Acromag
THE LEADER IN INDUSTRIAL I/O

Embedded Computing & I/O Solutions

SFF Embedded Computers

Rugged

Flexible I/O Options

SWaP-C

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Bulletin # 8401041c

SFF Embedded Computers

The ARCX1100 is built on a COM Express Type 10 Platform.

Typical applications include deployable systems such as vetronics, C4ISR, payload management, as well as command and control for drones and robotics. Many custom communications applications are implemented on the AcroPack® FPGA modules (CameraLink, Synchronous Serial, to name a few).

The ARCX1100 embedded computer features an Intel® Atom processor and the ability to interface with up to four AcroPack modules. The modules support different I/O needs from digital I/O, to analog I/O, to communications (RS422/485, CAN bus, 1553, Ethernet), to FPGA modules. The FPGA modules can be programmed to support diverse custom interfaces and custom protocols.

The ACEX4040 carrier card and the ARCX1100 support Acromag's AcroPack I/O modules.

Acromag is focused on developing embedded computing solutions that provide the best long term value in the industry. Compare and you will find that Acromag offers an unmatched balance of price, performance and features.

ARCX1100

ARCX-4000

The ACRX4000 Series is a Powerful Embedded SFF Computing Platform Featuring an Intel® i7 COM Express Type 6 Processor.

The ARCX4000 supports PMC, XMC, and AcroPack modules. Two size options are available, the smaller unit supports up to 1x PMC or XMC module or up to 2x AcroPack modules. The larger unit will support up to 2x PMC or XMC modules or up to 4x AcroPack modules. This unit is designed for full military compliance with 38999 connections plus a removable drive is available.

PMC and XMC module support brings a whole new level of capability to the ARCX family of products. Acromag has an extensive line of high-performance PMC and XMC FPGA modules of which the most popular are the Xilinx® Artix® and Kintex® families. You will find Acromag's FPGA modules working in conjunction with the system processor to perform: video capture, targeting, communications protocols, and custom high-speed Interfaces without burdening the system processor. The ARCX4000 Series product has been available for several years and has equipped many battleships, aircrafts, and land vehicles.

Embedded Computers

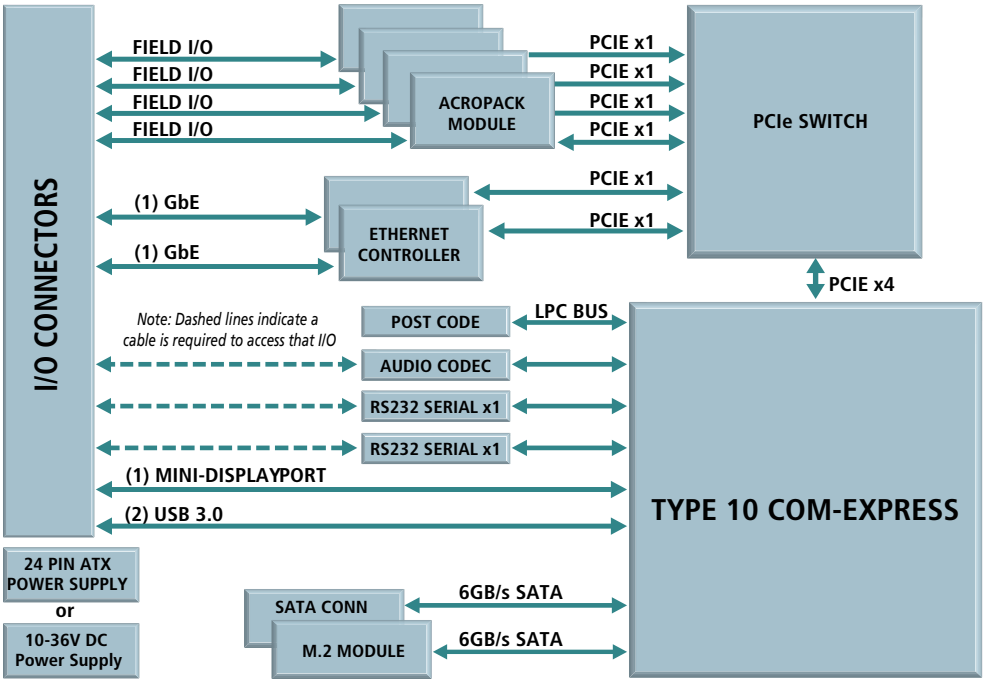
ARCX1100 Rugged, Small Form Factor Embedded Computer

