

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

UEIPAC BRICK4

### 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
- Support for Linux, VxWorks, Modbus, iDDS and VISTAS
- 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 and made in the USA



The new UEIPAC BRICK4 provides 4 I/O slots and uses standard DNR-series I/O boards (e.g. DNR-AI-217). It is available in the standard PowerDNR configuration or as a UEIPAC, including UEISIM, iDDS, UEIMODBUS and UEIOPC deployment options.

## General Description

The UEIPAC BRICK4 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 UEIPAC BRICK4 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-BRICK4 may be powered via standard 4 pair PoE++ (802.3bt) compatible Ethernet ports. PoE supplies up to 55 W, though the UEIPAC BRICK4 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.

**UEIPAC embedded deployment:** The UEIPAC BRICK4 is electronically identical to the standard UEIPAC Series RACKtangle, and, as the unit is a UEIPAC deployment, it can run fully stand-alone and/or embedded. The standard firmware running on a traditional RACKtangle is replaced by either a Linux or VxWorks operating system. The user then writes the Linux/VxWorks application that runs on the UEIPAC BRICK4 hardware. For more information on the UEIPAC deployment, please see the specifications shown on the following page or visit the [UEIPAC on our website](#).

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

## Deployment Options Overview

The UEIPAC BRICK4 is also available in different deployment options, including PowerDNR, UEISIM, UEI iDDS, UEIMODBUS and UEIOPC. More information on these deployment options can be found below.

**PowerDNA (DNR-BRICK4):** In PowerDNA mode, the chassis operates as a slave I/O device, running under the control of a host PC. All application code in this mode is created and run on the host. PowerDNA mode offers almost unprecedented software support, including:

- All popular operating systems including Windows, Linux, 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

**UEISIM series:** Simulink users will appreciate the ability to use Simulink Coder to compile and deploy their models on the UEISIM hardware. It's an ideal platform for testing models on actual hardware. Once the model is proven, it can be deployed using the exact same hardware.

**UEIPAC iDDS series:** This deployment can be configured to run the rapidly growing family of iDDS products. iDDS provides an ideal solution for applications where data needs to be shared across various chassis and also has the advantage of vendor independence.

**UEIMODBUS series:** Users needing a compact, rugged Modbus TCP I/O server will appreciate UEIMODBUS. The rugged, IP66/NEMA 4 sealed unit allows you to deploy your I/O system in the field, without any additional enclosure and protection.

**UEIOPC series:** A rugged and standalone OPC-UA server (not dependent on Windows), supporting the OPC-UA Historian functionality. System configuration is made easy by an intuitive, easy to use web/HTML interface.

## Technical Specifications UEIPAC 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 *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 2. DNR-SYNC-1G series cables and boards provide both clock and trigger sync signals 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	
<b>Vibration</b>	MIL-STD-810 g 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	
<b>Shock</b>	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)	
Software / Operating System		
	Option 02/03 (with 8347 CPU)	Option 11 (with SoloX/ARM CPU)
Embedded OS	Linux, kernel 4.9.x or VxWORKS v6.9	4.9.88 kernel based Real-time Linux
Real-time Support	Linux RT, VxWORKS	Linux RT
Development Language	C/C++, Eclipse IDE support	C/C++, or Python, Eclipse IDE support
Development Environments	Linux PC or Cygwin Windows environment	Linux PC or Cygwin Windows environment
EPICS CAS Interface	Yes (Linux version)	Yes
SNMP Library	Yes	Yes
OS Royalties	None	None
Processor/System		
	Option 02/03 (with 8347 CPU)	Option 11 (with SoloX/ARM CPU)
CPU	Freescall 8347 / 8347E, 400 MHz, 32-bit	SoloX / i.MX6 Cortex A9 ARM 1 GHz
Memory	256 MB	1 GByte
FLASH memory	32 MB, CPU option 02 128 MB, CPU option 03	8 GByte
Solid State Hard Drive	Up to 32 GByte	Up to 32 GB, up to 320 GByte in M.2 slot
M.2 PCIe Slot (internal, non-removable installed at factory)	-	1 slot for 42-20, 60-20, or 80-20 cards

# UEIPAC BRICK4 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-BRICK4 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.

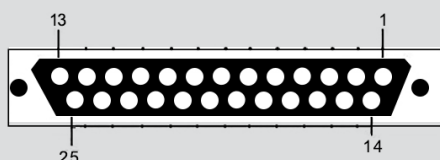
## E NIC 2 Connector

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

## F USB Port

USB connector provides the interface to the USB 2.0 port.

