USER MANUAL

ReliaGATE 15-10

Transportation IOT Gateway Development Kit

Rev 1 – November 7, 2014 – 110129-30001

Trademarks

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Document Revision History

REVISION	DESCRIPTION	DATE
1	Initial Release	November 2014

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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, is 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 handing 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.**
- **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.**

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

- Only start the product with a power supply that conforms to the voltage requirements as specified in Power Supply,. In case of uncertainty about the required power supply, please contact your local Eurotech Technical Support Team.
- Eurotech recommends a supply that has the following characteristics:
  - Safety - UL Listed, CE, CSA listed, LPS Output and Certified for 40°C
  - Electrical - 12VDC output, 5A output current, 60W power
  - This should be used with the 4-pin connector supplied with your system, with the following details:
    Pin 1 – Power Control
    Pin 2 – Positive VCC In
    Pin 3 – Ignition Switch
    Pin 4 - Ground
- 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 and Warranty Service

If you have any technical questions, cannot isolate a problem with your device, or have any inquiry about repair and returns policies, contact your local Eurotech Technical Support Team. For Warranty terms and conditions users should contact their local Eurotech Sales Office. These office locations are listed in the topic Eurotech World Presence.

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.

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 it 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 15-10 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 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 15-10 supports wireless applications including GPS, Wi-Fi, ReliaCELL for cellular, and IEEE 802.15.4/ZigBee® Standard and wired connectivity such as USB 2.0, 10/100Mbit Ethernet, serial ports, CAN, analog inputs, digital I/O.

With the ReliaGATE 15-10, you can easily manage configuration and deliver out-of-the-box connectivity for your M2M and network applications. The system is qualified by Intel in the “Intel® Gateway Solutions for the Internet of Things Software” and comes complete with an Integrated, Pre-Validated, Complete Solution including:

- Intel® Quark™ SoC X1020D
- Wind River Linux 5.0
- Wind River* Intelligent Device Platform XT 2 — Speeds up designs with a proven development environment
- McAfee* Embedded Control — Maximizes security by dynamically managing whitelists.
- 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 figures show a full-feature ReliaGATE 15-10. Actual units may vary in appearance depending on the selected options.

Figure 1. ReliaGATE 15-10 Front View

Figure 2. ReliaGATE 15-10 Rear View

Disclaimer:
This equipment generates and can radiate radio frequency energy and may cause harmful interference to radio communications. If this equipment does 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® Quark SoC X1021D, 400Mhz

Memory

- RAM - Single Bank – Memory Down, 512MB, 800 MT/s
- MicroSD – Card; Size based on configuration/options

Communications

- 1 Optional Wi-Fi – IEEE 802.11 a/b/g/n
- 1 Optional Cellular Radio Via ReliaCELL
- 2 USB 2.0 host ports on the rear panel, 1 host port on the front panel (will support ReliaCELL)
- 1 USB 2.0 Client on the rear
- 2 10Mbit/100Mbit Ethernet ports
- 1 D25 Male Serial connector that can be configured as follows:
  - Port 1 – EIA 232 and Port 2 EIA 232
  - Port 1 - EIA 485 and Port 2 EIA 232
  - Port 1 – EIA 232 and Port 2 EIA 485 (Standard)
  - Port 1 – EIA 485 and Port 2 EIA485

- 1 EIA 232 Transmit/Receive only, supports default boot console
- 1 high speed (default) and one low speed (optional) CAN 2.0 buses
- Available with 2 GPS Options
    - The Ublox NEO-6T (Integrated)
    - The Eurotech ReliaCELL external module
- Optional BLUETOOTH 4
- Optional Zigbee

Inputs and Outputs

- 3 10 Bit analog inputs
- 3 digital inputs/outputs
- 1 single channel Microphone Input
- 1 single channel Line Out

Accelerometer

- 3 axis linear accelerometer
- Dynamically user selectable full scales of ±2g/±4g/±8g and it is capable of measuring accelerations with output data rates from 0.5 Hz to 1 kHz

Software

- Wind River Linux 5.0 Operating System
- Wind River* Intelligent Device Platform XT 2
- McAfee* Embedded Control
- Everyware™ Software Framework option
- Supports Everyware™ Device Cloud

Power Supply

- 6 to 36 VDC (Nominal 12)
- Vehicle ignition input
- Programmable Power Control input
- Low power modes of operation
- Optional Coin Cell Battery for RTC back-up

Power Consumption

- 6.5W Typical

Mechanical

- 5.4” x 3.8” x 1.8” (L x W x H)
- Mounting option

Environmental

- Industrial temperature option (-40°C to 85°C)

