Overview of the Router

The Cisco 2010 Connected Grid Router is a ruggedized power utility substation router, which offers data functionality through Gigabit Ethernet ports, and security functionality with a VPN accelerator.

This Cisco CGR 2010 router has new rugged grid router WAN interface card (GRWIC) slots (for both single-wide and double-wide GRWICS) that support the rugged product power utility market.

Ruggedized routers comply with specifications IEEE 1613 and IEC 61850, for products that meet stringent environmental, surge, and electromagnetic Interference (EMI) requirements for utility substation environments without moving parts or fans.

These topics are discussed:

- Software Requirements, page 5
- Supported PIDs, page 5
- Chassis Views, page 5
- Hardware Features, page 6
- Slot, Port, and Interface Information, page 11
- LED Indicators, page 11

Software Requirements

You must have Cisco IOS Release 15.8(3) software installed in the CGR2010 to support the PIDs referenced in Cisco 2010 Connected Grid Router Data Sheet.

Supported PIDs

See the Cisco 2010 Connected Grid Router Data Sheet for the list of Cisco 2010 Connected Grid Router Product IDs (PIDs).

Chassis Views

This section has views of the power supply side and cable side panels of the Cisco CGR 2010 router, showing locations of the interfaces, module slots, status indicators, and chassis identification labels.

- Figure 1 on page 6 shows the Cisco 2010 Connected Grid Router chassis.
- Figure 2 on page 6 shows the power supply side view of the Cisco CGR 2010 router.
- Figure 3 on page 6 shows the cable side panel of the Cisco CGR 2010 router.

Figure 1 Cisco CGR 2010 Router Chassis

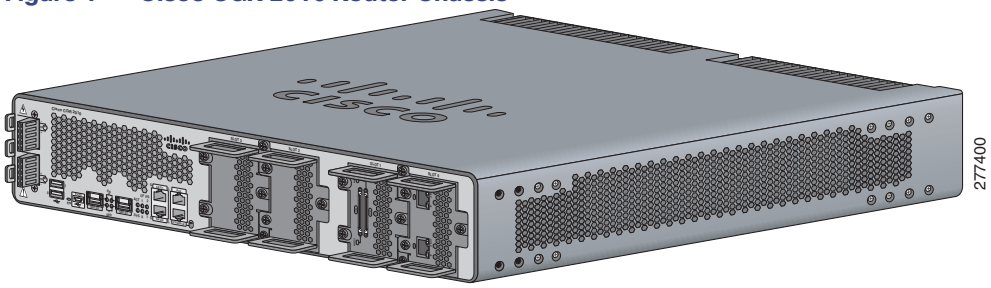


Figure 2 Power Supply Side View of the Cisco CGR 2010 Router

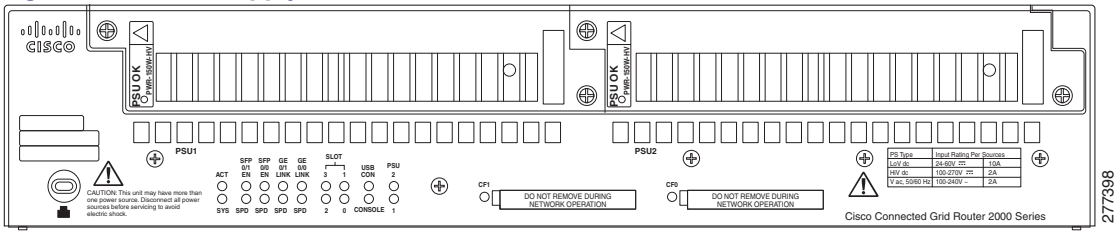
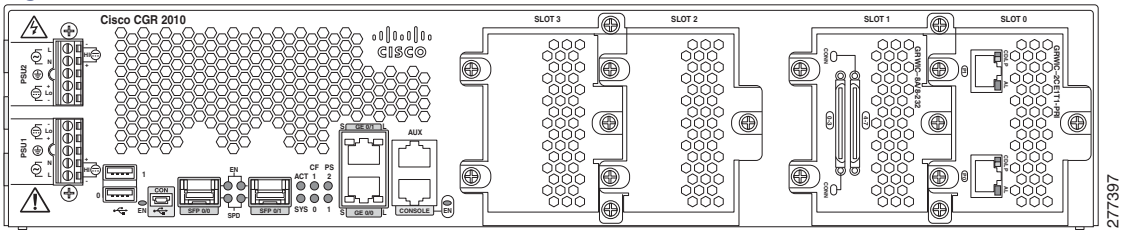


