

Cisco Catalyst IR8140H Router Hardware Description and Specifications

This chapter describes the major hardware features of the Cisco Catalyst IR8140H Heavy Duty Router (henceforth referred to as router or IR8140H in this document), including the chassis, internal and external connectors and ports, and hardware specifications.

These topics are discussed:

- Cisco Catalyst IR8140H Router Overview, on page 1
- Router Hardware Overview: Exterior, on page 2
- Operating Range, on page 12
- Accessories, on page 12
- Port Pinouts, on page 14

Cisco Catalyst IR8140H Router Overview

The Cisco Catalyst IR8140H router is a ruggedized communication platform designed for use in Field Area Network (FAN) power distribution grids that require outdoor, pole-mounted routers. The FAN is a distribution system in which power generation and transmission are linked to the power consumers.

The router provides an end-to-end communication network that enables increased power grid efficiency and reliability, reduced energy consumption, and reduced greenhouse gas emissions. The router can be leveraged across applications, including:

- Smart transportation and roadways
- Advanced Metering Infrastructure (AMI)
- Distribution Automation (DA)
- Integration of Distributed Energy Resources (DER)
- Remote Workforce Automation
- Smart Lighting

The router provides reliable and secure real-time communication between the FAN systems and the numerous devices that exist in the FAN, including meters, sensors, protection relays, Intelligent Electronic Devices (IEDs), plug-in electric vehicle (PEV) charging stations, and distributed solar farms. Network data is forwarded

and processed over secure communication links between devices within the distribution grid for local decision processing.