Product Configurations

Sub-System	Development Kit	Standard Configuration	Standard Configuration "Entry"	Comments
Cell Modem Audio				Future option
Accelerometer	✓	✓	Option	Factory build option for Entry
Multi-path Audio	Option	Option	Option	Factory build option
Basic Audio	✓	✓		
CAN Bus 1x High speed, 1x Low Speed	✓	✓	Option	Factory build option for Entry
1GB DRAM	Option	Option	Option	Future option
512MB DRAM	✓	✓	✓	
1x RS-232 Tx/Rx only	✓	✓	✓	
Serial EIA-485, configurable 232	✓	✓	✓	
3x Digital GPIO and 3x Analog input	✓	✓	✓	
10/100 LAN	✓ 2x	✓ 2X	✓ 1X	
Quark SoC, secure boot, ECC, 400Mhz	✓	✓	✓	
4GB eMMC on-board flash boot media	✓	✓	✓	Future Option
8GB eMMC on-board flash boot media	Option	Option	Option	Factory Build Option
WiFi + BT (+Zigbee when available)	✓	✓	Standard Option	Standard Option denotes minimum order required with defined lead times
Cell Modem w/GPS	ReliaCELL	ReliaCELL	ReliaCELL	
Ublox GPS NEO family	Standard Option	Standard Option	Standard Option	Standard Option denotes minimum order required with defined lead times
Zigbee				Will become available in the future
Enclosure w/hardware + Cover	✓	✓	✓	Plastic Lid will be available in the future
Antenna's, AC/DC adapter, packaging, Breakout Cables set for Serial ports and CAN Bus	✓			Antennas, AC/DC adapter, packaging. Also includes breakout cables for development use.
RTC battery	✓	Option	Option	
Micro SD - 4GB or larger	✓	✓	✓	
TPM - Trusted Platform Management	Option	Option	Option	Factory build option

Software

The ReliaGATE 15-10 runs a version of Wind River Linux 5.0 created via the Wind River Intelligent Device Platform 2.0, which is a scalable, sustainable, and secure development environment that simplifies the development, integration, and deployment of IoT gateways. . The platform contains security features, smart and connected capabilities that enable rich network options, and validated and flexible device management software. Wind River Intelligent Device Platform includes ready-to-use components built exclusively for M2M applications.

Key Features

- Gateway Security
- The Intelligent Device Platform delivers built in configurable and customizable security features designed to secure the communication channel, the data and the end device.
- Application Enablement
- Lua, JAVA, and OSGi application environments enable portable, scalable, and reusable application building on resource-constrained to full-featured devices
- Device Connectivity
- Embraces IoT protocol MQTT for data transportation and native support for WiFi, Bluetooth, Zigbee, short range wireless protocols widely used in IoT devices.
- Remote Device Management
- Well established management protocols such as TR-069 and OMA-DM

Related Documents

This manual describes the ReliaGATE 15-10 at the system level and is intended for installers, software developers, and system integrators. The following documents are also important resources for the ReliaGATE 15-10.

Document	Available at
Wind River 5.0 Linux	http://www.windriver.com/products/linux.html http://www.windriver.com/support/
Wind River* Intelligent Device Platform XT 2	http://www.windriver.com/products/platforms/intelligent-device/ http://www.windriver.com/support/
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

Interfaces

This section gives an overview of the hardware features of the ReliaGATE 15-10 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 15-10 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.

