



EtherWAN C4G-S-1P3M and C4G-S-1P6M Router Hardware Guide



Preface

Audience

This guide is for the network or computer technician responsible for installing the EtherWAN C4G-S-1P3M/C4G-S-1P6M router. Familiarity with the concepts and terminology of LTE, GNSS, Ethernet and LAN (local area networks) is required.

Purpose

EtherWAN routers provide users, networking equipment as well as M2M & IoT appliances with net-work connectivity for fixed locations (i.e. buildings, POS, Kiosks, ...etc) and mobile (i.e. vehicle, trains, robots) applications. When used in vehicular applications, the router provides connectivity and is not involved in the operation of the vehicle or direct interaction with the operators. This document describes the hardware and physical characteristics of the EtherWAN C4G-S-1P3M/C4G-S-1P6M Series of Routers. It covers hardware features as well as installation and operation. This document does not cover how to configure your EtherWAN router. Information to configure your EtherWAN router can be found in the Router's User Guide and the Router's CLI Reference Guide on the EtherWAN website. Quick Start information can be found in the C4G-S-1P3M/C4G-S-1P6M Cellular LTE Router Quick Start Guide that came with your product.

Key Features

- Supports bridging/switching and routing
- LTE coverage spanning 30 frequency bands for global coverage
- Fully automatic network switching supporting dual network SIMs
- Routing with Primary/Backup route
- LTE and VPN Fail-over
- Provides network connectivity via LTE, Ethernet, USB-C
- Active GPS for tracking equipment
- Two digital Inputs and one Relay contact
- RS485 half-duplex capabilities
- Wireless LAN 2.4/5 GHz support (models C4G-M-2P3MW and C4G-M-2P6MW)
- 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
- Meets industry-grade certifications

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 EtherWAN's C4G-S-1P3M Series Routers are used in a normal manner with a well-constructed network. EtherWAN's C4G-S-1P3M Series Routers 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. EtherWAN 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 C4G-S-1P3M while in control of a vehicle. Doing so will detract from the driver or operator's control and operation of that vehicle. The C4G-S-1P3M EtherWAN 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 EtherWAN 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 EtherWAN series router even if EtherWAN 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 EtherWAN aggregate liability arising under or in connection with the EtherWAN 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 EtherWAN product.

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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 EtherWAN Series of Routers 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 EtherWAN, 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 EtherWAN Technical support at <https://www.EtherWAN.com> **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 EtherWAN à l'adresse <https://www.EtherWAN.com>

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 EtherWAN Routers are 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 EtherWAN 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 EtherWAN representative. Contact EtherWAN Systems Technical support at <https://www.EtherWAN.com>

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 EtherWAN. Contactez le support technique de EtherWAN Systems à l'adresse <https://www.EtherWAN.com>

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 EtherWAN could void the FCC approval and negate your authority to operate the product.

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

EtherWAN, the EtherWAN logo, and C4G-S-1P3M/C4G-S-1P6M Series of Routers are trademarks of EtherWAN.

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Publishing History

Date	Revision	Update Details
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Overview

The EtherWAN routers are generically referred to as the router C4G-S-1P3M/C4G-S-1P6M in this guide. C4G-S-1P3M/C4G-S-1P6M 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 LTE/4G supports Cat-12 technology with peak download rates of 600 Mbps and uploads speeds of 150 Mbps. They support North American and EMEA frequency bands with automatic fall-back to 3G (HSPA+, UMTS) networks and integrated GNSS receiver (GPS, GLONASS, Beidou, and Galileo) satellite support. The C4G-S-1P6M offers global coverage of frequency bands, supports Cat-12 technology with automatic fall-back to 3G (HSPA+, UMTS) networks. Download speeds of 600 Mbps and uploads speeds of 150 Mbps. The C4G-S-1P6M 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
- Providing reliable Internet access to a mobile workforce

What's Included

The following components are included with your product:

- The router
- 2 LTE antennas (depending on model)
- DC Power cable – pigtail (depending on model)
- 12VDC/2A power supply (depending on model)
- Quick Start Guide
- Optional – GPS passive or active antenna (orderable from EtherWAN)

