

CONNECTIONS

The Newsletter of Serial Communication & Control Solutions

TIPS FOR USING PORT POWERED CONVERTERS

When using or installing any RS-232 port powered device, it is important to keep a few things in mind. The two main items are the Power Available from the RS-232 port and the Power Dissipated by the RS-422 or RS-485 system.

POWER DISSIPATION

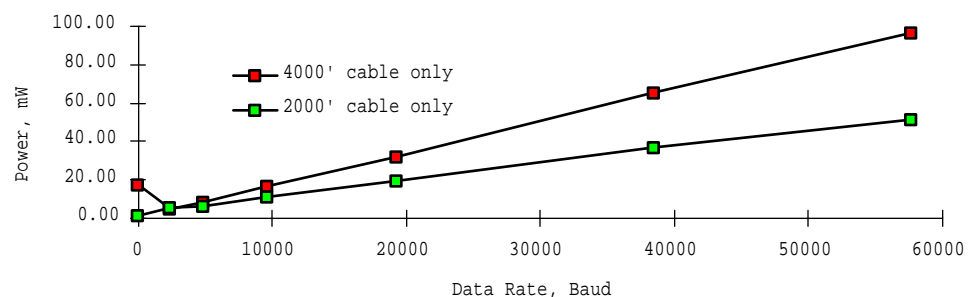
The power dissipated when using a port powered converter is consumed by:

- The cable on the RS-232 side of the converter.
- Termination resistors used on the RS-422 or RS-485 transmission line.
- The RS-422 or RS-485 cable.
- The port powered converter.

*Details on our new
Current Loop Application Note
and how to request free product
information (pg. 2).*

It is assumed in this discussion that the RS-232 cable is short (6 ft.) so that the RS-232 cable power is insignificant. The power dissipated by our typical port powered converter is 50 mW. Figure 1 shows the power dissipated by 2000 ft. and 4000 ft. of transmission line (unterminated). For the data shown in Figure 1, the RS-422 line driver was not power limited by an RS-232 port. This table clearly shows that the line power increases as the data rate increases. The transmission line used in this example is a high quality polyethylene cable recommended for RS-422 & RS-485 applications. The port powered converter is operating at the highest power consumption when it is transmitting data to the RS-422 or RS-485 line. All available power that is not used by the internal converter circuit is used to drive power to the transmission line.

Figure 1. Power vs Baud Rate



The power dissipated by the termination resistors is significant (75 mW for a very short transmission line). Under certain conditions it is not necessary to terminate the RS-422 or RS-485 transmission line. If the system is operating at low speed or short cable lengths, it does not need to be terminated. Low speed is considered to be signaling rates below 200 kbits/sec. or when the cable delay (the time required for an electrical signal to transverse the cable) is substantially shorter than the bit width or when the signal rise time is more than four times the one way propagation delay of the cable (i.e. not a transmission line). As a general rule, if the signal rise time is greater than four times the propagation delay of the cable, the cable is no longer

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SIMPTERM "SHAREWARE TOOL" NOW AVAILABLE

SimpTerm, a new shareware program, ships with all B&B software products and is now available for downloading from our BBS or CompuServe. This SIMPLE TERMinal emulator allows you to open four ports at a time, at any address and IRQ, with user definable Receive and Transmit Buffer sizes. SimpTerm's most notable feature is Monitor Mode which lets you track communications between two devices while remaining transparent to them.

Other features include 16550A FIFO/TRIGGER control, data logging, loop back test mode, any baud rate, and handshake control among others. DOS 3.3 or higher is required. After trying out SimpTerm, you can register with B&B Electronics to be eligible for upgrades and free technical support. Register through CompuServe by typing "GO SWREG" and using registration number 5281. B&B's BBS: (815)-434-2927. SimpTerm is also available in B&B's catalog for \$49.95.

OTHER APPLICATIONS

In addition to SimpTerm, a utility program called PortFind is shipped with all B&B software. PortFind reports the address and interrupt request number of the serial and parallel ports installed in your computer.

Packaged with our Data Acquisition products is a simple DOS-based program called DataLogger. This program takes data samples and stores them to an ASCII comma delimited file. The data can then be imported into software supplied by other vendors for analysis. For example by using Microsoft Excel, you can print a graph of your data.

MAKING CONNECTIONS WITH B&B ELECTRONICS

*A variety of ways to contact our
technical support and sales staff*

Phone (815) 433-5100
8:00 am to 4:30 pm Central M-F

FAX (815) 434-7094
24-hour service

Internet E-Mail

Sales Department
sales@bb-elec.com
Technical Support
techsupt@bb-elec.com

Postal Mail

707 Dayton Road
P.O. Box 1040
Ottawa, IL 61350

Bulletin Board (815) 434-2927
24-hour service
Up to 14,400 baud, no parity,
8 data bits, and 1 stop bit

*Use our BBS to request a catalog,
download manuals and product
specification sheets, leave technical
support questions, and place or
check on orders.*

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considered a transmission line. For most cables, which are 4000 ft. or shorter and baud rates at 19.2k baud or lower, termination is not required.