Figure 3 Cable Side View of the Cisco CGR 2010 Router



Hardware Features

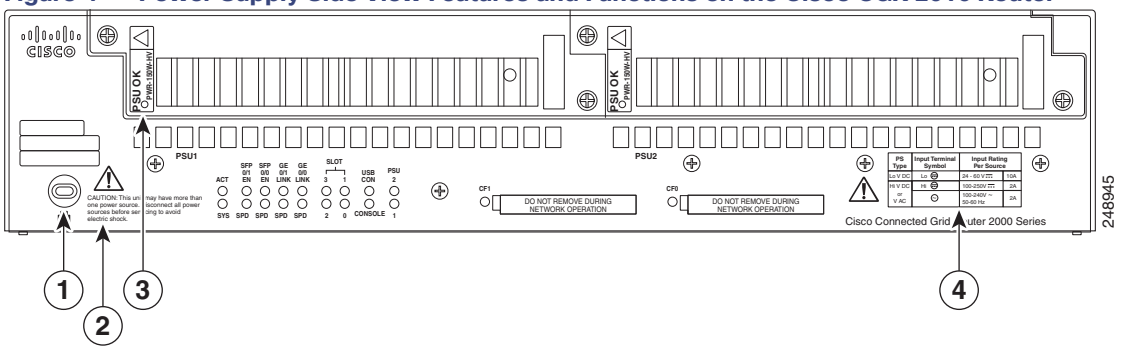
This section describes the hardware features in Cisco CGR 2010 router.

- Locating Chassis Features and Functions, page 6
- Built-in Interface Ports, page 8
- Removable and Interchangeable Modules and Cards, page 9
- Real-Time Clock, page 11

Locating Chassis Features and Functions

Figure 4 on page 7 shows the different chassis features and functions available on the power supply side view of the Cisco CGR 2010 router. Figure 5 on page 7 shows the different chassis features and functions available on the cable side view of the Cisco CGR 2010 router.

Figure 4 Power Supply Side View Features and Functions on the Cisco CGR 2010 Router



