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Cisco IR829 Integrated Services Router Hardware Installation Guide

August 2015

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

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C O N T E N T S

Cisco IR829 Integrated Services Router Hardware Installation Guide
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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. It contains the following sections:

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Objective

This guide provides an overview and explains how to install, connect, and perform initial configuration for the Cisco IR829.

Audience

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

Organization

This guide is organized into the following chapters.

Chapter	Name	Description
Chapter 1	Chapter 1, "Product Overview"	Describes the router models and the hardware features available.
Chapter 2	Chapter 2, "Installing the Router"	Lists the items shipped with the router, the equipment and tools necessary for installing the router, the safety warnings and guidelines, and the procedures for installing the router.
Chapter 3	Chapter 3, "Connecting the Router"	Describes typical connections for the router, procedures for connecting the router to various devices, and how to verify the connections.
Chapter 4	Chapter 4, "Initial Configuration"	Provides the procedures for initially configuring the router settings.
Chapter 5	Chapter 5, "Guest Operating System (Guest OS) Installation and Configuration"	Provides details Guest for Operating System (Guest OS) installation for the Cisco IR829.
Chapter 6	Chapter 6, "Technical Specifications"	Provides the router, port, and cabling specifications.

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.

Safety Warnings

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

SAVE THESE INSTRUCTIONS

Waarschuwing   **BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u 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 laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention   **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung **WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten 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 di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze 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 arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

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 corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua 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, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna 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

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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. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos 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 du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med 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 أخر 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 כדי לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

предупредување

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   POMEMBNI VARNOSTNI NAPOTKI

Ta opozorilni simbol pomeni nevarnost. Nahajate se v situaciji, kjer lahko pride do telesnih poškodb. Preden pričnete z delom na napravi, se morate zavedati nevarnosti udara električnega toka, ter tudi poznati preventivne ukrepe za preprečevanje takšnih nevarnosti. Uporabite obrazložitveno številko na koncu posameznega opozorila, da najdete opis nevarnosti v priloženem varnostnem priročniku.

SHRANITE TE NAPOTKE!

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   When installing the product, please use the provided or designated connection cables/power cables/AC adaptors. Using any other cables/adaptors could cause a malfunction or a fire. Electrical Appliance and Material Safety Law prohibits the use of UL-certified cables (that have the "UL" shown on the code) for any other electrical devices than products designated by CISCO. The use of cables that are certified by Electrical Appliance and Material Safety Law (that have "PSE" shown on the code) is not limited to CISCO-designated products. Statement 371

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   To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables. Statement 1021

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 If the symbol of suitability with an overlaid cross appears above a port, you must not connect the port to a public network that follows the European Union standards. Connecting the port to this type of public network can cause severe personal injury or can damage the unit. Statement 1031

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 When installing or replacing the unit, the ground connection must always be made first and disconnected last. Statement 1046

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 Installation of the equipment must comply with local and national electrical codes. Statement 1074

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

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

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

Warning The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed. Statement 1077

⚠️

Warning   **Hot surface.** Statement 1079

Related Documentation

- *Regulatory Compliance and Safety Information for Cisco 800 Series and SOHO Series Routers*
- *Cisco IOS Release Notes*
- *Cisco 800 Series Integrated Services Routers Software Configuration Guide.*

Searching Cisco Documents

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C H A P T E R 1

Product Overview

This chapter provides an overview of the features available for the Cisco IR829 Integrated Services Routers (ISRs) and contains the following sections:

Note For compliance and safety information, see *Regulatory Compliance and Safety Information for Cisco 800 Series and SOHO Series Routers.*

General Description

The Cisco IR829 Integrated Services Router, part of the Cisco Integrated Services Routers Generation 2 (ISR G2) Family, is designed as a next generation ruggedized fixed form factor router. It is a a small-form factor cellular router targeting mobile/vehicle applications and includes WiFi to provide connectivity in non-carpeted IT spaces, Industrials, Utilities, Transportation, Infrastructure, Industrial M2M application, asset monitoring, Smart Grid, and Utility Application.

Figure 1-1 shows the IR829.

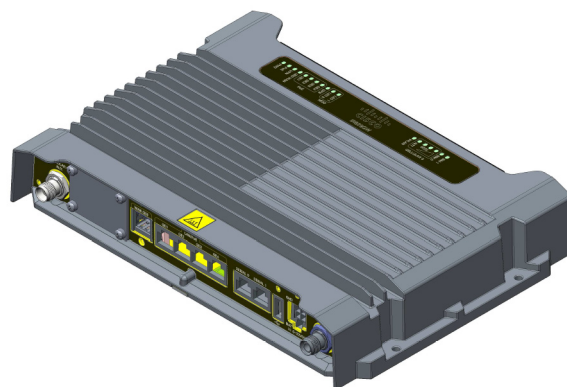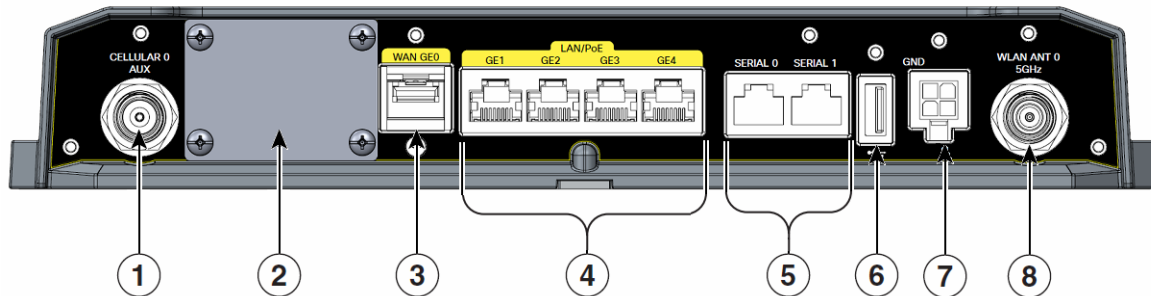**Figure 1-1**   **Cisco IR829 Integrated Services Router**

Figure 1-2 shows the front panel details of the Cisco IR829.

Figure 1-2   ***Cisco IR829 Front Panel***

1	CELLULAR 0 AUX	5	Serial Ports
2	Limited Modularity Slot	6	USB-A Port
3	Gigabit WAN	7	Power Input, Battery, and Ignition connector. Refer to the DC Power section for pin-outs.
4	Gigabit LAN/PoE	8	WLAN ANT0 5GHz

Figure 1-3 shows the back panels details of the Cisco IR829.

Figure 1-3   ***Cisco IR829 Back Panel***
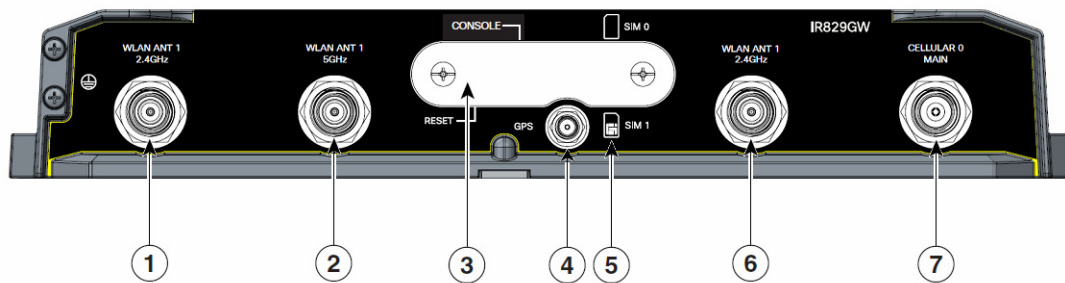
1	WLAN ANT 0 2.4GHz	5	SIM connection 1 (SIM connection 0 is above)
2	WLAN ANT 1 5GHz	6	WLAN ANT 1 2.4GHz
3	SIM Door Assembly	7	CELLULAR 0 MAIN
4	GPS SMA		

Note   Behind the SIM Door Assembly, there is a reset switch, Mini USB Debug connection, and Dual SIM slots. See Figure 1-4 for details
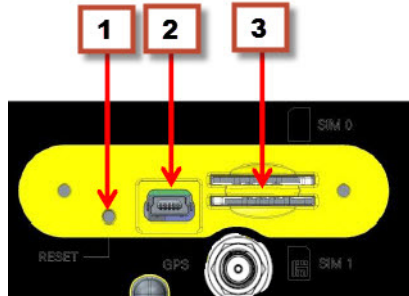
Figure 1-4   *Behind the SIM Door*

Figure 1-5 shows the top of the Cisco IR829.

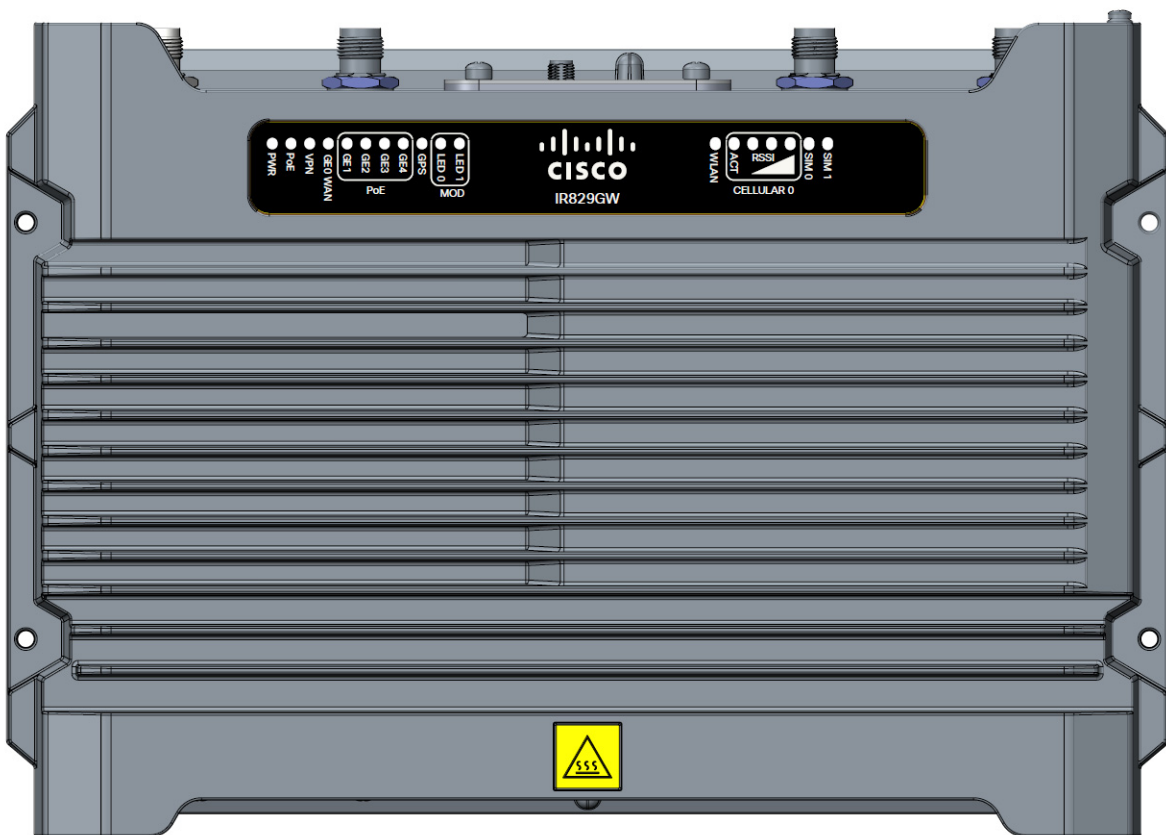*Figure 1-5*   *Cisco IR829 Top Cover*

Figure 1-6 shows the LED detail.

