Integrity Instruments

XP485-9E
ISOLATED XP485-9EI
RS-232 to RS-485
Auto Enabled
Converter

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) **XP485-9E**	22 ma
DC input current nominal (+V) **XP485-9EI**	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 (**XP485-9EI ONLY**)	3,000 volts

JUMPER SETTINGS		
JUMPER NUMBER	FUNCTION	**FACTORY DEFAULT**
JP1 JP2	TERMINATION	ON (TERMINATED)
JP3	ECHO	ON (NO ECHO)
JP4 JP5	DTE OR DCE	DTE (ORIENTATION)

DB25 Pinning

RS-232 TxD transmit (output):   **DB9 pin 3**
RS-232 RxD receive (input):   **DB9 pin 2**
RS-232 Ground   **DB9 pin 5**

LED Operation

The **XP485-9E/EI** 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 **XP485-9E/EI** 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.
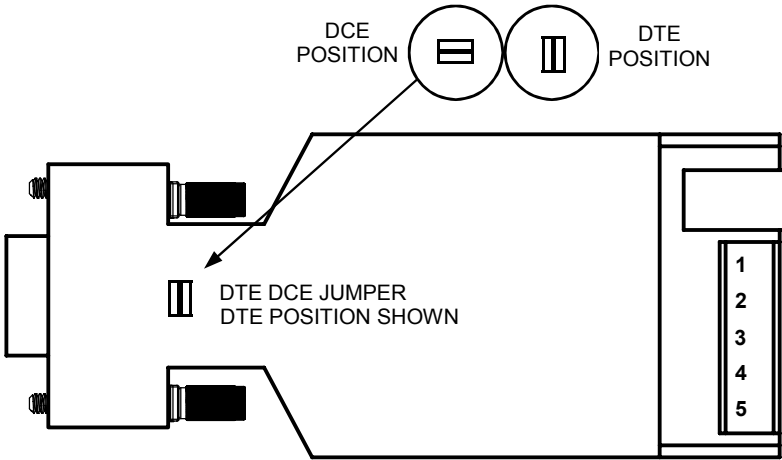
Jumpers

There are several jumpers associated with the **XP485-9E/EI** unit. The rs-485 termination jumpers are exposed on the end of the unit. The echo and dte/dce jumpers are inside the unit. The echo jumper echoes the transmitted data back to the unit. If this function is desirable the echo jumper must be removed.

If DCE wiring is needed, or if the echo feature is desired, the case will have to be opened. Use a small screwdriver in the slots on the side of the case and twist, this will open the case so the jumpers can be changed. When the jumpers are changed re-assemble the case by squeezing the case pieces together..

JUMPER PHYSICAL POSITION AND ORIENTATION

NOTE: DTE/DCE Jumper in the DTE position removing the right side jumper will make the unit a **RX only**. Removing the left hand jumper will make the unit a **TX only**.
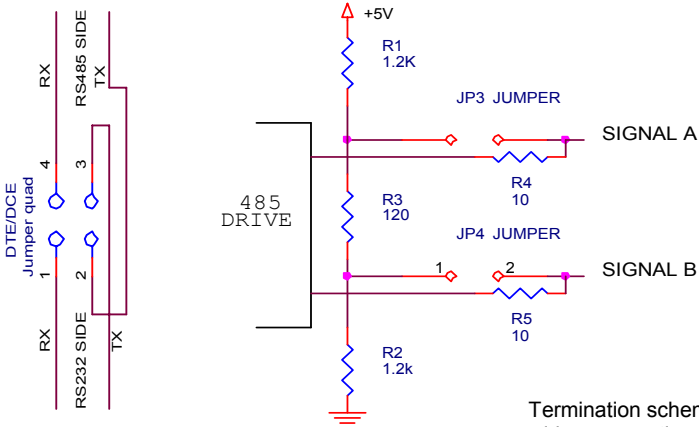

Termination schematic wiring connection, active termination.

RS-485 Cabling

The **XP485-9E/EI** is designed to operate in a Multi-Drop RS-485 LAN configuration. In a half-duplex mullti-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

Connect up 256 nodes on the same wire pair
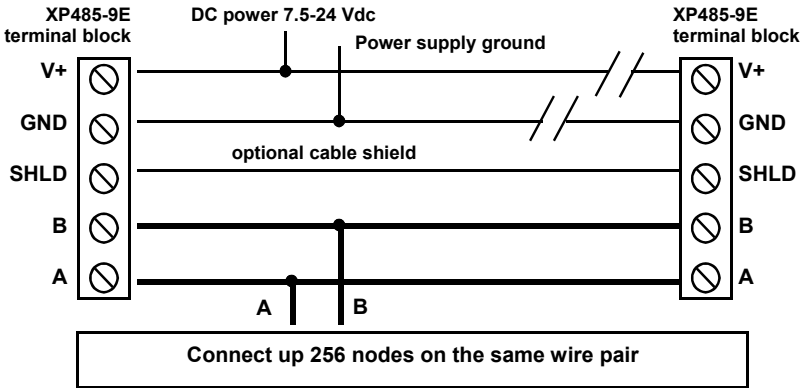
UNIT CAN BE POWERED VIA TERMINAL CON-
NECTIONS, OR POWER JACK.
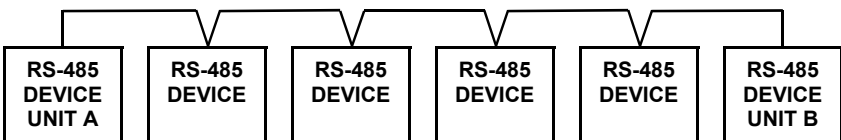IF POWERED BY POWER JACK, OTHER UNITS
CAN BE POWERED VIA THE TERMINALS

