

User Manual

MOS-1120Y/1121Y Series

ADVANTECH

Enabling an Intelligent Planet

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Online Technical Support

For technical support and service, please visit our support website at
<http://support.advantech.com.cn>

Product Warranty (2 years)

Advantech warrants the original purchaser that all 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 that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you believe your product is defective, follow the steps outlined below.

1. Collect all information about the problem encountered (for example, CPU speed, Advantech products used, other hardware and software used, etc.). Note anything abnormal and list any onscreen messages displayed 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 a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

Packing List

Before card installation, ensure that the following items are included in the shipment:

- 1 x Mini PCIe card
- 2 x DB9 I/O plates/1 x DB37 I/O plate with 1 x iDoor bracket
- 1 x Cable
- 1 x Startup manual
- 1 x DB37-to-DB9 (4 ports) cable (for MOS-1120Y-1402E, MOS-1121Y-1402E)
- 1 x Warranty card

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Ordering Information

- MOS-1120Y-0202E 2-port isolated RS-232 iDoor module
- MOS-1120Y-1402E 4-port non-isolated RS-232 iDoor module
- MOS-1121Y-0202E 2-port isolated RS-422/485 iDoor module
- MOS-1121Y-1402E 4-port non-isolated RS-422/485 iDoor module

Message to the Customer

Advantech Customer Services

Every Advantech product is built to the most exact specifications to ensure reliable performance in the harsh and demanding conditions typical of industrial environments. Whether your Advantech product is destined for a laboratory or factory floor, be assured that your product can provide the reliability and ease of operation for which Advantech is renowned. Your satisfaction is our primary concern. A guide to Advantech's customer services is provided below. To ensure that you receive the full benefit of our services, please follow the instructions provided.

Technical Support

We want you to get the maximum performance from your products. Should you encounter any technical difficulties, we are available to provide assistance. Answers to the most frequently asked questions are provided in the product documentation. These answers are typically a lot more detailed than the ones provided over the phone. So please consult this manual first. If you still cannot find the answer, gather all relevant information or questions that apply to your problem, and with the product close to hand, call your dealer. Our dealers are well trained and ready to provide the support required for you to experience the most from your Advantech products. Most of the problems reported are minor and can be easily solved over the phone. In addition, free technical support from Advantech engineers is available during business hours. We are always willing to provide advice regarding application requirements or the installation and operation of any of our products.

Warnings, Cautions, and Notes

Warning! *Warnings indicate conditions that if not observed can cause personal injury!*



Caution! *Cautions are included to help prevent hardware damage and data losses. For example,*



“Batteries are at risk of exploding if incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.”

Note! *Notes provide additional optional information.*



Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect the equipment from all power outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or spray detergents.
4. For pluggable equipment, the power outlet socket must be located near the equipment and easily accessible.
5. Protect the equipment from humidity.
6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
7. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet.
8. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
9. All cautions and warnings on the equipment should be noted.
10. If the equipment is not used for a long time, disconnect it from the power source to avoid damage from transient overvoltage.
11. Never pour liquid into an opening. This may cause fire or electrical shock.
12. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
13. If one of the following occurs, have the equipment checked by service personnel:
 - The power cord or plug is damaged
 - Liquid has penetrated the equipment
 - The equipment has been exposed to moisture
 - The equipment is malfunctioning or does not operate according to the user manual
 - The equipment has been dropped and damaged
 - The equipment shows obvious signs of breakage
14. Do not leave this equipment in an environment with a storage temperature of below $-25\text{ }^{\circ}\text{C}$ ($-13\text{ }^{\circ}\text{F}$) or above $60\text{ }^{\circ}\text{C}$ ($140\text{ }^{\circ}\text{F}$) as this may damage the equipment.
15. This equipment has been tested and found to comply with the requirements for a Class A digital device. Operation of this equipment in a residential area is likely to cause harmful interference to radio communications. In such an event, users are required to correct this interference.

In accordance with IEC 704-1:1982 standards, the sound pressure level at the operator position does not exceed 70 dB (A).

DISCLAIMER: These instructions are provided according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

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Chapter 1

Overview

1.1 Introduction

Advantech's MOS-1120Y/MOS-1121Y series are industrial serial communication modules.

