IS4310-232M4

RS232 Modbus RTU Slave Module

Presentation

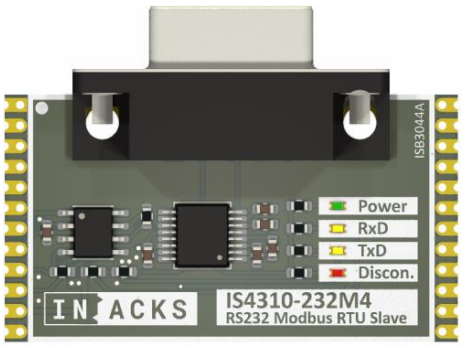
The IS4310-232M4 is a ready-to-operate module integrating the Modbus RTU Slave chip IS4310 with an RS232 transceiver. This solution reduces to the minimum expression the design effort of integrating a Modbus RTU Slave with an RS232 electrical interface.

The module can be directly soldered to your PCB with its castellated holes, or you can solder a pin header and use it as a module.

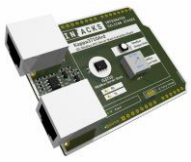
Module Characteristics

Electrical Characteristics	
Module Voltage	3.3V
I2C Compatible Voltage Levels	3.3V, 5V

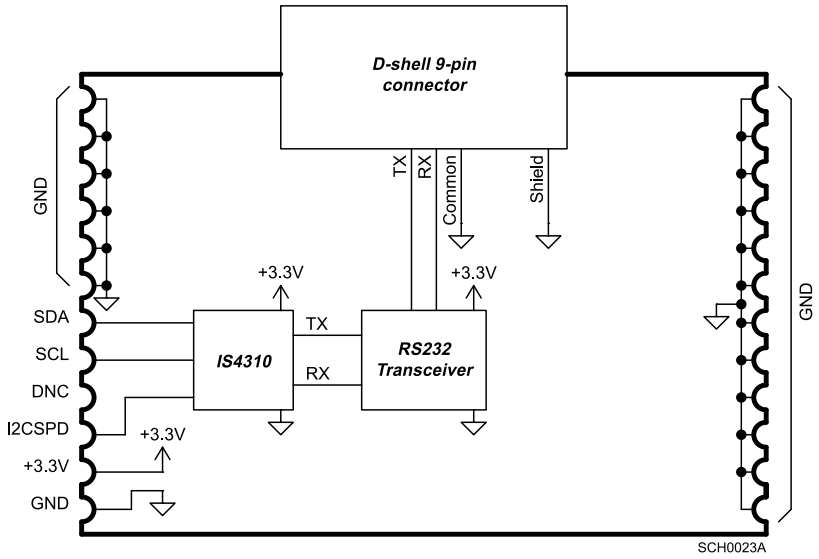
Modbus Characteristics	
Supported Function Codes:	3 (0x03) - Read Holding Registers 6 (0x06) - Write Single Register 16 (0x10) - Write Multiple Registers
Holding Registers:	500
Operating Mode:	RTU
Electrical Interface:	RS232



Product Selection Guide

	Part Number		Form Factor	Physical Layer	Stack	Description
Only Stack	IS4310-S8		SO8N	UART	Modbus RTU Server	Modbus RTU Slave Stack Chip.
Stack with Physical Layer	IS4310-485M2		Castellated Holes Module	RS485	Modbus RTU Server	IS4310 with RS485 Transceiver. Industrial communications.
	IS4310-ISO485M6		Castellated Holes Module	Isolated RS485	Modbus RTU Server	IS4310 with Isolated RS485 Transceiver. The isolation offers more robust communications and longer RS485 bus distances.
	IS4310-422M3		Castellated Holes Module	RS422	Modbus RTU Server	IS4310 with RS422 Transceiver.
	IS4310-232M4		Castellated Holes Module	RS232	Modbus RTU Server	IS4310 with RS232 Transceiver.
Evaluation Boards	Kappa4310Ard		Arduino Compatible	RS485	Modbus RTU Server	IS4310 Evaluation Board with RS485 Transceiver. Compatible with Arduino.
	Kappa4310Rasp		Raspberry Pi Compatible	RS485	Modbus RTU Server	IS4310 Evaluation Board with RS485 Transceiver. Compatible with Raspberry Pi.

1. Description



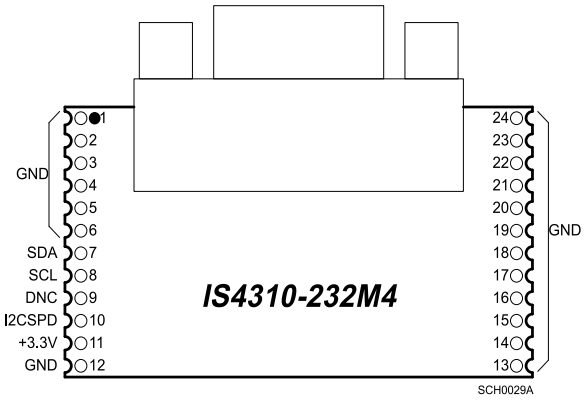
The IS4310-232M4 is a compact (44 × 24 mm) module with castellated holes, designed for PCB mounting to function as an RS232 Modbus RTU Slave. It features two key components: the Modbus RTU Slave Stack (IS4310) and an RS232 transceiver.

