

# **PowerLogic® COM128**

RS-232 to RS-485 Converter

Installation and Operation Guide

August 2006



# Conventions

Throughout this operation manual, the following methods are used to highlight important information.

## **NOTE**

Describes important considerations related to a device setup, feature or application.

## **CAUTION**

Alerts you to a condition which could potentially cause damage to the device or other external equipment.

## **WARNING or DANGER**

Warns you to avoid conditions that could potentially cause serious personal injury and/or equipment damage.

# Table of Contents

	<b>COM128 FEATURES .....</b>	<b>1</b>
<b>1</b>	<b>INTRODUCTION .....</b>	<b>2</b>
<b>2</b>	<b>Physical Features .....</b>	<b>3</b>
2.1	RS-232 Panel .....	3
2.2	RS-485 Panel .....	3
<b>3</b>	<b>CONFIGURATION .....</b>	<b>4</b>
3.1	Configuration Switches .....	4
3.2	Mode Descriptions .....	4
3.2.1	RS-485 Flow Control .....	4
3.2.2	Speed Compensation .....	5
3.2.3	RTS / CTS Flow Control .....	5
3.2.4	RS-485 Data Buffering .....	6
3.2.5	Repeater .....	6
<b>4</b>	<b>INSTALLATION .....</b>	<b>7</b>
4.1	DC Supply Connections .....	7
4.2	RS-232 Connection & Configuration .....	7
4.2.1	RS-232 Cable .....	7
4.2.2	Direct Connection to a Computer .....	7
4.2.3	Connection to a Modem .....	8
4.3	RS-485 Bus Connections .....	9
4.3.1	Convertor Connections .....	9
4.3.2	General Bus Wiring Considerations .....	9
4.3.3	Recommended Topologies .....	9
<b>5</b>	<b>SUPPLYING POWER TO THE RS-232 DTR PIN .....</b>	<b>11</b>
<b>6</b>	<b>TECHNICAL SPECIFICATIONS .....</b>	<b>13</b>
<b>7</b>	<b>COM128 OPTIONS .....</b>	<b>14</b>
7.1	-UNI Option .....	14
7.2	-IND Option .....	14

# COM128™

## *MULTI-PORT RS-232 TO RS-485 CONVERTER*



### **FEATURES**

- Connects one RS-232 line to four RS-485 buses.
- Automatic baud rate detection supporting data rates of 1200, 2400, 4800, 9600, and 19200 baud.
- DTE or DCE operation allows connection to computers or modems without the need for null modem adapters.
- RS-485 transmit enable may be controlled automatically, or by the RS-232 RTS line.
- RTS/CTS handshaking capability for use with radio modems.
- Compatible with short-haul modems and line drivers that are powered by the RS-232 line.
- Works directly with M-SCADA, L-SCADA and PowerView software, or with other proprietary software.
- Full electrical isolation between RS-232 and RS-485 to 750 VDC
- Microprocessor control allows for future enhancements by firmware upgrade.

# 1 INTRODUCTION

The COM128 is used to interface a single RS-232 communications line to up to four RS-485 communications buses.

The RS-485 standard restricts each RS-485 bus to supporting 32 or fewer devices connected to it. The standard also dictates a 4000 foot (1219 m) maximum overall cable length on an RS-485 bus. The COM128 is ideal for installations that contain more than 32 remote devices, or that have devices positioned at distances greater than could be reached with a 4000 foot cable.

The COM128 has four physically independent RS-485 ports, allowing communications with up to 128 devices. Data is transmitted to all four RS-485 ports simultaneously (ie. the ports are not addressable).

The COM128 provides many features which make it flexible, easy to use, and reliable:

## TWO METHODS OF RS-485 BUS CONTROL

RS-232 is a *duplex* communications standard, allowing signals to be transmitted and received simultaneously. RS-485 is *half duplex* standard, allowing only one device connected to an RS-485 bus to transmit at any given time.

The COM128 has two ways to determine whether it should be transmitting onto the RS-485 buses, or listening to them:

- 1) The COM128 can use the RTS signal generated by a computer or other device connected to the RS-232 port. When the RTS line is asserted, the COM128 will convert the RS-232 data stream to RS-485 signal levels and transmit onto the RS-485 buses. When the RTS signal is de-asserted, the COM128 will listen for data on the RS-485 bus and pass it through to the RS-232 port.
- 2) Some types of modems and computer hardware/software do not support RTS line operation. For these applications, the COM128 has an *Auto RTS* mode which monitors the RS-232 bus for data signals. When data is present, the COM128 automatically enables the RS-485 transmit mode and begins to transmit onto the RS-485 buses.

## DTE OR DCE OPERATION

The COM128 is switch-selectable to act in DTE or DCE mode. An RS-232 port is provided for each mode, eliminating the need for null-modems.

In DTE mode, the COM128 supports a CTS-WAIT mode in which received RS-485 packets will be buffered until the CTS line indicates the RS-232 device is ready to receive the data. This feature is useful when interfacing radio modems or slow data logging equipment to RS-485 devices.

## AUTOMATIC BAUD RATE DETECTION

The microprocessor within the COM128 continuously monitors the data being received on its RS-232 port, and determines the correct baud rate. No jumper or switch settings are required.

## HIGH ELECTRICAL ISOLATION

RS-485 buses are generally quite long, and are often run through electrically noisy environments. The risk of exposure to transient voltage surges and spikes on an RS-485 line is substantially higher than on an RS-232 line. The COM128 uses optical isolation between RS-485 and RS-232 sections to provide 750 VDC electrical isolation, and includes transient suppression circuitry on its RS-485 ports.

## MICROPROCESSOR CONTROL

Unlike most converters, the COM128 is controlled by a microprocessor. COM128 features are determined by the processor, not by its electrical circuitry. As new features become available, they can be added to the COM128 by a simple firmware upgrade. This process requires the replacement of a single chip, allowing upgrades to be performed in the field in a matter of minutes.

## LINE DRIVER COMPATIBILITY

Short-haul modem/line drivers, such as the Gandalf mLDS, draw their power from the RS-232 DTR line. The COM128 will support these devices by means of a simple process that requires the movement of a jumper within the COM128 case. The process requires only a screwdriver and should take no more than a few minutes to perform. Please refer to Chapter 5 (Page 12) "Supplying Power to the RS-232 DTR Pin" for details.

## 2 PHYSICAL FEATURES

### 2.1 RS-232 PANEL

The RS-232 panel of the COM128 is illustrated in Figure 2.1.1.

#### DC SUPPLY CONNECTORS

These connections allow the COM128 to be powered from a wide range of DC voltage sources, including the supplied adapter. See Chapter 4 for additional information.

#### RS-232 PORTS

These ports provide connection to either a computer (DCE) or a modem (DTE). See Chapter 3 for configuration. See Chapter 4 for connections.

#### SWITCH

The 6-position switch is used to configure the operation of the COM128. See Chapter 3 for additional details.

### 2.2 RS-485 PANEL

The RS-485 panel of the COM128 is illustrated in Figure 2.2.1.

