

# OPTO 22

## DATA SHEET

Form 739-230112

### Description

**\*\*\*\* This product is obsolete and no longer available. \*\*\*\***

The Pamux® B6 is an addressable analog brain board that can control up to 16 input and output points in distributed I/O applications. The B6 is designed for use with Opto 22 mounting racks, including the PB4AH (four points of analog I/O), PB8AH (eight points), and PB16AH (16 points).

Up to 32 B6 brain boards may be linked on a single Pamux bus to control up to 512 points of analog I/O. Each B6 requires 5 VDC ±0.1 V @ 0.75 A (plus an additional 0.5 A if a terminator board is installed).

The B6 includes an on-board microprocessor that continually scans all I/O points on the mounting rack, performs necessary conversions, and then updates dual-port RAM. The host computer transfers data along the Pamux bus by reading from or writing to the dual-port RAM.

This document illustrates how to install the B6 analog I/O

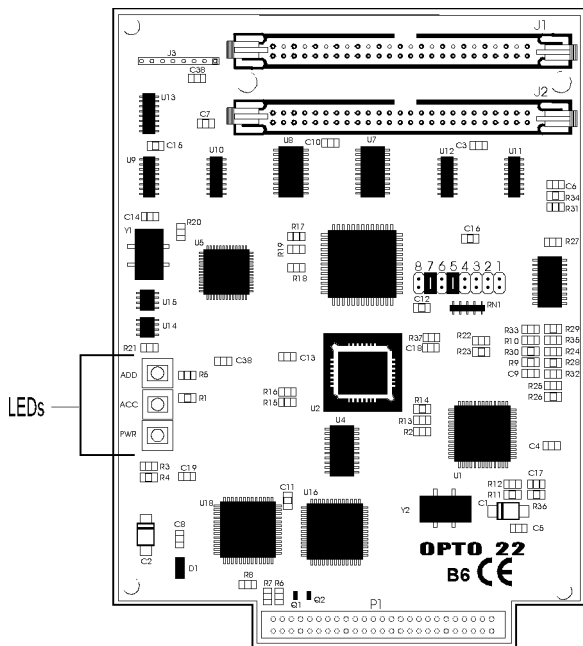


Figure 1: B6 Brain Board

# BRAIN BOARDS CLASSIC B6 INSTALLATION NOTES

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Part Number	Description
B6	16-Channel Analog Brain Pamux

brain board on a compatible mounting rack. It discusses all B6 configuration issues, including how to set jumpers for the address, watchdog, and reset line. It also explains how to install a terminator board when a B6 station is at the end of a Pamux system.

Opto 22 form #726, the *Pamux User's Guide*, contains complete information about the Pamux system and can be downloaded free from our Web site at [www.opto22.com](http://www.opto22.com).

The B6 brain board measures 6.40 by 4.75 inches. It includes a 50-pin female connector to attach to an analog I/O mounting rack. At the top of the brain board are two 50-pin male header connectors used to link the brain board to the Pamux bus. For the last brain board on a Pamux bus, one of these connectors holds the terminator board.

NOTE: If you have older B6 brain boards, you may notice that the latest version looks different. Functionally it is the same as previous versions; the difference in appearance is because some parts are no longer available and also because we now use surface-mount technology to produce the boards.

### LED Indicators

The B6 brain board includes the following LEDs:

- **ADD**—The Address LED is on whenever the brain board is addressed (read from or written to) on the Pamux bus. It is off otherwise. For each operation, the LED stays on for about 250 milliseconds, so if the bus is very active the LED may appear constantly on.
- **ACC**—The Access LED is on whenever access has been granted to the dual-port RAM. It remains on until access is released. (See Chapter 4 of the *Pamux User's Guide* for details on getting and releasing access.)
- **PWR**—The Power LED is on whenever power is connected to the board. It is off otherwise. It does not indicate whether voltage is within specifications.

This product is obsolete.

