

Digital IO

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Digital IO

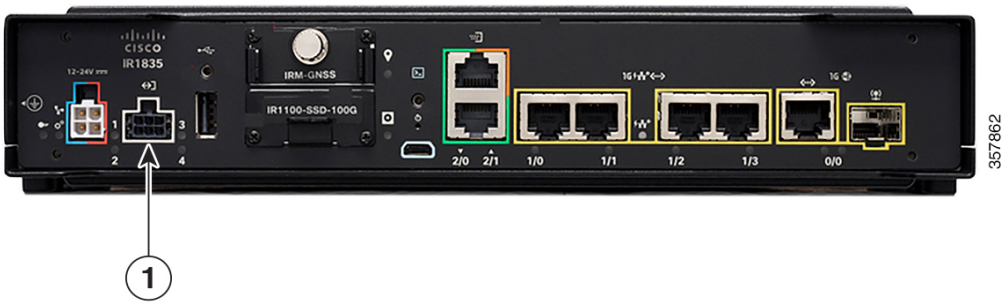
Table 1: Feature History

Feature Name	Release Information	Description
Digital IO	Cisco IOS XE Catalyst SD-WAN Release 17.9.1a Cisco vManage Release 20.9.1	The Cisco IR1835 supports four general-purpose input/output (GPIO) ports. You can configure a GPIO port as an input or an output alarm.

Information About Digital IO

The Cisco IR1835 supports four general-purpose input/output (GPIO) ports, also called digital IO (or I/O) ports. You can configure contacts in the digital IO port to receive digital sensor input or provide digital output. For example, sensors might provide information about the environment in which the router is installed, and the digital output might trigger an external alarm or other notification device, or a type of actuator. Because the digital output for this feature is often used to trigger an external alarm, descriptions of this feature often use the alarm terminology. Each contact in the port can operate as a dry or wet contact. The contacts are protected up to +60 V.

Figure 1: Digital IO Port on a Cisco IR1835 Router



Digital IO is similar to the alarm in and alarm out features supported on Cisco Industrial Ethernet (IE) Series switches and Cisco Industrial Router (IR) Series routers. The differences are that the alarm in is a dedicated input and the alarm out is a dedicated output, whereas the digital IO ports can be used for input or output. alarm out includes a relay to provide normally open (NO) or normally closed (NC) terminals.

For more information, including digital IO limitations, see Digital IO in the *Cisco Catalyst IR1800 Rugged Series Router Software Configuration Guide*.

Supported Devices

Cisco IR1835 router

Use Cases for Digital IO

In one use case, a Cisco IR1835 router is installed in an outdoor utility cabinet exposed to weather conditions. Using the digital IO port, you can connect sensors to the router that indicate the heat and humidity in the cabinet, and indicate whether the cabinet is properly closed. Using these sensor inputs, you can configure an alarm state triggered by excessive heat or humidity, or when the cabinet is not properly closed.

The alarm state can trigger sending a message to a central location to enable you to take appropriate action if the utility cabinet conditions require attention.

Enable Digital IO Using a CLI Template

1. Enable digital IO, such as to trigger an alarm, on a contact. For *contact-number*, the range is 1 to 4.

   alarm contact *contact-number* **enable**

2. Configure the alarm severity value. The default is minor. For *contact-number*, the range is 1 to 4.

   alarm contact *contact-number* **severity** {**none** | **minor** | **major** | **critical**}

3. Configure the alarm threshold, in the range of 1,600 to 2,700 mV. The default is 1,600 mV. For *contact-number*, the range is 1 to 4.

   alarm contact *contact-number* **threshold** *threshold*

4. Configure the alarm trigger mode. The default is closed, meaning that the digital input is triggered if the circuit connected to the contact is closed, providing current. This may be used to trigger an alarm. For *contact-number*, the range is 1 to 4.

   alarm contact *contact-number* **trigger** {**open** | **closed**}

5. For a particular contact, configure the router to provide power for an IO circuit (using the **wet** option) or not provide power (using the **dry** option). The default is **dry**. For *contact-number*, the range is 1 to 4.

   alarm contact *contact-number* **application** {**dry** | **wet**}

6. Configure a contact to be in output mode, and configure whether the router provides current on the contact. Use **1** for high (provide current) or **0** for low (do not provide current). The choice of high or low for a digital IO output depends on the digital IO circuitry that the router is communicating with, and is beyond the scope of this documentation. For *contact-number*, the range is 1 to 4.

   If you configure a contact to be in output mode, then for that contact, do not use any of the commands relevant only to input, such as **severity**, **threshold**, **trigger**, or **application**.

   alarm contact *contact-number* **output** {**0** | **1**}

7. Configure a description for the digital IO handled by a particular contact. The description string can be up to 80 alphanumeric characters long. The description is included in system messages that relate to the contact number. For *contact-number*, the range is 1 to 4.

   alarm contact *contact-number* **description** *descriptive-text*

Here is a complete configuration example that enables contact 1 in input mode and configures the input parameters:

```
alarm contact 1 enable
alarm contact 1 severity minor
alarm contact 1 threshold 1600
alarm contact 1 trigger closed
alarm contact 1 application dry
alarm contact 1 description "Sensor indicating enclosure open"
```

Here is a complete configuration example that enables contact 1 in output mode:

```
alarm contact 1 enable
alarm contact 1 output 1
alarm contact 1 description "Sensor indicating enclosure open"
```

Verify the Digital IO Status

On the device, use the **show alarm** command, filtering for digital IO and the contact (range 1 to 4) you want to view.

```
Router#show alarm | section Digital I/O 2
Digital I/O 2:
Description: External digital I/O port 2
Status: Not Asserted
Application: Dry
Severity: minor
Trigger: Closed
Voltage: 3300mV
Threshold: 1600mV
Mode: Input
```