



WESROC[®] RMS
Residential LTE Cellular Tank Monitor
Model MT9104RTM
Operation Manual



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Safety Information

Hazardous Environments

The WESROC® RMS Residential LTE Cellular Tank Monitor (RTM) is designed for safe use in environments containing hazardous vapors. However, certain precautions need to be taken to ensure the safety of the person(s) working with the RTM, the tank, and any associated equipment.

TO ENSURE SAFE OPERATION: Install the RTM according to the instructions contained in this WESROC RMS Residential LTE Cellular Tank Monitor Operation Manual.

WARNING!!!

**Do NOT loosen or remove float gauge from a pressurized tank!
Tank decompression can cause serious injury or property damage!**

WARNING!!!

**Do NOT connect the RTM to any apparatus or wiring from another manufacturer!
Substitution of components may impair the intrinsic safety of the RTM!
Clean only with a damp cloth to prevent the possibility of electrostatic discharge!**

Battery Replacement

The RTM uses a field replaceable battery. The battery is a very specific type and should only be purchased from Independent Technologies, Inc. Use of any other power source will compromise the safety and/or performance of the RTM and will void the RTM warranty. Dispose of used batteries properly.

The RTM must be moved to a non-hazardous location before opening to replace the battery.

Radio Frequency Exposure

To ensure that exposure to hazardous radio frequency radiation is prevented, the RTM must NOT be installed in a location where humans will be routinely within 20 centimeters of the RTM.

To ensure that FCC requirements are met regarding radio frequency exposure, the RTM is NOT to be placed in operation where it will be co-located with another RTM. Co-location is considered to be where one operating RTM is within 20 centimeters of another operating RTM.

Compliance Information

Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.

This product meets the applicable FCC Part 15 rules and Industry Canada's license exempt RSSs. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent matériel est conforme aux CNR exemptions de licence d'Industrie Canada. Son fonctionnement est soumis aux deux conditions suivantes: (1) cet appareil ne peut pas provoquer d'interférences, et (2) cet appareil doit accepter toute interférence, y compris celles susceptibles de provoquer le fonctionnement du dispositif.

Overview

Device Characteristics

The WESROC® RMS Residential LTE Cellular Tank Monitor (RTM) is used to remotely monitor the level of the contents of a tank. The tank level and additional event and status information are reported to the WESROC® RMS Host System (Host) at scheduled intervals. In addition, the RTM will report to the Host immediately to track tank events in real time. The RTM uses the cellular data network and the internet to transport this information.

Communication with the Host is always originated by the RTM, but is bi-directional once a data session has been established. This allows for remote configuration of the RTM should the tank monitoring requirements change or in the event that the RTM is moved to another site.

The RTM can also provide a local tank level display capability. The RTM can be configured to send radio data packets to a nearby WESROC® RMS Base Unit (Base Unit). Once initialized to the RTM, the Base Unit will provide the customer with a local display of tank level for up to eight tanks (depending on which Base Unit is used).

Note – the Residential RTM has reduced range when communicating with a Base Unit compared to the Industrial CTM.

Installation

A basic RTM installation is easily performed in a few minutes by persons with a basic understanding of the tank equipment to be monitored and of the RTM device itself. Since the RTM is self-contained, the complete installation can be performed at the tank. No access to the customer's residence or place of business is required when local tank level display is not needed.

By default, the RTM is configured to monitor the most common type of tanks, but may be re-configured to monitor a wide variety of tank configurations. The RTM may be remotely configured by the Host, or may be configured on site by using the handheld WESROC® RMS Portable Diagnostic Unit (PDU).

Power

The RTM is battery powered, and due to its low power design will provide many years of monitoring before battery replacement is required. The battery may be replaced in the field once the RTM has been moved to a non-hazardous location.

Installation

Mounting Location

The WESROC® RMS Residential LTE Cellular Tank Monitor (RTM) is designed to be installed directly on the tank to be monitored. The RTM is connected to the tank gauge by the tank level sensor and sensor cable. The RTM itself may be attached to the tank with the supplied mounting magnet. The RTM may also be located a few feet away from the tank if necessary to improve cellular reception. Versions of the RTM are available with a longer sensor cable to facilitate mounting the RTM further away from the tank.

Tank Gauge

The standard RTM is equipped with a hall-effect based tank level sensor. This sensor is designed to be snapped into a remote ready tank gauge dial. The sensor and dial are part of the R3D dial and sensor system manufactured by Rochester Gauges. R3D dials are available for a wide variety of tank and gauge types. The RTM is configurable to work correctly with all available types.

