

# UEISIM Cubes and RACKs

## Simulink® and RTW I/O Targets

- Supports all Cube, RACKtangle and MIL chassis!
- Powerful, compact and rugged
- Flexible: Over 70 I/O boards available
- Standard Linux OS (4.4.89 Kernel)
- Supports hardware synch bus or IEEE-1588 synchronization
- Standard Ethernet 100Base-T, 100 Base-FX or GigE Interface
- Supports up to 5k "loops" per second
- Low cost
- Ideal for HIL (Hardware-in-the-loop) applications
- Ideal for development, prototype and production



The UEISIM is available on PPC Cube, GigE Cube and RACKtangle platforms!



## General Description:

The UEISIM offers Simulink users a powerful and flexible I/O target. Models built in Simulink are deployed directly on the UEISIM using Real-Time Workshop. The combination creates a powerful solution for creating and tuning real-time (and non-real-time) applications, including simulation model verification, rapid prototyping, and hardware-in-the-loop testing. The UEISIM is rugged, flexible, and expandable enough not only to be a great solution while in your development cycle, but also the ideal solution for your production hardware.

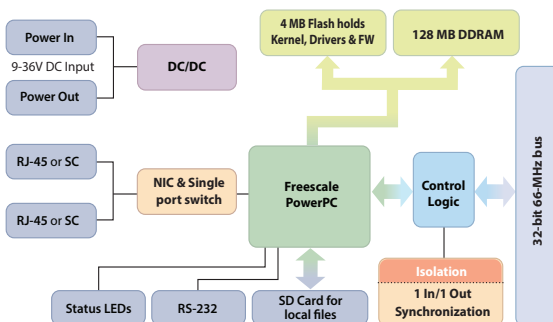
To use the UEISIM, simply: a.) Build your Simulink application. b.) Open MATLAB and select Simulink/Embedded target for UEISIM. c.) Convert your model to use the UEISIM I/O blocks (if you had not used them in your original model). d.) Create an executable via Simulink Coder (formerly RTW). e.) Connect the UEISIM in "external mode" (if you wish to remotely monitor the application while running on the UEISIM). f.) Start your simulation. Six easy steps and your simulation is running live on real hardware.

The UEISIM 300 is 4.1" W x 4.0" D x 4.0" H and offers 3 I/O slots. The UEISIM 600 is slightly larger at 4.1" W x 4.0" D x 4.0" H, but provides 6 I/O slots and allows up to 150 analog inputs or 288 DIO channels, or 96 serial I/O channels. GigE versions of the UEISIM Cubes are designated as the UEISIM 100-1G, UEISIM 300-1G, UEISIM 600-1G and UEISIM 700-1G, offering 1, 3, 6 and 7 I/O slots respectively. The RACKtangle-based UEISIM 1200R and UEISIM 600R offer 12 and 6 slots respectively in a front-loading rack configuration. The UEISIM is also offered in the four slot, 1U FLATrack and our new MIL series chassis. The UEISIM uses the same I/O boards as our popular DNA and DNR families and includes analog input (with up to 24 bit

resolution), analog output (up to 32 channels PER BOARD), digital I/O, Serial and CAN communications, ARINC-429, counter/timer, quadrature encoder input and more. With over 90 different I/O boards available, there is sure to be a configuration perfect for your application.

The heart of every UEISIM is a PowerPC processor running a standard (4.4.89) Linux OS kernel. Flash memory contains the OS Kernel and drivers for the I/O boards. The CPU/NIC also provides an SD Card slot and optional solid state hard drive, Ethernet interface, RS-232 serial port, power supply inputs and a variety of annunciator LEDs. Depending on the UEISIM options selected, the file system will be contained on a solid state hard drive, on an SD card or in FLASH on the CPU board. It includes the other components of the operating system such as libraries, utilities, init script and daemons.