Figure 1-6   Cisco IR829 LED Detail

The following section shows a detailed description of the LEDs.

LEDs

The following table describes the LEDs for the Cisco IR829.

Table 1-1   LED Descriptions

LED	Activity	Description
PWR	Power Status	Off — No power
		Green Steady on — Normal operation
		Green Flashing — Boot up phase or in ROM Monitor mode
		Yellow Steady on — System shutdown due to under or over voltage conditions
		Yellow Flashing — System has an error, but has network connectivity
POE	POE Power Supply Status	Off — No -54V PoE power supply detected or no PoE board installed
		Green Steady on — 53.5V POE power supply good and all powered port operating normally
		Yellow Steady on — 53.5V POE power supply good, but one or more POE ports has a fault.
VPN	VPN	Off — No VPN tunnel
		Steady on — At least one VPN tunnel is up
GE0 WAN	Link Status	Off — No link
		Steady on — Link is up
		Blink — Transmitting and Receiving data

Table 1-1   LED Descriptions (continued)

LED	Activity	Description
GPS	GPS Status	Off — GPS not configured
		On — GPS configured
		Slow Flash — GPS Acquiring in Standalone GPS
		Fast Flash — GPS Acquiring in Assisted GPS
		✎ **Note** Slow Flash is defined as the LED will be on for 0.25 seconds and off for 0.75 seconds. Fast Flash s defined as the LED will be on for 0.25 seconds and off for 0.25 seconds.
MOD		
Ethernet LAN Switch Ports GE1-GE4] Single LED per Port	Link Status/POE Status	Off — No link
		Green Steady on — Link is up
		Green Blink — Transmitting and Receiving data
		Yellow — POE Fault, implies no link
WLAN	2.4GHz 5GHz	Off — Radio is down (no SSID configured)
		Flashing Green — Bootloader, IOS Ethernet Initialization, IOS Start Up after system initialization.
		Green to Red to Yellow — Discovery/Join process.
		Rapid Flashing Green — Joined to a controller
		Steady Green — One wireless client is associated.
CELLULAR0/ CELLULAR1	ACT	Off — Module not powered on On — Module is powered on and connected but not transmitting or receiving Slow Blink — Module is powered on and searching for connection Fast Blink — Module is transmitting or receiving.
CELLULAR0/ CELLULAR1	RSSI	The RSSI LEDs are a 3 LED bar graph to indicate signal strength. Their functionality is described in the RSSI LED figure below.
SIM0/SIM1	Sim cards	Off — No USIM Green — USIM installed and active

Figure 1-7   RSSI LED

RSSI	RSSI (2)	RSSI (1)	RSSI (0)
	Green	Green	Green/Yellow
<110dBm	Off	Off	Off
-110 — 90dBm	Off	Off	On - Yellow

RSSI	RSSI (2)	RSSI (1)	RSSI (0)
-90 — 75dBm	Off	Off	On - Green
-75 — 60dBm	Off	On - Green	On - Green
>60dBm	On - Green	On - Green	On - Green

Memory

The Cisco IR829 uses flash memory and main memory. The flash memory contains the Cisco IOS software image and the boot flash contains the ROMMON boot code. All memory components are factory default and not upgradeable by the end user.

Table 1-2 shows the memory allocation.

Table 1-2   Cisco IR829 Memory

Memory	Capacity
DDR	2GB
Boot ROM	16MB
System Flash	4GB

SKU Information

Table 1-1 lists the different SKUs available for the Cisco ISRs. All SKUs support external antenna.

Table 1-3   Supported SKUs for Cisco IR829s

SKU ID	Description
IR829GW-LTE-VZ-AK9	C829 Hardened WAN GE 4G LTE secure platform multi-mode Verizon LTE/DoRa with 802.11n, FCC compliant
IR829GW-LTE-NA-AK9	C829 Hardened WAN GE 4G LTE secure platform multi-mode ATT and Canada LTE/HSPA+ with 802.11n, FCC compliant
IR829GW-LTE-GA-EK9	C829 Hardened WAN GE 4G LTE secure platform multi-mode Global (Europe) LTE/HSPA+ with 802.11n, ETSI Compliant
IR829GW-LTE-GA-ZK9	C829 Hardened WAN GE 4G LTE secure platform multi-mode Global (Australia) LTE/HSPA+ with 802.11n, Australia Compliant

Hardware Features

This section provides an overview of the following hardware features for the Cisco IR829.

- Platform Features for Cisco IR829, page 1-7

- Antennas, page 1-8

Platform Features for Cisco IR829

The following lists the hardware platform features for the Cisco IR829.

- Intel Atom Dual-Core Rangeley CPU, 1250 MHz
- 2GB DDR3 memory capacity
- 64MB SPI BIOS NOR flash
- 8GB (4GB usable) "eMMC" bulk storage flash
- 4-port GE LAN switch, optional PoE 802.3at (30W max)
- WAN 1 GE SFP
- WWAN /WLAN
    - mini PCIe slots for 3G/4G/LTE modems, dual SIM
    - Single 802.11 a/b/n WiFi radio
- Optional Limited Modularity (BYOI) slot'
- One RJ45 RS232 port
- One RJ45 RS232/RS485 Serial port
- One USB 2.0 Type A external port
- One mini USB connector
- Lithium Ion battery backed-up RTC
- External Reset/Recovery Push Button
- External Power
    - Direct-wire 12/24VDC vehicle charging system input (9 — 32VDC)
    - 4-pin locking power connector
- External GPS SMA Connector
- Six External TNC/RP-TNC connectors (depends on the configuration) for connection to WWAN /WLAN internal modules
- Class A EMC compliance
- RoHS6 compliance
- Mechanical
    - Fanless operation
    - Form-factor with no cable cover = 11.00" x 7.70" x 1.73" (WDH)
    - Horizontal, Vertical, wall, floor, cabinet-mount and shelf-mount

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.

Note   The rear cover must be removed to expose the reset switch.

Antennas

The IR829 has 4 x Wi-Fi antennas (2.4GHz & 5GHz) + 2 antennas for cellular RP-TNC bulkhead connectors.

Standard antennas are:

- Two multiband swivel-mount dipole antennae (ANT-4G-DP-IN-TNC) and one extender (4G-AE010-R) are included with all the IR829s.

- WLAN: Three Cisco Multiband Swivel-Mount Dipole Antennae. (AIR-ANTM2050D-R) are included for all IR829 SKUs that have WLAN functionality.

For detailed information about Cisco Antennas, please refer to the following guides:

Connected Grid Antennas Installation Guide:

http://www.cisco.com/c/en/us/td/docs/routers/connectedgrid/antennas/installing/cg_antenna_install_guide.html

Antennas for the Cisco 800 Series Routers:

http://www.cisco.com/c/en/us/support/routers/800-series-routers/products-installation-guides-list.html

Antennas and Installation Scenarios

Note   Before choosing your antenna type and installation scenario, read through the following information.

Coexistence of radio standards:

When operating and planning installation of products with WiFi, 4G LTE, and GPS wireless standards coexisting on the IR829 platform, the user needs to provision greater than 15dB isolation between the WiFi and LTE antennas at all frequencies of 4G LTE and WiFI operation for minimum impact to performance.

Ideally, isolation should be 20-25dB or more. Specifically, users should not install 4G LTE dipoles and WiFi dipoles on the chassis at the same time, since doing so would generally result in less than 15dB isolation and may have a strong impact on performance depending on frequency bands in question.
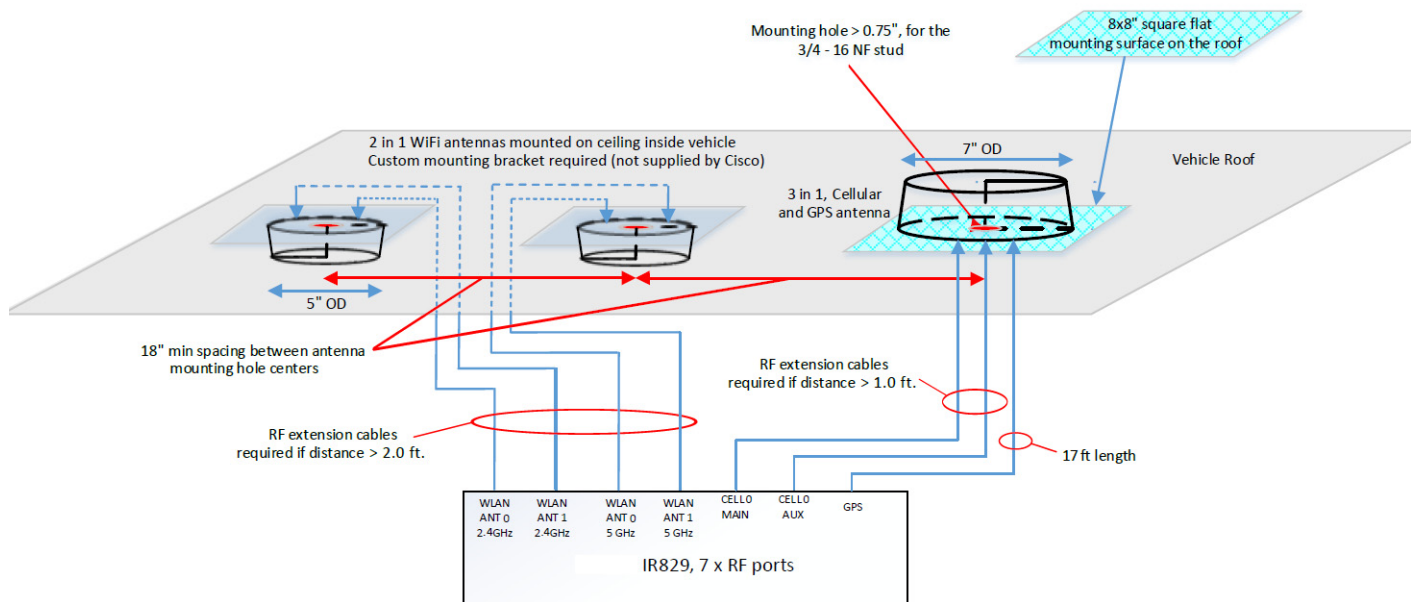
Vehicular 5-in-1 and 2-in-1 installation and deployment notes

In the section that follows, the 5-in-1 antenna refers to ANT-5-4G2WL2G1-O, and 2-in-1 antenna refers to ANT-2-WLAN-D-O.

Figure 1-8   Sample Installation

IR829, 7 Port Vehicular Antennas Installation Diagram

Mounting hole > 0.75", for the
3/4 - 16 NF stud

8x8" square flat
mounting surface on the roof

2 in 1 WiFi antennas mounted on ceiling inside vehicle
Custom mounting bracket required (not supplied by Cisco)

7" OD

Vehicle Roof

3 in 1, Cellular
and GPS antenna

5" OD

18" min spacing between antenna
mounting hole centers

RF extension cables
required if distance > 1.0 ft.

RF extension cables
required if distance > 2.0 ft.

17 ft length

WLAN ANT 0 2.4GHz	WLAN ANT 1 2.4GHz	WLAN ANT 0 5 GHz	WLAN ANT 1 5 GHz	CELL0 MAIN	CELL0 AUX	GPS

IR829, 7 x RF ports

Installation

Users need to provision a 8 x 8" flat mounting surface with a mounting hole on the roof of the vehicle for the 5-in-1 antenna, and a 6 x 6" flat mounting surface with a mounting hole for the 2-in-1 WiFi antenna. Without a flat mounting surface, the antenna will not meet IP67 standards and may have reduced service life.

Ground plane

Cisco recommends having a 1 foot ground plane under both the 5-in-1 and 2-in-1 antennas. In case of a metal vehicle roof, the roof itself shall be the ground plane. While Cisco has investigated the effects of ground plane and no ground plane, wireless performance was certified with the 1 foot ground plane.

