



Perle IRG5521+ FN Hardware Installation Guide



Updated: May 2021
Version A.03.05, 2021
Document Part#5500474-10

Preface

Audience

This guide is for the network or computer technician responsible for installing the Perle IRG5521+ FN (FirstNet) router. This router supports worldwide global coverage for LTE networks, integrated Wireless LAN 2.4/5 GHz capabilities as well as support for the First Responder Network Authority (FirstNet) network. Familiarity with LTE's concepts and terminology, GNSS, Ethernet, and LAN (local area networks) are required.

Purpose

Perle routers provide users, networking equipment, as well as M2M & IoT appliances with network connectivity for fixed locations (i.e. buildings, POS, Kiosks, ...etc.) and mobile (i.e. vehicle, trains, robots) applications. In vehicular applications, the router provides connectivity and does not interact with the vehicle's operation or vehicle operators. The router provides full support for LTE network band 14 in compliance with the First Responder Network Authority (FirstNet) network.

This document describes the hardware and physical characteristics of the Perle IRG5521+ FN router. It covers hardware features as well as installation and operation. This document does not cover how to configure your Perle IRG5521+ FN router. Information to configure your router can be found in the Perle IRG5000 Series Router User's Guide and the Perle IRG5000 Series Router CLI Reference Guide located on the Perle website. Quick Start information can be found in the IRG5521+ FN Cellular LTE Router Quick Start Guide (QSG) that came with your product.

Key Features

- Supports bridging/switching, and routing
- LTE coverage spanning 30 frequency bands for global coverage
- Support for FirstNet network band 14
- Fully automatic network switching supporting dual network SIMs
- Routing with Primary/Backup route
- LTE and VPN Fail-over
- Provides network connectivity via LTE, Ethernet and USB-C
- Active GPS for tracking equipment
- Low voltage Standby function to prevent battery drain
- One GPIO pin for remote monitoring/control and one IGN (Ignition) pin
- Two digital Inputs and one Relay contact
- RS485 half-duplex capabilities
- Wireless LAN 2.4/5 GHz
- Security via remote authentication (RADIUS and TACACS+)
- Processor Power Saving Mode – this feature optimizes idle power consumption, saving energy by reducing performance where possible
- Power Saving Features including; LED power saving mode, Smart Standby Mode, Power saving strategies such as turning off unused interfaces (USB, Serial, Ethernet), turning off GPS and adjusting the Ethernet rate
- FirstNet Ready™
- Meets industry-grade certifications

Additional Documentation

Document	Description
Perle IRG5000 Series Router User's Guide	User guide explaining how to configure the IRG5521+ FN features using the Web Manager application. New users should use this method to configure the router.
Perle IRG5000 Series Router CLI Reference Guide	Command Line Interface Reference Guide using CLI commands to configure the IRG5521+ FN (this is an advanced way to configure the router).

Document Conventions

This document contains the following conventions:

Most text is presented in the typeface used in this paragraph. Other typefaces are used to help you identify certain types of information. The other typefaces are:

Note: *Means reader take note:* notes contain helpful suggestions.

Caution: Means reader be careful. In this situation, you might perform an action that could result in equipment damage or loss of data.

Warning: IMPORTANT SAFETY INSTRUCTIONS

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.

Important Notice

Due to the nature of wireless communications, transmission and reception of data can never be guaranteed. Data may be delayed, corrupted (i.e., have errors) or be totally lost. Although significant delays or losses of data are rare when cellular devices such as the Perle IRG552+ FN router is used in a normal manner with a well-constructed network. The Perle IRG5521+ FN router should not be used in situations where failure to transmit or receive data could result in damage of any kind to the user or any other party, including but not limited to personal injury, death, or loss of property. Perle accepts no responsibility for damages of any kind resulting from delays or errors in data transmitted or received using our products.

Safety and Hazards

The driver or operator of any vehicle should not operate the IRG5521+ FN router while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. The IRG5521+ FN is Listed to UL121201 and CSA C22.2 No. 213 and are suitable for use in Class I, Division 2, Groups A, B, C and D Hazardous Locations.

The following warnings and instructions apply:

Limitation of Liability

The information in this manual is subject to change without notice and does not represent a commitment on the part of Perle for any and all direct, indirect, special, general, incidental, consequential, punitive or exemplary damages including, but not limited to loss of profits or revenue or anticipated profits or revenue arising out of the use or inability to use any Perle IRG5521+ FN routers even if Perle has been advised or the possibility of such damages or they are foreseeable or for claims by any



third party. Notwithstanding the foregoing, in no event shall Perle aggregate liability arising under or in connection with the Perle product, regardless of the number of events, occurrences, or claims giving rise to liability, be in excess of the price paid by the purchaser for the Perle product.

Copyright © 2021 Perle. All rights reserved.

Windows® is a registered trademarks of Microsoft Corporation.

Other trademarks are the property of their respective owners

General cautions and warnings

13		IEC 60417-5041 (2002-10)	Caution, hot surface
14			Refer to manual/safety

Warning: Power sources must be off prior to beginning the power connection steps. Read the installation instructions before you connect the unit to its power source.

Avertissement: Les sources d'alimentation doivent être éteintes avant de commencer les étapes de connexion d'alimentation. Veuillez lire les instructions d'installation avant de connecter l'appareil à sa source d'alimentation.

Warning: Ensure that the voltage and current ratings of the intended power source are appropriate for the IRG5521+ FN router as indicated on the product label.

Avertissement: Assurez-vous que les valeurs nominales de tension et de courant de la source d'alimentation prévue conviennent aux routeurs de la série IRG5521+ FN, comme indiqué sur l'étiquette du produit.

Warning: Ensure that the installation and electrical wiring of the equipment is performed by trained and qualified personnel and that the installation complies with all local and national electrical codes.

Avertissement: Assurez-vous que l'installation et le câblage électrique de l'équipement sont effectués par du personnel formé et qualifié et que l'installation est conforme à tous les codes électriques locaux et nationaux.

Warning: This equipment must be used in the matter specified by the manufacturer.

Avertissement: Cet équipement doit être utilisé dans les matières spécifiées par le fabricant.

Warning: In case of malfunction or damage, no attempts at repair should be made by the user. Do not dismantle this product. In case of malfunction or damage, contact Perle Technical support at

https://www.perle.com/support_services/support_request.aspx

or email at

https://www.perle.com/support_services/support_request.aspx#form

Avertissement: En cas de dysfonctionnement ou de détérioration, aucune tentative de réparation ne doit être effectuée par l'utilisateur. Ne démontez pas ce produit. En cas de dysfonctionnement ou de dommage, contactez le support technique de Perle à l'adresse

https://www.perle.com/support_services/support_request.aspx

ou par courrier électronique à

https://www.perle.com/support_services/support_request.aspx#form

Warning: If the ambient temperature is to exceed 50°C (122°F), the unit should be installed in a restricted access location where access can only be gained by service personnel or users who have been instructed about the reasons for the restrictions applied to the location and about any precautions

that shall be taken; and access is through the use of a tool or lock and key, or any means of security, and is controlled by the authority responsible for the location.

Avertissement: Si la température ambiante doit dépasser 50 ° C, l'unité doit être installée dans un emplacement à accès restreint, auquel seul le personnel de service ou les utilisateurs informés des raisons des restrictions appliquées peuvent accéder. sur le lieu et sur les précautions à prendre; et l'accès se fait au moyen d'un outil ou d'un verrou et d'une clé, ou de tout moyen de sécurité, et est contrôlé par l'autorité responsable du lieu.

Warning: The working voltage inputs are designed for operation with Safety extra low Voltage (SELV). Connect only to SELV circuits with voltage restrictions in line with IEC/EN 62368-1.

Avertissement: Les entrées de tension sont conçues pour fonctionner avec une tension de sécurité très basse (SELV). Connectez uniquement aux circuits SELV avec des restrictions de tension conformes à IEC / EN 62368-1.

Warning: For equipment installed within the same end-product enclosure ensure leads are segregated or insulated the leads from different circuits.

Avertissement: Pour les équipements installés dans le même boîtier de produit final, assurez-vous que les conducteurs sont séparés ou isolés des conducteurs de circuits différents.

Hazardous Location Warnings

Specific Conditions of Use

1. The IRG5521+ FN router is intended for installation into an IECEx/ATEX certified and IP54 minimum rated enclosure in accordance with IEC/EN 60079-0 and accessible only by the use of a tool. Les modèles de routeurs IRG5521+ FN sont destinés à être installés dans un boîtier certifié IECEx/ATEX qui conforme à la norme IP54 conformément à la norme IEC/EN 60079-0 et accessible uniquement à l'aide d'un outil.

2. The equipment shall only be used in an area of not more than pollution degree 2, as defined in IEC/EN 60664-1. L'équipement ne doit être utilisé que dans une zone où le degré de pollution n'est pas supérieur à 2, tel que défini dans la IEC/EN 60664-1.

