

MIC-1816R

16-Bit, 1MS/s, DAQ Platform with ARM
Cortex™-A9 i.MX6 1GHz

Preliminary



Features

- i.MX6 Quad - 4x Cortex-A9 processor
- Onboard 2G DDR3 memory design
- Build-in 4G EMMC NAND Flash for OS (Yotco only)
- Sampling rate up to 1MS/s
- 4 x IEPE input with preamp gain = 1,10,100
- 8 x Analog input with voltage or 4-20mA
- 2 x Analog outputs, up to 3 MS/s, 16-bit resolution
- Supports digital and analog triggers
- 16 x isolated digital input and 8 x isolated digital output
- 2 x 32-bit programmable counter/timers
- Onboard FIFO memory (4,000 samples)
- 2-port RS-232 with surge protection
- 1 x 10/100/1000 Base-T RJ-45 LAN ports
- 1 x USB 2.0 and 1 x USB 2.0 OTG
- 2 x CAN ports transmission speeds up to 1Mbps



Introduction

MIC-1816R is a RISC (ARM) based stand-alone automation controller integrates with data acquisition and signal conditioning to provide IEPE input, analog I/O, isolated digital I/O, and counter functions. This application ready controller also supports serial communication ports and several other networking interfaces to seamlessly enable integration and rapid system development.

Specifications

Analog Input

- **Channels** 4-ch IEPE and 8-ch general AI (Voltage/Current)
- **Resolution** 16 bits
- **Sample Rate** Single channel: 5 MS/s max.;
Multiple channels: 1 MS/s max.

Note: The sampling rate of each channel is influenced by the number of used channels. For example, if 4 channels are used, the sampling rate will be 1MS/4 = 250 kS/s per channel.

- **Trigger Reference** Analog triggers
- **Trigger Mode** Start, Delayed Start
Stop, Delayed Stop
- **FIFO Size** 4,000 samples
- **Overvoltage Protection** 30 Vp-p
- **Input Impedance** Voltage : 1 G Ω
Current : 500 Ω
- **Sampling Modes** Software and external clock
- **Input Range** Software programmable

Gain	0.5	1	2	4	8
Unipolar	NA	0~10	0~5	0~2.5	0~1.25
Bipolar	± 10	± 5	± 2.5	± 1.25	± 0.625
Gain Error (%FSR)	0.0075	0.0075	0.0075	0.008	0.008

- **Current Input Range** 4-20mA (according to voltage range 0~10 V)
- **Current Input Update Rate** 20 KS/s
- **Current Input -3dB frequency** 15 Hz
- **Analog Trigger Reference** -10 ~ +10 V
- **Analog Trigger Resolution** 16 bits (0.3 mV/step)

Integrated Electronic Piezoelectric (IEPE)Excitation

- **Preamplifier Gain** 1, 10, 100 switch selectable
- **AC Couple Upper Cut-Off Frequency** Gain x1, x10(-5%) : 100KHz
Gain x100(-1%) : 50KHz
- **AC Couple Lower Cut-Off Frequency (-3dB, 1M Ω)** 0.58Hz
- **Accuracy** < $\pm 2\%$ for all gain settings
- **Compliance** > 24 V
- **Current** 4 mA
- **Discharge Time Constant** > 0.3 seconds
- **DC Offset** < 30 mA

Analog Output

- **Channels** 2-ch Voltage / Current-sink / Current-source (shared)
- **Resolution** 16 bits
- **Sample Rate** 3 MS/s max.
- **Output Range** Software programmable
- **Voltage Output Range** 0V~5V, 0V~10V, $\pm 5V$, $\pm 10V$
- **Current Output Range** 4-20mA (according to voltage range 0~10 V)
- **Current Mode Update Rate** 20 KS/s
- **Current Mode Accuracy** Source : 0.15% FSR
Sink : 0.05% FSR
Source : max. 600 Ω
Sink : depends on external voltage
Sink : max. 50 V_{DC}
- **Current Mode Loading**
- **Current Sink Voltage**

Isolated Digital Input

- **Channel** 8
- **Isolation Protection** 2,500 V_{DC}
- **Interrupt Capable Channel** 1
- **Digital Filter Channel** 1
- **Opto-Isolator Response** 100 μ s
- **Input Voltage** Logic 0 : 2V max.
Logic 1 : 5 ~ 50 V

