SNAP ULTIMATE BRAIN

Features

- Programmable I/O and communications processor
- I10/100 Mbps Ethernet, automatic speed negotiation
- RS-232 serial port for optional modem connection using PPP
- Simultaneous communication using Modbus/TCP, SNMP, SMTP, FTP, and OptoMMP protocols

SNAP-UP-1-ADS

DESCRIPTION

NOTE: The SNAP-UP1-ADS and SNAP-UP1-M64 are obsolete and no longer available. The SNAP-UP1-D64 is available until the limited stock is depleted. *Although fully supported, this is a legacy product and not recommended for new designs.*

For new development, we recommend using SNAP PAC R-series controllers instead of SNAP Ultimate I/O. SNAP PAC R-series controllers are more powerful, have two Ethernet network interfaces, can run PAC Project software, and are priced lower. See Opto 22 form #1594, the SNAP PAC R-Series Controller Data Sheet, *for details.*

The **SNAP Ultimate brain** is an I/O and communications processor mounted on a standard SNAP rack. SNAP Ultimate I/O brings processing power, programmability, networking capability, and enterprise connectivity to the I/O level.

This intelligence, programmability, and connectivity simplifies your control system design and expands the range of application solutions you can deliver. Besides running control programs at the I/O level and eliminating the need for separate controllers, the SNAP Ultimate controller/brain also has the ability to simultaneously communicate with multiple devices using Modbus®/TCP, SNMP, SMTP, FTP, and other protocols.

The connectivity with standard TCP/IP Ethernet networks first introduced with SNAP Ethernet I/O also applies to SNAP Ultimate I/O. You can attach a SNAP Ultimate controller/brain to existing wired or wireless Ethernet networks, making it easy to add monitoring and control capabilities. Or you can use standard Ethernet hardware to build an independent control network, connecting your PC directly to I/O.

Communication with SNAP Ultimate I/O can also be established via a modem connection using Point-to-Point Protocol (PPP). Wireless or wireline modem connections are ideal for remote locations where an Ethernet network is not practical.

Three models of the compact SNAP Ultimate controller/brain are available:

- The **SNAP-UP1-ADS [Obsolete]** interfaces with a mix of Opto 22 SNAP I/O™ analog, digital, and serial modules.
- The digital-only **SNAP-UP1-D64 [Limited Stock]** handles up to 64 points of simple digital I/O (16 modules) on one mounting rack.
- The **SNAP-UP1-M64 [Obsolete]** handles up to 16 analog, digital, and serial modules on a special rack that can accommodate digital modules in any location. Digital functions are simplified.

All SNAP Ultimate controller/brains include a battery-backed real-time clock to time stamp email messages and data log entries. Data logs are stored locally on the brain for convenient access. A standard RJ-45 twisted-pair connector provides both 10 and 100 Mbps Fast Ethernet compatibility with automatic speed negotiation. The brain also includes an RS-232 serial connector, which can be used for modem communication, programming, diagnostics, and direct connection to serial devices.

With an Opto 22 mounting rack and standard SNAP I/O modules, the brain can be used as a combination controller and I/O unit or simply as a capable I/O unit. As an I/O unit, it provides distributed intelligence when used with a standalone Opto 22 industrial controller such as the SNAP PAC S-series, or with a SNAP PAC R-series on-the-rack controller.

