# M215 SIGNAL CONDITIONING M-MODULE

The M215 provides special purpose signal conditioning for low speed signals. It has two debounce channels designed to cleanup noisy switch contact closure signals and a very versatile quad window comparator function for monitoring voltage, current, or resistance.

The window comparators are isolated from logic ground to allow monitoring of floating sources, such as batteries or isolated UUT's. The window limits can operate in a fixed mode that requires no application programming or can be programmed through the M-module interface.

## Overview:

The M215 is specifically designed to provide special purpose signal conditioning functions. Debounce circuits can be used to level detect noisy or slow rising/falling signals. The window comparators can be used for voltage, current, or resistance monitoring of floating sources. The M-module trigger feed-through and isolated power source outputs are useful in general test applications.

Key Features:

- Two Signal Debounce Circuits With Differential Outputs
- Versatile Quad Isolated Window Comparator
- Programmable or Preset Window References
- External Voltage Ref. up to 30V
- Voltage Sensing up to 40V
- Current or Resistance Sensing
- Relay Driver Outputs
- Isolated Power Source
- Over-Voltage Protection on Inputs
- Bidirectional M-Module Trigger Function

## Front Panel I/O:

- 44-Pin female (socket) DSUB right angle connector (CONEC part number 164A18119X or equivalent).
- Any standard 44-pin male (plug) DSUB connector will mate with it.

## I/O Signals:

- EXTVA/B, ISENSEA/B, VSENSE
- F5VREF
- VSCALE1-0, SSCALE1-0, WSEL1-0
- +5VF, ±15VF
- GND, GNDF
- INW4SEL
- RLYOUT1-4, RLYOUTA-C
- RLYPWR
- DEBIN1-2, DEBOUT1-2+/-
- TRIGA-B

## Power:

| | |
|---|---|
| +5V | 550 ma |
| +12V | 0 ma |
| -12V | 0 ma |

## Temperature:

| | |
|---|---|
| Operating | 0°C to 50°C |
| Storage | -40°C to 70°C |

## M Module Compliance

Complies with ANSI/VITA Std. 12-1996 for single-wide M Modules

| | |
|---|---|
| Data Transfers: | 16 bit |
| M-Triggers | Supported |

Compatible with VXI, LXI, PXI, VME, PCI, cPCI, Ethernet and other M Module carriers.
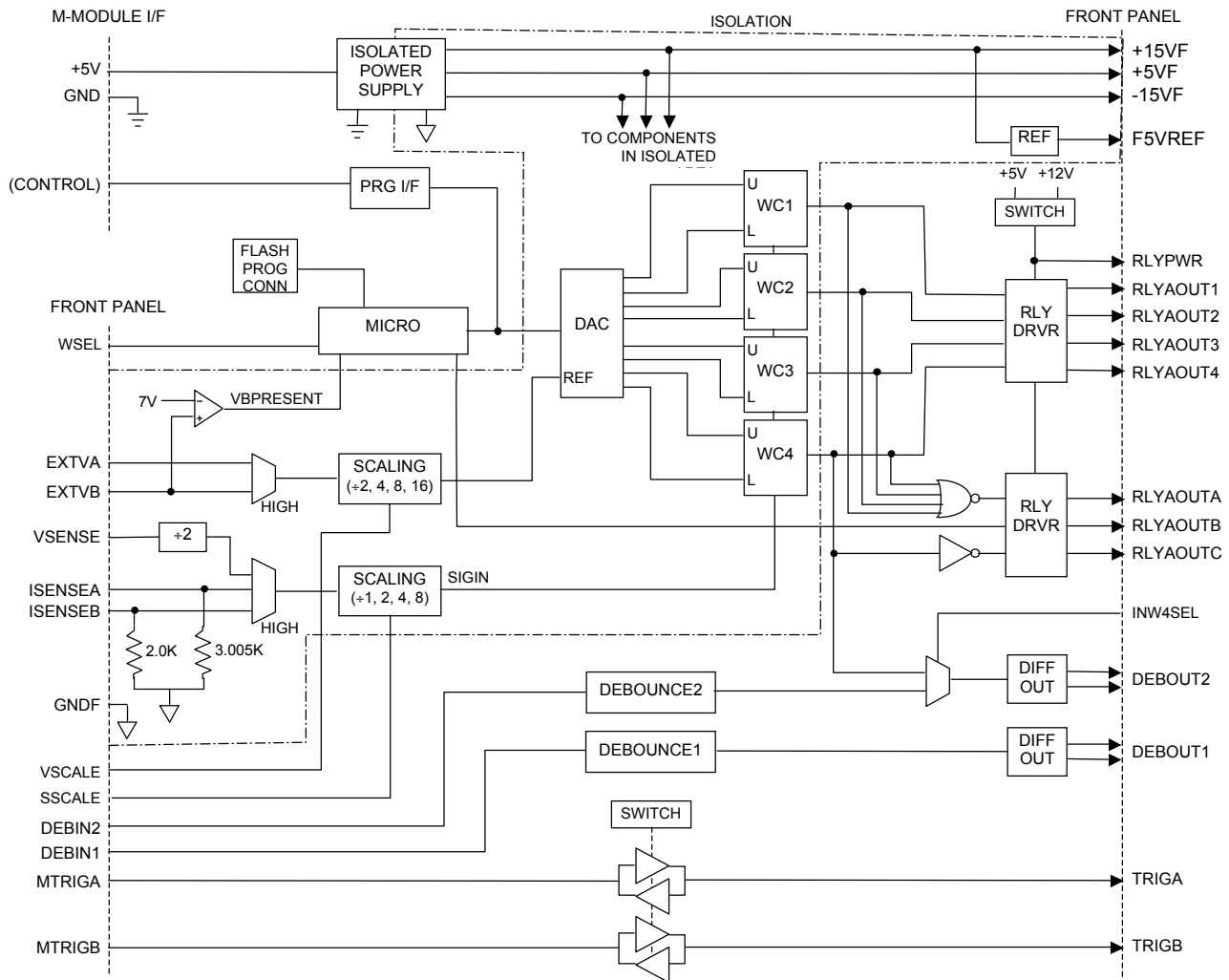
## Applications