## UEISIM Hardware Block Diagram:



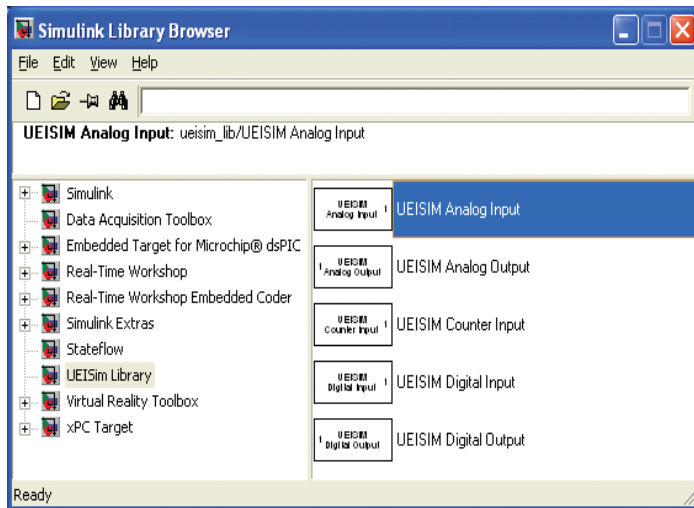
The UEISIM is rugged and robust. With 100Base-T Cubes tested from -40 °C to +85 °C, at 50 g shock, 5 g vibration and altitudes up to 70,000 feet (special version to 120,000 feet) and GigE-based chassis tested from -40 °C to +70 °C and 3 g vibration and 100 g shock, the UEISIM is tough enough for the most challenging applications. All I/O is fully isolated from the controller, so the UEISIM is immune to the glitches and spikes so commonly seen in an industrial environment.

The UEISIM cubes offer a wide variety of mounting options. A flange kit 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. UEISIM RACKtangles include flexible mounting ears that allow the RF or portable applications. There is even an attaché style carrying case that will safely hold a cube, its

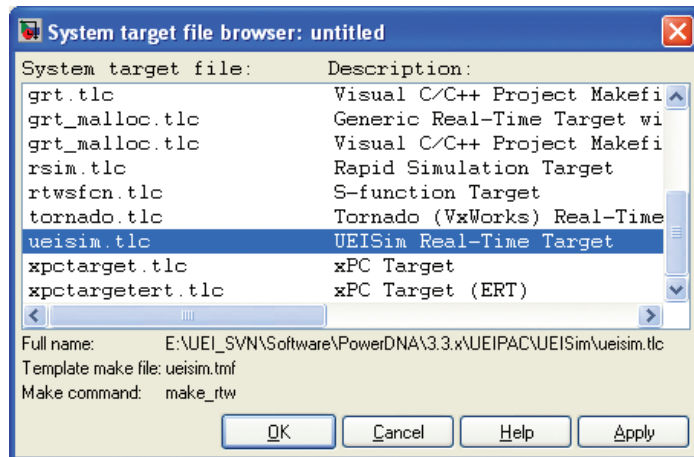
## General Description: (continued)

power supply, cables and screw terminal panels. RACKtangle-based UEISIMs include rubber feet for desktop use, as well as mounting brackets that allow the RACKtangle directly into 19 inch racks. The brackets may be mounted on the rear of the RACKtangle allowing the chassis to be mounted on any flat surface or bulkhead.

Whether your application requires a few I/O channels or a few thousand, the UEISIM is an ideal solution. The Cube's unique combination of clean and simple Simulink/RTW target compatible Linux operating system, I/O flexibility, compact size, mechanical and electrical ruggedness, and ease of use are unparalleled.



The UEISIM I/O blocks provided are both powerful and easy to use.



The UEISIM appears as a standard Real-Time-Workshop target.

