

ReliaGATE 50-21

Multi-Service Gateway and Edge Controller

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Trademarks

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Document Revision History

REVISION	DESCRIPTION	DATE
1	Preliminary release	November 2012
A	Added additional information regarding safety notices Added Product Options and Power Management State sections Updated for placement of connectors and LEDs on rear panel Added details about IGN input	November 2013

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Important User Information

In order to lower the risk of personal injury, electric shock, fire, or equipment damage, users must observe the following precautions as well as good technical judgment, whenever this product is installed or used.

All reasonable efforts have been made to ensure the accuracy of this document; however, Eurotech assumes no liability resulting from any error/omission in this document or from the use of the information contained herein.

Eurotech reserves the right to revise this document and to change its contents at any time without obligation to notify any person of such revision or changes.

Alerts that can be found throughout this manual

The following alerts are used within this manual and indicate potentially dangerous situations.



DANGER! Electrical shock hazard:

Information regarding potential electrical shock hazards:

- Personal injury or death could occur. Also damage to the system, connected peripheral devices, or software could occur if the warnings are not carefully followed.
 - Appropriate safety precautions should always be used, these should meet the requirements set out for the environment that the equipment will be deployed in.
-



WARNING!

Information regarding potential hazards:

- Personal injury or death could occur. Also damage to the system, connected peripheral devices, or software could occur if the warnings are not carefully followed.
 - Appropriate safety precautions should always be used, these should meet the requirements set out for the environment that the equipment will be deployed in.
-



INFORMATION and/or NOTES:

These will highlight important features or instructions that should be observed.

Safety Notices and Warnings

The following general safety precautions must be observed during all phases of operation, service, and repair of this equipment. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Eurotech assumes no liability for the customer's failure to comply with these requirements.

The safety precautions listed below represent warnings of certain dangers of which Eurotech is aware. You, as the user of the product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

Ventilation



WARNING!

Ensure adequate ventilation to avoid overheating. Eurotech suggests the following steps:

- When installing the device within a cabinet, rack, or other enclosed space, be sure to leave sufficient space to allow adequate air circulation.
- Do not block any ventilation openings.

Do not operate in an explosive atmosphere



WARNING!

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

Antistatic precautions



WARNING!

To avoid ESD (Electro Static Discharge) damage, always use appropriate antistatic precautions when handling any electronic equipment.

Maintenance



DANGER!

- Never open, dismantle, or repair the device!
- For your maintenance or repair requirements, please contact a qualified Eurotech engineer.

If the device does not function correctly and you are unable to find a solution, contact the Eurotech Technical Support Team.

Cleaning

**WARNING!**

When you clean the device, remember to

- Ensure sufficient ESD protection during the cleaning process.
- Remove any power from the device.
- Use a dry cloth on the external casing when cleaning an enclosed system or peripheral.
- Use only a low power air brush or soft bristled paintbrush for single boards.
- Not use detergents, aerosol sprays, solvents or abrasive sponges.

Installation

**WARNING!**

- Verify that the mounting location can withstand the added loads caused by the addition of the device. It should be firmly secured so that it will not cause any potentially hazardous situations (e.g. falling down due to vibration or shock).
- Do not operate the device near heat sources or flames.
- Underwriters Laboratories Inc. ("UL") has not tested the performance or reliability of this product's hardware, operating software, or other aspects of this product in relation to permanent mounting in a vehicle or powered by a car battery. UL has only tested for fire, shock, or casualties as outlined in UL's Standard(s) for Safety.

**NOTE:**

If the device must be moved from one place to another with different ambient temperatures, ensure sufficient time for the temperature of the device to stabilize before repowering.

Connection to power supply or other devices

**DANGER!**

Before applying power to the system, thoroughly review all installation, operation, and safety instructions.

Failure to install the system power supply correctly or to follow all operating instructions correctly may create an electrical shock hazard, which can result in personal injury or loss of life, and/or damage to equipment or other property.

Other Safety Notices and Precautions

- To avoid injuries, always disconnect power and discharge circuits before touching them.
- Only start the product with a power supply that conforms to the voltage requirements as specified in Power Supply, page 47. In case of uncertainty about the required power supply, please contact your local Eurotech Technical Support Team.
- Eurotech recommends the CUI ETSA120500U or an equivalent supply that has the following characteristics:
 - Safety - UL Listed, LPS Output and Certified for 40°C
 - Electrical - 12VDC output, 5A output current, 60W power
 - This should be used with the 2-pin connector supplied with your system, with the following details:
 - Pin 1 – Negative (white text on negative wire)
 - Pin 2 – Positive (ribs on positive wire)
- Before connecting other equipment, carefully read any supplied instructions.
- Always disconnect the power before connecting or disconnecting cables.
- Do not perform connections with wet hands.
- Check any power cords for damage before use.

- Use certified power cables. The power cable must fit the product, the voltage, and the required current. Position cable with care. Avoid positioning cables in places where they may be trampled on or compressed by objects placed on it. Take particular care of the plug, power-point, and outlet of power cable.
- Position cables with care. Avoid positioning cables in places where they may be trampled on or compressed by objects placed on them. Take particular care of the plug, power-point, and outlet of power cable.
- Avoid overcharging any power outlets.
- Only apply power to the device or connected equipment after checking that all the above conditions have been met.

Life Support Policy



WARNING!

Users must not use Eurotech products as critical components of life support devices or systems without the express written approval of Eurotech Spa.

Technical Assistance

If you have any technical questions, cannot isolate a problem with your device, or have any enquiry about repair and returns policies, contact your local Eurotech Technical Support Team.

See [Eurotech Worldwide Presence](#) page 49 for full contact details.

Transportation

When transporting any device or system, for any reason, it should be packed using anti-static material and placed in a sturdy box with enough packing material to adequately cushion it.



WARNING!

Any product returned to Eurotech that is damaged due to inappropriate packaging will not be covered by the warranty.

Warranty

For Warranty terms and conditions users should contact their local Eurotech Sales Office.

See [Eurotech Worldwide Presence](#) page 49 for full contact details.

CE Notice

This product has the CE labelling to confirm compliance with the following European Community Directives:



Council Directive 2004/108/EC of 31 December 2004 on the approximation of the laws of Member States relating to electromagnetic compatibility;

Council Directive 2006/95/EC of 12 December 2006 on the harmonization of the laws of Member States relating to electrical equipment designed for use within certain voltage limits;

Council Directive 1999/5/EC of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

Eurotech shall not be liable for use of its products with equipment (i.e. power supplies, personal computers, etc.) that are not CE marked.

Safety

This product conforms to IEC 60950-1 (2005) Second Edition, with Am. 1:2009, additionally evaluated to EN60950-1:2006 with Am. 11:2009, Am. 1:2010, Am. 12:2011, to Group and National Differences for European countries; other National Differences also specified in the CB Test Report.



WEEE

The information below is issued in compliance with the regulations as set out in the 2002/96/EC directive, subsequently superseded by 2003/108/EC. It refers to electrical and electronic equipment and the waste management of such products. When disposing of a device, including all of its components, subassemblies, and materials that are an integral part of the product, you should consider the WEEE directive.

The use of the following symbol, attached to the equipment, packaging, instruction literature, or the guarantee sheet, states that the device has been marketed after August 13th 2005, and implies that you must separate all of its components when possible, and dispose of them in accordance with local waste disposal legislations:



- Because of the substances present in the equipment, improper use or disposal of the refuse can cause damage to human health and the environment.
- With reference to WEEE, it is compulsory not to dispose of the equipment with normal urban refuse; an arrangement for separate collection and disposal is essential.
- To avoid any possible legal implications users should contact the local waste collection body for full recycling information.
- In case of illicit disposal, sanctions will be levied on transgressors.

RoHS

This device, including all its components, subassemblies and the consumable materials that are an integral part of the product, has been manufactured in compliance with the European directive 2002/95/EC known as the RoHS directive (Restrictions on the use of certain Hazardous Substances). This directive targets the reduction of certain hazardous substances previously used in electrical and electronic equipment (EEE).



EMC Requirements for Industry Canada

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. This device complies with Industry Canada RSS Appliance radio exempt from licensing. The operation is permitted for the following two conditions:

- 1) The device may not cause harmful interference, and
- 2) The user of the device must accept any interference suffered, even if the interference is likely to jeopardize the operation.



FCC Part 15 Class B Statement

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 in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.



Warning: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Conventions

The following table describes the conventions for signal names used in this document.

Convention	Explanation
GND	Digital ground plane
#	Active low signal
_P	Positive signal in differential pair
_N	Negative signal in differential pair

The following table describes the abbreviations for direction and electrical characteristics of a signal used in this document.

Type	Explanation
I	Signal is an input to the system
O	Signal is an output from the system
IO	Signal may be input or output
P	Power and ground
A	Analog signal
3.3	3.3 V signal level
5	5 V signal level
NC	No Connection
Reserved	Use is reserved to Eurotech

Introduction

The ReliaGATE 50-21 is a ready-to-deploy, industrial-grade, smart device that enables communications, computational power, simplified application deployment, and M2M platform integration for immediate service generation. It provides a flexible communication architecture and offers connectivity to a wide range of sensors and edge devices making it easy to deliver data to your business application. ReliaGATE 50-21 supports wireless applications including GPS, Wi-Fi, 2G/3G cellular, and IEEE 802.15.4/ZigBee® Standard and wired connectivity such as USB 2.0, Gigabit Ethernet, serial ports, CAN, analog inputs, and isolated digital I/O.

With the ReliaGATE 50-21, you can easily manage configuration and deliver out-of-the-box connectivity for your M2M and network applications. It is compatible with the Wind River Linux operating system. Software support includes Eurotech's Everyware™ Software Framework (ESF) that provides the MQTT plug-in enabling connection to Eurotech's Everyware™ Cloud.

Product Overview

The following figure shows a full-feature ReliaGATE 50-21. Actual units may vary in appearance depending on the selected options.



Figure 1. ReliaGATE 50-21



Disclaimer:

This equipment generates and can radiate radio frequency energy and may cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by such measures as reorienting the receiving antenna, increasing separation between equipment and receiver, or connecting the equipment into an outlet on a different electrical circuit.

Additional restrictions and requirements are given in section [Cellular](#), page 17.

Features

Processor

- Intel® Atom™ processor Z510P at 1.1 GHz
- Intel® System Controller Hub US15WP

Memory

- Up to 32 GB CompactFlash
- 512 MB DRAM SODIMM (Support for up to 2 GB DRAM)

Communications

- GPS – 50 channel receiver
- Wi-Fi – IEEE 802.11 a/b/g/n (Access Point and Client)
- Cellular
 - Telit HE910 (UMTS/HSPA+)
 - Telit DE910 (CDMA/EvDO)
 - Telit GE910 (2G GSM/GPRS)
- IEEE 802.15.4/ZigBee® Standard (Support for ZigBee Pro Stack and NXP JenNet networking)
- Four USB 2.0 host ports
- Two Gigabit Ethernet ports
- Two EIA-232/485 port (5-wire)
- Two CAN2.0 busses

Display and Indicators

- VGA display output
- Four LED status indicators (Power, Cellular Activity, two User-configurable)

Inputs and Outputs

- Two analog inputs
- Four isolated digital inputs
- Two isolated digital outputs

Software

- Wind River Linux 4.3 Operating System
- Everyware™ Software Framework option
- Supports Everyware™ Device Cloud

Power Supply

- 9 to 36 VDC with transient protection (12 VDC nominal)
- 8W power consumption

Mechanical

- 205 x 130 x 42.5 mm (L x W x H)
- Mounting option

Environmental

- Extended operating temperature (-20°C to 60°C)*
- Industrial temperature option (-40°C to 85°C)*
- CE, FCC, IC, 60950-1 and Mil-810F Compliant

* This device has been UL Listed at 40° C, limited by power supply. UL Certification does not apply or extend to an ambient above 40° C and has not been evaluated by UL for ambient greater than 40° C.

