

Modem 202 and Modem 202T

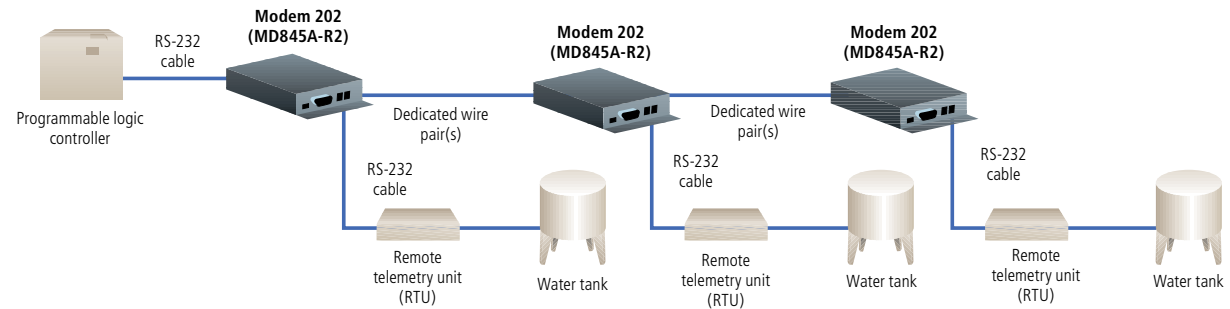
Reliable old favorites,  
manufactured to today's  
exacting specifications.



## FEATURES

- » Compatible with the Bell 202T standard.
- » Operate over 2- or 4-wire voice-grade leased or private lines.
- » For point-to-point or point-to-multipoint polling networks.
- » Prevent data and carrier-detect errors over noisy lines.
- » Anti-streaming capability.
- » Choose between AC- and DC-powered Modem 202T models.

## An industrial application for the Modem 202.



## OVERVIEW

Back in the day, Bell 202 was the top-speed modem standard, boasting 1200-bps rates that were four times faster than the poky Bell 108 standard. Still widely used in many industries, Bell 202 modems like our [Modem 202](#) or [Modem 202T](#) keep data moving along. Order one of these modems to expand an existing industrial, System Control and Data Acquisition (SCADA), or metering application, or to replace an old UDS/Motorola® 202T Modem. In fact, the [Modem 202T](#) is a pin-for-pin, form, fit, and function replacement for that tried-and-true modem. Just think what it can do for your legacy system!

The [Modem 202](#) (MD845A-R2) and the [Modem 202T](#) (MD1970A, MD1970A-DC) function the same way. However, the [Modem 202](#) supports speeds up to 1200 bps over unconditioned lines; the [Modem 202T](#) supports speeds up to 1800 bps over conditioned lines.

Widely installed and a prerequisite for many leased-line applications, both the [Modem 202](#) and the [Modem 202T](#) support voice-band frequency shift keyed (FSK) modulation within asynchronous point-to-point or multipoint systems that use voice-grade 2-wire, half-duplex or 4-wire, full duplex dedicated or leased lines. These can be loaded or unloaded circuits, equal to or better than the ITU (formerly CCITT) M.1020/1025 or Bell 3002 leased lines.

### These modems have many uses.

You can use a [Modem 202](#) or [Modem 202T](#) with remote terminal units (RTUs) and programmable logic controllers (PLCs) to control and monitor a large number of remote devices—traffic control lights, for instance. In addition to SCADA applications, the modems are quite useful for temperature and pressure controllers in numerous industries, particularly those in which you expect to add automated devices.

The water-treatment industry prefers the [Modem 202](#) because it's compatible with battery systems from 11 to 18 VDC. The [Modem 202](#) is also relied upon heavily by the U.S. Government for daily commerce.

Noisy lines aren't a problem either. The [Modem 202](#) and the [Modem 202T](#) have circuitry that prevents data errors that occur on such lines, particularly those within multidrop systems where carrier turn-offs and other modems on the same line can cause noise spikes and other harmful high frequencies. The modems combine soft-carrier generation and soft-carrier detection as well as a signal-noise-ratio (SNR) detector to eliminate such line-noise errors.

The modems also have antistreaming features, which prevent them from remaining in Transmit Mode when they're not actively transmitting data. Great for multipoint applications, antistreaming prevents a malfunctioning slave modem from occupying the line indefinitely. When anti-streaming is active, the [Modem 202](#) or [Modem 202T](#) can only transmit data for up to 56 seconds. Then, they automatically turn off their transmitter and look for an ON-to-OFF transition of Request To Send (RTS) before proceeding with normal operation.

### Modem 202T offers diagnostic testing features.

For testing purposes, the [Modem 202T](#) has a five-position rotary switch on its front panel for running analog and digital loopbacks as well as self-tests. To verify the transmitter and receiver of the local modem and its connection to a local DTE, generate a data pattern from the locally attached DTE or have the modem generate a test pattern.

