

January 2004

## Description

When wires can't be run for practical or economic reasons, the WLM Wireless Link Module (WLM) provides accurate and reliable wireless connectivity between remote field sites.

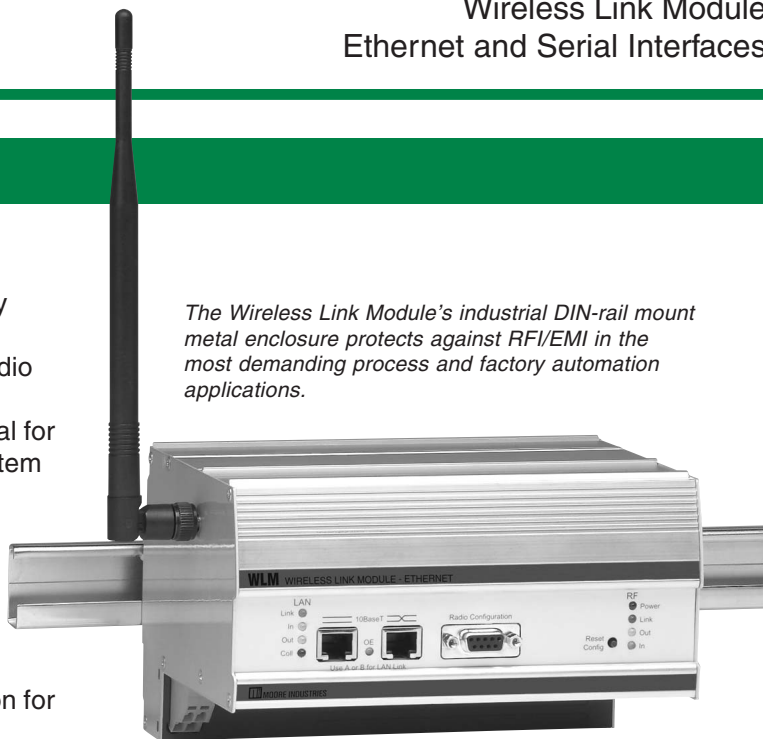
The WLM, a bi-directional, spread spectrum radio modem, delivers the flexibility and cost-saving advantages of wireless data transmission. It is ideal for use with Moore Industries' NET Concentrator® System (NCS), as well as similar process control and distributed I/O systems.

### Highly Reliable Intelligent Spectrum Frequency Hopping Technology

The WLM employs Intelligent Spectrum Frequency Hopping technology and 32-bit CRC error correction for secure, robust communications. The Intelligent Spectrum Frequency Hopping technique ensures reliable wireless communications without requiring a FCC site license. Intelligent Spectrum uses a unique combination of advanced frequency hopping, high radio frequency (RF) data rate, and sensitive RF receiver to achieve its high reliability.

The Intelligent Spectrum RF data rate, coupled with robust error detection and correction, ensure data throughput in high interference or reflective environments. Additionally, the outstanding noise immunity and sensitive RF receiver allow long range communication with easy-to-install omni directional antennas.

*The Wireless Link Module's industrial DIN-rail mount metal enclosure protects against RF/EMI in the most demanding process and factory automation applications.*



## Features

- **Save time and money.** Use the WLM to overcome rugged, long-distance or normally impassable environments by sending just a few, or thousands of, process signals over a low-cost wireless communication link.
- **Standard operating frequencies.** Available models operate at frequency ranges of 902-928MHz or 2.4-2.483GHz
- **Long-distance data transmission.** Utilizing omni directional or high gain antennas, 2.4-2.483GHz Ethernet units provide a 10 mile (15km) transmission range; and 2.4-2.483GHz serial units transmit up to 15 miles (24km); 902-928MHz units (Ethernet and serial) can transmit up to 25 miles (40km).
- **Supports Ethernet and serial communications.** Available WLM models are ideal for use with data communication networks that use Ethernet and serial (RS-485) communications.
- **FCC site license is not required.** To use the WLM, you do not need to obtain a FCC license, and costly RF site surveys are usually unnecessary.
- **User configurable.** The WLM is set up using the PC-based HyperTerminal user interface that comes standard on PC's running a Microsoft® operating system. Factory configuration is also available.