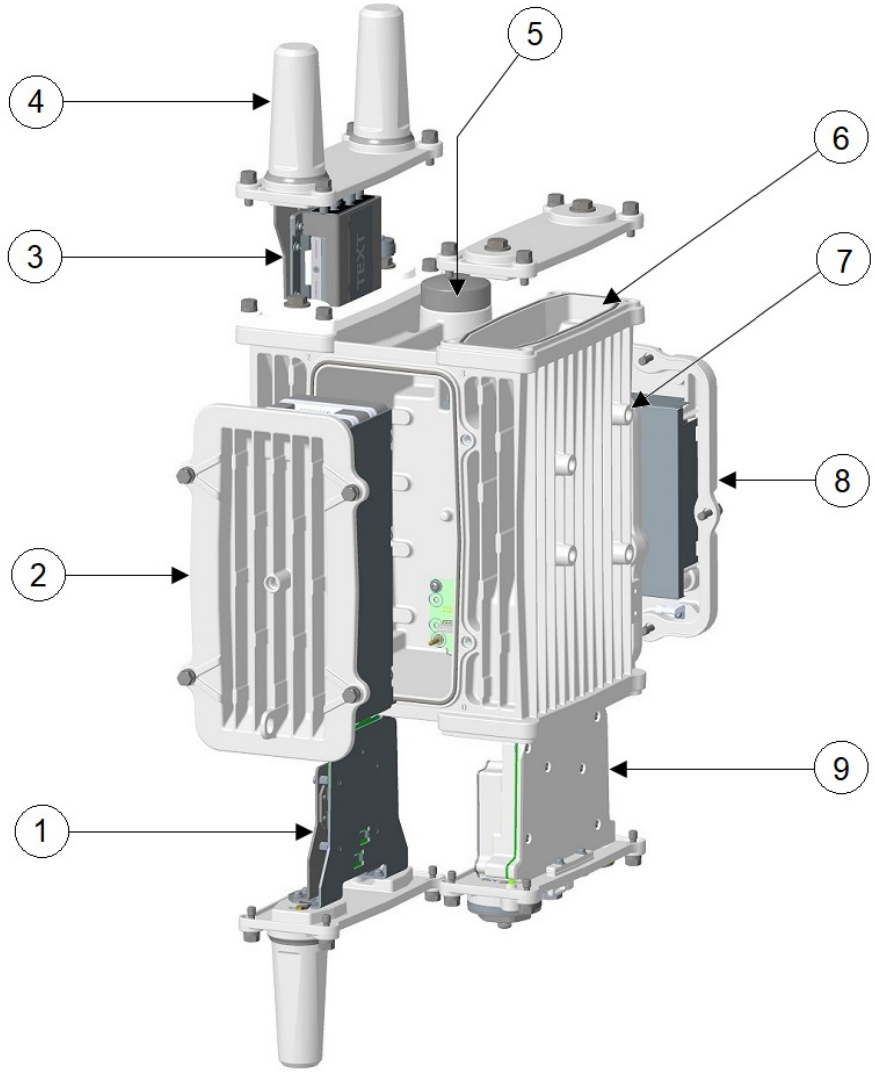
Router Hardware Overview: Exterior

The IR8140H is an IP67 industrial router for outdoor use. It comprises of a base modular platform with four module slots. One of the four IR8140H modules is larger than the other three and is referred to the super slot and is identified as Slot 0. This super slot is reserved for the CPU module. It faces downward in the IR8140H as shown in the following figure. The other three slots support Universal Interface Modules (UIMs).



Note Do not leave module slots unsealed because it can damage the router when exposed to the elements outdoors. We recommend that you use a slot cover when the module is not populated. See Accessories, on page 12.

Figure 1: IR8140H with Component Labeling



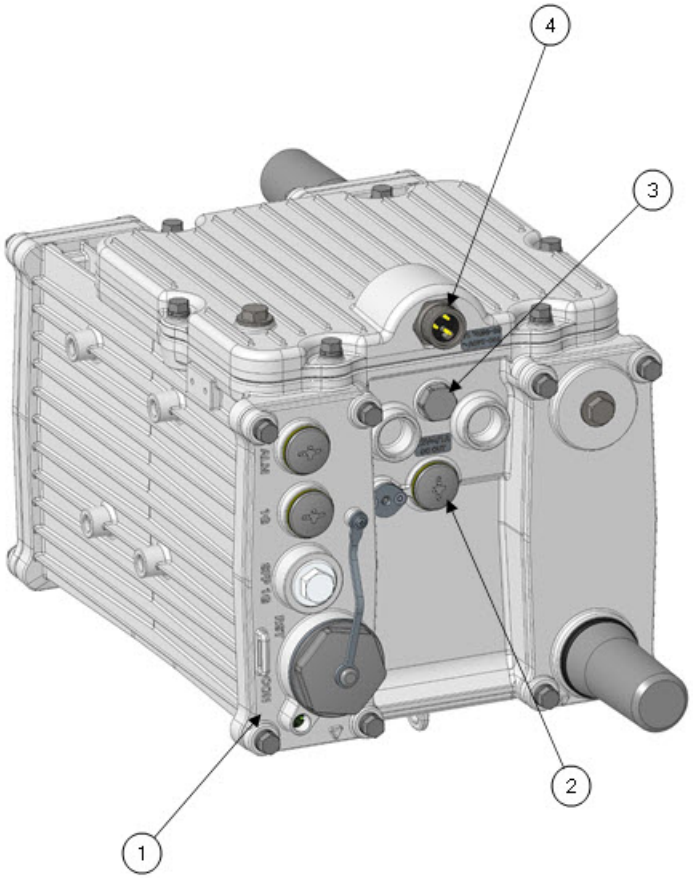
The following table provides a summary of all the modules and power supplies supported on the IR8140H shown in the figure above.

Table 1: Cisco Catalyst IR8140H Components

Item No.	Description
1	Industrial Router Module Heavy Duty with one antenna, for example, a IRMH-WPAN module.
2	Battery Backup Unit (BBU) Module. Up to three BBUs can be stacked in the enclosure.