Power 2.5mm horizontal

J1

TB1

+V in	1
Gnd	2
Shield	3
B	4
A	5
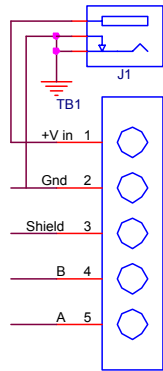
Terminal Block 3.5 mm

Cabling Notes:
1.
2. Gnd and Shld are connected internally within the **XP485-9E/EI**.
3. Cable termination is important for long distanceand high-speed applications
3. Suggested cable: 24 awg stranded twisted pair with shield for cable runs in excessof 200 feet. See also Belden cable #9841 and #9463.
4. The normal connection method is the "Daisy Chain" type shown below. there are other kinds of connections, but this is considered as the standard.
5. The end units (**A**) and (**B**) should be terminated. All other units should not.

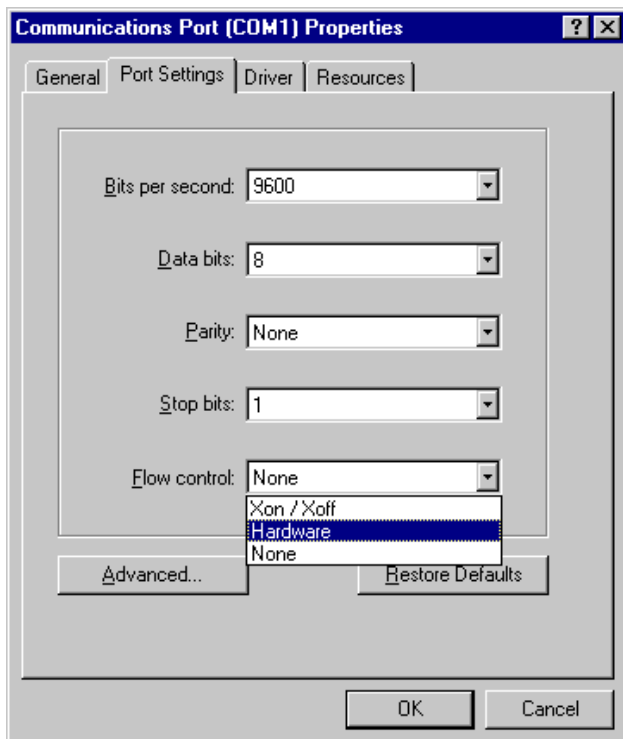| RS-485 DEVICE UNIT A | RS-485 DEVICE | RS-485 DEVICE | RS-485 DEVICE | RS-485 DEVICE | RS-485 DEVICE UNIT B |

DAISY CHAIN

Flow Control Options

The Microsoft Windows operating systems allow a user to select several RS-232 flow control options. The **XP485-9E/EI** supports both **Hardware** and **None** options. The Xon/Xoff flow control is supported only if your RS-485 target device supports Xon/Xoff.
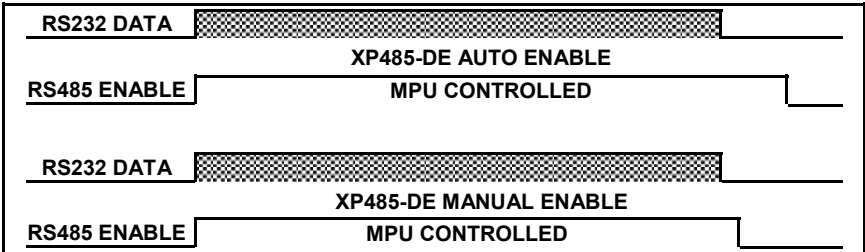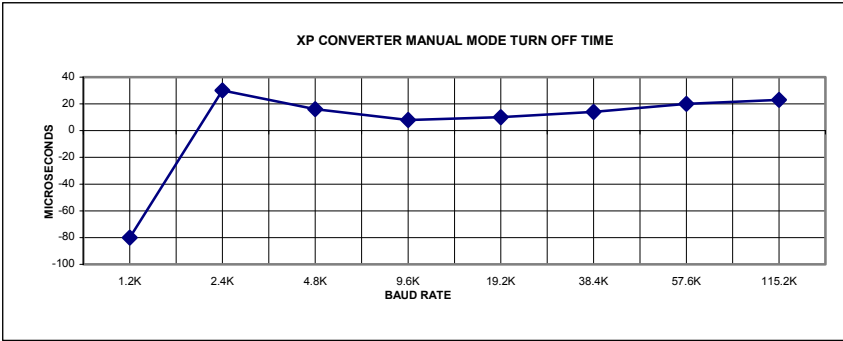
Hardware flow control is also known as RTS/CTS flow control. The PC asserts the RTS (Ready To Send) signal and waits for the connected device to assert CTS (Clear To Send) before transmitting any RS-232 data. The microprocessor in the **XP485-9E/EI** monitors the RTS line and asserts the CTS line when the unit is ready for RS-485 transmission.

