MULTITECH®

rCell 300 Series Router

MTR3-L4G2D Hardware Guide

rCell 300 Series Router Hardware Guide

Model: MTR3-L4G2D

Document Part Number: S000827 Rev. 1.0

Copyright

Trademarks

Legal Notices

The MultiTech products are not designed, manufactured, or intended for use, and should not be used, or sold or re-sold for use, in connection with applications requiring fail-safe performance or in applications where the failure of the products would reasonably be expected to result in personal injury or death, significant property damage, or serious physical or environmental damage. Examples of such use include life support machines or other life preserving medical devices or systems, air traffic control or aircraft navigation or communications systems, control equipment for nuclear facilities, or missile, nuclear, biological, or chemical weapons or other military applications ("Restricted Applications"). Use of the products in such Restricted Applications is at the user's sole risk and liability.

MULTITECH DOES NOT WARRANT THAT THE TRANSMISSION OF DATA BY A PRODUCT OVER A CELLULAR COMMUNICATIONS NETWORK WILL BE UNINTERRUPTED, TIMELY, SECURE, OR ERROR FREE, NOR DOES MULTITECH WARRANT ANY CONNECTION OR ACCESSIBILITY TO ANY CELLULAR COMMUNICATIONS NETWORK. MULTITECH WILL HAVE NO LIABILITY FOR ANY LOSSES, DAMAGES, OBLIGATIONS, PENALTIES, DEFICIENCIES, LIABILITIES, COSTS, OR EXPENSES (INCLUDING WITHOUT LIMITATION REASONABLE ATTORNEYS FEES) RELATED TO TEMPORARY INABILITY TO ACCESS A CELLULAR COMMUNICATIONS NETWORK USING THE PRODUCTS.

MULTITECH DOES NOT WARRANT THAT THE TRANSMISSION OF DATA BY A PRODUCT OVER A WIRELESS COMMUNICATIONS NETWORK WILL BE UNINTERRUPTED, TIMELY, SECURE, OR ERROR FREE, NOR DOES MULTITECH WARRANT ANY CONNECTION OR ACCESSIBILITY TO ANY WIRELESS COMMUNICATIONS NETWORK. MULTITECH WILL HAVE NO LIABILITY FOR ANY LOSSES, DAMAGES, OBLIGATIONS, PENALTIES, DEFICIENCIES, LIABILITIES, COSTS, OR EXPENSES (INCLUDING WITHOUT LIMITATION REASONABLE ATTORNEYS FEES) RELATED TO TEMPORARY INABILITY TO ACCESS A WIRELESS COMMUNICATIONS NETWORK USING THE PRODUCTS.

The MultiTech products and the final application of the MultiTech products should be thoroughly tested to ensure the functionality of the MultiTech products as used in the final application. The designer, manufacturer, and reseller has the sole responsibility of ensuring that any end-user product into which the MultiTech product is integrated operates as intended and meets its requirements or the requirements of its direct or indirect customers. MultiTech has no responsibility whatsoever for the integration, configuration, testing, validation, verification, installation, upgrade, support, or maintenance of such end-user product, or for any liabilities, damages, costs, or expenses associated therewith, except to the extent agreed upon in a signed written document. To the extent MultiTech provides any comments or suggested changes related to the application of its products, such comments or suggested changes is performed only as a courtesy and without any representation or warranty whatsoever.

Disclaimers

Information in this document is subject to change without notice and does not represent a commitment on the part of Multi-Tech Systems, Inc. Multi-Tech Systems, Inc. provides this document "as is," without warranty of any kind, expressed or implied, including, but not limited to, the implied warranties of fitness or merchantability for a particular purpose. Multi-Tech Systems, Inc. may make improvements and/or changes in this manual or in the product(s) and/or the software described in this manual at any time.

Contents

1 About the rCell 300

The MultiTech rCell 300 router is both an industrial router and a specialized network device designed to connect internet-of-things (IoT) devices. The rCell 300 provides enhanced security to protect against cyber threats, includes edge intelligence to run local applications, and offers secure data communication between many types of devices that use legacy or the latest communication technologies. The rCell 300 can be remotely managed via MultiTech Device Manager.

MultiTech CT300 (MTCT300) is a wireless and self-powered electrical current monitoring device. It is capable of reporting average, peak, and minimum RMS Amperes and tracking accumulated Amp-Hours. The device parasitically harvests energy from the monitored conductor, negating the need for routine maintenance to replace or charge batteries.

MTCT300 uses sub-gigahertz LoRaWAN for long range wireless communications. This IoT interface can be deployed as a private network, or used with an available public one. The use of short data messages increases reliability of transmission in suboptimal environments such as metal electrical panels.

Intended Use

The rCell 300 is designed for a variety of industrial and IoT applications. Some of its intended uses include:

- **Remote monitoring and control**: This device is ideal for remote monitoring and control of equipment and systems in industries such as oil and gas, utilities, and agriculture. The rCell 300 allows for real-time data collection and management of remote locations.
- **Smart cities and infrastructure**: This device can be used in smart-city applications, including traffic management, environmental monitoring, and electric vehicle charging stations.
- **Industrial automation**: This device works with current industrial automation equipment (such as RTU) for remote data collection, fault notifications, control/manage field equipment.

The rCell 300 can be used in applications that require equipment to operate in harsh environments. For outdoor deployments, the rCell 300 must be installed in a waterproof enclosure.

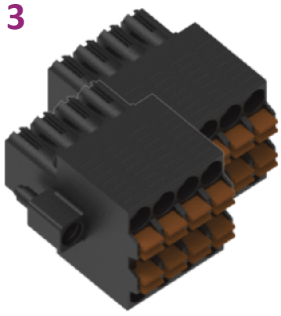
In the Box

Some options don't include all of the items shown below. See rCell 300 Ordering Options.

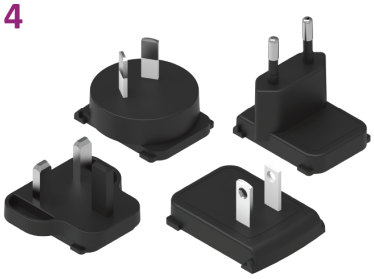
1

2

3



4



5

6

7

8

9

Item	Description	Quantity
1	rCell 300 LTE Cat 4 cellular router with fallback	1
2	2-wire terminal block (power)	1
3	8-wire terminal block (serial, GPIO)	2
4	AU/NZ, EU, GB, US power blade set	1
5	Power supply with stripped wires	1
6	Cellular (LTE) antenna	2
7	Wi-Fi antenna[1]	1
8	GPS antenna	1
9	Ethernet CAT5e cable, 6 ft	1
10	Quick-start guide (not shown)	1
11	Registration card (not shown)	1

1 Option based on configuration

rCell 300 Ordering Options

Ordering Part Number	In the Box Items Included	Region
MTR3-L4G2D-AC00PA-EWM	All items (with Wi-Fi)	Australia Canada European Union United Kingdom United States
MTR3-L4G2D-AC00QA-EWM	All items except 7 (without Wi-Fi)	
MTR3-L4G2D-AC00PA-11M	Only items 1, 2, 3, 10, and 11 (with Wi-Fi)	
MTR3-L4G2D-AC00QA-11M	Only items 1, 2, 3, 10, and 11 (without Wi-Fi)	

Wi-Fi antenna, GPS antenna, and other accessories are available for all ordering options. See Accessories.

Required Tools

The following tools are only required if mounting the device:

- Four #6 (3.5mm) screws with anchors (not provided)
- Screwdriver
- Drill

2 Safety Instructions

Operation Safety

CAUTION: Read all instructions and safety information before installing or using this device.

ATTENTION: Lisez toutes les instructions et consignes de sécurité avant d'installer ou d'utiliser cet appareil.