Item No.	Description
3 and 4	Universal Interface Module (UIM) with two antennas (3). The antenna (4) is part of the module. The UIM slots that are available for industrial router modules that provide connectivity to Neighborhood Area Networks (NAN) endpoints and to the WAN for connectivity to the utility control center. IR8140H supports the following UIMs: • IRMH-WPAN module (WPAN Module. Normally installed in the downward facing slot: slot 1) **Note** From Cisco IOS XE Release 17.7.1, you can install two WPAN modules to the chassis. If you want to install two WPAN modules, install one module in slot 1, and the other in slot 2 or 3. • IRMH-LTE module (LTE Module. Normally installed in one of the upward-facing slots: slot 2 or slot 3) • IRMH-LTEA module (LTE Advanced Module. Normally installed in one of the upward-facing slots: slot 2 or slot 3) • IRMH-5GS6-GL module (4G LTE / 5G FR1 Module. Normally installed in one of the upward-facing slots: slot 2 or slot 3) **Note** The IRMH-5GS6-GL module is supported on IR8140H from Cisco IOS XE Release 17.8.1. You can install only one IRMH-5GS6-GL module in the chassis. • IRMH-LTE7-NA-900 and IRMH-LTE7-EAL (LTE CAT7) modules are supported on Cisco IOS XE Release 17.17.1 and later. • IRMH-5GR16SA (5G FR1) module is supported on Cisco IOS XE Release 17.17.1 and later.
5	GNSS/GPS antenna. Identifies the router location after it is installed and is in use. The GNSS/GPS antenna provides accurate time and location information to the system.
6	Empty Universal Interface Module (UIM) slot with cover elevated. By default, the cover is attached unless a module is installed in the IR8140H chassis.
7	4 x Mounting posts (M8)
8	Power supply
9	CPU module provides processing power for the IR8140H modules and provides two Gigabit Ethernet connections to the backhaul network and other IP network devices. The CPU module is installed in slot 0 and it is the largest module slot. It is found at the bottom of the IR8140H.

Figure 2: Bottom View of the IR8140H with Cable Port Seals



Item No.	Description
1	CPU module. The CPU module provides processing power for the IR8140H modules and provides two Gigabit Ethernet connections to the backhaul network and other IP network devices. The CPU module is installed in slot 0, which is the largest module slot. It is found at the bottom of the IR8140H. The CPU module includes the following items: • Console Port - CON • Reset Button - RST • SSD Module - SSD • Alarm Port - ALM • SFP Gigabit Ethernet- SFP 1G • SYS LED • 10/100/1000 RJ45 Ethernet - 1G You must remove the plugs on the bottom of the CPU module to access the items listed above. • See Figure 1: IR8140H with Component Labeling, on page 3 and Figure 2: Bottom View of the IR8140H with Cable Port Seals, on page 5 to view the location of the CPU module in the IR8140H chassis. • See Checking the System (SYS) LED to view the system LED states.
2	12VDC_OUT/1A port covered by cable port seal to power an external device. Available only when Power-over-Ethernet (PoE) is *not in use*.
3	Pressure vent. The vent relieves the pressure build up inside the router chassis that can be caused by changing temperatures in the router installation environment. The vent also protects the router interior from dust, dirt, water, and other environmental elements.
4	AC power input with a 7/8” 3-pin circular AC power connector.

For an illustration of cable port seals, see Figure 8: PG13 Plug: Cable Port Seal, on page 14.

The following figure shows the CPU module with covers off all components.

Figure 3: CPU Module with Covers Off All Components (Front Faceplate View of CPU Module)