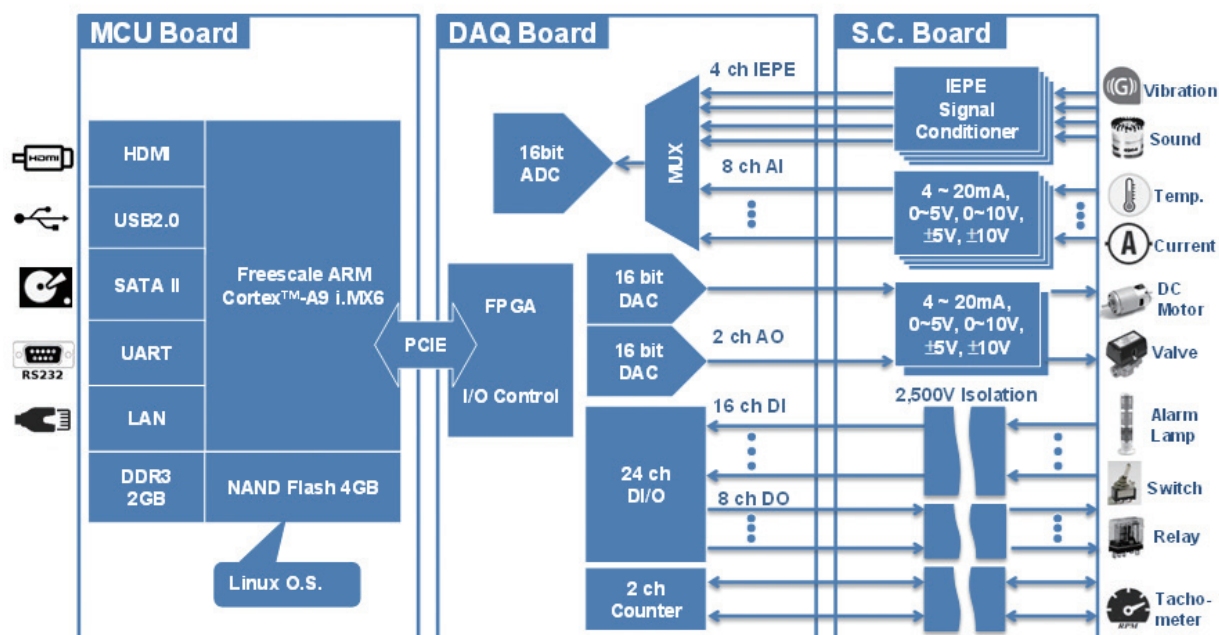
Isolated Digital Output

- **Channels** 8 (NPN)
- **Isolation Protection** 2,500 V_{DC}
- **Output Voltage** 5 ~ 40 V_{DC}
- **Sink Current** 500 mA max./channel
- **Opto-Isolator Response** 100 μ s

Counter

- **Channels** 2
- **Resolution** 32 bits
- **Compatibility** 5 V/TTL
- **Isolation Protection** 2,500 V_{DC}
- **Opto-Isolator Response** 100 μ s

Block Diagram



General

- **Dimensions (W x H x D)** 165 x 65 x 130 mm (6.49" x 2.56" x 5.11")
- **Power Consumption** 15W
- **Power Requirements** Single 12V_{DC} power input
- **Weight** 2.4 kg (typical)
- **OS Support** Linux Ubuntu, Yotco

RISC System Hardware

- **CPU** NXP ARM® Cortex® -A9 i.MX6 Quad 4 x processor
- **Memory** Onbard DDR3 2GB
- **Flash** 4 GB eMMC NAND Flash for O.S (Yotco only)
- **Ethernet** 1 x 10/100/1000 Mbps
- **USB** 1 x USB 2.0, 1 x USB 2.0 OTG
- **Serial Port** 2 x RS-232/422/485
- **CAN Port** 2 x 1 Mbps
- **Storage** 1 x SATA 2.5" SSD, 1 x SD slot

Environment

- **Storage Humidity** 5 ~ 95% RH, non-condensing
- **Operating Temperature** 0 ~ 50°C (32 ~ 122°F) @ 5 ~ 85% RH with 0.7m/s air flow
- **Storage Temperature** -20 ~ 80 °C (-4 ~ 176 °F)
- **Indicators** LEDs for Power, IDE and LAN (Active, Status)

Ordering Information

- **MIC-1816R-AE** 16-Bit, 1MS/s, DAQ Platform with ARM Cortex™-A9 i.MX6 1GHz

Optional Accessories

- **1700001714** Power cord (BSMI) 3P, 7A, 125V, 18AWG, 180 cm
- **1702002600** Power cord UL/CSA (USA) 3P, 10A, 125V, 1.83 m, 180 D
- **1700023535-01** Power cord (CCC) 3P, 16A, 250V, 183 cm
- **1960077844N001** Table mount (130 x 175 mm)