E-DIO24

Ethernet-based 24-channel Digital I/O Device

The E-DIO24 provides 24 bits of digital I/O with ±24 mA drive capability

Features

- 24 digital I/O bits
- ±24 mA drive capability
- Digital output alarm
- One 32-bit event counter (shared with a DIO pin)
- Remote network configuration
- DIN-rail compatible
- Available with enclosure and screw terminals, or board-only OEM with header connectors
- External power supply included with standard version

Supported Operating Systems

- Windows™ 10/8/7/Vista® 32- and 64-bit
- Android™

Overview

The E-DIO24 is a 24-channel Ethernet digital I/O device ideal for network-based applications and remote monitoring and control with 24 high-drive channels capable of driving relays. One counter channel is included.

The E-DIO24 is functionally equivalent to USB-DIO24 Series and USB-1024 Series devices, making application migration easy.

Ethernet Interface

The E-DIO24 has a built-in high-speed communication port. Users can remotely access and configure the device with software over the internet.

Digital I/O

The E-DIO24 has 24 digital I/O lines configured as three 8-bit ports. Each bit is individually configurable for input or output.

Users can enable a digital bit configured for output to change state when a host connection is established or broken.

Data can be transferred at rates up to 5 kS/s when the device and host are connected by Ethernet to the same local network. Typical throughput is system-dependent.

All DIO lines are pulled high by default to 5 V through 47 kΩ resistors through three onboard jumpers. Each jumper configures one 8-bit digital port, and can easily be changed to pull-down.

Counter Input

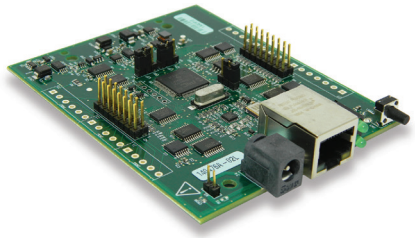
The 32-bit event counter pin counts TTL pulses, and accepts frequency inputs up to 10 MHz. Users access the counter using the pin shared with digital port 2 bit 7 (P2D7).

External Power

The E-DIO24 requires 5 VDC power to operate. A 5 volt, 1 amp adapter ships with the standard device (MCC p/n PS-5V1AEPS). OEM users can connect a 5 V supply to a 2-pin terminal block header or to the barrel connector on the board.

E-DIO24-OEM

The E-DIO24-OEM has a board-only form factor with header connectors for OEM and embedded applications (no case, CD, or Ethernet cable). The device can be further customized to meet customer needs.



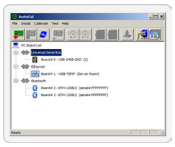
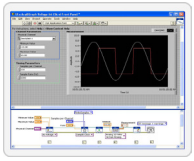
The E-DIO24-OEM has the same specifications as the standard device, but in a board-only form factor with header connectors instead of screw terminals.

E-DIO24

Software

Software Support

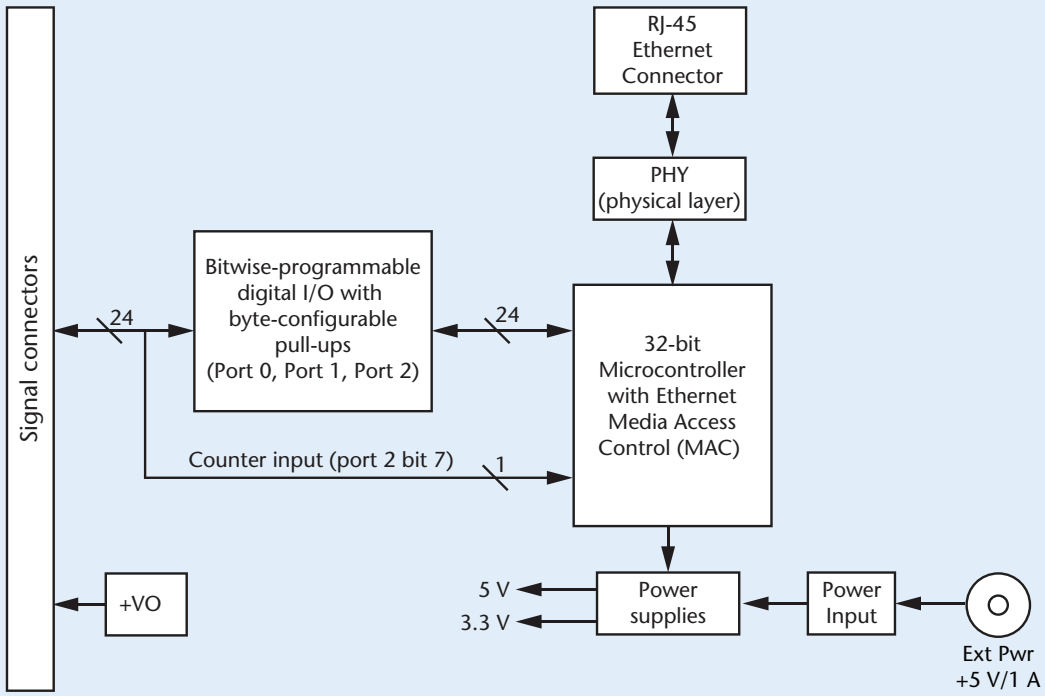
The E-DIO24 is supported by the software in the table below.