Part Numbers

Part	Description
SNAP-UP1-ADS **[Obsolete]**	**[Obsolete]** Analog/Digital/Serial SNAP Ultimate Brain
SNAP-UP1-D64 **[Limited Stock]**	**[Limited Stock]** Digital-Only SNAP Ultimate Brain
SNAP-UP1-M64 **[Obsolete]**	**[Obsolete]** Analog/Simple Digital/Serial SNAP Ultimate Brain

PROGRAMMING OPTIONS

The SNAP Ultimate brain is programmed using Opto 22's **ioProject™ Basic** software suite, which is included with your purchase of the controller/brain.

ioControl Basic includes:

- **ioControl™**, a graphical, flowchart-based programming tool developing software applications to monitor, control, and acquire date from equipment, processes, and devices. In addition to flowchart programming, ioControl includes a powerful, built-in scripting language based on C and other procedural languages.
- **ioDisplay™**, an intuitive package for building operator interfaces (HMIs) for your Microsoft® Windows®-based clients communicating with a SNAP Ultimate I/O system. ioDisplay offers a full-featured HMI including alarming, trending, and a built-in library of 3,000 industrial automation graphics.
- **ioManager™**, a utility application used to assign IP addresses, configure I/O points and I/O unit features, and inspect, read from, or write to I/O units in real time. For multiple I/O units that use the same configuration, you can configure all I/O units simultaneously.

For additional information on the ioProject software suite, see the ioProject data sheet, Opto 22 form #1473.

COMMUNICATION OPTIONS

You can use any of the following methods—or all of them simultaneously—to interface with one or more SNAP Ultimate brains and I/O, using the RJ-45 or RS-232 connections:

- **Opto 22 ioControl and ioDisplay—**Create and download control programs with ioControl, and monitor and control the brain using an operator interface built with ioDisplay.
- **Modbus/TCP driver—**for interfacing with any third-party software or hardware that uses the Modbus/TCP protocol.
- **SNMP messaging—**for communicating with SNMP-based enterprise management software such as Computer Associates' Unicenter TNG® or Hewlett Packard's OpenView®.
- **OptoOPCServer—**providing OPC 2.0 access for OPC clients.
- **Opto 22's OptoMMP™ Communications Toolkit—**for writing your own applications. The toolkit includes an ActiveX® component and a C++ class, which hide the details of Ethernet communications and the memory map protocol. Sample utilities with source code are also provided. For details, see form #1465, the *OptoMMP Protocol Guide*.
- **Linux® support—**The IEEE 1394-based OptoMMP protocol is open and documented in the *OptoMMP Protocol Guide*.

I/O MOUNTING RACKS

SNAP Ultimate brains must be connected to the appropriate rack to avoid damage to the brain.

The analog/digital/serial SNAP-UP1-ADS connects to standard SNAP B-series brain mounting racks, which are available with 4, 8, 12, or 16 positions for Opto 22 SNAP I/O modules. Serial communication, high-density digital, and analog modules can be placed in any position; 4-channel digital modules can be placed in any of the first eight positions. (A maximum of eight serial modules can be used on a rack.) Because of the rack's flexibility in handling many types of modules, you can install the modules that fit your needs.

The digital-only SNAP-UP1-D64 brain connects to a SNAP-D64RS mounting rack, which can hold up to 16 4-channel digital input and output modules. Digital functions are simplified; the following are not included: high-speed and quadrature counters, pulsing, and TPO (time-proportional output). Note that high-density digital modules cannot be used with this brain.

The analog/digital/serial SNAP-UP1-M64 connects to a SNAP-M64 rack, which lets you use any type of module in any of its 16 positions, subject to the maximum limit of eight serial modules. Like the SNAP-UP1-ADS brain, the SNAP-UP1-M64 supports all types of modules; like the digital-only brain, it supports simplified digital functions on all channels.

SYSTEM ARCHITECTURE

The SNAP Ultimate controller/brain communicates with other Ethernet devices running a broad assortment of software applications. The ioControl strategy in the controller/brain controls analog, digital, and serial devices through the I/O modules on its own I/O unit; in addition, it can control other SNAP Ethernet-based I/O units on the Ethernet network.

SPECIFICATIONS

NOTE: The SNAP-UP1-ADS and SNAP-UP1-M64 are obsolete and no longer available.

The SNAP-UP1-D64 is available until the limited stock is depleted.