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

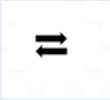

Front View




LEDs



Power LED (P1 and P2) 	Normal Mode	Power Saving Mode	Special Notes: Power must be applied to the Power inputs P1 and P2 in order for the LEDs to light
Off	Router powered off	Router powered off	
Green-Solid	Normal operating mode	N/A	Power must be applied
Green - Blip	N/A	Normal operating mode	
Green - Flashing	Booted - No configuration	N/A	
Amber - Blip	Standby mode	Standby mode	Blips every 5 seconds
Amber - Flashing	Router booting	Router booting	
Red - Blip	Overheat standby	Overheat standby	
Red - Solid	Hardware error	Hardware error	

Serial LED 	Normal Mode	Power Saving Mode	Special Notes
Off	Disabled or not in use	Always off	
Green - Flashing	Serial port Tx/Rx	N/A	
WWAN 	Normal Mode	Power Saving Mode	Special Notes
Off	Disabled	Disabled	
Solid	Connected	Connected - Turns off after 5 seconds	Green = Good signal Amber = Fair signal Red = Poor signal
Flashing	Connection in progress	N/A	Same as above
Blip	Not connected	Not connected	Same as above
GNSS 	Normal Mode	Power Saving Mode	Special Notes
Off	Disabled	Disabled	
Green-Solid	Location Fix	Location Fix - Turns off after 5 seconds	
Green - Blip	Initializing	off	
Amber - Flashing	No Fix	N/A	
Amber - Blip	N/A	No Fix	
VPN 	Normal Mode	Power Saving Mode	Special Notes
Off	No VPN	No VPN	

Green-Solid	VPN connected	VPN connected - Turns off after 5 seconds	
Green - Flashing	VPN connecting	N/A	
Red - Flashing	VPN failed	N/A	
Internet 	Normal Mode	Power Saving Mode	Special Notes
Off	Disabled	Disabled	
Green-Solid	Internet/WAN connection	Internet/WAN connection - Turns off after 5 seconds	
Green - Blip	Not connected	N/A	
Amber - Solid	Backup mode	N/A	
Red - Solid	Connection failed	N/A	
Red - Blip	N/A	Connection failed	

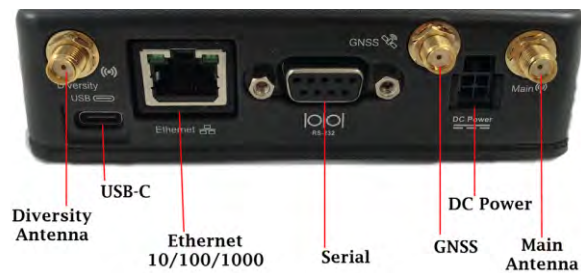
SIM Card/s

The C4G-S-1P3M/C4G-S-1P6M supports two SIM cards. See [Inserting the SIM card](#) for the installation procedure. SIM/s Interface 1.8V/3V



SIM/s Interface 1.8V/3V

Back View



Antenna/s

The router has three SMA antenna connectors Main, Diversity and GNSS. For more information on connecting the antennas see [Connecting the Antenna/s](#). For more information on recommended LTE Antenna specifications see [Antenna/s](#)

USB-C Port

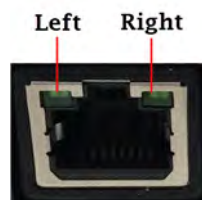
The USB port is used as a console port providing direct access to CLI (Command Line Interface) as well as status, logging and troubleshooting information. In addition, this sport can increase the methods by which data can be sent and received from a connected computer. The USB port can be set as a Ethernet over USB port or as a console port.

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



Ethernet LAN Port

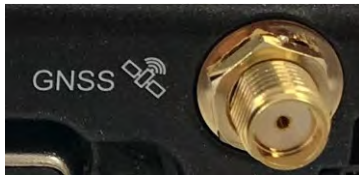
Once the port has connected and the link is established, the speed LED will turn on. The LED will indicate whether you have a 10, 100 or 1000 Mbps link on the Ethernet port.