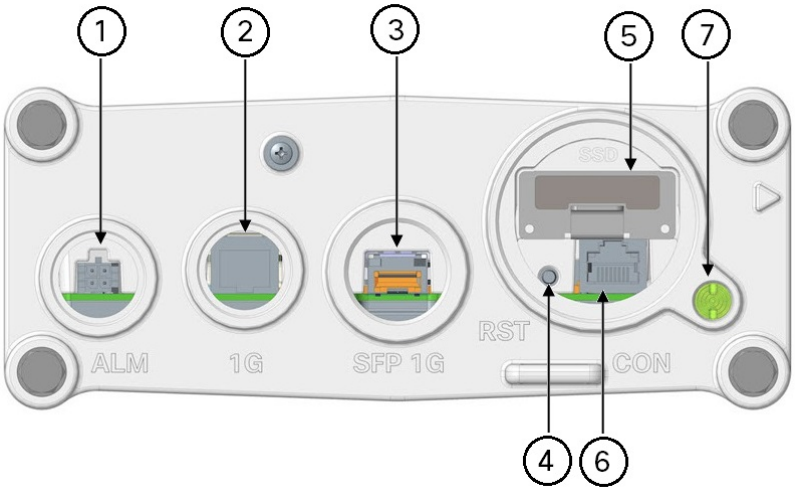
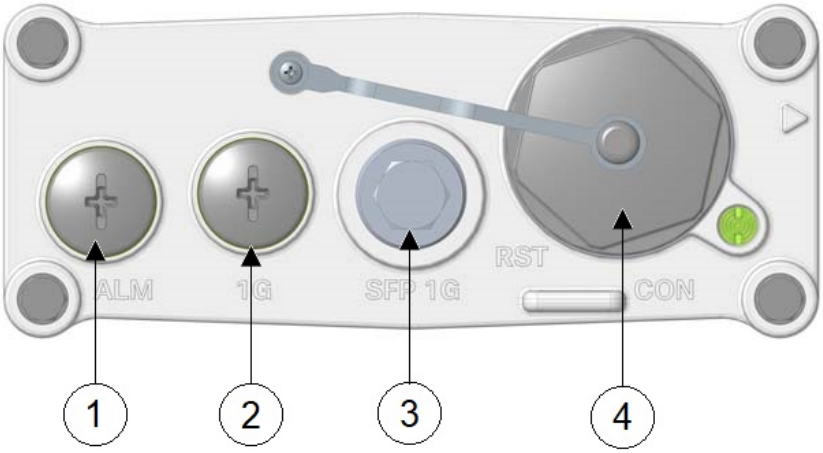


Table 2: Description of CPU Module Components (Left-to-Right)

Item No.	Item	Description
1	ALM	Alarm port with Micro-fit 4P connector
2	1G	10/100/1000 Mbps Ethernet port
3	SFP 1G	SFP One Gigabit Ethernet
4	RST	Reset button
5	SSD	SSD module (optional)
6	CON	Console port (accessible when plug is removed)
7	LED	SYS LED See SYS LED States to view the system LED states.

The following figure shows the CPU module with covers over all components.

Figure 4: CPU Module with Covers Over All Components



Item No.	Item
1	Alarm port covered by PG13 plug **Note** To remove alarm port plug, use #3 Phillips bit.
2	Ethernet port covered by PG13 plug **Note** To remove Ethernet port plug, use #3 Phillips bit.
3	SFP port covered by 3/4 NPT plug **Note** To remove the SFP port plug, use the 5/8" 6 Pt socket driver.
4	Reset button and console port covered by M42 plug **Note** To remove M42 plug, use an adjustable wrench that spans to 1 3/8".

The following figure shows the bottom view of the router.