- Follow all local laws, regulations, and rules for operating a wireless device.
- Use the device security features to block unauthorized use and theft.
- Unless otherwise noted, antennas are not approved for outdoor use. Do not extend any antenna outside of any building, dwelling, or campus.
- Do not attempt to disassemble the device. There are no user-serviceable parts inside.
- Do not misuse the device. Follow instructions on proper operation and only use as intended. Misuse could make the device inoperable, damage the device or other equipment, or harm users.
- Do not apply excessive pressure or place unnecessary weight on the device. This could result in damage to the device or harm to users.
- Do not use this device in explosive or hazardous environments unless the model is specifically approved for such use. The device may cause sparks. Sparks in explosive areas could cause an explosion or fire that may result in property damage, severe injury, or death.
- Do not expose the device to any extreme environment where the temperature or humidity is high. Such exposure could result in damage to the device or cause a fire. See the device specifications for recommended operating temperature and humidity.
- Do not expose the device to water, rain, or other liquids. It is not waterproof. Exposure to liquids could result in damage to the device.
- Using accessories, such as antennas, that MultiTech has not authorized or that are not compliant with the device accessory specifications may invalidate the warranty.

If the device is not working properly, contact MultiTech technical support.

Hot Caution

 **WARNING!** HOT SURFACE DO NOT TOUCH

CAUTION: Depending on the operation mode and environment the device is subject to, the metal enclosure may become hot to touch.

 **AVERTISSEMENT!** SURFACE CHAUDE NE PAS TOUCHER

Attention: En fonction du mode de fonctionnement et de l'environnement auquel l'appareil est soumis, le boîtier métallique peut devenir chaud au toucher.

Ethernet Ports

CAUTION: Ethernet ports and command ports are not designed to be connected to a public telecommunication network or used outside a building or campus.

ATTENTION: Les ports Ethernet et les ports de commande ne sont pas conçus pour être connectés à un réseau de télécommunication public ni utilisés à l'extérieur du bâtiment ou du campus.

Customer-Provided Power Supply and Power Cable

MultiTech warranty/UL Certification does not apply or extend to the device's safety certification of voltages outside the certified range. Optional power supply operating temperature and installation location determines the maximum operation temperature of the device.

A customer-provided power cable must be connected to a certified LPS power source. Using a customer-provided DC power cable does not apply or extend to the device's safety certification or MultiTech warranty. Cord length and wire composition must be taken into consideration to determine voltage drops and safety hazards of wire routing.

Radio Frequency (RF) Safety

Due to the possibility of radio frequency (RF) interference, it is important that you follow any special regulations regarding the use of radio equipment. Follow the safety advice given below.

- Operating your device close to other electronic equipment may cause interference if the equipment is inadequately protected. Observe any warning signs and manufacturers' recommendations.
- Different industries and businesses restrict the use of cellular devices. Respect restrictions on the use of radio equipment in fuel depots, chemical plants, or where blasting operations are in process. Follow restrictions for any environment where you operate the device.
- Do not place the antenna outdoors.
- Turn off your wireless device when in an aircraft. Using portable electronic devices in an aircraft may endanger aircraft operation, disrupt the cellular network, and may be illegal. Failing to observe this restriction may lead to suspension or denial of cellular services to the offender, legal action, or both.
- Turn off your wireless device when around gasoline or diesel-fuel pumps and before filling your vehicle with fuel.
- Turn off your wireless device in hospitals and any other place where medical equipment may be in use.

Sécurité relative aux appareils à radiofréquence (RF)

À cause du risque d'interférences de radiofréquence (RF), il est important de respecter toutes les réglementations spéciales relatives aux équipements radio. Suivez les conseils de sécurité ci-dessous.

- Utiliser l'appareil à proximité d'autres équipements électroniques peut causer des interférences si les équipements ne sont pas bien protégés. Respectez tous les panneaux d'avertissement et les recommandations du fabricant.

- Certains secteurs industriels et certaines entreprises limitent l'utilisation des appareils cellulaires. Respectez ces restrictions relatives aux équipements radio dans les dépôts de carburant, dans les usines de produits chimiques, ou dans les zones où des dynamitages sont en cours. Suivez les restrictions relatives à chaque type d'environnement où vous utiliserez l'appareil.
- Ne placez pas l'antenne en extérieur.
- Éteignez votre appareil sans fil dans les avions. L'utilisation d'appareils électroniques portables en avion est illégale: elle peut fortement perturber le fonctionnement de l'appareil et désactiver le réseau cellulaires. S'il ne respecte pas cette consigne, le responsable peut voir son accès aux services cellulaires suspendu ou interdit, peut être poursuivi en justice, ou les deux.
- Éteignez votre appareil sans fil à proximité des pompes à essence ou de diesel avant de remplir le réservoir de votre véhicule de carburant.
- Éteignez votre appareil sans fil dans les hôpitaux ou dans toutes les zones où des appareils médicaux sont susceptibles d'être utilisés.

Interference with Pacemakers and Other Medical Devices

Radio frequency energy (RF) from cellular devices can interact with some electronic devices. This is electromagnetic interference (EMI). The FDA helped develop a detailed test method to measure EMI of implanted cardiac pacemakers and defibrillators from cellular devices. This test method is part of the Association for the Advancement of Medical Instrumentation (AAMI) standard. This standard allows manufacturers to ensure that cardiac pacemakers and defibrillators are safe from cellular device EMI.

The FDA continues to monitor cellular devices for interactions with other medical devices. If harmful interference occurs, the FDA will assess the interference and work to resolve the problem.

Precautions for Pacemaker Wearers

If EMI occurs, it could affect a pacemaker in one of three ways:

- Stop the pacemaker from delivering the stimulating pulses that regulate the heart's rhythm.
- Cause the pacemaker to deliver pulses irregularly.
- Cause the pacemaker to ignore the heart’s own rhythm and deliver pulses at a fixed rate.

Based on current research, cellular devices do not pose a significant health problem for most pacemaker wearers. However, people with pacemakers may want to take simple precautions to be sure that their device doesn't cause a problem.

- Keep the device on the opposite side of the body from the pacemaker to add extra distance between the pacemaker and the device.
- Avoid placing a turned-on device next to the pacemaker (for example, don’t carry the device in a shirt or jacket pocket directly over the pacemaker).

Vehicle Safety

When using your device in a vehicle:

- Do not use this device while driving.

- Respect local regulations on the use of cellular devices in vehicles.
- If incorrectly installed in a vehicle, operating the wireless device could interfere with the vehicle's electronics. To avoid such problems, use qualified personnel to install the device. The installer should verify that the vehicle electronics are protected from interference.
- Using an alert device to operate a vehicle's lights or horn is not permitted on public roads.
- UL evaluated this device for use in ordinary locations only. UL did *not* evaluate this device for installation in a vehicle or other outdoor locations. UL certification does not apply or extend to use in vehicles or outdoor applications.

3 Specifications

Category	Description
General	
Regions	Australia, Canada, European Union, United Kingdom, United States
Cellular module performance[2]	3GPP release 10
	4G-LTE FDD/TDD category 4
	150 Mbps peak downlink/50 Mbps peak uplink with 3G/2G fallback
Dual SIM	micro (3FF) SIM cards
Dual Ethernet ports for WAN and LAN connectivity	RJ45 (10/100 BaseT)
RS 232/RS 485(HD)/DIO	Serial data input and Digital IO; 8-pin terminal connector
Frequency bands (MHz)	4G LTE FDD (Europe): B3 (1800), B7 (2600), B8 (900), B20 (800)
	2G (Europe fallback): B2 (1900), B3 (1800), B5 (850), B8 (900)
	4G LTE FDD (AT&T): B2 (1900), B4 (AWS1700), B12 (700), B14 (700)
	4G LTE FDD (Verizon): B2 (1900), B4 (AWS1700), B13 (700)
	4G LTE FDD (Anterix): B8-US (900)
	4G LTE FDD (APAC): B1 (2100), B9 (1800), B18 (800), B19 (850), B26 (850), B28 (700)
	3G: B1 (2100), B2 (1900), B4 (AWS1700), B5 (850), B6, B8 (900), B19 (850)
	2G: B2 (1900), B3 (1800), B5 (850), B8 (900)
	4G LTE FDD bands: B25 (1900)
SMS	Mobile Originate, Mobile Terminated, Point-to-Point
Wi-Fi, AC00PA models	IEEE 802.11a/b/g/n/ac/ax (2.4 and 5 GHz)
GNSS, all models	GNSS systems supported: default; concurrent GPS/QZSS/SBAS and GLONASS
Physical Description	
Dimensions	117 mm × 117 mm × 38 mm (4.61 in. × 4.61 in. × 1.50 in.)
Weight	0.5 kg (1 lb)
Chassis	Aluminum (IP30 rating)
Mounting options	Desktop; Wall mount (using Wall-Mount accessory); DIN rail mount (using DIN-Mount accessory)