Cellular Signal

The RTM must be installed in a location served by 4G LTE (Long Term Evolution) cellular service. The model MT9104RTMA RTM is supported by AT&T and its roaming partners. The model MT9104RTMV RTM is supported by Verizon and its roaming partners.

The RTM has a robust cellular sub-system, but there are limits to the capabilities of the cellular network in general. As with most wireless technologies, cellular signal reception can be affected by obstructions such trees, mountainous terrain, buildings, metal structures, large vehicles parked nearby, etc. In addition, cellular signal reception will be directly affected by the distance between the RTM and the nearest cell tower with LTE cellular service.

The best signal reception will be achieved with a line of sight path between the RTM and the cell tower. Obviously, this is rarely the case in the real world, but it should be kept in mind when selecting a mounting location for the RTM. Elevation can also help; typically performance will increase as the RTM is raised higher above the ground. The orientation of the RTM itself will also affect performance. The RTM should be installed upright, and if possible, with the sensor cable exit from the RTM enclosure pointed AWAY from the nearest cell tower supporting LTE cellular service.

Host Information

The customer information, installation location, and tank configuration for the installation site must be entered into the WESROC® RMS Host System (Host) BEFORE the RTM is installed on the tank. A RTM Installation Information Worksheet outlining the required information is included in the box and is also available from your host administrator or from Independent Technologies, Inc. Email or fax the completed worksheet to the host administrator before beginning the installation. Installation information can also be called in verbally provided your host administrator considers this an acceptable method.

Installation Steps

Performing the installation steps in the order shown will help ensure proper operation of the RTM. A large percentage of “trouble sites” are caused by improper installation.

1] If possible, perform a site visit to the location of the tank to be monitored. Determine the size of the tank and the type of gauge on the tank. This will help you select the right equipment to bring with at installation time. This is also a good time to try to determine if you have LTE cellular service available. Access to a cell phone can help with checking for the presence of a usable LTE cellular signal.

2] Send a completed RTM Installation Information Worksheet to your host administrator. *Try to do this at least one day BEFORE you intend to perform the actual installation so that the host administrator has time to enter the information into the Host.*

3] If not already done, install the correct remote ready dial or large dial assembly on the tank gauge. This step is covered in more detail in the WESROC® RMS Dial Replacement Guide available from Independent Technologies, Inc.

4] Remove the RTM from the box and make sure it has the right type of sensor and sensor cable for your application. Make sure the small round programming magnet is secured in the OFF position on the RTM enclosure. This is important to ensure proper operation of the RTM when you are ready to perform the first report to the Host.

5] Mount the RTM directly on or near the tank to be monitored. The maximum distance from the tank will be determined by the length of the sensor cable on the particular type of RTM that you are using. The RTM may be mounted to the steel surface of the tank using the mounting magnet on the bottom of the RTM. Another option is to mount the RTM to a pole or another nearby structure using a right-angle mounting bracket. Mounting brackets can be obtained from Independent Technologies, Inc.

Try not to place the RTM right next to a vertical metal object such as a tank dome or hood. Metal objects higher than the bottom of the RTM enclosure tend to have a negative effect on cellular signal quality. As mentioned before, the RTM should be installed upright, and if possible, with the sensor cable exit from the RTM enclosure pointed AWAY from the nearest cell tower supporting LTE cellular service.

6] Connect the sensor at the end of the sensor cable to the remote ready dial. This is accomplished by sliding the sensor into the sensor slot on the top of the dial. Slide the sensor from the side towards the center of the dial until it is fully seated. You will hear or feel a small “snap” once it is fully seated. To remove the sensor from the dial, *gently* lift up on the end of the sensor before attempting to slide it out of the dial.

7] (Optional.) If you are going to be using a WESROC® RMS Base Unit (Base Unit) as a local display device, now is the time to initialize the RTM to the Base Unit. See section “Operation” of this document for details. *The “Local Display” system configuration parameter on the RTM must be enabled for this feature to work.*

8] *This step assumes that the installation site information has already been entered into the Host and that this particular installation does not require any unusual configuration of the RTM.* Remove the programming magnet from the OFF position on the RTM enclosure and step away from the RTM. (Do not degrade the RTM cellular signal quality by leaning over it while it is attempting to report.)

At this time, the RTM will attempt a configuration report to the Host. The report is typically completed in under a minute, but can take up to 4 minutes to complete under adverse cellular signal conditions.

The RTM does not provide any direct feedback regarding report success or failure; therefore it is highly recommended to make use of a handheld WESROC® RMS Portable Diagnostic Unit (PDU) when performing RTM installations. The PDU will provide the installer with a wealth of information regarding report status, tank level status, RTM system status, and cellular network performance. See section “Portable Diagnostic Unit” of this document, or the WESROC® RMS Portable Diagnostic Unit Operation Manual for more information on operating the PDU.

