

Cisco Catalyst IR1101 Rugged Series Router Hardware Installation Guide

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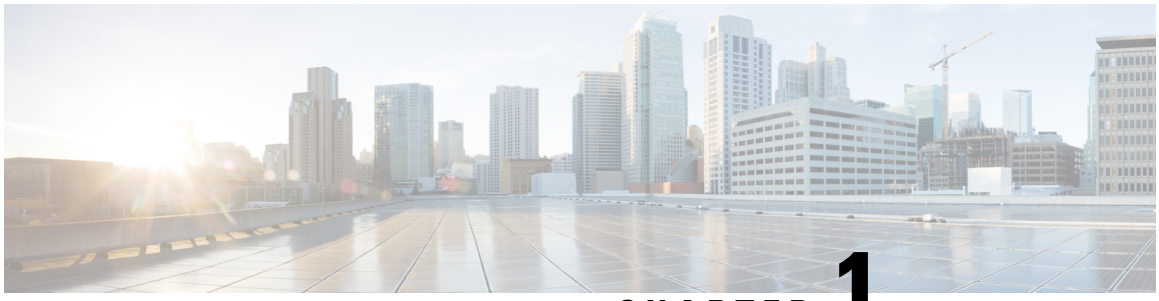
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CHAPTER 1

Preface

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Preface

This preface describes the objectives, audience, organization, and conventions of this guide and describes related documents that have additional information.

Note The documentation set for this product strives to use bias-free language. For purposes of this documentation set, bias-free is defined as language that does not imply discrimination based on age, disability, gender, racial identity, ethnic identity, sexual orientation, socioeconomic status, and intersectionality. Exceptions may be present in the documentation due to language that is hardcoded in the user interfaces of the product software, language used based on RFP documentation, or language that is used by a referenced third-party product.

Objective

This guide provides an overview of and explains how to install and connect your Cisco Router.

Audience

This guide is intended for people who have a high level of technical ability, although they may not have experience with Cisco software.

Conventions

This section describes the conventions used in this guide.

Note Means reader take note. Notes contain helpful suggestions or references to additional information and material.

Caution This symbol means reader be careful. In this situation, you might do something that could result in equipment damage or loss of data.

Tip Means *the following information will help you solve a problem* . The tip information might not be troubleshooting or even an action, but could be useful information.

Warning Means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.

Safety Warnings

Warning	**Warning** **Statement 1071—**Warning Definition IMPORTANT SAFETY INSTRUCTIONS Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar w for preventing accidents. Read the installation instructions before using, installing, or connecting the system to t the statement number at the beginning of each warning statement to locate its translation in the translated safety device. SAVE THESE INSTRUCTIONS 
Waarschuwing	BELANGRIJKE VEILIGHEIDSINSTRUCTIES Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. V apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen. BEWAAR DEZE INSTRUCTIES

Varoitus	TÄRKEITÄ TURVALLISUUSOHJEITA Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laittei käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten kä mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonu SÄILYTÄ NÄMÄ OHJEET
Attention	IMPORTANTES INFORMATIONS DE SÉCURITÉ Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des bl corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des av les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction sit avertissement. CONSERVEZ CES INFORMATIONS
Warnung	WICHTIGE SICHERHEITSHINWEISE Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetz Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden. BEWAHREN SIE DIESE HINWEISE GUT AUF.
Avvertenza	IMPORTANTI ISTRUZIONI SULLA SICUREZZA Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure st di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le tra riportate in questo documento. CONSERVARE QUESTE ISTRUZIONI
Advarsel	VIKTIGE SIKKERHETSINSTRUKSJONER Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å ar må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å f nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte TA VARE PÅ DISSE INSTRUKSJONENE
Aviso	INSTRUÇÕES IMPORTANTES DE SEGURANÇA Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corpo utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos e com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cad tradução nos avisos de segurança traduzidos que acompanham este dispositivo. GUARDE ESTAS INSTRUÇÕES

¡Advertencia!	INSTRUCCIONES IMPORTANTES DE SEGURIDAD Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña GUARDE ESTAS INSTRUCCIONES
Varning!	VIKTIGA SÄKERHETSANVISNINGAR Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utfö utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygg nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som anordning. SPARA DESSA ANVISNINGAR
Figyelem	**FONTOS BIZTONSÁGI ELOÍRÁSOK** **Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.** **ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!**
Предупреждение	**ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ** **Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.** **СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ**
警告	重要的安全性说明 此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。 请保存这些安全性说明
警告	安全上の重要な注意事項 「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。 これらの注意事項を保管しておいてください。
주의	중요 안전 지침 이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오. 이 지시 사항을 보관하십시오.
Aviso	INSTRUÇÕES IMPORTANTES DE SEGURANÇA Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. A qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as prática de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos d que acompanham o dispositivo. GUARDE ESTAS INSTRUÇÕES

Advarsel	VIGTIGE SIKKERHEDSANVISNINGER Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før d udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte denne enhed. GEM DISSE ANVISNINGER
تحذير	إرشادات الأمان الهامة يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في آخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات
Upozorenje	VAŽNE SIGURNOSNE NAPOMENE Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod. SAČUVAJTE OVE UPUTE
Upozornění	DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení. USCHOVEJTE TYTO POKYNY
Προειδοποίηση	ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή. ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ
אזהרה	הוראות בטיחות חשובות סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן. שמור הוראות אלה
Opomena	ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот. ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА
Ostrzeżenie	WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń. NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ
Upozornenie	DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu. USCHOVAJTE SI TENTO NÁVOD
Opozorilo	Ta naprava mora biti ozemljena. Nikoli ne odklapljajte ozemljitve oz. upravljajte naprave, ki ni primerno ozemljena. V primeru, da niste sigurni, ali imate primerno ozemljitev, nemudoma pokličite pooblaščeni električni servis ali električarja.
警告	重要安全性指示 此警告符號代表危險，表示可能造成人身傷害。使用任何設備前，請留心電路相關危險，並熟悉避免意外的標準作法。您可以使用每項警告後的聲明編號，查詢本裝置隨附之安全性警告譯文中的翻譯。 請妥善保留此指示

Warning **Statement 1094—**Read Wall-Mounting Instructions Before Installation

Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system.

Warning **Statement 1008—**Class 1 Laser Product

This product is a Class 1 laser product.

Warning **Statement 1024—**Ground Conductor

This equipment must be grounded. To reduce the risk of electric shock, never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available.

Warning **Statement 1033—**Safety Extra-Low Voltage (SELV)—IEC 60950/ES1–IEC 62368 DC Power Supply

To reduce the risk of electric shock, connect the unit *only* to a DC power source that complies with the SELV requirements in the IEC 60950-based safety standards or the ES1 requirements in the IEC 62368-based safety standards.

Warning **Statement 1046—**Installing or Replacing the Unit

To reduce risk of electric shock, when installing or replacing the unit, the ground connection must always be made first and disconnected last.

If your unit has modules, secure them with the provided screws.

Warning **Statement 1073—**No User-Serviceable Parts

There are no serviceable parts inside. To avoid risk of electric shock, do not open.

Warning **Statement 1074—**Comply with Local and National Electrical Codes

To reduce risk of electric shock or fire, installation of the equipment must comply with local and national electrical codes.

Warning **Statement 9001**—Product Disposal

Ultimate disposal of this product should be handled according to all national laws and regulations.

Warning **Statement 1079**—Hot Surface

This icon is a hot surface warning. To avoid personal injury, do not touch without proper protection.



Warning Intended for installation in a restricted access location.

Related Documentation

All of the IR1101 documentation can be found online here:

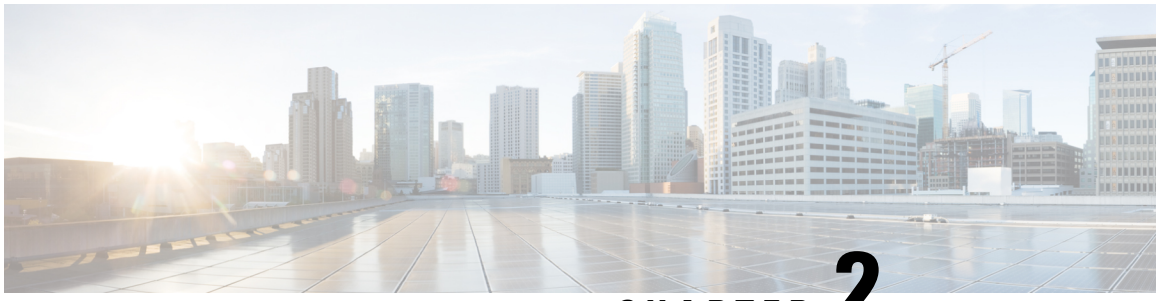
- Product support page: https://www.cisco.com/c/en/us/support/routers/1101-industrial-integrated-services-router/model.html
- Datasheet: https://www.cisco.com/c/en/us/products/collateral/routers/1101-industrial-integrated-services-router/datasheet-c78-741709.html
- Regulatory Compliance and Safety Information: https://www.cisco.com/c/dam/en/us/td/docs/IIOT/compliance/routers/rcsi-0502-book.pdf
- Statement of Volatility: https://trustportal.cisco.com/c/r/ctp/trust-portal.html?search_keyword=1101#/19339541724455836

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation* , which also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as a Really Simple Syndication (RSS) feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service and Cisco currently supports RSS Version 2.0.



CHAPTER 2

Product Overview

This section contains the following:

- Product Overview, on page 9
- General Description, on page 9
- SKU Information, on page 10
- Cisco IR1101 Series Platform Features, on page 11
- Front Panel Icons and LEDs, on page 21
- Supported Cisco Antennas and Antenna Accessories, on page 23
- Modem Support, on page 23
- Power Supply, on page 26
- RJ45 Ports, on page 27

Product Overview

This chapter provides an overview of the features available for the Cisco Catalyst IR1101 Rugged Series Router and its Expansion Module. It contains the following sections:

Note Prior to installing this device read the Regulatory Compliance and Safety Information .

General Description

The Cisco IR1101 Industrial Integrated Services Router is a next generation modular industrial router which has a base module with additional Pluggable Modules that can be added. The Pluggable Module provides the flexibility of adding different interfaces to the IR1101 platform, for example, a cellular module.

Details on the Pluggable Modules can be found in the chapter Pluggable Modules, on page 51.

The IR1101 also has Expansion Modules that adds key capabilities such as dual LTE Pluggables, mSATA SSD FRU, SFP, additional L2 ethernet interfaces, additional RJ45 serial ports, and Digital GPIO connections.

Figure 1: The Cisco Catalyst IR1101 Rugged Series Router



SKU Information

The following table lists the different SKUs available for the Cisco IR 1101.

Table 1: Supported SKUs for Cisco IR1101

SKU ID	Description
IR1101-K9	IR1101 Base Unit
IRM-1100-4S8I	Expansion Module with 4x GE SFP, and 1 Digital I/O Connector.
IRM-1100-SPMI	Expansion Module with 1 GE SFP, 1 Pluggable Module, 1 Digital I/O Connector, and 1 mSATA SSD Slot.
IRM-1100-SP	Expansion Module with 1 GE SFP and1 Pluggable Module.
IRM-1100-4A2T	Expansion Module with an additional four asynchronous serial ports and two Ethernet interfaces.
IR1100-SSD-100G	100 GB mSATA SSD
PWR-IE50W-AC	Optional AC power adapter with 110/220V AC and 88-300V DC input (Temperature: -40C to 60C)
IR1101-DINRAIL(=)	Din rail kit and mounting screws for horizontal and vertical mounting

SKU ID	Description
IRM-1100-DINRAIL	Din rail kit for the Expansion Module
IR1101-WALLMNT(=)	Wall mount kit

Cisco IR1101 Series Platform Features

This section describes the different components of the router.

Cisco IR1101 Base Router

The following lists the hardware platform features for the Cisco IR1101.

- External Power Entry
  - Nominal: 12 to 48VDC
  - Absolute min/max: 9.6 to 60VDC
  - Typical current: 0.82A to 0.22A
  - Maximum current: 0.91A to 0.28A
  - 4-pin 3.8 mm EURO power connector
- External Reset/Recovery Push Button
- Gigabit Ethernet Combo RJ45+SFP connector.
  - RJ45 connector will support IEEE802.3 Ethernet over copper wiring standards of 10Base-T, 100Base-TX, and 1000Base-T
  - SFP port will support 1000Base-X or 100Base-FX Fiber Ethernet standard SFP
- LAN Ports
  - 4x RJ45 10/100 Fast Ethernet
- Serial Port
  - 1 x RJ45 RS232 Port (DTE)
- USB Ports
  - 1x USB 2.0 Type A Host Port
  - 1x USB 2.0 mini USB Type B console port
- Compliance
  - Class A EMC or better
  - IP30 compliant when vertical and ports downward

- Industrial temperature [-40ºC to +60ºC, 13.8Kft (operating), 15Kft (non-operating)]
- One alarm input

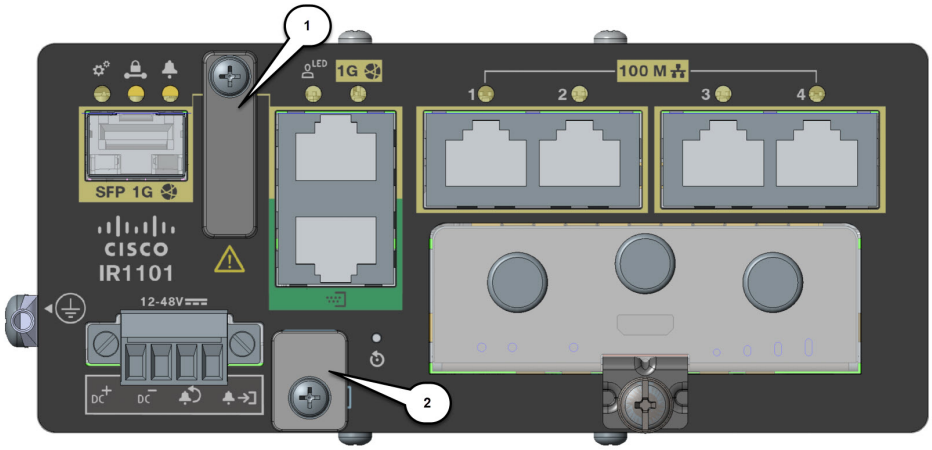
The following graphic shows the IR1101 base router.

Figure 2: Cisco Catalyst IR1101 Rugged Series Router



The following graphics show the IR1101 Base Module Front.

Figure 3: Cisco Catalyst IR1101 Rugged Series Router with USB covers in place



Item	Details
1	USB 2.0 Port Cover
2	Mini-USB Console Cover

The following graphic shows the front panel details of the Cisco IR1101.

Figure 4: Cisco IR1101 Front Panel

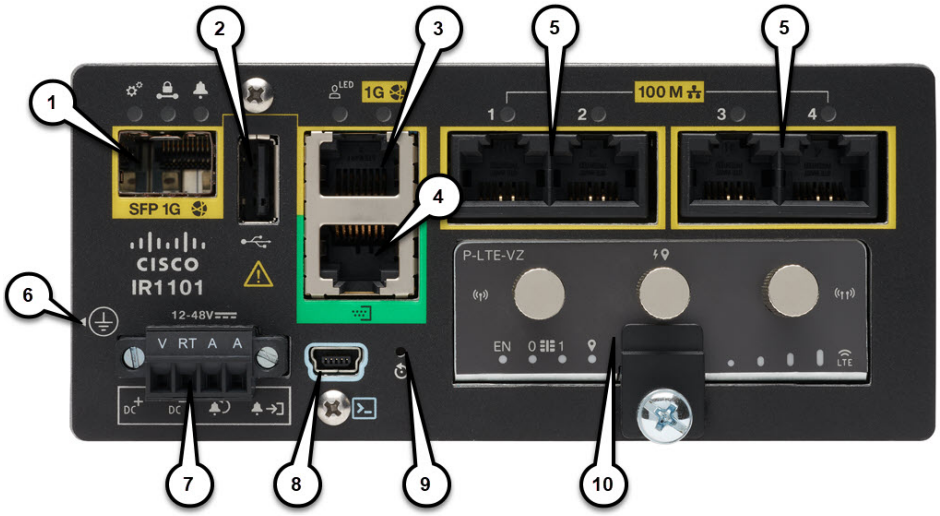


Table 2:

1	SFP GE WAN
2	USB 2.0
3	RJ45 GE WAN
4	Serial Port
5	FE LAN Ports 1-4
6	Grounding Point (on side of device)
7	DC Power and Alarm Input
8	Mini-USB Console
9	Reset Button

10	Pluggable Module

Cisco IRM-1100-4S8I Expansion Module

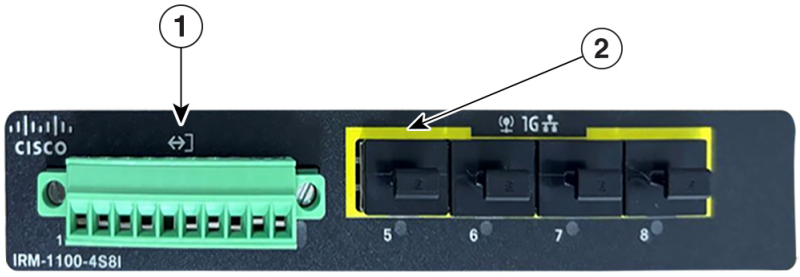
The IRM-1100-4S8I expansion module supports 4x 1G SFP ports and 8x GPIO dry/wet contact ports.

Note The Cisco IRM-1100-4S8I module is not a hot swapable module.

Note For more information, see IRM-1100-4S8I Expansion Module Installation, on page 109 section.

The following illustration shows the IR-1100-4S8I Expansion Module.

Figure 5: IRM-1100-4S8I Expansion Module



1	8 GPIO and 2 common Return (Digital I/O)
2	4x SFP Connector

The hardware platform features for the Cisco IR-1100-4S8I:

- 4x 1GE L2/L3 SFP ports
- 8x Digital I/O connector

IR-1100-4S8I Expansion Module LEDs

There are 12 LEDs in the Expansion Module. Eight LEDs show the status of digital I/O. Four LEDs shows the SFP port status. The LED behavior is shown in the following table.

Table 3: IR1100-4S8I Expansion Module LEDs

LED	Color	Definition
SFP	Off	No Link
	Solid Yellow	Port link, no activity
	Blinking Yellow	Link active with activity
Digital I/O as Input	Off	Inactive
	Yellow	Active

Cisco IRM-1100-SPMI Expansion Module

The following graphic shows the IR-1100-SPMI Expansion Module.

Figure 6: IRM-1100-SPMI Expansion Module



The following lists the hardware platform features for the Cisco IR-1100-SPMI:

- 1 GE SFP
- 1 Pluggable slot
- 1 Digital I/O connector
- 1 mSATA SSD slot

Figure 7: IRM-1100-SPMI Expansion Module Details



1	4 GPIO + 1 Return (Digital I/O)
2	SFP Connector
3	Pluggable Module
4	mSATA SSD Slot
5	Digital I/O LEDs

Digital I/O Connector

The Digital I/O connector has 4 GPIO connections plus 1 Return connection. The Digital I/O supports Both Dry and Wet contacts up to 60Volts.

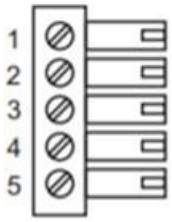
- Dry contact is isolated from a voltage source (or “No Volt”), with an embedded relay function (NPN transistor), usually used to indicate an event. For example: open/close, alarm.
- Wet contact is a contact with external power (+3.3V to +60V, max 150mA of current allowed at high voltage) applied, usually used to energize something. For example: solenoid, light.

The following graphic shows the connector.

Note Digital I/O is only supported on IOS-XE version 16.12.1 and above.

Note The default state of the Digital I/O is input, the open-collector is open (off).

Figure 8: Digital I/O connector



The pinouts for the Digital I/O are described in the following table.

Table 4: Digital I/O Pinouts

Pin #	Name	Direction	Description
1	DIO1	I/O	Digital IO 1
2	DIO2	I/O	Digital IO 2
3	DIO3	I/O	Digital IO 3
4	DIO4	I/O	Digital IO 4
5	Return	Return	Digital IO Common Return

Digital Input and Output Specifications are described in the following tables.

Digital Input Specification is considered “dry contact”, and Digital Output Specification is considered “wet contact”.

Table 5: Digital Input Specification

Specification	Minimum	Maximum	Unit
Input Voltage High	2.2	60	Volts
Input Voltage Low	—	1.2	Volts
Input Current	—	0.68mA **Note1**	uA

Note Current is flowing out of the terminal although it is an input, i.e. sourcing. The current is flowing in the terminal for the output, i.e. sinking.

Table 6: Digital Output Specification

Specification	Minimum	Maximum	Unit	Notes
Output Voltage High	2.5		Volts	No external voltage applied.
Output Voltage Low	—	0.4	Volts	No external voltage applied.
Internal Pull-up Resistance	3.3K – 1%	3.3K – 1%	Ohms	—
Internal Pull-up Voltage	—	3	Volts	—
External Pull-up Voltage	3.3	60	Volts	External resistance required to limit current to 200mA.
Sink Current	—	200	mA	—

Common features of the Digital I/O are:

- Withstands up to 60V applied at the terminal.
- Reverse voltage protected and causes no damage to the equipment.
- Digital input and output can coexist on different channel.
- LED Indicator: provision-able, On: Active, Off: Non-active.
- Electrical isolation: 2000 VDC.
- 4kV Surge protected (IEC 61000-4-5).

IR-1100-SPMI Expansion Module LEDs

There are 6 LEDs in the Expansion Module. Four LEDs show the status of digital input and output. One LED shows the SFP port status and one LED shows the mSATA status. The LED behavior is shown in the following table.

Table 7: Expansion Module LEDs

LED	Definition
Digital I/O as Input	Off - Inactive Solid Yellow- Active
Digital I/O as Output	Off - Inactive Solid Yellow- Active

LED	Definition
SFP	Off - No Link Solid Yellow - Port link with no activity Flashing Yellow - Port link healthy with activity
mSATA	Off - Not powered on or no activity Flashing Green - mSATA being accessed

Cisco IR-1100-SP Expansion Module

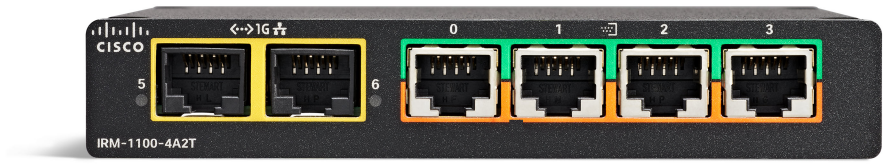
The IR-1100-SP Expansion Module is the same as the IR-1100-SPMI module, without the Digital I/O and mSATA components.

The following lists the hardware platform features for the Cisco IR-1100-SP:

- 1 GE SFP (see the supported list of SFP's here: SFP Module, page 26)
- 1 Pluggable slot

Cisco IRM-1100-4A2T Expansion Module

The IRM-1100-4A2T is an expansion module that can be attached to the IR1101. It offers an additional four asynchronous serial ports and two Ethernet interfaces to the IR1101. The following graphic shows the IRM-1100-4A2T.



The IRM-1100-4A2T Ethernet interfaces are Layer 2 RJ45 10/100/1000 Mbps ports.

The IRM-1100-4A2T serial ports are RJ45 combo ports (RS232/RS485/RS422).

The IR1101 has two sides that expansion modules mount to. The top is called the Expansion side, and the bottom is called the Compute side. If the additional module is connected to the top, then it is referenced as the Expansion Module (EM) side. If the additional module is connected on the bottom, then it is referenced as the Compute Module (CM) side. Functionality differs depending on which side the expansion module is attached to, and how many and type of expansion modules are in use.

Note For more information, see the IRM-1100-4A2T Expansion Module Installation, on page 91 section.

The IRM-1100-4A2T can be managed from the following tools:

- Cisco DNA Center
- WebUI

Router Switch Path

The switch path that is detected on the platform, is based on the type of additional module connected on the Expansion module (EM) side. Refer to the following table:

Additional Module	Switch Path
No Module Connected	IR1101-ES-5
IRM-1100-SPMI	IR1101-ES-6S
IRM-IR1100-4A2T	IR1101-ES-7G

Note When an IRM-IR1100-4A2T is connected on both sides of the IR1101-K9, there is a maximum of nine Async interfaces which can be enumerated. The switch path for the IR1101-K9 will be IR1101-ES-7G.

Serial Port Pinouts and Characteristics

The serial ports are intended as a DCE port, capable of both RS232 and RS485. RS485 can support full or half duplex.

The RJ45 pinouts are shown in the following figure and table:

Figure 9: Pinouts

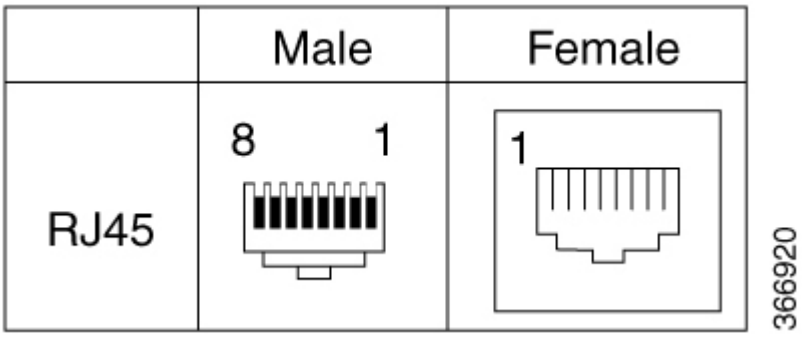


Table 8: Serial Port Characteristics

RS232					RS485 Full Duplex		RS485 Half Duplex	
Pin #	Signal Description	Abbr.	S0 (DTE)	S1 (DCE)	Signal	DIR	Signal	Direction
1	DCE ready. Used as DSR in Cisco IOS.	DSR/RI	Input	Output	TX-	Output	TX/RX+	<->

RS232					RS485 Full Duplex		RS485 Half Duplex	
Pin #	Signal Description	Abbr.	S0 (DTE)	S1 (DCE)	Signal	DIR	Signal	Direction
2	Received Line Signal Detector	DCD	Input	Output	TX+	Output	TX/RX-	<->
3	DTE Ready	DTR	Output	Input	RX-	Input	—	—
4	Signal Ground	COM	—	—	COM	—	COM	—
5	Received Data	RxD	Input	Output	—	—	—	—
6	Transmitted Data	TxD	Output	Input	RX+	Input	—	—
7	Clear To Send	CTS	Input	Output	—	—	—	—
8	Request To Send	RTS	Output	Input	—	—	—	—

Front Panel Icons and LEDs

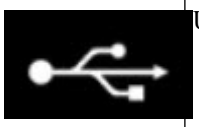
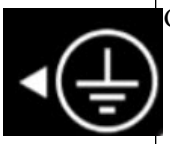
The IR1100 Series uses icons to show the different features of the device. The following two tables provide details.

Table 9: Icons with LEDs

Icon	Description/Activity	Icon	Description/Activity
	System - Power and System Status. Off — No power Green Steady on — Normal operation Green Flashing — Boot up phase or in ROM Monitor mode Amber Steady on — Power is OK but possible internal failure		Alarm - Alarm Input Status Off — Normal operation Red - Alarm State on the Alarm Input
	VPN Off — No VPN tunnel Steady Green — At least one VPN tunnel is up		Red, Green, and Blue User Configurable LED
	Gigabit Ethernet Combo Port Off — No Link Solid Green — Copper Link up, no activity Flashing Green — Copper Link up, with activity Solid Amber — SFP Link up, no activity Flashing Amber — SFP Link up, with activity		RJ45 Fast Ethernet Ports -Link Status 0:1 Off — No link Steady Green — Link is up Flashing — Transmitting and Receiving data

Icon	Description/Activity	Icon	Description/Activity
	mSATA Storage Off - Not powered on or no activityFlashing Green - mSATA being accessed		Digital I/O Off - InactiveSolid Yellow- Active

Table 10: Icons only

Icon	Description	Icon	Description
	USB 2.0 Console Mini-B Connector		USB 2.0 Type A Port for Storage and Networking
	Grounding point (located on side of device)		Reset Button
	DC Power Input (12V to 48V)		DC Power Return
	Alarm Return		Alarm IN
	Serial Ports		Warning
	Expansion Module (Top or Left side)		Expansion Module (Bottom or Right side)

Memory

The Cisco IR1101 uses flash memory and main memory. The flash memory contains the Cisco OS software image and the boot flash contains the ROMMON boot code. The memory includes:

- 4 GB DRAM (soldered down)

- 4 GB onboard flash memory

Reset Button

The Reset button resets the router configuration to the default configuration set by the factory. To restore the router configuration to the default configuration set by the factory, use a standard size #1 paper clip with wire gauge 0.033 inch or smaller and simultaneously press the reset button while applying power to the router.

Supported Cisco Antennas and Antenna Accessories

The IR1101 must have a Pluggable Module with antenna ports installed in order to connect antennas. The base unit does not have any wireless capabilities on its own.

The Antenna Selection and Installation, on page 123 chapter lists the supported Antennas and Accessories for the Cisco IR1101 with a wireless Pluggable Module. For detailed information about Cisco Antennas for the Industrial Routers, please refer to the following guide:

Cisco Industrial Routers and Industrial Wireless Access Points Antenna Guide

Modem Support

The Cisco IR1101 wireless Pluggable Module uses the Sierra Wireless series modems. The software download page can be found here:

https://software.cisco.com/download/navigator.html?mdfid=286288566&flowid=76082

The following tables provide the technology details for the modems.

Table 11: Modem Technology Supported

SKU ID	Modem Used	Description	Technology Supported
P-LTE-VZ	WP7601-G	U.S. (Verizon) Single Micro SIM	LTE CAT4: B4, B13
P-LTE-US	WP7603-G	North America (AT&T) Dual Micro SIM	LTE CAT4:B2,B4,B5,B12 3G UMTS DC-HSPA+, HSPA+, HSPA, WCDMA: B2,B4, B5
P-LTE-JN	WP7605-G	Japan	LTE CAT4: B1, B3, B8, B11, B18, B19, B21 3G UMTS HSPA+
P-LTE-GB	WP7607-G	Europe Dual Micro SIM	LTE CAT4: B1,B3, B7, B8, B20, B28 3G UMTS DC-HSPA+, HSPA+, HSPA, WCDMA GPRS/EDGE: 900/1800

SKU ID	Modem Used	Description	Technology Supported
P-LTE-IN	WP7608-G	India and China	LTE CAT4: B1, B3, B5, B8, B40, B41* 3G UMTS DC-HSPA+ * B41 supported frequency range: (2535–2655 MHz)
P-LTE-MNA	WP7610-G	North America	LTE CAT4: B2, B4, B5, B12, B13, B14, B17, B66 3G UMTS DC-HSPA+, HSPA+, HSPA, WCDMA
P-LTEA-LA	EM7430	APAC	Multimode LTE 3.0 for carriers that operate FDD LTE 700-MHz (band 28), 850-MHz (band 5 CLR), 850-MHz (bands 18 and 19 Low), 900-MHz (band 8), 1500-MHz (band 21), 1800-MHz (band 3), 2100-MHz (band 1), or 2600-MHz (band 7) networks; the multimode Cisco LTE Advanced 3.0 NIMs are backward-compatible with UMTS and DC-HSPA+: 800 MHz (band 19 Japan), 850 MHz (band 5), 850 MHz (band 6 Japan), 900 MHz (band 8), 1800 MHz (band 9), 2100 MHz (band 1), and TD-SCDMA 39. Multimode LTE Advanced 3.0 for carriers that operate TDD LTE 1900 MHz (band 39), 2300 MHz (band 40), 2500 MHz (band 41), or 2600 MHz (band 38). Multimode LTE Advanced 3.0 for carrier aggregation band combinations: 1+(8,18,19,21); 3+(5,7,19,28); 7+(5,7,28); 19+21, 38+38, 39+39, 40+40, and 41+41.

SKU ID	Modem Used	Description	Technology Supported
P-LTEA-EA	EM7455	USA, Canada, Europe, Latin America	Multimode LTE Advanced 3.0 for carriers that operate FDD LTE 700-MHz (band 12), 700-MHz (band 29), 800-MHz (band 20), 850-MHz (band 5 CLR), 850-MHz (bands 26 Low), 900-MHz (band 8), 1800-MHz (band 3), 1900-MHz (band 2), 1900-MHz (PCS band 25), 1700-MHz and 2100-MHz (band 4 AWS), 2100-MHz (band 1), 2300-MHz (band 30), or 2600-MHz (band 7) networks. The multimode Cisco LTE Advanced 3.0 NIMs are backward compatible with Universal Mobile Telecommunications Service (UMTS) and Dual-Carrier High-Speed Packet Access Plus (DC-HSPA+): 850-MHz (band 5), 900-MHz (band 8), 1800-MHz (band 3), 1900-MHz (band 2), 1700-MHz and 2100-MHz (band 4 AWS), and 2100-MHz (band 1). Multimode LTE Advanced 3.0 for carriers that operate TDD LTE 2500-MHz (band 41). Multimode LTE Advanced 3.0 for carrier aggregation band combinations: 1+8; 2+(2,5,12,13,29); 3+(7,20); 4+(4,5,12,13,29); 7+(7,20); 12+30, 5+30, and 41+41.
P-LTEAP18-GL, Cisco LTE Advanced Pro Pluggable 3GPP Category 18 **Note** Supported only in the IR1101 Base Unit. Not supported in the IRM-1100 Expansion Module. **Note** GNSS is not supported on the CAT18 module.	LM960AP18	United States, Europe, Canada, Japan, Australia and New Zealand.	LTE bands 1-5, 7, 8, 12-14, 17, 18-20, 25, 26, 28-30, 32, 38-43, 46, 48, 66, and 71. FDD LTE 600 MHz (band 71), 700 MHz (bands 12, 13, 14, 17, 28, and 29), 800 MHz (band 20), 850 MHz (bands 5, 18, 19, and 26), 900 MHz (band 8), 1500 MHz (band 32), 1700 MHz (bands 4 and 66), 1800 MHz (band 3), 1900 MHz (bands 2 and 25), 2100 MHz (band 1), 2300 MHz (band 30), 2600 MHz (band 7). TDD LTE 1900 MHz (band 39), 2300 MHz (band 40), 2500 MHz (band 41), 2600 MHz (band 38), 3500 MHz (bands 42 and 48), 3700 MHz (band 43), 5200 MHz (band 46).
P-LTEA7-NA	EM7411	North America	LTE CAT 7: B2, B4, B5, B7, B12, B13, B14, B25, B26, B41, B42, B43, B48, B66, B71 3G UMTS, WCDMA: B2, B4, B5

SKU ID	Modem Used	Description	Technology Supported
P-LTEA7-EAL	EM7421	Canada, Europe, Latin America, US	LTE CAT 7: B1, B3, B7, B8, B20, B28, B32, B38, B40, B41, B42, B43 3G UMTS, WCDMA: B1, B5, B8
P-LTEA7-JP	EM7431	Japan	LTE CAT 7: B1, B3, B5, B8, B18, B19, B39, B41, B42, B43 3G UMTS, WCDMA: B1, B5, B6, B19
P-5GS6-R16SA	EM9293	United States, Europe, Canada, Japan, Australia and New Zealand.	5G FR1 NR: n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n70, n71, n75, n76, n77, n78, n79 LTE bands: FDD LTE: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18,B19, B20, B25, B26, B28, B29,B30, B32, B66, and B71 TDD LTE: B34, B38, B39, B40, B41, B42, B43, B46, B48 3G UMTS, WCDMA: B1, B2, B4, B5, B8

Table 12: GNSS Technology Support

Technology	RF Band	Receive (Rx) Band MHz	Support
GNSS	GPS	1575.42 +/- 1.023	Supported
	GLONASS	1597.52 - 1605.92	Not Supported
	Galileo	1575.42 +/- 2.046	Not Supported
	BeiDou	1561.098 +/- 2.046	Not Supported

Power Supply

The Cisco IR1101 comes with an external DC power connector. The 4-pin power entry connector (receptacle) is mounted to the unit. The 4-pin power entry mating connector (plug) is attached to the receptacle. It is removed during installation and used to connect to the DC power source, then reattached to provide power to the unit.