Figure 5: Bottom View of IR8140H Without Cable Seals

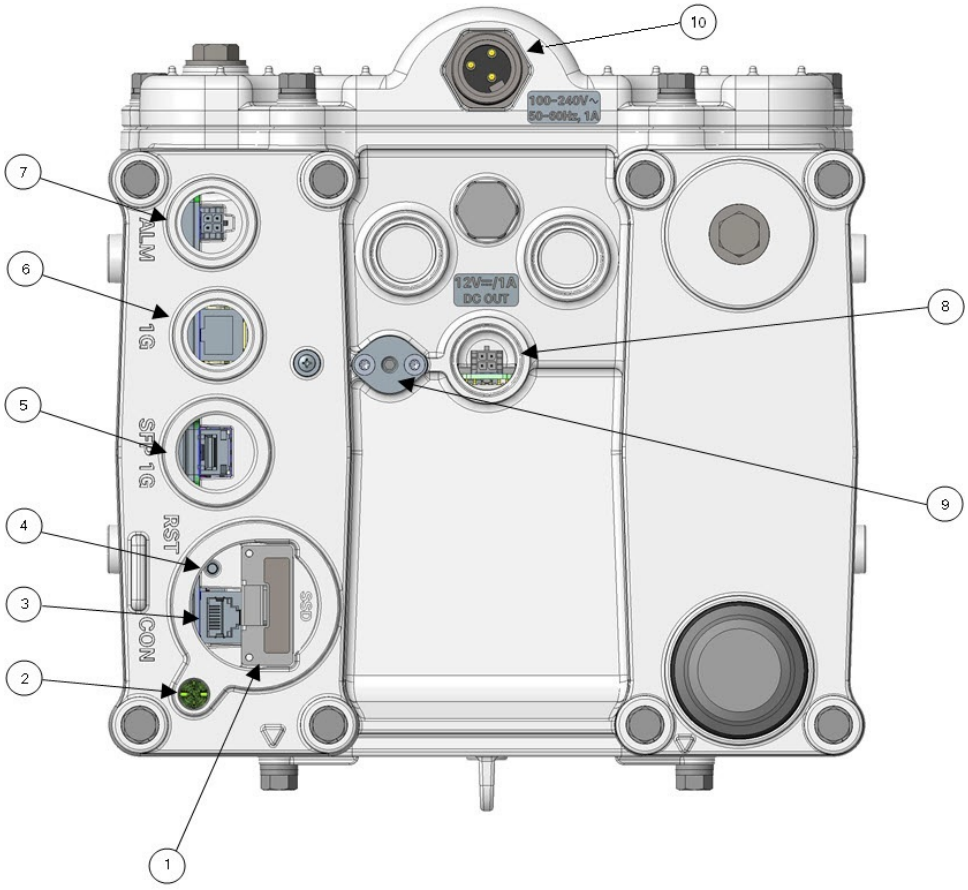


Table 3: Components at the Bottom of IR8140H Without Cable Port Seals

Item No.	Hardware Feature	Item No.	Hardware Feature
1	SSD module	6	One Gigabit Ethernet (1G) with PG13 port
2	LED See SYS LED States to view the system LED states.	7	Alarm port with PG13 port
3	Console port (accessible when plug is removed)	8	12VDC/1A DC output
4	Reset button	9	BBU locking screw

Item No.	Hardware Feature	Item No.	Hardware Feature
5	Small form-Factor Pluggable (SFP) 1G SFP 1G module can be installed or removed while the router is on and operating normally. See Connecting the SFP Port for instructions on how to install and remove an SFP module from the CPU module.	10	AC power input—Hexagonal 7/8” 3-pin circular connector

The following table provides the IR8140H hardware features.

Table 4: IR8140H Hardware Features

Hardware Feature	Description
CPU Module: Quantity of one (1)	The CPU module provides processing power for the IR8140H modules, and two Gigabit Ethernet connections to the backhaul network and other IP network devices. The CPU module is installed in slot 0, which is the largest module slot. It is found at the bottom of the IR8140H. You can access the following ports and connectors when you remove the plugs found at the bottom of the CPU module, as seen in Figure 5: Bottom View of IR8140H Without Cable Seals, on page 9. • ALM: Alarm port for use with PG13 cable gland (Figure 7: Cable Gland, on page 13). • 1G: 10/100/1000 Mbps Ethernet port for use with PG13 cable gland. This port provides up to 15 W of PoE PSE output power (only available with IR8140H-P-K9 SKU). • SFP 1G: One Gigabit Ethernet SFP socket. **Note** Requires an SFP adapter kit, if you want to cable it. • RST: Reset button covered by M42 plug • CON: Console Port (RJ45): Accessible when M42 plug is removed.

