BLACK BOX® ®
NETWORK SERVICES

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INDUSTRIAL MODEM RF115
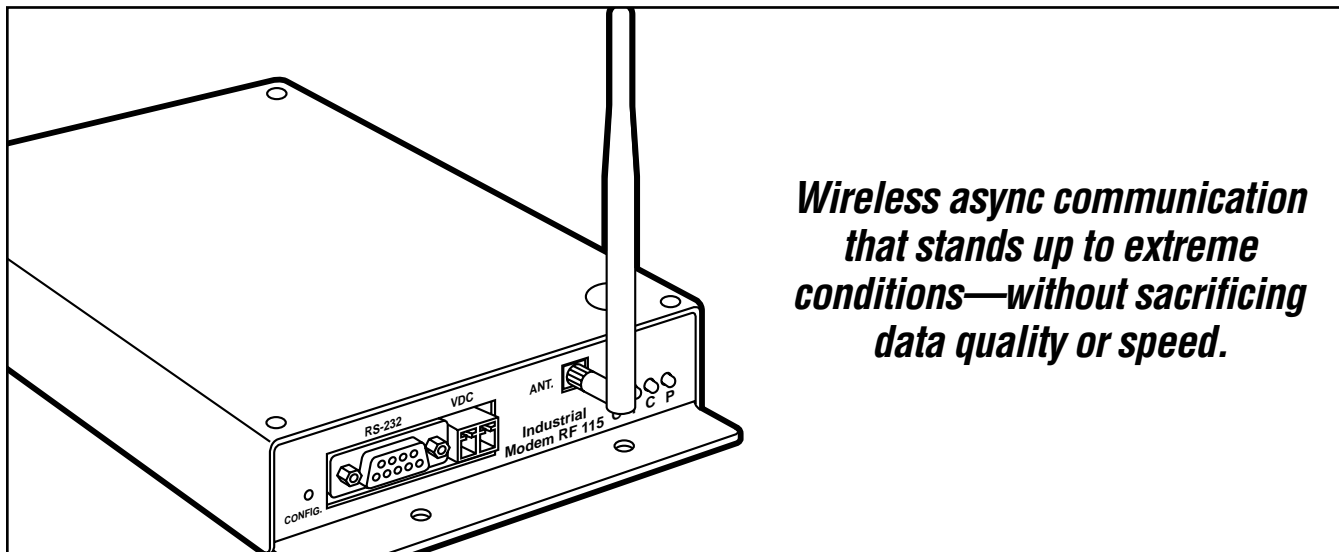
Wireless async communication that stands up to extreme conditions—without sacrificing data quality or speed.

Key Features

▶ **Data speeds of up to 115.2 kbps half-duplex.**

▶ **Supports a distance of up to 20 miles (32.2 km) for line-of-sight, up to 60 miles (96.6 km) with 2 repeaters.**

▶ **10- or 11-bit word structure.**

▶ **Offers Modbus RTU protocol support.**

▶ **Optional antennas available— omnidirectional and unidirectional.**

The Industrial Modem RF115 is designed to stand up to electromagnetic and radio interference, industrial motors, and temperature extremes found in oil and gas fields and refineries, utility substations, manufacturing floors, military installations— anywhere ordinary equipment can't go. This wireless async modem uses Spread-Spectrum technology to speed your data to its final destination—safe and error-free. Data travels over the license-free 902–928-MHz radio band.

You can use two modems in a point-to-point configuration and receive incoming signals from a remote control device. Or use the modem in a polled multipoint configuration and communicate with multiple remote devices. The Modem's DB9 connector is an RS-232 interface. Optional RS-485 Modules are also available.

Each Industrial Modem includes a fixed whip antenna with a 20-mile (32.2-km) line-of-sight range. The modem can also be outfitted with any of our optional antennas. Choose from omnidirectional or unidirectional antennas—in a variety of cable lengths and mounting options.

For additional security, the modem features voltage clamps and fuses to protect your transmissions from electrical surges found on power lines.

Still Compatible

If you already have an Industrial Modem RF115, don't worry—the MDR100A-R4 is compatible with older models and antennas.

We also offer adapter cables for attaching older Industrial Modem RF115s to newer antennas or attaching older antennas to newer Industrial Modem RF115s.

Choosing the Right Antenna for Your Industrial Modem RF115

For ordinary line-of-sight installations, the built-in antenna may be all you need.

If you can't get a direct line of sight without separating the modem from the antenna, choose one of our Omnidirectional Antennas.

