This product is obsolete.

Part Number	Description
SNAP-B6	High Speed Analog/Digital Pamux Brain

Description

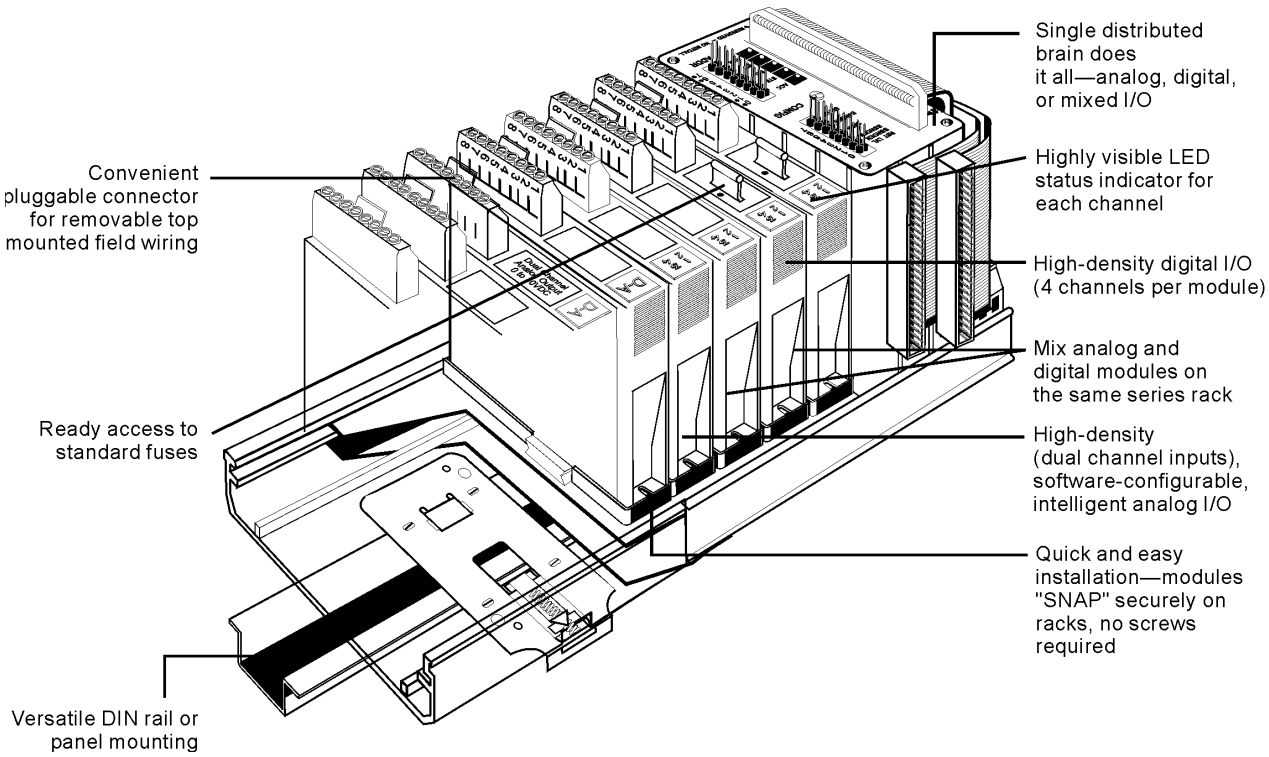
*** This product is Obsolete and no longer available. ***

The SNAP-B6 is a high-speed, addressable brain that can remotely control a mix of both analog and digital I/O modules, using the Pamux® protocol. Since the SNAP-B6 is designed for use with Opto 22's SNAP "B series" mounting racks, capable of handling eight, 12, or 16 I/O modules, it has a maximum capacity of 32 analog channels, or 16 analog and 32 digital channels.

The equivalent of two regular B6 analog brains and one regular B4 digital brain, the SNAP-B6 provides power and flexibility in a compact package. The SNAP-B6 includes an on-board microprocessor that continually scans all I/O points on the mounting rack, performs necessary conversions, and then updates a dual-port RAM. The host computer transfers data along the Pamux bus by reading from or writing to the dual-port RAM.