Another option for checking report status is to have the Host send a text alert message to the installer’s cell phone once a successful report has completed. This of course requires that the host administrator enter the installer’s texting address into the Host before installation time. *Once installation is completed, the installer will want to have their texting address taken off of the alert list for this site to prevent the Host from sending the installer future tank activity alerts.*

9] Once a successful report has completed, secure the sensor cable using appropriate fasteners (cable ties, etc.). Route the sensor cable to make sure the cable will not be damaged by a moving object such as a tank dome or hood. Before leaving the installation site, make sure any programming magnets are removed from the RTM enclosure. Normal operating mode is with NO programming magnets installed.

Operation

General

After the WESROC® RMS Residential LTE Cellular Tank Monitor (RTM) has been installed on the tank to be monitored; it will periodically report tank level and activity data, and system status information to the WESROC® RMS Host System (Host). Reports can be triggered by expiration of a scheduled report interval timer, or by tank level events or conditions.

Operating Modes

The RTM has four basic operating modes, only one of which is used during normal operation. The other three modes are used for installation, configuration, or storage purposes. The four modes are selected by the installer using one or two small round programming magnets. The magnets are placed in the programming magnet recesses on the ends of the RTM enclosure when selecting different operating modes. *One programming magnet is supplied with each RTM – it is recommended to keep a few extra magnets on hand for use when configuring a RTM.*



OFF Mode: (One programming magnet in OFF position.)

Off mode is used for storage of the RTM. This is the mode the RTM will be in when shipped from the factory. When in Off mode, the RTM will wake up once per second and check the position of the programming magnets. If the installer has moved the programming magnet position(s) the RTM will switch to the newly selected mode. If not, the RTM will resume sleeping for another second. *Always leave the RTM in the Off mode to minimize battery drain and to minimize cellular data charges when a RTM is not in use.*

NORMAL Mode: (No programming magnets.)

Normal mode is used while the RTM is monitoring the level of the tank. This is the default operating mode of the RTM once it has been installed. While in this mode, the RTM will wake up once per minute and measure the level of the tank contents. The RTM will then go back to sleep or will take the appropriate action if the tank level has changed since the last measurement. Actions may include starting or ending the qualification of a tank level event, reporting a tank level event to the Host, or reporting to the Host at a scheduled report time. While in Normal mode, the RTM is also constantly monitoring itself for any conditions that may require reporting to the Host. *The RTM will also simulate a WESROC® RMS Tank Transmitter and will send ISM radio data packets to a Base Unit while in this mode if the "Local Display" system configuration parameter has been enabled.*

INITIALIZATION Mode: (One programming magnet in INIT position.)

Initialization mode is used for initializing the RTM to a WESROC® RMS Base Unit (Base Unit) before using the Base Unit as a local tank level display device. Once the RTM has been put into Initialization mode, it will simulate a WESROC® RMS Tank Transmitter and will send an initialization data packet to the Base Unit once every 15 seconds (or sooner if the tank level changes.) The RTM will time out of Initialization mode and will revert to the Normal operating mode after 60 minutes. This is done to conserve battery life and to ensure that the RTM continues reporting to the Host once the installer has left the site. *See the operating manual for the type of Base Unit that you are using for instructions on putting the Base Unit into Initialization mode.*

CONFIGURATION Mode: (One programming magnet in both OFF and INIT positions.)

Configuration mode is used to change one or more of the internal RTM configuration parameters. When in this mode, system (RTM) or application (tank level) operating characteristics can be changed using a PDU.

Changes made with a PDU are reported to the Host once the RTM is returned to Normal mode. If field configuration is enabled in the Host, the Host will store the changes to its configuration database, and will send the changes back to the RTM to confirm acceptance of the changes. If field configuration is not enabled in the Host, the Host will overrule the RTM and will send the previous configuration back to the RTM. The RTM will time out of Configuration mode and return to Normal mode if it has not received a configuration command from the PDU for 15 minutes. This is done to conserve battery life and to ensure that the RTM continues reporting to the Host once the installer has left the site.

Reporting To Host

The RTM reports to the Host on a schedule determined by the Host configuration. The reporting schedule can range from once per day to once per month. The report interval will directly affect battery life as the cellular sub-system is the major consumer of power in the RTM. ***It is not recommended to leave the RTM configured with a reporting schedule shorter than weekly as it will shorten battery life and may lead to excessive cellular data charges.***

In addition to scheduled reporting, the RTM will contact the Host to report RTM configuration changes, and tank level events.