Isolation between 5-in-1 and 2-in-1 antennas

Cisco recommends 18" inch spacing between the 5-in-1 and the 2-in-1 antenna centers for optimal isolation.

Cisco recommends routing the 2.4GHz WLAN ports of the IR829 to the 2-in-1 antenna, and the 5GHz ports to the 5-in-1 antenna to optimize isolation between WiFi 2.4 GHz and cellular 4G LTE. The 5-in-1 antenna has been fully optimized for WiFI and cellular LTE coexistence and isolation. Connecting the 2.4GHz WiFi signals to a separate antenna simply allows to user to optimize the antenna isolation further. Both the 5-in-1 and 2-in-1 are dual band WiFi capable and fully support both 2.4 GHz or 5GHz WLAN signals.

MIMO ports on 5-in-1 and 2-in-1

Cellular and WLAN ports on the 5-in-1 and 2-in-1 antennas support MIMO technology. MIMO brings significant improvements in throughput and robustness of the wireless link in fading channels. Users choosing to connect only one wireless port on MIMO capable products are giving up significant wireless performance in both throughput and robustness of the link.

- The individual 4G antenna cables on the 5-in-1 antenna can be connected to either cellular port of IR829. There is no one-to-one assignment requirement.
- The individual WLAN antenna cables on the 5-in-1 antenna and the 2-in-1 antenna can be connected to any WLAN port of IR829. There is no one to one assignment requirement.

The following section shows some examples of different installation scenarios.

Supported Cisco Antennas and Cables

Table 1-4 lists the supported 4G/LTE Radio Modules/Cables/Antennas for Cisco IR829.

Table 1-4   4G/LTE Radio Modules/Cables/Antennas

Use Case	Radio Module	Indoor Cable	Lightning Arrestor or Adapter	Outdoor Cable	Antenna
4G/LTE Case 1: 1' 2', 5', 10', 15' or 20' cable to mast mounted antenna, Stick Omni or Directional Flat Panel antenna	IR829GW-LTE-GA-EK9 IR829GW-LTE-GA-ZK9 IR829GW-LTE-NA-AK9 IR829GW-LTE-VZ-AK9 2x TNC(f)	None Router located in outdoor protective enclosure	None	RA-TNC(m) to N(m), LMR-400-DB, 20', qty 2 - 37-1378-01 - "CAB-L400-20-TNC-N	2x 4G Omni Stick, Standard Perf, 10" 2dBi, 1x N(f) each - 07-1171-01 - ANT-4G-OMNI-OUT-N 1x 4G Panel Antenna, 2x N(f) each - 07-1172-01 - ANT-4G-PNL-OUT-N
4G/LTE Case 2:	IR829GW-LTE-GA-EK9 IR829GW-LTE-GA-ZK9 IR829GW-LTE-NA-AK9 IR829GW-LTE-VZ-AK9 2x TNC(f)	R/A-TNC(m) to N(m), LMR-240-FR/CMR, 2', qty 2 - 37-100707-01 **Note** Not available from Cisco			1x 4G Panel Antenna, 2x N(f) each - 07-1172-01 - ANT-4G-PNL-OUT-N

Table 1-4   *4G/LTE Radio Modules/Cables/Antennas*

Use Case	Radio Module	Indoor Cable	Lightning Arrestor or Adapter	Outdoor Cable	Antenna
		R/A-TNC(m) to N(m), LMR-240-FR/CMR, 1', qty 2 • 37-100705-01 **Note** Not available from Cisco			
		R/A-TNC(m) to N(m), LMR-240-FR/CMR, 5', qty 2 • 37-100717-01 **Note** Not available from Cisco			
		R/A-TNC(m) to N(m), LMR-240-FR/CMR, 10', qty 2 • 37-100754-01 **Note** Not available from Cisco			
		R/A-TNC(m) to N(m), LMR-240-FR/CMR, 15', qty 2 • 37-100757-01 **Note** Not available from Cisco			
		R/A-TNC(m) to N(m), LMR-240-FR/CMR, 20', qty 2 • 37-100758-01 **Note** Not available from Cisco			

Table 1-4   *4G/LTE Radio Modules/Cables/Antennas*

Use Case	Radio Module	Indoor Cable	Lightning Arrestor or Adapter	Outdoor Cable	Antenna
4G/LTE Case 3: Front Panel Swivel Mount 4G-LTE dipoles	IR829GW-LTE-GA-EK9 IR829GW-LTE-GA-ZK9 IR829GW-LTE-NA-AK9 IR829GW-LTE-VZ-AK9 2x TNC(f)	None —OR qty 2x PID: 4G-AE010-R CPN: 07-1144-01 10ft extension base for TNC dipole antennas —OR qty 2x PID: 4G-AE015-R CPN: 07-1145-01 15ft extension base for TNC dipole antennas	None	None	Qty 2 x 4G Indoor Swivel Mount Dipole, 0 dBi, TNC(m), white • 07-1174-01 • ANT-4G-DP-IN-TNC
4G/LTE Case 4: Front Panel Swivel Mount 4G-LTE dipoles	IR829GW-LTE-GA-EK9 IR829GW-LTE-GA-ZK9 IR829GW-LTE-NA-AK9 IR829GW-LTE-VZ-AK9 2x TNC(f)	None —OR qty 2x PID: 4G-AE010-R CPN: 07-1144-01 10ft extension base for TNC dipole antennas —OR qty 2x PID: 4G-AE015-R CPN: 07-1145-01 15ft extension base for TNC dipole antennas	None	None	Qty 2 x 4G Indoor Swivel Mount Dipole, 0 dBi, TNC(m), black • 07-1137-01 • 4G-LTE-ANTM-D

Table 1-4   4G/LTE Radio Modules/Cables/Antennas

Use Case	Radio Module	Indoor Cable	Lightning Arrestor or Adapter	Outdoor Cable	Antenna
4G/LTE Case 5: 2x ceiling mount 4G-LTE antennas	IR829GW-LTE -GA-EK9 IR829GW-LTE -GA-ZK9 IR829GW-LTE -NA-AK9 IR829GW-LTE -VZ-AK9 2x TNC(f)	None	None	None	Qty 2 x 4G Indoor omni-directional Ceiling Mount 2 dBi, • 07-1121-01 • 4G-ANTM-OM-C M — OR Qty 2 x 4G Dipole Ceiling Mount 2 dBi • 07-1174-01 • ANT-4G-DP-IP-TN C
GPS Case 1: GPS Antenna with Integrated 15' coax cable, Mounted to top of Utility Cabinet Roof • SMA(f), qty 1					GPS Antenna. Need one with integrated coax cable and SMA(m) connector, 17ft, outdoor, IP67 qty 1 • 07-1183-01 • GPS-ACT-ANTM-S MA=

Table 1-5 lists the supported Single Band Cisco WiFi antenna for the Cisco IR829.

Table 1-5   ***Supported Single Band Cisco WiFi Antenna***

Use Case	Radio Module	Indoor Cable	Lightning Arrestor or Adapter	Outdoor Cable	Antenna
WiFi Use Case 2: Single Band, Front Panel Mounted Antennas	Dual Band Simultaneous 802.11n 2x2 MIMO WiFi Connectors: 4x RP-TNC (jack)	N/A	N/A	N/A	2x Single Band, Swivel Mount Omni, RP-TNC(plug), 2.2dBi @ 2.4 GHz 07-1056-02 AIR-ANT4941 2x Single Band, Swivel Mount Omni, RP-TNC(plug), 3.5dBi @ 5 GHz • 07-1055-02 • AIR-ANT5135
WiFi Use Case 3: Single Band, Single Element, Ceiling Mounted Antennas	Dual Band Simultaneous 802.11n 2x2 MIMO WiFi Connectors: 4x RP-TNC (jack)	None — OR RP-TNC (jack) to RP-TNC (plug), Outdoor rated, Plenum rated, 0.195" O.D. cable, 5' long • 37-1067-01 • AIR-CAB005 PL-R	N/A	N/A	2x Single Band, Ceiling Mount Omni, 36" LONG RG-58 cable with RP-TNC (plug), 5.2dBi @ 2.4 GHz • 74-1868-01 • AIR-ANT1728 2x Single Band, Ceiling Mount Omni, 36" LONG RG-58 cable with RP-TNC (plug), 5.2dBi @ 5 GHz • 74-3733-01 • AIR-ANT5160V-R
WiFi Use Case 4: 2.4 GHz, Dual Element, 5 GHz Single Element, Ceiling Mounted Antennas	Dual Band Simultaneous 802.11n 2x2 MIMO WiFi Connectors: 4x RP-TNC (jack)	None — OR RP-TNC(jack) to RP-TNC(plug), Outdoor rated, Plenum rated, 0.195" O.D. cable, 5' long 37-1067-01 AIR-CAB005PL-R	N/A	N/A	1x Single Band, Ceiling Mount Omni, Dual Element, 36" LONG RG-58 cable with RP-TNC, 2.0dBi @ 2.4 GHz • 800-33316-01 • AIR-ANT24020V-R 2x Single Band, Ceiling Mount Omni, 36" LONG RG-58 cable with RP-TNC (plug), 5.2dBi @ 5 GHz • 74-3733-01 • AIR-ANT5160V-R

Table 1-5   *Supported Single Band Cisco WiFi Antenna(continued)*

Use Case	Radio Module	Indoor Cable	Lightning Arrestor or Adapter	Outdoor Cable	Antenna
WiFi Use Case 5: Single Band, Dual Element, Wall Mounted Antennas	Dual Band Simultaneous 802.11n 2x2 MIMO WiFi Connectors: 4x RP-TNC (jack)	None	None — OR RP-TNC lightning arrestor, qty 4 • 74-3722-01 • AIR-ACC245LA-R	None — OR RP-TNC(plug) to RP-TNC(jack) LMR-400-DB, 5' qty 4 • 37-0766-01 • AIR-CAB005LL-R — OR RP-TNC(plug) to RP-TNC(jack) LMR-400-DB, 20' qty 4 • 72-2760-02 • AIR-CAB020LL-R — OR RP-TNC(plug) to RP-TNC(jack) LMR-400-DB, 50' qty 4 • 72-2761-02 • AIR-CAB050LL-R — OR RP-TNC(plug) to RP-TNC(jack) LMR-600-DB, 100' qty 4 • 72-2766-02 • AIR-CAB100ULL-R	1x Single Band, Dual Element, Wall Mount Patch, 18" LONG RG-58 cable with RP-TNC, 6.5dBi @ 2.4 GHz • 800-27066-01 • AIR-ANT2465P-R 1x Single Band, Dual Element, Wall Mount Omni, 18" LONG RG-58 cables with RP-TNC, 4.5dBi @ 5 GHz (INDOOR ONLY) • 800-25716-06 • AIR-ANT5145V-R **— OR** 1x Single Band, Dual Element, Wall Mount Patch, 18" LONG RG-58 cables with RP-TNC, 7.0dBi @ 5 GHz (INDOOR/OUTDOOR) • 800-25718-05 • AIR-ANT5170P-R

Table 1-5   *Supported Single Band Cisco WiFi Antenna(continued)*

Use Case	Radio Module	Indoor Cable	Lightning Arrestor or Adapter	Outdoor Cable	Antenna
WiFi Use Case 7: Single Band, Dual Element, Wall Mounted Patch, Indoor/ Outdoor Antennas	Dual Band Simultaneous 802.11n 2x2 MIMO WiFi Connectors: 4x RP-TNC (jack)		N(f) to N(f), RF-adapter qty 4 • 29-1008 18-01 • AIR-AC C370-NF-N F	RP-TNC(plug) to N(m)-R/A LMR-240-DB, 5' qty 4 • 37-1492-01 • AIR-CAB005LL-R-N	1x Single Band, Dual Element, Wall Mount Patch, 18" LONG RG-58 cable with N(m), 13dBi @ 2.4 GHz • 07-1193-01 • AIR-ANT2413P2M-N 1x Single Band, Dual Element, Wall Mount Patch, 18" LONG RG-58 cable with N(m), 14dBi @ 5 GHz • 07-1192-01 • AIR-ANT5114P2M-N

lists the supported Dual Band Cisco WiFi antenna for Cisco IR829.