Warning: These devices are open-type devices that are to be installed in an enclosure with tool removable cover or door, suitable for the environment.

Avertissement: Ces périphériques sont des périphériques de type ouvert à installer dans un boîtier avec un couvercle ou une porte amovible pour outils, adapté à l'environnement.

Warning: This equipment is suitable for use in Class I, Division 2, Groups A, B, C, D, or only non hazardous locations.

Avertissement: Cet équipement est adapté à une utilisation dans les zones non dangereuses de classe I, division 2, groupes A, B, C, D

Warning: WARNING-EXPLOSION HAZARD - Do not connect or disconnect equipment unless power has been removed or the area is known to be non-hazardous.

Avertissement: DANGER D'EXPLOSION ET D'AVERTISSEMENT - Ne pas connecter ou déconnecter l'équipement tant que l'alimentation n'est pas débranchée ou que la zone n'est pas dangereuse.

Warning: WARNING-EXPLOSION HAZARD - Substitution of any components on this unit may impair suitability for Class I, Division 2.

Avertissement: DANGER DANGER D'EXPLOSION - La substitution de tout composant de cet appareil peut compromettre l'adéquation à la Classe I, Division 2.

Warning: Power supply of the equipment must be rated appropriately (see Appendix for specifications) with limited power. Limited power means complying with one of the following requirements.
Class 2 circuit according to Canadian Electrical Code, Part 1, C22.1

Class 2 circuit according to National Electrical Code, NFPA-70

Limited Power Supply (LPS) according to EN/IEC 60950-1;

Limited-energy circuit according to EN/IEC 61010-1

Avertissement: l'alimentation de l'équipement doit être correctement dimensionnée (voir annexe pour les spécifications) avec une puissance limitée. Une puissance limitée signifie que vous vous conformez à l'une des exigences suivantes.

Circuit de classe 2 selon le code électrique Canadien, partie 1, C22.1

Circuit de classe 2 selon le code électrique national NFPA-70

Alimentation électrique limitée (LPS) selon EN / IEC 60950-1;

Circuit à énergie limitée selon EN / IEC 61010-1

Warning: If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Avertissement: Si cet équipement est utilisé d'une manière non spécifiée par le fabricant, la protection fournie par l'équipement peut être altérée.

Warning: In case of malfunction or damage, no attempts at repair should be made. Do not dismantle the product. All repairs need to be made by a qualified Perle representative. Contact Perle Systems Technical support at https://www.perle.com/support_services/support_request.aspx or email at https://www.perle.com/support_services/support_request.aspx#form

Avertissement: En cas de dysfonctionnement ou de dommage, aucune tentative de réparation ne doit être effectuée. Ne démontez pas le produit. Toutes les réparations doivent être effectuées par un représentant qualifié de Perle. Contactez le support technique de Perle Systems à l'adresse https://www.perle.com/support_services/support_request.aspx ou par courrier électronique à https://www.perle.com/support_services/support_request.aspx#form

Warning: This router is not intended for use close to the human body. The unit should be mounted in such that Antennas are at least 20cm (8 inches) away from any person.

Avertissement: Ce routeur n'est pas destiné à être utilisé à proximité du corps humain. L'appareil devrait être monté de façon à ce que les antennes soient à au moins 20 cm (8 po) de toute personne.

Warning: Explosion hazard. Do not connect or disconnect while the circuit is live or unless the area is free of ignitable concentrations.

Avertissement: Risque d'explosion. Ne pas connecter ou déconnecter le circuit est sous tension ou à moins que la zone ne présente aucune concentration inflammable.

Warning: Do not use the USB connector unless the area is free of ignitable concentrations.

Avertissement: N'utilisez pas le connecteur USB à moins que la zone ne soit exempte de

concentrations inflammables.

Warning: Do not use the reset button unless the area is free of ignitable concentrations.

Avertissement: N'utilisez pas le bouton de réinitialisation à moins que la zone ne soit exempte de concentrations inflammables.

RF Exposure

In accordance with FCC/IC requirements of human exposure to radio frequency fields, the radiating element shall be installed such that a minimum separation distance of 20 cm should be maintained from the antenna and the user's body.

Conformément aux exigences de la FCC/IC relatives à l'exposition humaine aux champs de radiofréquences, l'élément de rayonnement doit être installé de manière à ce qu'une distance de séparation minimale de 20 cm soit maintenue par rapport à l'antenne et au corps de l'utilisateur.

THE SPECIFICATIONS AND INFORMATION REGARDING THE PRODUCTS IN THIS GUIDE ARE SUBJECT TO CHANGE WITHOUT NOTICE. ALL STATEMENTS, INFORMATION, AND RECOMMENDATIONS IN THIS GUIDE ARE BELIEVED TO BE ACCURATE BUT ARE PRESENTED WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED. USERS MUST TAKE FULL RESPONSIBILITY FOR THEIR APPLICATION OF ANY PRODUCTS.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio-frequency energy and, if not installed and used in accordance with this hardware guide may cause harmful interference to radio communications.

Modifications to this product not authorized by Perle could void the FCC approval and negate your authority to operate the product.

Perle reserves the right to make changes without further notice, to any products to improve reliability, function, or design.

Perle, the Perle logo, and IRG5521+ FN router is a trademark of Perle.

Copyright ©2021 Perle.

60 Renfrew Drive, Markham, Ontario, L3R 0E1, Canada

All rights reserved. No part of this document may be reproduced or used in any form without written permission from Perle.

Publishing History

Date	Revision	Update Details
May 2021	A.03.05.2021	Initial release.

Table Of Contents

Preface	I
Overview	1
What's Included	1
What You Need to Supply	1
Hardware	2
Front View	2
LEDs	2
SIM Card/s	6
USB-C Port	6
Ethernet LAN Ports	7
Ethernet Link Status	7
GNSS Connector	7
Connecting the Power	7
AUX /IO	8
Relay Alarm	9
Installation	9
Inserting the SIM card	9
Connecting the Antenna/s	10
Connecting to the Ethernet Ports	10
Connecting to the Serial Port	10
Connecting to the USB-C port in Console Mode	11
Connecting to the USB-C port as an Ethernet over USB Port	12
Connecting the Power	12
Operation	12
Reset / Factory Default / Safe Mode	12
Reset Button	12
Fast Setup	13
Managing the Router	13
WebManager	13
CLI	14
SNMP	14
Fast Setup Mode	14
PerleView	14
Power Management	15
Power Modes	15
Power Saving Options	
Power Saving Scenarios	16
Low Voltage Standby	17
Overheat Standby	17
Deployment Modes	18
Fixed Installation without I/O	18
Recommended Vehicle Installation (Ignition Mode)	18
Fixed Installation with Analog Input	19
I/O Configurations	20

Pulse Counter / Digital Input	20
High Side Pull-up / Dry Contact Switch Input.	20
Digital Output / Low Side Current Sink	21
Digital Output / Open Drain.	22
AUX I/O	22
Pulse Counter / Digital Input	23
High Side Pull-up / Dry Contact Switch Input.	23
Relay Alarm	24
Appendix A—Technical Specifications	25
Appendix B—Sample Label	30
Appendix C—Mounting the Router	31
Appendix D—Mechanical	33
Appendix E—Maintaining and Troubleshooting	34

Overview

The IRG5521 + router is a compact, rugged, fully featured communications platform for real-time wireless capabilities. It has multiple communication ports including Serial, Ethernet, and a USB port that can be used as a console port or as an additional Ethernet port. It supports LTE/4G wireless solutions for both fixed and mobile applications (IoT). The IRG5521+ FN LTE/4G router supports Cat-12 technology with peak download rates of 600 Mbps and uploads speeds of 150 Mbps. It offers global coverage of frequency bands, supports Cat-12 technology with automatic fall-back to 3G (HSPA+,UMTS) networks, and is FirstNet Ready™. The IRG5521+ FN also includes integrated GNSS receiver (GPS, GLONASS, Beidou and Galileo) satellite support.

Application uses:

- Remotely monitoring and controlling equipment on pipelines, meters, pumps and valves in any energy, utility, or industrial application
- Tracking the location of heavy equipment and assets in the field
- For use with FirstNet Ready™ networks
- Providing reliable Internet access to a mobile workforce

What's Included

The following components **may** be included with your product. Components will vary depending for each model. See the Perle website for updates.