Product Options

In addition to the standard features described in the previous section, the ReliaGATE 50-21 is designed to support the following options:

- J1708 bus on Vehicle connector
- Two EIA-232/485 ports (5-wire) on Serial 1 connector
- Two EIA-232/485 ports (5-wire) on Serial 2 connector
- Accelerometer (3-axis, $\pm 2g$ / $\pm 4g$ / $\pm 8g$ / $\pm 16g$)
- Line out audio

If your application requires one or more of these options, contact your local Eurotech representative for availability.

Related Documents

This manual describes the ReliaGATE 50-21 at the system level and is intended for installers, software developers, and system integrators. The following documents are also important resources for the ReliaGATE 50-21.

Document	Available at
ReliaGATE Development Kit Quick Start	http://support.eurotech-inc.com/forums/topic.asp?topic_id=3058
Denali User Manual	http://support.eurotech-inc.com/forums/topic.asp?topic_id=3040
Everyware Cloud Developer's Guide	http://everywarecloud.eurotech.com/doc/ECDevGuide
Everyware Software Framework Developer's Guide	http://esf.eurotech.com/doc/ESFDevGuide

Table 1. Related Documents

Getting Started

Follow these steps to get started using your ReliaGATE 50-21:

1. Connect to your peripherals.
ReliaGATE 50-21 provides connectivity to a VGA display, USB devices (e.g. USB keyboard), and serial devices (e.g. Serial console). For descriptions of these interfaces, see [Communications](#), page 12 and [User Interface](#), page 20.
2. Connect to your network.
ReliaGATE 50-21 supports wireless networks including GPS, Wi-Fi, and 2G/3G cellular and wired Gigabit Ethernet networks. For descriptions of these network interfaces, see [Communications](#), page 12.
3. Connect your discrete inputs and outputs.
ReliaGATE 50-21 provides connectivity to analog inputs and isolated digital inputs/outputs. For descriptions of these signals, see [Inputs and Outputs](#), page 21.
4. Apply power to your system.
ReliaGATE 50-21 supports a variety of usage scenarios. For power supply requirements, see [Power Supply](#), page 22.
5. Log into the administrative console.
ReliaGATE 50-21 runs the Wind River 4.3 operating system and supports login via a variety of methods. For instructions about how to log in, see [Administrative Console](#), page 23.
6. Configure the settings for your network.
ReliaGATE 50-21 runs the Denali routing application software allowing configuration for a variety of networks. For instructions about how to configure the network settings, see [Network Configuration](#), page 28.
7. Connect to the Everyware Cloud, if required.
ReliaGATE 50-21 leverages ESF, plus the power of Denali, to provide a cloud-ready device. For instructions about how to configure your system to connect to the Everyware Cloud, see [Everyware Cloud Configuration](#), page 41.
8. Install your system, if required.
The ReliaGATE 50-21 electronics are housed in a sturdy aluminium enclosure. For mechanical specifications, see [Mechanical](#), page 41.
9. Ensure security of your system.
ReliaGATE 50-21 supports a variety of features to ensure the security of your system. For details about these features, see [Administrative Console](#), page 23, [Denali Routing Application](#), page 25, and [Cloud Account Security](#), page 42.
10. Start developing your applications.
ReliaGATE 50-21 supports ESF, which is an inclusive software framework that puts a middleware layer between the operating system and the OEM application. The ESF Developer's Guide provides detailed instructions and sample applications for developing device applications using ESF on Eurotech platforms. It is available at <http://esf.eurotech.com/doc/ESFDevGuide>.

Interfaces

This section gives an overview of the hardware features of the ReliaGATE 50-21 including communications, user interface, and power supply.

Communications

ReliaGATE offers connectivity to a wide range of sensors and edge devices making it easy to deliver data to your business application. It provides a flexible wireless communication architecture that includes GPS, Wi-Fi (IEEE 802.11), 2G/3G cellular, and IEEE 802.15.4/ZigBee® Standard interfaces. The ReliaGATE 50-21 also includes interfaces for wired connectivity such as USB 2.0, Gigabit Ethernet, serial ports, and CAN interfaces.

The following figures show the location of these communication interfaces.

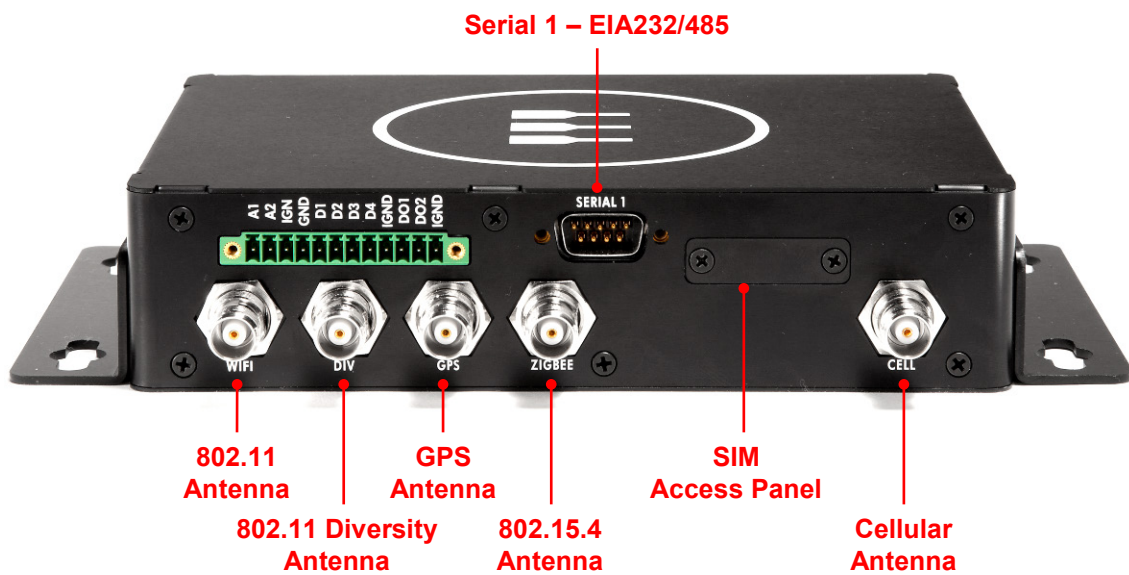


Figure 2. Communication Interfaces – Front Panel

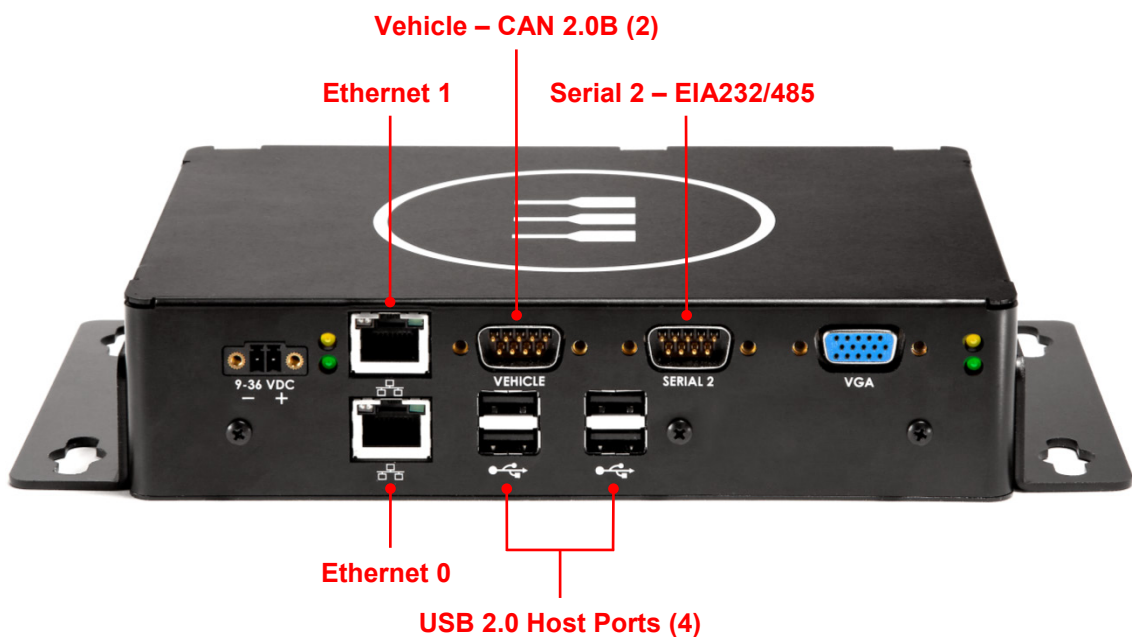


Figure 3. Communication Interfaces – Rear Panel

GPS

The ReliaGATE 50-21 includes a u-blox NEO-6M integrated GPS receiver and external antenna connection supporting localization and allowing users to geographically reference the data sent over a network.

GPS is available via a TNC connector, using an external GPS antenna with a frequency of 1575.42 MHz (GPS L1). Typically, GPS antennas must have line of sight to a wide area of the sky in order to receive signals from multiple positioning satellites.

The following table summarizes the performance of the u-blox NEO-6M receiver.

Parameter	Description
Receiver Type Channels: Frequency: SBAS:	50 GPS L1, C/A Code WAAS, EGNOS, MSAS
Time-To-First-Fix (all satellites at -130 dBm) Cold Start (without aiding): Warm Start (without aiding): Hot Start (without aiding): Aided Starts: (dependent on aiding data connection speed and latency)	27 s 27 s 1 s <3 s
Sensitivity (demonstrated with a good active antenna) Tracking & Navigation: Reacquisition: (for an outage duration ≤10 s) Cold Start (without aiding): Hot Start:	-161 dBm -160 dBm -147 dBm -156 dBm
Navigation Update rate:	Up to 5 Hz
Horizontal position accuracy (CEP, 50%, 24 hours static, -130dBm, SEP: <3.5m) GPS: SBAS	2.5 m 2.0 m
Configurable Timepulse Frequency range:	f = 0.25 ... 1000 Hz
Accuracy for Timepulse signal RMS: 99%: Granularity: Compensated:	30 ns <60 ns 21 ns 15 ns
Accuracy (CEP, 50%, 24 hours static, -130dBm, SEP: <3.5m) Velocity: Heading:	0.1 m/s 0.5 degrees

Note:

1. Specifications per the NEO-6 Data Sheet, GPS.G6-HW-09005-E, www.u-blox.com.

Table 2. GPS Receiver Performance

Underwriters Laboratories Inc. ("UL") has not tested the performance or reliability of the Global Positioning System ("GPS") hardware, operating software, or other aspects of this product. UL has only tested for fire, shock, or casualties as outlined in UL's Standard(s) for Safety. UL60950-1 Certification does not cover the performance or reliability of the GPS hardware and GPS operating software.

Wi-Fi (IEEE 802.11)

For connectivity to a wireless network compliant with the IEEE 802.11 standard, the ReliaGATE 50-21 includes an internal PCIe to Wi-Fi adapter and external antenna connection.

Wi-Fi is available via a TNC connector, using an external Wi-Fi antenna with a typical frequency of 2.4 GHz. In addition, a second TNC connector is provided for an optional second antenna (i.e. RX diversity) allowing 5 GHz operation.