#### RS-485 PORTS

These four ports connect the COM128 to the four RS-485 buses. Four pluggable 3-pin terminal blocks are provided.

#### STATUS INDICATORS

- A. **IN (RS-232)**  
This LED will flash to indicate that data is being passed from the connected RS-232 port to the RS-485 ports.
- B. **IN (RS-485)**  
This LED will flash to indicate that data is being passed from one of the four RS-485 ports to the connected RS-232 port.
- C. **RS-485 OUT (A, B, C, D)**  
For each corresponding RS-485 port these LED's indicate if the port is in receive or transmit mode. If the LED is on, the corresponding port is listening for data from the RS-485 bus. If the LED is off, the corresponding port is transmitting data to the RS-485 bus.

Figure 2.1.1 RS-232 Connection Panel

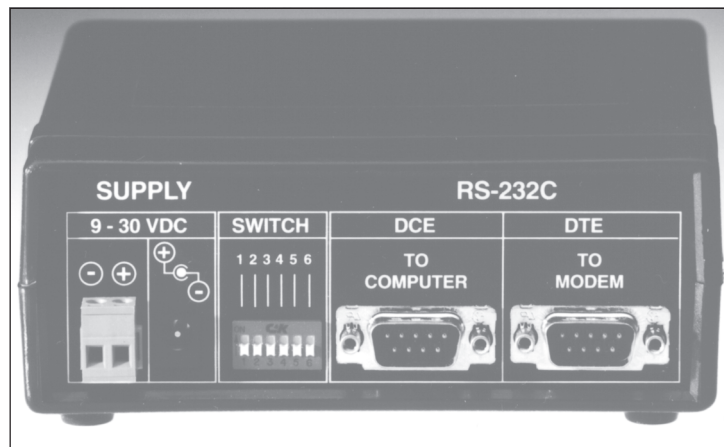
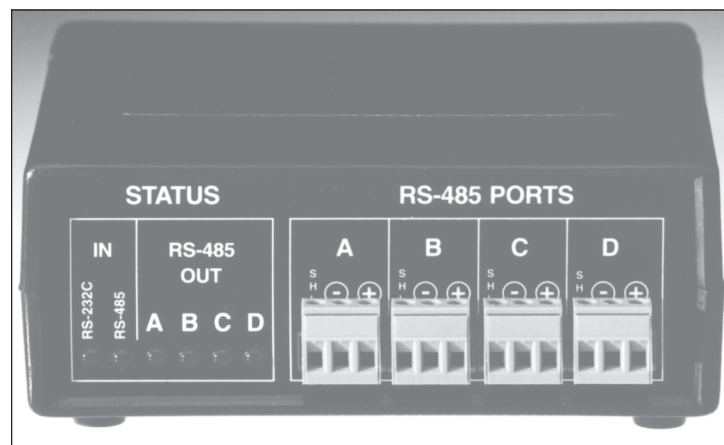


Figure 2.2.1 RS-485 Connection Panel



## 3 CONFIGURATION

### 3.1 CONFIGURATION SWITCHES

These six switches are used to configure the COM128 for the desired operation (see Figure 3.1.1). A switch is ON when it is in the UP position. The following is a description of each mode of operation. A list of switch settings for the different modes follows each mode description. The configuration switches are only read when control power is initially applied to the COM128. To re-configure the COM128, the control power must be removed and re-applied.

### 3.2 MODE DESCRIPTIONS

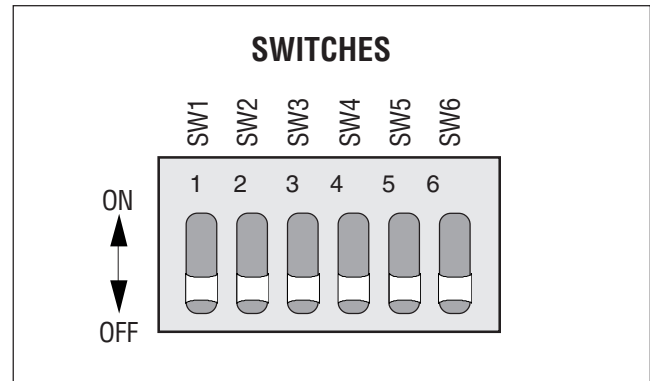
#### 3.2.1 RS-485 FLOW CONTROL

##### FUNCTION

This mode is used to convert the RS-232 signals from either a DTE or DCE device to RS-485 signals. The COM128 makes the signal conversion and provides the timing control signals for the RS-485 ports. No data buffering takes place. Timing can be set for a fixed baud rate or the COM128 is able to do automatic baud rate detection on the incoming RS-232 data. Either the DTE or DCE port can be programmed. When the DTE port of the COM128 is selected in automatic baud rate detection mode, the input CD (Carrier Detect) signal from the DCE device can be used to control the transmission of RS-232 data from the COM128 to the DCE device.

For applications where a DTE device uses the RS-232 RTS signal for flow control the COM128 can be programmed to use the RTS signal to control the RS-485 ports.

Figure 3.1.1 COM128 Configuration Switches



##### NOTE

Setting the Configuration Switches to an undefined value will cause the COM128 to continually reset.

Mode	Port	Baud	SW1	SW2	SW3	SW4	SW5	SW6
RS-485 Flow Control @ fixed Baud Rate	DTE	1200	OFF	OFF	OFF	OFF	ON	OFF
RS-485 Flow Control @ fixed Baud Rate	DTE	2400	ON	OFF	OFF	OFF	ON	OFF
RS-485 Flow Control @ fixed Baud Rate	DTE	4800	OFF	ON	OFF	OFF	ON	OFF
RS-485 Flow Control @ fixed Baud Rate	DTE	9600	ON	ON	OFF	OFF	ON	OFF
RS-485 Flow Control @ fixed Baud Rate	DTE	19,200	OFF	OFF	ON	OFF	ON	OFF
RS-485 Flow Control @ fixed Baud Rate	DCE	1200	ON	OFF	ON	OFF	ON	OFF
RS-485 Flow Control @ fixed Baud Rate	DCE	2400	OFF	ON	ON	OFF	ON	OFF
RS-485 Flow Control @ fixed Baud Rate	DCE	4800	ON	ON	ON	OFF	ON	OFF
RS-485 Flow Control @ fixed Baud Rate	DCE	9600	OFF	OFF	OFF	ON	ON	OFF
RS-485 Flow Control @ fixed Baud Rate	DCE	19,200	ON	OFF	OFF	ON	ON	OFF
RS-485 Flow Control with Auto Baud Rate Detect	DCE	NA	OFF	ON	OFF	ON	ON	OFF
RS-485 Flow Control with Auto Baud Rate Detect	DTE	NA	ON	ON	OFF	ON	ON	OFF
RS-485 Flow Control with Auto Baud Rate Detect and Carrier Detect Required	DTE	NA	OFF	OFF	ON	ON	ON	OFF
RS-485 Flow Control with Hardware RTS	DCE	NA	ON	OFF	ON	ON	ON	OFF



### 3.2.2 SPEED COMPENSATION

#### APPLICATION

For use with DCE devices that require very accurate baud rate input. Typical uses are with high speed dial up modems. This mode can be programmed to either ignore the Carrier Detect (CD) input of its RS-232 DTE port or require that CD be asserted by the DCE device before data is transmitted by the COM128 to the DCE device.