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



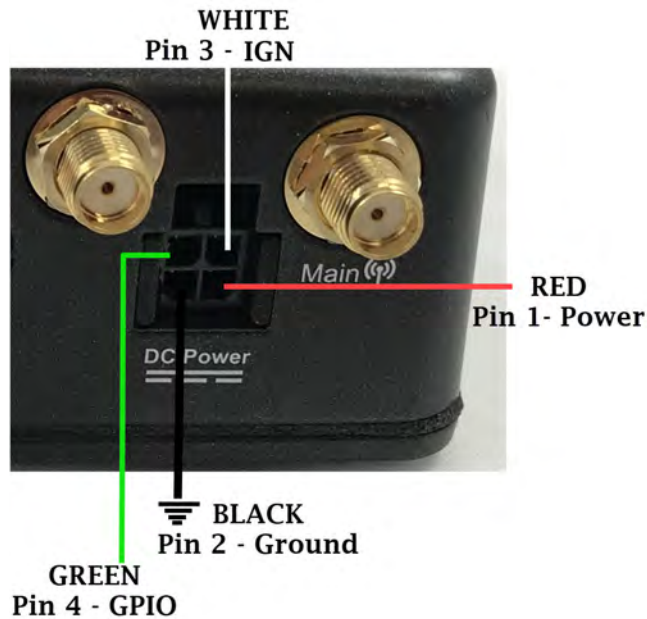
GPS+GLONAS+GAILEO



Passive Antenna – SMA(M) straight connector See Technical Specifications for electrical details.

Connecting the Power

Models can be shipped with a DC power cable or a pigtail cable depending on the model. One GPIO configurable as high side pull-up / dry contact digital input, analog input, low side current sink output, digital output/open drain, or pulse counter. One IGN configurable as vehicle ignition sense or 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 <i>Note: If you want to turn the 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</i>	PWR
2	Ground	Black	Main device ground	
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.	
4	GPIO	Green	User configurable digital input/output or analog voltage sensing input. Connect to switch, relay or external device.	

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 [Antenna/s](#)
3. Connecting the Ethernet Port. See [Ethernet LAN Port](#)
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 Ether-net over USB Port](#)
7. Connecting the power. See [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 EtherWAN User's Guide for more information.](#)
8. Logging into the routerC4G-S-1P3M. See [Fast Setup](#) or [Connecting to the USB-C port in Con-sole Mode](#)

Inserting the SIM card

TheC4G-S-1P3M comes with two SIM sockets for mini-SIM (2FF) cards. Ensure the power is disconnected before you insert the SIM card/s.

1. Using your Phillips screwdriver, remove 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 will slide 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 on yourC4G-S-1P3M/ .



Connecting the Antenna/s

The router C4G-S-1P3M/has three SMA female antenna connectors:

- Main Cellular antenna connector
- Rx Diversity antenna connector
- GNSS antenna connector



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**



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

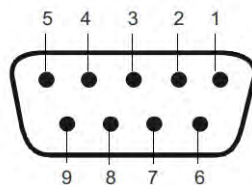
The Ethernet RJ45 ports provide the standard Ethernet interface speeds of 10/100/1000 Mbps through twisted pair (UTP) cables of up to 100 meters (328ft) in length. Cat5e or Cat6 cables are recommended for 1000 Mbps connections.

Connecting to the Serial Port

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

It can be 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 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 connect the cable to the PC.
6. Press the Enter key on the keyboard and the prompt will display.

See the EtherWAN 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 the cable connection

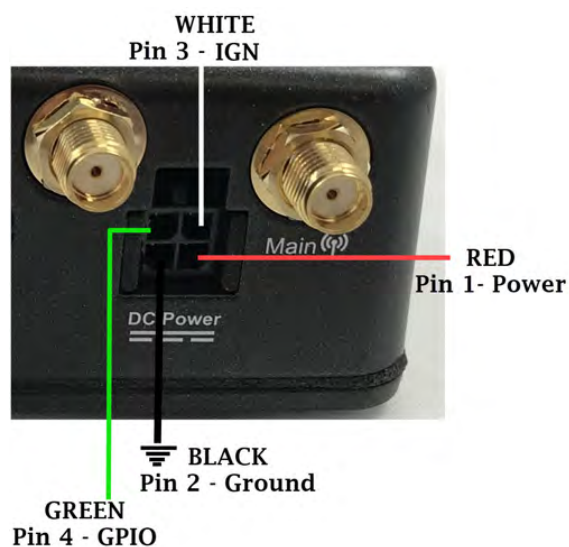
Warning: Do not use the USB port in a potentially explosive environment.

