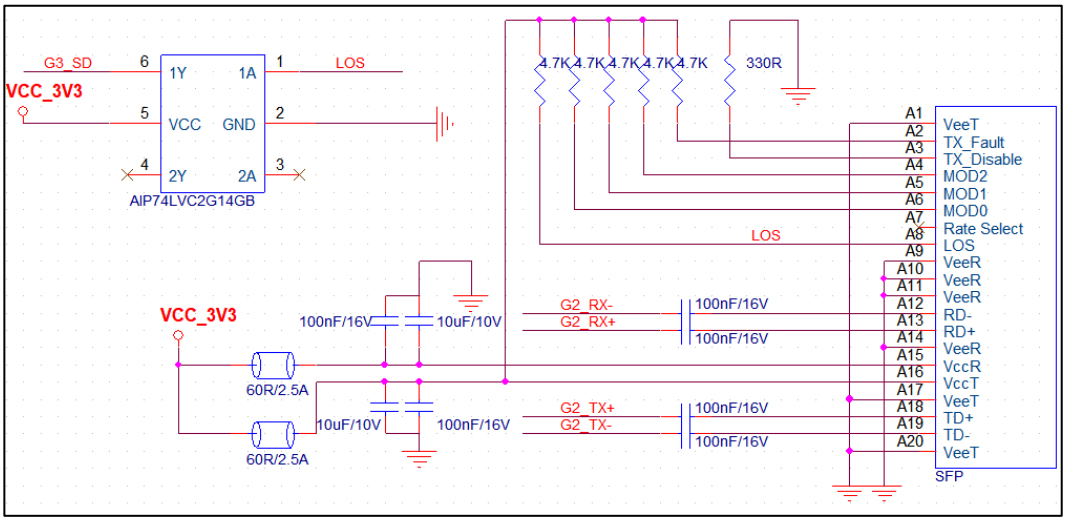
Pin definition list of SFP.

Pin No.	PIN Name	Function Description
1	VeeT	Send partial ground
2	TX_FAULT	Send part error
3	TX_Disable	Disable emission, high level or suspending is effective.
4	MOD_DEF(2)	Module definition pin, data line for I2C communication.
5	MOD_DEF(1)	Module definition pin, clock line for I2C communication
6	MOD_DEF(0)	Module definition pin, grounding
7	Rate Select	Rate Select
8	LOS	LOS alarm
9	VeeR	Receive partial ground
10	VeeR	Receive partial ground
11	VeeR	Receive partial ground
12	RD-	Receive partial data inverted output
13	RD+	Receive partial data output
14	VeeR	Receive partial ground
15	VccR	Receive partial power
16	VccT	Send partial power
17	VeeT	Send partial ground
18	TD+	Send partial data input

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Pin No.	PIN Name	Function Description
19	TD-	Send partial inverted data input
20	VeeT	Send partial ground

Gigabit Fiber Port Reference Circuit of Port G3



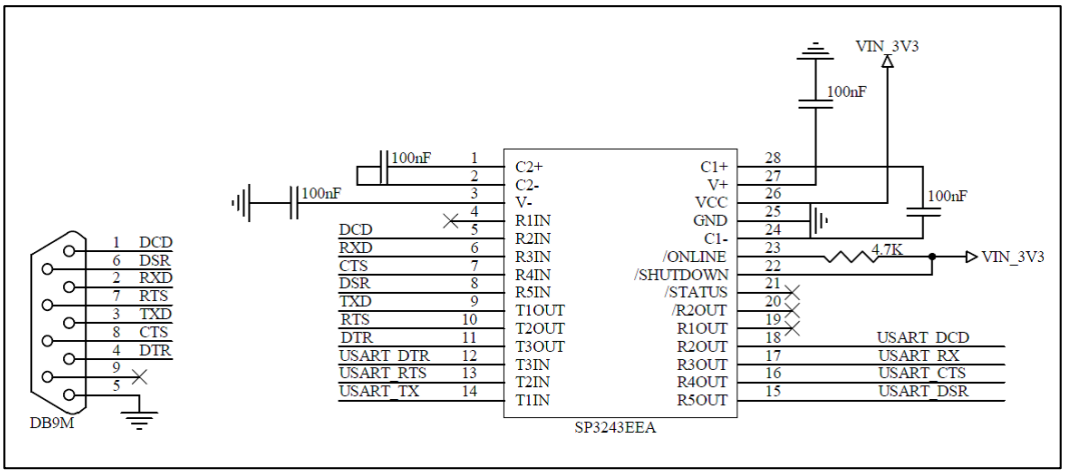
4.3 TTL UART Interface

The module has 4 TTL UART interfaces, which can be configured into RS-232 and RS-485/422 communication modes. Each communication mode has reference circuit and description information, and the user can configure the communication mode according to the requirements.