### Detailed Drawing and Dimensions

Figure 2 shows the B6 and its dimensions.

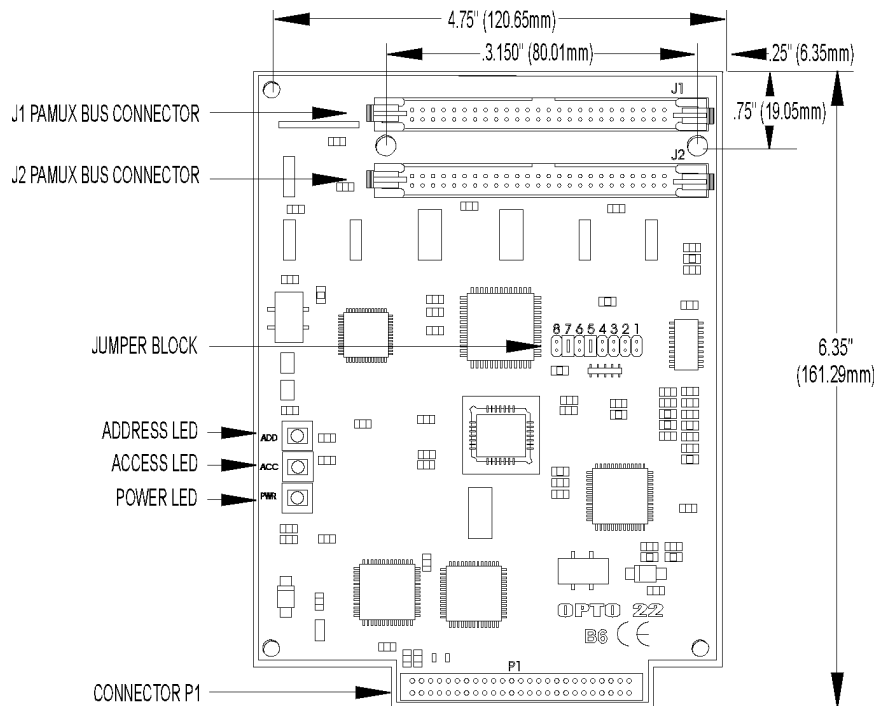


Figure 2: Dimensions of the B6 Brain Board

### Installing the B6 on a Mounting Rack

Three I/O mounting racks are available for the Pamux B6 brain board:

- PB4AH—4 channels of single-point standard analog I/O
- PB8AH—8 channels of single-point standard analog I/O
- PB16AH—16 channels of single-point standard analog I/O

Each mounting rack accommodates any combination of analog input and output modules and connects to the Pamux B6 brain board via a 50-pin header connection. The mounting rack includes a fuse for the 5-volt power line.

Figures 3 through 5 show the mounting dimensions of these racks with the B6 brain board installed.

This product is obsolete.

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### Installation (continued)

