## Key Differentiators

**Data Concentrator**

Concentrates data from many Modbus servers into a unified Modbus map. It polls devices over Ethernet, serial, and RF links, concatenating and simplifying values into a Modbus "proxy" register map within the XetaWave device. The RTU then only needs to poll the consolidated Modbus register map within the XetaWave devices to obtain the values. Polling can occur more often, the RTU is offloaded.

**Distributed I/O Architecture**

XetaWave I/O, with available RF, Ethernet, and serial interfaces, can provide distributed I/O architecture to the facility. Wires no longer need to be run all the way back to the central location, thereby providing savings much greater than the cost of the "concentrating" XetaWave device. Data integrity is improved with transport over a digital interface instead of long home run wires. Install and commissioning is dramatically simplified as subsystems can be prewired with XetaWave I/O, and at install only power and connectivity is provided. Troubleshooting and repair is minimized with intelligent interfaces close to the I/O point and network troubleshooting technologies.

**Wireless & I/O in One Offering and Multiple Frequencies**

XetaWave I/O can be combined with 0, 1, or 2 XetaWave RF Modules: 100 MHz, 200 MHz, 400 MHz, 700 MHz, 900 MHz, 1.3 GHz, 1.4 GHz, or 2.4 GHz.

**I/O Expander**

XetaWave I/O is available without a radio (RF module) to provide the most cost effective I/O solution with a Data Concentrator.

XetaWave I/O solutions combine Ethernet and serial high speed, long range wireless communication with integrated I/O functionality. XetaWave I/O is compatible with common instrumentation interfaces, supports Modbus, and seamlessly integrates with XetaWave networks. XetaWave I/O is ideally suited for process control to securely and wirelessly monitor temperature, pressure, level, and flow, and control pumps, latches, and valves and more. XetaWave I/O offers unmatched speed and distance and the widest selection of frequencies.

### Multi-Function I/O

XetaWave I/O includes a total of **8 multi-function I/O channels** to monitor and control industrial operations. All 8 channels are multi-function channels. I/O channels support analog input (1 to 5 Volt, 4 to 20 milliAmp with internal sense resistor), analog output (4 to 20 milliAmps), digital input (wet contact, dry contact), and digital output (sinking 2 Amps with current monitoring). Xetawave I/O also has programmable output actions for communication loss and power up. XetaWave multi-function I/O are running all the time to automate any industrial automation application with minimum configuration.



*Rugged Enclosure
Board level also available*

### Seamless Ethernet and Serial

XetaWave I/O supports Seamless Ethernet and Serial networks to offer the ultimate flexibility in upgrading legacy equipment. Legacy serial networks can be upgraded to XetaWave I/O without changing any of the configurations on the PLC or controllers. XetaWave I/O delivers faster communication than legacy serial networks, a second virtual serial network invisible to the legacy serial network, Modbus TCP/RTU/ASCII support, and configuration and management over Ethernet and USB.

### Data Concentrator

XetaWave I/O includes a **Data Concentrator** application which reduces network traffic and simplifies SCADA polling. Multiple Modbus TCP, RTU and ASCII devices can be polled by the Data Concentrator and organized in a fully customizable Modbus map. The Data Concentrator includes configurable failure filtering, command skipping, default values, and error flags so the user can get the fastest possible performance without sacrificing data integrity. The Data Concentrator is available in XetaWave's proprietary operating system, uTasker, with support for up to 32 devices and 10 polls each. It is also available as a module in an ever more powerful version for XetaWave's Linux operating system with support for more devices, more polls, and more data translation options.

### Powerful Wireless Communication

XetaWave I/O provides wireless communication with unmatched speed, distance, and selection of frequencies. One or two high performance XetaWave radios can also be included in one device. All radio options are currently available including Xeta9 dual-band ISM/MAS modules for 902 to 960 MHz; licensed narrow band radios—100 MHz, 200 MHz, 400 MHz, 700 MHz; 1.3 GHz and the 2.4 2.4 GHz ISM band.

## Firmware Capabilities

### BASIC Interpreter

Load code into any XetaWave I/O device to add custom logic on the edge. More complex safety systems, automatic pump shutdown, automatic valve closure, complex variable transformation, and more.