Intel® Atom™ CPU (E3950 Apollo Lake) ◆ Four I/O expansion slots (AcroPack® or mini PCIe)

Description

The ARCX1100 is a customizable-off-the-shelf (COTS), SWaP-optimized deployable computing solution. This rugged, small form factor computer is designed for a variety of defense and industrial applications. For maximum flexibility, the modular platform combines a carrier card hosting a COM Express Type 10 CPU and a mix of AcroPack I/O modules to support a variety of communication, monitoring and control functions. Front ports offer easy access to gigabit Ethernet, USB, video, and COM signals. High-density connectors simplify interfacing field signals.

Typical applications include deployable systems such as: vetronics, C4ISR, payload management, as well as command and control for drones and robotics. The ARCX1100 is perfect as a portable communication system with the ability to add A/D, D/A, discrete I/O, RS-232/485, CAN bus, Ethernet, FPGA, MIL-STD-1553, and other signal interfaces. Using AcroPack plug-in I/O modules provides a more rugged alternative to mini PCIe modules that eliminates the need for internal cables. More than 25 AcroPack models are available to meet your I/O requirements.



Key Features & Benefits

- Intel Atom COM Express Type 10 module (Apollo Lake)
- Four AcroPack / mini PCIe slots for field I/O
  - A/D and D/A analog I/O
  - Digital I/O and counter/timers
  - Serial communication
  - Ethernet communication
  - CANbus communication
  - Mil-STD 1553 and ARINC 429
  - FPGA signal processing
  - Many more
- Ports available
  - Four field I/O 68-pin CHAMP
  - Two GbE RJ45 ports
  - Mini-DisplayPort
  - Two USB 3.0 ports
  - Two COM RS232 ports
- One M.2 site
- One SATA connector
- -40 to 71°C extended temperature range
- Wide range DC input power with redundancy

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Bulletin #8400-936

ARCX1100 Rugged, Small Form Factor Embedded Computer

Performance Specifications

Processor Interface

Compatibility
Provides an electrical and mechanical interface for an industry standard COM Express Type 10 Mini (55mm x 84mm) CPU module.

CPU module must have four PCIe lanes configured as an x4 port.

CPU Option
Intel® Atom™ E3950 quad-core, 1.6/2.0GHz (Turbo) , 4GB RAM, 12W.

Interface
COM Express module provides CPU, memory, PCIe bus, SATA, USB, serial communication, graphics, and other computing functions.

PCIe Switch
9-port 12-lane PCIe Gen 2 switch expands the single host PCIe x4 port to 6 independent x1 ports (one for each AcroPack site and one for each Ethernet controller).

I/O Interfaces

AcroPack / Mini PCIe Expansion I/O
Four slots for plug-in I/O modules. Two isolated slots. Field I/O routed to 68-pin VHDCI connectors.

Ethernet Interfaces
Two Intel i210 Gigabit Ethernet Controllers. Two RJ-45 ports supporting 10/100/1000BASE-T.

Data Storage
M.2: Expansion site supports SATA III devices, speeds up to 6Gb/s. Accepts 2242, 2260 and 2280 SSD Socket 2/3 (mechanical Key B/M) modules.

SATA: Data and power connectors for use of a Solid-State Disk Drive. Supports SATA III devices, speeds up to 6Gb/s.