2 Actual device performance speeds may be affected by cell tower distance, data loads, packet sizes, etc.

Category	Description
Power Requirements	
Input voltage	9–36 VDC at 1 A[3]
Power at 12 VDC	Idle: 2.4 W (200 mA)
	Maximum: 6.5 W (542 mA)
Environmental	
Operating temperature[4]	-40 °C to 75 °C (-40 °F to 167 °F)
Storage temperature	-40 °C to 85 °C (-40 °F to 185 °F)
Relative humidity	15%–93% RH non-condensing
Certifications	
EMC and radio compliance	CE, FCC, IC, RCM, UKCA
Safety compliance	UL/cUL 62368-1 3rd Edition
	IEC 62368-1 3rd Edition including IP30
	AS/NZS 62368.1 3rd Edition
Network compliance	PTCRB
Network operator[5]	AT&T, Verizon
Quality	MIL-STD-810G: High Temp, Low Temp, Cold Dwell, Random Vibration, and Sine Vibration
	SAE J1455: Random Vibration and Sine Vibration
Warranty	2 years, https://www.multitech.com/warranty/

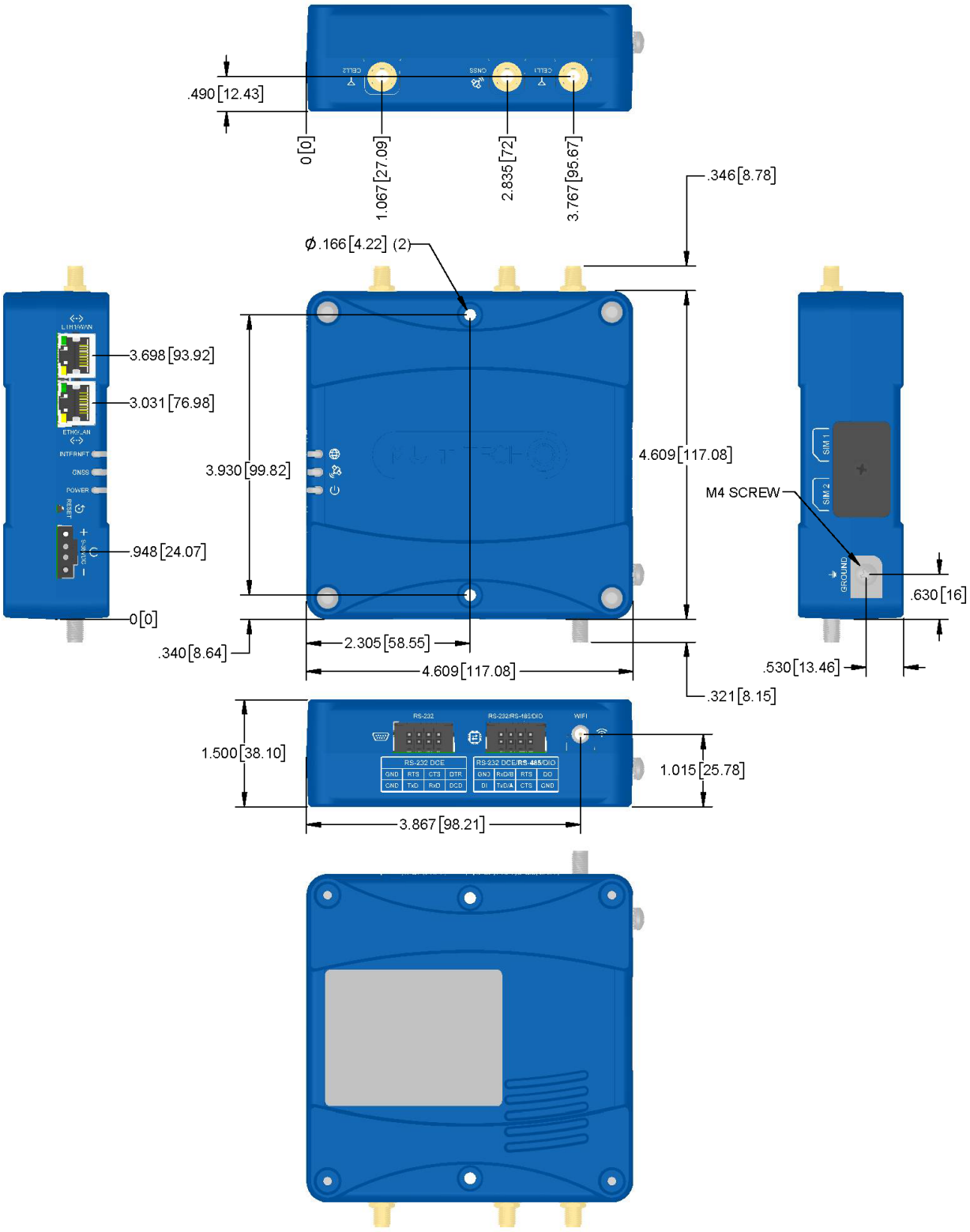
3 This current rating is driven by the Safety Standards. 1 A is the maximum current draw over the entire voltage range. This rating includes 20% margin under full load conditions. Actual power consumption varies with the input voltage selected.

4 Operating temperatures vary based on the power supply:

- MultiTech-provided power supply: UL listed at 40 °C (limited by power supply)
- Customer-provided DC power cable: UL listed at 75 °C (see Customer-Provided DC Power Cable requirements)
- Customer-provided power supply: Operating temperature determined by power supply specifications and environmental installation location (see Customer-Provided Power Supply requirements)

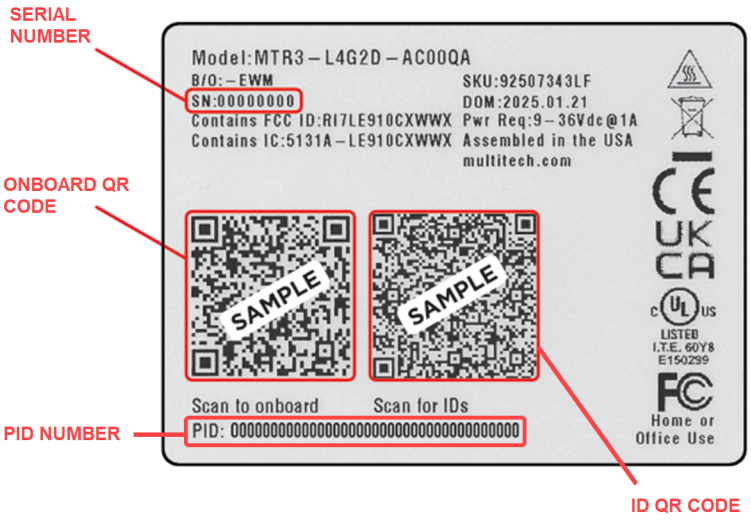
5 The rCell 300 supports other cell providers outside of North America based on the Frequency bands.

Device Dimensions



rCell 300 Serial Label

This is an example serial label. Actual labels vary depending on the regulatory approval markings and device model.



