Riot
Ultrasonic Level Sensor
End-User Manual

100-00 Sensor Platform

Copyright Notice

REVISION HISTORY

Revision	Date	Description
1.00	04/20/2017	First draft
0.1 - Pre	09/15/17	Pre Release End User Manual
1.2.7	06/15/18	Production release
101-V8	05/7/19	Hardware production release
2.7.1	06/21/2019	Support message push from App from end user

TABLE OF CONTENTS

INTRODUCTION

The Riot Family of Ultrasonic Level Sensors, (Product Family 100-00) was designed to provide accurate and cost-effective remote monitoring of levels in various tanks, storage bins, and silos. There are several product offerings within the family, but most operate similarly from a user perspective.

Reference

Document Name/Part #	Revision/Version
Central Processor	2.7.1
LoRa Processor	2.2.2
BTLE	2.1.3

Elements of the Tank Level Monitor

There are several elements that make up the Riot US1 Sensor family:

1. Sensors
    a. Different products in the family use different Ultrasonic sensors – with a variety of attributes:
        i. Frequency - Multiple frequencies are used for various sonic qualities. In general, lower frequency sensors (longer wavelength) are used for longer distances, and shorter for shorter. Also, shorter frequency sensors have shorter minimum distance and tend to be more useful for smaller tanks. Lastly, shorter frequency sensors tend to be more power efficient and are more suitable for very long battery life in field applications. A given device has a fixed frequency due to optimization of the actual signaling element.
        ii. Material – our standard sensors use an aluminum housing. This is sonically efficient and very low cost. We also use other materials (Kynar, etc.) for applications where exposure to reactive chemicals is prevalent.
        iii. Frequency and Material can be specified at time of order.
    b. Sensor Processing – all data is processed on-board. The internal devices include analog and digital filtering, signal recognition, and time-distance calculation with temperature error correction. The data delivered to the user is in distance units as defined (i.e. inches or centimeters.)

Physical Interface to the Transducer

Data and commands can be sent to the transducer via wired or wireless means. A "standard" transducer has a Blue Tooth Low Energy (BTLE) interface built in. Once the configurations are

determined, it is very straightforward to download configuration information to the sensor via the BTLE interface.

Device Interface

Operational

Under Field Deployment, all data and commands are sent to the device via wireless links (BTLE, LORA, or other communications backbones as required).
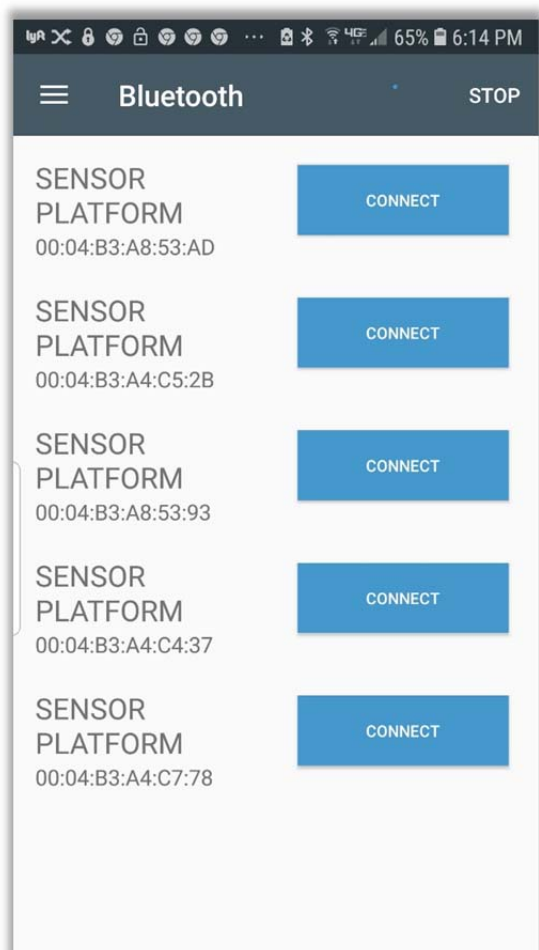
Mobile Phone Application

