OPTO 22

DATA SHEET

Form 956-050221

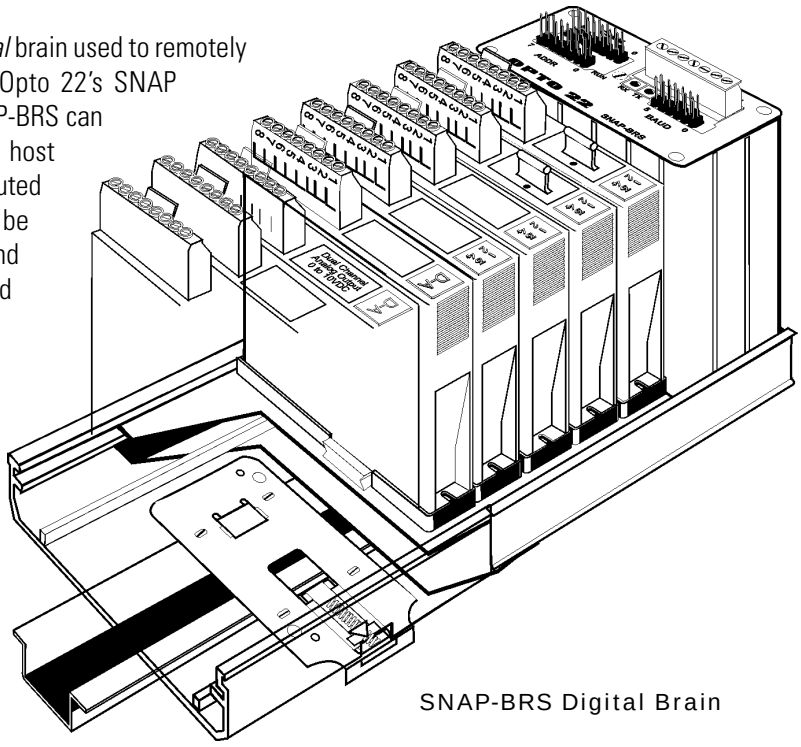
Part Number	Description
SNAP-BRS	Remote Digital Brain, Serial, Mistic Protocol

Description

The SNAP-BRS is a high-performance *digital* brain used to remotely control up to 32 digital I/O channels using Opto 22's SNAP "B Series" 8-position I/O mounting racks. SNAP-BRS can be used with either an Opto 22 controller or a host computer. On-board intelligence enables distributed control functions. The SNAP-BRS brain can be combined with other SNAP "B Series" racks and brains to provide the world's most powerful and sophisticated I/O handling systems.

The SNAP-BRS communicates with a host processor serially over RS-485 twisted pair wiring, and supports the advanced Mistic® protocol. Designed for high-speed input and output, the functions supported by the BRS family include read, write, and latching.

By using the SNAP-BRS family with the Mistic protocol and a controller, SNAP I/O customers can take advantage of FactoryFloor®, Opto 22's impressive new suite of Windows® 32-bit software that delivers total control to industrial automation customers. FactoryFloor consists of four integrated components:



SNAP-BRS Digital Brain

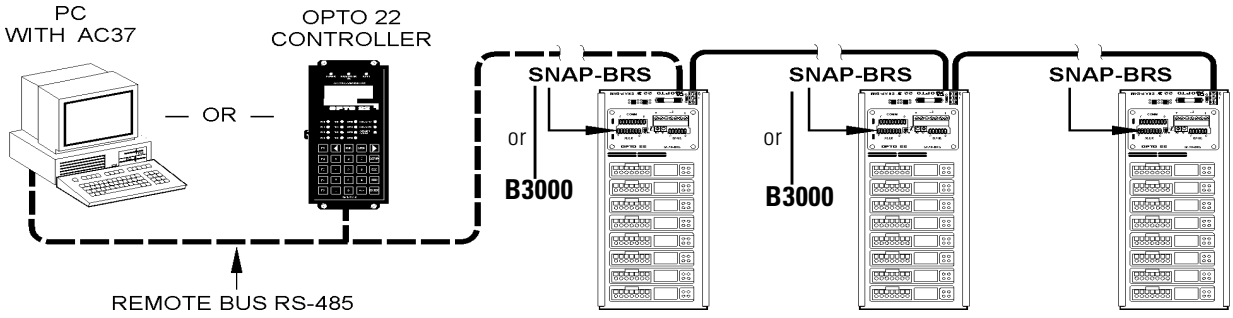
- OptoControl™, a graphical, flowchart-based development environment for control solutions
- OptoDisplay™, a graphical, multimedia operator interface package
- OptoServer™, a robust data server that connects the controller network with the PC-based FactoryFloor network
- OptoConnect™, a drag-and-drop database utility that makes building SQL Server and Access databases a snap.

OptoControl is the cornerstone of Opto 22's FactoryFloor software, and is the programming environment that leverages all the power of Opto 22's distributed hardware platform. OptoControl utilizes the distributed control capability of the SNAP-BRS brain and takes advantage of the graphical Windows 95 or NT interface to make it easy to configure, design, and troubleshoot your control system.

Opto 22's OptoDriver Toolkit may be used for direct communications from a host PC to the SNAP-BRS. The toolkit includes new 32-bit Windows-compatible drivers, Windows 16-bit drivers, and Opto 22's Classic DOS drivers.

