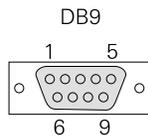


# Serial Communication

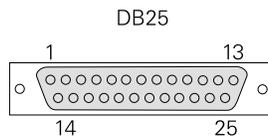
RS-232 and RS-485 are Electronic Industries Association (EIA) specifications commonly used for serial data communication. Siemens ACCESS devices support the RS-485 as standard. Some ACCESS devices also support the RS-232 standard.

## RS-232

RS-232 is a serial communication protocol which sends and receives information through twisted pair cable. It is common to see both 9-pin and 25-pin RS-232 connectors. It is important to note that although the RS-232 standard consists of 25 transmission lines, many applications do not require all the lines available. Depending on the device, manufacturers use various combinations of the transmission lines available. The following illustration, for example, shows the connector requirements for equipment used in the Siemens ACCESS system.

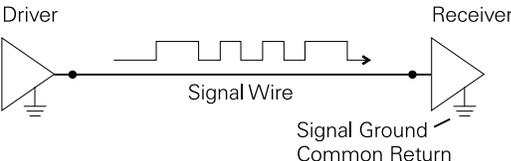


Pin	Signal
1	Received Line Signal Detector (DCD)
2	Received Data (Rxd)
3	Transmitted Data (Txd)
4	Data Terminal Ready (DTR)
5	Signal Ground
6	Data Set Ready (DSR)
7	Request to Send (RTS)
8	Clear to Send (CTS)
9	Ring Indicator (RI)
Shell	Frame Ground



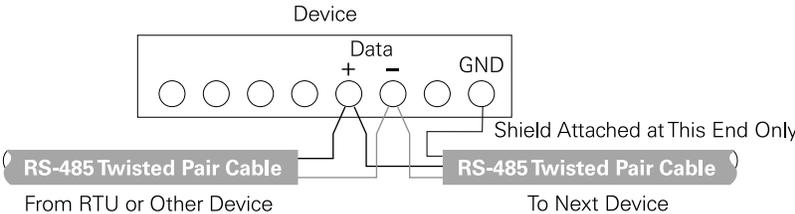
Pin	Signal
1	Frame Ground
2	Transmitted Data (Txd)
3	Received Data (Rxd)
4	Request to Send (RTS)
5	Clear to Send (CTS)
6	Data Set Ready (DSR)
7	Signal Ground
8	Received Line Signal Detector (DCD)
20	Data Terminal Ready (DTR)
22	Ring Indicator (RI)
Shell	Frame Ground

RS-232 uses what is referred to as an unbalanced signal or communication method. There is one signal wire for each circuit with a common return. The driver sends a series of binary signals to the receiver. These binary pulses make up predefined words that either give the status of a system being monitored or provide commands to control an event. This method is susceptible to unwanted electrical noise. The RS-232 standard supports only one driver (transmitter) and one receiver with distances limited to no greater than 50 feet.

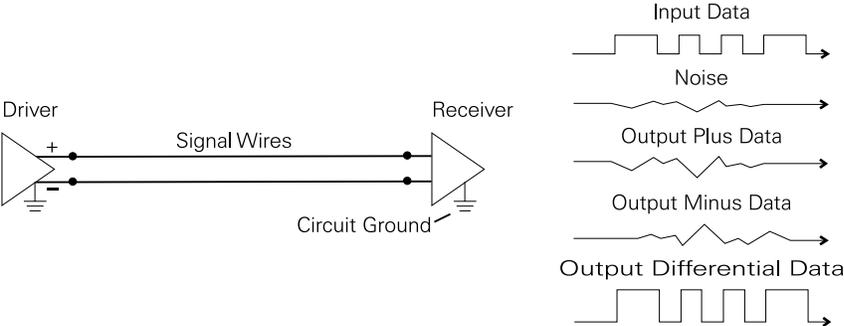


**RS-485**

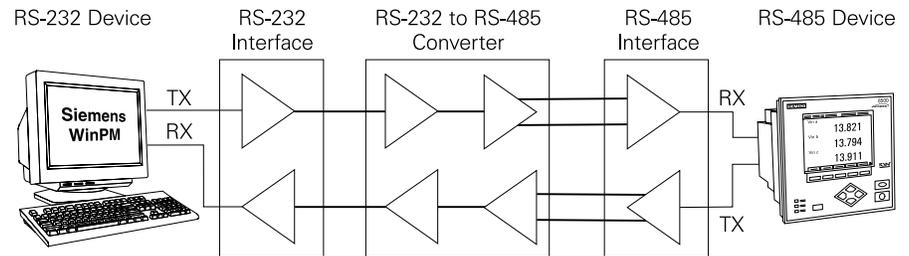
RS-485 is a communication standard that is better suited for industrial applications that involve distances greater than 50 feet. The RS-485 standard can support up to 32 devices over a maximum distance of 4000 feet.



