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## **Overview**

- The **Control-it™ 5005** is a manual RS232 to RS422 converter that allows your PC to communicate with remote devices 1.8km away at 115.2k baud or 3.6km at 56k baud. via a RS232 serial port.

## **Features**

1. Fully isolated. Therefore safe to use on any Laptop or PC.
2. Due to high quality, low current components no separate power supply is needed for the RS232 side.
3. RS422 transmitter can handle up to 32 modules.
4. Four LED indicators - POWER, RTS (ready to send), RXD (receive data) and TXD (transmit data) – provide valuable status information.
5. RS232 side is supplied with 500mm lead and 9way female connector.
6. Jumper settings for line termination and flow control

# General Description

## Control-it™5005 case markings and led lights



Figure 1

The **Control-it™ 5005** comes in a robust, flame-retardant ABS case. It is provided with 500mm shielded cable and a DB9 female connector.

## Control-it™ 5005 Block diagram

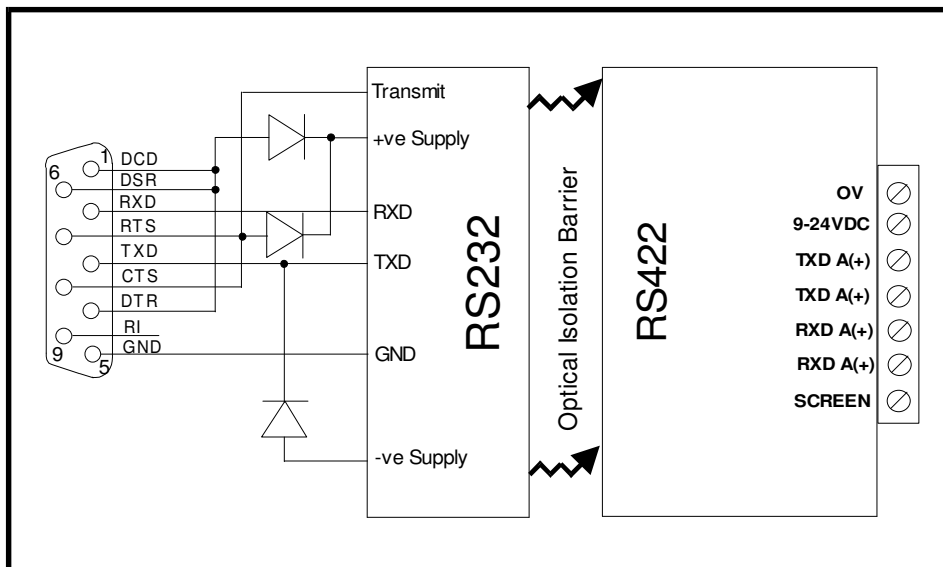


Figure 2 - Control-it™ 5005 block diagram.

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## ***LED indicator functions***

**RXD LED** shows data flow to the RS232 device (e.g. your PC).

**TXD LED** shows data flow from the RS232 device.

**POWER LED** indicates if power is applied to the RS485 side.  
This will light up as soon as power is applied.

**RTS LED** indicates flow control.

## ***RTS and DTR Lines***

Power to the RS232 side of the converter is supplied from the connected device (e.g. your PC) via either the RTS or DTR lines. Therefore, one of these lines must be permanently high (+12Vdc).

If the RTS line is being used for flow control, you will need to ensure that the DTR line is held high.

## ***Quick Test***

This test is designed to give you a quick indication that the computer is communicating with the converter.

1. Plug converter into serial port COM1 & apply power (9-24Vdc) to the RS422 side.
2. Go into DOS mode and type the following: **copy con: com1:**
3. Press the **ENTER** key
4. Press the U key 10 times, followed by **CTRL Z**.
5. Watch the TXD light as you press the **ENTER** key. The typed characters will be sent to COM1 and the TXD light on the Converter lights up momentarily.