Description

System Architecture



Specifications

General

Power Requirements	5.0 VDC ± 0.1 VDC @ 1.0A max.
Operating Temperature	0 to 70° C, 95% humidity, non-condensing
CPU	8-bit 8051 processor
Communications Interface	Supports 2-wire or 4-wire RS-485 using twisted pair cable with shield
Data Rates	300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 76800, and 115200 baud
Range: (Multidrop)	Up to 3,000 feet and 32 stations maximum between repeaters
LED Indicators	RUN (Power On), RCV (Receive), XMT (Transmit)
Options: Jumper Selectable	Address, communication, baud rate, CRC/Checksum, Binary/ASCI

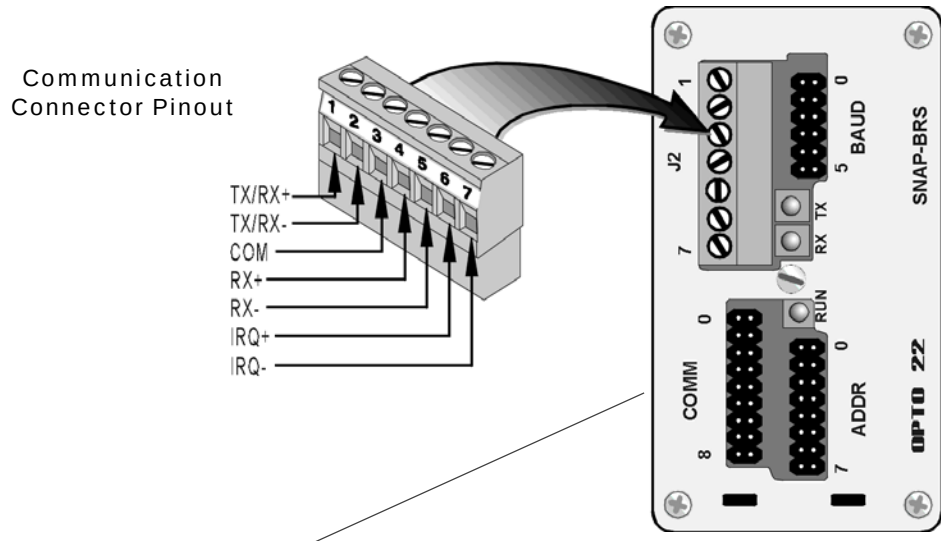
Command Set: Setup And System Commands

Setup and System Commands	Digital Read/Write, Latch Commands
Identify Unit	Read and optionally clear input latches (group command)
Power up clear	Read and optionally clear input latch
Repeat last response	Read module status
Reset	Set output module state (group command)
Set response delay	Set output Clear output

Specifications

Communication Jumpers/Wiring

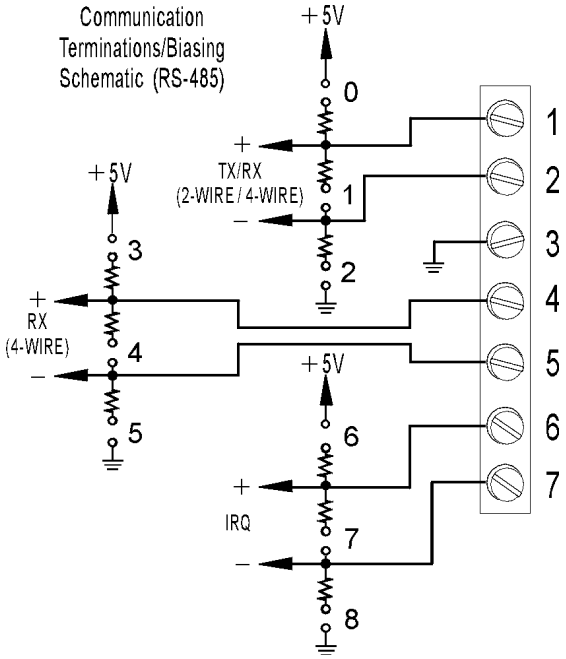
Communication Connector Pinout



Communication Jumper Descriptions

Jumper	Description
0	Pull-up for TX/RX+
1	Terminator for TX/RX
2	Pull-down for TX/RX-
3	Pull-up for RX+
4	Terminator for RX line
5	Pull-down for RX line
6	Pull-up for IRQ+
7	Terminator for IRQ
8	Pull-down for IRQ-

Communication Terminations/Biasing Schematic (RS-485)



Specifications

Baud/Address Jumpers, LED Descriptions

SNAP-BRS Brain

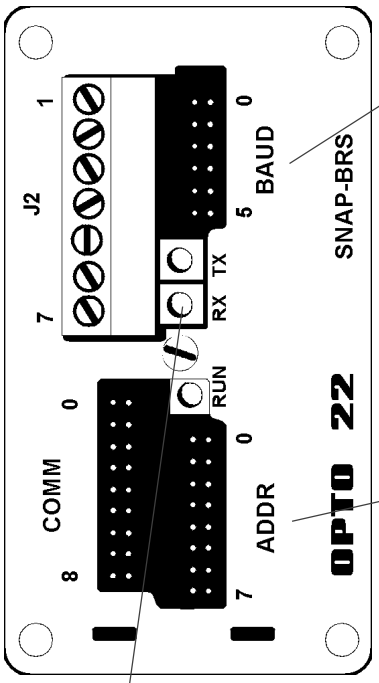


Table 1: Baud Rate Jumpers (0 - 5)