None flow control setting is also supported by the unit. Since the **XP485-25E/EI** 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 **XP485-9E/EI** will automatically handle RS-485 transmit enable.

XP CONVERTER MANUAL MODE TURN OFF TIME

A line chart with vertical axis labeled MICROSECONDS ranging from -100 to 40, and horizontal axis labeled BAUD RATE with values 1.2K, 2.4K, 4.8K, 9.6K, 19.2K, 38.4K, 57.6K, 115.2K.

RS232 DATA	
	XP485-DE AUTO ENABLE
RS485 ENABLE	**MPU CONTROLLED**

RS232 DATA	
	XP485-DE MANUAL ENABLE
RS485 ENABLE	**MPU CONTROLLED**

Auto Enable (Data Send Control)

The **XP485-9E/EI** automatically handles the RS-485 half-duplex control via an adaptive algorithm running in the on-board PIC16C63A 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 **XP485-9E/EI** 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 **XP485-9E/EI** 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 **XP485-9E/EI** in the manual mode.

PROGRAMMING AND RS-232 DATA

The **XP485-9E/EI** 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 XP485-9E/EI converters is used on the rs-485 link and has the termination jumpers on!*

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PROGRAMMING AND RS-232 DATA

The **XP485-9E/EI** 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 **XP485-9E/EI.** When power is first applied to the **XP485-9E/EI** 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 v1.01
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)

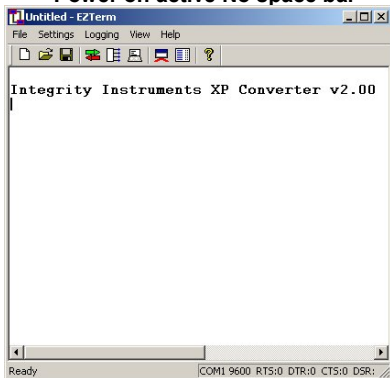| PROGRAMMING COMMANDS	
USE ALL CAPITALS, ↵ SIGNIFYS A CARRIAGE RETURN	
COMMAND	FUNCTION
Mx ↵	Mode change if x = 1 >>>>> Mode 1 Auto mode 2 >>>>> Mode 2 Manual mode
Bx ↵	Baud rate if x = 0 >>>>> 1200 1 >>>>> 1200 2 >>>>> 2400 3 >>>>> 4800 4 >>>>> 9600 5 >>>>> 19,200 6 >>>>> 38,400 7 >>>>> 57,600 8 >>>>>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

PROGRAMMING AND RS-232 DATA

In Auto mode, the baud rate has no function.
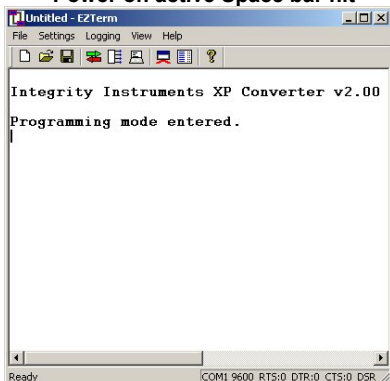
EXAMPLES

Power on active No space bar


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Integrity Instruments XP Converter v2.00
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Power on active Space bar, ?
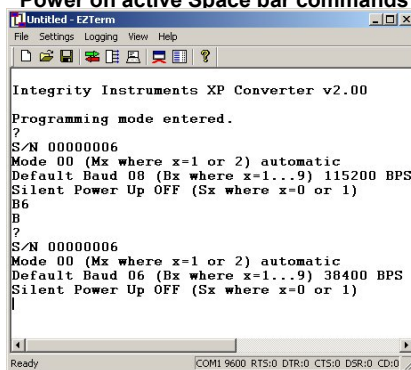

```
Integrity Instruments XP Converter v2.00

Programming mode entered.
?
S/N 00000006
Mode 01 (Mx where x=1 or 2) automatic
Default Baud 08 (Bx where x=1...9) 115200 BPS
Silent Power Up OFF (Sx where x=0 or 1)
```

Power on active Space bar hit


```
Integrity Instruments XP Converter v2.00

Programming mode entered.
```

Power on active Space bar commands


```
Integrity Instruments XP Converter v2.00

Programming mode entered.
?
S/N 00000006
Mode 00 (Mx where x=1 or 2) automatic
Default Baud 08 (Bx where x=1...9) 115200 BPS
Silent Power Up OFF (Sx where x=0 or 1)
B6
B
?
S/N 00000006
Mode 00 (Mx where x=1 or 2) automatic
Default Baud 06 (Bx where x=1...9) 38400 BPS
Silent Power Up OFF (Sx where x=0 or 1)
```

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 it's 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 convered by this warranty.