

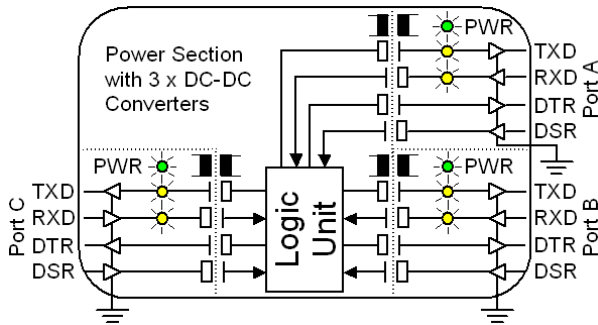
## RDC 232HUB USERS MANUAL

ISOLATED RS-232 3-WAY HUB

ISOLATED RS-232 MASTER TO 2 SLAVE DEVICES

### 1. INTRODUCTION

#### 1.1. Block Diagram



#### 1.2. Product Over-view

The rdc232hub is an incredibly handy device for use in distributed industrial applications. It provides an electrically safe, fool-proof, hands-off method to "share" an RS-232 programming port with both a remote engineering work-station (EWS) and a local work-station or note-book computer (LPC). Once you use one, you'll never want to design a system without it again.

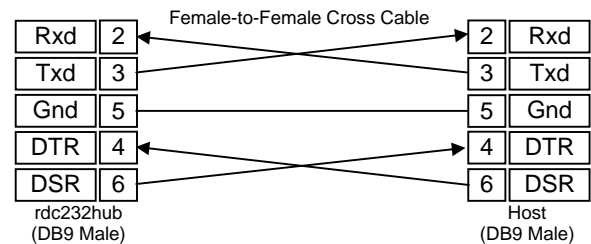
- ❑ In 3-way hub mode (*internal jumper J3 removed*) half-duplex data flows freely between all three ports A, B, & C. It allows the 232hub to act like a 3-node RS-485 network without the need for RS-485.
- ❑ In Master-Slave mode (*internal jumper J3 installed*) full-duplex data flows freely between either ports A & C, or ports B & C. It allows one master device to talk to 2 slaves, or two devices (a primary & backup) to share one resource.
- ❑ Handshaking signals DTR/DSR is supported in Master-Slave mode.
- ❑ All ports are galvanically/optically isolated from each other, up to 2.5 Kv.
- ❑ With an isolated floating ground, cable lengths up to 50m can be guaranteed with quality, low-capacitance cable like Beldon 1422A at 42pF/m. (RS-232 requires less than 2500pF per signal)
- ❑ For rapid troubleshooting, there are LED indicators for the Txd, Rxd, input power and isolated power.
- ❑ Wide power supply range (9 to 36vdc) allows use with 9v, 12v, 15v, 24v power supplies or direct from 12v or 24v battery systems.
- ❑ All three ports have 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.

- ❑ 600 watt transient suppresser diodes are installed on all isolated port. (600w for 1ms with less than 1psec response to over-voltage)

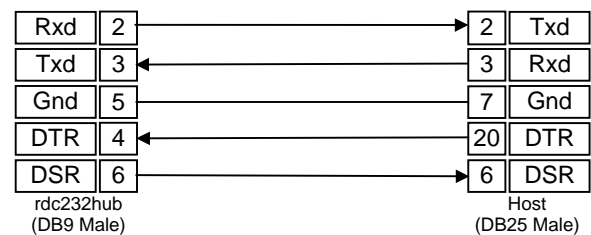
### 2. INSTALLATION

#### 2.1. Making Direct Cables

The rdc-232hub has three 9-pin male ports configured as in a standard "AT" style COM port. At least Txd, Rxd, and SGnd (pins 2, 3, 5) must be connected properly for normal 3-wire RS-232 communications. DTR and DSR can be enabled by setting the jumper as shown in the table in section 3.



**Wiring Diagram A : host with 9-pin DTE port**



**Wiring Diagram B : host with 25-pin DTE port**

#### 2.2. Compression screw terminals:

All three RS-232 ports also have Txd, Rxd, and Gnd signals available as screw terminals along the top. They will hold wires with lugs or ferrules up to 2.5mm<sup>2</sup>. This may be more effective in some system designs.

❑ A DVM or voltmeter can be used to tap on the screw terminals to instantly verify the cable wiring. When properly wired, both Txd and Rxd must be in the range of -3 to -15vdc. If you have your wires swapped, then Txd will be correct and Rxd will be around 0v, which is incorrect.

#### 2.3. Planning the panel wiring:

**Power Supply:** A fuse should be installed in the V+ supply wire. The rdc232hub is built with internal diodes for full protection against reverse wiring the supply.

**RS-232 Connection:** The RS-232 connection is wired as described above. You may need to jumper the RTS/CTS pins in the host end of the cable -- this depends on your application software (it never hurts to do it!). RDC suggests using a shield drain wire between 24 to 28 AWG. Ground the shield only at the remote end (not at the rdc232hub).

