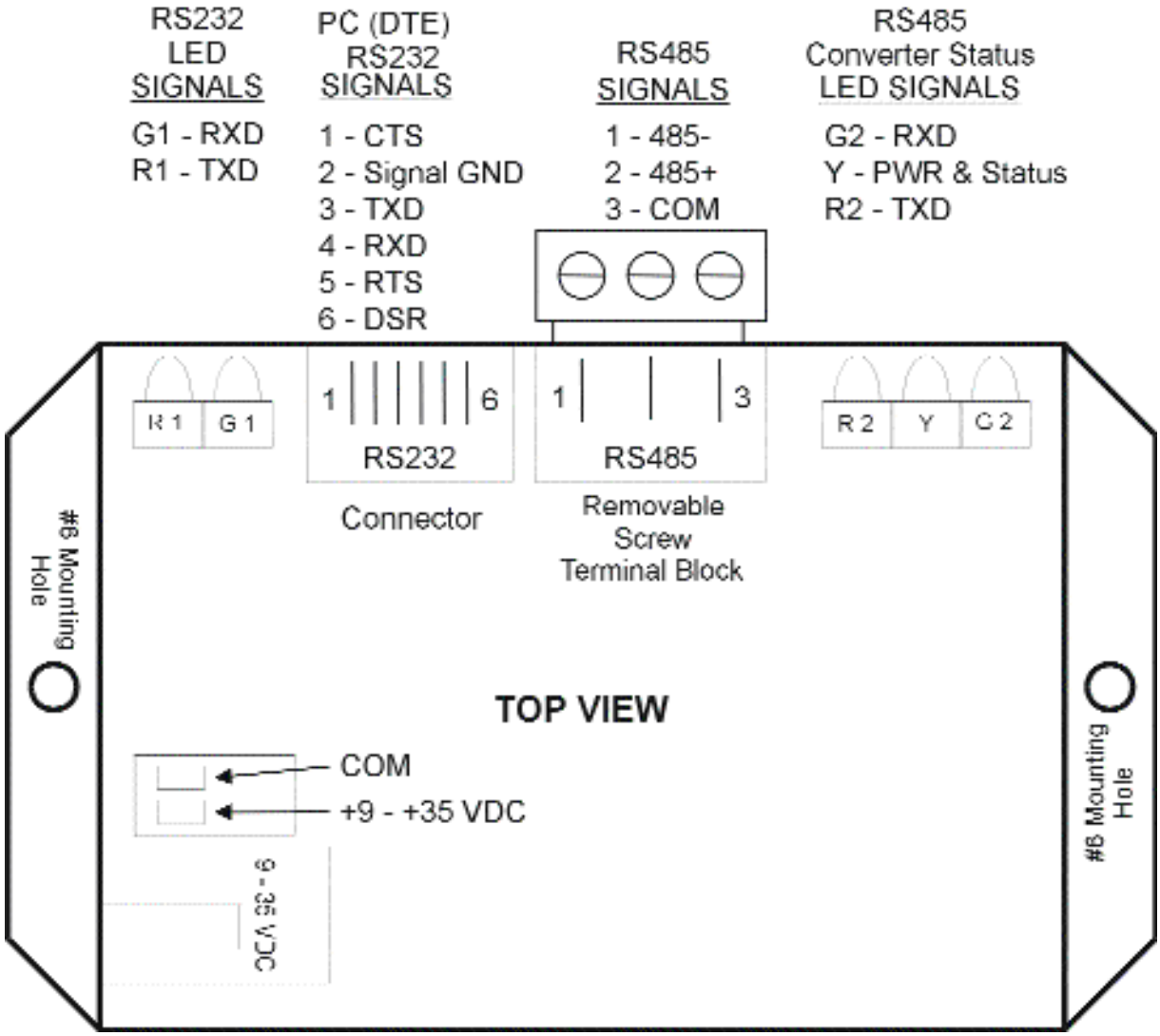
TECHNICAL BULLETIN

PRO22CVT1

Figure 1



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ENGINEERED SYSTEMS
A Division of Northern Computers, Inc.