The RS-485 standard uses a twisted pair of wires for each circuit with differential drivers and receivers. This method provides a balanced signal which cancels out signal noise to allow for better data integrity.

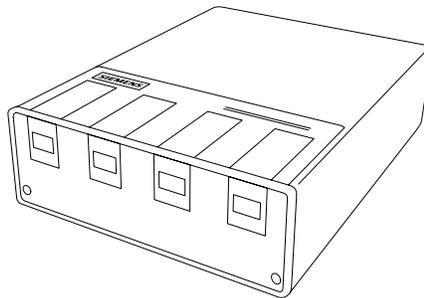


Typically, at the top level of a communication system is a host computer with an RS-232 interface. The host computer may have to communicate with an RS-485 device. In this situation a converter, such as a Siemens isolated multi-drop converter can be used.



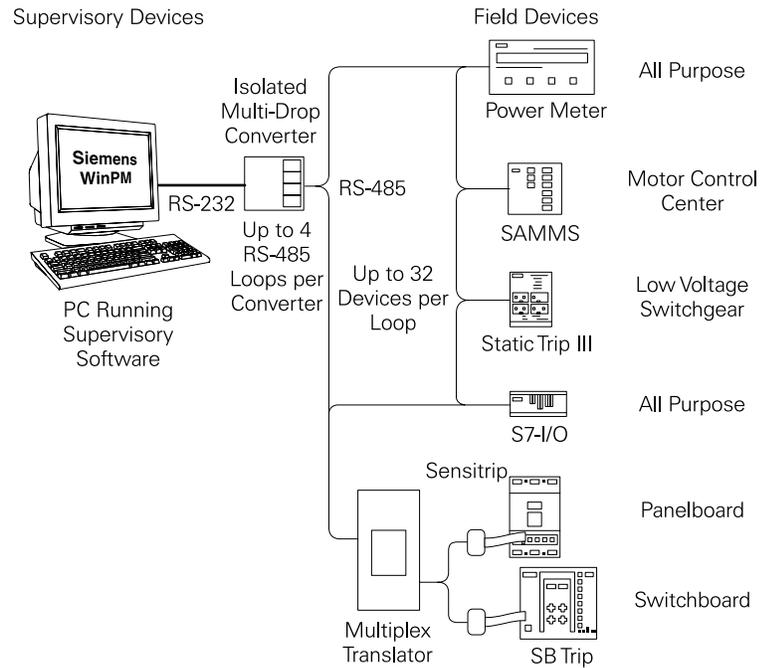
### Isolated Multi-Drop Converter

The Isolated Multi-Drop Converter is an RS-232 to RS-485 converter that provides connectivity between a computer's RS-232 serial port and a Siemens SEABus RS-485 communications loop for ACCESS field devices. A multi-drop converter will accept up to four RS-485 input loops. Each input loop will support up to 32 devices. One isolated multi-drop converter can handle up to 128 field devices.



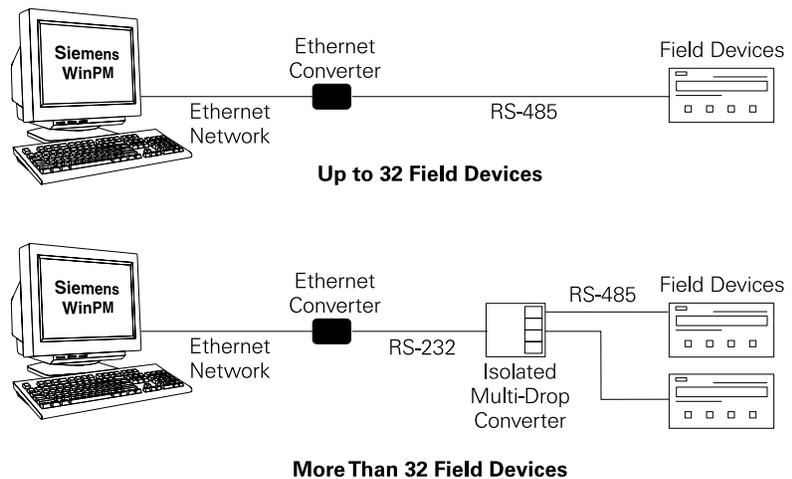
## Using the Isolated Multi-Drop Converter

In the following illustration a computer communicates with various ACCESS field devices through an RS-232 interface and isolated multi-drop converter.



