OPTO 22

DATA SHEET

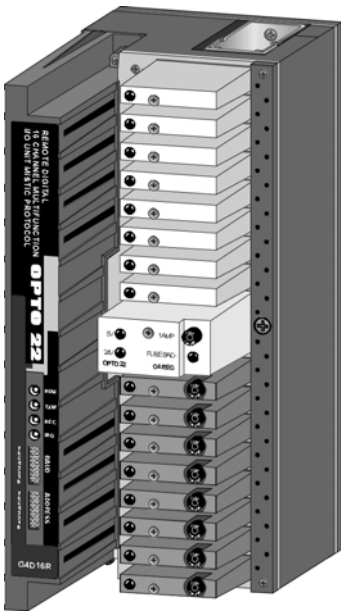
Form 640-010129

Part Number	Description
G4D16R	Remote Digital 16-Channel Multifunction I/O Unit Mistic Protocol

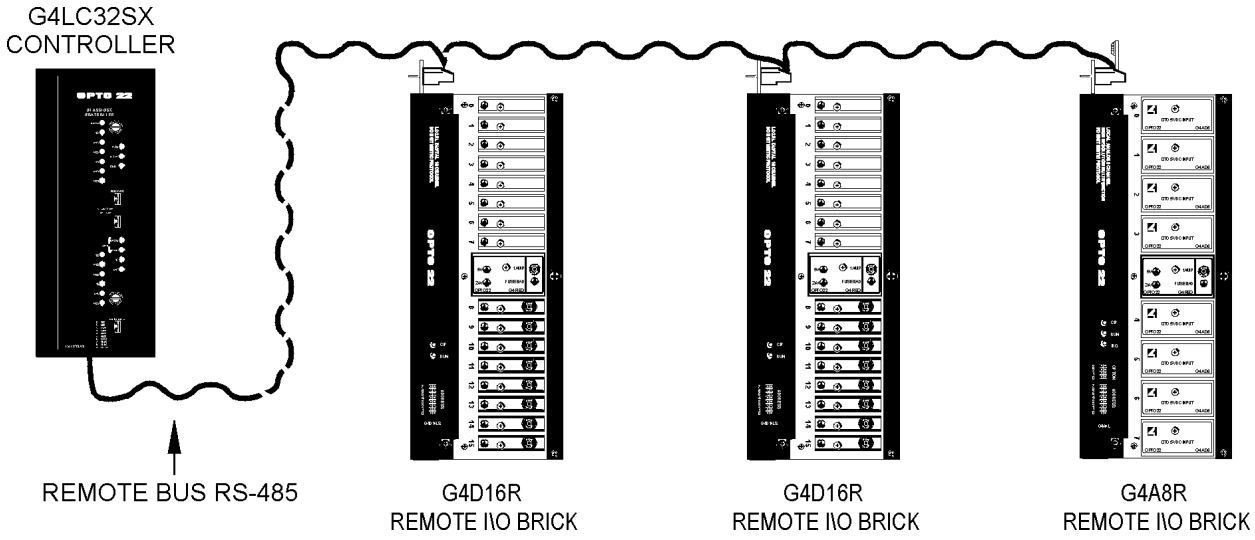
Description

The G4D16R is a high-performance digital I/O brick for the Opto 22 family of processors and I/O. It provides intelligent and flexible single-point I/O control for up to 16 digital I/O modules in a rugged, deadfront, compact package. Onboard brick intelligence offers latching, pulse train generation, time delays, counting, event/reactions, and many other control functions. Event/reactions execute high-speed deterministic responses to sophisticated control sequences, alarm monitors, diagnostics, and host interrupts.

Digital bricks use Opto 22's Mistic protocol and high-speed serial communications. You can program digital bricks using Opto 22's intuitive multitasking, flowchart-based languages OptoControl or Cyrano. For custom software development, use a host computer and Opto 22's Misticware software driver with the high-level software language of your choice.