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 EtherWAN User's Guide for more information.

Connecting the Power

The wire colors shown are for the power/GPIO cable that is included with the . 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

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 can be used to accomplish the below function.

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 will remain the same.
Factory default	Press Reset and Hold for 10 seconds when the router is running	All LEDs flash Amber, release Reset button, then Power LED flashes Amber.	Reboots and resets the configuration to the EtherWAN 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 the user to configure basic operating parameters on the router. Your EtherWAN router has been shipped to you in Factory Default mode. When the router is in “Fac-tory Default” mode, it will automatically power up in “Fast setup” mode. When the router is in “Fast Setup” mode, the Power LED will be flashing green. In this mode, when you connect to the router either via the console port or via a Web browser, you will be asked to enter some basic operating parameters including setting up the initial user ID and password for the router.

To connect via the console port, follow the instructions provided in - [Connecting to the Serial Port](#).

If you wish to connect using a Web browser, connect your PC Ethernet cable to an Ethernet port on the router. Ensure that the PC is set up to use DHCP as the method 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”. You should see the fast setup screen appear. Refer to the Quick Start Guide or the Router’s User Guide for more information on setup instructions.

Managing the Router

The C4G-S-1P3M/C4G-S-1P6M can be configured, operated and monitored using any of the following methods.

WebManager

The EtherWAN WebManager is an embedded Web based application that provides an easy to use a browser interface for configuring and managing the C4G-S-1P3M. WebManager is accessible through any standard desktop web browser. You must have pre-configured a valid IP address on the C4G-S-1P3M 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 C4G-S-1P3Mrouter, Telnet, SSH or the Web interface can also be used to access the C4G-S-1P3Mrouter for administration purposes. See the CLI Router Reference Guide for more information.

SNMP

The C4G-S-1P3M 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 will be in “Fast setup mode”. For more details, see - [Fast Setup](#).

Power Management

Power Modes

The EtherWAN router has three operating power modes:

- Standard Mode
- Ignition Mode
- Smart Standby Mode

Standard Mode

When power is applied to the router, it will power up. All inputs are ignored (from a power up per-spective). 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

You can configure a combination of one or two user defined conditions to determine when the router is powered up and when it goes into Standby mode.

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
- WIFI 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

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.

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 will enter Low Voltage Standby. When the voltage increases above the threshold, power will be resumed. This is a battery protection feature and therefore will override Ignition Mode and Smart Standby Mode. The feature can measure voltage either with the IGN pin or the GPIO (analog) pin.

Overheat Standby

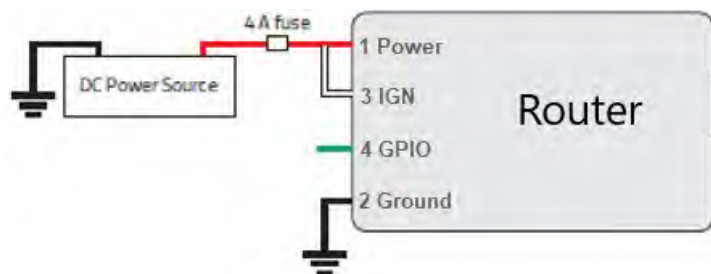
The internal ambient temperature of the router is continuously monitored and if the temperature remains above the router's primary high threshold alarm (default is 95°C/203°F) setting for 5 minutes, then your router will enter into Standby mode and remain in standby until the temperature returns to 5°C/9°F 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 will be ignored and the value of 60°C/140°F will be used for the monitoring for overheat standby.

Deployment Modes

Fixed Installation without I/O

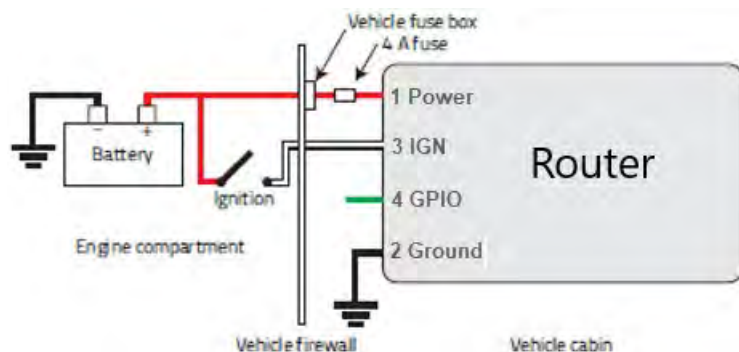
For fixed installations, connect the wires as shown in the figure below. You can configure Low Voltage Standby Mode (LVS) to force the into Standby mode when the voltage is low. Voltage is monitored on Pin 3 and 4.



