

# NETio

Analog and Digital I/O



## Data Acquisition | Flexible Wireless I/O

The MDS NETio is an integrated, scalable family of wireless solutions that provide long distance unlicensed communications, allowing users to interface both analog and digital I/O including sensors for pressure and flow as well as controls for pumps or alarms. NETio can wirelessly regenerate I/O signals or use standard IP/Ethernet and serial protocols to communicate with controllers such as PLCs, RTUs and SCADA systems.

### Key Benefits

- Direct connectivity to analog and digital devices without the need for a controller
- Unlicensed long range communication of IP/Ethernet or serial data
- Supports multiple industry-standard protocols including Modbus TCP and DNP3
- Reduces the high cost of wiring and terminations
- Reduces integration, configuration, and support costs found with multi-box solutions
- Seamless connectivity to network access points

### Application Specific Wireless Solution



#### Water & Wastewater

- Low-cost, low-power tank level monitoring for remote locations
- Control pumps across multiple sites from central PLC



#### Energy

- Real-time circuit trip control for distributed generation sites
- Condition monitoring for pole-top circuit breakers and capacitor banks



#### Oil & Gas

- Remote monitoring of pipeline flow and status signals
- Monitor and transmit wellhead pressure and tank levels to RTUs



#### Heavy Industrial

- Activation of perimeter gates based on detection of vehicle
- Monitor and control remote pumps and compressors

## Industrially Hardened

- Operation in extreme temperatures from  $-40^{\circ}\text{C}$  to  $70^{\circ}\text{C}$
- Class I, Div 2 hazardous location approval
- Fully-isolated I/O

## Application Flexibility

- Handles diverse I/O configurations including analog 4-20 mA, 0-5 V or 0-10 V and digital 5-36 VDC
- Long range wireless communication up to 30 miles (900 MHz) and 15 miles (2.4 GHz)
- Wirelessly expand I/O coverage 3,000 feet using the 802.15.4 wireless option
- IP/Ethernet, serial and I/O functions simultaneously on the same network
- Backwards compatible with entraNET and TransNET networks

## Reliable & Scalable

- License-free spread spectrum technology in both 900 MHz and 2.4 GHz bands
- Point-to-Multipoint, 2-way communication
- High receive sensitivity for noisy environments and long distances
- Handles multiple industry protocols including Modbus, Modbus-TCP, and DNP3

## Secure

- Authorized access point and remote lists prevent unauthorized access
- Password protected access and lockdown
- Built-in 128-bit encryption



## Application Flexibility

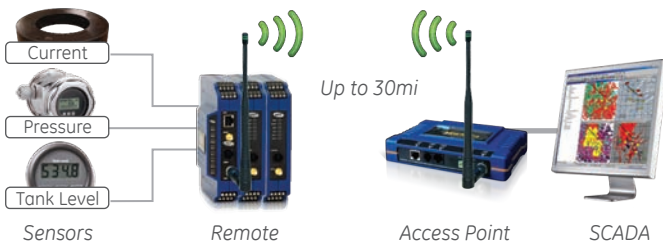
The MDS NETio family of industrial-strength data communications products from GE offer secure, reliable, long distance transmission of data for your mission critical applications. The NETio operates in license-free 900 MHz or 2.4GHz spread spectrum frequencies and has built-in I/O for a wide variety of market applications.

The NETio solution acquires, transports and delivers I/O signal data, and interfaces directly to a wide variety of I/O without the need for a controller. NETio offers a quickly deployed low cost alternative to wires. In many industrial applications, it is impossible or cost prohibitive to run hardwired circuits between inputs and outputs.

## Protocol Addressability

NETio interfaces I/O from sensors and devices using multiple industrial protocols including Modbus RTU, Modbus TCP and DNP3. This allows a SCADA system or host controller to communicate directly with NETio using IP/Ethernet or serial protocols when PLCs and RTUs are not necessary. NETio allows serial communication using DNP3 or Modbus RTU without the need for an access point for simple point-to-multipoint applications between remotes or over WeXP.