### Accessories

#### Antennas

- Omni directional antenna, for line of sight or short ranges
- Yagi directional antenna, linear end-fire antenna for high gain directivity

#### Cable

- †Coaxial cable available in 25', 50' and 75' lengths. Maximum length is 200'

†Consult factory if cable lengths longer than 200' are required

\* All product names are the property of their respective holders.

# WLM

Wireless Link Module  
Ethernet and Serial Interfaces

## Specifications

### WLM Wireless Link Module Ethernet Interface

<p><b>Operating Frequency</b> 902-928MHz; 2.4-2.483GHz</p> <p><b>Transmitter</b> <b>Range:</b> Up to 25 miles (40km), line-of-sight distance using 902-928MHz units; and up to 10 miles (15km) using 2.4-2.483GHz units (both using omni directional antennas) <b>Output Power:</b> 1W maximum (10 programmable steps from 100mW to 1W) (+30dBm) for 902-928MHz units; 500mW max. (10 programmable steps from 100mW to 500mW) (+27dBm) for 2.4-2.483GHz <b>Modulation:</b> Spread Spectrum, GFSK <b>Spreading Code:</b> Frequency Hopping <b>Hop Patterns:</b> 15 (user-selectable) <b>Occupied Bandwidth:</b> 230kHz</p> <p><b>Receiver</b> <b>Sensitivity:</b> -108dBm@10-6 raw BER <b>Selectivity:</b> 40dB@fc ±230kHz <b>System Gain:</b> 135dB</p>	<p><b>RF Data Transmission</b> <b>Error Correction:</b> 32-Bit CRC <b>Data Encryption:</b> Substitution Dynamic key <b>RF Data Rate:</b> 144-188kbps</p> <p><b>Interface</b> 10Base-T (UTP); one straight, one cross-pinned (only one connector can be used at a time) <b>Data Throughput:</b> 110 kbps in point-to-point mode; Data throughput measured assuming 75% frequency availability <b>Connectors:</b> 10Base-T for communications; DB9 for configuration</p> <p><b>Antenna</b> Standard thread SMA female; supplied bench test antenna; optional external omni directional or Yagi antenna available</p> <p><b>Power</b> <b>Input Voltage Requirements:</b> 10-28Vdc <b>RF Output Power:</b> 0.1 to 1.0W for a 902-928MHz unit; 500mW (selectable in nine step increments) for a</p>	<p><b>Power (continued)</b> 2.4-2.483GHz unit <b>Connector:</b> Standard 24V connector <b>Transmit Current (Peak):</b> 700mA@12Vdc for 1W <b>Receive Current:</b> 100mA@12Vdc</p> <p><b>Operating Modes</b> Point-to-Point, Point-to-Multi-Point, Store-and-Forward Repeater, Repeater/Remote</p> <p><b>Indicators</b> <b>Front Panel LEDs:</b> Power, RF Link, RF In, RF Out, LAN In, LAN Out, LAN Link, LAN Collision, Overrun Error</p> <p><b>Diagnostics</b> <b>Serial Port Data:</b> Stored signal strength, noise and disconnect information</p> <p><b>Operating Environment</b> <b>Standard Temperature:</b> -40° to +75°C (-40° to +167°F) <b>Humidity:</b> 0 to 95% non-condensing humidity</p> <p><b>Weight</b> 1.13 kg (2.5 lbs.)</p>
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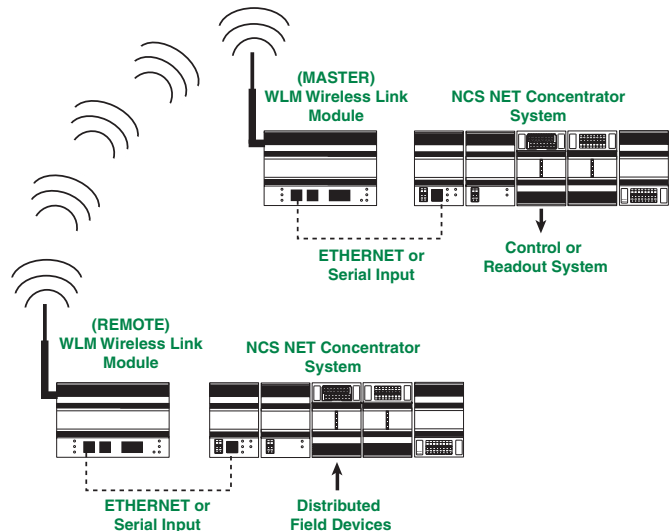
### Versatile Application Options