The following table summarizes the features of the PCIe to Wi-Fi adapter.

Feature	Description
IEEE WLAN Standard	IEEE 802.11 a/b/g/n Access Point and Client
Security	
Authentication:	WPA and WPA2, 802.1X, EAP-SIM, EAP-AKA
Authentication Protocols:	PAP, CHAP, TLS, GTC, MS-CHAP, MS-CHAPv2
Encryption:	64-bit and 128-bit WEP, AES-CCMP, TKIP

Note:

- Specifications per the Intel Centrino Advanced-N 6205 Product Brief, 326745-001US, www.intel.com.

Table 3. Wi-Fi Adapter Features

Cellular

The ReliaGATE 50-21 provides connection to a variety of cellular networks using an integrated cellular modem. Currently, ReliaGATE 50-21 supports the following modems.

- Telit HE910 (UMTS/HSPA+)
- Telit DE910 (CDMA/EvDO)
- Telit GE910 (GSM/GPRS)

Cellular is available via a TNC connector, using an external cellular antenna. This cellular antenna must be rated for operation within the range specified by the cellular type as given in the following table.

Modem	Cellular Type	FCC ID	Frequencies (MHz)	Antenna Gain
Telit HE910	UMTS/HSPA+	RI7HE910	824.2 – 846.4	≤ 5.22 dBi
			1712.4 – 1752.6	≤ 6.45 dBi
			1850.2 – 1907.6	≤ 3.31 dBi
Telit DE910	CDMA/EvDO	RI7DE910-DUAL	824.7 – 848.31	≤ 5.12 dBi
			1851.25 – 1908.75	≤ 6.12 dBi
Telit GE910	GSM/GPRS	RI7GE910	824.4 – 848.8	≤ 8.32 dBi
			1850.2 – 1909.8	≤ 3.34 dBi

Note:

- Antenna gain per the FCC certification available at <https://apps.fcc.gov/oetcf/eas/reports/GenericSearch.cfm>.

Table 4. Cellular Modem Specifications



Disclaimer:

To meet the FCC's RF exposure rules and regulations the antenna(s) used must be installed to provide a separation distance of at least 20 cm from all the persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

IEEE802.15.4

The ReliaGATE 50-21 includes a wireless module with external antenna connection supporting IEEE802.15.4 networks including NXP JenNet and ZigBee® Pro Stack.

IEEE802.15.4 is available via a TNC connector, using an external antenna with a typical frequency of 2.4 GHz.

The following table summarizes the features of this wireless module.

Feature	Description
Network Standard Support	2.4 GHz IEEE802.15.4
Range (external antenna)	Up to 4 km
Nominal output power	+20 dBm
Nominal sensitivity	-98 dBm
Compliance	FCC part 15 rules, IC Canada RSS 210e ETSI ETS 300-328 Japan ARIB STD-T66

Note:

- Specifications per the JN5148 Module Product Brief, JN5148-MO-PBv1.1, www.jennic.com.

Table 5. IEEE802.15.4 Module Features

For details about connecting your ReliaGATE 50-21 to an IEEE 802.15.4 device, contact your local Eurotech technical representative.

USB

The ReliaGATE 50-21 provides four Universal Serial Bus (USB) host ports that support the USB 2.0 specification operating at low (1.5 Mbps), full (12 Mbps), and high speed (480 Mbps). All ports are general-purpose USB host ports (500 mA max).

The four USB host ports are available on two USB Type A dual receptacles located on the rear panel.

Additional details about the USB specifications are available at www.usb.org.

Ethernet

For wired network connectivity, the ReliaGATE 50-21 provides two Gigabit Ethernet ports.

These ports are available on standard RJ-45 sockets located on the rear panel. For documentation purposes, the lower Ethernet port is referenced as Ethernet 0, while the upper Ethernet port is referenced as Ethernet 1. The MAC address for each port is provided on the label that is located on the bottom of the enclosure.

The following table summarizes the features of the Ethernet ports.

Feature	Description
Network Standard	IEEE 802.3/802.3u/802.3ab
Speeds	10/100/1000 Mbps (note 5)
Supports	Auto-negotiation Auto MDI-X

Note:

- Ethernet 1 is implemented by a high-speed USB 2.0 to 10/1000/1000 Ethernet Controller. Speeds may be limited by the USB 2.0 host interface.

Table 6. Ethernet Features

Serial Ports

The ReliaGATE 50-21 provides two external serial ports for wired connectivity to various field equipment. BIOS defaults have been selected to enable these ports as 5-wire, EIA-232 serial ports. You can change the serial port setting to EIA-485 mode in the BIOS setup utility.

Serial 1 is available on a DB9 plug located on the front panel, while Serial 2 is available on a DB9 plug located on the rear panel. Each serial port supports baud rates from 300 bps to 1.2 Mbps. The following table describes the pin assignment of the serial ports.

Pin	EIA-232 Name	Type	Description (Default)	EIA-485 Name	Type	Description (Option)
1	Reserved		(note 6)	Reserved		(note 6)
2	RXD	I	Receive Data	RX-	I	Receive Data -
3	TXD	O	Transmit Data	TX-	O	Transmit Data -
4	Reserved		(note 6)	Reserved		(note 6)
5	GND	P	Ground	GND	P	Ground
6	Reserved		(note 6)	Reserved		(note 6)
7	RTS	O	Request To Send	TX+	O	Transmit Data +
8	CTS	I	Clear To Send	RX+	I	Receive Data +
9	Reserved		(note 6)	Reserved		(note 6)

Note:

- 6. See [Product Options](#), page 13.

Table 7. Serial Ports Pin Assignment

To change the default BIOS setting for the serial ports to EIA-485 mode, complete the following steps:

1. Connect a VGA display and USB keyboard to your ReliaGATE 50-21.
2. Connect the 12 VDC power adapter to the DC power input, and then connect the adapter to AC power. The Power LED lights green when power is successfully connected.
3. Press the <F2> key on the USB keyboard rapidly while the system boots. The Eurotech screen will display the message “F2 detected, going into setup utility”, then the BIOS screen will appear.
4. In the Advanced tab, select Peripheral Configuration and then press <Enter>.
5. Select the serial port, press <Enter>, and then select RS485.
6. Press <F10> to Save and Exit and then press <Enter> to select Yes.



Note:

Eurotech HIGHLY recommends not changing any other BIOS setting on the system without consulting your Eurotech technical representative. Permanent damage may occur to your system.

The Status tab in the Denali Setup Web page lists the serial ports available as described in the following table. For instructions to access Denali, see [Accessing the Setup Web Page](#), page 26.

COM Port Name	Serial Port (Configurations without IEEE802.15.4)	Serial Port (Configurations with IEEE802.15.4)
ttyUSB0	Serial 1	Serial 1
ttyUSB1	Serial 2	Serial 2
ttyUSB2	Serial 3 (internal)	Serial 3 (internal)
ttyUSB3	Serial 4 (internal)	Serial 4 (Internal)
ttyUSB4	-	Serial 5 (used for IEEE802.15.4 module)
ttyUSB5	-	Not available

Table 8. Serial Ports in Denali Status Web Page

Vehicle – CAN 2.0B

The ReliaGATE 50-21 supports two CAN (Controller Area Network) buses that are compliant with the CAN 2.0B specification.

Both CAN buses are available on a single DB9 plug located on the rear panel. The following table describes the pin assignment of this connector.

Pin	Signal Name	Type	Description
1	CAN 2-	IO	CAN bus 2, Low
2	CAN 1-	IO	CAN bus 1, Low
3	NC		No connection
4	Reserved		(note 7)
5	GND	P	Ground
6	Reserved		(note 7)
7	CAN 1+	IO	CAN bus 1, High
8	CAN 2+	IO	CAN bus 2, High
9	NC		No connection

Note:

- 7. See [Product Options](#), page 13.

Table 9. CAN 2.0B Pin Assignment

User Interface

Users can view display output and monitor system operation using the VGA display output and LED status indicators provided on the ReliaGATE 50-21 rear panel.

The following figure illustrates the location of these features.

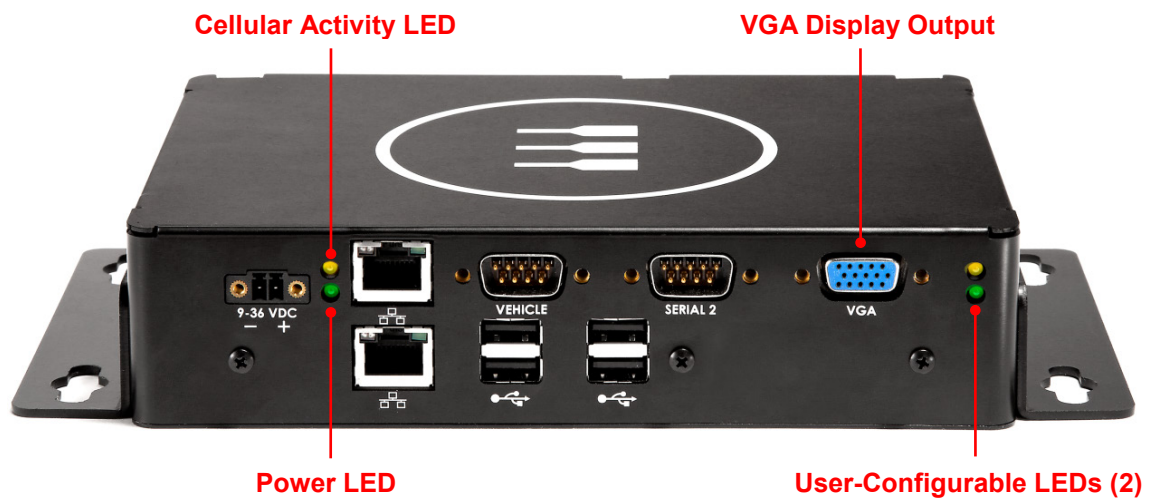


Figure 4. User Interface – Rear Panel

VGA Display Output

The ReliaGATE 50-21 drives a VGA display with resolutions up to SVGA. This output provides red, green, and blue data, as well as horizontal sync and vertical sync signals. Use a controlled impedance video cable to connect the ReliaGATE 50-21 to your display. Cables should not introduce major impedance discontinuities that cause signal reflections. In addition, the VGA display output includes a Display Data Channel (DDC) serial interface for monitor Plug and Play capability with various computer displays.

The VGA Display Output is available on a DE15 socket located on the rear panel.

LED Indicators

The ReliaGATE 50-21 uses four light-emitting diodes (LEDs) located on the rear panel to indicate system operation. The following tables describe the LED functionalities.

LED	Color	System Operation	LED Status
Power	Green	Power Off	Off
		Power On	On
Cellular	Orange	No Cellular activity	Off
		Cellular active and communicating	On
User-Configurable	Green	User-configurable	Off
			On
User-Configurable	Orange	User-configurable	Off
			On

Table 10. LED Indicators

Inputs and Outputs

A 12-position terminal block located on the rear panel provides access to two analog inputs, four general-purpose digital inputs, two general-purpose digital outputs, and a sleep/wake input. For electrical specifications, see [Inputs and Outputs](#), page 47.

The following figure shows this terminal block.

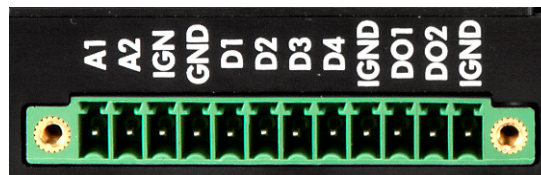


Figure 5. Input/Output Terminal Block

The following table defines these inputs and outputs.

