



Digi Connect<sup>®</sup> Tank

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Getting Started Guide

# Digi Connect Tank Getting Started Guide

(Part number 90001317 G)

| Revision | Date           | Description                                                                                                                                                                                                                              |
|----------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A        | July 2013      | Baseline release of the document.                                                                                                                                                                                                        |
| B        | September 2013 | Updated the guides to reflect the changes in LED sequence.                                                                                                                                                                               |
| C        | November 2013  | Updated pages 7 and 10.                                                                                                                                                                                                                  |
| D        | March 2014     | Updated the entire document for Digi ConnectTank Phase 2 updates.                                                                                                                                                                        |
| E        | March 2014     | Add the Changing APN for Digi ConnectTank UMTS Models section.                                                                                                                                                                           |
| F        | August 2014    | Revised to include the following: corrected procedure for uploading firmware over-the-air; added a procedure for configuring the cellular APN for Device Cloud via SMS; incorporated miscellaneous formatting and editorial corrections. |
| G        | February 2015  | Added safety and required tool information. Updated certifications and added conformity to UL / cUL standards. Added ATEX special conditions for safe use.                                                                               |

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# Safety notices and certifications

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Read all instructions before installing and powering the unit and keep these instructions in a safe place for future reference.

If the device shows any signs of damage or malfunction when connecting the battery, remove the battery connection immediately and contact your supplier for repair or replacement.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment. Use only the accessories and battery provided by the manufacturer; connecting non-approved accessories and batteries may damage the unit.

Do not attempt to repair the product. Any attempt to service or repair the unit by the user will void the product warranty.

Digi Connect Tank must be maintained by Digi or a Digi qualified technician only. Always use the designated battery, model number 76000912, from Digi. You must remove the unit from the installation or unclassified hazard location before opening the enclosure due to the risk of screws or batteries falling into the storage tank.

## Warning—explosion hazards

Digi products are designed to the highest standards of safety and international standards compliance for the markets in which they are sold. However, cellular-based products contain radio devices that require specific consideration. Read and understand the following warnings and cautions. Digi International assumes no liability for failure to comply with these precautions.

In this manual, **WARNING** Indicates a hazardous situation which, if not avoided, could result in death or serious injury.



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**WARNING!** Digi Connect Tank is suitable for use in UL/cUL Class 1, Division 2, Group D hazardous locations or non-hazardous locations only.

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**WARNING!** Substitution of any component may impair suitability for Class I, Division II.

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**WARNING!** The Digi Connect Tank unit contains internal batteries. Do not open the unit enclosure unless the area is known to be free of ignitable concentrations.

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**WARNING!** Electrostatic discharge (ESD) can damage equipment and impair electrical circuitry. ESD damage occurs when electronic components are improperly handled and can result in complete or intermittent failures.

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## Certifications

### RF exposure statement

In order to comply with RF exposure limits established in the ANSI C95.1 standards, ensure users maintain a distance from the product of no less than 20 cm (approximately 7.8 inches).

### FCC certifications and regulatory information

#### Radio frequency interface (RFI) (FCC 15.105)

This device has been tested and found to comply with the limits for Class B digital devices pursuant to Part 15 Subpart B, of the FCC rules. These limits are designed to provide reasonable protection against frequency energy, and if not installed and used in accordance with the instruction manual, 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, you are encouraged to attempt to correct the interference with one or more of the following measures:

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

#### Labeling requirements (FCC 15.19)

This device complies with Part 15 of 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.

If the FCC ID is not visible when the unit is installed inside another device, then the outside of the device into which the module is installed must also display a label referring to the enclosed module FCC ID.

## Modifications (FCC 15.21)

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

## CE certifications (Europe only)

Digi Connect Tank complies with European union CE marking requirements.

## UL / cUL conformity

Conformity to UL / cUL standards in the United States and Canada is in accordance with the following:

| Standard                    | Title                                                                                                                                     | Issue Date       |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| ANSI/ISA 12.12.01, 2012     | Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations | 2012             |
| CAN/CSA C22.2 No. 213-M1987 | Non-incendive Electrical Equipment for Use in Class I, Division 2 Hazardous Locations                                                     | 1987             |
| UL2054                      | UL Standard for Safety for Household and Commercial Batteries                                                                             | October 29, 2004 |
| UN 38.3                     | Recommendations on the Transport of Dangerous Goods Manual of Tests and Criteria                                                          | 2009             |
| UL 61010-1                  | Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use                                                 | 05/11/2012       |

## Essential health and safety requirements

The Digi Connect Tank complies with the essential health and safety requirements provided by the following standards:

| Standard                 | Title                                                                                                                                   | Issue Date |
|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|------------|
| EN 60079-0:2012/A11:2013 | Explosive Atmospheres - Part 0: Equipment - General Requirements                                                                        | 2013       |
| EN 60079-15:2010         | Explosive Apparatus for Explosive Gas Atmospheres - Part 15: Construction, Test and Marking of Type Protection "n" Electrical Apparatus | 2010/05/01 |

## Digi Connect Tank, special conditions for safe use - (ATEX)

### Applicability

The ATEX evaluation and the special conditions in this section apply to part numbers:

50001825-03

50001825-06



**WARNING!** Digi Connect Tank is suitable for use in ATEX Zone 2, Group IIA hazardous locations or non-hazardous locations only.



**WARNING!** The Digi Connect Tank unit should be installed only in process tanks containing neither non-pressurized nor non-flammable materials. The battery should be replaced in unclassified areas only.



**WARNING!** The Digi Connect Tank is intended for fixed installation, where the installation is intended to minimize the risk from electrostatic discharge. Instructions are provided for guidance for the user to minimize the risk from electrostatic discharge.



**WARNING!** Install the Digi Connect Tank in an area that does not have more than pollution degree 2 as defined in EN/ IEC 60664-1.



**WARNING!** To avoid potentially dangerous static discharges, control all likely ignition sources, minimize the harmful effects of any accidental fire or explosion by using explosion relief and suppression systems. All zoned areas containing potentially explosive atmospheres should be clearly marked using ATEX Ex hazardous area warning signs.

### ATEX product marking

The device must be marked with the CE Mark, the ATEX logo and the ATEX classification below:



 II 3 G Ex nA IIA T6 Gc IP54

## Explanation of the ATEX product marking

The following table provides the meaning of the ATEX marking.

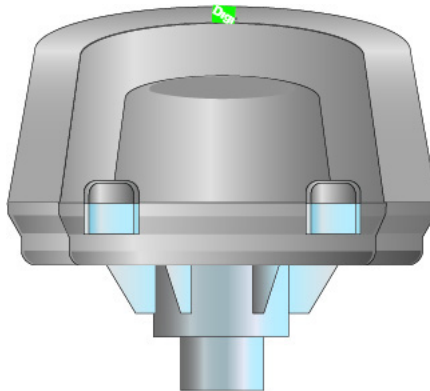
| Mark                                                                              | Meaning                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | The ATEX symbol. This symbol indicates certification for use in an explosive atmosphere. The symbols that follow it provide the details of that certified use.                                                                                                                                                                                                                                                                                                     |
| <b>II</b>                                                                         | This indicates Group II (Clause 4.2). The equipment is intended for use in places with an explosive gas atmosphere other than mines susceptible to firedamp.                                                                                                                                                                                                                                                                                                       |
| <b>3</b>                                                                          | This indicates Equipment category 3. Category 3 comprises products designed to be capable of keeping within its operational parameters, stated by the manufacturer, and based upon a normal level of protection for its intended use, considering areas in which explosive atmospheres caused by mixtures of air and gases, vapors, mists or air/dust mixtures are unlikely to occur and if they do occur, do so infrequently and for a short period of time only. |
| <b>G</b>                                                                          | This indicates the Environment based on International Electrotechnical Commission (IEC) 60079-0, Clause 29.4.                                                                                                                                                                                                                                                                                                                                                      |
| <b>Ex</b>                                                                         | This indicates Ex Components.                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>nA</b>                                                                         | This indicates that the device is non-sparking (Gc).                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>IIA</b>                                                                        | This is the Group symbol where <b>IIA</b> is for electrical equipment for places with an explosive gas atmosphere other than mines susceptible to firedamp.                                                                                                                                                                                                                                                                                                        |
| <b>T6</b>                                                                         | This is the Temp Code, indicating a maximum surface temperature of 85°C.                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Gc</b>                                                                         | This indicates the Equipment Protection Level. <b>Gc</b> means equipment for explosive gas atmospheres, having an “enhanced” level of protection, which is not a source of ignition in normal operation and which may have some additional protection to ensure that it remains inactive as an ignition source in the case of regular expected occurrences (for example failure of a lamp).                                                                        |
| <b>IP54</b>                                                                       | This indicates the Ingress Protection (IP) rating. Optional.                                                                                                                                                                                                                                                                                                                                                                                                       |

# About Digi Connect Tank

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Digi Connect Tank offers a low cost and seamless solution for monitoring remote single tank locations. It has a proven built-in ultrasonic sensor that periodically monitors the tank liquid level and alerts the backend via Device Cloud by Etherios.