- The router
- Quick Start Guide
- 2 LTE SMA antenna pack (#08000120)
- 2 Wi-Fi antennas (#08000140)
- GPIO Cable with 4 pin plug (#2500468)
- GPIO Cable with 8 pin plug (#2500476)
- 12VDC/2A 4 pin (NA-#08000150, EU #08000160, UK #08000170, #08000180) power supply
- GNSS PASV RP-Antenna SMA/CA (#08000130) passive or active antenna (order-able from Perle #08000130)

What You Need to Supply

Before you can begin, you need to have the following:

- A SIM card/s (provided by your mobile network operator)
- #1 Phillips screwdriver (if you are installing the SIM card)
- Computer or laptop computer with Ethernet interface and cable
- An Ethernet CAT5e or CAT6 10/100/1000BASE-T cable/to connect the router to the network

Hardware

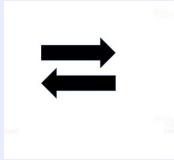

Front View






LEDs



Power LED	Function	Normal	Low Power Mode	Meaning
	No Power	Off	N/A	
	Boot	Red—solid	N/A	
	Green—Blip	N/A	N/A	
	Powering up	Amber—flashing	N/A	
	Normal Operation	Green—solid	Green—blip starting after a boot is complete	
	Normal operation but no config	Green—flashing		
	Fatal error	Red—solid	Red—solid	

	Setup Mode	Amber—solid	Amber—solid	When you press and hold the reset button for 15 seconds during operational mode. The solid Amber LED indicate the time to release to initiate Setup Mode.
	Factory Reset	Red—solid	Red—solid	Press and hold the reset button for 20 seconds during power up. The solid Red LED indicates the time to release for Reset to Factory.
	Overheat Standby	Red—blip	Red—blip	Overheat causes the unit to go into Standby Mode. The router will restart when the temperature is below the threshold.
	No Config	Green—flashing	N/A	Unit has powered up normally—unit has no config. Unit is in Safe Mode or Factory default Mode.
Serial 	Function	Normal	Low Power Mode	Meaning
	Disabled or not in use	Off	Off	Always off in power saving mode.
	Serial port/s TX/RX	Green—flashing	Off	
WWAN 	Function	Normal	Low Power Mode	Meaning
	Disabled	Off	Off	

	Connected—good signal	Color—solid	Off—once connection is established, it will come on for 5 secs then go off	Colour will depend on signal strength. Green = Good signal— $\geq -80\text{dBm}$ Amber = Fair signal— $> -94\text{dBm} < -80\text{dBm}$ Red = Poor signal— $\leq -94\text{dBm}$
	Connection in progress	Green, Amber or Red flashing	Off	Signal strength flash.
	Not connected or not connecting	Green, Amber, or Red blips	Off	Signal strength blip.
GNSS 	Function	Normal	Low Power Mode	Meaning
	Disabled	Off	Off	No GPS activated or in power saving mode.
	Initializing	Green—blip	Off	
	Attempting to get a fix or unable to get a fix	Amber—flashing	Amber—blip	
	GPS fix	Green—solid	Off—Green solid for 5 seconds then off	
WLAN 	Function	Normal	Low Power Mode	Meaning
	5.0GHz	Green—solid	Off	Client mode connected—AP Radio mode.
	5.0 TX/RX	Green—flashing	Off	Client or AP activity.
	2.4GHz	Amber—solid	Off	Client mode connected—AP-radio active.
	2.4 TX/RX	Amber—flashing	Off	Client or AP activity.

	No connection	Off	Off	Client mode—no connection; AP mode not enabled.
Internet 	Function	Normal	Low Power Mode	Meaning
	Disconnected	Off	Off	No connection by intention <ul style="list-style-type: none"> • disabled or radio off • disconnect requested
	Connected	Green—solid	Off	<ul style="list-style-type: none"> • LTE primary if no WAN • Primary connection if WAN
	Backup mode	Amber—solid	Off	Backup connection if WAN.
	Connection failure	Red—solid	Red—blip	A connection was attempted, but it failed. <ul style="list-style-type: none"> • APN incorrect • SIM card missing • insufficient signal • no service • modem failure • data connection failed—waiting to retry • PIN incorrect SIM blocked, bad unlock code • SIM locked • SIM blocked, unblock code incorrect

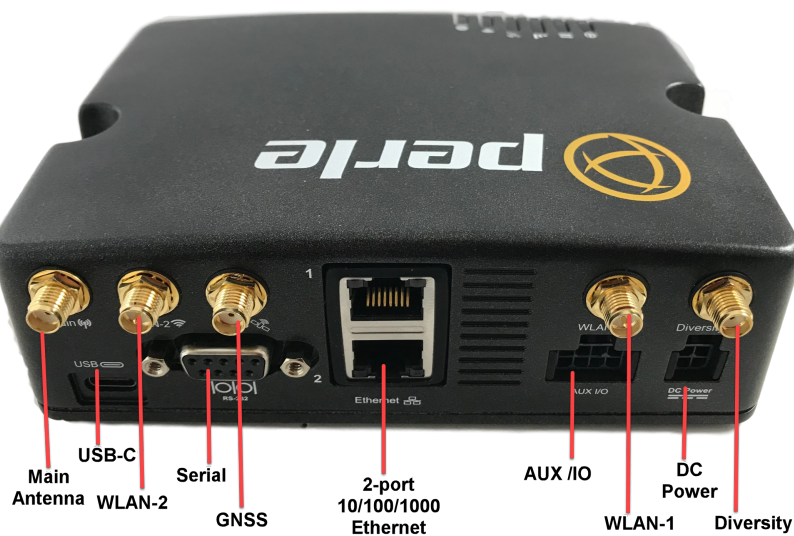
SIM Card/s

The router supports two SIM cards. See [Inserting the SIM card](#) for the installation procedure.



SIM/s Interface 1.8V/3V

Back View Antenna/s



The router has five SMA antenna connectors Main, Diversity, GNSS, WLAN-1 and WLAN-2. For more information on connecting the antennas see [Connecting the Antenna/s](#).

USB-C Port

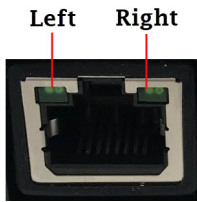
In console mode, the router's USB port provides direct access to the CLI (Command Line Interface) as well as statuses, logging, and troubleshooting information. Alternatively, this port can be set as an Ethernet over USB port.

See [Connecting to the USB-C port in Console Mode](#) and [Connecting to the USB-C port as an Ethernet over USB Port](#).



Ethernet LAN Ports

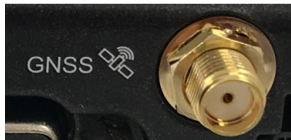
Once the ports are connected and the link is established, the speed LED turns on. The LED indicates a 10, 100, or 1000 Mbps link on the Ethernet port/s.



Ethernet Link Status

Link/Speed Indicator		Description
Left LED Green	Link + Flashing with activity	1000 Mbps
Both LEDs	Link + Flashing with activity	100 Mbps
Right LED Green	Link + Flashing with activity	10 Mbps
Off	Off	No LAN connected

GNSS Connector



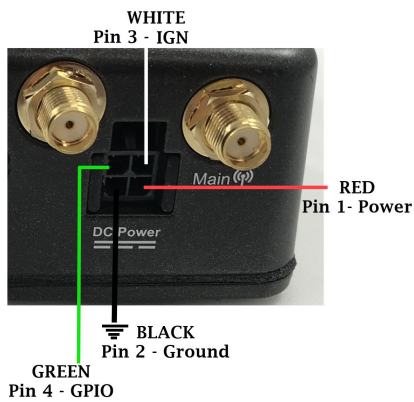
GPS+GLONAS+GAILEO

Passive Antenna—SMA(M) straight connector

Connecting the Power

Models can be shipped with a DC power cable or a pigtail cable depending on the model.

The GPIO connector can be configured as a high side pull-up/dry contact digital input, analog input, low side current sink output, digital output/open drain, or pulse counter depending on your application. Pin 3—IGN can be configured as vehicle ignition sense or as analog input.



Warning: Before servicing this product ensure the power source has been disconnected.

Note: Use copper conductors only.

Pin	Name	Associated DC Cable Wire color	Description	Type
1	Power	Red	Main power supply for device Note: If you want to turn the router on/off using a control line, such as a vehicle ignition line, we recommend that you connect the control/ignition line to Pin 3 and apply continuous power On Pin 1	PWR
2	Ground	Black	Main device ground	GND
3	IGN	White	Connect to the vehicle ignition or an external switch. This input can be configured to put the router into a Standby Mode when the signal goes low and take it out of Standby Mode when it goes high. Alternatively it can be used simply as an analog input.	IGN
4	GPIO	Green	User configurable digital input/output for analog voltage sensing input. Connect to switch, relay, or external device.	GPIO

Note: Use copper conductors only.

AUX I/O

The AUX/IO connector allows a connection for an RS485 device, 2 digital input devices (A and B), and 1 normally open (NO) relay contact.



Pin Number	8	7	6	5
Pin Descriptions	RS485 -	GND	Input B	Relay NO (normally open)
Pin Number	4	3	2	1
Pin Descriptions	RS485 +	GND	Input A	Relay NO (normally open)

Warning: Before connecting wiring, ensure the power source has been disconnected.

