

blu²ⁱ RS-232 Adaptor Range User Guide



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Before You Begin

Congratulations on your purchase of the TDK Systems blu²ⁱ Universal RS-232 Adaptor or RS-232 Adaptor. These products were conceived as robust Bluetooth enabled RS-232 solutions for the industrial sector.

These products are developments of the blu²ⁱ Module. This module, based on the CSR BC2 Bluetooth chipset is aimed at serial cable replacement over distances of up to 100 metres, although effective data transfer has been achieved over much greater distances.

Introduction

The blu²ⁱ Universal RS-232 Adaptor and RS-232 Adaptor both contain a complete Bluetooth interface and requires only power to implement full Bluetooth communication. The unit has an integrated, high performance antenna together with all RF and base band circuitry, it interfaces to the host over an RS-232 UART serial interface using AT commands. The unit runs specific firmware within the Virtual Processor that includes a serial Port Profile and AT command interpreter. Is is factory configured to accept an incoming connection upon power-up. A nominal fixed PIN will also be pre-configured.

Integrating the module into a boxed product has the advantage that since it is already Bluetooth qualified and approved, much less time, effort and expense will be incurred.

Features at a glance:

Feature	Implementation
Bluetooth power class	1
Frequency	2.400 – 2.485Ghz
Minimum Transmit Power	+0dBm
Maximum Transmit Power	+6dBm
Receive Sensitivity	Better than -85dB
Antenna Gain	+2dBi
Range	Up to 100 metres, free space
Data Transfer Rate	Up to 200Kbps
Weight	60g
Fully Bluetooth pre-qualified	Bluetooth 1.1 PRODUCT listing
Operating temperature	-20°C to +75°C

Universal RS-232 Adaptor Interface

The blu2i Universal RS-232 Adaptor has two LED indicators. The first LED illuminates when the device is powered. The second LED indicates Bluetooth connection status. The second LED is driven by the DTR line and is configurable via the S Registers.

See **Interface Specification**

The power connector is a 2 way screw down terminal block.



See **GPIO Lines**

The reset button is a momentary push to make switch. When pressed it forces a Power-on Reset (POR).

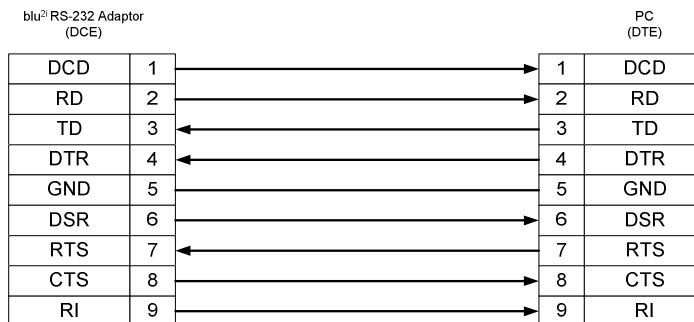
RS-232 Adaptor Interface Specification

The blu²ⁱ RS-232 Adaptor is designed to operate as DCE (Data Communication Equipment). Connection is made through a 9 way D type connector that can be plugged straight into a serial port on a PC or peripheral.

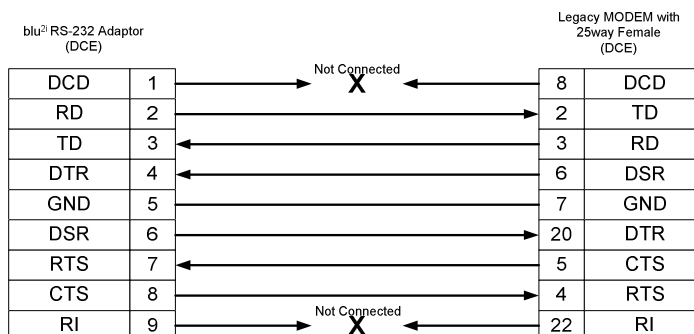
The pin-out for the 9 way D type connector is the same as a 9 pin DCE.