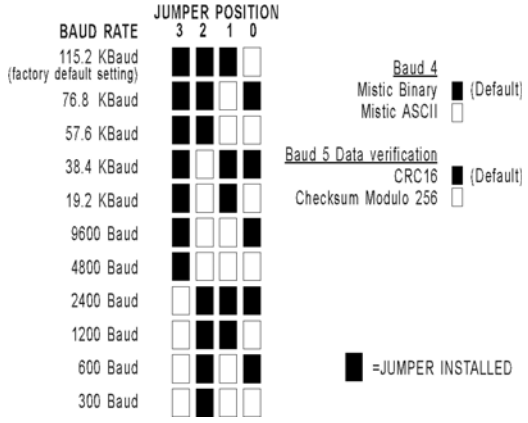


Table 2: Address Jumpers (0 - 7)

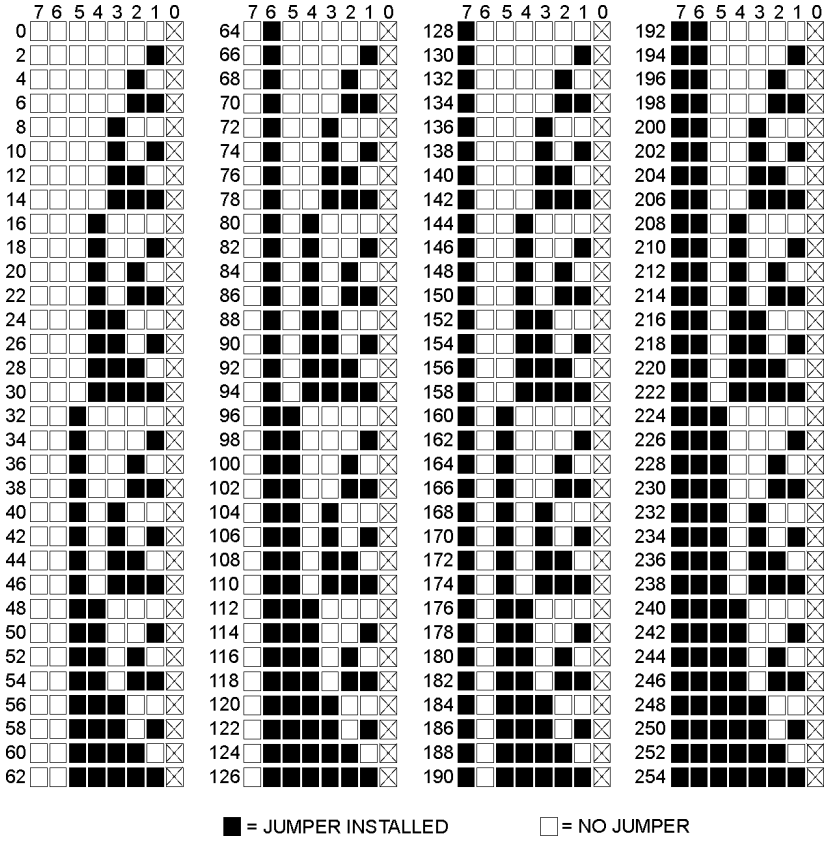


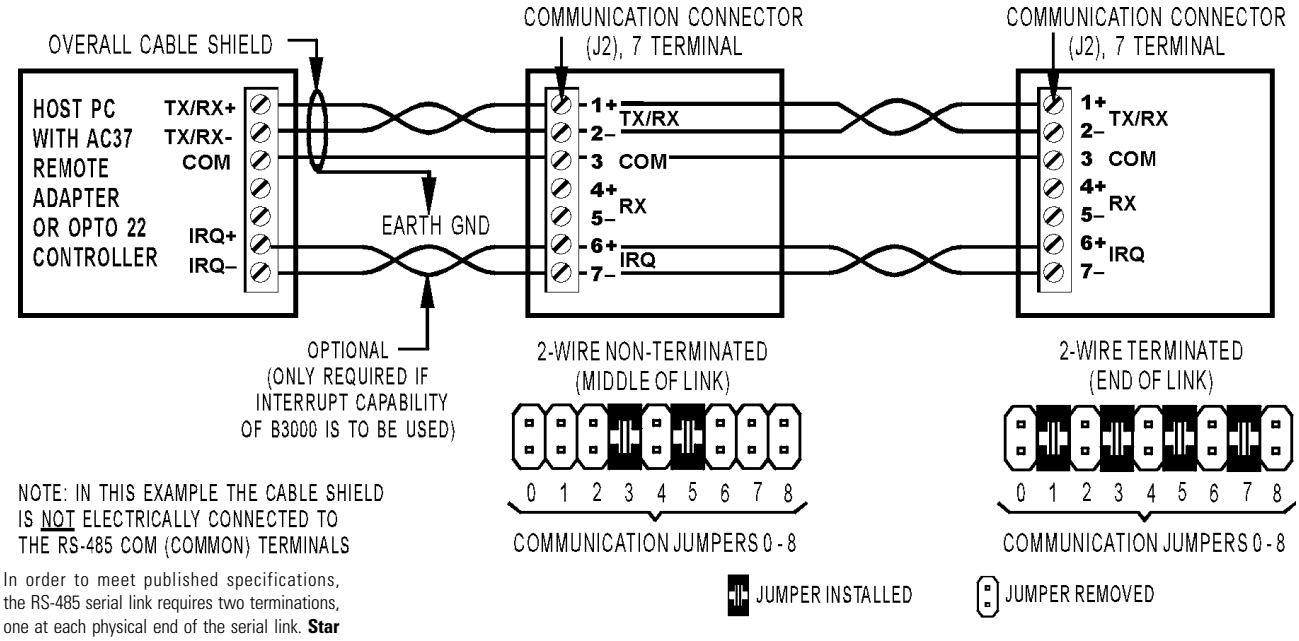
Table 3: LED Descriptions

LED	Description
RX	Processor is currently receiving data on communication line.
TX	Processor is currently transmitting data on communication line.
RUN	Power on processor (at least 4.75 VDC)

Specifications

Communication Jumpers/Wiring

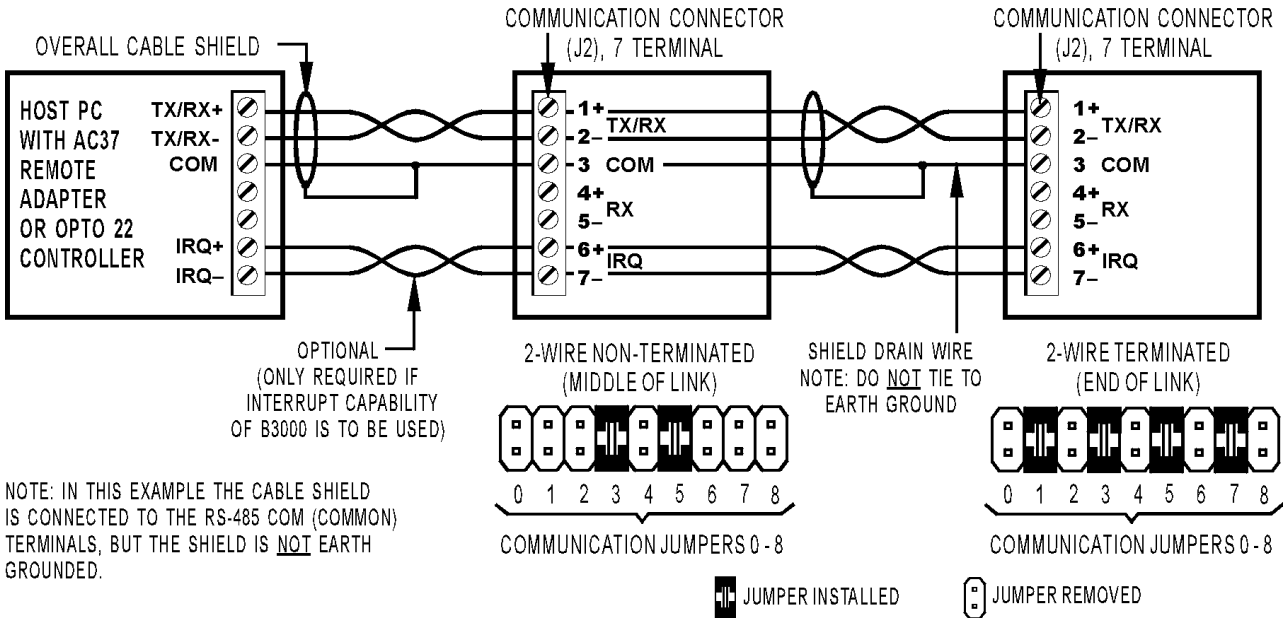
STANDARD 2-WIRE CONFIGURATION



NOTE: IN THIS EXAMPLE THE CABLE SHIELD IS NOT ELECTRICALLY CONNECTED TO THE RS-485 COM (COMMON) TERMINALS

In order to meet published specifications, the RS-485 serial link requires two terminations, one at each physical end of the serial link. **Star configuration is not allowed.** In order to use a star configuration, use Opto 22 Part No. AC38A/B.

ALTERNATE 2-WIRE CONFIGURATION
(ACCEPTABLE FOR MOST CONDITIONS)