For application examples see --> [AUX I/O](#)

Relay Alarm

The router has one Normally Open (NO) relay (Pin 5 and Pin 1) switch. The relay switch can be connected to an external powered device such as a siren or light for visual or audible notification of an alarm status.

Ensure the power source is off prior to connection.

For application example see --> [Relay Alarm](#)

Installation

The steps for a typical installation are:

1. Inserting the SIM card/s. See [Inserting the SIM card](#).
2. Connecting the antenna/s. See [Connecting the Antenna/s](#).
3. Connecting the Ethernet Ports. See [Ethernet LAN Ports](#).
4. Connecting the Serial Port. See [Connecting to the Serial Port](#).
5. Connecting to the Console Port in Console Mode. See [Connecting to the USB-C port in Console Mode](#).
6. Using the Console port as a virtual Ethernet port. See [Connecting to the USB-C port as an Ethernet over USB Port](#).
7. Connecting the power. See [Connecting the Power](#).
8. Logging into the router See [Fast Setup](#) or [Connecting to the USB-C port in Console Mode](#).

Inserting the SIM card

The router comes with two SIM sockets for mini-SIM (2FF) cards.

Note: Ensure the power is disconnected before you insert the SIM card/s.

1. Using your Phillips screwdriver, removed the two screws from the panel covering the SIM slots. Gently pry the cover loose from the opening.
2. Align the SIM card so that the SIM card slides into the top slot (slot#1). Each SIM card has a notched corner for orientation and the SIM card can only be inserted the correct way. You will hear an audible click when the SIM is inserted correctly. Always populate slot#1 first. Add a second SIM card if your network setup requires it.
3. Align the SIM cover plate and secure the plate with the screws.

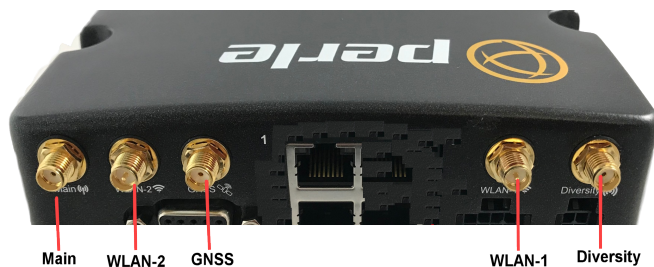
Note: Do not force the SIM(s) card in or you may damage the card or your IRG5521+ FN router.







Connecting the Antenna/s

The router5521+ FN has these connectors:

- Main Cellular female antenna connector
- Rx Diversity female antenna connector
- GNSS female antenna connector
- WLAN-1
- WLAN-2



1. Connect your cellular antenna to the SMA cellular antenna connector labeled **Main** 
2. Connect your GPS antenna to the SMA GPS antenna connector labeled **GNSS**. 
3. Mount the GPS antenna where it has a good view of the sky (at least 90°).
4. Connect the diversity antenna to the SMA diversity antenna labeled **Diversity** 
5. Connect the WLAN antennas to WLAN-1 and WLAN-2. 

Warning: For Zone 2 and/or Class I, Division 2 hazardous location applications. Antennas intended for use with the product must be installed within the end use enclosure. For remote mounting of the antennas in unclassified or classified locations, routing and installation of the antennas shall be in accordance with the appropriate location regulations.

Note: When attaching the antennas to the SMA connectors hand tighten only (do not use tools to tighten (maximum torque is 7Kgf-cm/1.1 N-m(10 in-lb).

Connecting to the Ethernet Ports

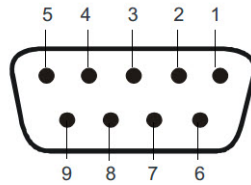
The Ethernet RJ45 ports provide the standard Ethernet interface speeds of 10/100/1000 Mbps through twisted pair (UTP) cables of up to 100 meters (328ft) in length. Cat5e or Cat6 cables are recommended for 1000 Mbps connections.

Connecting to the Serial Port

The serial port has a 9-pin female port connector allowing you to directly connect to most computers or devices with a standard serial straight-through cable.

It is used for:

- Connecting a serial device
- Connecting as a console port
- As a GNSS output device



Note: When connecting to a DCE device, a crossover cable is needed.

Female Serial Pin out			
Name	Pin	Description	Type
DCD	1	Data Carrier Detect	OUT
TXD	2	Transmit Data	OUT
RXD	3	Receive Data	IN
DTR	4	Data Terminal Ready	IN
GND	5	Ground	GND
DSR	6	Data Set Ready	OUT
RTS	7	Request to Send	IN
CTS	8	Clear to Send	OUT
RI	9	Not Connected	-

Connecting to the USB-C port in Console Mode

By default, the USB-C port is set to console mode. In this mode, the USB-C port acts as a console port.

1. Connect the power. See [Connecting the Power](#).
2. Allow the router to complete the boot up sequence.
3. Connect a USB cable to the PC's USB port, then connect the other end of the cable to the router's USB-C connector.
4. On the PC Choose Start -> Control Panel -> Hardware and Sound (or equivalent) on the Windows Operating System. Choose the Device Manager, and expand the Ports section. The assigned COM port can be identified.
5. Start a terminal emulation program (such as Putty or SecureCRT) on the com port where you have connected the cable to the PC.
6. Press the Enter key on the keyboard and the prompt displays.

See the Perle IRG5000 Series Router CLI Reference Guide for more information on using CLI commands.

Warning: If you connect or disconnect the console cable with the power applied to the router or any device on the network, an electrical arc can occur. This could cause an explosion when installed in a hazardous location. Ensure the power is removed from all devices prior to making any cable connections.

Warning: Do not use the USB port in a potentially explosive environment.

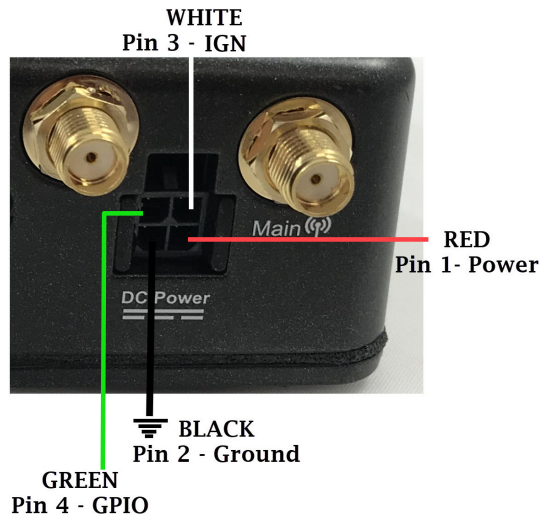
Connecting to the USB-C port as an Ethernet over USB Port

In this mode, the USB-C port behaves as if a PC is connected to the Ethernet port, allowing access to networks and the Internet.

See the Perle IRG5000 Series Router User's Guide and the Perle IRG5000 Series Router CLI Reference Guide for more information on setting this parameter.

Connecting the Power

The wire colors shown are for the power/GPIO cable for the IRG5521+ FN. Other wiring setups may have different colors. See [Appendix A—Technical Specifications](#).



If you are using a cable that is longer than two meters, we recommend the following:

Wire gages (AWG):

- 22 gauge wire or up to 4 meters (13ft)
- 20 gauge wire for up to 6 meters (20ft)
- 18 gauge wire for up to 12 meters (40ft)

Molex part number 2451320420 or equivalent

Rectangular socket to socket 6.56' (2.00m)

Cable and connector must be rated for minimum 76°C (168.8°F)

Note: Before servicing this product ensure the power source has been disconnected. Electrical installations should be performed by personnel thoroughly trained in safe electrical wiring procedures.

Operation

Reset / Factory Default / Safe Mode

The table below shows how the reset button is used.

Reset Button



Mode	Description	LEDs	System Status
Restart	Press and Release the Reset button when the router is running	Power LED will begin to blink Amber	Reboots. All configuration and files remain the same.
Factory Default	Press the Reset button and Hold for about 20 seconds when the router is running	LEDs flash Red	Reboots and resets the configuration to the Perle factory default configuration. All configuration, User IDs, passwords, and security certificates are deleted.
Safe Mode	Press the Reset button while powering up	All LEDs, except power blinking Amber	<ul style="list-style-type: none"> • Saves the startup config • Boots with no config file • Allows you to do setup mode

Fast Setup

Fast Setup mode allow you to quickly configure basic operating parameters on your router. Your Perle router is shipped to you in Factory Default mode. On power up, your router is in “Fast Setup” mode with the Power LED flashing green. Make a connection to your router via the console port or a Web browser, then answer basic setup operating parameters such as your initial user ID and password. To connect to the console port, follow the instructions provided in—[Connecting to the USB-C port in Console Mode](#).