- 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.

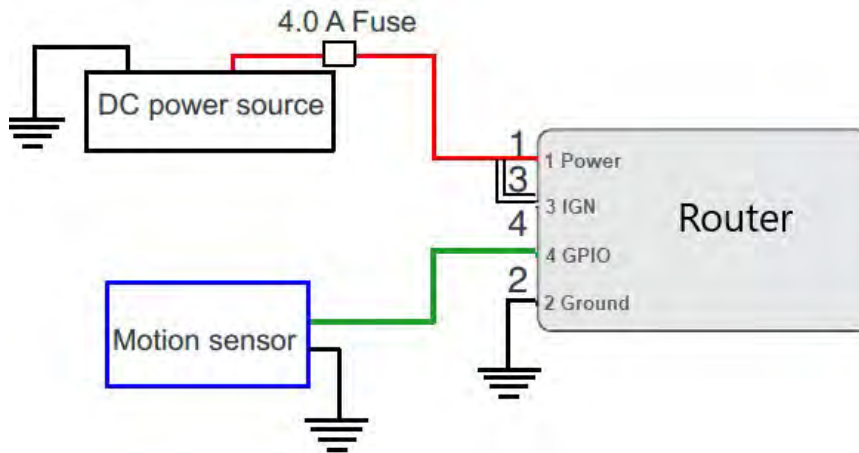
Recommended Vehicle Installation (Ignition Mode)

For vehicle installations, connect the white IGN wire to the vehicle's ignition switch as shown in the diagram below. This allows the to operate with the vehicle. When the vehicle's ignition is off the can enter standby mode. You can configure a time delay between the vehicle's ignition shuts off, and the time the should go into standby mode. A delayed standby is useful 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 .

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 (GPIO)— In this example, the GPIO (green) can by used as an analog input and used to enter and exit standby.

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

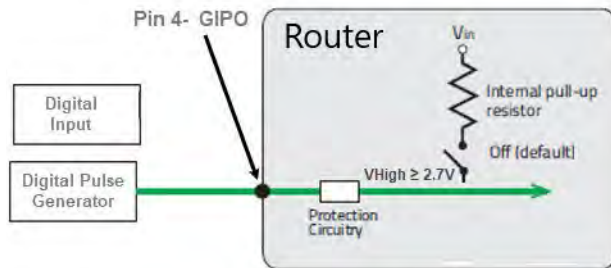
I/O Configurations

You can use Pin 4 (GPIO) green wire as:

- Pulse counter
- Digital input
- Analog input
- Digital Output / Low Side Current Sink
- Digital Output/Open Drain

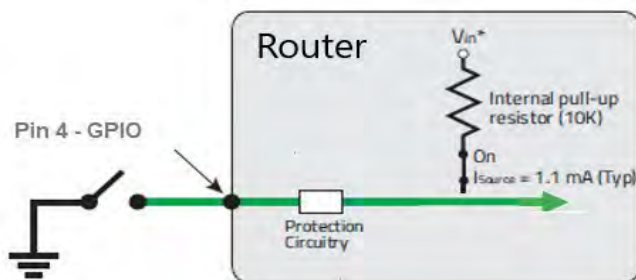
Pulse Counter / Digital Input

You can connect pin 4 - GPIO to a pulse counter to monitor frequencies to 512 Hz, with duty cycle between 25%-75%. or a digital input to detect the state of a switch 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.