THE RS-232 PORT AS A POWER SUPPLY

An RS-232 port can supply only limited power to another device. The number of output lines, the type of interface driver IC, and the state of the output lines are important considerations.

The types of driver ICs used in serial ports can be divided into three general categories:

- Drivers which require plus (+) and minus (-) voltage power supplies such as the 1488 series of interface integrated circuits. (Most desktop and tower PCs use this type of driver.)
- Low power drivers which require one +5 volt power supply. This type of driver has an internal charge pump for voltage conversion. (Many industrial micro-processor controls use this type of driver.)
- Low voltage (3.3 v) and low power drivers which meet the EIA-562 Standard. (Used on notebooks and laptops.)

(Cont'd. on page 3)

CURRENT LOOP INTERFACING

B&B Electronics offers a free application note explaining current loop interfaces. B&B current loop converters and serial cards interface RS-232, RS-422, and RS-485 systems to the most common current loop ports. Also available is a free RS-422 and RS-485 Application Note. These notes attempt to cover enough technical details so that all major aspects of a system design can be considered. Contact B&B Electronics to request this information (see side bar on this page).

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Table 1 is a comparison of several types of driver ICs. For driver ICs, their ability to deliver power is greater if the output of the driver is in the positive voltage state.

Table 1. Comparison of RS-232 Drivers			
TYPE OF RS-232 DRIVER	STATE OF LINE	VOLTAGE/CURRENT per driver at max. power	POWER AVAILABLE (from 3 drivers)
1488	Positive	+5v @ 6.5 ma	98 mw
1488	Negative	-5v @ 6.5 ma	78 mw *
Charge Pump (MAX232)	Positive	+5v @ 5 ma	75 mw
Charge Pump (MAX232)	Negative	-5v @ 3.5 ma	42 mw *
EIA-562	Positive	+4.5v @ 1.5 ma	none
EIA-562	Negative	-4.5v @ 1.5 ma	none

* The voltage inverter in the port powered converter dissipates power when converting -v.

WHAT TYPE OF DRIVER DO I HAVE ON MY PORT?

To determine the type of driver used on a serial port without looking at the ICs, put a 3K ohm load on the driver output line to signal ground and measure the voltage. If possible measure the voltage under both (+) and (-) voltage conditions. These voltage measurements should give values as shown below.

1488 Driver	+/- 9 volts	<	Vout	<+/- 11 volts
Charge Pump Driver	+/- 7.5 volts	<	Vout	<+/- 8 volts
EIA-562 Driver	+/- 3.7 volts	<	Vout	<+/- 5 volts

LOOP BACK CONNECTIONS

Many port powered converters will have loop back connections, such as RTS connected to CTS. These loop back connections each dissipate about 8.3 mW per input line. The only reason to make these connections is that some software requires these connections. If you have control over the software, change the software so that the loop back conditions are not required. Also, don't complete the loop back connections in the cables you are using. (See Figure 2.)

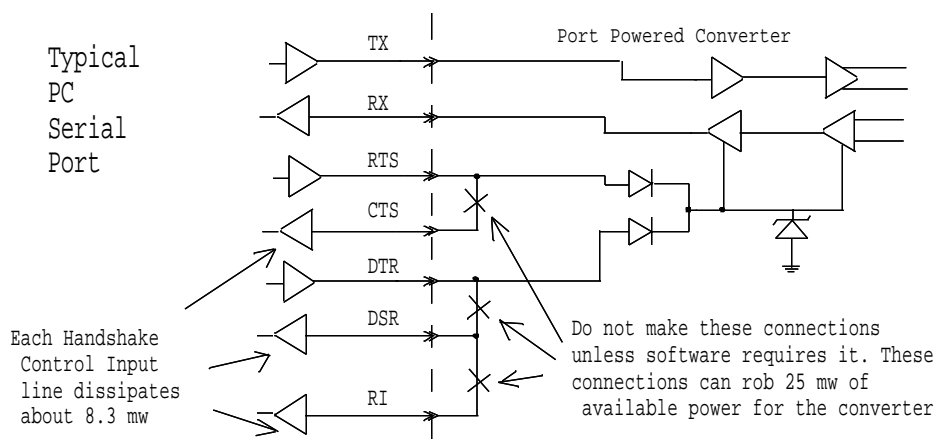


Figure 2. PC Serial Port Used With Port Powered Converter

SUMMARY OF TIPS

- Connect all port driver lines to the converter.
- Keep all unused port driver lines in the positive voltage state.
- Determine if the port can drive the converter (what type of driver).
- Don't terminate the transmission line, if not necessary.
- Don't make loop back connections, if not necessary.