Note The IR1101 may be connected to a Non-Cisco external power source provided that source meets the following requirements:

- 9.6V to 60V DC input range
- 12V/24V/48V (+/-20%) are the nominal voltages
- Minimum 3A current

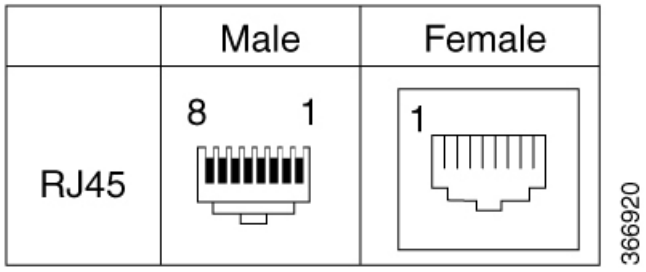
Connecting to a power supply is covered in Connecting to DC Power, on page 128

RJ45 Ports

The IR1101 supports one **ISOLATED** RS232 port which conforms to EIA-561 standard.

The RJ45 pinouts are shown in the following graphic.

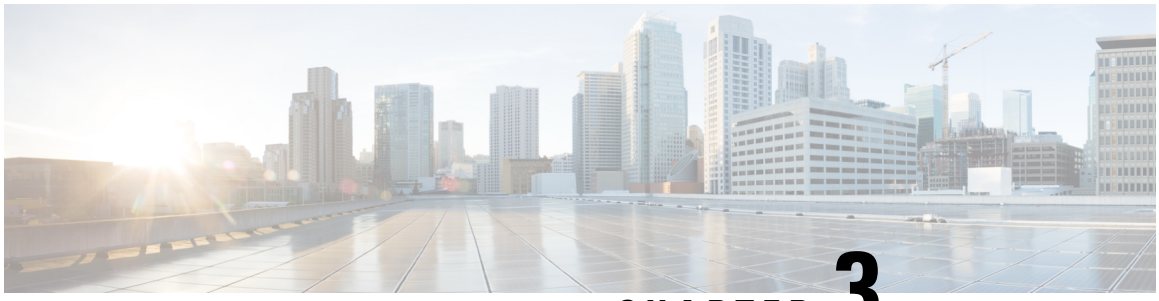
Figure 10: S0 Characteristics



The RS232 port is a DTE and its pin out is shown in the following table.

Table 13: S0 Details

Pin Number	Description	Abbreviation	DTE
1	DCE Ready, Ring Indicator	DSR/RI	<—
2	Received Line Signal Detector	DCD	<—
3	DTE Ready	DTR	—>
4	Signal Ground	COM	
5	Received Data	RxD	<—
6	Transmitted Data	TxD	—>
7	Clear To Send	CTS	<—
8	Request To Send	RTS	—>



CHAPTER 3

Installing the Router

This section contains the following:

- Overview, on page 29
- Equipment, Tools, and Connections, on page 30
- Items Shipped with your Router, on page 30
- Additional Items Needed, on page 31
- Ethernet Devices, on page 31
- Installing the Router, on page 31
- Grounding Warning, on page 32
- Mounting on a Wall, Table, or Other Flat Surface, on page 32
- Installing a Pluggable Module, on page 35
- Installing the Router Ground Connection, on page 40
- Installing a DIN Rail, on page 42

Overview

This chapter describes the equipment and the procedures for successfully installing the Cisco IR1101 Base Router. There is a separate section for installing the IR1101 with an Expansion Module.

Caution Do not install the router or power supplies next to a heat source of any kind, including heating vents.

Caution Online Insertion and Removal (OIR) is not supported on the IR1101 or any of its modules. If a module is inserted or pulled out while the device is powered up, it may damage the device.

Warning Read the installation instructions before connecting the system to the power source. **Statement 1004**

Warning Only trained and qualified personnel should be allowed to install, replace, or service this equipment. **Statement 1030**

Warning Ultimate disposal of this product should be handled according to all national laws and regulations. **Statement 1040**

Warning Do not locate the antenna near overhead power lines or other electric light or power circuits, or where it can come into contact with such circuits. When installing the antenna, take extreme care not to come into contact with such circuits, because they may cause serious injury or death. For proper installation and grounding of the antenna, please refer to national and local codes (for example, U.S.:NFPA 70, National Electrical Code, Article 810, Canada: Canadian Electrical Code, Section 54). **Statement 1052**

Warning No user-serviceable parts inside. Do not open. **Statement 1073**

Warning This product is not intended to be directly connected to the Cable Distribution System. Additional regulatory compliance and legal requirements may apply for direct connection to the Cable Distribution System. This product may connect to the Cable Distribution System ONLY through a device that is approved for direct connection. **Statement 1078**

Warning A minimum of 1 inch clearance is required on all sides of the device except for the side mounted against the wall/floor or DIN rail. Stacking heat-dissipating objects on top of the router is not allowed. I/O side clearance is needed as it is required to access the cable connections. Clearance is required to attach, mount the DIN rail bracket, and Wall mount bracket.

Equipment, Tools, and Connections

This section describes the equipment, tools, and connections necessary for installing your Cisco IR1101.

Note There are no antennas shipped with the IR1101. They must be ordered separately.

Items Shipped with your Router

Unpack the box and verify that all items listed on the invoice were shipped with the Cisco IR1101.

The following items are shipped with your router:

- Getting Started/Product Document of Compliance
- Grounding Lug Kit

- Power Connector

Additional Items Needed

The following items are not shipped with the router but are required for installation:

- ESD-preventive cord and wrist strap.
- Wire crimper for chassis grounding.
- Wire for connecting the chassis to an earth ground.
- Ethernet cables for connecting to the Fast Ethernet (FE) WAN and LAN ports
- A flathead 2mm screwdriver
- A flathead 3.5mm screwdriver
- A number 1 Phillips screwdriver
- A number 2 Phillips screwdriver



Note Use the #2 Phillips screwdriver for all screw installations unless specified otherwise.

Ethernet Devices

Identify the Ethernet devices that you will connect to the router. Ensure that each device has a network interface card (NIC) for connecting to Ethernet ports.

Installing the Router

This section describes how to install the Cisco IR1101. This router can be installed in the following ways:

- Table top
- Flat horizontal surface
- Mounted on a wall
- Using a DIN rail

Grounding Warning

Warning For NEC-compliant grounding, use size 16awg (1.5mm2) or larger copper wire and a ring terminal with an inner diameter of 1/4 in. (6 to 7mm).

Mounting on a Wall, Table, or Other Flat Surface

The Cisco IR1101 can be mounted in a vertical or horizontal orientation. It can be mounted to a wall or other flat surface, and can also be mounted to a DIN rail.

Note See the Overview, on page 29 section for limitations on mounting with an expansion module attached.

Tip When choosing a location for wall-mounting a router, consider cable limitations and wall structure, and consider suitable antenna location ahead of time.

Warning Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system. **Statement 378**

Warning A minimum of 1 inch clearance is required on all sides of the device except for the side mounted against the wall/floor or DIN rail, to allow for proper air flow.

The wall mounting kit contains the following:

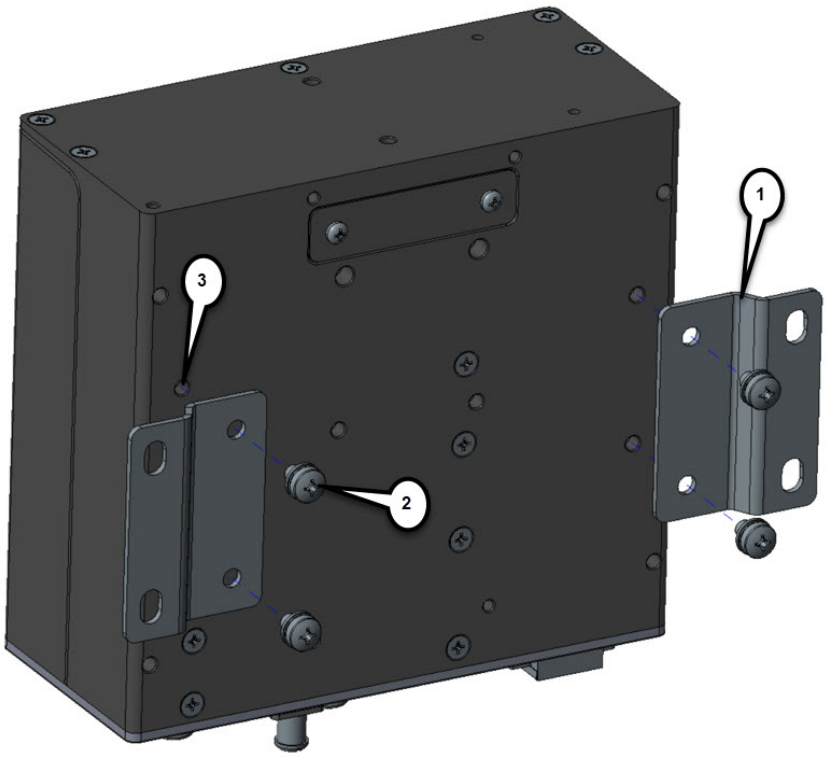
- Mounting brackets (x2)
- Mounting screws (x4) M4 x 6mm

To mount the router on a wall or other flat surface, follow these steps:

Procedure

Step 1 Attach the mounting brackets to the bottom of the router. Refer to the following for guidance.

Figure 11: Cisco IR1101 Mounting Bracket

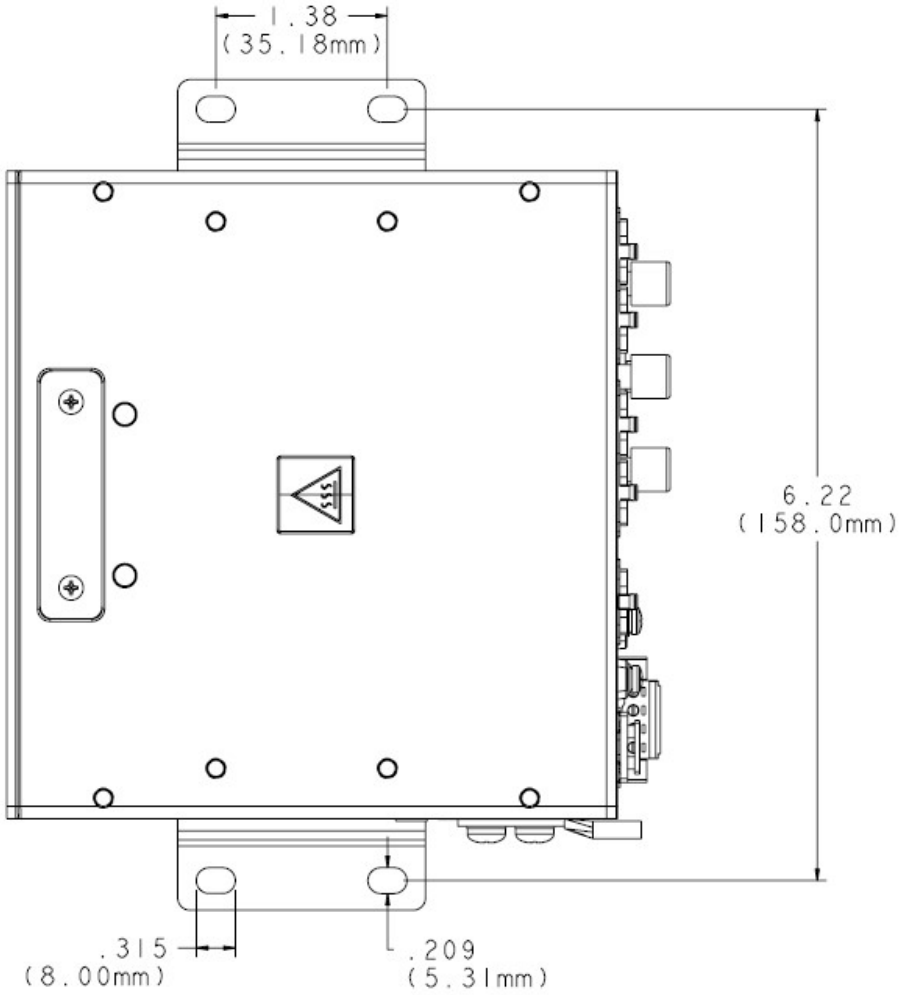


Step 2 Align the mounting brackets (**1**) over the mounting holes (**3**) so that the larger holes on the brackets extend out over the router.

Step 3 Attach the brackets to the router with the four screws (**2**) provided using a Phillips head driver. Torque to 13-15 in. lbs.

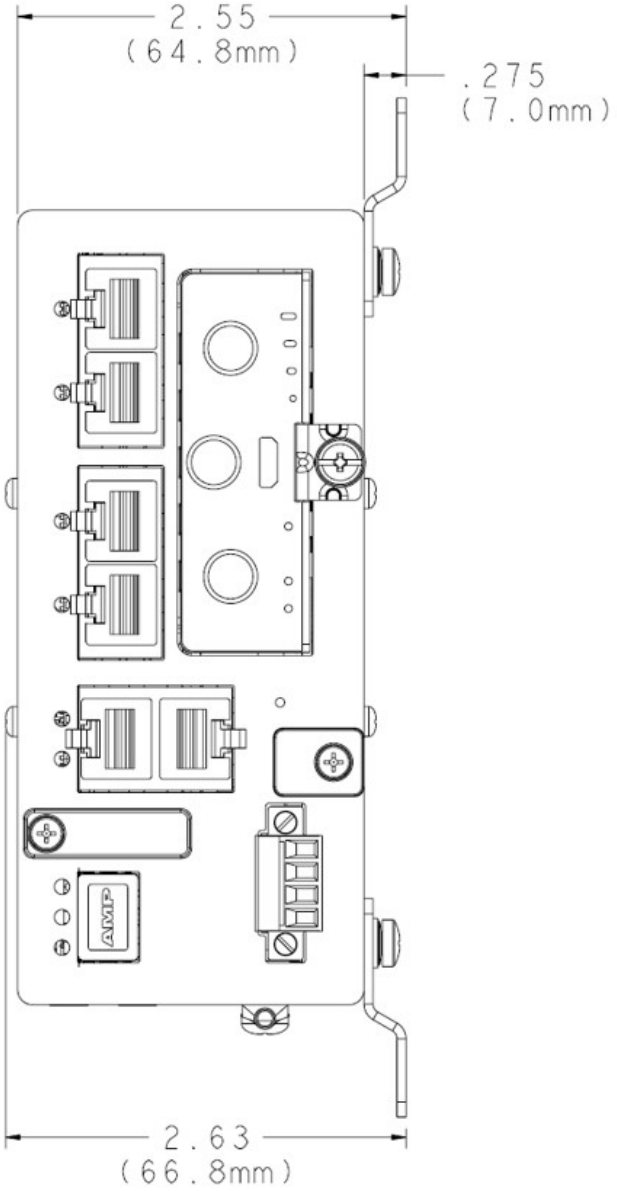
Step 4 Mount the router with the attached brackets in a proper wall structure to carry the weight of the device. See the following for the dimensions of the mounting holes with the brackets attached to the router

Figure 12: Wall/Floor mounting hole dimensions with mounting brackets attached



Note
Four #10-32 screws are recommended when mounting the unit with these brackets attached to the neighboring surface.

Figure 13: Wall/Floor mounting clearance and overall dimensions with mounting brackets attached



Step 5 Route the cables so that they do not put a strain on the connectors or mounting hardware.

Installing a Pluggable Module

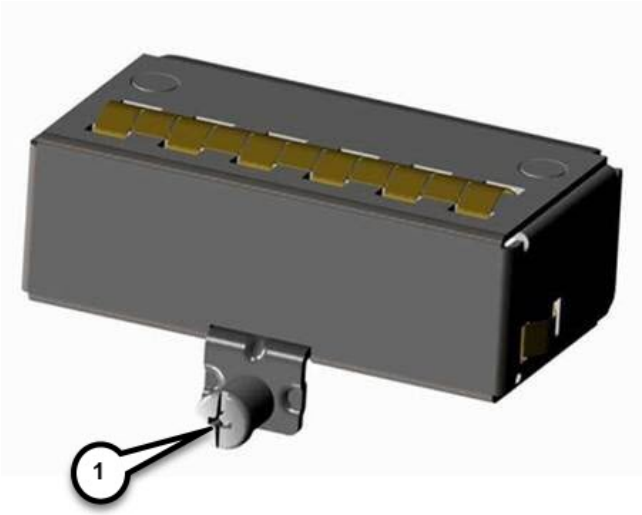
The Pluggable Module provides the IR1101 with a number of different configuration options. In this section the modular cellular modem Pluggable Module remove and replace option is shown.

The IR1101 may have a blank plate covering the Pluggable Module slot. This will need to be removed prior to installing the cellular modem module. The following example shows the LTE Pluggable Module.

Procedure

Step 1 Remove the blank plate by unscrewing the latch lock screw(**1**) that holds the plate secure. Refer to the following figure.

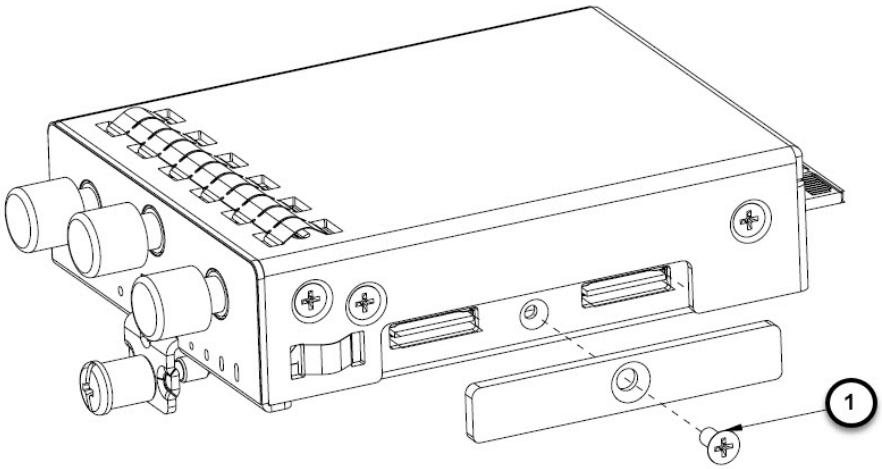
Figure 14: Latch Lock Screw



Step 2 Slide the blank plate out of the device.

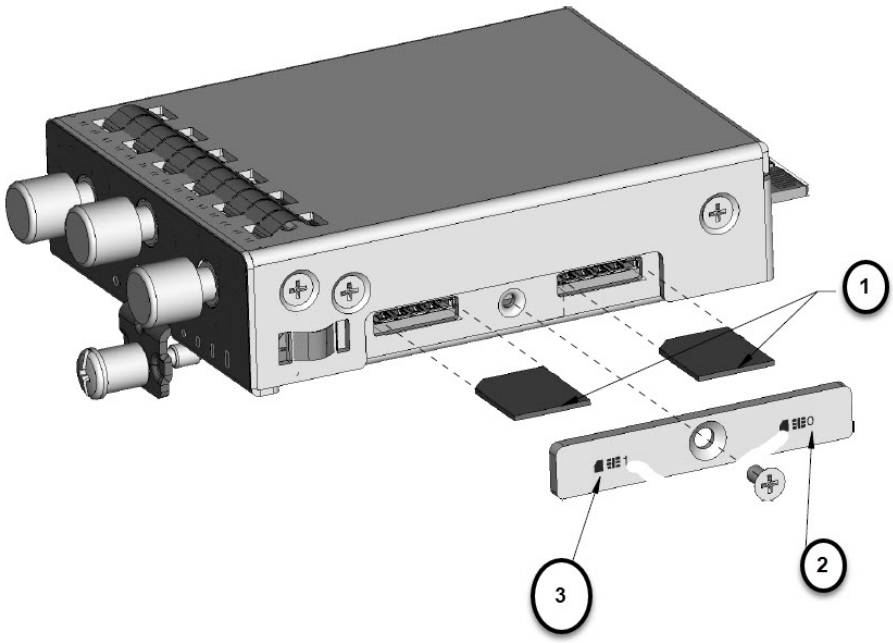
Step 3 Prepare the cellular modem module by inserting the micro sims applicable for your modems into the device. Remove the screw (**1**) holding the access plate in place that covers the sim slots. Use a #1 Phillips screw driver. The access plate is located on the side of the module, as shown in the following:

Figure 15: Sim Access Plate Removal



Step 4 Install your sims as shown in the following. Make note of the proper slot number and sim orientation.

Figure 16: Sim Installation



Item	Description
1	Micro SIMs
2	SIM 0 (towards the device)
3	SIM 1 (away from device)

Step 5 Push in each SIM until it clicks into place. When the SIMs are installed, re-attach the access plate previously removed with a #1 Phillips screwdriver. Torque to 2.8 to 3.8 inch-lbs (0.9-1.1 newton meter).

Note
Ensure the cover is properly aligned with the screw hole.

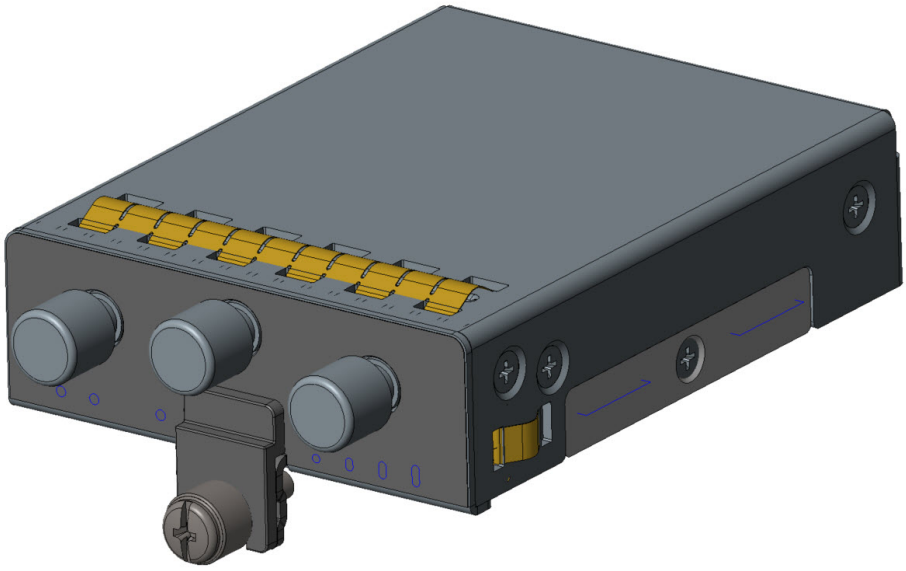
Step 6 If your Pluggable Module is the type that has a USB port, make sure that the USB cover is properly installed. Place the USB cover (**1**) with the plug indentation against the USB port (**2**). The half circle of the USB cover fits behind the latch lock screw. Refer to the following.

Figure 17: USB Port Cover Installation



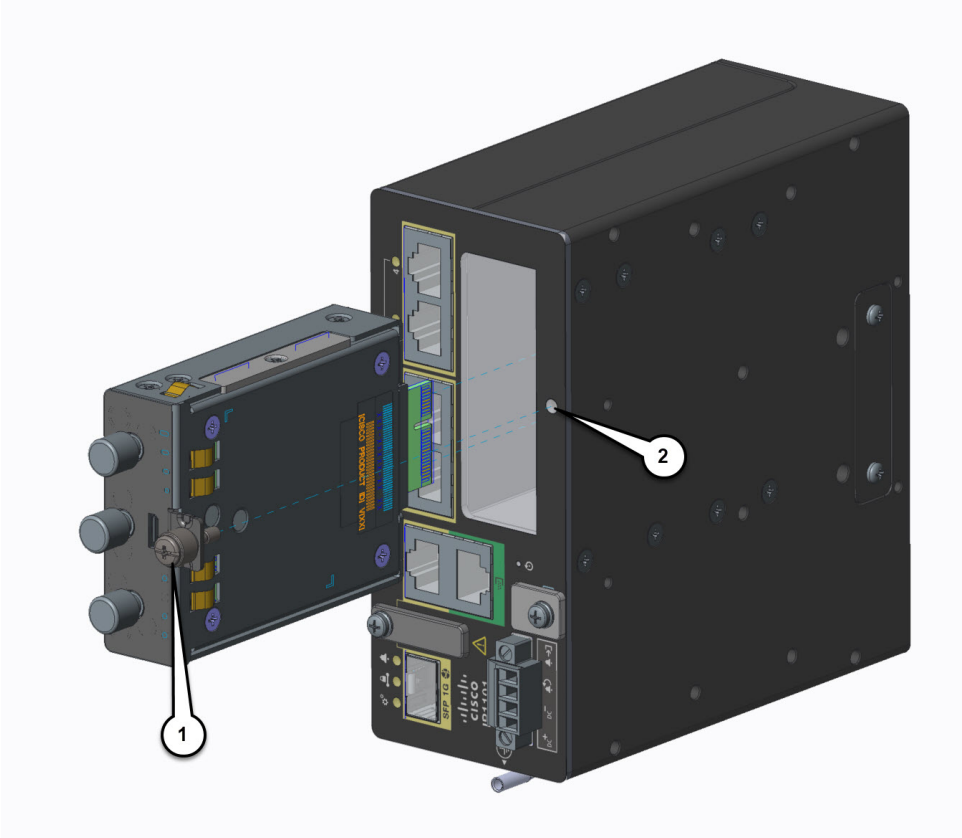
Step 7 Tighten the latch lock screw to a torque of 2.8 to 3.8 inch-lbs (0.3 to 0.4 newton meter). Refer to the following for a finished USB cover installation.

Figure 18: USB Cover Finished Installation



Step 8 Slide the Pluggable Module into the device as shown in the following. The latch lock screw (**1**) aligns with the screw hole (**2**) on the front of the device. Push the Pluggable Module all the way into the device until you feel it seat, and then torque the latch lock screw 8-10 inch-pound (0.9 to 1.1 newton meter).

Figure 19: Pluggable Module Insert



Step 9 Attach your antennas to the ports on the pluggable module. There are different instructions for each antenna type, be sure to consult the antenna documentation for proper orientation and torque to install them.

Step 10 If no antennas are being installed on a port, make sure the caps are installed on the connector.

Installing the Router Ground Connection

The router must be connected to a reliable earth ground. Install the ground wire in accordance with local electrical safety standards. There are separate grounding points on the Base IR1101 and the Expansion Module.

- For NEC-compliant grounding, use size 16 awg (1.5mm2) or larger copper wire and a ring terminal with an inner diameter of 1/4 in. (6 to 7mm).
- For EN/IEC 60950-compliant grounding, use size 18 awg (1 mm2) or larger copper wire.

Warning This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. **Statement 1024**

Caution Cable distribution system should be grounded (earthed) in accordance with ANSI/NFPA 70, the National Electrical Code (NEC), in particular Section 820.93, Grounding of Outer Conductive Shield of a Coaxial Cable.

To install the ground connection, follow these steps:

Procedure

Step 1 Locate the grounding lug (**1**) attached to the side of the Cisco IR1101. It will be attached underneath two screws. Remove the screws holding it to the router and set it aside for reuse.

Step 2 Strip one end of the ground wire to the length required for the terminal.

Step 3 Crimp the ground wire to the grounding lug using the wire crimper.

Step 4 Attach the grounding lug (**1**) to the chassis using the screws set aside in step 1. Tighten the screw to a torque of 8 to 10 inch-pound (0.9 to 1.1 newton meter). Refer to the following figure.

Figure 20: Chassis Ground Connection Points



Step 5 Connect the other end of the ground wire to a known reliable earth ground point at your site.

Step 6 If you are using this router in a vehicle, attach the ring terminal to the chassis using one of the screws provided and the green or green and yellow striped wire. Connect the other end of the wire to the vehicle ground.

What to do next

After you install and properly ground the router, you can connect the power wiring, the LAN cables, and the cables for administrative access as required for your installation.

Installing a DIN Rail

The DIN Rail kit is ordered separately.

Note The DIN Rail can be installed on the Base IR1101 in two different orientations, horizontally and vertically. If the Base IR1101 has an Expansion Module attached, horizontal DIN mounting is not supported.

Warning A minimum of 1 inch clearance is required on all sides of the device except for the side mounted against the wall/floor or DIN rail, to allow for proper air flow.

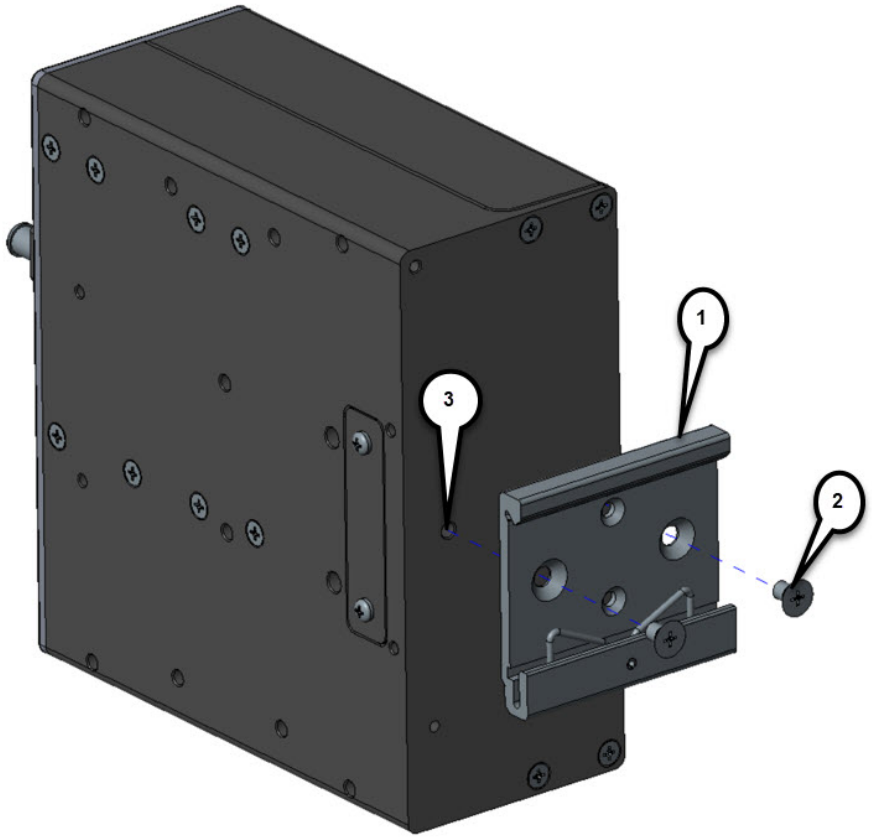
To attach the DIN rail bracket to the Cisco IR1101, follow these steps.

Mounting the DIN Rail Bracket on the Router

Procedure

Step 1 First, attach the DIN rail bracket to the back of the router. The DIN rail bracket mounts in two different ways, depending on the orientation you wish to use. See the following two figures for vertical orientation, and for horizontal orientation.

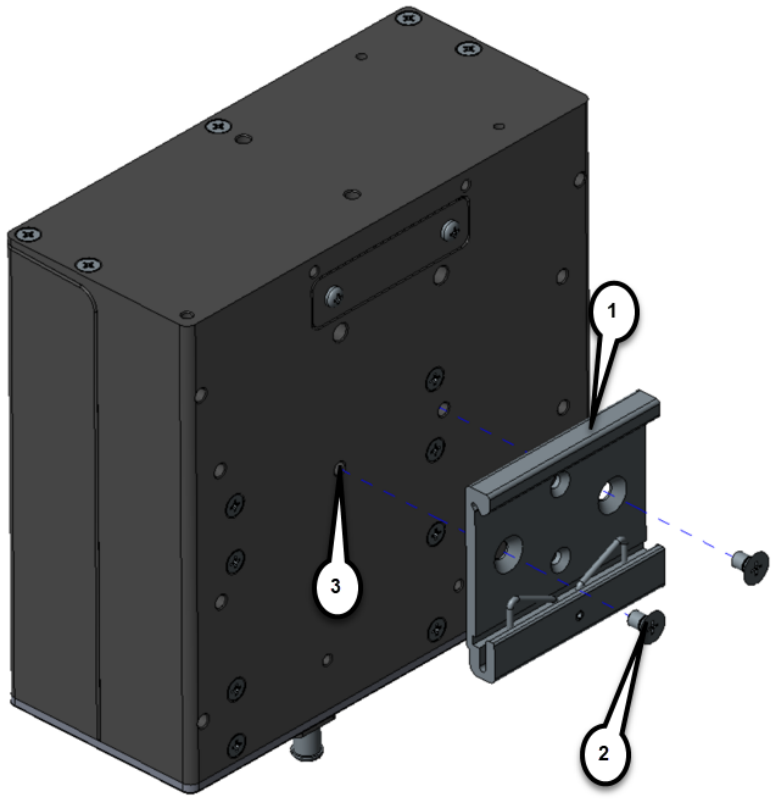
Figure 21: Attaching the DIN Rail Bracket for vertical mounting



1	DIN mounting bracket
2	Screws from kit
3	Mounting holes

Note
Position the router with the ground lug facing down for vertical mounting.

Figure 22: Attaching the DIN Rail Bracket for horizontal mounting



1	DIN mounting bracket
2	Screws from kit
3	Mounting holes

Note
Position the router with the front ports facing down for horizontal mounting.

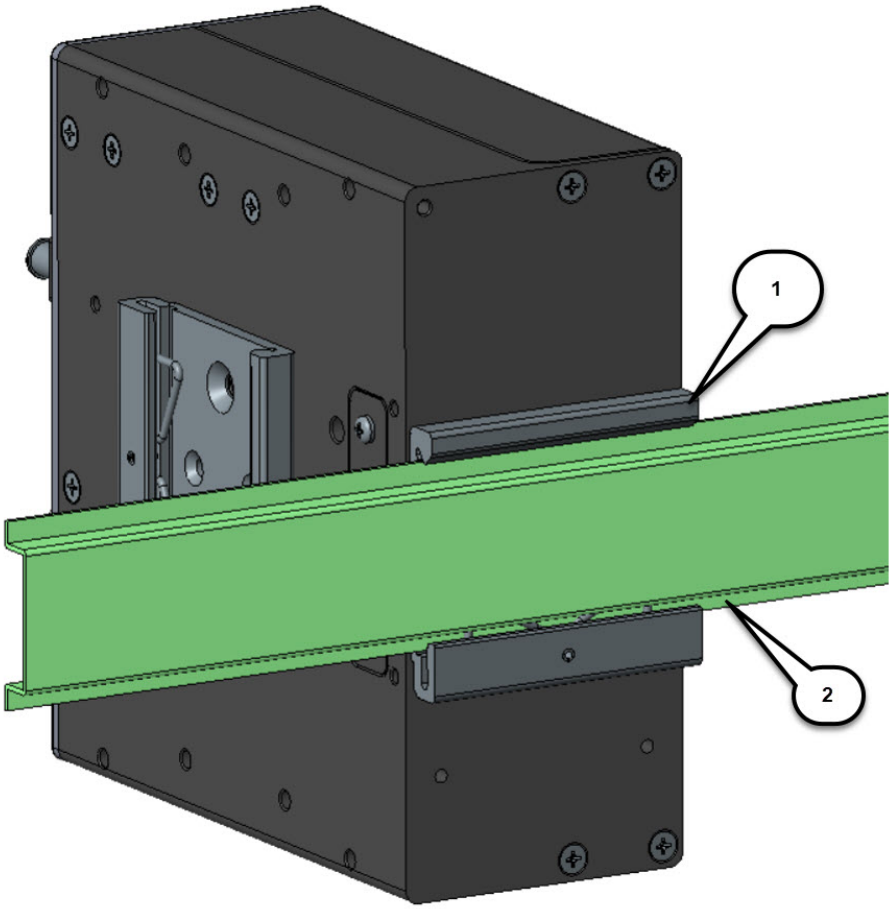
Step 2 Attach the DIN mounting bracket to the router using the two screws provided in the kit. Position the bracket over the two mounting holes that correspond to your orientation. Use 13-15 in. lbs. of torque to screw the bracket onto the router.

Step 3 Once the bracket is attached to the router, it can be mounted onto the DIN Rail.

Attaching the Bracket onto the DIN Rail

To attach the Cisco IR1101 with the bracket to a DIN rail, follow these steps. Refer to the following figure for details of a completed attachment.

