Acromag: The I/O Leader

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.

60+ Years of I/O Experience

With over 60 years of industrial I/O design experience, Acromag stands alone in the high-performance bus-board market. Developing VMEbus I/O boards since 1984, we combine our process control expertise with extensive experience in embedded computing. This background gives us unrivaled insight to many unique concerns when interfacing computer systems to various sensors and controllers in a wide range of applications.

Acromag processor, FPGA, and I/O products are commonly used in these industries:

- military/defense
- transportation
- semiconductors
- communication
- aerospace
- manufacturing
- scientific
- research labs

Quality You Can Count On

We take every measure to guarantee dependable operation with ISO9001 and AS9100 certified quality management. State-of-the-art manufacturing with industrial-grade components adds extra ruggedness. Advanced inspection and testing further ensure that Acromag I/O performs at or beyond their rated specs.

Technical Support

Drawing on a wealth of embedded I/O experience, our sales engineers are well qualified to support you in the use of our products in your end-applications. We take pride in our highly experienced staff that excels at after-sale technical support.

Global Representation

Great care has been put into building a team of highly skilled representatives and distributors. They are located around the world to service your needs.

Online Ordering

Find full documentation and pricing information online. You can get quotes and even order directly on our website.

Experience counts–especially when engineering the right embedded solution. And with more than 60 years experience, Acromag can help you reduce your costs and increase your productivity.
If you’re one of the thousands who depends on the continued use of your VMEbus systems you can feel confident that Acromag is there for you. This single board computer updates your legacy systems with an Intel processor that will deliver significant performance advancements such as: enhanced microarchitecture, integrated graphics, and expanded memory performance with up to 16GB of high-bandwidth DDR3L memory and ECC memory controllers.

The XVME-6510 will add 7 to 10 years of life to your system with modern technology. This high-performance SBC features a FPGA-based VME to PCIe-bridge that solved the end of life issue with the TSI148 VME interface chip.

Cutting-edge technology features programmable power limits allowing the user to “dial-down” the maximum power consumption of the CPU in heat sensitive applications.

Ruggedized SODIMM 16GB removable memory is surrounded by heat sink material to provide a mechanically and thermally robust mechanism. The SODIMM is secured with four screws so it is easy to replace faulty memory.

The XVME-6510 also takes advantage of Intel Advanced Vector Extensions 2.0 for enhanced performance on floating point-intensive applications and Hyper-Threading Technology that enables each core to use two software threads for more efficient use of the CPU.

Key Features & Benefits

- 4th Generation Intel Core:  
  - Quad Core i7 CPU for high performance (47W)
- Programmable CPU power for heat sensitive applications
- FPGA-based VME to PCIe bridge
- Intel 8-Series QM87 PCH bridge
- Up to 16GB of high-speed DDR3L memory with SODIMM lock-down mechanism
- Front panel I/O includes:
  - dual USB 2.0 ports
  - VGA (switched w/rear)
  - dual Gb Ethernet ports thru RJ Point 5 connector
  - RS-232 port
- Backplane I/O includes:
  - dual Gigabit Ethernet (on optional P0)
  - dual SATA ports & dual USB ports
  - DVI-D
  - RS-232/422/485
  - VGA (switched with front)
- XBRD-9060 expansion module adds:
  - dual USB 2.0 ports
  - Gigabit Ethernet port (switched with one of the rear ports)
  - RS-232 port
  - dual mSATA drives
- Power-on self test (POST) code LCD display

Intel® i7 CPU ◆ Up to 16GB DDR3L ECC RAM ◆ BIOS Selectable Byte Swapping

Expansion Capabilities

In addition to a comprehensive range of front panel and backplane I/O features, the XVME-6510 offers increased expansion capabilities through two PMC/XMC sites on the board.

In lieu of one PMC/XMC module, the optional XBRD-9060 expansion I/O carrier module may be installed. The XBRD-9060 allows for two SSD mSATA drives, as well as another Gigabit Ethernet port, RS-232 port, and two USB 2.0 ports.

The XVME-9640 rear transition module is also available for further storage, networking, and easy access to the P2 connector I/O.

Operating System Software

VxWorks, Linux and Windows

Extensive Support

With over 60 years experience, more than 35 of those years working with defense and military contracts, we are focused on providing embedded computing solutions for the best long term value in the industry.

Designed and manufactured in the USA, with a 2-year standard warranty.
XVME-6510  6U VME Intel® Core™ i7 Air Cooled Processor Board

Performance Specifications

■ Processor and Memory
  Processor
  Intel Core™ i7 processor.
  (4th generation, codename Haswell). The CPU allows programming a lower power limit in the BIOS setup allowing use in applications where less power is available or heat removal is an issue.
  i7-4700EQ:  2.4GHz, quad core, 6Mb cache, 47W.
  Chipset
  Intel 8-Series QM87 PCH chipset.
  Intel DH82QM87 Platform Controller Hub.
  Memory
  16GB of 1600 DDR3L ECC memory.