The module features a female D-shell 9 pin connector, the popular and wrongly known as DB9. The Shield pin connected to GND. Ensure that you use shielded cables.

The module operates at a fixed voltage of 3.3V. The I2C pads (SDA and SCL) are open-drain and compatible with both 3.3V and 5V. The DNC pad must be left unconnected. The I2CSPD pin is used for I2C speed selection. The module includes multiple GND pads, and proper soldering of all pads is essential for mechanical stability and durability when attaching the module to the main PCB.

The module also features a green LED to indicate power status, a yellow LED to signal data transmission and another to signal reception. A cable disconnected LED is also present.

1.1. Module Pinout



Pad	Name	Type	Description
7	SDA	Open Drain 3.3V (5V Tolerant)	SDA pin of the IS4310: Open drain, it requires pull-up.
8	SCL	Open Drain 3.3V (5V Tolerant)	SCL pin of the IS4310: Open drain, it requires pull-up.
9	DNC	Do Not Connect	This pad must be left floating.
10	I2CSPD	Analog Input 0 to 3.3V	I2CSPD pin of the IS4310: I2C-Serial Interface Speed Selection. • For 100kHz pull to GND. • For 400kHz make a voltage divider of +3.3V/2 (1.65V). • For 1MHz pull to 3.3V. Attention: Voltage in this pin above 4V will damage the IS4310.
11	+3.3V	Module Power (Power In)	Power supply for the module.
1-6, 12, 13-24	GND	Ground	Ground reference pad. GND pads are connected to the “Common” of the RS232 bus. GND pads are connected to the shield of the connector RS232 bus.

SCL and SDA Pads

I2C-Compatible Bus Interface Pads.

Both pads are open-drain and must be pulled up to 3.3V or 5V. The pull-up resistor value should be chosen based on the bus speed and capacitance. Typical values are 4.7kΩ for Standard Mode (100kbps) and 2.2kΩ for Fast Mode (400kbps) at both 3.3V and 5V.

+3.3V Pad

Module Power Supply Pad.

This pad is the power input for the entire module. 3.3V must be supplied to this pad. Bypass capacitors are included on the module, no need to place them outside of the module.

GND Pads

Module Ground.

These pads are also connected to the Common signal of the RS232 bus.

GND pads are connected to the shield of the DB9 connector.

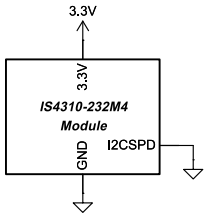
The module has multiple GND pads, all of which must be soldered to ensure proper mechanical attachment of the module to the main PCB. This is especially important when the RJ45 connectors are plugged in, as a significant amount of force is applied to the module. Failing to solder all pads or poor soldering can cause the module to detach from the main PCB.

I2CSPD Pad

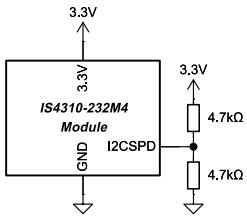
I2C-Serial Interface Speed Selection Pad.

This pad is directly connected to the pin I2CSPD of the IS4310. It configures the IS4310 internal I2C-Serial Interface timings and filters to properly work with the selected bus speed.

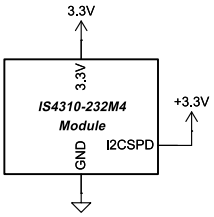
- For a **100kHz** setting, set the I2CSPD pad to GND.



- For a **400kHz** setting, set the I2CSPD to 1.65V (+3.3V/2) using a balanced voltage divider. This can be achieved by placing two 4.7kΩ resistors from the I2CSPD pin: one to VDD and the other to VSS.



- For a **1000MHz** setting, set the I2CSPD pad to 3.3V. Please note that pulling I2CSPD to 5V would permanently damage the IS4310 IC.



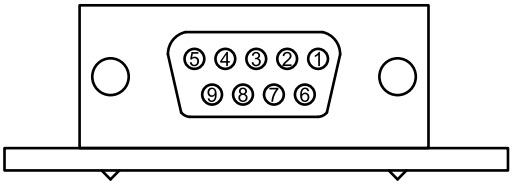
Important Remark:
A mismatch between the configured I2C speed and the actual operating I2C speed (e.g., configuring the bus for 100kHz but operating at 1MHz) can lead to an inconsistent state where some I2C messages are processed while others are not.