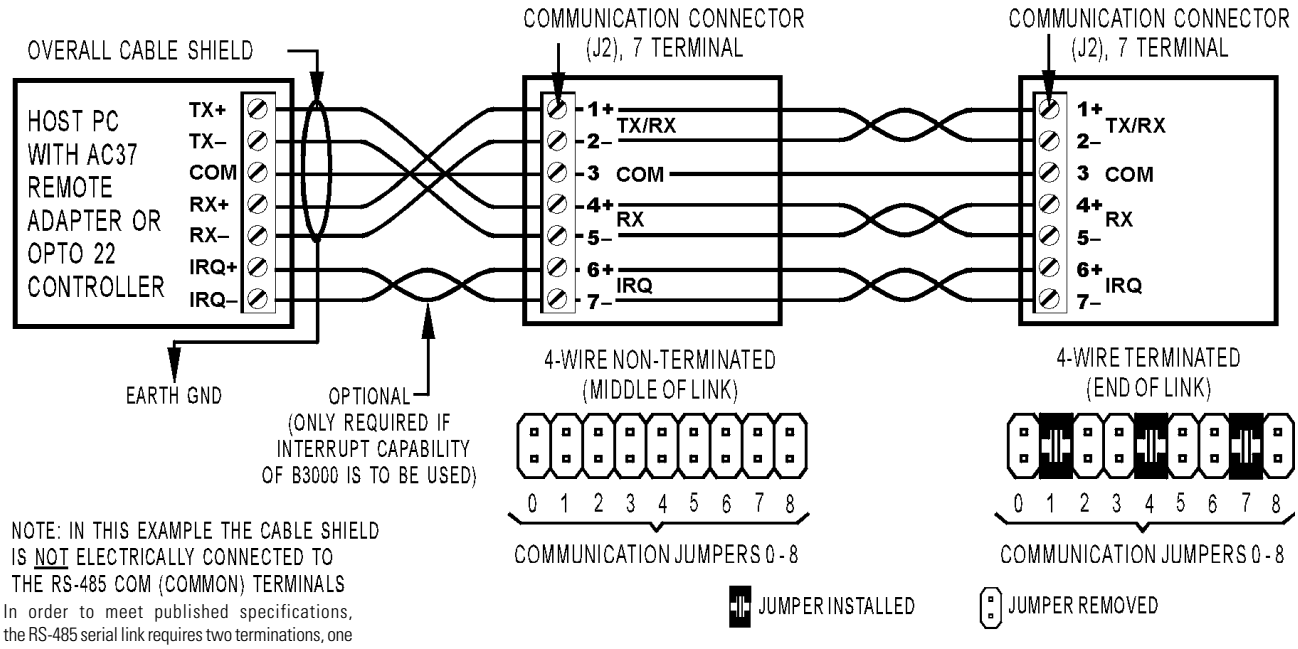


NOTE: IN THIS EXAMPLE THE CABLE SHIELD IS CONNECTED TO THE RS-485 COM (COMMON) TERMINALS, BUT THE SHIELD IS NOT EARTH GROUNDED.

Specifications

Communication Jumpers/Wiring (Continued)

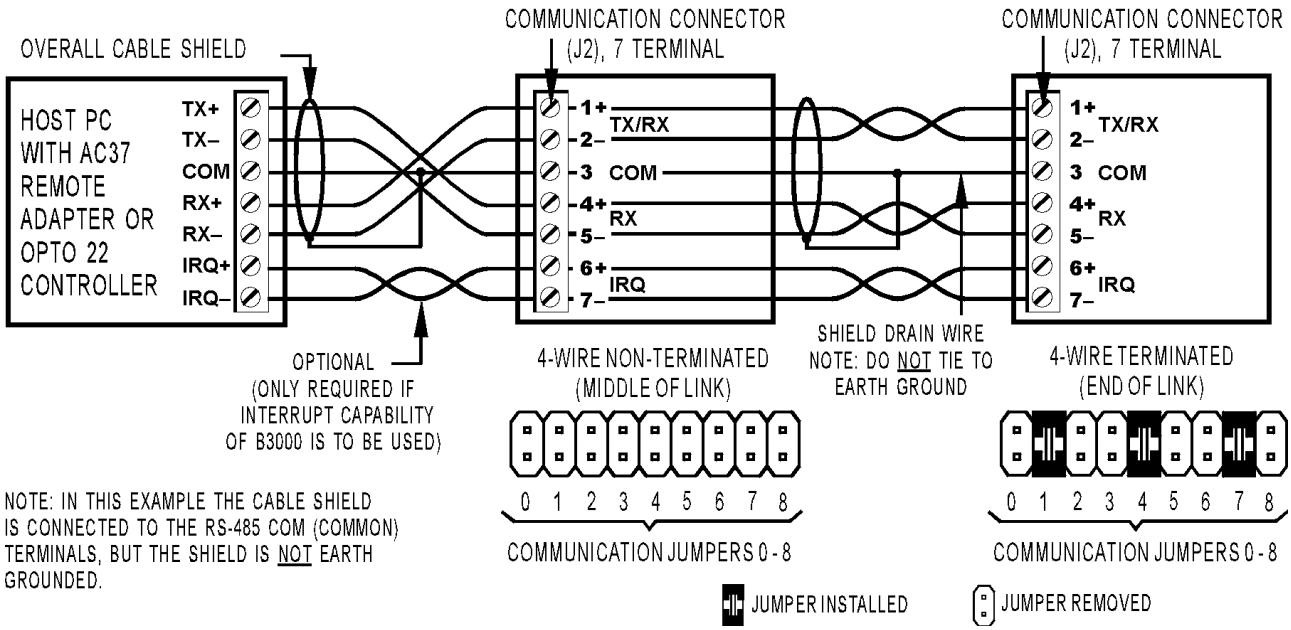
STANDARD 4-WIRE CONFIGURATION



NOTE: IN THIS EXAMPLE THE CABLE SHIELD IS NOT ELECTRICALLY CONNECTED TO THE RS-485 COM (COMMON) TERMINALS

In order to meet published specifications, the RS-485 serial link requires two terminations, one at each physical end of the serial link. **Star configuration is not allowed.** In order to use a star configuration, use Opto 22 Part No. AC38A/B.