Ready-to-Run Applications		
DAQami		Advanced data logging application with drag-and-drop software interface that is used to acquire, view, and log data. DAQami can be configured to log analog, digital, and counter channels, and to view that data in real-time or post-acquisition on user-configurable displays. Windows OS DAQami is available as a purchased software download.
InstaCal		An installation, configuration, and test utility for MCC hardware. Windows OS InstaCal is included with the free MCC DAQ Software bundle (CD/download).
TracerDAQ and TracerDAQ Pro		Virtual strip chart, oscilloscope, function generator, and rate generator applications used to generate, acquire, analyze, display, and export data. Supported features may vary by hardware. The Pro version provides enhanced features. Windows OS TracerDAQ is included with the free MCC DAQ Software bundle (CD/download). TracerDAQ Pro is available as a purchased software download.
General-Purpose Programming Support		
Universal Library (UL)		Programming library of function calls for C, C++, VB, C# .Net, and VB .Net using Visual Studio and other IDEs. Windows OS The UL is included with the free MCC DAQ Software bundle (CD/download).
UL for Android		Programming library of function calls for Java programmers who develop apps for Android-based tablets and phones. UL for Android communicates with select MCC DAQ devices. Supports Android project development on Windows, Linux, Mac OS X UL for Android is included with the free MCC DAQ Software bundle (CD/download).
Application-Specific Programming Support		
ULx for NI LabVIEW		A comprehensive library of VIs and example programs for NI LabVIEW that is used to develop custom applications that interact with most MCC devices. Windows OS ULx for NI LabVIEW is included with the free MCC DAQ Software bundle (CD/download).
DASYLab		Icon-based data acquisition, graphics, control, and analysis software that allows users to create complex applications in minimal time without text-based programming. DASYLab is available as a purchased software download. Windows OS

E-DIO24

Specifications

E-DIO24 Block Diagram



Specifications

These specifications apply to both E-DIO24 standard and OEM versions unless noted otherwise.

Digital input/output

Digital type: 5 V TTL input / CMOS output
Number of I/O: 24, configured as 3 ports of 8 bits each (Port 0, Port 1, Port 2)
Configuration: Each bit can be independently configured for input or output
Pull-up configuration: Each port has 47 kΩ resistors configurable as pull-up (default) or pull-down via internal jumpers.
Digital I/O transfer rate (system paced): 100 to 5000 reads/writes per second, typical, on a local network.
This is the typical throughput when the device and host are both connected by Ethernet to the same local network. Throughput can vary significantly. Typical throughput is not guaranteed if a wireless connection is involved or data is sent over the internet.
Alarm functionality A digital output bit may be configured to change state when an Ethernet connection with a host is established or lost.
Power on and reset state: All input, unless the alarm functionality is enabled.
Input high voltage threshold: 2.0 V min
Input high voltage limit: 5.5 V absolute max
Input low voltage threshold: 0.8 V max
Input low voltage limit: –0.5 V absolute min, 0 V recommended min
Output high voltage: 4.4 V min (IOH = –50 µA), 3.76 V min (IOH = –24 mA)
Output low voltage: 0.1 V max (IOL = 50 µA), 0.44 V max (IOL = 24 mA)
The digital input thresholds (P2D7 only) and counter input thresholds differ, due to different buffer types.

Counter

Pin name: P2D7 (shared with one digital I/O bit)
Counter type: Event counter
Number of channels: 1
Input type: Schmitt trigger; uses port 2 digital I/O pull-up/down selection
Resolution: 32 bits
Schmitt trigger hysteresis: 1.01 V typ, 0.6 V min, 1.5 V max
Input high voltage threshold: 2.43 V typ, 1.9 V min, 3.1 V max
Input high voltage limit: 5.5 V absolute max
Input low voltage threshold: 1.42 V typ, 1.0 V min, 2.0 V max
Input low voltage limit: –0.5 V absolute min, 0 V recommended min
Input frequency: 10 MHz max
High pulse width: 50 ns min
Low pulse width: 50 ns min
The digital input thresholds (P2D7 only) and counter threshold values differ, due to different buffer types.