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

High Side Pull-up / Dry Contact Switch Input

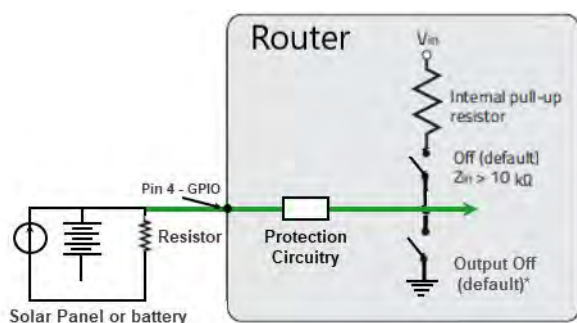


The voltage on Pin 4 when the high side pull-up is enabled (depends on the V_{in} and power consumption).

	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

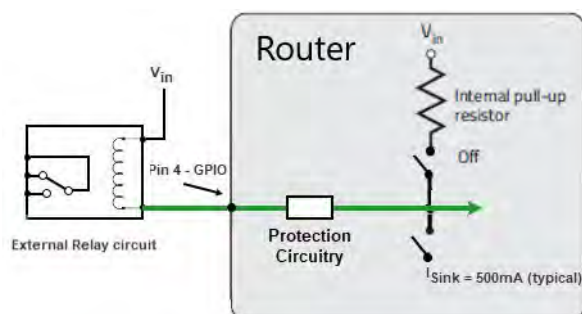
Connect the green wire P4 – GPIO to an analog source. The will monitor voltages from the input source and transform them into analog values. Pin 4 can detect inputs of 0.5 - 36 V referenced to ground. By transforming the voltages, with the user defined formulas, the GPIO pin can monitor mea-surements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



	Minimum	Maximum
Analog Input Range	0.5V	36V

Digital Output / Low Side Current Sink

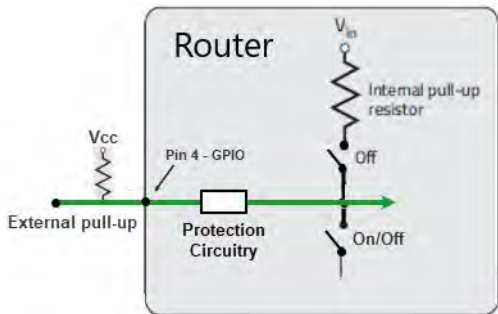
Use Pin 4 - GPIO as a low side current sink.



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	—	$V_{in} = 12$

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

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	1 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

Technical Specifications	
Operating Altitude	Up to 3,048 meters (10,000 feet)
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 Division2, 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
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)	Band 1	2100
	Band 2	1900
	Band 3	1800
	Band 4	1700
	Band 5	850
	Band 7	2600
	Band 8	900
	Band 12	700
	Band 13	700
	Band 20	800
	Band 25	1900 (Block C)
	Band 26	850
	Band 29	700
	Band 30	2300
	Band 41	2500
	HSPA+,UMTS	
	Band 1	2100
	Band 2	1900
	Band 3	1800
	Band 4	1700
	Band 5	850
	Band 8	900

Technical Specifications		
Network Technology (LTE)	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 18	850
	Band 19	850
	Band 20	800
	Band 26	850
	Band 28	700
	Band 29	700
	Band 30	2300
	Band 32	1500
	Band 41	2500
	Band 42	2300
	Band 43	3700
	Band 46	5200
	Band 48	3500
	Band 66	1700
	HSPA+,UMTS	
	Band 1	2100
	Band 2	1900
	Band 4	1700
	Band 5	850
	Band 6	800
	Band 8	900
	Band 9	1700
	Band 19	850
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 - Label (sample)

EtherWAN **C4G-S-1P3M** Contains: FCC-ID: N7NEM7455 IC: 2417C-EM7455

S/N: 351-001319T00001

IMEI: 861824563918001

MAC : 004002930000

Input : 7-36VDC, 1000mA max.

Model: C4G-S-1P3MX

CE II 3G

DEMKO 19 ATEX 2287 X II 3 G Ex ec IIC T4 Gc -40°C ≤ Tamb. ≤ 70°C 60 Renfrew Drive, Markham, Ontario, Canada L3R 0E1

UL US LISTED E465984 IND. CONT. EQ. FOR HAZ. LOC. Class I, Division 2, Groups A, B, C and D Temp Code: T4A Max. Ambient 70 Deg.C Min. Ambient -40 Deg.C

UL US LISTED E160409 I.T.E. E466997 IND. CONT. EQ. Surrounding Air Temp: Max. 70 Deg.C Min. -40 Deg.C

FC

Made in Taiwan

EtherWAN **C4G-S-1P6M** Contains: FCC-ID: N7NEM75 IC: 2417C-EM75

S/N: 351-011319T00001

IMEI: 861824563918001

MAC : 00400293000D

Input : 7-36VDC, 1000mA max.