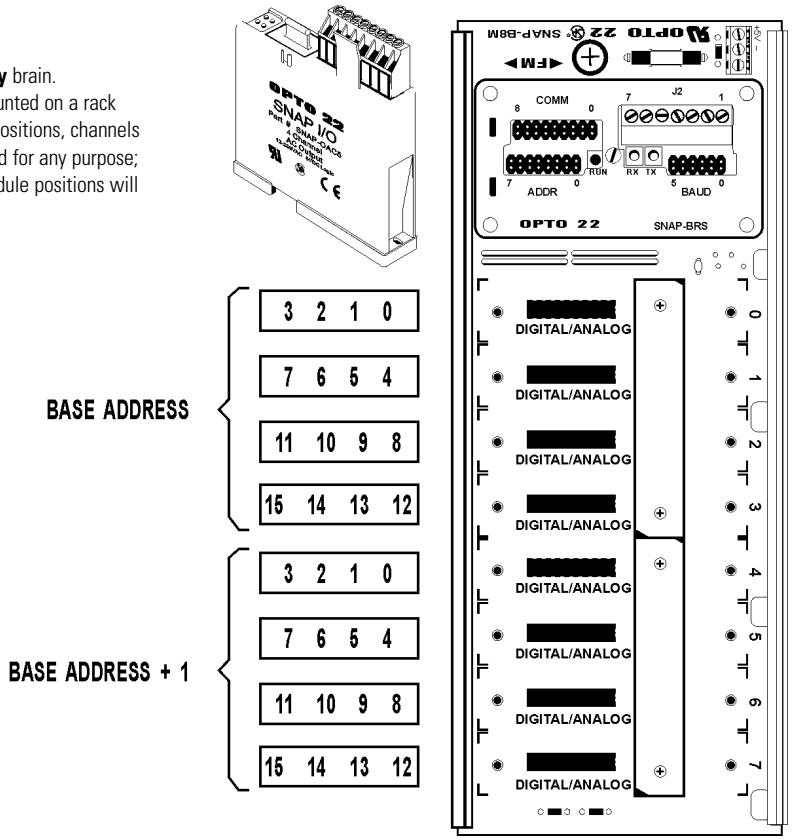
ALTERNATE 4-WIRE CONFIGURATION
(ACCEPTABLE FOR MOST CONDITIONS)



NOTE: IN THIS EXAMPLE THE CABLE SHIELD IS CONNECTED TO THE RS-485 COM (COMMON) TERMINALS, BUT THE SHIELD IS NOT EARTH GROUNDED.

Specifications
SNAP Digital I/O Mapping

Notes:
1. SNAP-BRS is a **digital-only** brain.
2. If SNAP-BRS brains are mounted on a rack with more than 8 module positions, channels 8 and above cannot be used for any purpose; however the first eight module positions will function normally.