### Wire Replacement

Create a virtual wire from any network accessible XetaWave I/O point to any other network accessible Xetawave I/O point and the Wire Replacement system will replicate the signal from the input to the output. Instead of transiting wires where it may not be possible or reliable, let XetaWave I/O replicate those signals across Ethernet or Radio links. *Available only in Linux.*

### Modbus R/W Blocks

Create a block of Modbus registers for any use. Simplify interfacing 3rd party flow meters into the facility network and dataset allow the 3rd party meter to write to a known fixed Modbus block, and let the facility poll it with all other Modbus data. Add history, trending, and other blocks to custom developed programs running in the BASIC interpreter *(uTasker only).*

### Available Soon

- MQTT
- Data logging

### Future Capabilities

- DNP3
- Custom applications/modules

*Contact XetaWave for specifics.*

## Emancipator 2+ Superset

The Emancipator2+ (EM2+) is available with 3 inputs, usable as either analog inputs or digital inputs. The EM2+ is useful in applications where very limited input I/O is needed and providing a great value.



*Emancipator 2+ Superset*

| Channel Type | Input |
|---|---|
| **Digital Input function** | |
| Input high, minimum (V) | 2.4 |
| Input low, maximum (V) | 0.7 |
| Counting frequency (Hz) | 200 |
| Pull-up resistor (Ohm) | 4.7 k |
| **Analog Input, voltage function** | |
| Signal range (V) | -0.3 to 6.25 |
| Accuracy | 2.5% of reading |
| Resolution (bits) | 16 |
| **Electrical and Environmental** | |
| Input impedance (Ohm) | 62 k |
| Maximum terminal voltage (V) | Vbat |
| Battery/supply voltage (Vbat) | 10 to 32 |
| Temperature (Celsius) | -40 to 85 |

## Emancipator 2-

The Emancipator 2- (EM2-) is available with 1 digital input. As a serial only option, the EM2- power consumption is minimized, while still allowing monitoring of serial devices and an I/O point, for example, door open, UPS or power monitoring/fault, flame status, and more.



*Emancipator-*

| Channel Type | Input |
|---|---|
| **Digital Input function** | |
| Input high, minimum (V) | 2.4 |
| Input low, maximum (V) | 0.6 |
| Pull-down resistor (Ohm) | ~ 5 k |
| **Electrical and Environmental** | |
| Input impedance (Ohm) | ~ 5 k |
| Maximum terminal voltage (V) | +/- 25 V |
| Battery/supply voltage (Vbat) | 10 to 32 |
| Temperature (Celsius) | -40 to 85 |

## I/O Channels (EIO/SIO)

| Pin | IO Ref | Function |
|---|---|---|
| Pin 1 | IO 1 | Multifunction Analog |
| Pin 2 | IO 2 | Multifunction Analog |
| Pin 3 | IO 3 | Multifunction Analog |
| Pin 4 | - | Ground |
| Pin 5 | IO 4 | Multifunction Analog |
| Pin 6 | IO 5 | Multifunction Digital with 10 kHz counting and input-only Multi-Sync |
| Pin 7 | - | Ground |
| Pin 8 | IO 6 | Multifunction Digital |
| Pin 9 | - | Ground |
| Pin 10 | IO 7 | Multifunction Digital |
| Pin 11 | - | Ground |
| Pin 12 | IO 8 | Multifunction Digital |

