Modbus TCP based I/O Chassis

- Uses industry standard Modbus TCP interface
- Flexible, rugged and compact
- Easy-to-use web-browser based configuration
- Standard 100Base-T, 100Base-FX, or Gigabit Ethernet interface
- Optional 8347E offers IPSec encryption (coming soon)
- Flexible: Over 50 I/O boards available
- Solid-State Drive, Flash or SD Card-based boot disk
- AC or DC powered
- Available on all Cube and RACKtangle platforms including the MIL chassis

General Description:
The UEIModbus Cube/RACKtangle is a compact, rugged, Ethernet based data acquisition and control interface that communicates with a host computer or PLC over Modbus TCP. Its flexibility allows you to configure one or more chassis to match the specific I/O requirements of your application. The UEIModbus is ideally suited for a wide variety of industrial monitoring and control applications.

The Modbus messaging protocol was developed by Modicon in 1979 and is used to establish master-slave/client-server communication between intelligent devices. It is a de facto standard, truly open and the most widely used network protocol in the industrial manufacturing environment.

Modbus devices communicate in a master-slave configuration. Only one device (the master) can initiate transactions (called queries). Other devices (slaves) respond by supplying the requested data to the master, or by taking the action requested in the query.

The UEIModbus chassis functions as a Modbus slave that is easily accessed by any software client acting as a Modbus master. Most popular HMI software supports the Modbus protocol. Configuration is done with an easy-to-use web-browser interface.

The heart of every UEIModbus system is the Cube or RACKtangle chassis, which are available in a wide variety of configurations. You select the I/O boards installed in the chassis to match your application. There are currently over 50 different I/O boards supported by the UEIModbus, covering analog input and output, digital I/O, counter/timers, and quadrature encoders.

Each I/O chassis consists of two primary subsections: a CPU Module and I/O slots or layers. The CPU Module provides the PowerPC CPU running the Modbus TCP server software. The core modules also provides the Ethernet Network Interface Controller (NIC), indicator lights, timing/trigger interface, configuration ports and internal power supply. It’s the brains of the chassis and controls the unit’s operations including reading and writing to the I/O boards.

The remainder of the UEIModbus Cube is dedicated to I/O slots or layers. These slots are populated with I/O modules selected to match your application. With over 50 different I/O boards available, we’re sure to have just what your application requires. We offer: Analog input boards to measure voltage, current, strain gages, thermocouples and more, Analog output boards with outputs to ±40V or ±50 mA, Digital I/O interfaces for logic and “real-world” signal levels, counters/timers, and quadrature encoder inputs.

The UEIModbus cubes offer a wide variety of mounting options. A flange kit is available that allows the cubes to be mounted to a wall or other flat surface. Rack kits and DIN Rail kits are available to allow mounting in 19" racks or on DIN rails, respectively. The UEIModbus RACKtangles are designed to install directly in standard 19" racks.

Whether your application requires a few I/O channels or a few thousand, the UEIModbus chassis are an ideal solution in your Modbus based application. The UEIModbus chassis’ unique combination of flexibility, compact size, mechanical and electrical ruggedness, and ease of use is unparalleled.
# UEIModbus: Technical Specifications