To connect using a Web browser, connect your PC’s Ethernet cable directly to an Ethernet port on the router. Configure the PC to use DHCP for obtaining its IP address. The router will act as a DHCP server and assign an IP address to the PC. Next, launch the Web browser and browse to “http://192.168.0.1”. The Fast Setup screen appears.

Refer to the Quick Start Guide or the Perle IRG5000 Series Router User’s Guide for more information on setup instructions.

Managing the Router

The IRG5521+ FN can be configured, operated, and monitored using any of the following methods. See the Perle IRG5000 Series Router User’s Guide for more details on these methods.

WebManager

The Perle WebManager—an embedded Web based application that provides an easy-to-use browser interface for configuring and managing the IRG5521+ FN. The WebManager is accessible through any standard desktop web browser. You must have pre-configured a valid IP address on the IRG5521+ FN before connecting with the WebManager.

CLI

A text-based Command Line Interface based on industry standard syntax and structure. The CLI can be accessed from the console port. Once a valid IP address is configured on the IRG5521+ FN, you can Telnet or SSH to access the IRG5521+ FN for administration purposes. See the Perle IRG5000 Series Router CLI Reference Guide for more information.

SNMP

The IRG5521+ FN can be managed with an SNMP compatible management station that is running platforms such as HP Openview.

Fast Setup Mode

If your router is in “Factory Default” mode, when you first connect, you are in “Fast setup mode”. For more details, see—[Fast Setup](#).

PerleView

A Windows server-based centralized management package that simplifies the configuration, administration, monitoring, and troubleshooting of Perle Managed Media Converters, Ethernet Copper Extenders, Industrial Switches, and the IRG Series of Perle Routers. Your Internet browser, can securely access PerleVIEW and manage 10's, 100's or 1000's of Perle devices from a centralized server.

Power Management

Power Modes

The IRG5521+ FN has three operating power modes:

- Standard Mode
- Ignition Mode
- Smart Standby Mode

Standard Mode

When power is applied to the router, it powers up. Both GPIO and IGN power inputs are ignored. This is the default.

Ignition Mode

Configurable time delay for shutdown / start based on vehicle status.

This mode monitors the ignition input and goes in and out of Standby Mode based on the voltage of the ignition input. When the voltage on the ignition input goes below a set pre-defined threshold, the router will be powered down into Standby Mode. When the voltage on the ignition input goes above the router's pre-defined value it will return to normal operating mode (Wakeup).

Smart Standby Mode

When in standby mode, the router is essentially powered off. The microprocessor runs to monitor the internal and external environment to determine when to power the router back up and take it out of Standby Mode. When the router is in Standby Mode, the System LED blips Amber. Pressing the reset button takes the router out of Standby Mode and powers it up.

Power Saving Options

Feature	Notes
Processor power savings	This feature optimizes idle power consumption, saving energy by reducing performance where possible.
LED power savings	Minimize use of LEDs, showing only alerts.
USB power saving	USB shutdown.
Ethernet power savings	Ethernet port savings can be achieved by; 1) Lowering Ethernet speed. 2) Ensuring EEE (Energy Efficient Ethernet) is enabled. 3) Shutting down unused Ethernet ports.
Serial Power savings	Shutting down serial port if it is not being used.
GNSS power savings	Shutting down GNSS if it is not being used.
Ignition shutdown delay	When powered by battery (car battery), the router can use the ignition sense pin on the DC power cable to shutdown after a user configured delay (i.e. once the ignition is turned off)
Low voltage standby	The router will enter standby mode if the voltage reaches a user defined threshold. This is intended as a battery saving feature.
Standby	When the router is not required for a specific time period or when the analog/digital inputs are in a particular state, it can be put into standby where minimal power will be consumed. When these conditions change, the router will automatically wake up and resume normal operations.

Power Saving Scenarios

Idle Mode setup

- Cellular connected (no activity)
- Ethernet connected (no activity)
- Serial disabled
- USB connected (no activity)
- GPS enabled—active antenna
- CPU power savings mode disabled
- LED power savings mode disabled

Typical Mode setup

- Cellular connected
- Ethernet connected
- Wi-Fi active
- Serial disable
- USB enabled
- GPS enabled—active antenna
- CPU power savings mode disabled
- LED power savings mode disabled

Standby mode setup

- Cellular disconnected
- Ethernet disconnected
- Serial disabled
- USB disconnected
- GPS disconnected
- CPU power savings mode enabled
- LED power savings mode enabled

Model	Idle Mode		Typical Use		Standby	
	Current (W)	Power (W)	Current (W)	Power (W)	Current (mA)	Power (mW)
IRG5521+ FN (2 Eth, LTE-A Pro, Wi-Fi)	0.36	4.37	0.40	4.79	3.9	46.8
IGR5541+ FN (4 Eth, LTE-A Pro, Wi-Fi)	0.39	4.67	0.42	5.09	3.9	46.8

Power consumption was measured at 12 V.

Note: up to 0.08A 1W more in power savings can be achieved through shutting down the USB port, LEDs, GPS as well as turning down router processor speed.

Note: To configure Power Modes, more information can be found in the Perle IRG5000 Series Router User's Guide found on the Perle website.

Low Voltage Standby

This feature is intended to monitor the voltage being provided to the router in order to avoid a depletion of the battery. Should the voltage go below a user defined threshold condition, the router enters Low Voltage Standby. When the voltage increases above the threshold, power is resumed. This is a battery protection feature and therefore overrides Ignition Mode and Smart Standby Mode. The feature can measure voltage either with the IGN pin or the GPIO (analog) pin. See the Perle IRG5000 Series Router User's Guide on how to configure this feature.

Overheat Standby

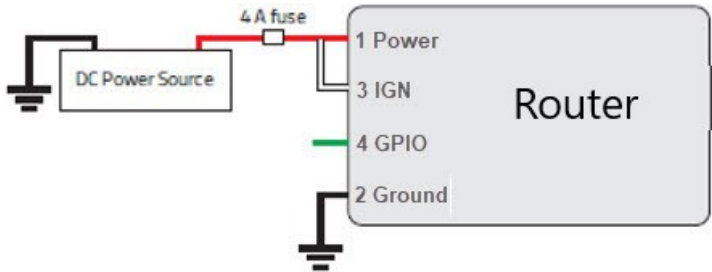
The internal ambient temperature of the router is continuously monitored and if the temperature remains above the router's primary high threshold alarm (default is 95°C/203°F) setting for 5 minutes, then your router enters into Standby Mode and remains in Standby Mode until the temperature returns to 5°C/9°F is below the primary high threshold value for 5 minutes. The high threshold can be configured within Alarm Manager /Primary/High Threshold menu.

Note: that any value below 60°C/140°F set for this threshold is ignored and the value of 60°C/140°F is used for the monitoring for Overheat Standby.

Deployment Modes

Fixed Installation without I/O

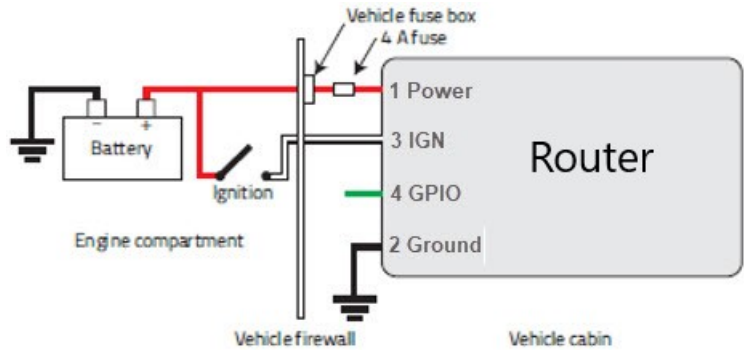
For fixed installations, connect the wires as shown in the figure below. You configure Low Voltage Standby Mode (LVS) to force the IRG5521+ into Standby Mode when the voltage is low. Voltage is monitored on Pin 3 and 4.



