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DONGKER XY-K485

DONGKER TTL to RS485 Converter Module XY-K485 User Manual

Model: XY-K485

1. Introduction

The DONGKER TTL to RS485 Converter Module XY-K485 facilitates mutual conversion between TTL and RS485 signals. This module is designed for industrial applications, offering robust anti-interference capabilities and automatic control of RS485 signal flow. It supports a wide voltage range and is compatible with both 3.3V and 5.0V systems.

2. Product Features

- **Wide Voltage Support:** Operates with a power supply from 3.0V to 30V (limit 33V, recommended under 30V, minimum 2.8V).
- **Signal Compatibility:** Compatible with both 3.3V and 5.0V TTL signals.
- **Multi-Machine Communication:** Supports communication with multiple devices, allowing connection of at least 40 nodes on the same network.
- **Hot-Swappable:** Designed to be hot-swappable without signal interruption.
- **Automatic Flow Control:** Automatically manages RS485 signal flow, switching between transmit and receive directions.
- **Industrial Grade Design:** Features strong anti-interference capabilities and 485 lightning protection, suitable for harsh industrial and outdoor environments.
- **Operating Temperature:** Functions reliably in temperatures ranging from -40°C to +85°C.
- **Transmission Distance:** Effective transmission distance up to 800 meters. For distances exceeding 800 meters, a repeater is recommended.
- **High EMC and EMI Performance:** Ensures stable operation in electromagnetically noisy environments.
- **User-Friendly Connections:** Equipped with terminal blocks and silicone wires for convenient wiring.
- **Status Indicators:** Includes RXD and TXD signal indicators to monitor transmission and reception status.
- **Secondary Development Support:** Standard 2.54mm pitch pins are available for custom integration.
- **Matching Resistance:** Features a 120 ohm matching resistance (shorted R0) for optimized long-distance transmission.

- **Interference Prevention:** Anti-jamming alignment and copper traces are incorporated to prevent signal interference.

3. Specifications

Specification	Value
Brand	DONGKER
Model Number	XY-K485 (Part No. 420319)
Baud Rate	110 ~ 256000 bps
Operating Voltage	3.0V ~ 30V DC
Operating Temperature	-40°C to +85°C
Dimensions (L x W x H)	52mm x 23mm x 20mm (approx.)
Connector Type	TTL (4-pin header), RS485 (2-pin screw terminal)
Specific Product Uses	Industrial control, automation
Quantity per Package	1 unit

4. Setup and Wiring

Proper wiring is crucial for the correct operation of the TTL to RS485 converter module. Refer to the diagrams below for connection details.

