

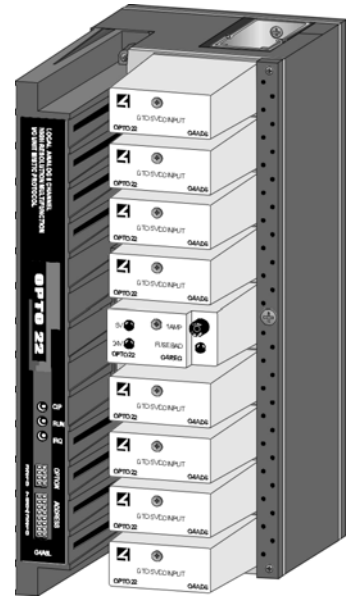
Form 670-010126

Part Numbers	Description
G4A8R	Remote Analog 8-Channel Multifunction I/O Unit Mystic Protocol

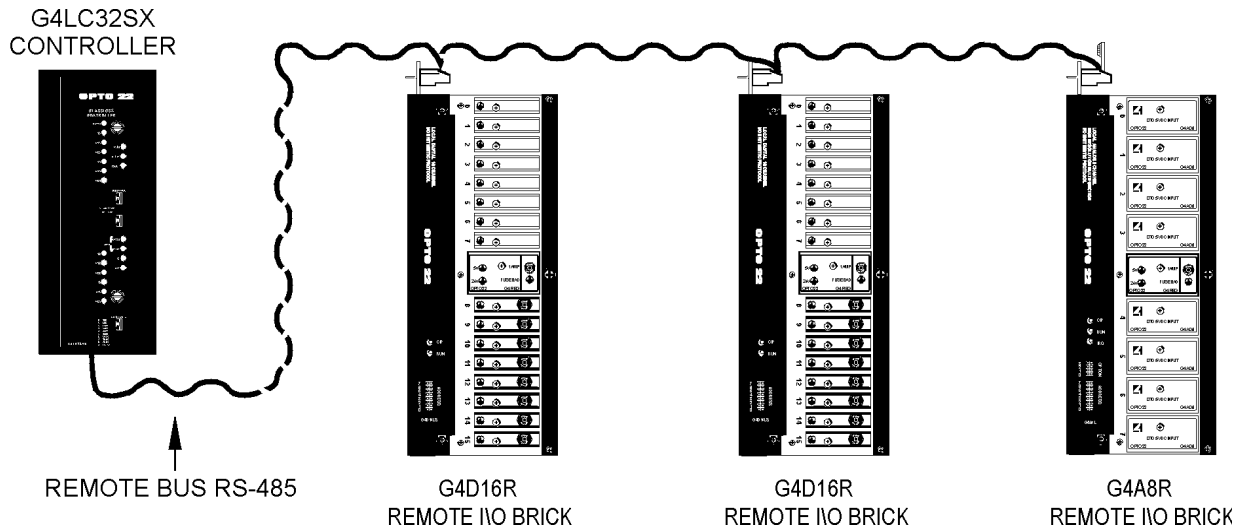
### Description

The G4A8R is a high performance analog I/O brick for the Opto 22 family of processors and I/O. It provides intelligent and flexible single point I/O control in a rugged, deadfront, compact package. Customers select the signal type for each of the 8 channels on the brick, in any combination, from the G4 family of isolated analog I/O modules. Up to 16 channels are supported with available expansion options. Each module has channel to channel isolation and provides 12 bits of resolution. Onboard brick intelligence offers PID loop control, HI/LO limit monitoring, thermocouple linearization, event/reactions, and many other control functions. Event/reactions execute high speed deterministic responses to sophisticated control sequences, alarm monitoring, diagnostics, and host interrupts.

Analog bricks utilize Opto 22's Mystic protocol and high speed serial communications. Programming is accomplished with Opto 22's intuitive multitasking, flowchart-based languages OptoControl or Cyrano. Custom software development is achieved using a host computer and Opto 22's Mysticware software driver with the high-level software language of your choice.