Mode	Port	Baud	SW1	SW2	SW3	SW4	SW5	SW6
Speed Compensation w/o Carrier Detect	DTE	1200	OFF	ON	ON	OFF	OFF	OFF
Speed Compensation w/o Carrier Detect	DTE	2400	ON	ON	ON	OFF	OFF	OFF
Speed Compensation w/o Carrier Detect	DTE	4800	OFF	OFF	OFF	ON	OFF	OFF
Speed Compensation w/o Carrier Detect	DTE	9600	ON	OFF	OFF	ON	OFF	OFF
Speed Compensation w/o Carrier Detect	DTE	19,200	OFF	ON	OFF	ON	OFF	OFF
Speed Compensation with Carrier Detect	DTE	1200	ON	ON	OFF	ON	OFF	OFF
Speed Compensation with Carrier Detect	DTE	2400	OFF	OFF	ON	ON	OFF	OFF
Speed Compensation with Carrier Detect	DTE	4800	ON	OFF	ON	ON	OFF	OFF
Speed Compensation with Carrier Detect	DTE	9600	OFF	ON	ON	ON	OFF	OFF
Speed Compensation with Carrier Detect	DTE	19,200	ON	ON	ON	ON	OFF	OFF

### 3.2.3 RTS / CTS FLOW CONTROL

#### APPLICATION

This mode is used in conjunction with DCE devices which require hardware RTS / CTS handshaking. Typical uses are radio modems and multi-drop lease line modems with switched carriers.

#### RS-232 TO RS-485 DATA FLOW

The COM128 detects the start bit, or falling edge, of the first byte received by the RS-232 DTE port and sets all 4 RS-485 ports into Transmit mode. The COM128 continues to monitor the RS-232 DTE port for data and continues to pass data to the RS-485 port until there is no data coming in the RS-232 port.

#### RS-485 TO RS-232 DATA FLOW

The COM128 detects data received on any of the 4 RS-485 ports. The first byte is stored in an internal memory buffer and the Request To Send (RTS) output signal of the DTE RS-232 port is asserted. The buffer size is 256 bytes. The COM128 continues to buffer bytes received from the RS-485 port and scans the RS-232 DTE ports' input signal Clear To Send (CTS). When the COM128 detects that CTS has been

asserted it starts to transmit the buffered data out the RS-232 DTE port. After the last byte in the buffer has been transmitted out the RS-232 DTE port the COM128 de-asserts the RTS signal and returns to the Idle State.

If CTS is not asserted after 256 bytes have been received from the RS-485 port a buffer overflow will occur. The COM128 de-asserts RTS and clears the buffer.

If CTS is not asserted within 256 byte times after the first byte has been received from the RS-485 port a time-out will occur. The COM128 de-asserts RTS and clears the buffer.

If CTS is de-asserted before the entire contents of the buffer have been transmitted out the RS-232 DTE port the COM128 de-asserts RTS and clears the buffer.

When in the RS-485 to RS-232 Data flow state the COM128 ignores any data received from its' RS-232 DTE port.

Mode	Port	Baud	SW1	SW2	SW3	SW4	SW5	SW6
RTS / CTS Flow control	DTE	1200	ON	OFF	OFF	OFF	OFF	OFF
RTS / CTS Flow control	DTE	2400	OFF	ON	OFF	OFF	OFF	OFF
RTS / CTS Flow control	DTE	4800	ON	ON	OFF	OFF	OFF	OFF
RTS / CTS Flow control	DTE	9600	OFF	OFF	ON	OFF	OFF	OFF
RTS / CTS Flow control	DTE	19,200	ON	OFF	ON	OFF	OFF	OFF

### 3.2.4 RS-485 DATA BUFFERING WITH TRANSMISSION DELAY AFTER RTS ASSERTION

#### APPLICATION

This mode is very similar to the RTS / CTS mode. The COM128 buffers data from the RS-485 ports, asserts its RTS output then transmits data out of the DTE port after a programmable time delay. This mode is used in conjunction with DCE devices which require hardware flow control (handshaking) but do not provide a CTS signal back to the COM128. Typical uses are radio modems and multi-drop lease line modems with switched carriers.

#### RS-232 TO RS-485 DATA FLOW

The COM128 detects the start bit, or falling edge, of the first byte received by the RS-232 DTE port and sets all 4 RS-485 ports into Transmit mode. The COM128 continues to

monitor the RS-232 DTE port for data and continues to pass data to the RS-485 port until there is no data coming into the RS-232 port.

#### RS-485 TO RS-232 DATA FLOW

The COM128 detects data received on any of the 4 RS-485 ports. The first byte is stored in an internal memory buffer and the Request To Send (RTS) output signal of the DTE RS-232 port is asserted and an internal timer is started. The buffer size is 256 bytes. The COM128 continues to buffer bytes received from the RS-485 port. When the COM128's internal timer has elapsed it starts to transmit the buffered data out the RS-232 DTE port. After the last byte in the buffer has been transmitted out the RS-232 DTE port the COM128 de-asserts the RTS signal and returns to the Idle State.

When in the RS-485 to RS-232 Data flow state the COM128 ignores any data received from its' RS-232 DTE port.

Mode	Port	Baud	SW1	SW2	SW3	SW4	SW5	SW6
RS-485 Data Buffering with 20 mSec transmission delay after RTS assertion	DTE	1200	OFF	OFF	OFF	OFF	OFF	ON
RS-485 Data Buffering with 50 mSec transmission delay after RTS assertion	DTE	1200	ON	OFF	OFF	OFF	OFF	ON
RS-485 Data Buffering with 100 mSec transmission delay after RTS assertion	DTE	1200	OFF	ON	OFF	OFF	OFF	ON
RS-485 Data Buffering with 20 mSec transmission delay after RTS assertion	DTE	2400	ON	ON	OFF	OFF	OFF	ON
RS-485 Data Buffering with 50 mSec transmission delay after RTS assertion	DTE	2400	OFF	OFF	ON	OFF	OFF	ON
RS-485 Data Buffering with 100 mSec transmission delay after RTS assertion	DTE	2400	ON	OFF	ON	OFF	OFF	ON
RS-485 Data Buffering with 20 mSec transmission delay after RTS assertion	DTE	4800	OFF	ON	ON	OFF	OFF	ON
RS-485 Data Buffering with 50 mSec transmission delay after RTS assertion	DTE	4800	ON	ON	ON	OFF	OFF	ON
RS-485 Data Buffering with 100 mSec transmission delay after RTS assertion	DTE	4800	OFF	OFF	OFF	ON	OFF	ON
RS-485 Data Buffering with 20 mSec transmission delay after RTS assertion	DTE	9600	ON	OFF	OFF	ON	OFF	ON
RS-485 Data Buffering with 50 mSec transmission delay after RTS assertion	DTE	9600	OFF	ON	OFF	ON	OFF	ON
RS-485 Data Buffering with 100 mSec transmission delay after RTS assertion	DTE	9600	ON	ON	OFF	ON	OFF	ON
RS-485 Data Buffering with 20 mSec transmission delay after RTS assertion	DTE	19,200	OFF	OFF	ON	ON	OFF	ON
RS-485 Data Buffering with 50 mSec transmission delay after RTS assertion	DTE	19,200	ON	OFF	ON	ON	OFF	ON
RS-485 Data Buffering with 100 mSec transmission delay after RTS assertion	DTE	19,200	OFF	ON	ON	ON	OFF	ON

### 3.2.5 REPEATER

For use as a RS-485 repeater. It is a 1 to 3 repeater with Port A as a "master" port and Ports B, C, and D as slaves. Ports B, C, and D do not share data. The RS-232 ports are not used. That is, port A can transmit to B, C, and D, and ports B or C or D can transmit to A.