■ Bus Compliance
  VMEbus Interface
  P1 and P2 connectors are compatible with VME64x.
  VME Master/Slave using FPGA-based VME to PCIe bridge.
  A32/A24/A16/D32/D16/D8, MBLT64, 2eVME/2e5ST.
  Dual PMC/XMC Sites
  32/64-bit, 33/66/133MHz sites (IEEE P1386/P1386.1).
  Front panel I/O bezel and P4 module user I/O on optional P0 rear connector and P2 connector.
  (XMC module P16 connector I/O optionally available on P0 connector, please consult the factory).
  XMCs are PCIe x8.
  Option to replace PMC/XMC #2 with the XBRD-9060.

■ System Integrity
  A two-digit LED display is available for power-on self test (POST) codes for problems during the boot operation. It can then be used for application software user codes to aid in software debugging.

■ Form Factor
  6U VMEbus 9.2" (233mm) x 6.3" (160mm).

■ Optional Expansion
  XBRD-9060
  Allows more I/O to the front panel, as well as mSATA SSD modules to be added for storage. Front panel I/O available are Gb Ethernet, RS-232 serial port, and two USB ports.
  The XBRD-9060 also contains two mSATA sockets that allow two SSD drives to be added while still remaining within a single VME slot. Using the software RAID functionality of the QM87 PCH, these drives can even be setup as a RAID 0/1 array if redundancy or extra speed is desired.
  XVME-9640
  Installed onto the rear slot directly behind the XVME-6510 to easily access all of the available I/O on the P2, and optionally P0 connectors, as well as allow mSATA SSD modules to be added for storage. Front panel I/O available are two Gb Ethernet ports, one VGA port, one DVI-D port, and two USB ports. Internal connectors are also available. Please see the manual for more information.

■ Environmental
  Operating temperature
  Standard temperature models: 0 to 70°C*.
  Extended temperature models: -40 to 75°C*.
  * w/ 300 lfm airflow; depends on application - see manual for details.
  Storage temperature
  -55 to 85°C.
  Relative humidity
  5% to 95% at 60°C non-condensing.
  Power Inputs from backplane
  Quad Core i7
  5V (5V only backplane): 89W maximum, 53W typical.
  5V (5V +3.3V backplane): 86W max., 50W typical.
  3.3V (optional): 3W.
  +/12V: Used only for PMC/XMC.

Ordering Information

XVME-6510-1160-LF
6U VME SBC, P0
XVME-6510-1160E-LF
6U VME SBC, P0, extended operating temperature
XVME-6510-1161-LF
6U VME SBC, no P0
XVME-6510-1161E-LF
6U VME SBC no P0, extended operating temperature
XVME-6510-1162-LF
6U VME SBC, P0, no battery
XVME-6510-1162E-LF
6U VME SBC, P0, ext. operating temp., no battery
XVME-6510-1163-LF
6U VME SBC, no P0, no battery
XVME-6510-1163E-LF
6U VME SBC no P0, ext. operating temp., no battery
Note: Please contact the factory for conduction-cooled models.

■ Accessories
  For more information, see www.acromag.com.
  XBRD-9060-LF
  Expansion I/O Carrier Module for XVME-6510
  XVME-9640-LF
  6U VMEbus Rear Transition Module with P0 connector
  XVME-9640-LF
  6U VMEbus Rear Transition Module without P0 connector

■ Cable Set
  5028-568
  Cable adapter: RJ Point 5 Male to RJ45 Female, 6 in
  5028-572
  Cable adapter: 26-pin to 2 USB, VGA, Serial, 18 in

■ Software Development Tools
  Board support package includes driver and integration directions.
  XVME-6500/6700-BSP-LNX
  Linux board support package
  XVME-6500/6700-BSP-VXW
  VxWorks board support package
  XVME-6500/6700-BSP-WIN
  Windows board support package

■ Related Products
  XMC FPGA modules
  PMC FPGA modules
Single Board Computers

**XVME-6700 6U VME Intel® Celeron® 2002E Air-Cooled Processor Board**

**Description**
If you’re one of the thousands who depends on the continued use of your VMEbus systems you can feel confident that Acromag is there for you. This single board computer updates your legacy systems with an Intel processor that will deliver an enhanced microarchitecture, integrated graphics, and expanded memory performance with 8 GB of high-bandwidth DDR3L memory and ECC memory controllers.

The XVME-6700 will add 7 to 10 years of life to your system with modern technology. This high-performance SBC features a FPGA-based VME to PCIe bridge that solves the end of life issue with the TSI148 VME interface chip.

Ruggedized SODIMM removable memory is surrounded by heat sink material to provide a robust hold-down mechanism. The SODIMM is secured with four screws so it is easy to replace faulty memory.

**Operating System Software**
Linux, VxWorks and Windows 7+

Advanced Vector Extensions 2.0 for enhanced performance on floating point-intensive applications and Hyper-Threading Technology that enables each core to use two software threads for more efficient use of the CPU.

**Expansion Capabilities**
In addition to a comprehensive range of front panel and backplane I/O features, the XVME-6700 offers increased expansion capabilities through two PMC/ XMC sites on the board.