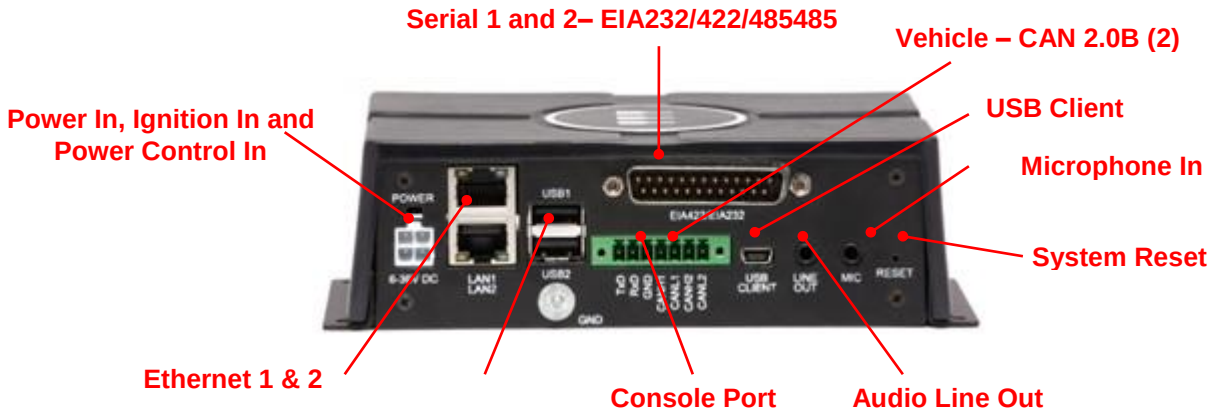


Figure 3. Communication Interfaces – Rear Panel

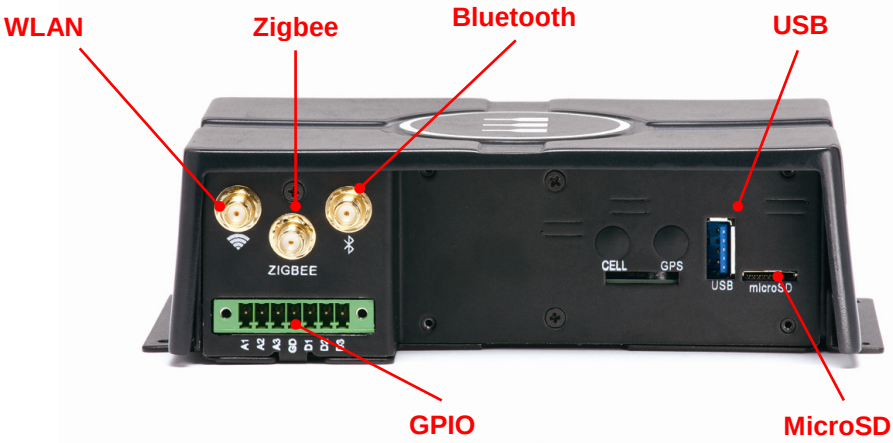


Figure 4. Communication Interfaces – Front Panel

GPS

The ReliaGATE 15-10 includes an integrated GPS receiver and external antenna connection supporting localization and allowing users to geographically reference the data sent over a network. In addition the ReliaCELL optional GPS Module t attaches to the ReliaGATE 15-10.

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

See the Specifications section for the full specifications on these features

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 15-10 includes an internal PCIe to Wi-Fi adapter an external antenna connection.

Wi-Fi is available via an external Wi-Fi antenna with a typical frequency of 2.4 GHz operation.

Cellular Option

Cellular service is currently provided by the Eurotech ReliaCELL. The ReliaCELL is a fully-certified cellular modem built for rugged applications. Its weatherproof enclosure can be mounted to existing installations to add cellular and GPS connectivity to any system that supports a USB host connection.

The ReliaCELL provides the following features:

CELLULAR

Global support for the following cellular technologies:

- 2G GSM
- 2.5G 1x RTT
- 3G HSDPA/UMTS/EVDO Rev A

Ready to Deploy: certified and carrier approved

Ruggedized: for commercial and industrial applications

POSITIONING

Monitors positioning satellites from two systems:

- GPS (US)
- Glonass (Russia)

ANTENNAS

- Cellular 2 SMA (main and Diversity, if available)
- FCC/IC/CE
- SAE J1455
- UL
- TELEC

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.

USB

The ReliaGATE 15-10 provides 3 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 3 USB host ports are available via one USB Type A dual receptacle located on the rear panel and a single USB Type A receptacle on the front panel. (Used for the ReliCELL Module).

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

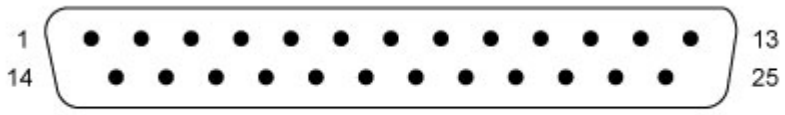
Ethernet

For wired network connectivity, the ReliaGATE 15-10 provides two 10/100 Mbit Ethernet ports.

The two ports are available on a standard dual RJ-45 socket 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.

Serial Ports

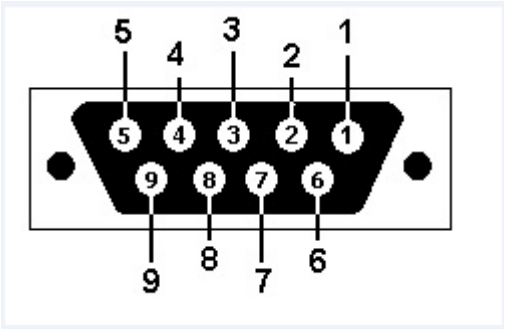
The ReliaGATE 15-10 provides two external serial ports for wired connectivity to field equipment. Both ports are provided via a single DB25 male connector. A breakout cable is provided with the development kit that provides a RS232 port via a DB9 connector and a RS285 port via a DB25 connector. The information below is for the standard configuration which is one RS232 and one RS485. Please contact customer support for other configurations.



