

This product is obsolete.

## DIGITAL I/O FOR RASPBERRY PI STARTER KIT

### Features

- > Perfect for prototyping, proofs of concept, and environments where an industrially hardened controller isn't required
- > Provides a reliable way to sense and switch industrial-level electrical loads with your own Raspberry Pi®
- > Includes Digital I/O Carrier Board, mounting rack, and four popular G4 I/O modules
- > Code samples available at [developer.opto22.com](http://developer.opto22.com)



### DESCRIPTION

\*\*\* NOTE: This part is OBSOLETE and no longer available. \*\*\*

Use your Raspberry Pi in the real world!

Available only for a limited time, the Digital I/O for Raspberry Pi Starter Kit gets you started sensing and switching industrial loads with your own Raspberry Pi.

The system includes the same field-tested, industrially hardened Opto 22 G4 input/output (I/O) modules used in automation applications worldwide for nearly 40 years. Just bring your Pi and its power supply, and you're ready to begin.

The Starter Kit includes all of the following:

- [OPTO-P1-40P](#) Digital I/O Carrier Board, including interface cable, Pi board mounting standoffs, and spare fuse for mounting rack
- [G4PB8H](#) 8-module mounting rack
- [G4IAC5](#) 90-140 VAC/VDC input module
- [G4IDC5MA](#) 10-32 VDC input module with manual/auto Switch
- [G4OAC5](#) 12-140 VAC output module
- [G4ODC5](#) 5-60 VDC output module

With the Starter Kit, you can use your Pi to switch industrial-level electrical loads far beyond the Pi's built-in 3.3 VDC GPIO pins. You can monitor and control real-world devices like industrial motors, pumps, and sensors.

And you'll know that you can count on reliable Opto 22 industrial I/O, manufactured and supported in the U.S.A. Product support is free, and most I/O modules are guaranteed for life.

### Room to Expand

The Starter Kit gives you plenty of room to expand. You can add up to 4 additional I/O modules on the mounting rack (choose from the [list of compatible G4 modules](#)).

In addition, the Carrier Board's auxiliary 40-pin GPIO connector lets other Pi-compatible peripherals access the Pi's unused pins.

### Read and Write with Pi

It's easy to read and write to Opto 22 I/O points using your favorite Pi-supported language—Python, Node-RED, Pi Terminal, Pi Filesystem GPIO, or others.

Visit [developer.opto22.com](http://developer.opto22.com) for code samples and tips for using your Pi to read and write to Opto 22 I/O modules.

### HERE'S WHAT YOU NEED

- Digital I/O for Raspberry Pi Starter Kit
- Raspberry Pi (any model with a 40-pin GPIO header connector, including Raspberry Pi Models A+ and B+, Pi 2 Model B, Pi 3 Model B, Pi 4 Model B, and Pi Zero)
- Power supply

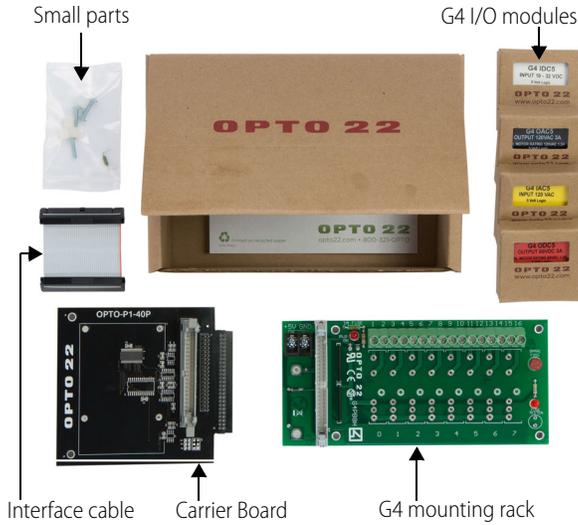
*Raspberry Pi® is a trademark of the Raspberry Pi Foundation.*