## UEISIM: Technical Specifications—MIL Chassis (DNA/DNR Chassis specs on following page)

Computer Interface	MIL series ruggedized chassis
Primary Ethernet Port	10/100/1000Base-T, 38999 connector
Diagnostic Port	10/100/1000Base-T, 38999 connector
Net Teaming/Bonding	Supported in Linux OS
Configuration/Serial Port	On LAN/COM 38999 connector
USB Port	USB 2.0 fully supported
Synchronization Options	Synchronization input/output port or IEEE-1588
I/O Board Support	
Series Supported	All DNR/DNA-series boards as appropriate
Software / Operating System	
Embedded OS	Linux, kernel 4.4.89
Real-time Support	Xenomai RTOS is supported in Linux, but file I/O is not available
EPICS CAS Interface	Yes (Linux version)
SNMP Library	Yes
Processor/system	
CPU	Freescall 8347 or 8347E, 400 MHz, 32-bit
Memory	256 MB, 228 MB available to user applications
FLASH Memory	32 MB standard/128 MB optional 16 MB/112 MB available for user applications
Solid-State Hard Drive*	Optional 8 or 16 GByte drives available
USB drive Interface	Standard USB 2.0 port
Physical Dimensions	
4 I/O slots	UEISIM 400-MIL: 6.2" x 7.1" x 8.7", 11 lbs.
6 I/O slots	UEISIM 600-MIL: 10.6" x 7.0" x 6.4", 16 lbs.
12 I/O slots	UEISIM 1200-MIL: 17.5" x 8.1" x 7.0" 22 lbs. (Std 3U)
Environmental	
Temperature (operating) UEIPAC 1200-MIL	-40 °C to 85 °C (power dissipation of actual system may require derated max temp.)
Temperature (operating) UEIPAC 400-MIL	-40 °C to 70 °C (power dissipation of actual system may require derated max temp.)
Temperature (storage)	-40 °C to 85 °C
Humidity	0 to 95%, non-condensing
<b>Vibration</b>	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
<b>Shock</b>	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
EMI / RFI	Designed to meet MIL-STD-461
Altitude	70,000 feet, maximum
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 400-MIL	>130,000 hours
MTBF 600-MIL	>130,000 hours
MTBF 1200-MIL	>130,000 hours

\*The SD cards and SSD devices used are not built by UEI. As we do not control the source, we cannot offer our 10-year availability guarantee on these devices.

# UEISIM: Technical Specifications—DNA/DNR Chassis

Computer Interface	UEISIM xxx series Cubes	UEISIM xxx-1G series GigE Cubes	RACKtangle Chassis
Primary Ethernet Port	10/100Base-T, RJ-45 connector	10/100/1000Base-T, RJ-45 connector	10/100/1000Base-T, RJ-45 connector
Diagnostic Port	Not applicable	10/100/1000Base-T, RJ-45 connector	10/100/1000Base-T, RJ-45 connector
Other Port functions	Daisy chained single port switch provided	Ports may optionally be bonded/teamed	Ports may optionally be bonded/teamed
Optional Interface	100Base-FX Fiber (single or multi mode)	n/a	n/a
Configuration/Serial Port	RS-232, 9-pin "D"	RS-232, 9-pin "D"	RS-232, 9-pin "D"
USB Port	Not supported	USB 2.0 fully supported	USB 2.0 fully supported
Synchronization Options	1. DNA-SYNC series cables/boards provide system clock or trigger synchronization 2. DNA-IRIG-650 for IRIG and GPS synchronization 3. Software implementation of IEEE-1588	1. DNA-SYNC-1G series cables and boards provide both clock and trigger synchronization signals 2. DNA-IRIG-650 for IRIG and GPS synchronization 3. IEEE-1588 synchronization	1. DNA-SYNC-1G series cables and boards provide both clock and trigger synchronization signals 2. DNA-IRIG-650 for IRIG and GPS synchronization 3. IEEE-1588 synchronization