In lieu of one PMC/XMC module, the optional XBRD-9060 expansion I/O carrier module may be installed. The XBRD-9060 allows for two SSD mSATA drives, as well as another Gigabit Ethernet port, RS-232 port, and two USB 2.0 ports.

The XVME-9640 rear transition module is also available for storage, networking, and easy access to the P2 connector I/O.

**Extensive Support**
With over 60 years’ experience, more than 35 of those years working with defense and military contracts, we are committed to providing embedded solutions for the best long term value in the industry.

Designed and manufactured in the USA, this product comes with a 2-year warranty.

**Key Features & Benefits**
- Celeron-based board for cost-sensitive applications
- FPGA-based VME to PCIe bridge
- Intel 8-Series QM87 PCH chipset
- 8GB of high-speed DDR3L memory with SODIMM lock-down mechanism standard (16GB optional)
- Front panel I/O includes:
  - dual USB 2.0 ports
  - VGA (switched w/ rear)
  - dual Gb Ethernet ports thru RJ Point 5 connector
  - RS-232 port
- Backplane I/O includes:
  - dual Gigabit Ethernet (on optional P0)
  - dual SATA ports & dual USB ports
  - DVI-D
  - RS-232/422/485
  - VGA (switched with front)
- XBRD-9060 expansion module adds:
  - dual USB 2.0 ports
  - Gigabit Ethernet port (switched with one of the rear ports)
  - RS-232 port
  - dual mSATA drives
- Power-on self-test (POST) code LCD display

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

Bulletin #B400-870f
### XVME-6700 6U VME Intel® Celeron® 2002E Air-Cooled Processor Board

#### Performance Specifications

- **Processor and Memory**
  - **Processor**: Intel® Celeron® Processor 2002E (2M Cache, 1.50 GHz).
  - **Chipset**: Intel 8-Series QM87 PCH chipset.
  - **Memory**: 8GB of 1600 DDR3L ECC memory.
  - **Flash Memory**: 8GB standard.
- **Software Support**: VxWorks, Linux and Windows 7+.
- **Bus Compliance**
  - **VMEbus Interface**: P1 and P2 connectors are compatible with VME67x VME Master/Slave using FPGA-based VME to PCIe bridge.
  - **A32/A24/A16/D32/D16/D8, MBLT64, 2eVME/2eSST**.
  - **Dual PMC/XMC Sites**: 32/64-bit, 33/66/133MHz sites (IEEE P1386/P1386.1).
  - **Front panel I/O bezel and P4 module user I/O on optional P0 rear connector and P2 connector.** (XMC module P16 connector I/O optionally available on P0 connector, please consult the factory). XMCs are PCIe x8.
- **System Integrity**
  - A two-digit LED display is available for power-on self test (POST) codes for problems during the boot operation. It can then be used for application software user codes to aid in software debugging.
- **Form Factor**
  - 6U VMEbus 9.2” (233mm) x 6.3” (160mm).

#### Optional Expansion

- **XBRD-9060**
  - Allows more I/O to the front panel, as well as mSATA SSD modules to be added for storage. Front panel I/O available are Gb Ethernet, RS-232 serial port, and two USB ports.
  - The XBRD-9060 also contains two mSATA sockets that allow two SSD drives to be added while still remaining within a single VME slot. Using the software RAID functionality of the QM87 PCH, these drives can even be setup as a RAID 0/1 array if redundancy or extra speed is desired.

- **XVME-9640**
  - Installed onto the rear slot directly behind the XVME-6700 to easily access all of the available I/O on the P2, and optionally P0 connectors, as well as allow mSATA SSD modules to be added for storage. Front panel I/O available are two Gb Ethernet ports, one VGA port, one DVI-D port, and two USB ports. Internal connectors are also available. Please see the user manual for more information.

#### Environmental

- **Operating temperature**
  - Standard temperature models: 0 to 70°C*.
  - Extended temperature models: -40 to 75°C*.
  - * application dependent - see manual for details.
- **Storage temperature**
  - -55 to 85°C.
- **Relative humidity**
  - 5% to 95% at 60°C non-condensing.
- **Power Inputs from backplane**
  - Dual Core Celeron.
  - 5V (5V only backplane): 53W typical to 53W maximum, 37.5W typical.
  - 5V (5V +3.3V backplane): 50W typical to 50.5W maximum, 35W typical.
  - 3.3V (optional): 3W.
  - +/-12V: Used only for PMC/XMC.

#### Accessory

- **Expansion I/O Carrier Module**
  - XBRD-9060-LF
- **6U VMEbus Rear Transition Module with P0 connector**
  - XVME-9640-1-LF
- **6U VMEbus Rear Transition Module without P0 connector**
  - XVME-9640-2-LF
- **Cable Set**
  - 5028-568: Cable adapter: RJ Point 5 Male to RJ45 Female, 6 in
  - 5028-572: Cable adapter: 26-pin to 2 USB, VGA, Serial, 18 in
- **Software Development Tools**
  - Board support package includes driver and integration directions.
  - XVME-6500/6700-BSP-LNX
  - Linux board support package
  - XVME-6500/6700-BSP-VXW
  - VxWorks board support package
  - XVME-6500/6700-BSP-WIN
  - Windows BSP for XVME-6500 and XVME-6700
  - IPSW-A7VME-LNX
  - Linux example libraries for models XVME-6510 & XVME-6700 and VME carriers.