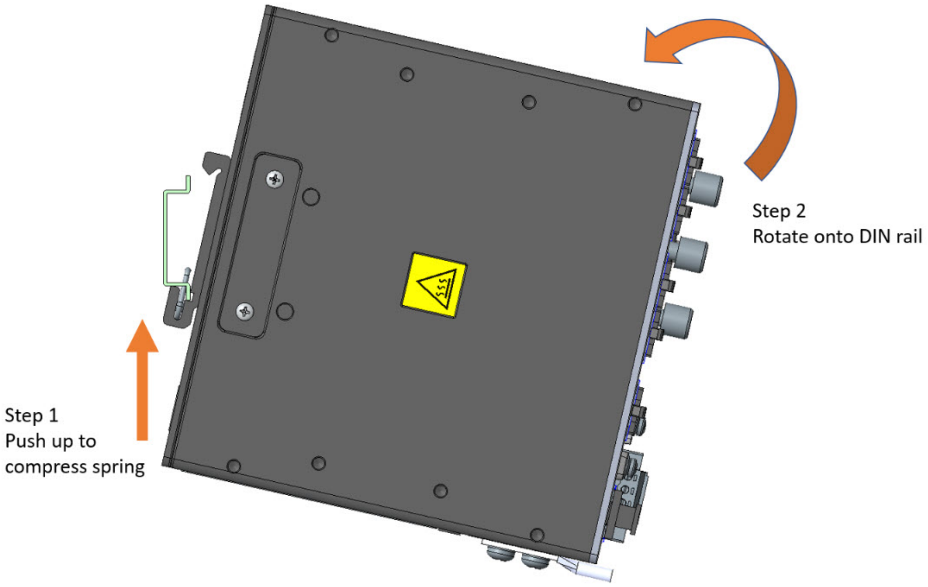
Figure 23: Bracket Attached to the DIN Rail



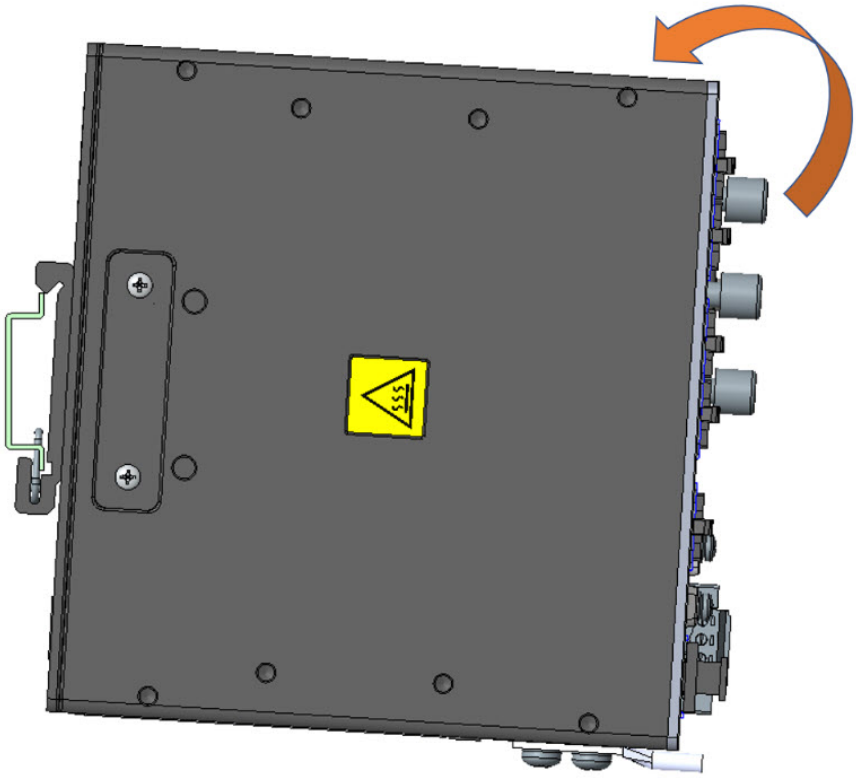
1	DIN rail bracket
2	DIN rail

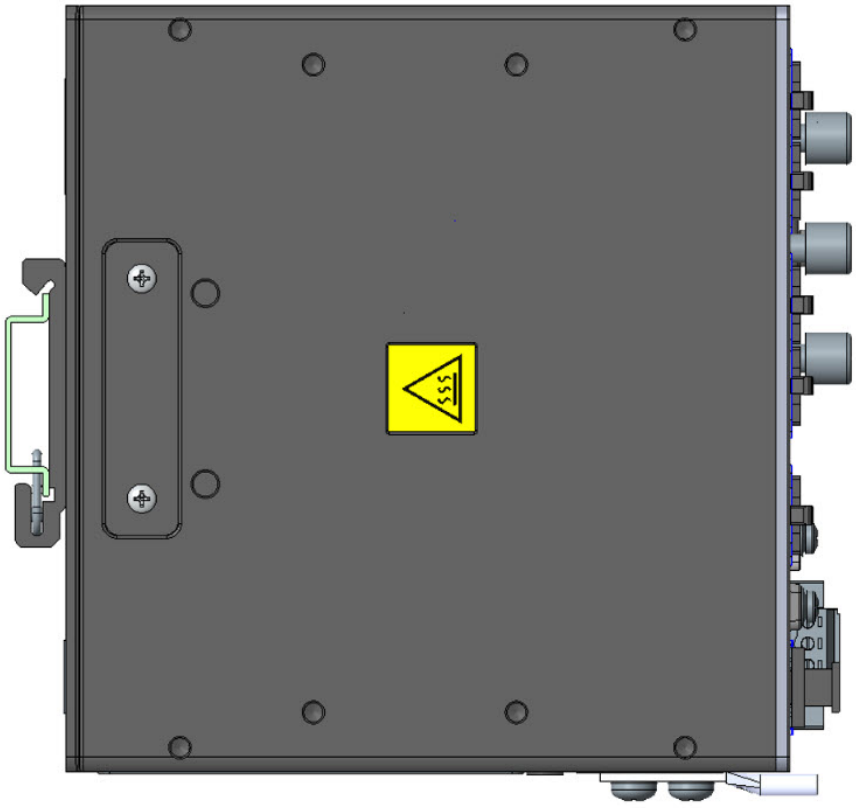
Procedure

Step 1 Position the router so that the lower edge and spring of the DIN clip, located within the bottom of the DIN rail bracket, engages with the bottom section of the DIN rail. Push up to compress the spring.



Step 2 Rotate the router so that the top hook of the DIN clip clamps to the top section of DIN rail. Refer to the following figures.





What to do next

Note The procedure to attach the unit to the rail is the same with both orientations.

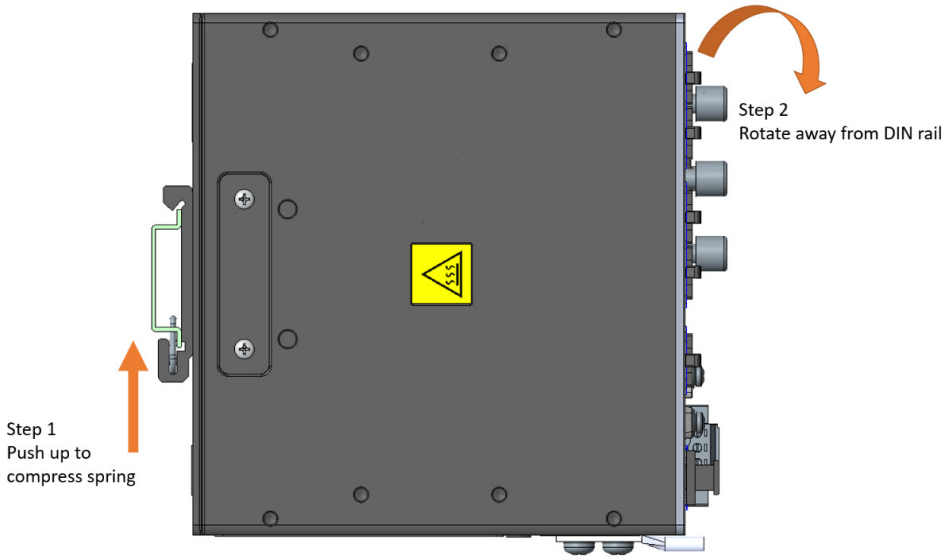
Note In order to prevent excessive side to side movement of the unit it is advised to install DIN rail stop plates such as Mouser part Numbers 653-PFP-M, 651-1201662 or 845-CA402. These stop plates can be installed on one or both sides of the unit to limit excessive side to side movement that typically occurs in high vibration environments.

Removing the Router from the DIN Rail

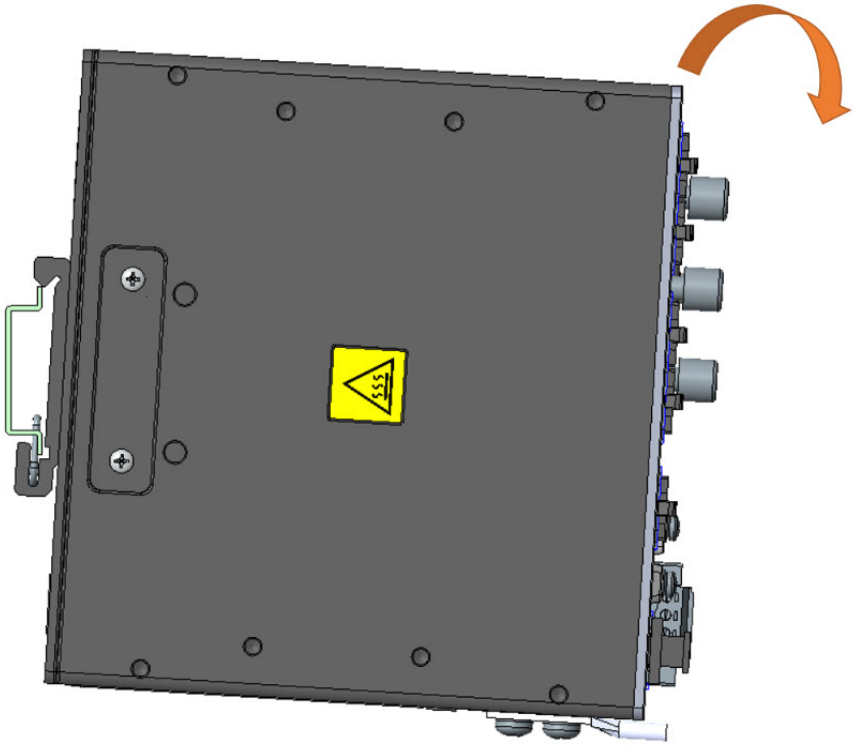
To remove the Cisco IR1101 with the bracket from the DIN rail, follow these steps.

Procedure

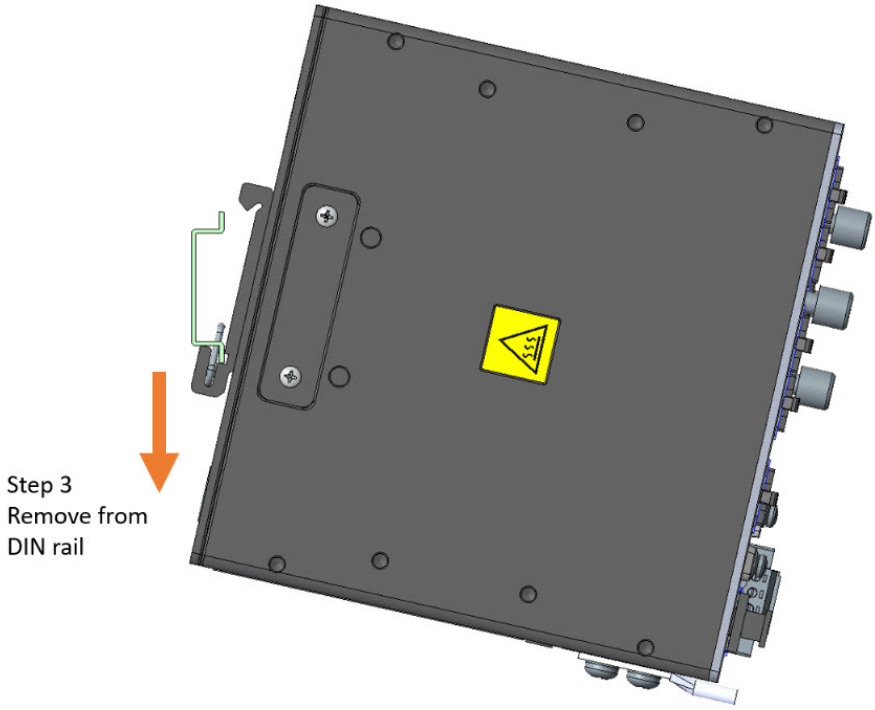
Step 1 Press up on the router to compress the spring in the DIN rail clip.

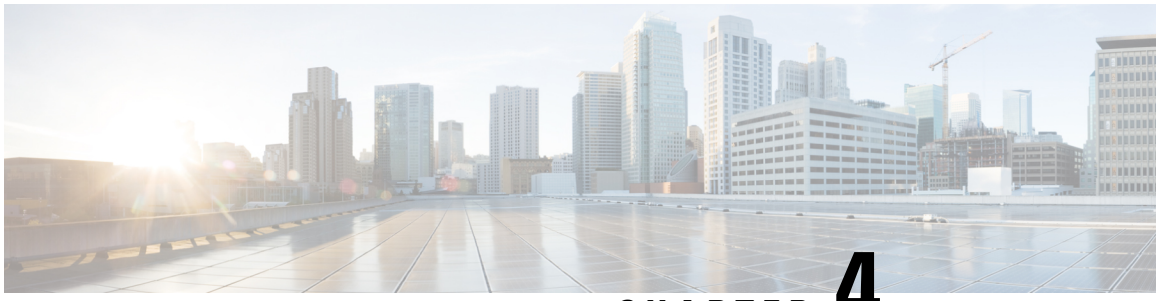


Step 2 Grasp the upper part of the router and rotate it away from the DIN rail. Refer to the following figure.



Step 3 Lower the router away from the DIN rail and remove it. Refer to the following figure.





CHAPTER 4

Pluggable Modules

The following subsections provide details on the different modules that can be plugged into the IR1100 Series Routers.

- Cisco Pluggable Modules, on page 51
- Cellular Pluggable Module, on page 51
- LTE Category 18 Pluggable Module, on page 52
- 5G Sub-6 GHz Support on IoT Routing, on page 54
- P-LTE-450 Interface LTE 450 MHz category 4 Pluggable Module, on page 54
- mSATA Module, on page 55
- Ethernet and Optical SFP Modules, on page 56
- DSL SFP Module, on page 57

Cisco Pluggable Modules

The Pluggable Module provides the flexibility of adding different interfaces to the IR1101 platform, for example, a cellular module.

Important The Pluggable Module is not hot swappable. The router must be reloaded after a new module is installed.

Cellular Pluggable Module

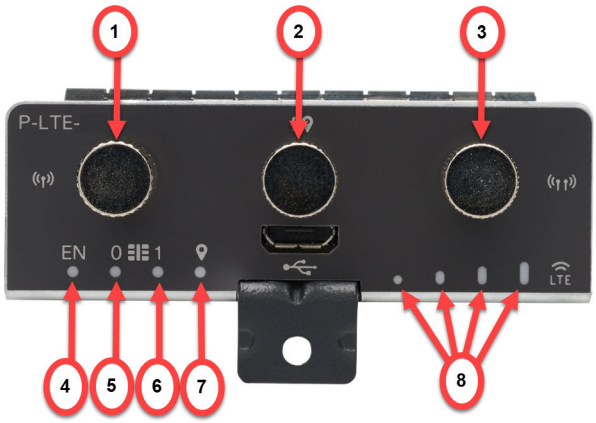
Highlights of the Cellular Pluggable Module are:

- All Cellular interfaces are supported through a Pluggable Module
- Micro-Sim, 3FF size. Cisco recommends Industrial Temp micro SIMs that are rated from -40C to +105C
- To ensure a reliable contact to the SIM socket, gold plated SIM cards must be used

Note Complete details on the Cellular Pluggable Module are found in the Cellular Pluggable Interface Module Configuration Guide.

The following figure shows an example of a Pluggable Module. In this case, the LTE Pluggable Module.

Figure 24: LTE Pluggable Module (front)



Item	Description
1	Cellular-Main SMA
2	GPS SMA
3	Cellular-Div SMA
4	Enable LED
5	SIM 0 LED
6	SIM 1 LED
7	GPS LED
8	RSSI LEDs

LTE Category 18 Pluggable Module

This module has a new smaller form factor SMA Diversity Antenna for usability and Micro-USB port access.

Note The P-LTEAP18-G pluggable module must be installed in the IR1101 Base. It cannot be used in the IRM-1100 Expansion Module.

Figure 25: P-LTEAP18-GL

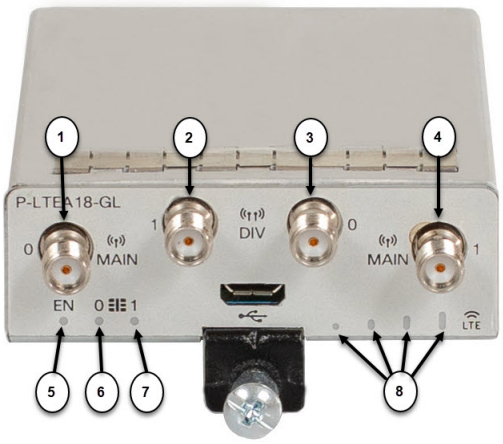


Table 14:

Item	Description
1	Main 0 Antenna
2	Diversity 1 Antenna
3	Diversity 0 Antenna
4	Main 1 Antenna
5	Enable LED
6	SIM 0 LED
7	SIM 1 LED
8	RSSI LEDs

P-LTEAP18-GL Frequency Bands

The following table provides the global frequency bands available.

Note Antennas must be attached to the RF connectors as listed below for proper bands service.

Item	Description
MAIN 0 and DIV 0	B1, B2(B25), B3, B4(B66), B5(B26,B18,B19), B8, B12(B17), B13, B14, B20, B28, B29, B39, B71, B41
MAIN 1 and DIV 1	B7, B30, B32, B38, B40, B41, B42, B46, B48, B2(B25)

5G Sub-6 GHz Support on IoT Routing

The 5G Sub-6 GHz Pluggable Interface Modules offer 5G capability to the IoT Industrial Router family. The product IDs for the pluggable modules are P-5GS6-GL and P-5GS6-R16SA-GL. The P-5GS6-GL uses the FN980 Telit modem, and P-5GS6-R16SA-GL uses the EM9293 modem.

Note

- IOS XE release 17.7.1 is the first software release to provide support for the P-5GS6-GL.
- IOS XE release 17.15.1a is the first software release to provide support for the P-5GS6-R16SA-GL.

Features and Limitations

The following features and limitations apply across all IoT routing platforms unless specifically mentioned:

- IoT routing platforms support a maximum of two pluggable modules, with a combination of 5G and 4G PIMs.
- The pluggable module can be started or stopped through the CLI under exec mode. Also, it can be configured to power off the module to reduce power consumption as needed.
- The capability to disable FDD Band 30 for vehicular applications is available.

The following are product specific:

- On the IR1101 with P-5GS6-GL module:
  - When plugged into the base, the module is accessible via Cellular 0/1/0, 0/1/1.
  - The module is not supported on the expansion module.
- On the IR1101 with the P-5GS6-R16SA-GL module:
  - The module is software and hardware supported on both, base and expansion module.
- On the IR1800
  - The cellular modems are accessible via Cellular 0/4/0, 0/4/1, 0/5/0, 0/5/1.

P-LTE-450 Interface LTE 450 MHz category 4 Pluggable Module

The P-LTE-450 is a 450MHz Category-4 LTE PIM, which addresses LTE use cases primarily targeting utility, public safety, and critical infrastructure maintained by public organizations in Europe and other world regions. The module supports only Band 31 and 72 for LTE 450MHz networks.

Note Throughout the user documentation, you will see the module referred to as P-LTE-450, which is the Cisco product name. The module is designed and manufactured by Intelliport, which refers to it as the IPS-701. Both names will be present in documentation.

Unlike regular LTE modules, there are some differences with regards to the P-LTE-450MHz on IOS-XE platform. Some of the key differences are:

- IP pass through will be on Gigabit Ethernet interfaces rather than cellular interface
- Troubleshooting commands are from web interface of third-party hardware

See the Cellular Pluggable Interface Module Configuration Guide for complete details.

For additional information, see the LTE 450MHz Alliance.

mSATA Module

Mini-SATA, or mSATA, is a low-profile interface connector that enables more effective Serial ATA (SATA) integration in small form-factor drives roughly the size of a business card, such as solid state disks (SSDs). The mSATA Pluggable Module plugs into the IR-1100-SPMI Expansion Module. The following figure shows the mSATA Pluggable Module.

Figure 26: mSATA Pluggable Module



Highlights of the mSATA Pluggable Module are:

- Provides an additional 100GB of additional flash memory storage
- Main purpose is to provide space to store application data for IOx

- Field Replaceable unit, but is not hot-swappable

Ethernet and Optical SFP Modules

The Ethernet and Optical SFP modules provide connections to other devices. These field-replaceable transceiver modules provide the uplink interfaces. The Ethernet and Optical modules can be either copper or optical. Details are in the two tables listed below.

The Local Connectors (LCs) provide the fiber-optic connection. RJ-45 connectors allow copper connections. You can use any combination of the supported SFP modules listed in the table that follows.



Note The IR1101 is designed to operate in the Industrial temperature range (-40C to +85C internal component temperature range) and therefore cannot support commercial rated SFPs.

Table 15: Supported Gigabit SFPs

GE SFP	Distance	Fiber	Commercial 0C to +70C	Extended -5C to +85C	Industrial -40C to +85C	DOM
GLC-SX-MM-RGD	220-550 m	MMF			YES	
GLC-LX-SM-RGD	550m/10 km	MMF/SMF			YES	
GLC-ZX-SM-RGD	70 km	SMF			YES	YES
GLC-BX40-DA-I	40 km	SMF			YES	YES
GLC-BX40-U-I	40 km	SMF			YES	YES
GLC-BX80-D-I	80 km	SMF			YES	YES
GLC-BX80-U-I	80 km	SMF			YES	YES
SFP-GE-S	220-550 m	MMF		YES		YES
SFP-GE-L	550 m/10 km	MMF/SMF		YES		YES
SFP-GE-Z	70 km	SMF		YES		YES

Table 16: Supported FE SFPs

FE SFP	Distance	Fiber	Commercial 0C ~ +70C	Extended -5C ~ +85C	Industrial -40C ~ +85C	DOM
GLC-FE-100FX-RGD	2 km	MMF			YES	

FE SFP	Distance	Fiber	Commercial 0C ~ +70C	Extended -5C ~ +85C	Industrial -40C ~ +85C	DOM
GLC-FE-100LX-RGD	10 km	SMF			YES	

Table 17: Supported SFPs added in IOS XE 17.7.1

SFP	Distance	Fiber	Commercial 0C ~ +70C	Extended -5C ~ +85C	Industrial -40C ~ +85C	DOM
GLC-T-RGD	100 M	Copper			YES	
CWDM-SFP-1470	100 km	SMF	YES			YES
CWDM-SFP-1610	100 km	SMF	YES			YES
CWDM-SFP-1530	100 km	SMF	YES			YES
DWDM-SFP-3033	80 km	SMF	YES			YES
DWDM-SFP-3112	80 km	SMF	YES			YES
GLC-BX-D-I	10 km	SMF			YES	YES
GLC-BX-U-I	10 km	SMF			YES	YES
GLC-TE	100 km	Copper			YES	NO

For the most up-to-date list of supported SFP models for Cisco Industrial Devices, see the Cisco Optics-to-Device Compatibility Matrix.

DSL SFP Module

This section provides an example of installing and removing the DSL SFP module.

Attention Prior to installing the DSL SFP Module, please note the following statements:

1. Follow all of warning notices and instructions marked on the product or in the user manual.
2. Do not install telephone wiring during a lightning storm.
3. The device should be installed by a service/skilled person on stationary pluggable equipment and connected to a socked-outlet with a protective earthing conductor to building earth.
4. External paired conductor cable should be minimum wire diameter of 0.4 mm, shall have the current limited to 1.3 A.

5. Please disconnect RJ45/RJ11 line before disconnect the power supply.

The following photo shows the DSL SFP Module:



Note SFP-VADSL2+-I was evaluated to country specific regulatory requirements only. The product was not evaluated to IEC 61850-3 and IEEE1613 substation / utility standards.

Prerequisite for Installing the DSL SFP

The DSL SFP will only function on IOS-XE release 17.4.1 and above.

Due to a change in the IR1101 Faceplate, older routers are not able to use the DSL SFP. There is no viewable version on the IR1101 Faceplate, but you can determine if your router is new enough to use the DSL SFP through the **show inventory** command:

```
IR1101#show inventory
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
INFO: Please use "show license UDI" to get serial number for licensing.
++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
NAME: "Chassis", DESCR: "IR1101 Base Chassis"
PID: IR1101-K9          , VID: V05  , SN: FCW23500H5X
NAME: "Module 0 - Mother Board", DESCR: "Cisco IR1101 motherboard"
PID: IR1101-K9          , VID: V05  , SN: FOC23473SRK
NAME: "module subslot 0/0", DESCR: "IR1101-ES-5"
PID: IR1101-ES-5        , VID: V01  , SN:
NAME: "subslot 0/0 transceiver 0", DESCR: "GE T"
PID: SFP-VADSL2+-I        , VID: V01  , SN: MET2023000A
```

The IR1101 K9 VID version must be equal to, or greater than V05 as shown above.

DSL SFP Overview

The DSL SFP interface is an 8 pin modular jack. The following table shows the pin-out assignments:

Pin Number	Pin Assignment
1	Not Used
2	Not Used
3	Not Used
4	Analog Input
5	Analog Input

Pin Number	Pin Assignment
6	Not Used
7	Not Used
8	Not Used

The modular jack pin-outs are shown in the following graphics:

Figure 27: Front View

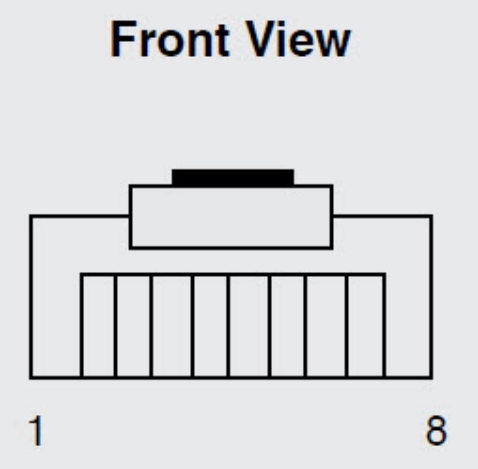
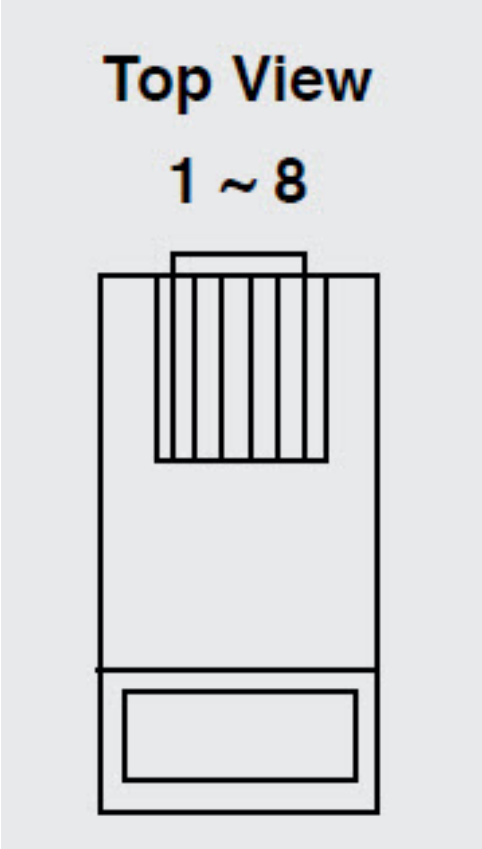
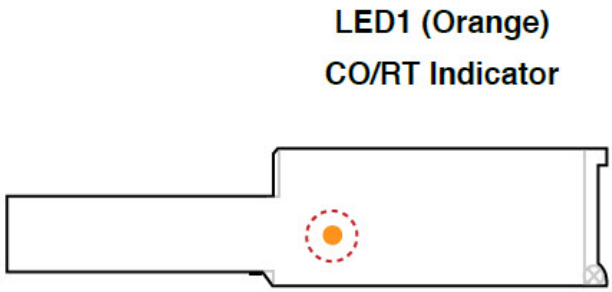


Figure 28: Top View



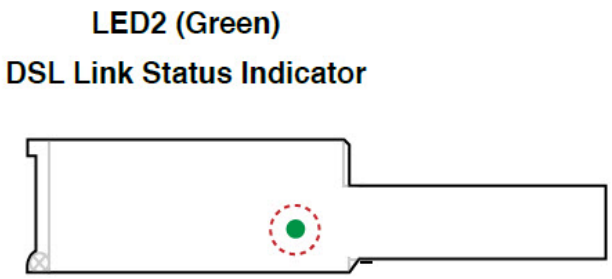
The DSL SFP has two LEDs built in. The LED positions and definitions are shown in the following:

Figure 29: LED 1



Indicator LED	State	Description
LED 1 (Orange)	On	CPE side (expected to be ON when used on an IR router)
LED 1 (Orange)	Off	Central office side (not supported)

Figure 30: LED 2



Indicator LED	State	Description
LED 2 (Green) xDSL Status LED	Off	No DSL Connection Possibly a bad cable, link, etc...
LED 2 (Green) xDSL Status LED	Slow Flash	Idle
LED 2 (Green) xDSL Status LED	Fast Flash	Training
LED 2 (Green) xDSL Status LED	Steady	Showtime
LED 2 (Green) xDSL Status LED	Extremely Rapid Flash	Packet Transmit

Installing the DSL SFP Module

Perform the following to install the module:

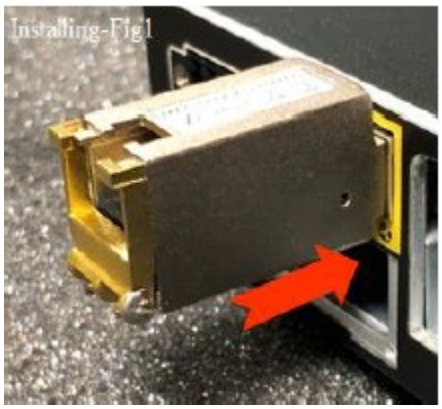
Important This section uses photos of a generic SFP and product as an illustration of proper installation and handling methods. Your completed installation will appear different.

Procedure

Step 1 Close the SFP-Pull before inserting the SFP module.

Step 2 Line up the SFP module and slide it into the cage.

Figure 31: Align SFP Module



LED 1 will turn orange as an indicator of RT. Check for physical connection. You should see LED 2 flashing green slowly as soon as you insert the device.

Step 3 Plug in the xDSL connection cable. This is only available for an RJ-45 connector.

Figure 32: xDSL Connection



Check for physical connection. You should see LED 2 flashing green slowly as soon as you insert the cable.

Link time takes about 60 seconds. Fast flashing green LED 2 indicates DSL training. LED 2 on both VDSL2 SFP Modules (CO & RT) turns solid green when the devices link up.

Removing the DSL SFP Module

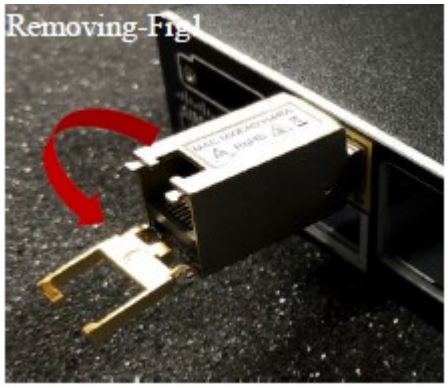
Perform the following to remove the module:

Procedure

Step 1 Remove the xDSL connection cable from the ports.

Step 2 Open the SFP-Pull with your finger and press it to the end.

Figure 33: SFP-Pull



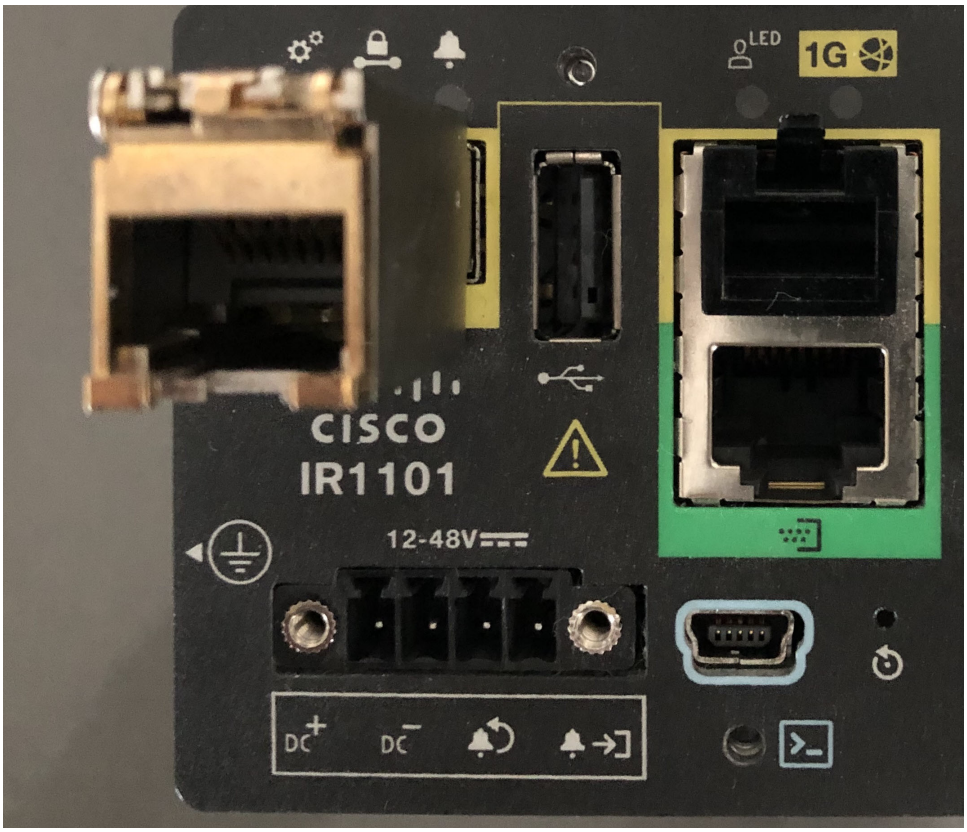
Step 3 Grasp the SFP module between your thumb and index finger, and carefully remove it from the cage. Do NOT pull on the SFP-Pull.

Figure 34: Grasp SFP Module

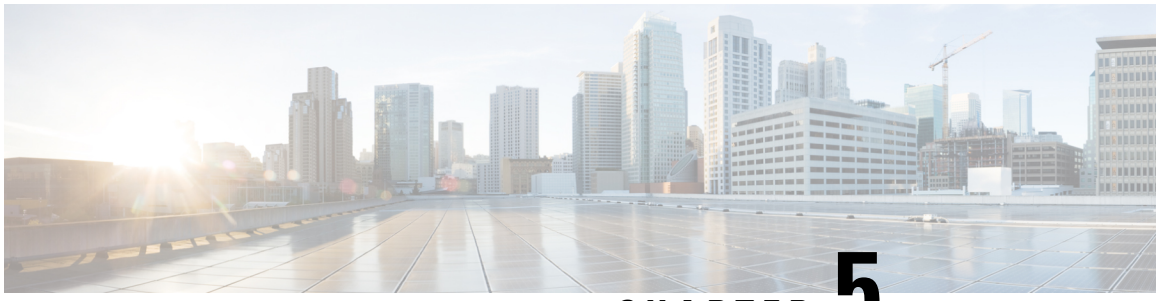


Completed Installation

The previous installation instructions illustrated handling techniques using a generic SFP. The following illustrations show a DSL SFP plugged into an IR1101.


