

rdc485Enet User Manual

ISOLATED DEVICE SERVER

Introduction

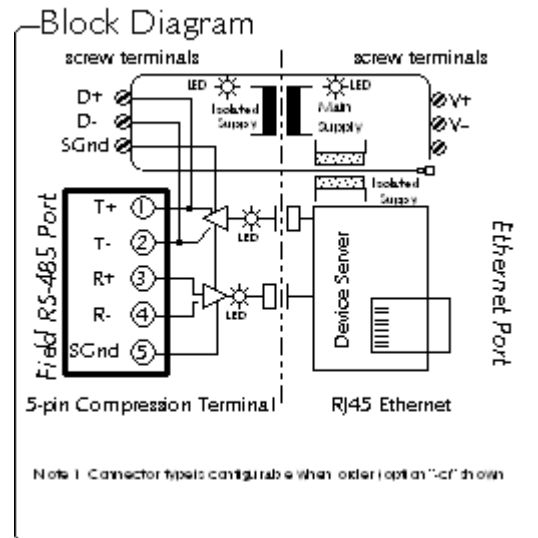
Serial communications (RS-232, RS-422 and RS-485) are cost-effective, reliable and time-tested protocols for data transfer. They are used in millions of manufacturing, banking, industrial and security applications that require serial-based peripheral device such as: bar code scanners, printers, CNC machines, security cameras, process equipment and card readers. Effectively and efficiently using data from a stand-alone serial device can be difficult however, as access is available only to the computer to which it is physically connected via local COM port. A device server offers a better solution by IP-enabling the serial device, connecting it to an Ethernet LAN or WAN. It can then be accessed from any computer on the network, just as if it were attached to a local serial COM port at each PC authorized to access it.

The rdc485Enet Isolated device server brings network connectivity safely and easily. It is designed to connect industrial devices with serial interface to an Ethernet network using the TCP/IP protocol family (TCP for transparent stream and UDP for datagram applications).

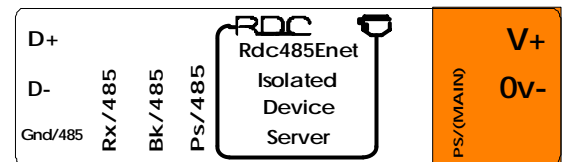
Product Overview

- Serial Interface**
 5-way terminal block connector (T+, T-, R+, R- and SGnd) & 3-way screw terminal at the top (D+, D- and SGnd)
- Network Interface**
 RJ45 (10/100BaseT) connector
 Supports 10/100 Mbps over Ethernet
- Isolation**
 2.5 KV optical isolation between RS-485 port and network port (RJ45)
 2.5 KV galvanic isolation between RS-485 port, RJ45 Port and the power supply
- Hardware and IP address**
 Six-bytes MAC address & default IP set to 0.0.0.0 (DHCP enabled)

- Surge Protection**
 600W transient suppresser diodes installed on RS-485 port (600w for 1ms with less than 1psec response to overvoltage)
- Network Protocols**
 The supported standards are:
 TCP, UDP, ARP, ICMP, DHCP, SNMP, HTTP, SMTP and SSL/TLS

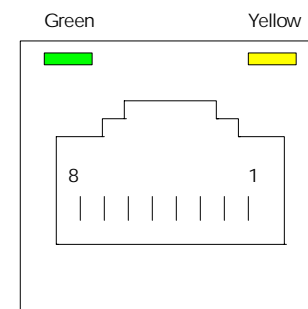


- User Indication (Top Side)**



Green LEDs PS/main and PS/485 denote main power and isolated power respectively. Yellow LED Rx/485 flickers when data is received from the RS-485 interface. Red LED Bk/485 turns on when the RS-485 is in the wrong idles state for too long.

- User Indication (RJ45 Side)**



Green LED
On 10/100Base-T network link present
Off 10/100Base-T network link not present

Yellow LED
On Network traffic detected
Off No network traffic detected

Configuration

Network Configuration

1. Setting the IP address

The unit has to be configured over the network, but first, its IP address has to be set. It is recommended to configure the unit in a network that has a DHCP server. This is because the initial IP for the unit is set to 0.0.0.0.

If a DHCP server is available, then refer to the next section to log in.

Otherwise, refer to the following steps to assign a temporary IP address over the network.

- (i) Go to the dos prompt.
- (ii) Use the ARP command to set the desired IP address using the MAC address of the unit, which is printed on the product label.

For example, with a MAC address of 00-40-9d-23-62-03 and a desired IP of 192.168.2.33, the command is:

For DOS systems,
Arp -s 192.168.2.33 00-40-9d-23-62-03

For Unix systems,
Arp -s 192.168.2.33 00:40:9d:23:62:03

Note: In order for the ARP command to work in windows, the ARP table on the PC must have at least one IP address defined other than its own. If there is no other entry beside the local machine, **ping** another IP machine on your network to build the ARP table. Once there is at least one entry in the ARP table, use the above command to ARP an IP address to the unit.