Pin	Description	Signal	Direction
1	Data Carrier Detect	DCD	Output
2	Receive Data	RD	Output
3	Transmit Data	TD	Input
4	Data Terminal Ready	DTR	Input
5	Ground	GND	---
6	Data Set Ready	DSR	Output
7	Request To Send	RTS	Input
8	Clear To Send	CTS	Output
9	Ring Indicate	RI	Output

Wiring to a PC



Wiring to a modem



Universal RS-232 Adaptor Interface Specification

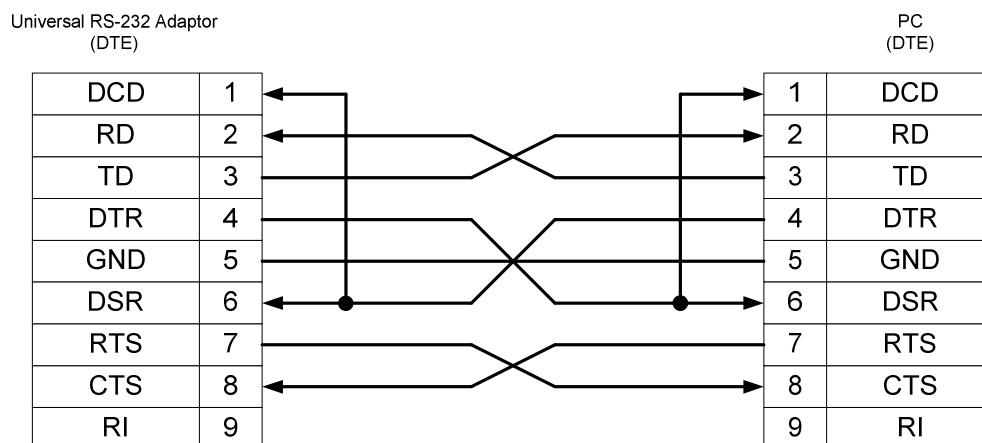
The blu²ⁱ Universal RS-232 Adaptor is designed to operate as DTE (Data Terminal Equipment).

The pin-out for the 9 way D type connector is shown in the table below.

Pin	Description	Signal	Direction
1	Data Carrier Detect	DCD	Input
2	Receive Data	RD	Input
3	Transmit Data	TD	Output
4	Data Terminal Ready	DTR	Output
5	Ground	GND	---
6	Data Set Ready	DSR	Input
7	Request To Send	RTS	Output
8	Clear To Send	CTS	Input
9	Ring Indicate	RI	Input

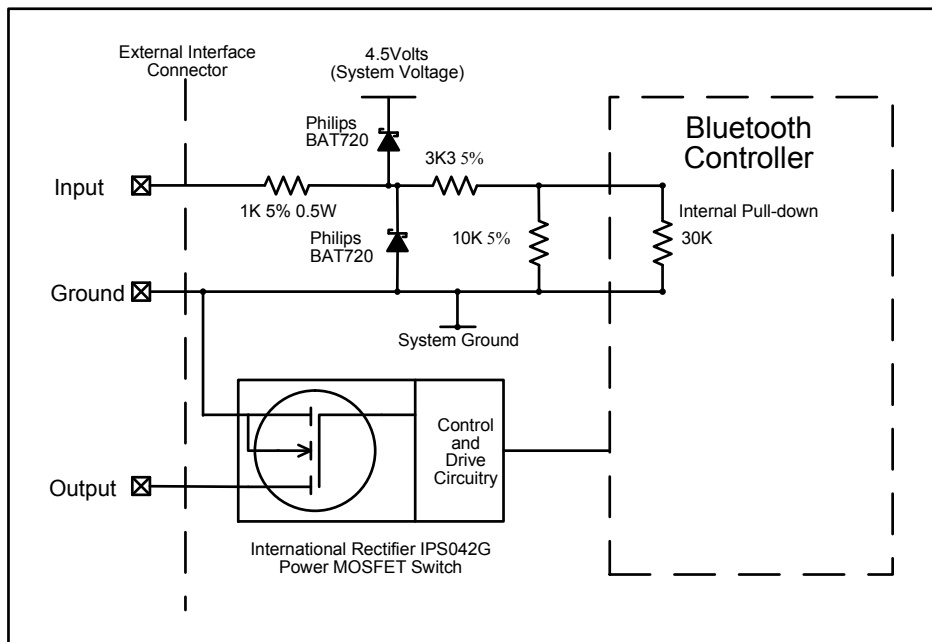
When connecting to DCE (Data Communication Equipment), e.g. a modem, a regular modem cable or serial cable can be used.

When connecting to another DTE, e.g. a PC, a crossover serial cable or null modem cable must be used. The cable wiring diagram shown below is suitable.



Universal RS-232 Adaptor GPIO Lines

The 6 way screw down terminal block provides access to 4 General Purpose I/O (GPIO) lines and two ground lines. These digital GPIO lines consist of 2 dedicated input and two dedicated output lines. The 2 input lines have under/over voltage protection. The output lines are open collector and through the software can connect to the output and have over temperature and current shutdown protection circuitry.