LED
1G
CISCO
IR1101
12-48V
DC+
DC-


CISCO
IR1101
12-48V
DC+
DC-
1G
1
EN



CHAPTER 5

5G Sub-6 GHz Pluggable Interface Module

This chapter contains the following sections:

- 5G Sub-6 GHz Support on IoT Routing, on page 67
- 5G Pluggable Interface Module Overview, on page 68
- LED Behaviors, on page 69
- RF Band and Port Mapping for the P-5GS6-GL and P-5GS6-R16SA-GL Antenna, on page 70
- Attaching an Antenna, on page 73

5G Sub-6 GHz Support on IoT Routing

The 5G Sub-6 GHz Pluggable Interface Modules offer 5G capability to the IoT Industrial Router family. The product IDs for the pluggable modules are P-5GS6-GL and P-5GS6-R16SA-GL. The P-5GS6-GL uses the FN980 Telit modem, and P-5GS6-R16SA-GL uses the EM9293 modem.

Note

- IOS XE release 17.7.1 is the first software release to provide support for the P-5GS6-GL.
- IOS XE release 17.15.1a is the first software release to provide support for the P-5GS6-R16SA-GL.

Features and Limitations

The following features and limitations apply across all IoT routing platforms unless specifically mentioned:

- IoT routing platforms support a maximum of two pluggable modules, with a combination of 5G and 4G PIMs.
- The pluggable module can be started or stopped through the CLI under exec mode. Also, it can be configured to power off the module to reduce power consumption as needed.
- The capability to disable FDD Band 30 for vehicular applications is available.

The following are product specific:

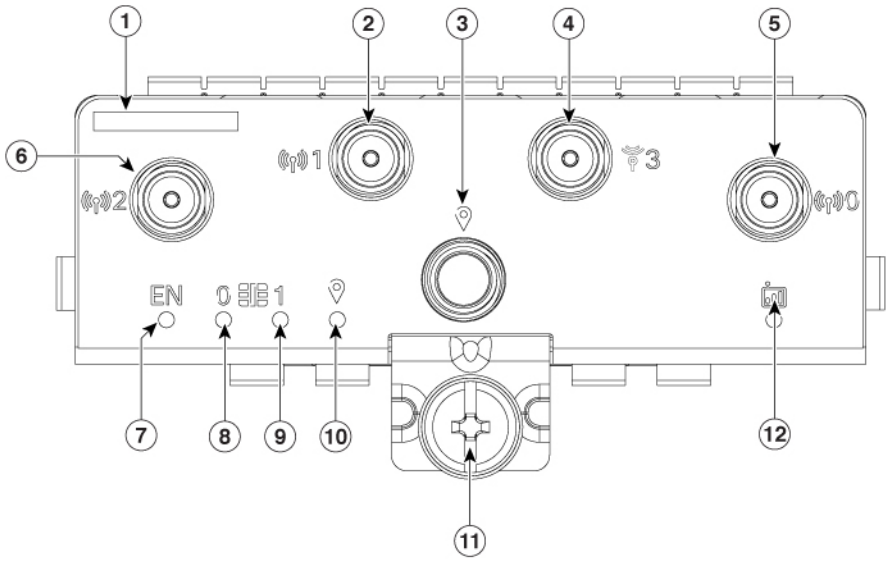
- On the IR1101 with P-5GS6-GL module:
  - When plugged into the base, the module is accessible via Cellular 0/1/0, 0/1/1.
  - The module is not supported on the expansion module.

- On the IR1101 with the P-5GS6-R16SA-GL module:
  - The module is software and hardware supported on both, base and expansion module.
- On the IR1800
  - The cellular modems are accessible via Cellular 0/4/0, 0/4/1, 0/5/0, 0/5/1.

5G Pluggable Interface Module Overview

The following figure shows the face plate of P-5GS6-GL and P-5GS6-R16SA-GL pluggable modules:

Figure 35: 5G Pluggable Interface Module - P-5GS6-GL, P-5GS6-R16SA-GL



1	The printed PID **Note** Modules P-5GS6-GL, P-5GS6-R16SA-GL share the same face plate.
2	Antenna 1 (SMA)
3	GPS (SMA)
4	Antenna 3 (SMA)
5	Antenna 0 (SMA)
6	Antenna 2 (SMA)
7	Enable LED
8	SIM 0 LED
9	SIM 1 LED

10	GPS LED
11	M3.5 thumb-screw
12	Service LED

LED Behaviors

The following table lists the LED indicators and their behavior. The LEDs provide a visual indication of the status and the currently selected services.

LED Indicators:

LED	Color	Function
EN	Green, Yellow	**Enable LED** • Pluggable enable LED • Off: System power is off • Yellow: Module power is not functioning correctly • Green: Module power is on
SIM0	Green, Yellow	**SIM0 LED/Activity** • SIM0 LED status and WWAN activity • Off: SIM0 is not installed • Yellow: SIM0 is installed, but not active • Green: SIM0 installed and active • Green Flash: LTE data activity
SIM1	Green, Yellow	**SIM1 LED/Activity** • SIM1 LED status and WWAN activity • Off: SIM1 is not installed • Yellow: SIM1 is installed, but not active • Green: SIM1 installed and active • Green Flash: LTE data activity
GPS	Green, Yellow	**GPS LED** • Off: GPS not configured • Yellow: Software defined

LED	Color	Function
		• Green: GPS configured • Green Flash: GPS acquiring (flashing done by SW)
Service	Green, Yellow, Blue	**Service Indication LED** • Yellow: 3G • Green: 4G LTE • Blue: 5G

RF Band and Port Mapping for the P-5GS6-GL and P-5GS6-R16SA-GL Antenna

The following table lists the RF band mapping for antenna ports.

RF Band Mapping for Antenna Ports:

Table 18: RF Band Mapping for P-5GS6-GL Module

Antenna Port	Technology	TX	RX
ANT 0	3G WCDMA	B1, B2, B3, B4, B5, B6, B8, B9, B19	B1, B2, B3, B4, B5, B6, B8, B9, B19
	4G LTE	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B30, B34, B38, B39, B40, B41, B66, B71	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66, B71
	5G NR FR1	n1, n2, n3, n5, n7, n8, n12, n20, n28, n38, n40, n41, n66, n71	n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n38, n40, n41, n48, n66, n71, n77, n78, n79
ANT 1	3G WCDMA	—	B1, B2, B3, B4, B5, B6, B8, B9, B19
	4G LTE	B5, B20, B42, B43, B48, B71	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66, B71
	5G NR FR1	n5, n48, n77, n78, n79	n1, n2, n3, n5, n7, n8, n12, n20, n25, n28, n38, n40, n41, n48, n66, n71, n77, n78, n79

Antenna Port	Technology	TX	RX
ANT 2	3G WCDMA	—	—
	4G LTE	B1, B2, B3, B4, B7, B41, B66	B1, B2, B3, B4, B7, B25, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66
	5G NR FR1	n1, n2, n3, n7, n25, n41, n66, n77, n78, n79	n1, n2, n3, n7, n25, n38, n40, n41, n48, n66, n77, n78, n79
ANT 3	3G WCDMA	—	—
	4G LTE	—	B1, B2, B3, B4, B7, B25, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66
	5G NR FR1	—	n1, n2, n3, n7, n25, n38, n40, n41, n48, n66, n77, n78, n79

Table 19: RF Band Mapping for P-5GS6-R16SA-GL Module

Antenna Port	Technology	TX	RX
ANT 0 (Filtered)	3G WCDMA	B1, B2, B4, B5, B8, B19	B1, B2, B4, B5, B8, B19
	4G LTE	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B32, B34, B38, B39, B40, B41, B66, B71	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B46, B48, B66, B71
	5G NR Sub-6G	n1, n2, n3, n5, n7, n8, n12, n13, n14, n17, n18, n20, n25, n26, n28, n30, (n38), n39, n40, (n41), n66, n70, n71	n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n70, n71, n75, n76, n77, n78, n79
ANT 1	3G WCDMA	—	—
	4G LTE	(B42), (B43), (B48)	B1, B2, B3, B4, B7, B25, B30, B32, B38, B39, B40, B41, B42, B43, B48, B66
	5G NR Sub-6G	(n48), (n77), (n78), (n79)	n1, n2, n3, n4, n7, n25, n30, n38, n40, n41, n48, n66, n70, n75, n76, n77, n78, n79

Antenna Port	Technology	TX	RX
ANT 2 (Filtered)	3G WCDMA	—	B1, B2, B4, B5, B8, B19
	4G LTE	(B41)	B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B42, B43, B48, B66, B71
	5G NR Sub-6G	n38, n41, (n77), (n78)	n1, n2, n3, n5, n7, n8, n12, n13, n14, n18, n20, n25, n26, n28, n29, n30, n38, n40, n41, n48, n66, n70, n71, n75, n76, n77, n78, n79
ANT 3	3G WCDMA	—	—
	4G LTE	B42, B43, B48	B1, B2, B3, B4, B7, B25, B30, B32, B38, B39, B40, B41, B42, B43, B46, B48, B66
	5G NR Sub-6G	n48, n77, n78, n79	n1, n2, n3, n4, n7, n25, n30, n38, n40, n41, n48, n66, n70, n75, n76, n77, n78, n79

Note Bands in parenthesis are used for EN-DC or CA.

Port Mappings for 5G-ANTM-0-4-B on the P-5GS6-GL and P-5GS6-R16SA-GL PIMs

The following table lists the port mappings using the 5G-ANTM-O-4-B antenna as an example, mapping to the ports on the P-5GS6-GL and P-5GS6-R16SA-GL pluggable module.

5G-ANTM-O-4-B	P-5GS6-GL, P-5GS6-R16SA-GL
MAIN 0 (LTE1)	ANT 0
MAIN 1 (LTE3)	ANT 1
DIV 0 (LTE2)	ANT 2
DIV 1 (LTE4)	ANT 3
GNSS	GPS

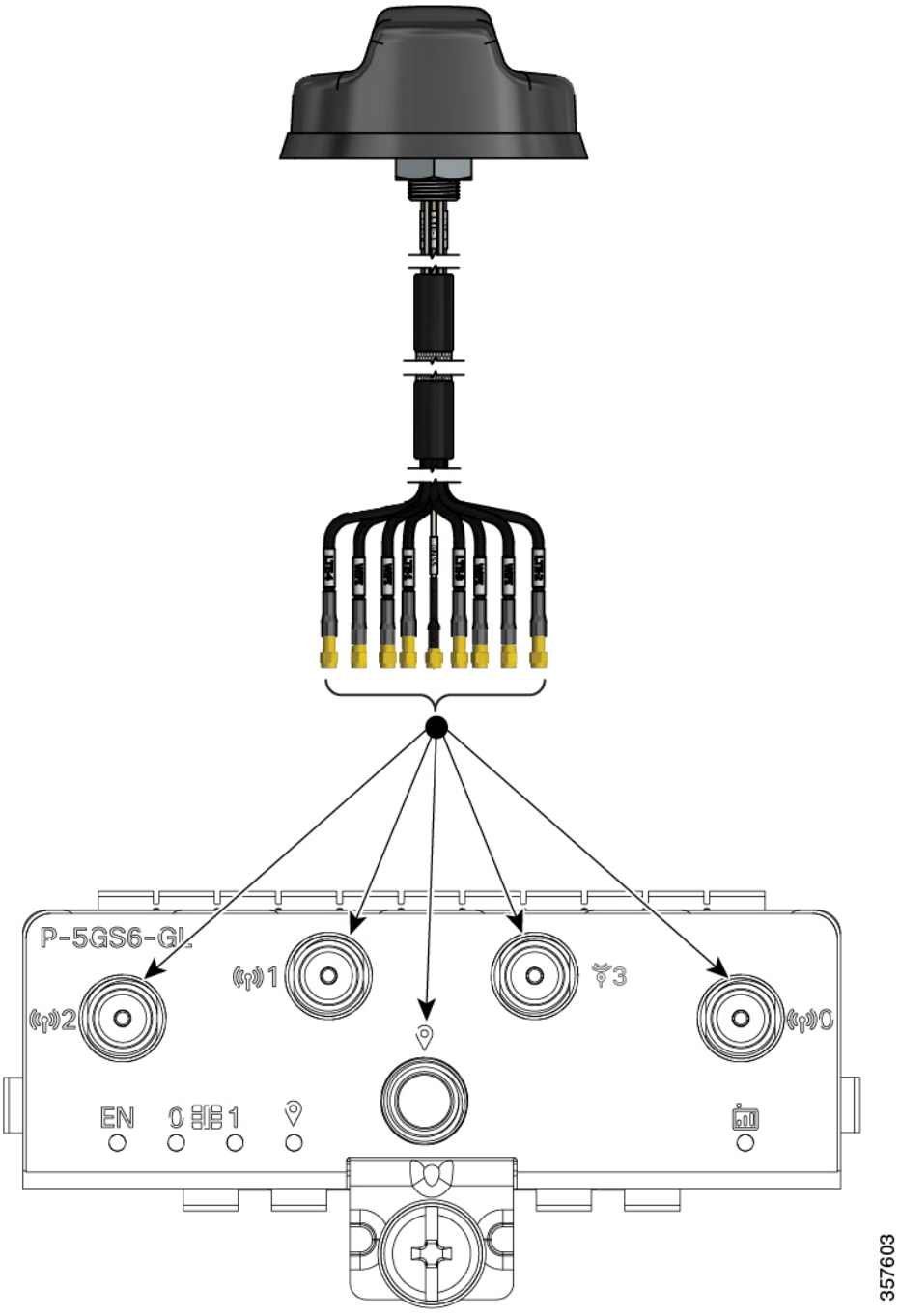
The following link contains the antenna specifications and installation instructions for 5G NR (5G-ANTM-O-4-B):

https://www.cisco.com/c/en/us/td/docs/routers/connectedgrid/antennas/installing-combined/b-cisco-industrial-routers-and-industrial-wireless-access-points-antenna-guide/m-5g-antm-04b.html#Cisco_Generic_Topic.dita_e780a6fe-fa46-4a00-bd9d-1c6a98b7bcb9

Attaching an Antenna

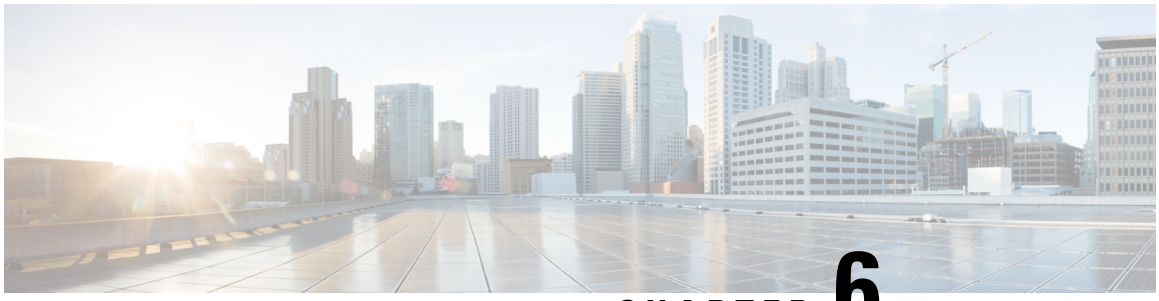
To attach the antenna in the Pluggable Interface Module, perform the below steps:

Figure 36: Attaching 5G NR Antenna (5G-ANTM-O4-B) to P-5GS6-GL, P-5GS6-R16SA-GL PIM



1. Attach each SMA cable to the ports as indicated in the table mappings.

2. Ensure that you tighten and secure each SMA cable into the SMA connector on the PIM.



CHAPTER 6

Installing the IRM-1100 Expansion Module

This section contains the following:

- IRM-1100 Expansion Module Overview, on page 75
- Items Shipped with your Expansion Module, on page 75
- Installing the Expansion Module, on page 76
- Mounting the IR1101 Router with the IRM-1100 Expansion Module Attached, on page 78
- Installing a DIN Rail, on page 82
- Pluggable Module, on page 86
- Digital I/O Connections, on page 86
- Installing the mSATA SSD, on page 88

IRM-1100 Expansion Module Overview

This chapter describes the equipment, and the procedures for successfully installing the Cisco IRM-1100 Expansion Module onto the IR1101. There are two different Expansion Modules available:

- IRM-1100-SPMI
- IRM-1100-SP

Details on both Expansion Modules can be found in the Product Overview chapter.

Items Shipped with your Expansion Module

Unpack the box and verify that all items listed on the invoice were shipped with the Cisco IRM-1100.

The following items are shipped with your Expansion Module:

- 4 mating screws to connect the IRM-1100 to the IR1101

Installing the Expansion Module

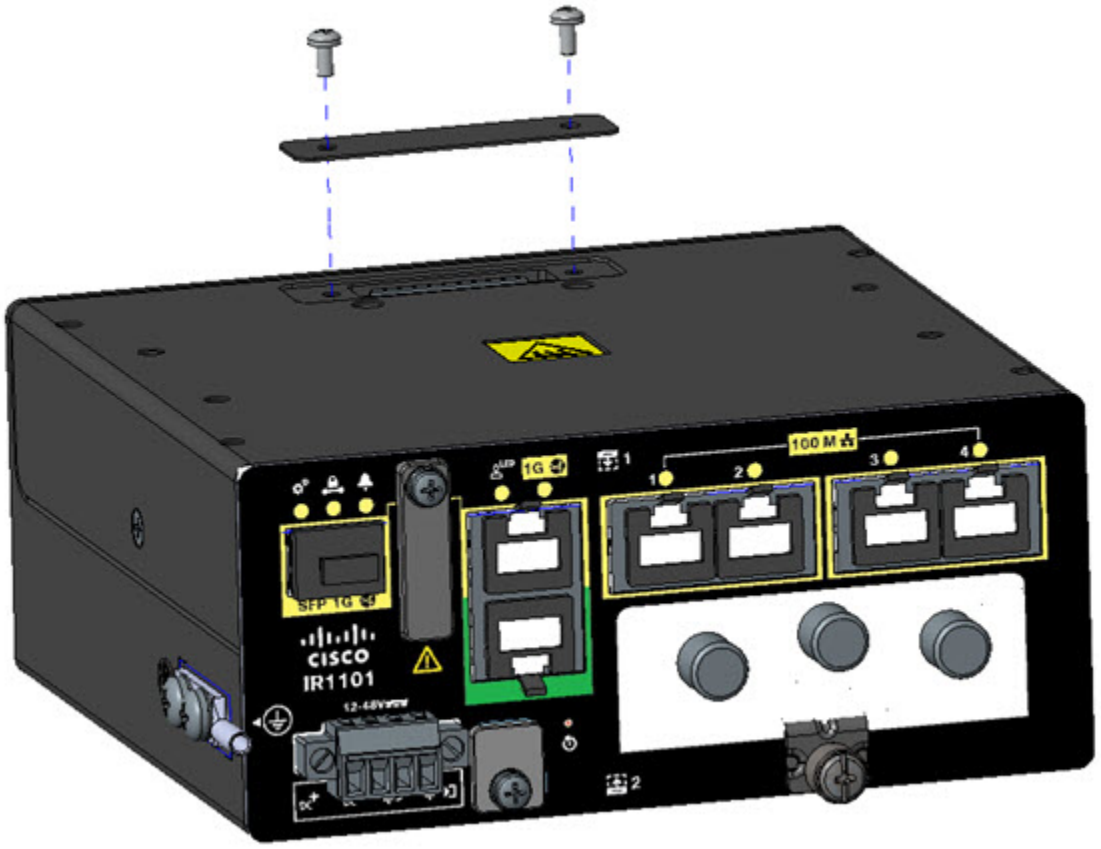
This section describes how to install the Cisco IRM-1100. The Expansion Module attaches to the IR1101 Base using 4 mating screws, and is connected through a mating connector. The Expansion Module is grounded and powered through the connection to the IR1101.

To attach the IRM-1100 to the IR1101, perform the following steps:

Procedure

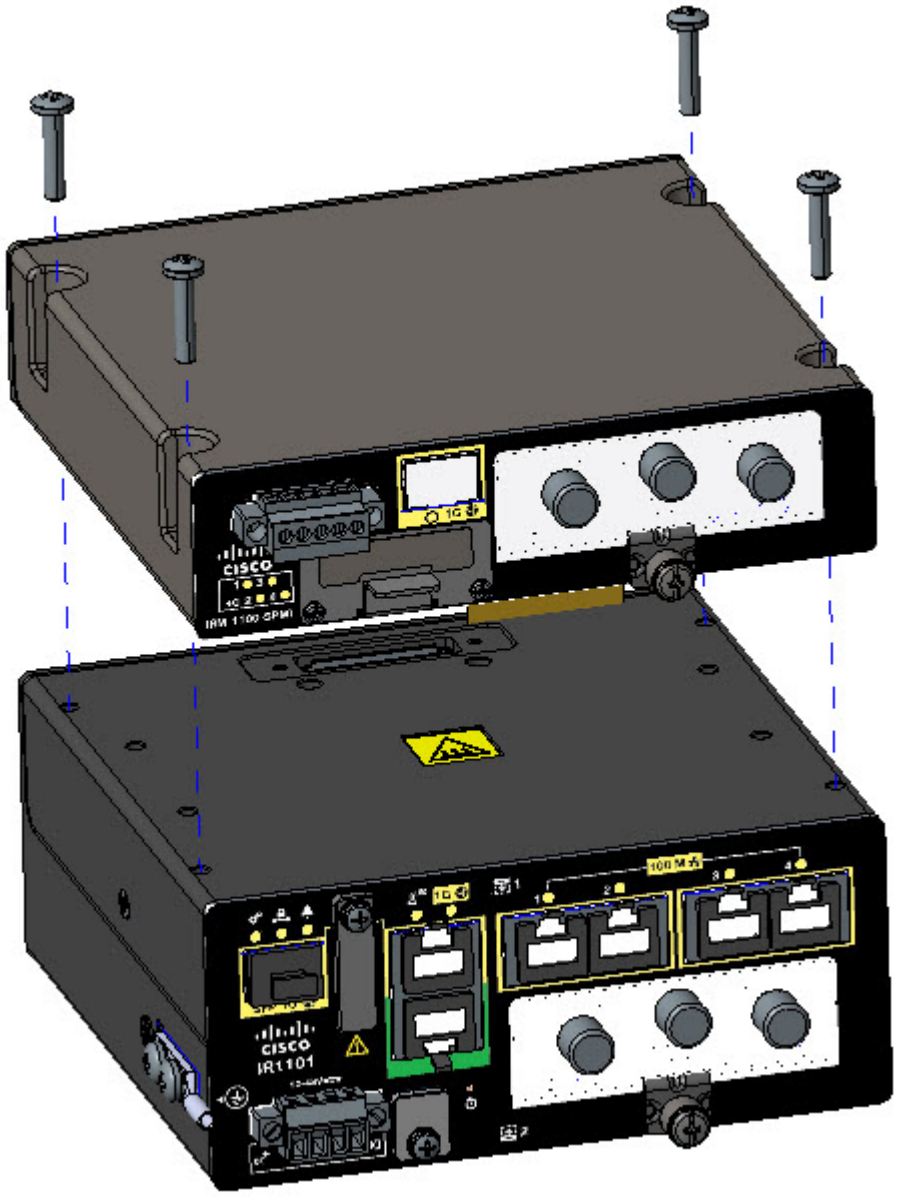
Step 1 Remove the protective cover from the mating connector on the IR1101 by unscrewing the two Phillips head screws. Refer to the following.

Figure 37: Protective Cover



Step 2 After removing the protective connector cover from the IR1101, carefully align the Expansion Module to the IR1101 so that both mating connectors engage. Refer to the following figure. Once properly seated, install the four mating screws to fully secure the Expansion Module to the IR1101.

Figure 38: Mounting the Expansion Module



Step 3 Tighten the screws to a torque of 13-15 in. lbs (1.5-1.7 newton meter). When complete, the two devices form a single assembly as shown in the following figure.

Figure 39: Completed Assembly



Mounting the IR1101 Router with the IRM-1100 Expansion Module Attached

After the Cisco IRM-1100 is attached to the IR1101, it can be mounted in the following ways:

- On a DIN Rail
- Using mounting brackets

Note For the remainder of these instructions, we will refer to the combined IR1101/IRM-1100 as the "Device".

Mounting the Device Using Mounting Brackets

The wall mounting kit contains the following:

- Mounting brackets (x2)
- Mounting screws (x4)

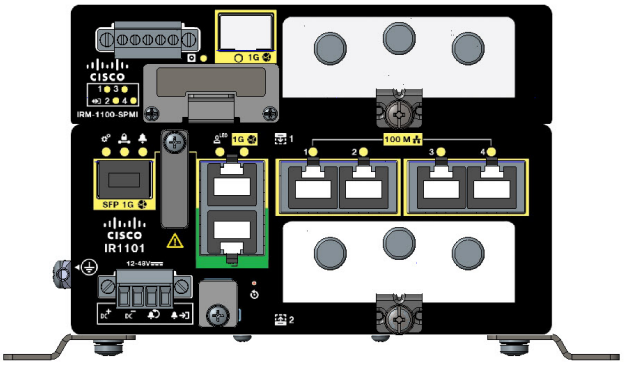
Warning Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system. **Statement 378**

Warning A minimum of 1 inch clearance is required on all sides of the device except for the side mounted against the wall/floor or DIN rail, to allow for proper air flow.

Tip When choosing a location for wall-mounting a router, consider cable limitations and wall structure, and consider suitable antenna location ahead of time.

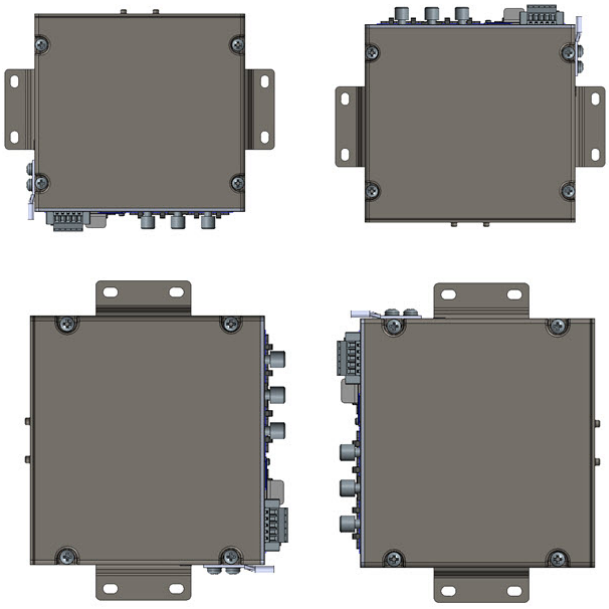
The Device can be mounted on the top of a flat surface as shown in the following figure, but cannot be mounted upside down.

Figure 40: Table Mounting



The device can also be mounted vertically on a wall in four orientations as shown in the following figure.

Figure 41: Wall Mounting

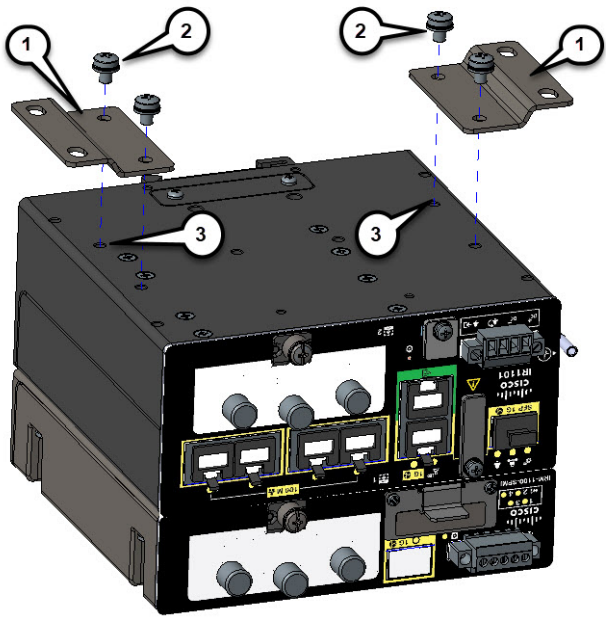


To mount the Device on a wall or other flat surface, follow these steps:

Procedure

Step 1 Attach the mounting brackets to the bottom of the Device. Refer to the following figure for guidance.

Figure 42: Mounting Brackets

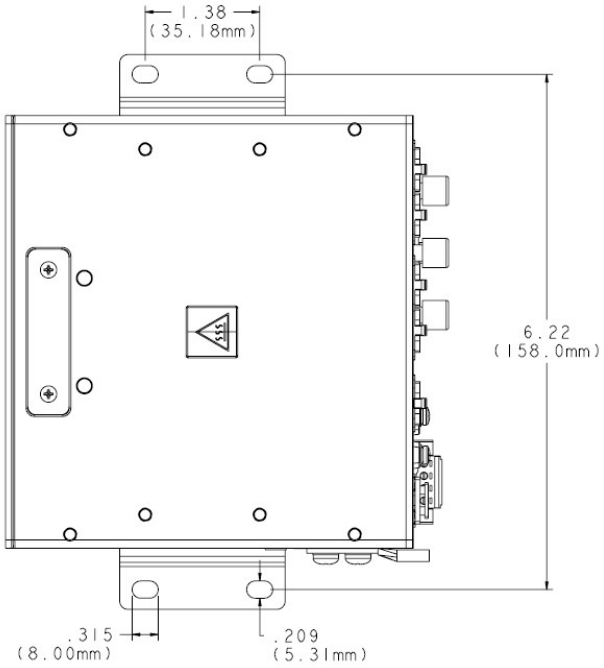


Step 2 Align the mounting brackets (**1**) over the mounting holes (**3**) so that the larger holes on the brackets extend out over the Device.

Step 3 Attach the brackets to the Device with the 4 screws (**2**) provided using a Phillips head driver. Torque to 13-15 in. lbs (1.5-1.7 newton meter).

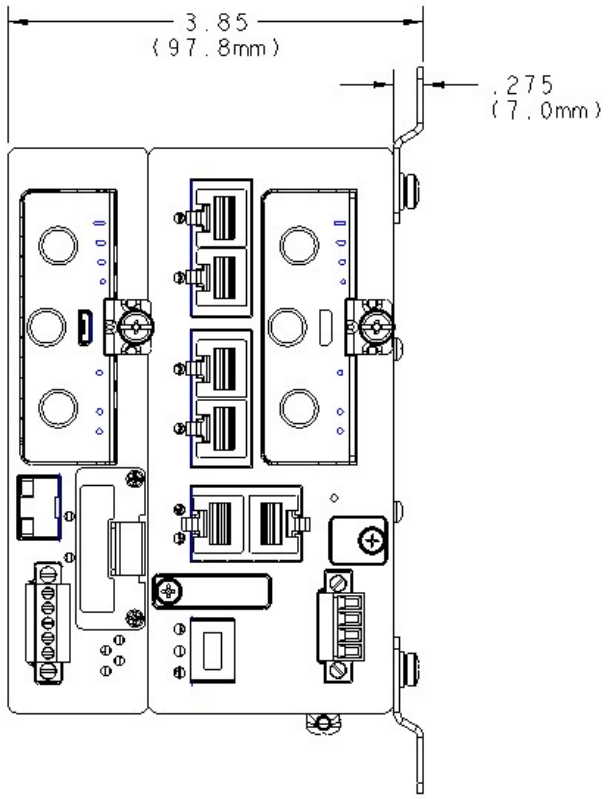
Step 4 Mount the Device with the attached brackets in a proper wall structure to carry the weight of the device, which is a combined 3.85 lbs. See the following figures for the dimensions of the mounting holes with the brackets attached to the Device.

Figure 43: Wall/Floor mounting hole dimensions with mounting brackets attached



Note
Four #10-32 screws are recommended when mounting the Device with these brackets attached to the neighboring surface.

Figure 44: Wall/Floor mounting clearance and overall dimensions with mounting brackets attached

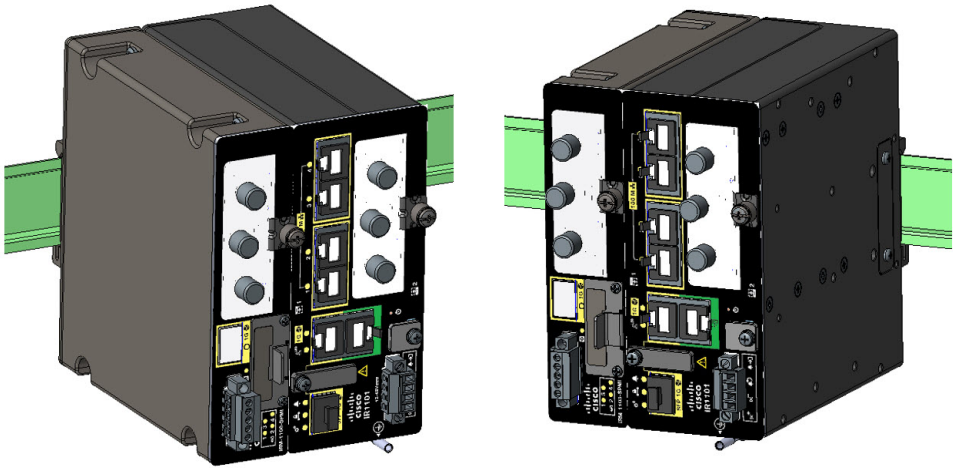


Step 5 Route the cables so that they do not put a strain on the connectors or mounting hardware.

Installing a DIN Rail

The DIN Rail kit is ordered separately. The Device can only be mounted vertically, with the ground lug on the bottom side as shown in the following figure.

Figure 45: Device Orientation

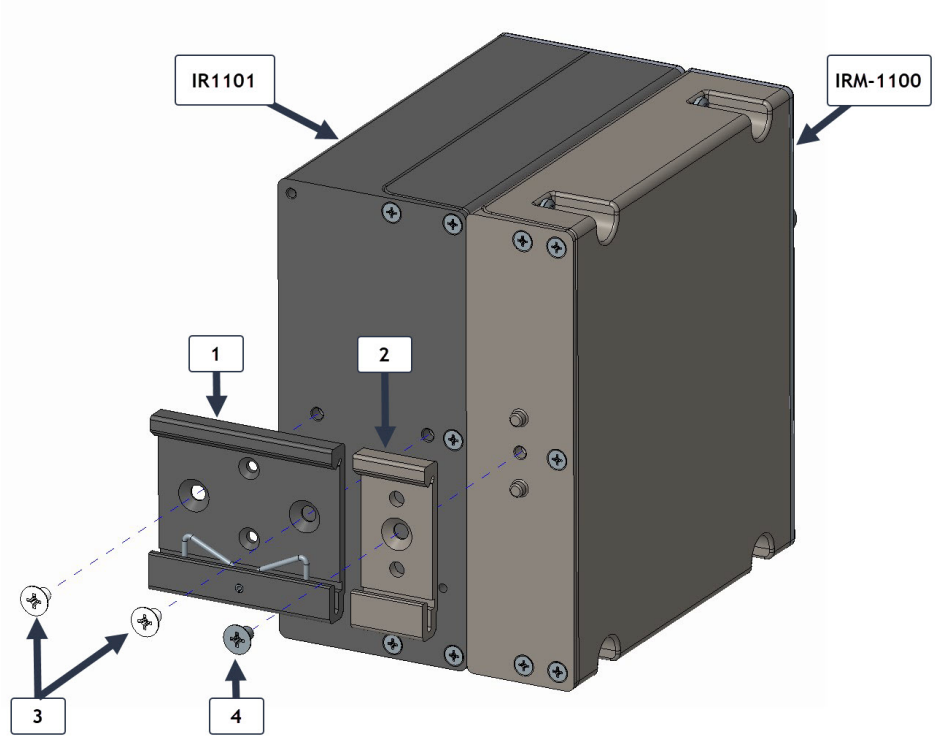


Mounting the DIN Rail Bracket on the Device

Procedure

Step 1 First, attach the DIN rail brackets to the back of the Device. There are two separate mounting brackets. One attaches to the IR1101, and the other attaches to the IRM-1100. The combined DIN rail brackets mount in the vertical orientation only. See the following figure.

Figure 46: Attaching the DIN Rail Brackets



1	DIN mounting bracket
2	IRM-1100 DIN mounting bracket
3	Screws from kit
4	Screws from IRM-1100 kit

Step 2 Attach the IR1101 DIN mounting bracket to the Device using the two screws provided in the kit. Position the bracket over the two mounting holes, then use 13-15 in. lbs. (1.5-1.7 newton meter) of torque to screw the bracket onto the Device.