Mode	Port	Baud	SW1	SW2	SW3	SW4	SW5	SW6
Repeater	NA	1200	ON	ON	OFF	OFF	ON	ON
Repeater	NA	2400	OFF	OFF	ON	OFF	ON	ON
Repeater	NA	4800	ON	OFF	ON	OFF	ON	ON
Repeater	NA	9600	OFF	ON	ON	OFF	ON	ON

## 4 INSTALLATION

### 4.1 DC SUPPLY CONNECTIONS

The COM128 is shipped with a 9 VDC adapter which plugs into the adapter receptacle. **Use only the adapter provided with the COM128 for this particular powering application.**

Alternatively, any DC power supply capable of supplying from 9 to 30 VDC at 500 mA (minimum) can be used to power the COM128. Connect the (+) and (-) outputs from the power supply to the corresponding terminals of the removable 2-pin terminal block connector supplied with the COM128 (See Chapter 2, Figure 2.1.1).

### 4.2 RS-232 CONNECTIONS & CONFIGURATION

Sections 4.2.2 and 4.2.3 discuss RS-232 port connections when connecting to a computer or modem. The COM128 configuration switches are used to select which port is active. Note that the COM128 can also be used in other applications by selecting the appropriate port and modes as described in Chapter 3. For configuration switch settings, refer to section 3.2, 'Mode Descriptions'.

#### 4.2.1 RS-232 CABLE

A standard RS-232 serial communications cable should be used. The COM128 end must be a female DB9 connector for direct connection, or a male DB25 for connection via the supplied adapter plug. Maximum cable length is 50 feet (15.2 m).

### 4.2.2 DIRECT CONNECTION TO A COMPUTER

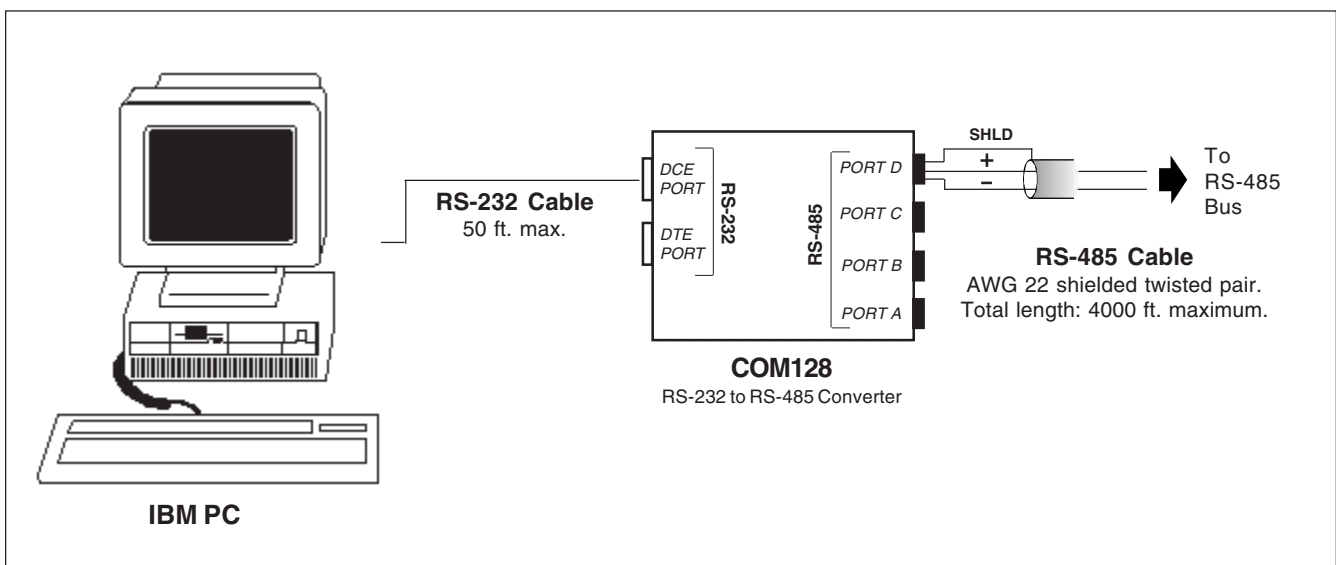
#### PORT SELECTION

An IBM-compatible PC acts as a DTE (Data Terminal Equipment) RS-232 device. Therefore, the computer's RS-232 port should be connected to the DCE port on the COM128. Refer to Figure 4.2.2.

#### SWITCH SETTINGS

To properly communicate with the computer, the COM128 must be configured as a DCE (Data Communications Equipment) RS-232 device (see subsection 3.2.1, 'RS-485 Flow Control').

Figure 4.2.2 RS-232 Direct Connection to Computer



### 4.2.3 CONNECTION TO A MODEM

#### PORT SELECTION

A telephone or radio modem typically acts as a DCE RS-232 device. Therefore, the modem's RS-232 port should be connected to the COM128's DTE RS-232 port. Refer to Figure 4.2.3.