System Architecture



Setup And System Commands
IDENTIFY UNIT
POWER UP CLEAR
REPEAT LAST RESPONSE
RESET
RESET ALL PARAMETERS TO DEFAULT
SET COMM LINK WATCHDOG MOMO* AND DELAY
SET RESPONSE DELAY
SET SYSTEM OPTIONS

Digital I/O Configuration Commands
READ MODULE CONFIGURATION
SET CHANNEL CONFIGURATION
SET I/O CONFIGURATION-GROUP
STORE SYSTEM CONFIGURATION

Digital Read/Write, Latch Commands
CLEAR OUTPUT
READ AND OPTIONALLY CLEAR INPUT LATCHES GROUP
READ AND OPTIONALLY CLEAR INPUT LATCH
READ MODULE STATUS
SET OUTPUT MODULE STATE-GROUP
SET OUTPUTS

Digital Counter, Frequency Commands
CLEAR COUNTER
ENABLE/DISABLE COUNTER GROUP
ENABLE/DISABLE COUNTER
READ 16-BIT COUNTER
READ 32-BIT COUNTER GROUP
READ 32-BIT COUNTER
READ AND CLEAR 16-BIT COUNTER
READ AND CLEAR 32-BIT COUNTER GROUP
READ AND CLEAR 32-BIT COUNTER
READ AND CLEAR ENABLE/DISABLE STATUS
READ FREQUENCY MEASUREMENT
READ FREQUENCY MEASUREMENT GROUP

Digital Time Delay, Pulse Output Commands
GENERATE N PULSES
READ OUTPUT TIMER COUNTER
SET TIME PROPORTIONAL OUTPUT PERIOD
SET TIME PROPORTIONAL OUTPUT PERCENTAGE
START CONTINUOUS SQUARE WAVE
START OFF PULSE
START ON PULSE

Digital Pulse/Period Measurement Commands
READ 16-BIT PULSE/PERIOD MEASUREMENT
READ 32-BIT PULSE/PERIOD GROUP
READ 32-BIT PULSE/PERIOD MEASUREMENT
READ AND RESTART 16-BIT PULSE/PERIOD
READ AND RESTART 32-BIT PULSE/PERIOD
READ AND RESTART 32-BIT PULSE/PERIOD GROUP
READ PULSE/PERIOD COMPLETE STATUS

Event Reaction Commands
CLEAR EVENT/REACTION TABLE
CLEAR EVENT ENTRY
CLEAR INTERRUPT
ENABLE/DISABLE EVENT ENTRY GROUP
ENABLE/DISABLE EVENT ENTRY
READ AND OPTIONALLY CLEAR EVENT LATCH
READ AND CLEAR EVENT LATCHES
READ EVENT ENABLE/DISABLE STATUS
READ EVENT LATCHES
READ EVENT/DATA HOLD BUFFER
READ EVENT ENTRY
SET EVENT INTERRUPT STATUS
SET EVENT ON A COMMUNICATIONS WATCHDOG TIME OUT
SET EVENT ON COUNTER GREATER OR EQUAL
SET EVENT ON TIMER GREATER OR EQUAL
SET EVENT ON COUNTER LESS THAN OR EQUAL
SET EVENT ON TIMER LESS THAN OR EQUAL
SET EVENT ON MOMO* MATCH
SET REACTION TO NULL
SET REACTION TO CLEAR COUNTER/TIMER
SET REACTION TO OUTPUT A MODULE STATE
SET REACTION TO ENABLE/DISABLE COUNTER
SET REACTION TO ENABLE/DISABLE AN EVENT
SET REACTION TO ENABLE/DISABLE EVENT GROUPS
SET REACTION TO START OFF-PULSE
SET REACTION TO START ON-PULSE
SET REACTION TO READ AND HOLD COUNTER VALUE
SET REACTION TO READ AND HOLD TIMER VALUE
SET REACTION TO WRITE MOMO*