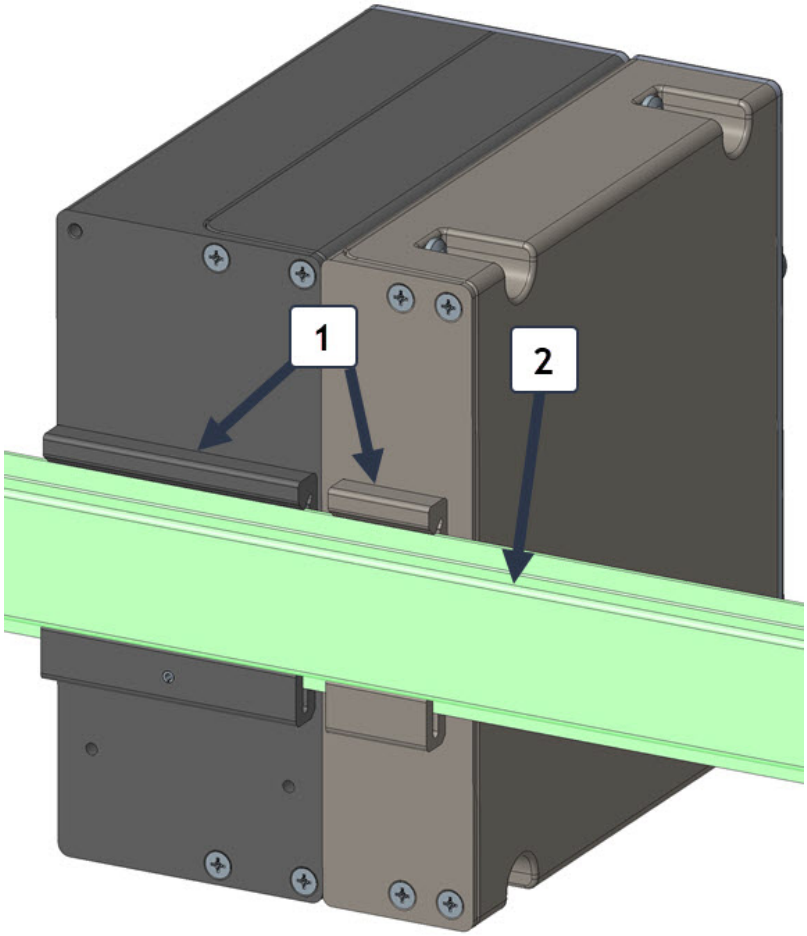
Step 3 Attach the IRM-1100 DIN mounting bracket to the Device using the screw provided in the kit. Position the bracket over the single mounting hole, then use 13-15 in. lbs. (1.5-1.7 newton meter) of torque to screw the bracket onto the Device.

Step 4 Once the two brackets are attached to the Device, it can be mounted onto the DIN Rail.

Attaching the Bracket onto the DIN Rail

To attach the Device with the brackets to a DIN rail, follow these steps. Refer to the following figure for details.

Figure 47: Attaching the Brackets to the DIN Rail



Procedure

Step 1 Position the Device so that the lower edge and spring of the Din clips (**1**) engages with the bottom section of the Din rail (**2**).

Step 2 Push up on the Device so that the spring of DIN clips (**1**) compresses against the lower section of DIN rail (**2**) and then rotate the Device so that the top hook of the DIN clips (**1**) clamps to the top section of DIN rail (**2**).

Step 3 To remove the Device from the DIN Rail, simply reverse the procedure.

Note
In order to prevent excessive side to side movement of the unit it is advised to install DIN rail stop plates such as Mouser part Numbers 653-PFP-M, 651-1201662 or 845-CA402. These stop plates can be installed on one or both sides of the unit to limit excessive side to side movement that typically occurs in high vibration environments.

Step 4 If you are using this Device in a vehicle, attach the ring terminal to the chassis using one of the screws provided and the green or green and yellow striped wire. Connect the other end of the wire to the vehicle ground.

What to do next

After you install and properly ground the Device, you can connect the power wiring, the LAN cables, and the cables for administrative access as required for your installation.

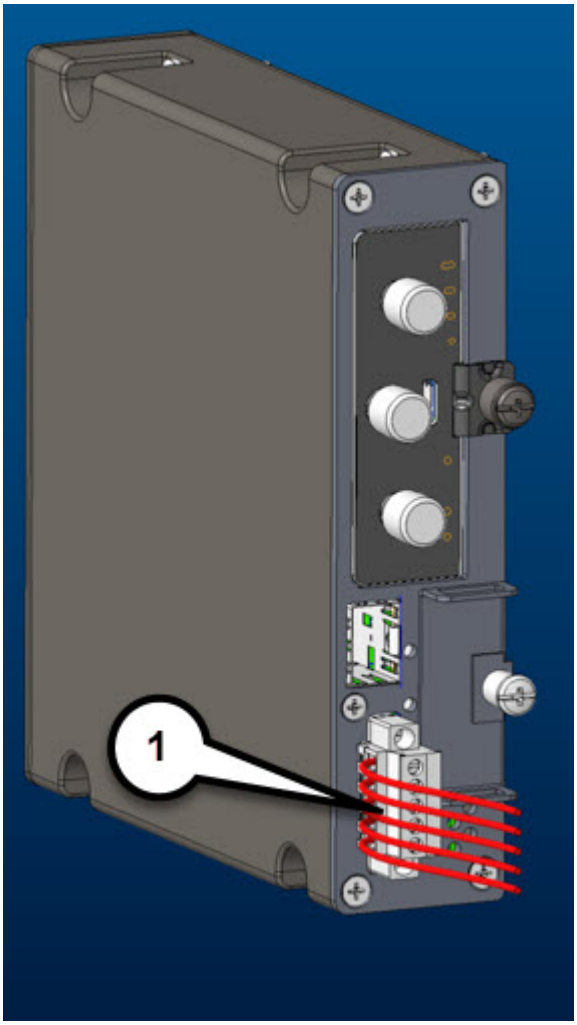
Pluggable Module

The Pluggable Module provides the IRM-1100 with a number of different configuration options. The installation of the Pluggable Module into the Expansion Module is the same as installing it into the IR1101. See that section at Cisco Pluggable Modules, on page 51.

Digital I/O Connections

The wired Digital I/O connector is show as (**1**) in the following figure.

Figure 48: Digital I/O connector



The Digital I/O connector has 4 GPIO connections plus 1 Return connection. The default state of the Digital I/O is input, the open-collector is open (off). Further details on the Digital I/O connector can be found at Digital I/O Connector, on page 16.

Wiring the Alarm Connections

To wire the alarm connections on your Cisco IR1101 Expansion Module, follow these steps:

Procedure

Step 1 Locate the alarm connector on the router front panel.

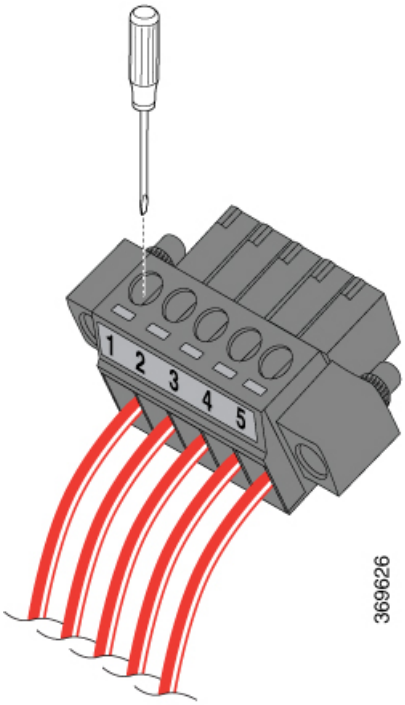
Step 2 Identify the connectors.

Step 3 Using a wire-stripping tool, strip each of the alarm wires to 0.25 inch (6.3 mm) ± 0.02 inch (0.5 mm). Do not strip more than 0.27 inch (6.8 mm) of insulation from the wire. Stripping more than the recommended amount of wire can leave exposed wire from the connector after installation.

Step 4 Remove the two captive screws that attach the alarm connector to the Expansion Module, and remove the connector

Step 5 On the alarm connector, insert the exposed part of the wire into the connection. Make sure that you cannot see any wire lead. Only wire with insulation should extend from the connector. See the following figure.

Figure 49: Alarm Connector Captive Screws



Step 6 Use a ratcheting torque flathead screwdriver to torque the power connector captive screws (above the installed wire leads) to 2 in-lb (0.23 N-m).

Step 7 Connect the other end of the wires to the alarm source, and re-attach the alarm connector to the Expansion Module.

Installing the mSATA SSD

Mini-SATA, or mSATA, is a low-profile interface connector that enables more effective Serial ATA (SATA) integration in small form-factor drives roughly the size of a business card, such as solid state disks (SSDs).

This section provides an overview of the mSATA SSD available for the Cisco IRM-1100 Expansion Module.

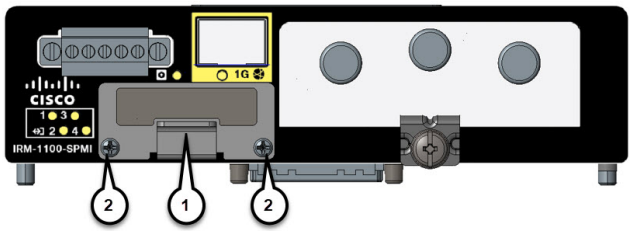
mSATA Installation Instructions

Note Ensure that you are using proper static discharge techniques such as a wrist strap and static mat.

Caution Ensure the device is powered down before performing any removal or installation of a module.

The mSATA SSD module plugs into the slot shown in the following figure.

Figure 50: Cisco IRM-1100-SPMI Front Panel



Item	Description
1	mSATA Module Slot
2	Module Captive Screws

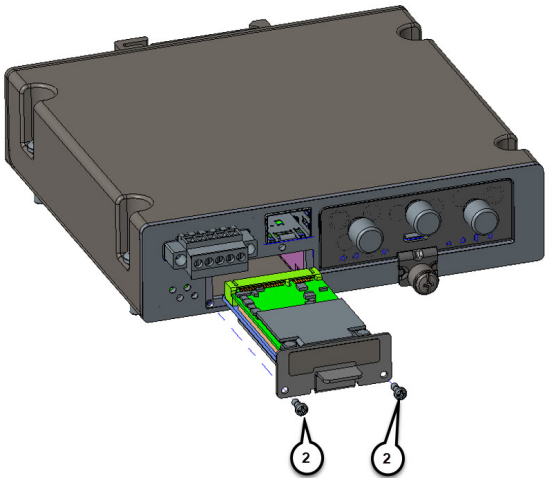
Perform the following steps in order in install the module.

Procedure

Step 1 Remove the two screws (**2**) holding the cover of the mSATA Slot.

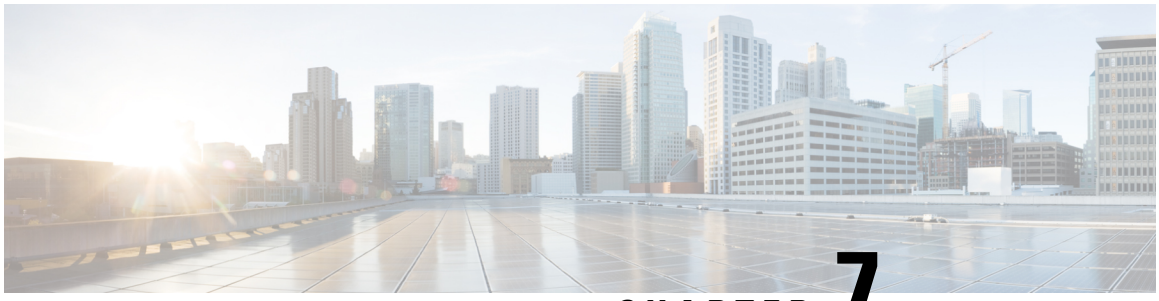
Step 2 Insert the mSATA SSD module into the slot on the IRM-1100-SPMI. Refer to the following figure for guidence.

Figure 51: Module Placement



Step 3 After the module is properly inserted, tighten the module plate to the IRM-1100-SPMI with the two screws (**2**). The screws should be torqued to 2-3 in-lb (0.2-0.3 newton meter).

Step 4 The installation is now complete.



CHAPTER 7

IRM-1100-4A2T Expansion Module Installation

This chapter describes the equipment and procedures necessary for successfully installing the Cisco IRM-1100-4A2T Expansion Module onto the IR1101.

For details on the expansion module, see Cisco IRM-1100-4A2T Expansion Module, on page 19 section.

- Items Shipped with your Expansion Module, on page 91
- Installing the Expansion Module on the EM Side, on page 91
- Installing the Expansion Module on the CM Side, on page 94
- Mounting the IR1101 Router with the IRM-1100-4A2T Expansion Module Attached, on page 97
- Installing a DIN Rail, on page 102

Items Shipped with your Expansion Module

Unpack the box and verify that all items listed on the invoice were shipped with the Cisco IRM-1100-4A2T.

The following items are shipped with your Expansion Module:

- Four mating screws to connect the IRM-1100-4A2T to the IR1101

Installing the Expansion Module on the EM Side

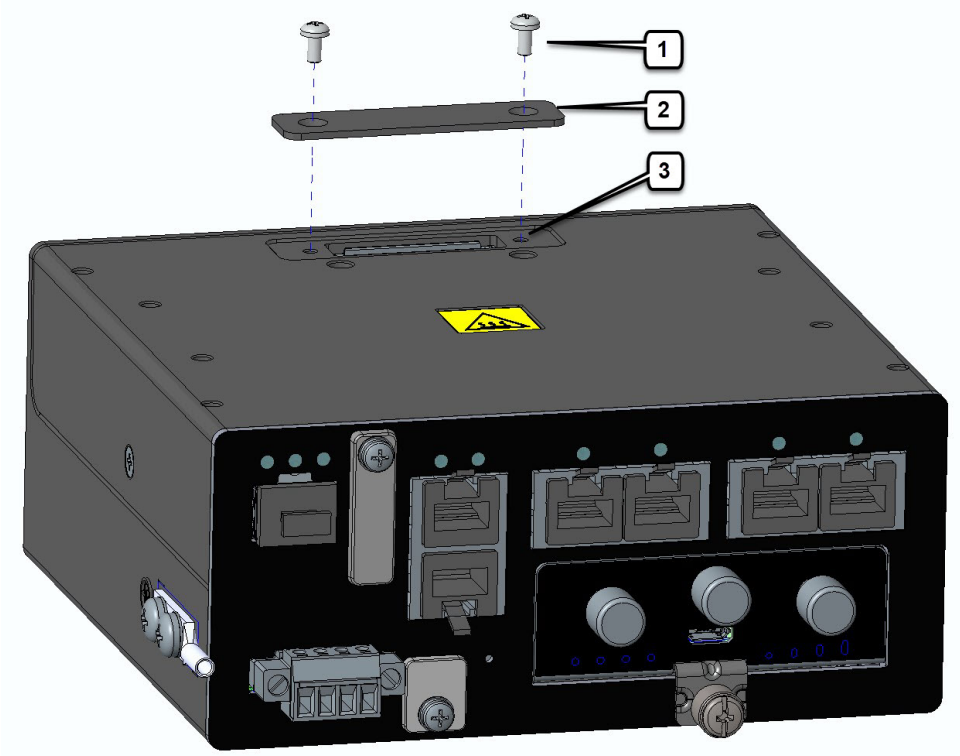
This section describes how to install the Cisco IRM-1100-4A2T on the EM (top) side of the router. The Expansion Module attaches to the IR1101 Base using 4 mating screws, and is connected through a mating connector. The Expansion Module is grounded and powered through the connection to the IR1101.

To attach the IRM-1100-4A2T to the IR1101 on the EM side, perform the following steps:

Procedure

Step 1 Remove the protective cover from the mating connector on the IR1101 by unscrewing the two Phillips head screws. Refer to the following figure.

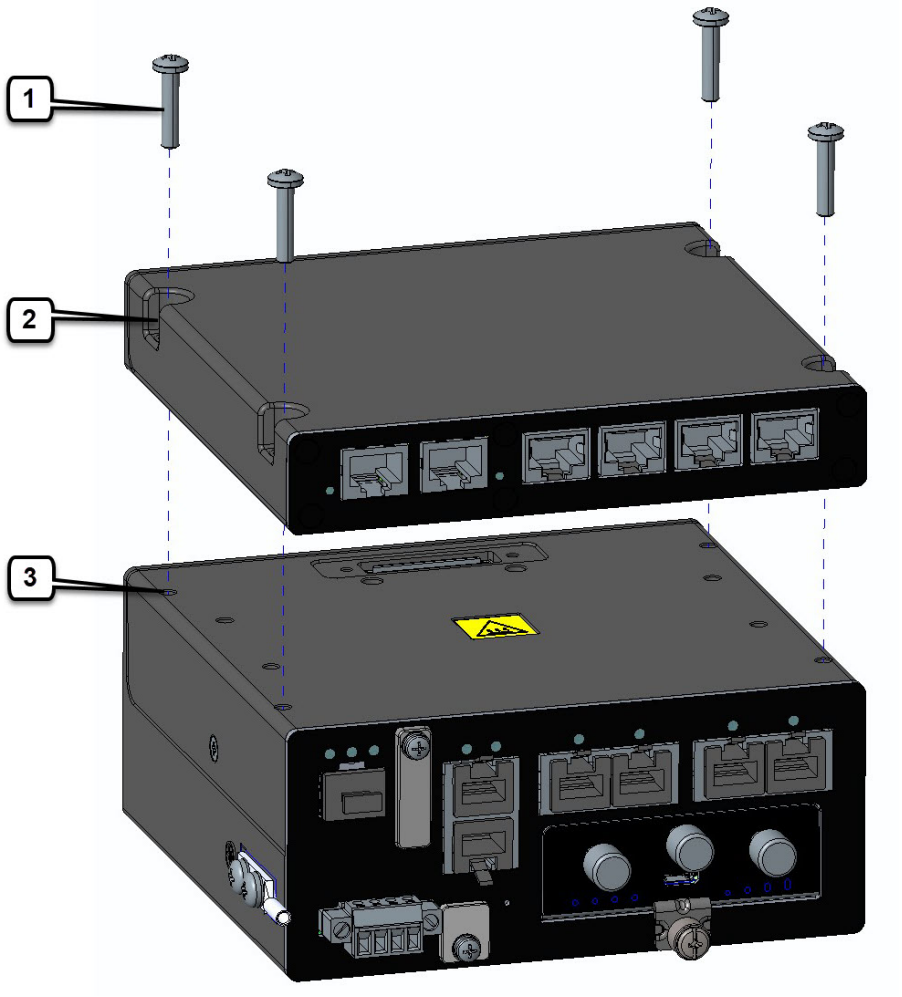
Figure 52: Protective Cover



1	Phillips head screws
2	Protective cover
3	Cover mounting holes

Step 2 After removing the protective connector cover from the IR1101, carefully align the Expansion Module to the IR1101 so that both mating connectors engage. Refer to the following figure. Once properly seated, install the four mating screws to fully secure the Expansion Module to the IR1101.

Figure 53: Mounting the Expansion Module



1	Mating screws
2	Expansion mating screw holes
3	Mounting holes

Step 3 Tighten the screws to a torque of 13-15 in. lbs (1.5-1.7 newton meter). When complete, the two devices form a single assembly as shown in the following figure.

Figure 54: Completed Assembly



Installing the Expansion Module on the CM Side

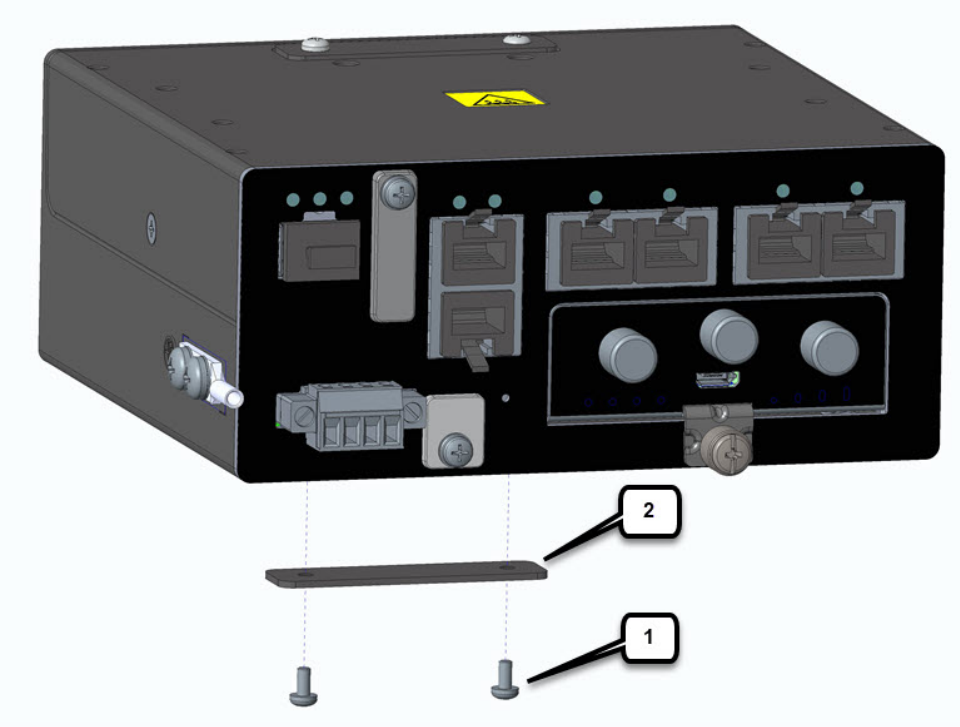
This section describes how to install the Cisco IRM-1100-4A2T on the CM (bottom) side of the router. The Expansion Module attaches to the IR1101 Base using 4 mating screws, and is connected through a mating connector. The Expansion Module is grounded and powered through the connection to the IR1101.

To attach the IRM-1100-4A2T to the IR1101 on the CM side, perform the following steps:

Procedure

Step 1 Remove the protective cover from the mating connector on the IR1101 by unscrewing the two Phillips head screws. Refer to the following figure.

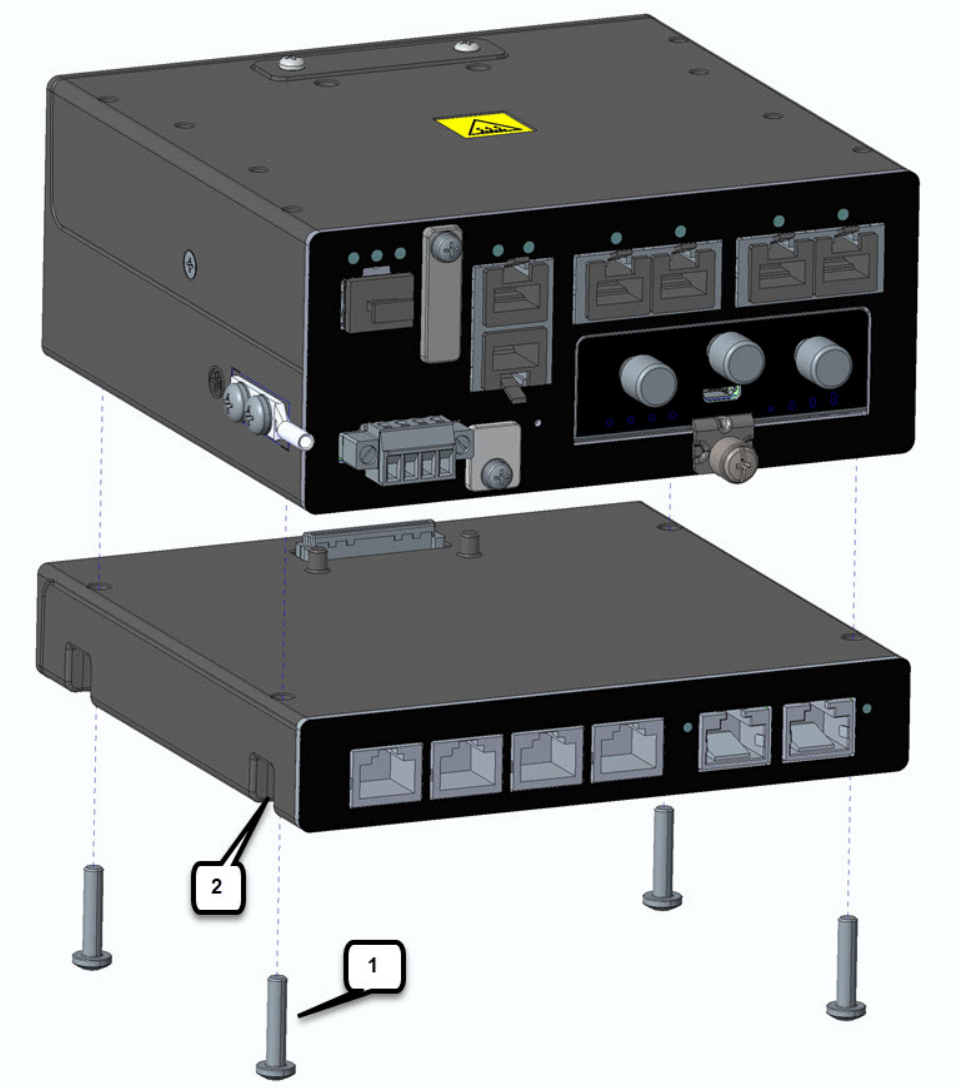
Figure 55: Protective Cover



1	Phillips head screws
2	Protective cover

Step 2 After removing the protective connector cover from the IR1101, rotate the expansion module upside down so the mating connector is facing the IR1101 base unit. Carefully align the Expansion Module to the IR1101 so that both mating connectors engage. Refer to the following figure. Once properly seated, install the four mating screws to fully secure the Expansion Module to the IR1101.

Figure 56: Mounting the Expansion Module



1	Mating screws
2	Expansion mating screw holes

Step 3 Tighten the screws to a torque of 13-15 in. lbs (1.5-1.7 newton meter). When complete, the two devices form a single assembly as shown in the following figure.

Figure 57: Completed Assembly



Mounting the IR1101 Router with the IRM-1100-4A2T Expansion Module Attached

After the Cisco IRM-1100-4A2T is attached to the IR1101, it can be mounted in the following ways:

- On a DIN Rail
- Using mounting brackets

Note For the remainder of these instructions, we will refer to the combined IR1101/IRM-1100-4A2T as the "Device".

Mounting the Device Using Mounting Brackets

The wall mounting kit part number is IR1101-WALLMNT and contains the following:

- Mounting brackets (x2)
- Mounting screws (x4)

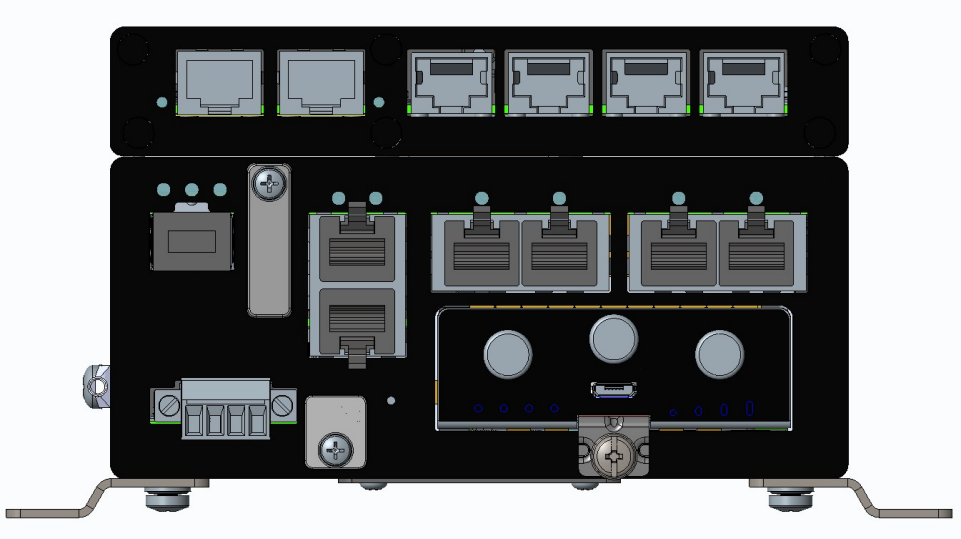
Warning Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system. **Statement 378**

Tip When choosing a location for wall-mounting the Device, consider cable limitations and wall structure.

Note A minimum of 1 inch clearance is required on all sides of the device except for the side mounted against the wall/floor or DIN rail, to allow for proper air flow.

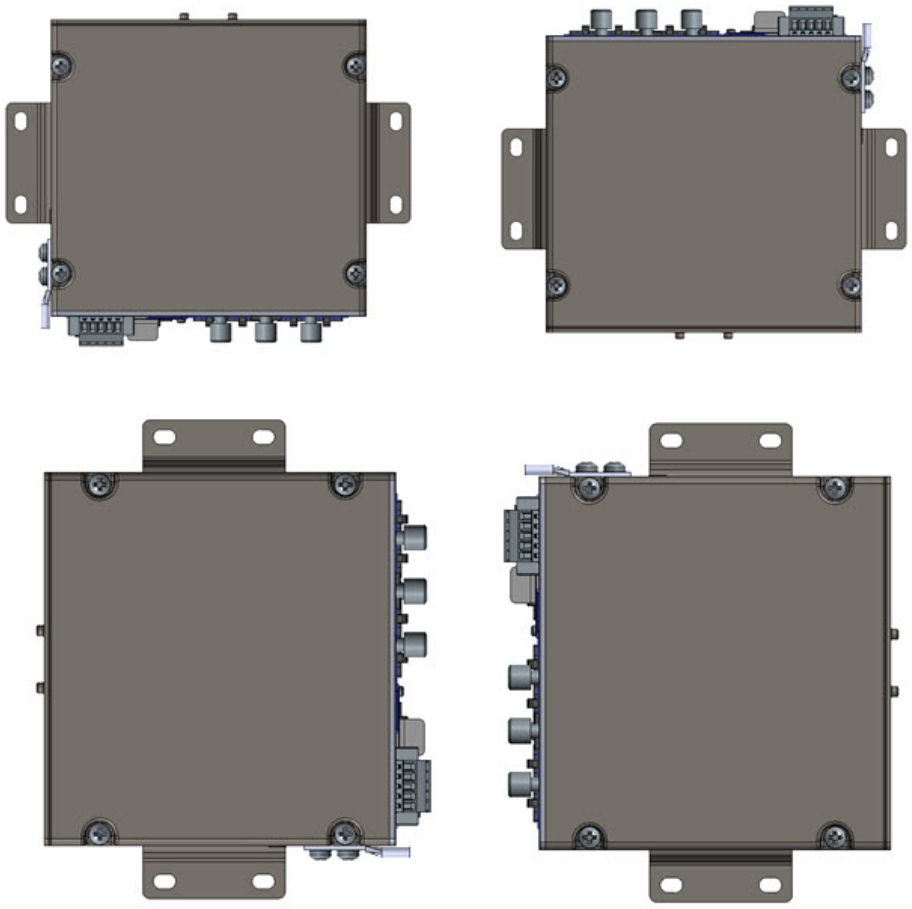
The Device can be mounted on the top of a flat surface as shown in the following figure, but cannot be mounted upside down.

Figure 58: Table Mounting



The device can also be mounted vertically on a wall in four orientations as shown in the following figure.

Figure 59: Wall Mounting

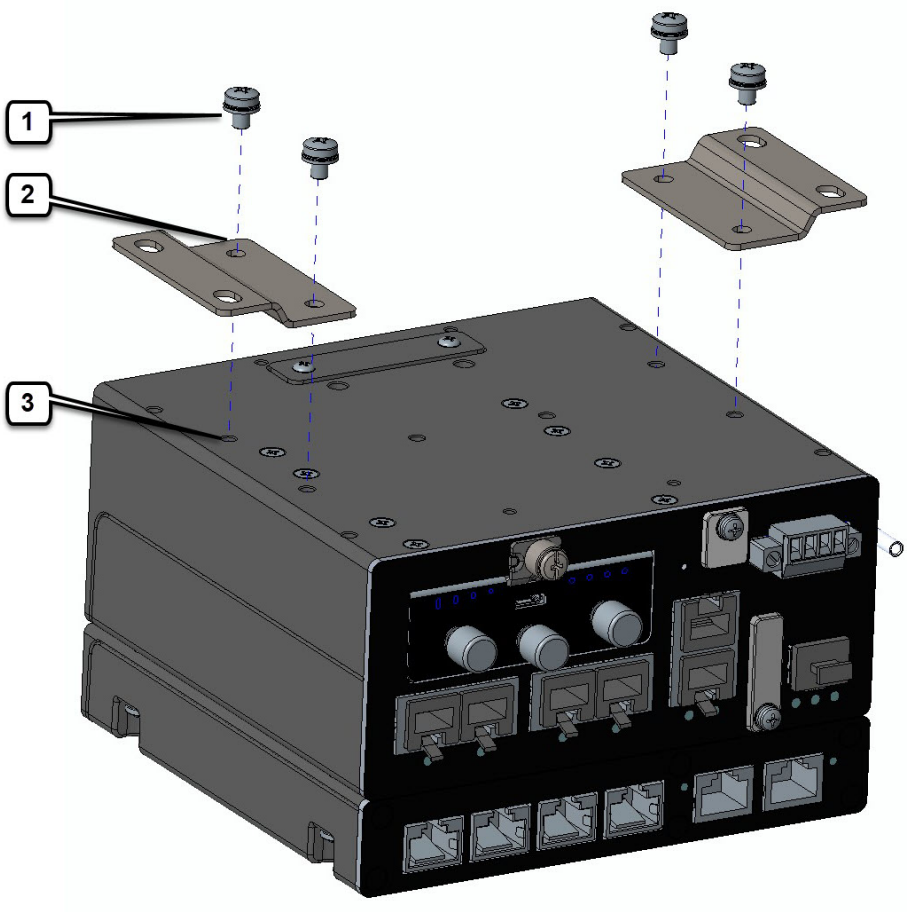


To mount the Device on a wall or other flat surface, follow these steps:

Procedure

Step 1 Attach the mounting brackets to the bottom of the Device. Refer to the following figure for guidance.

Figure 60: Mounting Brackets



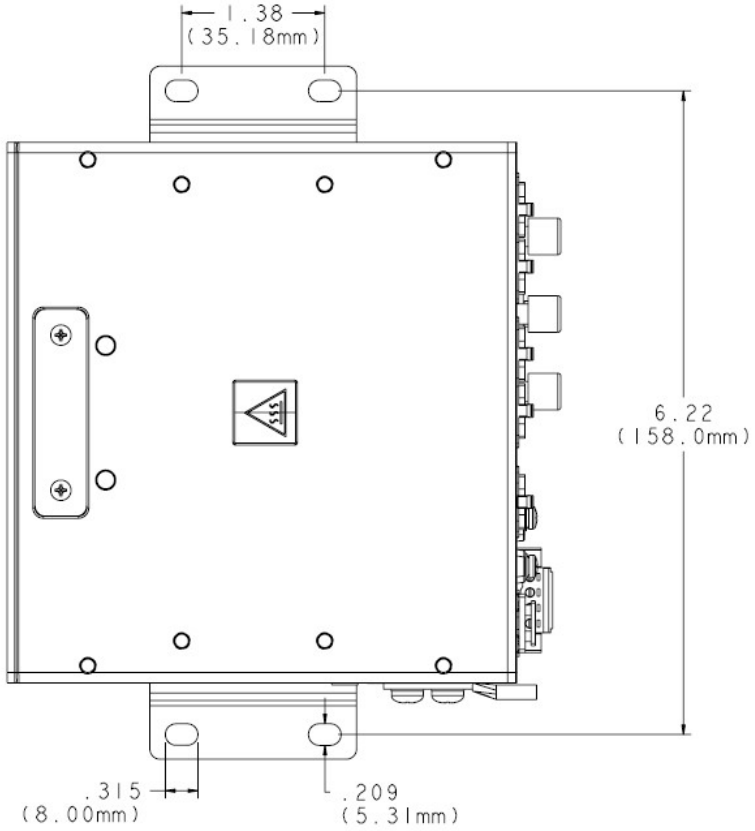
1	Provided screws
2	Holes in provided mounting brackets
3	Mounting holes

Step 2 Align the mounting brackets over the mounting holes so that the larger holes on the brackets extend out over the Device.

