# Ultra-Compact & Rugged
# 4-Slot I/O Chassis  DNR-BRICK-4

## KEY FEATURES

- 4 I/O Slots, with over 90+ I/O board options available
- -40 to 85 °C and 100 g shock
- IP66/NEMA 4 (pending)
- Sealed I/O connectors
- Dual Ethernet connections through M12 connectors
- Power over Ethernet, and/or multiple power inputs for redundancy
- Complete Windows, VxWorks, QNX, RTX support
- LabVIEWTM, MATLAB® support and more
- Long-term product availability with UEI's industry leading 10-Year Availability Guarantee
- 3-Year Standard Warranty, 5-Year, up to 10-Year available
- 100% COTS



*The new DNR-BRICK-4 provides 4 I/O slots and uses standard DNR-series I/O boards (e.g. DNR-AI-217).*

## General Description

The DNR-BRICK-4 is the latest deployment of UEI's popular RACKtangle® architecture. The IP66/NEMA 4 rating (pending) ensures it works in tough indoor or outdoor environments. The unit's footprint is extremely small and is ideal for a huge assortment of commercial and military applications, including jet engine test stands, flight line systems, oil drilling platforms and refineries, heavy machinery and many other areas that will be exposed to harsh elements.

The DNR-BRICK-4 offers slots for 4 I/O boards, and with over 90 unique UEI I/O boards, there is sure to be a configuration matching your application. Sealed D-Sub I/O connectors ensure pinout compatibility with all of UEI's popular DNx-series I/O boards. Ethernet connections are made through standard M12 connectors, ensuring compatibility with industry standard cables. The DNR-BRICK-4 may be powered via standard 4 pair PoE++ (802.3bt) compatible Ethernet ports. PoE supplies up to 55 W, though the DNR-BRICK-4 consumes less than 30 W. Redundant power sources may be used via the 25-pin D-Sub connector, and the primary source is programmable. For non-POE applications, the chassis requires 9-36 VDC.  An optional AC/DC power supply is available (DNA-PSU-60). Built-in power supply voltage monitoring offers

health and usage monitoring. All this is housed in a 9.5" (wide), 7.12" (deep), 4.3" (tall) chassis, weighing approximately 7 pounds including I/O boards and typically consumes fewer than 25 W. Heat transfer from the internal electronics to the external chassis is designed such that no fans or rotary cooling is required. The lack of fans maximizes MTBF and mechanical reliability.

Regardless of your application, the DNR-BRICK4 is an ideal solution for any I/O system that will be subjected to the elements or otherwise be exposed to either liquid or particulate contamination.

The DNR-BRICK-4 chassis operates as a slave I/O device, running under the control of a host PC. All application code is created and run on the host. Almost unprecedented software support is offered, including:

- All popular operating systems including Windows, VxWorks, QNX, RTX and InTime
- All popular programming languages including C, C#, C++, Python, JAVA, VB and VB.NET
- All popular application packages including MATLAB, Simulink, LabVIEW, and more

## Cybersecurity
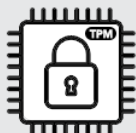
**CYBERSECURITY-READY PROCESSOR**

**SECURE TOOLKITS**

**SECURITY AUTOMATION TOOL**

UEI offers a suite of cybersecurity tools to help you on your pathway to NIST 800.213 compliance. For the SoloX ARM processor, UEI's PowerDNA Secure programmer toolkit subscriptions provides the software tools necessary to start building out your application. Once you successfully test and verify your system, it is time to lock down your hardware and software. **UEI-SAT** (Security Automation Tool) makes it easy to configure cybersecurity options with no need to trade-off product schedules. Quickly configure and deploy with confidence that security is done right without having to hire additional experts. All security features provide necessary and important protection.

