BRAIN BOARDS
CLASSIC PAMUX
B4 INSTALLATION NOTES

Introduction

The Pamux® B4 is an addressable digital brain board that can control up to 32 input or output points in distributed I/O applications. The B4 is designed for use with the G4PB32H mounting rack for single-point digital I/O, or the PB32HQ mounting rack for quad pak digital I/O (four points of I/O per module).

The B4 features a 70-pin header connector to attach to a digital I/O mounting rack. Up to 16 B4 brain boards may be linked on a single Pamux bus to control up to 512 points of digital I/O. Each B4 requires 5 VDC ± 0.1 V @ 0.5 A (plus an additional 0.5 A if a terminator board is installed).

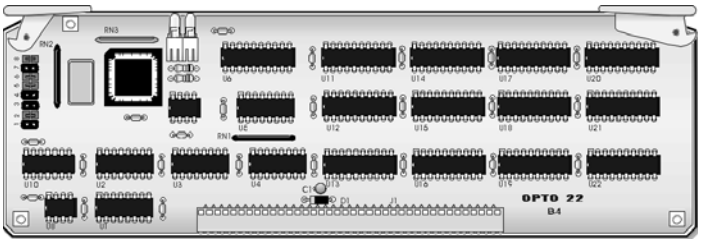

Figure 1: B4 Brain Board

This document describes how to install the B4 digital I/O brain board on a compatible mounting rack. It discusses all B4 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 B4 station is at one end of a Pamux system. Finally, it describes the LED indicators on the B4 and provides information on Opto 22 product support.

For complete information on the Pamux system, call Opto 22 at 800/321-6786 and request the *Pamux User's Guide* (form 726).

Installing the B4 on a Mounting Rack

The B4 brain board measures 9.25 by 2.9 inches. It includes a 70-pin box connector along its bottom edge to attach to a digital I/O mounting rack. Two levers are located on opposite corners of the board. These levers operate with the card guides on the mounting rack to hold the brain board in place or to help release it from the rack.

Figure 2 is a detailed illustration of the B4 along with its dimensions.

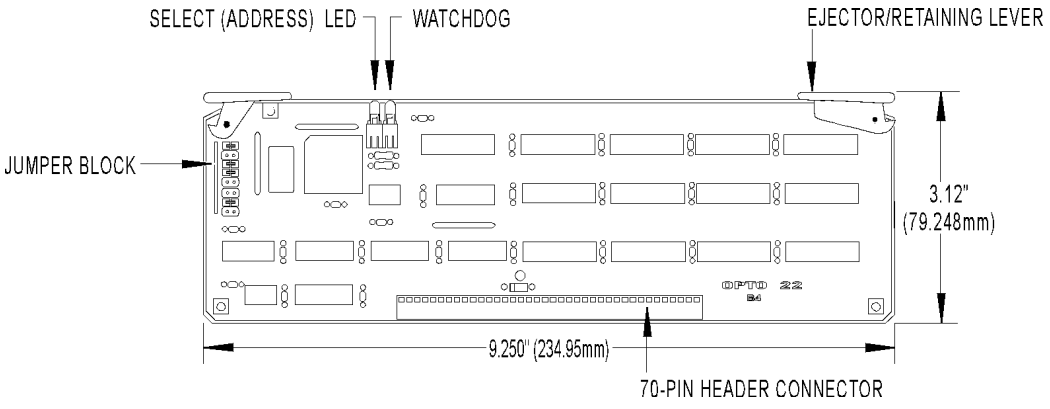

Figure 2: Dimensions of the B4 Brain Board

The B4 can be installed on either of two I/O mounting racks:

- G4PB32H — *32 channels of single-point G4 I/O*
- PB32HQ — *8 channels of quad pak I/O (four points per module)*

The G4PB32H mounting rack uses single-point digital modules. It offers a dense footprint and point-by-point I/O configuration.

The PB32HQ also offers a dense footprint but uses Opto 22 quad pak modules. Each quad pak contains four discrete points of I/O in one package. The PB32HQ is thus configured in four-point increments.