Step 3 Attach the brackets to the Device with the four screws provided using a Phillips head driver. Torque to 13-15 in. lbs (1.5-1.7 newton meter).

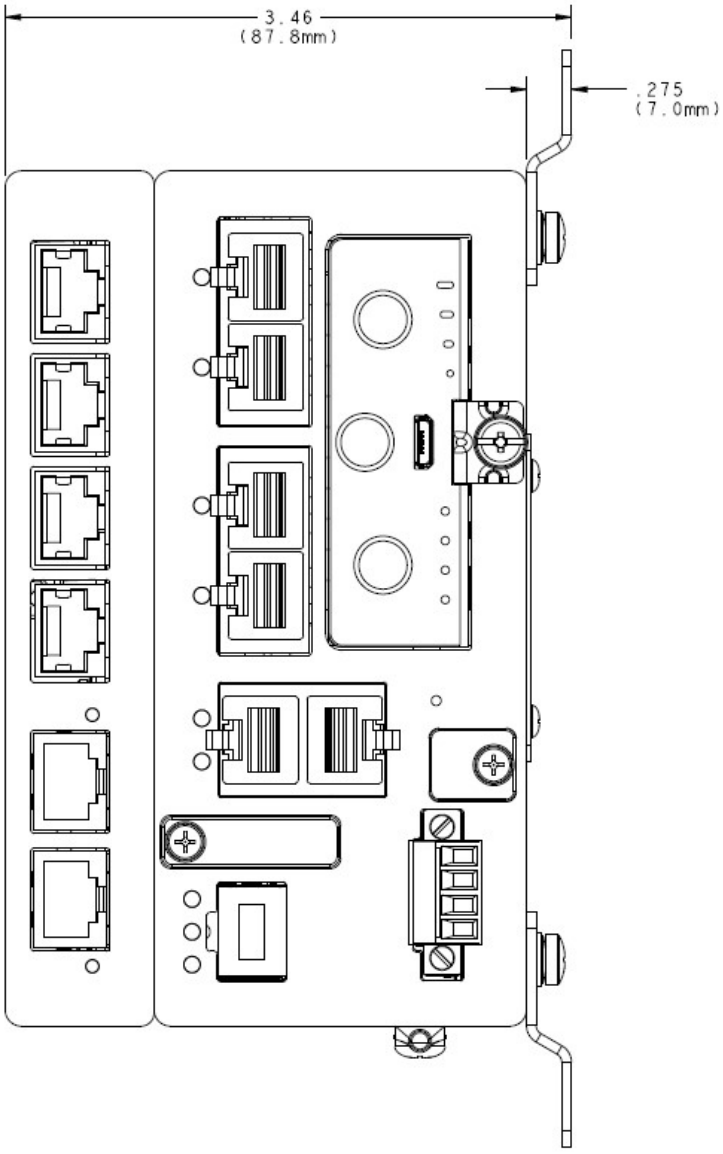
Step 4 Mount the Device with the attached brackets in a proper wall structure to carry the weight of the device, which is a combined 3.85 lbs. See the following figures for the dimensions of the mounting holes with the brackets attached to the Device.

Figure 61: Wall/Floor mounting hole dimensions with mounting brackets attached



Note
Four #10-32 screws (customer provided), are recommended when mounting the Device with these brackets attached to the neighboring surface.

Figure 62: Wall/Floor mounting clearance and overall dimensions with mounting brackets attached

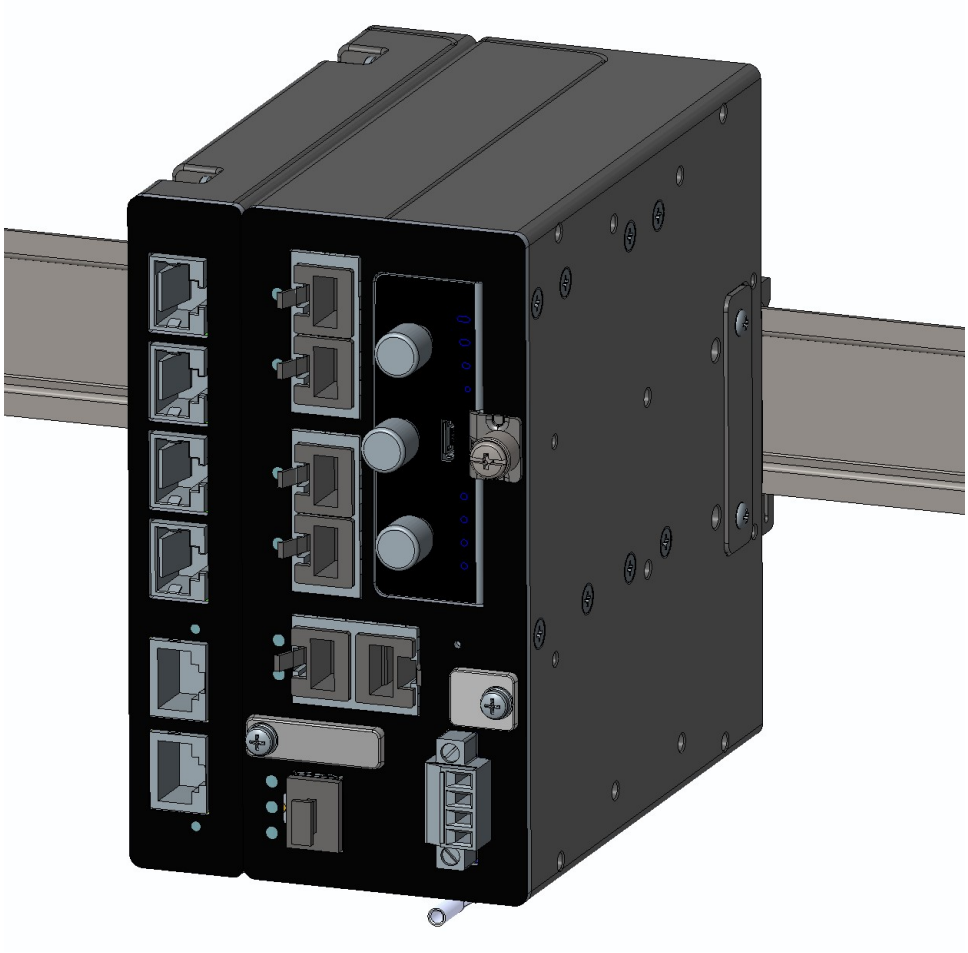


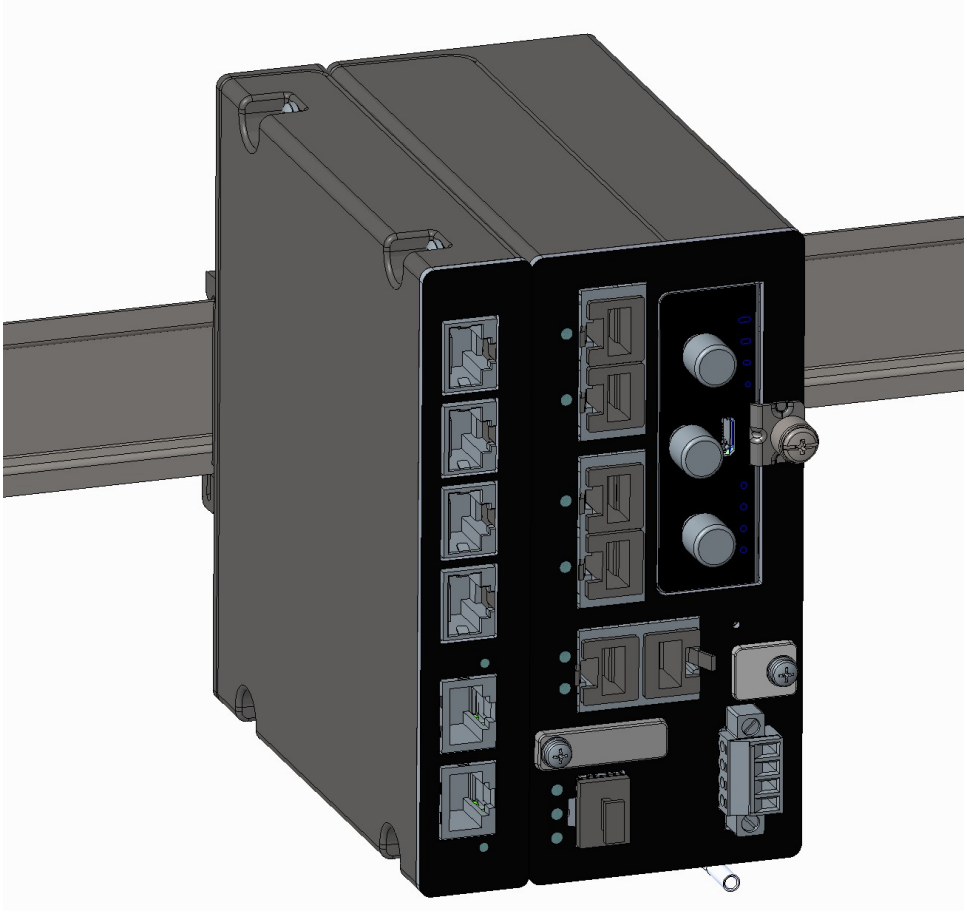
Step 5 Route the cables so that they do not put a strain on the connectors or mounting hardware.

Installing a DIN Rail

The DIN Rail kit is ordered separately, and the part number is IRM-1100-DINRAIL. The Device can only be mounted vertically, with the ground lug on the bottom side as shown in the following figures.

Figure 63: Device Orientation



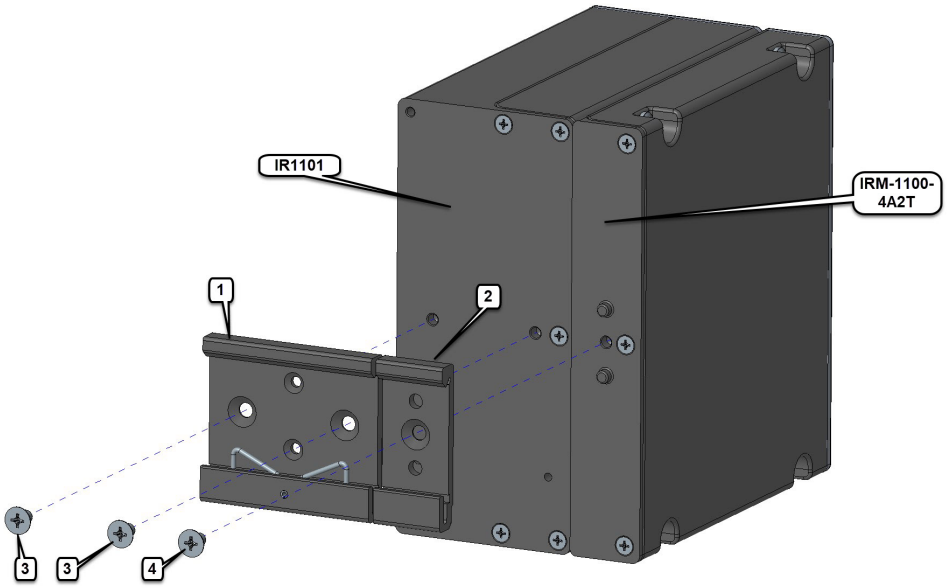


Mounting the DIN Rail Bracket on the Device

Procedure

Step 1 Attach the DIN rail brackets to the back of the Device. There are two separate mounting brackets. One attaches to the IR1101, and the other attaches to the IRM-1100-4A2T. The combined DIN rail brackets mount in the vertical orientation only. See the following figure.

Figure 64: Attaching the DIN Rail Brackets



1	DIN mounting bracket
2	IRM-1100-DINRAIL mounting bracket
3	Screws from IR1101 kit
4	Screw from IRM-1100-DINRAIL kit

Step 2 Attach the IR1101 DIN mounting bracket to the Device using the two screws provided in the kit. Position the bracket over the two mounting holes, then use 13-15 in. lbs. (1.5-1.7 newton meter) of torque to screw the bracket onto the Device.

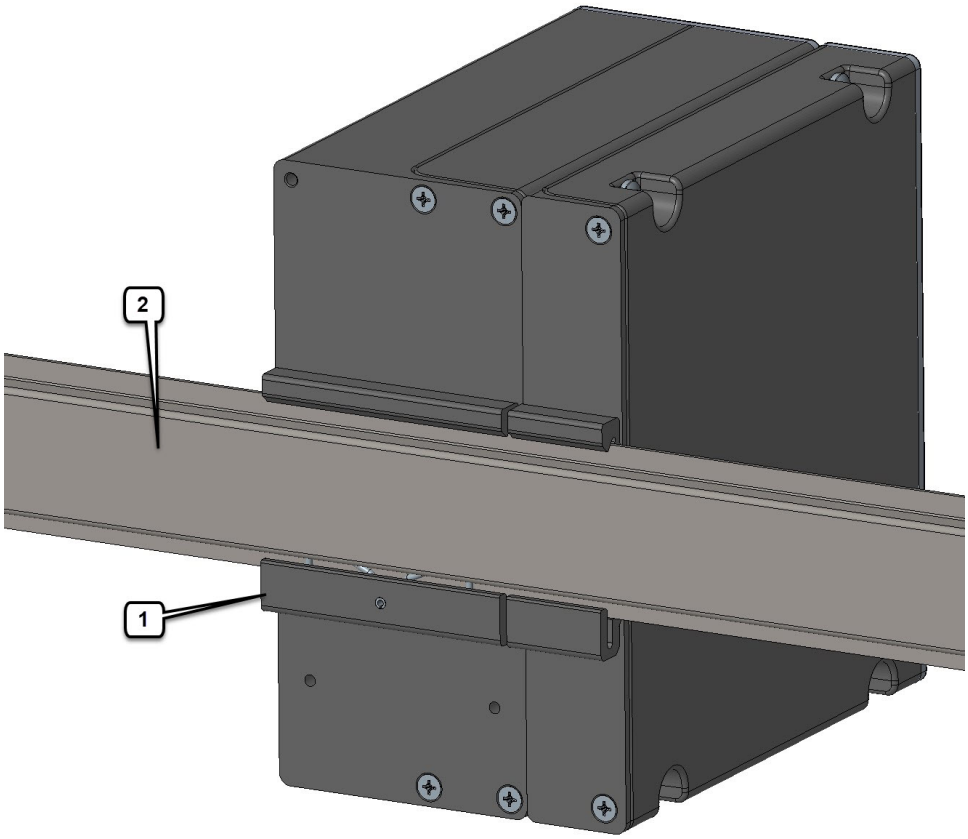
Step 3 Attach the IRM-1100-DINRAIL mounting bracket to the Device using the screw provided in the kit. Position the bracket over the single mounting hole, then use 13-15 in. lbs. (1.5-1.7 newton meter) of torque to screw the bracket onto the Device.

Step 4 Once the two brackets are attached to the Device, it can be mounted onto the DIN Rail.

Attaching the Bracket Onto the DIN Rail

To attach the Device with the brackets to a DIN rail, follow these steps. Refer to the following figure for details of a completed attachment.

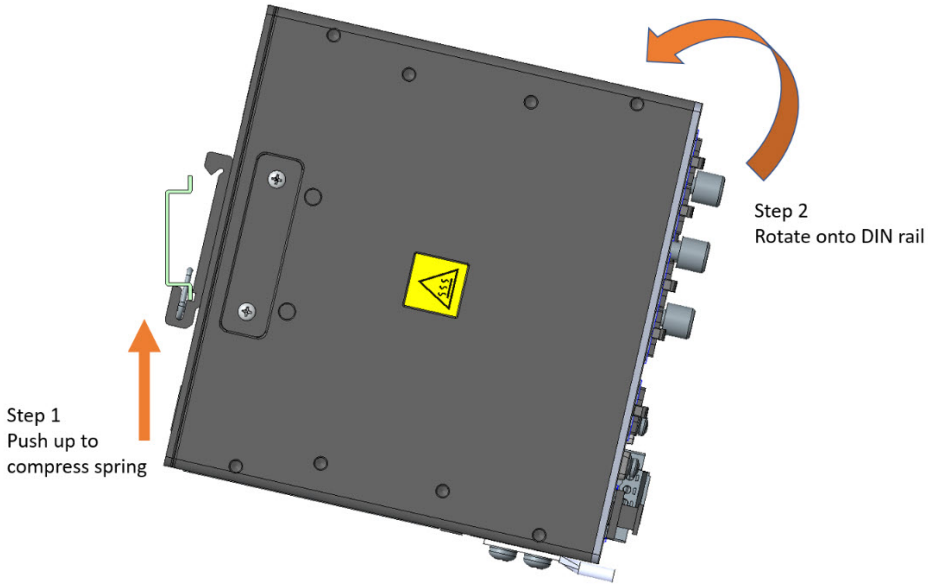
Figure 65: Attaching the Brackets to the DIN Rail



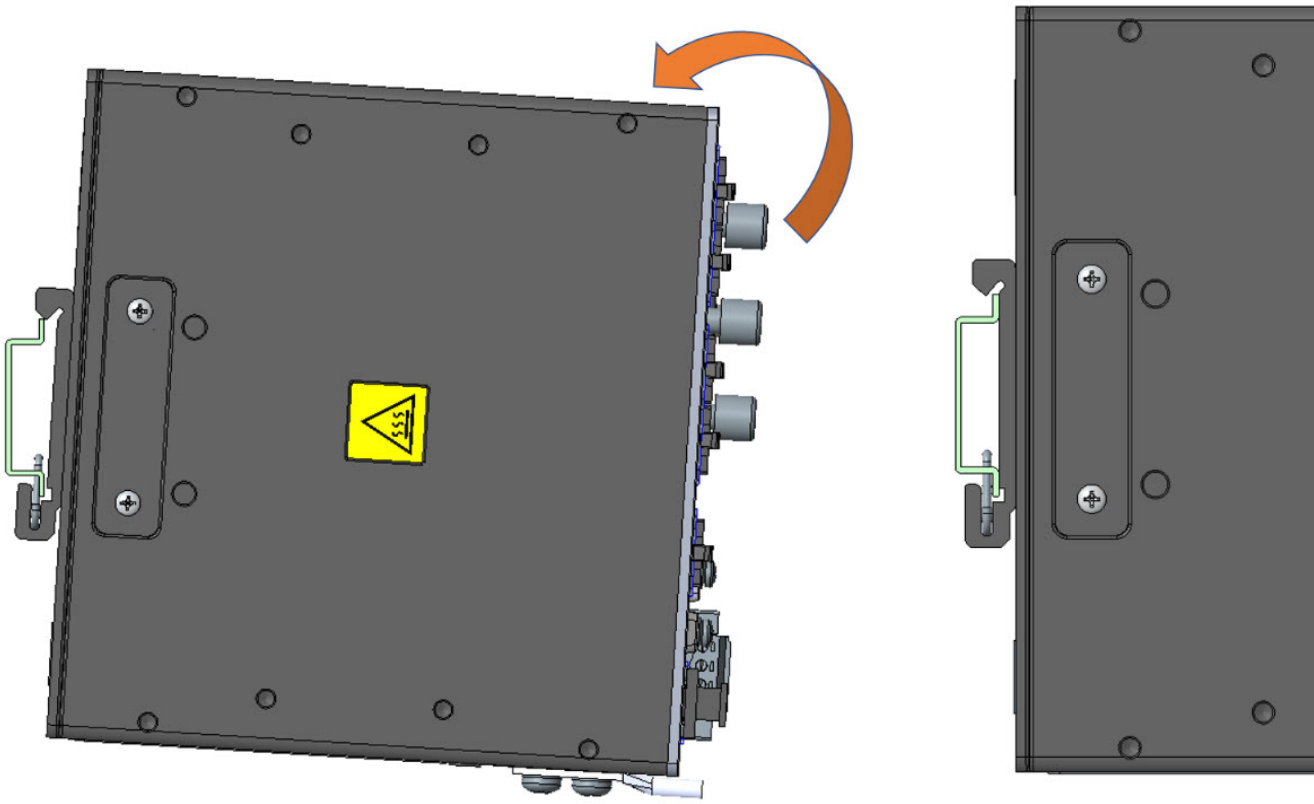
1	DIN rail clips
2	DIN rail

Procedure

Step 1 Position the router so that the lower edge and spring of the DIN clip, located within the bottom of the DIN rail bracket, engages with the bottom section of the DIN rail. Push up to compress the spring.



Step 2 Rotate the router so that the top hook of the DIN clip clamps to the top section of DIN rail. Refer to the following figures.



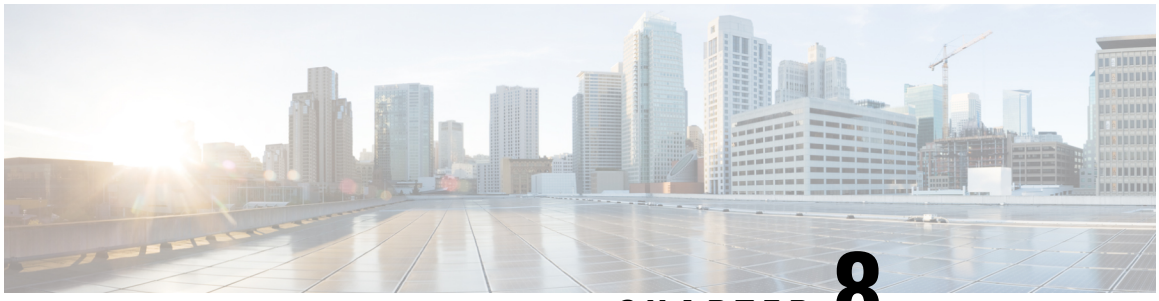
Step 3 To remove the Device from the DIN Rail, simply reverse the procedure.

Note

In order to prevent excessive side to side movement of the unit it is advised to install DIN rail stop plates such as Mouser part Numbers 653-PFP-M, 651-1201662 or 845-CA402. These stop plates can be installed on one or both sides of the unit to limit excessive side to side movement that typically occurs in high vibration environments.

What to do next

After you install and properly ground the Device, you can connect the power wiring, the LAN cables, and the cables for administrative access as required for your installation.



CHAPTER 8

IRM-1100-4S8I Expansion Module Installation

This chapter describes the equipment, and the procedures necessary for successfully installing the Cisco IRM-1100-4S8I Expansion Module onto the IR1101.

For details on the expansion module, see Cisco IRM-1100-4S8I Expansion Module, on page 14 section.

- Items shipped with your Expansion Module, on page 109
- Installing the Expansion Module on the EM Side, on page 109
- Mounting the IR1101 Router with the IRM-1100-4S8I Expansion Module Attached, on page 112
- Installing a DIN Rail, on page 117

Items shipped with your Expansion Module

Unpack the box and verify that all items listed on the invoice were shipped with the Cisco IRM-1100-4S8I.

The following items are shipped in the box:

- Cisco IRM-1100-4S8I expansion module
- Four mating screws to connect the IRM-1100-4S8I to the IR1101

Installing the Expansion Module on the EM Side

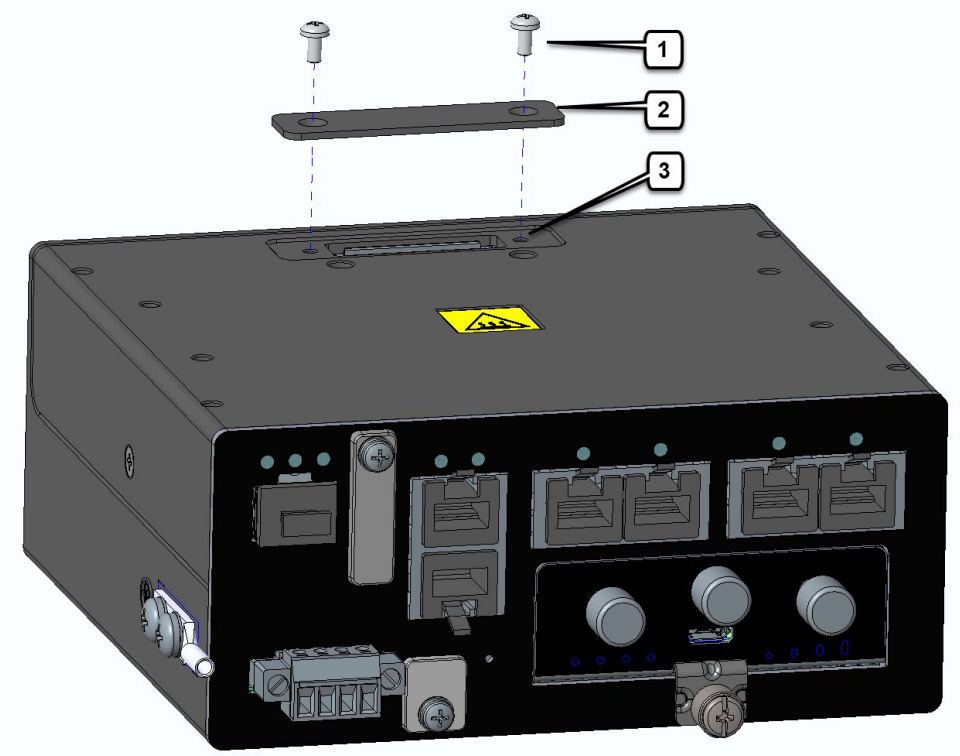
This section describes how to install the Cisco IRM-1100-4S8I on the EM (top) side of the router. The Expansion Module is secured to the IR1101 Base with four Phillips head screws. It connects via a mating connector, which also provides grounding and power from the IR1101.

To attach the IRM-1100-4S8I to the IR1101 on the EM side, follow these steps.

Procedure

Step 1 Remove the protective cover from the mating connector on the IR1101 by unscrewing the two Phillips head screws.

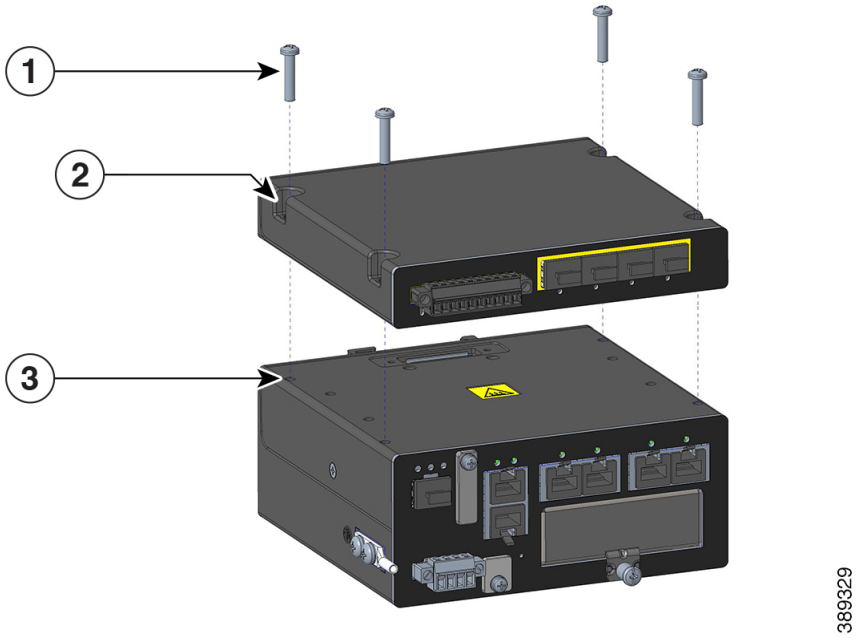
Figure 66: Protective Cover



1	Phillips head screws
2	Protective cover
3	Cover mounting holes

Step 2 After removing the protective connector cover from the IR1101, carefully align the Expansion Module with the IR1101 so that the mating connectors engage. Once the Expansion Module is seated, secure it to the IR1101 with four mating screws.

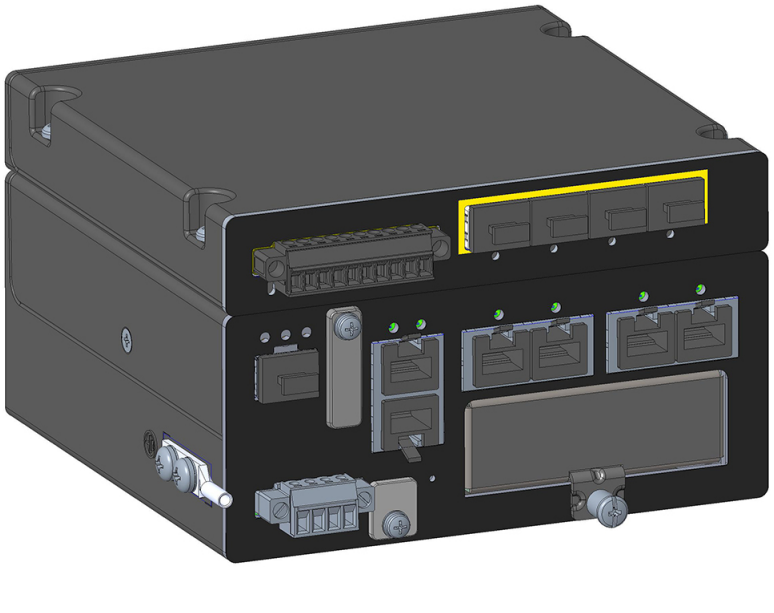
Figure 67: Mounting the Expansion Module



1	Mating screws
2	Expansion mating screw holes
3	Mounting holes

Step 3 Tighten the screws to a torque of 13-15 in. lbs (1.5-1.7 Nm). When complete, the two devices form a single assembly.

Figure 68: Completed Assembly



Mounting the IR1101 Router with the IRM-1100-4S8I Expansion Module Attached

After the Cisco IRM-1100-4S8I module is attached to the IR1101, it can be mounted in the following ways:

- On a DIN Rail
- Using mounting brackets

Note For the remainder of these instructions, we will refer to the combined IR1101/IRM-1100-4S8I as the “Device”.

Mounting the Device Using Mounting Brackets

The wall mounting kit part number is IR1101-WALLMNT and contains the following:

- Mounting brackets (x2)
- Mounting screws (x4)

Warning **Statement 1094**—Read Wall-Mounting Instructions Before Installation

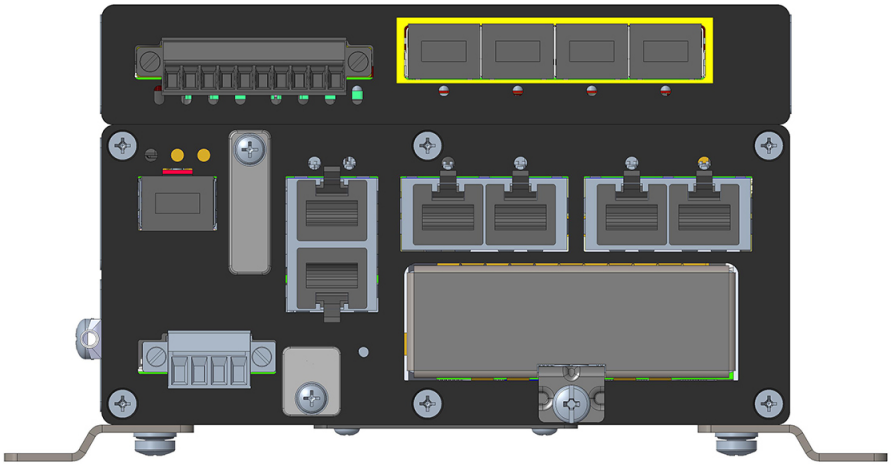
Read the wall-mounting instructions carefully before beginning installation. Failure to use the correct hardware or to follow the correct procedures could result in a hazardous situation to people and damage to the system.

Tip When choosing a location for wall-mounting the Device, consider cable limitations and wall structure.

Note A minimum of 1 inch clearance is required on all sides of the device except for the side mounted against the wall/floor or DIN rail, to allow for proper air flow.

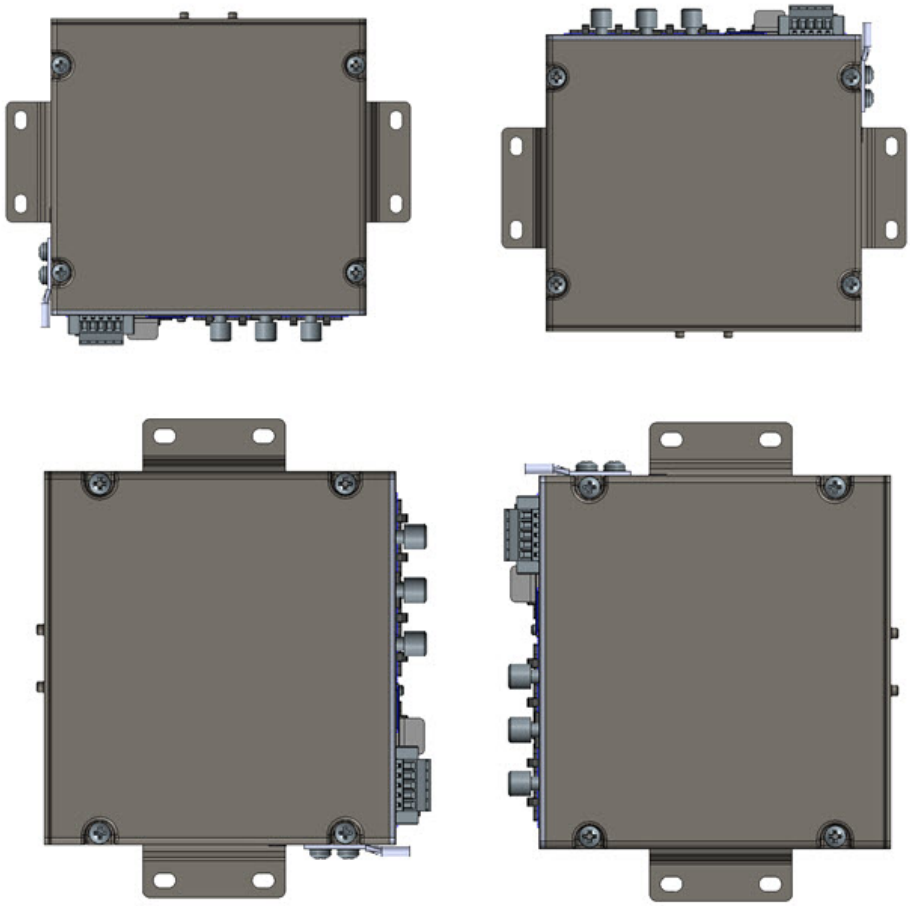
The Device can be mounted on the top of a flat surface as shown in the following figure, but cannot be mounted upside down.

Figure 69: Table Mounting



The device can also be mounted vertically on a wall in four orientations as shown in the following figure.

Figure 70: Wall Mounting

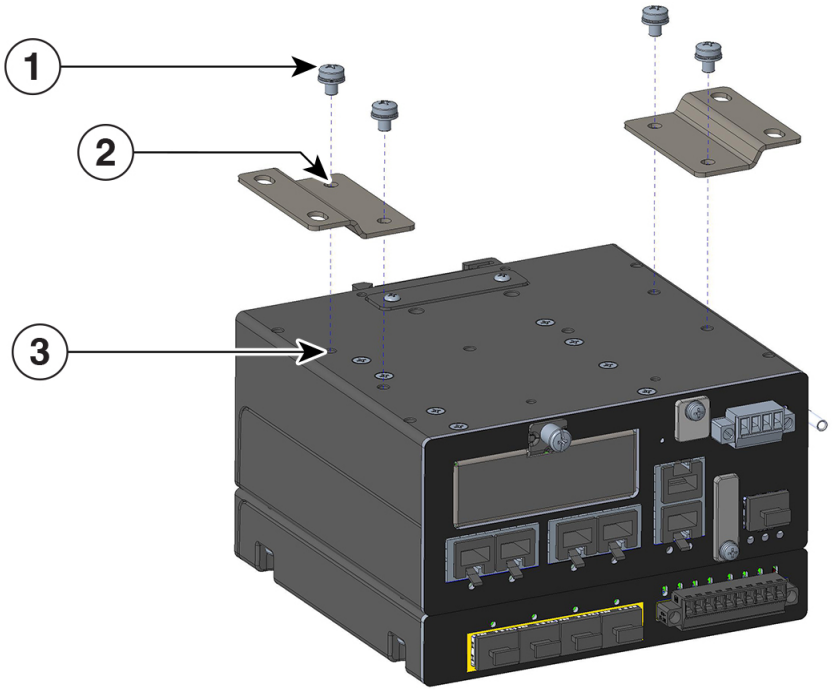


To mount the Device on a wall or other flat surface, follow these steps:

Procedure

Step 1 Attach the mounting brackets to the bottom of the device.