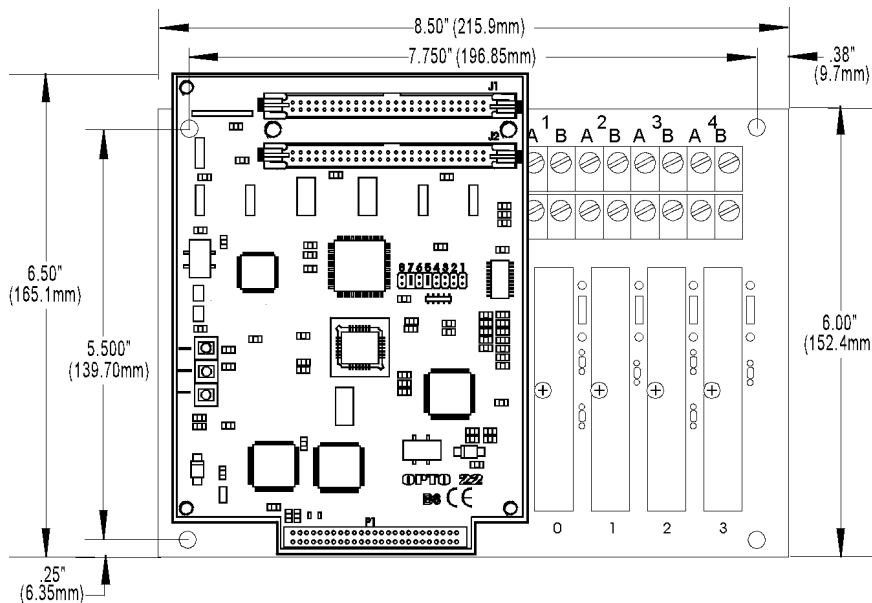


Figure 3: Mounting Dimensions of the PB4AH with a B6 Installed

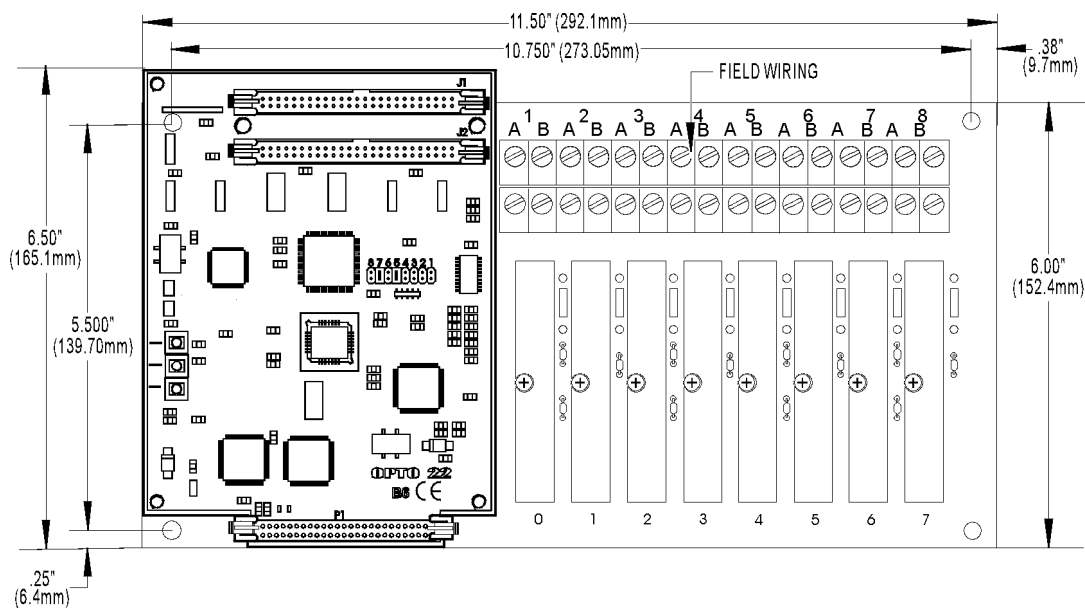


Figure 4: Mounting Dimensions of the PB8AH with a B6 Installed

This product is obsolete.

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### Installation (continued)