Figure 3 shows how the B4 brain board is installed on either mounting rack.

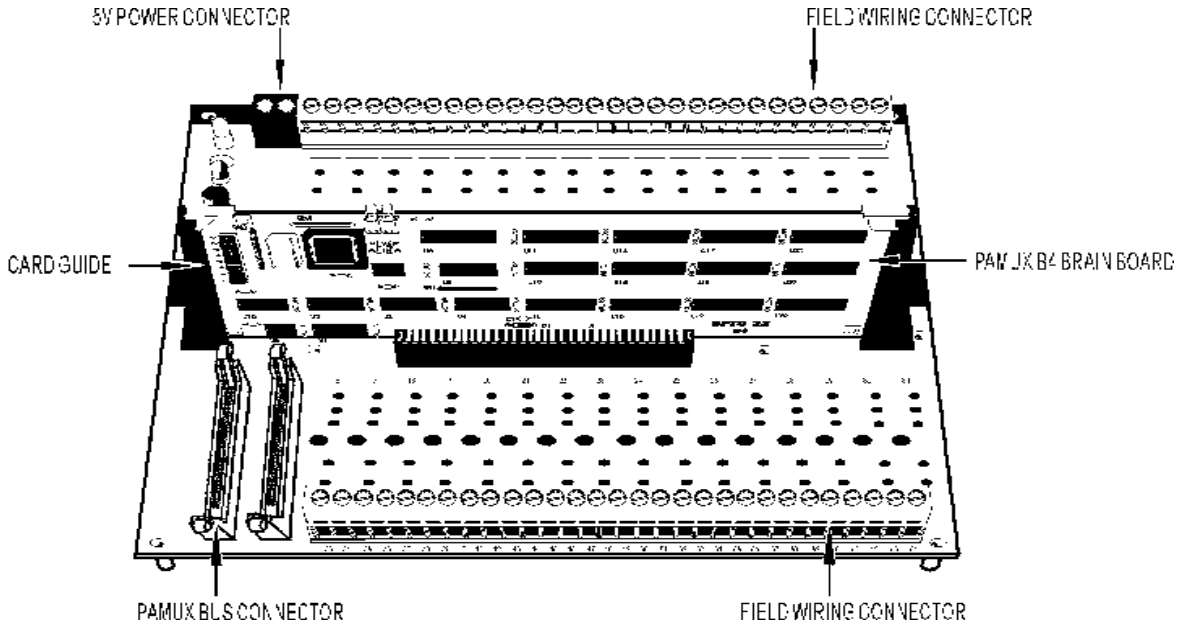

Figure 3: Installation of the B4 on a Mounting Rack

Figures 4 and 5 show the mounting dimensions of these racks.

