

Using the B3000 in Custom Apps and 3rd-Party Drivers

This technical note describes how to configure module types used with B3000 brains when using a custom application or third-party driver that supports the *mistic* or Optomux Protocol but does not support configuring module types for the B3000. The B3000 allows you to configure a variety of analog and digital modules, each of which must be configured correctly for proper scaling, accurate data conversion, and to avoid erroneous readings or returned errors.

NOTE: The B3000 is obsolete and no longer available as of October 2009. The information in this technical note applies only to the B3000. It does not apply to the B3000-B, a modern drop-in replacement for the B3000.

Use the steps in this technical note if you are using the B3000 with:

- Custom *mistic* applications
- All Optomux applications
- Third-party solution drivers for either *mistic* or Optomux protocols

Go to the appropriate section for your system:

["Configuring Modules on a Windows 32-Bit Computer"](#)

["Configuring Modules on a Non Windows 32-Bit Computer"](#)

Configuring Modules on a Windows 32-Bit Computer

For a 32-bit Windows computer, you'll use an Opto 22 application called SnapIOType to configure the module types. See ["Step 2: Acquire SnapIOType" on page 2](#).

In this section:

["Step 1: Configure Jumpers on the B3000"](#)

["Step 2: Acquire SnapIOType" on page 2](#)

["Step 3: Set Up Communications in SnapIOType" on page 2](#)

["Step 4: Configure Module Types" on page 3](#)

Step 1: Configure Jumpers on the B3000

Before configuring jumpers, make sure the B3000 is OFF. Then configure the B3000 jumpers as follows:

Parameter	Setting	Jumpers
Baud rate	115.2 kbaud	Baud 1, 2, and 3
Data verification	Binary	Baud 4
Error correction	CRC16	Baud 5
Protocol	<i>mistic</i>	No jumper in Baud 6
Base address	0	No Address jumpers

This means that baud jumpers are installed in positions 1, 2, 3, 4, and 5. No address jumpers are installed.

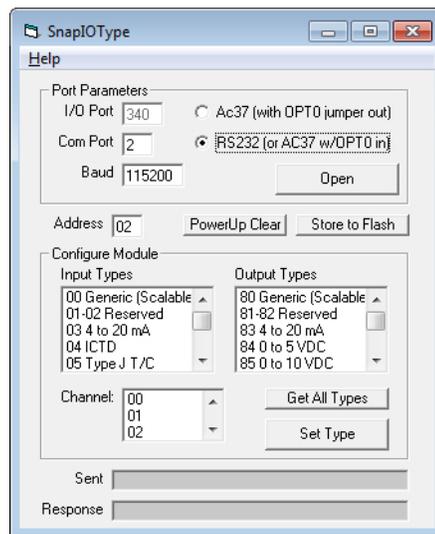
Step 2: Acquire SnapIOType

If you are using a Windows 32-bit computer, you'll need to download Opto 22's SnapIOType application, which is free.

1. Go to Support > Downloads on the Opto 22 website (<http://www.opto22.com>).
2. Search on the term, "SnapIO."
The installation filename is SNAPIO.exe.
3. Download the installation file, and then double-click it to start the SnapIOType installation wizard.

Step 3: Set Up Communications in SnapIOType

1. Launch the SnapIOType application.



2. Under Port Parameters, set the Com Port number to match the connection to your PC.
3. Check that the Baud rate matches the jumper settings on your B3000, which should be 115200.
4. When the Com Port, Baud, and Address are correct, click the Open button.

NOTE: If you have an AC37 configured as a Com Port, use the RS232 option. You should only select the Ac37 radio button if you have an older system and have a WinRT driver configured through an older utility called OptoPort.

5. Click the Power Up Clear button.

Step 4: Configure Module Types

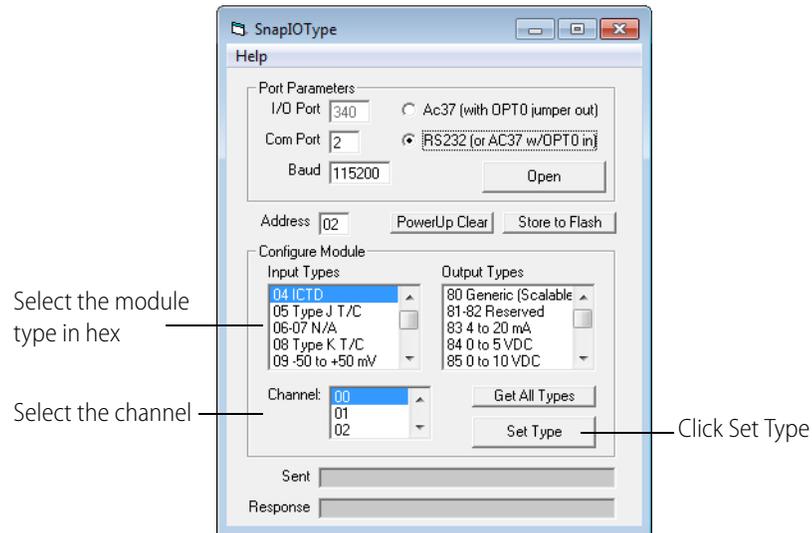
Now, you're ready to configure your module types.