#### Ordering Information

- **XVME-6700-7080-LF**
  - 6U VME SBC, P0
- **XVME-6700-7082-LF**
  - 6U VME SBC, P0, no battery
- **XVME-6700-7080E-LF**
  - 6U VME SBC, P0, extended operating temperature
- **XVME-6700-7082E-LF**
  - 6U VME SBC, P0, ext. operating temp., no battery
- **XVME-6700-7081-LF**
  - 6U VME SBC, no P0
- **XVME-6700-7083-LF**
  - 6U VME SBC, no P0, no battery
- **XVME-6700-7081E-LF**
  - 6U VME SBC no P0, extended operating temperature
- **XVME-6700-7083E-LF**
  - 6U VME SBC no P0, ext. operating temp., no battery

**Note:** Please contact the factory regarding conduction-cooled models.

#### Related Products

- XMC FPGA modules
- PMC FPGA modules
AVME967x  VME64 6U, Non-intelligent, IP Carrier Cards

Holds four IP modules ◆ VME64 high-density rear connectors ◆ Geographical or user-defined addressing

Description
The AVME9670 and AVME9675 are non-intelligent slave boards that interface up to four IP modules to the VMEbus. The only difference is that the AVME9675 adds fully implemented geographical addressing. Both are full-height (6U) IP carrier cards that use VME64-compliant connectors to increase the quantity of rear I/O connections beyond that of standard VME.

When used with a VME64 backplane, the AVME9670 brings all 200 I/O points out the rear P0 and P2 connectors. This convenience eliminates messy cables from hanging out the front of the cage. In addition to a cleaner cage design, it is also much easier to insert and replace boards into the system.

Acromag's carrier boards provide full data access to the IP module's I/O, ID and memory spaces. With full access to the programmable registers, you can easily configure and control the operation of the IP modules from the VMEbus.

Up to two interrupt requests are supported for each IP module. The VMEbus interrupt level is software programmable.

Individual passive filters on each IP module power supply line provide optimum filtering and isolation between the IP modules and the carrier board.

Key Features & Benefits
- Four industry-standard IP module slots (two IP slots on AVME9675-2 models)
- 200 I/O points with rear access
- VME64x high-density rear connectors
- Full geographical addressing (AVME9675 only)
- Two interrupts per IP module
- Individually filtered and fused power to each IP
- Front panel status LEDs

See www.acromag.com/industrypack for Industry Pack modules
Industry Pack Carriers

**AVME967x** VME64 6U, Non-intelligent, IP Carrier Cards

### Performance Specifications

- **IP Compliance (ANSI/VITA 4)**
  - Electrical/mechanical interface:
    - Supports single or double size IP modules.
    - 32-bit IP modules are not supported.
    - I/O space and ID space supported.
  - Memory space: Supports 1MB to 8MB per IP module.
  - Interrupts: Supports two interrupt requests per IP module and interrupt acknowledge cycles, D16/D08(O).

- **VMEbus Compliance**
  - Data transfer bus: A24/A16:D16/D08(EO) DTB slave; supports Read-Modify-Write cycles.
  - Interrupts: Creates I(1-7) programmable request levels (up to two requests sourced from each IP module).
  - Supports D16/D08(O) round-robin hardware interrupt prioritization of IP sources. Carrier registers support interrupt control and status monitoring. Interrupt release mechanism is Release on Register Access (RORA) type.

- **Physical**
  - **Physical Configuration**
    - Length: 9.187 inches (233.3 mm).
    - Width: 6.299 inches (160.0 mm).
    - Board Thickness: 0.062 inches (1.59 mm).
    - Max Component Height: 0.550 inches (13.97 mm).
    - Recommended Card Spacing: 0.800 inches, (20.32 mm).
  - **Connectors**
    - P1 & P2 (VME64x bus): DIN 41612 160-pin Type C, Level II.
    - P0 (VME64x bus): J3 Type B, Right-Angle Female 95-contacts, with upper ground shield.
    - P3, 5, 7, 9 (IP Field I/O): 50-pin male plug header (AMP 173280-3 or equivalent).
    - P4, 6, 8, 10 (IP Logic Interface): 50-pin male plug header (AMP 173280-3 or equivalent).

### Environmental

- **Operating temperature** 0 to 70°C (AVME9670/75) or -40 to 85°C (AVME9670E/75E models).
- **Storage temperature** -25 to 85°C (AVME9670/75) or -40 to 85°C (AVME9670E/75E models).
- **Relative humidity** 5 to 95% non-condensing.
- **Power**
  - +5V (+5%): 525mA maximum.
  - ±12V (+5%): 0mA (not used).
  - Plus IP module load.
- **MTBF**

### Ordering Information

- **Carrier Card**
  - **AVME9670**
    - VME64x 6U carrier, user-defined addressing.
    - Holds four IP modules.
  - **AVME9670E**
    - Same as AVME9670 plus extended temperature range.
  - **AVME9670-2**
    - Same as AVME9670 except it holds two IP modules (no P0 connector).
  - **AVME9670-2E**
    - Same as AVME9670-2 plus extended temperature range.
  - **AVME9675-2**
    - Same as AVME9675-4 except it holds two IP modules (no P0 connector).
  - **AVME9675-2E**
    - Same as AVME9675-2 plus extended temperature range.
  - **AVME9675-4**
    - Same as AVME9670 plus geographical addressing.
    - Holds four IP modules.
  - **AVME9675-4E**
    - Same as AVME9675-4 plus extended temperature range.

### Accessories

- **5028-187**
  - Cable: Shielded, SCSI-2 to flat 50-pin connector. 6 feet.
- **5028-552**
  - Termination panel, 50-pin connector, 50 screw terminals, DIN rail-mount.
- **TRANS-200**
  - Transition module.

### IP Modules

See [www.acromag.com/industrypack](http://www.acromag.com/industrypack) for more information.

### Software Development Tools

- **IPSW-API-LNX**
  - Linux example libraries for Industry Pack modules and PCI/CompactPCI carrier cards.
- **IPSW-API-VXW**
  - Deluxe Library (I/O function routines for VxWorks® 6.x 32-bit, x86, PowerPC, and other RTOS environments), CD-ROM
- **IPSW-API-WIN**
  - 64-bit and 32-bit Windows® DLL driver and demonstration software for Industry Pack Modules, PCI, and cPCI carriers.

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Industry Pack Carriers

AVME9668  VMEbus 6U, Non-intelligent, IP Carrier Cards

Holds four IP modules  ◆  Front panel SCSI-2 connectors  ◆  Supports 8MHz and 32MHz clocks

Description

The AVME9668 is a non-intelligent slave board that interfaces IP modules to the VMEbus. The full-height (6U) board holds four IP modules. All field I/O connections are made through the front panel of the carrier board.

This carrier card is ready for rugged, high-performance applications. The front-panel SCSI-2 connectors provide screw-down or spring latch connections to hold cables securely. And with support for 8MHz and 32MHz clocks, you can process data at very high speeds.

Acromag’s carrier boards provide full data access to the IP module’s I/O, ID and memory spaces. With full access to the programmable registers, you can easily configure and control the operation of the IP modules from the VMEbus.

Up to two interrupt requests are supported for each IP module. The VMEbus interrupt level is software programmable.

Individual passive filters and fuses on each IP module power supply line provide optimum filtering between the IP modules and the carrier board.

Key Features & Benefits

◆ 6U VMEbus card holds four IP modules
◆ Industry-standard IP module interface
◆ Front panel SCSI-2 connectors for field I/O signals
◆ Supports two interrupt channels per IP
◆ Provides individually fused and filtered +5V, +12V, and -12V DC power lines to each IP module
◆ Accepts other manufacturers’ IP modules
◆ Accommodates 8MHz and 32MHz IP clocks
◆ Up to 8MB of memory space per IP module
◆ Full IP module data access enables convenient software configuration and control of the IP modules.
◆ Front panel connectors provide shielded SCSI-2 cable connections to field I/O for maximum noise immunity.
◆ SCSI-2 cables lock down for secure connections.
◆ 32MHz clock support allows faster data processing.

See www.acromag.com/industrypack for Industry Pack modules
Industry Pack Carriers

AVME9668  VMEbus 6U, Non-intelligent, IP Carrier Cards

Performance Specifications

- IP Compliance (ANSI/VITA 4)
  Meets IP specifications per ANSI/VITA 4-1995. Electrical/mechanical interface:
  Supports single or double size IP modules. 32-bit IP modules are not supported.
  I/O space and ID space supported.
  Memory space: Supports 1MB to 8MB per IP module.
  8 and 32MHz IP modules are supported.
  Interrupts: Supports two interrupt requests per IP module and interrupt acknowledge cycles, D16/
  D08(O).

- VMEbus Compliance
  Data transfer bus: A24/A16:D16/D08(EO) DTB slave; supports Read-Modify-Write cycles.
  Interrupts: Creates (1-7) programmable request levels (up to two requests sourced from each IP module).
  D16/D08(O) interrupter (interrupt vectors come from IP modules). Carrier registers are for control and status monitoring.
  Interrupt release mechanism is Release on Register Access (RORA) type.

Physical

Physical Configuration
Length: 9.187 inches (233.3 mm).
Width: 6.299 inches (160.0 mm).
Board Thickness: 0.062 inches (1.59 mm).
Connectors
P1, 2 (VMEbus): DIN 41612 96-pin Type C, Level II. P2 has no connections.
A-D (Carrier field I/O): 50-pin female SCSI-2 connectors.
P3, 5, 7, 9 (IP field I/O): 50-pin male plug header (AMP 173280-3 or equivalent).
P4, 6, 8, 10 (IP logic interface): 50-pin male plug header (AMP 173280-3 or equivalent).