Digi Connect Tank runs on internal battery and communicates through the cellular network, thereby avoiding expensive and cumbersome cabling and maintenance.



## Digi Connect Tank models and specifications

Digi Connect Tank offers models based on cellular options. For a complete list of models and model specifications, navigate to the following Digi Connect Tank page:

[www.digi.com/pdf/ds\\_digiconnecttank.pdf](http://www.digi.com/pdf/ds_digiconnecttank.pdf)

| Part number   | Description                                                            |
|---------------|------------------------------------------------------------------------|
| CTANK-M110    | Connect Tank, short-range ultrasonic sensor, Sprint.                   |
| CTANK-M110-12 | Connect Tank, short-range ultrasonic sensor, Sprint, 2-unit bulk pack. |
| CTANK-M210    | Connect Tank, short-range ultrasonic sensor, Verizon.                  |

| Part number   | Description                                                                               |
|---------------|-------------------------------------------------------------------------------------------|
| CTANK-M210-12 | Connect Tank, short-range ultrasonic sensor, Verizon, 12-unit bulk pack.                  |
| CTANK-M510    | Connect Tank, short-range ultrasonic sensor, UMTS/HSPA ATT and Global.                    |
| CTANK-M510-12 | Connect Tank, short-range ultrasonic sensor, UMTS/HSPA ATT and Global, 12-unit bulk pack. |
| CTANK-M120    | Connect Tank, mid-range ultrasonic sensor, Sprint.                                        |
| CTANK-M120-12 | Connect Tank, mid-range ultrasonic sensor, Sprint, 12-unit bulk pack.                     |
| CTANK-M220    | Connect Tank, mid-range ultrasonic sensor, Verizon.                                       |
| CTANK-M220-12 | Connect Tank, mid-range ultrasonic sensor, Verizon, 2-unit bulk pack.                     |

## Digi Connect Tank features

Digi Connect Tank has the following features.

- An M300/150 sensor with the following specifications:
  - 150 kilohertz, 8-degree beam angle
  - Range of 10 centimeters to 2.5 meters (7 feet)
  - Resolution of 0.25 millimeters
- An M300/95 sensor with the following specifications:
  - 95 kilohertz, 8-degree beam angle
  - Range of 0.3 meters (1 foot) to 4 meters (13 feet)
  - Resolution of 0.25 millimeters
- A built-in temperature sensor.
- An internal battery with more than two-year battery life under recommended operating conditions, such as measuring and uploading tank level data to Device Cloud twice a day.
- Internal cellular and GPS antennas.
- A failsafe OTA (Over The Air) device firmware upgrade mechanism.
- Optional GPS for nomadic tanks.
- 1" NPT mounting; 2" to 1" adapters are also available.

Digi Connect Tank is highly configurable, eliminating the need for custom programming and development. Additionally, you can configure several settings through Device Cloud, including:

- Cellular settings
- Device Cloud settings
- Data collection period
- Data reporting period

- Tank level alarms

Additional features:

- Stores up to 96 sensor readings
- Stores data in case of a network outage, and publishes that data when the network becomes available
- Transmits data via SMS or TCP/data path
- C1 D2 group D compliant

## Digi Connect Tank specifications and certifications

Complete, updated specifications of the Digi Connect Tank device and accessories are available on the Digi website. To view the Digi Connect Tank Hardware Specifications, click the [Specs](#) tab on the Digi Connect Tank page or see the tables below.

| Connect Tank             | CDMA                                          | UMTS                                                                                                              |
|--------------------------|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <b>WWAN</b>              |                                               |                                                                                                                   |
| Carriers                 | Verizon, Sprint                               | AT&T, International GSM carriers                                                                                  |
| Frequency Band           | Dual band 850/1900 MHz<br>CDMA 1x Data        | Quad band 850/900/1900/2100 MHz<br>HSDPA/UMTS/EDGE/GPRS/GSM                                                       |
| Data Rate                | CDMA2000 1x; 153 Kbps<br>forward/reverse link | GPRS: 85.6 Kbps DL; 42.8 Kbps UL<br>EDGE: 236.8 Kbps DL; 118.4 Kbps UL<br>WCDMA: 384 Kbps DL/UL<br>HSPA: 3.6 Mbps |
| Transmit Power (Typical) | 24 dBm (0.25W)                                | GSM: 29-32 dBm (0.8W-1.6W)<br>EDGE: 25-29 dBm (0.32W-0.8W)<br>UMTS: 23 dBm (0.2W)                                 |
| Receiver Sensitivity     | -107 dBm                                      | GSM: -109 dBm typ;<br>EDGE: -105.5 dBm min;<br>UMTS: -108 dBm to -110 dBm typ                                     |

| Sensor | Short Range                                                                                                                                      | Mid Range                                                                                                                                          | Short Range                                                                                                                                      | Mid Range                                                                                                                                          |
|--------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Model  | Massa M-300/150                                                                                                                                  | Massa M-300/95                                                                                                                                     | Massa M-300/150                                                                                                                                  | Massa M-300/95                                                                                                                                     |
| Type   | Ultrasonic, Built-in temperature/sound speed compensation                                                                                        |                                                                                                                                                    | Ultrasonic, Built-in temperature/sound speed compensation                                                                                        |                                                                                                                                                    |
| Range  | Range at -20° C to +65° C:<br>4 inches (100 mm) to 7 feet (2.1 meters)<br>Range at -30° C to -20° C:<br>4 inches (100 mm) to 5 feet (1.5 meters) | Range at -20° C to +65° C:<br>1 feet (0.3meters) to 13 feet (4 meters)<br>Range at -30° C to -20° C:<br>1 feet (0.3meters) to 12 feet (3.7 meters) | Range at -20° C to +65° C:<br>4 inches (100 mm) to 7 feet (2.1 meters)<br>Range at -30° C to -20° C:<br>4 inches (100 mm) to 5 feet (1.5 meters) | Range at -20° C to +65° C:<br>1 feet (0.3meters) to 13 feet (4 meters)<br>Range at -30° C to -20° C:<br>1 feet (0.3meters) to 12 feet (3.7 meters) |

| Connect Tank               | CDMA                                                                                                  | UMTS                                           |
|----------------------------|-------------------------------------------------------------------------------------------------------|------------------------------------------------|
| GPS                        |                                                                                                       |                                                |
| Channels                   | 16                                                                                                    |                                                |
| Assisted GPS               | Yes                                                                                                   |                                                |
| Sensitivity                | -155 dBm typ                                                                                          | -152 dBm typ                                   |
| TTFF (Typical)             | Cold start: ~45 seconds;<br>Hot start: <5 seconds                                                     | Cold start: ~60 seconds; Hot start: <5 seconds |
| Horizontal Accuracy        | 3m                                                                                                    |                                                |
| Antenna                    | Built-in                                                                                              |                                                |
| Management                 |                                                                                                       |                                                |
| Configuration & Management | Device Cloud                                                                                          |                                                |
| Protocol                   | SMS, TCP                                                                                              |                                                |
| Power                      |                                                                                                       |                                                |
| Transmit Current           | ~1A pk @ 7.2V                                                                                         | ~1.3A pk @ 7.2V during GSM Tx burst            |
| Receive Current            | ~40 mA @ 7.2V                                                                                         |                                                |
| Peak Current               | ~1A @7.2V                                                                                             | ~1.3A pk @7.2V during GSM Tx burst             |
| Power-Down Current         | ~2.2 uA at +25° C; <10 uA at > +25 °C                                                                 |                                                |
| Battery                    | 7.2V, 14.5 Ah, Lithium Thionyl Chloride, non-rechargeable, replaceable                                |                                                |
| Battery Life               | Approximately 2 years (@ 2 reads/transmits per day)                                                   |                                                |
| Environmental              |                                                                                                       |                                                |
| Operating Temperature      | -30° C to +65° C (See range limitations in Sensor section above)                                      |                                                |
| Storage Temperature        | -40° C to +85° C                                                                                      |                                                |
| Relative Humidity          | 90%                                                                                                   |                                                |
| Battery Discharge          | <1%/year if stored at +30° C                                                                          |                                                |
| Physical                   |                                                                                                       |                                                |
| Dimensions (L x W x H)     | 7.0 in x 5.15 in x 6.0 in (17.8 cm x 12.9 cm x 15 cm)                                                 |                                                |
| Weight                     | 1.25 lbs                                                                                              |                                                |
| LEDs                       | Battery, Network                                                                                      |                                                |
| Enclosure Material         | Polybutylene terephthalate (PBT) (The Massa sensor is PVC/PPA)<br>Polycarbonate (PC) for some devices |                                                |
| Enclosure Rating           | NEMA 4X                                                                                               |                                                |
| Mounting                   | 1" NPT                                                                                                |                                                |