- The onboard QR code provides a link for onboarding the device.
- The ID QR code provides the following product information:
  - MultiTech model/ordering part number
  - Serial number
  - UUID (universally unique identifier)
  - IMEI (international mobile equipment identity)
  - ICCID (integrated circuit card identification); only if the device is shipped with a SIM card installed
  - PID (provisioning identifier)
  - Hardware version

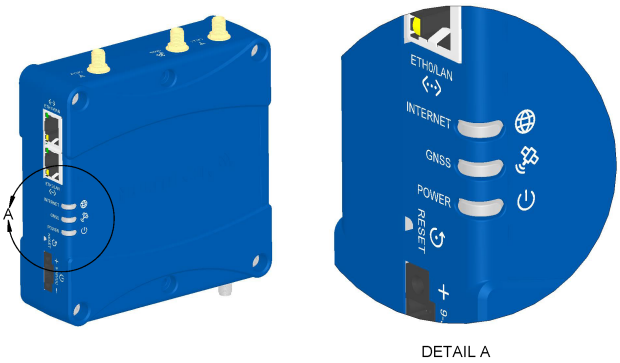
Device Connectors

Label	Description
CELL 1, CELL 2	Main antenna (CELL 1) and diversity antenna (CELL 2) antenna inputs; use with two Cat 4 LTE antennas; SMA(F)
GNSS	GNSS antenna input; use with one GNSS antenna; SMA(F)
WI-FI	Wi-Fi antenna input; use with one Wi-Fi antenna (varies with model); RP-SMA(F)
GROUND	Connection to earth ground
SIM1, SIM2	Receptacles for SIM card(s); Micro SIM (3FF) 1.8 V and 3 V (under SIM door)
RESET	Reset button; see Reset the Device

Label	Description
RS-232	Serial data input; 8-pin terminal connector
RS-232/RS-485/DIO	Serial data input and Digital IO; 8-pin terminal connector
9-36 VDC	9-36 VDC power input; 2-pin terminal block connector
ETH0/LAN	Local area network; RJ45 (10/100 BaseT)
ETH1/WAN	Wide area network; RJ45 (10/100 BaseT)

LEDs

The rCell 300 includes three LEDs to indicate the status of the device and the cellular connection.



DETAIL A

LED	Description
INTERNET	■ Off when there is no cellular or internet connection ■ Blinks green when attempting to connect ■ Solid yellow when the Ethernet internet connection is active ■ Solid green when the cellular internet connection is active
GNSS	■ Off when GNSS is disabled ■ Blinks green while attempting to aquire a GNSS fix ■ Solid green once a GNSS fix is acquired
POWER	■ Off when there is no power ■ Solid yellow when powered on and rebooting or booting up ■ Solid green when powered on and running normally

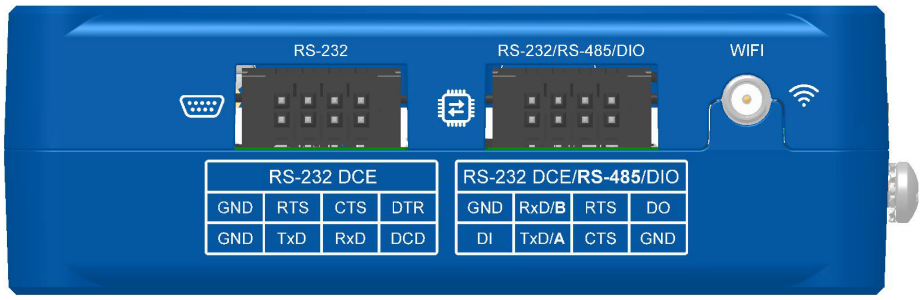
Ethernet LEDs

The ETH0/LAN and ETH1/WAN connectors each have the same two LEDs.

LED	Description
Ethernet link LED	■ Located to the right of the Ethernet connector ■ Off when the Ethernet link is not established ■ Blinks green when there is transmit/receive activity ■ Solid green when there is a valid Ethernet connection
Ethernet speed LED	■ Located to the left of the Ethernet connector ■ Off when the Ethernet is linked at 10 Mbps ■ Solid yellow when the Ethernet is linked at 100 Mbps

Serial and Digital IO Interfaces

The rCell 300 is a DCE serial device capable of supporting the RS-232 and RS-485 electrical signaling modes. The terminal block labeled RS-232 supports a 7-wire RS-232 connection. The terminal block labeled RS-232/RS-485/DIO can be configured for RS-485 half-duplex or 4-wire RS-232 connection. This connector also supports a digital input and digital output signal. The digital IO function is not shared with the serial port pins.



Terminal Block Connector Pinout

RS-232 Terminal Block Pinout

Pin Number	Signal Name	Description	Signal Direction
1	GND	Main GND; connected internally to Digital GND	N/A
2	GND	Main GND; connected internally to Digital GND	N/A
3	TxD	Transmit data	Input
4	RTS	Ready to send	Input
5	RxD	Receive data	Output
6	CTS	Clear to send	Output
7	DCD	Data carrier detect	Output
8	DTR	Data terminal ready	Input

RS-232/RS-485/DIO Terminal Block Pinout

Pin Number	Signal Name	Description	Signal Direction
1	DI	Digital input	Input
2	GND	Main GND; connected internally to Digital GND	N/A
3	TxD (RS-232)	Transmit data	Input
	RX+/TX+ (RS-485)	Data +	Bidirectional
4	RxD (RS-232)	Receive data	Output
	RX–/TX– (RS-485)	Data -	Bidirectional
5	CTS	Clear to send	Output
6	RTS	Ready to send	Input
7	GND	Main GND; connected internally to Digital GND	N/A
8	DO	Digital output	Input

Serial Port Electrical Specifications

RS-232 Electrical Specification (TIA/EIA-232 Compatible)

Parameter	Recommended Operation
Input voltage level (with respect to GND)	±15 V (nominal), ±25 V (absolute maximum)[6]
Ouput voltage level (with respect to GND)	±12 V (nominal), ±13.2 V (absolute maximum)
Cable length (maximum)	15.54 m/50 ft (Baud rate of 19,200 bps)
Baud rate (maximum)	921,600 bps
Flow control	Hardware (RTS/CTS)

RS-485 Electrical Specification (TIA/EIA-485 Compatible)

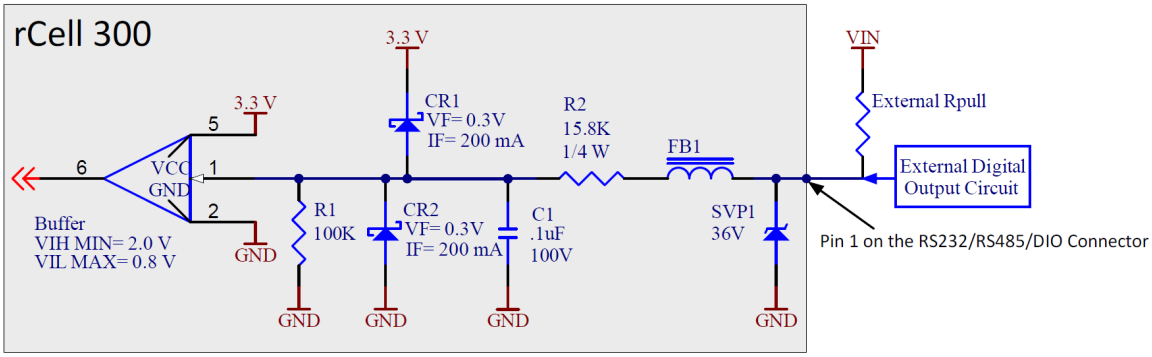
Parameter	Recommended Operation
Communication mode	Half-duplex (2-wire configuration)
Differential voltage level (with respect to GND)	–7 V to +12V (nominal), ±16 V (absolute maximum)
Cable length (maximum)	305 m/1,000 ft (120 Ω termination enabled)
Baud rate (maximum)	921,600 bps

6 The absolute maximum input voltage is ±25 V with series resistance ≥250 Ω, and ±20 V without series resistance.

Digital IO Interface

Digital Input

Below is the digital input equivalent circuit connected to an external open-drain output.



