DNA-FPPCx

PowerDNA® Fiber Interface PowerPC I/O Cubes

- Flexible enough to match your application
- Over 70 I/O boards available
- Standard 100Base-FX Interface
- Operates up to 2 km from host (20km with optional single mode fiber)
- Inter-Cube sync interface
- Supports Standalone operations as a logger or deployed with embedded Linux application.
- Rugged and Compact
     4" x 4.1" x 4" provides 3 I/O slots (DNA-FPPC5)
     4" x 4.1" x 5.8" provides 6 I/O slots (DNA-FPPC8)
- Real-time: 1000 I/O scans in < 1 millisecond
- Complete Windows, Linux and RT OS support
- LabVIEW™, MATLAB®, DASYLab™ support and more

Core Module consists of NIC and PowerPC CPU layers stacked on top of each other and packaged in lightweight aluminum chassis.

General Description:

The PowerDNA® (**D**istributed **N**etworked **A**utomation) Cube is a compact, rugged, Ethernet based DAQ interface. Its flexibility allows you to configure one or more cubes to match the specific I/O requirements of your application. The PowerDNA Cube is ideally suited for a wide variety of industrial, aerospace and laboratory data acquisition and control applications. The Fiberoptic network interface allows the cube to be located up to 2 kilometers from the host computer. A single mode fiber interface is available as a special order allowing ranges up to 20 kilometers.

The heart of every PowerDNA system is the Cube. The PowerDNA Cubes are 4" x 4.1" x 4" (3 I/O slots), or 4" x 4.1" x 5.8" (6 I/O slots) and are packed with power and flexibility. Each I/O Cube consists of two primary subsections: a Core Module and I/O slots or layers.

The Core Module occupies the top portion of the Cube and provides the PowerPC CPU, Fiberoptic Network Interface Controller (NIC), indicator lights, timing/trigger interface, 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) and supervising the activity of the I/O Layers.

The remainder of the Cube is dedicated to I/O slots or layers. These slots are populated with the I/O modules that are selected to match your process or test application. With over 30 different I/O boards available we're sure to have just what your application requires. We currently 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 and timers, quadrature encoder inputs, and Communications interfaces for RS-232, RS-422/485 and the CAN bus.

The host communicates with the cube in one of three ways. The first is simple, single point, programmed I/O. This mode is simple and is suitable for most systems where high speed or precise sample timing is not required. The second is the ACB (Advanced Circular Buffer). In ACB mode data is written to and from buffers on the I/O boards rather than directly to the Ethernet port. ACB mode is preferred for high speed acquisition/control or where precise timing is required as the buffers are large enough to assure data is not lost due to Ethernet timing latencies. The third mode is DMAP. In DMAP mode cubes use our patented DAQBIOS Ethernet protocol to assure deterministic real-time performance and achieve sub-millisecond response times across more than 1000 I/O (analog and/or digital) points

No system is complete without software. The PowerDNA Cube is supported by all the popular Windows, Linux and Real-time operating systems. Our UEIDAQ Framework provides a simple and universal API and supports all common programming languages. The Cube is also fully supported by an extensive array of application packages including LabVIEW, MATLAB, DASYLab and more.

The PowerDNA 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. For portable ap-

Block Diagram:
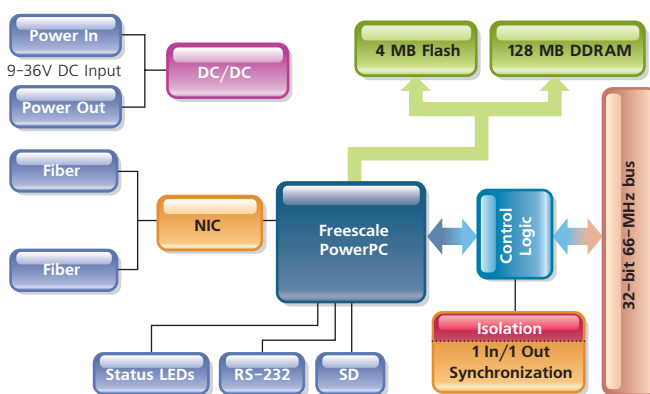
General Description (continued):

plications there is even an attache style carrying case that will safely hold a cube, its power supply, cables and screw terminal panels.

