rdc232ir5 User Manual

RS-232 TO RS-232 ISOLATED REPEATER
(5-WIRE : TXD, RXD, RTS, CTS, SGND)

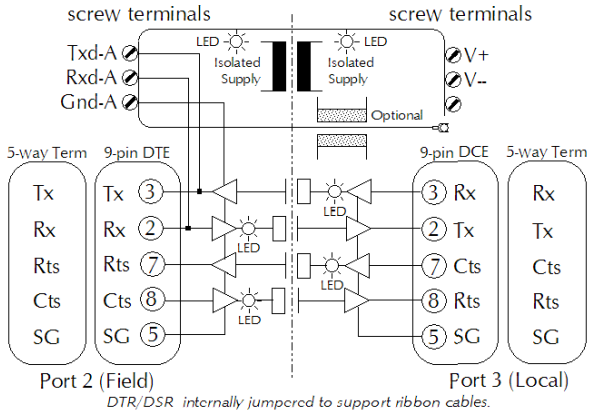
1. Introduction

1.1 Product Overview

For robust operation, the rdc232ir5 is an essential component of your industrial applications. It provides the following unique combination of features:

- ❑ It isolates and protects the RS-232 data signals Tx and Rx, supporting the common 5-wire RS-232 cables with pins 2, 3, 5, 7 & 8.
- ❑ With Port 2 on a floating ground, RS-232 cable runs up to 50 m can be guaranteed with quality, low-capacitance cable like Beldon 1422A at 42 pF/m. (RS-232 requires less than 2500 pF per signal wire.)
- ❑ Over 2500 Vrms optical isolation between Port 2 and Port 3 (5 KV test isolation) and 2500 Vrms galvanic isolation between Port 2 and the power supply (3 KV test isolation). The 3-port full isolation model has isolation between Port 3 and power supply too.
- ❑ For rapid troubleshooting, there are LED indicators for Tx, Rx, Rts, Cts, input power and isolated power. (LED sets A and B on the top casing corresponds to Port 2 and Port 3 respectively)
- ❑ Wide power supply range (9 to 36 Vdc) allows use with 9, 12, 15, 24 Vdc power supplies or direct from 12 or 24 Vdc battery systems.
- ❑ Port 2 (Field Port) has both a 9-pin d-sub shell connector (AT style) and large capacity compression screw terminals, giving maximum flexibility in installation in panels and terminal boxes.
- ❑ The 9-pin female "DCE like" port allows use of ribbon cables from 9-pin computer ports.
- ❑ 600 W transient suppresser diodes are installed on Port 2 as well as Port 3 in the 3-port isolation models. (600 W for 1 ms with less than 1 ps response to overvoltage)

1.2 Block Diagram



2. Installation

2.1 Making Standard Cables

For the "-dd" option, the rdc-232ir5 has a 9-pin male (DTE) connector on Port 3 and a 9-pin female (DCE) connector on Port 2. Both are configured as a standard "AT" style COM port and this combination of male/female ports allows the rdc232ir5 to be by-passed for testing purposes (but don't leave it that way!)

For the "-cc" option, both Ports 2 and 3 are fitted with removable 5-way screw terminals. The terminals on Port 2 are labeled in the in the following sequence Tx, Rx, Rts, Cts, SG while Port 3's sequence is Rx, Tx, Cts, Rts, SG.

Important Note : For the "-cc" option, the sequence of the terminal labels in Port 2 and Port 3 are different !

The following figures below illustrates some possible common connections :