The GPIO lines are controllable via S Register commands and the input lines status can be made visible as part of the Serial Port service name making status monitoring very quick; and removing the need to connect to the serial port service.

The output lines can drive resistive switching circuitry. For inductive load switching (for example a relay coil) we recommend addition protection circuitry. For further information please refer to IPS042G data sheet from the company International Rectifier.

Details are available at:

<http://www.irf.com/product-info/datasheets/data/ips042g.pdf>

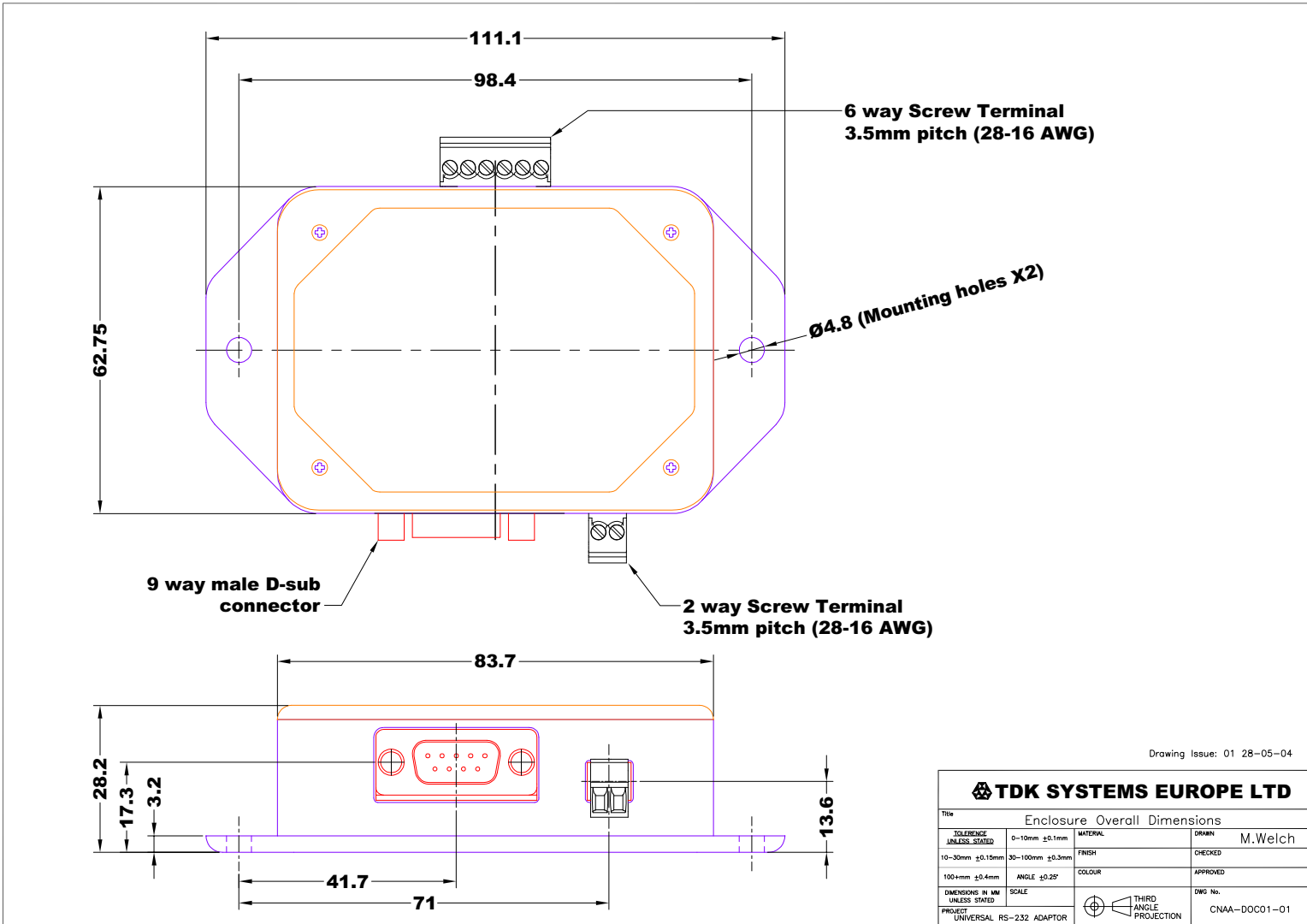
Typical usages include monitoring any digital sensors, such as motion, heat or pressure sensors.