- MOS-1120Y-0202E: Isolated RS-232, 2-channel, DB9, PCIe I/F
- MOS-1121Y-0202E: Isolated RS-422/485, 2-channel, DB9, PCIe I/F
- MOS-1120Y-1402E: Non-isolated RS-232, DB37, 4-channel, PCIe I/F
- MOS-1121Y-1402E: Non-isolated RS-422/485, DB37, 4-channel, PCIe I/F

1.2 Specifications

1.2.1 General

- **Bus Type:** PCI Express mini card, Revision 1.2
- **Certification:** CE, FCC class A
- **Connectors:**
 - 2 x Male DB9 for MOS-112XY-0202E
 - 1 x Female DB37 for MOS-112XY-1402E
- **Dimensions:**
 - Module: 51 x 30 x 12.4 mm (2 x 1.18 x 0.49 in)
 - I/O Plate: 81 x 19.4 x 41 mm (3.19 x 0.76 x 1.61 in)
- **Power Consumption:**
 - 400 mA @ +3.3 V for MOS-112XY-0202E
 - 500 mA @ +3.3 V for MOS-112XY-1402E

1.2.2 Communications

- **Communications Controller:**
 - XR17V352 for MOS-112XY-0202E
 - XR17V354 for MOS-112XY-1402E
- **Data Bits:** 5, 6, 7, 8
- **Data Signals:**
 - RS-232: TX, RX, RTS, CTS, DTR, DSR, DCD, DI, GND
 - RS-422: TX+, TX-, RX+, RX-, (MOS-1121Y-1402E)
TX+, TX-, RX+, RX-, CTS+, CTS-, RTS+, RTS- (MOS-1121Y-0202E)
 - RS-485: Data+, Data-
- **FIFO:** 256 bytes
- **Flow Control:** Flow control RTS/CTS (MOS-1121Y-1402E not supported), Xon/Xoff
- **Parity:** None, Odd, Even, Mark, and Space
- **Speed:** 50 bps ~ 921.6 kbps
- **Stop Bits:** 1, 1.5, 2

1.2.3 Protection

- **Isolation Protection:** 2,000 V_{DC} for MOS-112XY-0202E
- **ESD Protection:** 15 KV
- **EFT Protection:** 1,000 V_{DC}
- **Surge Protection:** 1,000 V_{DC}

1.2.4 Software

- **Bundled Software:** ICOM tools and drivers
- **OS Support:** Windows XP/7/8/10, and Linux

1.2.5 Environment

- **Humidity (Operating):** 5 ~ 95% RH, non-condensing
- **Operating Temperature:** -20 ~ 60 °C (-4 ~ 140 °F)
- **Storage Temperature:** -40 ~ 85 °C (-40 ~ 185 °F)

1.3 Initial Inspection

The MOS-1120/MOS-1121 series modules are inspected mechanically and electrically before shipment. The product should be free of marks and scratches and in perfect working order when received.

When unpacking the MOS module, check for signs of shipping damage (damaged box, scratches, dents, etc.). If the product is damaged or fails to meet the specifications, notify our service department or your local sales representative immediately. Also notify the carrier. Retain the shipping carton and packing material for inspection by the carrier.

After inspection, we will make arrangements to repair or replace the unit. Regarding handling, remove the MOS module from its protective packaging by grasping the rear metal panel. Keep the anti-vibration packaging. When removing the card from a PC, store the card in the anti-vibration packaging for protection.

Chapter 2

Driver Setup and Installation

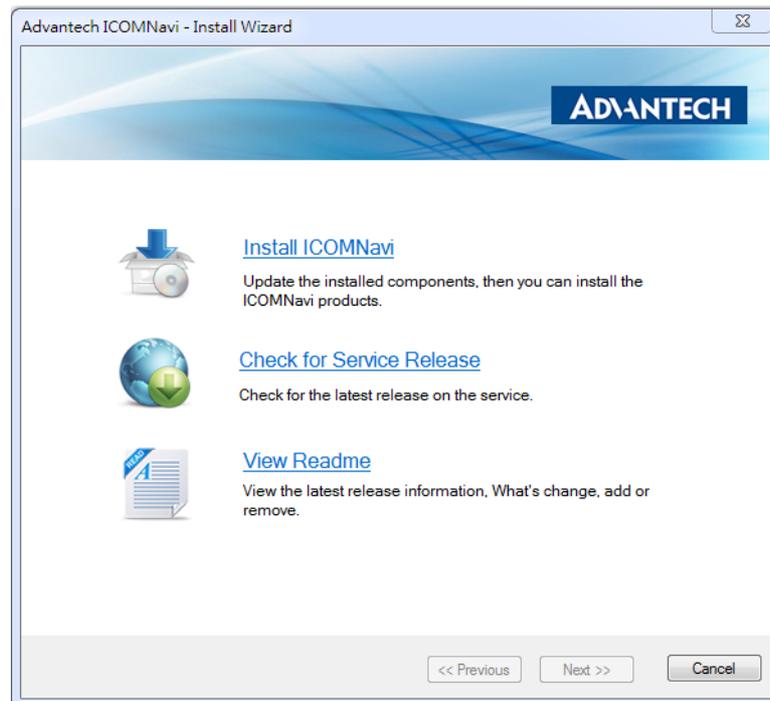
Follow the steps below to install the Advantech CAN WDM driver.