All Models

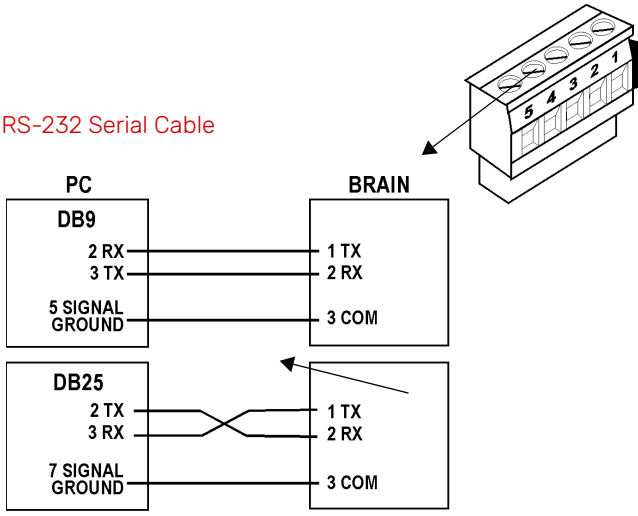
Power Requirements	5.0 VDC to 5.2 VDC at 1.2 A maximum (does not include module power requirements)
Processor	32-bit ColdFire 5407
Memory: Total RAM Battery-backed RAM Flash EEPROM	 16 MB 512 KB 8 MB
Backup battery	CR2032, fixed (not user replaceable)
Network Interface	IEEE 802.3 network, 10Base-T and 100Base-TX
Serial Port	RS-232
Serial Data Rates	Default is 19,200 baud; baud rate is soft-selectable from 150 to 115,200 baud.
Maximum Ethernet Segment Length	100 meters with Category 5 or superior UTP. For 100 Mbps at this distance, use Category 5 or superior solid UTP.
Jumpers (Internal)	Boot to kernel/boot to loader Reset to factory defaults
Temperature: Operating Storage	 0 °C to 70 °C -40 °C to 85 °C
Humidity	0–95% humidity, non-condensing

NOTE: To compare specifications and features for the SNAP Ultimate controller/brain with other Opto 22 hardware, see the following:

- For I/O processing features, form #1486, the *SNAP Ethernet-Based I/O Processor Comparison Chart*
- For controller features, form #1485, the *SNAP Controller Comparison Chart*

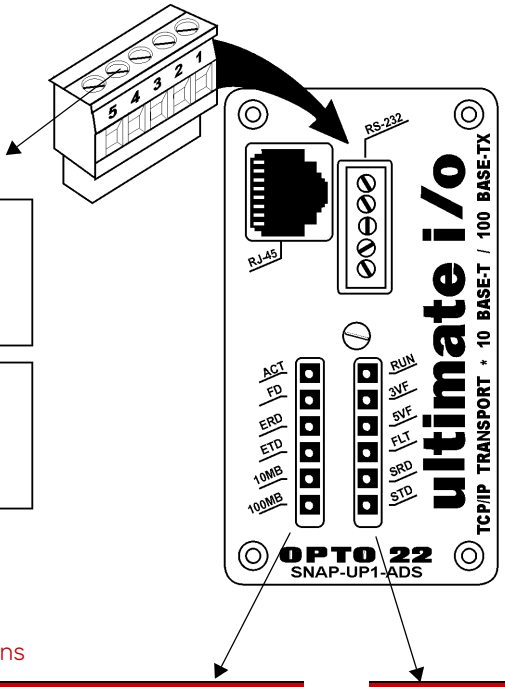
SPECIFICATIONS (CONTINUED)