The SNAP-B6 includes an adapter cable with two 50-pin connectors to attach to the Pamux bus or a terminator board. Up to 16 SNAP-B6 brains can be linked on a single Pamux bus to control up to 512 points of analog or digital I/O. Each SNAP-B6 requires 5 VDC ±0.1 V @ 1.0 A (plus an additional 0.5 A if a terminator board is installed).

For complete information on the Pamux system, see form #726, the *Pamux Manual*, available on our website, www.opto22.com. The easiest way to find it is to search on the form number, 726.



Specifications - Obsolete

Power Requirements	5.0 VDC ± 0.1 VDC @ 1.0A max (plus additional 0.5A if terminated)
Operating Temperature	0º C to 70º C, 95% humidity, non-condensing
Communications Interface	50-pin Pamux bus
Analog Read/Write Access Time	70 µsec per channel, 1.12 msec per 16 channels (channels accessed individually)
Digital Read/Write Access Time	2 µsec per channel, 2 µsec per 8 channels (channels accessed in banks of 8)
	With digital functionality enabled: Analog channels updated every 20 msec Digital channels updated every 1.25 msec Without digital functionality: Analog channels updated every 2 msec
Range: Multidrop	Up to 500 feet
LED Indicators	ACC (Access), STS (Status), SEL (Address selected), WD (Watchdog), and RUN (Power On)
Options: Jumper Selectable	Address Watchdog Reset Enable digital (B4) Analog configuration mode

Software Included

The SNAP-B6 includes the following software:

PamScan utility (DOS and Windows 32-bit versions), used for troubleshooting and for configuring analog modules. Online help in PamScan tells how to use the utility.

Pamux drivers, used to allow PamScan and third-party software to talk to the AC28 adapter card.

Specifications [OBSOLETE]

Address Jumpers and LED Descriptions

Table 1: Configuration Jumpers 0–7

See the next page for specific jumper settings.

Jumper(s)	Description
0	Sets the reset line polarity
1 and 2	Set the analog watchdog
3	Not used
4	Enables digital functionality
5 and 6	Set the digital watchdog
7	Used for analog setup in a special boot mode

Top View: SNAP-6

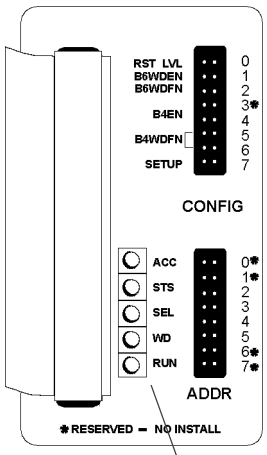


Table 2: Address Jumpers

These jumpers configure the base address of the SNAP-B6. Each Pamux station on a bus must have a unique address. The SNAP-B6 emulates two analog brains and, optionally, one digital brain. Each analog brain occupies two addresses, one for the data register and one for the control register. (For more information, see the *Pamux User's Guide*.) The digital brain occupies four addresses, one for every 8-bits (or bank) of I/O. If configuration jumper 4 is installed to enable digital function, address jumper 2 must not be installed.

Jumpers				With digital enabled			Without digital enabled	
J5	J4	J3	J2	An#1	An#2	Dig	An#1	An#2
	Out	Out	Out	00	02	04–07	00	02
	Out	Out	In				04	06
Out	Out	In	Out	08	10	12–15	08	10
Out	Out	In	In				12	14
Out	In	Out	Out	16	18	20–23	16	18
Out	In	Out	In				20	22
Out	In	In	Out	24	26	28–31	24	26
Out	In	In	In				28	30
In	Out	Out	Out	32	34	36–39	32	34
In	Out	Out	In				36	38
In	Out	In	Out	40	42	44–47	40	42
In	Out	In	In				44	46
In	In	Out	Out	48	50	52–55	48	50
In	In	Out	In				52	54
In	In	In	Out	56	58	60–63	56	58
In	In	In	In				60	62

Table 3: LED Descriptions

LED	Description
ACC (Access)	LED is on whenever access has been granted to the dual-port RAM. It remains on until access is released (For more information on access, see chapter 4 of the *Pamux User's Guide*.)
STS (Status)	LED is on while booting (approximately two seconds) or while in reset. It flashes rapidly in configuration mode and blinks slowly to indicate an error condition such as an improperly configured module. LED is off for normal operation.
SEL (Selected)	LED flashes when analog or digital address is selected by the host computer.
WD (Watchdog)	LED is on if watchdog timer is tripped. LED is off for normal operation. Disabling the analog or digital watchdog does *not* disable the watchdog LED.
RUN	LED is on whenever power is connected to the board.