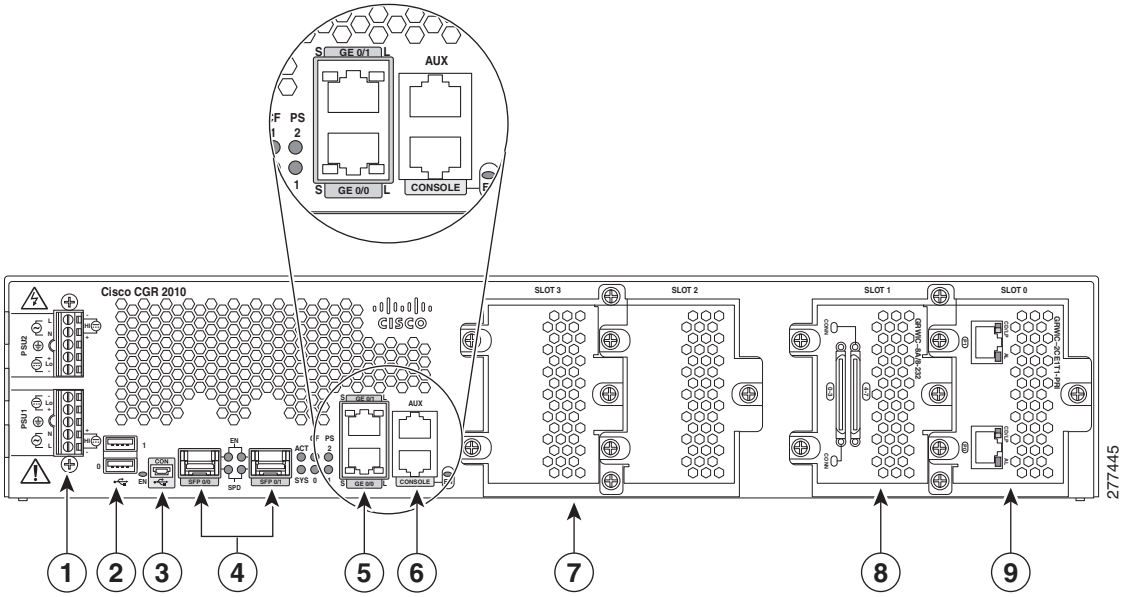
1 Kensington security slot

2 Caution label and statement for multiple power source

3 Power supply unit 1 (PSU1) label

4 Power supply power range label

Figure 5 Cable Side View Features and Functions on the Cisco CGR 2010 Router



1 Terminal blocks[1]

2 USB0 and USB1 (1, top)

3 USB[2] serial console port

4 SFP0/0 and SFP0/1

5 100/1000 Ethernet port (GE0/0 and GE0/1)

6 RJ-45 aux port and serial console port

7 GRWIC slot 3 (slot cover showing)

8 GRWIC slot 2 (slot cover showing)

9 GRWIC slot 1 (8-port dual RS-232 serial interface showing)

10 GRWIC slot 0[3] (T1/E1 dual port interface showing)[4]

[1] Enables AC power, high-voltage DC power, and low-voltage DC power input for dual power supplies.

[2] USB = Universal serial bus.

[3] GRWIC slots 0, 1, 2, and 3 (slot 0 is on the far right).

[4] For T1/E1 interfaces, shielded cables are required to meet EN55022, Cispr 22, and EN300-386 compliance.

GRWIC Installation Options

CGR 2010 has four slots with two removable dividers that allow the following GRWIC installation options:

- 4 single-wide GRWICs
- 2 single-wide GRWICs and 1 double-wide GRWIC
- 2 double-wide GRWICs

Built-in Interface Ports

Table 1 on page 8 summarizes the interface ports built into the router chassis.

Table 1 Summary of Cisco CGR 2010 Built-In Interfaces

	Data Ports			Management Ports		
Router Model	10/100/1000 GE RJ-45	100/1000 SFP	USB Type A	Console, Serial, RJ-45	Console, Mini-USB (Type B)	Auxiliary, RJ-45
Cisco CGR 2010	2	2	2	1	1	1

Gigabit Ethernet Ports

There are two different types of Gigabit Ethernet ports available on Cisco CGR 2010 router.

- Gigabit Ethernet Ports, page 8
- SFP Ports, page 8

Gigabit Ethernet Ports

The Gigabit Ethernet RJ-45 copper interface ports support 100BASE-TX and 1000BASE-T.

SFP Ports

The small form factor pluggable (SFP) ports on the Cisco CGR 2010 router support the SFP modules listed in Table 2 on page 9.

Table 2 Supported SFP Modules

Type of SFP Module	Model
Rugged and Industrial SFPs -40 to 140° F (-40 to 60° C)	■ GLC-SX-MM-RGD ■ GLC-LX-SM-RGD ■ GLC-ZX-SM-RGD ■ GLC-FE-100LX-RGD ■ GLC-FE-100FX-RGD
Commercial SFPs 32 to 113° F (0 to 45° C)	■ GLC-BX-U with digital optical monitoring (DOM) support ■ GLC-BX-D with DOM support ■ GLC-FE-100LX ■ GLC-FE-100BX-D ■ GLC-FE-100BX-U ■ GLC-FE-100FX ■ GLC-FE-100EX ■ GLC-FE-100ZX ■ CWDM-SFP with DOM support
Extended temperature SFPs 23 to 140° F (-5 to 60° C)	■ SFP-GE-S with DOM support ■ SFP-GE-L with DOM support ■ SFP-GE-Z with DOM support

The SFP port shares the same physical port as an RJ-45 GE port. The SFP port can be configured for the following behaviors:

- Always use the RJ-45 port.
- Always use the SFP port.