Table 1-6   *Supported Dual Band Cisco WiFi Antenna*

Use Case	Radio Module	Indoor Cable	Lightning Arrestor or Adapter	Outdoor Cable	Antenna
WiFi Use Case 8: Dual Band Front Panel Mounted Antennas	Dual Band Simultaneous 802.11n 2x2 MIMO WiFi Connectors: 2x RP-TNC (jack)	N/A	N/A	N/A	2x Dual Band, Swivel Mount Omni, RP-TNC(plug), 2dBi @ 2.4 GHz, 4dBi @ 5 GHz • 07-1146-01 • AIR-ANT2524DB-R

Table 1-6   Supported Dual Band Cisco WiFi Antenna(continued)

Use Case	Radio Module	Indoor Cable	Lightning Arrestor or Adapter	Outdoor Cable	Antenna
WiFi Use Case 9: Dual Band, Dual Element, Wall Mounted Antennas	Dual Band Simultaneous 802.11n 2x2 MIMO WiFi Connectors: 2x RP-TNC (jack)	N/A	N/A	N/A	1x Dual Band, Dual Element per Band, Omni, 18" LONG RG-58 cables with RP-TNC (plug), 2.0dBi @ 2.4 GHz (2 ports), 3.0dBi @ 5 GHz (2 ports) • 07-1071-02 • AIR-ANT2451V-R
WiFi Use Case 10: Dual Band Front Panel Mounted Antennas	Dual Band Simultaneous 802.11n 2x2 MIMO WiFi Connectors: 2x RP-TNC (jack)	N/A	N(f) to N(f), RF-adapter qty 2 • 29-1008 18-01 • AIR-AC C370- NF-N F	RP-TNC(plug) to N(m)-R/A LMR-240-DB, 5' qty 2 • 37-1492-01 • AIR-CAB005LL -R-N	2400-2484MHz, 5150-5875MHz, WiFi, omni-directional 4 dBi (2.4 GHz) 7 dBi (5 GHz) stick antenna indoor / outdoor with type N(m) connector, qty 2 Antennas are IP66, IP67 and -40 to +70C. • 07-1126-01 • AIR-ANT2547V-N= White — OR qty 2 • 07-1285-01 • AIR-ANT2547VG-N= Gray

Table 1-7 lists the supported 7 in 1 antenna configuration for transportation for Cisco IR829.

Note   In the following use cases, Lightning Arrestors are not required, and the Radio Modules are:
IR829GW-LTE-GA-EK9
IR829GW-LTE-GA-ZK9
IR829GW-LTE-NA-AK9
IR829GW-LTE-VZ-AK9

Table 1-7   7 in 1 Antenna Configuration for Transportation

Antennas

Use Case	Extension Cable	Antenna
Transportation Use Case 1: 7 x RF ports, with the IR829 deployed in a transportation application. (Default Configuration) Quinta 5-in-1 antenna AND a WiFi 2-in-1 antenna to utilize all 7 ports. The 5-in1 Quinta antenna and the 2-in1 WiFi antennas need to be separated 18" between mounting hole centers of the two antennas.	No extension cables are required if the IR829 is located within ~1.0ft of 5-in-1 antenna, and ~2.0ft of WiFi 2-in-1 antenna. If these conditions are not met, this deployment requires the following extension cables: **Cellular extension cables (2 ports)** Qty 2X LMR-400-DB TNC(m)-R/A - TNC(f), 5ft • 4G-CAB-LMR400-5 • 37-100842-01 — OR Qty 2X LMR-400-DB TNC(m)-R/A - TNC(f), 10ft • G-CAB-LMR400-10 • 37-100843-01 — OR Qty 2X LMR-400-LLPL plenum / indoor only TNC(m)-R/A - TNC(f), 20ft • 4G-CAB-ULL-20 • 37-1401-01 — AND	Quinta 5 element 5-in-1 transportation antenna, black radome color, 2x 4G cellular, 2x dual band WiFi, 1xGPS • ANT-5-4G2WL2G1-O • 07-100261-01 Has the following integrated cables: qty 2 x cellular, LMR-195, 2ft long, TNC(m) qty 2 x WiFi, 2ft long, LMR-195 RPTNC (plug) qty 1 x GPS, RG-174, 17ft long, SMA(m) — AND WiFi 2-in-1 2 element 2 in 1 transportation antenna, black radome color, 2x dual band WiFi • ANT-2-WLAN-D-O • 07-100265-01 Has the following integrated cables: qty 2 x WiFi, 3ft long, LMR-240 RPTNC(plug)

Use Case	Extension Cable	Antenna
Transportation Use Case 1 Continued:	WiFi 2.4 GHz / 5GHz extension cables (4 ports, can mix and match lengths per installation requirements if needed) Qty 4x LMR-400-DB RPTNC(plug) - STR RPTNC(jack) - STR, 5ft • AIR-CAB005LL-R • 37-0766-01 — OR Qty 4x LMR-400-DB RPTNC(plug)-R/A RPTNC(jack)-STR, 10ft • CAB-L400-10-R • 37-100844-01 — OR Qty 4x LMR-400-DB RPTNC(plug)-STR RPTNC(jack)-STR, 20ft • AIR-CAB020LL-R • 72-2760-02 — AND GPS port No extension cable required, 5-in-1 antenna comes with integrated active GPS antenna with 17ft cable.	

Use Case	Extension Cable	Antenna
Transportation Use Case 2: 7 x RF ports, with the IR829 deployed in a transportation application. (Alternate Configuration, can be used in case the application calls for the WiFi antennas to be separate from the LTE antenna for example. a ceiling mount WLAN). This case describes a Tercia 3-in-1 transportation antenna (which covers MIMO cellular and GPS) together with qty 2 x 2-in-1 WiFi antennas. ✎ **Note** A CUSTOM CEILING MOUNT BRACKET IS REQUIRED FOR THE 2-in-1 antenna if installed in a ceiling mount configuration (NOT SUPPLIED BY CISCO)	No extension cables are required if the IR829 unit is located within ~1.0ft of 3-in-1 antenna, and ~2.0ft of WiFi 2-in-1 antenna. If these conditions are not met, this deployment requires the following extension cables: Cellular extension cables: (2 ports) Qty 2X LMR-400-DB TNC(m)-R/A - TNC(f), 5ft • 4G-CAB-LMR400-5 • 37-100842-01 — OR Qty 2X LMR-400-DB TNC(m)-R/A - TNC(f), 10ft • 4G-CAB-LMR400-10 • 37-100843-01 — OR Qty 2X LMR-400-LLPL plenum / indoor only TNC(m)-R/A - TNC(f), 20ft • 4G-CAB-ULL-20 • 37-1401-01 — AND WiFi 2.4 GHz / 5GHz extension cables (4 ports, can mix and match lengths per installation requirements if needed) Qty 4x LMR-400-DB RPTNC(plug) - STR RPTNC(jack) - STR, 5ft • AIR-CAB005LL-R • 37-0766-01 — OR Qty 4x LMR-400-DB RPTNC(plug)-R/A RPTNC(jack)-STR, 10ft • CAB-L400-10-R • 37-100844-01 — AND GPS port - No extension cable required, 3-in-1 antenna comes with integrated active GPS antenna with 17ft cable.	Tercia 3 element 3-in-1 transportation antenna, black radome color, 2x 4G cellular, 1xGPS • ANT-3-4G2G1-O • 07-100263-01 Has the following integrated cables: qty 2 x cellular, LMR-195, 2ft long, TNC(m) qty 1 x GPS, RG-174, 17ft long, SMA(m) — AND QTY 2 of 2-in-1 antennas WiFi 2-in-1 2 element 2 in 1 transportation antenna, black radome color, 2x dual band WiFi • ANT-2-WLAN-D-O • 07-100265-01 Has the following integrated cables: qty 2 x WiFi, 3ft long, LMR-240 RPTNC (plug) ✎ **Note** A CUSTOM CEILING MOUNT BRACKET IS REQUIRED FOR THE 2-in-1 antenna if installed in a ceiling mount configuration (NOT SUPPLIED BY CISCO)

Power Supply

The Cisco IR829 comes with an external power connector.

- Direct-wire 12/24VDC vehicle charging system input (9 — 32VDC).
- 4-pin locking power connector.

SFP Modules

The router Ethernet SFP modules provide connections to other devices. These field-replaceable transceiver modules provide the uplink interfaces. 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.

Table 1-8   Maximum Operating Temperature

Type of SFP Module	Model
Rugged and Industrial SFPs –40 to 185°F (–40 to 85°C)	GLC-SX-MM-RGD with digital optical monitoring (DOM) support GLC-LX-SM-RGD with digital optical monitoring (DOM) support GLC-ZX-SM-RGD with digital optical monitoring (DOM) support

For minimum software requirements, refer to the Release Notes for your platform.

For the most up-to-date list of supported SFP models for Cisco Industrial Ethernet switches, see http://www.cisco.com/en/US/docs/interfaces_modules/transceiver_modules/compatibility/matrix/OL_6981.html#wp138176

CHAPTER 2

Installing the Router

This chapter describes the equipment and the procedures for successfully installing the Cisco IR829 and contains the following sections:

⚠
Caution   Do not place anything on top of the router that weighs more than 10 pounds (4.5 kilograms), and do not stack routers on a desktop. Excessive weight on top of the router could damage the chassis.

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

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

⚡
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** **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

Equipment, Tools, and Connections

This section describes the equipment, tools, and connections necessary for installing your Cisco IR829. It contains the following topics:

- Items Shipped with your Router, page 2-2
- Additional Items, page 2-2
- Ethernet Devices, page 2-3

Items Shipped with your Router

Unpack the box and verify that all items listed on the invoice were shipped with the Cisco IR829.

The following items are shipped with your router:

- Getting Started Guide Part Number 78-100611
- Power Cable components
- Grounding Lug
- Ethernet Cable Part Number 75-1501-01

Additional Items

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

- ESD-preventive cord and wrist strap.
- Screws for mounting the router on a wall.
- Two number-10 wood screws (round- or pan-head) with number-10 washers or two number-10 washer-head screws, for mounting on a wall stud. The screws must be long enough to penetrate at least 3/4 inch (20 mm) into the supporting wood or metal wall stud.
- Two number-10 wall anchors with washers, for mounting the router on a hollow wall.
- Wire crimper for chassis grounding.
- Wire for connecting the chassis to an earth ground.
- AWG 14 (2 mm2) or larger wire for NEC-compliant chassis grounding.
- AWG 18 (1 mm2) or larger wire for EN/IEC 60950–compliant chassis grounding.
- Ethernet cables for connecting to the Fast Ethernet (FE) WAN and LAN ports.
- Ratcheting torque flathead screwdriver that exerts up to 15 in-lb (1.69 N-m) of pressure.
- A number-2 Phillips screwdriver.

Ethernet Devices

Identify the Ethernet devices that you will connect to the router: hub, servers, and workstations or PCs. Ensure that each device has a network interface card (NIC) for connecting to Ethernet ports.

If you plan to configure the software using Cisco IOS commands through the console port, provide an ASCII terminal or a PC that is running terminal emulation software to connect to the console port.