Hardware Feature	Description
Universal Interface Module (UIM) slots, Quantity of three (3) slots	The three Universal Interface Module (UIM) slots are available for ruggedized industrial router modules that provide connectivity to Neighborhood Area Networks (NAN) endpoints and to the WAN for connectivity to the utility control center. IR8140H supports the following UIMs: • IRMH-WPAN module • IRMH-LTE module • IRMH-LTEA module • IRMH-5GS6-GL module • IRMH-LTE7 module • IRMH-5GR16SA module
Management interface	An RJ-45 console port on the CPU module provides local access to the router for management and administration tasks. Accessible when the plug is removed.
N-type female connectors	Allows direct connection of an antenna or cable to the IR8140H.
60W Power Supply Unit (PSU) Board	Found at the back of the IR8140H. **Note** The power supply can be replaced in the field. However if the router is installed on a pole, the IR8140H must first be removed from the pole to swap the power supply. Also, BBU must be disabled before swapping the power supply. The Power over Ethernet-enabled (PoE-enabled) PID (IR8140H-P-K9) allows up to 15-W PoE output power.
Battery Backup Unit (BBU)	Up to three BBUs can be installed in an IR8140H. The BBUs are stacked upon one another in the module assembly in which they reside. When you install three BBUs, up to eight hours of battery backup power is available on a fully-loaded system if there is an AC power failure. BBUs can be replaced in the field. BBUs are found in the center-front of the IR8140H.
12VDC_Out	Provides 12 VDC/1A to power an external device. The power option is only available when PoE is not in use.
Small form-Factor Pluggable (SFP)	SFP modules can be installed or removed while the router is on and operating normally. See Connecting the SFP Port for instructions on how to install and remove an SFP module from the CPU module.
GNSS/GPS	An integrated GNSS receiver provides accurate time and location information to the system.
Mounting Bracket Kit	Includes mounting hardware for the IR8140H.

Hardware Feature	Description
Optional Items (To Be Ordered Separately)	
Pole-mount kit	Includes the following equipment to support installation of the IR8140H on a pole: • Mounting plate • Two clamp brackets • Required hardware
Band strap kit	Two steel straps and band strip kit
Strap tool kit	BAND-IT strap tool
Antenna plug	IR-ANT-PLUG
Cable gland	IR-IP67GLAND
Fiber kit	Cable Extender and Cable Gland (AIR-ACC15-SFP-GLD=)
Module slot cover	IRMH-BLANK

Operating Range

IR8140H can operate in a temperature range of -40°C to +70°C.

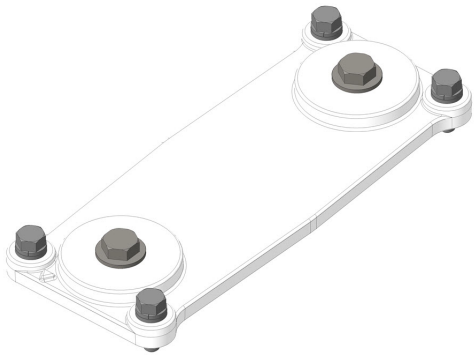
Accessories

Module Slot Cover

The following figure shows an illustration of the slot cover you can use to cover empty IR8140H module slots. You should always cover an empty module slot to prevent damage to a system that is exposed to the elements.

Note Slot covers are ordered separately.

Figure 6: Module Slot Cover



Cisco Product ID
IRMH-BLANK

Cable Glands

A cable gland (also known as a cable connector) is required to install cables in the CPU Alarm and Ethernet ports and the Chassis 12VDC_OUT port. Use a compatible cable gland to attach and secure the end of a cable to the router. The cable gland provides cable strain relief and seals the cable entry into the router chassis to prevent damage to the router interior.

Note Cable glands must be ordered separately. Note that the following figure might not be an exact depiction of the latest version of the cable gland.

Figure 7: Cable Gland



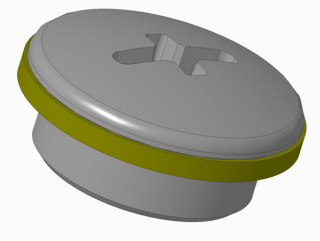
Table 5: Supported Cisco Cable Port Seal

Cisco Product ID
IR-IP67GLAND

Cable Port Seals

Unused CPU (Alarm and Ethernet) and Chassis 12VDC_OUT ports must be sealed with a liquid-tight cover (PG13) cable port seal to protect the router interior from environmental elements.

