This product is obsolete.

BRAIN BOARDS
BRICK
ANALOG

OPTO 22

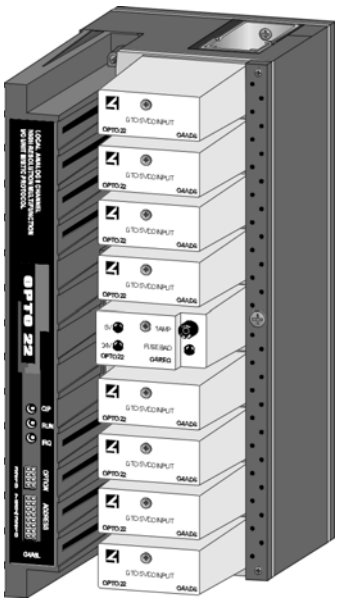
DATA SHEET

Form 670-230117

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

Description

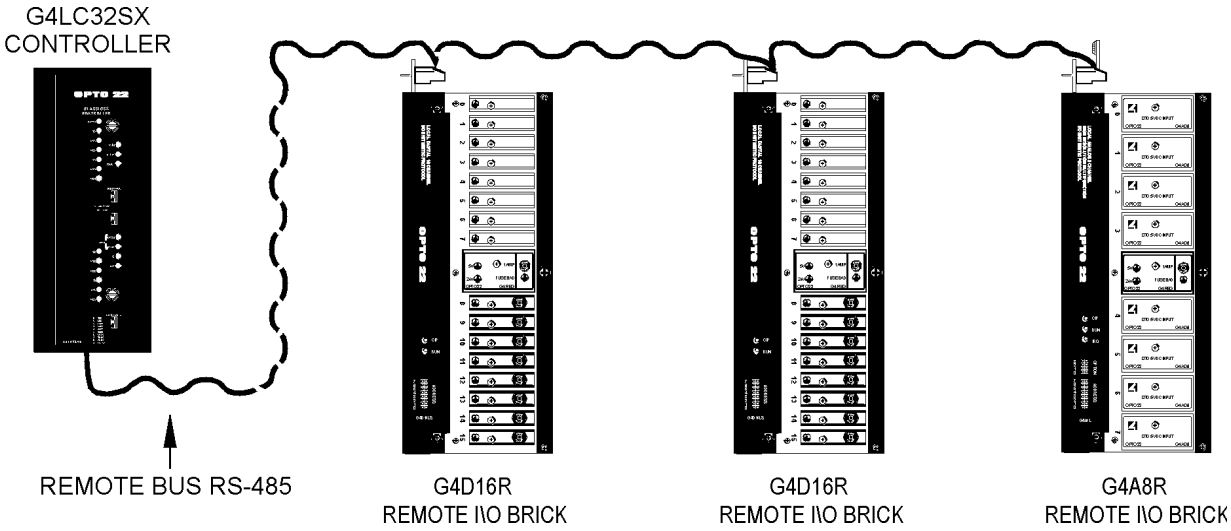
[This product is obsolete and no longer available.]



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 isolaton 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 Mistic 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 Misticware software driver with the high-level software language of your choice.

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



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Specifications **[This product is obsolete and no longer available.]**

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

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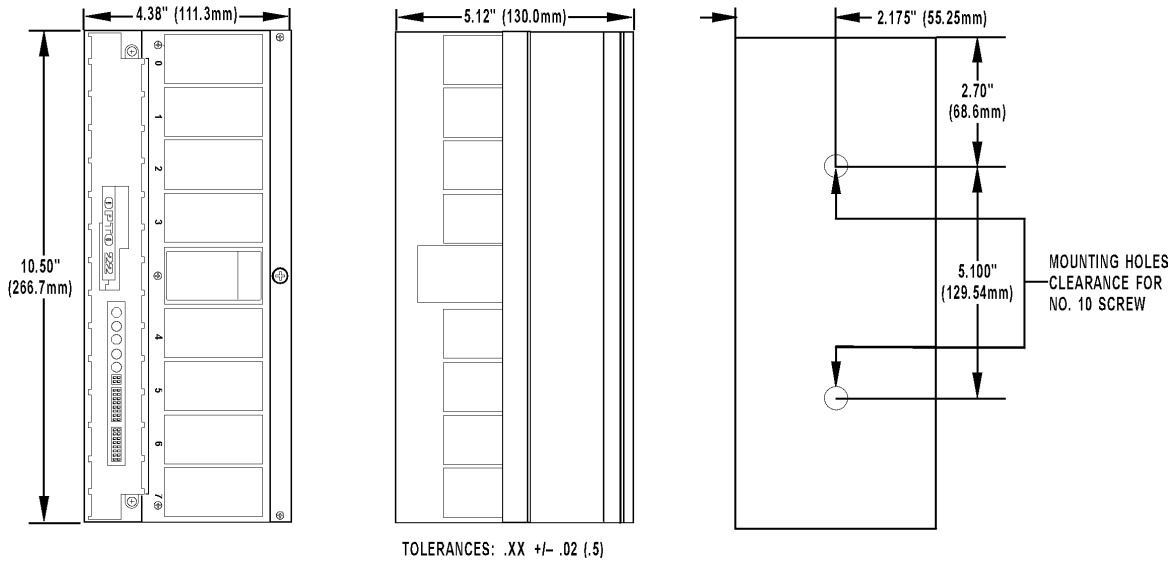
Specifications **[This product is obsolete and no longer available.]**