Installing the Router

This section describes how to install the Cisco IR829. This router can be installed on a table top or other flat horizontal surface mounted on a wall or DIN rail.

The recommended clearance when horizontally mounted is 1.5 inches on both sides for floor mount bracket clearance and 2 inches on top. Top clearance is not required but 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 not required on the backside (opposite side from I/O face) unless DIN rail mounting is required. Clearance is required to attach and mount the DIN rail bracket. The same clearances apply when mounted vertically.

This section also describes how to attach external antennas to the routers and contains the following topics:

- Warnings, page 2-3
- Accessing the SIM Cards, page 2-3
- Installing Antennas, page 2-5
- Mounting on a Wall, Table, or Other Flat Surface, page 2-5
- Installing the Router Ground Connection, page 2-7

Warnings

⚠️

Warning   **This equipment needs to be grounded. Use a green and yellow 12 to 14 AWG ground wire to connect the host to earth ground during normal use.** Statement 242

Accessing the SIM Cards

This section describes how to install and/or replace a SIM card. Ensure that the router is not mounted to a wall, floor, or DIN rail.

⚠️

Caution   Do not touch any part of the exposed PCB circuit area when the SIM cover is removed.

⚠️

Warning   **The covers are an integral part of the safety design of the product. Do not operate the unit without the covers installed.** Statement 1077

Warning   **Hot surface.** Statement 1079

Note   High Temperature SIMs are required for 4G operations if the Ambient temperature is above 95F (35C)

To access the SIM card in the Cisco IR829, follow these steps:

Step 1   Place the router on its bottom and ensure that any installed antennas are carefully oriented.

Step 2   Remove the SIM access panel using two Phillips head screws. (See Figure 2-1.)

Step 3   Locate the SIM card you wish to install/replace. Details are shown in Figure 2-2.

Step 4   Remove the SIM card (if present) and install the new card(s).

Figure 2-1   *Accessing the SIM Cards*

Figure 2-2   *Sim Card Detail*
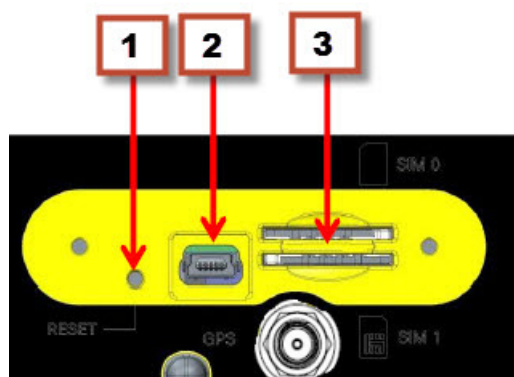
1. Reset Switch
2. Mini USB Port
3. Dual Sim Slots

Step 5   Replace the panel and the screws.

Installing Antennas

Note   Before you install the Cisco IR829 Integrated Services Router on a table, wall, or DIN rail, install the antennas on the front panel. It is difficult to install the antennas after the router is installed.

There are four TNC connectors on the front side of the chassis. There are two TNC and one SMA connectors on the back side of the chassis. Two TNC connectors are used to connect to the 4G modem. The four TNC connectors at the back will be connected to the two 4G modems. The front two TNC connectors will be used for WiFi.

Orient the antennas. For optimum wireless performance, the antennas should be perpendicular with respect to the floor.

If the router is being mounted on a desk, orient the antennas straight up.

To attach the radio antennas to your wireless router, follow these steps:

Step 1   Manually screw the antenna tight to the TNC connectors on the back of the router.

Step 2   Orient the antennas. For optimum wireless performance, antennas should be generally perpendicular to each other.

Mounting on a Wall, Table, or Other Flat Surface

The Cisco IR829 has mounting holes on the bottom of the chassis for mounting the unit on a wall or other vertical surface. The attachment hardware is provided.

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

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

To mount the router on a wall, follow these steps:

Step 1   Locate the mounting holes on the router. There are 4 holes are shown circled in red in Figure 2-3.

Figure 2-3   *Cisco IR829 Mounting Holes*
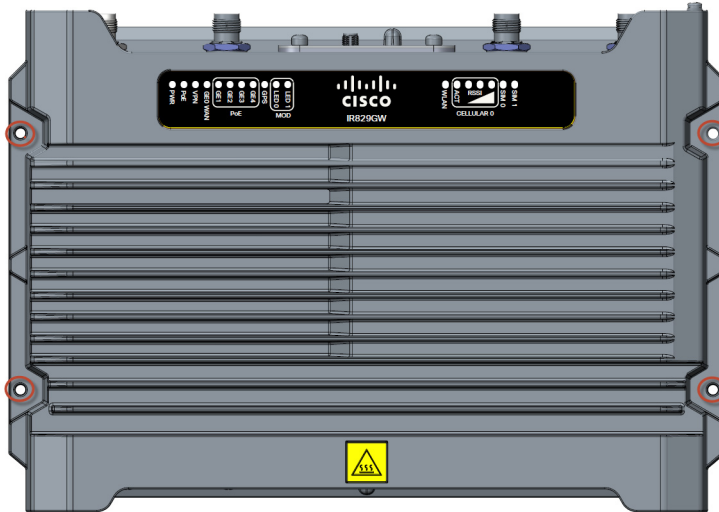
Step 2   Install the router to a wall stud using two number-10 wood screws, round- or pan-head, with number-10 washers or two number-10 washer-head screws. The screws must be long enough to penetrate at least 1.0 inch (25.4 mm) into the supporting wood or metal wall stud. (See Figure 2-4.)

Figure 2-4   *Mounted to wall*

Note   For hollow-wall mounting, each bracket requires two wall anchors with washers. Wall anchors and washers must be size number 10.

Step 3   Route the cables so that they do not put a strain on the connectors or mounting hardware. Cables should be routed down relative to the router to prevent water from traveling on the cables.

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.

- For NEC-compliant grounding, use size 14 AWG (2 mm2) or larger copper wire and a ring terminal with an inner diameter of 1/4 in. (5 to 7 mm).

- 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

⚠

Warning   **This equipment needs to be grounded. Use a green and yellow 12 to 14 AWG ground wire to connect the host to earth ground during normal use.** Statement 242

To install the ground connection, follow these steps:

Step 1   Locate the grounding lug attached to the back of the Cisco IR829. 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 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). (See Figure 2-5.)

Figure 2-5   Chassis Ground Connection Points
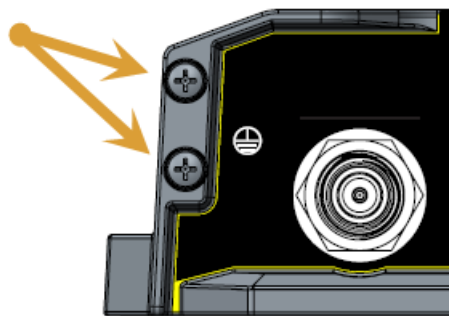
Step 5   Connect the other end of the ground wire to a known reliable earth ground point at your site.

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.

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.

Connecting the Router

This chapter describes how to connect Cisco IR829 Integrated Services Router (ISRs) to Ethernet devices and a network. The chapter contains the following sections:

- Preparing to Connect the Router, page 3-1
- Connecting a PC, Server, or Workstation, page 3-2
- Connecting a Terminal or PC to the Console Port, page 3-3
- Connecting to DC Power, page 3-3
- Verifying Connections, page 3-6

Note   For compliance and safety information, see the Regulatory Compliance and Safety Information Roadmap that ships with the router and *Regulatory Compliance and Safety Information for Cisco 800 Series and SOHO Series Routers.*

Preparing to Connect the Router

Before you connect the router to the devices, install the router according to the instructions in Chapter 2, "Installing the Router".

Preventing Damage to the Router

To prevent damage to your router, follow these guidelines when connecting devices 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.

- If you must supply your own cable, see the "Technical Specifications" section on page 6-1 for cabling specifications. If this appendix does not provide specifications for a particular cable, we strongly recommend ordering the cable from Cisco.

Connecting a PC, Server, or Workstation

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

Step 1   Connect one end of the Ethernet cable to an Ethernet switch port on the router. In this example a PC is being connected to GE LAN Port 2. See Figure 3-1.
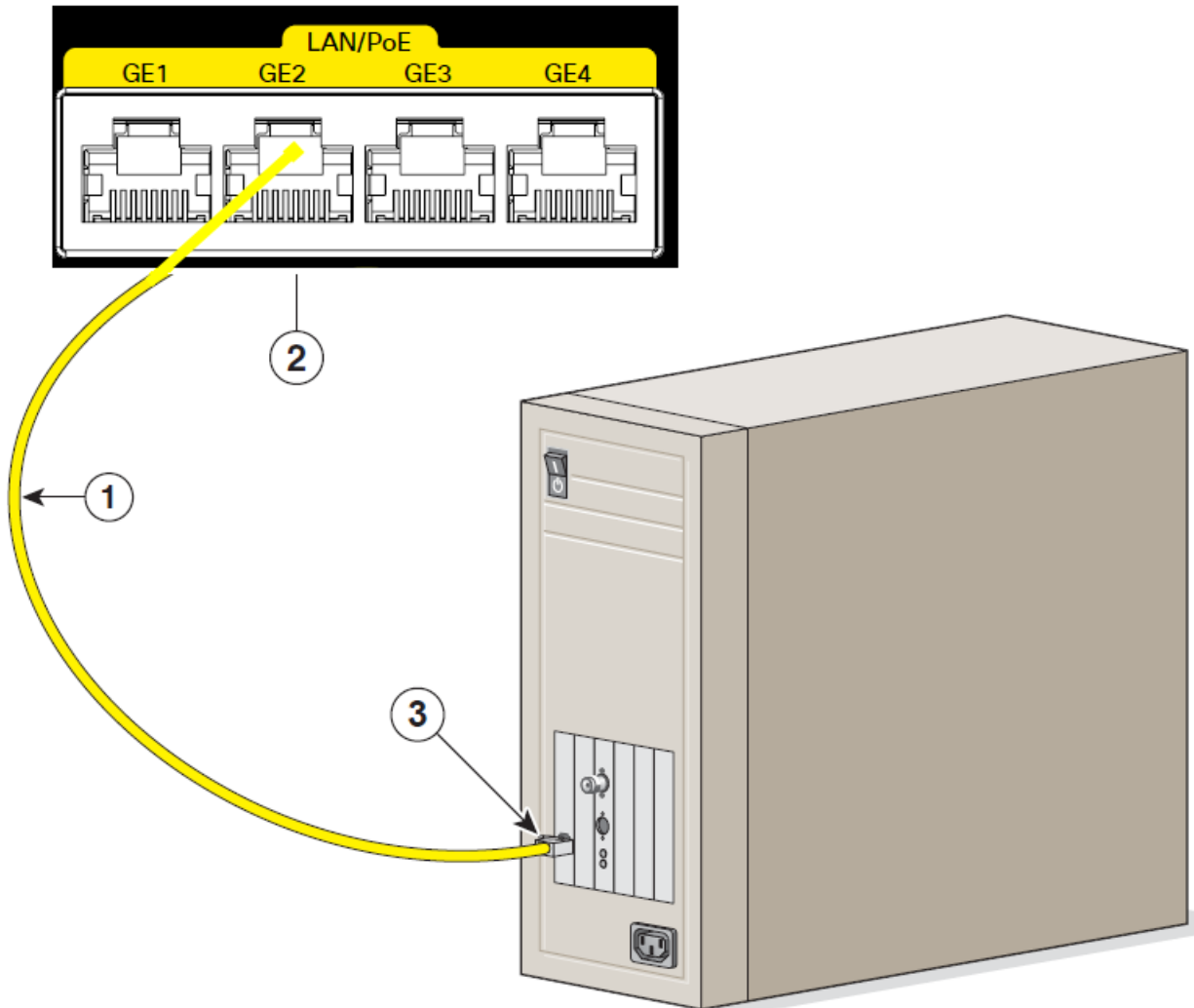
Figure 3-1   *Connecting a Server, PC, or Workstation*

1	Ethernet cable	3	RJ-45 port on the PC, Server, or Workstation
2	Ethernet switch port on the router		

Step 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.

