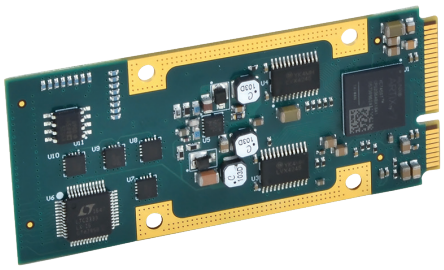
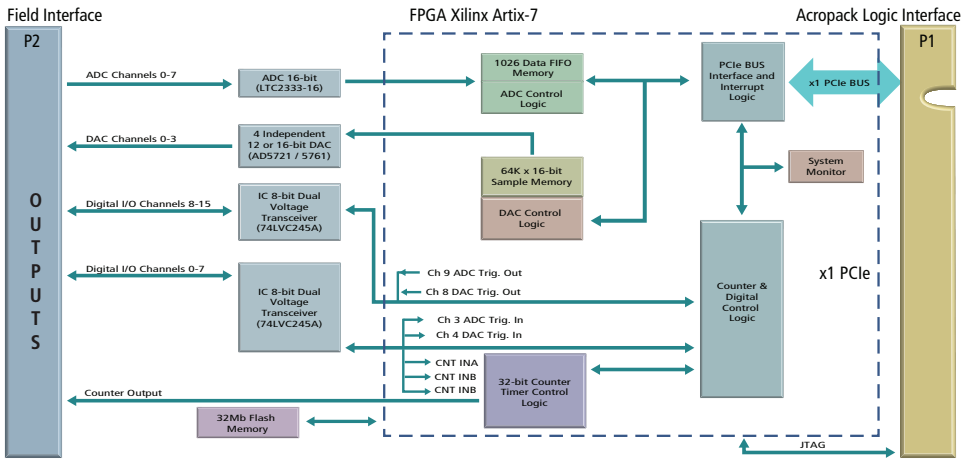
AcroPack® Modules

AP700 Series Multi-function I/O





Analog input ◆ Analog output ◆ Digital I/O ◆ Counter/timers ◆ PCIe Bus Interface

Models

AP730E-LF: Multi-function I/O with 16-bit DAC
AP731E-LF: Multi-function I/O with 12-bit DAC

The AP730 mini PCIe-based interface board provides a variety of I/O functions on a single plug-in card. This new high-density module performs both high-speed and high resolution A/D and D/A conversions. It also includes digital I/O and counter/timer functions.

Now you can conserve your precious AcroPack slots and still get all the I/O functionality you need. The AP730 is designed for extreme versatility with many deluxe features to meet most applications. However, the AP730 is still very budget-friendly.

The AP730 modules are 70mm long (19.05mm longer than the full-length mini PCIe card at 50.95mm). The board's width is the same as an mPCIe board at 30mm and uses the same standard board hold down standoff and screw keep out areas.

A down facing 100 pin Samtec connector will mate with the carrier card. This ensures a secure connection for your I/O. Fifty of these signals are available as field I/O signals.

Key Features & Benefits

Analog Inputs

- Eight differential input channels (±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 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
- External trigger input or output
- Factory calibration constants stored in on-board flash memory for error correction

Analog Outputs

- Four analog output channels (±3V, ±5V, ±10V, -2.5 to +7.5V, 0-5V, and 0-10V ranges)
- Individual 12 or 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

Acromag® THE LEADER IN INDUSTRIAL I/O

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AcroPack® Modules

ISO9001
AS9100
MADE IN USA

Performance Specifications

General

Power Supply Voltage	Current Draw
3.3 VDC ±5%	250mA typ., 300mA max.
1.5 VDC ±5%	260mA typ., 300mA max.
5.0 VDC ±5%	85mA typ., 280mA max.
+12 VDC ±5%	22mA typ., 30mA max.
-12 VDC ±5%	3.5mA typ., 15mA max.

Analog Input

Input channels
8 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
4 single-ended voltage (non-isolated).

Resolution
AP730E-LF: 16 bits.
AP731E-LF: 12 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 4.0 µs.

Counter/Timer

Configuration: 32-bit timer.

Counter input: TTL input port.

Counter output: MOSFET output port.

Counter output pull-up voltage:
+5V with 1K pull-up.

Internal clock: 62.5MHz, 15.625MHz, 7.8125MHz, 3.90625MHz, 1.953125MHz.

PCIe Compliance

Conforms to revision 2.1

Lanes
1 lane.

Bus Speed
2.5 Gbps (Generation 1).

Memory
1MB required.

Environmental

Operating temperature
-40 to 85°C.
Temperatures above 70°C requires an AcroPack heatsink conduction-cool kit, model AP-CC-01.

Storage temperature
-55 to 100°C.

Relative humidity
5 to 95% non-condensing.

Operating Vibration
Designed to comply with IEC 60068-2-64: 10-500Hz, 5G-rms, 2 hours/axis.

Operating Shock
Designed to comply with IEC 60068-2-27: 30G, 11ms half sine, 50G, 3mS half sine, 18 shocks at 6 orientations for both test levels.

EMC Directive
Conforms to EMC Directive 2004/108/EC.

Physical

Length
70mm

Width
30mm

Ordering Information

Model

AP730E-LF
Multi-function I/O module with 16-bit DAC

AP731E-LF
Multi-function I/O module with 12-bit DAC

Accessories

AP-CC-01
Conduction-cool kit

Carrier Cards

See Acromag.com/AcroPack-Carriers for a full list of AcroPack carrier cards.

Software *(see software documentation for details)*

APSW-API-VXW
VxWorks® software support package.

APSW-API-WIN
Windows® DLL driver software support package.

APSW-API-LNX
Linux® support (website download only).

AP-CC-01 Conduction-Cool Kit

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