Configuration jumpers

Default settings are shown in **boldface**.

Table 4: Reset Jumper

Reset Level	Jumper 0
Active High	In
Active Low	**Out**

Table 5: Analog Watchdog Jumper

Watchdog	Jumper 1	Jumper 2
Disabled	**In**	**--**
Enabled	Out	--

Table 6: Digital Functionality Jumper

Digital Functionality	Jumper 4
Enable digital	**In**
Disable digital	Out

Table 7: Digital Watchdog Jumper

Watchdog	Jumper 5	Jumper 6
No action	In	In
Activate channel 0	Out	In
Deactivate all channels	**In**	**Out**
Activate channel 0 and deactivate channels 1–31	Out	Out

Table 8: Setup Jumper

Analog Setup	Jumper 7
Configuration mode	In
Normal operation	**Out**

Jumper 0 (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 SNAP-B6 station to zero scale and turn off all digital outputs, and then to set the configuration of the SNAP-B6 to input on all positions. Note that the reset is not intended to be used to shut off outputs upon a system communication error.

Jumper 0 determines the polarity of the reset line, either active high or active low, as shown in Table 4 at left. The default is active low. In general, it does not matter which polarity you select as long as you are consistent throughout your Pamux system.

Jumpers 1 and 2 (Analog Watchdog)

A watchdog timer shuts down a process when the host computer goes offline. If the host computer does not access the SNAP-B6 analog or digital addresses for 1.6 seconds, the watchdog function is activated. As shown in Table 5, jumper 1, if installed, disables the watchdog for both analog addresses. The default is disabled. Jumper 2 is reserved for future use and has no effect.

Since the SNAP-B6 watchdog function is also under software control, the watchdog register must be written to **and** the jumper must be removed for the watchdog to be enabled. For information on software configuration of the watchdog, see Chapter 3 of the *Pamux User's Guide*.

Note: Disabling the analog watchdog does **not** disable the watchdog LED.

Jumper 3 (Not Used)

Jumper 4 (Digital Functionality)

To enable digital functionality, install jumper 4. See Table 6. The default is enabled.

Jumpers 5 and 6 (Digital Watchdog)

A watchdog timer shuts down a process when the host computer goes offline. If the host computer does not access the SNAP-B6 analog or digital addresses for 1.6 seconds, the watchdog function is activated.

Jumpers 5 and 6 configure the digital address to take one of four actions when the watchdog is activated. The four actions are shown in Table 7. The default is all channels deactivated.

Note: Disabling the digital watchdog does **not** disable the watchdog LED.

Jumper 7 (Setup)

Because SNAP analog modules are multi-purpose, the SNAP-B6 must be set up using a special configuration mode in order to scale module readings properly. Use jumper 7, shown in Table 8, to set up this special mode before you turn the board on for the first time. (See next page for instructions.)

SNAP-B6 I/O Configuration

Setting Up Analog Modules

The disk that comes with the SNAP-B6 includes a utility called PamScan, a diagnostic tool for reading and writing to analog and digital I/O. PamScan can also be used to configure analog channel types. It reads channel types and lets you change types easily. For information on using PamScan, see its online help.