DB-25P (Male Plug Front View)

Pin	EIA-232 Name	Type	Description (Default)	EIA-485 Name	Type	Description (Option)
1			Shield	Shield		
2	NC			NC		
3	RTS	O	Request to Send			
4	CTS	I	Clear to Send			
5	NC			NC		
6				DSR_P	I	Data Set Ready Positive
7				DTR_P	O	Data Terminal Ready Positive
8	NCNC			NC		
9				GND		Signal Return
10				RXP	I	Receive Data Positive
11				TxD_P	O	Transmitted Data Positive
12				RTS_N	O	Ready to Send Negative
13				CTS_N	I	Clear To Send Negative
14	NC			NC		
15	Shield					
16	TxD	O	Transmitted Data			
17	RxD	I	Received Data			
18				SER_A_485_DSR_N	I	Data Set Ready Negative
19				DTR_N	O	Data Terminal Ready Negative
20	GND		Signal Return			
21						
22				RxD_N	I	Receive Data Negative
23				_TxD_N	O	Transmit Data Negative
24				RTS_P	O	Ready to Send Positive
25				CTS_P	I	Clear To Send Positive

Table 2. DB25 on ReliaGATE 10-15 Serial Port Pin Assignment



DB 9 connector on end of breakout cable for both CAN Bus I/Os.

Pin	EIA-232 Name	Type	Description (Default)
1	Shield		
2	RxD	I	Received Data
3	TxD	O	Transmitted Data
4	NC		
5	Ground	Signal Return	
6	NC		
7	RTS	O	Ready to Send
8	CTS	I	Clear to Send
9	NC		

Table 3. RS232 DB9 on Breakout Cable Pin Assignment

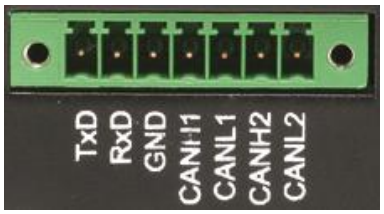
Pin	EIA-485 Name	Type	Description (Option)
1	Shield		
2	TxD_P	O	Transmit Data Positive
3	SER_A_485_ RxD_P	I	Receive Data Positive
4	RTS_P	O	Request to Send Positive
5	CTS_P	I	Clear to Send Positive
6	DSR_P	I	Data Set Ready Positive
7	Ground		Signal Ground
8	NC		
9	NC		
10	NC		
11	NC		
12	NC		
13	CTS_N	I	Clear to Send Negative
14	TxD_N	O	Transmit Data Negative
15	NC		
16	RxD_N	I	Receive Data Negative
17	NC		
18	NC		
19	RTS_N	O	Request to Send Negative
20	DTR_P	O	Data Terminal Ready Positive
21	NC		
22	DSR_N	I	Data Set Ready Negative
23	DTR_N	O	Data Terminal Ready Negative
24	NC		
25	NC		

Table 4. RS485 DB25 on Breakout Cable Pin Assignment

Console and Vehicle – CAN 2.0B

The ReliaGATE 15-10 supports a serial console output a high speed CAN (Controller Area Network) Bus and a Slow speed CAN Bus that are compliant with the CAN 2.0B specification.

All three interfaces are on the 7-position terminal block pictured below. The following table describes the pin assignment of this connector and the connectors available on the breakout cables included in the development kit.



Pin	Signal Name	Type	Description
1	Transmit Data	O	Console/Serial Data Transmit
2	Receive Data	I	Console Serial Data Receive
3	Ground/Shield		Signal Return
4	CANHi+	IO	High Speed CAN Bus Plus
5	CANHi-	IO	High Speed CAN Bus Minus
6	CANLo+	IO	Low Speed CAN Bus Plus
7	CANLo-	IO	Low Speed CAN Bus Minus

Table 5. Console and CAN 2.0 Bus Pin Assignment

Pin	Signal Name	Type	Description
1			
2	RxD	I	Console/Serial Data Received Data
3	TxD	O	Console/Serial Data Transmitted Data
4	NC		
5	Ground/Shield		Signal Return
6	NC		
7	NC		
8	NC		
9	NC		

Table 6. Console/Serial on DB9 Breakout Cable

Pin	Signal Name	Type	Description
1			
2	CANHi-	IO	High Speed CAN Bus Minus
3	Ground/Shield		Signal Return
4	NC		
5	NC		
6	NC		
7	CANHi+	IO	High Speed CAN Bus Plus
8	NC		
9	NC		

Table 7. Hi Speed CAN Bus 2 on DB9 Breakout Cable

Pin	Signal Name	Type	Description
1			
2	CANHi-	IO	High Speed CAN Bus Minus
3	Ground/Shield		Signal Return
4	NC		
5	NC		
6	NC		
7	CANLo+	IO	Low Speed CAN Bus Plus
8	NC		
9	NC		

Table 8. Low Speed CAN Bus 2 on DB9 Breakout Cable

Inputs and Outputs

A 7-position terminal block located on the Front panel provides access to three analog inputs and three general-purpose digital inputs/outputs. For electrical specifications, see

The following figure shows this terminal block.