USB Console Port

The Mini-USB type B port has been enabled to perform management tasks on the router. To use this port, you must install a Windows USB device driver before establishing physical connectivity between a personal computer and the router. See the Installing the Cisco Microsoft Windows USB Device Driver, page 45 for driver installation instructions.

Removable and Interchangeable Modules and Cards

GRWICs and power supply units (PSU) for the Cisco CGR 2010 fit into external slots and can be removed or replaced without opening the chassis.

Note: See *Installing Cisco Interface Cards in Cisco Access Routers* for instructions that describe how to install GRWICs in the router.

Grid Router WAN Interface Cards

GRWICs are the latest generation of interface cards. GRWICs are installed in the GRWIC slots on the router (see Figure 8 on page 87).

The router can accommodate four single-wide GRWICS, or two single-wide GRWICs and one double-wide GRWIC, or two double-wide GRWICs at any one time. See Installing Grid Router WAN Interface Cards, page 86.

Memory

Cisco CGR 2010 routers contain the following types of memory:

- DDR2—Stores the running configuration and routing tables, and is used for packet buffering by the network interfaces. Cisco IOS software executes from DRAM memory. Supports 1-GB on board DDR2.
- Boot/NVRAM—Stores the bootstrap program (ROM monitor), the configuration register, and the startup configuration.
- Flash memory—External flash memory. Stores the operating system software image. Supports two external 4 GB I-temp compact flash memory cards.
- Two 1-GB USB flash memory sticks (MEMUSB-1024FT), one each in drives USB 0 and USB 1.

Power Supplies

Cisco CGR 2010 supports three PSUs (power supply units). Power supplies are field replaceable, externally accessible, and hot swappable.

Table 3 on page 10 summarizes the three power supply options.

Table 3 Power-Supply Modules

Model	Description
PWR-RGD-AC-DC	High-voltage AC or DC power supply.
PWR-RGD-LOW-DC	Low-voltage DC power supply.
PWR-RGD-AC-DC-C	High-voltage AC or DC power supply. China-specific model.

Note: Any combination of power supplies can be inserted into the chassis. Dual power supply configurations are load sharing in redundancy mode. A single power supply is sufficient for supporting power needs to the system.

Caution: Two types of power supplies are supported on the Cisco CGR 2010 router: a low-voltage DC power supply and a high-voltage DC/AC power supply. Take caution when selecting the correct input voltage for the power supply installed or damage will result. For details on connecting AC and DC power supplies, see the Power-Supply Modules, page 32.

Table 4 on page 11 summarizes the power options.

Table 4 Cisco CGR 2010 Power Options

Router	AC	AC + POE	DC	Hot Swap	Internal RPS[1]	Dual DC[2]
CGR 2010	Yes	No	Yes	Yes	Yes	No

[1] Internal RPS means that additional power supply can be added to the PS2 slot.

[2] Dual DC means two separate DC lines input to the same power supply.

Real-Time Clock

Upon system power up, the internal real-time clock with battery backup provides the system software with time of day. This allows the system to verify the validity of the certification authority (CA) certificate. The Cisco CGR 2010 has a lithium battery. This battery lasts the life of the router under the operating environmental conditions specified for the router and is not field-replaceable.

Note: If the lithium battery in a Cisco CGR 2010 router should fail, the router must be returned to Cisco for repair.