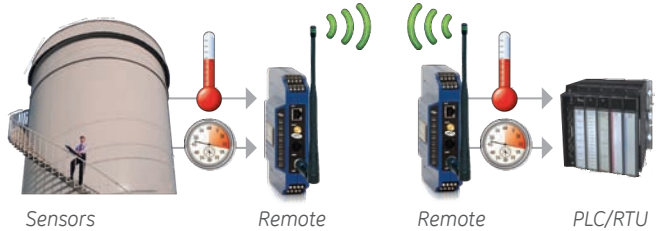
### I/O from remote sensors to SCADA host



## I/O Extension

Using I/O extension, NETio regenerates analog and digital signals between multiple field devices and controllers resulting in significant savings on wiring and termination costs. NETio supports cost-effective remote to remote communication for small point-to-point or point-to-multipoint requirements that do not require an access point

### Wirelessly extend I/O from the field to PLCs and RTUs



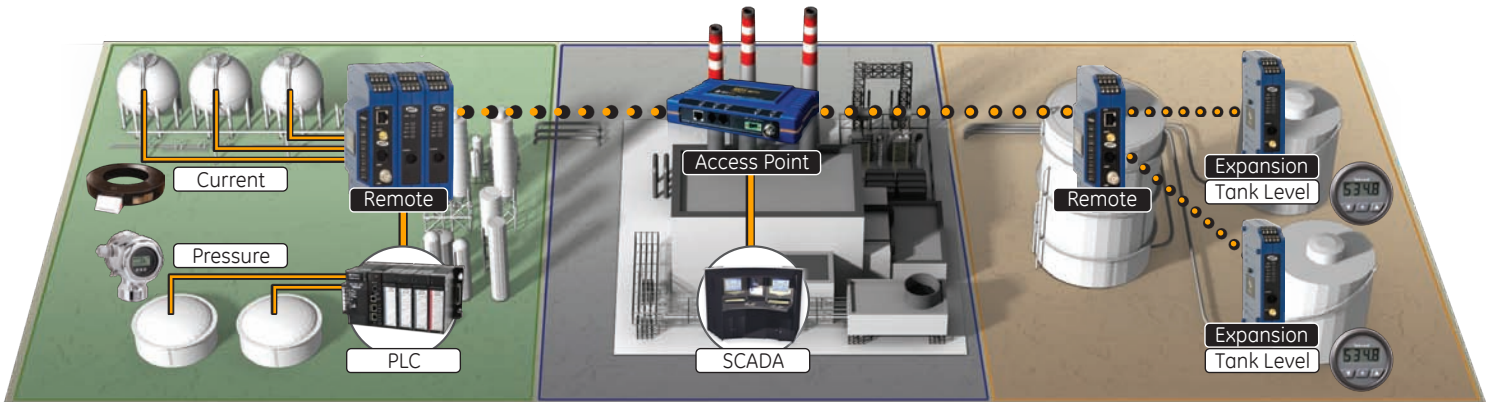
## IP/Ethernet and Serial Communications

In addition to I/O extension and protocol addressability, NETio also supports IP/Ethernet and serial communication over long distance between SCADA systems and RTUs or PLCs. Use the NETio Access Point whenever IP/Ethernet communications are required.

## Backwards Compatibility

NETio can serve as the wireless access point to a central control station for remote NETio units in the field. In applications where wireless network infrastructure already exists, NETio Remotes can still be deployed, as they are compatible and interoperable with MDS TransNET and MDS entraNET wireless access points.

## NETio Application Advantages



### I/O Extension

- NETio can be used to regenerate I/O signals between sensors and PLCs
- Input signals can be mapped to outputs anywhere in a NETio network
- NETio provides IP/Ethernet and serial data communications for attached PLC or RTU

### Protocol Communications

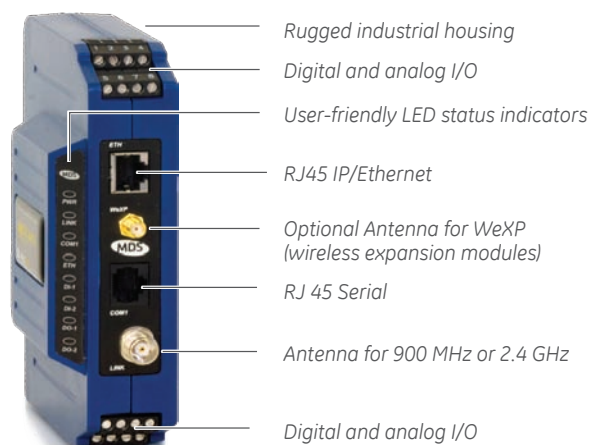
- NETio supports multiple protocols including Modbus RTU, Modbus TCP, and DNP3
- Provides IP/Ethernet and serial communication to SCADA hosts and HMI's
- Accommodates multiple protocols for diverse devices and I/O signals on the same IP/Ethernet network

### Wireless Expansion

- Wirelessly expand I/O capacities of NETio Remotes to connect additional I/O signals
- Cover I/O signals within 3,000 feet with NETio expansion modules with 802.15.4 WeXP
- Combine protocol addressable I/O and I/O extension on the same network

## Remote

NETio is available in the 900 MHz or 2.4 GHz frequency bands for IP/Ethernet and serial communication. Each NETio has built-in connections for one analog input, one analog output, two digital inputs and two digital outputs. Each NETio can be configured for multiple operating modes including I/O extension for regenerating I/O signals between devices, protocol addressability for interfacing I/O using industry-standard protocols (e.g., Modbus-TCP), and SCADA communications to remote RTUs and PLCs using IP/Ethernet and a NETio Access Point.



