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XP485-DE
ISOLATED XP485-DEI
35mm DIN rail mount
RS-232 to RS485
Auto Enabled Converter

Integrity Instruments XP485-DE/I User Manual

Performance Characteristics	
Operating Temperature Range	-40°C to 85°C (-40F to +185F)
DC input voltage min. (+V)	7.5 Vdc
DC input voltage maximum. (+V)	24 Vdc
DC input current nominal (+V) XP485-DE	22 ma
DC input current nominal (+V) XP485-DEI	55 ma
DC input current max. (+V)	250 ma
ESD static discharge (A/B)	1500 V
Baud Rate maximum	115.2 Kbps
Baud Rate minimum	600 bps
Number of RS-485 nodes	256
Maximum cable length	4000 feet +
Termination resistance	120 ohms
MPU (14.7456 Mhz)	PIC16C63A
RS-485 line driver	SP483EEN
Isolation voltage (XP485-DEI ONLY)	3,000 volts

T1 TO B AND T2 TO A JUMPERS		
JUMPER	FUNCTION	FACTORY DEFAULT
T1 to B and T2 to A on	TERMINATION	ON (TERMINATED)
T1 to B and T2 to A OFF	NOT TERMINATED	

LED Operation

The **XP485-DE** and **XP485-DEI** provides a power status and signal LEDs to aid in cabling problems and general operation. Since the signal LEDs are powered only when data is present, they may be illuminated for somewhat brief periods.

POWER YELLOW LED : Power to unit when on
SIGNAL RED LED : RS-232 transmitting when on
SIGNAL GREEN LED : RS-485 receiving when on

Power Supply

The **XP485-DE** and **XP485-DEI** requires an external power supply for proper operation. We suggest a 9 Vdc 400 ma power supply. Power must be in the voltage range 7.5 Vdc to 24.0 Vdc.

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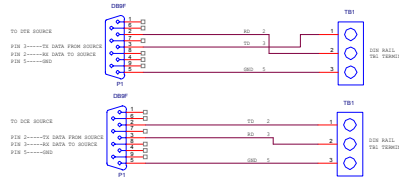
PINOUTS:

TB1

RS-232 Tx transmit (output)
 RS-232 Rx receive (input)
 RS-232 Ground
 Power Plus
 Power Minus

Pin 1
 Pin 2
 Pin 3
 Pin 4
 Pin 6

DB9CST Schematic



TB2

T1 Termination
 T2 Termination
 RS-485 GND
 RS-485 B Signal
 RS-485 A Signal
 RS-485 Shield

Pin 1
 Pin 2
 Pin 3
 Pin 4
 Pin 5
 Pin 6

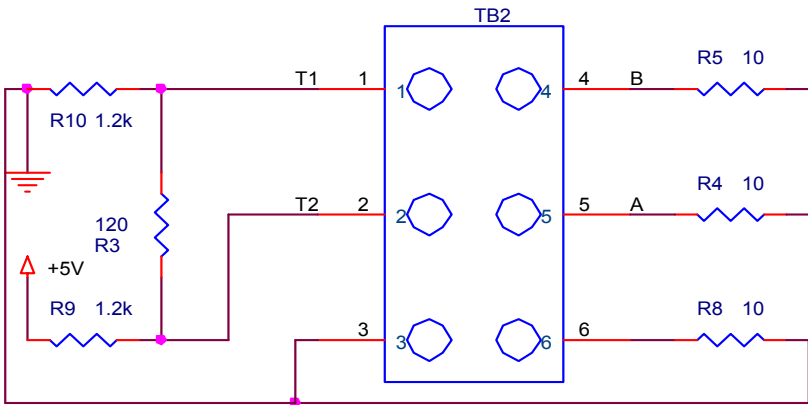
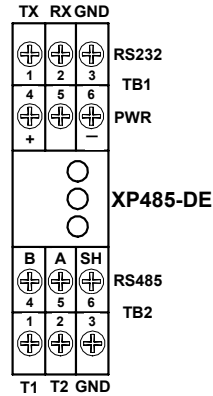
Jumpers

The **XP485-DE** and **XP485-DEI** units use active passive termination built in the unit.