Memory

Non-volatile memory: 4,096 bytes (272 bytes for settings, 3,824 bytes for user)

Power

External power supply: 5 V ±5% required; 5 V, 1 A supply recommended (standard version ships with the PS-5V1AEPS adapter).
Supply current
Quiescent current: 160 mA typ. Total quiescent current requirement, including LEDs; does not include any potential loading of the DIO bits or +VO pin. 840 mA max, including all external loading.
User output voltage range
Available at +VO terminal: 4.40 V min to 5.25 V max; assumes AC adapter is used.
User output current
Available at +VO terminal: 10 mA max
Power connector type: DC barrel input jack labeled J4 (mates with 5.5 mm OD / 2.1 mm ID plug) and 1 x 2 pin 0.1 in. pitch header labeled W1

Network

Ethernet connection

Ethernet type: 100 Base-TX, 10 Base-T
Communication rates: 10/100 Mbps, auto-negotiated
Connector: RJ-45, 8 position
Cable length: 100 meters (328 feet) max
Additional parameters: HP Auto-MDIX support

E-DIO24

Order Information

Network interface

Protocols used: TCP (IPv4 only) and UDP
Network ports used
UDP: 54211 (discovery)
UDP: 6234 (bootloader only)
TCP: 54211 (commands)
Network IP configuration: DHCP + link-local, DHCP, static, link-local
Network name: E-DIO24-xxxxxx, where xxxxxx are the lower 6 digits of the device MAC address
Network name publication: By NBNS; responds to b-node broadcasts, therefore only available on the local subnet.

Network factory default settings

Factory default IP address: 192.168.0.101
Factory default subnet mask: 255.255.255.0
Factory default Gateway: 192.168.0.1
Factory default DHCP setting: DHCP + link-local enabled

Network security

Security implementation: TCP sockets are not opened unless application sends the correct PIN connection code; stored in non-volatile memory; may be changed by user; default value is 0000.
Number of concurrent sessions: 1
Vulnerabilities: TCP Sequence Number Approximation Vulnerability

LED displays and the factory reset button

Power LED (top)
4.2 V < Vext < 5.6 V: On
Vext < 4.2 V, Vext > 5.6 V: Off (power fault)
Blinks continuously in firmware update mode.
Activity LED (bottom): On when there is a valid host connection; blinks when a command is received. Blinks continuously in firmware update mode.
Ethernet connector LEDS
Left (green) Link/activity indicator: on when there is a valid Ethernet link, and blinks when network activity is detected.
Right (yellow) Speed indicator: on for 100 Mbps, off for 10 Mbps or no link.
Factory reset button Resets network and alarm configuration settings to factory default values.

Environmental

Operating temperature range: 0 °C to 55 °C max
Storage temperature range: –40 °C to 85 °C max
Humidity: 0% to 90% non-condensing max

Mechanical

Signal I/O Connector type
E-DIO24: Two banks of screw terminals; 16 AWG to 30 AWG gauge wire
E-DIO24-OEM: Two 2 × 8 pin 0.1 in. pitch headers
Dimensions (L × W × H)
Standard: 117.9 × 82.8 × 29.0 mm (4.64 × 3.26 × 1.14 in.)
OEM: 101.35 × 76.71 × 14.61 mm (3.99 × 3.02 × 0.575 in.) max

Ordering Information

Part No.	Description
E-DIO24	Ethernet-based digital I/O DAQ device with 24 bit-configurable DIO lines, one counter input, and screw terminal connectors. Includes Ethernet cable, power adapter, and MCC DAQ software CD. Functionally equivalent to the USB-DIO24 Series and USB-1024 Series hardware.
E-DIO24-OEM	Board-only Ethernet-based digital I/O board with 24 bit-configurable DIO lines, one counter input, and header connectors. Functionally equivalent to the USB-DIO24 Series and USB-1024 Series hardware.

Accessories and Cables

Part No.	Description
PS-5V1AEPS	5 volt, 1 amp power supply. Shipped with the E-DIO24 standard device; optional component with the OEM version. Interchangeable plugs are available separately.
ACC-205	DIN-rail kit; compatible with the E-DIO24 standard device.

Software also Available from MCC

Part No.	Description
DAQami	Easy-to-use advanced data logging software to acquire, view, and log data
TracerDAQ Pro	Out-of-the-box virtual instrument suite with strip chart, oscilloscope, function generator, and rate generator – professional version
DASYLab	Icon-based data acquisition, graphics, control, and analysis software

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