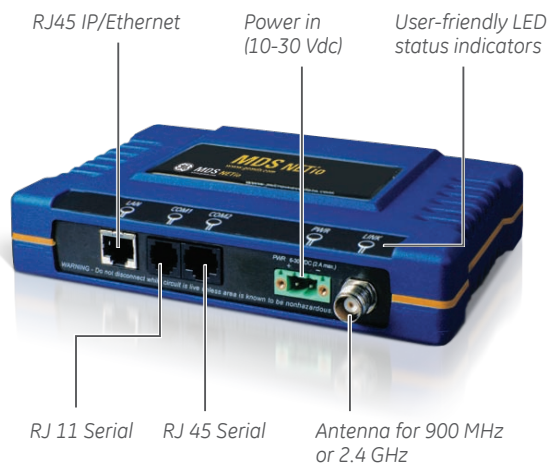
## Expansion Module

Expansion Modules expand the number of I/O points to meet your requirements. Expansion Modules can be connected directly to the NETio via a fully integrated power/communication backplane connector or they can be located up to 3,000 feet away and wirelessly connect to NETio over WeXP. Expansion Modules are available in 6 different configurations and deliver connectivity for up to 128 I/O signals at any one location.



## Access Point

When you require protocol addressability using Modbus TCP or DNP3 via TCP, or utilize IP/Ethernet on your SCADA network and other applications, NETio uses an access point for maximum performance. The NETio access point provides long range, peer-to-peer, secure wireless IP/Ethernet and serial communication plus network-wide configuration from a single location. The access point also allows you to mix modes of communication and multiple protocols on the same network.



### Increase I/O capacity of remotes with expansion modules



Expansion modules connected via backplane

Wireless expansion modules connected via 802.15.4

## Accessories & Custom Enclosures

GE MDS provides a complete line of reliable industrial-strength and cost effective accessories that are tested to perform at optimal levels and maintain product warranties. GE MDS offers both standard and custom packages for wireless applications in harsh industrial environments. We simplify your wireless systems design by providing a convenient single-source ordering process. From antennas for the NETio (900 MHz and 2.4 GHz) to field-rated power supplies for your mission critical application, GE MDS can help ensure your system is robust and future-proof.

### Accessories for the NETio

	900 MHz	2.4 GHz
Fixed Remote Kit with Yagi	KFR-N09-D1	KFR-N24-E1
WeXP antenna	97-4278-A10	97-4278-A10
Power Supply (AC Input)	01-3682A02	01-3682A02

View Accessories catalog at [www.gemds.com](http://www.gemds.com)

## Specifications

### GENERAL

Access Point Power	10-30 Vdc
Remote Power	6-30 Vdc
Current	<450 mA Transmit, < 180 mA receive (@13.8 Vdc)
Temperature	-40° C to +70° C
Housing (Remote)	High-impact plastic
Housing (Access Point)	Die-cast Aluminum
Mounting	35mm DIN rail (Remote), Flat Panel or DIN (Access Point)
Access Point Size	3.15H x 17.2W x 11.2D cm. (1.25H x 6.75W x 4.5D in.)
Remote Size	14.6H x 4.14W x 11.4D cm. (5.75 H x 1.63 W x 4.5 D in.)
Expansion Size	14.6H x 3.0W x 11.4D cm. (5.75H x 1.18W x 4.5D in.)
Access Point Weight	635g (1.4 lb.)
Remote Weight	226 g (0.5 lb.)