Follow these steps to set up analog modules:

1. Install configuration jumper 7 on the SNAP-B6 brain. The STS and RUN LEDs should be lit. (Ignore other LEDs.)
2. Watch for the STS LED to start flashing rapidly, indicating that the brain is in configuration mode.
3. Using the PamScan utility, choose the I/O Address/Bank that corresponds to the address jumpers on the SNAP-B6. Make sure the type of I/O is analog.
4. Scan the brain and read current channel types using the tables on this page. Values are decimal if you are using the DOS version of PamScan. If you are using the Win 32 version, you can choose whether to show decimal or hexadecimal values.
5. To change a channel type, write the appropriate value from the table on this page out to the channel. Channel types cannot be larger than 1 byte (values 0–255). You can configure the channels for both analog addresses in any order.
6. To put the SNAP-B6 into the 16-bit mode for analog reads, write a 10 hex to the status register at 76 hex.
7. When you have finished, remove configuration jumper 7. The configuration is automatically saved, the STS LED stops flashing, and the SNAP-B6 goes through a normal power-up sequence.

Note: The flash memory on the SNAP-B6 has a programming life of approximately 100,000 write/erase cycles.

*For information on how temperature is reported, see page 7.

Outputs (Bit 7 = 1 if Output)

Dec	Hex	Channel Type
128	80	Generic Output Module
129	81	Reserved
131	82	4–20 mA
132	83	0–5 VDC
133	84	0–10 VDC
134	85	-5–+5 VDC
135	86	-10–+10 VDC
136	88	0–20 mA
137–255	89–FF	Reserved Output Types

Inputs

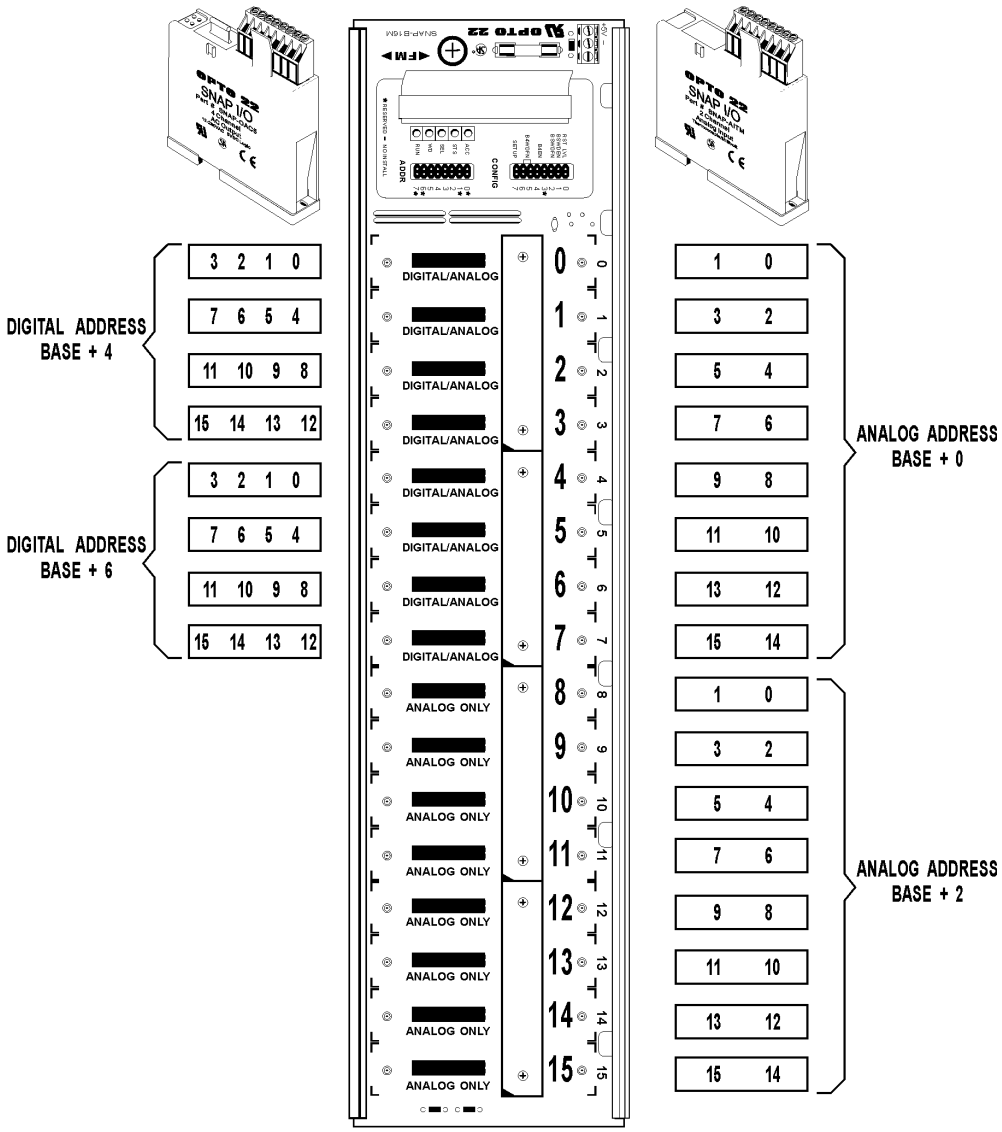
Dec	Hex	Channel Type
0	0	Generic Input Module (Bipolar)
1	1	Generic Input Module (Unipolar)
2	2	0–20 mA
3	3	4-20 mA
4	4	ICTD
5	5	Type J Thermocouple*
6	6	0-5 VDC
7	7	0-10 VDC
8	8	Type K Thermocouple*
9	9	-50-+50 mV
10	A	3-wire, 100 Ohm PT RTD
11	B	-5-+ VDC
12	C	-10-+10 VDC
13	D	0-100 mV (±160 mA)
14-16	E-10	Unused
17	11	Type R Thermocouple*
18	12	Type T Thermocouple*
19	13	Type E Thermocouple*
20	14	Unused
21	15	Unused
22	16	0-1 VDC
23	17	Type S Thermocouple*
24	18	Type B Thermocouple*
25-29	19-1D	Unused
30	1E	Type N Thermocouple*
31	1F	Type G Thermocouple*
32	20	Type C Thermocouple*
33	21	Type D Thermocouple*
34-63	22-3F	Unused
64	40	-20-+20 mA
65	41	Unused
66	42	-150-+150 mV
67	43	-25-+25 mV
68	44	-75-+75 mV
69	45	AIRATE, 0-25,000 kHz
70-127	46-7F	Unused