# Installation

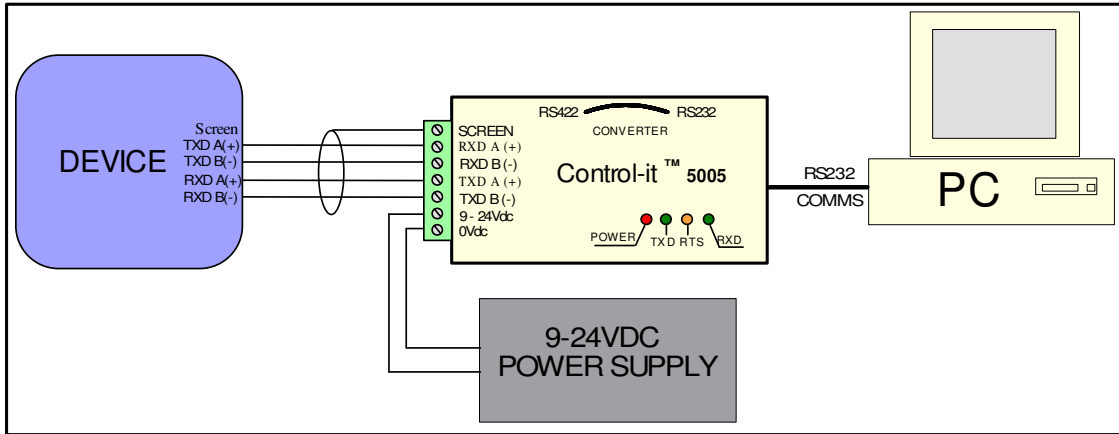


Figure 3

1. Connect the DB9 connector to a **COM** port on your PC.
2. Wire the RS422 connector to your device as per figure 3.

Refer to table 1 for data line connection details.

Data Line Connections	
Converter	Device
TXD A(+)	RXD A(+)
TXD B(-)	RXD B(-)
RXD A(+)	TXD A(+)
RXD B(-)	TXD B(-)

Table 1 – Data line connections.

- We recommend a **shielded, four core, twisted pair** data cable. **Do not** remove more than 100mm of shield from each end of the cable when connecting to devices. Connect shield to ground at **one point only**.
- For short wire communication, such as bench-top or laboratory set-ups, no screened data cable is necessary between the **Control-it™ 5005** converter and your device, unless it is in an electrically noisy environment.

- If the cable is longer than 100m, connect a 120  $\Omega$  terminating resistor across the positive and negative data lines of the twisted pair cable i.e. between **RXD A (+)** and **RXD B (-)** as well as between **TXD A (+)** and **TXD B (-)**.  
NB If the last device is also using a **Control-it™ 5005**, this resistor is already in place and does not need to be added.
3. Connect the power supply (9 - 24Vdc) to the **Control-it™ 5005** converter. The **POWER** light will come on at this point.



Make sure 24V does not get connected to the RS422 terminals.

### ***Installation when used with multiple devices***

The **Control-it™ 5005** can be connected with up to 32 devices on the one network.

Installation is essentially the same as described on page 5, with a few additional considerations.

1. Always connected devices in 'daisy-chain', as shown in figure 4, with each device connected in a row. Never connect devices in a 'star', as each branch will create unwanted reflections, leading to data errors.

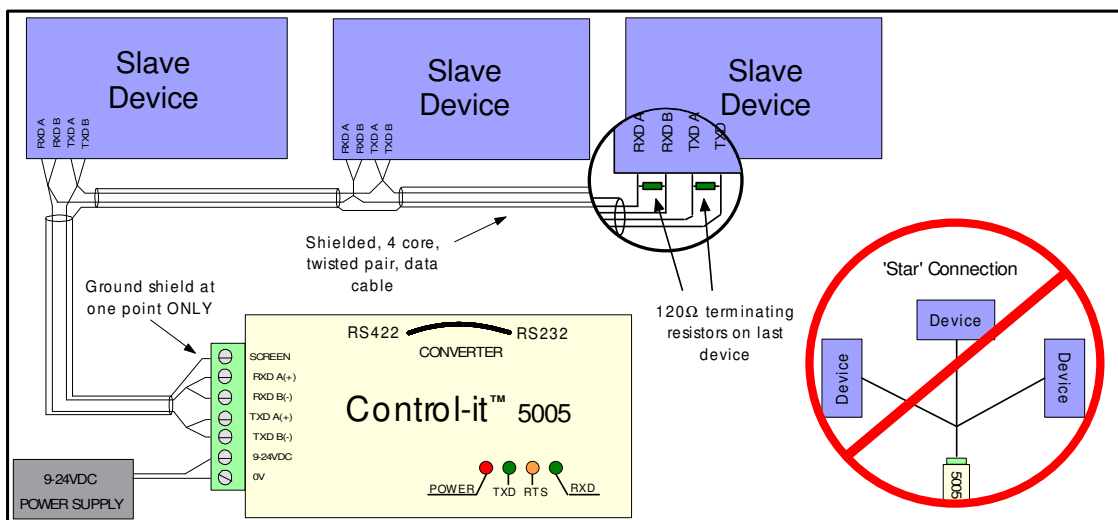


Figure 4 – Connection of a multi-drop network in 'Daisy-chain' configuration considerations.