Model: C4G-S-1P6MX

CE II 3G

DEMKO 19 ATEX 2287 X II 3 G Ex ec IIC T4 Gc -40°C ≤ Tamb. ≤ 70°C 60 Renfrew Drive, Markham, Ontario, Canada L3R 0E1

UL US LISTED E465984 IND. CONT. EQ. FOR HAZ. LOC. Class I, Division 2, Groups A, B, C and D Temp Code: T4A Max. Ambient 70 Deg.C Min. Ambient -40 Deg.C

UL US LISTED E160409 I.T.E. E466997 IND. CONT. EQ. Surrounding Air Temp: Max. 70 Deg.C Min. -40 Deg.C

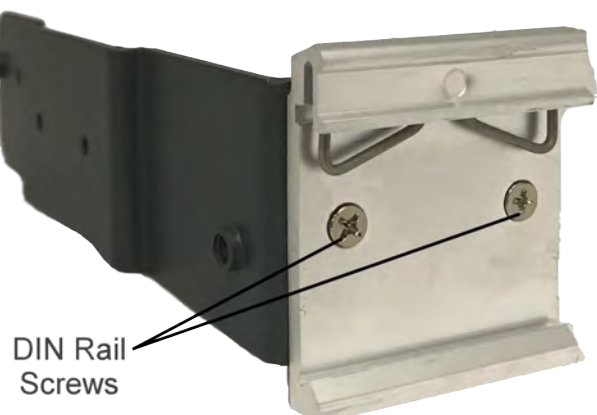
FC

Made in Taiwan

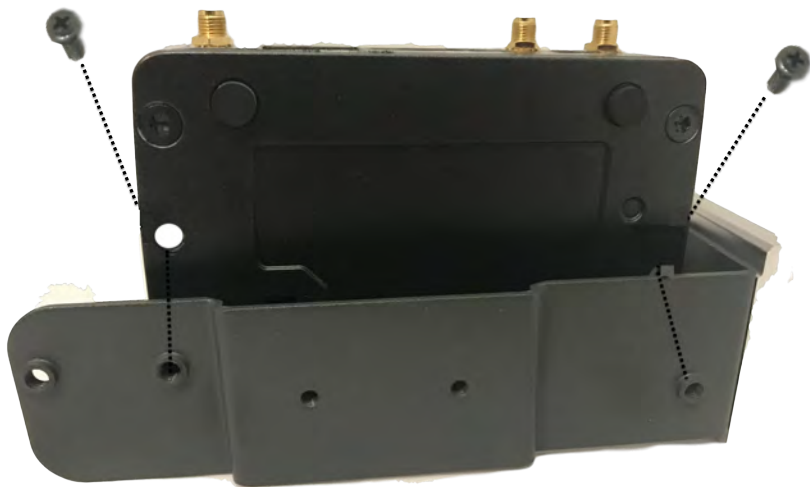
Appendix C - Mounting the Router

Option One

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



2. Slide the two screws into the holding plate, then attached that holding plate to the router. See below.



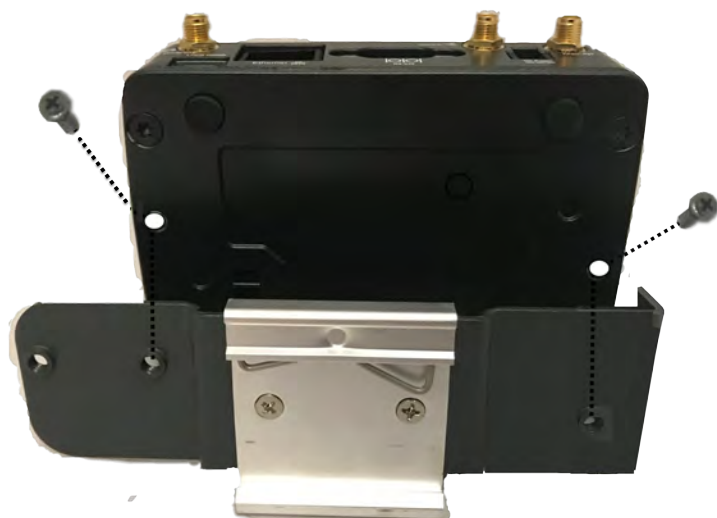
3. Position the router such that the top hooks of the DIN rail clip attach onto the top of the DIN rail.
4. Rotate the bottom of the router towards the rail. This will snap the bottom hooks of the DIN rail clip onto the bottom of the DIN rail.