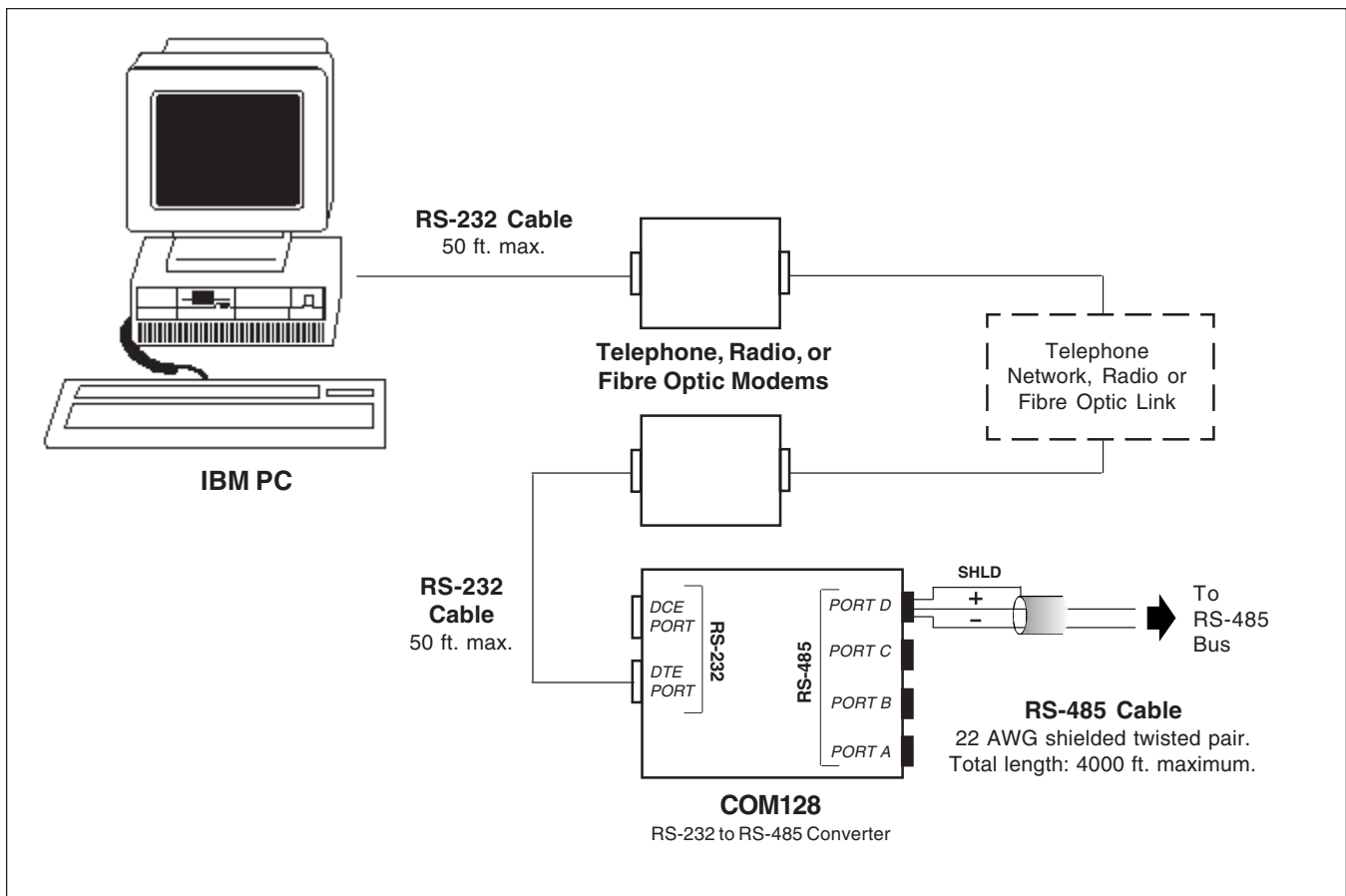
#### SWITCH SETTINGS

To properly communicate with the modem, the COM128 must be configured as a DTE RS-232 device.

If the modem requires RTS-CTS handshaking, the RTS/CTS Flow Control function provided by the COM128 should be enabled. This will force the COM128 to buffer all RS-485 data received until the modem is ready to receive the data. Most radio modems require this mode, as do some telephone modems. Refer to your modem's operation manual to see if your modem provides or requires this handshaking.

Refer to Section 3.2, 'Mode Descriptions', for examples of switch settings for this application.

Figure 4.2.3 RS-232 Connection to Modem



## 4.3 RS-485 BUS CONNECTIONS

### 4.3.1 CONVERTOR CONNECTIONS

The RS-485 port of the COM128 provides screw down, captured wire type terminal blocks that unplug from the main chassis to simplify wiring.

Refer to the following sections for detailed information on wiring requirements and recommended topologies.

### 4.3.2 GENERAL BUS WIRING CONSIDERATIONS

Up to 32 devices can be connected on a single RS-485 bus. The overall length of the RS-485 cable connecting all devices cannot exceed 4000 ft. (1219 m).

Devices connected on the bus, including convertor(s) and other instrumentation, must be wired as follows:

- Use a good quality shielded twisted pair cable for each RS-485 bus. It is recommended that AWG 22 (0.6 mm) or larger conductor size be used.
- Ensure that the polarity is correct when connecting to the RS-485 port (+) and (-) terminals of each device.
- The shield of each segment of the RS-485 cable must be connected to ground at *one end only*.

#### CAUTION

Do not connect ground to the shield at both ends of a segment. Doing so will allow ground loop currents to flow in the shield, inducing noise in the communications cable.

- It is recommended that an intermediate terminal strip be used to connect each device to the bus. This will allow for easy removal of a device for servicing if necessary. The terminal strip should be connected as shown in Figure 4.3.2.

### 4.3.3 RECOMMENDED TOPOLOGIES

Devices on an RS-485 bus are connected in a point-to-point configuration, with the (+) and (-) terminals of each device connected to the associated terminals on the next device. This is illustrated in Figure 4.3.3a.

While there are many topologies that can be used to connect devices on an RS-485 communication bus, the two recommended methods are the *straight-line* and *loop* topologies.

#### STRAIGHT-LINE TOPOLOGY

The straight-line wiring method is illustrated in Figure 4.3.3a. Note that connections are shown for one RS-485 port only. The COM128 supports four RS-485 buses simultaneously. The COM128 can exist at any position on the RS-485 bus, including an end point.

Each end point of the straight-line bus must be terminated with a 1/4 watt resistor. These *termination resistors* reduce signal reflections which may corrupt data on the bus.

Termination resistors are connected between the (+) and (-) terminals of the device at each end of the bus. This device can include either a convertor or any other instrument. The value of the resistor should match the line impedance of the cable being used. For AWG 22 shielded twisted pair cable, values between 150 and 300 ohms are typical. Consult the cable manufacturer's documentation for the exact impedance of your cable.

#### LOOP TOPOLOGY

The loop wiring method is illustrated in Figure 4.3.3a. The COM128 can exist at any position on the RS-485 bus.

One advantage of the loop topology is that a single open circuit fault condition anywhere on the loop will not result in the loss of communication between the computer station and any of the remote devices.

The loop topology does not require termination resistors at any point on the bus.