TECHNICAL BULLETIN

PRO22CVT1

PRO22CVT1 *(RS232 to RS485 Converter)*

The PRO22CVT1 provides fast RS232 to RS485 conversion for two-wire applications at any baud rate between 300 to 115.2Kbits/s. It has Auto-Baud capability so there are no resistors or jumpers to change when communicating at different baud rates. The unit is fully enclosed and comes with its own plug-in wall transformer power supply. An adapter cable comes with the unit for connection with RS232 DTE or DCE equipment with DB-9 or RJ45 connectors.

The PRO22CVT1 has five LEDs to provide status information on its power supply, RS485 & RS232 communications. Internal jumpers are available for different options. They are factory configured for standard operation with Northern Computers products and should require no field modification. Jumper selectable features include DTE/DCE mode, RS485 line biasing, and 120 ohms RS485 line termination. Other jumpers are reserved for NCI Engineering use only.

The PRO22CVT1 also provides the following features:

A) Optical isolation between the RS232 and RS485 communications. This provides for greater protection from noise and problems generally associated with ground loops because there is no physical connection between the two communication buses.

B) Built-in transient surge protection on the RS485 line.

C) Built-in, self-resetting, over-current protection on the RS485 line.

D) Automatic Switching between Transmit and Receive. This allows for fast RS485 communications without introducing delays.

E) Automatic Baud Rate. The PRO22CVT1 will operate at any baud rate from 300 to 115,200 baud with no need to change jumpers, switches or programming.

Installation

Always use 24AWG, 120 ohm impedance, low-capacitance cable for RS485. Use the standard 24AWG shielded cable for RS232. Refer to Figure 1 for pin definitions. Connect one of the twisted pairs to the 485+ terminal, and the other wire of the twisted pair to the 485-terminal. The other set of twisted pair wires are attached to the Com terminal of the removable screw type terminal block on the PRO22CVT1. The shield wire should be grounded at the control panel and not at the PRO22CVT1. The COM wire provides a signal ground for the entire RS485 network and is required by the RS485 specification. This connection is necessary to keep the RS485 signal voltage within a safe range for all units on the network. The RS485 interface may operate without this signal ground connection, but will sacrifice reliability and noise immunity.

The PRO22CVT1 can be installed anywhere on the RS485 line. However, installing it near the middle of the RS485 line will result in higher noise immunity for the entire bus. Therefore it is highly recommended to connect the PRO22CVT1 to the middle of the RS485 copper line. If this location is chosen, remove the jumper (J7) for the 120 ohms termination inside the PRO22CVT1 unit. Ensure that the RS485 line is terminated at 120 ohms at each end.

Connect the power supply provided to a 120VAC wall outlet and to the PRO22CVT1. Connect the RS232 & RS485 signal wires to the PRO22CVT1 according to Figure 1. When the PRO22CVT1 is installed at the end of RS485 line, no modification is necessary since the 120 ohms end-of-line termination jumper is installed by factory.

Connect the RS232 cable to the DB-9 adapter included with the PRO22CVT1. Plug the DB-9 adapter into the appropriate DB-9 serial port on the back of the host PC.

Some sites may desire to use an RS232 multiplexing (multiport) device and attach the PRO22CVT1 to one of the ports. For this purpose, use the NTEXPDI family of products. The RJ12 cable from this product will plug directly into RJ45 connector on the NTEXPDI product with no need for an adapter.

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Please note that other RS-485 products such as the N485DRLA, PRO-2200 and FC485 have been tested for compatibility with this converter. Using any other product in conjunction with this converter is not recommended and may cause problems.

Power

Power for the PRO22CVT1 is provided by a plug-in wall transformer power supply shipped with the unit. When the unit is plugged in and power is applied, the Yellow LED will be on (or flashing). The converter consumes 1.8 watts of power (i.e. 200 mA at 9VDC). Higher input voltage will result in lower current consumption.

