

Industrial Modem RF115

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



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.

OVERVIEW

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 application over a 0.25- to 0.5-mile (0.4- to 0.8-km) range.

Why Buy From Black Box? Exceptional Value. Exceptional Tech Support. Period.

Recognize any of these situations?

- You wait more than 30 minutes to get through to a vendor's tech support.
- The so-called "tech" can't help you or gives you the wrong answer.
- You don't have a purchase order number and the tech refuses to help you.
- It's 9 p.m. and you need help, but your vendor's tech support line is closed.

According to a survey by *Data Communications* magazine, 90% of network managers surveyed say that getting the technical support they need is extremely important when choosing a vendor. But even though network managers pay anywhere from 10 to 20% of their overall purchase price for a basic service and support contract, the technical support and service they receive falls far short of their expectations—and certainly isn't worth what they paid.

At Black Box, we guarantee the best value and the best support. You can even consult our Technical Support Experts before you buy if you need help selecting just the right component for your application.

Don't waste time and money—call Black Box today.

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.



The MDR1000A-R4 has a fixed-whip antenna but can also be used with an optional RF antenna.

TECH SPECS

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)

Item	Code
Industrial Modem RF115	MDR100A-R4
RS-485 RF Modem Module 2-Wire	MD3310-R2
Optional RF Antennas	
Omnidirectional with Bracket Mount	
10-ft. (3.0-m) Cable	MDR151-0010-R2
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	
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