Figure 4.3.2 RS-485 Intermediate Terminal Strip Connection

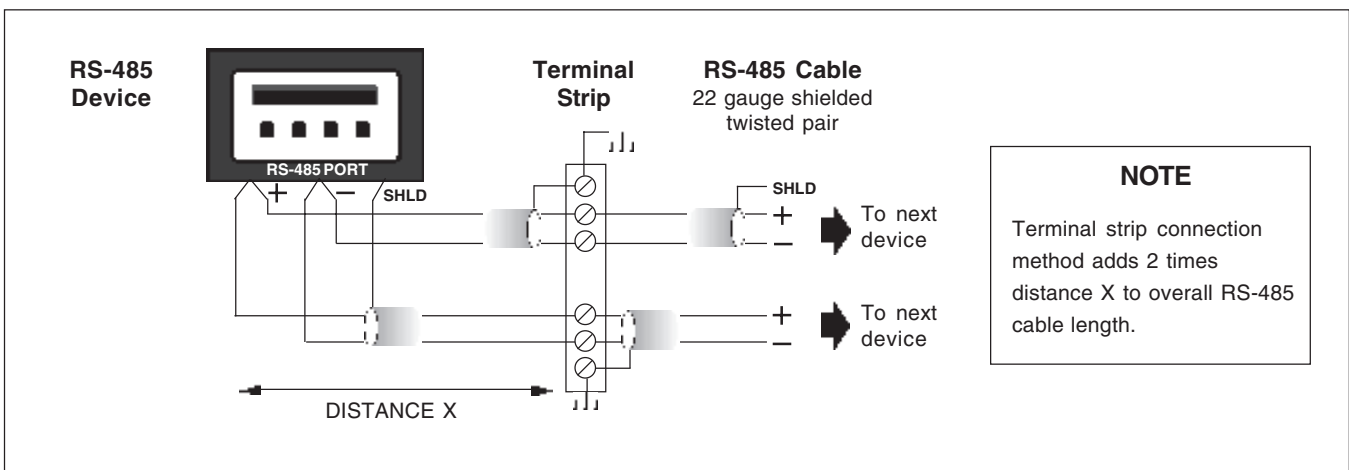
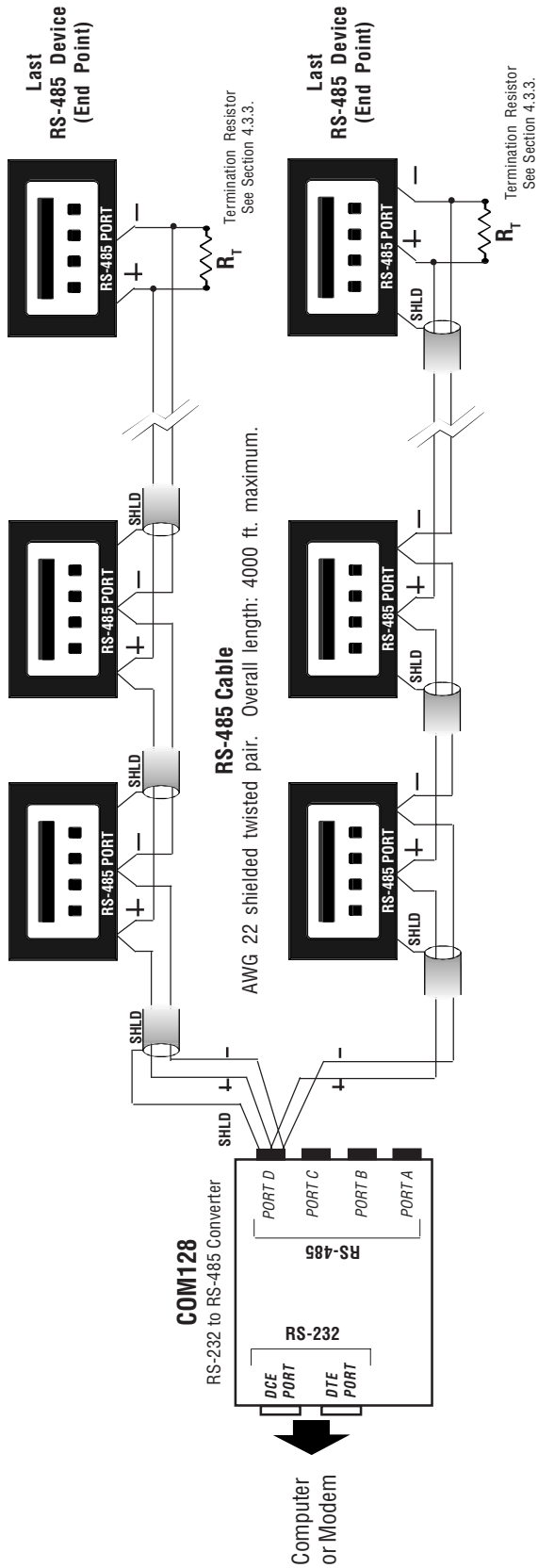
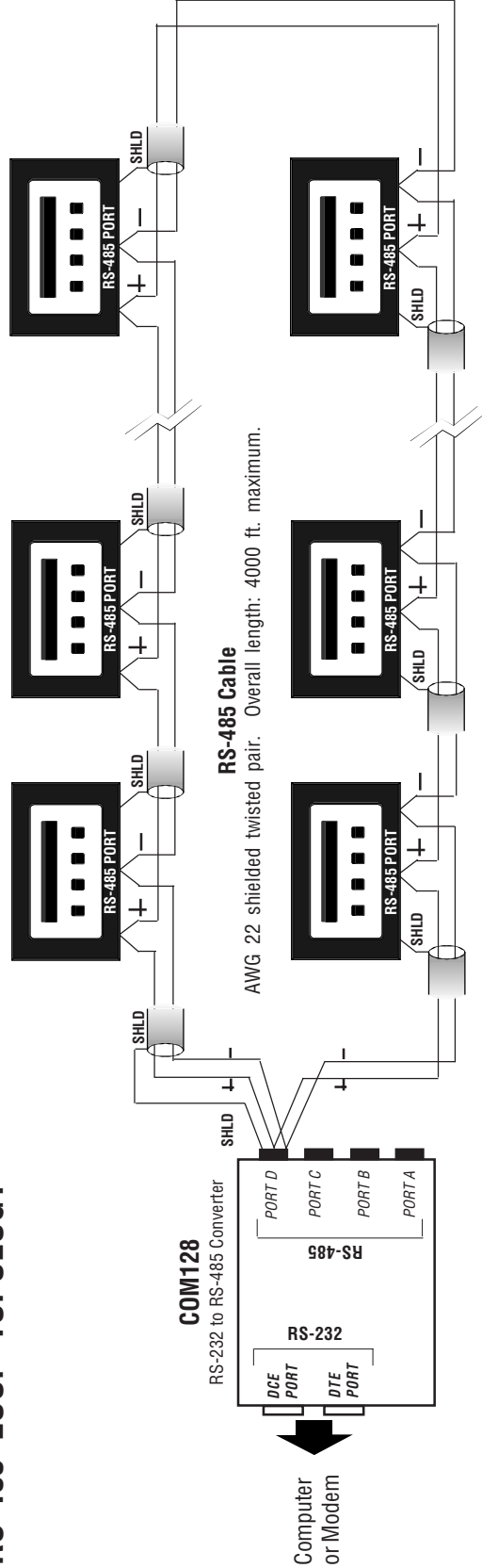


Figure 4.3.3a RS-485 Straight-Line and Loop Topologies

### RS-485 STRAIGHT-LINE TOPOLOGY



### RS-485 LOOP TOPOLOGY



**CALCULATING OVERALL CABLE LENGTH**

When determining the overall length of an RS-485 communication straight-line or loop connection, it is important to account for all cable segments. For example, when RS-485 connections to the device are made via an intermediate terminal block (Figure 4.3.2), the lengths of cable between the device and the terminal block must be added to the total cable distance. This length is equal to 2 times distance X in the diagram.