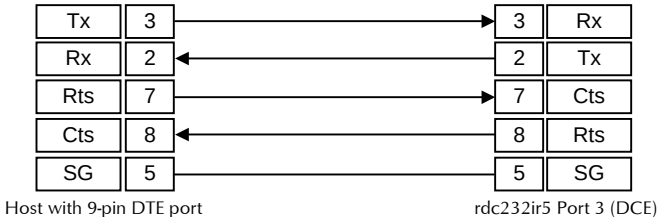


Figure 1 : Host with 9-pin DTE to Port 3

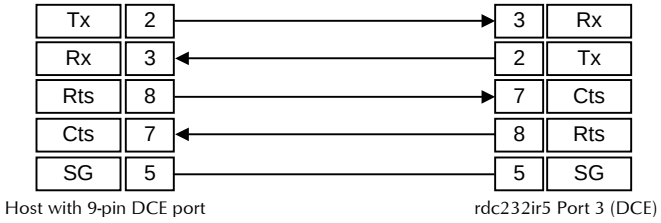


Figure 2 : Host with 9-pin DCE to Port 3

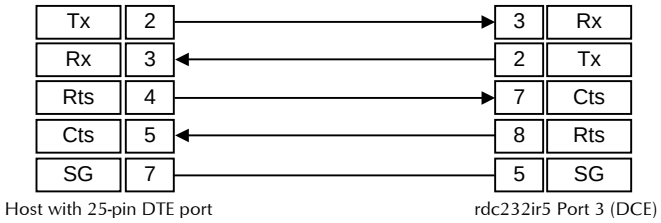


Figure 3 : Host with 25-pin DTE to Port 3

Figure 4 : Host with 25-pin DCE to Port

Standard RS-232 interface devices cannot be damaged by reverse wiring or short-circuits to ground. But be warned that some low-cost devices use transistors to approximate an RS-232 signal and this built-in protection may not be there.

2.2 Compression screw terminals:

Port 2 has a duplicate set of signals that are labeled as Txd-A, Rxd-A, and Gnd-A as screw terminals along the top of the casing. They will hold wires with lugs or ferrules up to 2.5mm² and could be more effective in some system designs. Note that Txd-A and Rxd-A cannot be used with Tx and Rx on Port 2 simultaneously.

2.3 Planning the panel wiring:

Power Supply: A fuse should be installed in the V+ supply wire. Models with full 3-port isolation have internal diodes to provide full reverse wire protection. Models with partial 2-port isolation have internal diodes that will attempt to blow this fuse should the power supply wirings be reversed.

RS-232 Connection: The RS-232 connection is wired as described above. You may need to jumper the DTR/DSR or RTS/CTS pins in the host end of the cable – this depends on your application software (although it never hurts to do it!). A 24 to 28 AWG shielded cable with a shield drain wire is suggested. Ground the shield only at the remote end (i.e. not at the rdc232ir5 !).

RS-232 Lightning Protection: If required, RS-232 field wires can be protected by standard lightning protection devices. RDC suggests 15 or 16 V surge protection – but if you expect lightning problems, then RS-232 is a bad standard to use. It is both limited in distance and very sensitive to capacitance > 2500 pF - and all good lightning protection devices will add 10,000 pF or more.

3. Technical Specification

3.1 Port Description

3.1.1 RS-232
5-wire Signals : Tx, Rx, Rts, Cts, SG
Working voltage range : ±9 Vdc
Max voltage range : ±15 Vdc
Max surge : ±25 Vdc

3.1.2 Duplex
Operation can be either half or full-duplex.
No configuration required.

3.1.3 Speed
Tested to 115200 bps.
No configuration required.

3.1.4 Character Setting
Operates with any combination of parity, data, stop, and start bits. No configuration required.

3.2 Isolation (Per ISO/IEC 9549)

3.2.1 Port 2 to Port 3 : 2.5 KV (optical, 5 KV test)

3.2.2 Port 2 to Supply : 2.5 KV (galvanic, 3 KV test)

3.2.3 Port 3 to Supply
model "-2p" : none
model "-3p" : 2500 Vrms

3.2.4 Casing
Dielectric strength per DIN VDE 0303/part 2 is 400 KV/cm

3.3 Power Supply

3.3.1 Option "-dv" : 0.75 W Nominal (32 mA @ 24 Vdc)

3.3.2 Option "-hv" : 0.75 W Nominal (16 mA @ 48 Vdc)

3.3.3 Option "-5v" : 0.75 W Nominal (150 mA @ 5 Vdc)

3.4 Environmental

3.4.1 Ambient Operating Temperature : -20 C to +65 C

3.4.2 Ambient Storage Temperature : -40 C to +100 C

3.4.3 Relative Humidity : 10 to 90%, non condensing

3.4.4 Casing
Fungus and termite resistant

Flame Characteristics
Self-extinguishing per UL 94 V2

3.5 Mechanical Dimensions

3.5.1 Height, Width, Depth (See drawing below).

3.5.2 Weight : 130 g

3.5.3 Terminal Capacity
2.5mm strand (12 AWG)
4.0mm solid (12 AWG)

3.5.4 DB9 Connectors
30µ gold pins, 500 insertion cycles

3.5.5 Mounting Rail
DIN EN 50022 (35mm sym)
DIN EN 50025 (32mm asym)
Note: removal from a DIN EN 50025 rail is difficult