You can also run line and modem tests to verify the integrity of the line between the local and remote modems. With this test, the local [Modem 202T](#) loops back received data to the transmitter and sends the data to the remote modem. These characters can be done by using a modem test pattern or by originating a data pattern from the local DTE.

## TECH SPECS

### MD845A-R2:

**Distance (Maximum)** — 20 mi. (32.2 km) on unloaded lines, depending upon line characteristics  
**Enclosure** — Standard NEMA 1; 18-gauge steel with mounting flanges  
**Handshake Modes** — DataSense (DSCC) or RTS line  
**Mounting** — Hole pattern ¼" (0.6-cm) diameter located on rectangle 8.3" x 2.8" (21.1 x 7.1 cm)  
**Operating Frequency** — 1200/2200 Hz (Bell 202 or 1300/2100 ITU V.35) FSK (Frequency Shift Key)  
**Operation** — 2-wire, half-duplex or 4-wire, full duplex  
**Protocol** — Asynchronous  
**Speed** — 300, 600, or 1200 baud half- or full duplex up to 1200 baud simplex  
**Connectors** — (2) terminal blocks, (1) DB9 F  
**Indicators** — (4) LEDs: Data Out, Data In, Carrier, Power  
**Temperature Tolerance** — -4 to +158°F (-20 to +70°C)  
**Power** — Input: 11 to 18 volts DC at a minimum of 200 mA; External wallmount power supply provided for 110 VAC nominal  
**Size** — 1.5"H x 5"W x 9"D (3.8 x 12.7 x 22.9 cm) over mounting flanges

### MD1970A and MD1970A-DC:

**Carrier Detect Delay** — 6 or 23 ms OFF-to-ON, 6 ON-to-OFF  
**Carrier Frequencies** — Mark: 1200 Hz ± 1%; Space: 2200 Hz ± 1%  
**Diagnostics** — Self-test, analog loopback, digital loopback, test pattern transmit  
**Line Impedance** — 600 ohms ± 10% transformer coupled and transient protected  
**Modulation** — Phase coherent; frequency shift keyed (FSK)  
**Operation** — 2-wire, half-duplex or 4-wire, full duplex  
**Protocol** — Asynchronous  
**RTS to CTS Delay** — 8, 33, 59, or 219 ms  
**Speed (Maximum)** — Unconditioned line: 1200 bps; Conditioned line: 1800 bps  
**Transmitter Output Level** — Selectable from 0 to -14 dBm in 2-dB steps  
**Turnaround Squelch** — 8 ms or 159 ms  
**Connectors** — (1) DB25 female (DTE); (1) RJ-45 (telco)  
**Indicators** — (7) LEDs: RS, CS, CD, RD, TD, TM, Power  
**Temperature Tolerance** — -40 to +185°F (-40 to +85°C)  
**Humidity Tolerance** — Up to 95%, noncondensing  
**Power** — MD1970A: 115 VAC, 60 Hz; MD1970A-DC: 12 to 60 VDC  
**Size** — 2.3"H x 7"W x 9.6"D (5.8 x 17.8 x 24.4 cm)

## Configuration is simple!

To configure the **Modem 202T**, just set a few DIP switches. These jumper settings control operating characteristics such as the dynamic range of the modem receiver, the transmit level, and the call turnaround squelch (which guards against echoes from already-completed transmissions).

By default, the **Modem 202T's** DIP switches are set for 4-wire, full duplex operation. To reconfigure the modem for 2-wire, half-duplex applications, just change the jumper settings.

When configured for 4-wire, full duplex operation, the modem can be strapped to transmit data to corresponding slave modems with no RTS to Carrier Turnoff Signal (CTS) delay, which is ideal for minimizing turnaround. To increase the modem's turnaround time, just configure it for 2-wire, half-duplex operation. This will enable the modem to encounter an RTS-to-CTS delay when transmitting to its slave modems.

On the inside of the **Modem 202T** is a simple three-position header for full or half-duplex mode. The device's DCE interface quickly connects to any device equipped with a standard DB9 or DB25 connector.

## Troubleshooting's easy, too.

An LED control display enables you to confirm modem operation at a glance, and a local and remote test switch enables verification of the link's integrity.

Along with the **Modem 202** or **Modem 202T**, you'll receive a cable for making RJ-45 to 4-wire leased-line connections. But to connect a data terminal, you'll need an RS-232 cable.



MD845A-R2



MD1970A

## What's included

### MD845A-R2, MD1970A, MD1970A-DC:

- ◆ Modem
- ◆ RJ-45 to 4-wire leased-line cable
- ◆ User's manual

### MD1970C:

- ◆ 202T Modem Rackmount Card
- ◆ User's manual

## Item

## Code

Modem 202 (without Diagnostics)	MD845A-R2
Modem 202T Standalone (with Diagnostics)	
Standalone	
AC	MD1970A
DC	MD1970A-DC
Rackmount Card	MD1970C
<b>You may also need...</b>	
DB9 Extension Cable	EDN12H-0010-MF
DB9 Male to DB25 Female Adapter	FA521A-R3