The MOS-1120/MOS-1121 series drivers are available download from the Advantech website at

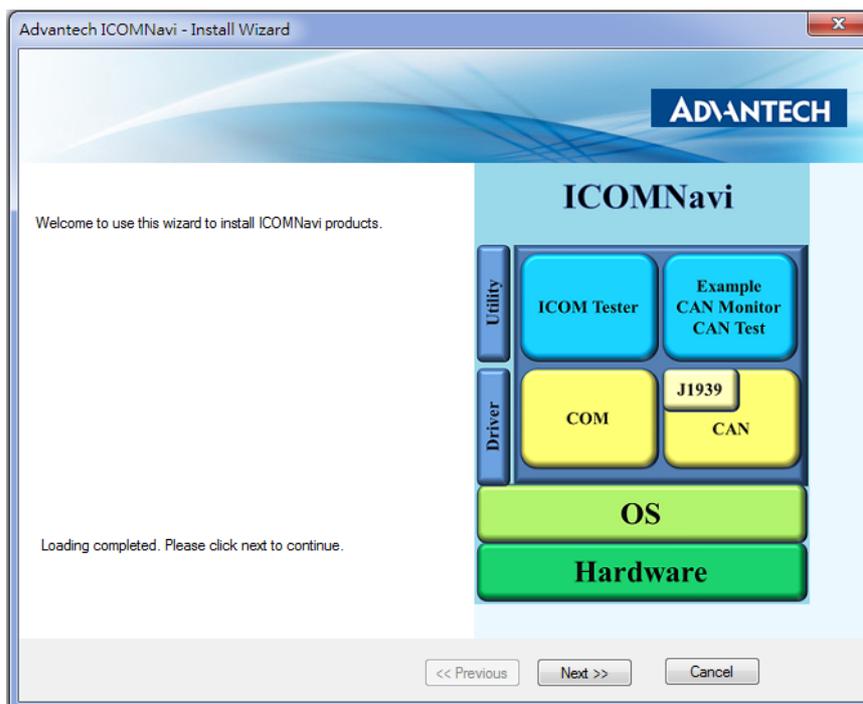
http://www.advantech.tw/products/idoor-module-mini-pcie-expansion-kit/sub_bc858a7f-a52b-441b-a59c-f511289f98bc

2.1 Driver Installation

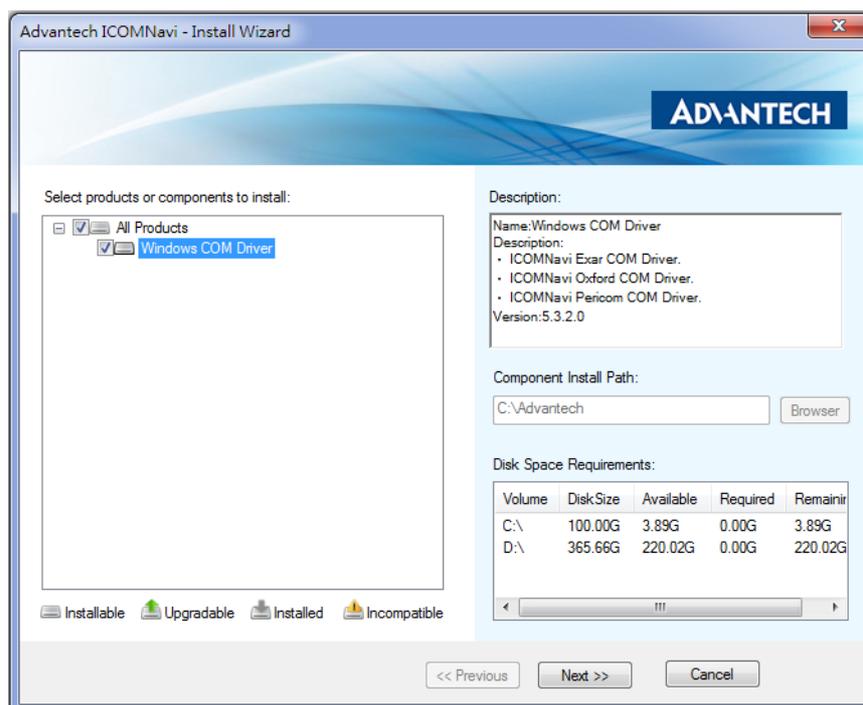
1. Download and double click the .exe file from the Advantech website to open the driver installation wizard.