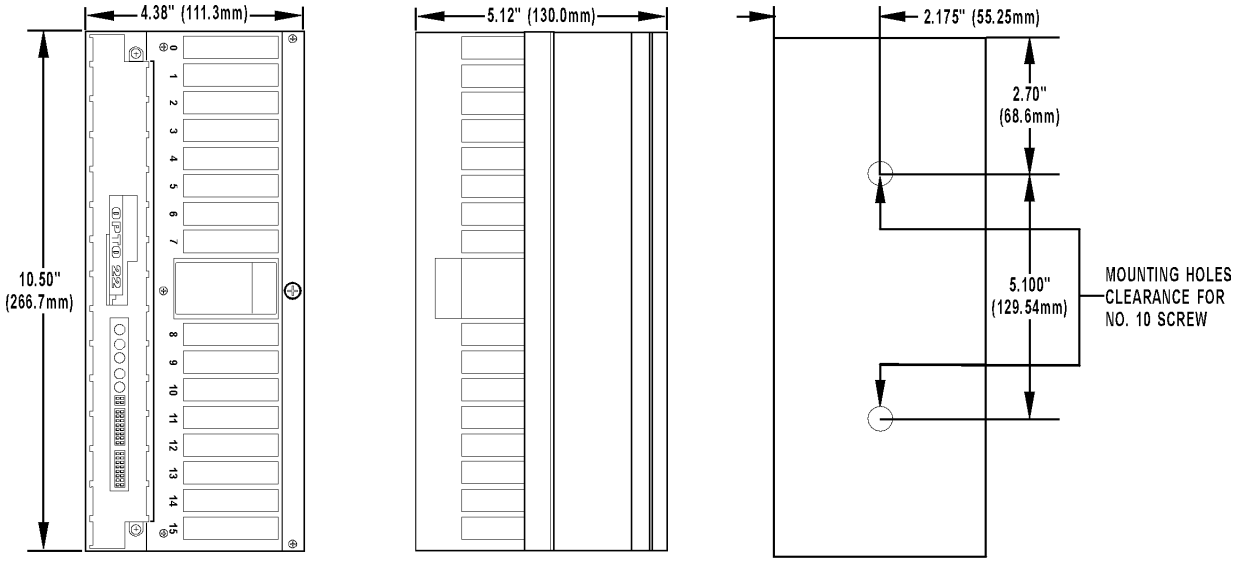
* MOMO-Must Be On, Must Be Off - Used to set or test state of digital outputs or inputs.

Specifications

Multifunction Digital Brick Specifications

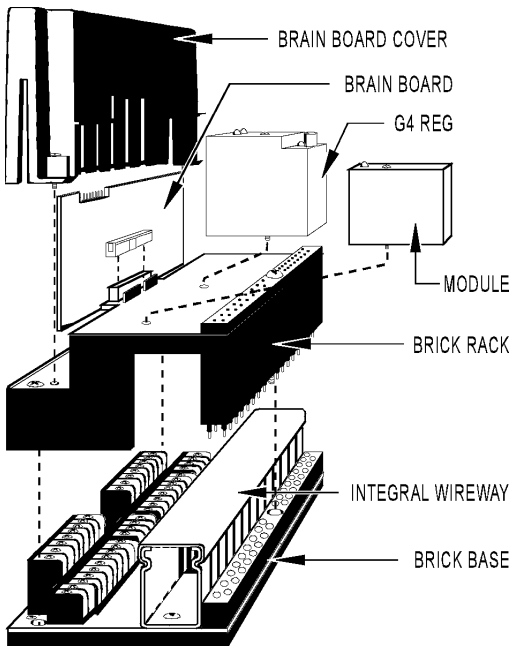
CPU CPU clock frequency	16-bit, Intel 80C196 processor 12 MHz processor
Communications Bus speed Cable type Maximum cable length Mode	 300 - 115.2 KBd 3 wire, twisted pair + GND, Interrupt uses 2nd wire pair 3,000 ft (more with repeaters) Binary or ASCII
Typical I/O times (includes communication transfer time) Read 16 channels Write 16 channels	 1.76 ms 2.27 ms
Counters (frequency measure) Maximum rate Data size Minimum pulse width ON Minimum pulse width OFF	 20 KHz 32 bits 10 µs 10 µs
Latching (minimum pulse width)	10 µs
Output pulse Maximum continuous rate Minimum pulse width ON Minimum pulse width OFF	 500 Hz 1 ms 1 ms
Time-proportional output (TPO) minimum period	100 ms
Typical Event/Reaction time (£16 Event/Reactions)	4 ms
*System power consumption @ 24 VDC ± 0.1V Terminated (last brick on the bus) Non-terminated (all other bricks)	 250 mA 250 mA
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

Dimensions



TOLERANCES: .XX +/– .02 (.5) .XXX +/– .010 (.25)