Ensure a proper match between the actual operating speed and the configured speed at the I2CSPD pad: If your bus works at 100kHz, ensure the I2CSPD pad is tied to VSS. If it works at 400kHz ensure the pad is at 1.65V. If it works at 1000MHz, ensure the pad is at 3.3V.

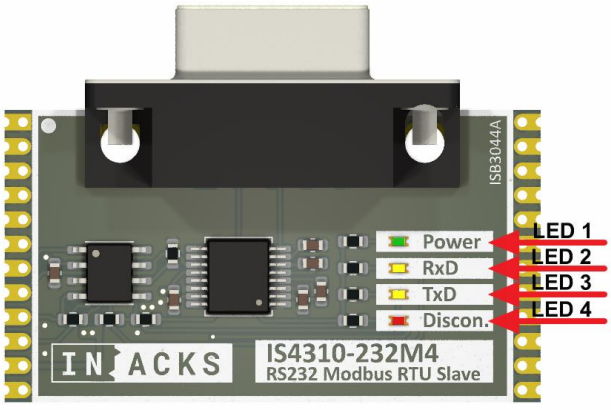
1.2. DB9 Connector

Typical Modbus Serial Line connectors include Screw Terminals, RJ45, and D-Sub 9-pin (commonly known as DB9), among others. The device-side connector must be female, while the cable-side connector must be male.

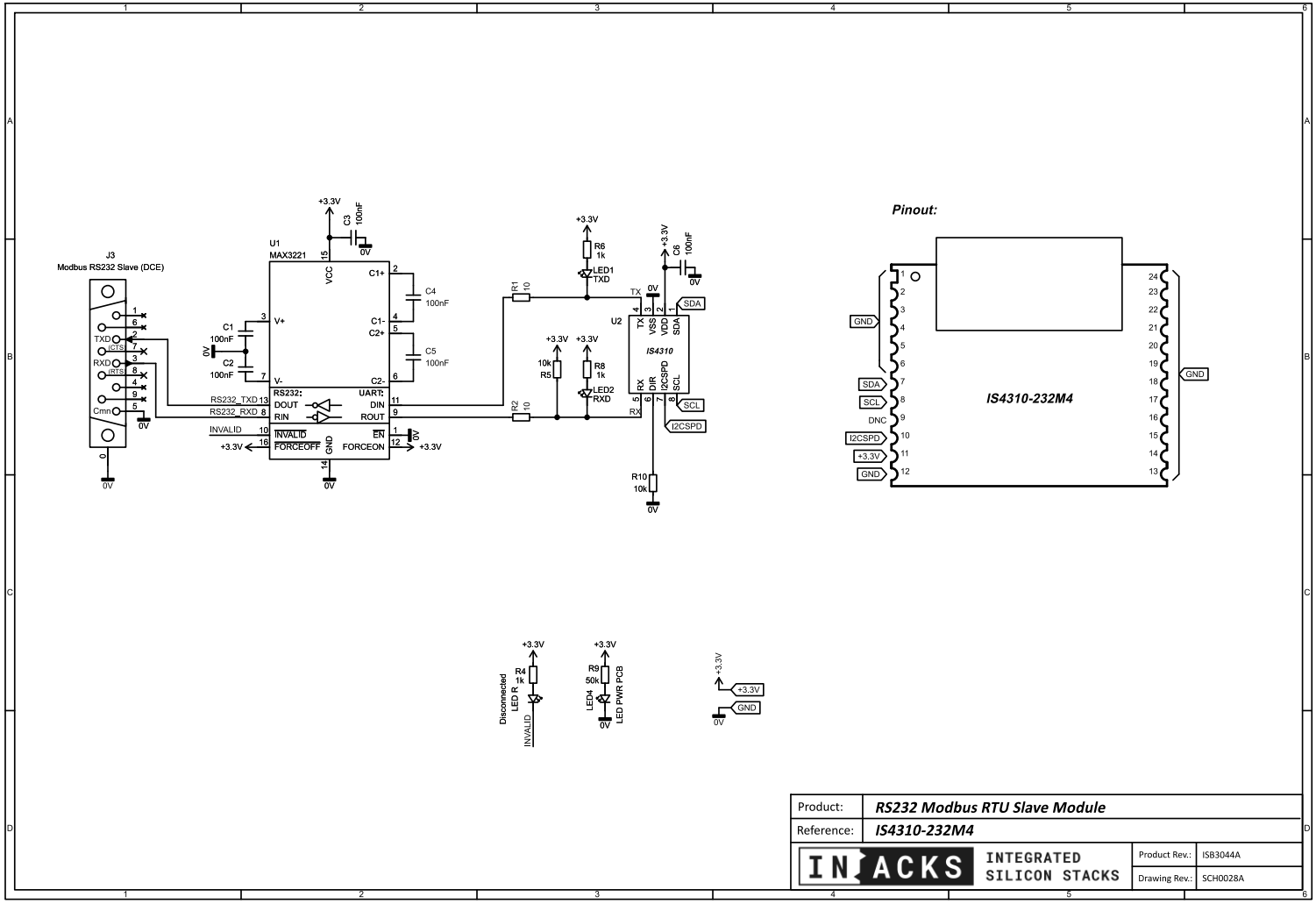
When selecting a cable, ensure it has shield and make sure to connect the cable shield to the connector shield to ensure proper electrical continuity.