## Technical Specifications DNR-BRICK4 is not field serviceable. Power supply not included.

| Computer Interface | |
|---|---|
| Primary Ethernet Port | 10/100/1000Base-T, M12 connector |
| Diagnostic Port* | 10/100/1000Base-T, M12 connector<br>*Alternatively can be teamed/bonded with primary port. |
| Power/Serial/Reset/Sync | RS-232, 25-pin D-Sub connector |
| USB Port | USB 2.0 fully supported |
| Synchronization Options | 1. PTP client provides software implementation of IEEE-1588<br>2. DNR-SYNC-1G series cables and boards provide both clock and trigger sync signals<br>3. DNR-IRIG-650 board provides IRIG time synchronization |

| I/O Board Support | |
|---|---|
| Series Supported | All DNR-series boards |

| Physical Dimensions | |
|---|---|
| 4 I/O Slots | 9.5 " W x 7.12" D  x 4.3" H, 7 lbs.,  Including  I/O boards |

| Environmental | |
|---|---|
| Electrical Isolation | 350 Vrms |
| Temperature (operating) | -40 to 85 °C |
| Temperature (storage) | -40 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, 5 g (rms), Broad-band random |
| *(IEC 60068-2-6)* | 10–500 Hz, 5 g, Sinusoidal |
| **Shock** | MIL-STD-810G plus the IEC stds 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 |
| IP Rating | IP66/NEMA 4 sealed (pending) |
| Altitude | 70,000 feet, maximum |
| EMI / RFI | Designed to meet MIL-STD-461, CE, FCC Part 15, Subpart B |

| Power Requirements | |
|---|---|
| Voltage | PoE++ (IEEE 802.3bt) power with redundant power input, 9 - 36 VDC (115/220 VAC adaptor available) |
| Power | 10 W (not including I/O boards) |
| Power Quality Requirement | Fully compliant with all CE requirements |

| Reliability | |
|---|---|
| MTBF | >130,000 hours (not including I/O boards) |

| Processor/System | | |
|---|---|---|
| | **Option 02/03** (with 8347 CPU) | **Option 11** (with SoloX/ARM CPU) |
| CPU | Freescale 8347 / 8347E, 400 MHz, 32-bit | SoloX / i.MX6 Cortex A9 ARM 1 GHz |
| Memory | 256 MB | 1 GB |
| FLASH Memory | 32 MB, CPU option 02<br>128 MB, CPU option 03 | 8 GB |
| Cybersecurity Ready | - | PowerDNA Secure support available |

# DNR-BRICK-4 Interface
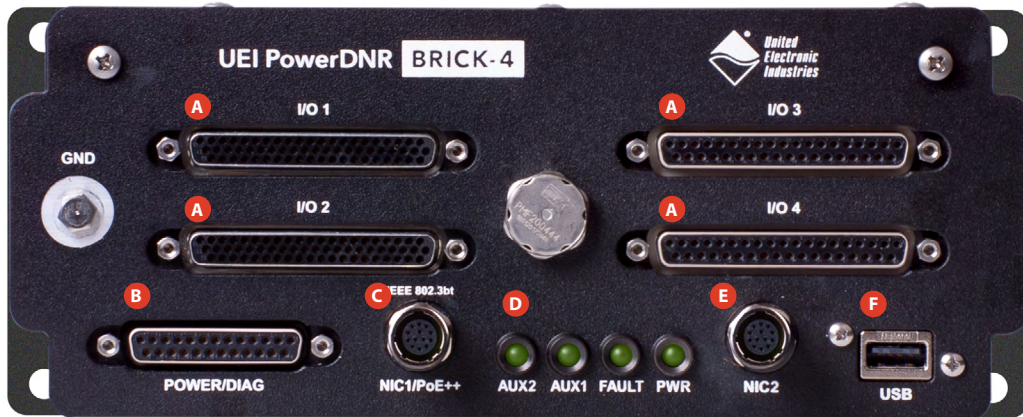


## A I/O Board Slots

4 D-Sub connectors allow for connection to all DNR series I/O boards through standard cables. Boards installed in the I/O slots perform the various analog, digital and communications functions you need for your specific application. Your signals may be connected directly to the I/O boards via your custom cabling or take advantage of our wide variety of easy-to-use, external screw terminal panels. Boards ordered with the DNR-BRICK-4 are factory installed.