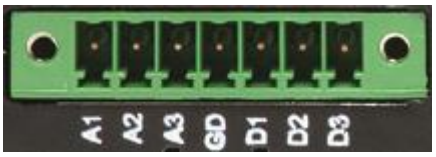


Figure 5. Input/Output Terminal Block

The following table defines these inputs and outputs.

Signal Name	Type	Description
A1	I	Analog input 1
A2	I	Analog input 2
A3	I	Analog input 3
GND	P	Ground
D1	I/O	Digital input/output 1
D2	I/O	Digital input/output 2
D3	I/O	Digital input/output 3

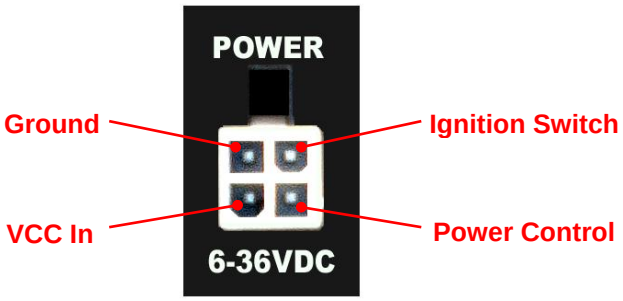
Table 9. Inputs and Outputs

Power and Power Management

Power Supply

To support a variety of usage scenarios, the ReliaGATE 15-10 accepts a wide input power range and includes transient protection. For electrical specifications, see Power Supply, page 27.

Power is supplied to the system on a 4-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	Power Control	I	Allows vehicle to control power. This input is defaulted to an active low signal to activate. The input when active causes an 'Event" to occur which trigger an number of actions to be taken by the system; from going into the Sleep State to running a script to be run.
2	VCC In	I	Power input
3	Ignition Switch	I	State of vehicle's ignition switch. This input is defaulted to an active low signal in order to active. The system powers up when the signal is active and powers down when the signal is inactive.
4	Ground	I	Signal Return

Note:

1. 4-pin header Molex 39-30-0040 .

Table 10. Power Connector Pin Assignment

Power Management States

The following table describes the power management states supported by the ReliaGATE 15-10.

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 11. Power Management States

Administrative Console

The ReliaGATE 15-10 runs the Wind River Linux 5.0 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:

- Serial console (Console Port)
- Remote login via Secure SHell (SSH)

The default username is "`root`" and the default account password is "`root`". The username and password is case sensitive.

Note:
By default, the system will boot the Wind River Linux operating system with the console input and output displayed on the Console Port serial connection.

Log in using the Serial Console

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

1. Connect a null modem serial cable from your development PC to Console Port on the ReliaGATE 15-10.
2. Start a terminal emulation program (such as Putty) on your development PC. Configure the serial port connection for 115,200 baud, 8 bits, 1 stop bit, no parity, and no flow control.
3. Connect the 12 VDC power adapter to the DC power input, and then connect the adapter to AC power.
4. The system boots to the OS.
5. At the login prompt, enter the username and password.

Remote Login

If you are logging into the ReliaGATE 15-10 over a network connection, you will need:

- to enable the SSH client on the ReliaGATE 15-10,
- the IP address of the ReliaGATE 15-10, and
- an SSH (Secure SHell) connection on your host computer (Linux or Windows).

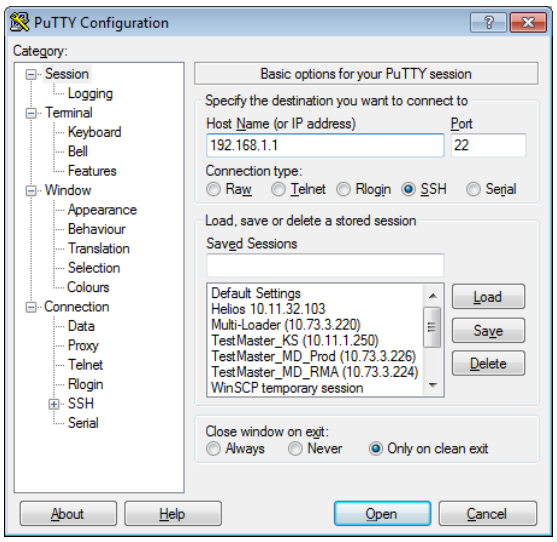
To enable the SSH client on the ReliaGATE 15-10, login using the Serial Console and type `/etc/init.d/sshd start`.