Step 3   (Optional) Connect additional servers, PCs, or workstations to the other Ethernet switch ports.

Connecting a Terminal or PC to the Console Port

Connect a terminal or 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:

Step 1   Connect the mini-USB side of a cable to the USB Console port on the router. Figure 3-2 shows the mini-USB location (**1**) for the Console port on the router.
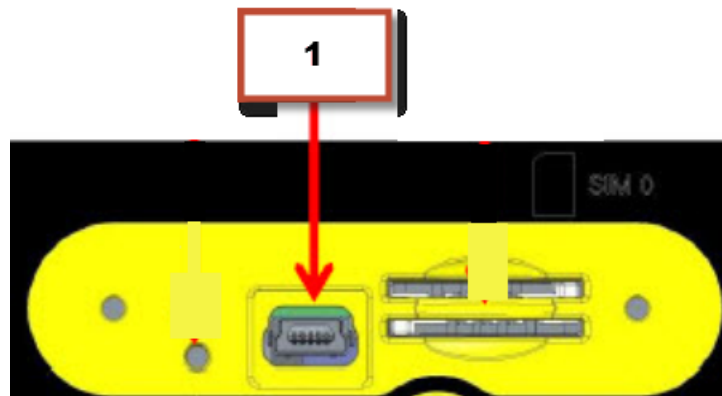
Figure 3-2   *Connecting a Terminal or PC to the Console Port*

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/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx

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 36 VDC, 5A** Statement 1005

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
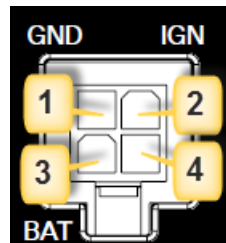
Plugs and Pin-Outs

The IR829 ships with a DC power accessory kit that contains a 4-pin locking connector and pins to use for the power connections. Four contacts are supplied, but only three are used. One is a spare.

The power entry receptacle is on the IR829. The pin-outs are shown in Figure 3.

Figure 3   Power Connector Pin-outs

Figure 4   Power connector Descriptions

Pin Number	Name	Description	Color
1	DC In -	DC Power Return (GND-)	Black
2	Ignition	Ignition Input (IGN)	Blue
3	DC In +	DC Power In (BAT+)	Red
4	N/A	N/A	N/A

Constructing a Power cable

Special care should be taken when making the connections for DC power. It is easy to make a mistake when crimping connections, and there is a very good tutorial available at Molex:
http://www.molex.com/tnotes/crimp.html

The specifications for the wiring are as follows:

- 16 AWG (1.02-to-1.29mm)
- UL1015 Rated
- Wires will be wound at 1 twist per inch

The example in Figure 3-5 shows a cable constructed with a ferrite for a different certification. You can build your cable without the ferrite eliminating items 2 and 3 in the diagram.
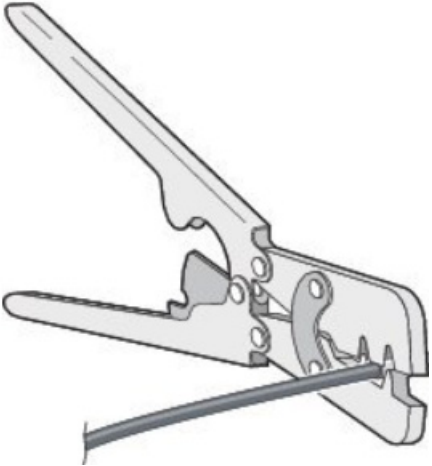
Figure 3-5   Power cable
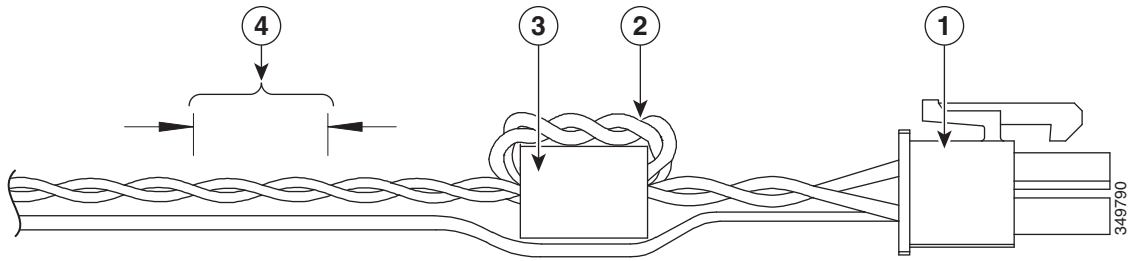
Details listed in the power cable example are:

1	4-pin locking connector		
2	2 loops of DC power and power return wires only. Other wires that may be used should run outside the Ferrite.	✎ Note	Ferrite bead and the loops of wire are not needed at this time.
3	Ferrite Bead	✎ Note	Ferrite bead and the loops of wire are not needed at this time.
4	Wires wound at 1 twist per inch		

Wiring the DC Power

To connect the DC power on your Cisco IR829, follow these steps:

Step 1	Identify the DC power source and measure 4 strands of copper wire 16 AWG (1.29mm) long enough to connect to the DC power source. ✎ **Note** The maximum length of the cable **before** twisting is 15 feet (4.6 meters).	
Step 2	Using an 16-gauge wire-stripping tool, strip each of the 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.	

Step 3	Using the pins included in the kit, crimp each pin onto a wire.	
Step 4	Insert the pins into the power connector, referring to previous figures for guidance.	
Step 5	Plug the connector into the power entry receptacle.	

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 Table 3-1.

For full LED description, see Chapter 1, "LEDs"

Table 3-1   Verifying the Router Operation

Power and Link	LEDs to Check	Normal Patterns
PWR	Green steady On	Normal operation
	Green (blinking)	Boot up phase or in ROM Monitor mode
	Yellow	System shutdown due to under or over voltage conditions
GE0 WAN	Steady On	Link is up
	Flashing	Transmitting and Receiving data
	Off	No network activity.
Ethernet LAN Switch Ports	Single LED per port	Off — No link Green Steady on — Link is up Green Blink — Transmitting and Receiving data Yellow — POE Fault, implies no link

Table 3-1   Verifying the Router Operation (continued)

Power and Link	LEDs to Check	Normal Patterns
Sim cards	SIM0/SIM1	Off — No USIM Green — USIM installed and active
Cellular Modems	CELLULAR0/ CELLULAR1	Off — Module not powered on On — Module is powered on and connected but not transmitting or receiving Slow Blink — Module is powered on and searching for connection Fast Blink — Module is transmitting or receiving.

C H A P T E R 4

Initial Configuration

This chapter provides instructions for initial configuration of the Cisco IR829 Integrated Services Routers (ISRs). To create the initial configuration, the setup command facility prompts you for basic information about your router and network.

This chapter contains the following sections:

Setup Command Facility

The setup command facility guides you through the configuration process by prompting you for the specific information that is needed to configure your system. Use the setup command facility to configure a hostname for the router, to set passwords, and to configure an interface for communication with the management network.

To use the setup command facility, you must set up a console connection with the router and enter the privileged EXEC mode.

To configure the initial router settings by using the setup command facility, follow these steps:

Step 1 Set up a console connection to your router, and enter privileged EXEC mode.

Step 2 In privileged EXEC mode, at the prompt, enter **setup**.

```
yourname# setup
```

The following message is displayed:

```
--- System Configuration Dialog ---

Would you like to enter the initial configuration dialog? [yes/no]:
```

You are now in the setup command facility.

The prompts in the setup command facility vary, depending on your router model, on the installed interface modules, and on the software image. The following steps and the user entries (in **bold**) are shown as examples only.

✎

Note   If you make a mistake while using the setup command facility, you can exit and run the setup command facility again. Press **Ctrl-C** and enter the **setup** command at the privileged EXEC mode prompt (Router#). To proceed using the setup command facility, enter **yes.**

```
Would you like to enter the initial configuration dialog? yes
```

Step 3   When the following messages appear, enter **yes** to enter basic management setup.

```
At any point you may enter a question mark '?' for help.
Use ctrl-c to abort configuration dialog at any prompt.

Default settings are in square brackets '[]'.

Basic management setup configures only enough connectivity
for management of the system, extended setup will ask you
to configure each interface on the system

Would you like to enter basic management setup? [yes/no]: yes
```

Step 4   Enter a hostname for the router (this example uses Router).

```
Configuring global parameters:
Enter host name [Router]: Router
```

Step 5   Enter an enable secret password. This password is encrypted (more secure) and cannot be seen when viewing the configuration.

```
The enable secret is a password used to protect access to
privileged EXEC and configuration modes. This password, after
entered, becomes encrypted in the configuration.
Enter enable secret: xxxxxx
```

Step 6   Enter an enable password that is different from the enable secret password. This password is *not* encrypted (less secure) and can be seen when viewing the configuration.

```
The enable password is used when you do not specify an
enable secret password, with some older software versions, and
some boot images.
Enter enable password: xxxxxx
```

Step 7   Enter the virtual terminal password, which prevents unauthenticated access to the router through ports other than the console port.

```
The virtual terminal password is used to protect
access to the router over a network interface.
Enter virtual terminal password: xxxxxx
```

Step 8   Respond to the following prompts as appropriate for your network:

```
Configure SNMP Network Management? [yes]:
    Community string [public]:
```

A summary of the available interfaces is displayed. The following is an example summary and may not reflect your configuration:

```
Current interface summary

Any interface listed with OK? value "NO" does not have a valid configuration

Interface              IP-Address      OK? Method Status              Protocol
GigabitEthernet0       20.1.0.165      YES DHCP   up                  up
GigabitEthernet1       unassigned      NO  unset  up                  up
```

```
Async0                      unassigned      YES unset  up                  down
Async1                      unassigned      YES unset  up                  down
GigabitEthernet2            unassigned      NO  unset  up                  up
Cellular0                   unassigned      NO  unset  down                down
Cellular1                   unassigned      NO  unset  down                down
```

Step 9   Choose one of the available interfaces for connecting the router to the management network.

```
Enter interface name used to connect to the
management network from the above interface summary: GigabitEthernet0
```

Step 10   Respond to the following prompts as appropriate for your network:

```
Configuring interface GigabitEthernet0:
    Configure IP on this interface? [yes]: yes

Use the 100 Base-TX (RJ-45) connector? [yes]: yes
Operate in full-duplex mode? [no]: yes
Configure IP on this interface? [yes]: yes
    IP address for this interface: 172.1.2.3
    Subnet mask for this interface [255.255.0.0] : 255.255.0.0
    Class B network is 172.1.0.0, 26 subnet bits; mask is /16
```

The configuration is displayed:

```
The following configuration command script was created:

hostname Router
enable secret 5 $1$D5P6$PYx41/lQIASK.HcSbfO5q1
enable password xxxxxx
line vty 0 4
password xxxxxx
snmp-server community public
!
no ip routing
!
interface GigabitEthernet0
no shutdown
speed 100
duplex auto
ip address 172.16.2.3 255.255.0.0
!
```

Step 11   Respond to the following prompts. Enter **2** to save the initial configuration.

```
[0] Go to the IOS command prompt without saving this config.
[1] Return back to the setup without saving this config.
[2] Save this configuration to nvram and exit.

Enter your selection [2]: 2
Building configuration...
Use the enabled mode 'configure' command to modify this configuration.

Press RETURN to get started! RETURN

The user prompt is displayed.
Router>
```

Step 12   Verify the initial configuration. See the "Verifying the Initial Configuration" section on page 4-4 for verification procedures.