### NETIO B MODEL

Compatibility	MDS entraNET networks & AP
I/O Capacity	1 analog input, 1 analog output, 2 digital inputs, 2 digital outputs
Ethernet Port	One RJ45 10baseT, 10 Mbps, requires NETio Access Point
Serial Port	One RJ-45, RS232, 1.2 to 115.2 kbps
I/O extension	Network-wide (Access points, remotes, expansion modules)

Protocols	Serial (Modbus RTU and DNP3); Ethernet (DNP3, Modbus-TCP) requires NETio Access Point
-----------	---

### NETIO T MODEL

Compatibility	MDS TransNET & Master
I/O Capacity	1 analog input, 1 analog output, 2 digital inputs, 2 digital outputs
Serial Ports	Two RJ45, RS-232, 1.2 to 115.2 kbps
I/O Extension Protocols	Over WeXP option only Modbus RTU

### 900 MHZ OPTION

Data Rate	106 kbps (EB); 115 kbps (TB)
Frequency	902-928 MHz ISM band
Mode	Frequency Hopping Spread Spectrum
Range	Up to 30 miles
Antenna	TNC female
System Gain	136 dB
Carrier Power	0.1 to 1.0 watts (20 to 30 dBm)
Receiver Sensitivity	-106 dBm (1 x 10 <sup>-6</sup> BER)

### 2.4 GHZ OPTION

Data Rate	106 kbps
Frequency	2.4016 - 2.4778 GHz ISM band
Mode	Frequency Hopping Spread Spectrum
Range	Up to 15 miles
Antenna	TNC female
System Gain	131 dB
Carrier Power	.05 to .5 watts (17 to 27 dBm)
Receiver Sensitivity	-104 dBm (1 x 10 <sup>-6</sup> BER)

### WeXP OPTION (BASED ON 802.15.4)

Frequency	2.4 to 2.4835 GHz
Range	Up to 3,000 ft.
Antenna	SMA female
Carrier Power	10-60 mW (10 to 18 dBm)
TX Power	27 dBm
Receiver Sensitivity	-100 dBm (1% packet error)

### ANALOG INPUTS

Types	4-20 mA, 0-5 vDC, 0-10 vDC, .1-5 vDC
Accuracy	0.1% (full scale V or I)
A/D Resolution	22 bit
Isolation	1400 V input to power (not isolated on NIOXM-6)

### ANALOG OUTPUTS

Types	4-20 mA, 0-5 V, 0-10 V
Accuracy	0.2% (full scale V or I)
Isolation	1400 V output to power
D/A resolution	16 bits

### DIGITAL INPUTS

Type	5-36 VDC
Isolation	3000 V to chassis ground

### DIGITAL OUTPUTS

Type	FET relay
Hold Off Voltage	36 vDC
Load	2A continuous (per output)
Isolation	3,700 V to chassis ground

### AGENCY APPROVALS

FCC	Part 15.247
Industry Canada	RSS210
CSA	Class 1, Div. 2 groups A,B,C,D for hazardous locations (ANSI/UL equivalent)

## Ordering

### NETio Remote

NETIO Model	* -MD * 11 * BFC10N	Serial and Ethernet Remote (NETio and entraNET Access Point compatible)
Frequency	B T	Serial Remote (TransNET Access Point compatible)
Wireless Expansion	9 2	MDS 900 MHz long range, up to 30 miles MDS 2.4 GHz long range, up to 15 miles (Only with B model)
	W N	WeXP short-range wireless option (up to 3,000 ft.) No WeXP short-range wireless

#### Order Code Example

NETIOB-MD911WBFC10N

- Remote
- Serial and Ethernet
- entraNET-based 900 MHz
- Wireless expansion

### NETio Expansion Module

NETIOE-MDN1 I/O config	* * NFC00N	1 Analog input (V or I), 1 Analog output (I), 2 Digital inputs, 2 Digital outputs
	1	6 Digital inputs
	2	6 Digital outputs
	3	2 Analog inputs (V or I), 4 Digital inputs
	4	2 Analog inputs (V, non-isolated), 2 Analog outputs (V, non-isolated), 2 Digital inputs, 2 Digital outputs
	6	2 Analog inputs (I), 1 Digital inputs, 3 Digital outputs
Wireless Expansion	W N	WeXP short-range wireless option (up to 3,000 ft.) No WeXP short-range wireless

#### Order Code Example

NETIOE-MDN16WNFC00N

- Expansion module
- 4 Analog I/O
- 4 Digital I/O
- Wireless expansion

### NETio Access Point

NETIOA-MD Frequency	* F * *	NETio Serial/Ethernet Access Point - entraNET model
Mounting	9 2	MDS 900 MHz long range, up to 30 miles MDS 2.4 GHz long range, up to 15 miles
Network Management	S A	Standard Brackets DIN Rail
	1 0	Enable Disable

#### Order Code Example

NETIOA-MD9A1

- Access Point (Serial/Ethernet)
- entraNET-based 900 MHz
- DIN rail mounting
- Network management

Visit [www.GEMDS.com/NETio](http://www.GEMDS.com/NETio) to download NETio resources