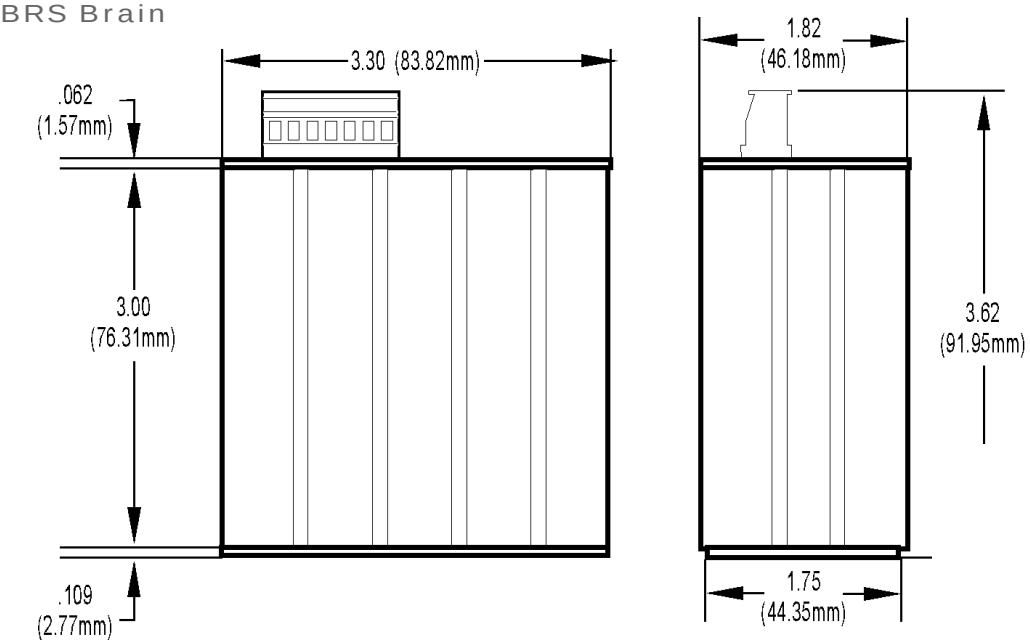
Specifications
SNAP I/O Addressing

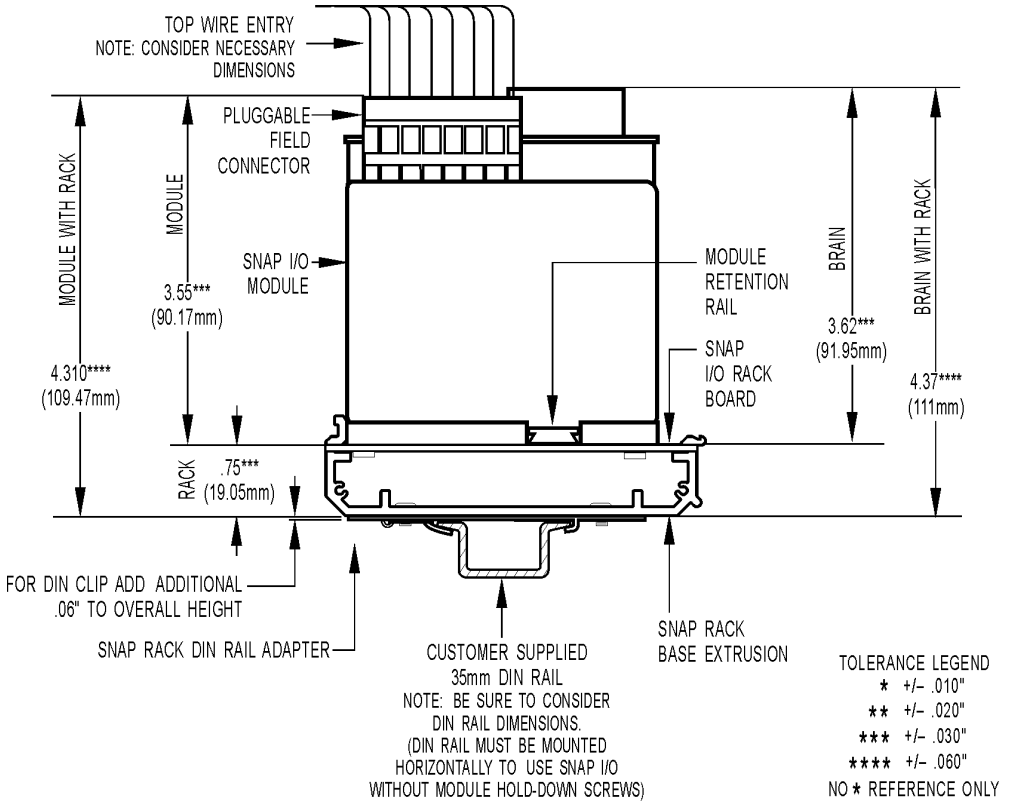
A SNAP-BRS is capable of addressing a maximum of 32 channels of digital I/O and has no analog capability. I/O on the SNAP-BRS is divided into two addresses, each with 16 channels of I/O. The digital addresses are base +0 and base +1. Therefore, if a SNAP-BRS brain is configured at address 12, the digital addresses would be 12 and 13. Address 12 would talk to the modules in positions 0 - 3; channels would be numbered 0 - 15 in the software. Address 13 would talk to module positions 4 - 7; again the channels would be numbered from zero through 15. When configuring the brain in OptoControl, select two consecutive addresses. In the Add I/O Unit dialog add two separate brains; in the Type field, configure both addresses as SNAP Remote Simple Digital I/O units.

When a SNAP I/O point is configured on a digital brain, OptoControl automatically creates and configures the other three points in that module. For example, if a SNAP digital point is added at channel 5, then identical points are created at channels 4, 6, and 7. Unique names are created for these new points, based on the name entered for the original point. You can then modify the name and description for each channel independently. If the module type of one digital point is changed, then the module type of all other points in that module is automatically changed.