TYPICAL MISTIC I/O SYSTEM ARCHITECTURE WITH A CLASSIC SX CONTROLLER



### Specifications

#### Setup and System Commands

IDENTIFY TYPE  
POWER UP CLEAR  
REPEAT LAST RESPONSE  
RESET  
RESET ALL PARAMETERS TO DEFAULT  
SET COMM LINK WATCHDOG AND DELAY  
SET COMM LINK WATCHDOG TIME-OUT DATA  
SET RESPONSE DELAY  
SET SYSTEM OPTIONS

#### Analog I/O Configuration Commands

CALCULATE AND SET ADC MODULE OFFSET  
CALCULATE AND SET ADC MODULE GAIN  
READ MODULE CONFIGURATION  
SET ADC MODULE OFFSET  
SET ADC MODULE GAIN  
SET AVERAGING SAMPLE WEIGHT (DIGITAL FILTERING)  
SET CHANNEL CONFIGURATION  
SET ENGINEERING UNIT SCALING PARAMETERS  
SET I/O CONFIGURATION-GROUP  
SET TOTALIZATION SAMPLE RATE  
SET TPO RESOLUTION  
STORE SYSTEM CONFIGURATION

#### Analog Read/Write/Output Commands

RAMP DAC OUTPUT TO ENDPOINT  
READ AND CLEAR I/O MODULE DATA  
READ AND CLEAR I/O MODULE DATA-GROUP  
READ I/O MODULE MAGNITUDE  
READ I/O MODULE MAGNITUDE-GROUP  
SET DAC MODULE MAGNITUDE, ENG. UNITS  
SET DAC MODULE MAGNITUDE, ENG. UNITS-GROUP  
SET DAC MODULE MAGNITUDE, COUNTS  
SET DAC MODULE MAGNITUDE, COUNTS-GROUP

### Specifications

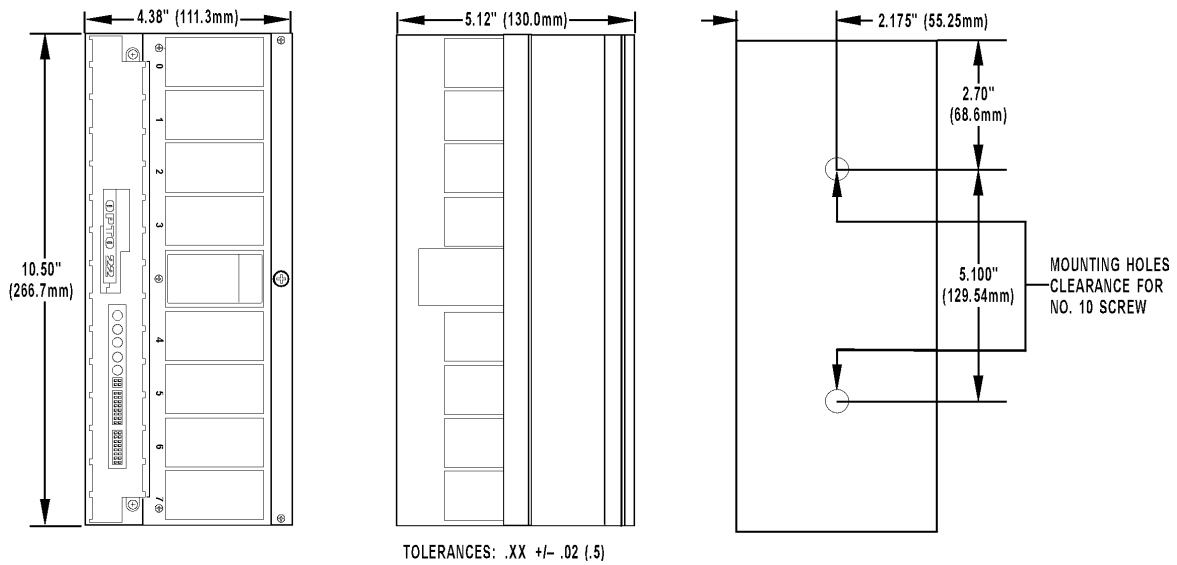
#### Multifunction Analog Brick Specifications