Serial Communication
Two ports with standard UART (RX/TX) RS-232 signal levels.

USB
Two USB 3.0 ports with speeds up to 5Gb/s.

Audio
Realtek HD Audio CODEC with line in / line out.

Video
Mini DisplayPort for high-resolution graphics.

JTAG
14-pin Xilinx JTAG header for programming and debugging FPGA AcroPack modules.

Electrical / Mechanical

Form Factor
Mini-ITX form factor.

Size
7.6 x 7.6 x 3.25 inches (193 x 193 x 83 mm).
4.55 pounds (2.06 kg).

PCI Express
Complies with PCI Express Specification, Rev. 2.1.

PICMG
Complies with PICMG COM Express COM.0 Specification Rev. 3.0. Conforms to COM Express Carrier Design Guide Rev. 2.0.

Power Requirement
Accepts powered from a standard 24-pin ATX power supply or a 10-36V DC power supply. Carrier will auto-switch between power sources.

+3.3 Volts (±5 %) 0.383A, typical.
+12 Volts (±8 %) 0.175A, typical.

Fuses
Individually fused +1.5V, +3.3V, +5V, +12V, and -12V DC power.

Environmental

Temperature Range
Operation: -40 to 71°C (200 lfm airflow min.)
Storage: -55 to 125°C.

Relative Humidity
5 to 95% non-condensing.

Shock, Operating
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.

Vibration, Operating
Sinusoidal: Designed to comply with IEC 60068-2-6. 10-500Hz, 5G, 2 Hours/axis.

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

Certifications
CE compliant.

Coating / Sealant
Conformal coating available on request.

IP65 water-resistant versions available

Software Support

Operating Systems
AcroPack series products require support drivers specific to your operating system. Supported operating systems include Linux®, Windows®, and VxWorks®.

Power ON Self-Test (POST)
POST codes output to 2-digit LED for debugging.

Ordering Information

ARCX1111-0000
No CPU, M.2 or SSD

ARCX1121-0000
No CPU, M.2 or SSD, includes a bay to insert a 2.5"SSD

ARCX1121-2110
Includes CPU, M.2 (500GB) and 2.5" SSD (500GB)

Accessories

See www.acromag.com/AcroPacks for I/O modules ordering information.

5028-618
ACEX4041 Serial Cable

5028-617
ACEX4041 Audio Cable

5028-615
API0 Cable 68-Pin CHAMP-PIGTAIL 36 inches

5028-616
API0 Cable 68-PIN CHAMP-PIGTAIL 70 inches

All ports and I/O connections are easily accessible from the rear panel

Carrier card mounts securely inside to host CPU, I/O, and storage modules.

ISO9001
AS9100
MADE IN USA

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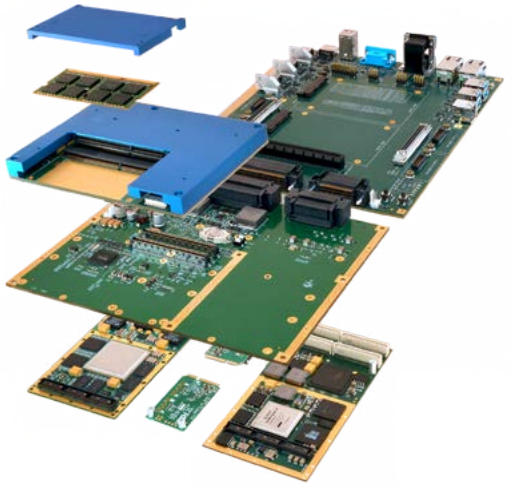
Embedded Computers

MADE IN USA

ARCX-4000 Rugged, Small Form Factor Embedded Computer

CE FC 2 YEAR WARRANTY RoHS Compliant

POWER MANAGEMENT



4th Gen Intel® Core™ i7 CPU ◆ Removable SATA drives ◆ PMC/XMC module expansion slots

Description

Acromag's ARCX embedded computer is a customizable-off-the-shelf (COTS), SWaP-optimized deployable solution. This rugged, small form factor mission computer is designed for extreme rugged and MIL-AERO applications. This true COTS solution uses the Acromag COM Express Type 6 product platform.