As shown in this example, the external pull-up resistor (Rpull) value depends on the pull-up voltage VIN. Starting at VIN > 3.5 VDC, an external pull-up resistor must be added as shown above.

$$Rpull = [\ (\ VIN \times 100\ K\ )\ \div 3.3\ ]\ -\ 15.8\ K\ -\ 100\ K$$

Digital Input Specification

Logic State	VIN Minimum	VIN Maximum	Units
LOW	0	0.8	V
HIGH	2.4	36	V

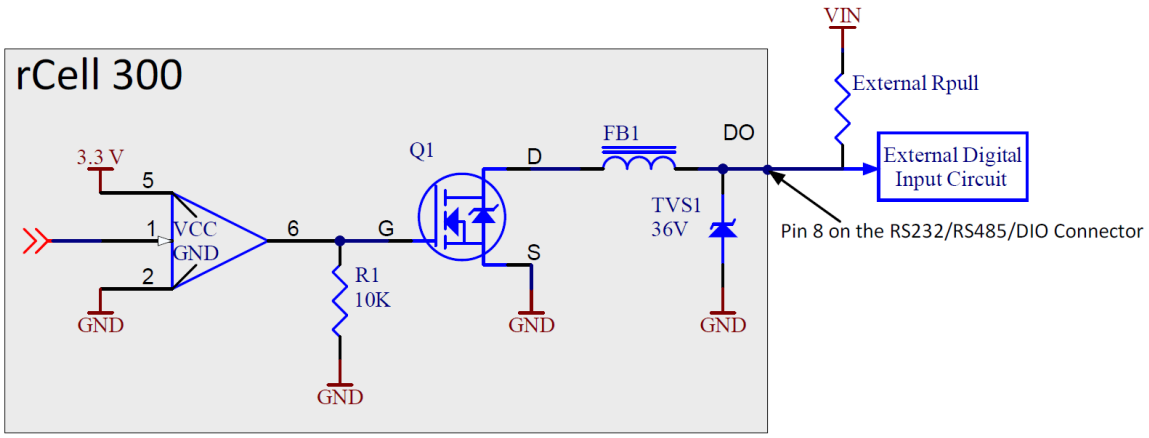
Digital Output

The digital output pin can be used in an open-drain configuration or as a low-side current-sink output; for example, to drive an external solenoid/relay circuit.

The digital output pin can typically sink 500 mA, but it can vary with operating environmental conditions such as temperature.

Open Drain Output

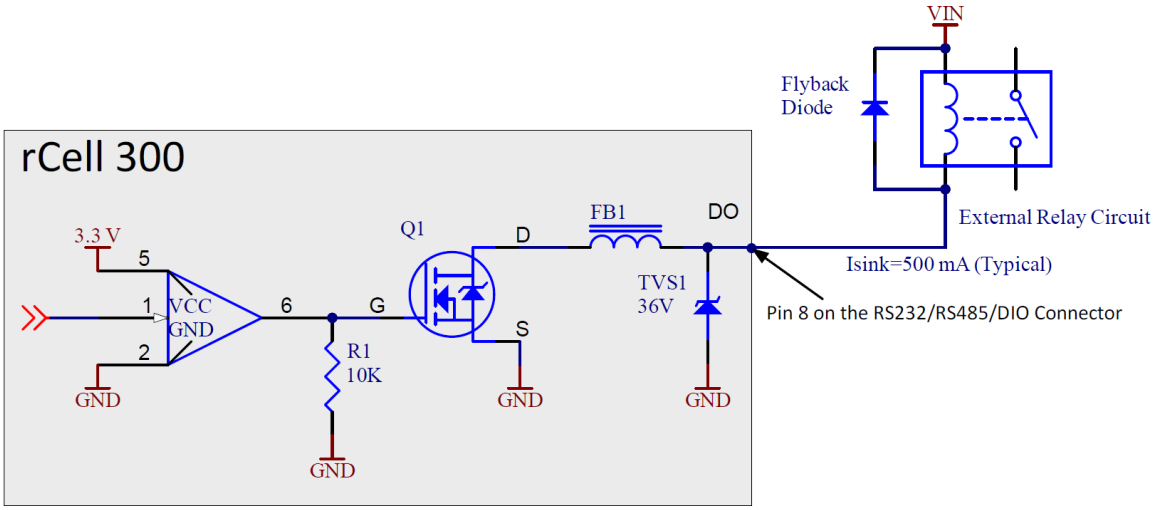
Below is the digital output equivalent circuit in an open-drain configuration driving an external digital input.



Low-side Current Sink

The digital output can be used as a low-side current sink to drive a relay or solenoid.

To prevent damage to the transistor, add a flyback diode across the relay coil.



Power Supply Requirements

The device should be used with a UL LPS-certified power source that has an output voltage between 9 VDC and 36 VDC and a minimum rating of 9 W. The actual power consumption depends on the selected input voltage. A 9 W power source is sufficient to cover the entire input voltage range. For safety information, see Customer-Provided Power Supply and Power Cable.

Customer-Provided Power Supply

A customer-provided power supply must meet the following requirements:

- Listed ITE safety certified
- Rated for use at 5000 m
- Marked LPS
- 9–36 VDC; rated for the range, or within the range

- 9 W minimum (see Power Supply Requirements)
- Rated 40 °C or higher (safety agency certified operation temperature)

Customer-Provided DC Power Cable

A customer-provided DC power cable must meet the following requirements:

- UL or other safety-recognized wire (AVLV2 or ZJCZ)
- VW-1, FT1, FT2, SPT-1 or better
- 36 V or better
- 18 AWG or better
- 80 °C or better

Sample Power Measurements

The measurements below are based on a specific configuration. Power consumption varies with operating environmental conditions such as temperature and strength of cellular and Wi-Fi signals.

MultiTech recommends incorporating a 10% buffer into your power source when determining product load.

Radio Protocol	Live Connection or Callbox Idle (No Data)	Average Current[7,8]	TX Pulse Amplitude Current for Peak Current (Average)[9]	Total Inrush Charge[10]	Total Inrush Charge Duration During Power Up (Inrush Duration)
MTR3-L4G2D-AC00PA-EWM					
9 Volts					
GSM 850 MHz	155 mA	272 mA	752 mA	1.73 mC	9 ms
WCDMA 1854 MHz	181 mA	550 mA	656 mA	1.73 mC	9 ms
LTE Band 8 897.5 MHz	173 mA	491 mA	596 mA	1.73 mC	9 ms
32 Volts					
GSM 850 MHz	96 mA	125 mA	200 mA	5.09 mC	31.8 ms
WCDMA 1854 MHz	88 mA	182 mA	276 mA	5.09 mC	31.8 ms
LTE Band 8 897.5 MHz	87 mA	166 mA	268 mA	5.09 mC	31.8 ms
MTR3-L4G2D-AC00QA-EWM					
9 Volts					
GSM 850 MHz	145 mA	237 mA	628 mA	2.0 mC	8.5 ms
WCDMA 1854 MHz	142 mA	464 mA	560 mA	2.0 mC	8.5 ms
LTE Band 8 897.5 MHz	147 mA	452 mA	544 mA	2.0 mC	8.5 ms
32 Volts					
GSM 850 MHz	84 mA	109 mA	176 mA	6.3 mC	38.7 ms

_____

7 The continuous current during maximum data rate with the radio transmitter at maximum power.

8 IP connection to cellular call box with data.

9 The average peak current during a GSM850 transmission burst period or HSDPA/LTE connection. The transmission burst duration for GSM850 can vary, depending on what transmission scheme is being deployed (GPRS Class 8, Class 10, GSM, etc.).

10 The total inrush charge at power on.

Radio Protocol	Live Connection or Callbox Idle (No Data)	Average Current[7,8]	TX Pulse Amplitude Current for Peak Current (Average)[9]	Total Inrush Charge[10]	Total Inrush Charge Duration During Power Up (Inrush Duration)
WCDMA 1854 MHz	84 mA	161 mA	236 mA	6.3 mC	38.7 ms
LTE Band 8 897.5 MHz	85 mA	159 mA	232 mA	6.3 mC	38.7 ms

Cellular Radio

Radio-Conducted Transmit Power

Telit LE910Cx Module (L4G2D)

Band	Max. Output Power	Power Class
2G (GSM) LB	2 W, 33 dBm	4
	0.5 W, 27 dBm EDGE	E2
2G (GSM) HB	1 W, 30 dBm	1
	0.4 W, 26 dBm EDGE	E2
3G (WCDMA)	0.25 W, 24 dBm	3
TD-SCDMA	0.13 W, 21d Bm	3
4G (FDD and TDD)	0.2 W, 23 dBm 1 RB	3

Antenna Information

Cellular Antenna

The cellular/wireless performance depends on the implementation and antenna design. The integration of the antenna system into the product is a critical part of the design process. Therefore, it is essential to consider it early so that the performance is not compromised. Devices were approved with the antenna(s) described below and for alternate antennas meeting the given specifications.

The antenna system is defined as the SMA connection point from the device to the specified cable specifications and specified antenna specifications.