PIN name	Type	Configuration Method
U_RXD[1:4]	Input	UART[1:4] received data signal
U_TXD[1:4]	Output	UART[1:4] transmitted data signal
U_CTS[1:4]	Input	UART[1:4] clear to send signal
U_RTS[1:4]	Output	UART[1:4] request to send signal Note: When UART is extended to RS-485 serial port, this pin is used as RS-485 transmit enable, and the high level is active.
U_DSR[1:4]	Input	UART[1:4] data send ready signal
U_DTR[1:4]	Output	UART[1:4] data terminal ready signal

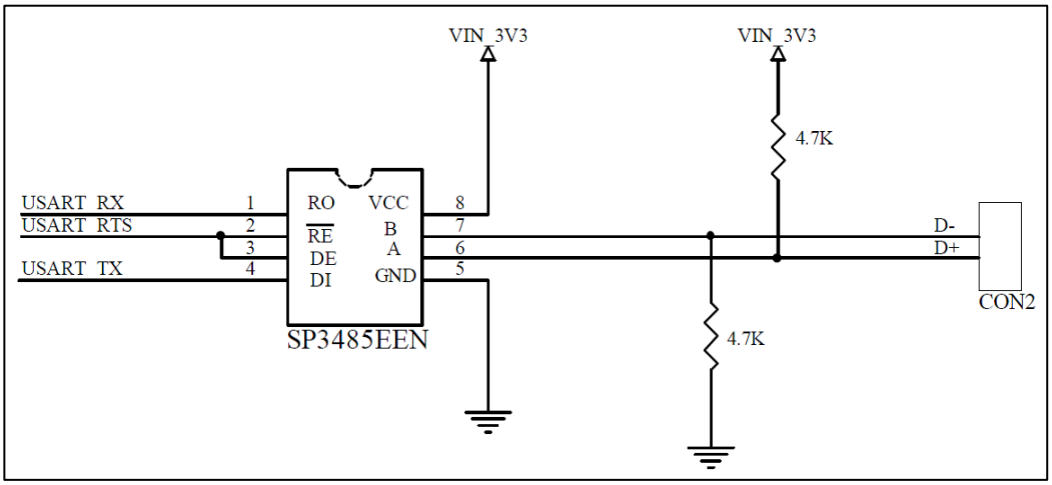
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RS-232 Reference Circuit



RS-485 (Two-wire) Reference Circuit

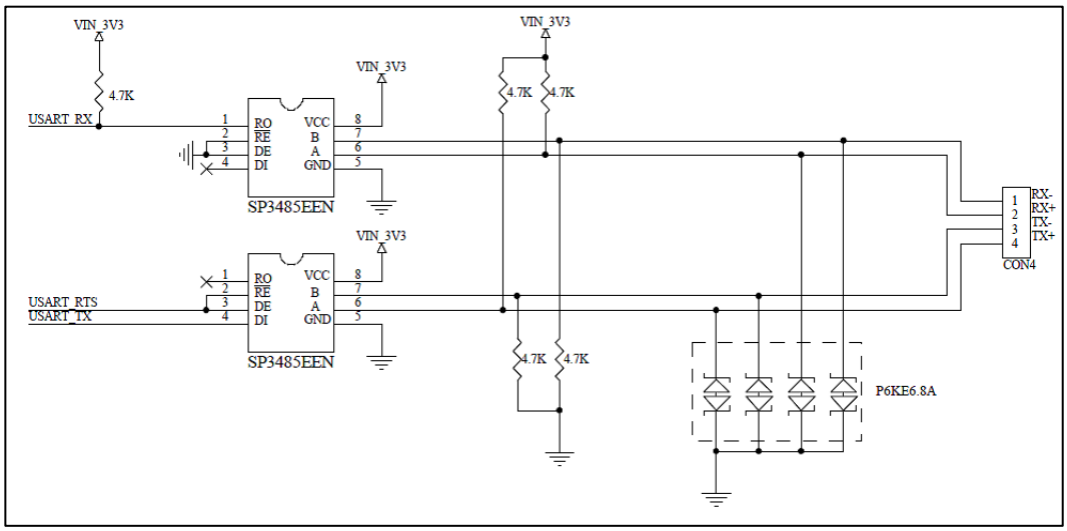
RS-485 two-wire connection method adopts half-duplex communication mode; This connection mode is a bus topology structure, and up to 32 nodes can be connected on the same bus. Master-slave communication is generally adopted in RS-485 communication network, that is, one master has multiple slaves. RS-485 sends and receives in differential mode.