CPU CPU clock Frequency	16-bit, Intel 80C 196 processor 12 MHz processor
Communications Bus speed Cable type  Maximum cable length Mode	300-115.2 KBd 2 twisted pair + GND Interrupt uses 1 twisted pair 3,000 ft (more with repeaters) Binary or ASCII
Typical I/O time (includes communication transfer time) Read 16 channels Write 16 channel	5.53 ms 6.52 ms
Input/output update rate Input Output	7 ms 50 ms
Analog input/output timing Analog Mystic 200 I/O units constantly update the status of their I/O. Input modules are read every 7 milliseconds and the data held in memory until requested by their host CPU. Output module data is held in memory and output to each module every 50 milliseconds.	
PID scan rate	100 ms for all 8 PIDs 4 PID loops/brick Up to 8 PID loops with brick expansion option
Typical Event/Reaction time ( $\leq 16$ Event/Reactions)	4 ms
*System power consumption @ 24 VDC $\pm$ 0.1 V (excludes analog modules) Terminated (last brick on the bus) Non-terminated (all other bricks) Analog expansion brick Typical analog module	180 mA 180 mA 65 mA 45 mA
Isolation Input to output Output to analog supply	4,000 Vrms 4,000 Vrms
Temperature Operating Storage	0° C to 70° C -40° C to 80° C
Humidity	5% to 95% relative humidity
Software	OptoControl, Cyrano 200, and Mysticware
Expansion options G4RAX Remote analog expansion brick	Adds 8 additional analog I/O channels on a separate brick unit

Form 670-010126

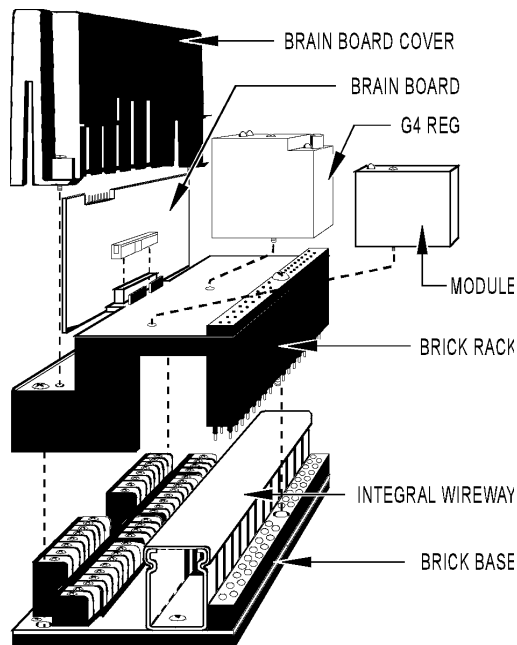
### Dimensions

#### Analog Brick Dimensions



### Assembly

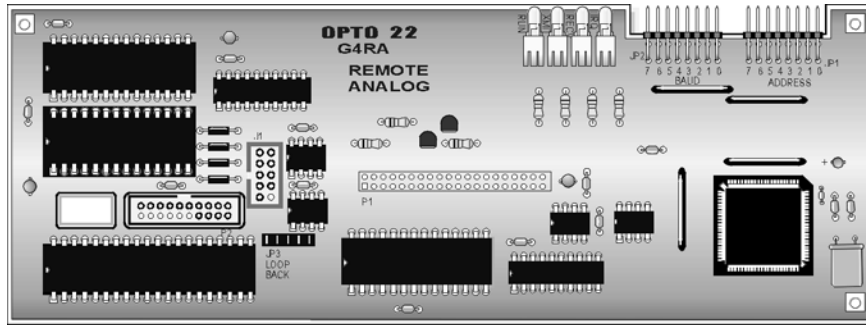
#### Analog Brick Assembly



Form 670-010126

### G4A8R/G4D16R BRICK INSTALLATION NOTE

#### G4RA/G4RD BRAIN BOARD



#### ADDRESSING

Install a jumper where indicated by the following table to set a unique system address on each I/O brick. The factory default is address 0.

76543210	76543210	76543210	76543210	76543210	76543210	76543210	76543210
0	32	64	96	128	160	192	224
1	33	65	97	129	161	193	225
2	34	66	98	130	162	194	226
3	35	67	99	131	163	195	227
4	36	68	100	132	164	196	228
5	37	69	101	133	165	197	229
6	38	70	102	134	166	198	230
7	39	71	103	135	167	199	231
8	40	72	104	136	168	200	232
9	41	73	105	137	169	201	233
10	42	74	106	138	170	202	234
11	43	75	107	139	171	203	235
12	44	76	108	140	172	204	236
13	45	77	109	141	173	205	237
14	46	78	110	142	174	206	238
15	47	79	111	143	175	207	239
16	48	80	112	144	176	208	240
17	49	81	113	145	177	209	241
18	50	82	114	146	178	210	242
19	51	83	115	147	179	211	243
20	52	84	116	148	180	212	244
21	53	85	117	149	181	213	245
22	54	86	118	150	182	214	246
23	55	87	119	151	183	215	247
24	56	88	120	152	184	216	248
25	57	89	121	153	185	217	249
26	58	90	122	154	186	218	250
27	59	91	123	155	187	219	251
28	60	92	124	156	188	220	252
29	61	93	125	157	189	221	253
30	62	94	126	158	190	222	254
31	63	95	127	159	191	223	255