After the initial configuration file is created, you can use the Cisco IOS CLI to perform additional configuration.

Verifying the Initial Configuration

To verify that the new interfaces are operating correctly, perform the following tests:

*   To verify that the interfaces and line protocol are in the correct state—up or down—enter the **show interfaces** command.
*   To display a summary status of the interfaces configured for IP, enter the **show ip interface brief** command.
*   To verify that you configured the correct hostname and password, enter the **show configuration** command.

After you complete and verify the initial configuration, you can configure your Cisco router for specific functions.

Where To Go From Here

There are a wide variety of configuration options available on the Cisco IR829. The rest of this chapter will discuss different pieces of documentation to refer to, as well as point out the differences between this device and the rest of the 800 series routers.

800 Series Documentation

The home for all of the 800 series router documentation is here:

http://www.cisco.com/c/en/us/support/routers/800-series-routers/tsd-products-support-series-home.html

Most of the Cisco IR829 configuration tasks are available in the Cisco 800 Series Integrated Services Routers Software Configuration Guide:

http://www.cisco.com/c/en/us/td/docs/routers/access/800/software/configuration/guide/SCG800Guide.htm

Some common tasks between the Cisco 800 series and the Cisco IR829 are listed here:

Configuring Wireless Devices

http://www.cisco.com/c/en/us/td/docs/routers/access/800/software/configuration/guide/SCG800Guide/SCG800_Guide_BookMap_chapter_01001.html

Cisco 4G LTE Software Installation Guide

http://www.cisco.com/c/en/us/td/docs/routers/access/interfaces/software/feature/guide/EHWIC-4G-LTESW.html

Cisco IR829 Differences

This section will discuss some of the ways that the Cisco IR829 differs from the rest of the 800 series.

LEDs

The Cisco IR829 has LEDs that are discussed in previous chapters in this guide. There is also a command that will show you the status of the LEDs if you are not near the device. Use the show platform led command with options to view the different output.

```
IR800#show platform led

LED STATUS:
==================================================

GE PORTS :  GE0      GE1      GE2      GE3      GE4
LINK LED :  GREEN    GREEN    GREEN    GREEN    OFF
==================================================
PoE LED   : GREEN

Cellular PORTS: Cellular0
RSSI LED 1  : Green
RSSI LED 2  : Green
RSSI LED 3  : Off
GPS LED     : Slow Blinking
SIM0 LED    : Green
SIM1 LED    : Off
==================================================
VPN LED   : OFF

System LED: amber, blinking


IR800#show platform led summary
 Ports  LINK/ENABLE
-------+--------------
GE0     GREEN
GE1     GREEN
GE2     GREEN
GE3     GREEN
GE4     OFF
-------+--------------
PoE LED   : GREEN


        RSSI 1        RSSI 2        RSSI 3        GPS
-----+------------+------------+------------+-------------
Ce0     Green        Green         Off         Slow Blink

-----+------------+------------+------------+-------------


Cellular   SIM0   SIM1
--------+-------+-------
Ce0      Green    Off
--------+-------+-------
VPN LED   : OFF

System LED: amber, blinking
```

```
IR800#show platform led system
System LED: amber, blinking
Summary of the LED status providers:
           Client                   Type     Status
------------------------------   --------  --------
GigabitEthernet5                 critical  OK
```

Note   There may be a lag time between the LED indication on the router and what the show led commands return.

Software Bundle Installation

The Cisco IR829 ships with the latest software available with the configuration that was ordered. There should be no reason to have to upgrade unless a failure occurs or you have been instructed to reload all software. Should the need arise, the following steps will assist in performing a bundle installation.

Overview:

1. Download the bundle to flash memory from a TFTP server.

2. Install the bundle from the Command Line Interface

3. Save the configuration and reload the router to use the new image.

4. Download the 4G firmware upgrade.

Example:

Step 1   Copy the bundle from a TFTP server to your router.

```
IR800#copy tftp flash
Address or name of remote host [223.255.254.254]? your ip address here
Source filename [path to file/ir800-universalk9-bundle.SSA.156-0.3.T]?
Destination filename [ir800-universalk9-bundle.SSA.156-0.3.T]?
Accessing tftp://223.255.254.254/tachen/ir800-universalk9-bundle.SSA.156-0.3.T...
Loading tachen/ir800-universalk9-bundle.SSA.156-0.3.T from 223.255.254.254 (via Vlan1): !
*Jun 25 18:28:45.685: %ARP-4-NULL_SRC_MAC: NULL MAC address from 99.99.0.1 on
wl0!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
!!!!!!!!!!!!!!!!!!!!!!!!
[OK - 143536651 bytes]

143536651 bytes copied in 774.390 secs (185354 bytes/sec)
```

Step 2   The bundle download is complete, and now needs to be installed. Perform the `bundle install flash:`
`< bundle iOS image name>` command.

```
IR800#bundle install flash:ir800-universalk9-bundle.SSA.156-0.3.T
 Installing bundle image:
/ir800-universalk9-bundle.SSA.156-0.3.T.....................................................
......................................

updating Hypervisor image...
 Sending file modes: C0444 23753557 ir800-hv.srp.SPA.0.28

    SRP md5 verification passed!
```

```
updating IOS image...
 Sending file modes: C0644 61505652 ir800-universalk9-mz.SSA.156-0.3.T

    IOS md5 verification passed!
Done!

IR800#
*Jun 25 18:51:16.975: %SYS-5-CONFIG_I: Configured from console by bundle install command
*Jun 25 18:51:16.975: %IR800_INSTALL-6-SUCCESS_BUNDLE_INSTALL: Successfully installed
bundle image.
```

Step 3   Save the configuration and reload the router.

```
IR800#reload

Do you want to reload the internal AP ? [yes/no]: yes

System configuration has been modified. Save? [yes/no]: yes
Building configuration...

  [OK]
Proceed with reload? [confirm]press return

*Jun 25 19:03:13.685: %SYS-5-RELOAD: Reload requested by console. Reload Reason: Reload
Command.
```

Step 4   Download the 4G firmware or AP image. Instructions for uploading firmware are located here:

http://www.cisco.com/c/en/us/td/docs/routers/access/interfaces/software/feature/guide/EHWIC-4G-LT ESW.html

Search for "Upgrading the Modem Firmware".

C H A P T E R 5

Guest Operating System (Guest OS) Installation and Configuration

This chapter details Guest Operating System (Guest OS) installation for the Cisco IR829.

This chapter contains the following sections:

Guest Operating System Overview

The IR829 supports a Hypervisor architecture to support multiple user-specified operating systems within independent Virtual Machines (VMs). Specific functions include Serial Relay and Network Address Translation (NAT).

Cisco IOS interacts closely with the platform and underlying Hypervisor. Cisco Guest OS allows you to run the Linux operating system (if within the memory, disk, and CPU budget) next to Cisco IOS on the Hypervisor. Cisco Guest OS does not require signing, allowing maximum deployment latitude; however you must ensure the integrity and proper behavior for any Guest OS that you install.

When you install the IR829 software bundle (image) on the router, the image automatically installs the supported Guest OS (Cisco IOS and Linux OS) instance(s). You can use the Linux Guest OS running on a VM on the IR829 to run utility applications.

The following example shows connectivity of Guest OS and Cisco IOS. A virtual interface (see Configuring Guest OS Interface on Cisco IOS) managed by Cisco IOS provides network connectivity to Guest OS. Cisco IOS forwards traffic from Guest OS through regular IP forwarding mechanisms.

Figure 5-1   Connectivity Between Cisco IOS and Guest OS
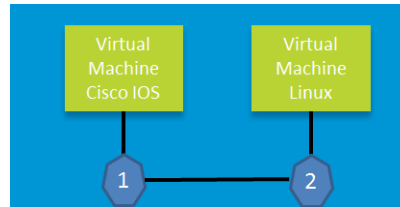
In this example, number 1 is the interface being used on the router and number 2 is the interface on the Linux OS. For the Cisco IR829, 1 is Gigabit Ethernet 5 and 2 is Eth 0.

Prerequisites

- Router must be running Cisco IOS.

Guidelines and Limitations

- The bundled Guest OS is based on Linux kernel version 3.8.11.
- You must configure Cisco IOS to provide Guest OS Connectivity.

Default Settings

The bundled Linux Guest OS:

- uses DHCP to acquire the IP address.
- does not have a default root password.

Installation and Upgrade

By default, IR829s ship with a software bundle that includes the latest versions of all of the required images such as Cisco IOS, Guest OS, and Hypervisor.

Use the following procedure to upgrade your router to the latest software bundle. It can take several minutes for the router to upgrade and install all of the images (Hypervisor, Cisco IOS, and Guest OS).

DETAILED STEPS

Step 1   Copy the bundle image to the IR829 IOS flash partition using scp or sftp.

Example bundle name: **ir800-universalk9-bundle.SPA.<VERSION>**

Step 2   Enter the following commands at the IR829 prompt:

Command	Purpose
bundle install flash: *<bundle name>***.CG**	Installs the specified bundle.
copy running config-config startup-config	Saves the current running configuration.
reload	Reloads the router.

Configuring Cisco IOS

This section describes how to configure the Cisco IOS VM to provide network connectivity to the Guest OS VM.

Guest OS connects to the network through a virtual Network Interface Card (VNIC) provided by the Hypervisor. Network attributes on the interface are statically configured or configured for DHCP to dynamically obtain IP addresses. Guest OS network connectivity is only through Cisco IOS, using the virtual network interface provided by the Hypervisor. Network attributes such as IP address, can be configured statistically or dynamically, and are obtained from Cisco IOS using DHCP requests. The bundled Linux Guest OS is configured to use DHCP.

This section outlines the task to configure a Cisco IOS DHCP pool to provision the Linux Guest OS with an IP address, and an external Ethernet interface in Cisco IOS to allow the Guest OS network connectivity.

This section includes the following topics:

- Configuring the IR829 Ethernet Interface, page 5-3
- Configuring Guest OS Interface on Cisco IOS, page 5-5
- Enabling Guest OS Console, page 5-6

Configuring the IR829 Ethernet Interface

You must enable one of the external Ethernet interfaces on the IR829 to provide network connectivity. For details on interface configuration refer to the Cisco 800 Series Integrated Services Routers Software Configuration Guide:

http://www.cisco.com/c/en/us/td/docs/routers/access/800/software/configuration/guide/SCG800Guide.html

IPv6 Gigabit Ethernet

On Guest OS, IPv6 is enabled by default. The following example configuration uses IPv6 on Guest OS, where Guest OS is automatically assigned an IPv6 address by enabling prefix delegation on the Cisco IOS interface GigabitEthernet 5.

The following example configures G 0 for external connectivity:

```
interface GigabitEthernet 0
no switchport
    ipv6 address autoconfig default
    ipv6 enable
```

```
        ipv6 dhcp client pd prefix-from-provider
        end
```

The following example configures G5 to allow the Guest OS network connectivity:

```
interface GigabitEthernet 5
    duplex auto
    speed auto
    ipv6 address prefix-from-provider ::2:0:0:0:1/64
    ipv6 enable
    end
```

Enabling IPv4 Gigabit Ethernet

To enable an external Gigabit Ethernet IPv4 interface on the IR829 to provide network connectivity, enter the following commands:

Command	Purpose
config terminal	Enters global configuration mode.
interface gig 0	Configures an IPv4 address on Gigabit Ethernet interface 0, and enters interface configuration mode.
ip address 9.1.1.5 255.255.255.0	Sets the IP address and subnet mask for Gigabit Ethernet interface 0.
no shutdown	Enables the Gigabit Ethernet interface.