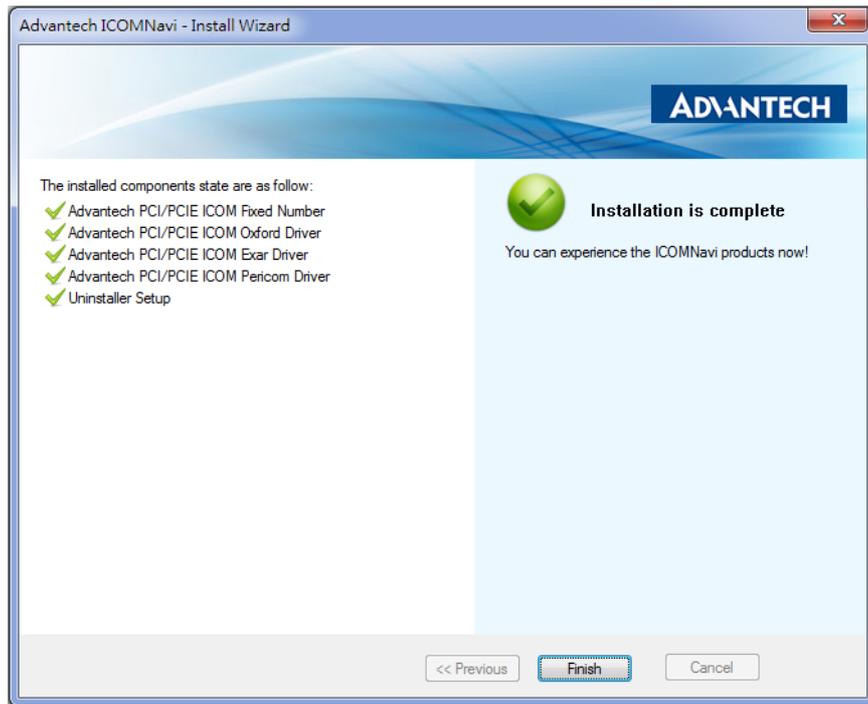


2. Click on the “Install ICOMNavi” option and click Next to begin the installation.



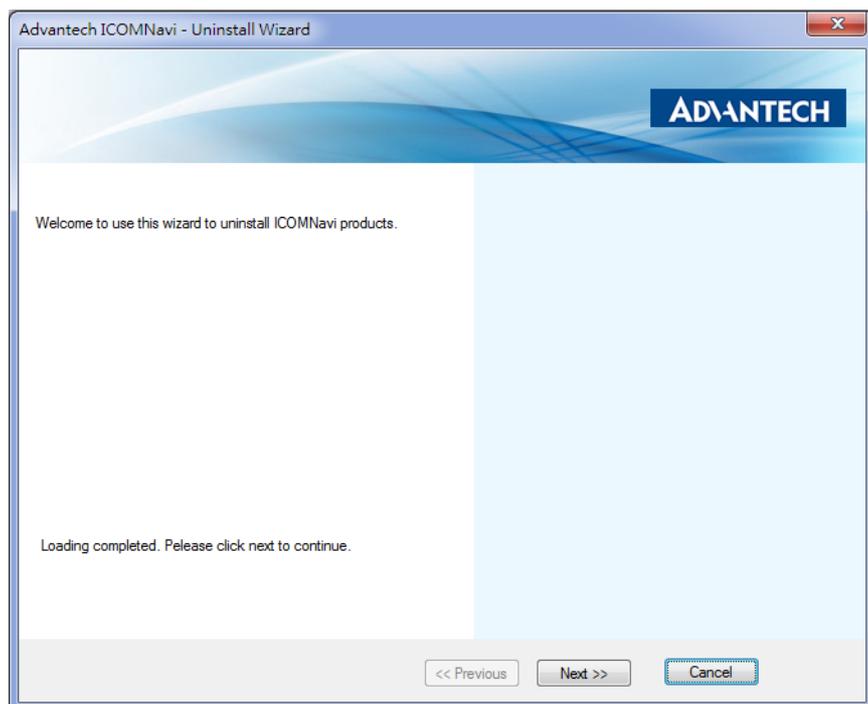
- Configure the driver installation path and click Next. The default path is "C:\Advantech".