The mobile phone application is the primary interface for the end user when in the field to check the health of sensor and tank status. The application is available for Android phones from Riot Wireless. From the phone select BLE Access. Then select the Hamburger menu.
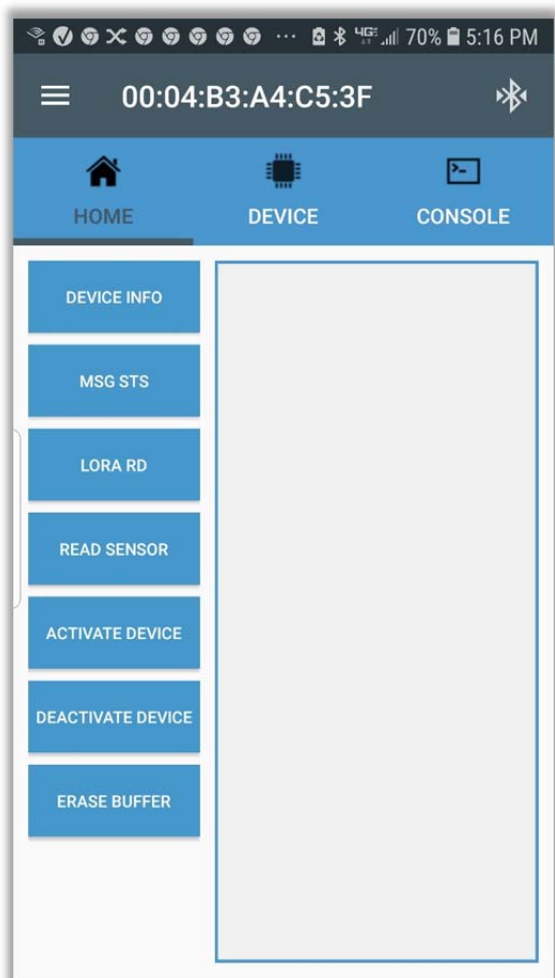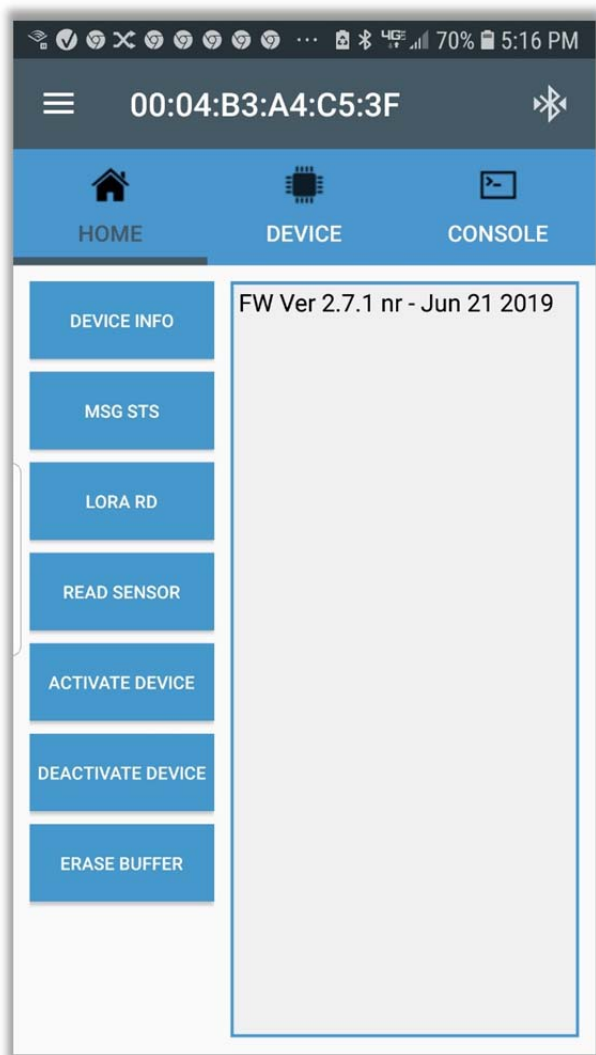
Search for available End Devices
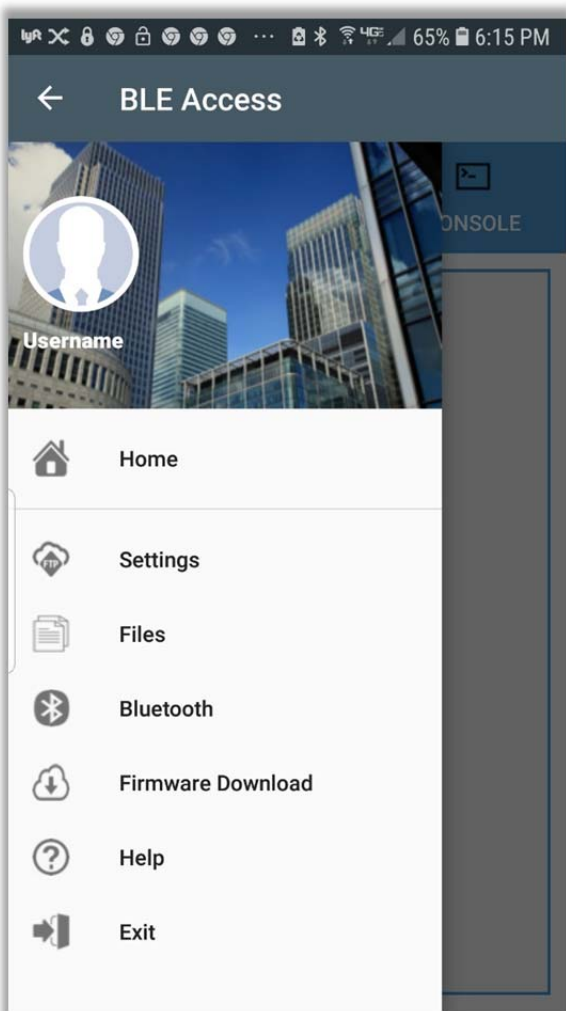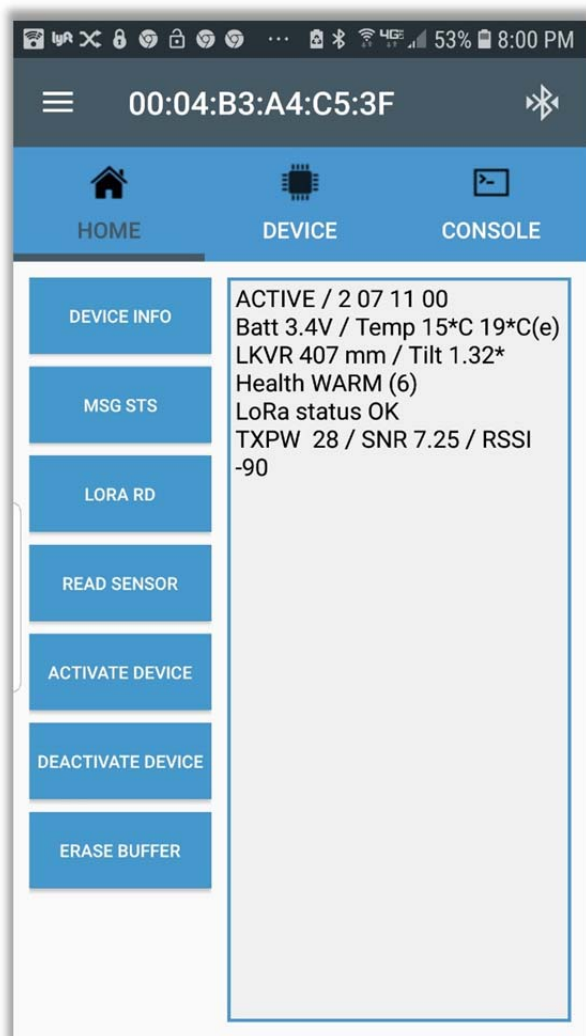
Connecting to End Device