Tank Level Measurement

The RTM wakes up and measures the level of the tank contents once per minute. This enables the RTM to be very responsive to changing tank level conditions and to more accurately qualify events such as tank fills or tank draws. The tank level is reported in a number ranging from 0 to 99, representing the tank level in percent full. This is the predominant measurement unit in the propane industry, and also serves well when monitoring low pressure fuels such as gasoline, diesel fuel, heating oil, etc.

Tank Level Events and Conditions

The RTM tracks and qualifies a number of different tank level events and conditions. Qualification of a tank level event or condition will cause the RTM to report to the Host ahead of its scheduled report time. A tank level event such as a tank fill is a one time event and will be reported and then cleared from the tank status. A tank level condition such as a low tank level will be reported, but will not be cleared from the tank status until the condition is no longer true. The following is a summary of the tank level events and conditions supported by the RTM. The configuration parameters referred to in this section can be referenced in the “Application Configuration” section of this document.

Tank Fill Event:

A tank fill event will be qualified by the RTM when the tank level increases by the configured amount.

Tank Draw Event:

A tank draw event will be qualified by the RTM when the tank level has decreased by the configured amount within one hour. A tank draw event will NOT be qualified if the tank level has dropped to 0% (bad or missing sensor).

Tank Level Change Event:

A tank level change event will be qualified by the RTM when the tank level has moved above or below the configured tank level change threshold since the last report to the Host. This threshold can be positive or negative, depending on if the user is looking to track a rising or falling tank level.

Tank Critical High Condition:

A tank critical high condition will be qualified by the RTM when the tank level has risen above the configured tank critical high threshold.

Tank Warning High Condition:

A tank warning high condition will be qualified by the RTM when the tank level has risen above the configured tank warning high threshold.

Tank Warning Low Condition:

A tank warning low condition will be qualified by the RTM when the tank level has dropped below the configured tank warning low threshold.

Tank Critical Low Condition:

A tank critical low condition will be qualified by the RTM when the tank level has dropped below the configured tank critical low threshold.

Missing Sensor Condition:

A bad or missing sensor condition will be qualified by the RTM when the tank level has dropped to 0% for a pre-determined amount of time. The qualification of this condition is not configurable.

Low Battery Notification

A low battery condition will not immediately trigger a report to the Host, but it will set a RTM system status flag that will be picked up by the Host at the next scheduled or event report.