- Voltage/Current/Resistance Monitoring
- Signal Debounce

## Ordering Information

**M215 M-Module**     11029350-0001

## Additional Information

User Manuals for C&H carriers and this module can be found on our website at www.chtech.com.

M-MODULE I/F

ISOLATION

FRONT PANEL

ISOLATED POWER SUPPLY

+5V → +15VF
+5VF
GND → -15VF

TO COMPONENTS IN ISOLATED

REF → F5VREF

(CONTROL) → PRG I/F

+5V +12V
SWITCH

FLASH PROG CONN

FRONT PANEL

MICRO → DAC

WSEL

RLYPWR
U WC1 L
U WC2 L
U WC3 L
U WC4 L
REF

RLY DRVR → RLYAOUT1, RLYAOUT2, RLYAOUT3, RLYAOUT4

7V → VBPRESENT

EXTVA
EXTVB → HIGH → SCALING (÷2, 4, 8, 16)

VSENSE → ÷2

ISENSEA
ISENSEB → HIGH → SCALING (÷1, 2, 4, 8) → SIGIN

2.0K   3.005K

RLY DRVR → RLYAOUTA, RLYAOUTB, RLYAOUTC

INW4SEL

GNDF

DIFF OUT → DEBOUT2

DEBOUNCE2

VSCALE
SSCALE
DEBIN2
DEBIN1

DEBOUNCE1 → DIFF OUT → DEBOUT1

SWITCH

MTRIGA → TRIGA

MTRIGB → TRIGB

# Specifications:

**Debounce (DEBINx & DEBOUTx):**

| | |
|---|---|
| Input Pull-up Level (R=10KΩ) | +5V [1] |
| Threshold Level | +1.3V typ [1] |
| Debounce Time | 30ms typ |
| Response Time [3] high going transition | 18$\mu$s typ |
| low going transition | 400ns typ |

**External Reference Voltage (EXTVA/B)**

| | |
|---|---|
| Input Range | 1.0 to 30V [2] |
| Scaling [7] | 1 to 8 |

**Voltage Sense Input (VSENSE)**

| | |
|---|---|
| Input Range | 0.5 to 40V [2] |
| Scaling [7] | 2 to 16 |

**Current (Resistance) Sense Input (INSENSEA/B)**

| | | |
|---|---|---|
| Input Range | ISENSEA | 0 to 13.2ma |
| | ISENSEB | 0 to 20.0ma |
| Scaling [7] | | 1 to 8 |
| Accuracy | VRA, nom=3.005KΩ | ±1% |
| | VRB, nom=2.00KΩ | ±1% |
| Power | VRA & VRB | 0.5W |

**Differential Outputs**

| | | |
|---|---|---|
| High Level Output | $I_{OH}$=-40ma | 2.0V min [1] |
| Low Level Output | $I_{OH}$=-40ma | 0.45V max [1] |
| Short Circuit Output | | -90ma typ |

**Relay Driver Outputs**

| | | |
|---|---|---|
| Output Sink Current (continuous) | | 500ma [4] |
| RLYPWR Output | +5V drive | 450ma [5] |
| | +12V drive | 200ma [5] |

**Floating Fixed References**

| | | |
|---|---|---|
| Voltage Output | F5VREF (+5V nom) | ±0.08% |
| Temp Coef | | 12 ppm/°C max |
| Isolation Voltage | | 1000V min |
| Maximum Current | | 50ma |

**Floating Output Supplies**

| | | |
|---|---|---|
| Maximum Current | +5VF, ±15VF | 10ma [6] |
| Isolation Voltage | | 1000V min |

Notes:

1. This level is with respect to GND.
2. This level is with respect to GNDF.
3. This time assumes that the signal has not changed level for at least the debounce time. After a change is detected, the input signal is ignored during the debounce time.
4. Assumes external power is used.
5. These maximum values are specified to meet the maximum current specifications specified in the ANSI/VITA 12-1996 M-Module specification.
6. These supplies are provided for limited external use. The supplies are used internally; the maximum current specified must not be exceeded to ensure proper internal operation.
7. Set through front panel connections