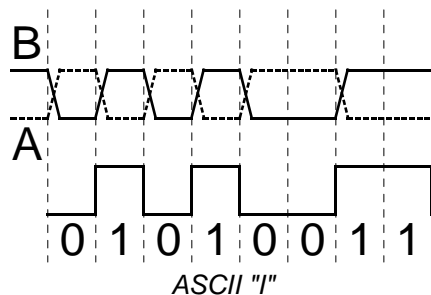


RDC422IR USERS MANUAL

ISOLATED RS-422 REPEATER

1. WHAT IS RS-422 ?

RS-422 is a full-duplex, point-to-point data communication standard. It uses two twisted wire pairs; one pair to transmit and one pair to receive. Data is transmitted by a differential voltage signal. **The two wires in a pair are not a loop** -- both are really '+' signals sourcing current to a third "virtual" ground conductor. For example, here is the differential signal for an ASCII character 'I'.



Though labels vary from vendor to vendor, the EIA/RS-422 standard labels one wire A and the other B. Data is represented by the relative voltage of A to B. When $V_A < V_B$, then the data is a binary 1. When $V_A > V_B$, then the data is a binary 0. An idle line without data will be in the binary 1 state. This differential voltage signal is quite robust and not susceptible to noise or minor shifts in signal reference ground.

Although some vendors refer to "multi-drop" RS-422, the EIA/RS-422 standard only supports one transmitter per wire. These vendors are using 4-wire RS-485, but keeping the RS-422 name (perhaps due to product history).

2. INSTALLATION

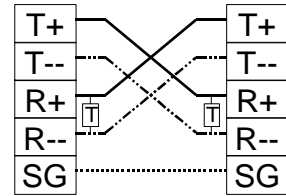
2.1. Plan your wiring

The RDC422ir terminals are labeled T+, T--, R+, R--, and SG. The "+" terminals correspond to the "B" terminals and the "-" terminals correspond to the "A" terminals. The "+" terminals are named "+" because when the data communications line is idle, they will have a higher voltage than the "-" terminals. *Do remember that even though labeled + and --, they are not a "loop".*

Due to a lack of naming conventions, wiring any RS-422 device may require some bench-top experimentation. While the word sounds bad, it is often required when integrating multi-vendor systems. **The RS-422 interface cannot be damaged by reverse wiring or short-circuits to ground.**

2.2. Mapping out the wire pairs:

RS-422 4-wire has 2 uni-directional wire pairs connected as shown at right. (For clarity, the "twists" in the pairs are not shown.) Transmit (T) terminals of one device must connect to the receive (R) terminals of the other device. Also the "+" terminals connect to "+" terminals, and likewise "--" connect to "--".



2.3. Placing your bus terminators:

For 4-wire RS-422, 100Ω (or 220Ω) resistors must be placed at the receive end of each pair (total 2 pieces - see the drawing above). The actual value required depends on the impedance of the cable installed. The RDC422ir normally comes with one 100Ω resistor (Trm1) and one 220Ω resistor (Trm2). One of these can be field selected by the jumpers labeled "Trm1", "Trm2", "1", or "2". The factory default is Trm1. For custom values, you could disable both internal jumpers and install an external resistor.

You will also notice two other jumpers labeled "Bias+" and "Bias--" with wire links installed. These are bias resistors which force a floating or open-circuit receive pair to an idle/1 state. The factory default is to solder these jumpers in place. These force the wire idle when the remote device is powered off, the cable is disconnected, or a broken wire creates an open-circuit. Depending on the wire capacitance and design of the other RS-422 device, these situations may generate a great deal of noise. If not prevented, this noise may cause a very high interrupt load on the receiving device -- and even system failure. These line bias resistors eliminate this problem. If the bias resistors cause a problem due to the remote device design, these links can be cut with a sharp-nosed wire cutter.

2.4. Planning the panel wiring:

Power Supply: The "dv" models are fully protected from reverse wiring and will sustain no damage. The 5v model is partially protected and if a fuse is installed in the V+ supply wire, should not sustain any damage.

RS-422 Fuses: RS-422 field wires may be protected by 250mA fuses. RS-422 interface ICs are internally protected from short-circuits. These fuses protect the system from over-voltages caused by mis-wiring or a failure of the lightning protection system.

RS-422 Lightning Protection: If required, the RS-422 field wires should be protected by standard lightning protection devices. RDC suggests 15v

or 16v surge protection. While many vendors suggest clamping surges to 6v or 7v, this disregards that modern RS-422 devices can work normally up to +12 volts. Clamping at too low of a voltage can lead to the RS-422 drivers operating at near short-circuit conditions and driving at the full current. This can cause overheating of the device and/or power supply and hence shortens the product life.

3. TECHNICAL SPECIFICATION

3.1. Port Description

3.1.1. Local and Field Ports

4-wire RS-422 Signals: T+, T-, R+, R-, SG
 Working voltage range 0 to +5vdc
 Max voltage range -7 to +12vdc
 Max surge ± 25 vdc

3.1.2. Duplex

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

3.1.3. Speed

Tested up to 115K baud.
 No configuration required.

3.1.4. Character Setting

Operates with any combination of parity, data, stop, and start bits.
 Protocol independent.
 No configuration required.

3.2. Isolation (Per ISO/IEC 9549)

3.2.1. Between RS-422 ports

2.5Kv (optical, 5Kv test)

3.2.2. Field RS-422 port to Supply

2.5Kv (galvanic, 3Kv test)

3.2.3. RS-422 #1 to Supply

Depends on options
 2-port option : no isolation
 3-port option : 500v isolation

3.2.4. Casing

Dielectric strength per DIN VDE 0303/part 2 is 400kV/cm

3.3. Power Supply

3.3.1. Model RDC422ir-5v

5vdc $\pm 5\%$; 160 mA max

3.3.2. Model RDC422ir-dv

9 to 36 vdc, nominal 45 mA @ 24 vdc

3.4. Environmental

3.4.1. Ambient Operating Temperature

0C to +65C

3.4.2. Ambient Storage Temperature

-40C to +100C

3.4.3. Relative Humidity

10 to 90%, non condensing

3.4.4. Casing

fungus and termite resistant

3.4.5. Casing

flame characteristics

self-extinguishing per UL 94 V2

3.5. Mechanical Dimensions

3.5.1. Height; Width; Depth (See drawing).

3.5.2. Weight

130 g

3.5.3. Terminal Capacity

2.5mm strand (12 AWG)

3.5.4. Mounting Rail

DIN EN 50022 (35mm sym)

DIN EN 50025 (32mm asym)