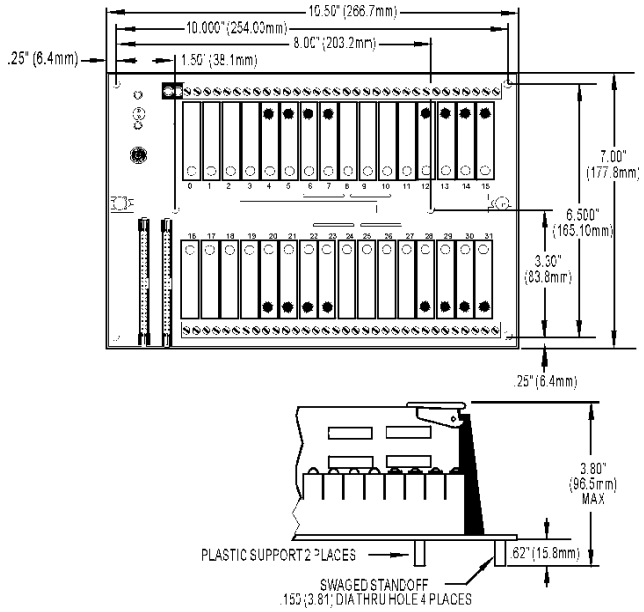

Figure 4: Mounting Dimensions of the G4PB32H

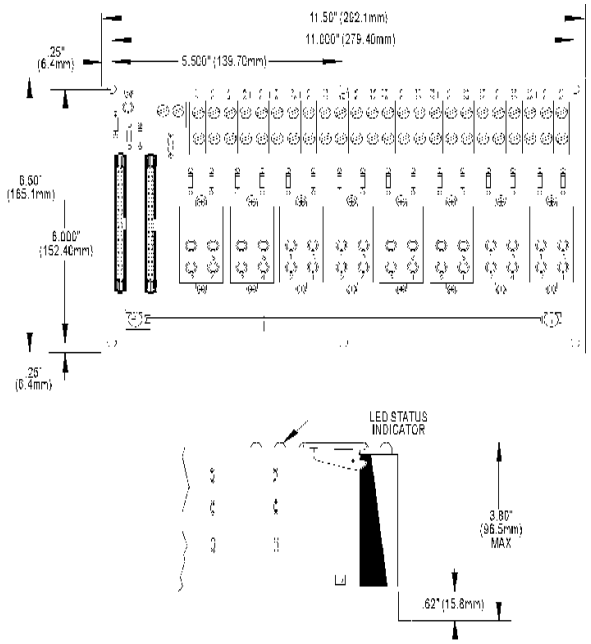

Figure 5: Mounting Dimensions of the PB32HQ

Figure 6 shows the vertical dimensions of the B4 mounted on either rack.

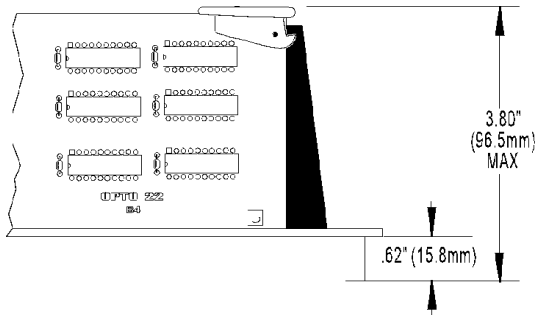

Figure 6: Vertical Dimensions of the B4 Mounted on a Rack

Setting the Jumpers

The B4 includes eight jumpers. Jumpers 1 through 4 set the address, jumpers 5 and 6 set the watchdog functionality, and jumpers 7 and 8 determine the behavior of the reset line.

Jumpers 1–4 (Address)

These jumpers configure the base address of the B4. Since the brain board controls 32 points of I/O, while the Pamux data bus is only eight bits wide, the B4 must be accessed as four consecutive banks of eight I/O channels each. Each bank has its own address.

The four banks on the B4 have contiguous addresses. The bank 0 address is the base address of the B4; the bank 1 address is the base address plus one; the bank 2 address is the base address plus two; and the bank 3 address is the base address plus three. Hence, only the base address needs to be configured. Refer to Table 1 to determine how to set this base address.

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

Table 1: Address Jumpers

Base Address	Jumper 4	Jumper 3	Jumper 2	Jumper 1
	Out	Out	Out	Out
4	Out	Out	Out	In
8	Out	Out	In	Out
12	Out	Out	In	In
16	Out	In	Out	Out
20	Out	In	Out	In
24	Out	In	In	Out
28	Out	In	In	In
32	In	Out	Out	Out
36	In	Out	Out	In
40	In	Out	In	Out
44	In	Out	In	In
48	In	In	Out	Out
52	In	In	Out	In
56	In	In	In	Out
60	In	In	In	In

Jumpers 5 and 6 (Watchdog)

A watchdog timer shuts down a process when the host computer goes off line. The watchdog timer on the B4 depends on a periodic read or write strobe from the host processor. The individual B4 need not be addressed. The absence of a strobe for a specified time activates the watchdog function.

Using jumpers 5 and 6, you can configure the B4 to trigger one of four actions upon a timeout. Refer to Table 2.