SNAP-B6 I/O Mapping

The largest SNAP B Series I/O rack can contain a maximum of 16 modules. As shown below, the first eight modules can be either digital or analog. The last eight modules can be analog only. Because of the rack's flexibility in handling both digital and analog inputs and outputs in many of the same module positions, you can choose where to install modules and how to use the points.

Since each digital module contains four points, up to 32 digital I/O points can be installed in the first eight module positions.

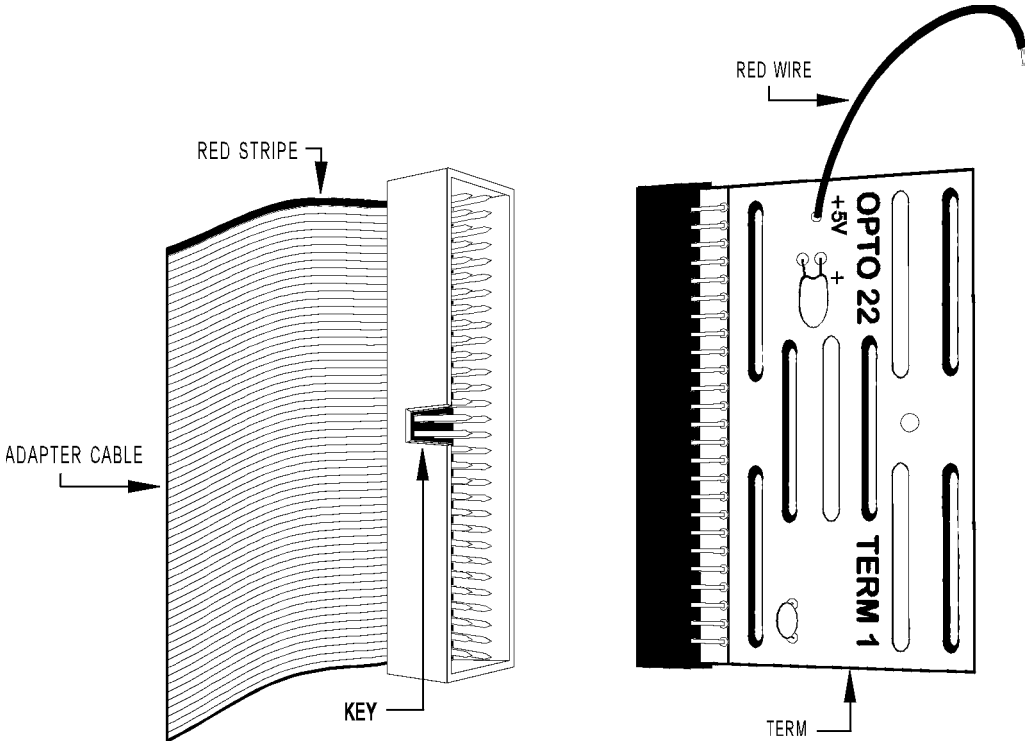
Analog input modules contain two points, but analog output modules can have either one or two points, depending on the module. Using all module positions, up to 32 analog I/O points can be installed in the rack.