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<tr>
<th>Computer Interface</th>
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<th>UEIModbus xxx-1G series GIGE Cubes</th>
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<tr>
<td>Primary Ethernet Port</td>
<td>10/100Base-T, RJ-45 connector</td>
<td>10/100/1000Base-T, RJ-45 connector</td>
<td>10/100/1000Base-T, RJ-45 connector</td>
</tr>
<tr>
<td>Diagnostic Port</td>
<td>Not applicable</td>
<td>10/100/1000Base-T, RJ-45 connector</td>
<td>10/100/1000Base-T, RJ-45 connector</td>
</tr>
<tr>
<td>Other Port Functions</td>
<td>Daisy chained single port switch provided</td>
<td>Ports may optionally be bonded/teamed</td>
<td>Ports may optionally be bonded/teamed</td>
</tr>
<tr>
<td>Optional Interface</td>
<td>100Base-FX Fiber (single or multi-mode)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>USB Port</td>
<td>Not supported</td>
<td>Not supported</td>
<td>Not supported</td>
</tr>
<tr>
<td>I/O Board Support</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Series supported</td>
<td>DNA-series boards</td>
<td>DNA-series boards</td>
<td>DNR-series boards (DNF for FLATrack)</td>
</tr>
<tr>
<td>Software / Operating System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Embedded OS</td>
<td>Linux, kernel 4.4.89</td>
<td>Linux, kernel 4.4.89</td>
<td>Linux, kernel 4.4.89</td>
</tr>
<tr>
<td>Processor / System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CPU</td>
<td>Freescale MPC5200, 400 MHz, 32-bit</td>
<td>Freescale 8347E, 400 MHz, 32-bit</td>
<td>Freescale 8347E, 400 MHz, 32-bit</td>
</tr>
<tr>
<td>RAM Memory</td>
<td>128 MB, 100 MB available to user apps</td>
<td>128 MB standard / 256 MB optional</td>
<td>128 MB standard / 256 MB optional</td>
</tr>
<tr>
<td>FLASH Memory</td>
<td>4 MB (0 MB available for user apps)</td>
<td>32 MB standard / 128 MB optional</td>
<td>32 MB standard / 128 MB optional</td>
</tr>
<tr>
<td>Solid-State Hard Drive</td>
<td>not available</td>
<td>*Optional 8, 16 or 64 GB drives available</td>
<td>*Optional 8, 16 or 64 GB drives available</td>
</tr>
<tr>
<td>SD Card Interface</td>
<td>SD cards up to 32 GB (8 GB included)</td>
<td>SD cards up to 32 GB (8 GB included)</td>
<td>SD cards up to 32 GB (8 GB included)</td>
</tr>
<tr>
<td>USB Drive Interface</td>
<td>n/a</td>
<td>Standard USB 2.0 port</td>
<td>Standard USB 2.0 port</td>
</tr>
<tr>
<td>Physical Dimensions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 I/O slot</td>
<td>UEIModbus 100-1G: 4.1”x 4.0”x 2.7”</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 I/O slots</td>
<td>UEIModbus 300: 4.1”x 4.0”x 4.0”</td>
<td>UEIModbus 300-1G: 4.1”x 5.0”x 4.0”</td>
<td>n/a</td>
</tr>
<tr>
<td>4 I/O slots</td>
<td>UEIModbus 400R: 1.75”x 7.8”x 16” (1U)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 I/O slots</td>
<td>UEIModbus 600: 4.1”x 4.0”x 5.8”</td>
<td>UEIModbus 600-1G: 4.1”x 5.0”x 5.8”</td>
<td>UEIModbus 600R: 5.25”x 6.2”x 10.5” (3U)</td>
</tr>
<tr>
<td>7 I/O slots</td>
<td>UEIModbus 700: 4.1”x 4.0”x 6.6”</td>
<td>UEIModbus 700-1G: 4.1”x 5.0”x 6.6”</td>
<td></td>
</tr>
<tr>
<td>12 I/O slots</td>
<td>n/a</td>
<td>n/a</td>
<td>UEIModbus 1200R: 5.25”x 6.2”x 17.5” (3U)</td>
</tr>
<tr>
<td>Environmental</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrical Isolation</td>
<td>350 Vrms</td>
<td>350 Vrms</td>
<td>350 Vrms</td>
</tr>
<tr>
<td>Temp (operating)</td>
<td>-40 °C to 85 °C</td>
<td>-40 °C to 70 °C</td>
<td>-40 °C to 70 °C</td>
</tr>
<tr>
<td>Temp (storage)</td>
<td>-40 °C to 100 °C</td>
<td>-40 °C to 85 °C</td>
<td>-40 °C to 85 °C</td>
</tr>
<tr>
<td>Humidity</td>
<td>0 to 95%, non-condensing</td>
<td>0 to 95%, non-condensing</td>
<td>0 to 95%, non-condensing</td>
</tr>
<tr>
<td>Vibration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(IEC 60068-2-64)</td>
<td>10–500 Hz, 5 g (rms), Broad-band random</td>
<td>10–500 Hz, 3 g (rms), Broad-band random</td>
<td>10–500 Hz, 3 g (rms), Broad-band random</td>
</tr>
<tr>
<td>(IEC 60068-2-6)</td>
<td>10–500 Hz, 5 g, Sinusoidal</td>
<td>10–500 Hz, 3 g, Sinusoidal</td>
<td>10–500 Hz, 3 g, Sinusoidal</td>
</tr>
<tr>
<td>Shock</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(IEC 60068-2-27)</td>
<td>50 g, 3 ms half sine, 18 shocks at 6 orientations; 30 g, 11 ms half sine, 18 shocks at 6 orientations</td>
<td>100 g, 3 ms half sine, 18 shocks at 6 orientations; 30 g, 11 ms half sine, 18 shocks at 6 orientations</td>
<td>100 g, 3 ms half sine, 18 shocks at 6 orientations; 30 g, 11 ms half sine, 18 shocks at 6 orientations</td>
</tr>
<tr>
<td>Altitude</td>
<td>70,000 feet (special version to 120,000’)</td>
<td>70,000 feet, maximum</td>
<td>70,000 feet, maximum</td>
</tr>
<tr>
<td>Power Requirements</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Voltage</td>
<td>9-36 VDC (115/220 VAC adaptor included)</td>
<td>9-36 VDC (115/220 VAC adaptor included)</td>
<td>9-36 VDC (115/220 VAC adaptor included)</td>
</tr>
<tr>
<td>Power</td>
<td>3.5 Watts (not including I/O boards)</td>
<td>7 Watts (not including I/O boards)</td>
<td>10 Watts (not including I/O boards)</td>
</tr>
<tr>
<td>Reliability</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MTBF</td>
<td>&gt;300,000 hours</td>
<td>&gt;160,000 hours</td>
<td>&gt;130,000 / 160,000 hrs DNR-12 / DNR-6</td>
</tr>
</tbody>
</table>