## B Power/Diagnostic/Sync/Reset Connector

Vin1/Vin2 - redundant power input, Synch IN0/IN1 for synching, triggering    and reset, and can be used for automatic IP address selection. RS-232 for Diagnostics.

## C NIC 1 / PoE++ Connector

M12 connector provides the interface to the NIC1, GigE port as well as the unit's PoE++ (802.3bt) connections.

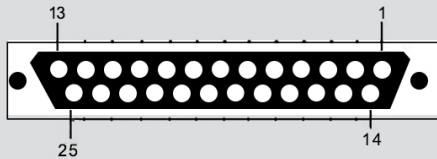## D Communication Status LEDs

These LEDs monitor communications.

## E NIC 2  Connector

M12 connector provides the interface to the NIC2, GigE  port.

## F USB Port

USB connector provides the interface to the USB 2.0 port.

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# Power/Diagnostics/Sync/Reset connector (25-pin DBF)



| PIN | Signal | PIN | Signal | PIN | Signal | PIN | Signal |
|---|---|---|---|---|---|---|---|
| 1 | Sync Gnd | 8 | VIn1 Gnd | 14 | Sync IN0 | 20 | VIn2 9-36 VDC |
| 2 | Sync Gnd | 9 | rsvd | 15 | Sync IN1 | 21 | VIn1 9-36 VDC |
| 3 | Sync Gnd | 10 | rsvd | 16 | Sync IN2/Reset | 22 | rsvd |
| 4 | Sync Gnd | 11 | rsvd | 17 | Sync Out0 | 23 | rsvd |
| 5 | Sync +5V | 12 | RS-232 RX | 18 | Sync Out1 | 24 | RS-232 Gnd |
| 6 | Sync +5V | 13 | RS-232 Gnd | 19 | Sync Out2 | 25 | RS-232 TX |
| 7 | VIn2 Gnd |  |  |  |  |  |  |

**Notes:**

1. Please do not connect anything to rsvd pins.

2. Sync IN0/IN1 can be used to automatically select the system's IP addresses. The unit can be set to boot with one of three IP addresses determined by the states of IN0/IN1. This allows the unit's IP address to be controlled by the installation.  This allows multiple units to be installed on the same network at separate IP addresses without requiring any reprogramming of the units.

3. VIn1 and VIn2 are isolated with diodes that allow redundant power supplies to power VIn1 and VIn2. If either power supply fails, or drops below ~0.5V relative to the other supply, that diode will cease conducting and the other power supply will provide power. In single power supply applications, it is recommended that VIn1 is connected to VIn2, and VIn1 Gnd to VIn2 Gnd.

4. To simplify connections to the power/diagnostic/sync/reset connector, UEI offers the optional DNR-BRICK4-DIAG kit. Please see details on the following page.

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# M12 connector (Straight, shielded)
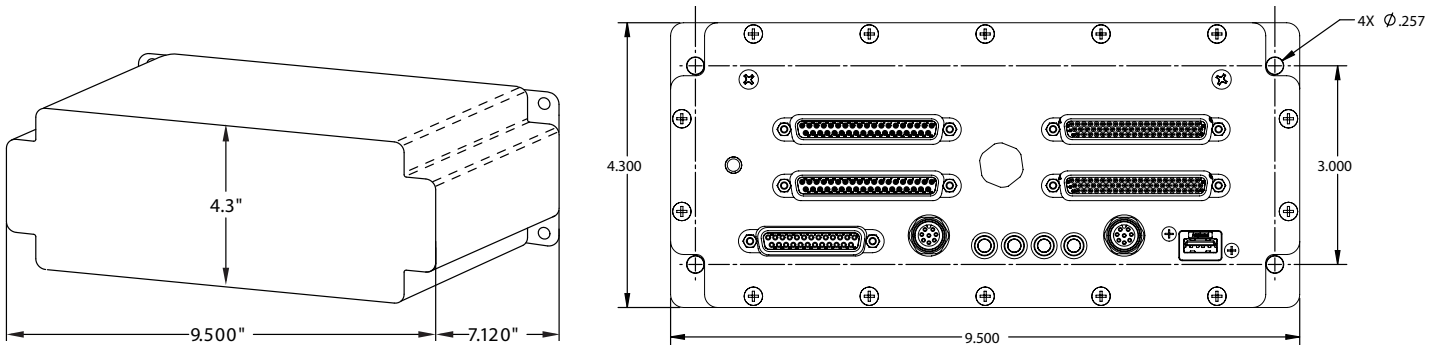
### Schematic Diagram
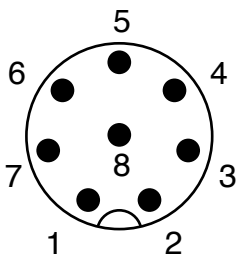