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



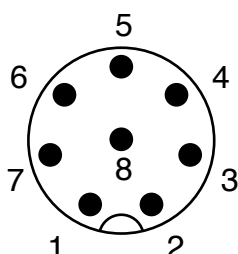
PIN	Signal	PIN	Signal	PIN	Signal	PIN	Signal
1	Sync Gnd	8	VIn1 Gnd	14	Sync IN0	20	VIn2 9-36 VDC
2	Sync Gnd	9	rsvd	15	Sync IN1	21	VIn1 9-36 VDC
3	Sync Gnd	10	rsvd	16	Sync IN2/Reset	22	rsvd
4	Sync Gnd	11	rsvd	17	Sync Out0	23	rsvd
5	Sync +5V	12	RS-232 RX	18	Sync Out1	24	RS-232 Gnd
6	Sync +5V	13	RS-232 Gnd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

### Notes:

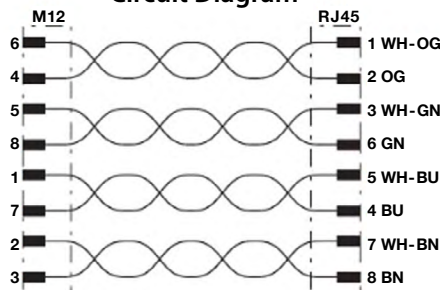
- Please do not connect anything to rsvd pins.
- Sync IN0/IN1 can be used to automatically select the system's IP addresses. The unit can be set to boot with one of three IP addresses determined by the states of IN0/IN1. This allows the unit's IP address to be controlled by the installation. This allows multiple units to be installed on the same network at separate IP addresses without requiring any reprogramming of the units.
- 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.
- 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.

## M12 connector (Straight, shielded)

### Schematic Diagram



### Circuit Diagram



Contact assignment of the M12 and RJ45 plug

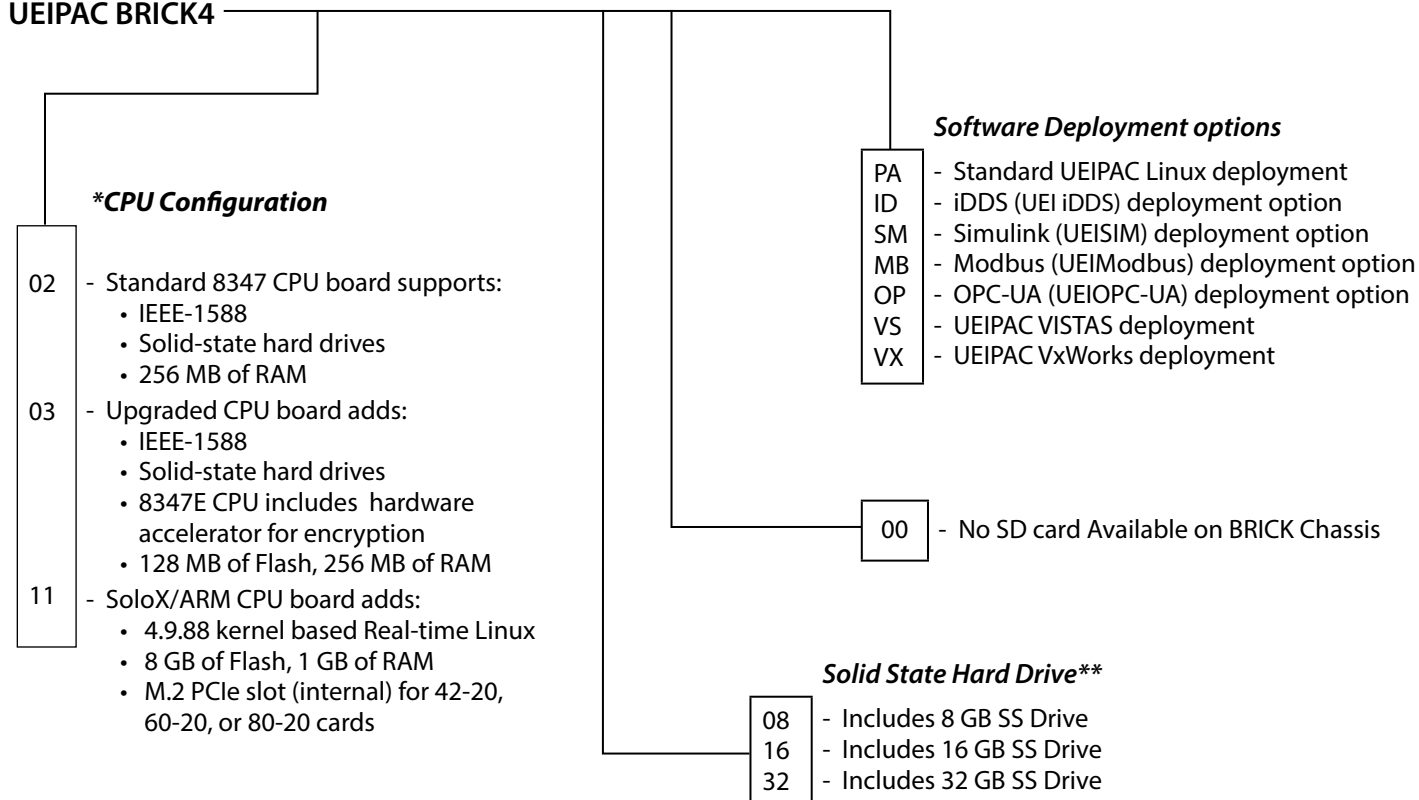
**Note:** Color coding is for most standard cables; not all vendors use the same colors.

