



A1000 and A2000 SERIES RS-232/RS-485 CONVERTERS and RS-485 REPEATERS



FEATURES

- Completely transparent to host software.
- No external flow control signals required.
- Optically-isolated bidirectional data flow.
- Standard baud rates: 300 to 115K baud.
- Automatic internal RS-485 bus supervision.
- Networking up to 4,000 feet.
- Transient suppression on RS-485 data lines.
- Internal jumper selectable termination resistors.
- Internal 1K Ω biasing resistors on RS-485 data lines.

APPLICATIONS

- Interface DGH RS-485 modules to any RS-232 port.
- Expand existing RS-485 networks.
- Portable data acquisition systems.

GENERAL DESCRIPTION

The A1000 and A2000 series converter boxes convert RS-232 communications signal levels to the correct electrical signals required by RS-485. The RS-485 communications standard is recommended when many DGH modules, or other addressable devices, must be connected to a host computer over long distances. The A1000 and A2000 converters allow communications bus lengths up to 4,000 feet and baud rates up to 115K baud using one twisted pair of wires.

The RS-485 standard allows for bidirectional data on the same pair of wires. Therefore, some means of arbitrating the data direction is required. The A1000 and A2000 automatically control the bus direction without external handshaking signals from the host. Therefore, host software written for half-duplex RS-232 may be used without modification. RS-485 bus control is completely transparent to the user.

The A1000 and A2000 can also operate as repeaters for RS-485. Repeaters are required to extend communications bus lengths or to allow more than 32 RS-485 devices to be connected to a communications bus. A repeater simply reamplifies, or boosts, existing RS-485 signals transmitted over long distances.

The A1000 converters are powered by either 115Vac or 230Vac. When ordering the A1000, specify desired power by adding -115 or -230 to the model number. The A1000 converters contain an internal +24-volt 1A power supply for powering DGH modules or accessory circuits—such as relays or 4-20mA transmitters. The internal power supply is protected against overloads and short circuits.

The A2000 converter boxes operate on a wide range of power supply input voltage: +10 to +30Vdc unregulated.

SPECIFICATIONS

Max common mode voltage: 1500Vrms, 60s duration.
Baud rates: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.

Temperature range (operating & storage): -25 to +70°C.
Relative humidity: 0 - 95% noncondensing.
Warranty: 12 months on workmanship and materials.

A1000 Power Specifications

Power requirements: 115Vac (order A1000-115) or 230Vac (order A1000-230) $\pm 10\%$, 50-60 Hz.
Power consumption: 30W Full Load.
Power supply output: +24Vdc @ 1A.

A2000 Power Specifications

Power requirements: +10 to +30Vdc unregulated.
Power consumption: 1.0W Max (RS-485 driver on).
0.2W Max (Idle, LEDS off).

MECHANICAL AND DIMENSIONS

Case: Impact resistant ABS.
Weight: 2.8 lbs.(A1000), 1.0 lb.(A2000).
Dimensions: 8.08"W x 2.50"H x 6.25"D (A1000).
7.06"W x 1.53"H x 5.30"D (A2000).

AUTOMATIC RS-485 BUS SUPERVISION

The A1000 and A2000 automatically control bus direction in hardware without the need of handshaking signals from the host computer. As shown in figure 1, the I/O control circuitry monitors the RS-232 receive (RX) input and both RS-485 drivers. The RS-485 drivers in the converters are always in the receive mode until either RS-485 driver, or RS-232 input, receives the start of a character to be retransmitted. When the start of a character is detected, the I/O circuitry enables the proper RS-485 driver for one character time at the selected baud rate. When the character time expires the drivers return to receive mode. Since the converters are bidirectional it does not matter which driver receives the character.

ISOLATION

The A1000 and A2000 converters are designed to protect host computers from destructive fault conditions that may occur on the RS-485 data lines. The host input connections on each converter are optically-isolated up to 1500VAC from the RS-485 connections. The optical-isolation will prevent short circuits to hazardous AC voltages on the RS-485 data lines, or static discharges, from reaching a host computer. The A1000 RS-485 output is connected to earth ground to provide a safe path for static discharge. The A2000 power supply ground should reference earth ground to provide a safe path for static discharge.

