Related Products	RS232 to RS485 Converter (CONV–RS485G)
Subject	Converter module for all Kontron Embedded Modules GmbH boards with RS232 10pin header interface
Document Name	R485K117.doc
Usage	Common

1. REVISION HISTORY

Date	Document Name	Subjects added, changed, deleted	Changed by
13-Sep-01	R485K116.doc	Initial release of short reference	R. Barth
12-Feb-03	R485K117.doc	Changed to Kontron style	H. Bruhn

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3. INTRODUCTION

The „**CONV-RS485“** is a completely electrically isolated converter module from RS232 to RS485 for use with **Kontron Embedded Modules GmbH**'s 10 pin RS232 connectors only, because the 10 pin connectors have 5V on pin 10 to supply external converter hardware.

One side of the module is a 9 pin DSUB connector directly mounted on the module. The module can be assembled in a system by fixing this connector on a front panel or any other appropriate panel.

The internal (RS232) side of the converter is a 10 Pin Header which can be connected using a 10 pin ribbon cable to a 10 pin serial port on Kontron boards equipped with such an interface.

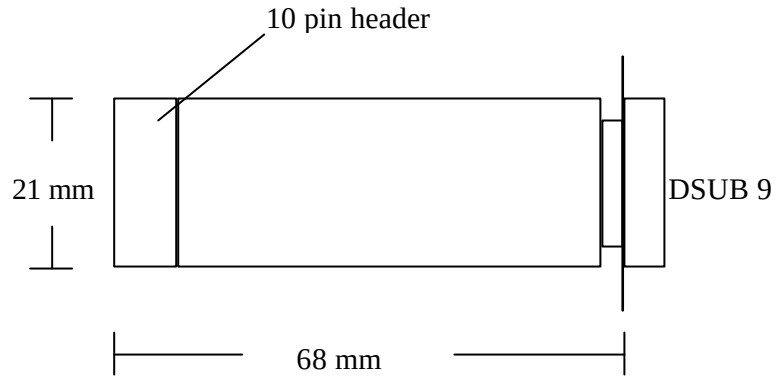
The RS485 connection can be configured with 120 Ohm termination or without termination for multidrop applications. Full duplex and half duplex applications are supported by software control.

4. ELECTRICAL CHARACTERISTICS

Supply voltage:	5V +/- 10%
Supply current:	50 mA max with no load on RS485 terminals. 120 mA max with 60 Ohm load on RS485 terminals. < 1 mA in shutdown mode (CEN is low)
Isolation barrier:	1KV for 30 seconds 400 Volts continuous
Data rate:	115 kBaud max
tr, tf RS485 drv:	0,25 µs - 2 µs, Rdiff = 54 Ohm, CL = 100 pF
Enable time:	< 100 µs
Disable time:	< 50 µs
Bus load:	up to 32 transceivers
diff drv output:	> 2 V, 54 Ohm load > 1.5 V, 27 Ohm load
Receiver input:	> 12 kOhm
RS485 drivers:	up to 1200 m using 26AWG twisted pair wire at 115 kBaud into 120 Ohm loads.
RS232 drivers:	max cable length is 0,5 meters on the RS232 side.

5. MECHANICAL AND CONNECTION CHARACTERISTICS

5.1. Dimensions:



5.2. Pinout tables

RS232 side (10 pin header)

Pin	Signal	Function
1	--	not used
2	--	not used
3	RX	receive data
4	/TXE	transmit enable
5	TX	transmit data
6	--	not used
7	CEN	converter enable
8	--	not used
9	GND	Ground
10	VCC	+5V

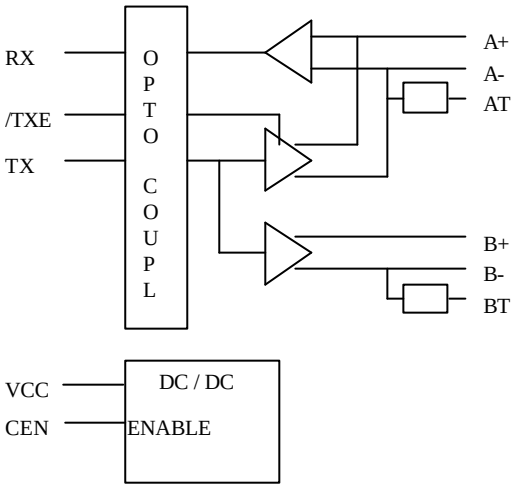
RS485 side (DSUB 9)

Pin	Signal	Function
1	A+	channel A positive terminal
2	AT	channel A termination resistor (connect to pin 1 for termination)
3	A-	channel A negative terminal
4	--	not used
5	GND	Ground
6	B+	channel B positive terminal
7	BT	channel B termination resistor (connect to pin 6 for termination)
8	B-	channel B negative terminal
9	--	not used

5.3. Pin description

Signal	Description
RX	receive data signal from RS485 converter to Com port
TX	transmit data signal from Com port to RS485 converter
/TXE	transmit Buffer enable. low (-) enables the RS485 transmitter A for half duplex applications
CEN	enable signal for converter. High (+) enables the converter modul.
A+	channel A positive termial
A-	channel A negative terminal
AT	channel A termination resistor. A internal 120 Ohm resistor is connected to terminal A-
B+	channel B positive termial
B-	channel B negative terminal
BT	channel B termination resistor. A internal 120 Ohm resistor is connected to terminal A-

5.4. Schematic diagram



6. OPERATIONAL CHARACTERISTICS

6.1. Device operation

For device operation the CEN signal must be switched high. When this signal is low the DC / DC converter is disabled and the module is in standby mode at low power consumption. In standby mode, the receivers and transmitters are disabled.

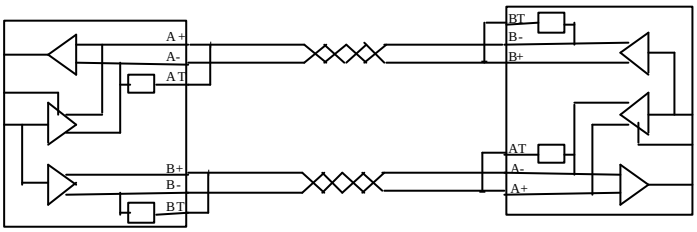
Full duplex operation is enabled when the Transmitter A is disabled by switching /TXE high. In this mode the terminals A are the receiving pair while the terminals B are the transmitters. For external loop back testing A+ has to be connected to AT, BT and B+, while terminal A- has to be connected to B-.
The termination resistors are easily enabled by connecting terminal A+ or B+ to AT or BT with a short between the two respective pins on the DSUB connector.

In half duplex operation, only the A terminals are used and /TXE is switching between transmit and receive operation.

In multi-drop applications (more than two devices are connected to one cable), only the two cable ends are terminated. All other RS485 transceivers are connected without termination. The maximum number of transceivers on a RS485 BUS is 32.

6.2. Application diagrams

Full duplex operation:



Half duplex operation:

