

## IP470A TTL Level Digital I/O

IP470A Industrial I/O Pack (IP) modules provide 48 general-purpose, bidirectional I/O points to economically monitor and control a large quantity of digital devices.

Each channel has interrupt capability for detecting low-to-high or high-to-low transitions. Change-of-state interrupts are supported using paired channels. Debounce eliminates interrupts from noise and switching transients for error-free edge detection.

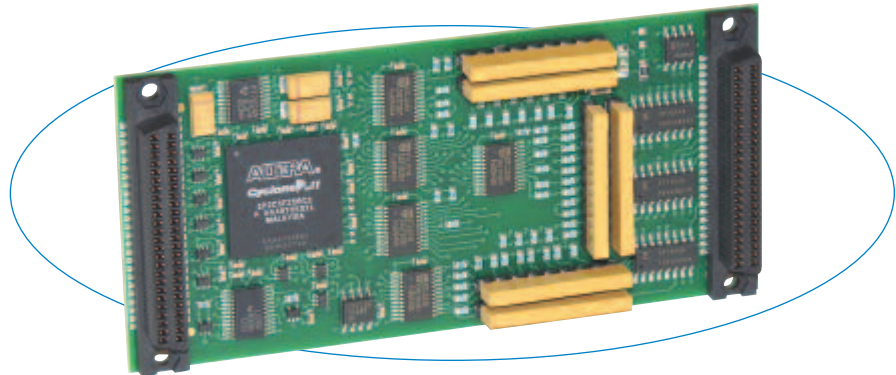
IP470A outputs are full-featured. They have socketed pull-ups and provide closed-loop readback status monitoring. TTL level thresholds and 15mA sink capability allow a direct interface to standard relay racks. And for safety, outputs go to a failsafe state upon power-up/reset without any instantaneous toggling to prevent false alarms.

### Features

- 48 bidirectional input/output channels
- TTL-compatible inputs
- CMOS-compatible open-drain outputs
- Interrupt support for each channel
- Input debounce
- Electronic overvoltage protection on individual channels
- Open drain outputs with socketed pull-ups
- Output readback registers

### Benefits

- Output readback capability eliminates the need for additional input channels to verify the output channel state.
- Pinouts are compatible with industry-standard isolated I/O racks.
- Output channels do not “glitch” after a power-up/reset to eliminate false alarms.



With four IP470A modules on a 6U VMEbus carrier card, you can monitor and control 192 devices from a single card slot.

### Specifications

#### Digital Inputs

Input channel configuration: 48 buffered inputs.  
Input voltage range: 0 to 5V DC.  
Input signal threshold: 1.5V typical.  
Input response time: 135nS.

#### Digital Outputs

Output channel configuration: 48 open-drain CMOS outputs.  
Output voltage range: 0 to 5V DC.  
Output “ON” current range: 0 to 15mA DC.  
Output pull-ups: 4.7K ohms pull-ups installed in board sockets. With pull-ups removed, integrated 47.5K ohms nominal pull-ups are present.  
Turn on time: 125nS, typical.  
Turn off time: 3µS, typical.

#### IP Compliance (ANSI/VITA 4)

Meets IP specifications per ANSI/VITA 4-1995.  
IP data transfer cycle types supported:  
Input/output (IOSel\*), ID read (IDSel\*), Interrupt select (INTSel\*).  
Access times (8MHz clock): 0 wait states (250ns cycle).  
Updates: Requires six 8-bit read/writes to update all 48 channels.

#### Environmental

Operating temperature: 0 to 70°C (IP470) or -40 to 85°C (IP470E model).  
Storage temperature: -55 to 150°C (all models).  
Relative humidity: 5 to 95% non-condensing.  
MTBF: Contact the factory.  
Power:  
+5V (±5%): 160mA maximum.  
±12V (±5%) from P1: 0mA maximum (not used).

### Ordering Information

#### Industry Pack Modules

**IP470A**  
48-channel digital I/O module.

**IP470AE**  
Same as IP470A plus extended temperature range.

*Acromag offers a wide selection of Industry Pack Carrier Cards.*

#### Software (see [software documentation](#) for details)

**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.

**IPSW-API-LNX**  
Linux example libraries for Industry Pack modules and PCI/CompactPCI carrier cards.

See [accessories documentation](#) for additional information.

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