NEW PRODUCT UPDATE

B&B Electronics has introduced two new products which allow temperature measurements to be made through a serial interface. With a simple set of commands, each product will report temperature as well as perform thermostat operations. Non-volatile registers can be programmed with high and low thermostat settings.

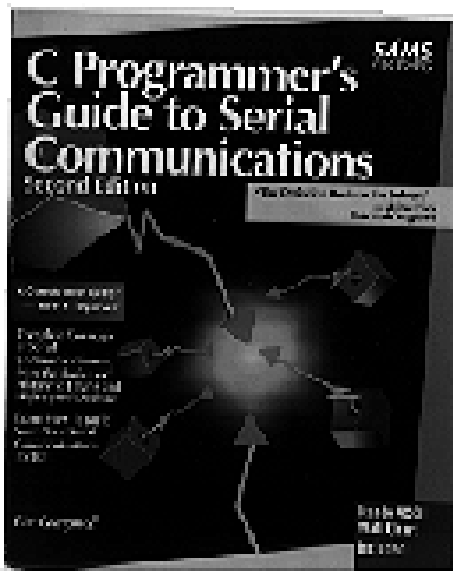
The **Model 232DTT** has an RS-232 serial interface and can be self powered by setting host port handshake lines RTS and DTR high. The RS-485 version, **Model 485DTT**, has a programmable address and turn around delay allowing simple connectivity on two or four wire RS-485 multidrop networks. The DTT units can be externally powered by connecting 12VDC to the terminal blocks.



Both units come with sample Basic source code, a command library, a simple DOS and Windows program, and data logging software on a 3.5" floppy disk. 232DTT \$59.95. 485DTT \$64.95.

Features

- ± 0.5 degree accuracy and resolution
- High, low and hysteresis type open collector thermostat outputs
- Thermostat thresholds programmable in non-volatile registers
- Latching Status Register indicates which thermostat outputs have tripped



2nd Edition Now Available

SUGGESTED READING

Joe Campbell's C Programmer's Guide to Serial Communications 2nd Ed. presents the reader with a complete theoretical and practical background into asynchronous serial programming. Written with the programmer in mind, it is a valuable addition to every programmer's library.

Part I presents a thorough look at the fundamentals of asynchronous technology. The ASCII character set, a programmer's look at RS-232, error detection, Cyclical Redundancy Code, plus flow control and information transfer protocols are all covered. Additional topics include modems, baselines and protocols, data compression, encoding/decoding, and UARTs (including buffered UARTs).

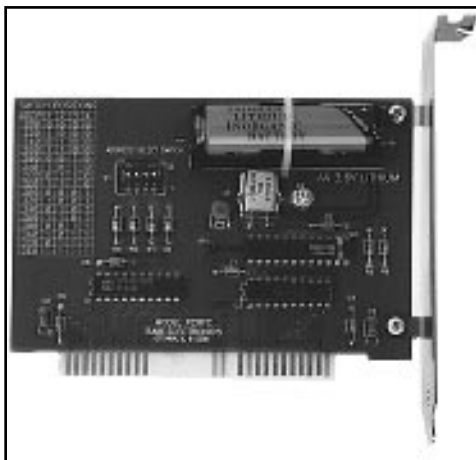
Part II includes examples written in C and develops a library of portable functions to help tackle everyday programming chores such as setting parameters, RS-232 control and monitoring, and many others. 952 pgs, \$39.95.

UPGRADE YOUR INACCURATE DOS CLOCK WITH B&B's PCRTC

Make your PC a reliable timekeeper with B&B Electronics' **PCRTC** - an accurate, temperature stable real time clock for PCs. Simply install the 8 bit card, load the device driver, and your DOS clock will be updated with the correct time every minute. A four position DIP switch is used to set the PCRTC's I/O address, and no interrupts are used.

The PCRTC uses a highly stable oscillator to achieve error of less than 5 seconds per month in a temperature stable environment, and less than 15 seconds per month in an environment ranging from 0 - 50° C. Other features include a battery status function that lets you replace a low battery before time is corrupted, and a register that helps you log and determine the time of last power loss or reset. A timesetting utility and a simple command library are included with the PCRTC on a 3.5" floppy disk. \$129.95.

To receive additional information on the PCRTC or any B&B product, contact our technical support staff at PH: (815) 433-5100, FAX: (815) 434-7094 or on the internet: techsupt@bb-elec.com.



Stable Real Time Clock for PCs