### Circuit Diagram
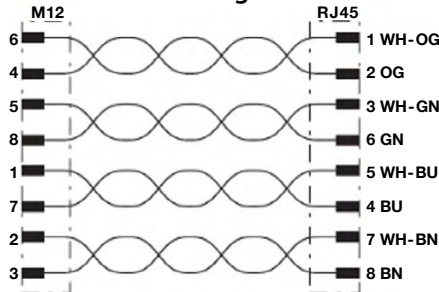


Contact assignment of the M12 and RJ45 plug

*Note:* **Color coding is for most standard cables; not all vendors use the same colors.**

### Pinout

| Signal | M12 Pin |
|---|---|
| D1+ | 4 |
| D1- | 6 |
| D2+ | 5 |
| D2- | 8 |
| D3+ | 1 |
| D3- | 7 |
| D4+ | 2 |
| D4- | 3 |

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## BRICK-4 Footprint



4.3"

9.500"    7.120"

4.300
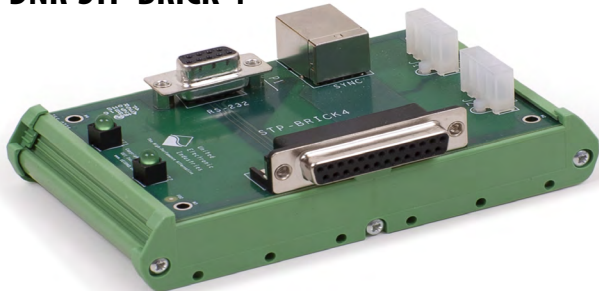
3.000

4X Ø .257

9.500

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## Ordering Guide

### DNR-BRICK-4

***CPU Configuration***

| 02 | - Standard 8347 CPU board supports:<br>• IEEE-1588 |
| 03 | - Upgraded CPU board adds:<br>• IEEE-1588<br>• 8347E CPU includes hardware accelerator for encryption |
| 11 | - SoloX/ARM CPU board adds:<br>• IEEE-1588<br>• Cybersecurity ready |

For example, a DNR-BRICK4 with 8347 PowerPC card would be:

DNR-BRICK4 - 02

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### DNR-STP-BRICK-4



The optional DNR-STP-BRICK-4 (shown at left) provides easy connections to the 25-pin D-Sub diagnostic/power/sync connector. Power (for non POE or backup) connections are provided via standard UEI power supply Molex connectors. RS-232 connections are through a 9-pin D-Sub connecto`r, while sync connections are provided via a RJ-50 connector. Please see the accessories section below for order info.

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## Accessories

| Part Number | Description |
| --- | --- |
| DNR-BRICK-4-DIAG | Diagnostic kit includes DNR-STP-BRICK4 interconnect board plus 25-pin and 9-pin cables |
| DNR-STP-BRICK-4 | Diagnostic board provides simple connection to the 25-pin Power/Diagnostics/Sync/Reset connector |
| DNA-CBL-25MM6 | 6 foot cable connects the 25-pin Power/Diag/Sync/Reset connector to the DNA-STP-BRICK4 board. |
| DNA-DB9MF-CBL | 9-pin interconnect cable connects DNA-STP-BRICK4 board to standard 9-pin serial ports |
| DNA-PSU-60 | Optional AC/DC 60 W power supply (The DNR-BRICK4 chassis requries 9-36 VDC power. It does not include an AC/DC power adaptor.) |
| Extended Warranty | Option to purchase UEI's extended 10 year warranty is available |

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