Figure 71: Mounting Brackets



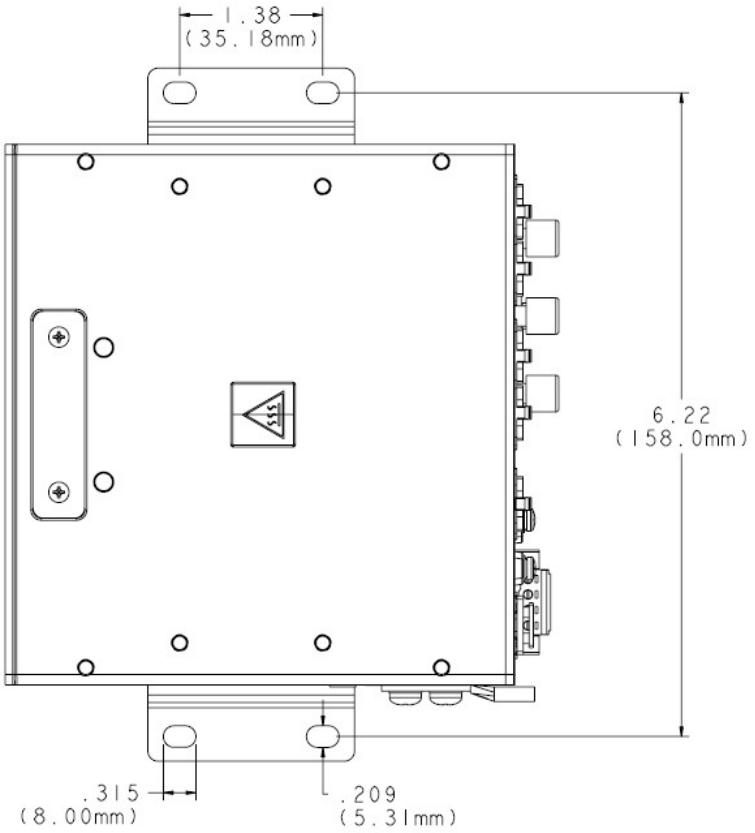
1	Provided screws
2	Holes in provided mounting brackets
3	Mounting holes

Step 2 Align the mounting brackets with the mounting holes, ensuring that the larger holes on the brackets extend beyond the edge of the device.

Step 3 Attach the brackets to the device using the four provided screws and a Phillips head driver. Tighten the screws to a torque of 13–15 in-lbs (1.5–1.7 Nm).

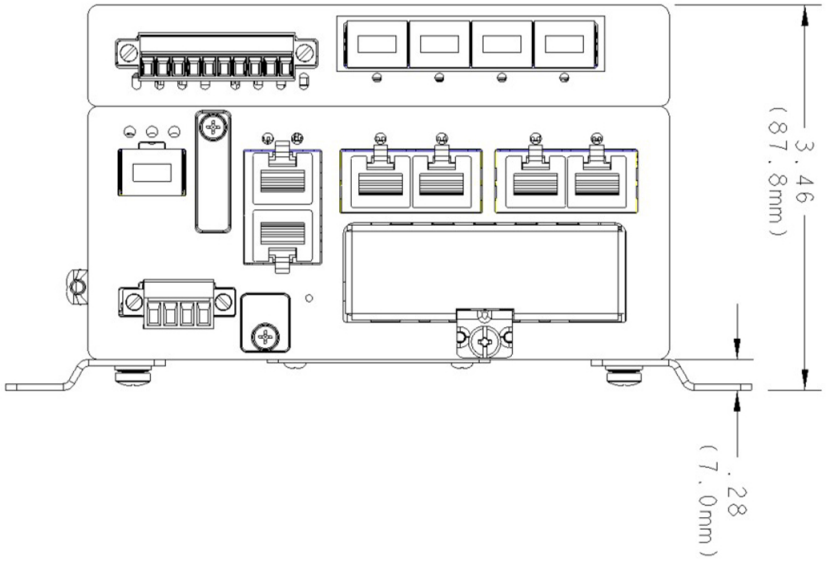
Step 4 Mount the device with the attached brackets to a suitable wall structure capable of supporting the combined weight of 3.85 lbs. Refer to the following figures for the mounting hole dimensions with the brackets attached.

Figure 72: Wall/Floor mounting hole dimensions with mounting brackets attached



Note
When mounting the device with the brackets attached to a surface, it is recommended to use four customer-provided #10-32 screws.

Figure 73: Wall/Floor mounting clearance and overall dimensions with mounting brackets attached

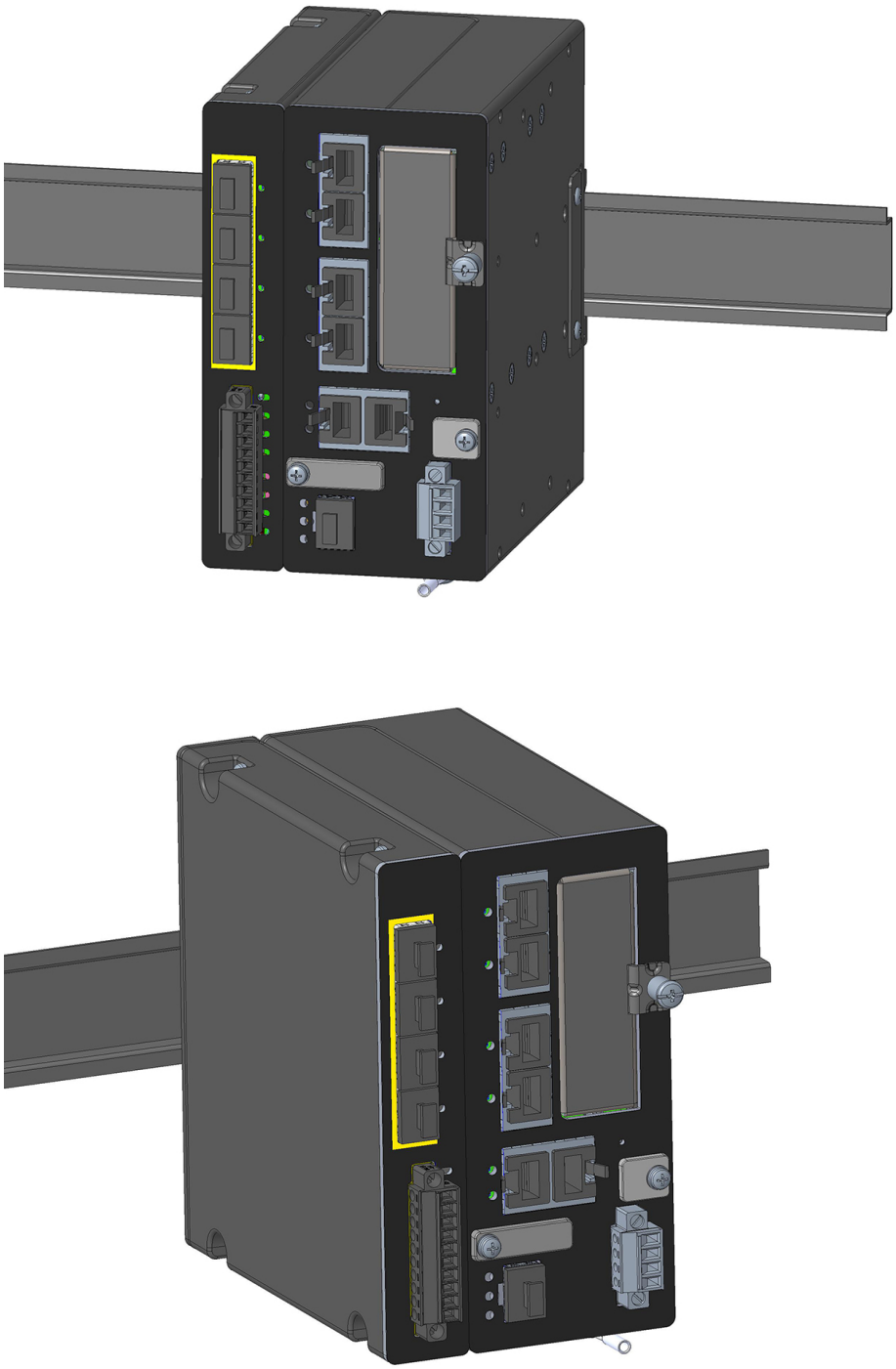


Step 5 Route the cables to avoid placing strain on the connectors or mounting hardware.

Installing a DIN Rail

The DIN rail kit is ordered separately (part number IRM-1100-DINRAIL). The device must be mounted vertically, with the ground lug positioned on the bottom.

Figure 74: Device Orientation

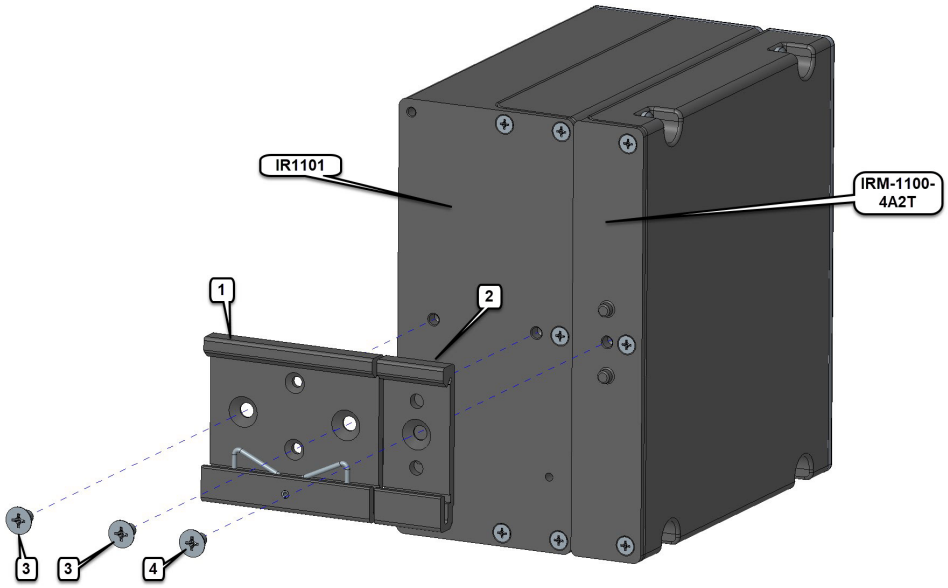


Mounting the DIN Rail Bracket on the Device

Procedure

Step 1 Attach the DIN rail brackets to the back of the device. There are two separate mounting brackets: one attaches to the IR1101, and the other attaches to the IRM-1100-4S8I. The combined DIN rail brackets mount in a vertical orientation only.

Figure 75: Attaching the DIN Rail Brackets



1	DIN mounting bracket
2	IRM-1100-DINRAIL mounting bracket
3	Screws from IR1101 kit
4	Screw from IRM-1100-DINRAIL kit

Step 2 Attach the DIN rail mounting bracket to the device using the two screws provided in the kit. Position the bracket over the two mounting holes, then tighten the screws to a torque of 13–15 in-lbs (1.5–1.7 Nm).

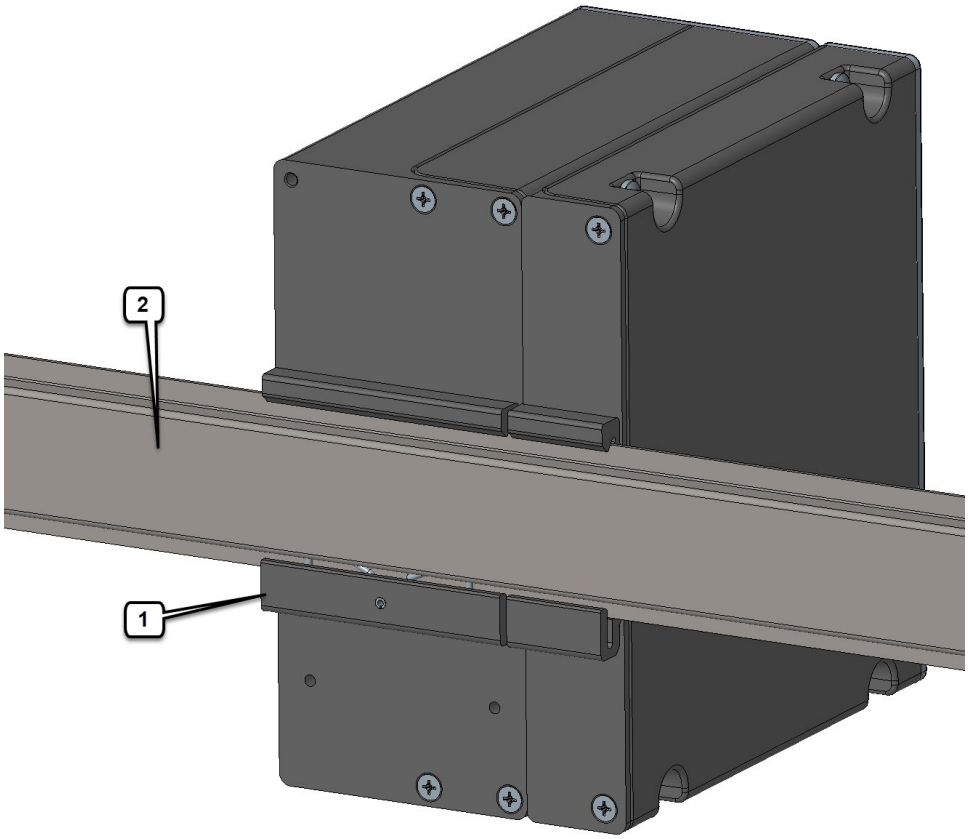
Step 3 Attach the IRM-1100-DINRAIL mounting bracket to the device using the screw provided in the kit. Position the bracket over the mounting hole, then tighten the screw to a torque of 13–15 in-lbs (1.5–1.7 Nm).

Step 4 Once the two brackets are attached to the device, you can mount it onto the DIN rail.

Attaching the Bracket Onto the DIN Rail

To attach the Device with the brackets to a DIN rail, follow these steps.

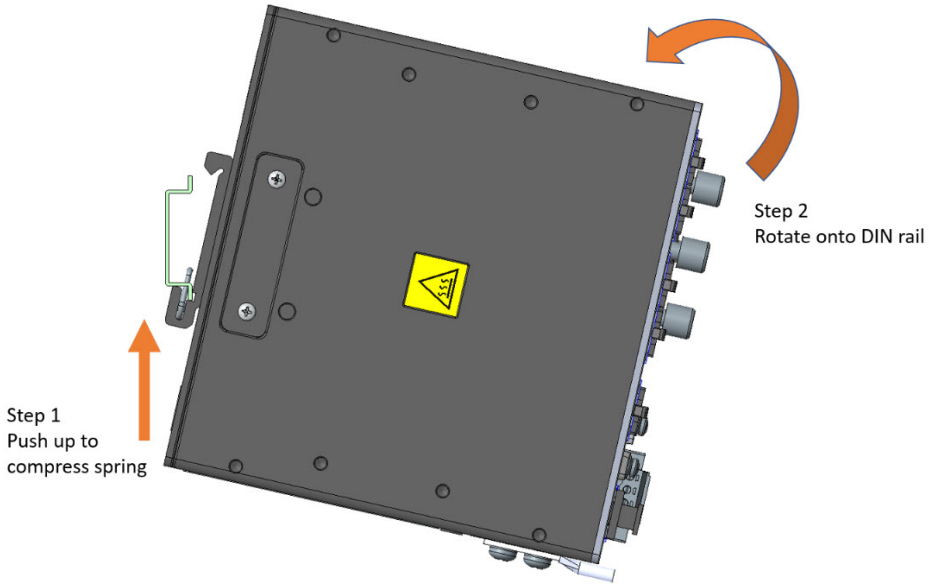
Figure 76: Attaching the Brackets to the DIN Rail



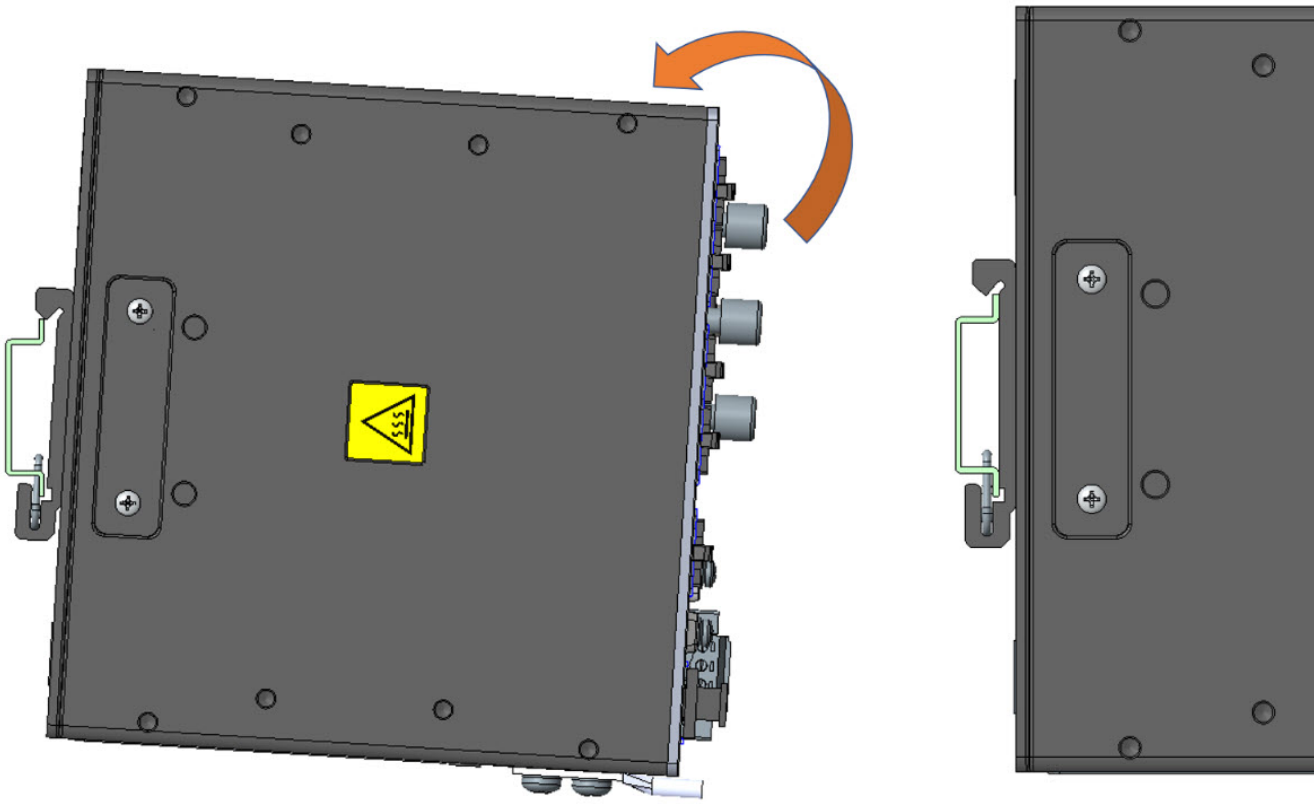
1	DIN rail clips
2	DIN rail

Procedure

Step 1 Position the router so that the lower edge and spring of the DIN clip, located within the bottom of the DIN rail bracket, engages with the bottom section of the DIN rail. Push up to compress the spring.



Step 2 Rotate the router so that the top hook of the DIN clip clamps to the top section of DIN rail.



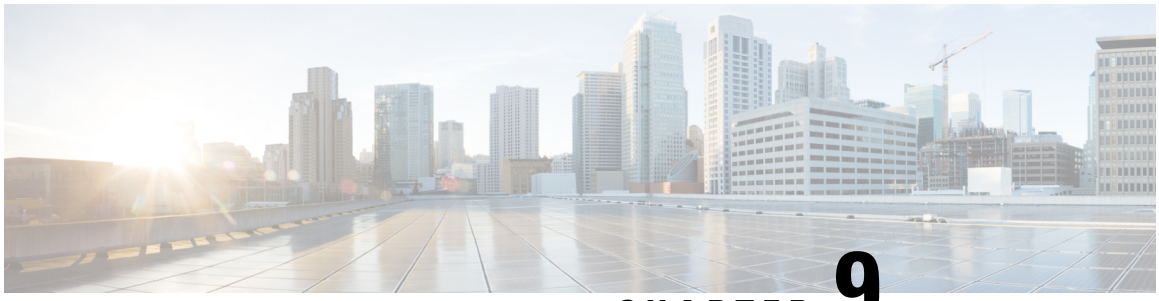
Step 3 To remove the device from the DIN Rail, simply reverse the procedure.

Note

To prevent excessive side-to-side movement of the unit, install DIN rail stop plates such as Mouser part numbers 653-PFP-M, 651-1201662, or 845-CA402. These stop plates can be installed on one or both sides of the unit to limit movement, especially in high-vibration environments.

What to do next

After you install and properly ground the device, you can connect the power wiring, LAN cables, and administrative access cables as required for your installation.



CHAPTER 9

Antenna Selection and Installation

This chapter contains the following sections:

- Antenna Selection and Installation, on page 123
- Antenna Installation Best Practices, on page 123
- Supported Antennas for the IR1101, on page 125
- Supported Accessories for the IR1101, on page 125

Antenna Selection and Installation

Note Before you install the Cisco IR1101 Integrated Services Router on a table, wall, or DIN rail, install the antennas on the Pluggable Module. It is difficult to install the antennas after the router is installed.

The following section contains information for installing antennas with the base IR1101 router with or without the Expansion Modules, using P-LTE-xx or P-LTEA-xx cellular modules. There are three RF SMA(f) connectors on the Pluggable Module. Two connectors, Main and Div (diversity) are used to connect to the 4G/LTE modem. The third connector is used for GPS. The Diversity port may also be referred to as an Aux connector.

Antenna Installation Best Practices

The optimal site location for antennas for 4G routers and cellular modules plays a significant role in determining overall cellular link performance. Routers located at the farthest coverage points might have 10 to 50 percent of the bandwidth available compared to routers located closer to the cellular base station tower, away from obstructions, and with an unobstructed view of the cellular tower.

Because antennas transmit and receive radio signals over the air, the signal propagation and antenna performance may be adversely affected by the surrounding environment, including physical obstructions. Radio frequency (RF) interference may also occur between wireless systems located close to each other, especially if the antennas of these systems are located close to each other. Interference may also occur when the antenna is in close proximity to cable clutter or other sources of radio interference.

Follow these guidelines to ensure the best possible performance:

- When you use any cellular antennas such as 3G UMTS, 4G/LTE, 4G/LTEA (LTE Advanced) with a modular router and a pluggable module, try to mount the antenna a certain distance away from the router. For example, in indoor deployments, an appropriate extension cable and antenna stand can be utilized. For outdoor installations, choose a suitable outdoor antenna, and mount it away from obstructions that ideally have a direct view of the cellular tower. The antenna performance, and therefore that of the router, will not be optimal if mounted directly on a pluggable module. Primary reasons for possible degradation of performance include:
  - Obstruction of the router antenna view of the cellular base station tower by Ethernet cables, power cables, USB cables, and walls.
  - Possible coupling of digital noise from inside the router to the antenna when unshielded Ethernet cables are used.
- Keep antennas away from electrical and signal cable clutter. Metal conductors inside cables may block antenna view of the base station. Additionally, unshielded (and even shielded cables in some cases) may radiate signals that interfere with RF signal reception.
- It is recommended that all cellular antennas for the IR1101 are oriented vertically to ensure polarization match. While polarization of the signal may change as it is reflected from obstructions, when the view is unobstructed - vertical polarization is optimal.
- When installing the IR1101 with or without the Expansion Modules, the following note is important:



Note When cellular FDD Band 5 is deployed with 3G WCDMA, 4G/LTE or 4G/LTEA C/A, such as with P-LTE-US or P-LTEA-EA pluggable modules on certain carriers, ensure that both Main and Aux cellular antennas are physically separated from the IR1101 chassis by a minimum of 5 feet (1.5 meters). This note only affects P-LTE-xx receiver operation in Band 5 in a narrow 875 MHz frequency range. No significant effect on the P-LTE-xx cellular Band 5 receiver has been measured when antennas are separated from the chassis by more than 5 feet (1.5 meters). This note does not apply when the receive signal does not overlap 875 MHz, such as when operating on other bands, or other frequencies within FDD Band 5.

- For optimal MIMO performance, space cellular Main and Aux antennas apart by at least 17 inches (43 cm). At the lowest LTE frequency of 700 MHz, 17 inches represents 1 wavelength. Spacing of half (or 0.5) wavelength or 8.5 inch (22.5cm) results in good MIMO performance.
- Spacing Main and Aux LTE antennas less than 8.5 inches may result in significantly reduced MIMO performance.
- Spacing antennas too close to each other (e.g. 3 inches) results in antennas significantly detuning from their original designed performance due to antenna coupling.
- Wherever possible, mount the IR1101 router with the pluggable LTE module and antenna where the cellular base station or tower are within sight and without physical obstructions. Barriers along the line of sight between the router and the local base station will degrade the wireless radio signals. Install the IR1101, pluggable modules and antennas above floor level in office environments or near the ceiling for better performance because most obstructions tend to be near the floor level.
- The density of the materials used in a building's construction determines the number of walls the signal must pass through while still maintaining adequate coverage. Consider the following before choosing the location for installing the antenna:

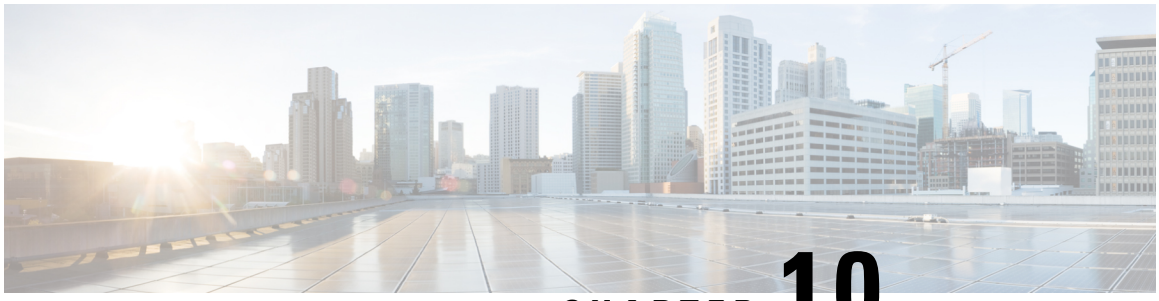
  - Paper and vinyl walls have very little effect on signal penetration.
  - Solid and precast concrete walls limit signal penetration to one or two walls without degradation of coverage.
  - Concrete and wood block walls limit signal penetration to three or four walls.
  - A signal can penetrate five or six walls constructed of drywall or wood.
  - A thick metal wall or wire-mesh stucco wall causes signals to reflect back and causes poor penetration.
- Avoid mounting the antenna next to a column or vertical support that could create a shadow zone and reduce the coverage area.
- Keep the antenna away from reflective metal objects such as heating and air-conditioning ducts, large ceiling trusses, building superstructures, and major power cabling runs. If necessary, use an extension cable to relocate the antenna away from these obstructions.

Supported Antennas for the IR1101

All of the currently supported antennas are broken down by functional groups in the Cisco Industrial Routers and Industrial Wireless Access Points Antenna Guide. Details are found in the Antenna Selection Table.

Supported Accessories for the IR1101

All of the currently supported accessories are broken down by functional groups in the Cisco Industrial Routers and Industrial Wireless Access Points Antenna Guide. Details are found in the Cisco RF Cables, Adapters, Lightning Arrestors, Extension Bases and other Accessories chapter.



CHAPTER 10

Connecting the Router

This section contains the following:

- Preparing to Connect the Router, on page 127
- Connecting to DC Power, on page 128
- Serial Port Cable, on page 131
- Verifying Connections, on page 137

Preparing to Connect the Router

This chapter describes how to connect the IR1101 to Ethernet devices and a network.

Before you connect the router to the devices, install the router according to the instructions in Installing the Router, on page 29 .

Preventing Damage to the Router

To prevent damage to your router, turn off power to the devices and to the router until all connections are completed.

Caution Do not turn on the devices until after you have completed all connections to the router.

Connecting a PC, Server, or Workstation

To connect a PC (or other Ethernet devices) to an Ethernet switch port, follow these steps:

1. Connect one end of the Ethernet cable to an Ethernet switch port on the router.
2. Connect the other end of the cable to the RJ-45 port on the network interface card (NIC) that is installed in the PC, server, or workstation.
3. (Optional) Connect additional servers, PCs, or workstations to the other Ethernet switch ports.

Connecting a PC to the Console Port

Connect a PC to the Console port either to configure the software by using the CLI or to troubleshoot problems with the router. To connect a terminal or PC to the console port on the router and access the CLI, follow these steps:

Note On earlier models of the device, the console port speed was set at 115200. Later models had the console port speed switched to 9600.

Procedure

Step 1 Connect the mini-USB console cable to the console port on the router.

Step 2 Connect the opposite end of the mini-USB cable to the USB port on your laptop or PC.

Step 3 To communicate with the router, wait for your laptop or PC to discover the new device.

Step 4 If your laptop or PC warns you that you do not have the proper drivers to communicate with the router, you can obtain them from your computers manufacturer, or go here: https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers

Connecting to DC Power

Warning This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than 60 VDC minimum, 5A maximum. **Statement 1005**

Warning Connect the unit only to DC power source that complies with the safety extra-low voltage (SELV) requirements in IEC 60950 based safety standards. **Statement 1033**

Warning This product requires short-circuit (overcurrent) protection, to be provided as part of the building installation. Install only in accordance with national and local wiring regulations. **Statement 1045**

Plugs and Pin-Outs

The IR1101 ships with a DC power accessory kit.

The power entry receptacle is on the IR1101. The pin-outs are shown in the following figure.

Figure 77: Power Connector Pin-outs

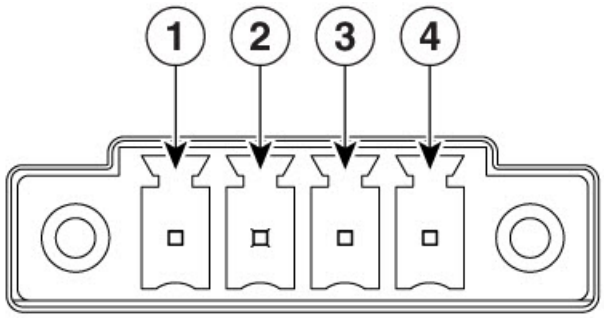
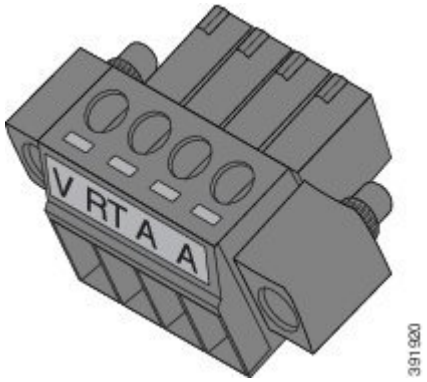


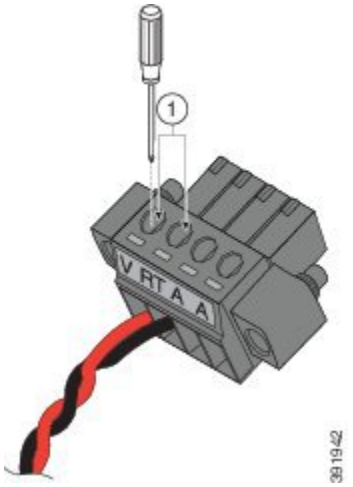
Table 20: Power connector Descriptions

Pin Number	Name	Description
1	DC In +	DC Power Positive Input
2	DC In -	DC Power Return (GND-)
3	AC	Alarm Common
4	AI	Alarm Input

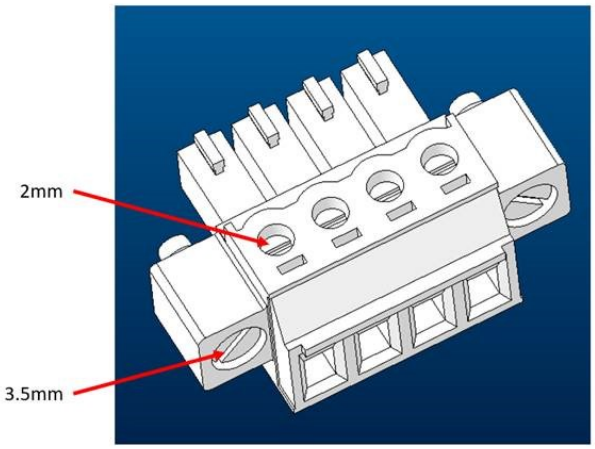
Wiring the DC Power

To connect the DC power on your Cisco IR1101, follow these steps:

1.	Locate the power and alarm connector on the router front panel. **Note** Your connector may not have the labels V RT A A. In the labeled connector, the pins are: V—Positive DC power connection RT— Return DC power connection A— Alarm Common A— Alarm Input	

2.	Identify the connector positive and return DC power connections. The connections left to right are: **1.** Positive DC power connection **2.** Return DC power connection **3.** Alarm Common **4.** Alarm Input	
3.	Measure two strands of twisted-pair copper wire (18-to-20 AWG) long enough to connect to the DC power source.	
4.	Using an 18-gauge wire-stripping tool, strip each of the two twisted pair wires coming from each DC-input power source to 0.25 inch (6.3 mm) ± 0.02 inch (0.5 mm). Do not strip more than 0.27 inch (6.8 mm) of insulation from the wire. Stripping more than the recommended amount of wire can leave exposed wire from the power connector after installation.	
5.	Remove the two captive screws that attach the power and alarm connector to the router, and remove the connector.	
6.	On the power and alarm connector, insert the exposed part of the positive wire into the connection labeled "V" and the exposed part of the return wire into the connection labeled "RT". Make sure that you cannot see any wire lead. Only wire with insulation should extend from the connector. **Note** Use the same method for wiring the alarm connections.	 1—Power connector captive screws
7.	Use a ratcheting torque flathead screwdriver to tighten the power connector captive screws (above the installed wire leads) to their proper torque. See the figure and details below.	
8.	Connect the other end of the positive wire to the positive terminal on the DC power source, and connect the other end of the return wire to the return terminal on the DC power source. Connect the other end of the Alarm wires to your alarm source.	

Refer to the following graphic for details on blade size and torque:



Torque to the following values:

- Flathead 2mm screwdriver for top power supply screws to 2 inch LBF
- Flathead 3.5mm screwdriver for power supply mating screws to 1 - 1.6 inch LBF

Serial Port Cable

One of the more common causes for tech support calls to Cisco is improper pinouts for serial port cables. This section will describe the different components that make up the serial cabling for the IoT routers.

Note The most common type of serial connector found is the DB9. That will be the focus for this section.

One of the popular ways to build a serial cable is through the use of a RJ-45 to DB9 adapter. These adapters can be ordered from numerous sources Online, or purchased in electronics stores. They typically come as a fixed RJ-45 female connector with loose wires, which can be inserted into a DB9 connector to match the pinouts that you need. See the following graphic.

Figure 78: RJ-45 to DB9 Adapter



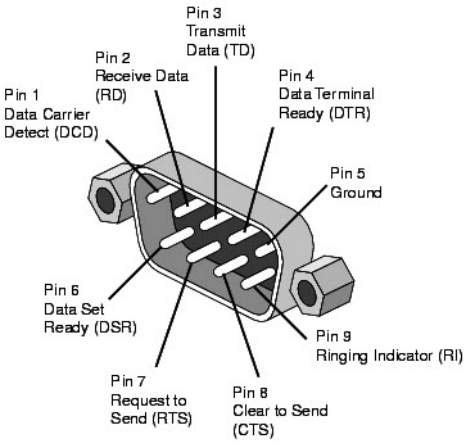
Make note of the front side versus the back side of the connector. This is important when pinning the wires into the connector. In the graphic above, the front of the DB9 connector is present. When it is pinned, it becomes the male side of the connector.