Connecting T1 to RS-485 Signal B, and T2 to RS-485 Signal A will terminate the RS-485 link.

Leaving the jumpers off will leave the RS-485 link non terminated.

The active/passive termination schematic is shown below.



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DTE CONNECTIONS	
DB9	DB25
RX PIN 2 to TB1-2	RX PIN 3 to TB1-2
TX PIN 3 to TB1-1	TX PIN 2 to TB1-1
GND PIN 5 to TB1-3	GND PIN 7 to TB1-3
DCE CONNECTIONS	
RX PIN 3 to TB1-2	RX PIN 2 to TB1-2
TX PIN 2 to TB1-1	TX PIN 3 to TB1-1
GND PIN 5 to TB1-3	GND PIN 7 to TB1-3

RS-485 Cabling

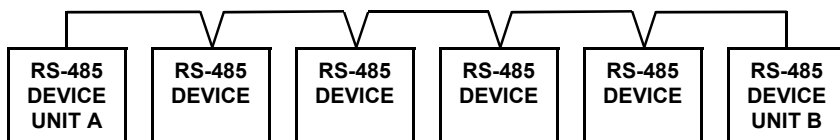
The **XP485-DE** and **XP485-DEI** are designed to operate in a Multi-Drop RS-485 LAN configuration. In a half-duplex multi-drop environment all RS-485 nodes share the same data lines. A single pair of data lines act as both Transmit and Receive wires.

*** Data lines (A/B) are the only wires required between RS-485 nodes**

*** All RS-485 nodes need not share the same V+ and GND.**

Cabling Notes:

- 1 Cable termination is important for long distance and high-speed applications.
- 2 Suggested cable: 24 awg stranded twisted pair with shield for cable runs in excess of 200 feet. See also Belden cable #9841 and #9463.
- 3 The "normal" connection for the RS-485 link is the "Daisy Chain" type connection shown below. There are other kinds of connections, but this is considered as the standard.
- 4 The end units (**A**) and (**B**) should be terminated for proper RS-485 operation. All other units should not.



DAISY CHAIN

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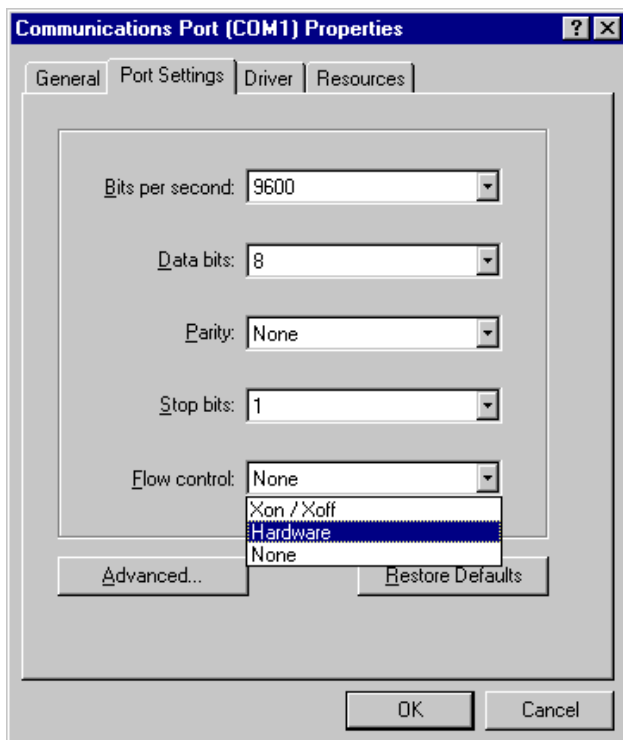
Flow Control Options

The Microsoft Windows operating systems allow a user to select several RS-232 flow control options. The **XP485-DE** and **XP485-DEI** supports both **Hardware** and **None** options. The Xon/Xoff flow control is supported only if your RS-485 target device supports Xon/Xoff.