Indicators

Line status is continuously monitored by the PRO22CVT1 and displayed via five LEDs. The LEDs are arranged in two groups. Red 1 and Green 1 monitor the RS-232 status. Red 2 and Green 2 monitor the RS485 status. The Yellow indicator, which appears between Red 2 and Green 2 monitors power and time-out status.

In general, when the Yellow LED is ON and all RED and GREEN LEDs are flashing the system is functioning normal. The description for each LED is listed below:

Yellow (on) - Power is on. Red and Green LEDs may be flashing. System is normal.

Yellow (flashing) - Converter has not received any data from the host PC for 20 seconds or more, or there is an error condition detected.

Red 1 (flashing or dim) - Converter is transmitting RS232 data to the host PC.

Green 1 (flashing or dim) - Converter is receiving RS232 data from the host PC.

Red 2 (flashing at a random rate) - Converter is sending RS485 data.

Red 2 (flashing at a constant rate) - Converter internal error or a short on the RS-485 bus. If the flashing stops after disconnecting the RS-485 bus, then the error is most likely external in nature.

Red 2 (on) - Converter has sent but not received any reply from the RS485 bus. Either the RS485 receiver in the converter is not working properly or there is no target on the RS485 bus.

Green 2 (flashing at a random rate) - Converter is receiving RS-485 data.

Red 1 (off) and Green 2 (flashing) - Converter is receiving RS-485 data, but not able to send RS-232 data to host PC.

Red 1 (flashing) and Green 2 (flashing) - Converter is transferring data from RS-485 to RS-232.

Green 1 (flashing) and Red 2 (off) - Converter is receiving RS-232 data, but not able to send RS-485 data to the target.

Green 1 (flashing) and Red 2 (flashing) - Converter is transferring data from RS-232 to RS-485.

Jumpers

User selectable jumpers are provided as follows:

J1 & J2 - RS-232 DTE (Factory installed default, for connection to PC and NTEXPDI)

J3 & J4 - RS-232 DCE

J5 & J6 - RS-485 Line Biasing (Factory installed default)

J7 - RS-485 120 ohm termination (Factory installed default). Remove ONLY if the unit is NOT located at the end of the RS-485 copper line.

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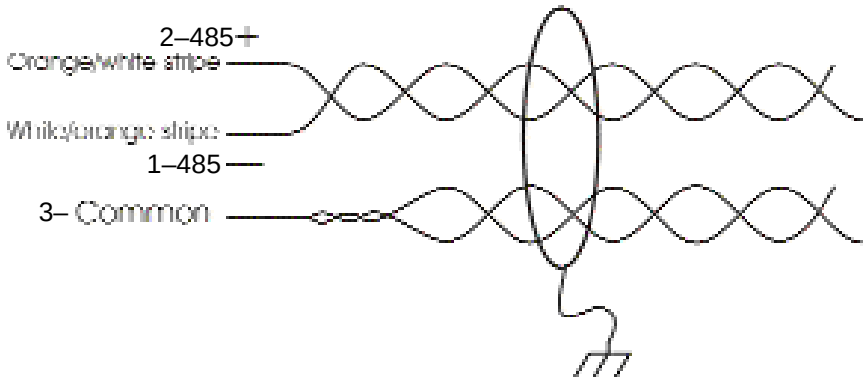
Cable Pair



NCI Cable Part Number

NC2441-TN or NCP2441-TN(for Plenum)

Pinout Configurations

This table is for informational purposes only.
Please refer to the diagram (figure 1) for proper configuration.

RS-232 Signal Name	PRO22CVT1 RJ12	PRO22CVT1 DB-9 Adapter	PC DB-9	PC DB-25	DIGI-Board DB-9**
CTS*	1	8	8	5	8
S.GND	2	5	5	7	5
TXD	3	2	3	2	3
RXD	4	3	2	3	2
RTS*	5	7	7	4	1
DSR*	6	6	6	6	N/C
DTR*	N/C	N/C	4	20	4
DCD*	N/C	N/C	1	8	6

Note:

***** *Converter does not make use of these signals.*

****** *Digi-board uses non-standard configurations for their DB9 connector.*