**CONNECTION METHODS TO AVOID**

Any device connection that causes a branch in the main RS-485 bus should be avoided. This includes *star* and *tee (T)* methods. Refer to Figure 4.3.3b for examples. These wiring methods will cause signal reflections that may cause interference.

**RULE OF THUMB**

At any connection point on the RS-485 bus, no more than two (2) cables should be connected. This includes connection points on instruments, converters, and terminal strips. Following this guideline ensures that star and tee connections are avoided.

## 5 SUPPLYING POWER TO THE RS-232 DTR PIN

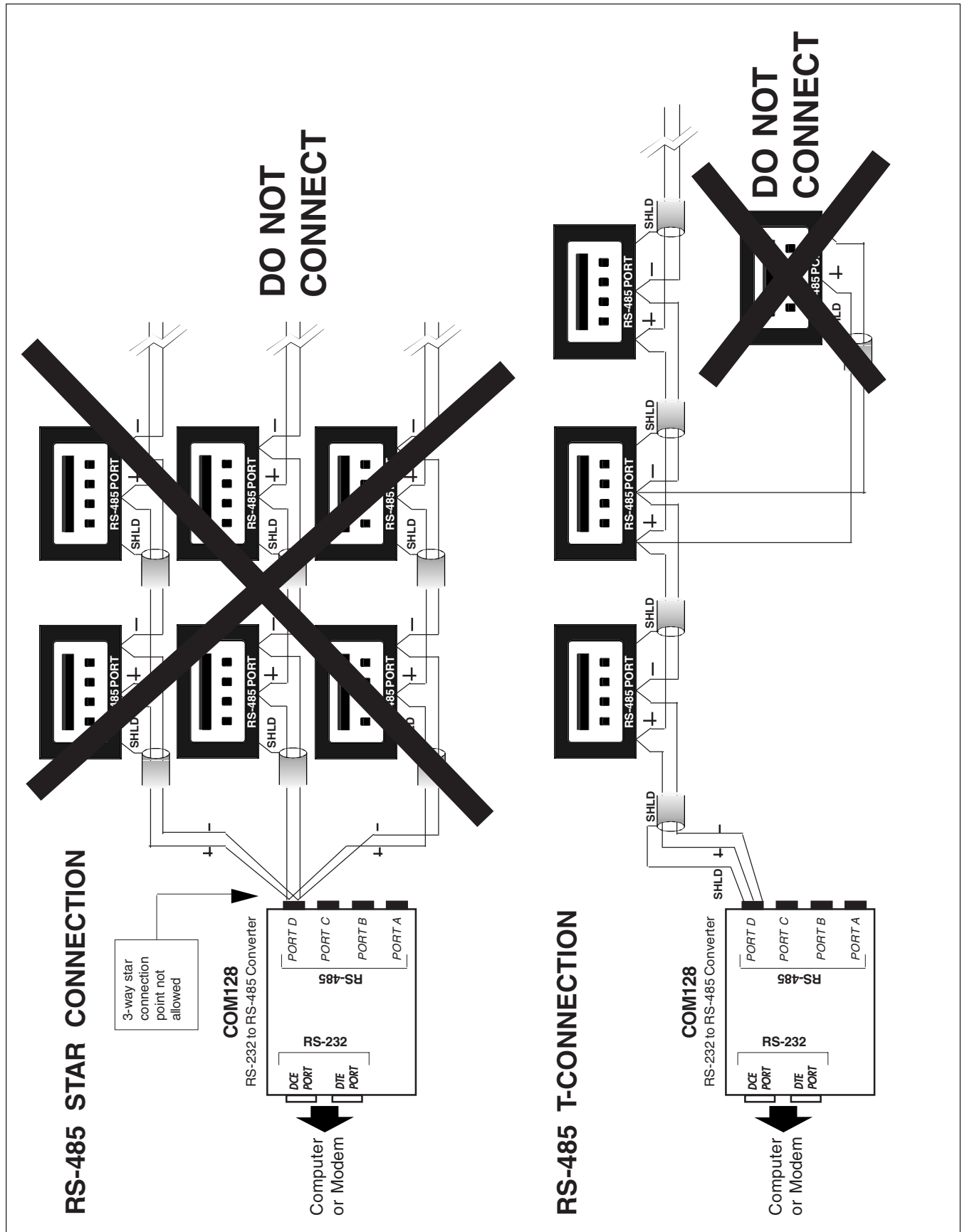
The COM128 is shipped configured for use with devices that supply their own power.

Some RS-232 devices, such as short-haul modems and line drivers, receive their power from the DTR pin of the RS-232 line. The COM128 can be configured to support these devices, supplying 5 VDC @ 10 mA to the DTR pin of its DTE or DCE port.

To configure the COM128 to supply power on the DTR pin, follow this procedure:

1. Disconnect all power and communications connections to the COM128.
2. Remove the two case screws, and lift the top half of the case away from the base of the unit.
3. Locate the 3-pin jumper blocks J1 and J2. For normal use, these are configured with pins 2 and 3 connected. Change each jumper so that pins 1 and 2 are connected.
4. Replace the cover and re-install the screws.

Figure 4.3.3a RS-485 Topologies to Avoid





## 6 TECHNICAL SPECIFICATIONS

### ELECTRICAL RATINGS

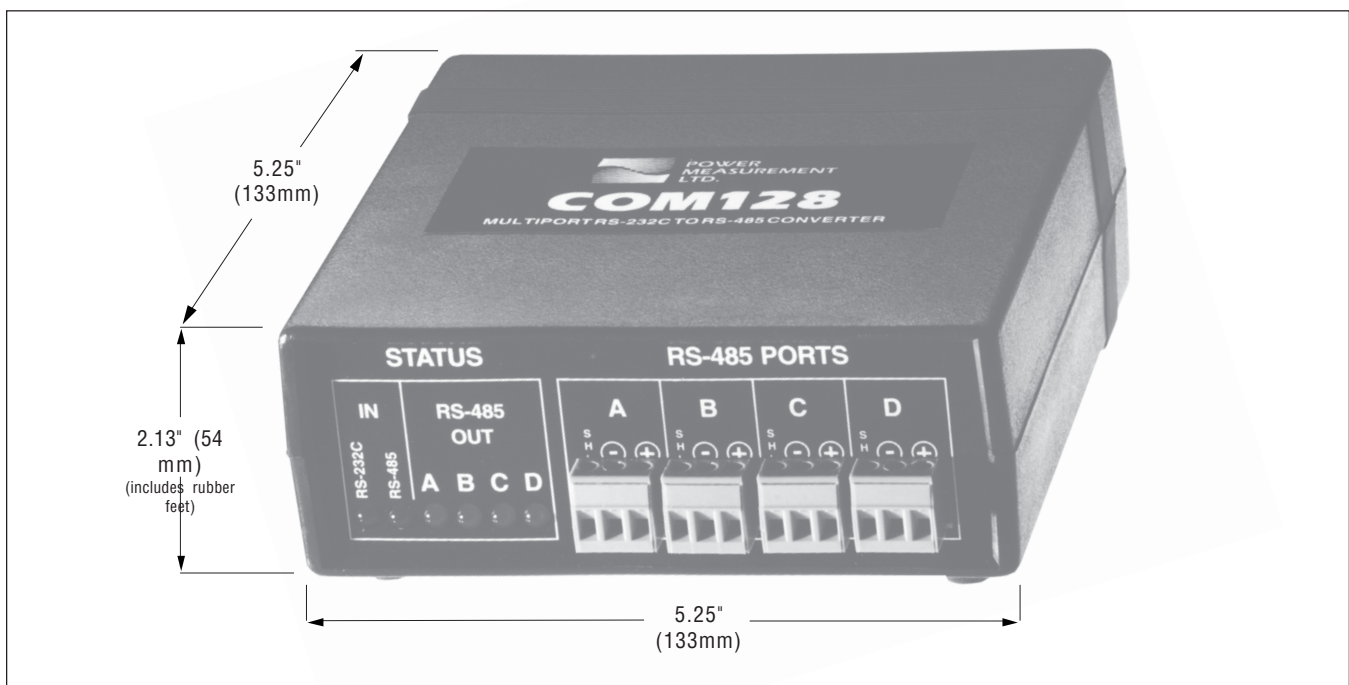
Isolation:	750 V between RS-232 and RS-485 ports
Power Supply:	Standard: 9 VDC @ 500 mA (120 VAC adapter supplied) Alternate: 2-pin pluggable terminal block accepts 9-30 VDC
Power to DTR Pin:	5 VDC @ 10 mA (jumper selectable)
Operating Temperature:	0°C TO 50°C (32°F to 122°F) ambient air
Storage Temperature:	-30°C to 70°C (-22°F to + 158°F)
Humidity:	5 to 95 percent, non-condensing
Shipping:	Weight: 0.9 kg (2 lbs. 0 oz.) Carton: 30 x 25 x 18cm (11.8" x 9.8" x 5.9")