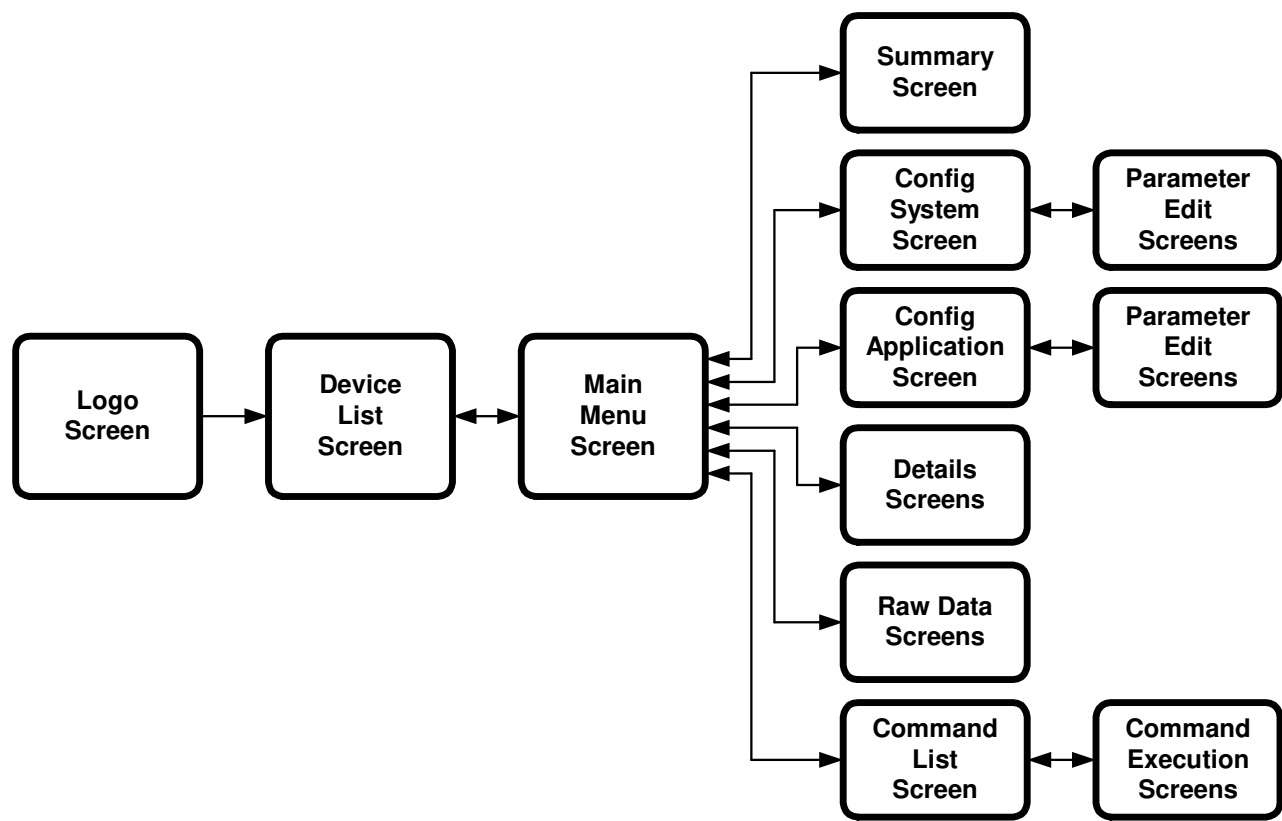
Portable Diagnostic Unit

General

The handheld WESROC® RMS Portable Diagnostic Unit (PDU) is used to configure and monitor the status of the WESROC® RMS Residential LTE Cellular Tank Monitor (RTM). This valuable device should be considered an essential part of any installation tool kit. The following is a summary of the sections of the PDU interface that are designed for use with the RTM. *A more detailed description of the operation of the PDU can be found in the WESROC® RMS Portable Diagnostic Unit Operation Manual.*

A configuration data packet is required to be transmitted by the RTM before the PDU can be used to configure the RTM or view detailed data from the RTM. The RTM will transmit a configuration data packet before and after each report to the Host, when the RTM is placed in Configuration mode, and each time a configuration command is received from the PDU. *The RTM must be in Configuration mode to respond to configuration commands sent by the PDU. A configuration command is sent from the PDU to the RTM each time the user changes a configuration parameter value and leaves a configuration parameter editing screen.*

PDU Screen Map



PDU Screens

Logo Screen:

This is the first screen displayed when the PDU is powered up. This screen will contain the WESROC® logo, or may contain your company logo if arrangements have been made for a custom logo. Press the right arrow key on the PDU to move to the Device List Screen. *This screen will only be displayed once when the PDU is powered on.*



Device List Screen:

Each line on this screen represents a WESROC® RMS device that has transmitted a data packet in the recent past. The serial number of the device will be displayed on the left side of the screen. A configuration data packet from a RTM will be noted by the "CelTnk" or "CelMon" device label in the middle of the screen. The time since the last transmission from each device is listed on the right side of the screen. Press the up arrow or down arrow keys to select the desired device. Press the right arrow key to move to the Main Menu Screen.



Main Menu Screen:

This screen contains a list of screens that can be selected depending on what type of action you want to take. Press the up arrow or down arrow keys to select the desired screen. Press the right arrow key to move to the selected screen. Press the left arrow key to return to the Device List Screen.



Summary Screen:

This screen contains a quick snapshot of the status of the RTM, the tank level, and the cellular network conditions during the last report to the Host. Press the left arrow key to return to the Main Menu Screen.



System Configuration Screen:

This screen contains a list of RTM system configuration parameters. Press the up arrow and down arrow keys to select a configuration parameter to change. Not all of the system configuration parameters are visible on the screen at the same time. Press the right arrow key to move to the selected configuration parameter editing screen. Press the left arrow key to return to the Main Menu Screen.



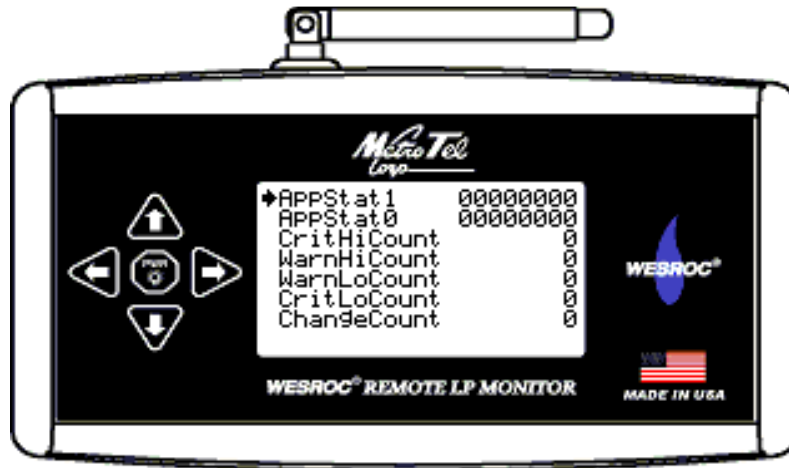
Application Configuration Screen:

This screen contains a list of application (tank level) configuration parameters. Press the up arrow and down arrow keys to select a configuration parameter to change. Not all of the application configuration parameters are visible on the screen at the same time. Press the right arrow key to move to the selected configuration parameter editing screen. Press the left arrow key to return to the Main Menu Screen.