### Pinout

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

## Ordering Guide: (All chassis include pre-installed Linux OS.)

### UEIPAC BRICK4



#### \*Default Boot Software Location

- 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
- 11 CPUs: The CPU boots from FLASH memory

For example, a standard UEIPAC BRICK4 with 8347 PowerPC, an 8 GB SS Drive, no SD card in standard PAC mode would be:

**UEIPAC BRICK4 - 02 - 08 - 00 - PA**

### Cybersecurity



**CYBERSECURITY-READY  
PROCESSOR**



**SECURE  
TOOLKITS**

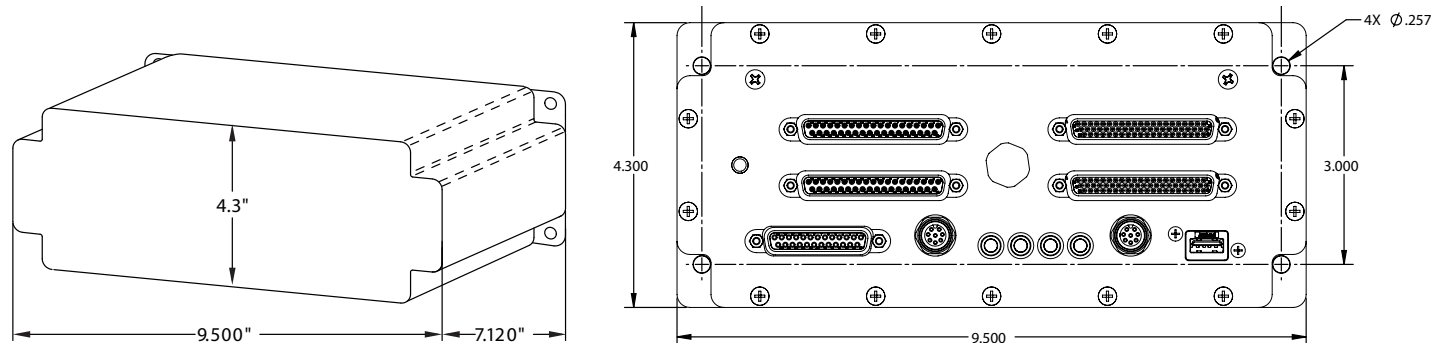


**SECURITY  
AUTOMATION  
TOOL**

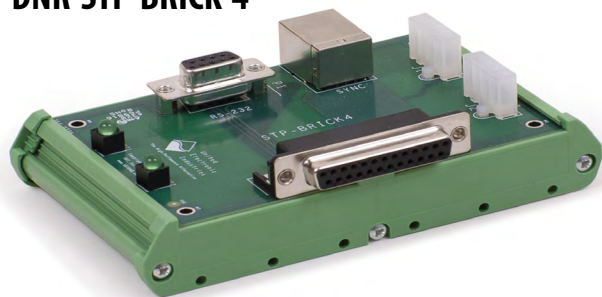
UEI offers a suite of cybersecurity tools to help you on your pathway to NIST 800.213 compliance. For the SoloX ARM processor, UEI's PowerDNA Secure programmer toolkit subscriptions provides the software tools necessary to start building out your application. Once you successfully test and verify your 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.



# UEIPAC BRICK4 Footprint



## 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 connector, while sync connections are provided via a RJ-50 connector. Please see the accessories section below for order info.

## Accessories

Part Number	Description
<a href="#">DNR-BRICK4-DIAG</a>	Diagnostic kit includes DNR-STP-BRICK4 interconnect board plus 25-pin and 9-pin cables
<a href="#">DNR-STP-BRICK4</a>	Diagnostic board provides simple connection to the 25-pin Power/Diagnostics/Sync/Reset connector
<a href="#">DNA-CBL-25MM6</a>	6 foot cable connects the 25-pin Power/Diag/Sync/Reset connector to the DNA-STP-BRICK4 board
<a href="#">DNA-DB9MF-CBL</a>	9-pin interconnect cable connects DNA-STP-BRICK4 board to standard 9-pin serial ports
<a href="#">DNA-PSU-100</a>	Optional AC/DC 60 W power supply (The DNR-BRICK4 chassis requires 9-36 VDC power. It does not include an AC/DC power adaptor)
<a href="#">DNA-SSD-320-M2</a>	320 GB M.2 solid state drive for UEI SoloX processor chassis
<a href="#">Extended Warranty</a>	Option to purchase UEI's extended 10 year warranty is available

### Software including SDK and Board Support Packages (Only one toolkit is required, regardless of the number of UEIPACs deployed)

Part Number	Description
<a href="#">UEIPAC VxW BSP (Software Only)</a>	VxWorks Board Support Package (BSP) allows you to program your UEIPAC applications in VxWorks
<a href="#">UEIPAC-Linux TK (Software Only)</a>	UEIPAC Linux Programmer's Toolkit for -02/03 PowerPC
<a href="#">UEIPAC-Linux TK-SX (Software Only)</a>	UEIPAC Linux Programmer's Toolkit for -11/12 ARM/SoloX