SURGE PROTECTION

The A1000 and A2000 RS-485 drivers contain internal surge-protection on the data lines. Internal high speed transient suppressors on each RS-485 data line protect the driver from dangerous voltage levels, or spikes, that can occur on the data lines. Thermistors are installed in series with each RS-485 data line to protect the drivers against overcurrent and excessive voltage conditions. In a fault condition the normally low impedance thermistor reacts by rapidly increasing its impedance thus limiting excessive current flow. Once the fault condition is corrected the thermistor will return to its normally low impedance.

RS-485 TERMINATION

The RS-485 standard is highly immune to noise when each data line is properly biased and terminated. The A1000 and A2000 contain the proper termination technique for any RS-485 system. Each RS-485 driver is connected to pull-up and pull-down biasing resistors and termination resistors.

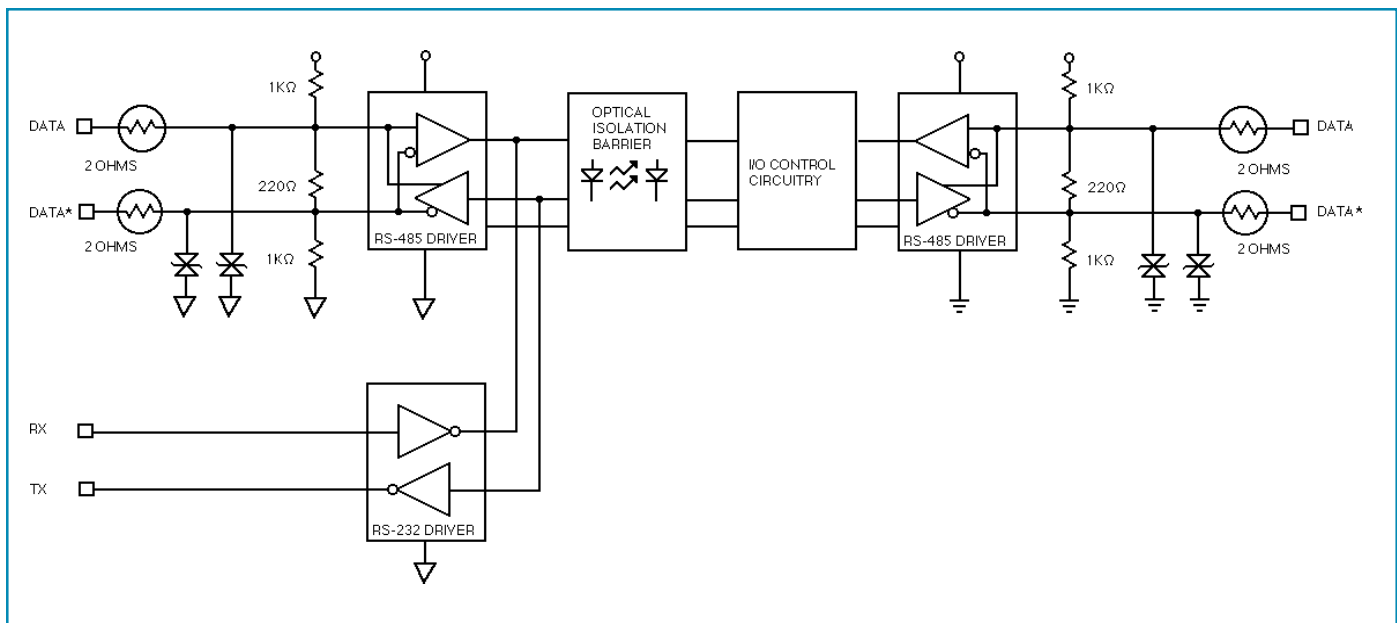


Figure 1 A1000 and A2000 Block Diagram.