Environmental
Operating temperature 0 to 70°C (AVME9668) or -40 to 85°C (AVME9668E models).
Storage temperature -25 to 85°C (AVME9668) or -40 to 85°C (AVME9668E models).
Relative humidity 5 to 95% non-condensing.
Power +5V (±5%): Consult factory. ±12V (±5%): 0mA (not used). Plus IP module load.

Ordering Information
Carrier Card
AVME9668
VMEbus 6U carrier board, holds four IP modules, front panel SCSI-2 connectors.

Accessories
5028-378
Termination panel, DIN-rail mount, 50 screw terminals, SCSI-2 connector.
5028-438
Round cable, shielded, SCSI-2 50-pin connectors, 6 feet long.

IP Modules
See www.acromag.com/industrypack for more information.

Software Development Tools
IPSW-API-LNX
Linux example libraries for Industry Pack modules and PCI/CompactPCI carrier cards.
IPSW-API-VXW
Deluxe Library (I/O function routines for VxWorks® 6.x 32-bit, x86, PowerPC, and other RTOS environments), CD-ROM
IPSW-API-WIN
64-bit and 32-bit Windows® DLL driver and demonstration software for Industry Pack Modules, PCI, and cPCI carriers.
**Industry Pack Carriers**

**AVME9660A** VMEbus 6U, Non-intelligent, IP Carrier Cards

**Description**

The AVME9660A is a non-intelligent slave board that interfaces Industry Pack (IP) modules to the VMEbus. The full-height (6U) board holds four IP modules. All field I/O connections are made to the carrier board.

Acromag’s carrier boards provide full data access to the IP module’s I/O, ID and memory spaces. With full access to the programmable registers, you can easily configure and control the operation of the IP modules from the VMEbus.

Up to two interrupt requests are supported for each IP module. The VMEbus interrupt level is software programmable.

Individual passive filters on each IP module power supply line provide optimum filtering and power isolation between the IP modules and the carrier board.

**Key Features & Benefits**

- Full IP module data access enables convenient software configuration and control of the IP modules.
- Front panel LEDs simplify debugging with a visual indication of successful IP accesses.
- Front panel connectors provide ribbon cable access to field I/O without interference from boards in adjacent slots.

**Holds four IP modules** ◆ **Supports 1MB-8MB memory per IP module** ◆ **Front panel connectors**

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**Diagram**

- VME BUS
- P1
- +3.3
- +5
- -12
- +12
- RST#
- INTA#
- C/BE(0-3)#
- IDSEL
- FRAME#
- RDY#
- DEVSEL#
- AD(0-31)
- LOCK#
- PERR#
- SERR#
- STOP#
- PAR

**FPGA**

- CARRIER STATUS REGISTER
- INTERRUPT CONTROL AND STATUS REGISTERS
- IP MODULE ERROR STATUS
- IP MEMORY SPACE REGISTERS
- CARRIER CONTROL REGISTERS

**Termination panel & cable**

**Industry Pack modules**

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844-878-2352  ■  solutions@acromag.com  ■  www.acromag.com  ■  30765 Wixom Rd, Wixom, MI 48393 USA

Bulletin #8400-942b
Industry Pack Carriers

AVME9660A VMEbus 6U, Non-intelligent, IP Carrier Cards

Performance Specifications

- **IP Compliance (ANSI/VITA 4)**
  Meets IP specifications per ANSI/VITA 4-1995.
  Electrical/mechanical interface: Supports single or double size IP modules. 32-bit IP modules are not supported.
  I/O space and ID space supported.
  Memory space: Supports 1MB to 8MB per IP module.
  Interrupts: Supports two interrupt requests per IP module & interrupt acknowledge cycles, D16/D08(O).

- **VMEbus Compliance**
  Data transfer bus: A24/A16:D16/D08(EO) DTB slave; supports Read-Modify-Write cycles.
  Interrupts: Creates (1-7) programmable request levels (up to two requests sourced from each IP module). D16/D08(O) interupter (interrupt vectors come from IP modules). Carrier registers are for control and status monitoring. Interrupt release mechanism is Release on Register Access (RORA) type.

- **Physical**
  **Physical Configuration**
  - Length: 9.187 inches (233.3 mm).
  - Width: 6.299 inches (160.0 mm).
  - Board Thickness: 0.062 inches (1.59 mm).
  - Max Component Height: 0.550 in. (13.97 mm)
  - Recommended Card Spacing: 0.800 inches (20.32mm)

  **Connectors**
  - P1 (VMEbus): DIN 41612 96-pin Type C, Level II
  - P2 (VMEbus): Not Used.
  - A-D (Carrier Field I/O): 50-pin Male Header x2 stacked "condo type" 3M 3433-D303 with ejector latches

- **Environmental**
  **Operating temperature**
  - 0 to 70°C (AVME9660A-LF)
  - -40 to 85°C (AVME9660AE-LF models).