* The UEIModbus does not support local data storage. Though the hardware is capable of drives larger than 8 GByte, the is little value in selecting a larger hard drive.
**UEIModbus Technical Specifications:**

<table>
<thead>
<tr>
<th>Computer Interface</th>
<th>MIL series ruggedized chassis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Ethernet Port</td>
<td>10/100/1000Base-T, 38999 connector</td>
</tr>
<tr>
<td>Diagnostic Port</td>
<td>10/100/1000Base-T, 38999 connector</td>
</tr>
<tr>
<td>Net Teaming/bonding</td>
<td>Supported</td>
</tr>
<tr>
<td>Config/Serial Port</td>
<td>on LAN/COM 38999 connector</td>
</tr>
<tr>
<td>USB Port</td>
<td>n/a on UEIModbus</td>
</tr>
</tbody>
</table>

**I/O Board Support**
- Series supported: DNA/DNR-series

**Software / Operating System**
- Embedded OS: Linux, kernel 4.4.89
- Real-time support: Standard Linux kernel

**Processor/system**
- CPU: Freescale 8347 or 8347E, 400 MHz, 32-bit
- Memory: 256 MB, 228 MB available to user apps
- FLASH memory: 32 MB standard / 128 MB optional, 16 MB / 112 MB available for user apps
- Solid-State Hard Drive: *Optional 8, 16, or 64 GB drives available
- SD card interface: SD cards up to 32 GB

**Physical Dimensions**
- 4 I/O slots: UEIModbus 400-MIL: 6.2" x 7.1" x 8.7", 11 lbs.
- 12 I/O slots: UEIModbus 1200-MIL: 17.5" x 8.1" x 7.0", 22 lbs. (Std 3U)

**Environmental**
- Temp (operating): -40 °C to 85 °C (power dissipation of actual system may require derated max temp.)
- Temp (storage): -40 °C to 85 °C
- Humidity: 0 to 95%, non-condensing
- Vibration: MIL-STD-810G plus the IEC specs below
  - (IEC 60068-2-64): 10–500 Hz, 5g (rms), Broad-band random
  - (IEC 60068-2-6): 10–500 Hz, 5 g, Sinusoidal
- Shock: MIL-STD-810G plus the IEC specs below
  - (IEC 60068-2-27): 100 g, 3 ms half sine, 18 shocks at 6 orientations; 30 g, 11 ms half sine, 18 shocks at 6 orientations
- Altitude: 70,000 feet, maximum
- EMI / RFI: Designed to meet MIL-STD-461
- Sealing: Default unit sealed to IP 66 or better. Pressure relief valves support continuous altitude changes of 5000 fpm. Units can be configured with bottom weep holes if desired.

**Power Requirements**
- Voltage: 9 - 36 VDC designed to meet MIL-STD-1275 / 704
- Reliability
  - MTBF: 1200-MIL > 100,000 hours
  - MTBF: 400-MIL > 130,000 hours

*The UEIModbus does not support local data storage. Though the hardware is capable of drives larger than 8 GByte, the is little value in selecting a larger hard drive.*

**UEIModbus Advantages:**

**Easy to configure and deploy**
- Uses standard Modbus TCP protocol
- Over 50 different I/O boards available
- Web browser based configuration
- Built-in signal conditioning
- Cube, RACKtangle and MIL configurations
- Standard “Off-the-shelf” products and delivery

