DNx-ECAT™ series

EtherCAT based I/O Cubes and RACKs

10 YEAR AVAILABILITY GUARANTEE

STANDARD WARRANTY 3 YEAR

- Fully EtherCAT compliant
- Compatible with UEI's popular DNx-series I/O boards
- Over 85 I/O boards available
- Cubes with 2, 4 or 8 I/O slots, RACKs with 4, 6 or 12 I/O slots
- Standard Ethernet 100BaseT EtherCAT Interface
- >2 kHz update rates
- Compact:
  - 4" x 4.1" x 2.7" provides 2 I/O slots (DNA-ECAT-200)
  - 4" x 4.1" x 4" provides 4 I/O slots (DNA-ECAT-400)
  - 4" x 4.1" x 6.6" provides 8 I/O slots (DNA-ECAT-800)
  - 3U 19" RACK provides 12 I/O slots (DNR-ECAT-1200)
  - 3U 10.5" portable RACK provides 6 I/O slots (DNR-ECAT-600)
  - 1U 19" RACK provides 4 I/O slots (DNF-ECAT-400)
- 350 Vrms Isolation

EtherCAT functionality is now available on UEI's Cube, RACKtangle and FLATRack series chassis

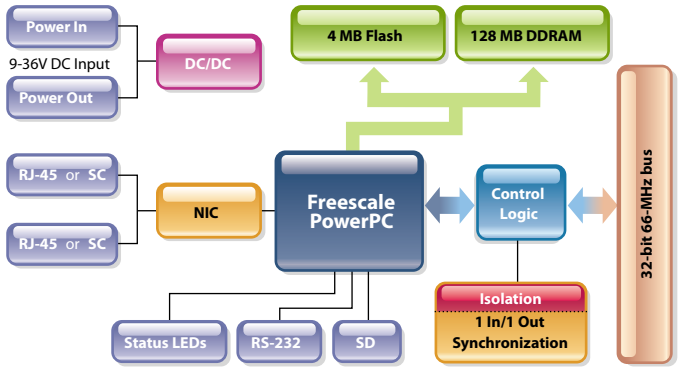
General Description:

The DNA-ECAT series of I/O chassis is based on UEI's popular DNA series Cubes and DNR series RACKtangles, but includes a CPU module specifically designed to run as an EtherCAT slave. The DNx-ECAT series offers all the I/O flexibility of the DNA Cubes and RACKs, including compatibility with over 85 different I/O boards while providing full EtherCAT compliance. EtherCAT developers can now harness the power, flexibility and ruggedness of the the UEI DNx family. The EtherCAT chassis are ideally suited for a wide variety of industrial, aerospace and lab data acquisition and control applications.

In general, the Ethernet is not ideal for real-time monitoring and control response, though there are a number of ways to make it real-time. The EtherCAT is a special implementation of Ethernet designed to support real-time applications. (Note: UEI's standard DNx series Cubes and RACKs also support real-time I/O systems using our powerful DMAP/VMAP control protocols.)

The EtherCAT Cubes are available with 2, 4 or 8 I/O slots and are packed with power and flexibility. The 3U RACKtangles provide a 12-slot 19" rack unit or 6-slot portable unit. Finally, the DNF-ECAT units provide 4 I/O slots in a standard 1U 19" rack unit.

Block Diagram:



EtherCAT chassis are typically configured one of two ways, with MDP or fixed configuration ESI files. MDP allows the EtherCAT master to interrogate the UEI-ECAT Chassis and automatically determine the boards installed and the functionality they provide. Alternatively, some EtherCAT masters require a single ESI file for each device. UEI supports both methods.

The CPU Module occupies the top portion of the Cube or center slot of the RACKtangle and provides the CPU, Ethernet Controller (NIC), indicator lights, configuration ports and internal power supply. It's the brains of the Cube and controls the unit's operations, including the interface with the host Controller (and other Cubes), as well as supervising the activity of the I/O boards. The CPU module also includes rotary switches that set the chassis' EtherCAT explicit device identification. If the switch is set to ECAT ID 0, the unit's address is programmed by any EtherCAT master. In addition to connecting to other UEI chassis the DNx-ECAT series can be installed in any chain with ETG conforming devices.

The remainder of the chassis is dedicated to I/O slots. These slots are populated with the I/O modules selected to match your process or test application. With over 85 different I/O boards available, we're sure to have just what your application requires. We currently offer: A/D boards to measure voltage, current, strain gages, thermocouples and more, D/A boards with outputs to ±40V or ±50 mA, digital I/O interfaces for logic and "real-world" signal levels, counters and timers, quadrature encoder inputs, and RVDT/LVDT/synchro/resolver input and simulated output.