Signal Name	Type	Description
A1	I	Analog input 1
A2	I	Analog input 2
IGN	I	Sleep/Wake input When the system is powered down, a low-to-high transition (> 7V) will wake the system. When the system is in full operation, a high-to-low transition will cause the system to send an ESF notification to your application. (notes 9 and 10)
GND	P	Ground
D1	I	Digital input 1
D2	I	Digital input 2
D3	I	Digital input 3
D4	I	Digital input 4
IGND	P	Isolated ground
DO1	O	Digital output 1
DO2	O	Digital output 2
IGND	P	Isolated ground

Notes:

- 8. 12-position terminal block, 3.5 mm, Phoenix Contact 1843897.
- 9. Contact your local Eurotech technical representative for details about using this notification.
- 10. For details about the power states, see [Power Management States](#), page 22.

Table 11. Inputs and Outputs

Power and Power Management

Power Supply

To support a variety of usage scenarios, the ReliaGATE 50-21 accepts a wide input power range and includes transient protection. For electrical specifications, see [Power Supply](#), page 47.

Power is supplied to the system on a 2-pin power header located on the rear panel. The following table describes the pin assignment of the DC power input.

Pin	Name	Type	Description
1	GND	P	Ground
2	VIN	PI	Power input

Note:

- 2-pin header, 3.5 mm, Phoenix Contact 1937318. Use mating connector 2-pin plug, Phoenix Contact 1847055.

Table 12. Power Header Pin Assignment

Power Management States

The following table describes the power management states supported by the ReliaGATE 50-21.

State	Description
Full Operation	All devices are operational with dynamic power management functions active.
Standby or Sleep	Most devices are powered down. DRAM is retained using low-power self-refresh. Wake events are active and enable a transition back to full operation.
Hibernation	All devices are powered down except the embedded controller which is active but in low-power mode. Operating system context is saved to non-volatile memory prior to powering down. Limited wake events are active. Resume to full operation is dependent on numerous system components.
Power down	All devices are powered down except the embedded controller which is active but in low-power mode. No operating system context is preserved. Limited wake events are active.

Table 13. Power Management States

Administrative Console

The ReliaGATE 50-21 runs the Wind River Linux 4.3 operating system. This section describes accessing the operating system for diagnostic and system maintenance purposes.

You can log into the administrative console using one of the following methods:

- Graphics console (VGA display and USB keyboard)
- Serial console (Serial 1)
- Remote login via Secure SHell (SSH)

The default username is “root” and the default account password is “IsiTech”. The password is case sensitive.

**Note:**

By default, the system will boot the Linux operating system to the GRUB menu displayed on the graphics console (VGA display/USB keyboard).

You can log in using the graphics console or using the serial console by choosing an option from the GRUB menu.

Log in using the Graphics Console

By default, the system will boot the Linux operating system to the GRUB menu displayed on the graphics console (VGA display/USB keyboard).

To log in using the graphic console, complete the following steps:

1. Connect a VGA display and USB keyboard to ReliaGATE 50-21.
2. Connect the 12 VDC power adapter to the DC power input, and then connect the adapter to AC power. The Power LED lights green when power is successfully connected.
3. The system boots to the GRUB menu on the VGA display. On the USB keyboard, press <Enter> to select the graphics console.
4. After the message `startall -force` is displayed, press <Enter> for the login prompt.
5. At the login prompt, enter the username and password.

Log in using the Serial Console

You can log in using the serial console by choosing an option from the GRUB menu.

To log in using the serial console, complete the following steps:

1. Connect a VGA display and USB keyboard to ReliaGATE 50-21.
2. Connect a null modem serial cable from your development PC to Serial 1 on the ReliaGATE 50-21.
3. Start a terminal emulation program such as Tera Term on your development PC. Configure the serial port connection for 115,200, 8 bits, 1 stop bit, no parity, and no flow control.
4. Connect the 12 VDC power adapter to the DC power input, and then connect the adapter to AC power. The Power LED lights green when power is successfully connected.
5. The system boots to the GRUB menu on the VGA display. On the USB keyboard, use the arrow key to select the serial console and then press <Enter>.
6. After the message `startall -force` is displayed, press <Enter> on your development PC for the login prompt.
7. At the login prompt, enter the username and password.

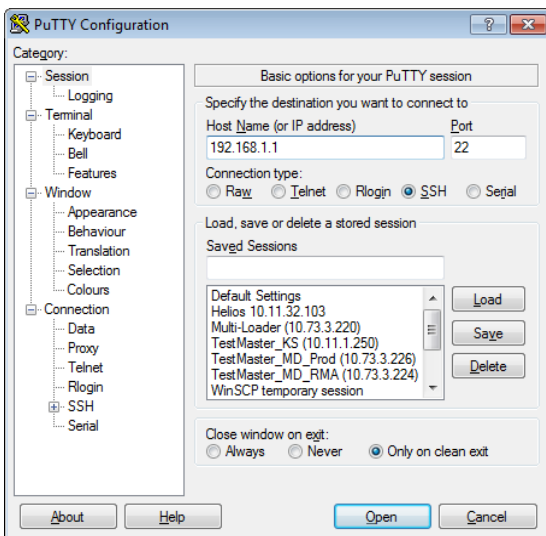
Remote Login

If you are logging into the ReliaGATE 50-21 over a network connection, you will need to use SSH (Secure SHell).

For systems running the Linux operating system, the `ssh` command is available as an SSH client.

For systems running the Windows operating system, the PuTTY program is available as a free SSH client. Download and install PuTTY (choose the Windows-based installer version) from <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>.

Once the PuTTY application is installed on your computer, run the PuTTY application and enter the IP address of your ReliaGATE 50-21. By default, Ethernet 0 is set to acquire its IP address automatically using DHCP. For instructions about determining the IP address, see [Connecting via Ethernet \(DCHP\)](#), page 25. Set the Connection type to SSH and the Port to 22. Click the Open button to connect.



The first time an SSH connection is made with PuTTY, a security warning is given as PuTTY tries to authenticate with the Denali routing application. Click No to continue. Then enter the username and password to log in.

Security Settings

Eurotech recommends that you change the Linux password after your initial setup.

To change your Linux password, complete the following steps:

1. Log in using the `root` account with the password `IsiTech`.
2. Change the 'root' password using the command `passwd`.
3. When prompted, enter a new 'root' account password.

Denali Routing Application

Denali is an application component of Eurotech's Everyware™ Software Framework (ESF), allowing configuration of a powerful network routing software platform. Eurotech's ESF and Denali software components provide a complete toolkit that is ready to use for a variety of communication and network applications.

Setup Web Page

To configure the Denali settings, you must access the Setup Web page by connecting to your ReliaGATE 50-21 via Wi-Fi or Ethernet. The following sections provide instructions for both methods.

**Note:**

If you change either the Ethernet or Wi-Fi configuration from the factory-default settings, you will subsequently need to use the new address rather than the default addresses given in the following sections.

Connecting via Ethernet

Ethernet 0 on the ReliaGATE 50-21 is typically set to acquire its IP address automatically using DHCP. Since the IP address is dynamically assigned, it must be determined before you can access the Denali Setup Web page.

To access Denali using an Ethernet connection to ReliaGATE 50-21, complete the following steps:

1. Connect the lower Ethernet port on the ReliaGATE 50-21 and your development PC to an Ethernet network with Internet access.
2. Connect the 12 VDC power adapter to the DC power input, and then connect the adapter to AC power. The Power LED lights green when power is successfully connected.
3. Log into the administrative console. For instructions, see [Administrative Console](#), page 23.
4. In the administrative console, type `ifconfig eth0`.
5. HTTPS is used for secure transfer of configuration data. On your PC, open a Web browser and enter `https://ip_address` where `ip_address` is the inet address displayed in step 4.
6. If the Denali Setup Web page loads successfully, you will see a security warning. Proceed to [Accessing the Setup Web Page](#), page 26.

Connecting via Wi-Fi

Wi-Fi on the ReliaGATE 50-21 is typically set to a fixed IP address. If your PC has Wi-Fi capability, you can use this fixed IP address to access the Denali Setup Web page.

To access Denali using a secure Wi-Fi connection to ReliaGATE 50-21, complete the following steps:

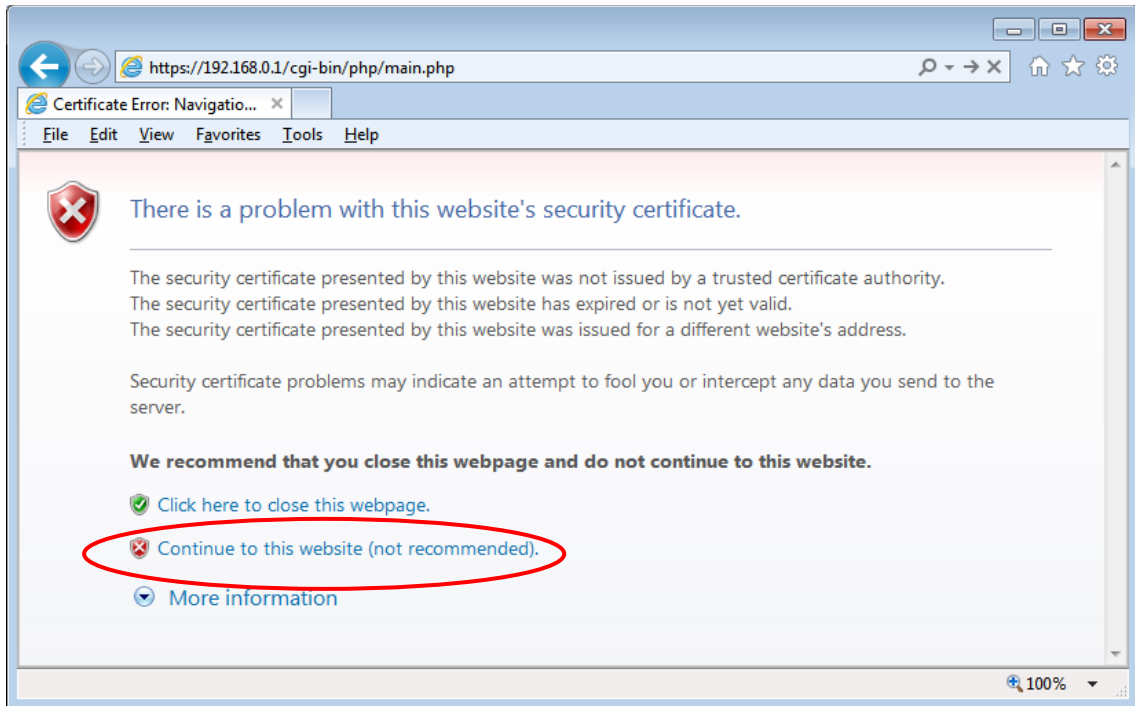
1. On your development PC, locate the list of available Wi-Fi access points (SSID) and find the SSID that matches the serial number located on the bottom of your ReliaGATE 50-21.
2. Disconnect your development PC from any existing Wi-Fi networks and connect to the access point identified in step 1. The security key is `eurotech`.
3. HTTPS is used for secure transfer of configuration data. On your PC, open a Web browser and enter `https://192.168.0.1`.
4. If the Denali Setup Web page loads successfully, you will see a security warning. Proceed to [Accessing the Setup Web Page](#), page 26.