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 repeaterss) 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 Mistic 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 (≤16 Event/Reactions)	4 ms
*System power consumption @ 24 VDC ± 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 Misticware
Expansion options G4RAX Remote analog expansion brick	Adds 8 additional analog I/O channels on a separate brick unit

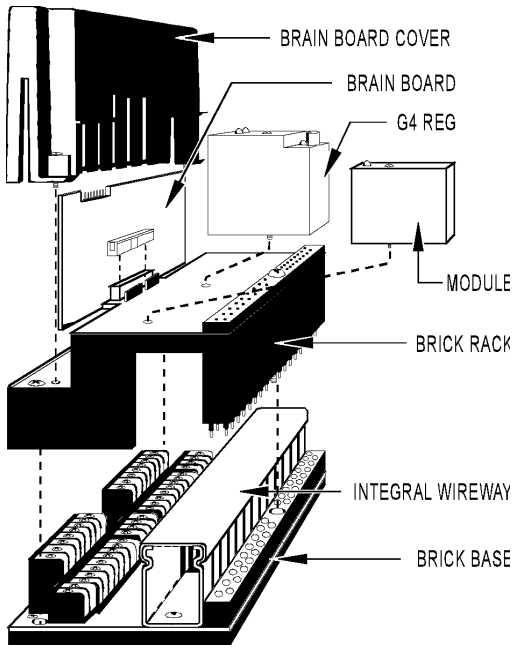
Dimensions

Analog Brick Dimensions



Assembly

Analog Brick Assembly



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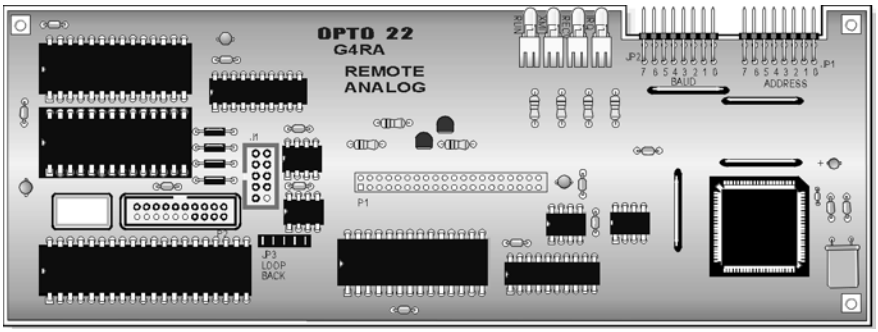
G4A8R/G4D16R BRICK INSTALLATION NOTE

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

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

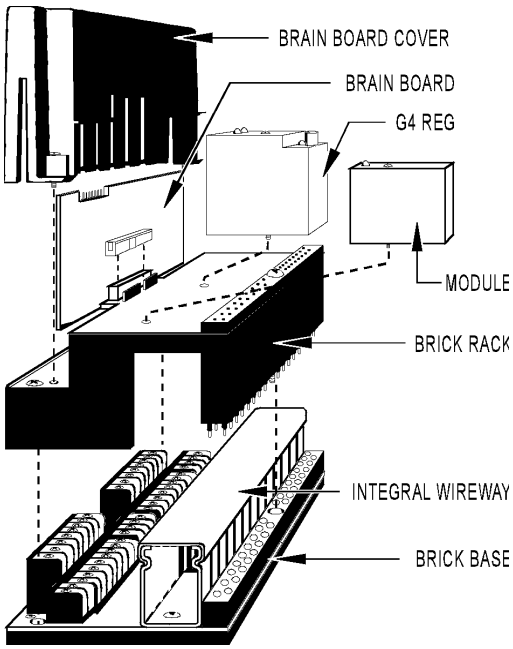
INSTALLATION

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 ± 0.5 V @ 180 mA	24 VDC ± 0.5 V @ 250 mA
Excludes module requirements	Includes module requirements

Add 50 mA for a terminated brick.

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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