|                      |                                                                                                                                                                                                           |      |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|
| Connect Tank         | CDMA                                                                                                                                                                                                      | UMTS |
| Regulatory Approvals |                                                                                                                                                                                                           |      |
| Safety               | UL/cUL Class 1 Division 2 (C1D2) Group D<br>Battery: UL 1642 standard<br>ATEX, per EN 60079-0:2012 (pending)<br>ATEX, EN 60079-15:2010<br>ATEX Zone 2, Group IIA                                          |      |
| Emissions/Immunity   | FCC Part 15B<br>CE                                                                                                                                                                                        |      |
| Immunity             | ESD (IEC 61000-4-2, Level 4: Air Discharge: 15KV, Contact Discharge: 8KV)<br>EMI, Radiated field immunity (IEC 61000-4-3, Level 3: 10V/m)<br>EMI, Magnetic field immunity (IEC 61000-4-8, Level 3: 10A/m) |      |
| Other                | EN 60068-2-31, Drop, Fall from 1 meter height, per face drop 2                                                                                                                                            |      |
| Warranty             |                                                                                                                                                                                                           |      |
| Product Warranty     | 3 years, excluding battery                                                                                                                                                                                |      |

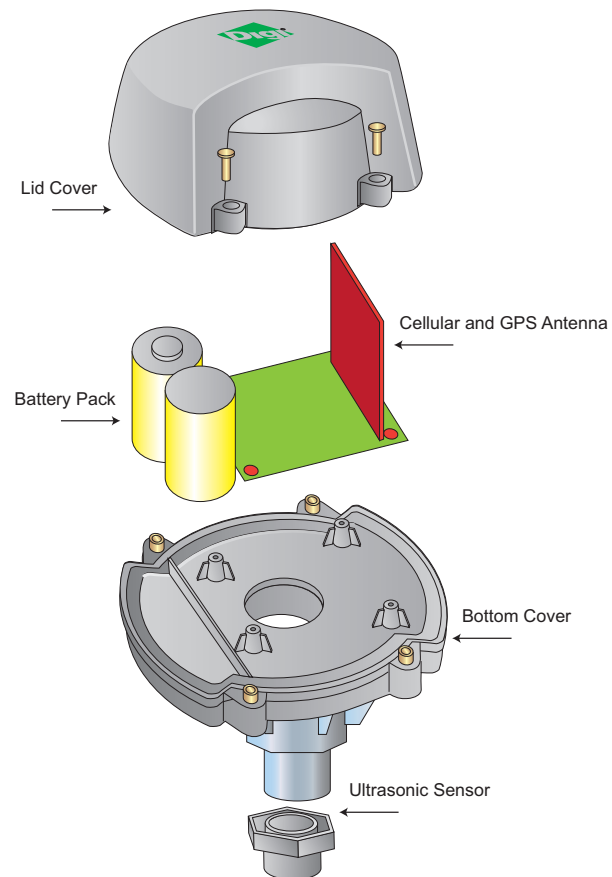
## Digi Connect Tank wake-up and sleep cycles

Digi Connect Tank can run on the internal battery for two years under recommended operating conditions. To achieve such an extended period of battery life, Digi Connect Tank switches between sleep and wake-up modes. The device is in sleep mode for the maximum amount of time, thus reducing the power consumption to the lowest possible levels. The device wake-up and subsequent operation are described in the following sections.

| Action                                          | Description                                                                                                                                                                                                                                                            |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| First-time power up<br>Battery power connection | Connect Tank powers up, detects the battery, and then goes into sleep mode.                                                                                                                                                                                            |
| Factory default button                          | Connect Tank performs the following: <ul style="list-style-type: none"> <li>• Sets the device configuration to factory defaults.</li> <li>• Sets the device time.</li> <li>• Uploads device information to Device Cloud.</li> </ul> The device then enters sleep mode. |

# Setting up Digi Connect Tank hardware

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# Assemble Digi Connect Tank

## Required tools

To assemble the Digi Connect Tank, you need one 9/64" hex (or Allen) wrench.

## Assembly instructions

Digi Connect Tank assembly consists of these basic steps:

- 1 Insert the SIM Card. You must install an activated SIM. The SIM card holder is installed on all models except CDMA models.
- 2 Connect the battery. See the *Digi Connect Tank Quick Start Guide* for detailed installation instructions.
- 3 Register the device on a network. See [Register Digi Connect Tank on a cellular network](#) on page 19 for detailed instructions.
- 4 Upload the device information to Device Cloud. See [Register Digi Connect Tank with Device Cloud](#) on page 20 for detailed instructions.
- 5 Mount the Digi Connect Tank.




---

**CAUTION!** Mounting the device vertically ensures proper orientation. If the device is not mounted vertically, the device may send erroneous readings. Cover screws are required as part of the safety rating.

---

## Ensure good network coverage for cellular and GPS antennas

Digi Connect Tank has internal antennas for cellular and GPS communications. There are no external antennas required to operate the device. While installing the device, make sure that there is adequate network coverage in the area by ensuring that the cellular LED is blinking blue. Good network coverage helps reduce power consumption, leading to improved battery life.

Unauthorized antenna modifications and attachments invalidate the device type specifications and may violate local RF emission regulations.

## Wake up Connect Tank

You can wake up Connect Tank using the Wake-up button or the magnet provided with Connect Tank. When you press the Wake-up button or activate the magnetic switch, the device performs the following functions.

- Sends a diagnostic record to Device Cloud with the following device information:
  - Sensor connect status
  - Measured distance reading
  - Measured temperature reading
  - GPS location (optional, based on configuration)

- Battery voltage (the current battery percentage remaining)
- Device configurations
- Cellular signal strength
- Battery and network status LEDs glow indicating their respective functions. See [Digi Connect Tank status LEDs](#) on page 40 for more information on the system status LED sequence.

## Wake up Connect Tank using the wake-up button

If the Connect Tank enclosure is open, press the Wake-up button to wake up Connect Tank.

## Wake up Connect Tank using the magnet

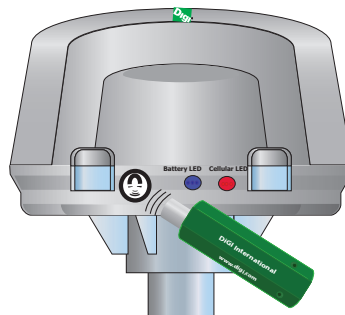
---

**Note** This was not evaluated as part of the ATEX evaluation.

---

If the Connect Tank enclosure is closed, use the magnetic sensor to wake up the device. To wake up Connect Tank using the magnet:

- 1 Bring the magnet close to the magnet icon on the Digi Connect Tank.



After several seconds, the LEDs start blinking indicating that the device is up and running. See [Digi Connect Tank status LEDs](#) on page 40 for more information on the system status LED sequence.

---

**Note** Waking up the device using the magnet is the same as pressing the **Wake-up** button.

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- 2 After wake-up, Digi Connect Tank sends the device configuration settings and data to Device Cloud. After sending all configuration settings and data to Device Cloud, the device enters sleep mode. The device remains in sleep mode until the next scheduled or manual wake-up.

## Configure wake-up for data acquisition and reporting

Using configuration options, you can configure Connect Tank to wake up to perform the following functions:

- Monitor the tank liquid level
- Report data to Device Cloud
- Check for a new configuration file from Device Cloud

- Check tank level alerts
- Check low battery alert

After a configured function is complete, the device returns to sleep mode. See [Managing Digi Connect Tank with Device Cloud](#) on page 21 for instructions.

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**Note** A two-year battery life assumes reading and reporting tank levels twice a day. Battery life may be significantly shortened by more frequent reading and reporting; or lengthened by less frequent reading and reporting.