RS-232 Serial Cable



Serial Connector Pinouts

Pin	RS-232
1	TX
2	RX
3	COM
4	RTS
5	CTS



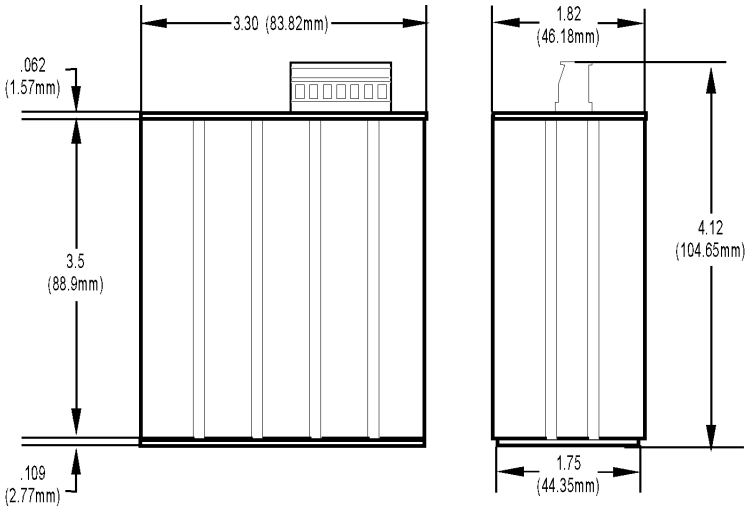
LED Descriptions

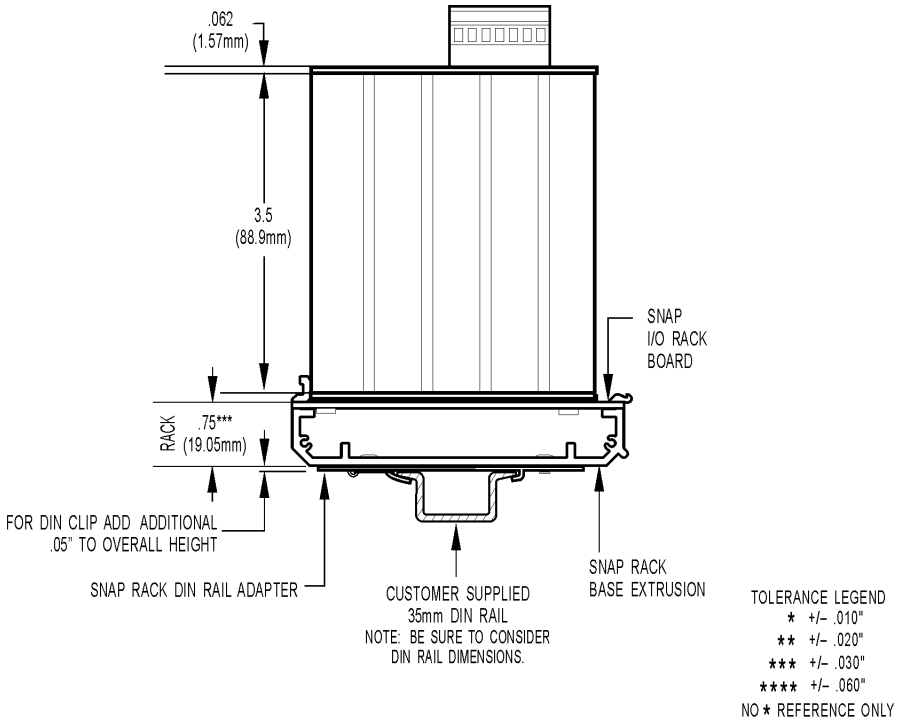
LED	Description
ACT	Network Activity
FD	Full Duplex Mode
ERD	Ethernet—Receive Data
ETD	Ethernet—Transmit Data
10MB	Ethernet Link Detection at 10 Mbps
100MB	Ethernet Link Detection at 100 Mbps

LED	Description
RUN	Normal Operation
3VF	3 Volt Fault
5VF	5 Volt Fault
FLT	Microprocessor Fault
SRD	Serial—Receive Data
STD	Serial—Transmit Data

DIMENSIONS

Dimensions are the same for all models of the SNAP Ultimate brain.





More about Opto 22

OPTO 22

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.

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