The EtherCAT master/host communicates with the cube over standard CAT5e/6/7 series cables. One key advantage of EtherCAT is that it does not require Ethernet switches/routers for multi-chassis connectivity. The EtherCAT network is a daisy-chain, where an input cable comes from the host/master and then an output cable goes to the next EtherCAT device in the chain. EtherCAT requires sub-microsecond propagation for data parsing through a device so system throughput and synchronization is preserved. Other key EtherCAT specifications include: Built-in watchdog timers, Safe state default conditions and cable redundancy.

The DNA-ECAT 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 RACK version is designed for rack mounting or the mounting ears can be used to install the unit against any flat surface.

Whether your application requires a few I/O channels or a few thousand, the DNx series EtherCAT chassis are an ideal solution. The Cubes' unique combination of flexibility, compact size, mechanical and electrical ruggedness are unparalleled while the RACKtangle versions are a perfect solution for conventional rack and stack deployments.

Technical Specifications:

Standard Interfaces	
To Host Computer	100Base-T, standard RJ-45 connector
Daisy chain output	100Base-T, standard RJ-45 connector
Configuration/General	RS-232, provided on 15-pin HD Dsub
EtherCAT Schema	ESI Schema 1.14 (call for previous version support details)
I/O Slots Available	
DNA-ECAT-200	EtherCAT Cube with 2 I/O slots
DNA-ECAT-400	EtherCAT Cube with 4 I/O slots
DNA-ECAT-800	EtherCAT Cube with 8 I/O slots
DNR-ECAT-1200	EtherCAT RACKtangle with 12 I/O slots
DNR-ECAT-600	EtherCAT RACKtangle with 6 I/O slots
DNF-ECAT-400	EtherCAT FLATRack with 4 I/O slots
Performance	
Distance from host	100 meters max, CAT5e cable
Data update rate	> 2 kHz
Environmental	
Temp (operating)	Cubes: Tested to -40 °C to 85 °C RACKs: Tested to -40 °C to 70 °C
Temp (storage)	-40 °C to 100 °C
Humidity	0 to 95%, non-condensing
Vibration	
(IEC 60068-2-64)	Cube: 10–500 Hz, 5 g (rms), Broad-band random RACK: 10–500 Hz, 3 g (rms), Broad-band random
(IEC 60068-2-6)	Cube: 10–500 Hz, 5 g, Sinusoidal RACK: 10–500 Hz, 3 g, Sinusoidal
Shock	
(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
Physical Dimensions	
DNA-ECAT-200	4.1" x 4.0" x 2.7" includes two I/O slots
DNA-ECAT-400	4.1" x 4.0" x 4" includes four I/O slots
DNA-EACT-800	4.1" x 4.0" x 6.6" includes eight I/O slots
DNR-ECAT-1200	3U x 17.5" includes ears for 19" rack mount
DNR-ECAT-600	3U x 10.5"
DNF-ECAT-400	1U x 16.5" includes ears for 19" rack mount
Power Requirements	
Voltage	9 - 36 VDC (AC adaptor included)
Power Dissipation	4 W at 24 VDC (not including I/O boards) DNR-ECAT-1200: 6W
Reliability	
MTBF	>350,000 hours

DNx-ECAT Advantages:

Easy to configure and deploy

- Over 85 different I/O boards available
- Built-in signal conditioning
- Easily distributed
- Flange kit for mounting to wall/flat surface
- DIN rail and Rack Mount kits
- Standard "Off-the-shelf" products and delivery

True Real-time Performance

- 500 µsec updates guaranteed

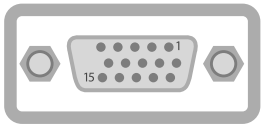
Compact Size:

- 4" x 4.1" x 2.7" or 4" x 4.1" x 4" or 4" x 4.1" x 6.6" cubes
- 3U 19" RACKtangles
- Up to 200/256 analog inputs/outputs per cube
- Up to 384 digital I/O bits per cube
- 1U and 3U Rack mountable units
- Up to 300/384 analog inputs/outputs per RACKtangle
- Up to 576 digital I/O bits per RACKtangle

Rugged and Industrial:

- All Aluminum construction
- Operationally tested from -40°C to 85°C
- Vibration tested to 5 g (operating)
- Shock tested to 100 g (operating)
- All I/O isolated from Cube and host PC
- Operation to 70,000 feet

Pinout Diagram:



1 - +Vin	6 - +Vin	11 - +Vin
2 - Gnd	7 - +Vin	12 - Gnd
3 - RS-232 RX	8 - Gnd	13 - Gnd
4 - Rsvd*	9 - RS-232 TX	14 - Rsvd*
5 - Rsvd*	10 - Rsvd*	15 - Rsvd*

* Rsvd pins should be left open/disconnected

A EtherCAT Input Connector

Ethernet in from host PC or from an earlier Cube in the EtherCAT network.