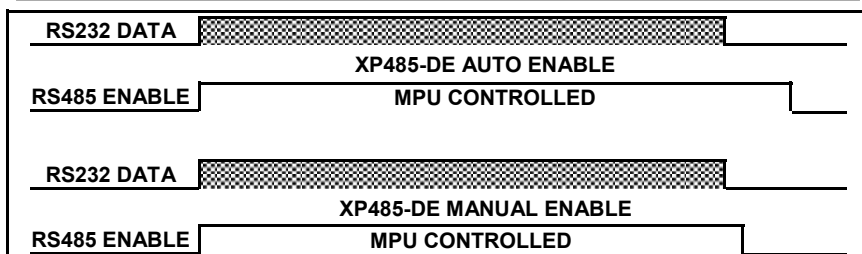
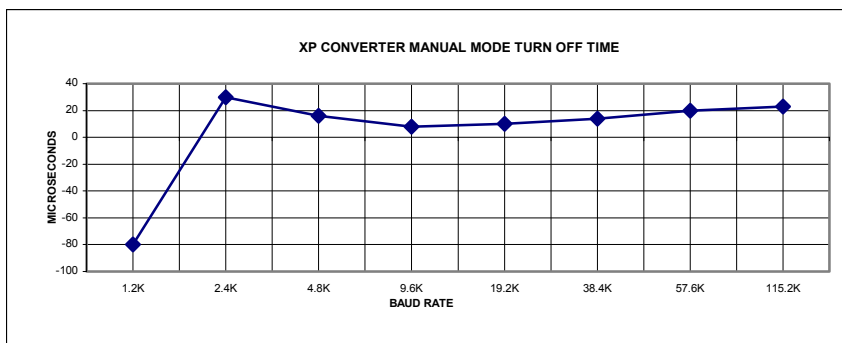
Hardware flow control is also known as RTS/CTS flow control. The PC asserts the RTS (Ready To Send) signal and waits for the connected device to assert CTS (Clear To Send) before transmitting any RS-232 data. This is not required but if your PC requires it, you must “loopback” these signals.

None flow control setting is also supported by the unit. Since the **XP485-DE** and **XP485-DEI** monitors the RS-232 transmit line, it seizes the RS-485 transmit immediately and begins sending data when any RS-232 data is sent.

Regardless of the flow control method selected, the **XP485-DE** and **XP485-DEI** will automatically handle RS-485 transmit enable.



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Auto Enable (Data Send Control)

The **XP485-DE** and **XP485-DEI** automatically handles the RS-485 half-duplex control via an adaptive algorithm running in the on-board PIC16F627 MPU. When RS-232 data is received, the RS-485 transmit enable is asserted immediately. After approximately one RS-232 byte time (auto detected baud rate) of no RS-232 data, the **XP485-DE** and **XP485-DEI** de-asserts RS-485 transmit enable and reverts back to RS-485 receive.

Conversely, other converters like our **485-25A** begin RS-485 transmit when the RTS line is asserted. RS-485 transmit continues until the RTS line is de-asserted.

Note:

When using the **XP485-DE** and **XP485-DEI** the responding RS-485 device must wait for the auto transmit enable to revert back to the receive state. If the responding RS-485 device transmits a packet back less than one RS-232 byte time after the end of the packet, then you should consider using the **XP485-DE** and **XP485-DEI** in the manual mode.

PROGRAMMING AND RS-232 DATA

The **XP485-DE** and **XP485-DEI** has two modes that it can operate in.

The first mode, mode 1 is the auto enabled mode.

The second mode, mode 2 is the manual mode.

NOTE: *The manual mode, mode 2, can only be used if one or more of the D485E or D485EI converters is used on the rs-485 link and has the termination jumpers on!*

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PROGRAMMING AND RS-232 DATA

The **XP485-DE** and **XP485-DEI** can be programmed for Auto or Manual mode, baud rate, and silent or active on power up. When in **active** on power up, when power is applied to the unit, it will respond with:

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at 9600 baud.