1. In the following table, find the Module Type Code in hex for the specific module.

Snap Module Type	Usable Range	Module Type Code (Hex)
SNAP-AICTD (ICTD Temperature Input)	-40 °C to +100 °C -40 °C to +100 °C	04 00 (Scalable)
SNAP-AIMA (Current Input)	+4 mA to +20 mA -20 mA to +20 mA -20 mA to +20 mA	03 00 (Scalable) 40
SNAP-AITM (Thermocouple or Millivolt Input)	270 °C to +1200 °C 270 °C to +1372 °C -270 °C to +1000 °C -150 mV to +150 mV -150 mV to +150 mV -75 mV to +75 mV	05 (Type J) 08 (Type K) 13 (Type E) 00 (Scalable) 42 44
SNAP-AITM2 (Thermocouple or Millivolt Input)	+42 °C to +1820 °C -50 °C to +1768 °C -50 °C to +1768 °C -270 °C to +400 °C 0 °C to +2320 °C 0 °C to +2320 °C 0 °C to +2320 °C -270 °C to +1300 °C -50 mV to +50 mV -50 mV to +50 mV -25 mV to +25 mV	18 (Type B) 11 (Type R) 17 (Type S) 12 (Type T) 20 (Type C) 21 (Type D) 1F (Type G) 1E (Type N) 09 00 (Scalable) 43
SNAP-AIRTD (RTD Input)	-200 °C to +850 °C -0 Ohms to +400 Ohms -60 °C to +250 °C -80 °C to +260 °C	0A (100 Ohm RTD) 00 (Scalable) 2E (3-Wire, 100 Ohm NI RTD) 30 (3-Wire, 120 Ohm NI RTD)
SNAP-AIV (Voltage Input)	-5 VDC to +5 VDC -10 VDC to +10 VDC -5 VDC to +5 VDC -10 VDC to +10 VDC -10 VDC to +10 VDC	0B 0C 1C (Optomux Only) 1D (Optomux Only) 00 (Scalable)
SNAP-AOA-3 (Current Output)	4 mA to +20 mA 4 mA to +20 mA	80 (Scalable) 83
SNAP-AOA-23 (Current Output)	4 mA to +20 mA 4 mA to +20 mA	80 (Scalable) A3
SNAP-AOV-5 (Voltage Output Unipolar)	0 VDC to +10 VDC 0 VDC to +10 VDC	85 80 (Scalable)
SNAP-AOV-25 (Voltage Output Unipolar)	0 VDC to +10 VDC 0 VDC to +10 VDC	80 (Scalable) A5
SNAP-AOV-7 (Voltage Output Bipolar)	-10 VDC to +10 VDC -10 VDC to +10 VDC	87 80 (Scalable)
SNAP-AOV-27 (Voltage Output Bipolar)	-10 VDC to +10 VDC -10 VDC to +10 VDC	80 (Scalable) A7
SNAP-AIRATE (Analog Rate Input)	0 to +25,000 Hz	45
SNAP-AIVRMS (Voltage Input)	0 to +250 V RMS AC/DC	46
SNAP-AIARMS (Current Input)	0 to +10 Amp RMS AC/DC	47

2. Under Configure Module, select the input or output type that matches the module type code (in hex) from the table.
3. Select the Channel you are configuring. Channels are numbered 0 through 15.

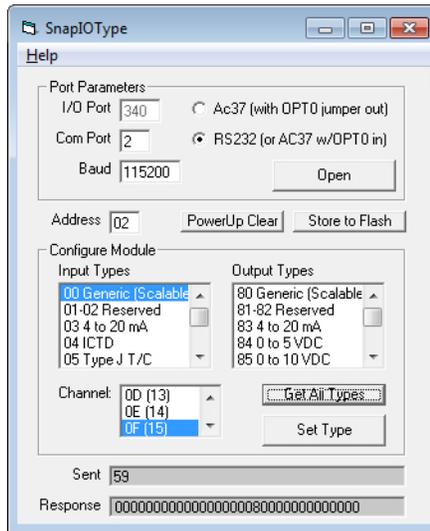
This screen shows an 04 ICTD Input Type on Channel 0.