If you need to transmit through trees or non-metallic structures— or if you want to increase signal-to-noise ratio—choose a Yagi (unidirectional) Antenna with Bracket Mount.

Remember, you always need a direct line of sight in any appli-cation over a 0.25- to 0.5-mile (0.4- to 0.8-km) range.

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Technically Speaking

Spread-Spectrum Technology Explained

Unlike conventional radio, Spread Spectrum doesn't stick to one frequency.

During transmission, Spread-Spectrum signals are spread over a wide range of frequencies. Then a receiver collects (de-spreads) the transmissions into their original form.

The Spread-Spectrum signal is then tagged with a pseudo-random code. Only the user's receiver recognizes this code. The receiver knows in advance how the transmitter will spread the spectrum, so it can easily find the signal and track the transmission.

To do this, the receiver uses a locally generated replica pseudo-random noise code, a received code, and a receiver correlator to separate only the desired coded information from all possible transmitters. (Think of the correlator as a filter that responds to signals encoded with a pseudorandom noise code that matches its own code.)

No Interference

The correlator is not susceptible to man-made interference or other noises—whether natural or generated by other Spread-Spectrum radios. The code simply sounds like background noise, so it's difficult for an unauthorized user to detect.

No Jamming

To prevent jamming, the de-spreading process spreads (decreases) the power level of other signals.

How the Technology Caught On

Low susceptibility to interference and anti-jamming features—plus the ability to tolerate high levels of electromagnetic and multipath interference—are what prompted the United States military to use the technology during World War II.

Spread Spectrum and the FCC

In 1985, the FCC let radios based on a Spread-Spectrum modulation method operate without a license in certain portions of the radio spectrum. The three frequencies the FCC specified for commercial Spread Spectrum are:

- 902 MHz to 928 MHz
- 2400 MHz to 2483.5 MHz
- 5725 MHz to 5850 MHz.

Why the Technology is Popular Today

Spread-Spectrum technology is the ideal medium for wireless data transmission for a number of reasons:

- Transmissions remain free from interference and jamming.
- Transmissions can be specifically addressed.
- Multiple conversations can occur simultaneously in relatively small areas.
- Data rates can be very high if you use the 2400 band or higher.

Specifications

Speed — Up to 115.2 kbps half-duplex (up to 57.6 kbps full-duplex)

Protocol — Async, Modbus RTU support

Distance — Up to 20 miles (32.2 km) line-of-sight, depending on environment, geographic conditions, and optional antenna; up to 60 miles (96.6 km) with 2 repeaters

Hopping Code — 15 orthogonal user-selectable pseudorandom algorithms

Occupied Bandwidth — 230 KHz

Spreading Function — Frequency-hopping 112 channels (96 channels international)

Word Length — 10-/11-bit maximum

Radio Frequency — 902- to 928-MHz spread spectrum; No FCC license required

RF Output Power — 1/10 to 1 watt (selectable in 1/10 increments)

Interface — RS-232 (can support 2- or 4-wire RS-485 with the optional RS-485 Modules)

Connectors — RS-232: DB9; Antenna: Standard-thread SMA F; RS-485: 2- or 4-wire screw terminal strip

Indicators — P (Power), C (Carrier), I (Data In), O (Data Out)

Operating Environment — -40 to +167°F (-40 to +75°C)

Relative Humidity Tolerance — Up to 95%, noncondensing

Power — 12 VDC (24 VDC available as special order); 115- or 230-VAC wallmount transformer included

Size — 1.4"H x 5"W x 7.8"D (3.6 x 12.7 x 19.8 cm)

Weight — 1.8 lb. (0.8 kg)

Ordering Information

ITEM	CODE
Industrial Modem RF115	MDR100A-R4
RS-485 RF Modem Module	
2-Wire	MD3310-R2
4-Wire (RS-485/422)	MD3311-R2
Optional RF Antennas	
Omnidirectional with Bracket Mount	
25-ft. (7.6-m) Cable	MDR151-0025-R3
50-ft. (15.2-m) Cable	MDR151-0050-R3
100-ft. (30.4-m) Cable	MDR151-0100-R3
Yagi (Unidirectional) with Bracket Mount	
25-ft. (7.6-m) Cable	MDR152-0025-R4
50-ft. (15.2-m) Cable	MDR152-0050-R4
100-ft. (30.4-m) Cable	MDR152-0100-R4
You may also need…	
DB9 Extension Cable with EM/RFI Hoods	EDN12H
Standard SMA Male to "N" Type Male Adapter Cable	MDR153
Reversed SMA Male to "N" Type Male Adapter Cable	MDR154

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