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## Register Digi Connect Tank on a cellular network

To register Digi Connect Tank on a cellular network:

| For this network: | Do the following:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sprint            | If you are a Sprint user, activate Dig Connect Tank by contacting customer support and providing your ESN number.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| AT&T and UMTS     | If you are an AT&T and UMTS user, use an activated SIM card.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Verizon           | <p>If you are a Verizon user, convert the hexadecimal ESN provided on the label to a decimal ESN using the converter at <a href="http://www.esnconverter.com">www.esnconverter.com</a>. Use the decimal ESN in the Verizon portal.</p> <p>Once your Verizon account is activated, register the device following these steps:</p> <ol style="list-style-type: none"> <li>1 Press the <b>Wake-up</b> button.</li> <li>2 Press the <b>Factory Default</b> button. <ul style="list-style-type: none"> <li>• The cellular LED blinks red until authentication is complete (approximately 10 minutes).</li> <li>• When authentication is complete, the cellular LED blinks blue (approximately 30 seconds).</li> </ul> </li> </ol> <p>The device is registered with the Verizon cellular network.</p> |

## Register Digi Connect Tank with Device Cloud

After the Digi Connect Tank is activated for the first time, register the device with Device Cloud. To register the device:

- 1 Press the **Reset** button and wait for 30 seconds.
- 2 Press the **Factory Default** button to restore factory default settings and register the device in Device Cloud.
- 3 Wait for the cellular LED to glow for 3 seconds.

The device is registered with Device Cloud.

## Replace the battery



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**CAUTION!** The unit is sensitive to electro-static discharge (ESD).

---

Digi Connect Tank must be maintained only by Digi or a Digi qualified technician. Always use the designated battery, model number 76000912, from Digi International. Before replacing the battery, note of the following:

- Replace the battery in non-hazardous and unclassified areas only.
- Allow only a trained technician to replace the Lithium Thionyl Chloride batteries used in Digi Connect Tank.
- Remove the device from the installation area before opening the enclosure, due to the risk of the screws or battery falling into the storage tank.
- You may be required to have a licensed electrician install or perform maintenance on this equipment. Always follow applicable local, state, and federal codes and guidelines.

To replace the Digi Connect Tank battery:

- 1 Unscrew the top cover of the device.
- 2 Disconnect the battery connector from the main PCB.
- 3 Remove the battery pack and insert the new battery pack.
- 4 The battery connector is polarized; follow the polarizing notch and connect the new battery.
- 5 Press the **Wake-up** button and ensure that the battery LED is glowing blue.

## Digi Connect Tank data upload methods

Digi Connect Tank data is transmitted using the following communication channels.

- Data path
- SMS (short message service)

You can subscribe to a data plan or an SMS with limited data plan to upload Connect Tank data. See [Configure device options](#) on page 25 for instructions on setting the data upload method.

# Managing Digi Connect Tank with Device Cloud

---

Device Cloud is an on-demand service with no infrastructure requirements. Remote devices and enterprise business applications connect to Device Cloud through standards-based web services. This section describes how to configure and manage a Digi Connect Tank using Device Cloud.

For detailed information on using Device Cloud, refer to the *Device Cloud User Guide*, available via the **Documentation** tab in Device Cloud.

## Create a Device Cloud account

To create a Device Cloud account:

- 1 Go to [www.etherios.com](http://www.etherios.com).
- 2 In the top menu bar, click **Free Trial**.
- 3 Follow the online instructions to complete account registration. You can upgrade your trial account to a Premier account at any time.

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**Note** For initial Digi Connect Tank test and development, you can use a 30-day free trial account. When you're ready to deploy Digi Connect Tank devices in the field, you need a Premiere account to access all Digi Connect Tank features.

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## Add a Digi Connect Tank to Device Cloud

To add a Digi Connect Tank to your Device Cloud account inventory, follow these steps:

- 1 Go to [login.etherios.com](http://login.etherios.com).
- 2 Log in to your account
- 3 Click **Device Management > Devices**.
- 4 Click **Add Devices**. The Add Devices dialog appears.

---

**Note** You cannot use the **Discover** button to discover Connect Tank devices automatically because the devices are not available on the local network.

---

- 5 Identify the device you want to add using either the **Device ID** or the **IMEI #**:
  - a **For a CDMA device:** Select **Device ID** from the drop-down menu, and enter the device ID. The format for the device ID is 00020000-00000000-00000000-XXXXXXX. The 8-digit ESN number is printed on the device label. For example, if the printed ID is 6C4A21EA, enter it in the Device ID field as 00020000-00000000-00000000-6C4A21EA.
  - a **For a UMTS device:** Select **IMEI#** from the drop down menu, and enter the device IMEI number. Add zero as the suffix of the IMEI number (format: XXXXXXXXXXXXX0). For example, if the IMEI number is 35642304400092, enter it in the IMEI field as 356423044000920.
- 2 Click **Add** to add the device. The device is added to your inventory.
- 3 Click **OK** to close the Add Devices dialog and return to the Devices view.




---

**CAUTION!** Before completing the installation, make sure you configure the **Tank upload method** option to match your cellular contract to avoid unexpected charges. See [Configure device options](#) on page 25 for instructions on setting the **Tank upload method** option; see [Device options](#) on page 28 for details on all device options.

---

# Configuring Digi Connect Tank with Device Cloud

Digi Connect Tank configuration includes the following options:

- Alarm options
- Cellular options
- Device Cloud options
- Device options

## Configure alarm options

To configure alarm options:

- 1 Click **Device Management > Devices**.
- 2 Double-click on the Connect Tank you want to configure.
- 3 Click the **Configuration > Alarm Settings**.
- 4 Enter an appropriate value for each alarm option. See [Alarm options](#) on page 27 for details.

| Alarm Settings              |                                                               |
|-----------------------------|---------------------------------------------------------------|
| High Alert (aem):           | <input type="radio"/> On <input checked="" type="radio"/> Off |
| High Threshold (alh):       | 511 inches                                                    |
| Low Alert (aem):            | <input type="radio"/> On <input checked="" type="radio"/> Off |
| Low Threshold (all):        | 0 inches                                                      |
| Delta Low Alert (aem):      | <input type="radio"/> On <input checked="" type="radio"/> Off |
| Delta Low Threshold (adl):  | 0 inches                                                      |
| Delta High Alert (aem):     | <input type="radio"/> On <input checked="" type="radio"/> Off |
| Delta High Threshold (adh): | 511 inches                                                    |
| Hysteresis (ahy):           | 1 inches                                                      |
| Battery Voltage (abl):      | 75 percent                                                    |

- 5 Apply the configuration changes:
  - If the Connect Tank is currently connected to Device Cloud, click **Save** to immediately apply configuration settings.
  - If the Connect Tank is currently not connected to Device Cloud (that is, the Connect Tank is in sleep mode), use the Schedule option to schedule when to apply configuration changes to the device. See [Schedule configuration changes](#) on page 25.

## Configure cellular options

To configure cellular options:

- 1 Click **Device Management > Devices**.
- 2 Double-click on the Connect Tank you want to configure.
- 3 Click the **Configuration > Cellular Settings**.
- 4 Enter an appropriate value for each cellular option. See [Cellular options](#) on page 28 for details.

**5** Apply the configuration changes to the device:

- If the Connect Tank is currently connected to Device Cloud, click **Save** to immediately apply configuration settings.
- If the Connect Tank is currently not connected to Device Cloud (that is, the Connect Tank is in sleep mode), use the Schedule option to schedule when to apply configuration changes to the device. See [Schedule configuration changes](#) on page 25.

## Configure Device Cloud options

**Note** Device Cloud settings should be changed only with assistance from Digi Technical Support.

To configure Device Cloud options:

- 1 Click **Device Management > Devices**.
- 2 Double-click on the Connect Tank you want to configure.
- 3 Click the **Configuration > Device Cloud Settings**.
- 4 Enter appropriate values for each options. See [Device Cloud options](#) on page 28 for details.

**5** Apply the configuration changes to the device:

- If the Connect Tank is currently connected to Device Cloud, click **Save** to immediately apply configuration settings.
- If the Connect Tank is currently not connected to Device Cloud (that is, the Connect Tank is in sleep mode), use the Schedule option to schedule when to apply configuration changes to the device. See [Schedule configuration changes](#) on page 25.

## Configure device options

To configure Connect Tank device options:

- 1 Click **Device Management > Devices**.
- 2 Double-click on the Connect Tank you want to configure.
- 3 Click the **Configuration > Device Settings**.
- 4 Enter appropriate values for each option. See [Device options](#) on page 28 for details.

1. Apply the configuration changes to the device:
  - If the Connect Tank is currently connected to Device Cloud, click **Save** to immediately apply configuration settings.
  - If the Connect Tank is currently not connected to Device Cloud (that is, the Connect Tank is in sleep mode), use the Schedule option to schedule when to apply configuration changes to the device. See [Schedule configuration changes](#) on page 25.