By default, only the LAN1 network connection is set to acquire its IP address automatically using DHCP. To obtain the IP address of the ReliaGATE 15-10, first ensure that the live network cable is connected to the LAN1 connector and while logged in using the Serial Console type `ipconfig eth0` which will display the IP address.

To create an SSH connection:

- 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 15-10 into the Putty dialog box and 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 SSH target. 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 `root`.
2. Change the 'root' password using the command `passwd`.
3. When prompted, enter a new 'root' account password.

Mechanical

The ReliaGATE 15-10 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.

Mechanical Drawings

The following mechanical drawings specify the dimensions of the ReliaGATE 15-10 enclosure. All dimensions are in inches.

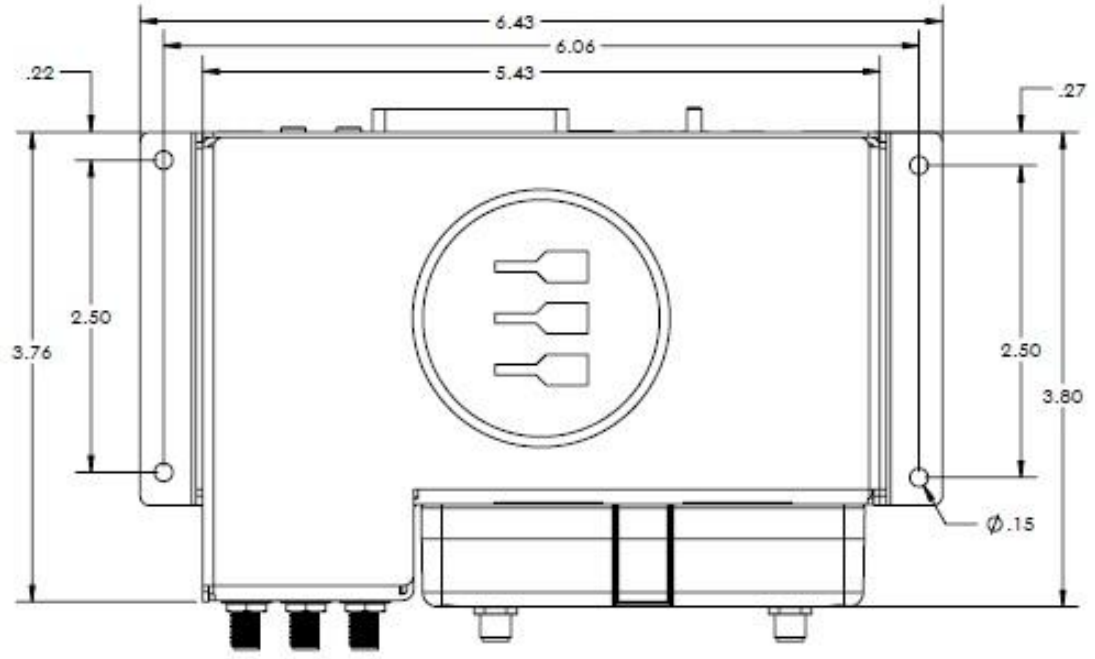


Figure 6. Mechanical Drawing, Top View

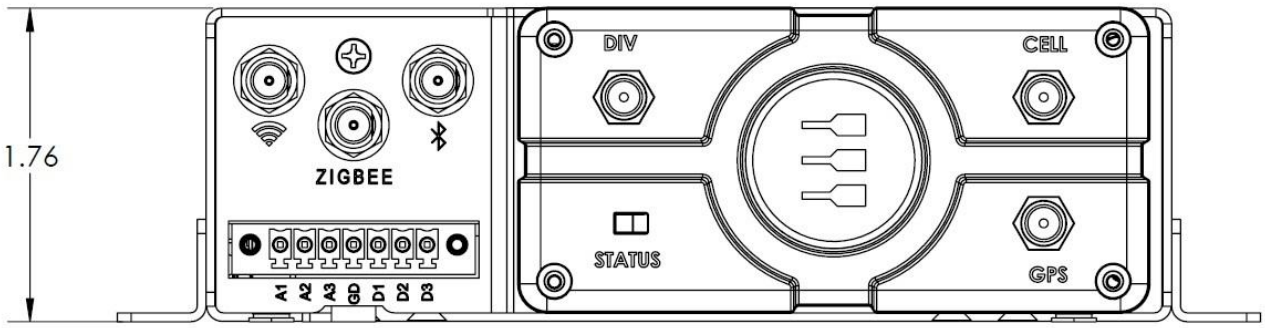


Figure 7. Mechanical Drawing, Front Panel;