4. Click the Set Type button.
The module configuration is saved to the B3000's EEPROM.
5. Repeat steps 1– 4 for each of the 16 channels.
Unused channels will usually be defined as “00 Generic Inputs”. This is also the default for the B3000 when the configuration is cleared.
6. When you are finished configuring *all* the module types, click the Store to Flash button.
7. Repeat all of the steps for each of the four I/O units on the B3000.

Step 5: Check the Module Configuration

1. Click the Get All Types button.
In the Response box at the bottom of the screen, a hexadecimal list of the module types appears. The list shows generic inputs for all channels except for a generic output in channel 6.



2. Read the module types in pairs from Channel 15 on the left to Channel 0 on the right.

NOTE: Remember that the module configuration is stored in the B3000. If the B3000 is swapped, the module types will have to be reconfigured.

Inspecting the Parameters Saved in the EEPROM

If you would like to inspect the EEPROM-saved parameters, do the following

1. Power cycle the B3000.
2. With SnapIOType open, click Power Up Clear and then click Get All Types.

Configuring Modules on a Non Windows 32-Bit Computer

For a non 32-bit Windows computer you can use a terminal emulator and *mistic* commands to configure modules.

In this section:

["Step 1: Configure Jumpers on the B3000"](#)

["Step 2: Configure the Modules" on page 6](#)

Step 1: Configure Jumpers on the B3000

Before configuring jumpers, make sure the B3000 is OFF. Then, configure the Baud and Address jumpers as follows:

Parameter	Setting	Jumpers
Baud rate	115.2kbaud	Baud 1, 2, and 3
Data verification	ASCII	No jumper in Baud 4
Error correction	Checksum	No jumper in Baud 5
Protocol	<i>mistic</i>	No jumper in Baud 6
Base address	0	No Address jumpers

The data type settings are 8 bits, no parity, one stop bit and no handshaking.

Step 2: Configure the Modules

Use an appropriate ASCII terminal emulator (for example, [HyperTerminal by Hilgraeve](#)) to connect to the serial port (with a 2 or 4 wire configuration). See form 270, the *Mistic Protocol User's Guide*.

The following *mistic* commands will be used in this example:

Letter	Description	Example
'A'	Power Up Clear	>00A??[CR]
'E'	Store System Configuration To Flash	>01E??[CR]
'x'	Reset All Parameters To Default	>02x??[CR]
'a'	Set Channel Configuration	>01a(channel)(module)??[CR]
'Y'	Read Module Configuration	>01Y??[CR]

NOTE: [CR] is a carriage return. Press the ENTER key.

All of the commands have the following beginning format:

>(2 ASCII HEX digits for address)(one ASCII character)

IMPORTANT: If you make a mistake, don't backspace. The B3000 reads all characters. Backspaces do not delete errant characters even if your terminal emulator makes you think it does. Just press

ENTER, [CR], without the "??" at the end of the string and most likely, you'll get an "N(hex number)" response for checksum error.

1. Power up the B3000 and launch the terminal emulator.
2. Make sure that the terminal settings (i.e. Baud rate, ASCII, No parity, 8-bits) are configured with the same settings as the brain.
3. Execute a power up clear to the unit.

Using the beginning format,

```
>(2 ASCII HEX digits for address)(one ASCII character)
```

replace the address field with your appropriate I/O unit. Assuming an address of 2, the command would be:

```
>02A?? [CR]
```

You should get a response of **A41**.

4. Configure each channel with the 'a' command.

For example, the following command configures position 8 with a generic output module, type 80 hexadecimal (for module types, see the table on [page 3](#)):

```
>02a0880?? [CR]
```

You should get an **A41** response every time.

5. When completed, you may inspect the module configuration by executing the *mistic* Read Module Configuration command: command 'Y'.

This command at address 2 would look like this:

```
>02Y?? [CR]
```

You should get a very long string of module configuration. In this long message, remove the 'A' character on the far left and the two checksum characters on the far right. The remainder of the string (in pairs of ASCII hex digits) is the module configuration with channel 15 on the left and channel 0 on the right.

6. To program the B3000 with your new I/O module configuration, use the 'E' command to Store System Configuration To Flash.

This command directed at address 2 would look like ">02E[CR]". The B3000 will take about a second to perform this EEPROM save.

7. To test, cycle power on the B3000, perform a power up clear:

```
>02A?? [CR]
```

and then the Read Module Configuration ('Y') command,

```
>02Y?? [CR]
```