Typical applications include military/aerospace deployable systems such as: vetronics, C4ISR, payload management, as well as command and control for drones and robotics. More specifically the ARCX is perfect as a portable data acquisition system in an aircraft by adding a 1553 interface board to a dual unit. Add a FPGA and high-speed graphics card for high-speed video transfer. For multi-sensor monitoring on mobile applications simply add a CAN bus interface.

High-Performance, 4th Generation CPU

Intel's 4th generation of multi-core processors provides enhanced capabilities for floating-point-intensive computations, media, graphics, and security. Better power efficiency reduces heat and allows smaller, lighter designs with more portability.

Cutting-edge technology features programmable power limits, allowing the user to "dial-down" the maximum power consumption of the CPU in systems where heat and/or power is a concern.

Rugged Military Design

The ARCX is designed and tested to meet IP67 ratings for reliably sealed protection from dust and limited immersion.

Thick circuit boards and advanced thermal management allow the computer to operate reliably under hostile conditions. This rugged computer can withstand extended temperatures. Shock and vibration has been tested to MIL-STD-810 specifications.

The front panel features 38999 type high-speed cylindrical connectors for extended I/O interfacing. Optional power filter is designed to meet the requirements of MIL-STD-704 and MIL-STD-1275.

Optional removable solid state drives allows for a variety of configurations including quick security access. Load the operating system on one drive and then collect data on the other drive.

Customizable Expansion

The ARCX offers great flexibility to meet ever-changing requirements for long-term applications with its customizable-off-the-shelf (COTS) design. PMC, XMC, Mini PCIe and mSATA slots allow the addition of specialized I/O, storage, and FPGA modules. Optional removable solid state drives allow large amounts of data storage plus quick security access.

Key Features & Benefits

- 4th Generation Intel Core i7
- Programmable power limits
- IP67 NEMA rating
- MIL-STD-810F environmental specification
- Optional power filter
- Wide range DC input power
- Provides access to standard computer peripherals via Type 6 COM Express CPU
- Ports available - varies by model
  Two HDMI/DVI ports or three display ports
  One VGA port
  Three or two USB 2.0 ports
  One SATA port
  Two Gigabit Ethernet ports
  Two COM RS232/485 ports
- Audio
- Fault/Status LED
- Two mPCIe/mSATA slots
- PMC/XMC expansion
- Dual/Quad SSD drive bay (optional)
- Two or four SATA SSD drive bays

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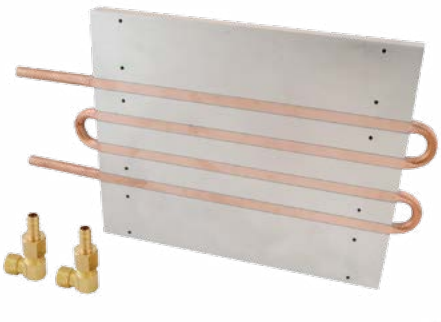
Embedded Computers

ARCX-4000 Rugged, Small Form Factor Embedded Computer

Air-cooled configuration (800 LFPM required) with finned heatsink provides consistent heat extraction from the double-wide ARCX System without the need for a cold plate.



Liquid cooled flow-through plate provides a mounting surface that allows consistent heat extraction from the single or double-wide ARCX System.

Removable solid-state option supports two 2.5" drives (not included). Drives support Raid 0 and 1 (software). IP67 standard is maintained.

Air-cooled assembly, part number ATMD-02.

Quad solid-state option supports 2.5" drives (not included). Drives support Raid 5 (software). High-speed connectors for XMC expansion.