**CAUTION!** Before applying Device settings options, make sure the **Tank Upload Method** matches your cellular contract. You can subscribe to a data plan or an SMS with limited data plan to receive tank data.

## Schedule configuration changes

After changing one or more configuration options, you can immediately apply the changes to the Connect Tank device or schedule a time for applying the configuration changes.

To schedule a time for applying configuration changes:

- 1 On any configuration page, click the down arrow next to the **Save** button.

- 2 Click **Schedule**. The Save Device Properties dialog appears.

- 3 Enable the **Schedule Offline** checkbox to create a schedule for a device that is off line.

**Note** If a device becomes disconnected from Device Cloud for any reason during the execution of this command, Device Cloud retries the command when the device reconnects.

## Configure a Digi Connect Tank with SMS and limited data

To configure a Connect Tank that subscribes to a cellular plan with SMS and limited data:

- 1 Go to [login.etherios.com](http://login.etherios.com), and log in to your account.
- 2 Click **Device Management > Devices**.
- 3 Right-click on the Connect Tank you want to configure, and select **SMS > Send Message**. The Send Message dialog appears.
- 4 Select **Request Connect**, and click **Send**.

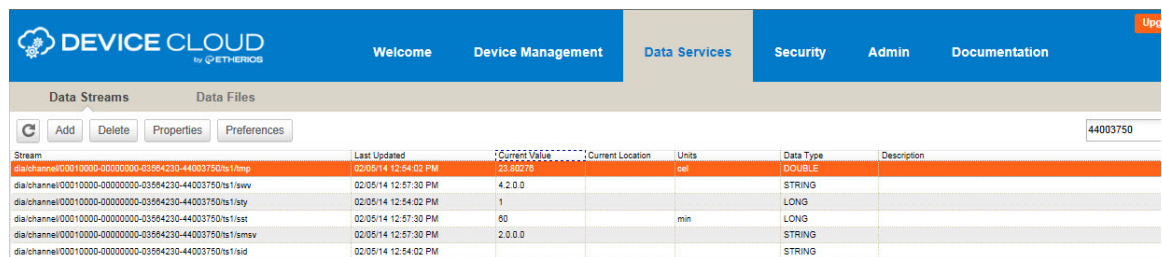
Once connected, modify configuration options using the instructions in [Configuring Digi Connect Tank with Device Cloud](#) on page 23.

## View Connect Tank sensor data

To view sensor data for a Connect Tank:

- 1 Click **Device Management > Data Services**.
- 2 Click **Data Streams**. The Data Streams view appears showing all reported data for all devices.
- 3 In the search box, enter the device ID of the device for which you want to view data.

For example, the following display shows data for the device ID 00010000-00000000-03564230-44003750.



| Stream                                                 | Last Updated         | Current Value | Current Location | Units | Data Type | Description |
|--------------------------------------------------------|----------------------|---------------|------------------|-------|-----------|-------------|
| dia:channel/00010000-00000000-03564230-44003750/1/req  | 02/05/14 12:54:02 PM | 25.00278      |                  | cel   | DOUBLE    |             |
| dia:channel/00010000-00000000-03564230-44003750/1/svwr | 02/05/14 12:57:30 PM | 4.2.0.0       |                  |       | STRING    |             |
| dia:channel/00010000-00000000-03564230-44003750/1/sy   | 02/05/14 12:54:02 PM | 1             |                  |       | LONG      |             |
| dia:channel/00010000-00000000-03564230-44003750/1/ssr  | 02/05/14 12:57:30 PM | 60            |                  | min   | LONG      |             |
| dia:channel/00010000-00000000-03564230-44003750/1/smsv | 02/05/14 12:57:30 PM | 2.0.0.0       |                  |       | STRING    |             |
| dia:channel/00010000-00000000-03564230-44003750/1/sid  | 02/05/14 12:54:02 PM |               |                  |       | STRING    |             |

- 4 Click on a data stream to see data details. Data for the stream is displayed in the bottom half of the view:
  - Click **Raw Data** to see the data in the selected data stream.
  - Click **Charts** to view the data in chart form.
- 5 To view properties for the data stream, click **Properties**.
- 6 To set preferences for the data stream, click **Preferences**.

# Connect Tank configuration options

## Alarm options

The following table describes Connect Tank alarm options.

| Option               | Description                                                                                                                                                                                                                                                                        | Range       | Default |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---------|
| High Alert           | When set to On, the device sends an alert when liquid level is above the high threshold.                                                                                                                                                                                           | On/ Off     | Off     |
| High Threshold       | This value indicates when to generate a high alert.                                                                                                                                                                                                                                | 0.0-511.0   | 511.0   |
| Low Alert            | When set to On, the device sends an alert when liquid level is below the low threshold.                                                                                                                                                                                            | On/Off      | Off     |
| Low Threshold        | This value indicates when to generate a low alert.                                                                                                                                                                                                                                 | 0.0 - 511.0 | 0.0     |
| Delta Low Alert      | When set to On, the device sends an alert if the liquid level decrease rate is more than delta low threshold on consecutive read intervals.                                                                                                                                        | On/Off      | Off     |
| Delta Low Threshold  | This value indicates when to generate a delta low alert.                                                                                                                                                                                                                           | 0.0-511.0   | 511.0   |
| Delta High Alert     | When set to On, the device sends an alert if the liquid increase rate is more than delta high threshold on consecutive read intervals.                                                                                                                                             | On/Off      | Off     |
| Delta High Threshold | This value indicates when to generate a delta high alert.                                                                                                                                                                                                                          | 0.0-511.0   | 511.0   |
| Hysteresis           | High alert does not re-trigger until the liquid level decreases below the difference between hysteresis value and High Threshold values.<br><br>Low Alert does not re-trigger until liquid level increases above the difference between hysteresis value and Low Threshold values. |             | 1.0     |
| Battery voltage      | Percentage at which the device generates a low battery alert.                                                                                                                                                                                                                      | 75-100      | 75      |

## Cellular options

The following table describes Connect Tank cellular options

| Option    | Description                                                                                                  | Value         |
|-----------|--------------------------------------------------------------------------------------------------------------|---------------|
| APN       | Access Point Network of the service provider.<br>Applicable only for UMTS devices.                           | apn.idigi.com |
| User name | User name of the service provider for data connectivity.<br>This is not required by most cellular providers. |               |
| Password  | Password of the service provider for data connectivity. This is not required by most cellular providers      |               |

## Device Cloud options

The following table describes Connect Tank Device Cloud options

| Option       | Description                                                      | Value              |
|--------------|------------------------------------------------------------------|--------------------|
| Phone Number | SMS will be published to this number                             | 43444              |
| Service ID   | Blank if phone number is 43444;<br>IDGP if phone number is 32075 |                    |
| Server Name  | Device Cloud server name                                         | login.etherios.com |

## Device options

The following table describes Connect Tank device options.

| Option                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                               | Range                                                                                                                            | Default                |
|--------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Read sensor every        | Based on this parameter value, the Connect Tank sensor reads the liquid level every x minutes.                                                                                                                                                                                                                                                                                                                                            | 15 minutes to 1440 minutes (24 hours)                                                                                            | 720 minutes (12 hours) |
| Report sensor data every | <p>Based on this parameter value and the <b>Read sensor every</b> parameter value, the Connect Tank device publishes data to Device Cloud.</p> <hr/> <p><b>Note</b> The Report Interval = <b>Read sensor every</b> x <b>Report sensor data every</b>.</p> <hr/> <p>Example:<br/>If Read sensor every = 15 and Report sensor every = 4, then a sensor reading is published to Device Cloud every hour (15 x 4 = 60 minutes or 1 hour).</p> | <p>1 to 672 readings</p> <p>Note: The sensor can store only 96 readings. Setting this value above 96 will lead to lost data.</p> | 1                      |