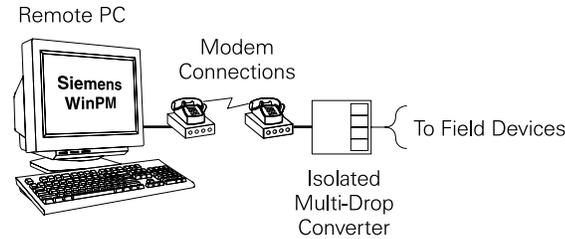
## Communicating on a LAN

Field devices in the Siemens ACCESS product line that cannot communicate directly on a LAN, such as Ethernet, can be connected to the LAN through an Ethernet converter. When more than 32 field devices are used an isolated multi-drop converter is also required.



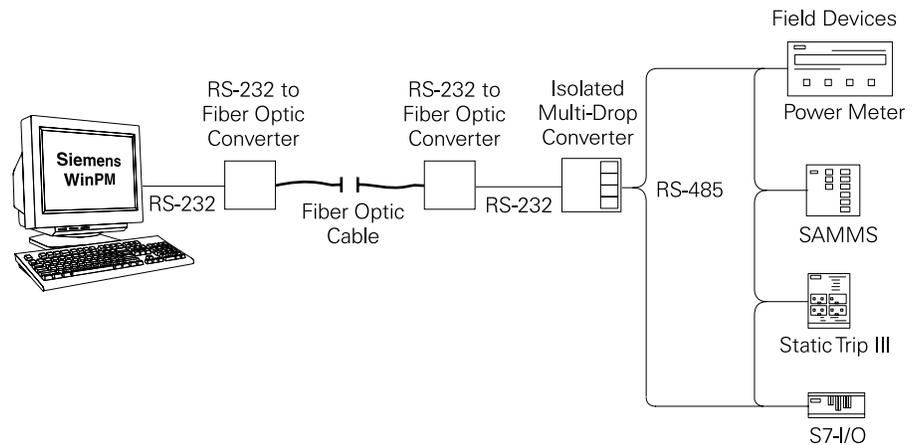
## Modem

Modems are electronic devices used for sending and receiving data over long distances. The Siemens ACCESS system also supports data communication through a modem. In the following illustration a remote computer communicates to an isolated multi-drop converter through a modem.



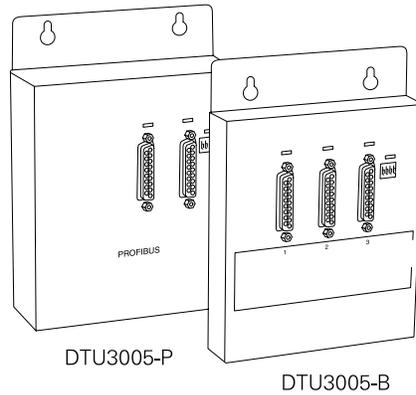
## Fiber Optics

Fiber optics is a method for transmitting data using light. A basic system consists of a transmitting device which generates a light signal, a fiber optic cable, and a receiving device. In the following illustration a supervisory computer is connected to a fiber optic converter through an RS-232 interface. At the other end of the fiber optic cable is another RS-232 to fiber optic converter which is connected to an isolated multi-drop converter. The RS-485 output of the multi-drop converter is connected to various field devices.



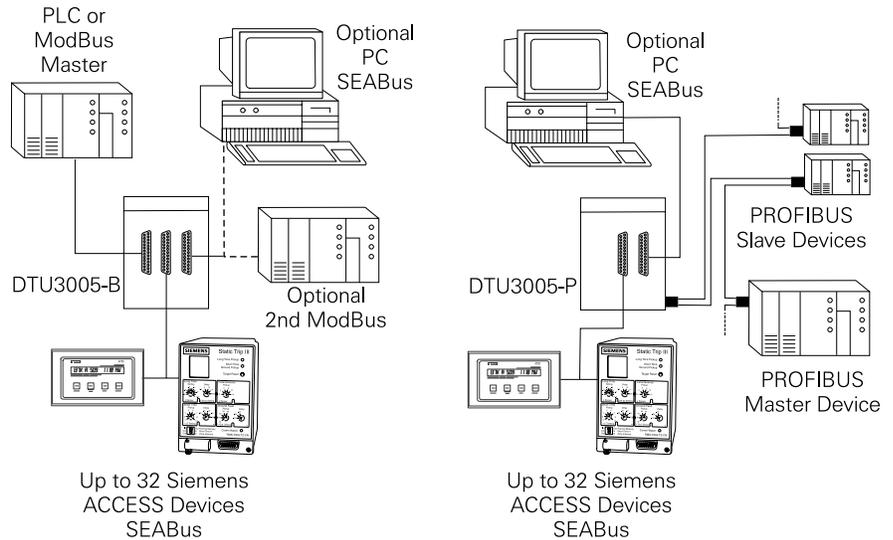
## DTU3005

The DTU3005 is a multiple-function data transfer unit, which acts as an intelligent device to request information from up to 32 ACCESS devices. The requested information is then made available to PLCs and various industrial automation networks such as ModBus and PROFIBUS DP. There are two models, the DTU3005-P and DTU3005-B.