Go to the next section to attempt to log in. If the device discovery program is unable to detect the unit, repeat the Arp procedure. Remember to set the unit to a fixed IP after logging in.

2. Logging In

To access the unit, use the digi device discovery program (must be installed from the CD). The discovery program will list the mac and IP addresses of all rdc devices servers within the network. Double-clicking on the appropriate mac address will open a login screen. Use the following information for the initial login :

Username : root
Password : dbps

At this point, the user has full control over the unit.

3. Serial Configuration

Following the network configuration, select the serial interface configuration to set the parameters for the serial comm.

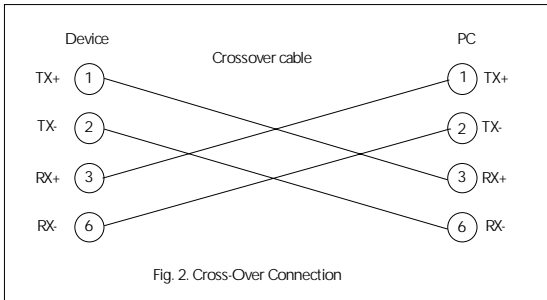
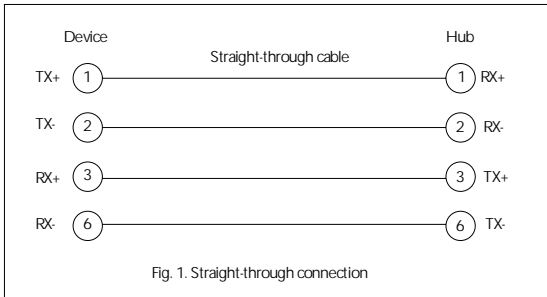
For normal operation, the Rdc485Enet has 8 jumpers installed on board to terminate and bias the RS-485 interface. These are only removed when more than two units of rdc485Enet are connected to the same RS-485 wire pair. For example, if 4 units of Rdc485Enet are connected to a wire pair, then at least 2 of them must have all TT & RT jumpers removed (see the application note for details).

Note: The unit can be selected for 2-wire or 4-wire communication mode using the 2w & 4w jumper.

Installation

1. Network Connection

There are two types of UTP Ethernet cable connections. One is the straight type and the other is Crossover type as can be seen in the following figures:



Note: A pair of twisted wires must be used to connect a set of transmitter pins to their corresponding receiver pins. DO NOT use a wire from one pair and another wire from a different pair.

2. Serial Connections

In 4-wire mode, the master device transmits on the transmit wire pair to the receive terminals of ALL slave device. The "T+" and "T-" terminals of the master should be connected to the "R+" and "R-" terminals of all the slaves respectively. All slave devices will share a common receive wire pair to respond to the master device. The "T+" and "T-" terminals of all slave devices should be connected to the master "R+" and "R-" terminals of the master.

As a convention, RDC suggests choosing the darker wire (or solid color) for the "+" and lighter color (or solid or striped) for the "-". Since the bus is bi-directional, all terminals "+" and "-" both transmit and receive when appropriate. Remember, RS-485 is not a loop.

On the Rdc485Enet, the removable terminals are labeled as "T+", "T-", "R+", "R-", "G". Due to space limitations, only the transmit signals are echoed on the top terminal as "D+", "D-", "Gnd". If 2-wire mode is selected, only T+, T- and Gnd on the removable terminals will work.

3. Grounding

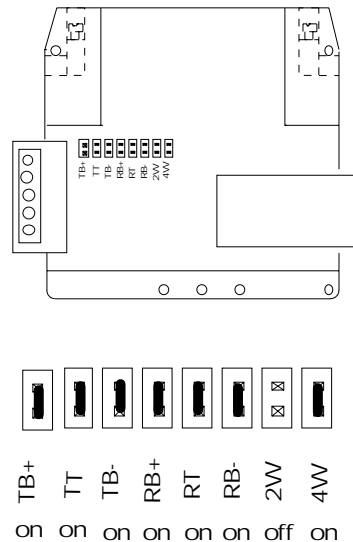
It is also critical that the signal ground be properly connected. If a 5th ground wire is unavailable, then the signal ground should be connected to the nearest device's digital ground or the shield drain wire. The unit will be damaged over time if this ground is not properly connected.

4. Jumper settings

Each RS-485 segment requires a terminating resistor at each end. The rdc485Enet assumes that the cable has a characteristic impedance of 120 Ohms. Therefore a RS-485 system will require at least 2 terminating resistors enabled (see the application note for details).

The biasing resistors will help to pull the wire pairs to a known state. Do take note however, that biasing voltages among different vendors could be different. Hence the rdc485Enet has the option to disable the biasings if required.

Below is a drawing of the rdc485Enet that shows the location of the jumpers for the RS-485. Those that are labeled "B" are the bias jumpers, while those labeled "T" are the terminating resistors.



Shorting enables the terminating/biasing while unshorting disables them. By default, all terminations and biasings are enabled.

Note: Either 4W (default) or 2W should be shorted at one time.