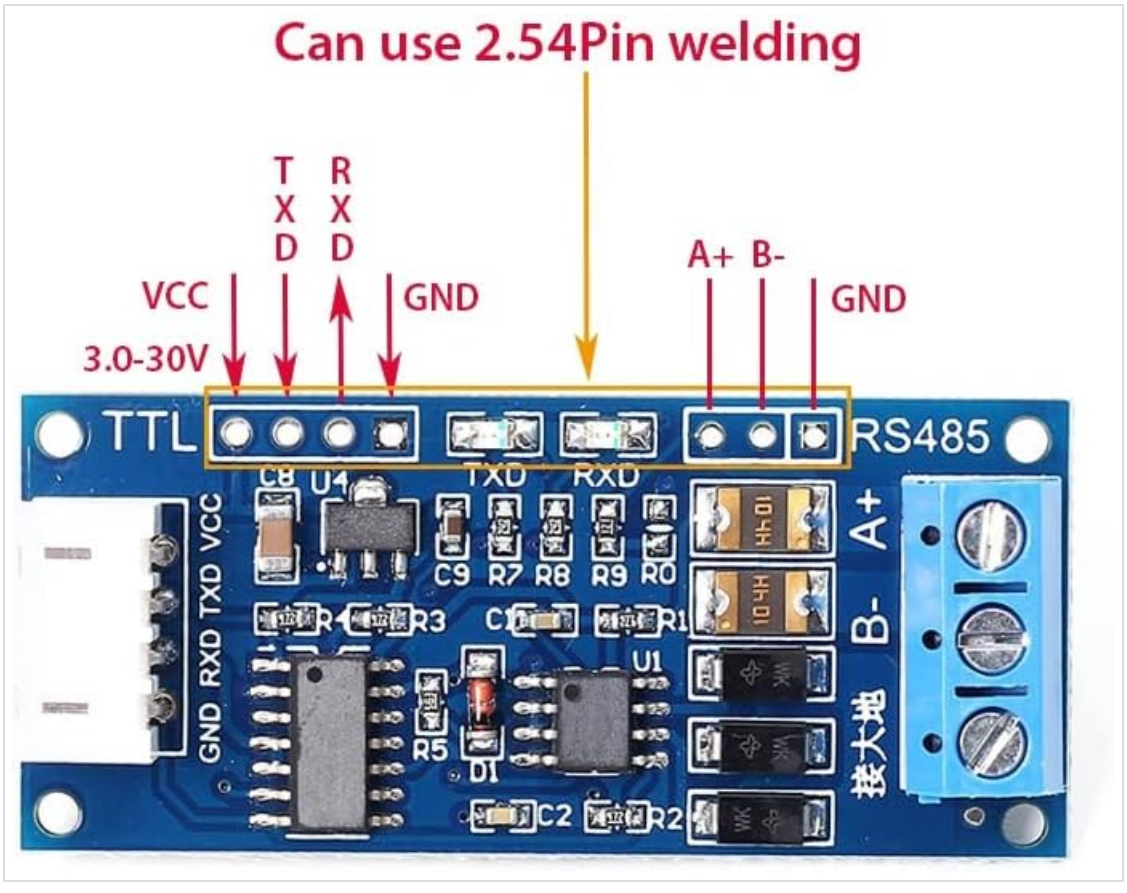


Image 4.1: TTL and RS485 Pinout Diagram. This image illustrates the pin assignments for both the TTL and RS485 interfaces. The TTL side includes VCC (power supply), TXD (transmit data), RXD (receive data), and GND (ground). The RS485 side shows A+ and B- terminals, along with an additional GND connection for grounding.

Description:	
The power supply of this product is wide voltage (3.0V ~ 30V), 3.3V system and 5.0V system compatible, 3.3V and 5.0V signals can match. This product with a terminal block and silicone wire, direct wiring use, all imported original chip, powerful, lightning protection design, anti-interference ability, industrial.	
This transmission module to achieve the TTL signal and RS485 signal interchange, but we must know, 485 is half duplex communication, this communication can achieve two-way communication, but not in both directions at the same time, must Alternately; that is, each section of the communication channel can be either a transmitting end or a receiving end, but at the same time, the information can have only one transmission direction.	
To achieve the RS485 signal automatic flow control, send and receive direction automatically switch, use this module with your operation as simple as the serial port	
Baud rate: 110 ~ 256000bps	
Feature:	
1	wide voltage power supply (3.0V ~ 30V), the limit voltage of 33V, it is recommended to use within 30V, the minimum voltage is higher than 2.8V.
2	compatible with 3.3V and 5.0V signals, can match the module
3	has a very high EMC and EMI performance.
4	the use of imported chips, industrial design, anti-interference ability, while the use of powerful 485 lightning design, industrial and field can be used in harsh environments, the working temperature of -40 ℃ to +85 ℃, transmission Distance up to kilometers (with 850 meters of 2*1.5 cable to do the test, it is recommended to use within 800 meters, more than 800 meters plus repeaters)
5	with a terminal block and silicone wire, the use of very convenient.
6	with RXD, TXD signal indicator, send and receive situation panoramic view.
7	This module fully considered the 485 bus lightning protection design and anti-jamming design, high EMC, EMI performance, long-distance transmission in the field, the module "access to the earth" side access to the earth, can play well The anti-interference and lightning protection of the role of the 485 bus more secure; indoor short-distance transmission can not access the earth.
8	with a standard 2.54 pitch pin, to facilitate your secondary development
9	with 120 ohm matching resistance, shorted R0 can be enabled to match the resistance, long-distance transmission recommended shorted.
10	support multi-machine communication, the same network can connect at least 40 nodes.
11	can be hot-swappable, there will be no signal to death phenomenon.
12	anti-jamming alignment and copper way to prevent interference with the signal.