- Pin 1 (Power)—Use the Red wire in the DC cable to connect Pin 1 to the power source. Include a 4.0A fast acting fuse to the input line. A continuous (unswitched) DC power source is recommended
- Pin 2 (Ground)—Use the Black wire in the DC cable to connect Pin 2 to Ground
- Pin 3 (IGN—Ignition)—Connect to Power for voltage sensing

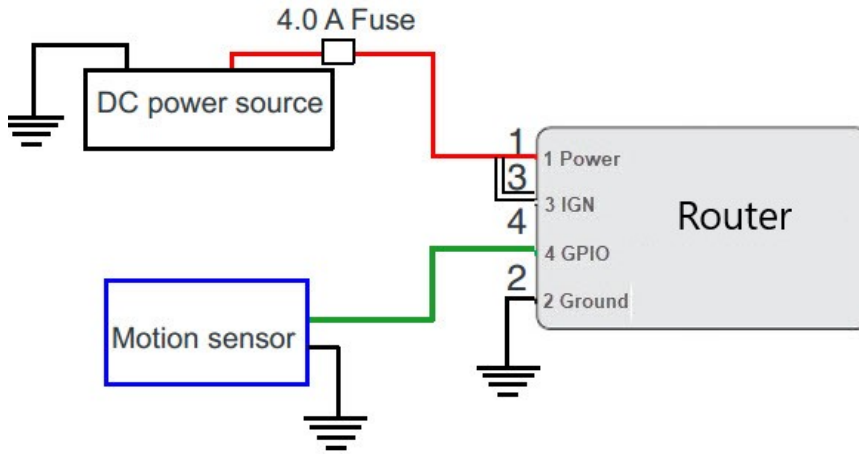
Recommended Vehicle Installation (Ignition Mode)

For vehicle installations, connect the white IGN wire to the vehicle’s ignition switch as shown in the diagram below. This allows the router to operate with the vehicle. When the vehicle’s ignition is off the router enters Standby Mode. Configure a time delay between the vehicle’s ignition shuts off, and the time the router goes into Standby Mode. A delayed Standby is used if you want to maintain a network connection while the vehicle’s engine is shut off for short periods of time— such as in a delivery vehicle.



- Pin 1 (Power)—Use the Red wire in the DC cable to connect Pin 1 to the power source. Include a 4.0 fast acting fuse in the input power line. continuous (unswitched) DC power source is recommended
- Pin 2 (Ground)—Use the Black wire in the DC cable to connect Pin 2 to Ground
- Pin 3 (IGN—Ignition)—It is recommended to use the IGN wire (Pin 3) to initiate standby mode on the router

Fixed Installation with Analog Input



- Pin 1 (Power)—Use the Red wire in the DC cable to connect Pin 1 to the power source. Include a 4.0 fast acting fuse in the input power line. continuous (unswitched) DC power source is recommended.
- Pin 2 (Ground)—Use the Black wire in the DC cable to connect Pin 2 to Ground
- Pin 3 (IGN—Ignition)—Connect to Power
- Pin 4 (GPIO)—In this example, the GPIO (green) is used as an analog input to enter and exit Standby Mode

For more information on configuring Standby Mode, Timed Standby Mode and Event Handling see the Perle IRG5000 Series Router User's Guide.

I/O Configurations

GPIO can be used as a:

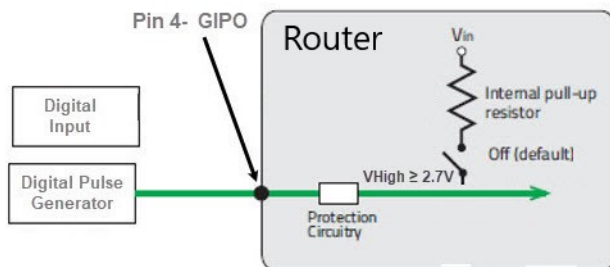
- Pulse counter
- Digital input
- High side pull-up/dry contact switch input
- Analog input
- Digital Output / Low Side Current Sink
- Digital Output/Open Drain

Pulse Counter / Digital Input

You can connect GPIO as:

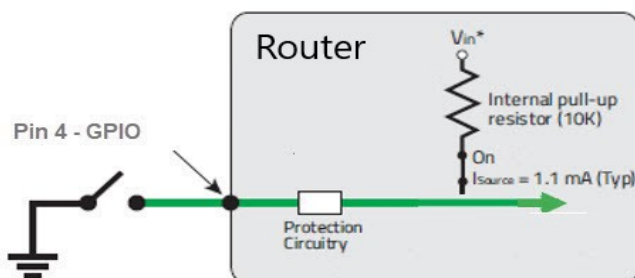
- a pulse counter to monitor frequencies up to 512 Hz, with duty cycle between 25%–75%
- a digital input to detect the state of a switch
- a monitor to an external device such as a motion detector, a remote solar panel, or a remote camera.

Digital input can also be used with the Standby Timer.



Input Range	State
0 - 1V	Low
2.7 - 36V	High

High Side Pull-up / Dry Contact Switch Input

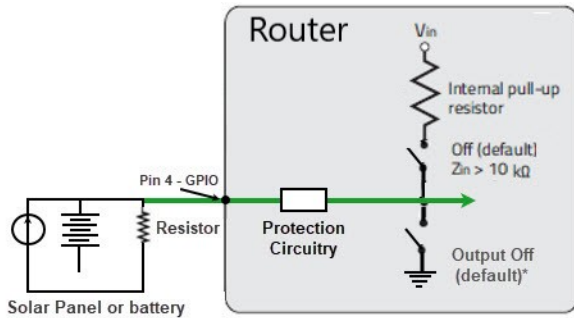


The voltage on Pin 4 when the high side pull-up is enabled (depends on the V_{in} and power consumption).

	Minimum	Typical	Maximum	Units
Source Current	0.6 $V_{in} = 7\text{ V}$	1.1 $V_{in} = 12\text{ V}$	3.5 $V_{in} = 36\text{ V}$	mA

Analog Input

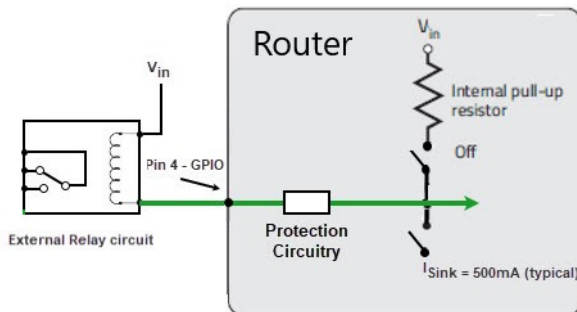
Connect the P4—GPIO to an analog source. The router monitors voltages from the input source and transform them into analog values. Pin 4 can detect inputs of 0.5–36 V referenced to ground. By transforming the voltages, with the user defined formulas, the GPIO pin can monitor measurements such as temperatures, sensors, or input voltages.



	Minimum	Maximum
Analog Input Range	0.5V	36V

Digital Output / Low Side Current Sink

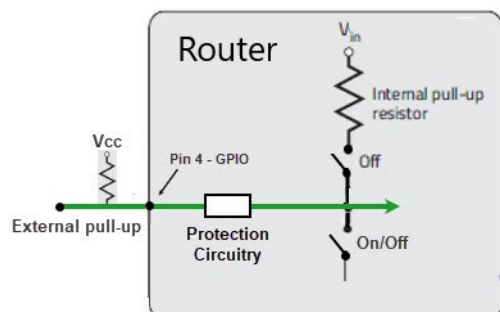
Use Pin 4—GPIO as a low side current sink.



State	Minimum	Typical	Maximum	Comments
On	200mA	500	850mA	$I_{\text{Typical}} = 25^{\circ}\text{C}$ $I_{\text{Min}} = 70^{\circ}\text{C}$ $I_{\text{Max}} = -40^{\circ}\text{C}$
Off	—	0	—	$V_{\text{in}} = 12$

Digital Output / Open Drain

You can use Pin 4—GPIO as an open drain to drive an external digital device.



Pull-up	State	Minimum	Typical	Maximum	Units
Off	Off	Open Circuit	—	—	—
	Active Low	—	—	0.5	V

AUX I/O

The AUX/IO connector allows a connection for an RS485 device, 2 digital input devices (A and B), and 1 normally open (NO) relay contact.

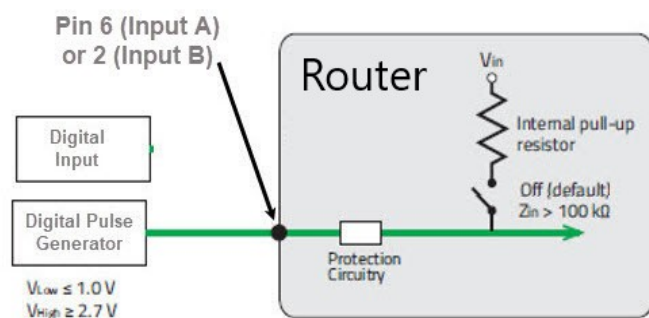


Pin Numbers	8	7	6	5
Pin Descriptions	RS485 -	GND	Input B	Relay NO (normally open)
Pin Numbers	4	3	2	1
Pin Descriptions	RS485 +	GND	Input A	Relay NO (normally open)

Warning: Before connecting wiring, ensure the power source has been disconnected.