Selecting Antennas

Select an antenna based on your product and application. Typically, both antennas are the same and either can be the main receive antenna. The required antenna impedance is 50 ohms. The antenna selected must meet the requirements for FCC/IC Compliance.

Requirements for FCC/IC Compliance

The rCell 300 is approved for operation with the antenna listed below and antennas with maximum gain including cable loss of the following:

- 8.51 dBi for Band 2 and Band 25
- 5.5 dBi for Band 4
- 6.91 dBi for Band 5 and Band 26
- 9.91 dBi for Band 8
- 9.7 dBi for Band 12
- 9.91 dBi for Band 13 and 14
- 9.01 dBi for Band 7

Important: Antennas that have a gain greater than specified are strictly prohibited for use with this device.

The following cellular antenna is approved for use with the rCell 300:

Manufacturer	Wieson
Manufacturer Model Number	ARY118-0167-005-00
Antenna Type	LTE dipole antenna

For the MultiTech ordering part number, see Accessories.

Antenna Specifications

Category	Description
Connector	SMA(M)
Operating frequency range	0.617–0.96 GHz
	1.710–2.69 GHz
	3.3–6 GHz
VSWR	3:1 maximum
Peak gain	3.36 dBi (max)
Impedance	50 Ω
Radiation	Omnidirectional
Polarization	Linear

Placing External Antennas

The antenna placement strongly affects the device's overall performance. MultiTech recommends that each cellular dipole antenna be tilted 45° from vertical and away from each other. However, the optimal placement can vary with the specific requirements of the application and the operating environment.

Antenna Approvals and Safety Considerations

- Network operators conduct antenna diversity tests.
- There are no EMC concerns about antenna diversity.
- All antennas that contain plastics require a minimum flammability rating (UL94-HB).
- Safety requirements depend on your final product.
- Unless otherwise noted, antennas are not approved for outdoor use. Do not extend any antenna outside of any building, dwelling, or campus.

Wi-Fi Antenna

Requirements for FCC/IC Compliance

Important: Customers intending to use an alternate antenna—that is, a different type or with different gains—must contact MultiTech Support for guidance.

The following Wi-Fi antenna is approved for use with the rCell 300:

Manufacturer	2J Antennas USA
Manufacturer Model Number	2JW1102-C943B
Antenna Type	2.4 GHz/5.0 GHz dipole antenna

For the MultiTech ordering part number, see Accessories.

For more information on FCC compliance, see Regulatory Information.

Antenna Specifications

Category	Description
Frequency Range	2.4/5.0/6.0 GHz[11]
Impedance	50 Ohms
VSWR	VSWR should not exceed 2.0:1 at any point across the bands of operation
Peak radiated gain	4.1 dBi for 2.4 GHz
	3.9 dBi for 5.0 GHz
Radiation	Omnidirectional
Polarization	Linear
Connector	RP-SMA(M)

11 Although the Wi-Fi antenna included in the MTR3-L4G2D-AC00PA-EWM ordering option covers up to 6.0 GHz, the rCell 300 operates on the 2.4 GHz and 5 GHz bands.

GNSS Antenna

The GPS antenna is included in the MTR3-L4G2D-AC00PA-EWM and MTR3-L4G2D-AC00QA-EWM ordering options. GPS is just one part of the broader GNSS (Global Navigation Satellite System) spectrum. The provided antenna only covers the GPS spectrum. A multifrequency or multiconstellation antenna is required if you require coverage of the entire GNSS spectrum.

A dedicated regulated bias is provided to support active antenna GNSS application. The operating range of this power supply is output voltage of 3.0–3.1 V at 100 mA maximum.

The following GPS antenna is provided for use with the rCell 300:

Manufacturer	Trimble
Manufacturer Model Number	66800-52
Antenna Type	GPS Active Antenna with low-noise amplifier

For the MultiTech ordering part number, see Accessories.

Antenna Specifications

Category	Description
Connector	SMA(M)
Frequency range	1,575.42 MHz ± 1.023 MHz
Impedance	50 Ohms
VSWR	2.0:1 max
Gain	10–30 dBi
LNA current consumption	40 mA max
Noise figure	< 2dB
Polarization	RHCP
Input voltage	3.0 V ± 0.3 V

Placing GNSS Antennas

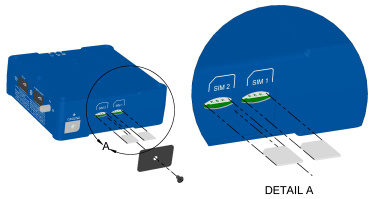
GNSS antennas need a clear view of the sky. Position the GPS antenna so that nothing blocks its view of the sky.

4 Before Installation

Install the SIM Card(s)

To operate the device on a particular wireless network, install a micro (3FF) SIM card rated for industrial use.

1. Using a #1 Phillips screwdriver, remove the SIM card cover.



2. In the **SIM 1** slot, insert the SIM card for the primary cellular network and push until it snaps into place.
3. *Optional:* In the **SIM 2** slot, insert the SIM card for the secondary cellular network and push until it snaps into place.
4. Reinstall the SIM card cover.

Add the Device to Your Cloud Account

Prerequisite: You must have a MultiTech Cloud Service Platform Account. To create an account, go to https://cloud.multitech.com. Refer to the rCell 300 Quick Start Guide to connect and manage your device.

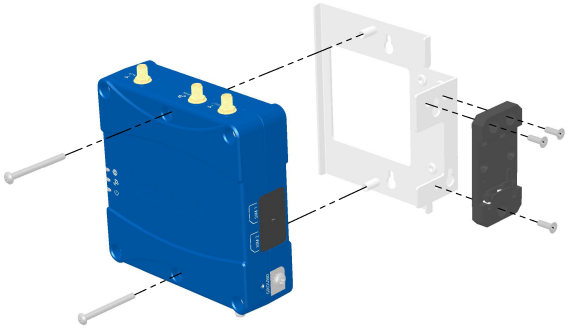
You can choose to add the rCell 300 device either via QR code or manually:

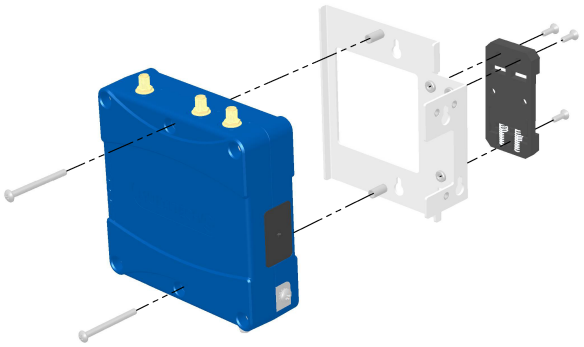
- **QR Code**
  a. Using a smartphone camera, scan the onboard QR code from the device serial label. See rCell 300 Serial LabelSee rCell 300 Serial Label.
  b. Follow the instructions to sign in to your cloud account and quickly onboard the device.
- **Manually**
  a. Sign in to your cloud account.
  b. Select **Gateways**.
  c. Under **Actions**, select **Add device**.
  d. Enter the PID number from the device serial label. See rCell 300 Serial LabelSee rCell 300 Serial Label.