Module's DB9 Connector for Modbus	
Module Front View (Female)  	1: NC
	2: TXD (Module's TXD pin)
	3: RXD (Module's RXD pin)
	4: NC
	5: Common
	6: NC
	7: NC
	8: NC
	9: NC
	Shield: Cable Shield

1.3. LEDs

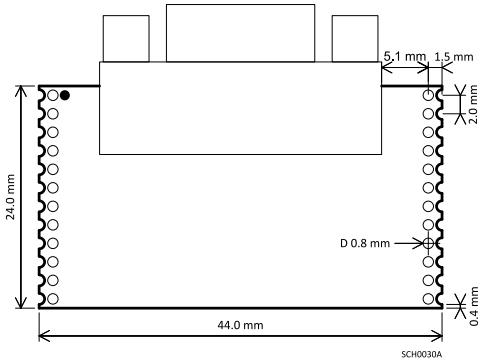
LED Location	LED #	Description
 	1	**Power Indicator** - Green: Module On - Off: Module Off
	2	**RxD Data Indicator** - Yellow Flashing: Receiving Data - Off: No Data
	3	**TxD Data Indicator** - Yellow Flashing: Transmitting Data - Off: No Data
	4	**Disconnected** - Red Steady: Error: the module is not properly plugged to a RS232 port. - Off: Connection Ok.

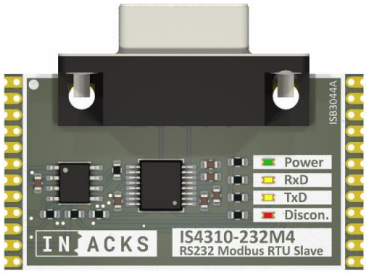
3. Schematic

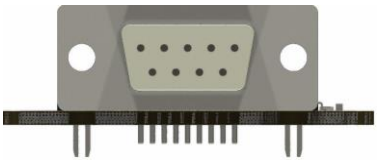

Pinout:
IS4310-232M4
Product: RS232 Modbus RTU Slave Module
Reference: IS4310-232M4
INTEGRATED SILICON STACKS
Product Rev.: ISB3044A
Drawing Rev.: SCH0028A

4. Mechanical Dimensions

M4 Package



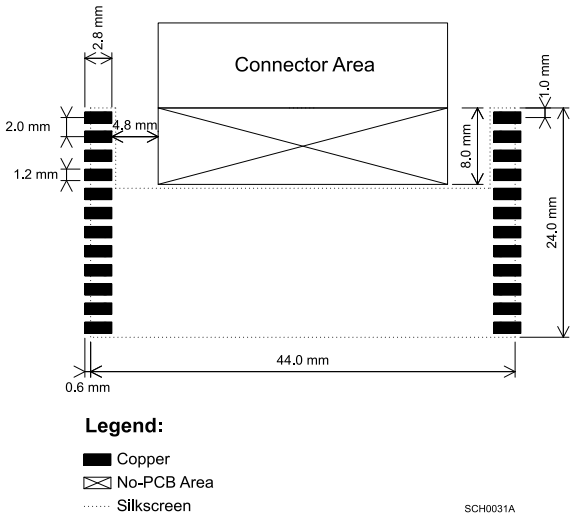


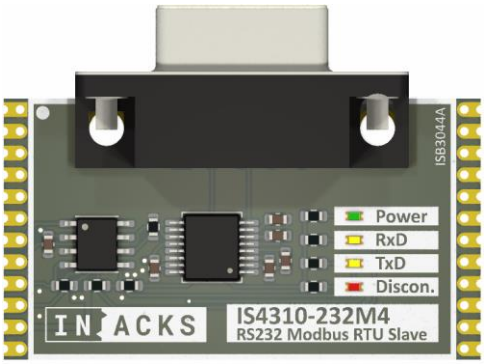


Units
Millimeters

Notes
This drawing is for general information only.
Not to scale.

M4 Recommended Footprint





Units
Millimeters

Notes
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Content

Appendix

Revision History

Document Revision

Date	Revision Code	Description
February 2025	ISDOC128**A**	Initial Release

Module Revision

Date	Revision Code	Description
February 2025	ISB3044**A**	Initial Release

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