<b>I/O Board Support</b>			
Series supported	All DNA-series boards	All DNA-series boards	All DNR-series boards (DNF for FLATrack)
<b>Software / Operating System</b>			
Embedded OS	Linux, kernel 4.4.89	Linux, kernel 4.4.89	Linux, kernel 4.4.89
Real-time support	Xenomai RTOS is supported in Linux, but file I/O is not available	Xenomai RTOS is supported in Linux, but file I/O is not available	Xenomai RTOS is supported in Linux, but file I/O is not available
<b>Processor/System</b>			
CPU	Freescale MPC5200, 400 MHz, 32-bit	Freescale 8347 or 8347E, 400 MHz, 32-bit	Freescale 8347 or 8347E, 400 MHz, 32-bit
RAM Memory	128 MB, 100 MB available to user applications	128 MB standard/256 MB optional 100 MB/228 MB available to user applications	128 MB standard/256 MB optional 100 MB/228 MB available to user applications
FLASH memory	4 MB (0 MB available for user applications)	32 MB standard/128 MB optional 16 MB/112 MB available for user applications	32 MB standard/128 MB optional 16 MB/112 MB available for user applications
Solid-State hard drive*	Not available	Optional 8 or 16 GByte drives available	Optional 8 or 16 GByte drives available
SD card interface**	SD cards up to 32 GB (8 GByte included)	SD cards up to 32 GByte (8 GByte included)	SD cards up to 32 GByte (8 GByte included)
USB drive interface	n/a	Standard USB 2.0 port	Standard USB 2.0 port
<b>Physical Dimensions</b>			
1 I/O slot		UEINET-SIM: 4.1" W x 4.0" D x 2.7" H	
3 I/O slots	UEISIM 300: 4.1" W x 4.0" D x 4.0" H	UEISIM 300-1G: 4.1" W x 5.0" D x 4.0" H	n/a
4 I/O slots			UEISIM 400F: 16" W x 7.8" D x 1.75" H (1U)
6 I/O slots	UEISIM 600: 4.1" W x 4.0" D x 5.8" H UEISIM 600-MIL: 10.6" W x 7.0" D x 6.4" H	UEISIM 600-1G: 4.1" W x 5.0" D x 5.8" H	UEISIM 600R: 10.5" W x 5.25" D x 6.2" H (3U)
7 I/O slots	UEISIM 700: 4.1" W x 4.0" D x 6.6" H	UEISIM 700-1G: 4.1" W x 5.0" D x 6.6" H	
12 I/O slots	n/a	n/a	UEISIM 1200R: 17.5" W 5.25" D x 6.2" H (3U)
<b>Environmental</b>			
Electrical Isolation	350 Vrms	350 Vrms	350 Vrms
Temperature (operating)	-40 °C to 85 °C	-40 °C to 70 °C	-40 °C to 70 °C
Temperature (storage)	-40 °C to 100 °C	-40 °C to 85 °C	-40 °C to 85 °C
Humidity	0 to 95%, non-condensing	0 to 95%, non-condensing	0 to 95%, non-condensing
<b>Vibration</b>			
(IEC 60068-2-64)	10–500 Hz, 5 g (rms), Broad-band random	10–500 Hz, 3 g (rms), Broad-band random	10–500 Hz, 3 g (rms), Broad-band random
(IEC 60068-2-6)	10–500 Hz, 5 g, Sinusoidal	10–500 Hz, 3 g, Sinusoidal	10–500 Hz, 3 g, Sinusoidal
<b>Shock</b>			
(IEC 60068-2-27)	50 g, 3 ms half sine, 18 shocks at 6 orientations; 30 g, 11 ms half sine, 18 shocks at 6 orientations	100 g, 3 ms half sine, 18 shocks at 6 orientations; 30 g, 11 ms half sine, 18 shocks at 6 orientations	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 (special version to 120,000')	70,000 feet, maximum	70,000 feet, maximum
<b>Power Requirements</b>			
Voltage	9–36 VDC (115/220 VAC adaptor included)	9–36 VDC (115/220 VAC adaptor included)	9–36 VDC (115/220 VAC adaptor included)
Power	3.5 W (not including I/O boards)	7 W (not including I/O boards)	10 W (not including I/O boards)
<b>Reliability</b>			
MTBF	>300,000 hours	>160,000 hours	150,000 / 130,000 hrs DNR-12 / DNR-6