| Option                                        | Description                                                                                                                                                                                                                                                                                                                                                                                        | Range                                                                                                              | Default                  |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|--------------------------|
| First daily report at HHMM                    | A value of 60 would be 1 hour after midnight GMT (minutes from midnight GMT).                                                                                                                                                                                                                                                                                                                      | 0 to 1439 (minutes)                                                                                                | 0                        |
| Send last                                     | Sends the specified number of latest readings. A value of 1 sends only the last reading. The value for this option must be less than the value for the <b>Report sensor data every</b> option.                                                                                                                                                                                                     | 1 to 96 readings                                                                                                   | 1                        |
| Send location every                           | Based on this parameter value, the device sends location data after the specified number of report intervals.                                                                                                                                                                                                                                                                                      | 1 to 96 readings                                                                                                   | 1                        |
| Tank upload method                            | <p>Mode of communication from device to Device Cloud.</p> <hr/> <p><b>Note</b> Allowing SMS fallback on a cellular contract with limited SMS could lead to a high bill. Contracts that are SMS only should not allow TCP fallback.</p> <hr/>                                                                                                                                                       | <p>0 - TCP/IP only</p> <p>1 - SMS only</p> <p>2 - TCP/IP with SMS fallback</p> <p>3 - SMS with TCP/IP fallback</p> | TCP/IP with SMS fallback |
| GPS enable                                    | Based on this setting, location data collection is enabled or disabled.                                                                                                                                                                                                                                                                                                                            | Off/ On                                                                                                            | Off                      |
| Waveform collection                           | <p>Based on the waveform setting, data is collected every report interval.</p> <hr/> <p><b>Note</b> Enabling this option increases your cellular data usage and should be used only for debugging purposes. Waveform collection does not work if you have set the Tank upload method to SMS only.</p> <hr/> <p>This should be turned OFF when upgrading Microcontroller code via Device Cloud.</p> | Off/ On                                                                                                            | Off                      |
| Last Reported UTC time in YYYY-MM-DD HH:MM:SS | <p>Set date and time on the device.</p> <hr/> <p><b>Note</b> Connect Tank time and date is automatically set from the network. Typically, you do not need to set the device time and date options.</p> <hr/>                                                                                                                                                                                       |                                                                                                                    | 1970-01-01-00:00:00      |

## Connect Tank data streams channel attributes

The following table describes the data stream channel names available in Device Cloud for Digi Connect Tank.

| Long name     | Short name | Command/semantics                                                                                                                                                                                |
|---------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| distance      | val        | Sensor tank level in inches.                                                                                                                                                                     |
| temperature   | tmp        | Temperature in degree centigrade.                                                                                                                                                                |
| rsi           | rsi        | Signal strength.                                                                                                                                                                                 |
| latitude      | lat        | LAT.YYY is represented as the geographic latitude coordinate. For example, 12.9833.                                                                                                              |
| longitude     | lon        | LON.YYY is represented as the geographic latitude coordinate. For example, 77.5833.                                                                                                              |
| altitude      | alt        | ALT.YYY is represented in meters above sea level. For example, 920 m.                                                                                                                            |
| GPS fix type  | fix        | 0 - no fix<br>1 - valid fix<br>2 - invalid fix                                                                                                                                                   |
| GPS interval  | gin        | Interval for GPS information. The range is 1-96.                                                                                                                                                 |
| battery level | bat        | The charge remaining in the battery, reported in percentage.                                                                                                                                     |
| apn           | apn        | apn.idigi.com                                                                                                                                                                                    |
| sensor type   | sty        | 1=M300/150<br>2=M300/95                                                                                                                                                                          |
| tank type     | tty        | Reserved for future use. Initialize to 0.<br>The tank type channel has application-defined values, but is intended for a user application. It is not typically needed in the initial deployment. |
| Read period   | rdp        | Value in minutes. 15 means read every 15 minutes.                                                                                                                                                |

| Long name               | Short name | Command/semantics                                                                                                                                                                                                                                                                                                                                                      |
|-------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Send interval           | sdp        | <p>Upload interval</p> <p>a) If the user wants to read the tank reading every 1 hour and report to Device Cloud in 24 hours:</p> <p>rdp = 60 (in minutes)</p> <p>sdp = 24 (in # of reads)</p> <p>b) If the user wants to read the tank reading every 1/2 hour and report to Device Cloud in 13 hours:</p> <p>rdp = 30 (in minutes)</p> <p>sdp = 26 (in # of reads)</p> |
| Send start time         | sst        | A value of 60 would be 1 hour after midnight GMT (minutes from midnight GMT).                                                                                                                                                                                                                                                                                          |
| Tank upload method      | tum        | <p>Values are as follows:</p> <p>1 - Data only</p> <p>2 - SMS only</p> <p>3 - Data with SMS fallback</p> <p>4 - SMS with data fallback</p> <p>Valid values are from 1 to 4, defaults to 3</p>                                                                                                                                                                          |
| SMS phone number        | phn        | <p>Device Cloud phone number.</p> <p>For example 00447786201216, 32075, etc.</p>                                                                                                                                                                                                                                                                                       |
| Service ID              | sid        | Service ID to be used when phn is a short code. For example, IDGP (can be left blank).                                                                                                                                                                                                                                                                                 |
| Cloud server name       | isn        | login.etherios.com                                                                                                                                                                                                                                                                                                                                                     |
| Sensor error            | ser        | <p>0 - No error</p> <p>1 - Sensor error (internally handled)</p>                                                                                                                                                                                                                                                                                                       |
| Sensor connected status | scs        | <p>0 - Sensor not connected</p> <p>1 - Sensor connected</p>                                                                                                                                                                                                                                                                                                            |
| Device wake type        | dwt        | <p>2 - Normal record</p> <p>3 - Alarm record</p> <p>8 - Wakeup record</p>                                                                                                                                                                                                                                                                                              |
| Send count              | sdv        | <p>Send the last N readings, <math>1 \leq N \leq 96</math>, using the smaller value of N to ensure room to grow PIC code. Default is 1.</p> <p>Implementation note: This is essentially the size of the round robin buffer where samples are stored.</p>                                                                                                               |

| Long name                                          | Short name | Command/semantics                                                                                                                                                                                                                   |
|----------------------------------------------------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Alarm high                                         | alh        | Alarm high means alarm when the val $\leq$ alh (calculated from the sensor's perspective, such as from top to bottom).                                                                                                              |
| Alarm low                                          | all        | Alarm low means send alarm when val $\geq$ all (calculated from the sensor's perspective, such as from top to bottom).                                                                                                              |
| Alarm delta low                                    | adl        | Alarm delta low sends an alarm when $\text{valprevious} + \text{adl} < \text{valcurrent}$ (calculated from the sensor's perspective, such as from top to bottom).                                                                   |
| Alarm delta high                                   | adh        | Alarm delta high sends an alarm when $\text{valprevious} - \text{adh} > \text{valcurrent}$ (calculated from the sensor's perspective, such as from top to bottom).                                                                  |
| Alarm enable mask (8 bits)                         | aem        | Enable bit for various alarms from LSB to MSB (1 is enabled)<br>0 - Alarm high enable - alh<br>1 - Alarm low enable - all<br>2 - Alarm delta low enable - adl<br>3 - Alarm delta high enable - adh<br>4-7 - Reserved for future use |
| Alarm hysteresis                                   | ahy        | -/+ ahy from high/low alarms respectively. Alarms high and low do not re-trigger until condition is not true for 1 reading outside of hysteresis.                                                                                   |
| Alarm reason mask (8 bits)                         | arm        | Bits from LSB to MSB (1 means the alarm was tripped):<br>0 - Alarm high<br>1 - Alarm low<br>2 - Alarm delta low<br>3 - Alarm delta high<br>4 - Manual upload<br>5 - Low battery alert<br>6-7 - Reserved for future use              |
| Alarm battery                                      | abt        | Send battery channel alarm when the battery $\leq$ abt. Default is 75 (75%).                                                                                                                                                        |
| Hardware version (in other words, the PCB version) | hvv        | String that returns the hardware version.                                                                                                                                                                                           |

| Long name                                       | Short name | Command/semantics                                                                  |
|-------------------------------------------------|------------|------------------------------------------------------------------------------------|
| Firmware version (e.g., PIC code version)       | fwv        | Recommend major.minor.maint.build (for example, 1.0.0.101).                        |
| Software version (e.g., Digi BREW code version) | swv        | Recommend major.minor.maint.build (for example, 1.0.0.101).                        |
| SMS version                                     | smsv       | SMS extension version. Recommend major.minor.maint.build (for example, 1.0.0.101). |
| I2C version                                     | i2cv       | I2C extension version. Recommend major.minor.maint.build (for example, 1.0.0.101). |
| GPS feature                                     | gps        | GPS ON/OFF feature.<br>0 – GPS Off<br>1 – GPS On                                   |
| POSIX time                                      | tim        | Set current POSIX time.<br>Epoch time from Jan 1 1970 (in seconds).                |

## Digi Connect Tank factory defaults

| Setting                       | Default value      |
|-------------------------------|--------------------|
| Alarm Battery                 | 75                 |
| Alarm Delta High              | 511.0              |
| Alarm Delta Low               | 0                  |
| Alarm High                    | 511.0              |
| Alarm Hysteresis              | 1.0                |
| Alarm Low                     | 0                  |
| Alarm Mask                    | 0                  |
| APN Name                      | apn.idigi.com      |
| Device Cloud Update Frequency | 1                  |
| GPS feature                   | 0                  |
| GPS interval                  | 1                  |
| Phone Number                  | 43444              |
| Restrict Reply                | 1                  |
| Restrict Sender               | 0                  |
| Send Count                    | 1                  |
| Send Start Time               | 0                  |
| Sensor Read Frequency         | 720                |
| Sensor Type                   | 1                  |
| Server Name                   | login.etherios.com |
| SMS Feature State             | 1                  |
| Tank Type                     | 0                  |
| Tank Upload Method            | 3                  |
| Waveform                      | 0                  |

# Updating Digi Connect Tank firmware

---

Digi Connect Tank has two firmware components:

- cellular module
- microcontroller

If you are updating both the cellular module and the microcontroller firmware, you must update the cellular module firmware before you update the microcontroller firmware.