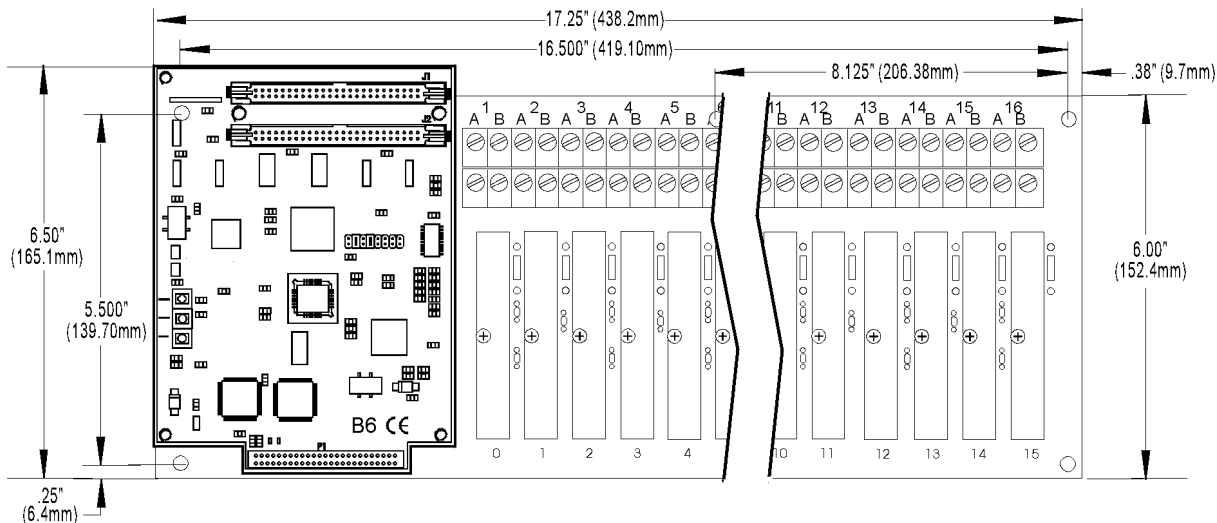


Figure 5: Mounting Dimensions of the PB16AH with a B6 Installed

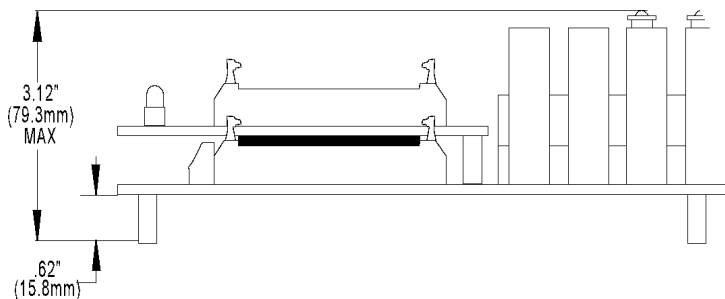


Figure 6: Vertical Dimensions of the B6 Mounted on a Rack

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*Setting the Jumpers*

The B6 includes eight jumpers. Jumpers 1 through 5 set the address, jumper 6 is disabled, jumper 7 sets the reset line polarity, and jumper 8 sets the watchdog functionality.

Jumpers 1–5 are described on this page; jumpers 6–8 are described on the following page.

*Jumpers 1–5 (Address)*

These jumpers configure the **base** address of the B6. The brain board can control 16 points of analog I/O. Data is passed to and from the host computer using one address register and one data register. Each B6 thus requires two consecutive addresses.

Refer to Figure 7 at right to determine how to set the **base** address of the B6.

Note that each Pamux station on a bus must have a unique address.

*Jumper 6*

Jumper 6 has been disabled and has no effect.

*Jumper 7 (Reset)*

One of the control lines on the Pamux bus is the reset line. This line is used to clear all analog outputs on a B6 station to zero scale, then to set all I/O positions on the B6 to be configured as inputs. Note that the reset is not intended to be used to shut off outputs upon a system communication error.

Jumper 7 determines the polarity of the reset line, either active high or active low, as shown in Table 1. In general, it does not matter which polarity you select as long as you are consistent throughout your Pamux system.