**RS-232 Lightning Protection:** If required, the RS-232 field wires can be protected by standard lightning protection devices. RDC suggests 15v or 16v surge protection - but if you expect lightning problems then RS-232 is a bad standard to use. It is limited in

distance and sensitive to capacitance > 2500pF - and all good lightning protection devices will add 10,000pF or more.

### 3. FIRMWARE

#### 3.1. Model -F1

Models ending with -F1 (such as the rdc232hub-dv-4p-F1) are loaded with a standard firmware that will respond to the jumper settings as shown in the table below. For example, when J3 is unshorted, the rdc232hub behaves like a hub with the DTR on all ports set to low (active).

J1	J2	J3	Function	DTR/DSR
Don't care	OFF		3-way Hub	All DTR Forced On
ON	ON	ON	Master (C) Slave (A & B)	All DTR Forced On
OFF	ON	ON		DTRC = DSRA and DSRB
ON	OFF	ON		DTRC = DSRA or DSRB
OFF	OFF	ON		Each DTR = DSR

See below for more details on the operation of the DTR/DSR pins.

- 3.1.1. **All DTR Forced On;** All 3 DTR signals will remain low (active) at all times.
- 3.1.2. **DSRA and DSRB;** the DTR of the Master (device C) is low (active) only if the DSR signals from BOTH slaves are low (active). This supports hardware hand-shaking on 2 printers with different print speeds. However, turning 1 printer off in effect disables printing.
- 3.1.3. **DSRA or DSRB;** the DTR of the Master (device C) is low (active) if the DSR signals from EITHER slave is low (active). This can be used to 'notify' the Master that at least 1 slave is ready.
- 3.1.4. **Each DTR = DSR;** each DTR output "copies" the DSR setting it sees. This, in effect, loops the DSR and DTR signals together.

### 4. TECHNICAL SPECIFICATION

#### 4.1. Port Description

- 4.1.1. **RS-232;** 5-wire RS-232; Signals: Txd, Rxd, DTR, DSR, SGnd; Working voltage range  $\pm 9\text{vdc}$ ; Max voltage range  $\pm 15\text{vdc}$ ; Max surge  $\pm 25\text{vdc}$
- 4.1.2. **Duplex;** Operation can be either half or full-duplex; No configuration required
- 4.1.3. **Speed;** Tested to 115K baud; No configuration required
- 4.1.4. **Character Setting;** Operates with any combination of parity, data, stop, and start bits; No configuration required

#### 4.2. Isolation (Per ISO/IEC 9549)

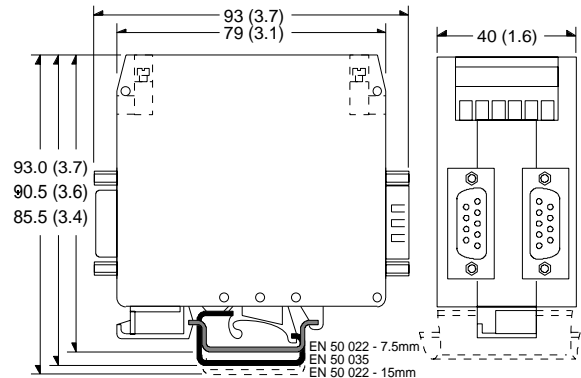
- 4.2.1. **Between all RS-232 ports;** 2.5Kv (optical, 5Kv test)
- 4.2.2. **Between Power and RS-232 ports;** 2.5Kv (galvanic, 3Kv test)
- 4.2.3. **Casing;** dielectric strength per DIN VDE 0303/part 2 is 400kV/cm

### 4.3. Power Supply

- 4.3.1. **Model rdc232hub-5v-4p;**  
5vdc  $\pm 5\%$ ; Max 260mA
- 4.3.2. **Model rdc232hub-dv-4p;** 9 to 36vdc; 1.5w
- 4.3.3. **Model rdc232hub-av-4p;** 9 to 36 vac; 1.5w

### 4.4. Environmental

- 4.4.1. **Ambient Operating Temperature;** -20C to +65C
- 4.4.2. **Ambient Storage Temperature;** -40C to +100C
- 4.4.3. **Relative Humidity;** 10 to 90%, non condensing
- 4.4.4. **Casing;** fungus and termite resistant
- 4.4.5. **Casing; flame characteristics:** self-extinguishing per UL 94 V2



### 4.5. Mechanical Dimensions

- 4.5.1. **Height; Width; Depth** (See drawing).
- 4.5.2. **Weight;** 200g.
- 4.5.3. **Terminal Capacity;** 2.5mm strand (12 AWG)
- 4.5.4. **Mounting Rail;** DIN EN 50022 (35mm sym) DIN EN 50025 (32mm asym) Note: removal from a DIN EN 50025 rail is difficult.