Accessing the Setup Web Page

After you have connected to your ReliaGATE 50-21, complete the following steps to log into the Denali Setup Web page:

1. Proceed past the certificate warning.

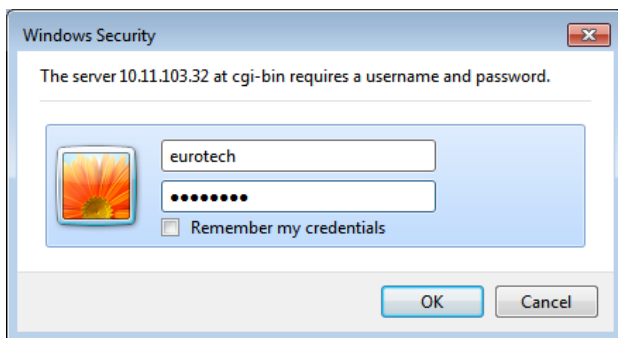
By default, the ReliaGATE 50-21 uses HTTPS for secure transfer of configuration data. The first Web page that you will see when accessing Denali using your Web browser is a security warning about a certificate. To continue past the security warning in Internet Explorer, click on the message Continue to this website.



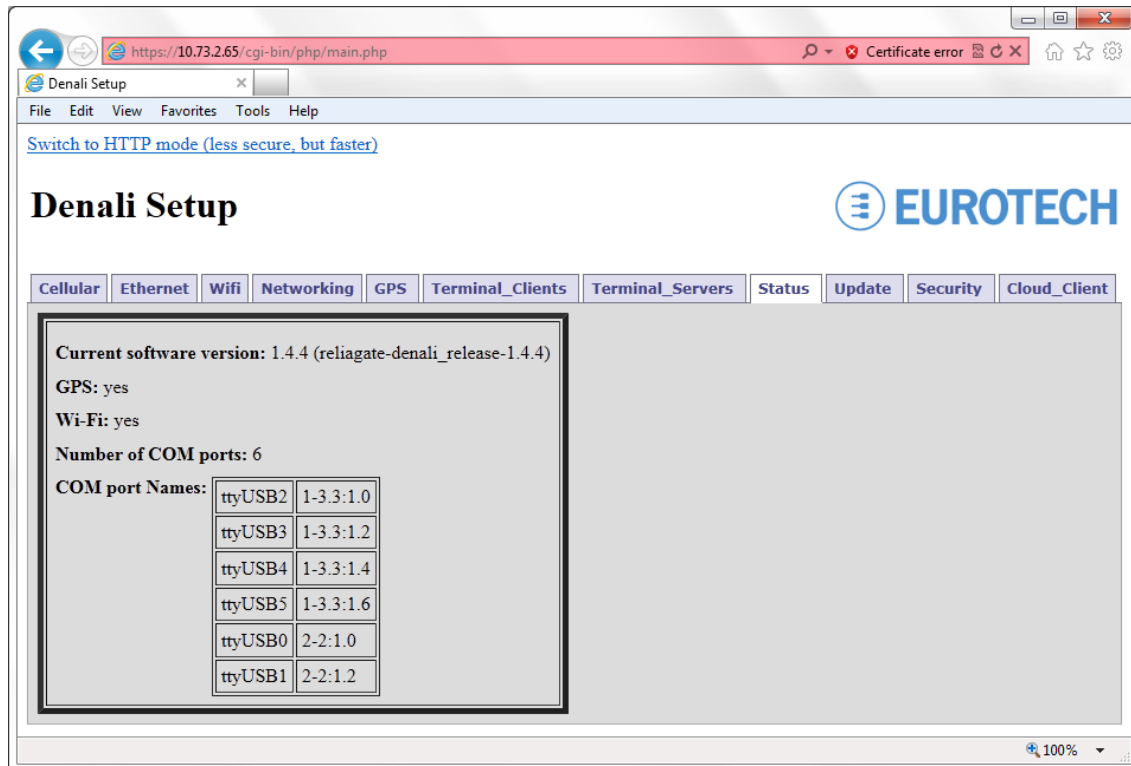
If using Mozilla Firefox, click Add Exception. If using Google Chrome, click Proceed Anyway.

2. Log into Denali.

Enter your login details when prompted. The default username is `eurotech` and default password is `eurotech`.



After logging in, the Denali Setup Web page is displayed. The following screen capture is given as an example. Your Setup Web page may display a different software version.



Security Settings

Eurotech recommends that you change the Denali password after your initial setup.

To change the Denali password on your ReliaGATE 50-21, complete the following steps:

1. Log into the Denali Setup Web page.
2. Click on the Security tab.
3. Enter the current username and password. The default username and password are `eurotech`.
4. Enter the new username and password.
5. Click the Change Web Password button to change the password.

Additional Configuration Settings

The Denali Setup Web page is comprised of a series of tabs allowing configuration of a variety of features. This User Manual provides instructions about configuring the network settings of your ReliaGATE 50-21 in [Network Configuration](#), page 28.

For details on configuring the remaining features on your ReliaGATE 50-21, refer to the *Denali User Manual* at http://support.eurotech-inc.com/forums/topic.asp?topic_id=3040.

Network Configuration

Your ReliaGATE 50-21 runs the Denali routing application software allowing configuration for the following networks:

- Ethernet via fixed IP address or DHCP
- Wi-Fi (IEEE 802.11) via fixed IP address or DHCP
- Cellular via the modem option installed

To connect to your available network, you must configure your ReliaGATE 50-21 network settings in the Denali Setup Web page. For detailed instructions about accessing the Setup Web page, see [Denali Routing Application](#), page 25.

The following sections provide instructions for Ethernet, Wi-Fi, and cellular network connections.



Note:
Changes made to the Ethernet, Wi-Fi, and cellular configuration pages take effect immediately after submitting changes, without requiring a reboot.

For more details on configuring the ReliaGATE 50-21, refer to the *Denali User Manual* at http://support.eurotech-inc.com/forums/topic.asp?topic_id=3040.

Understanding Network Interfaces

The ReliaGATE 50-21 contains four possible network connections or ‘interfaces’. The operating system assigns each interface a name. The last character of each interface name is a number, 0 (zero) or 1, as listed in the following table.

Name	Interface Description
eth0	Ethernet port 0
eth1	Ethernet port 1
ppp0	Cellular network (for all cellular technologies and providers)
wlan0	IEEE 802.11 network

Table 14. Network Interfaces

Ethernet

If your ReliaGATE 50-21 is connecting to an Ethernet network, click on the Ethernet tab in the Denali Setup Web page. ReliaGATE 50-21 can be configured for DHCP client (address assigned by an existing network), fixed IP (you will need to know the correct address settings to use on your network), or DHCP server (assigns an address to computers that request it).

Ethernet – DHCP Client

To configure Ethernet for DHCP client, set the Enable Eth_x to Yes, where x is 0 (Ethernet port 0) or 1 (Ethernet port 1). Set the Use Dhcp? option to Yes, and then click Submit New Configuration.

The screenshot shows a configuration interface with several tabs: Cellular, Ethernet, Wifi, Networking, GPS, Terminal_Clients, Terminal_Servers, Status, Update, Security, and Cloud_Client. The 'Ethernet' tab is selected. Below the tabs, there are three configuration options:

- Enable Eth0 (Onboard Ethernet device)? Yes No
- Use Dhcp? Yes No
- Enable Eth1 (Onboard Ethernet device)? Yes No

At the bottom of the configuration area is a button labeled 'Submit New Configuration'.

After submitting this configuration, connect the ReliaGATE 50-21 to an existing Local Area Network (LAN) Ethernet port.



Note:

If you are currently configuring the ReliaGATE 50-21 over Ethernet with a fixed IP address, this option will cause you to lose access to the ReliaGATE 50-21. Before submitting this change to Ethernet settings, make sure you can determine the address that is dynamically assigned either using the VGA display and keyboard or the Wi-Fi access point on the ReliaGATE 50-21.

Ethernet – Fixed IP

If your ReliaGATE 50-21 must use a fixed IP address, you will need to know the correct IP address, subnet mask, default gateway, and DNS server on your network. If you do not have this information, consult a network administrator.

To configure Ethernet for fixed IP, set the Enable Eth_x to Yes, where _x is 0 (Ethernet 0) or 1 (Ethernet 1). Set the Use Dhcp? option to No and the Run Dhcp Server? option to No. Enter the IP address information in the appropriate fields, and click Submit New Configuration.

The following table lists the Network Interface fields available.

Field	Description
IP Address	Enter the specific numeric address for ReliaGATE 50-21. Each of the four fields must be a number between 1 and 255.
Subnet Mask	Enter the subnet mask for this Ethernet network. Each of the four fields must be a number between 0 and 255.
Default Gateway	Enter the numeric address of the default gateway for this network, if this interface should be used as the default route. Each of the four fields must be a number between 1 and 255. If this interface is not the default route, leave the <i>Default Gateway</i> blank.
Preferred DNS Server	Enter the primary DNS server address. Each of the four fields must be a number between 1 and 255. If DNS is not needed or the server is unavailable, the DNS address may be left blank.
Alternate DNS Server	Enter the secondary DNS server address. Each of the four fields must be a number between 1 and 255. If DNS is not needed or a secondary DNS server is unavailable, the DNS address may be left blank.

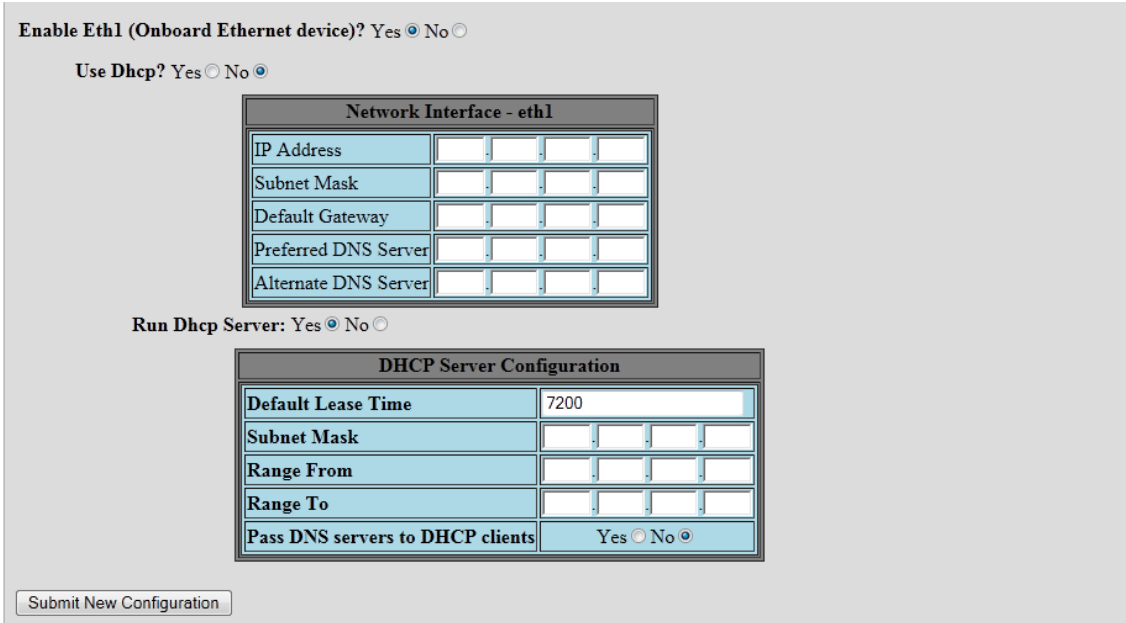
Table 15. Network Interfaces

After submitting this configuration, connect the ReliaGATE 50-21 to an existing Local Area Network (LAN) Ethernet port.

Ethernet – DHCP Server

As a DHCP server, your ReliaGATE 50-21 will respond to any client device on the network that requests an IP address. Denali will assign the device an address in accordance with the list of addresses specified in its Web configuration. The client device will use the system’s network address as its Default Gateway. Generally, this setting should not be used if there is another DHCP server already on the same network.