Dimensions

SNAP-BRS Brain





Assembly

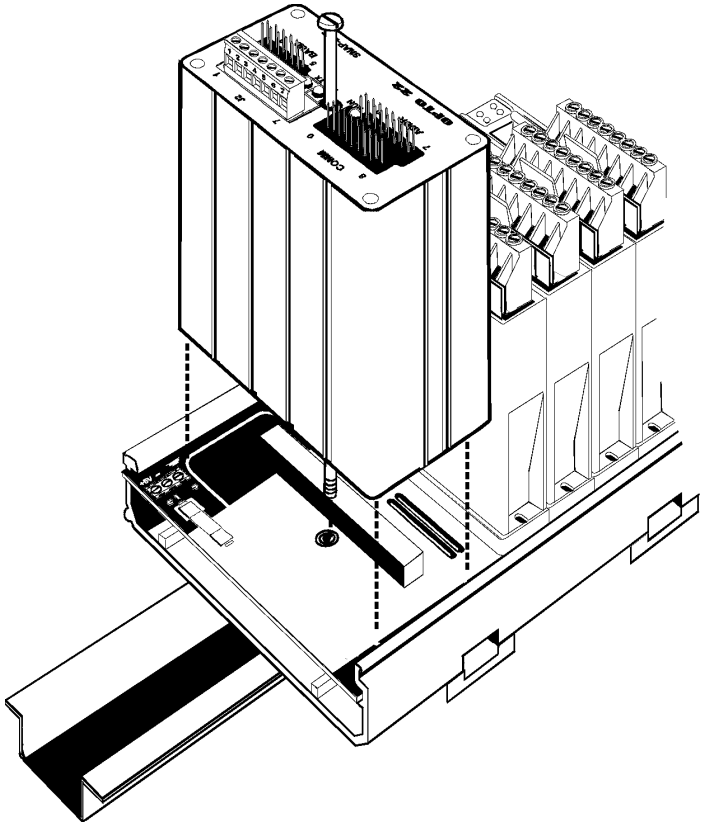
Brain And Mounting Rack

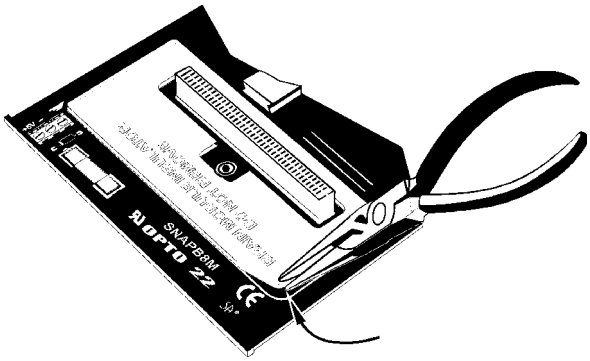
To install the brain onto a B Series rack:

1. Turn off power to rack assembly.
2. If a plastic brain insulator is present on your mounting rack, remove it as shown below.
3. Align brain connector with mating connector on rack.
4 Seat brain onto connector.
5. Use integral hold-down screw to secure in position. Do not overtighten.

To remove brain from B Series rack:

1. Turn off power to rack assembly.
2. Loosen integral hold-down screw on processor.
3 Pull up on processor.





Remove Plastic Insulator

More About OPTO 22

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Products

Opto 22 produces a broad array of reliable, flexible hardware and software products for industrial automation, remote monitoring, enterprise data acquisition, and machine-to-machine (M2M) applications.

SNAP Ethernet Systems

Based on the Internet Protocol (IP), SNAP Ethernet systems offer flexibility in their network connectivity and in the software applications they work with. The physical network may be a wired Ethernet network, a cellular wireless network, or a modem. A wide variety of software applications can exchange data with SNAP Ethernet systems, including:

- Opto 22's own ioProject™ suite of control and HMI software
- Manufacturing resource planning (MRP), enterprise management, and other enterprise systems
- Human-machine interfaces (HMIs)
- Databases
- Email systems
- OPC client software
- Custom applications
- Modbus/TCP software and hardware.

SNAP Ethernet system hardware consists of controllers and I/O units. Controllers provide central control and data distribution. I/O units provide local connection to sensors and equipment.

SNAP OEM Systems

Opto 22 SNAP OEM I/O systems are highly configurable, programmable processors intended for OEMs, IT professionals, and others who need to use custom software with Opto 22 SNAP I/O modules.

Linux® applications running on these systems can read and write to analog, simple digital, and serial I/O points on SNAP I/O modules using easily implemented file-based operations. Applications can be developed using several common development tools and environments, including C or C++, Java, and shell scripts.

M2M Systems

Machine-to-machine (M2M) systems connect your business computer systems to the machines, devices, and environments you want to monitor, control, or collect data from. M2M systems often use wireless cellular communications to link remote facilities to central systems over the Internet, or to provide monitoring and control capability via a cellular phone.

Opto 22's Nvio™ systems include everything you need for M2M—interface and communications hardware, data service plan, and Web portal—in one easy-to-use package. Visit nvio.opto22.com for more information.

Opto 22 Software

Opto 22's ioProject and FactoryFloor® software suites provide full-featured and cost-effective control, HMI, and OPC software to power your Opto 22 hardware. These software applications help you develop control automation solutions, build easy-to-use operator interfaces, and expand your manufacturing systems' connectivity.

Quality

In delivering hardware and software solutions for worldwide device management and control, Opto 22 retains the highest commitment to quality. We do no statistical testing; each product is made in the U.S.A. and is tested twice before leaving our 160,000 square-foot manufacturing facility in Temecula, California. That's why we can guarantee solid-state relays and optically-isolated I/O modules *for life*.

Product Support

Opto 22's Product Support Group offers comprehensive technical support for Opto 22 products. The staff of support engineers represents years of training and experience, and can assist with a variety of project implementation questions. Product support is available in English and Spanish from Monday through Friday, 7 a.m. to 5 p.m. PST.

Opto 22 Web Sites

- www.opto22.com
- nvio.opto22.com
- www.internetio.com (live Internet I/O demo)

Other Resources

- OptoInfo CDs
- Custom integration and development
- Hands-on customer training classes.

About Opto 22

Opto 22 manufactures and develops hardware and software products for industrial automation, remote monitoring, enterprise data acquisition, and machine-to-machine (M2M) applications. Using standard, commercially available Internet, networking, and computer technologies, Opto 22's input/output and control systems allow customers to monitor, control, and acquire data from all of the mechanical, electrical, and electronic assets that are key to their business operations. Opto 22's products and services support automation end users, OEMs, and information technology and operations personnel.

Founded in 1974 and with over 85 million Opto 22-connected devices deployed worldwide, the company has an established reputation for quality and reliability.

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