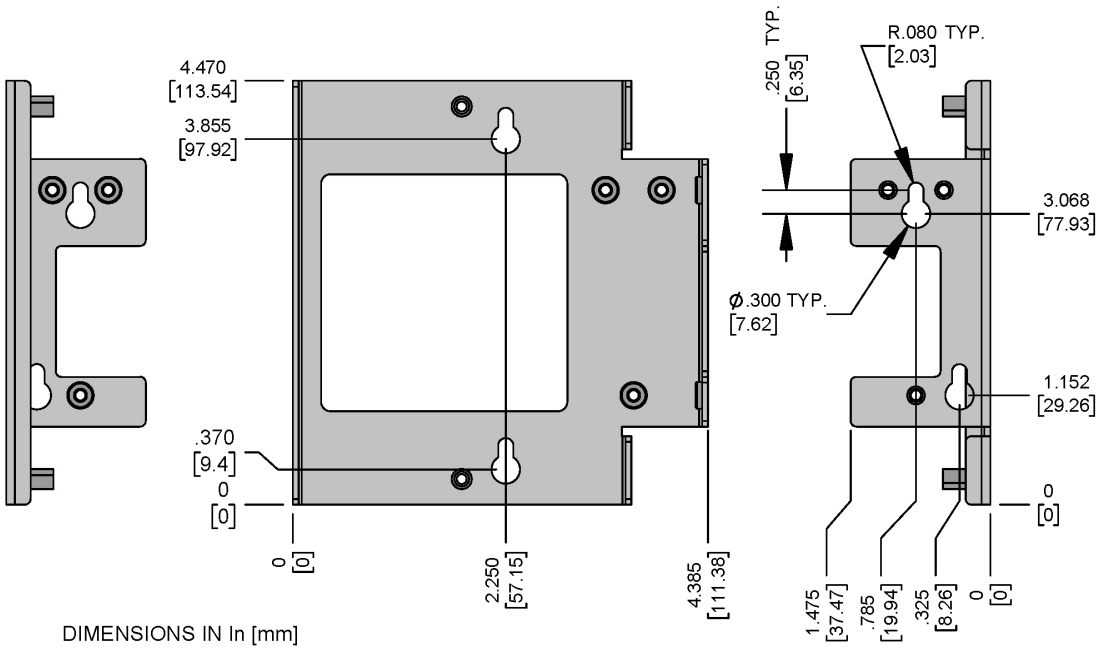
Mount the Device

The rCell 300 device can be mounted in one of two methods.

- **Wall-Mount Accessory**
  a. Using the two keyholes on either side of the mounting bracket, secure the mounting bracket to the wall.
  b. Using the bolts provided and a #2 Phillips screwdriver, secure the device to the mounting bracket.
- **DIN-Mount Accessory**
  a. Using the bolts provided and a #2 Phillips screwdriver, secure the device to the mounting bracket.
  b. Using the three screws provided, attach the DIN rail clip to either the front or side of the device bracket as shown below.







Mounting accessories are available separately. For details, go to www.multitech.com or contact your MultiTech sales representative. For MultiTech ordering part numbers, see Accessories.

Ground the Device

MultiTech recommends grounding the rCell 300 chassis to an earth ground.

1. Using a #2 Phillips screwdriver, remove the ground screw.
2. Attach the grounding lug of the grounding cable (cable not provided).
3. Replace the ground screw to secure the grounding wire.

5 Installation

Install the Device

To begin using the rCell 300:

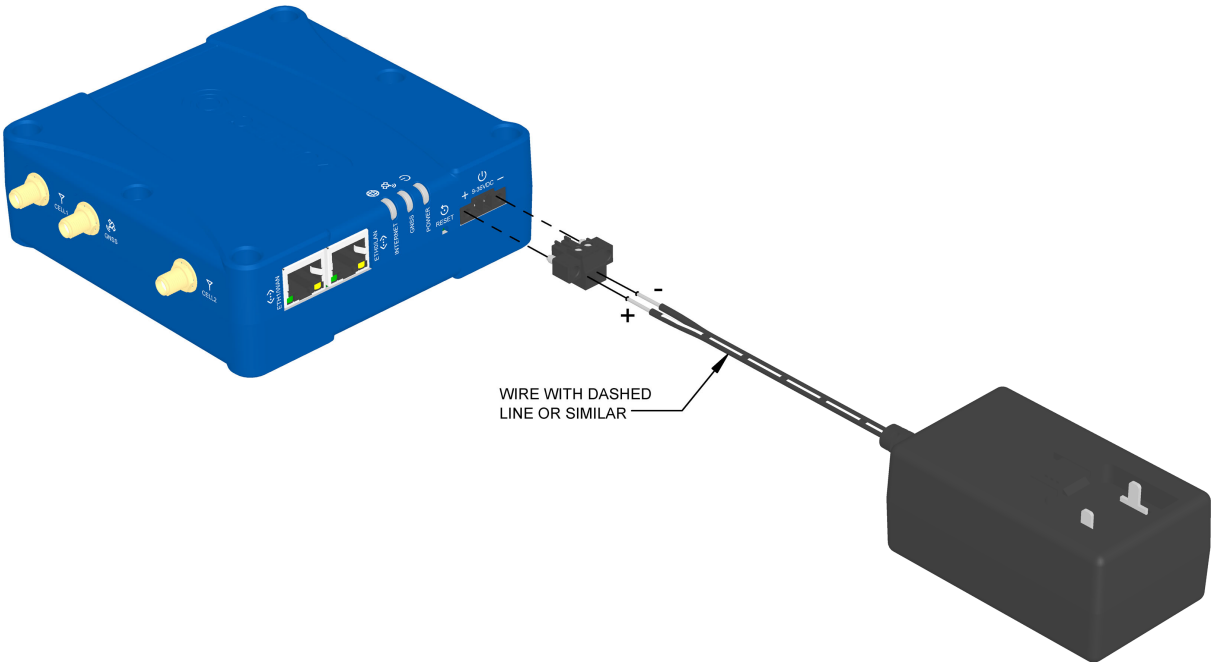
1. Connect the cellular, GNSS, and Wi-Fi antennas.
2. Connect the local configuration port (ETH0/LAN) on the rCell 300 to the networked device on the LAN network. The LAN port has a static IP of 192.168.2.1.
3. *Optional:* If using a serial device, use the 8-wire terminal block connectors to connect to the RS-232 or RS-485 serial port:
   a. Wire the push-in spring 8-wire terminal plug per your application needs.

      Note: Refer to Terminal Block Connector Pinout for complete information.

      Note: Refer to Terminal Block Connector Pinout in the rCell 300 Series Router Hardware Guide for complete information.
   b. Secure the 8-wire terminal plug to the device using a 2.5 mm slotted screwdriver.
4. Connect the power supply:
   a. Using a 2.0 mm slotted screwdriver, screw the power supply wires into the 2-wire terminal plug.
   b. Secure the 2-wire terminal plug to the 9–36 VDC 2-pin terminal block on the device using a 2.5 mm slotted screwdriver.
   c. Connect the power supply to a power source. The POWER LED turns solid green when the device is ready for use.

   The proper polarity is shown below.

   Note: The customer should take steps to prevent any potential reverse polarity connections.



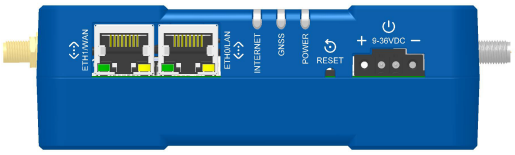
5. Use the device web user interface to configure the device.
   - The default IP address for the ETH0/LAN port is 192.168.2.1.
   - A DHCP server is enabled on the LAN interface to provision an IP to any device making a request for one. The range of addresses being assigned by this server is 192.168.2.100 to 192.168.2.254, with a subnet mask of 255.255.255.0.
   - When you log in for the first time, the device is in commissioning mode, which requires you to set up a username and password for an administrator user account. Enter and submit your desired username and password.

6 Operation

Reset the Device

Prerequisite: A pin, paperclip, or similar thin object that can fit into the reset hole.

The following is the default condition for the RESET button on the device. You can program a change to the behavior of the button if needed.



To reset the device:

1. Find the hole labeled RESET. The Reset button is recessed into the case.
2. Use the pin to press and release the Reset button as follows:
   - To reboot, press Reset for less than 3 seconds.
   - To reset to factory settings, press Reset for 10 seconds or longer.
     a. The device restarts in commissioning mode. The system automatically removes all user accounts.
     b. Enter a new username and password to create your new administrative account. See *User Accounts* in the appropriate software guide for details on username and password requirements.

7 Maintenance

Firmware Updates for Verizon

Verizon requires the cellular radio to have options for updating its firmware over the air. To comply with Verizon's requirements, you must ensure that all Verizon lines or SIMs for devices are set up only via Verizon Thingspace. Thingspace has options for performing FOTA as needed. Additional radio FOTA support will be available in the future via a Cloud-based management system from MultiTech.