Figure 8: PG13 Plug: Cable Port Seal



Note The cable port seals come with the chassis, and cannot be orderable separately.

Caution Do not install the router unless all the unused chassis cable ports are sealed. Leaving chassis ports unsealed might damage the router.

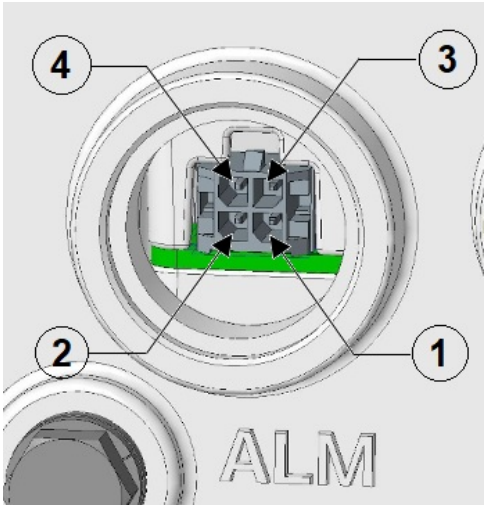
Port Pinouts

The following sections provide information about alarm port and DC Out port pinouts.

Alarm Port

The following figure shows the alarm port and pinouts.

Figure 9: Alarm Port



Pin	Description
Pin 1	Alarm Input/Output #1

Pin	Description
Pin 2	Alarm Input/Output #2
Pin 3	Alarm Common #1
Pin 4	Alarm Common #2

Note Pins 3 and 4 are tied together at the router, but are isolated from ground.

The following figure shows a mating connector: Micro-Fit 3.0™ Receptacle Housing.

Figure 10: Mating Connector

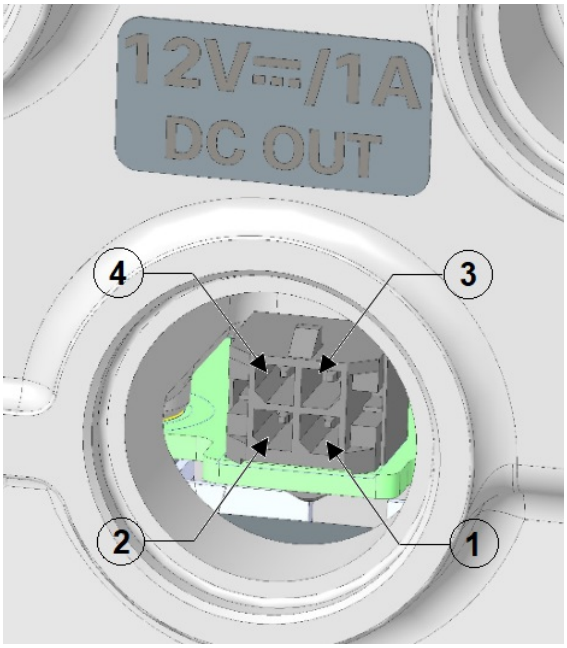


1	Pin 1	3	Pin 3
2	Pin 2	4	Pin 4

12V/1A DC Out Port

The following figure shows the 12V/1A DC Out port and pinouts.

Figure 11: 12V/1A DC Out Port



Pin	Description
Pin 1	+12 V Output pin
Pin 2	Ground pin
Pin 3	Cable_Present_L Input pin) **Note** External 12 V DC Out Cable should ground this pin 3 to pin 4 directly so that the router detects that the cable is inserted (present).
Pin 4	Ground pin

The power connector housing is installed on the router power harness for connection to an external, non-Cisco module. The following figure shows a mating connector: Micro-Fit 3.0™ Receptacle Housing.

Figure 12: Mating Connector



1	Pin 1	3	Pin 3

2	Pin 2	4	Pin 4