When integrated with a NET Concentrator System (or similar) distributed control and I/O strategy, WLM Modules can be operated in Point-to-Point (Figure 1) and in Point-to-Multi-Point (Figure 2) architectures.

Each WLM network includes a Master WLM module. The Master can be set to communicate with just one, or multiple, WLM modules configured as Remote (Slave) modules.

WLM modules can also be configured as Repeaters to relay signals when a direct line of site does not exist between a Master and Remote modules, or to significantly extend the transmission distance allowable within a WLM network (Figure 2). There can be up to two WLM Repeaters per WLM network.

**Figure 1.** In a Point-to-Point System, one WLM is set as a Master, while others in the network are set as Remotes (Slaves).

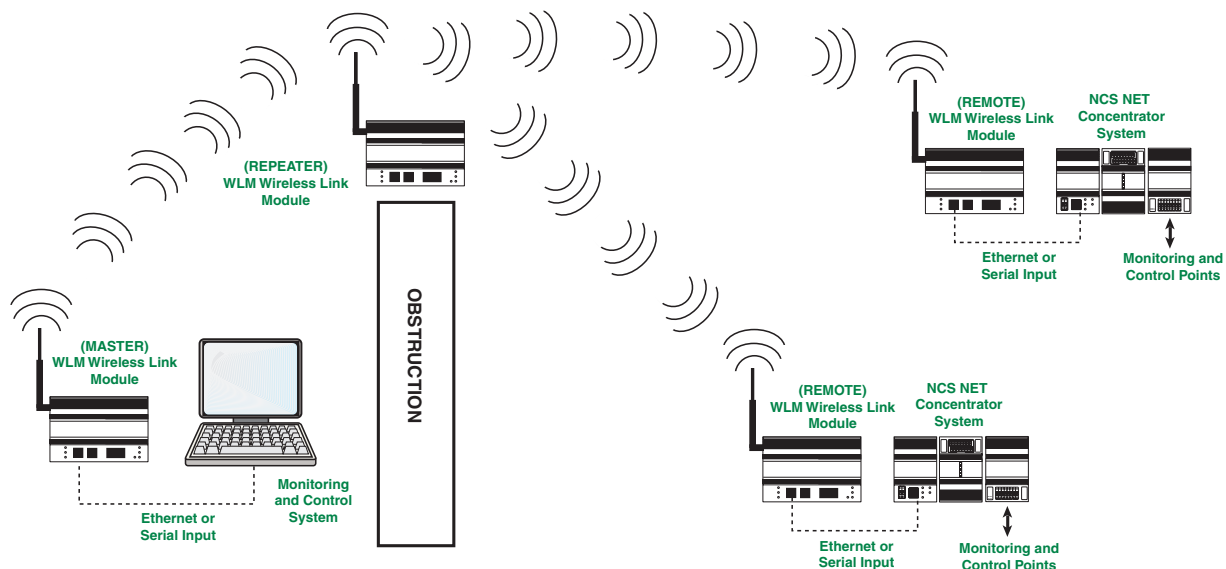


## Specifications

### WLM Wireless Link Module Serial Interface

<p><b>Operating Frequency</b> 902-928MHz; 2.4-2.483GHz</p> <p><b>Transmitter</b> <b>Range:</b> Up to 25 miles (40km), line-of-sight distance using omni directional antennas for 902-928MHz units; 15 miles (24km), line of sight distance, further with Repeaters or high gain antenna for 2.4-2.483GHz units</p> <p><b>Output Power:</b> 1W maximum (10 programmable steps from 100mW to 1W) (+30dBm) for 902-928MHz units; 500mW max. (10 programmable steps from 100mW to 500mW) (+27dBm)</p> <p><b>Modulation:</b> Spread Spectrum, GFSK, 144-188kbps</p> <p><b>Spreading Code:</b> Frequency Hopping</p> <p><b>Hop Patterns:</b> 15 (user-selectable)</p> <p><b>Occupied Bandwidth:</b> 230kHz</p>	<p><b>Receiver Sensitivity:</b> -108dBm@10-6 raw BER</p> <p><b>Selectivity:</b> 40dB@fc ±230kHz</p> <p><b>System Gain:</b> 135dB</p> <p><b>RF Data Error Correction:</b> 32 Bit CRC</p> <p><b>Data Encryption:</b> Substitution Dynamic key</p> <p><b>RF Data Rate:</b> 144Kbps</p> <p><b>Interface</b> RS-485 asynchronous, 10- or 11-bit words, <b>Data Throughput:</b> 1200-115.2kBaud. Data throughput measured assuming 75% frequency availability</p> <p><b>Connectors:</b> Standard 2-wire, RS-485</p> <p><b>Antenna</b> Standard thread SMA female; supplied bench test antenna; optional external omni directional or Yagi antenna available</p>	<p><b>Power Input Voltage Requirements:</b> 10-28Vdc</p> <p><b>Transmit Current (Peak):</b> 650mA@12Vdc for 1W</p> <p><b>Receive Current:</b> 100mA@12Vdc</p> <p><b>Operating Modes</b> Point-to-Point, Point-to-Multi-Point, Store-and-Forward Repeater, Repeater</p> <p><b>Indicators Front Panel LEDs:</b> Power Collision, RF In, RF Out</p> <p><b>Diagnostics Serial Port Data:</b> Stored signal strength, noise and disconnect information</p> <p><b>Operating Environment Standard Temperature:</b> -40° to +75°C (-40° to +167°F)</p> <p><b>Humidity:</b> 0 to 95% non-condensing humidity</p> <p><b>Weight</b> 1.13 kg (2.5 lbs.)</p>
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**Figure 2.** In a Point-to-Multi-Point System, one WLM Master can be used to send wireless data to multiple WLM Remote (Slave) units situated in different locations.



## Ordering Information

Unit	Communication	Transmission	Power	Frequency	Housing
<b>WLM</b> Wireless Link Module	<b>Ethernet</b> <b>Serial</b>	<b>RF</b> Bi-directional spread spectrum radio	<b>10-28DC</b>	<b>900MHz</b> 902-928MHz ranges  <b>2.4GHz</b> 2.4-2.483GHz ranges	<b>DIN</b> Aluminum DIN-style rail-mount housing mounts on 32mm G-type (EN50035) and 35mm Top Hat (EN50022) rails

**To Order, Specify:** Unit / Module Type / Input or Output Configuration / Power / Options [Housing]

### Wireless Link Module Model Number Examples:

**Wireless Link Module Example #1 - WLM ETHERNET Interface**  
WLM / ETHERNET / RF / 10-28DC / 900MHz [DIN]

**Wireless Link Module Example #2 - WLM Serial Interface**  
WLM / Serial / RF / 10-28DC / 2.4GHz [DIN]

### Accessory Ordering Information

900MHz Omni directional antenna and mounting hardware <sup>1</sup>	803-004-45
900MHz Yagi directional antenna and mounting hardware <sup>2</sup>	803-005-45
2.4GHz Omni directional antenna and mounting hardware <sup>1</sup>	803-006-45
2.4GHz Yagi directional antenna and mounting hardware <sup>2</sup>	803-007-45
25 feet of coaxial cable	803-823-26
50 feet of coaxial cable	803-819-26
75 feet of coaxial cable <sup>3</sup>	803-822-26

<sup>1</sup> Hardware includes bracket and pipe clamp

<sup>2</sup> Hardware includes a U-Bolt and bracket

<sup>3</sup> Maximum length is 200'. Consult factory if cable lengths longer than 200' are required

**Figure 3.** WLM Installation Dimensions (Ethernet model, with Ethernet connections, shown).