DB9 Adapter Side

The loose side of the adapter is the DB9 side.

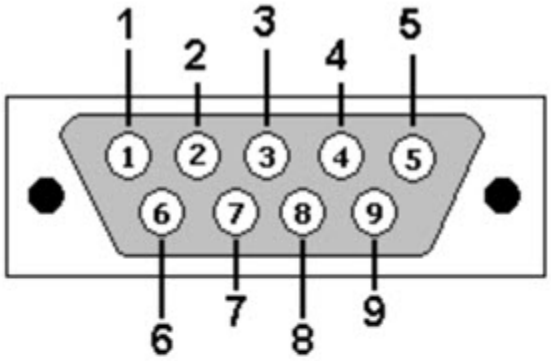
See the following graphic for an example of a typical DB9 connector with the signal names.

Figure 79: RS-232 DB9 Male connector Male View

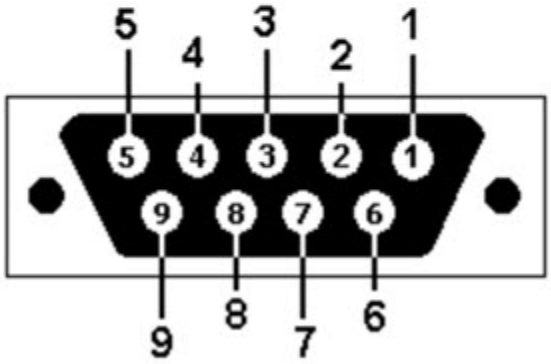


A common cause of confusion when building a connector is the perspective of how you are viewing the pinouts. The pinouts are different from the male versus female views when building the connector. See the following graphic.

Figure 80: DB9 Pinout Views



DB9: View looking into male connector



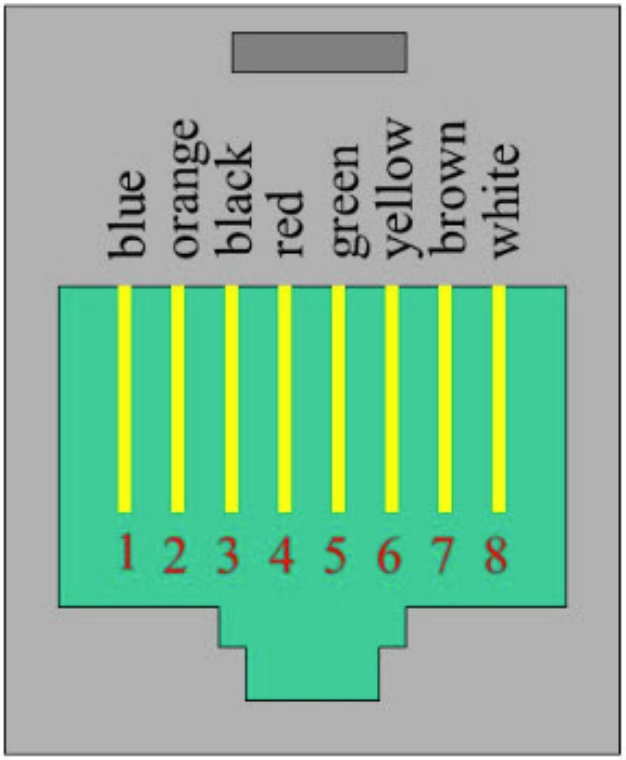
DB9: View looking into female connector

RJ-45 Adapter Side

The RJ-45 female side of the connector, as previously mentioned, has fixed wires on the connector. Refer to the following graphic for the pinouts, as well as the wire colors.

Note White can also be Gray, depending on the adapter manufacturer.

Figure 81: RJ-45 Female Pinouts



Now that both sides of the adapter have been explained, the next step is to place the pins into the proper holes of the DB9 side of the connector. This is done with the use of a pinning tool. An example of a common pinning tool is found in the following graphic.

Figure 82: Pinning Tool



There is a very good video on the use of a pinning tool that is found here .

The proper pinouts for a serial port are found in the following two tables.

Table 21: RJ45 to DB9 Male Adapter

RJ-45 Pins	Wire Color	DB9 Pins
1	Blue	6
2	Orange	1
3	Black	4
4	Red	5
5	Green	2
6	Yellow	3
7	Brown	8
8	White or Gray	7

Note The above table describes the pinouts for a RJ45 to DB9 (male) Adapter. This allows connection from a local RJ45 DTE port to a far-end DCE DB9 port.

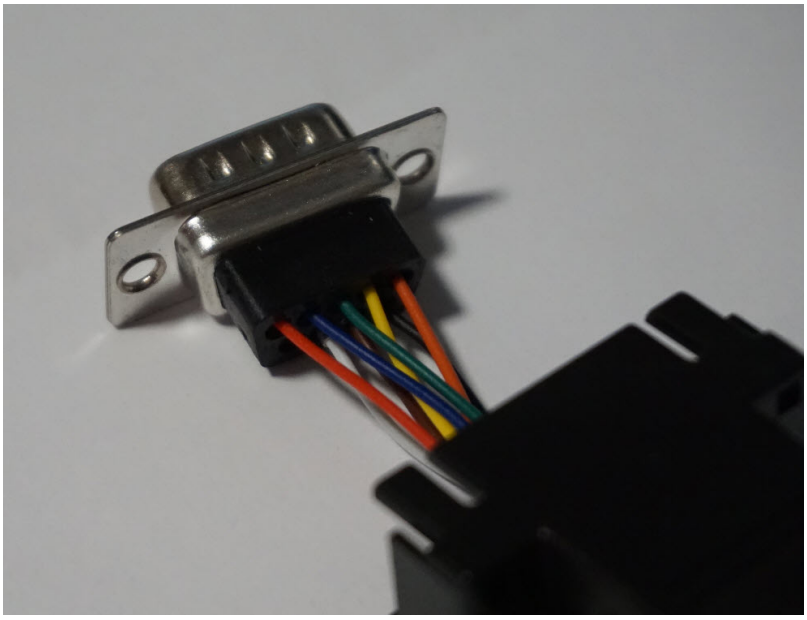
Table 22: RJ45 to DB9 Female Null Modem Adapter

RJ-45 Pins	Wire Color	DB9 Pins
1	Blue	4
2	Orange	1
3	Black	6
4	Red	5
5	Green	3
6	Yellow	2
7	Brown	7
8	White or Gray	8

Note the above table describes the pinouts for a RJ45 to DB9 (female) Null Modem Adapter. This allows connection from a local RJ45 DTE port to a far-end DTE DB9 port.

Place the pins into their proper sockets using the pinning tool, and when that is complete you should have a connector that looks similar to the following picture.

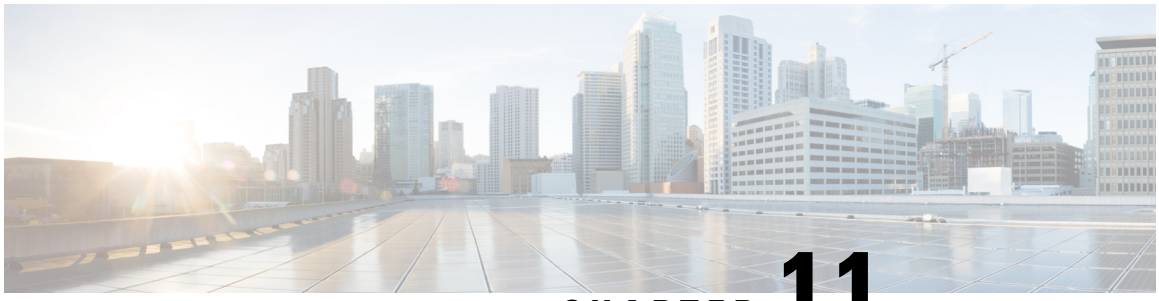
Figure 83: Completed Pinning



Snap the DB9 side of the adapter into place on the plastic connector holding the RJ-45 side of the connector. When this is complete, your connector is ready to use.

Verifying Connections

To verify that all devices are properly connected to the router, first turn on all the connected devices, then check the LEDs. To verify router operation, refer to the Front Panel Icons and LEDs, on page 21.



CHAPTER 11

Technical Specifications

This section contains the following:

- Technical Specifications, on page 139
- Router Specifications, on page 139
- Modem Specifications, on page 141

Technical Specifications

This appendix provides router and modem information for the IR1101 series.

Complete specifications for the IR1101 series can be found in the marketing data sheet.

Note Complete Regulatory Compliance and Safety Information is found online.

Router Specifications

Caution Operating the router outside of the limits specified is not supported.

IR1101 Base Unit

The following table lists the Base Unit specifications:

Table 23: Cisco IR1101 Specifications

Description	Design Specification
Dimensions	Inches: 2.3 (H) x 5.2 (W) x 4.9 (D) Millimeters: 58.4 (H) x 132.0 (W) x 124.5 (D)
Weight	2.25 lbs.

Description	Design Specification
Ingress Protection Rating	IP 30
Humidity	Non-condensing Relative Humidity: 5% to 95%
Standard Safety Certifications	UL 60950-1, 2nd edition; CAN/CSA C22.2 No. 60950-1, 2nd edition, EN 60950-1, 2nd edition; CB to IEC 60950-1, 2nd edition with all group differences and national deviations.
Operating Temperature and Altitude on the Base IR1101 with P-LTE-xx and P-LTE-xxx Pluggables using WP7600 Series Modems. **Note** See Modem Specifications, on page 141 for the EM74XX Series Modems. **Note** Please see Modem Support for Cisco P-LTE Pluggable Product IDs (PIDs) and corresponding modem series numbers.	-40° to 140°F (-40° to 60°C) in a sealed NEMA cabinet with no airflow -40° to 158°F (-40° to 70°C) in a vented cabinet with 40 LFM of air -40° to 167°F (-40° to 75°C) in a forced air enclosure with 200 LFM of air (type tested at +85°C for 16 hours). **Note** This product has been safety certified up to 60°C maximum ambient.-500 to 5,000 feet. Derate max operating temperature 1.5°C per 1000 feet.
Input Voltage	Nominal voltage: 12V to 48V DC Min/Max voltage: 9.6V to 60V DC input
Typical Current	12V - 0.72A 24V - 0.36A 59.8V - 0.17A
Typical/Maximum Power Consumption	Without LTE Pluggable: Typical 7.7W, Maximum 10W. With LTE Pluggable: Typical 10W, Maximum 13W.

IRM-1100 Expansion Unit

The following table lists the Expansion Unit specifications:

Table 24: Cisco IRM-1100 Specifications

Description	Design Specification
Dimensions	Inches: 1.3 (H) x 5.2 (W) x 4.9 (D) Millimeters: 33.0 (H) x 132.0 (W) x 124.5 (D)
Weight	1.6 lbs.
Ingress Protection Rating	IP 30
Humidity	Non-condensing Relative Humidity: 5% to 95%

Description	Design Specification
Standard Safety Certifications	UL 60950-1, 2nd edition; CAN/CSA C22.2 No. 60950-1, 2nd edition, EN 60950-1, 2nd edition; CB to IEC 60950-1, 2nd edition with all group differences and national deviations.
Operating Temperature and Altitude on the Expansion IRM-1100 with P-LTE-xx and P-LTE-xxx Pluggables utilizing WP7600 Series Modems. **Note** See Modem Specifications, on page 141 for the EM74XX Series Modems.	-40° to 140°F (-40° to 60°C) in a sealed NEMA cabinet with no airflow -40° to 158°F (-40° to 70°C) in a vented cabinet with 40 LFM of air -40° to 167°F (-40° to 75°C) in a forced air enclosure with 200 LFM of air (type tested at +85°C for 16 hours) **Note** This product has been safety certified up to 60°C maximum ambient.-500 to 5,000 feet. Derate max operating temperature 1.5°C per 1000 feet.

IRM-1100-4A2T Expansion Unit

The following table lists the Expansion Unit specifications:

Table 25: Cisco IRM-1100-4A2T Specifications

Description	Design Specification
Dimensions	13.3cm W x 12.35cm L x 6.0cm H
Weight	1.6 lbs.
Ingress Protection Rating	IP30 Chassis. Class A EMC or better.
Humidity	Non-condensing Relative Humidity: 5% to 95%
Standard Safety Certifications	UL 60950-1, 2nd edition; CAN/CSA C22.2 No. 60950-1, 2nd edition, EN 60950-1, 2nd edition; CB to IEC 60950-1, 2nd edition with all group differences and national deviations.
Operating Temperature and Altitude	Industrial temperature (-40C to +85C internal component temperature range) -40C to +60C operating temperature (outside ambient) 5Kft altitude

Modem Specifications

The EM74XX series modems have different performance numbers than the WP7600 series modems do. The EM74XX series will experience reduced (throttled) performance in conditions where the ambient temperature reaches high levels. Refer to the following table for details on temperature/airflow and performance throughput.

Table 26: Specifications for the IR1101 and IRM-1100 with EM74XX Series Modems and P-LTEA-LA and P-LTEA-EA modules

Maximum Ambient Temperature (C/F)	Air Flow (LFM)	Hardware	Throughput Performance
50°/122°	0	IR1101	Normal
60°/140°	0	IR1101	Throttled
60°/140°	40	IR1101	Throttled
65°/149°	200	IR1101	Throttled
50°/122°	0	IR1101 plus IRM-1100	Normal
55°/131°	40	IR1101 plus IRM-1100	Normal
60°/141°	200	IR1101 plus IRM-1100	Normal

Table 27: Specifications for the IR1101 and LM960A18 modem, P-LTEAP18-GL pluggable module

Maximum Ambient Temp (°C/°F)	Air Flow (LFM)	Chassis Hardware	LTE Throughput Performance
50°/122°	0	IR1101	Normal
55°/131°	0	IR1101	LTE Uplink throttled
60°/140°	0	IR1101	LTE Uplink (UL) throttled, and UL RF transmit power reduced on 50% of LTE frames. Uplink communication range reduced on 50% of LTE frames.
65°/149°	0	IR1101	Same as 60C, 0 LFM and downlink (DL) C/A carrier aggregation is disabled.
70°/158°	40	IR1101	Same as 65C, 0 LFM

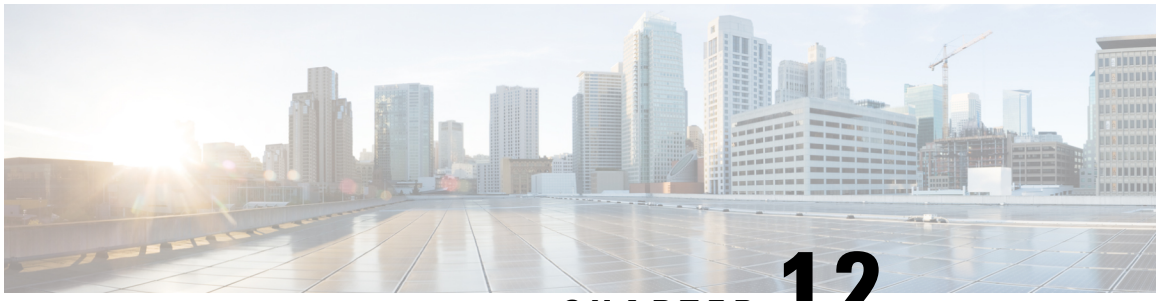
Table 28: Specifications for the IR1101 and IRM-1100 with EM74XX Series Modems and P-LTEA7-XX modules

MaximumAmbient Temperature (C/F)	AirFlow (LFM)	Hardware	ThroughputPerformance
60℃/140℉	0	IR1101 plus IRM-1100	Normal
65℃/149℉	40	IR1101 plus IRM-1100	Throttled
70℃/158℉	200	IR1101 plus IRM-1100	Throttled

The EM9293 modems will experience reduced (throttled) performance in conditions where the ambient temperature reaches high levels. Refer to the following table for details on temperature/airflow and performance throughput.

Table 29: Specifications for the IR1101 and IRM-1100 with EM9293 Modems and P-5GS6-R16SA-GL modules

MaximumAmbient Temperature (C/F)	AirFlow (LFM)	Hardware	ThroughputPerformance
50℃/122℉	0	IR1101 plus IRM-1100	Normal
60℃/140℉	40	IR1101 plus IRM-1100	Throttled
65℃/149℉	200	IR1101 plus IRM-1100	Throttled



CHAPTER 12

Regulatory Compliance

This chapter contains the following sections:

- Related Documentation, on page 145
- Installation Warning and Caution Statements, on page 146
- Hazardous Locations Standards and Marking Strings, on page 148
- EMC Information, on page 148
- Class A Notice for FCC, on page 148
- Industry Canada, on page 149
- European Community, Switzerland, Norway, Iceland, and Liechtenstein, on page 150
- Declaration of Conformity for RF Exposure, on page 150
- EMC Class A Notices and Warnings, on page 153
- National Restrictions, on page 155
- Taiwan, on page 156
- **Statement 1008**—Class 1 Laser Product, on page 156
- Changing Output Power, on page 156
- Antennas, on page 157

Related Documentation

All of the IR1101 documentation can be found online here:

- Product support page: https://www.cisco.com/c/en/us/support/routers/1101-industrial-integrated-services-router/model.html
- Datasheet: https://www.cisco.com/c/en/us/products/collateral/routers/1101-industrial-integrated-services-router/datasheet-c78-741709.html
- Regulatory Compliance and Safety Information: https://www.cisco.com/c/dam/en/us/td/docs/IIOT/compliance/routers/rcsi-0502-book.pdf
- Statement of Volatility: https://trustportal.cisco.com/c/r/ctp/trust-portal.html?search_keyword=1101#/19339541724455836

Installation Warning and Caution Statements

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device.**Statement 1071**

Warning The product is to be connected to a IEC 60950 compliant limited power source (LPS). **Statement 170**

Warning In order to comply with FCC radio frequency (RF) exposure limits, antennas for this product should be located a minimum of 11.8 in. (30 cm) or more from the body of all persons. **Statement 332**

Warning This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 60Vdc minimum, 5A maximum. **Statement 1005**

Warning This unit is intended for installation in restricted access areas. A restricted access area can be accessed only through the use of a special tool, lock and key, or other means of security. **Statement 1017**

Warning This equipment must be grounded. Never defeat the ground conductor or operate the equipment in the absence of a suitably installed ground conductor. Contact the appropriate electrical inspection authority or an electrician if you are uncertain that suitable grounding is available. **Statement 1024**

Warning Only trained and qualified personnel should be allowed to install, replace, or service this equipment. **Statement 1030**

Warning Ultimate disposal of this product should be handled according to all national laws and regulations. **Statement 1040**

Warning To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of 140°F (60°C). **Statement 1047**



Warning Use twisted-pair supply wires suitable for 86°F (30°C) above surrounding ambient temperature outside the enclosure. **Statement 1067**



Warning Installation of the equipment must comply with local and national electric codes. **Statement 1074**



Warning Avoid using or servicing any equipment that has outdoor connections during an electrical storm. There may be a risk of electric shock from lightning. **Statement 1088**



Caution When installed in a Class 1, Division 2 hazardous locations environment, equipment shall be installed in an enclosure suitable for the area. The enclosure shall be accessible by a tool only.



Caution Airflow around the router must be unrestricted. The dimensions (height x width x depth) are 7.70 x 11 x 1.73 in. (19.6 x 27.9 x 4.39 cm). Contact your Cisco Technical Assistance Centre (TAC) if tighter spacing is required.



Caution The equipment shall only be used in an area of at least pollution degree 2, as defined in EN 60664-1. The equipment shall be installed in a certified enclosure that provides a degree of protection not less than IP 54 in accordance with EN IEC 60079-0 and accessible only by the use of a tool.



Note Antennas attached to the equipment must be contained withing the IP54 enclosure.



Note This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or only nonhazardous locations.



Note This equipment is rated as follows: maximum operating range: 9.6V to 60V, marked 12-48Vdc.



Note The maximum ambient operating temperature range is –40 to 140°F (–40 to 60°C).

Hazardous Locations Standards and Marking Strings

The following standards were used for the hazardous locations approvals and certifications:

- CSA C22.2 No. 60079-0:19, 4th Ed., Issued 2019-0
- CAN/CSA-C22.2 No. 60079-7:16, 2nd Ed., Issued 2016-10
- CSA C22.2 No. 213-17, 3rd Ed., Rev. 2019-08-26
- EN IEC 60079-0:2018 EN IEC 60079-7: 2015 +A1:2018
- EN IEC 60079-7: 2015 +A1:2018
- UL 121201, 9th Ed., Rev. 2019-08-26
- UL 60079-0 ,7th Ed., Rev. 2020-04-15
- UL 60079-7 5th Ed. Rev. 2017-04-21

The following hazardous locations strings are provided on the router:

- Class 1, Div 2, Groups A B C D
- Class I, Zone 2, AEx ec IIC T4 Gc
- UL 21 ATEX 2512X
- Ex ec IIC T4 Gc

EMC Information

For EMC and safety information, see the Regulatory Compliance and Safety Information for Cisco IoT Series Routers document.

Class A Notice for FCC

Modifying the equipment without Cisco's authorization may result in the equipment no longer complying with FCC requirements for Class A digital devices. In such an event, your right to use the equipment may be limited by FCC regulations, and you may be required to correct any interference to radio or television communications at your own expense.

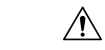
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits of a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful

interference when the equipment is operated in a residential environment. This equipment generates, uses, and radiates radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference. However, there is no guarantee that interference will not occur. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician.



Caution The Part 15 radio device operates on a noninterference basis with other devices operating at this frequency when using the integrated antennas. Any changes or modification to the product not expressly approved by Cisco could void the user's authority to operate this device.

Industry Canada

Canadian Compliance Statement

Cisco® Catalyst IR1101 Rugged Series Router

Cisco® IR1101 Industrial Integrated Services Router PIDS

- IR1101-K9

This Class A Digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

This device complies with Class A Limits of Industry Canada. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

Cisco® Catalyst IR1101 Rugged Series Router are certified to the requirements of RSS-210. The use of this device in a system operating either partially or completely outdoors may require the user to obtain a license for the system according to the Canadian regulations. For further information, contact your local Industry Canada office.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotopically radiated power (EIRP) is not more than that permitted for successful communication.

European Community, Switzerland, Norway, Iceland, and Liechtenstein

Cisco® Catalyst IR1101 Rugged Series Router PIDS.

- IR1101-K9

Declaration of Conformity with Regard to R-ED Directive 2014/53/EU

The following standards were applied:

- EN 62311: 2008
- EN 301 489-1 v 2.1.1; EN 301 489-19 v2.1.0; EN 301 489-52 v1.1.0
- EN 301 511 v12.5.1; 301 908-1 v 11.1.1; EN 301 908-2 v 11.1.2; EN 301 908-13 v11.1.1; EN 303 413 v1.1.1

With regard to the Directive 2014/53/EU, the conformity assessment procedure referred to in Article 17.2(a) and Annex II – module A has been followed.

Note This equipment is intended to be used in all EU and EFTA countries. For more details, contact the Cisco Corporate Compliance team.

The product carries the CE mark:

CE !

Declaration of Conformity for RF Exposure

This section contains information on compliance, with guidelines related to RF exposure.

RF Exposure

Cisco products are designed to comply with the following national and international standards on human exposure to RF:

- US 47 Code of Federal Regulations Part 2 Subpart J
- American National Standards Institute (ANSI) / Institute of Electrical and Electronic Engineers / IEEE C 95.1
- International Commission on Non Ionizing Radiation Protection (ICNIRP)
- Ministry of Health (Canada) Safety Code 6. Limits on Human Exposure to Radio Frequency Fields in the range from 3kHz to 300 GHz

- Australia Radiation Protection Standard

Note To ensure compliance with various national and international Electromagnetic Field (EMF) standards, the system should only be operated with Cisco-approved antennas and accessories.

This Device Meets International Guidelines for Exposure to Radio Waves

The IR1101 Series device includes a radio transmitter and receiver. It is designed to not exceed the limits for exposure to radio waves (radio frequency electromagnetic fields) recommended by international guidelines. The guidelines were developed by an independent scientific organization (ICNIRP) and include a substantial safety margin designed to ensure the safety of all persons, regardless of age and health.

As such the systems are designed to be operated as to avoid contact with the antennas by the end user. We recommended that you set the system in a location where the antennas can remain at least at a minimum distance, as specified, from a user in accordance with the regulatory guidelines that are designed to reduce the overall exposure to a user or operator.

The World Health Organization has stated that present scientific information does not indicate the need for any special precautions for the use of wireless devices. They recommend that if you are interested in further reducing your exposure, then you can easily do so by reorienting antennas away from users, or by placing he antennas at a greater distance than recommended.

This Device Meets FCC Guidelines for Exposure to Radio Waves

The IR1101 Series device includes a radio transmitter and receiver. It is designed to not exceed the limits for exposure to radio waves (radio frequency electromagnetic fields) as referenced in FCC Part 1.1310. The guidelines are based on IEEE ANSI C 95.1 (92) and include a substantial safety margin designed to ensure the safety of all persons, regardless of age and health.

As such the systems are designed to be operated so as to avoid contact with the antennas by the end user. We recommend that you set the system in a location where the antennas can remain at least at a minimum distance, as specified, from a user in accordance with the regulatory guidelines that are designed to reduce the overall exposure to a user or operator.

The device has been tested and found compliant with the applicable regulations as part of the radio certification process.

The U.S. Food and Drug Administration has stated that present scientific information does not indicate the need for any special precautions for the use of wireless devices. The FCC recommends that if you are interested in further reducing your exposure, you can easily do so by reorienting antennas away from users, or by placing the antennas at a greater distance than recommended, or by lowering the transmitter power output.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada’s license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L'émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

This Device Meets the Industry Canada Guidelines for Exposure to Radio Waves

The IR1101 Series includes a radio transmitter and receiver. It is designed to not exceed the limits for exposure to radio waves (radio frequency electromagnetic fields) as referenced in Health Canada Safety Code 6. The guidelines include a substantial safety margin designed into the limit to ensure the safety of all persons, regardless of age and health.

As such the systems are designed to be operated so as to avoid contact with the antennas by the end user. We recommend that you set the system in a location where the antennas can remain at least at a minimum distance, as specified, from a user in accordance with the regulatory guidelines that are designed to reduce the overall exposure to a user or operator.

Note Health Canada states that present scientific information does not indicate the need for any special precautions for the use of wireless devices. They recommend that if you are interested in further reducing your exposure, you can easily do so by reorienting antennas away from users by placing the antennas at a greater distance than recommended, or by lowering the transmitter power output.

ISED Radiation Exposure Statement

This equipment complies with ISED RSS-102 radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet équipement est conforme aux limites d'exposition aux rayonnements ISED établies pour un environnement non contrôlé. Cet équipement doit être installé et utilisé avec un minimum de 20cm de distance entre la source de rayonnement et votre corps

Le module émetteur peut ne pas être coïmplanté avec un autre émetteur ou antenne.

CAN ICES-3 (A)/NMB-3(A)

The Country Code Selection feature is disabled for products marketed in the US/Canada.

Additional Information on RF Exposure

You can find additional information on RF exposure in the following links:

- FCC Bulletin 56: Questions and Answers about Biological Effects and Potential Hazards of Radio Frequency Electromagnetic Fields
- FCC Bulletin 65: Evaluating Compliance with the FCC guidelines for Human Exposure to Radio Frequency Electromagnetic Fields
- FCC Bulletin 65C (01-01): Evaluating Compliance with the FCC guidelines for Human Exposure to Radio Frequency Electromagnetic Fields: Additional Information for Evaluating Compliance for Mobile and Portable Devices with FCC limits for Human Exposure to Radio Frequency Emission

You can obtain additional information from the following organizations:

- World Health Organization Internal Commission on Non-Ionizing Radiation Protection at this URL: https://www.icnirp.org
- United Kingdom, Wi-fi radio waves and health at this URL: https://www.gov.uk/government/publications/wireless-networks-wi-fi-radio-waves-and-health/wi-fi-radio-waves-and-health
- Cellular Telecommunications Association at this URL: https://www.ctia.org/
- The Mobile Manufacturers Forum at this URL: https://www.mwfai.org/

EMC Class A Notices and Warnings

Statement 340—Class A Warning for CISPR 32

Danger Warnung	**Danger** Dies ist ein Produkt der Klasse A. Bei der Verwendung dieses Produkts im Haus- oder Wohnungsbereich kann es zu Funkstörungen kommen. In diesem Fall muss der Benutzer u. U. angemessene Maßnahmen ergreifen.

Declaration of Conformity with Regard to EU Directive 2014/53/EU

The information in this document is applicable to the Cisco IR1101 Series wireless LAN products.

The equipment operates in the following frequency ranges:

- FDD LTE 700 MHz, 850 MHz, 900 MHz, 1700 MHz, 1800 MHz, 2100 MHz, and 2600 MHz
- GPS 1575.42 +/- 1.023, GLONASS 1597.52 - 1605.92, Galileo 1575.42 +/- 2.046, and BeiDou 1561.098 +/- 2.046

National regulations may require operations to be limited to portions of the frequency ranges identified above or at reduced power levels, or both. See the National Restrictions section for complete details.

This declaration is only valid for configurations (combinations of software, firmware and hardware), provided or supported by Cisco Systems for use within the EU or countries that have implemented the EU directives. The use of software or firmware not supported or provided by Cisco Systems may result in the equipment not being compliant with the regulatory requirements.

Table 30: Country Statements

Country	Statement
Български [Bulgarian]	Това оборудване отговаря на съществените изисквания и приложими клаузи на Директива 2014/53/EC.
Česky [Czech]:	Toto zařízení je v souladu se základními požadavky a ostatními odpovídajícími ustanoveními Směrnice 2014/53/EU.
Dansk [Danish]:	Dette udstyr er i overensstemmelse med de væsentlige krav og andre relevante bestemmelser i Direktiv 2014/53/EU.
Deutsch [German]:	Dieses Gerät entspricht den grundlegenden Anforderungen und den weiteren entsprechenden Vorgaben der Richtlinie 2014/53/EU.
Eesti [Estonian]:	See seade vastab direktiivi 2014/53/EL olulistele nõuetele ja teistele asjakohastele sätetele.
English:	This equipment is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU.
Español [Spanish]:	Este equipo cumple con los requisitos esenciales asi como con otras disposiciones de la Directiva 2014/53/UE.
Ελληνική [Greek]:	Αυτός ο εξοπλισμός είναι σε συμμόρφωση με τις ουσιώδεις απαιτήσεις και άλλες σχετικές διατάξεις της Οδηγίας 2014/53/EE.
Français [French]:	Cet appareil est conforme aux exigences essentielles et aux autres dispositions pertinentes de la Directive 2014/53/UE.
Hrvatski:[Croatian]	Ova oprema je u sukladnosti s bitnim zahtjevima i drugim relevantnim odredbama Direktive 2014/53/EU
Íslenska [Icelandic]:	Þetta tæki er samkvæmt grunnkröfum og öðrum viðeigandi ákvæðum Tilskipunar 2014/53/EU.
Italiano [Italian]:	Questo apparato é conforme ai requisiti essenziali ed agli altri principi sanciti dalla Direttiva 2014/53/UE.
Latviski [Latvian]:	Šī iekārta atbilst Direktīvas 2014/53/ES būtiskajām prasībām un citiem ar to saistītajiem noteikumiem.
Lietuvių [Lithuanian]:	Šis įrenginys tenkina 2014/53/ES Direktyvos esminius reikalavimus ir kitas šios direktyvos nuostatas.
Nederlands [Dutch]:	Dit apparaat voldoet aan de essentiele eisen en andere van toepassing zijnde bepalingen van de Richtlijn 2014/53/EU.
Malti [Maltese]:	Dan l-apparat huwa konformi mal-ħtiġiet essenzjali u l-provedimenti l-oħra rilevanti tad-Direttiva 2014/53/UE.
Magyar [Hungarian]:	Ez a készülék teljesíti az alapvető követelményeket és más 2014/53/EU irányelvben meghatározott vonatkozó rendelkezéseket.

Country	Statement
Norsk [Norwegian]:	Dette utstyret er i samsvar med de grunnleggende krav og andre relevante bestemmelser i EU-direktiv 2014/53/EU.
Polski [Polish]:	Urządzenie jest zgodne z ogólnymi wymaganiami oraz szczególnymi warunkami określonymi Dyrektywą UE: 2014/53/UE.
Português [Portuguese]:	Este equipamento está em conformidade com os requisitos essenciais e outras provisões relevantes da Directiva 2014/53/UE.
Română [Romanian]	Acest echipament este in conformitate cu cerintele esentiale si cu alte prevederi relevante ale Directivei 2014/53/EU.
Slovensko [Slovenian]:	Ta naprava je skladna z bistvenimi zahtevami in ostalimi relevantnimi pogoji Direktive 2014/53/UE.
Slovensky [Slovak]:	Toto zariadenie je v zhode so základnými požiadavkami a inými príslušnými nariadeniami direktív: 2014/53/EÚ.
Suomi [Finnish]:	Tämä laite täyttää direktiivin 2014/53/EU olennaiset vaatimukset ja on siinä asetettujen muiden laitetta koskevien määräysten mukainen.
Svenska [Swedish]:	Denna utrustning är i överensstämmelse med de väsentliga kraven och andra relevanta bestämmelser i Direktiv 2014/53/EU.
Türk [Turkish]	Bu cihaz 2014/53/EU Direktifi'nin temel gereklerine ve ilgili diğer hükümlerine uygundur.

National Restrictions

In the EU and other European countries, the 2.4-GHz and 5-GHz bands have been made available for use by wireless LANs.

The IR1800 Series is intended for outdoor usage. The equipment operates in the following frequency ranges:

- FDD LTE 700 MHz, 850 MHz, 900 MHz, 1700 MHz, 1800 MHz, 2100 MHz, and 2600 MHz
- GPS 1575.42 +/- 1.023, GLONASS 1597.52 - 1605.92, Galileo 1575.42 +/- 2.046, and BeiDou 1561.098 +/- 2.046

The following sections identify the countries having additional requirements or restrictions.

Italy

This product meets the National Radio Interface and the requirements specified in the National Frequency Allocation Table for Italy. Unless this wireless LAN product is operating within the boundaries of the owner's property, its use requires a "general authorization". For details, see:

http://www.comunicazioni.it/it/

Questo prodotto è conforme alla specifiche di Interfaccia Radio Nazionali e rispetta il Piano Nazionale di ripartizione delle frequenze in Italia. Se non viene installato all'interno del proprio fondo, l'utilizzo di prodotti Wireless LAN richiede una "Autorizzazione Generale". Consultare

http://www.mise.gov.it/index.php/it/comunicazioni

Latvia

The outdoor usage of the 2.4-GHz band requires an authorization from the Electronic Communications Office. For details, see: http://www.esd.lv.

2,4 GHz frekvenču joslas izmantošanai ārpus telpām nepieciešama atļauja no Elektronisko sakaru direkcijas. Vairāk informācijas: http://www.esd.lv .

Note Although Norway, Switzerland, Liechtenstein, and Turkey are not EU member states, the EU Directive 2014/53/EU has also been implemented in those countries.

Note The antenna gain mentioned does not include cable loss.

Taiwan

BSMI Class A warning

此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策

Statement 1008—Class 1 Laser Product

Warning **Statement 1008—**Class 1 Laser Product

This product is a Class 1 laser product.

Changing Output Power

Changing the power output is allowed only by a trained service professional.

Antennas

The Cisco Catalyst 1101 Rugged Router is a next generation modular industrial router which has a base module with additional pluggable modules that can be added. The plug-in module is referred to as the Pluggable Interface Module (PIM), or the pluggable. The pluggable provides the flexibility of adding different interfaces to the IR1101 platform, for example, a cellular module. These modules are equipped with antenna connectors to allow the use of dedicated (external) antennas available from Cisco.

The following link to the data sheet lists the antennas that can be used by IR1101. All antennas where assessed together with the equipment against the requirements of the R&TTE directive.

https://www.cisco.com/c/en/us/products/collateral/routers/1101-industrial-integrated-services-router/datasheet-c78-741709.html

Depending on the country a different regulatory limit might be applicable. It is therefore the responsibility of the end user to select a power level that, together with the antenna, results in an eirp (radiated power) level that is below the applicable limit.

Note The antenna gain mentioned does not include the cable loss.