Universal RS-232 Adaptor Electrical Characteristics

Absolute Maximum Ratings ^[1]					
Symbol	Parameter	Value	Conditions	Units	
V _{CC}	Supply Voltage	0 to +25.0		Volts	
V _I	DC Input Voltage (IN 1 & 2)	-18.0 to +27.0		Volts	
V _O	Maximum Voltage for OUT 1 & 2	47.0	Applied voltage to Output Pin. Output is Open Collector.	Volts	
I _{CC}	Maximum Supply Current	200		mAmps	
P _d	OUT 1 & 2 Power dissipation	1.0	For both channels	Watts	
Recommended Operating Conditions					
Symbol	Parameter	Min	Max	Units	
V _{CC}	Supply Voltage	6.0	24.0	Volts	
V _I	DC Input Voltage (IN 1 & 2)	0	24.0	Volts	
V _O	Voltage on OUT 1 & 2	0	35.0	Volts	
I _{OL}	Output Sink Current (OUT 1 & 2)	-	500.0	mAmps	
DC Electrical Characteristics					
Symbol	Parameter	Conditions	Min	Max	Units
V _{IH}	HIGH Level Input Voltage		3.0	-	Volts
V _{IL}	LOW Level Input Voltage		-	1.0	Volts
R _{DS(ON)}	On state resistance	Junction Temp 25°C		500	mΩ

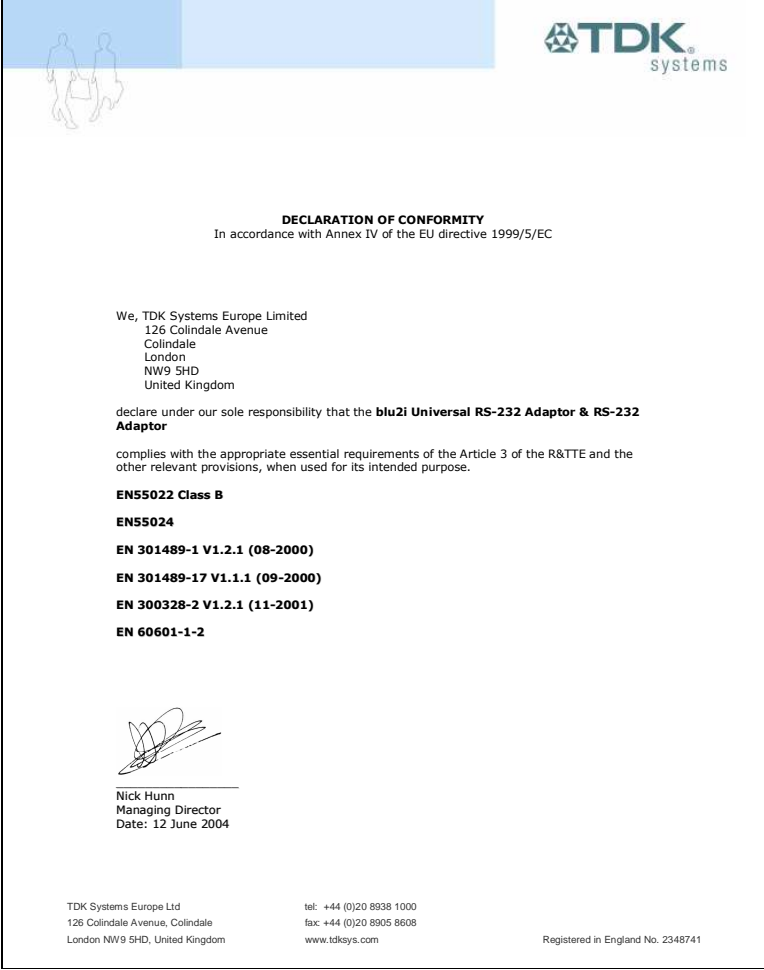
Note 1: The Absolute Maximum Ratings are those values beyond which the safety of the device cannot be guaranteed. The device should not be operated at these limits. The parametric values defined in the Electrical Characteristics tables are not guaranteed at the Absolute Maximum Ratings. The Recommended Operating Conditions table will define the conditions for actual device operation.