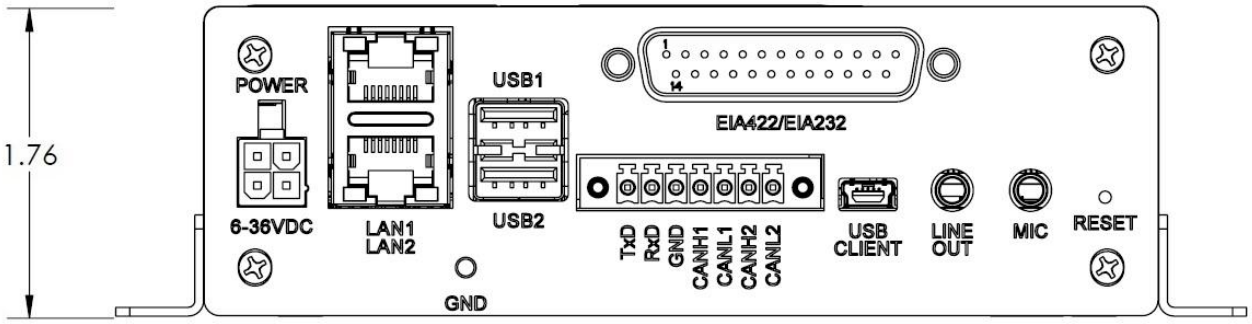


Figure 8. Mechanical Drawing, Rear Panel

System Specification

Power Supply

The ReliaGATE 15-10 is designed to operate with the following power supply requirements.

Absolute Maximum Ratings

Supply Voltage (VIN) 37V max
On any 3.3 volt pin 37V max

Symbol	Parameter	Min	Typ.	Max	Units
DC Power Input (VIN)					
V_{IN}	Supply voltage, regulated power	6	12	36	V

Table 12. Power Supply Specifications

GPS

Ublox NEO-6T (Embedded)

Parameter	Description
Receiver Type **Channels:** **Frequency:** **SBAS:**	 50 GPS L1, C/A Code SBAS , 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)**	 26 s 26 s 1 s 1 s
Sensitivity (demonstrated with a good active antenna) **Tracking & Navigation:** **Reacquisition: (for an outage duration ≤10 s)** **Cold Start (without aiding):** **Hot Start:**	 -162 dBm -160 dBm -148 dBm -157 dBm
Navigation **Update rate:**	 5 Hz
Horizontal position accuracy **(CEP, 50%, 24 hours static, -130dBm, SEP: <3.5m)** **GPS:** **SBAS** **SBAS + PPP7** **SBAS + PPP7**	 2.5 m 2.0 m < 1 m (2D, R50) < 2 m (3D, R50)
Configurable Timepulse	

Frequency range:	f = 0.25 HZ to 10 MHz
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
Operational Limits **Dynamics** **Altitude** **Velocity1**	 <4 g 50,000 m 500 m/s

RelaiCELL

Parameter	Description
Receiver Type **Channels:**	 Multiple
Time-To-First-Fix (all satellites at -130 dBm) **Cold Start (without aiding):** **Warm Start (without aiding):** **Hot Start (without aiding):**	 41 s 30 s 1.8 s
Sensitivity (demonstrated with a good active antenna) **Tracking & Navigation:** **Reacquisition: (for an outage duration ≤10 s)** **Cold Start (without aiding):** **Hot Start:**	 -166 dBm -160 dBm -147 dBm -161 dBm
Horizontal position accuracy **(CEP, 50%, 24 hours static, -130dBm, SEP: <3.5m)** **GPS:** **SBAS** **SBAS + PPP7** **SBAS + PPP7**	 3 m 2.0 m < 1 m (2D, R50) < 2 m (3D, R50)

WiFi

Feature	Description
IEEE WLAN Standard	IEEE 802.11 a/b/g/n
Features	Dual stream (2x2), Dual Band, WiFi Direct
Security **Authentication:** **Authentication Protocols:** **Encryption:**	 WPA and WPA2, 802.1X, EAP-SIM, EAP-AKA PAP, CHAP, TLS, GTC, MS-CHAP, MS-CHAPv2 64-bit and 128-bit WEP, AES-CCMP, TKIP

Ethernet

Feature	Description
Network Standard	IEEE 802.3/802.3u/802.3ab
Speeds	10/100 Mbps
Features	• Low power 3.3V, 0.18µm CMOS technology • Low power consumption < 270mW Typical • 3.3V MAC Interface • Auto-MDIX for 10/100 Mb/s • Energy Detection Mode
Supports	Auto-negotiation Auto MDI-X