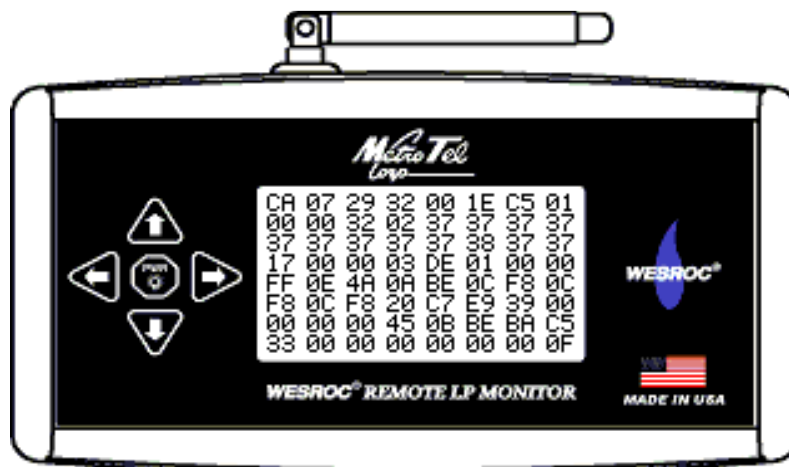
Details Screens:

This is a series of screens that can be used to view detailed information about the RTM system status, the tank level status and history, and information about the cellular network during the last report to the Host. Press the up arrow and down arrow keys to move between the various detail screens. Press the left arrow key to return to the Main Menu Screen.



Raw Data Screens:

This is a series of screens that can be used to view the raw data contained in the data packets transmitted from the RTM to the PDU. This information will only be useful for very rare and specific diagnostic purposes. Press the up arrow and down arrow keys to move between the various raw data screens. Press the left arrow key to return to the Main Menu Screen.

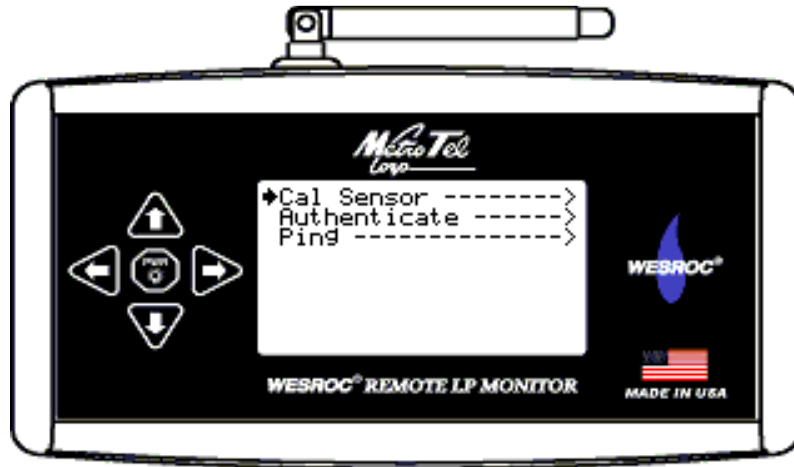


Command List Screen:

This screen contains a list of commands that can be used to control or configure the RTM. Press the up arrow and down arrow keys to move between the various commands.

Press the right arrow key to execute a command or to configure a parameter on the RTM.

Press the left arrow key to return to the Main Menu Screen.



NOTE: A PDU with firmware earlier than version 5.0 will not have a Command List Screen, but will instead show the 'Ping' command on the Main Menu Screen. The firmware on most PDUs can be updated to include the Command List Screen.

System Configuration Parameters

General

The WESROC® RMS Residential LTE Cellular Tank Monitor (RTM) system configuration parameters can be modified using the WESROC® RMS Portable Diagnostic Unit (PDU). These configuration parameters can also be modified by the WESROC® RMS Host System (Host) during a report.

Parameter List

Base ID: Used to identify a particular RTM device in the Host database.

Min: 000000000001; Max: 999999999999

Default: 99xxxxxxxxxx; Disable: N/A

Primary IP Address: The IP address used to report to the primary Host.