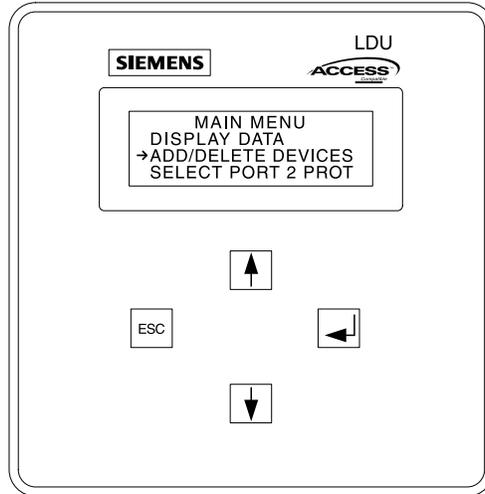
The following illustration shows two possible configurations. Up to 32 Siemens ACCESS devices can be connected to one port of the DTU3005. In one example, a PLC or ModBus master device can be connected to one port of a DTU3005-B. A second ModBus device or an optional supervisory PLC can be connected with SEABus to another port.

In the second example, PROFIBUS devices are connected via an RS-485 port on the DTU3005-P. A supervisory PC is connected to an available port.

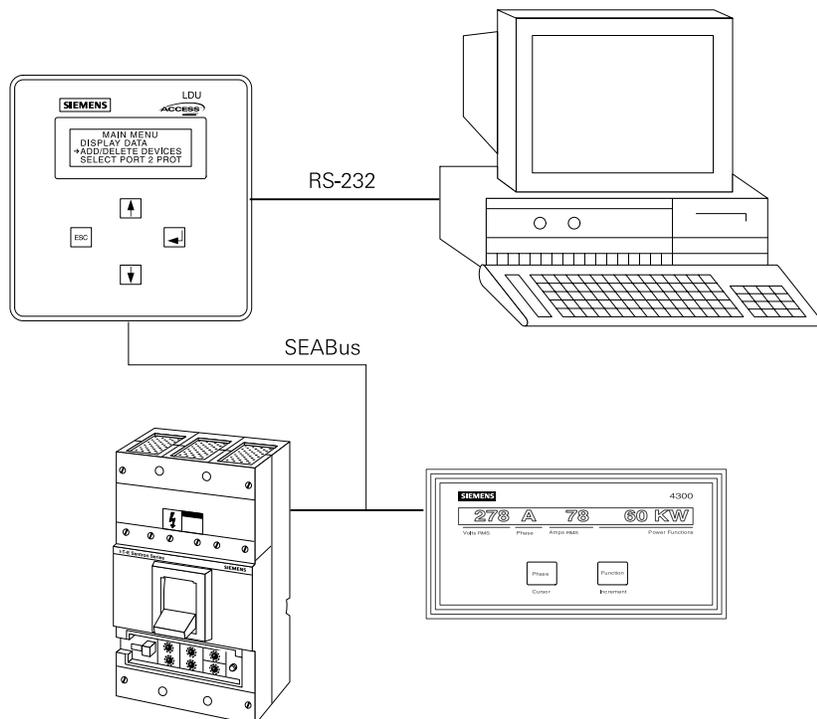


## Local Display Unit

The Local Display Unit (LDU) works with the SEABus network to poll data from Siemens ACCESS compatible devices. The LDU can be mounted in harsh industrial environments and is suitable for mounting in panelboards, switchboards, and switchgear.



The LDU can be connected through SEABus to up to 32 ACCESS devices. A second port can be connected through RS-232 to a WinPM monitoring station.



## Review 4

1. WinPM is an example of a \_\_\_\_\_ device.
  - a. supervisory
  - b. field
2. A Siemens ACCESS power meter is an example of a \_\_\_\_\_ device.
  - a. supervisory
  - b. field
3. The rules that govern the communication for the ACCESS system are known collectively as \_\_\_\_\_ and \_\_\_\_\_ Plus.
4. A \_\_\_\_\_ is an active device, such as a computer or printer, connected to the network.
5. Siemens \_\_\_\_\_ \_\_\_\_\_ can connect RS-232 and RS-485 devices directly to a LAN.
6. RS-232 is limited to transmission distances no greater than \_\_\_\_\_ feet.
7. RS-485 can support 32 different drivers and receivers over a maximum distance of \_\_\_\_\_ feet.
8. The LDU can be connected to up to \_\_\_\_\_ ACCESS devices.