= JUMPER INSTALLED     
  = NO JUMPER

## DATA SHEET

Form 670-010126

### BAUD JUMPER GROUP

Install jumpers according to the following table.

**Table 1 - Remote Brick Jumpers**

Jumper	Jumpers for use with Cyrano	Description
0 - 3	See Table 2 Baud Rate Jumpers	Selects the baud rate. The factory default baud rate is 115.2 KBd.
4	In	Selects the data transmission protocol. An installed jumper selects binary protocol and is the factory default. If the jumper is out, ASCII protocol is selected.
5	In	Selects the data verification method. An installed jumper selects CRC-16 and is the factory default. If the jumper is out, an 8-bit checksum is selected.
6	Out	Reserved for future use.
7	Out	Reserved for future use.

**Table 2 - Baud Rate Jumpers**

Jumper	3	2	1	0
115.2 KBd	X	X	X	O
76.8 KBd	X	X	O	X
57.6 KBd	X	X	O	O
38.4 KBd	X	O	X	X
19.2 KBd	X	O	X	O
9,600	X	O	O	X
4,800	X	O	O	O
2,400	O	X	X	X
1,200	O	X	X	O
600	O	X	O	X
300	O	X	O	O
150	O	O	X	X
110	O	O	X	O
Reserved	X	X	X	X
Reserved	O	O	O	X
Reserved	O	O	O	O

Form 670-010126

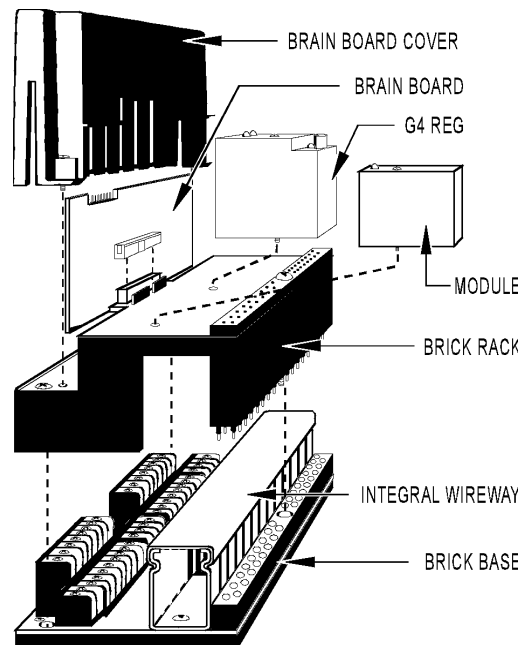
### INSTALLATION

1. Disassemble the brick unit and attach the brick base to the mounting surface.
2. Connect field and power wiring to the brick base. Refer to Form 595, "Mistic 200 System Installation Guide" for specific wiring information.

**Caution:** Turn OFF all power before wiring to the brick base.

3. Install the brick rack.
4. Install the I/O modules, G4REG, and brain board to the brick rack.
5. Set the jumpers and connect a remote cable or SBTA communications adapter to the 10-pin header.
6. If this is physically the last brick on the remote I/O network, install jumpers on the "JP3 LOOPBACK" jumper group.
7. Attach the brain board cover.

### BRICK DIAGRAM



### SYSTEM POWER CONSUMPTION

G4A8R	G4D16R
24 VDC $\pm$ 0.5 V @ 180 mA	24 VDC $\pm$ 0.5 V @ 250 mA
Excludes module requirements	Includes module requirements

Add 50 mA for a terminated brick.

### 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](http://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](http://www.opto22.com)
- [nvio.opto22.com](http://nvio.opto22.com)
- [www.internetio.com](http://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.