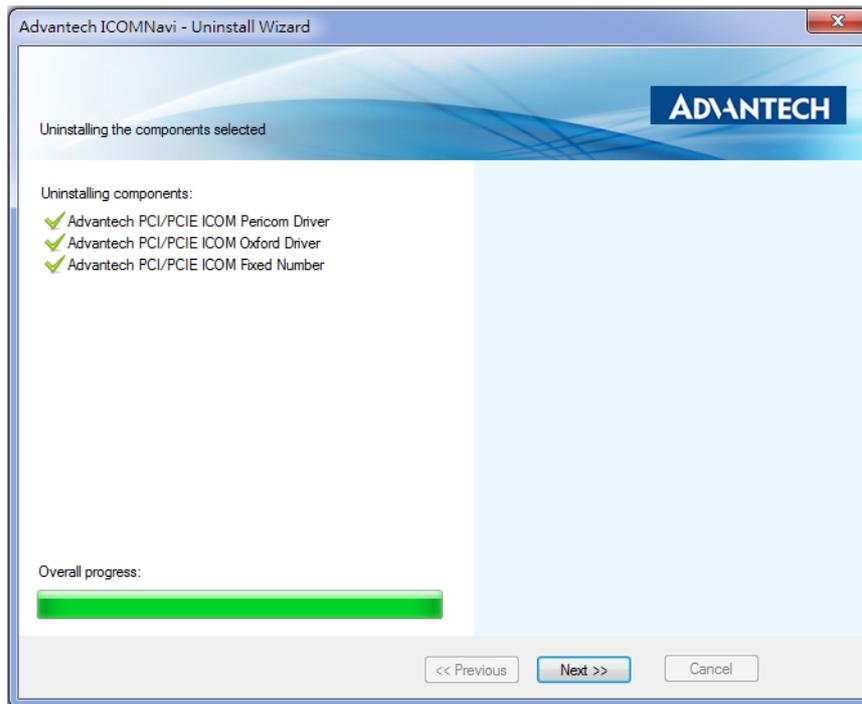




2.2 Uninstall Drivers

1. To remove the ICOM driver, access the Uninstall Wizard from the Start Menu folder and follow the onscreen prompts.





Chapter 3

Pin Assignments

3.1 MOS-1120Y-0202E

The following table shows the pin assignments of the two male DB9 connectors on the iDoor bracket for the MOS-1120Y-0202E card in RS-232 mode.

Table 3.1: MOS-1120Y-0202E Male DB9 on iDoor Bracket

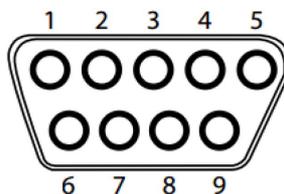
Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

3.2 MOS-1121Y-0202E

The following table and figure shows the pin assignments of the two male DB9 connectors on the iDoor bracket for the MOS-1121Y-0202E card in RS-422 and RS-485 modes.

Table 3.2: MOS-1121Y-0202E Male DB9 on iDoor Bracket

Pin	RS-422	RS-485
1	Tx-	Data-
2	Tx+	Data+
3	Rx+	-
4	Rx-	-
5	GND	GND
6	RTS-	-
7	RTS+	-
8	CTS+	-
9	CTS-	-



3.3 MOS-1120Y-1402E

The following tables and figures show the pin assignments of the one female DB37-to-DB9 male connector on the iDoor bracket for the MOS-1120Y-1402E card in RS-232 mode.

Table 3.3: MOS-1121Y-0202E Male DB9 on iDoor Bracket

Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

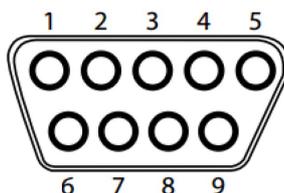
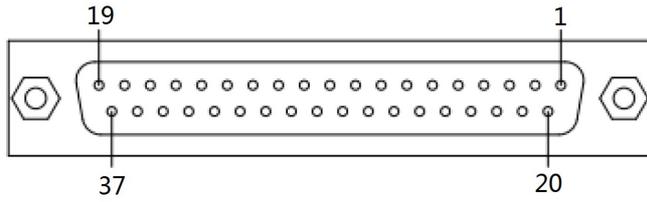


Table 3.4: MOS-1120Y-1402E Female DB37 on iDoor Bracket

Pin	RS-232	Pin	RS-232
1	-	20	3_RI
2	3_DCD	21	3_DTR
3	3_GND	22	3_DSR
4	3_CTS	23	3_RTS
5	3_RxD	24	3_TxD
6	4_RI	25	4_DCD
7	4_DTR	26	4_GND
8	4_DSR	27	4_CTS
9	4_DTS	28	4_RxD
10	4_TxD	29	2_RI
11	2_DCD	30	2_DTR
12	2_GND	31	2_DSR
13	2_CTS	32	2_RTS
14	2_RxD	33	2_TxD
15	1_RI	34	1_DCD
16	1_DTR	35	1_GND
17	1_DSR	36	1_CTS
18	1_RTS	37	1_RxD
19	1_TxD		



3.4 MOS-1121Y-1402E

The following tables and figures show the pin assignments of the one female DB37-to-DB9 male connector on the iDoor bracket for the MOS-1121Y-1402E card in RS-422 and RS-485 modes.