Option Two

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

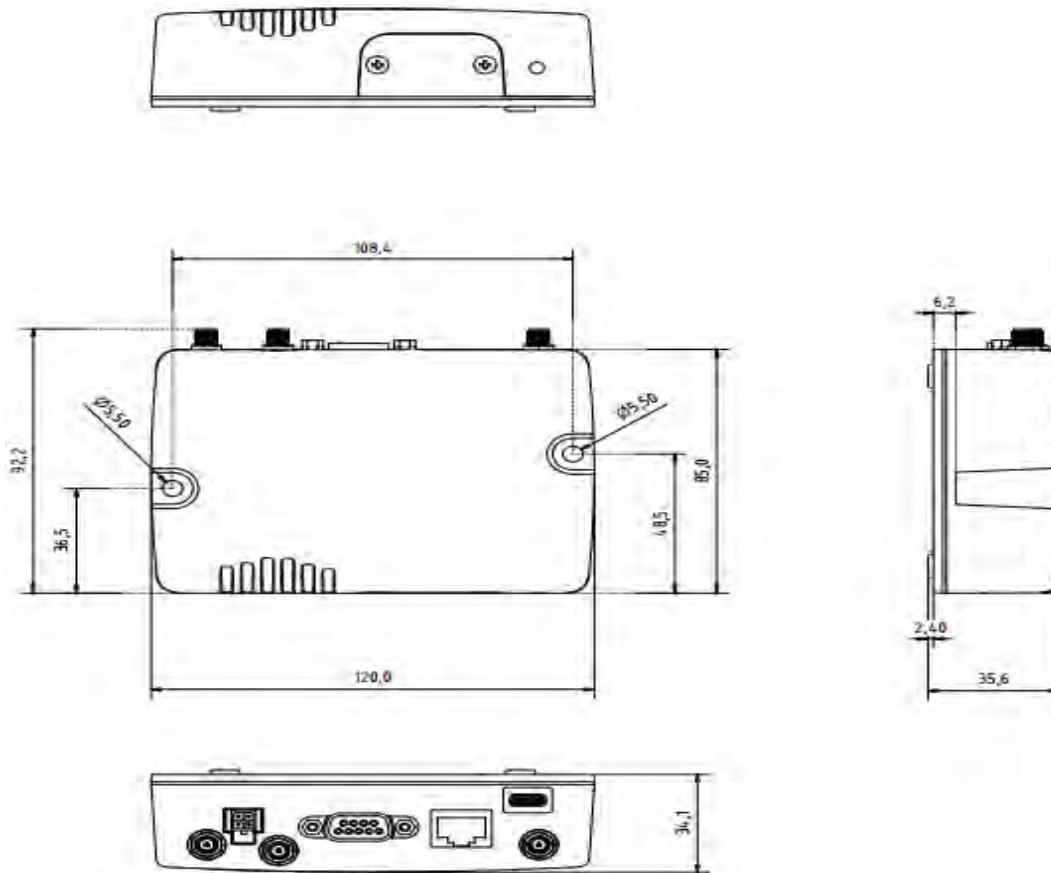


2. Slide the two screws into the holding plate, then attached that holding plate to the router. See below.



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 towards the rail. This will snap the bottom hooks of the DIN rail clip onto the bottom of the DIN rail.

Appendix D - Mechanical



Appendix E - Maintaining and Troubleshooting

Maintaining

- Easy access to the cables
- Cables are not bent, constricted, close to high amperages or exposed to extreme temperatures
- Front panel LEDs are easily visible
- Do not use solvents or cleaning agents on this router, if case gets dirty wipe with a dry cloth