### Part Number

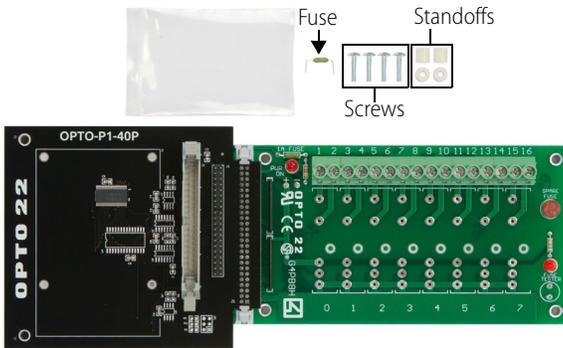
Part	Description
<a href="#">OPTO-P1-STARTERKIT-1</a> <a href="#">[OBSOLETE]</a>	<b>[Obsolete]</b> Digital I/O for Raspberry Pi Starter Kit, AC/DC

## GETTING STARTED [OBSOLETE]

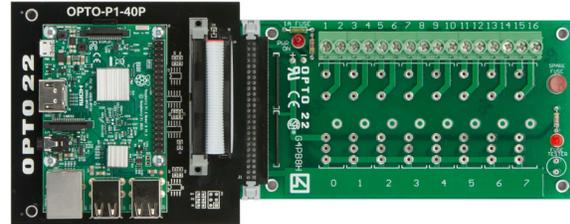
The Starter Kit works with any model Pi with a 40-pin header connector. Here's what's in the box:



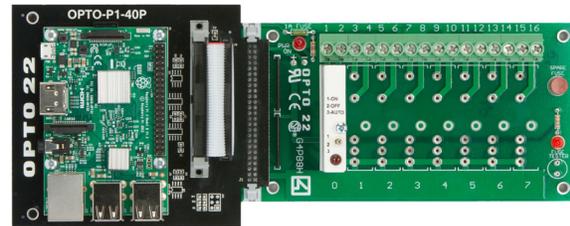
1. Snap the Carrier Board onto the G4 mounting rack.
2. Carefully open the bag of small parts.



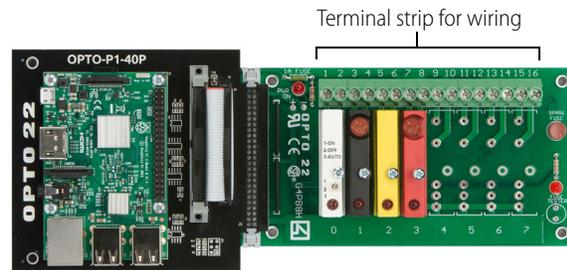
3. Use the four screws to secure the Pi to the top of the Carrier Board, placing a standoff between the Pi and the Board for each screw.
4. Insert one end of the interface cable into your Pi's GPIO connector. Insert the other end into the Carrier Board's gray connector, making sure it locks in place.



5. Remove an I/O module from its box and carefully install it in position 0 on the board. Secure it with its integral screw.



6. Install and secure the other 3 modules next to the first one.



7. Follow "[Field Wiring Diagrams \[Obsolete\]](#)" on page 4 to wire real-world sensors and devices to the mounting rack.

**CAUTION:** AC wiring is dangerous and should be done by a qualified electrician.

For additional wiring information and complete specifications, see form 2208, the [Digital I/O for Raspberry Pi Selection Guide](#). (This guide also shows all the other Opto 22 I/O modules you can use with your Pi.)

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- Plug in your Pi's power supply. (If you're using peripherals, see "Powering Peripherals" on page 3.)
- Use your favorite Pi-supported programming language to read and write to the I/O points.

Visit [developer.opto22.com](http://developer.opto22.com) for code samples and tips for using your Pi to read and write to Opto 22 I/O modules.

The mapping diagram at right and the "Mapping Overlay for Raspberry Pi" on page 3 will help you know which pins apply to each module on the rack.