Min: 0.0.0.1; Max: 255.255.255.255

Default: 69.11.190.186 (ITC WESROC Server); Disable: 0.0.0.0 (Do not report.)

Primary IP Port: The IP port number used to report to the primary Host.

Min: 1; Max: 65535

Default: 50444 (ITC WESROC Server); Disable: 0 (Do not report.)

Secondary IP Address: The IP address used to report to the backup Host.

Min: 0.0.0.1; Max: 255.255.255.255

Default: 69.11.190.186 (ITC WESROC Server); Disable: 0.0.0.0 (Do not report.)

Secondary IP Port: The IP port number used to report to the backup Host.

Min: 1; Max: 65535

Default: 50444 (ITC WESROC Server); Disable: 0 (Do not report.)

Host Response Timeout: The maximum number of seconds that the RTM will wait for a response from the Host before sending a data packet retry.

Min: 5; Max: 60

Default: 30; Disable: N/A

Maximum Packet Retries: The maximum number of times that the RTM will retry sending a data packet to the Host before terminating a report.

Min: 1; Max: 8

Default: 2; Disable: N/A

Report Interval: The number of minutes until the next scheduled report to the Host.

Min: 60 (One Hour); Max: 65535 (45.5 Days)

Default: 1440 (24 Hours); Disable: N/A

Low Battery Threshold (mV): The low battery threshold for the RTM system battery.

Min: 2500; Max: 3600

Default: 2808 (78%); Disable: N/A

Local Display Mode: Enable Local Display mode to configure the RTM to transmit ISM radio data packets to a local display device. *Disable if not used to maximize battery life.*

Range: Enable or Disable

Default: Disabled

ISM Transmitter Number: Sets the transmitter number of the RTM. The local display device will display this number next to the displayed tank level. *This feature is very useful in multiple tank applications.*

Min: 1; Max: 127 (Maximum of 8 on handheld and current local display devices.)

Default: 1; Disable: N/A

Application Configuration Parameters

General

The WESROC® RMS Residential LTE Cellular Tank Monitor (RTM) application (tank level) configuration parameters can be modified using the WESROC® RMS Portable Diagnostic Unit (PDU). These configuration parameters can also be modified by the WESROC® RMS Host System (Host) during a report.

Parameter List

Sensor Scaling: The sensor output scaling to be used to calibrate the RTM to the type of tank and gauge being monitored.

Min: 1; Max: 255 (Not all used at this time – see current list below.)

Default: 1 (Small horizontal tank dial.); Disable: N/A

- 1 = Std Horiz** (small dial horizontal propane or fuel tank)
- 2 = Lg Dial** (large dial horizontal tank - use on large dials with black Rochester sensor)
- 3 = 420# Vert** (420# vertical propane cylinder)
- 4 = 200# Vert** (200# vertical propane cylinder with Taylor type "A" dial)
- 5 = Liquid CO2** (vertical liquid CO2 cylinder – do not use, special use only)
- 6 = Fuel Horiz** (small dial horizontal fuel tank – no longer used, use Std Horiz scaling)
- 7 = Flat** (no dial scaling correction – used with hydrostatic RTM on a vertical tank)
- 8 = 20k Horiz** (20k gallon horizontal fuel tank – do not use, special use only)
- 9 = 4-20mA** (monitor 4-20mA industrial current loop – special use only)
- 10 = ITC LgDial** (large dial horizontal tank - use on large dials with ITC Precision Sensor)
- 13 = RoundHoriz** (used with hydrostatic RTM on a round horizontal tank)
- 14 = GWR Flat** (used with GWR sensor on vertical wall tanks)
- 15 = GWR RndHrz** (used with GWR sensor on round horizontal tanks)
- 16 = 2012 Horiz** (small dial horizontal propane or fuel tank w/ dial produced before 1/13)

Tank Fill Threshold: The tank fill event qualification amount in percent full.

Min: 3%; Max: 95%

Default: 10%; Disable: 0%

Tank Draw Threshold: The tank draw event qualification amount in percent full.

Min: 3%; Max: 95%

Default: 15%; Disable: 0%

Critical High Threshold: The tank critical high condition level in percent full.

Min: 5%; Max: 95%

Default: 0%; Disable: 0%

Warning High Threshold: The tank warning high condition level in percent full.

Min: 5%; Max: 95%

Default: 0%; Disable: 0%

Warning Low Threshold: The tank warning low condition level in percent full.

Min: 5%; Max: 95%

Default: 30%; Disable: 0%

Critical Low Threshold: The tank critical low condition level in percent full.

Min: 5%; Max: 95%

Default: 15%; Disable: 0%

Level Change Threshold: The tank level change qualification amount in percent full. Set to a negative number to track a tank level decrease; set to a positive number to track a tank level increase.