To change the settings, connect the unit to your PC and enable a RS-232 control program as our **EZTerminal**. Set the port settings for 8 data bits no parity and 1 stop bit at 9600 baud. With the unit connected, re cycle the power to the **XP485-DE** and **XP485-DEI**. When power is first applied to the **XP485-DE** and **XP485-DEI** and it is connected to an active PC terminal with the port settings just stated, if the space bar is actuated on the keyboard within 3 seconds of power being applied, the unit will go into a programming state.

If the space bar is hit within 3 seconds after power is applied, the unit will respond:

Programming Mode

If you now enter ? and carriage return the unit will respond with the current settings:

Integrity Instruments XP Converter v2.00
S/N FFFFFFFF
Mode 01 (Mx where x=1 or 2) automatic
Default Baud 08 (Bx where x=1...9) 115,200 BPS
Silent Power Up OFF (Sx where x=0 or 1)

PROGRAMMING COMMANDS	
USE ALL CAPITALS, ↵ SIGNIFYS A CARRIAGE RETURN	
COMMAND	FUNCTION
Mx ↵	Mode change if x = 1 >>>>> Mode 1 Automatic mode 2 >>>>> Mode 2 Manual fixed baud mode
Bx ↵	Baud rate if x = 0 >>>>> 1200 1 >>>>> 1200 2 >>>>> 2400 3 >>>>> 4800 4 >>>>> 9600 5 >>>>> 19,200 6 >>>>> 38,400 7 >>>>> 57,600 8 >>>>> 115,200 9>>>>>> 230,300
Sx ↵	Power up if x = Model and Version 0 >>>>> Model and version sent 1 >>>>> Model and version not sent
? ↵	Returns current settings of unit

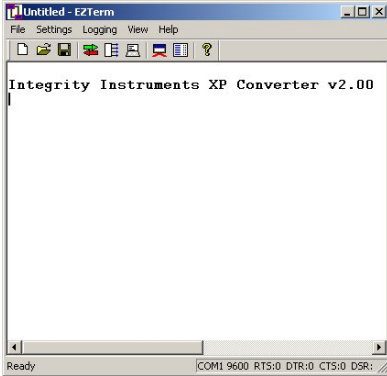
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PROGRAMMING AND RS-232 DATA

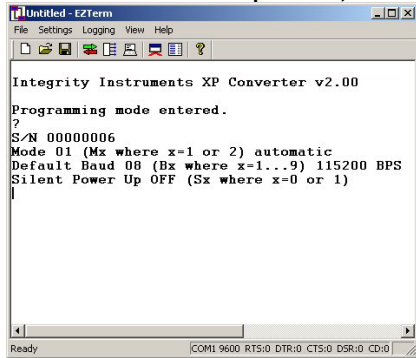
In Auto mode, the baud rate has no function.

EXAMPLES

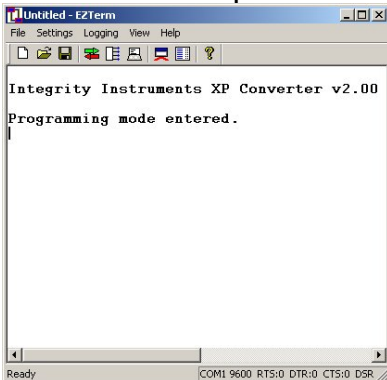
Power on active No space bar



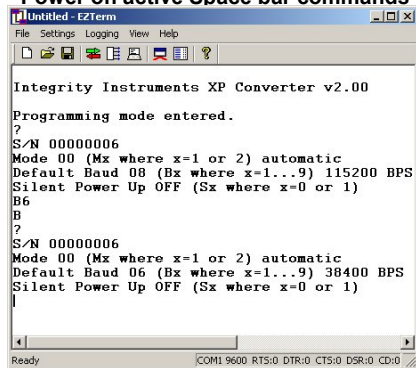
Power on active Space bar, ?



Power on active Space bar hit



Power on active Space bar commands



WARRANTY

Integrity Instruments warranties all products against defective workmanship and components for the life of the unit. Integrity Instruments agrees to repair or replace, at its sole discretion, a defective product if returned to Integrity Instruments with proof of purchase. Products that have been mis-used, improperly applied, or subject to adverse operating conditions fall beyond the realm of defective workmanship and are not covered by this warranty.

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