**APA7-500 Series** User-Configurable Artix®-7 FPGA I/O Modules

**Description**

**Models**

APA7-501E-LF: 48 TTL channels  
APA7-502E-LF: 24 EIA-485/422 channels  
APA7-503E-LF: 24 TTL and 12 EIA-485/422 channels  
APA7-504E-LF: 24 LVDS channels

The AcroPack® product line updates our popular Industry Pack I/O modules with a PCIe interface format. This tech-refresh design offers a compact size, low-cost I/O, the same functionality as the existing Industry Pack modules and a rugged form factor.

The APA7-500 series provides a FPGA based user-configurable bridge between a host processor and a custom digital interface via PCI Express. These boards feature a best in class Artix®-7 interface to deliver the industry’s lowest power and high performance.

The APA7-500 series modules are 70mm long. This is 19.05mm longer than the full length mini PCIe card at 50.95mm. The boards width is the same as mPCIe board of 30mm and they use the same mPCIe standard board hold down standoff and screw keep out areas.

The Engineering Design Kit provides users with basic information required to develop custom FPGA firmware for download to the Xilinx FPGA. Example FPGA design code is provided as a Vivado IP Integrator project for functions such as a one-lane PCI Express interface, DMA, digital I/O control register, and more. Users should be fluent in the use of Xilinx Vivado design tools.

**Key Features & Benefits**

- PCIe Express Generation 1 interface  
- Reconfigurable Xilinx® FPGA  
- High channel count digital interface: RS485, LVDS and TTL interface options.  
- 32Mb quad serial Flash memory  
- 52,160 logic cells  
- 65,200 Flip flops  
- 2,700 kb block RAM  
- 120 DSP slices  
- External LVTTL clock input  
- Long distance data transmission  
- Example design  
- Power up and system reset is failsafe  
- Conduction-cooled options

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**AcroPack® Modules**  
Reconfigurable Xilinx® Artix®-7 FPGA ◆ Conduction or Air Cooled ◆ PCIe Bus Interface

**Field I/O Connector**  
**I/O Buffers**  
**Artix-7 FPGA XC7A050**  
**Mini-PCIe Connector**

**I/O Buffers**  
TTL EIA-485/422  
LVDS

**Artix-7 FPGA XC7A050**

**I/O Buffers**  
TTL EIA-485/422  
LVDS

**Mini-PCIe Connector**

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**Solutions**  
- Tel 248-295-0310  
- solutions@acromag.com  
- www.acromag.com  
- 30765 Wixom Rd, Wixom, MI 48393 USA

**Bulletin #8400-966**
AcroPack® Modules

APA7-500 Series  User-Configurable Artix®-7 FPGA I/O Modules

Performance Specifications

■ **FPGA**
  FPGA device
  Xilinx Artix-7 FPGA Model XC7A50T.
  FPGA configuration
  Download via flash memory.
  Example FPGA program
  IP integrator block diagram provided for PCIe bus 1 lane Gen 1 interface, DMA controller, on chip block RAM, flash memory and control of field I/O.
  See EDK kit.

■ **I/O Processing**
  Field I/O Interface
  PCIe bus 1 lane Gen 1 interface.
  I/O Connector
  100 pin field I/O connector.

■ **Engineering Design Kit**
  Provides user with basic information required to develop a custom FPGA program. Kit must be ordered with the first purchase of a APA7-500 series module (see www.acromag.com for more information).

■ **PCI Express Base Specification**
  Conforms to revision 2.0
  Lanes
  1 lane in each direction.
  Bus Speed
  2.5 Gbps (Generation 1).
  Memory
  128k space required.
  1 base address register.

■ **Environmental**
  Operating temperature
  Air Cooled with heat sink -40 to 80°C.
  Air Cooled without heat sink -40 to 70°C.
  Conduction Cooled -40 to 85°C.
  A conduction cooled application with an AcroPack requires heatsink model AP-CC-01.
  Storage temperature
  -55 to 125°C.
  Relative humidity
  5 to 95% non-condensing.
  Power
  +3.3V (±5%) 500mA typical.

■ **Physical**
  Length
  70mm.
  Width
  30mm.

Ordering Information

**AcroPack® Modules**

APA7-501E-LF
48 TTL channels.

APA7-502E-LF
24 EIA-485/422 channels.

APA7-503E-LF
24 TTL & 12 EIA-485/422 channels.

APA7-504E-LF
24 LVDS channels.

(Note: AcroPack modules are compatible only with the carriers listed below)

**Accessories**

APA7-EDK
Engineering design kit. (One kit required)

**Carrier Cards**

APCe7012E-LF
PCIe AcroPack carrier, holds one AcroPack module, air-cooled.

APCe7022E-LF
PCIe AcroPack carrier, holds two AcroPack modules, air-cooled.

APCe7040E-LF
PCIe AcroPack carrier, holds four AcroPack modules, air-cooled.

VPX4500E-LF
3U VPX AcroPack carrier, holds three AcroPack modules, air-cooled.

VPX4500-CC-LF
3U VPX AcroPack carrier, holds three AcroPack modules, conduction-cooled.

XMCAP2020-LF
XMC AcroPack carrier, holds two AcroPack modules, 2-slots out front, air-cooled.

XMCAP2021-LF
XMC AcroPack carrier, holds two AcroPack modules, 2-slots out rear, air-cooled.

**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).

ISO9001 AS9100
Made in USA

Tel 248-295-0310  solutions@acromag.com  www.acromag.com  30765 Wixom Rd, Wixom, MI 48393 USA

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