RS-485 (Four-wire) Reference Circuit

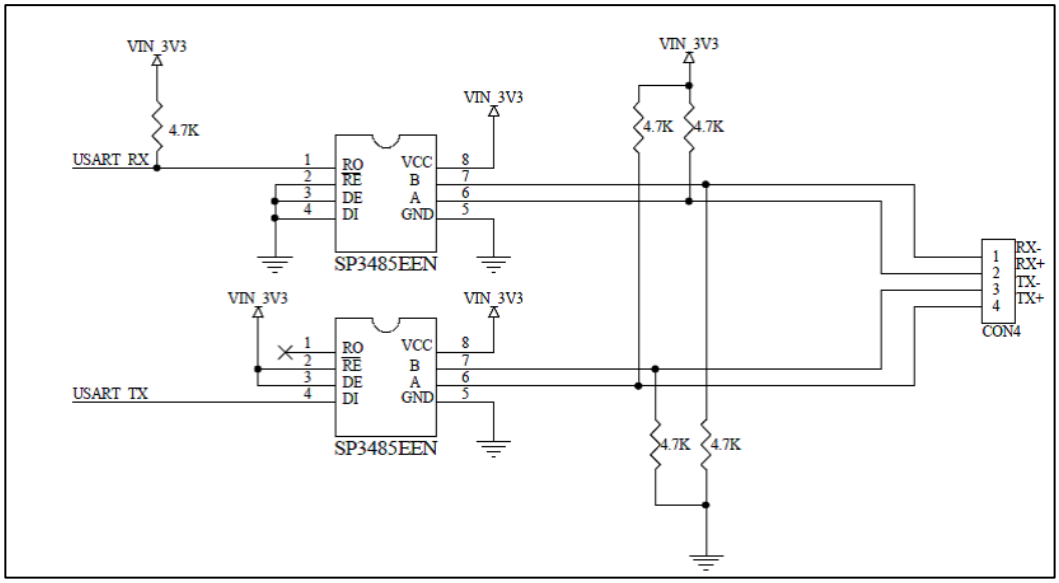
RS-485 four-wire connection mode adopts full-duplex communication mode, which can realize point-to-multipoint communication and is rarely used now, now it mostly adopts two-wire connection mode.

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RS-422 Reference Circuit

RS-422 adopts full-duplex communication mode has four signal lines: two transmission lines (TX+, TX-), two receiving lines (RX+, RX-), and point-to-point connection mode.



4.4 TTL CAN Interface

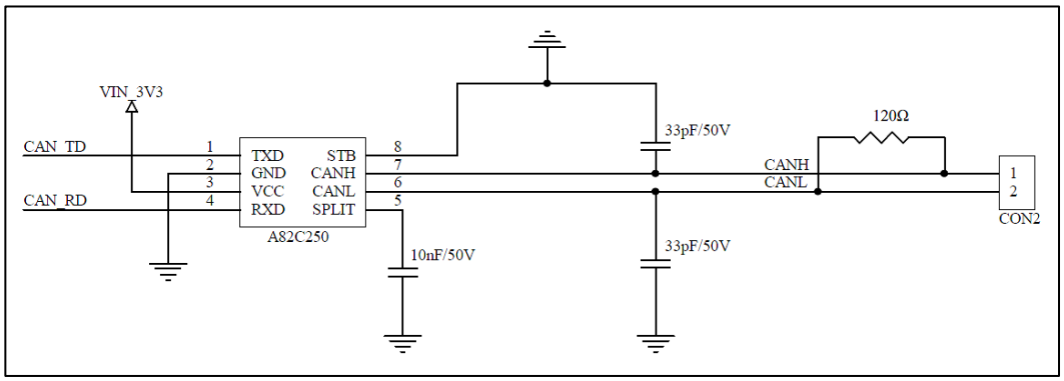
The module has two CAN bus interfaces, and 128 contacts can be hooked on the bus.

PIN name	Type	Configuration Method
CAN_TD[1:2]	Output	CAN transmitted data signal
CAN_RD[1:2]	Input	CAN received data signal

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CAN Reference Circuit

The CAN bus is connected to the physical bus through the two output terminals CANH and CANL of the CAN transceiver interface chip A82C250. The state of the CANH terminal can only be high level or suspending state, and that of the CANL terminal can only be low level or suspending state. Because of its different level properties, a terminal resistor should be added to the terminal of the CAN.