To configure Ethernet for DHCP server, set the Enable Eth_x to Yes, where _x is 0 (Ethernet 0) or 1 (Ethernet 1). Set the Use Dhcp? option to No and the Run Dhcp Server? option to Yes. Enter the Default Lease Time, Subnet Mask, and Range information in the appropriate fields, and click Submit New Configuration.



Enable Eth1 (Onboard Ethernet device)? Yes No

Use Dhcp? Yes No

Network Interface - eth1	
IP Address	<input type="text"/>
Subnet Mask	<input type="text"/>
Default Gateway	<input type="text"/>
Preferred DNS Server	<input type="text"/>
Alternate DNS Server	<input type="text"/>

Run Dhcp Server: Yes No

DHCP Server Configuration	
Default Lease Time	7200
Subnet Mask	<input type="text"/>
Range From	<input type="text"/>
Range To	<input type="text"/>
Pass DNS servers to DHCP clients	Yes <input type="radio"/> No <input checked="" type="radio"/>

The following table lists the DHCP Server Configuration fields and options available.

Field/Option	Description
Default Lease Time	Enter the default lease time (in seconds) for the assigned DHCP lease to expire. The default time is the time assigned if the client does not request a specific lease time.
Subnet Mask	Enter the subnet mask defining the range of network addresses to be assigned by this DHCP server. Each of the four fields must be a number between 0 and 255.
Range From	Enter the numeric address of the lowest DHCP address to be assigned by this DHCP server. Each of the four fields must be a number between 1 and 254.
Range To	Enter the numeric address of the highest DHCP address to be assigned by this DHCP server. Each of the four fields must be a number between 1 and 254, greater than the Range From.
Pass DNS servers to DHCP clients	Set this option to Yes if the ReliaGATE 50-21 should act as a DNS proxy server on the network. The ReliaGATE 50-21 will pass requests to whatever DNS server is assigned on its default route, and will pass the responses back to the requesting client.

Table 16. DHCP Server Configuration

After submitting this configuration, connect the ReliaGATE 50-21 to an existing Local Area Network (LAN) Ethernet port.

**Note:**

If the *Run Dhcp Server* option is set to *Yes*, then UDP port 67 must be included in the *Open Ports* section of the *Networking* page.

If *Pass DNS servers to DHCP clients* is set to *Yes*, UDP port 53 must be included in *Open Ports* section of the *Networking* page.

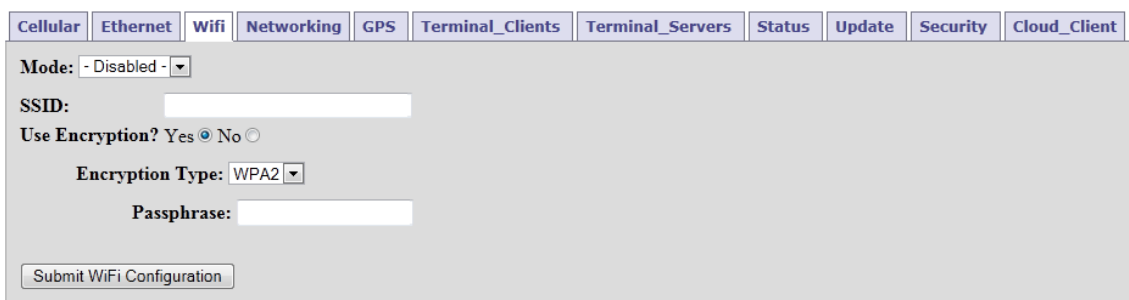
Wi-Fi (IEEE 802.11)

If your ReliaGATE 50-21 is connecting to a Wi-Fi (IEEE 802.11) network, click on the Wi-Fi tab in the Denali Setup Web page. Depending on the choice of *Mode* for Wi-Fi operation, ReliaGATE 50-21 can be configured for DHCP client (address assigned by an existing network), fixed IP (you will need to know the correct address settings to use on your network), or DHCP server (assigns an address to computers that request it) as shown in the following table.

Mode	DHCP/Fixed IP	Run DHCP Server
Ad-hoc	Selectable	Selectable, fixed IP only
Managed	Selectable	Not an option
Master	Fixed IP only	Selectable

Table 17. Wi-Fi Modes of Operation

In all cases, you will need to know the access point name (SSID) of your existing network and its encryption type (WEP, WPA, or none).



The following table lists the fields and options to enable the IEEE 802.11 network connection.

Field/Option	Description
Mode	Select the mode of operation of the IEEE 802.11 network connection. Options are: ad-hoc: Network composed of only one group of wireless devices and without an Access Point. managed: ReliaGATE 50-21 connects to an IEEE 802.11 Access Point on a network. master: ReliaGATE 50-21 is the synchronization master, acting as an Access Point. Disabled: IEEE 802.11 network connection is disabled.
SSID	Enter the network name (domain ID) which is to be used for this wireless network. Enter an SSID of any (case-sensitive) to allow roaming in managed or ad-hoc modes.
Use Encryption?	Select whether to use wireless encryption of data sent through this wireless network. It is strongly recommended to use encryption, unless the application does not support it.
Encryption Type	If Use Encryption? is selected above, select the Encryption Type. Options are: WEP (Wired Equivalent Privacy), WPA (Wi-Fi Protected Access), and WPA2. WPA2 uses the more secure AES encryption standard. Ad-hoc mode supports WEP only.
Key/Passphrase	If WEP is chosen for the Encryption Type, the Key must be entered. This is entered as either a 5-character alphanumeric or 10-character hexadecimal string (40-bit encryption), or a 13-character alphanumeric or 26-character hexadecimal value (104-bit encryption). The hexadecimal characters must be entered as numbers, or letters between A and F (upper or lowercase). If WPA or WPA2 is chosen for the Encryption Type, the Passphrase must be entered. This is an 8 to 63 character alphanumeric string or 64-character hexadecimal value (256-bit encryption).
Hardware Mode	If master mode is selected above, the default is 802.11g (up to 54 mbps).
Channel	If ad-hoc or master mode is selected above, the default is 1-2.412 GHz.

Table 18. Wi-Fi Configuration

**Note:**

If the ReliaGATE 50-21 has a Default Gateway on Ethernet (fixed or dynamic), it will use Ethernet as the default route to the Internet instead of Wi-Fi. If you want a different interface to be the default route, see [Setting Interface Priorities](#) on page 39.

Wi-Fi – DHCP Client

To configure Wi-Fi for DHCP client, set the Mode option to ad-hoc or managed and the Use Dhcp? option to Yes. Enter the SSID of your network's access point, choose the correct Encryption Type, and enter the Key/Passphrase (if any). Click Submit Wi-Fi Configuration.

Cellular Ethernet **Wifi** Networking GPS Terminal_Clients Terminal_Servers Status Update Security Cloud_Client

Mode: managed

Use Dhcp? Yes No

SSID:

Use Encryption? Yes No

Encryption Type: WPA2

Passphrase:

Submit WiFi Configuration

After submitting this configuration, the ReliaGATE 50-21 should automatically connect to the access point.

**Note:**

If you are currently configuring the ReliaGATE 50-21 over Wi-Fi, this option will cause you to lose access to the ReliaGATE 50-21. Before submitting this change to Wi-Fi settings, make sure you can determine the address that is dynamically assigned using the VGA display and keyboard or the Ethernet connection on the ReliaGATE 50-21.

Wi-Fi – Fixed IP

If your ReliaGATE 50-21 must use a fixed IP address, you will need to know the correct IP address, subnet mask, default gateway, and DNS server on your network. If you do not have this information, consult a network administrator.

To configure Wi-Fi for fixed IP, set the Mode option to ad-hoc, managed or master and the Use Dhcp? option to No. Enter the IP address information in the appropriate fields. Enter the SSID of your access point, the Encryption Type, and the Key/Passphrase (if any). Click Submit WiFi Configuration.

The following table lists the Network Interface fields available.

Field	Description
IP Address	Enter the specific numeric address for ReliaGATE 50-21. Each of the four fields must be a number between 1 and 255.
Subnet Mask	Enter the subnet mask for this Ethernet network. Each of the four fields must be a number between 0 and 255.
Default Gateway	Enter the numeric address of the default gateway for this network, if this interface should be used as the default route. Each of the four fields must be a number between 1 and 255. If this interface is not the default route, leave the Default Gateway blank.
Preferred DNS Server	Enter the primary DNS server address. Each of the four fields must be a number between 1 and 255. If DNS is not needed or the server is unavailable, the DNS address may be left blank.
Alternate DNS Server	Enter the secondary DNS server address. Each of the four fields must be a number between 1 and 255. If DNS is not needed or a secondary DNS server is unavailable, the DNS address may be left blank.

Table 19. Network Interfaces

After submitting this configuration, the ReliaGATE 50-21 should automatically connect to the access point.

Wi-Fi – DHCP Server

As a DHCP server, your ReliaGATE 50-21 will respond to any client device on the network that requests an IP address. Denali will assign the device an address in accordance with the list of addresses specified in its Web configuration. The client device will use the system’s network address as its Default Gateway. Generally, this setting should not be used if there is another DHCP server already on the same network.

To configure Wi-Fi for DHCP server, set the Mode option to ad-hoc or master, the Use Dhcp? option to No (if selectable), and the Run Dhcp Server? option to Yes. Enter the Default Lease Time, Subnet Mask, and Range information in the appropriate fields, and click Submit WiFi Configuration.

The following table lists the DHCP Server Configuration fields and options available.

Field/Option	Description
Default Lease Time	Enter the Default Lease Time (in seconds) for the assigned DHCP lease to expire. The default time is the time assigned if the client does not request a specific lease time.
Subnet Mask	Enter the Subnet Mask defining the range of network addresses to be assigned by this DHCP server. Each of the four fields must be a number between 0 and 255.
Range From	Enter the numeric address of the lowest DHCP address to be assigned by this DHCP server. Each of the four fields must be a number between 1 and 254.
Range To	Enter the numeric address of the highest DHCP address to be assigned by this DHCP server. Each of the four fields must be a number between 1 and 254, greater than the Range From.
Pass DNS servers to DHCP clients	Set this option to Yes if the ReliaGATE 50-21 should act as a DNS proxy server on the network. The ReliaGATE 50-21 will pass requests to whatever DNS server is assigned on its default route, and will pass the responses back to the requesting client.

Table 20. DHCP Server Configuration

**Note:**

If the *Run Dhcp Server* option is set to *Yes*, then UDP port 67 must be included in the *Open Ports* section of the *Networking* page.

If *Pass DNS servers to DHCP clients* is set to *Yes*, UDP port 53 must be included in the *Open Ports* section of the *Networking* page.

Security Settings

When using master or ad-hoc mode, Eurotech recommends that you change the default Wi-Fi security key/passphrase after your initial setup.

To change the Wi-Fi security key/pass phrase on your ReliaGATE 50-21, complete the following steps:

1. Log into the Denali Setup Web page.
2. Click on the Wi-Fi tab.
3. Enter the new Key/Passphrase.
4. Click the Submit Wi-Fi Configuration button to change the security key/passphrase.

Cellular

The cellular modem installed determines the cellular settings to be configured in the Denali Setup Web page. Typically, Eurotech configures the cellular settings prior to shipping the systems. The following sections are provided for reference purposes.



Note:

If the ReliaGATE 50-21 has a Default Gateway on Ethernet or Wi-Fi, it will use that network as the default route to the Internet instead of cellular. If you want a different interface to be the default route, see [Setting Interface Priorities](#) on page 39.