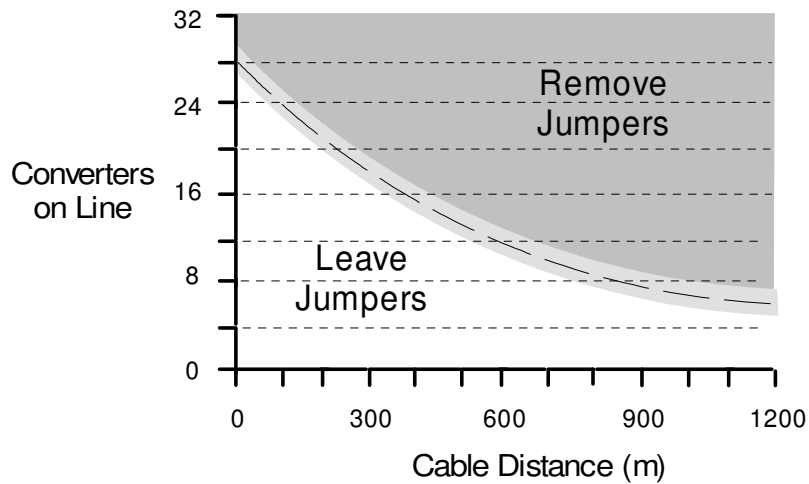
- 
2. Connect slave data lines like-to-like, i.e. TXD A(+) to TXD A(+) etc., then to converter as per table 1 (page 5).
  3. If more than one **Control-it™ 5005** is used, the RTS jumper inside the converters must be set correctly.
    - To access this jumper, undo the four screws in the bottom of the converter and remove the top cover.
    - Located the RTS jumper adjacent to the red POWER LED.
    - In a point-to-point set-up, or if the converter is the 'master', RTS can be held permanently 'on'.
    - The factory default setting of RTS is in "Transmit control".
    - In a multi-drop network the data transmission line (**TXD**) of the slave units needs to be controlled by **RTS** or data will get corrupted. To select this, place the jumper between the 'RTS' pin (centre) and the pin marked 'Transmit Control'.

### ***Systems with more than 6 converters***

Bias resistors within the converter ensure that the signal lines are held in the correct state when no transmitter drive is present. However, multiple units and long cable runs can hinder the transmitter's ability to pull against them, in which case they can be negated by removing the bias jumpers.

- Unscrew the lid and remove the 6 jumpers near the RS422 connector from all units apart from the two on each end.

The following graph may be used to approximate the number of units that can be connected to a line, considering cable distance, before the bias jumpers must be removed.



As examples, 18 converters may be used if the cable length doesn't exceed 300m, but only 6 converters can operate over 1.2km.

The actual figure will depend on many factors such as;

- Dc resistance of cable (larger gauge increases maximum)

Placement of units (even distribution, rather than toward far end increases maximum)

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## **Specifications**

Dimensions in mm	90 x 50 x 25 mm (3½ x 2 x 1")
Transmission Distance	1.8km (6000 feet) at 115.2k baud
	3.6km (12000 feet) at 56k baud
Weight	125g
Operating temperature	0° to 50°C (32° to 122° F)
Storage temperature	-20° to 70° C (-4° to 158° F)
Humidity	15 to 90% relative non-condensing
Isolation Voltage	1500V max transient <sup>1</sup>
Power	9-24Vdc regulated or unregulated 45mA at 12Vdc on RS422 side
Connectors	RS232: moulded DB9 female RS422: plug-able screw terminal connector with strain relief housing.
Operating mode	4 wire full duplex point-to-point or Multi-drop
Data rates	0 to 115200 bps
Indicator lights	TXD, RXD, RTS and POWER

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<sup>1</sup> EN 60950 : 1992

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# Declaration of Conformity 2001

**Manufacturer's Name:** Technman Electronics Ltd  
**Manufacturer's Address:** PO Box 302 107, Auckland 1330, New Zealand

**declares that the product**

**Product name:** Control-it 5000 Series Distributed Input/ Output System  
**Model numbers:** 5001, 5005, 5006, 5007, 5020, 5030, 5040, 5050, 5100, 5101  
**Product options:** All

**conforms to the following product specifications:**

**Safety Regulations:** Low Voltage Directive 73/23/EEC 22 July 1993 and the UK Electrical Equipment Safety Regulations 1994.  
EN 60950:1992+A1+A2+A3- Primary Circuit/ Double insulation  
Model 5020- Primary circuit/ Reinforced insulation  
Except when these modules are incorporated into a larger mechanical device, in which case a responsible person must ensure that all appropriate safety regulations are met.

**EMC Regulations:** EMC Directive 89/336/EEC 3 May 1989 and 92/31/EEC 28 April 1992, article 10.1.  
EN 55022:1998 Class A Device  
EN 55024:1998 I.T. Equipment  
EN 50082-2:1995 Generic Industrial Device

**The product herewith complies with the requirements of the following Directives and carries the CE marking accordingly:**

Low Voltage Directive 73/23/EEC  
EMC Directive 89/336/EEC

**The product was tested in a typical configuration with a personal computer system.**

**For compliance information contact:**

**Director**  
Technman Electronics Ltd.  
PO Box 302 107  
Auckland 1330  
New Zealand

or

**Quality Assurance Director**  
Amplicon Liveline Ltd  
Centery Industrial Estate  
Hollingdean Road  
Brighton  
UK BN2 4AW

**WARNING**

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

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