Table 3.5: MOS-1121Y-1402E Male DB9 on Cable

Pin	RS-422	RS-485
1	Tx-	Data-
2	Tx+	Data+
3	Rx+	-
4	Rx-	-
5	GND	GND
6		-
7		-
8		-
9		-

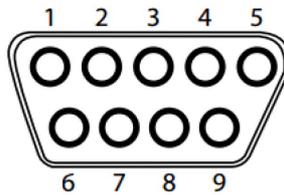
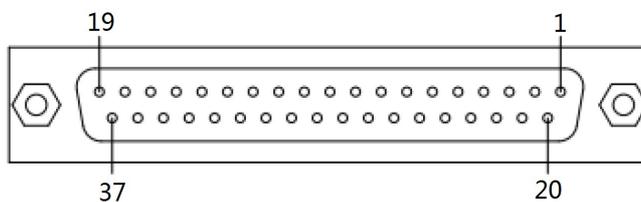


Table 3.6: MOS-1121Y-1402E Female DB37 on iDoor Bracket

Pin	RS-422	RS-485	Pin	RS-422	RS-485
1	-	-	20	-	-
2	3_TxD-	3_Data-	21	3_RxD-	-
3	3_GND	3_GND	22	-	-
4	-	-	23	-	-
5	3_TxD+	3_Data+	24	3_RxD+	-
6	-	-	25	4_TxD-	4_Data-
7	4_RxD-	-	26	4_GND	4_GND
8	-	-	27	-	-
9	-	-	28	4_TxD+	4_Data+
10	4_RxD+	-	29	-	-
11	2_TxD-	2_Data-	30	2_RxD-	-
12	2_GND	2_GND	31	-	-
13	-	-	32	-	-
14	2_TxD+	2_Data+	33	2_RxD+	-
15	-	-	34	1_TxD-	1_Data-
16	1_RxD-	-	35	1_GND	1_GND
17	-	-	36	-	-
18	-	-	37	1_TxD+	1_Data+
19	1_RxD+	-			



Chapter 4

Jumper and Switch Settings

4.1 MOS-1121Y-0202E Settings

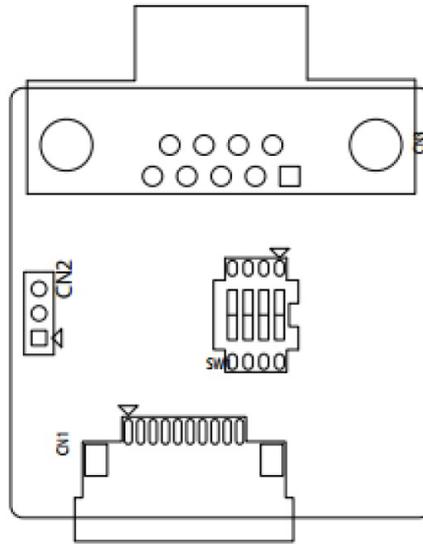


Table 4.1: MOS-1121Y-0202E Master/Slave Settings

Jumper	Pin	Description
CN2	1-2	RS-422 Master
	2-3	RS-485/RS-422 Slave (Default)

Table 4.2: MOS-1121Y-0202E Terminal Resistor Settings

Switch	Pin	Setting	RS-422 Description	RS-485 Description
SW1	1	ON	120 Ohm between	120 Ohm between
	3	OFF	Tx+/Tx-	Data+/Data-
	2	ON	120 Ohm between	Invalid
	4	OFF	Rx+/Rx-	
	1	OFF	300 Ohm between	300 Ohm between
	3	ON	Tx+/Tx-	Data+/Data-
	2	OFF	300 Ohm between	Invalid
	4	ON	Rx+/Rx-	