  **Storage temperature**
  - -55 to 100°C.

  **Relative humidity**
  - 5 to 95% non-condensing.

  **Power**
  - +5V (±5%): 0.233A typical, 0.275A maximum.
  - ±12V (±5%): 0mA (not used).
  - Plus IP module load.

  **MTBF**
  Contact the factory

Ordering Information

- **Carrier Card**
  - AVME9660A-LF*
    - VMEbus 6U carrier board, holds four Industry Pack modules.
  - AVME9660AE-LF*
    - VMEbus 6U carrier board, holds four Industry Pack modules. Extended temperature. (-40 to 85°C)

* The AVME9660A is designed as a fit, form and functional replacement of the AVME9660.

- **Accessories**
  - 5025-550
    - Cable, unshielded, 50-pin header both ends
  - 5025-552
    - Termination panel, 50-pin connector, 50 screw terminals

- **IP Modules**
  See [www.acromag.com/industrypack](http://www.acromag.com/industrypack) for more information.

- **Software Development Tools**
  - IPSW-API-LNX
    - Linux example libraries for Industry Pack modules and PC/CompactPCI carrier cards.
  - IPSW-API-VXW
    - Deluxe Library (I/O function routines for VxWorks® 6.x 32-bit, x86, PowerPC, and other RTOS environments), CD-RROM
  - IPSW-API-WIN
    - 64-bit and 32-bit Windows® DLL driver and demonstration software for Industry Pack Modules, PCI, and cPCI carriers.
Variety of additional connectors to access I/O from P2 and optionally P0

**Description**

**Models:** XVME-9640-1-LF
**Models:** XVME-9640-2-LF

Acromag’s XVME-9640 rear transition module adds a variety of I/O connectors to the XVME-6400, XVME-6510 or the XVME-6700. The XVME-9640 module may be installed into the rear slot directly behind the XVME-6500 to easily access all of the available I/O on the XVME 6500’s P2, and optionally P0 connectors, as well as allow mSATA SSD modules to be added for storage.

The XVME-9640 contains two mSATA sockets that allow two SSD drives to be added while still remaining within a single VME slot. Using the software RAID functionality of the QM87 PCH, these drives can even be setup as a RAID0/1 array if redundancy or extra speed is desired.

**WARNING:** mSATA requires P0 on both the XVME-6500 and XVME-9640 for proper operation.

**Note:** The standard XVME-9640 cannot be used in a backplane that uses VITA 31.1 Ethernet. A custom build option is available that isolates the Ethernet lines for use in a VITA 31.1 system.

Please consult factory for this option.

I/O is available on the front panel of the XVME-9640:
- Two optional Gigabit Ethernet ports are available on the front panel’s optional RJ Point 5 connector
- One VGA port
- One DVI-D port
- Two USB 2.0 ports
- PMC/XMC I/O from P2

I/O is available via internal connectors on the XVME-9640:
- Stereo Audio Line-In & Line-Out
- One software-selectable RS-232/RS-485 serial port
- PMC/XMC I/O from RJ0 connector is available via two optional high-speed Samtec connectors

**Key Features & Benefits**

- I/O available on the board via standard connectors:
  - VGA
  - USB (2)
  - DVI-D
  - PMC I/O from P2
- Available via headers:
  - Audio RS-232/422/485 Serial (1)
- Additionally available*:
  - Ethernet (2) thru RJ Point 5 connector*
  - PMC I/O from P0*

*requires P0 connector

**Ordering Information**

**XVME-9640-1-LF**
Rear Transition Module with P0

**XVME-9640-2-LF**
Rear Transition Module without P0
**Linux® Libraries**  I/O Function Routines

### Description

**IPSW-API-LNX**  Support for Industry Pack modules and carriers

**PCISW-API-LNX**  Support for PC/CompactPCI boards and PMC modules

**APSW-API-LNX**  Support for AcroPack® modules and carriers

**Application Programming Interface (API)**

Acromag’s software development tools greatly simplify the interface between the I/O boards and your software application program. The Linux libraries are supplied as “C” source code. These libraries provide easy-to-use function routines that quickly integrate with your application. Function routines are ready for use “as-is,” but they are also easily customized for your unique application.

**Demonstration Program**

This powerful program lets you fully exercise the libraries and your hardware before running the actual application. These diagnostics will save you hours troubleshooting and debugging your applications. You can set addresses, set up registers, read real-world inputs, or drive outputs. The demonstration program steps you through the exact functions that are called in your application.

### Key Features & Benefits

- Easy installation procedure
- Readme files with step-by-step instructions
- Programming tools for most Acromag I/O boards (excludes serial I/O and VME products)
- Demonstration program
- Downloadable at no charge from the Acromag website
- Source code provided to ensure maximum flexibility in implementing your driver
- Verify operation of your I/O modules and carrier cards with a demonstration program to ensure proper hardware operation before attaching your application

### Ordering Information

**NOTE:** This unsupported software is available ONLY by download from Acromag’s website.

- **IPSW-API-LNX**  Linux example libraries for Industry Pack modules and PCI/CompactPCI carrier cards
- **PCISW-API-LNX**  Linux example libraries for PCI, CompactPCI, and PMC modules.
- **APSW-API-LNX**  Linux example libraries for AcroPack modules and carriers.
**Description**

**Application Programming Interface**
Acromag’s software development tools greatly simplify the interface between the I/O boards and your Windows-based application program. These packages provide DLL driver level support for Acromag’s line of Industry Pack products. In addition, “C” source demonstration programs provide easy-to-use tools to test the operation of the module.