Inputs and Outputs

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

Symbol	Parameter	Min	Typ.	Max	Units
Analog Inputs (A1-A3)					
V_{IN}	Analog input voltage	0		37	V
f_{CONV}	Conversion rate	5.56		22.2	ksps
	A/D sample resolution		10		bit
IGN					
V_{IN}	Input voltage	0		13	V
Digital Inputs/Outputs (D1-D3)					
V_{IH}	High-level input voltage V_{CC} = 3.3V	2		3.6	V
V_{IL}	Low-level input voltage V_{CC} = 3.3 V	0		0.8	V

Table 13. Inputs and Outputs Specifications

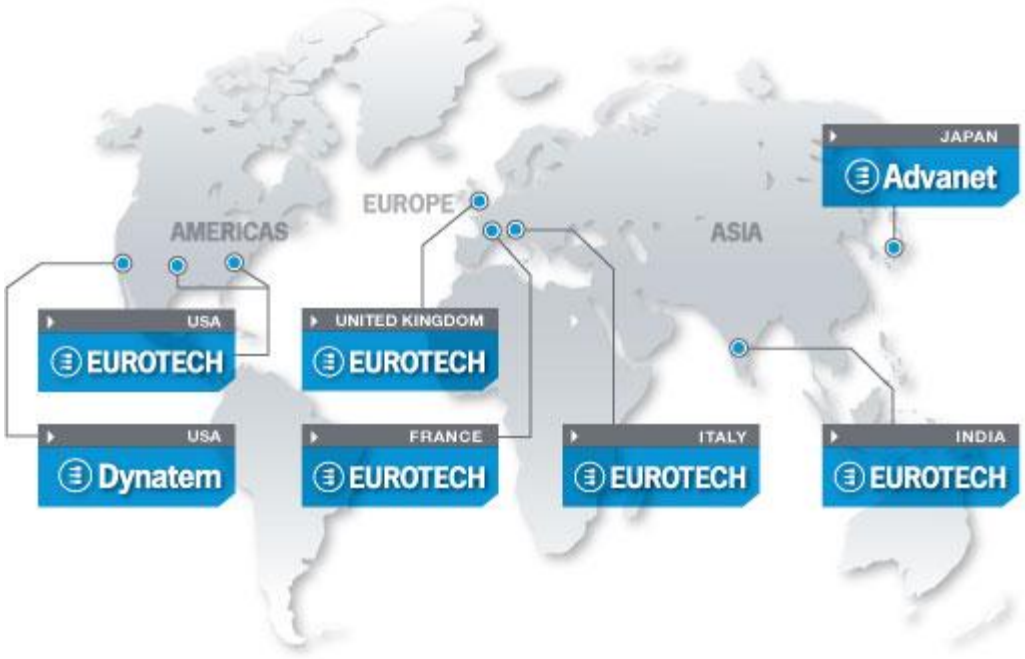
Environmental

The ReliaGATE 15-10 is designed to meet the following environmental specifications.

Parameter	Specification
Operating temperature * Industrial	-40°C to +85°C (local ambient) Note: This means the immediate environment in which the ReliaGATE 15-10 is installed must not exceed the temperature range regardless of the enclosure, surface mounting or other factors that may allow the case of the system to exceed those ranges.
Storage temperature	-50°C to +100°C
Relative humidity, non-condensing	Up to 95% @ +45°C
Compliance	FCC United States & Canada • Part 15 B & ICES-003 – Unintentional Radiators,, Conducted Emissions, Radiated Emissions CE Mark (Manufacturers Declaration of Conformity) • Transmitter Spurious Emissions (30 MHz - 12.75 GHz), Receiver Spurious Emissions (30 MHz - 12.75 GHz), Emissions - Conducted Emissions DC Power, Conducted Emissions AC Mains Harmonic Current Emissions, Voltage fluctuations and flicker, Telecommunication ports, Immunity - Radiated Immunity 80-270000 MHz, ESD, Fast Transients Common Mode, Conducted Immunity, Transients & Surges in the vehicular environment, Voltage Dips & Interruptions, SurgeS SAE J1455 • Mechanical Vibration (Cab Mounted Vibration, Class 8 Truck, Fig. 6-8) • MIL-STD-810F – Method 516.5 - Mechanical Shock, Procedure I, Functional Shock, Table 516.5-II, Figure 516.5-10 (Ground • Equipment, 40g*, 11ms, saw tooth) UL 60950-1 • Second Edition, with most current relevant amendmentS CSA C22.2 No. 60950-1 • Second Edition, with most current relevant amendments European Union EN 60950-1:2006 • Second Edition with Am 1

Table 14. Environmental Specifications

Eurotech Worldwide Presence



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