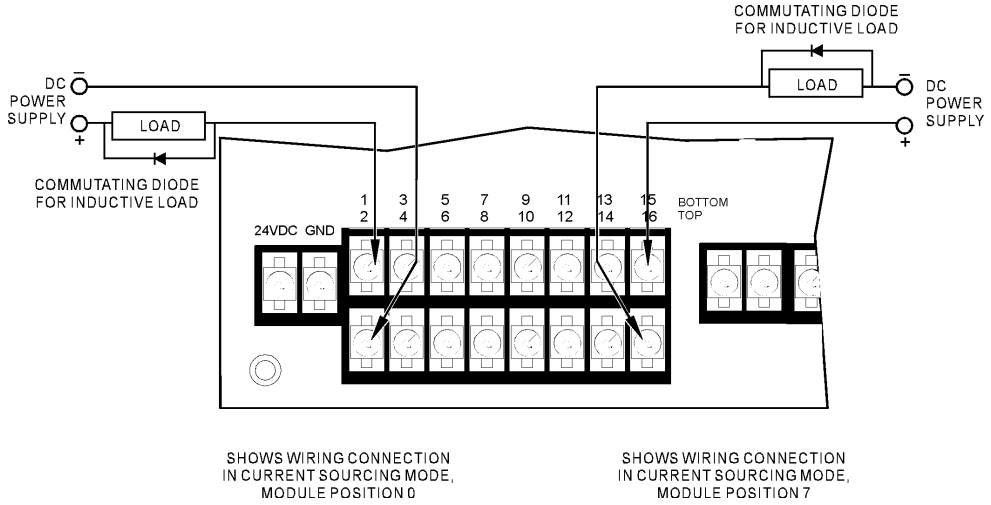
Assembly



Field Wiring Instructions

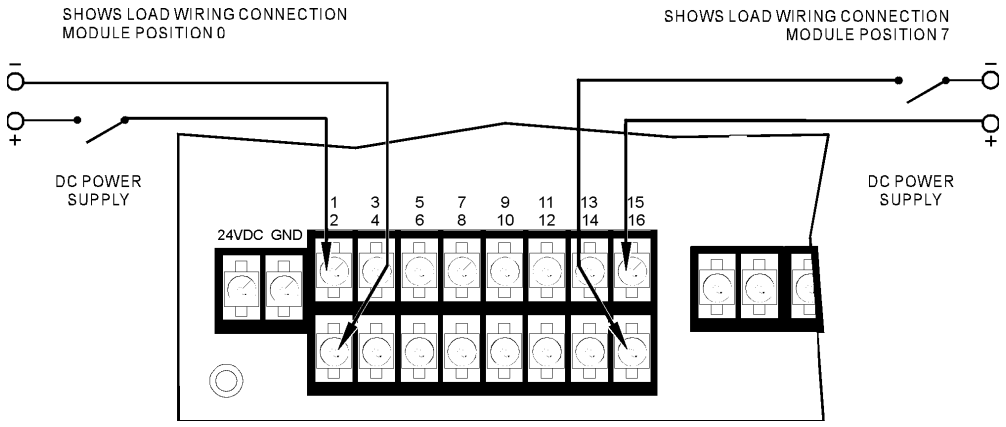
Digital DC Outputs

Applies to G4ODC5, G4ODC5A, G4ODC5MA, G4ODC5R, G4ODC5R5, and G4SWOUT modules



Digital DC Inputs

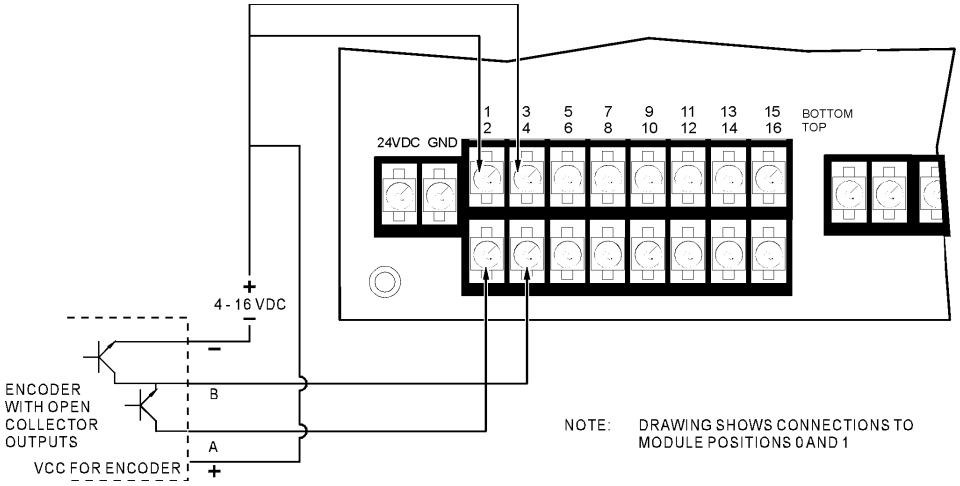
Applies to G4IDC5, G4IDC5B, G4IDC5D, G4IDC5G, G4IDC5K, and G4IDC5MA modules.
Also applies to G4IAC5, G4IAC5A, and G4IAC5MA modules when used with DC field voltages.
NOTE: Since the G4SWIN module simulates field devices for testing, this module does not need to be wired on the field side.