Configuring DHCP Pool

To configure a local DHCP pool, enter the following commands, one per line:

Note   The subnet used for the local DHCP pool must be reachable externally. If you cannot allocate the whole subnet to Guest OS, use a NAT-based configuration. See Configuring NAT.

Command	Purpose
config terminal	Enters global configuration mode.
ip dhcp pool gospool	Names the local DHCP pool.
network 9.1.2.0 255.255.255.0	Sets the network address.
default-router 9.1.2.1	Sets the router address.
domain-name utility.com	Sets the subnet address.
dns-server 9.1.1.1	Sets the DNS server address.
lease 5	Sets the duration of the IP address lease to five days.

Configuring Guest OS Interface on Cisco IOS

The Guest OS Ethernet port (eth0) connects to GigabitEthernet 5 on Cisco IOS. To configure the GigabitEthernet 5 interface with the default gateway address of the DHCP pool, enter the following commands:

Note   IPv6 must always be enabled on GigabitEthernet 5.

Command	Purpose
interface GigabitEthernet 5	Set the internal virtual interface that connects to the Linux Guest OS.
ipv6 enable	Enables IPv6.
ipv6 address 2001:DB8:FFFF:0000:0000:0000:0001	Sets the IPv6 address.
ipv4 enable	Enables IPv4.
ipv4 address 9.1.2.1 255.255.255.0	Sets the IPv4 address.
no shutdown	

Note   There exists a condition where the IR829 could display slow performance if the guest OS is consuming too many CPU resources.

By default, Guest OS gets 50% of one of the cores of the CPU. The following command allows you to change the percentage of CPU allocation to VDS out of 100. The rest will go to Guest OS. In the situation where you don't use the Guest OS, the CPU can be allocated 90% to VDS.

For Example:

```
IR800>en
IR800#config t
Enter configuration commands, one per line.  End with CNTL/Z.
IR800(config)#iox hypervisor ?
  sched-policy  percentage of CPU ticks to VDS

IR800(config)#iox hypervisor sched-policy ?
  10  VDS  10%   Guest OS 90%
  20  VDS  20%   Guest OS 80%
  30  VDS  30%   Guest OS 70%
  40  VDS  40%   Guest OS 60%
  50  VDS  50%   Guest OS 50%
  60  VDS  60%   Guest OS 40%
  70  VDS  70%   Guest OS 30%
  80  VDS  80%   Guest OS 20%
  90  VDS  90%   Guest OS 10%

IR800(config)#iox hypervisor sched-policy 90
```

Enabling Guest OS Console

For heightened security, Guest OS console is disabled by default. To enable Guest OS console, enter the following commands:

Command	Purpose
config terminal	Enters global configuration mode.
line 1/4	Specifies line 1/4 for configuration and enters line configuration collection mode.
transport input all	Defines which protocols to use to connect to a specific line of the router.

Configuring Guest OS

This section describes how to set the root password for Guest OS and enable SSH access. By default, SSH is disabled in Guest OS, this section describes the steps to reverse-Telnet into Guest OS, and enable SSH access.

Starting Guest OS

By default, Guest OS starts after installation. To manually start the Guest OS, enter the following commands:

Command	Purpose
show iox host list detail	Displays OS: RUNNING if Guest OS is already running. If it is, go to Accessing Guest OS Console.
guest-os 1 start	Starts Guest OS.

During start up, Guest OS sends a DHCP request and is assigned an IP address from the local DHCP pool. Guest OS is then configured with a hostname and sync time from IOS.

Note   It can take a few minutes for the Guest OS to start.

Accessing Guest OS Console

The Guest OS console is accessible at port 2070 on any Cisco IOS interface. Use the following commands to access the Linux Guest OS console from Cisco IOS.

Note   You must first enable the Guest OS console as described in Enabling Guest OS Console.

Command	Purpose
telnet 9.1.2.1 2070	Accesses the Guest OS console. This uses the IP address of the Gigabit Ethernet 5 port. The following is the example result:

EXAMPLE

```
Poky 9.0 (Yocto Project 1.4 Reference Distro) 1.4 qemux86 ttyS0

qemux86 login: root
root@qemux86:~#
```

Setting the Root Password

Guest OS does not have a default root password. To set a root password, at the GOS prompt enter the following command.

✎
Note   You must set a root password before turning on SSH access.

Command	Purpose
[GOS] # passwd	Runs the following UNIX password script. Enter your desired password at the prompt.

EXAMPLE

```
Changing password for user root.
New UNIX password:
Retype new UNIX password:
passwd: all authentication tokens updated successfully.
[GOS]#
```

An alternate method for changing the root password is shown in the following example:

```
IR800#iox host exec "resetpw cisco" IR800-GOS-1
Password reset successfully.
```

Enabling Remote SSH Access

By default, SSH access is disabled to prevent unauthorized access to Guest OS. To enable SSH server on the guest OS:

Step 1   Launch the vi editor to edit the sshd_config file:

vi /etc/ssh/sshd_config

Step 2   Set the **PermitRootLogin** and **PasswordAuthentication** parameters to **yes**.

> **Note**   Ensure that the **PermitEmptyPasswords** parameter is set to **no**.

```
PermitRootLogin yes
PasswordAuthentication yes
PermitEmptyPasswords no
```

Step 3   Restart SSHD:

```
[GOS]# /etc/init.d/sshd stop
Stopping sshd:                                          [  OK  ]
[GOS]# /etc/init.d/sshd start
Starting sshd:                                          [  OK  ]
[GOS]#
```

Step 4   From the IOS command line, enter the following:

```
IR800#iox host exec enablessh IR800-GOS-1
        ssh enabled successfully.
```

You now have remote SSH access to Guest OS.

Configuring NAT

The following example configuration uses NAT for Guest OS network connectivity, where:

- 9.1.1.0 is the externally reachable subnet.
- 9.1.1.131 is the external IP address made available for Guest OS access.
- 192.168.1.0 is the private subnet created for Guest OS to Cisco IOS connectivity. This is not directly reachable outside the IR829.
- The IP address acquired by Guest OS through IOS local DHCP pool is 192.168.1.2. This address can be obtained using **show iox host list details** command from IOS.

```
ip dhcp pool gospool
    network 192.168.1.0 255.255.255.0
    default-router 192.168.1.1
    domain-name utility.com
    dns-server 9.1.1.1
    lease 5

interface gig 5
    ip nat inside
    ip address 192.168.1.1 255.255.255.0
    ipv6 enable
    no shutdown

interface gig 0
    ip nat outside
    ip address 9.1.1.5 255.255.255.0
    no shutdown

ip nat inside source static 192.168.1.2 9.1.1.131

! End of configuration

IR800#sh ip nat trans
```

```
Pro Inside global     Inside local       Outside local        Outside global
tcp 9.1.1.131:22      192.168.1.2:22     9.1.1.3:53649        9.1.1.3:53649
tcp 9.1.1.131:60100   192.168.1.2:60100  9.1.1.3:22           9.1.1.3:22
--- 9.1.1.131         192.168.1.2        ---                  ---
```

Troubleshooting

To determine common causes of configuration failure, enter the following commands:

Command	Purpose
ifconfig eth0	Checks if Guest OS is assigned an IP address. The following is example output:

<pre>eth0   Link encap:Ethernet HWaddr 02:00:03:f1:cd:05
          inet addr:9.1.2.2 Bcast:0.0.0.0 Mask:255.255.255.248
          UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
          RX packets:2 errors:0 dropped:0 overruns:0 frame:0
          TX packets:5 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:684 (684.0 B) TX bytes:894 (894.0 B)
[GOS]#</pre>	

netstat -r	Displays the Guest OS route table. The following is example output:

<pre>Kernel IP routing table
Destination   Gateway   Genmask   Flags   MSS   Window   irtt   Iface
default   9.1.2.1   0.0.0.0   UG   0   0   0   eth0
9.1.2.0   *   255.255.255.0 U   0   0   0   eth0
[GOS]#</pre>	

show ip arp	Verifies that Cisco IOS learned Guest OS ARP mapping.The following is example output:

<pre>Protocol   Address   Age (min)   Hardware Addr   Type   Interface
Internet   9.1.1.1   -   0022.bdef.c562 ARPA   GigabitEthernet0
Internet   9.1.2.1   -   0022.bdef.c569 ARPA   GigabitEthernet5
Internet   9.1.2.2   112   0022.bdef.c56d ARPA   GigabitEthernet5
IR800#</pre>	

Checking Connectivity

Use standard Linux tools (for example, ping and traceroute) to check Guest OS connectivity.

Related Documentation

Find Cisco 1000 Series Connected Grid Routers product documentation at:

www.cisco.com/go/cgr1000-docs.

Find Connected Grid Modules for Cisco 1000 Series Connected Grid Routers documentation at:

www.cisco.com/go/cg-modules

For information on supporting systems referenced in this guide, see the following documentation on Cisco.com:

Cisco ASR 1000 Series Aggregation Services Routers Configuration Guide

Cisco 3945 Series Integrated Services Router

Cisco 2000 Series Connected Grid Routers

Installation and Configuration Guide for Cisco Services Ready Engine Virtualization 1.1

Cisco IOS IP Application Services Command Reference

C H A P T E R 6

Technical Specifications

This appendix provides router, port, cabling specifications, and power adapters for the Cisco IR829 Integrated Services Router (ISRs).

> ✎
> **Note** For compliance and safety information, see the Regulatory Compliance and Safety Information Roadmap that was shipped with the router and *Regulatory Compliance and Safety Information for Cisco 800 Series and SOHO Series Routers*.

Router Specifications

Table 6-1 lists the operational limits of the Cisco IR829. Operating the router outside of the limits specified is not supported.

Table 6-1   *Cisco IR829 Specifications*

Description	Design Specification
Physical Characteristics	
Dimensions (H x W x D)	(height x width x depth x) are 7.70 x 11 x 1.73 in. (19.6 x 27.9 x 4.39 cm). 5 lb (1.0 kg)
Weight	
Maximum Power Consumption	70 Watts with PoE
Environmental Operating Ranges	
Operating Temperature and Altitude	–40 to 140°F (–40 to 60°C). -500 to 5,000 feet. Derate max operating temperature 1.5°C per 1000 feet. 10,000 ft maximum
Humidity	10% — 95% non-condensing
Environmental Tests	
Ingress Protection Rating	IP 40 per IEC 60529 for Vertical Falling Water, Pollution Degree 3
Humidity	Non-condensing Relative Humidity: 5% to 95%

Table 6-1   Cisco IR829 Specifications (continued)

Description	Design Specification
Military Standard	MIL-STD-810G Method 514.6: Procedure 1 Category 4, Secured Cargo - Common
	MIL-STD-810G Method 514.6: Procedure 1 Category 20, Ground Vehicles
	MIL-STD-810G Method 516.6. Procedure 1, Functional Shock
	MIL-STD-810G Method 516.6. Procedure 5, Crash Hazard
	MIL-STD-810G Method 516.6. Procedure 6, Bench Handling
Vibration and Shock (Railway Vehicles)	EN61373 Functional Random Vibe - Category 1, Class B
	EN61373 Simulated Non-op Long-life Vibe - Category 1, Class B
	EN61373 Non-op Shock, Class B
Heavy-Duty Vehicle Applications	SAE J1455 Operating Random Vibe, Cab Mounted Truck
	SAE J1455 Operating Sinusoidal Vibe, Category 3
	SAE J1455 Non-operating Sinusoidal Vibe, Category 3
	SAE J1455 Handling Drop Test
Certifications	
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
Transportation/Storage Conditions	
Temperature	–40 to158°F (–40 to 85°C)
Humidity	5–95%
Altitude	4570 m (15,000 ft)