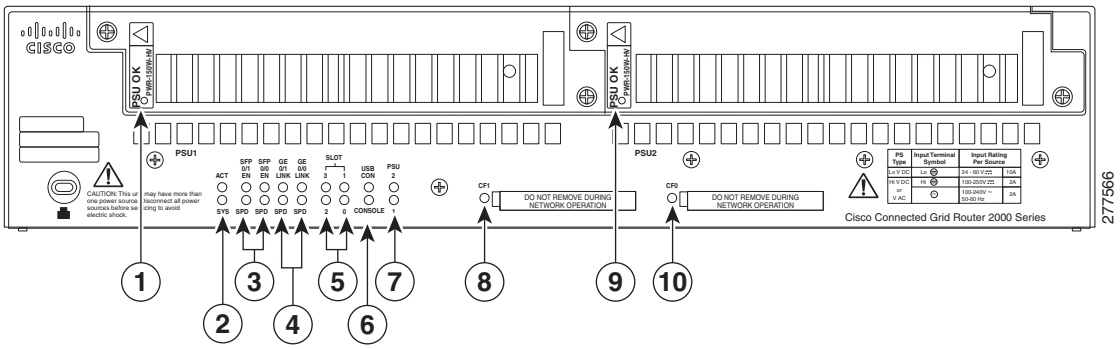
Slot, Port, and Interface Information

On the Cisco CGR 2010 router, the numbering format for slots and ports is defined as follows: **interface type** *0/slot/port*. “0” indicates slots that are built into the chassis of a router.

LED Indicators

Figure 6 on page 12 summarizes the LED indicators that are located on the router bezel or chassis, but not on the removable interface cards.