Field Wiring Instructions

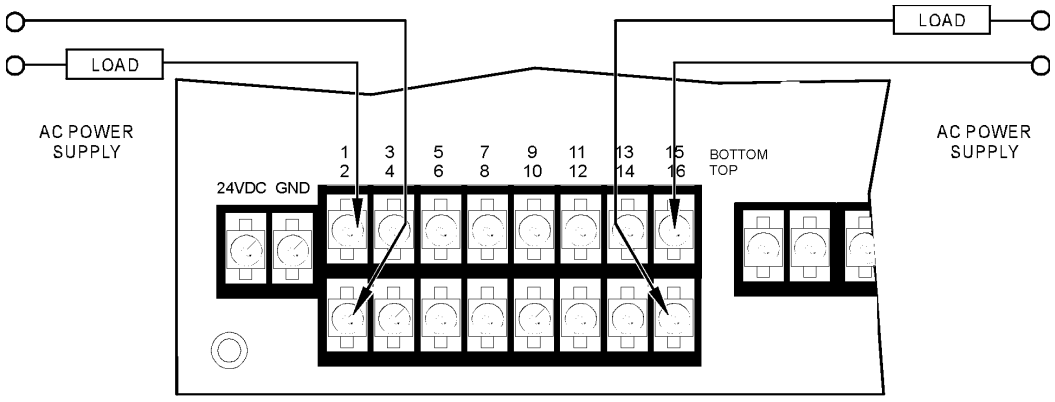
Digital Quadrature Inputs

Applies to the G4IDC5Q module



Digital AC Outputs

Applies to G4OAC5, G4OAC5A, G4OAC5A5, and G4OAC5MA modules.
Also applies to G4ODC5R, G4ODC5R5, and G4SWOUT modules when used with AC field voltages.

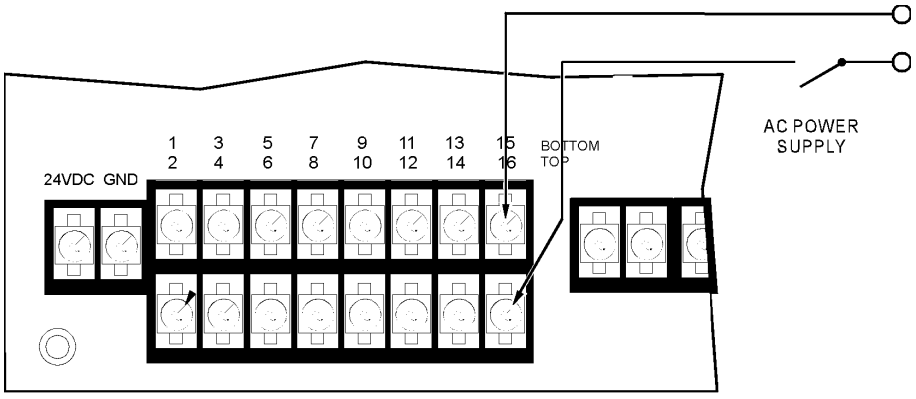


SHOWS LOAD WIRING CONNECTION
MODULE POSITION 0

SHOWS LOAD WIRING CONNECTION
MODULE POSITION 7

Digital AC Inputs

Applies to G4IAC5, G4IAC5A, and G4IAC5MA modules.
Also applies to G4IDC5, G4IDC5B, G4IDC5G, and G4IDC5MA modules when used with AC field voltages.



INPUT DEVICE MAY BE IN SERIES WITH
EITHER LINE. SHOWS WIRING
CONNECTION FOR MODULE POSITION 7.

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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