Universal RS-232 Adaptor Mechanical Dimensions



Appendix A

EU Declaration of Conformity



The image shows a formal EU Declaration of Conformity document. At the top left, there is a small icon of two people walking. At the top right, the TDK systems logo is present. The main text is centered and includes the title 'DECLARATION OF CONFORMITY' and a reference to Annex IV of the EU directive 1999/5/EC. It identifies the manufacturer as TDK Systems Europe Limited, located at 126 Colindale Avenue, Colindale, London, NW9 5HD, United Kingdom. The document declares that the 'blu2i Universal RS-232 Adaptor & RS-232 Adaptor' complies with the essential requirements of Article 3 of the R&TTE and other relevant provisions. A list of standards is provided: EN55022 Class B, EN55024, EN 301489-1 V1.2.1 (08-2000), EN 301489-17 V1.1.1 (09-2000), EN 300328-2 V1.2.1 (11-2001), and EN 60601-1-2. A signature of Nick Hunn, Managing Director, is shown with the date 12 June 2004. At the bottom, contact information for TDK Systems Europe Ltd is provided, including telephone, fax, and website details, along with the registration number in England No. 2348741.

DECLARATION OF CONFORMITY
In accordance with Annex IV of the EU directive 1999/5/EC

We, TDK Systems Europe Limited
126 Colindale Avenue
Colindale
London
NW9 5HD
United Kingdom

declare under our sole responsibility that the **blu2i Universal RS-232 Adaptor & RS-232 Adaptor**

complies with the appropriate essential requirements of the Article 3 of the R&TTE and the other relevant provisions, when used for its intended purpose.

EN55022 Class B


EN55024

EN 301489-1 V1.2.1 (08-2000)

EN 301489-17 V1.1.1 (09-2000)

EN 300328-2 V1.2.1 (11-2001)

EN 60601-1-2


Nick Hunn
Managing Director
Date: 12 June 2004

TDK Systems Europe Ltd
126 Colindale Avenue, Colindale
London NW9 5HD, United Kingdom

tel: +44 (0)20 8938 1000
fax: +44 (0)20 8905 8608
www.tdksys.com

Registered in England No. 2348741

FCC and Industry Canada Statements

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Bluetooth Declaration of Conformity

“Declaration of Conformance; this product contains the Approved Bluetooth portion of the TDK blu2i Serial Module as listed on the Bluetooth Qualified Product Listing. The Bluetooth Identifier is B01000, product ID TRBLU20-001A1. The listings can be found at <http://qualweb.opengroup.org>”

Additional Statement

TDK SYSTEMS' BLUETOOTH PRODUCTS ARE NOT AUTHORISED FOR USE AS CRITICAL COMPONENTS IN LIFE SUPPORT DEVICES OR SYSTEMS WITHOUT THE EXPRESS WRITTEN APPROVAL OF THE MANAGING DIRECTOR OF TDK SYSTEMS EUROPE.

The definitions used herein are:

- a) Life support devices or systems are devices which (1) are intended for surgical implant into the body, or (2) support or sustain life and whose failure to perform when properly used in accordance with the instructions for use provided in the labelling can reasonably be expected to result in a significant injury to the user.
- b) A critical component is any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

ESD (Electrostatic Discharge)

If your TDK Bluetooth device is affected by ESD, it is recommended that you restart any Bluetooth processes that were active at the time.

Electromagnetic Interference

When the unit is exposed to a high level of electromagnetic interference in the frequency range of 2402MHz - 2480MHz, degradation in performance can occur.

Warranty

TDK warrants that its products shall conform to TDK's published specifications and remain free from defects in materials and workmanship under normal, proper and intended use for a period of two (2) years from date of purchase, provided that proof of purchase be furnished with any returned equipment.

If during the warranty period any component part of the equipment becomes defective by reason of material or workmanship, and TDK is immediately notified of such defect, TDK shall at its option supply a replacement part or request return of equipment, freight prepaid, to its designated facility for repair. In the event no trouble is found on products returned for repair, TDK reserves the right to charge the customer its standard published repair charge.

This warranty shall not apply to any products that have been subject to misuse, bending, twisting, neglect, alteration, improper installation, testing or unauthorized repair performed by anyone other than a TDK designated repair facility. Any non-warranty repairs or maintenance shall be at TDK's standard rates in effect at the time.

This warranty is in lieu of all other warranties, whether expressed, implied, or statutory, including but not limited to, implied warranties or merchantability and fitness for a particular purpose. In no event shall TDK be liable, whether in contract, in part, or on any other basis, for any damage sustained by its customers or any other person arising from or related to loss of use, failure or interruption in the operation of any products, or delay in maintenance, or for incidental, consequential, in direct, or special damages or liabilities, or for loss of revenue, loss of business, or other financial loss arising out of or in connection with the sale, lease, maintenance, use, performance, failure, or interruption of these products.