*NOTE: Opto 22 I/O modules use negative true logic; that is, a zero bit means On and a 1 bit means Off. When reading and writing to I/O points, remember that 0 is On and 1 is Off.*

### Powering Peripherals

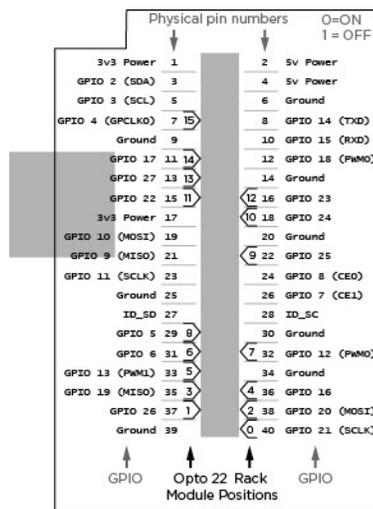
**IMPORTANT:** If your Pi uses USB-powered peripherals (especially hard drives or WiFi dongles), do the following:

- Connect a 5 V power supply rated 2.5 A to 5 A to the G4 rack's power terminals (located underneath the Carrier Board).
- Replace the G4 rack's standard 1 A fuse with the 5 A fuse that came in the bag of small parts. (If you need to replace this fuse, it is part number [FUSE05B](#)—10 pack.)

### MORE INFORMATION

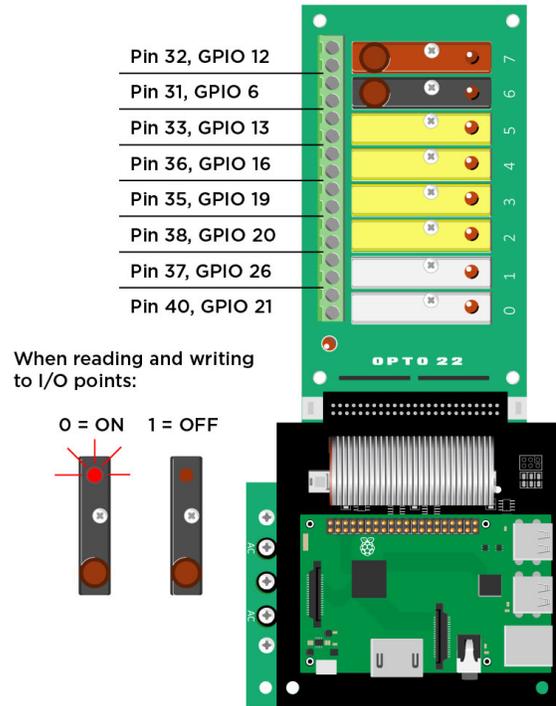
See the [Digital I/O for Raspberry Pi Selection Guide](#) for specifications and information about other I/O modules you can use with your Pi.

### MAPPING OVERLAY FOR RASPBERRY PI



Place this overlay over your Pi's GPIO pins for a handy mapping reference. You can download the template from [developer.opto22.com](http://developer.opto22.com).