\* The SD cards and SSD devices used are not built by UEI. As we do not control the source, we cannot offer our 10-year availability guarantee on these devices.

\*\* SD and µSD card interfaces are not available on MIL and BRICK chassis.

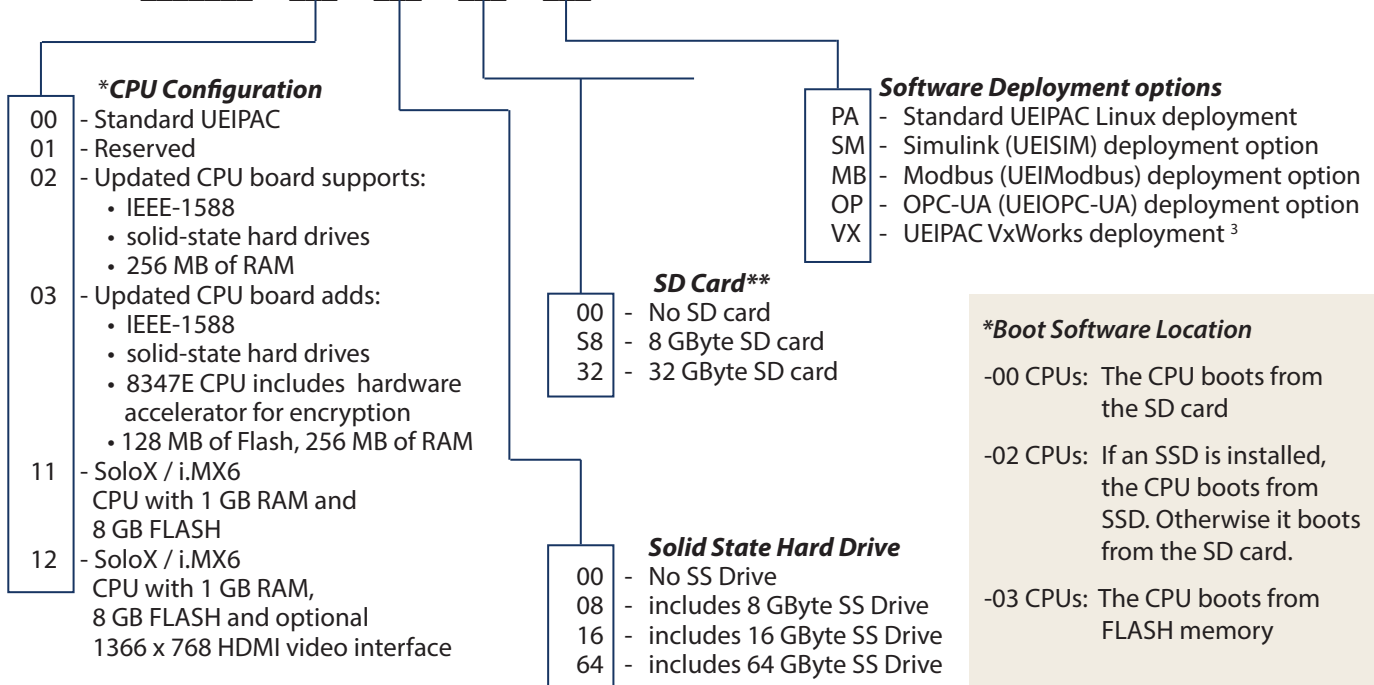
Please see the ordering guide on the following page.

**Ordering Guide:** (All chassis include: Universal AC power supply, Serial and Ethernet cables and pre-installed Linux OS.)

### Chassis Configuration

300 <sup>1,2</sup>	100Base-T Linux-based, Simulink Target, with 3 available I/O slots
600 <sup>1,2</sup>	100Base-T Linux-based, Simulink Target, with 6 available I/O slots
700 <sup>1</sup>	100Base-T Linux-based, Simulink Target, with 7 available I/O slots
100-1G	Gigabit Ethernet, Simulink Target, with 1 available I/O slots (a.k.a. UEINET-SIM)
300-1G	Gigabit Ethernet, Simulink Target, with 3 available I/O slots
600-1G	Gigabit Ethernet, Simulink Target, with 6 available I/O slots
700-1G	Gigabit Ethernet, Simulink Target, with 7 available I/O slots
600R	Gigabit Ethernet, Simulink Target, RACKtangle with 6 available I/O slots
1200R	Gigabit Ethernet, Simulink Target, RACKtangle with 12 available I/O slots
400F-AC	1U FlatRACK, rack mountable 4 slot chassis with Gigabit Ethernet and 100-240 VAC 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
600-MIL	Military style, 6 slot Cube with GigE Ethernet ports and 38999 connectivity
1200-MIL	Military style, 12 slot RACKtangle with GigE Ethernet ports and 38999 connectivity

## UEIPAC 3



For example a 3-slot GigE UEISIM Cube with 8347E encryption, an 8 GB SS Drive, and no SD card would be:

UEIPAC<sup>3</sup> 300-1G - 03 - 08 - 00 - SM

A 12-slot UEISIM RACKtangle without 8347E encryption, with a 16 GB SS Drive, but no SD card in would be:

UEIPAC<sup>3</sup> 1200R - 2 - 16 - 00 - SM

<sup>1</sup> There are no CPU or Solid State Drive options available on the UEIPAC 300, 600 and 700.

<sup>2</sup> The UEISIM 300/600 are available with 100Base-FX fiber connections or a DB-15 power connector. Contact UEI for details.

<sup>3</sup> The UEISIM chassis are based on the UEIPAC. We refer to the product family as the UEISIM, however the actual part numbers/SKUs begin with UEIPAC as shown here.

\*\*SD and  $\mu$ SD cards are not available on MIL and BRICK chassis.