Cellular – UMTS/HSPA 3G GSM/GPRS

In the Cellular tab, your cellular modem should appear in the list. Select the Enabled checkbox. Enter a zero for Interface, a text string for Modem Identifier, the APN, and Authentication Type. When complete, click Submit Modem Configuration.

The following table lists the fields and options available for a UMTS/HSPA 3G GSM/GPRS network.

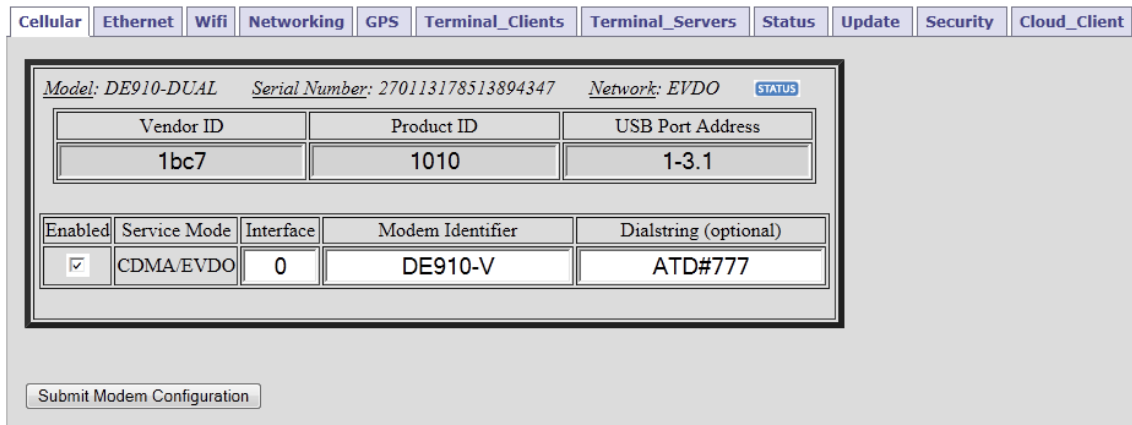
Field/Option	Description
Enabled	Check this box to enable the modem to be used for a PPP network session. This box is unchecked by default.
Interface	A zero indicates that there is one cellular modem installed. This number also becomes part of the internal network name (e.g. ppp0).
Modem Identifier	This is a required text string to uniquely identify each modem in the configuration. It may be used, for instance, to identify which cellular carrier is used (Sprint, AT&T, etc.). The following characters may not be used: & ` `) " / and \.
Dialstring	This field sets the modem dial string that is used when Denali initiates its connection to the PPP network. Denali supplies the default dialstring of AT*99***1#.
APN	Enter the APN (Access Point Name) of the cellular provider's data connection. The cellular provider supplies the APN.
Auth Type	Enter the Authentication type used by the cellular provider. Available types are: None, Pap, and Chap. If set to Pap or Chap, enter the Username and Password required to log onto the APN of the cellular provider.

Table 21. UMTS/HSPA 3G GSM/GPRS Configuration

After submitting the configuration, the ReliaGATE 50-21 should connect to the Internet using the cellular modem.

Cellular – CDMA/EvDO

In the Cellular tab, your cellular modem should appear in the list. Select the Enabled checkbox. Enter a zero for Interface and a text string for Modem Identifier. When complete, click Submit Modem Configuration.



The following table lists the fields and options available for a CDMA/EvDO network.

Field/Option	Description
Enabled	Check this box to enable the modem to be used for a PPP network session. This box is unchecked by default.
Interface	A zero indicates that there is one cellular modem installed. This number also becomes part of the internal network name (e.g. ppp0).
Modem Identifier	This is a required text string to uniquely identify each modem in the configuration. It may be used, for instance, to identify which cellular carrier is used (Sprint, AT&T, etc.). The following characters may not be used: ` `) " / and \
Dialstring	This field sets the modem dial string that is used when Denali initiates its connection to the PPP network. Denali supplies the default dialstring of AT#777.

Table 22. CDMA/EvDO Configuration

After submitting the configuration, the ReliaGATE 50-21 should connect to the Internet using the cellular modem.

Cellular – 2G GSM/GPRS

Contact Eurotech for details about 2G GSM/GPRS cellular.

Setting Interface Priorities

Depending on your network configuration, you may need to configure the Interface Priorities in Denali. The Interface Priorities setting ensures that the correct network is the default route to the Internet if more than one of your network interfaces contains a default gateway.

Click on the Networking tab in the Denali Setup Web page and then click the Set Interface Priorities button located at the bottom of the page.

The screenshot shows the Denali Setup Web page with the 'Networking' tab selected. Below the navigation tabs, there are several configuration options: 'Open Ports? Yes No ', 'Enable Port Forwarding? Yes No ', 'Enable NAT? Yes No ', and 'Time Synchronization' set to 'None'. The 'Set Interface Priorities' button is highlighted with a red circle.

The Interface Priorities window will be displayed. Determine the priorities for your network configuration and set the corresponding Priority field for each network interface. A lower number entered in the Priority field assigns the interface a higher priority as the primary route, assuming the interface is available and has a default gateway available. A zero entered in the field assigns the highest priority. If the interface with the lowest number is unavailable, the interface with the next higher number will be used as the default. For instance, if an Ethernet network has the lowest number, but its cable is disconnected or the interface does not have a default gateway, then the next higher numbered interface will be used. When complete, click Submit Interface Priorities.

The following screen capture is given as an example.

Interface	Description	Priority	Remove
eth0	Ethernet	100	Delete
ppp0	Point-to-Point	500	Delete
wlan0	WiFi	200	Delete

Submit Interface Priorities Close This Window

In this example, Ethernet is shown as having the highest priority, followed by Wi-Fi then cellular. The cellular modem (ppp0) is displayed in grey text with a Delete button because its interface is not currently available. For instance, the cellular modem was previously configured but has been removed from the system.

Using the administrative console, you can verify the default route of your ReliaGATE 50-21. At the system prompt, enter the following command:

```
route
```

Additional Networking Settings

Using the options provided in Networking tab, you can enable open ports, port forwarding, network address translation, and time synchronization. For a detailed description of each of these options, refer to the *Denali User Manual* at http://support.eurotech-inc.com/forums/topic.asp?topic_id=3040.

Everyware Cloud Configuration

The Everyware Cloud uses the MQTT publish/subscribe protocol to make connections from the end devices and other client systems to a cloud-based message broker. Your ReliaGATE 50-21 supports this protocol and can easily connect to the Everyware Cloud using your account credentials. To request an Everyware Cloud account, contact your regional Eurotech sales manager or email sales.us@eurotech.com. When your account is created, you will receive your account credentials in a registration email.

MQTT Cloud Client

To configure your ReliaGATE 50-21 to connect to the Everyware Cloud, you must access the Denali Setup Web page. For instructions, see [Denali Routing Application](#), page 25.

In the Denali Setup Web page, click on the Cloud_Client tab. Enter your account credentials in the Cloud_Client tab and then click Submit Cloud Client Configuration.

Username	Broker username (e.g. your_account_broker)
Password	Broker password
Account Name	Account name (e.g. your_account)
Device Display Name	"User-recognizable" name for your device. This name is used in the Everyware Cloud Console to identify your device. It is for display purposes only.
Broker URL	Broker URL

The following screen capture is shown as an example.

The screenshot shows a web interface with a navigation bar at the top containing tabs: Cellular, Ethernet, Wifi, Networking, GPS, Terminal_Clients, Terminal_Servers, Status, Update, Security, and Cloud_Client. The Cloud_Client tab is active. Below the navigation bar is a configuration form with the following fields:

- Username: [?] [text input]
- Password: [?] [password input]
- Account Name: [?] [text input]
- Device Display Name: [?] [text input]
- Broker URL: [?] [text input: mqtt://broker-sandbox.everyware-]
- Keep Alive: [?] [text input: 30]
- Reconnect Interval: [?] [text input: 5]
- Connection Lost Timeout: [?] [text input: -1]
- Master Client Enabled: [?] Yes No
- Master Client Autoconnect: [?] Yes No
- Clean Start: [?] Yes No

At the bottom of the form is a button labeled "Submit Cloud Client Configuration".

Cloud Account Security

Eurotech recommends that you change your Everyware Cloud account password after your initial setup.

To create a new Everyware Cloud password, change the Cloud_Client password in Denali on your ReliaGATE 50-21 and the Everyware Cloud broker password in your Everyware Cloud account using the Everyware Cloud Console.

To change your Everyware Cloud broker password, complete the steps described in the *Everyware Cloud Developer's Guide, Managing Account Settings* available at

<http://everywarecloud.eurotech.com/doc/ECDevGuide>.

Mechanical

The ReliaGATE 50-21 electronics are housed in a sturdy aluminium enclosure consisting of a base plate with mounting tabs and lid. This section provides mechanical details about the enclosure.

Enclosure

The following figure shows a top view of the enclosure.

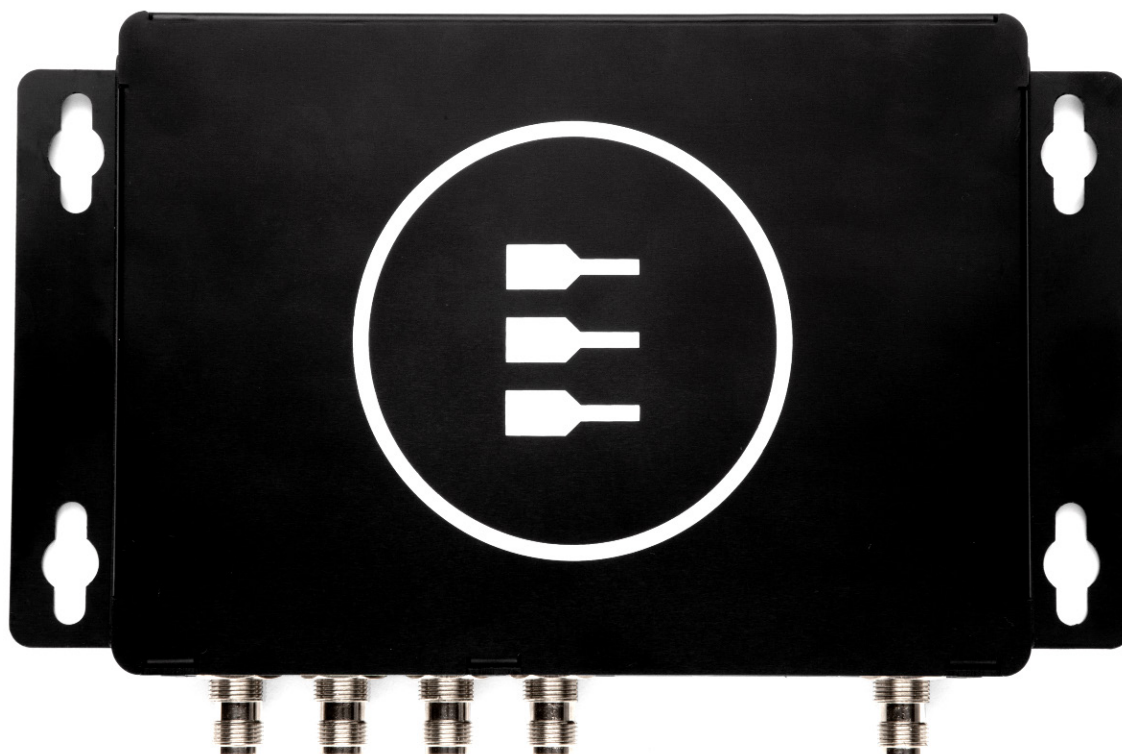


Figure 6. Enclosure, Top View

Mechanical Drawings

The following mechanical drawings specify the dimensions of the ReliaGATE 50-21 enclosure. All dimensions are in inches.