### Mapping: GPIO Pins to G4 Modules

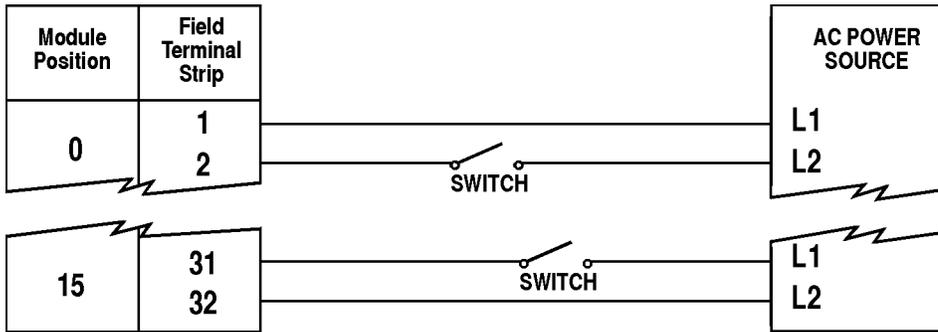


## FIELD WIRING DIAGRAMS [OBSOLETE]

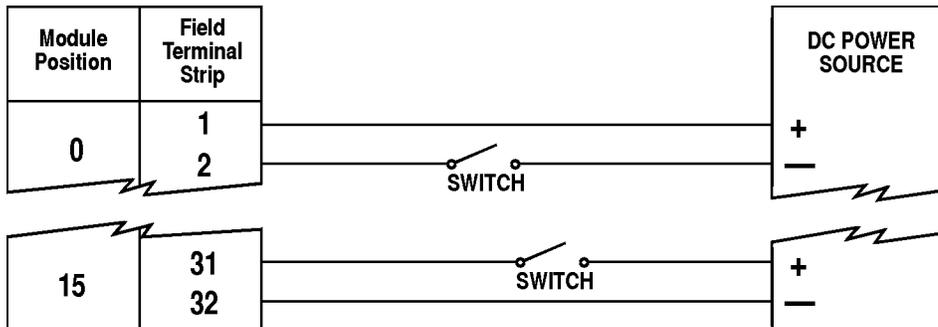
**CAUTION:** AC power is dangerous! All AC wiring should be done by a qualified electrician.

For specifications and additional wiring information, see the [Digital I/O for Raspberry Pi Selection Guide](#).

### G4IAC5—Digital AC input, 90-140 VAC



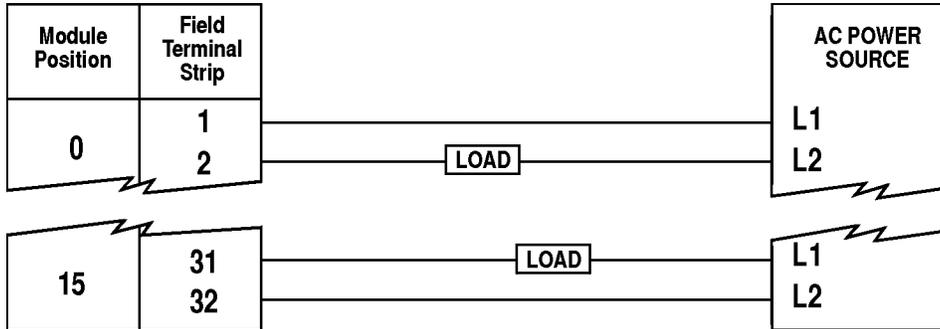
### G4IDC5MA—Digital DC input, 10-32 VDC, with manual/auto switch



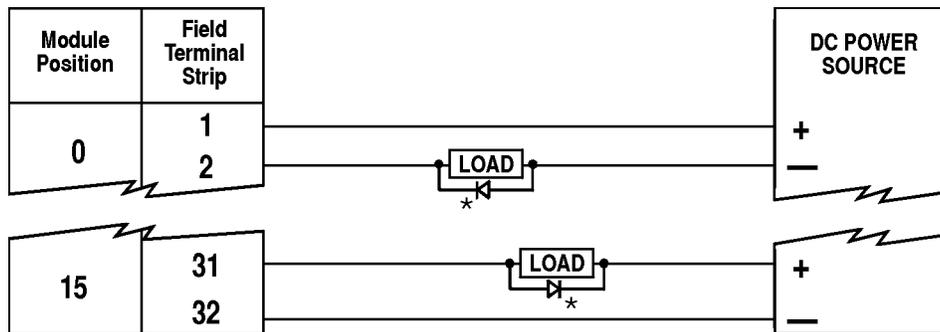
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## G40AC5—Digital AC output, 12-140 VAC

NOTE: The load can go on either terminal because AC modules are non-polar



## G40DC5—Digital DC output, 5-60 VDC



\*Note: Commutation diode must be used on inductive loads. Typically, use diode 1N4005

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## 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](http://www.opto22.com).