The embedded Linux tool kit allows users to develop custom DAQ and control applications on their PC and then deploy them to run standalone on PPC series cubes (call for availability of this toolkit).

Whether your application requires a few I/O channels or a few thousand, the PowerDNA cube is an ideal solution. The Cubes' unique combination of flexibility, compact size, mechanical and electrical ruggedness and ease of use is unparalleled.

Technical Specifications:

Standard Interfaces	
To Host Computer	100Base-FX, standard fiber SC connector
Daisy chain output	100Base-FX, standard fiber SC connector
Config/General	RS-232, 9-pin "D"
Sync	custom cable to sync multiple cubes
I/O Slots Available	
DNA-FPPC8	6 slots
DNA-FPPC5	3 slots
Host Communications	
Distance from host	2 kilometers max (20km single mode option)
Ethernet data transfer rate	2 megabyte per second
Analog data transfer rate	up to 1 megasample per sec (16-bit samples)
DMAP I/O mode	update 1000 I/O channels (analog and/or digital) in less than 1 millisecond, guaranteed
Processor	
CPU	Freescale MPC5200, 400 MHz, 32-bit
DDRAM	128 MB
On-board Flash	4 MB
Status LEDs	
	Attention, Read/Write, Power, Communications Active
Environmental	
Temp (operating)	Tested from -40 °C to 85 °C
Temp (storage)	-40 °C to 100 °C
Humidity	0 to 95%, non-condensing
Vibration	
(IEC 60068-2-64)	10–500 Hz, 5 g (rms), Broad-band random
(IEC 60068-2-6)	10–500 Hz, 5 g, Sinusoidal
Shock	
(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
Altitude	70,000 feet, maximum
Reliability	
MTBF	300,000 hours
Physical Dimentions	
DNA-PPC5	4.1" x 4.0" x 4.0"
DNA-PPC8	4.1" x 4.0" x 5.8"

PowerDNA Advantages:

Easy to configure and deploy
- Over 70 different I/O boards available
- Built-in signal conditioning
- 100BASE-FX based-simplicity of ethernet, long distance capability of fiber
- Flange kit for mounting to wall/flat surface
- DIN rail and Rack Mount kits
- Attach style carrying case available for portable deployments
- Standard "Off-the-shelf" products and delivery

True Real-time Performance
- 1 msec updates guaranteed with 1000 I/O
- Up to 1 million samples per second
- Use QNX, RTX, RT Linux, RTAI Linux, LabVIEW RT

Flexible Connectivity
- 10/100Base-FX Fiber interface available
- 100Base-T interface available (SEE DNA-PPC series)
- Built-in Ethernet switch allows daisy chain

Compact Size:
- 4" x 4" x 6" or 4" x 4" x 4" cubes
- 150 analog inputs per cube,
- 48 analog outputs per cube
- 288 digital I/O bits per cube.
- 48 counter/quadrature channels per cube

Low Power:
- Less than 15 watts per cube
- AC, 9-36 VDC or battery powered.

Stand alone and Data Logger Modes
- DNA-FPPC series loggers can be upgraded with UEI-LOGGER series capabilities
- DNA-FPPC series support stand-alone operation running embedded Linux applications (call for availability)

Rugged and Industrial:
- All Aluminum construction
- 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 Cube and host PC.
- Operation to 70,000 feet

Outstanding Software support
- Windows, Linux, RTX, VxWorks and QNX operating systems
- VB, VB .NET, C, C#, C++, J#
- MATLAB, LabVIEW, OPC, ActiveX support

Cost effective
- Cubes start at under $1400
- I/O boards start at $600

PowerDNA Cube Interface:

(A) Network/Fiber Connector

SC-type Fiber in from host PC or from another Cube. Standard fiber allows cubes to be deployed up to 2 km from the host PC. 20 km range is possible with optional single mode fiber interface.

(B) Network Dasy Chain Output

A build in router allows you to connect to additional cubes without requiring a seperate external router/switch.