Table 2: Watchdog Jumpers

Watchdog Function	Jumper 6	Jumper 5
No action	In	In
Activate relay channel 0	In	Out
Deactivate all relay channels	Out	In
Activate relay channel 0 and deactivate relay channels 1-31	Out	Out

The watchdog timeout interval is set within the hardware and cannot be changed by the user. Refer to Table 3 for minimum, typical, and maximum watchdog timeout values.

Table 3: Watchdog Timeout ValuesJumpers 7 and 8 (Reset)

Minimum	Typical	Maximum
1.0 sec	1.6 sec	2.25 sec

One of the control lines on the Pamux bus is the reset line. This line is used for turning off the relays on all Pamux stations on the bus. Note that the reset is not intended to be used to shut off outputs upon a system communication error.

Two jumpers control how the reset line affects the B4. Jumper 7 determines the polarity of the reset line, either active high or active low, as shown in Table 4. In general, it does not matter which polarity you select as long as you are consistent throughout your Pamux system.

Table 4: Reset Jumper

Reset Level	**Jumper 7**
Active High	In
Active Low	Out

Jumper 8 determines how the reset line affects the watchdog timer function of channel 0.

If jumper 8 is not installed, the reset line will not affect the watchdog timer function. Hence, if channel 0 activates due to a watchdog condition, an active reset line will have no effect on channel 0 (although it will deactivate any other channels that are on).

If jumper 8 is installed and the watchdog jumpers are configured to activate channel 0 upon a timeout, the state of channel 0 depends on whether or not the reset activates before the timeout occurs:

- If the reset line activates first, all outputs will deactivate. If a subsequent timeout occurs, no effect will take place until the reset line deactivates, at which time the watchdog function will take place and channel 0 will activate.
- If the timeout occurs first, the watchdog function takes place and channel 0 activates. If a subsequent reset occurs, channel 0 will not be affected and will remain active.

Terminating a B4 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 B4 station, plug a Pamux bus terminator board (TERM1 or TERM2) into either connector on the I/O mounting rack. When the terminator board is installed correctly, its component side faces away from the I/O modules and its red wire connects to the +5V terminal on the rack.

Figure 7 illustrates the proper installation of the terminator board.

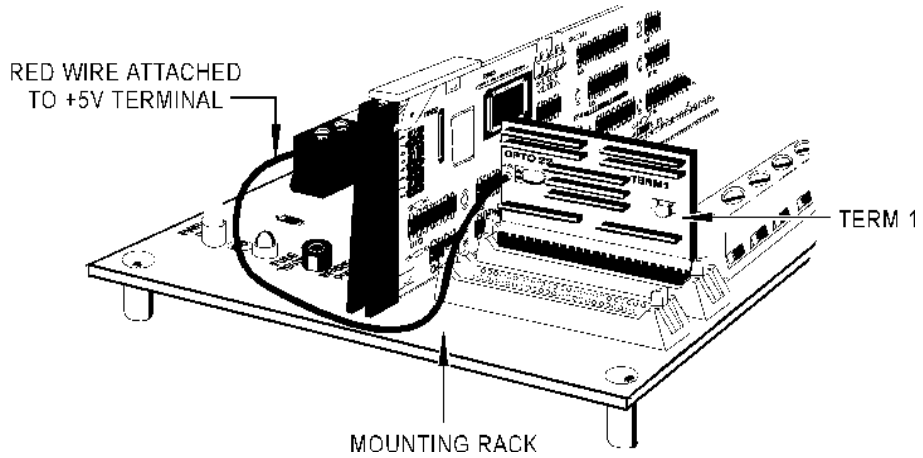

Figure 7: Terminator Board Installed
on a B4-Compatible Mounting Rack

LED Indicators

The B4 brain board includes the following LEDs:

- **Select (Address)** — This 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 msec, so if the bus is very active the LED may appear constantly on.
- **Watchdog** — This LED stays on if the Pamux bus is idle (no strobe is present) for more than 1.2 seconds. It is off otherwise. Note that unlike the Select LED, this LED monitors overall bus activity.