## I/O Specifications (EIO/SIO)

| Channel Type | Multifunction Analog | Multifunction Digital |
|---|---|---|
| **Digital Input function** | | |
| Input high, minimum (V) | 2.3 | 2.4 |
| Input low, maximum (V) | 2.2 | 0.7 |
| Counting frequency (Hz) | 0.4 | 200 |
| Counting frequency, high (Hz) | - | 10 k (IO 5 only) |
| Pull-up resistor (Ohm) | - | 4.7 k |
| Pull-down resistor (Ohm) | 250 | - |
| **Digital Output function** | | |
| Output rating (A current sink) | - | 2 |
| Output reporting accuracy | - | 5% |
| Output impedance (Ohm) | - | 0.1 |
| Power-up states | - | on, off |
| Fail-safe states | - | on, off, last value |
| **Analog Input, voltage function** | | |
| Signal range (V) | -0.3 to 6.25 | -0.3 to 7.5 |
| Accuracy | 0.5% of reading | 2.5% of reading |
| Resolution (bits) | 16 | 16 |
| **Analog Input, current function** | | |
| Signal range (mA) | 0 to 25 | - |
| Accuracy | 0.5% of reading | - |
| Internal sense resistor (Ohm) | 250 | - |
| Resolution (bits) | 16 | - |
| **Analog Output function** | | |
| Signal range (mA) | 0 to 24 | - |
| Power-on states | set point | - |
| Fail-safe states | set point, last value | - |
| Accuracy | 0.5% of reading | - |
| Resolution (bits) | 10 | - |
| **Sensor Power function** | | |
| Voltage output (V) | 14 | - |
| Current output (mA) | 24 | - |
| **Electrical and Environmental** | | |
| Input impedance (Ohm) | 62 k | 66 k |
| Maximum terminal voltage (V) | Vbat | |
| Battery/supply voltage (Vbat) | 10 to 32 | |
| Temperature (Celsius) | -40 to 85 | |

## I/O Selection Guide

| | | EIO | EIOL | SIO | XEIO | XEIOL | EM2+S | EM2- |
|---|---|---|---|---|---|---|---|---|
| **RF Module** | **I/O Model** | | | | | | | |
| | **XETA1-** | x | x | x | | | | |
| | **XETA2-** | x | x | x | | | | |
| | **XETA4-** | x | x | x | | | | |
| | **XETA7-** | x | x | x | | | | |
| | **XETA9-** | x | x | x | | | x | x |
| | **XETA24-** | x | x | x | | | | |
| **# RF Modules** | 1 RF Module | x | x | x | | | x | x |
| | 2 RF Modules | x | x | x | | | | |
| **RF Features** | Ethernet | x | x | x | | | x | x |
| | Seamless | x | x | x | | | x | x |
| | Serial | x | x | x | | | x | x |
| | INS Master | | | | | | | |
| | INS Slave | x | x | x | | | x | x |
| | MMS Source | | | | | | | |
| | MMS Sync | x | x | x | | | | |
| **IO** | # of IO Channels | 8 | 8 | 8 | 8 | 8 | 3 | 1 |
| **USB** | Virtual Serial | x | | x | x | | x | |
| **Ethernet** | 1 Port | | | | | | x | |
| | 2 Ports | x | x | | x | x | | |
| **Serial** | 1 Port | | | | | | x | x |
| | 2 Ports | x | | x | x | x | | |
| **Operating System** | uTasker / Bridge | x | | x | x | | | |
| | Linux / Router | | x | | | x | x | x |
| **Networking** | VLAN | x | x | x | x | x | x | |
| | Ethernet Bridge | x | x | x | x | x | x | |
| | IP Router | | | x | | x | x | |
| **Applications** | Modbus RTU | x | x | x | x | x | x | |
| | Modbus ASCII | x | | x | x | | | |
| | Modbus TCP | x | x | x | x | x | x | x |
| | Data Concentrator | x | m | x | x | m | m | |
| | SNMP | | x | | | x | x | x |
| | HTTP | x | x | x | x | x | x | |
| | HTTPS | | x | | | x | x | x |
| **Enclosure** | Rugged | x | x | x | x | x | | |

*m— Software Module*

## Ordering Guide

I/O Expanders XETA-XEIO and XETA-XEIOL are not available with RF Modules.

To order I/O with 1 RF Module start with the RF Module and add the IO model. For example, XETA9-EIO, XETA24-SIO, XETA4-EIOL.

To order I/O with 2 RF Modules start with the RF Module, add "X" and the second RF Module, and then add the I/O model. For example, XETA9X9-EIO, XETA24X24-SIO, XETA4X4-EIOL.

I/O models with uTasker / Bridge OS must have the same RF Modules; I/O models with Linux / Router OS support different RF Modules.