B EtherCAT Output Connector

EtherCAT output connector is connected to the next EtherCAT device in the chain (if applicable). It also serves as the input connector in a redundant EtherCAT network in case of a failure upstream.

C EtherCAT Explicit Device ID Switches

Allows the Cube to be set at an explicit ID of 1 through 65535. If ECAT ID 00 is selected, the unit is auto-enumerated by your EtherCAT master.

D I/O Board Status LEDs

These two green lights give a visual indication of the status of each I/O layer. **RDY:** Ready; **STS:** Status (varies per I/O board installed)

E I/O Board Slots (not shown on RACK version)

Cubes provide either 2, 4 or 8 I/O slots. 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 your cube are factory installed. It is also a simple task to add boards or reconfigure a cube in the field

F Power/Diagnostic Connector

Cubes (DNA series): Power-In, 9-36V DC from the DNA-PSU-100-D AC power adaptor, (included with each Cube) or a user-supplied power source. (Connector pinout shown on previous page.) This connector also provides connection to the CPU's RS-232 diagnostic port.

RACKTangles (DNR/DNF series): Racktangle power is 9-36V connected through the standard chassis power supply connectors (not the dSub on the CPU). A DNA-PSU-100-D AC to 24VDC power supply is included with each DNR series chassis. Likewise, power to the DNF series is provided through the power supply connector on the rear of the chassis. On DNR/DNF series chassis, the power connections on the CPU board dSub are not connected. This connectors serves only as a diagnostic connector on DNR/DNF chassis.

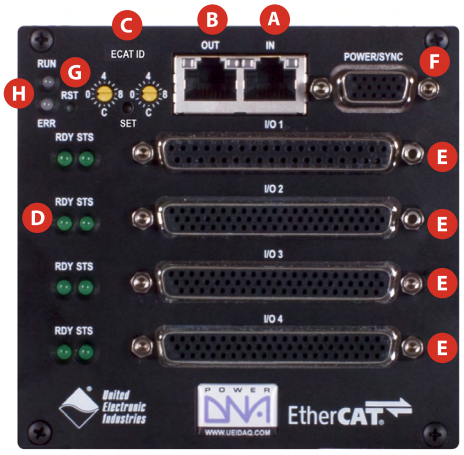
G Reset Button

When held in for 2 seconds or more, the reset button reboots the Cube.

H EtherCAT Status LEDs

Run: Off-Init mode, **Blinking:** PreOp mode, **Single Flash:** SafeOp Mode, **On:** Operating mode.

DNA-ECAT Series Cube Interface:



DNR/DNF-ECAT Series RACKtangle Interface:

Ordering Guide:

Part Number	Description
EtherCAT Cubes (includes universal AC power supply, serial and Ethernet cables)	
DNA-ECAT-200	EtherCAT Cube with 2 I/O slots
DNA-ECAT-400	EtherCAT Cube with 4 I/O slots
DNA-ECAT-800	EtherCAT Cube with 8 I/O slots
DNR-ECAT-1200	EtherCAT RACKtangle with 12 I/O slots
DNR-ECAT-600	EtherCAT RACKtangle with 6 I/O slots
DNF-ECAT-400-AC	EtherCAT RACKtangle with 4 I/O slots (AC powered)
DNF-ECAT-400-DC	EtherCAT RACKtangle with 4 I/O slots (DC powered, does not include AC power supply)
Accessories	
DNA-DR2	DIN rail mounting adaptor for DNA-ECAT-200 Cube
DNA-DR5	DIN rail mounting adaptor for DNA-ECAT-400 Cube
DNA-DR9	DIN rail mounting adaptor for DNA-ECAT-800 Cube
DNA-FLANGE	Bottom-mount flange assembly allows Cube to be mounted to any flat surface
DNR-EXT-BRACKET-4	Extension bracket allows DNR-ECAT-1200 to be mounted 4" behind the 19" rack's front panel
DNA-PSU-100-D	AC Power Supply for UEI-PIO-1010 Interface and UEI EtherCAT Chassis
Extended Warranty	Option to purchase UEI's extended 3-5 year warranty is available