8 Troubleshooting

Issue	Troubleshooting Steps
No LEDs or no communication	▪ Verify the device is receiving power and the power adapter is functioning correctly. ▪ Verify the input power source meets the requirements for voltage range and maximum power. ▪ Try using a different power outlet or power adapter. ▪ Inspect the power cable for damage and verify it is properly connected.
Cannot connect to the cellular network	▪ Verify the SIM card(s) is inserted correctly and securely. ▪ Verify the SIM card is activated and has sufficient data allowance. ▪ Try using a different SIM card from the same provider. ▪ Ensure that the antennas are properly attached and secured. ▪ Check the signal strength. ▪ Confirm the correct APN (access point name) is configured on the device. ▪ Move the device to a location with better signal reception. ▪ Consider using a signal booster. ▪ Check for any network restrictions or blocking by the cellular provider. ▪ Contact your cellular provider to check for network outages or service issues.
Cannot connect to the Wi-Fi network	▪ Ensure the antenna is properly attached and secured. ▪ Move the device to a location with better signal reception. ▪ Verify that the Wi-Fi network name (SSID) and password are correct.
Intermittent cellular or Wi-Fi connection	▪ Move the device to a location with better signal reception. ▪ For cellular connections, check the signal strength on the device's web interface. ▪ For cellular connections, consider using a signal booster.
Cannot access the rCell 300 web user interface	▪ Ensure that you are using the correct IP address and credentials to access the web interface. ▪ Verify that the PC's IP address is in the same subnet as the rCell 300. ▪ Inspect the Ethernet cables for damage and verify they are properly connected. ▪ Power cycle or reset the device.

If these troubleshooting steps fail to correct the problem, consider resetting the device to its factory default settings. See Reset the Device.

If you are unable to resolve the issue, contact MultiTech or your cellular provider for technical support.

9 Disposal

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown below is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, contact your local city office, your household waste disposal service or where you purchased the product.

July, 2005

10 Regulatory Information

FCC Notices

FCC 47 CFR Part 15 Regulation Class B Devices

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. However, there is no guarantee that interference will not occur in a particular installation.

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 one or more of the following measures:

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

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.

FCC Interference Notice

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

FCC, EU, and Industry Canada RF Exposure Compliance

The antenna intended for use with this unit meets the requirements for mobile operating configurations and for fixed mounted operations, as defined in 2.1091 of the FCC rules for satisfying RF exposure compliance. This device also meets the European RF exposure requirements of EN 62311. If an alternate antenna is used, consult user documentation for required antenna specifications.

Compliance of the device with the FCC, EU, and IC rules regarding RF Exposure was established and is given with the maximum antenna gain as specified elsewhere in this document for a minimum distance of 20 cm between the devices radiating structures (the antenna) and the body of users. Qualification for distances closer than 20 cm (portable operation) would require recertification.

Wireless devices could generate radiation. Other nearby electronic devices, like microwave ovens, may also generate additional radiation to the user, causing a higher level of RF exposure.

Industry Canada Class B Notice

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

This device complies with Industry Canada license-exempt RSS standard(s). The operation is permitted for the following two conditions:

1. The device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Cet appareil numérique de la classe B respecte toutes les exigences du Reglement Canadien sur le matériel brouilleur.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. L'appareil ne doit pas produire de brouillage, et
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

EU EMC, Safety, and Radio Equipment Directive (RED) Compliance


The CE mark is affixed to this product to confirm compliance with the following European Community Directives:

- Council Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment; and
- Council Directive 2014/53/EU on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity.

MultiTech declares that this device is in compliance with the essential requirements and other relevant provisions of Directive 2014/53/EU. The declaration of conformity may be downloaded at https://multitech.com/product-support/.

Australia Regulatory Compliance Mark (RCM)


This product complies with the requirements of the Regulatory Compliance Mark (RCM) for Electrical Regulatory Authorities Council (ERAC), Electrical Equipment Safety System (EESS), and the Australian Communications and Media Authority (ACMA) for Electromagnetic Compatibility (EMC).

Environmental Notices

EU WEEE Directive

The Waste from Electrical and Electronic Equipment (WEEE) Directive places an obligation on EU-based manufacturers, distributors, retailers, and importers to take back electronics products at the end of their useful life. A sister directive, ROHS (Restriction of Hazardous Substances) complements the WEEE Directive by banning the presence of specific hazardous substances in the products at the design phase. The WEEE Directive covers all MultiTech products imported into the EU as of August 13, 2005. EU-based manufacturers, distributors, retailers and importers are obliged to finance the costs of recovery from municipal collection points, reuse, and recycling of specified percentages per the WEEE requirements.

EU RoHS 3 Directive

MultiTech confirms that all products comply with the chemical concentration limitations set forth in the Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS 3) regulations for CE and UKCA, following the standard EN IEC 63000:2018.

For the current Certificate of Compliance for Hazardous Substances and additional regulatory documents, go to https://multitech.com/approvals-and-certifications/.

EU REACH-SVHC Statement

Multi-Tech Systems, Inc. confirms that none of its products or packaging contain any of the Substances of Very High Concern (SVHC) on the REACH Candidate List, in a concentration above the 0.1% by weight allowable limit.

For the current REACH-SVHC statement and additional regulatory documents, go to https://multitech.com/approvals-and-certifications/.

Accessories

Ordering Part Number	Description	Region
Power Supply		
PS-12VCB-SWC-U-GLOBAL	100–240 VAC/12 VDC power supply stripped wire connection; includes (4) power blades (Australia/New Zealand, Canada/United States, European Union, United Kingdom)	Australia Canada European Union United Kingdom United States
PB-NAM-V2 LEVEL VI	Replacement power blade; US-style locking power blade, level VI	Canada United States
PB-EU-V2 LEVEL VI	Replacement power blade; European-style locking power blade, level VI	European Union
PB-GB-V2 LEVEL VI	Replacement power blade; GB-style locking power blade, level VI	United Kingdom
PB-AU-V2 LEVEL VI	Replacement power blade; Australian-style locking power blade, level VI	Australia New Zealand
Terminal Blocks		
TBC-2-1	Terminal block connector, 2 wire; used for power connection to the device (1-pack)	Australia Canada European Union United Kingdom United States
TBC-8-1	Terminal block connector, 8 wire; used for GPIO and serial connections (1-pack)	
Cellular Antenna		
ANLTE7-2HRA	LTE antenna, 7.75 in., 2 dBi (2-pack)	Australia Canada European Union United Kingdom United States
ANLTE7-10HRA	LTE antenna, 7.75 in., 2 dBi (10-pack)	
ANLTE7-50HRA	LTE antenna, 7.75 in., 2 dBi (50-pack)	
Wi-Fi Antenna		
ANWBT3-1HRA	Wi-Fi/BT antenna, 2.4 GHz/5.0 GHz (1-pack)	Australia Canada European Union United Kingdom United States
ANWBT3-10HRA	Wi-Fi/BT antenna, 2.4 GHz/5.0 GHz (10-pack)	
ANWBT3-50HRA	Wi-Fi/BT antenna, 2.4 GHz/5.0 GHz (50-pack)	

Ordering Part Number	Description	Region
GPS Antenna		
ANGPS-1MM	GPS antenna, magnetic mount with 5-meter cable (1-pack)	Australia Canada European Union United Kingdom United States
ANGPS-10MM	GPS antenna, magnetic mount with 5-meter cable (10-pack)	
ANGPS-50MM	GPS antenna, magnetic mount with 5-meter cable (50-pack)	
Mounting Kits		
DIN-MOUNT-1	DIN rail mounting kit; includes device bracket, DIN rail clip, and screws (1-pack)	Australia Canada European Union United Kingdom United States
WALL-MOUNT-1	Wall mounting kit; includes device bracket and screws (1-pack)	

Warranty

To read the warranty statement for your product, go to https://www.multitech.com/warranty.

Contact Information

General Information	info@multitech.com https://multitech.com/contact-us/
Sales	+1 (763) 785-3500 sales@multitech.com
Technical Support Portal	+1 (763) 717-5863 https://support.multitech.com
Website	www.multitech.com
World Headquarters	2205 Woodale Drive Mounds View, MN 55112 USA

Related Documents

Additional documentation is available at www.multitech.com.

Document	Description	Part Number
API Developer Guide	Use the API interface to manage configurations, poll statistics, and issue commands. Go to www.multitech.net/developer/software/mtr-software/mtr-api-reference/.	N/A

Revision History

Revision Number	Description	Revision Date
1.0	Original publication.	February 2025