**Demonstration Programs**
Powerful programs let you fully exercise your hardware before developing the actual application. These diagnostics will save you hours troubleshooting and debugging your applications. You can set addresses, set up registers, read real-world inputs, or drive outputs. The demonstration programs step you through the exact functions that are called in your application.

**Key Features & Benefits**
- Easy installation procedure
- Documentation with step-by-step instructions
- Support for active Acromag Industry Pack I/O and Industry Pack FPGA modules and carriers
- Support for 32-bit and 64-bit systems
- Demonstration Programs
- Driver level support for desktop and embedded Windows level programming environments
- Compatible with Windows Embedded Standard applications
- Verifies operation of your I/O boards with a demonstration program to ensure proper hardware performance before attaching your application

**User-Friendly Licensing**
Acromag’s PCI Windows driver software is provided with a full site license. This allows anyone at your location to use this software without any additional charges. No run-time license is required.

You do not need to order additional software for different models within the family.

**Ordering Information**

**Software**
For more information, see www.acromag.com.

**APSW-API-WIN**
32-bit and 64-bit Windows driver software package with DLLs and demonstration programs for AcroPack products. Supports all active Acromag AcroPack products. Supplied on CD-ROM.

**IPSW-API-WIN**
32-bit and 64-bit Windows driver software package with DLLs and demonstration programs for Industry Pack products. Supports all active IP-based (Industry Pack modules, PCI carriers, & CompactPCI carriers) products. Supplied on CD-ROM.

**IPSW-VME-WIN**
32-bit and 64-bit Windows driver software package with DLLs and demonstration programs for Industry Pack products. Supports carrier models AVME9630, AVME9660, AVME9668, AVME9670 and all IP modules except IPSxx and XVME-6300 or XVME-6400 single board computers. Supplied on CD-ROM. (requires XVME board support package (BSP), sold separately)

NOTE: For PMC, XMC, PCI, and cPCI modules and carrier cards support software, please refer to PCISW-API-WIN.
Support Software

VxWorks® Libraries  I/O Function Routines

Supports any CPU target with quick modification  ◆  API easily convertible for any operating system

Description

Application Programming Interface (API)

Acromag’s software development tools greatly simplify the interface between the I/O boards and your software application program. VxWorks libraries are supplied as “C” source code. These libraries provide easy-to-use function routines that quickly integrate with your application. Function routines are ready for use “as-is,” but they are also easily customized for your unique application.

This powerful program lets you fully exercise the libraries and your hardware before running the actual application. These diagnostics will save you hours troubleshooting and debugging your applications. You can set addresses, set up registers, read real-world inputs, or drive outputs. The demonstration program steps you through the exact functions that are called in your application.

Target any CPU

Acromag provides direct support for VxWorks when using PowerPC, x86 and 68000 CPU boards. The VxWorks C Library includes support for x86 PCI, MV167 and MV2700 CPU boards. Each library contains detailed information on integrating with the CPU’s Board Support Package (BSP). The libraries also include instructions for implementing this software with other manufacturer’s CPU board BSPs. Use with Industry Pack carriers from third-party board vendors is also supported.

The IPSW-API-VXW library package offers support for Acromag carriers. Other carriers are compatible, but require some minor modifications. Acromag uses a very innovative modular programming technique. This allows new carrier files to be created without affecting any of the complex IP module files or interrupt service routines.

User-Friendly Licensing

Acromag’s VxWorks software libraries are provided with a full site license. This allows anyone at your location to use this software without any additional charges. Additionally, no run-time license is required either.

The VxWorks software libraries include support for the full family of boards or modules, not just certain models unless otherwise noted.

Key Features & Benefits

■ Easy installation procedure
■ Readme files with step-by-step instructions
■ Quickly creates libraries
■ Targeted support for Power PC, x86, and 68000 series CPUs
■ Supports any CPU target with quick modification
■ API easily convertible for any operating system
■ Source code provided to ensure maximum flexibility in implementing your application
■ Ability to verify operation of your modules and carriers with a demonstration program to ensure proper hardware operation before attaching your application

Ordering Information

APSW-API-VXW
VxWorks software support package for AcroPack modules and carriers

IPSW-A7VME-VXW
VxWorks software support package for Acromag VME SBC Series XVME6500 and XVME6700 when used with Industry Pack modules

IPSW-API-VXW
VxWorks software support package for Industry Pack modules and carriers

PMCSW-API-VXW
VxWorks software support package for PMC, PCI, and CompactPCI products (supports all Acromag PMC modules and PCI or cPCI boards except IP carriers)

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- Transmitters
- Converters

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- PCB assembly
- Surface mount technology
- Conformal coating & more