# XMC Modules

## XMC730 Multi-function I/O

### Models
- **XMC730**: Front I/O
- **XMC730E**: Front I/O, extended temperature
- **XMC730CC**: Rear I/O, conduction-cooled

### Description
XMC730 mezzanine modules provide a variety of I/O functions on a single plug-in card. These new high-density modules perform both high-speed and high resolution A/D and D/A conversion and also handle digital I/O and counter/timer functions.

Now you can conserve your precious XMC slots and still get all the I/O functionality you need. The XMC730 is designed for extreme versatility with many deluxe features to meet most applications. However, the XMC730 is still very budget-friendly. A conduction-cooled version is also available.

### Key Features & Benefits

#### Analog Inputs
- 16 differential (±10.24V, ±10.0V, ±5.12V, ±5.0V, 0 to 10.24V, 0 to 10.0V, 0 to 5.12V ranges)
- 16-bit ADC with integral sample-and-hold and reference
- 1.264μS conversion time (791KHz rate)
- 1026 sample FIFO buffer
- Programmable FIFO threshold conditions for interrupts, DMA transfers, and flags
- User-programmable channel conversion sequence and timing

#### Analog Outputs
- External trigger input or output
- Factory calibration constants stored in on-board flash memory for error correction
- Eight analog output channels (±3V, ±5V, ±10V, -2.5 to +7.5V, 0-5V, and 0-10V ranges)
- Individual 16-bit DACs per channel with 7.5μS settling time
- Flexible operating mode, trigger, and memory allocation
- Configurable for direct access, single burst, continuous, or streaming (FIFO) output
- Reliable software calibration with coefficients stored on-board
- FIFO for waveform generation
- Interrupt on user-programmable FIFO threshold
- Shared 64K x 16-bit sample memory

#### Digital I/O
- 16 bidirectional input/output channels (direction configured in 8-channel groups)
- TTL-compatible thresholds
- Programmable change-of-state/level interrupts
- Failsafe power-up and system reset

#### Counter/Timers
- Multi-function 32-bit counter/timer
  - Quadrature Position measurement
  - Pulse Width modulation
  - Watchdog timer
  - Event counter
  - Frequency measurement
  - Pulse-width or period measurement
- One-shot and repetitive one-shot pulse waveform generation
- Programmable interface polarity
- Internal or external triggering
- CMOS compatible thresholds

#### General
- DMA transfer support to move data between module memory and PCIe bus
- Software development tools for VxWorks®, Linux®, and Windows® environments

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Performance Specifications

- **Analog Input**
  - Input channels: 16 differential, voltage (non-isolated).
  - Resolution: 16 bits.
  - Conversion rate: 791,139.24Hz maximum.
  - Settling time: Full-scale step 420 ns to 0.005% of FSR.
  - Input ranges: Software-selectable on a per channel basis.
    - Bipolar: ±10.24V, ±10.0V, ±5.12V, ±5.0V.
    - Unipolar: 0 to 10.24V, 0 to 10.0V, 0 to 5.12V.
  - Calibrated error:
    - ±3.125 LSB max. (0 to 5.12V).
    - ±2.125 LSB max. (all other ranges).

- **Analog Output**
  - Output channels: 8 single-ended voltage (non-isolated).
  - Resolution: 16 bits.
  - Settling Time: 12.5 μs 20 V step to 1 LSB maximum.
  - 8.5 μs 10 V step to 1 LSB maximum.
  - 7.5 μs typical.
  - Output ranges (software-selectable):
    - Bipolar: ±10V, ±5V, ±3V, -2.5 to +7.5V.
    - Unipolar: 0 to 10V, 0 to 5V.
  - Output current: ±10mA maximum (minimum load resistance of 1KΩ with a 10V output).
  - Calibrated error: ±2.125 LSB (±0.0032% FSR) max.

- **Digital I/O**
  - Input/output range: 0 to 5V.
  - Signal thresholds:
    - VIH: 2.0V minimum.
    - VIL: 0.8V maximum.
    - IOH: 24 mA maximum.
    - IOL: 24mA maximum.
  - VOH: 3.7V minimum VCCA.
  - VOL: 0.55V maximum VCCA.
  - Minimum pulse: 32nS.
  - Debounce: Filters signals with duration <2.4 µs.

- **Counter/Timer**
  - Configuration: 32-bit timer.
  - Counter input: TTL input port.
  - Counter output: MOSFET output port.
  - Counter output pull-up voltage: ±5V or 12V with 1K pull-up, set by DIP switch.
  - Internal clock: 62.5MHz, 15.625MHz, 7.8125MHz, 3.90625MHz, 1.953125MHz.

- **XMC Compliance**
  - Complies with ANSI/VITA 42.0 specification for XMC module mechanicals and connectors.
  - Complies with ANSI/VITA 42.3 specification for XMC modules with PCI Express interface.

- **PCIE Compliance**
  - Conforms to PCI Express Base Specification, Revision 2.1.
  - Gen1 PCIe interface.
  - BAR0 memory size: 1M Byte.

- **Environmental**
  - Operating temperature:
    - XMC730: 0 to 70°C (200 LFM airflow).
    - XMC730E: -40 to 85°C (200 LFM airflow).
    - XMC730CC: -40 to 85°C (cold plate).
  - Storage temperature: -55 to 100°C.
  - Relative humidity: 5 to 95% non-condensing.
  - Shock, operating: Designed to comply with VITA 47 Class OS1.
  - Vibration, random operating: Designed to comply with VITA 47 Class V1.
  - Power:
    - 3.3V ±5%: 0.567A typical, 0.7A maximum.
    - VPWR ±5%: 0.10A typical, 0.11A maximum.
    - +12V ±5%: 0.03A typical, 0.0374 maximum.

Ordering Information

- **XMC Modules**
  - XMC730: Multi-function I/O module with front I/O 68-pin SCSI-2 connector. Lead free.
  - XMC730E: Multi-function I/O module with front I/O 68-pin SCSI-2 connector plus extended temperature. Lead free.
  - XMC730CC: Multi-function I/O module with rear P16 and P4 connectors. Conduction-cooled and lead free.

- **Software**
  - (see software documentation for details)
    - PMCSW-API-VXW: VxWorks® software support package
    - PCISW-API-WIN: Windows® DLL Driver software package
    - PCISW-API-LNX: Linux® support (website download only)

- **Accessories**
  - 5025-288: Termination panel, SCSI-3 connector, 68 screw terminals.
  - 5028-432: Cable, shielded, SCSI-3 connector both ends.

- **Carrier Cards**
  - VPX Carrier Cards | PCIe Carrier Cards