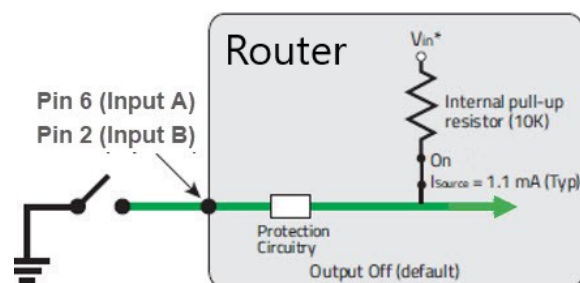
Pulse Counter / Digital Input

You can connect Pin 6 or Pin 2—AUX/IO to a pulse counter to monitor frequencies to 140 Hz, Duty cycle 20%–40%. digital input to detect the state of a switch such as a vehicle ignition, or to monitor an external device such as a motion detector, a remote solar panel, or a remote camera. Digital input can also be used with the Standby Timer.



Pull-up	State	Minimum	Typical	Maximum	Units
Off	Low	—	—	1.0	V
	High	2.7	—	V_{in}	V

High Side Pull-up / Dry Contact Switch Input



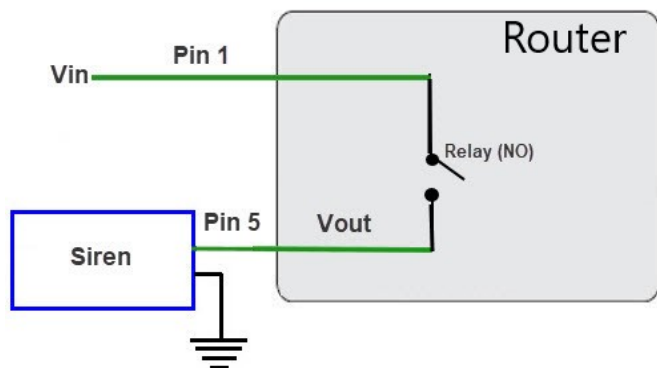
Maximum current the voltage output can provide (depends on V_{in})

The voltage on Pin 6 or Pin 2 when the high side pull-up is enabled (depends on the V_{in} and power consumption).

*Depending on the load, this value can range from V_{in} to $V_{in} - 2.5$

	Minimum	Typical	Maximum	Units
Source Current	0.6 $V_{in} = 7 V$	1.1 $V_{in} = 12 V$	3.5 $V_{in} = 36 V$	mA
V_{out}	$V_{in} - 2.5$	—	V_{in}	V

Relay Alarm



normally open (NO) dry contact 1A@24VDC

Appendix A—Technical Specifications

Technical Specifications	
General	
Power Requirements	Input: 7-36VDC, 1000 mA max
Power Line Protection	Fast transients 1.5KV (ENG61000-4-4 Criteria B) Surge 2KV (EN61000-4-5 common mode), 1.5KV (EN61000-4-5 differential and common modes)
Power	Built-in protection against voltage transient including 5 VDC engine cranking and +200 VDC load dump SAE J1455, MIL-STD-810G
Interfaces	
Ethernet Port	2 Ethernet 10/100/1000 Auto-neg Isolation 1.5 kV IEEE 802.3 for 10Base-T IEEE 802.3u for 100Base-TX and 100Base-FX IEEE 802.3ab for 1000Base-T IEEE 802.3x for Flow Control
USB	1 Type USB 3.0 Type-C Can be used as a console or additional Ethernet port.
RS232	1 DB9 Female connector Speeds 50bps - 230Kbps 15Kv ESD protection Can be used for serial server functions or as a console port
WLAN (Wireless)	2.4GHz 24 dBm and 5GHz 23dBm output power IEEE 802.11 compliant and backwards compatible with 802.11 a/b/g/n
SIM	2 15*25mm (2FF)
Environmental Specifications	
Operating Temperature Ranges	-40°C to 70°C (40°F to 158°F)
Storage Temperature	-40°C to 85°C (40°F to 185°F)
Operating Humidity Ranges	0% to 95% non-condensing
Storage Humidity Ranges	0% to 95% non-condensing
Operating Altitude	Up to 3,048 meters (10,000 feet)

Technical Specifications	
MTBF	287,215 hours
Standards and Certifications	
Safety	UL/ULC/EN 62368-1 (previously 60950-1) CE Mark CAN/CSA-C22.2 No. 62368-1-14 UL 61010-1 and 61010-2-201
EMI/EMC	FCC 47 Part 15, Subpart B, Class B ICES-003 Issue 6 Class B (Canada) EN302489 (Vehicle Installation) CISPR 32:2015/EN 55032:2015 (Class A) CISPR 25:2016/EN 55025 CISPR 24:2010/EN 55024:2010 CISPR 35:2016/EN 55035:2017 EN 61000-3-2 Limits for Harmonic Current Emissions EN 61000-3-3 Limits of Voltage Fluctuations and Flicker EN 61000-4-2 (ESD): Contact: EN 61000-4-3 (RS): EN 61000-4-4 (EFT): EN 61000-4-5 (Surge): EN 61000-4-6 (CS): EN 61000-4-8 (PFMF): EN 61000-4-11 EN 61000-4-16 EN 61000-6-4:2007 +A1:2011 ISO 7637-2:2004
Hazloc	ATEX Class 1 Zone 2 ANSI/ISA 12.12.01, Class 1 Division 2, Group A, B, C, D
Railway	EN 50155:2017 Clause 4.3.6 EN 50121-1:2017, 50121-3-2:2016, 50121-4:2016 IEC 60571:2012 for Clause 12.2.8 and 12.2.9 IEC 62236-1:2018. 62236-3-2:2008, 62236-4:2018
FirstNet Ready™	
GSM/UMTS certifications	PTCRB, RED
Environment Testing	

Technical Specifications	
Shock and Vibration	SAE J1455 (Shock and Vibration) MIL-STD-810G EN 61373
IP rating	Complaint to IP64
Drop	ISTA 2A 2001, test categorizes 1, 4,5, and 6
Power connector/AUX	
Ignition Sense	VDC voltage variation with on/Off and scheduling timer Analog Input: 0.5V to 36V
GPIO	<ul style="list-style-type: none"> • Digital Input & Pulse Counting VDC: 0 for $\leq 1V$, 1 for $\geq 2.7V$ • Dry Contact Max Current range: min 0.6mA @ 7V and max 3.5mA @ 36V • Current Sink Output: 0.5A @ 12V
Digital input and pulse counting	Digital Input & Pulse Counting VDC: 0 for $\leq 1V$, 1 for ≥ 2.7
Relay	Normally Open (NO) dry contact 1A@24VDC
GNSS	
Frequency range	GNSS: 1599-1606 MHz GPS: 1575.42 MHz Galilo: 1575.42 MHz BeiDou: 1561.098 MHz GLONASS: 1602 MHz
Bandwidth	45 MHz
Impedance	50 Ohm
VSWR	2.0 Typical
Gain	RHCP
Polarization	4 dBic (typical)
Axial Ratio at elevation	5 dB (typical)
Cellular	
Cellular/Telecom Regulatory Approvals	FCC/ICES, RED, PTCRB/CTIA, CE
Carrier Certifications	AT&T, Verizon











Technical Specifications			
Network Technology (LTE) IRG5521+ FNIRG5541+ FN	Band 1	2100	
	Band 2	1900	
	Band 3	1800	
	Band 4	1700	
	Band 5	850	
	Band 7	2600	
	Band 8	900	
	Band 9	1800	
	Band 12	700	
	Band 13	700	
	Band 14	700	
	Band 18	850	
	Band 19	850	
	Band 20	800	
	Band 26	850	
	Band 29	700	
	Band 30	700	
	Band 32	2300	
	Band 41	1500	
	Band 42	2500	
	Band 43	2300	
	Band 46	3700	
	Band 48	5200	
	Band 66	3500	
	HSPA+,UMTS		
	Band 1	1700	
	Band 2	2100	
	Band 4	1900	
	Band 5	1700	
	Band 6	850	
Band 8	800		
Band 9	900		
Band 19	1700		
Cellular	EN 301 908-1, EN 301- 908-2, EN 301 908-13 EN 62311:2019 / IEC 62311 Ed. 1.0 b:2007 EN 301 489-1 EN 301 489-17 EN 301 489-19		

Technical Specifications	
Vehicle Usage	E-Mark (UN ECE Regulation 10.04, ISO 7637-2:2011 and ISO 16750-2:2012)
Vehicle Velocity	224 mph for cellular connectivity

Recommended Main/Diversity Antenna Specifications

Parameter	Requirements	Comments
Antenna System	(LTE/4G) External multi-band 2x2 MIMO, SMA connector antenna system	if Ant2 includes GNSS, then it must also satisfy these requirements.
Operating Bands - Frequency range	704-902-928-960 MHz	
	1427.9-1575.42 MHz	
	1710-2170 MHz	
	2400-2480-2690 MHz	
Impedance	50 OHM	
Gain	2-3 dBi	
VSWR of Ant 1 and Ant 2	< 3.0	On all bands including Band edges.