Image 4.2: Back Connection Diagram. This diagram shows the back of the XY-K485 module, detailing the internal connections and pin labels for both TTL (VCC, TXD, RXD, GND) and RS485 (A+, B-, Earth) interfaces. It also indicates the module's model number, XY-K485.

4.1 TTL Interface Connection

- **VCC:** Connect to your power supply (3.0V to 30V).
- **TXD:** Connect to the RXD pin of your microcontroller or TTL device.
- **RXD:** Connect to the TXD pin of your microcontroller or TTL device.

- **GND:** Connect to the ground of your power supply and TTL device.

4.2 RS485 Interface Connection

- **A+:** Connect to the A+ line of the RS485 bus.
- **B-:** Connect to the B- line of the RS485 bus.
- **GND (Earth):** Connect to the common ground of the RS485 network, if applicable, for improved noise immunity.

The module uses a 2.54mm pitch white socket for TTL connections and screw terminals for RS485 connections, providing flexibility for various wiring methods.



Image 4.3: 2.54mm White Socket and Silicone Wires. This image highlights the 2.54mm pitch white socket for TTL connections, often used with 4-pin silicone wires. These wires are designed for high temperature resistance and anti-aging properties, ensuring durability in industrial applications.

5. Operating Instructions

The DONGKER XY-K485 module operates as a transparent transmission device, converting data between TTL and RS485 protocols. RS485 is a half-duplex communication standard, meaning data can be sent and received, but not simultaneously. The module automatically manages the direction of data flow.

5.1 Data Transmission

1. Connect your TTL device (e.g., microcontroller UART) to the TTL pins (VCC, TXD, RXD, GND) of the module.
2. Connect the RS485 bus to the A+ and B- terminals of the module.
3. When your TTL device sends data via its TXD pin, the module automatically converts it to RS485 signals and transmits it on the A+ and B- lines. The TXD indicator LED on the module will illuminate.
4. When RS485 signals are received on the A+ and B- lines, the module converts them to TTL signals and outputs them via the RXD pin to your TTL device. The RXD indicator LED will illuminate.