4.2 MOS-1121Y-1402E Settings

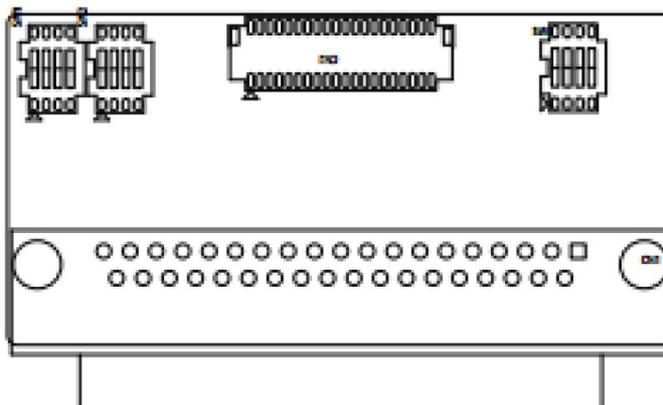


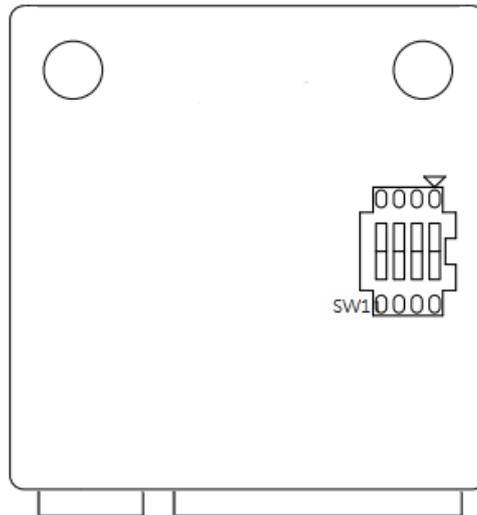
Table 4.3: MOS-1121Y-1402E Master/Slave Settings

COM Port	Switch	Pin	Setting	Description
COM 1	SW1	1	ON	RS-422 Master
			OFF	RS-485/RS-422 Slave (default)
COM 2		2	ON	RS-422 Master
			OFF	RS-485/RS-422 Slave (default)
COM 3		3	ON	RS-422 Master
			OFF	RS-485/RS-422 Slave (default)
COM 4		4	ON	RS-422 Master
			OFF	RS-485/RS-422 Slave (default)

Table 4.4: MOS-1121Y-1402E Terminal Resistor Settings

COM Port	Switch	Pin	Setting	RS-422 Description	RS-485 Description
COM 1	SW2	1	ON	120 Ohm between Tx+/Tx-	120 Ohm between Data+/Data-
			OFF	Open (default)	
		2	ON	120 Ohm between Rx+/Rx-	Invalid
			OFF	Open (default)	
COM 2		3	ON	120 Ohm between Tx+/Tx-	120 Ohm between Data+/Data-
			OFF	Open (default)	
		4	ON	120 Ohm between Rx+/Rx-	Invalid
			OFF	Open (default)	
COM 3	SW3	1	ON	120 Ohm between Tx+/Tx-	120 Ohm between Data+/Data-
			OFF	Open (default)	
		2	ON	120 Ohm between Rx+/Rx-	Invalid
			OFF	Open (default)	
COM 4		3	ON	120 Ohm between Tx+/Tx-	120 Ohm between Data+/Data-
			OFF	Open (default)	
		4	ON	120 Ohm between Rx+/Rx-	Invalid
			OFF	Open (default)	

4.3 Board ID Settings



This function is disabled as the default. If only a single communication card is installed, this function does not need to be enabled.

The communication cards feature a built-in DIP switch for defining the card's board ID. When multiple cards are installed, the board ID switch is useful for identifying the device number of each card.

After configuring the settings for each communication card, users can identify each card installed in the system according to their device numbers. The default board ID value is 0 (disabled). To adjust the board ID value, configure SW1 according to the table below.

Table 4.5: Board ID Setting

SW	Position 3	Position 2	Position 1	Position 0
BoardID	BID3	BID2	BID1	BID0
0	ON	ON	ON	ON
1	ON	ON	ON	OFF
2	ON	ON	OFF	ON
3	ON	ON	OFF	OFF
4	ON	OFF	ON	ON
5	ON	OFF	ON	OFF
6	ON	OFF	OFF	ON
7	ON	OFF	OFF	OFF
8	OFF	ON	ON	ON
9	OFF	ON	ON	OFF
10	OFF	ON	OFF	ON
11	OFF	ON	OFF	OFF
12	OFF	OFF	ON	ON
13	OFF	OFF	ON	OFF
14	OFF	OFF	OFF	ON
15	OFF	OFF	OFF	OFF

Chapter 5

Wiring

5.1 RS-232 Signal Wiring

Because the RS-232 interface is not strictly defined, many devices have unique connection methods that may ignore some signal lines or lines reserved for other functions. Therefore, it is best to refer to the installation instructions in the device user manual.