**Flexible Connectivity**
- 100Base-T or GigE with Cat-5 cable
- 10/100Base-FX Fiber interface available
- Supports WIFI / GSM / Cell networks

**Compact Size: UEIModbus 600 @ 4” x 4” x 5.8” allows:**
- 175 analog inputs per cube
- 224 analog outputs per cube
- 336 digital I/O bits per cube
- 48 counter/timer channels per cube
- 48 quadrature encoder inputs per cube

**Low Power:**
- As low as 15 watts per chassis
- AC, 9-36 VDC or battery powered

**Rugged and Industrial:**
- Operation tested from -40°C to 85°C
- Vibration tested to 5 g, (operating)
- Shock tested to 100 g (operating)
- All I/O isolated from chassis and host PC

**UEIModbus channels are configured using an intuitive, easy-to-use web browser interface!**

Please see the UEIModus ordering guide on the following page.
**Ordering Guide:** (All chassis include: Universal AC power supply, Serial and Ethernet cables.)

**Chassis Configuration**

- **300**: 100Base-T Linux-based, Modbus TCP I/O chassis with 3 available I/O slots
- **600**: 100Base-T Linux-based, Modbus TCP I/O chassis with 6 available I/O slots
- **700**: 100Base-T Linux-based, Modbus TCP I/O chassis with 7 available I/O slots
- **100-1G**: Gigabit Ethernet, Modbus TCP I/O chassis with 1 available I/O slots (a.k.a. UEINET-Modbus)
- **300-1G**: Gigabit Ethernet, Modbus TCP I/O chassis with 3 available I/O slots
- **600-1G**: Gigabit Ethernet, Modbus TCP I/O chassis with 6 available I/O slots
- **700-1G**: Gigabit Ethernet, Modbus TCP I/O chassis with 7 available I/O slots
- **600R**: Gigabit Ethernet, Modbus TCP I/O chassis, RACKtangle with 6 available I/O slots
- **1200R**: Gigabit Ethernet, Modbus TCP I/O chassis, RACKtangle with 12 available I/O slots
- **400F-AC**: 1U FlatRACK, rack mountable 4 slot chassis with Gigabit Ethernet and 100-240 V AC power
- **400F-DC**: 1U FlatRACK, rack mountable 4 slot chassis with Gigabit Ethernet and 9-36 VDC power
- **400-MIL**: Military style, 4 slot Cube with GigE Ethernet ports and 38999 connectivity
- **1200-MIL**: Military style, 12 slot RACKtangle with GigE Ethernet ports and 38999 connectivity

**UEIPAC**

- ***CPU Configuration**
  - **00**: standard CPU
  - **01**: reserved
  - **02**: Updated CPU board supports:
    - IEEE-1588
    - solid-state hard drives
    - 256 MB of RAM
  - **03**: Updated CPU board adds:
    - IEEE-1588
    - solid-state hard drives
    - 8347E encryption ready CPU (IPsec support pending)
    - 128 MB of Flash, 256 MB of RAM

- **Software Deployment options**
  - **PA**: Standard UEIPAC deployment
  - **SM**: Simulink (UEISIM) deployment option
  - **MB**: Modbus (UEIModbus) deployment option
  - **OP**: OPC-UA (UEIOPC-UA) deployment option

- **SD Card**
  - **00**: No SD card
  - **S8**: 8 GByte SD card
  - **32**: 32 GByte SD card

- **Solid State Hard Drive**
  - **00**: No SS Drive
  - **08**: includes 8 GByte SS Drive
  - **16**: includes 16 GByte SS Drive
  - **64**: includes 64 GByte SS Drive

**Boot Software Location**

- **00 CPUS**: The CPU boots from the SD card
- **02 CPUS**: If an SSD is installed, the CPU boots from SSD. Otherwise it boots from the SD card.
- **03 CPUS**: The CPU boots from FLASH memory

For example a 3-slot GigE UEIModbus Cube with 8347E encryption, no SS Drive, and no SD card would be:

```
UEIPAC 300-1G - 03 - 00 - 00 - MB
```

For example a 12-slot UEIModbus RACKtangle without 8347E encryption, a 8 GB SS Drive, and no SD card would be:

```
UEIPAC 1200R - 02 - 08 - 00 - MB
```

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1. There are no CPU or Solid State Drive options available on the UEIModbus 300, 600 and 700.
2. The UEModbus 300/600 are available with 100Base-FX fiber connections or a DB-15 power connector. Contact UEI for details.
3. The UEIModbus does not support local data storage. Though the hardware is capable of drives larger than 8 GByte, the is little value in selecting a larger hard drive.