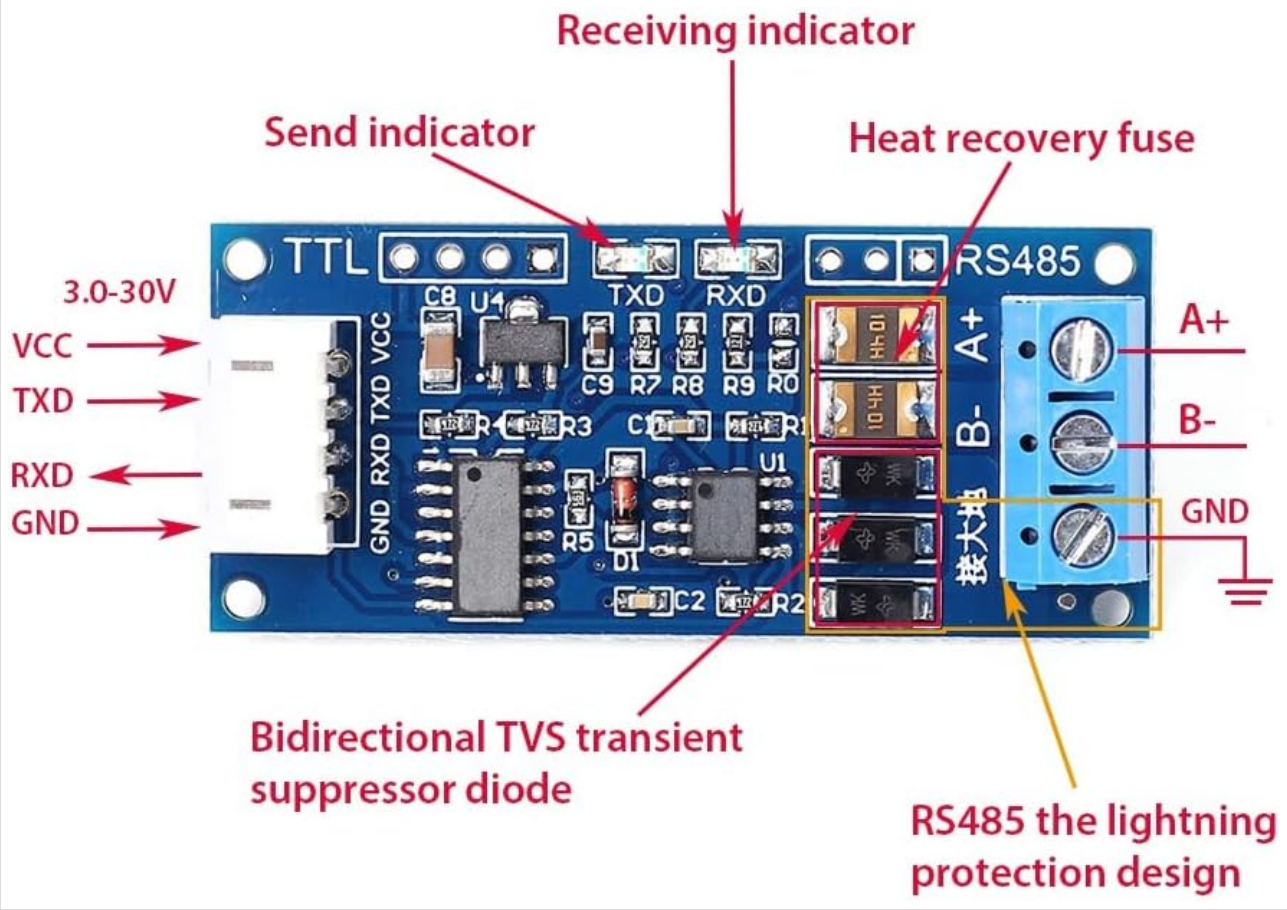


Image 5.1: Module Components and Indicators. This image provides a detailed view of the module's components, including the send (TXD) and receive (RXD) indicator LEDs, which provide visual feedback on data transmission status. It also highlights the heat recovery fuse, bidirectional TVS transient suppressor diode, and RS485 lightning protection design, emphasizing the module's robust industrial features.

5.2 Multi-Node Communication

For multi-node RS485 networks, ensure all modules are correctly wired to the bus. The automatic flow control feature simplifies communication by eliminating the need for manual direction switching. Each node can transmit and receive data sequentially.

5.3 Baud Rate Configuration

The module supports a wide range of baud rates from 110 bps to 256000 bps. Ensure that the baud rate configured on your TTL device matches the baud rate of the RS485 network for successful communication.

6. Troubleshooting

- **No Communication:**
  - Verify all wiring connections (VCC, GND, TXD, RXD, A+, B-).
  - Ensure the power supply voltage is within the 3.0V to 30V range.
  - Check that the baud rates of all communicating devices are identical.
  - Confirm that the A+ and B- lines are not swapped on the RS485 bus.
- **Intermittent Communication:**
  - Check for loose connections or damaged wires.
  - Ensure proper termination resistors (120 ohm) are used at both ends of a long RS485 bus. The module has an internal option (shorting R0).
  - Assess environmental interference; the module has strong EMI/EMC protection, but extreme conditions may require additional shielding.
- **LED Indicators Not Lighting Up:**
  - If TXD LED does not light, check if the TTL device is sending data.
  - If RXD LED does not light, check if the RS485 bus is transmitting data and if the A+/B- connections are correct.
- **Module Overheating:**
  - Ensure the power supply voltage does not exceed 30V for continuous operation.
  - Verify that the current draw is within acceptable limits for the module.

7. Maintenance

The DONGKER XY-K485 module is designed for durability and requires minimal maintenance. Keep the module clean and free from dust and moisture. Avoid exposing it to extreme physical shock or temperatures outside its specified operating range.

- Regularly inspect wiring for any signs of damage or corrosion.
- Ensure proper ventilation if installed in an enclosed space, especially in high-temperature environments.
- Store the module in an anti-static bag when not in use to prevent electrostatic discharge damage.



Image 7.1: Anti-static Bag Packaging. This image shows the module packaged in an anti-static bag, which is recommended for storage and transport to protect sensitive electronic components from electrostatic discharge.

8. Warranty and Support

Information regarding specific warranty terms and direct support contacts is not provided in the product details. For warranty claims or technical assistance, please refer to the retailer or manufacturer's official website where the product was purchased.

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