Generally, data terminal equipment (DTE) refers to a device that communicates with data circuit-terminating equipment (DCE). DTEs include PCs, terminals, and some printers, whereas DCEs include modems, digital service units (DSUs), printers, and laboratory/factory equipment.

In some situations, just three lines may be acceptable: data on TxD, a signal ground, and a handshaking line. Examples of where this would work are printer or plotter connections, troubleshooting, and situations where only one-wire communication is required.

Table 5.1: Terminal or PC (DTE) Connections

DB-25 Male		DB-25 Male or Female: Terminal	
Pin	Signal	Pin	Signal
2	TxD	3	RxD
3	RxD	2	TxD
4	RTS	5	CTS
5	CTS	4	RTS
6	DSR	20	DTR
7	GND	7	GND
20	DTR	6	DSR
8	DCD	8	DCD

Table 5.2: Modem Connections

DB-25 Male		Modem (DCE)	
Pin	Signal	Pin	Signal
2	TxD	3	RxD
3	RxD	2	TxD
4	RTS	5	CTS
5	CTS	4	RTS
6	DSR	20	DTR
7	GND	7	GND
20	DTR	6	DSR
8	DCD	8	DCD

For DTE-to-DCE connections, use a straight through cable (i.e., Lines 2 and 3, Lines 4 and 5, and Lines 6 and 20 do not need to be reversed because DCE RS-232 interfaces are typically already reversed).

Table 5.3: Terminal Without Handshake

DB-25 Male		Terminal, PC (DTE)	
Pin	Signal	Pin	Signal
2	TxD	3	RxD
3	RxD	2	TxD
4	RTS		
5	CTS		
7	GND	7	GND
6	DSR		
20	DTR		
8	DCD		

Therefore, if not using CTS, RTS, DSR,DTR and DCD signals, short Pins 4 and 5 together and Pins 6, 8, and 20 together.

5.2 RS-422 Signal Wiring

The RS-422 interface wiring is based on the one-to-one principle. The transmit lines on one side connect to the receive lines on the other side, and vice versa. With RS-422, data can be transmitted and received simultaneously (full duplex). The connections are as follows:

Table 5.4: RS-422 DB9 Pin Assignment

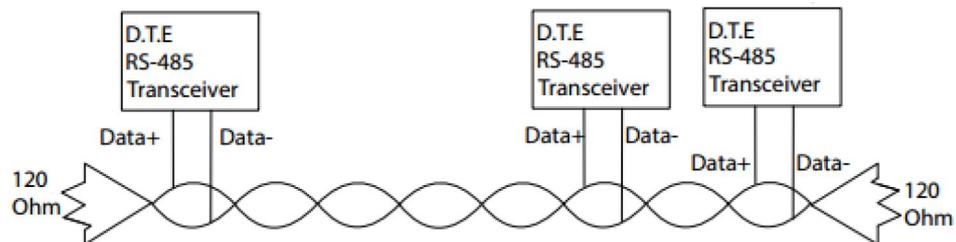
DTE (Male DB-9)		Terminal DTE	
Pin	Signal	Pin	Signal
1	TxD-	1	RxD-
2	TxD+	2	RxD+
3	RxD+	3	TxD+
4	RxD-	4	TxD-
5	GND	5	GND
6	RTS-	6	CTS-
7	RTS+	7	CTS+
8	CTS+	8	RTS+
9	CTS-	9	RTS-

Termination Resistor Setup

Termination resistors are included onboard and can be selected by using a jumper for 120 or 300. Each pair of signal lines has a separate resistor (RxD+/-, TxD+/-).

5.3 RS-485 Signal Wiring

The RS-485 standard supports half-duplex communication. This means that just two wires are needed to both transmit and receive data. Handshaking signals (such as Request-To-Send signals) are normally used to control the direction of the data flow and to switch transmissions accordingly. In RS-485 mode, MOS-1121Y cards automatically sense the direction of the data flow and switch the transmission direction, thereby eliminating the need for handshaking. This means users can build an RS-485 network with just two wires. This RS-485 control is completely transparent to the user. The software written for half-duplex RS-232 functions without requiring any modification.



Termination Resistor Setup

If necessary, termination resistors can be installed for impedance matching. MOS-1121Y cards have mounting spaces for termination resistors, but no resistors are installed at the factory. Depending on the application, users may need to solder on a single resistor to handle the DATA+/DATA- pair (and a corresponding resistor on the other end of the connection). The value of the resistor should equal the characteristic impedance of the signal wires (approximately 120 Ohms or 300 Ohms).

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