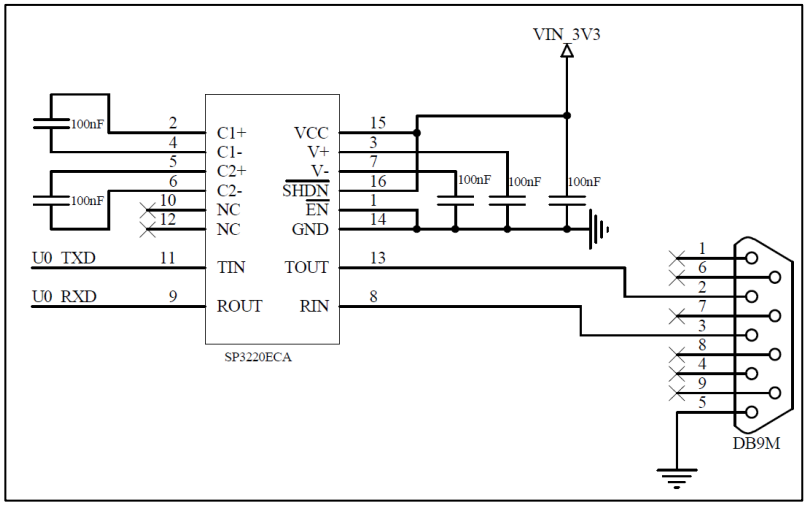
4.5 CONSOLE Port (Debugging Port)

UART0 debugging interface serves as the CONSOLE port of this module, mainly used for building CLI management platform.

PIN Name	Type	Configuration Method
U0_TXD	Output	UART0 transmitted data pin.
U0_RXD	Input	UART0 received data pin.

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Reference Circuit of CONSOLE Port



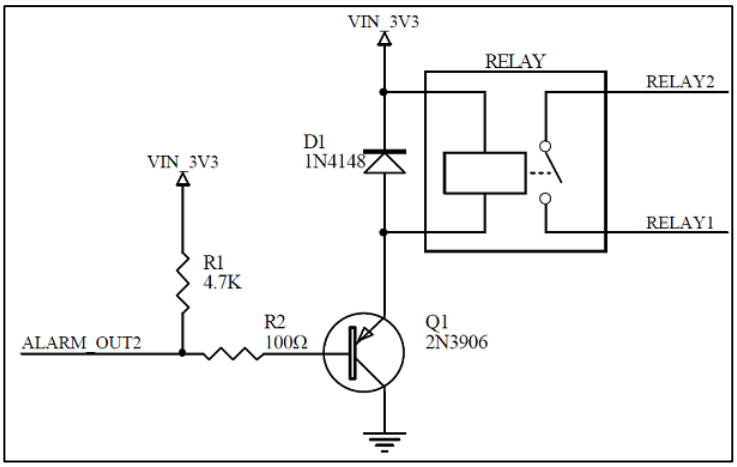
4.6 I/O Alarm Interface

The module has two alarm signal inputs, and the alarm input type can be self-configured. There are two alarm signals outputs for relay alarm output, which is active-low.

PIN Name	Type	Configuration Method
ALARM_IN1	Input	2 alarm signal input pins, which can configure alarm input types by yourself, such as power alarm information detection. The default configuration is low-level alarm, and high-level alarm is not available.
ALARM_IN2		
ALARM_OUT1	Output	ALARM_OUT1 can be extended to alarm indicator and low-level alarm.
ALARM_OUT2	Output	ALARM_OUT2 can be extended to relay, and the default is high level; The high and low levels can be configured by software.

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Reference circuit of relay alarm



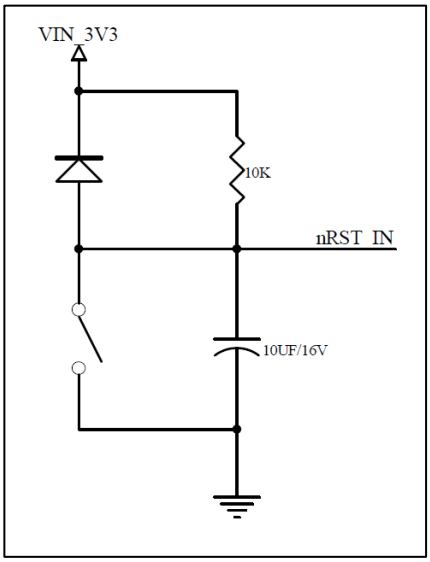
4.7 Reset Interface

The watchdog reset circuit is used in the module to monitor the normal operation of the program in real time, so as to prevent the program from entering an infinite loop or external interference. The module provides an external manual reset input pin, and an external hardware reset circuit can be designed for manual reset.

PIN Name	Type	Configuration Method
nRST_IN	Input	Module reset pin, when the duration of inputing low level of this pin is greater than 200ms, the system enters the reset state. Active low level, it is recommended to pull high.

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Reset Reference Circuit



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