Figure 6 Power Supply Side View LEDs on the Cisco CGR 2010 Router



1 PSU[1] OK LED

2 ACT[2] and SYS[3] LEDs

3 SFP0/1[4] EN[5] SPD[6] LEDs

4 GE0/1[7] LNK[8] and SPD LED

5 SLOT LEDs (slots 0 through 3)

6 Console/USB connection LEDs

7 PSU1/2 LEDs

8 Compact flash slot 1 LED

9 PSU OK LED

10 Compact flash slot 0 LED

[1] PSU = Power supply unit

[2] ACT = Activity

[3] SYS = System

[4] SFP = Small form-factor pluggable module slots 0 and 1

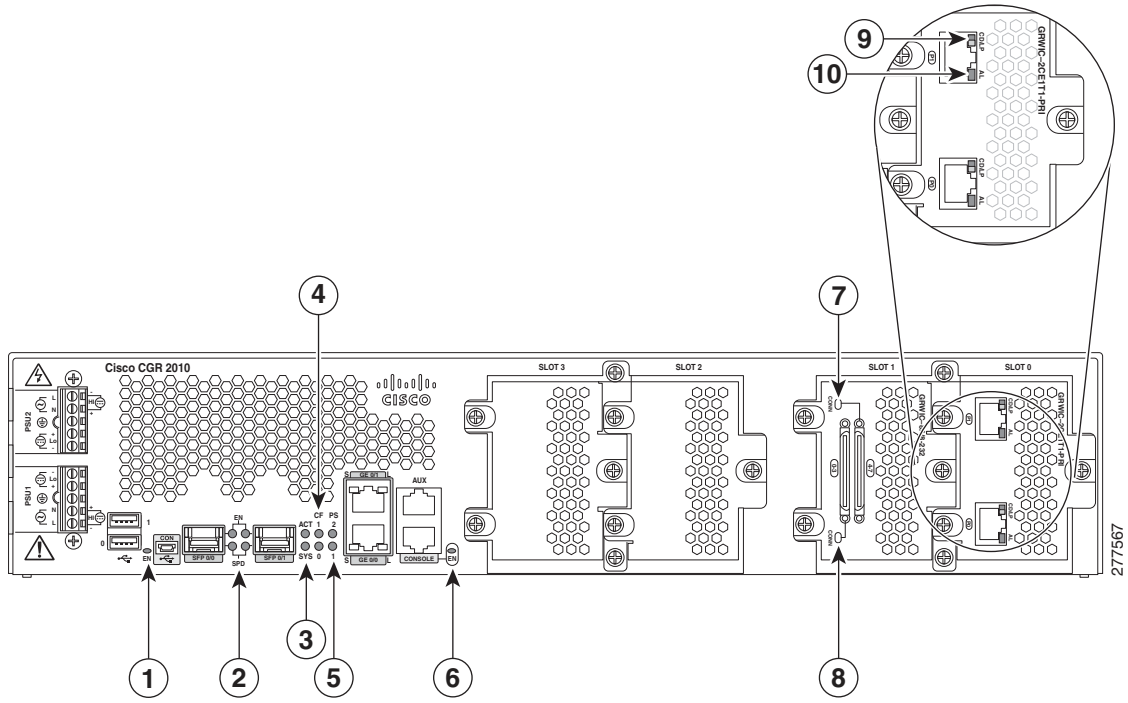
[5] EN = Enable

[6] SPD = Speed

[7] GE = Gigabit Ethernet slots 0 and 1

[8] LNK = Link

Figure 7 Cable Side View LEDs on the Cisco CGR 2010 Router



1	EN (enable USB console)	2	SFP EN and SPD LEDs
3	ACT status and SYS status LEDs	4	Compact flash 0 and 1 (0, bottom, 1, top)
5	PSU1 (bottom), PSU2 (top)	6	EN (enable RJ-45 console)
7	GRWIC serial interface CONN LED	8	GRWIC serial interface CONN LED
9	Dual-port T1/E1 GRWIC CD/LP LED	10	Dual-port T1/E1 GRWIC AL LED

For LED troubleshooting information, including possible trouble causes and corrective actions, see Table 5 on page 13 and Table 6 on page 14.

Table 5 Cisco CGR 2010 LED Indicators – Cable Side

LED	Color	Description
SYS	Solid green	Solid green indicates normal operation.
	Blinking green	System is booting or is in ROM monitor mode.
	Amber	System error.
	Off	Power is off or system board is faulty.
ACT	Solid or blinking green	Solid or blinking indicates packet activity between the forwarding and routing engine and any I/O port.
	Off	No packet transfers are occurring.
CF 0 CF 1	Green	Flash memory is being accessed; do not eject the compact flash memory card.
	Amber	Compact flash error.
	Off	Flash memory is not being accessed; okay to eject the compact flash memory card.
PSU 1 PSU 2	Green	Valid output.
	Red	Invalid output.
	Blinking red	Invalid input
CONSOLE EN (RJ-45)	Green	Serial console is active.
USB CON	Green	USB console is active.
SFP 0/0 EN SFP 0/1 EN	Off	Not present.
	Green	Present and enabled.
	Amber	Present with failure.
SFP 0/0 SPD SFP 0/1 SPD	Off	No link.
	blinking	Blink frequency indicates port speed: ■ 2 blinks before pause – 100Mbps link speed. ■ 3 blinks before pause – 1000Mbps link speed.

Table 6 Cisco CGR 2010 LED Indicators – Power Supply Side

LED	Color	Description
SYS	Solid green	Solid green indicates normal operation.
	Blinking green	System is booting or is in ROM monitor mode.
	Amber	System error.
	Off	Power is off or system board is faulty.
ACT	Solid or blinking green	Solid or blinking indicates packet activity between the forwarding and routing engine and any I/O port.
	Off	No packet transfers are occurring.
PSU 1 PSU 2	Green	Valid output.
	Red	Invalid output.
	Blinking red	Invalid input
CF 0 CF 1	Green	Flash memory is being accessed; do not eject the compact flash memory card.
	Amber	Compact flash error.
	Off	Flash memory is not being accessed; okay to eject the compact flash memory card.
CONSOLE EN (RJ-45)	Green	Serial console is active.
USB CON	Green	USB console is active.
SLOT 0 SLOT 1 SLOT 2 SLOT 3	Green	GRWIC is active.
	Amber	GRWIC is not active.
SFP 0/0 EN SFP 0/1 EN	Off	Not present.
	Green	Present and enabled.
	Amber	Present with failure.
SFP 0/0 SPD SFP 0/1 SPD	Off	No link.
	blinking	Blink frequency indicates port speed: ■ 2 blinks before pause – 100Mbps link speed. ■ 3 blinks before pause – 1000Mbps link speed.
GE 0/0 LINK GE 0/1: LINK	Green	Solid green indicates the Ethernet port has a link partner.
GE 0/0 SPD GE 0/1 SPD	Off	No link.
	blinking	Blink frequency indicates port speed: ■ 2 blinks before pause – 100Mbps link speed. ■ 3 blinks before pause – 1000Mbps link speed.

Specifications

To view specifications for the Cisco CGR 2010 router, see the Cisco 2010 Connected Grid Router Data Sheet.