(C) Serial Port

Using the supplied serial cable, you perform initial PowerDNA setup of the operating parameters from any serial terminal running at 57,600 baud/8 data bits/no parity/1 stop bit. From a terminal program you can, for instance, change the IP address from the default, if necessary. You also download updated firmware through the serial port. The serial port is usable for RS-232

(D) I/O Board Slots

Cubes provide either 3 or 6 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 re-
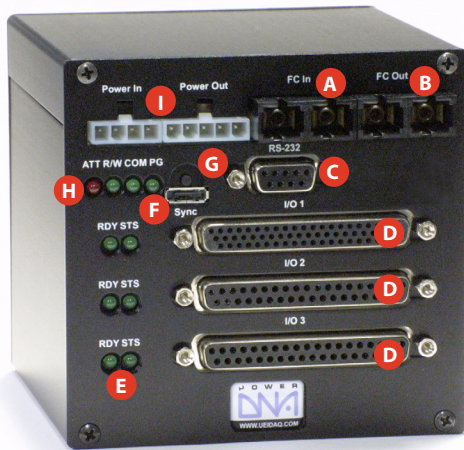
(E) I/O Layer Status LEDs

These two green lights give a visual indication of the status of each I/O layer.

RDY - *Ready* • **STS** - *Status*

(F) Sync Connector

High-speed Cube-to-Cube synchronization connector.

(G) Reset Button

Recessed to prevent accidental activation, this button resets the CPU layer for activities such as downloading and installing new

(H) Communication Status LEDs

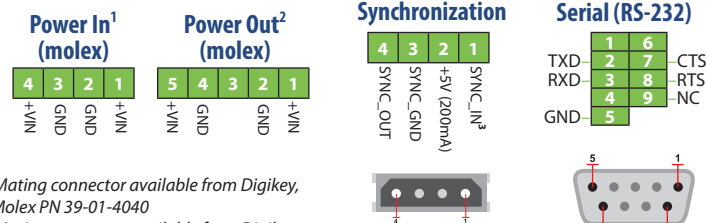These LEDs monitor communications through the serial and infrared ports.

ATT - *Attention* • **R/W** - *Read/Write*
COM - *Communications underway*

(I) Power Connectors

Power-In, 9-36V DC either from the DNA-PSU-24 (included with the Cube), a user-supplied source, or daisychained from another PowerDNA Cube.

Power-Out (same voltage as applied to Power-In) to another Cube, if desired.

Pinout Diagrams:

Power In[1]
(molex)

4	3	2	1
+VIN	GND	GND	+VIN

Power Out[2]
(molex)

5	4	3	2	1
+VIN	GND	GND	GND	+VIN

Synchronization

4	3	2	1
SYNC_OUT	SYNC_GND	+5V (200mA)	SYNC_IN[3]

Serial (RS-232)

1	6
TXD — 2	7 — CTS
RXD — 3	8 — RTS
4	9 — NC
GND — 5	

[1] Mating connector available from Digikey, Molex PN 39-01-4040
[2] Mating connector available from Digikey, Molex PN 39-01-4050
[3] Internal pull-up, start/stop trigger should connect SYNC_IN with SYNC_GND

Ordering Guide:

Part Number	Description
PPC Cubes (includes universal AC power supply and serial cable)	
DNA-FPPC5	100Base-FX fiber-based I/O Cube, 3 I/O slots, PowerPC CPU, sync interface
DNA-FPPC8	100Base-FX fiber-based I/O Cube, 6 I/O slots, PowerPC CPU, sync interface
Upgrades	
UEILogger UPG	Upgrade any PowerPC Cube to the UEILogger series
DNA-Embedded	Tool kit allows standalone embedded Linux applications on PPC series cubes (Call for availability)
Accessories	
DNA-FAN5	Rear-mount fan for PowerDNA 5-layer Cube
DNA-FAN8	Rear-mount fan for PowerDNA 8-layer Cube
DNA-DR5	Rear-mount DIN rail clip for PowerDNA 5-layer Cube
DNA-DR8	Rear-mount DIN rail clip for PowerDNA 8-layer Cube
DNA-FLANGE	Bottom-mount flange assembly allows cube to be mounted to any flat surface
DNA-CASE	Light-weight plastic carrying case for PowerDNA Cube
DNA-ACCESSORY	PowerDNA accessories kit includes spare universal AC power supply and serial/ethernet cabels
DNA-19RACKW	19" rackmount enclosure with DIN rail attached
DNA-CBL-37S	3 foot, 37 conductor shielded cable