Min: -95%; Max: +95%

Default: 0%; Disable: 0%; Invalid: +1 to +4%, -1% to -4%

Gain Adjust: Used to compensate for tank and gauge size mismatches and gauge gain calibration errors. ***For special applications only - use with caution.***

Min: -10.00x (Gain of -10.00); Max: +10.00x (Gain of +10.00)

Default: +1.00x (Gain of +1.00)

Disable: N/A; Invalid: +0.00

Offset Adjust: Used to compensate for gauge offset calibration errors.

For special applications only - use with caution.

Min: -100.00; Max: +100.00

Default: +0.00; Disable: N/A

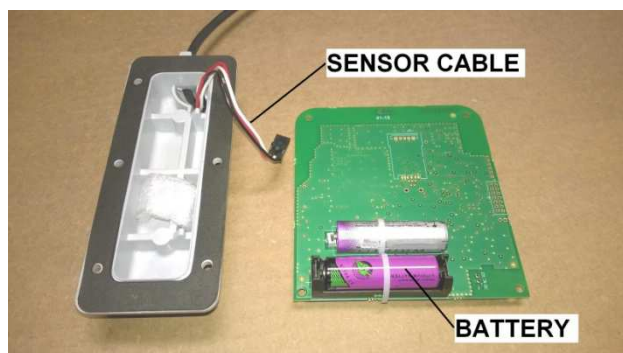
Battery Replacement

The WESROC® RMS Residential LTE Cellular Tank Monitor (RTM) uses a field replaceable 3.6V lithium thionyl chloride battery supplied by Independent Technologies, Inc. The RTM operates on a very small amount of power, but eventually the battery will need replacement. **The RTM must be moved to a non-hazardous location before opening the enclosure for battery replacement.** The following steps and photos illustrate how to replace the RTM battery.

1] Remove the six screws from the bottom of the RTM enclosure and remove the bottom half of the enclosure, sliding the circuit board out of the top half of the enclosure.



2] Depress the small tab on the sensor cable connector and remove it from the connector on the circuit board.



3] Clip the cable tie securing the old battery and remove the battery from the battery holder. Place a new battery in the battery holder and secure using a new cable tie.

Make sure the battery is properly seated into the holder and that the polarity markings are correct! Do NOT try to use a 1.5V alkaline or lithium battery!

4] Reconnect the sensor cable, place the circuit board into the upper half of the enclosure, fit the bottom half of the enclosure to the top half, and replace the six enclosure screws. (Make sure the small tab at the end of the enclosure bottom is properly aligned with the small notch on the edge of the enclosure top.)

Be sure to tighten the screws enough to compress the enclosure gasket and make a weather tight seal, but do not over tighten the screws and strip the threads from the RTM enclosure. (Proper screw torque is about 10 inch pounds.)

Specifications

Mechanical

Size: 5.7"L x 2.5"W x 5.8"H
Weight: Approximately 1.0 lbs
Mounting: Channel magnet or right-angle bracket.

Environment

Storage Temp: -50C to +70C
Operating Temp: -40C to +60C
Humidity: 0 to 100%

Power Source

Type: 3.6VDC AA size lithium thionyl chloride battery.
(Available from Independent Technologies, Inc.)
Expected Life: 5 years (reporting once per week).

Tank Level Sensor

Sensor Type: R3D Hall-Effect (Straight or Right-Angle)
Cable Length: 5, 10, or 30 feet depending on model

Cellular Radio

MT9104RTMA: 5 band LTE (4G), and 2 band UMTS (3G)
MT9104RTMV: 2 band LTE (4G)
Antenna: Internal

ISM Radio

Type: 900MHz ISM Band Transceiver (916.48MHz)
Antenna: Internal

Certifications

Safety

The WESROC® RMS Residential LTE Cellular Tank Monitor has been designed for use as Tank Monitoring Equipment in Class I, Division 1, Groups C and D Hazardous (Classified) Locations per UL1604/ANSI/ISA 12.12.01-2000 and CSA C22.2 No. 213-M1987.
Temperature Code: T4; Ambient Temperature Range: -40C to +60C;

FCC

The WESROC® RMS Residential LTE Cellular Tank Monitor (FCC ID number RWBMT9104RTM and IC number 115A-MT9104RTM) has been tested and found to comply with part 15 of the FCC Rules.

Cellular Carrier

The WESROC® RMS Residential LTE Cellular Tank Monitor has been certified for use on the following cellular networks.

MT9104RTMA:	AT&T LTE (4G) and UMTS (3G)
MT9104RTMV:	Verizon LTE (4G)

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