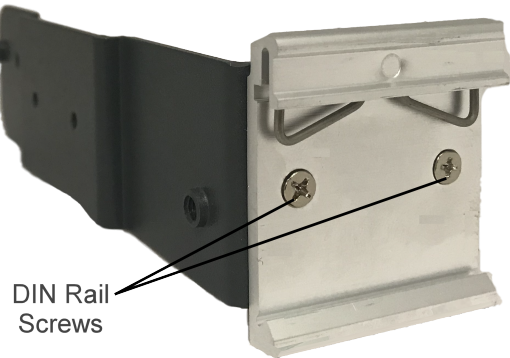
Appendix B—Sample Label

	IRG5521+ FN P/N: 08000200	Contains: FCC-ID: N7NEM75S IC: 2417C-EM75S
S/N: 350-131319T00001 	   	
IMEI: 861824563918001 		LISTED E160409 I.T.E. E466997
MAC :004002930012 		IND. CONT. EQ. Surrounding Air Temp: Max. 70 Deg.C Min. -40 Deg.C 60 Renfrew Drive, Markham, Ontario, Canada. L3R 0E1
SSID: IRG5521+_930012 Wireless Password: 83415851 Input : 7-36VDC, 1000mA max.	LISTED E465984 IND. CONT. EQ. FOR HAZ. LOC. Class I, Division 2, Groups A,B,C and D Temp Code:T4A Max. Ambient 70Deg.C Min. Ambient -40Deg.C	
Model: IRG5500+		Made in Taiwan

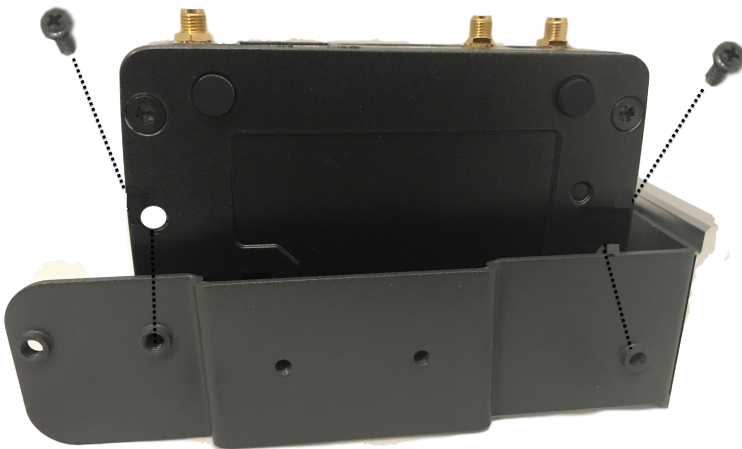
Appendix C—Mounting the Router

Option 1

1. Attached the two DIN Rail screws to the holding plate. The DIN Rail can be positioned either with the connector in the down or up position on the holding plate.



2. Slide the two screws into the holding plate, then attach that holding plate to the router.



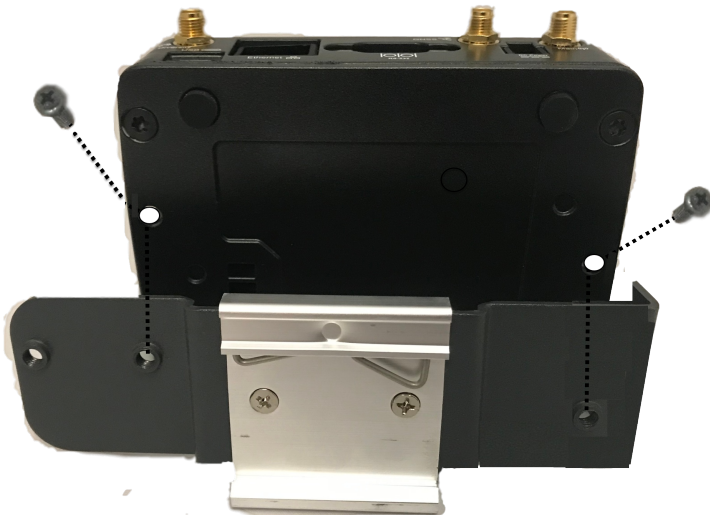
3. Position the router such that the top hooks of the DIN Rail clip attach into the top of the DIN Rail.
4. Rotate the bottom of the router towards the rail. This will snap the bottom hooks of the Din Rail clip onto the bottom of the DIN Rail.

Option 2

1. Attach the two DIN Rail screws to the holding plate. The DIN Rail can be positioned either with the connector in the down or up position on the holding plate.

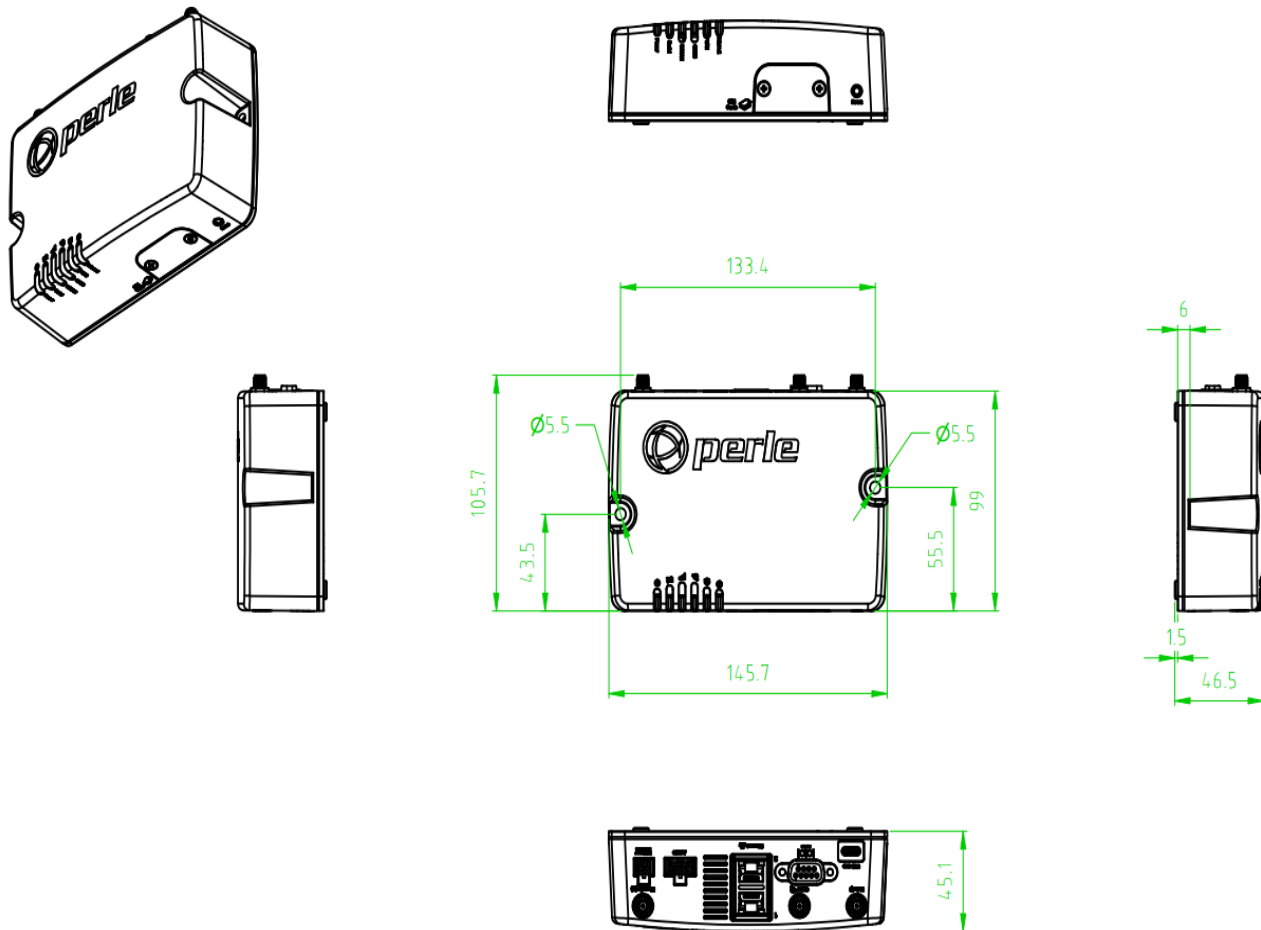


2. Slide the two screws into the holding plate, then attach the holding plate to the router.



3. Position the router such that the top hooks of the DIN Rail clip attach onto the top of the DIN Rail.
4. Rotate the bottom of the router towards the rail. This will snap the bottom hooks of the DIN Rail clip into the bottom of the DIN Rail.

Appendix D—Mechanical



Appendix E—Maintaining and Troubleshooting

Maintaining

- Ensure easy access to the cables
- Ensure cables are not bent, constricted, close to high amperages, or exposed to extreme temperatures
- Check that the front panel LEDs are easily visible
- Wipe case clean with a dry cloth—do not use solvents or cleaning agents