### FEATURES

Baud Rates Supported:	1200, 2400, 4800, 9600, 19200
RS-232 Ports:	One DTE (Male DB9) One DCE (Male DB9)
RS-485 Ports:	Four 3-pin, pluggable terminal blocks, each with (+), (-), and shield (SHLD) terminals

RS-485 port terminals all pass  
ANSI/IEEE C37.90A-1989  
surge withstand and fast transient tests.

Figure 6.1 COM128 Mechanical Dimensions



## 7 COM128 OPTIONS

### -UNI OPTION

The -UNI option is a universal power supply that allows the COM128 to be powered from any standard international voltage and frequency.

#### Specifications

Input Voltage:	90 VAC to 264 VAC
Input Frequency Range:	47 Hz to 63 Hz
Protection:	Internal Fuse
Operating Temperature :	0°C to 40°C 32°F to 104°F
Storage Temperature:	-40°C to 70°C -40°F to 158°F

#### Standards Compliance

The UNI option is CSA and UL approved, and CE compliant.

### -IND OPTION

The -IND option is a universal power supply that allows the COM128 to be powered from any standard international voltage and frequency. The power supply is designed for industrial applications where it can be mounted on the wall or door of a cabinet. Refer to Figure 7.2.1.

#### Specifications

Input Voltage:	85 VAC to 264 VAC 110 VDC to 340 VDC
Input Frequency Range:	47 Hz - 440 Hz
Protection:	Internal fuse
Operating Temperature:	0°C to 50°C (relative humidity, non-condensing) 32°F to 122°F
Storage Temperature:	-20°C to 75°C -4°F to 167°F

#### STANDARDS COMPLIANCE

The IND option is CSA, UL and VDE approved, and CE certified.

#### SPECIAL CONSIDERATION

For the CE certification to be valid, the IND power supply must be installed in accordance with all local electrical codes and standards and must not be user-accessible during normal operation.

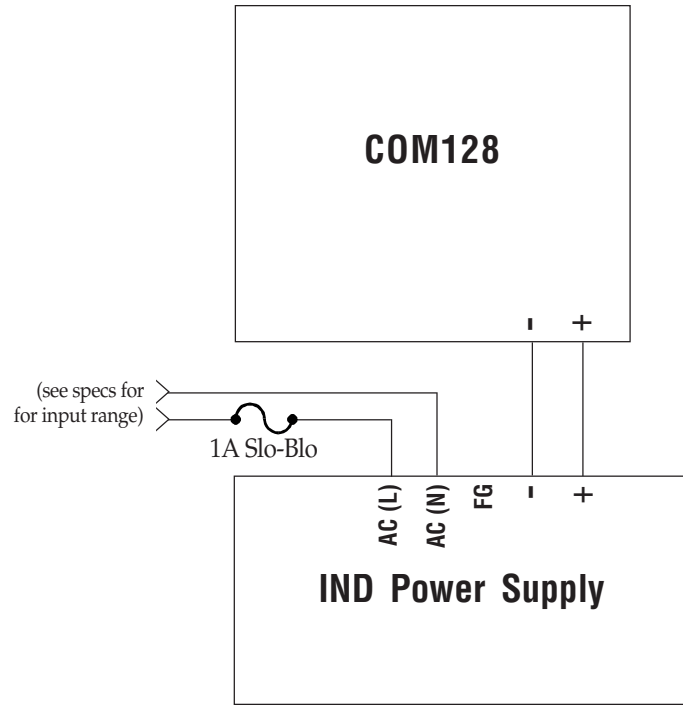
#### Mechanical and Mounting Dimensions

Dimensions in inches except where otherwise indicated.

#### Connections

The -IND power supply must be connected to a dedicated fused feed voltage source. The COM128 is connected to the IND supply via the Phoenix 2-pin power supply connector on the COM128 enclosure. Refer to Figure 7.2.

Figure 7.2 Connecting the -IND Power Supply











For further assistance  
please contact us at:

**Schneider Electric**

Power Monitoring and Control  
2195 Keating Cross Road  
Saanichton, BC  
Canada V8M 2A5  
Tel: 1-250-652-7100

295 Tech Park Drive, Suite 100  
Lavergne, TN 37086  
USA  
Tel: 1-615-287-3400

Electropole (38 EQI)  
31, rue Pierre Mendès France  
F - 38050 Grenoble Cédex 9  
Tel : + 33 (0) 4 76 57 60 60

Getting technical support:  
Contact your local Schneider Electric sales  
representative for assistance or go to the  
[www.powerlogic.com](http://www.powerlogic.com) website.

Electrical equipment should be installed, operated,  
serviced, and maintained only by qualified personnel.  
No responsibility is assumed by Schneider Electric for any  
consequences arising out of the use of this material.

70002-0025-06  
© 2006 Schneider Electric. All rights reserved.  
09/2006



## Free Manuals Download Website

<http://myh66.com>

<http://usermanuals.us>

<http://www.somanuals.com>

<http://www.4manuals.cc>

<http://www.manual-lib.com>

<http://www.404manual.com>

<http://www.luxmanual.com>

<http://aubethermostatmanual.com>

Golf course search by state

<http://golfingnear.com>

Email search by domain

<http://emailbydomain.com>

Auto manuals search

<http://auto.somanuals.com>

TV manuals search

<http://tv.somanuals.com>