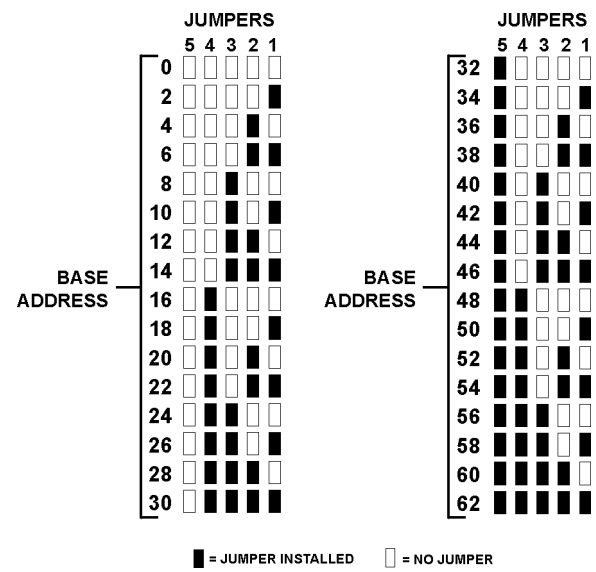


Figure 7: Address Jumpers

Table 1: Reset Jumpers

Reset Level	Jumper 7
Active High	In
Active Low	Out

This product is obsolete.

*Jumpers (continued)*

Figure 6 shows the vertical dimensions of the B6 mounted on any rack.

*Jumper 8 (Watchdog)*

A watchdog timer shuts down a process when the host computer goes offline. The watchdog function of the B6 can be enabled or disabled with jumper 8. Since the B6 watchdog function is also under software control, the jumper must be removed **and** the watchdog register must be written to for the watchdog to be enabled.

Table 2 shows how jumper 8 affects the watchdog. For information on software configuration of the watchdog, see Chapter 3 of the *Pamux User's Guide*.

Table 2: Watchdog Jumper

Watchdog	Jumper 8
Disabled	In
Enabled	Out

*Terminating a B6 Station*

For stations on a Pamux bus to operate correctly, both ends of the bus must be terminated. The host computer and the last Pamux station on the bus are the only devices that should be terminated. Note that if you are using an Opto 22 Pamux adapter card, the host computer is automatically terminated, since termination resistors are built into the card.

To terminate a B6 station, plug a Pamux bus terminator board (TERM1 or TERM2) into either connector on the brain board. TERM1 is used with standard ribbon cable. TERM2 is used with ribbon cable that has a ground plane. See the *Pamux User's Guide* for more information.

When the terminator board is installed correctly, its component side faces away from the brain board components and its red wire connects to the +5V terminal on the rack. Figure 8 illustrates the proper installation of the terminator board.

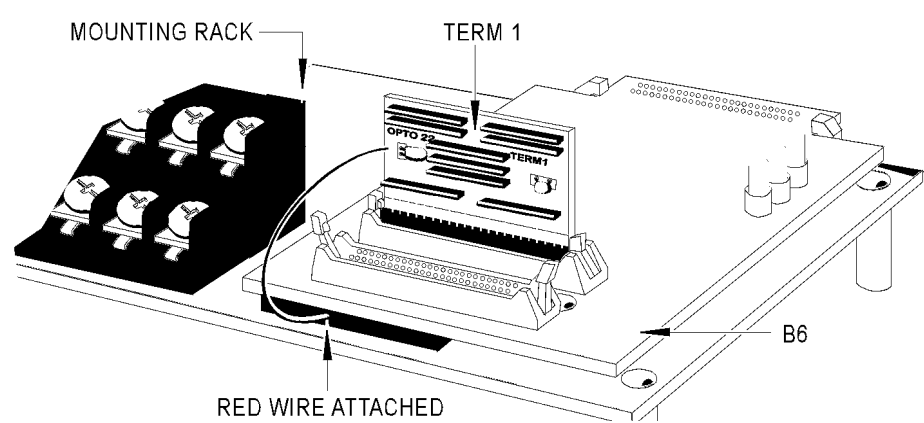


Figure 8: Terminator Board Installed on a B6-Compatible Mounting Rack

## PRODUCTS

Opto 22 develops and manufactures reliable, easy-to-use, open standards-based hardware and software products. Industrial automation, process control, remote monitoring, data acquisition, and industrial internet of things (IIoT) applications worldwide all rely on Opto 22.