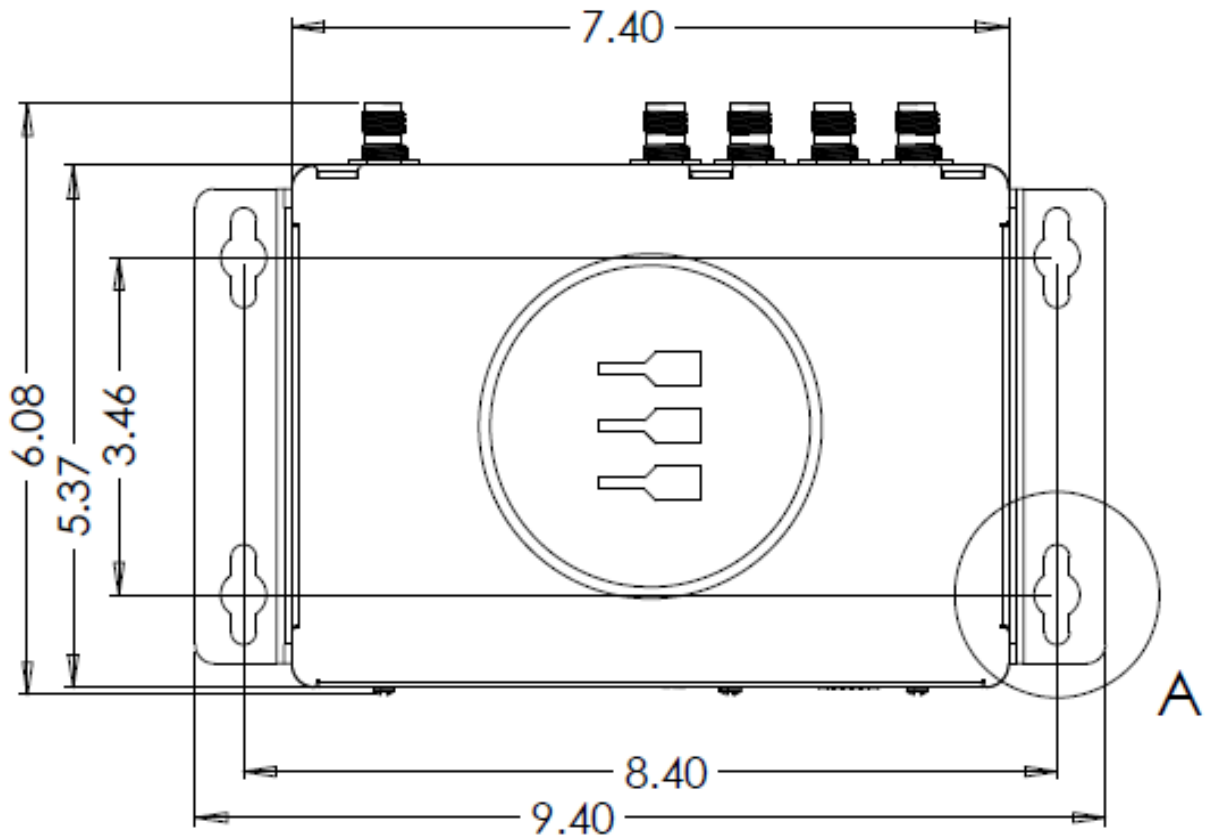


Figure 7. Mechanical Drawing, Top View

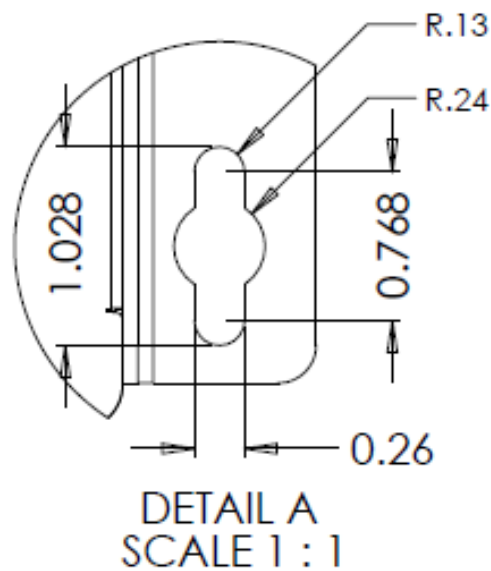


Figure 8. Mechanical Drawing, Detail A

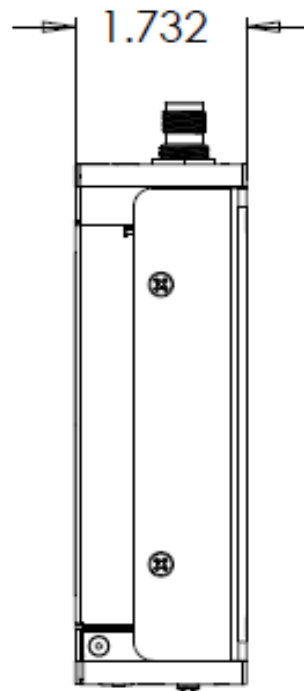


Figure 9. Mechanical Drawing, Side View

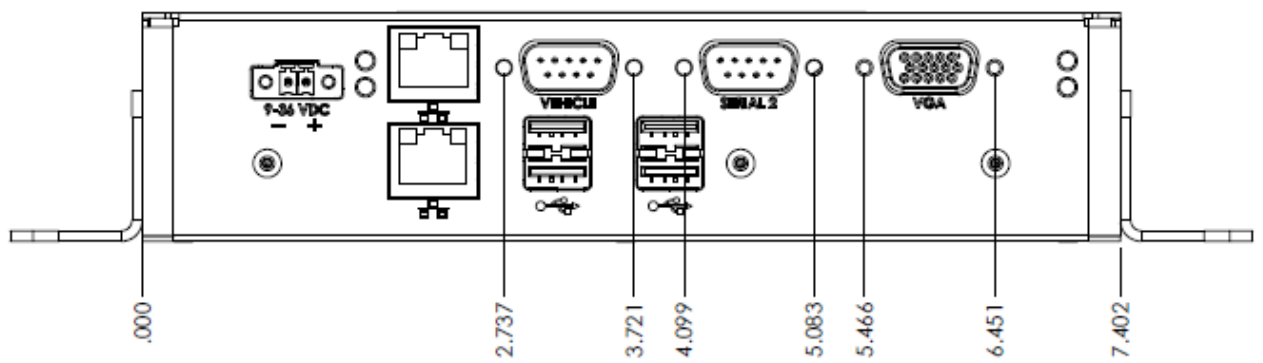


Figure 10. Mechanical Drawing, Rear Panel

Cables

Inter Connect Cables

USB cables from Host Board to Connector Board:

- Eurotech Inc 610126-9001x (where 'x' marks the revision)

RF Cables – u.FI to TNC:

- Lighthorse Technologies CB1.32D-IPX-TF3NT-8IN or equivalent

External Cables

For the following recommended cables and part numbers, please contact Technical Support (support.us@eurotech.com):

- Serial
- CANBus
- Ethernet
- Antennas

System Specification

Power Supply

The ReliaGATE 50-21 is designed to operate with the following power supply requirements.

Absolute Maximum Ratings

Supply Voltage (VIN) 36 V max

Symbol	Parameter	Min	Typ.	Max	Units
DC Power Input (VIN)					
V _{IN}	Supply voltage, regulated power	9	12	36	V

Table 23. Power Supply Specifications

Inputs and Outputs

Discrete inputs and outputs are designed to meet the following specifications.

Symbol	Parameter	Min	Typ.	Max	Units
Analog Inputs (A1-A2)					
V _{IN}	Analog input voltage	0		30	V
f _{CONV}	Conversion rate (note 12)	5.56		22.2	ksp/s
	A/D sample resolution		8		bit
IGN					
V _{IN}	Input voltage	0		13	V
Digital Inputs (D1-D4) (note 13)					
V _{IH}	High-level input voltage V _{CC} = 5 V	2		V _{CC}	V
V _{IL}	Low-level input voltage V _{CC} = 5 V	0		0.8	V
Digital Outputs (DO1-DO2) (note 13)					
V _{OH}	High-level output voltage I _{OH} = -4 mA, V _{CC} = 5 V	V _{CC} - 0.8			V
V _{OL}	Low-level output voltage I _{OL} = 4 mA, V _{CC} = 5 V			0.4	V

Notes:

- 12. Conversion rate is dependent on I²C clock rates.
- 13. Digital inputs and outputs are digitally isolated. Stuffing option for 3.3 V_{CC}, non-isolated I/O is available.

Table 24. Inputs and Outputs Specifications

Environmental

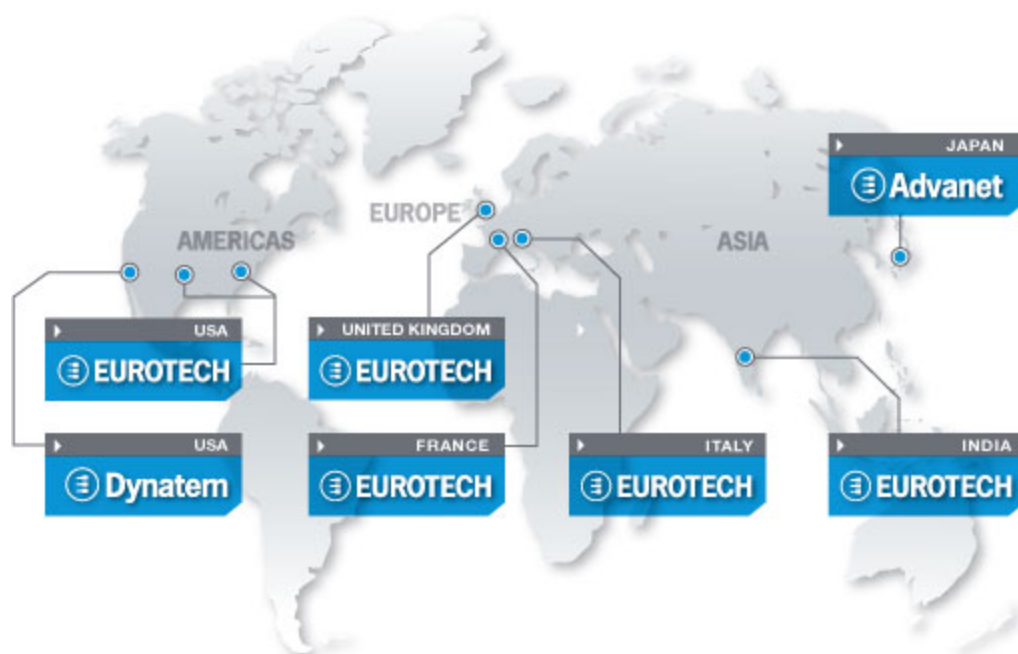
The Reliagate 50-21 is designed to meet the following environmental specifications.

Parameter	Specification
Operating temperature * Industrial Extended	-40°C to +85°C (local ambient) -20°C to +60°C (local ambient)
Storage temperature	-30°C to +80°C
Relative humidity, non-condensing	Up to 95% @ +45°C
Compliance	CE FCC, IC, 60950-1 MIL-STD-810, version F

Table 25. Environmental Specifications

- * This device has been UL Listed at 40° C, limited by power supply. UL Certification does not apply or extend to an ambient above 40° C and has not been evaluated by UL for ambient greater than 40° C.

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