Terminating a SNAP-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 SNAP-B6 station, plug a Pamux bus terminator board (TERM1 or TERM2) into either connector on the brain. When the terminator board is installed correctly, its red wire connects to the +5V terminal on the rack as shown below.

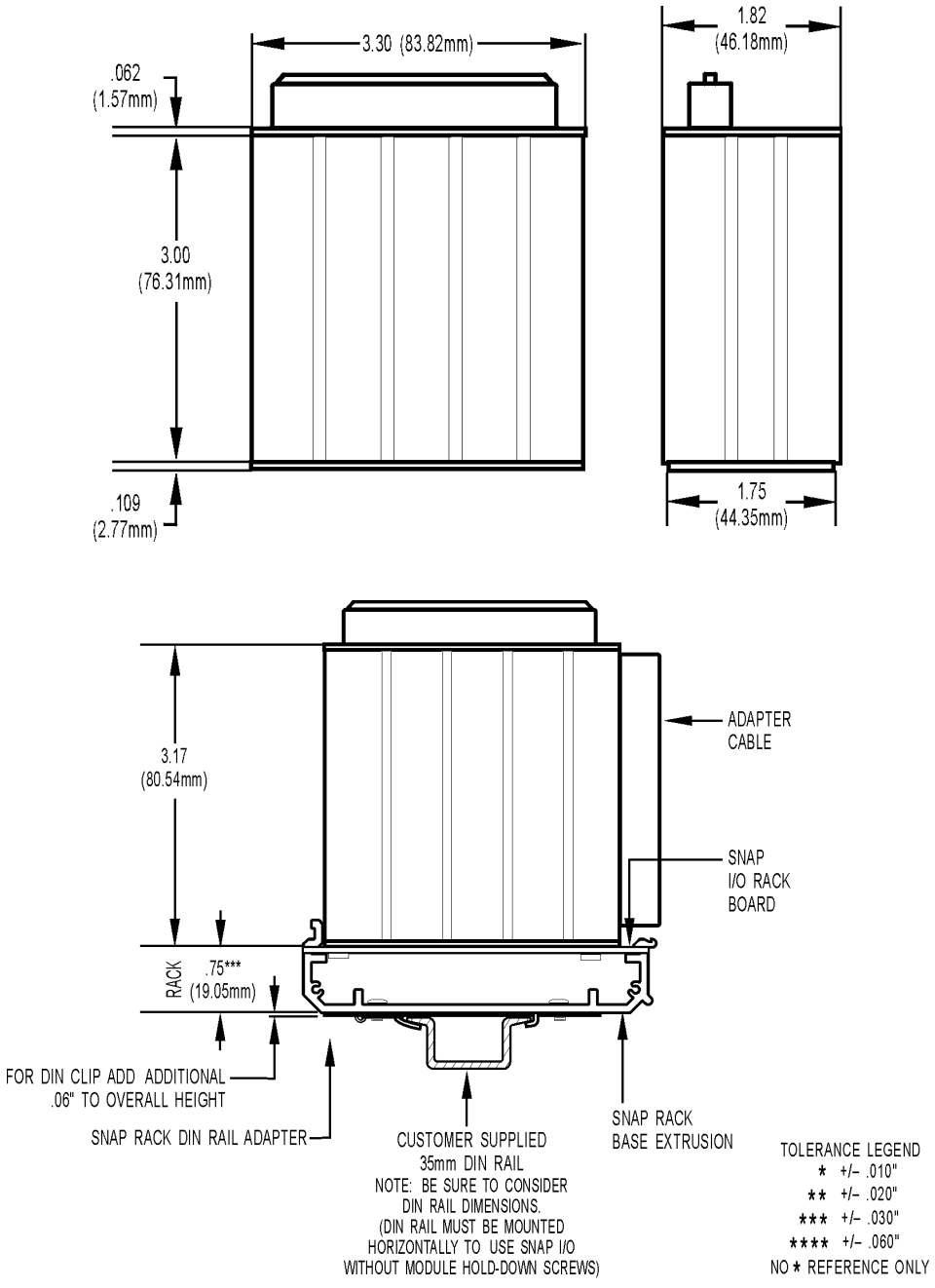


Temperature Reporting on the SNAP-B6

Customers who have used Classic B6 brains will notice a difference in the new SNAP-B6: how the brain reports temperature values. Classic B6 brains return a non-linear raw count between 0 and 4095, which you must linearize to derive temperature.

The SNAP-B6, however, does the linearization on the brain and returns a temperature value in degrees C multiplied by 10. For example, room temperature would be returned as 250 (25° C x 10).

Dimensions



Assembly

Brain

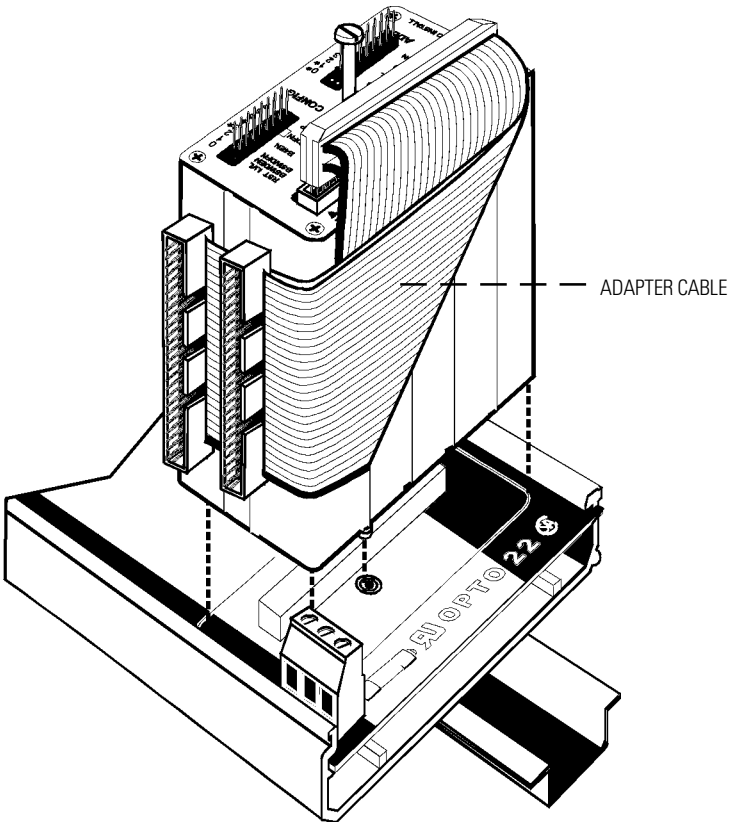
To install the SNAP-B6 brain on a B Series rack:

1. Remove power from rack assembly.
2. Align the brain connector with the mating connector on mounting rack.
3. Seat brain onto connector.
4. Use integral hold-down screw to secure in position.

   DO NOT OVERTIGHTEN!

To remove the brain from a B Series rack:

1. Remove power from rack assembly.
2. Loosen integral hold-down screw on brain.
3. Pull up on brain.



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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.

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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.

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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
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- 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

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