Cellular and microcontroller firmware can be updated with Device Cloud when a device is on line or scheduled offline to update at the next wake cycle.

---

**Note** The next wake cycle is based on the **Read sensor every** and **Report sensor data every** device options. For example, if **Read sensor every** is 15 and **Report sensor data every** is 4, then the device wakes up every 1 hour. See [Configure device options](#) on page 25 for instructions on configuring device options; see [Device options](#) on page 28 for a list of all device options.

---

## Update both cellular module and microcontroller firmware

To update both the cellular module and microcontroller firmware:

**1** Update the cellular module firmware:

- To update the cellular module firmware online, see [Update firmware for an online device using Device Cloud](#) on page 36.
- To update the cellular module firmware offline, see [Update firmware for an offline device using Device Cloud](#) on page 37.

Once the cellular module firmware is successfully updated, the device restarts and connects to Device Cloud.

**2** Update the microcontroller firmware:

- To update the microcontroller firmware online, see [Update firmware for an online device using Device Cloud](#) on page 36.
- To update the microcontroller firmware offline, see [Update firmware for an offline device using Device Cloud](#) on page 37.

## Update firmware for an online device using Device Cloud

To update firmware for a Connect Tank that is online:

- 1** Go to [login.etherios.com](https://login.etherios.com), and log in to your account.
- 2** Click **Device Management > Devices**.
- 3** Right-click on the device to be updated, and select **Firmware > Update Firmware**.
- 4** Click **Browse** and enter the path to the firmware file:
  - For cellular module firmware, enter the path that contains the SingleTank\_X.X.X.X.bin file.
  - For microcontroller firmware, enter the path that contains the Tank\_MCU\_Firmware.bin file.

---

**Note** Make sure the microcontroller firmware binary filename is Tank\_MCU\_Firmware.bin.

---

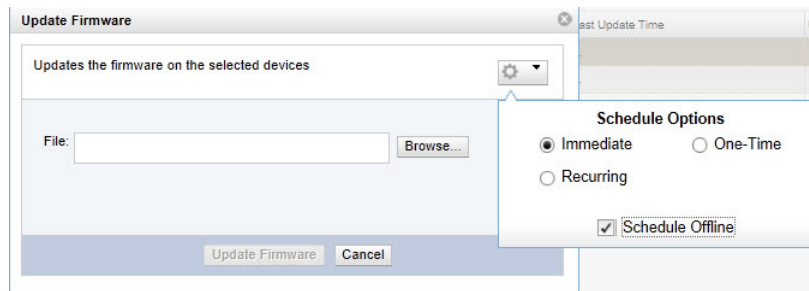
**5** Click **Update Firmware**.

Device Cloud updates the firmware on the device.

## Update firmware for an offline device using Device Cloud

To update firmware for a Connect Tank that is offline:

- 1 Go to [login.etherios.com](https://login.etherios.com), and log in to your account.
- 2 Click **Device Management > Devices**.
- 3 Right-click on the device to be updated, and select **Firmware > Update Firmware**.
- 4 Click the gear button, and select the **Schedule Offline** checkbox.



- 5 Click **Browse** and enter the path to the firmware file:
  - For cellular module firmware, enter the path that contains the SingleTank\_X.X.X.X.bin file.
  - For microcontroller firmware, enter the path that contains the Tank\_MCU\_Firmware.bin file.

---

**Note** Make sure the microcontroller firmware binary filename is Tank\_MCU\_Firmware.bin.

---

- 6 Click **Update Firmware**.

The firmware is updated when the device next connects to Device Cloud.

## Use SMS to request a connection for updating firmware

---

**Note** You cannot update firmware via SMS. SMS-only devices need data connectivity for firmware updates.

---

To request a connection via SMS:

- 1 Go to [www.etherios.com](https://www.etherios.com), and log in to your Device Cloud account.
- 2 Click **Device Management > Devices**.
- 3 Right-click on the device to which you want to upload firmware and select **SMS > Send Message**.
- 4 Select **Request Connect** and click **Send**.

Once connected, update firmware using the instructions in [Update firmware for an offline device using Device Cloud](#) on page 37.

## Verify Digi Connect Tank firmware version

After updating the microcontroller, send a configuration message to the device. For more instructions, see [Managing Digi Connect Tank with Device Cloud](#) on page 21. After you send the configuration message, the device acknowledges with device data.

### View the microcontroller firmware version

You can view the microcontroller version number in the Data Stream page under the channel name **fwv**.

| Data Streams                                                                                                        |                      | Data Files |
|---------------------------------------------------------------------------------------------------------------------|----------------------|------------|
|  Add Delete Properties Preferences |                      |            |
| Stream                                                                                                              | Last Updated         |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/iikv                                                            | 03/11/14 06:12:45 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/i2cv                                                            | 05/06/14 03:13:14 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/hwv                                                             | 05/06/14 03:13:14 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/gps                                                             | 05/06/14 03:13:19 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/gin                                                             | 05/06/14 03:12:43 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/fwv                                                             | 05/06/14 03:13:13 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/fix                                                             | 04/06/14 05:24:58 PM |            |

### View the cellular firmware version

You can view the cellular version number in the device management page or in the **Data Streams** page under the channel name **swv**.

| Data Streams                                                                                                          |                      | Data Files |
|-----------------------------------------------------------------------------------------------------------------------|----------------------|------------|
|  Add Delete Properties Preferences |                      |            |
| Stream                                                                                                                | Last Updated         |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/val                                                               | 05/06/14 03:12:43 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/tum                                                               | 05/06/14 03:12:43 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/tty                                                               | 05/06/14 03:13:13 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/tmp                                                               | 05/06/14 03:12:43 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/swv                                                               | 05/06/14 03:13:14 PM |            |
| dia/channel/00010000-00000000-03564230-44000010/ts1/sty                                                               | 05/06/14 03:12:43 PM |            |

### Query the device for firmware versions

For devices with SMS with limited data plan, query the version by sending the **Request connect** message. You can then view the microcontroller and cellular version number.

# Troubleshooting

---

This section provides a number of resources for troubleshooting your device and assessing the status of the device and its connections. There are several support resources available at the Digi support site: [www.digi.com/support/](http://www.digi.com/support/).

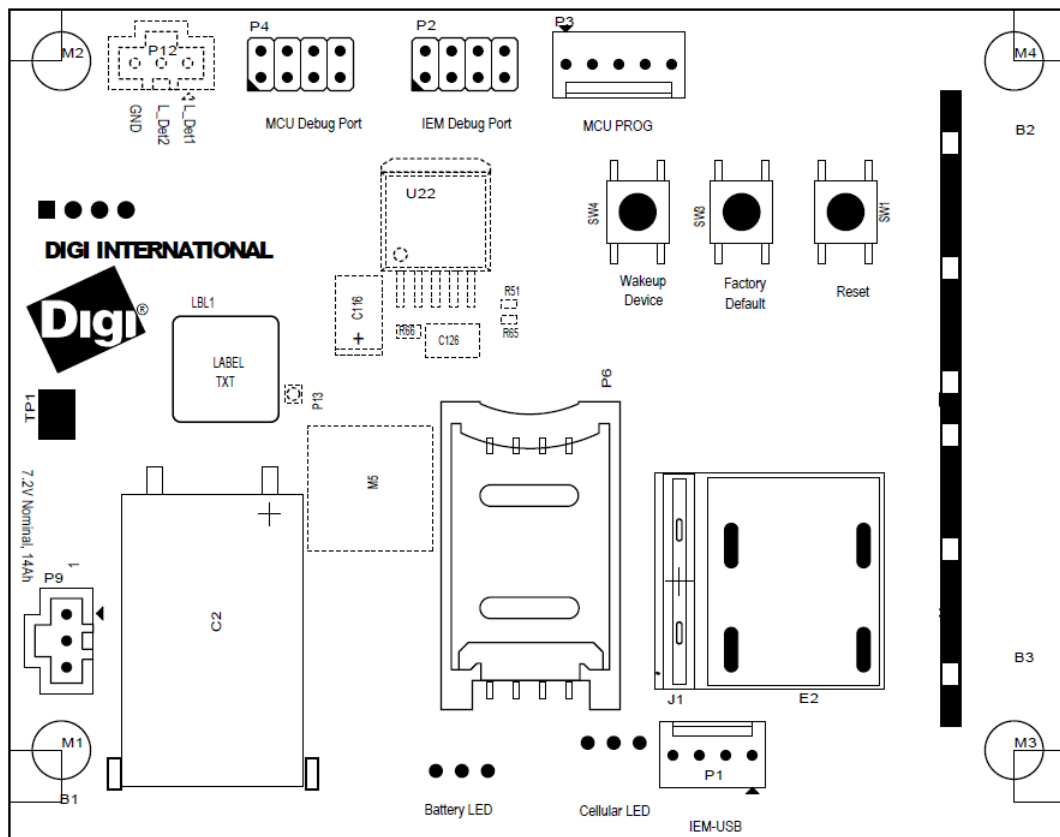
Additional resources are also available:

- Visit the Digi International support knowledge base at [www.digi.com/support/kbase](http://www.digi.com/support/kbase) to look for articles related to your situation.
- Visit the Digi International support forums at [www.digi.com/support/forum/](http://www.digi.com/support/forum/) and search for posts from other users with similar situations.
- If the knowledge base or support forums do not have the information you need, fill out an online support request via [www.digi.com/support/eservice/login](http://www.digi.com/support/eservice/login). You will need to create a user account if one is not already set up.

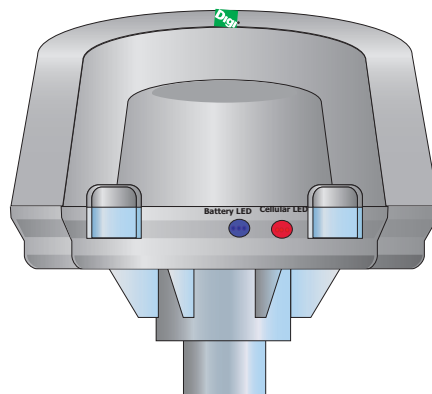
## Troubleshooting resources

Digi Connect Tank includes the following buttons that assist troubleshooting:

- **Factory Default button:** Reloads the factory default configuration into Connect Tank. Reloading factory defaults overwrites all customer configurations. This built-in recovery mechanism enables you to quickly restore Connect Tank to the original functionality.
- **Reset button:** Forces Connect Tank to wake up when the device does not respond to a timed wake-up, the **Wake-up** button, or the wake-up magnet. Upon hard reset, the device boots up and then enters sleep mode. After reset, you need to wake up the device by pressing the **Wake-up** button or using the magnet.



## Digi Connect Tank status LEDs



Digi Connect Tank has two LED indicators that assist with monitoring the battery and the cellular network:

| LED                                      | Color and light pattern                                 | Description                                                    |
|------------------------------------------|---------------------------------------------------------|----------------------------------------------------------------|
| Battery LED                              | Blink blue                                              | Battery level more than 25%.                                   |
|                                          | Blink red                                               | Battery level less than 25%.                                   |
| Cellular LED                             | Blink blue (1 second on/1 second off)                   | Registered to the cellular network.                            |
|                                          | Blink red                                               | Not registered to the cellular network or registration failed. |
|                                          | Glow blue                                               | Diagnostic record has been successfully sent to Device Cloud.  |
| Cellular LED (During Verizon activation) | Blink blue (2 seconds On- 2 seconds Off for 30 seconds) | Authentication successful.                                     |

**Note** For the battery LED, blinking occurs for 10 seconds only after you press and release the **Wake-up** button or activate the magnetic sensor. For the cellular LED, there may be a delay in LED activity for 20-90 seconds.

## Troubleshoot network activation

Network activation can fail due to one of the following reasons:

- Connect Tank has not been activated by the network.
- Connect Tank is placed in an area with no network coverage.

In the event of a network activation failure, repeat the authentication procedure until the network LED blinks blue. If necessary, move to an area with better coverage.

You may need to verify with your cellular carrier that the device has been assigned a contract.

## Troubleshoot configuration issues

While configuring Connect Tank in Device Cloud, make sure you press the **Refresh** button to fetch the latest Connect Tank values stored on the device.

Since a Connect Tank is in sleep mode most of the time, Device Cloud scheduled offline operations are best suited for configuring Connect Tank.

### Change the Access Point Network (APN)

By default, Digi Connect Tank UMTS models are configured with AT&T as the Access Point Network (APN).

To change the APN, follow these instructions.

- 1 Go to [login.etherios.com](http://login.etherios.com).
- 2 Log in to your Device Cloud account using your login credentials.

- 3 Click **Documentation > API Explorer**. The API Explorer appears.

- 4 Click **SCI Targets**. The Select devices to be used in examples dialog appears.

- 5 Enter the device ID and click **Add**.

- 6 Click **OK**.

Click **Examples** and navigate to **SCI -> SMS -> User Request**.

- 7 Replace **my\_target** with **apn** and **my user message** with the apn for your service provider. For example, if you are using a Vodafone apn, enter wap.vodafone.co.uk.

SCI Targets Examples Export Send Clear

Path: /ws/sci

HTTP Method: ☐ GET ☒ POST ☐ PUT ☐ DELETE ☐ HEAD

```

1 <sci_request version="1.0">
2   <send_message>
3     <targets>
4       <device id="00000000-00000000-00000000-00000000"/>
5     </targets>
6     <sms>
7       <user_msg path="my_target">my user message</user_msg>
8     </sms>
9   </send_message>
10 </sci_request>
  
```

8 Click **Send**.

SCI Targets Examples Export Send Clear

Path: /ws/sci

HTTP Method: ☐ GET ☒ POST ☐ PUT ☐ DELETE ☐ HEAD

```

1 <sci_request version="1.0">
2   <send_message>
3     <targets>
4       <device id="00000000-00000000-00000000-00000000"/>
5     </targets>
6     <sms>
7       <user_msg path="apn">wap.vodafone.co.uk</user_msg>
8     </sms>
9   </send_message>
10 </sci_request>
  
```

Device Cloud sends an SMS to the device for setting the new APN.

---

**Note** Change the APN when the device is in wake-up mode. If you change the APN when the device is in sleep mode, the change is delivered to the device on the next wake-up cycle. Also, make sure SIM details are available in Device Cloud.

---

## Get system information from an offline device

To get system information from an offline device:

- 1 Go to [login.etherios.com](https://login.etherios.com).
- 2 Log in to your Device Cloud account using your login credentials.
- 3 Select **Device Management > Schedules**.
- 4 Click **New schedule**. The New Schedule dialog appears.
- 5 Click **RCI Command**. The following code appears in the RCI command window.

```

<rci_request>
<query_state/>
</rci_request>
  
```

- 6 Enter a description for the scheduled operation.
- 7 Click **Schedule >>**
- 8 Select the Connect Tank from which you want to receive system information.
- 9 Click **Run Now**.
- 10 Click **Operations** to check the status of the job.

## Get configuration settings from an offline device

To get configuration settings from an Offline device:

- 1 Go to [login.etherios.com](https://login.etherios.com).
- 2 Log in to your Device Cloud account using your login credentials.
- 3 Select **Device Management > Schedules**.
- 4 Click **New schedule**. The New Schedule dialog appears.
- 5 Click **RCI Command**.
- 6 Edit the RCI request to include **<query\_setting/>**. For example:  

```
<rci_request>
<query_setting/>
</rci_request>
```
- 7 Enter a description for the scheduled operation.
- 8 Click **Schedule >>**.
- 9 Select the Connect Tank from which you want to receive system information.
- 10 Click **Run Now**.
- 11 Click **Operations** to check the status of the job.

## Get configuration and system information from an offline device

To receive both Configuration and System Information from an Offline device, follow these instructions:

- 1 Go to [login.etherios.com](https://login.etherios.com).
- 2 Log in to your Device Cloud account using your login credentials.
- 3 Select **Device Management > Schedules**.
- 4 Click **New schedule**. The New Schedule dialog appears.
- 5 Click **RCI Command**.
- 6 Edit the RCI request to include both **<query\_state/>** and **<query\_setting/>**. For example:  

```
<rci_request>
<query_state/>
<query_setting/>
</rci_request>
```

- 7** Enter a description for the scheduled operation.
- 8** Click **Schedule>>**.
- 9** Select the Connect Tank from which you want to get information.
- 10** Click **Run Now**.
- 11** Click **Operations** to check the status of the job.