### groov RIO®

*groov RIO edge I/O* offers a single, compact, PoE-powered industrial package with web-based configuration and IIoT software built in, support for multiple OT and IT protocols, and security features like a device firewall, data encryption, and user account control.

Standing alone, *groov RIO* connects to sensors, equipment, and legacy systems, collecting and securely publishing data from field to cloud. Choose a universal I/O model with thousands of possible field I/O configurations, with or without Ignition from Inductive Automation®, or a *RIO EMU energy monitoring unit* that reports 64 energy data values from 3-phase loads up to 600 VAC, Delta or Wye.

You can also use *groov RIO* with a Modbus/TCP master or as remote I/O for a *groov EPIC* system.

### groov EPIC® System

Opto 22's *groov Edge Programmable Industrial Controller (EPIC) system* gives you industrially hardened control with a flexible Linux®-based processor with gateway functions, guaranteed-for-life I/O, and software for your automation and IIoT applications.

#### groov EPIC Processor

The heart of the system is the *groov EPIC* processor. It handles a wide range of digital, analog, and serial functions for data collection, remote monitoring, process control, and discrete and hybrid manufacturing.

In addition, the EPIC provides secure data communications among physical assets, control systems, software applications, and online services, both on premises and in the cloud. No industrial PC needed.

Configuring and troubleshooting I/O and networking is easier with the EPIC's integrated high-resolution color touchscreen. Authorized users can manage the system locally on the touchscreen, on a monitor connected via the HDMI or USB ports, or on a PC or mobile device with a web browser.

#### groov EPIC I/O

*groov I/O* connects locally to sensors and equipment. Modules have a spring-clamp terminal strip, integrated wireway, swing-away cover, and LEDs indicating module health and discrete channel status. *groov I/O* is hot swappable, UL Hazardous Locations approved, and ATEX compliant.

#### groov EPIC Software

The *groov EPIC* processor comes ready to run the software you need:

- Programming: Choose flowchart-based PAC Control, CODESYS Development System for IEC61131-3 compliant programs, or secure shell access (SSH) to the Linux OS for custom applications
- Node-RED for creating simple IIoT logic flows from pre-built nodes
- Efficient MQTT data communications with string or Sparkplug data formats
- Multiple OPC UA server options
- HMI: *groov View* to build your own HMI viewable on touchscreen, PCs, and mobile devices; PAC Display for a

Windows HMI; Node-RED dashboard UI

- Ignition or Ignition Edge® from Inductive Automation (requires license purchase) with OPC-UA drivers to Allen-Bradley®, Siemens®, and other control systems, and MQTT communications

#### Older products

From solid state relays, to world-famous G4 and SNAP I/O, to SNAP PAC controllers, older Opto 22 products are still supported and working hard at thousands of installations worldwide. You can count on us for the reliability and service you expect, now and in the future.

## QUALITY

Founded in 1974, Opto 22 has established a worldwide reputation for high-quality products. All are made in the U.S.A. at our manufacturing facility in Temecula, California.

Because we test each product twice before it leaves our factory rather than testing a sample of each batch, we can afford to guarantee most solid-state relays and optically isolated I/O modules for life.

## FREE PRODUCT SUPPORT

Opto 22's California-based Product Support Group offers free technical support for Opto 22 products from engineers with decades of training and experience. Support is available in English and Spanish by phone or email, Monday–Friday, 7 a.m. to 5 p.m. PST.

Support is always available on our website, including [free online training](#) at OptoU, how-to [videos](#), [user's guides](#), the Opto 22 KnowledgeBase, and [OptoForums](#).

## PURCHASING OPTO 22 PRODUCTS

Opto 22 products are sold directly and through a worldwide network of distributors, partners, and system integrators. For more information, contact Opto 22 headquarters at **800-321-6786** (toll-free in the U.S. and Canada) or **+1-951-695-3000**, or visit our website at [www.opto22.com](http://www.opto22.com).