CPU I/O Peripheral Breakout Cable, part number 5028-556.

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AcroPack® Series Selection Guide

Series Number	Inputs	Outputs	Comments
Analog Modules			
AP220 / AP231		16 channels	12-bit / 16-bit DAC; -40 to +85°C
AP225 / AP235		16 channels	12-bit / 16-bit DAC with waveform memory; -40 to +75°C
AP226 / AP236		8 isolated channels	12-bit / 16-bit DAC; -40 to +85°C
AP323	High-density; 20 differential or 40 single-ended channels		16-bit ADC; -40 to +85°C
AP341	Eight simultaneous sample-and-hold channels		14-bit ADC; -40 to +85°C
AP342	Six simultaneous isolated channels		14-bit ADC; -40 to +85°C
Digital Modules			
AP408	32 bidirectional high-voltage channels		TTL, 0 to 60V DC; -40 to +85°C
AP418	16 channels		Source/sink; -40 to +85°C
AP441	32 isolated channels		-40 to +85°C
AP445		32 isolated bipolar solid-state relays	0 to ±60V voltage range; -40 to +85°C
AP471	48 bidirectional channels, TTL	48 bidirectional channels, CMOS	0 to 5V DC; -40 to +85°C
Counter/Timer Modules			
AP482 / AP483 / AP484	Ten TTL channels / Five TTL and three RS422 channels / Six RS422 channels		32-bit; -40 to +85°C
Communication Modules			
AP500 / AP520	Four / eight RS232 ports		256-byte FIFOs; -40 to +85°C
AP512 / AP513	Four isolated asynchronous, full duplex RS232 / RS422B serial ports (supports RS485)		256-byte FIFOs; -40 to +85°C
AP522	Eight RS422/485 asynchronous serial ports		256-byte FIFOs; -40 to +85°C
AP560A	Four isolated CAN channels		-40 to +71°C
AP570	One dual redundant MIL-STD-1553 communication channel		Single or multi-function options; -40 to +85°C
AP580	Single Ethernet port		1Gb Ethernet with optional PoE; -40 to +70°C
Reconfigurable Xilinx® FPGA Modules			
APA7-501 / 502 / 503 / 504	48 TTL / 24 RS485/422 / 24 TTL & 12 RS485/422 / 24 LVDS channels. 52k logic cells.		Artix-7®, -40 to +85°C
APZU-301 / 303 / 304	28 TTL / 20 TTL and three RS485/422 / 14 LVDS channels. Up to 154k logic cells.		Zynq® Ultrascale + MPSoC. Dual-core ARM Cortex A53-based application processor unit (APU).
Multi-function Modules			
AP730	16 bidirectional digital I/O, one multi-funciton 32-bit counter/timer. Eight analog diffferential inputs, four analog outputs.		
Carrier Cards			
ACEX4041	COM Express Type 10 Mini ITX, holds four AP modules. Front panel I/O		Development Lab System option, -40 to +85°C
APCe7012 / 22 / 40 / 43	PCI Express carrier; holds up to four AP modules	Front panel I/O	APCe7043 is 3/4-length ; -40 to +85°C
ACPS3310 / 20	3U CompactPCI Serial carrier; holds two AP modules	Front *or* rear panel I/O	Isolated, -40 to 85°C
VPX4500	3U VPX Bus carrier; holds three AP modules	Front *or* rear panel I/O	Air or conduction-cooled options; -40 to +85°C
VPX4520 / 21	6U VPX Bus carrier; holds four AP modules and one XMC module	Front *or* rear panel I/O	Air or conduction-cooled options; -40 to +85°C
XMCAP2020 / 21 / 22	XMC carrier; holds two AP modules	Front *or* rear panel I/O	Air cooled; -40 to +70°C
Software Support			
APSW-API-VXW / WIN / LNX	VxWorks™ software support package / Windows® DDL driver software support package / Linux® support (website download only)		

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