Activate and clear Buffer

Verifying Software Release

Last Message Status

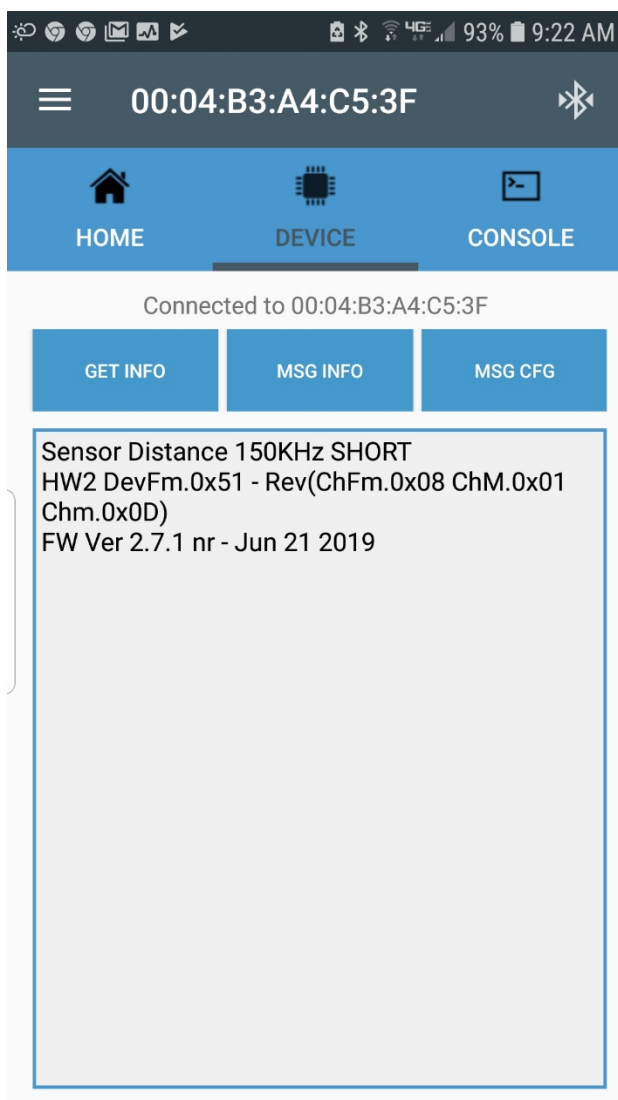

ACTIVE / 2 07 11 00
Batt 3.4V / Temp 15*C 19*C(e)
LKVR 407 mm / Tilt 1.32*
Health WARM (6)
LoRa status OK
TXPW 28 / SNR 7.25 / RSSI -90

Sending Message

Starting measurement..
Tilt +1.392
Distance measured 407 mm
Send message, please wait...
Checking network..
WAIT 1
Connection OK!
MSG T 1 (0)
Sending message..
Sent OK!
Tx SF08-BW500 904600000
Rx1 SF07-BW500 923900000
TXPW 26 / SNR 6.75 / RSSI -89
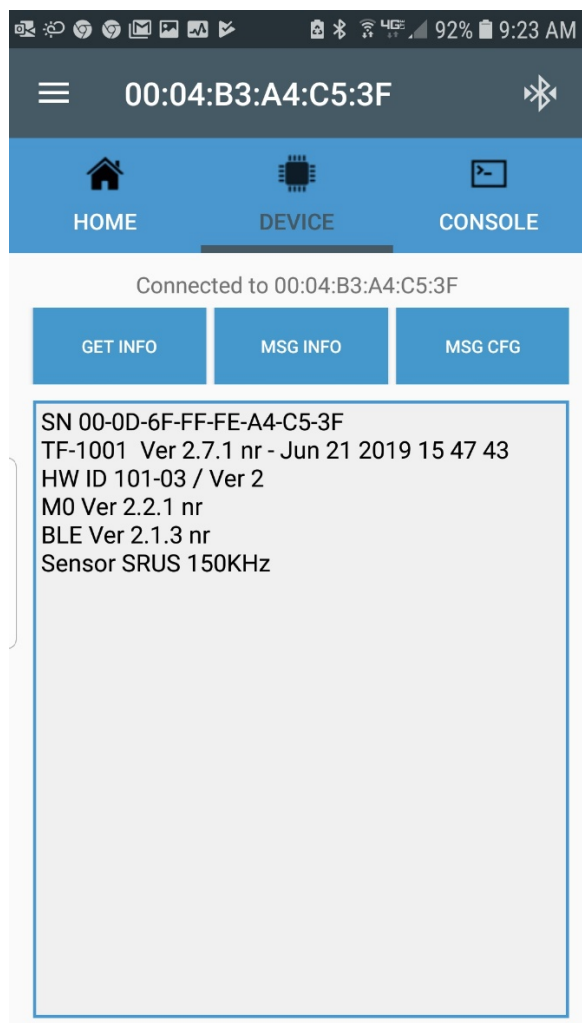MSG 171 / ACK 160 / NAK 11

Reading Tank Level
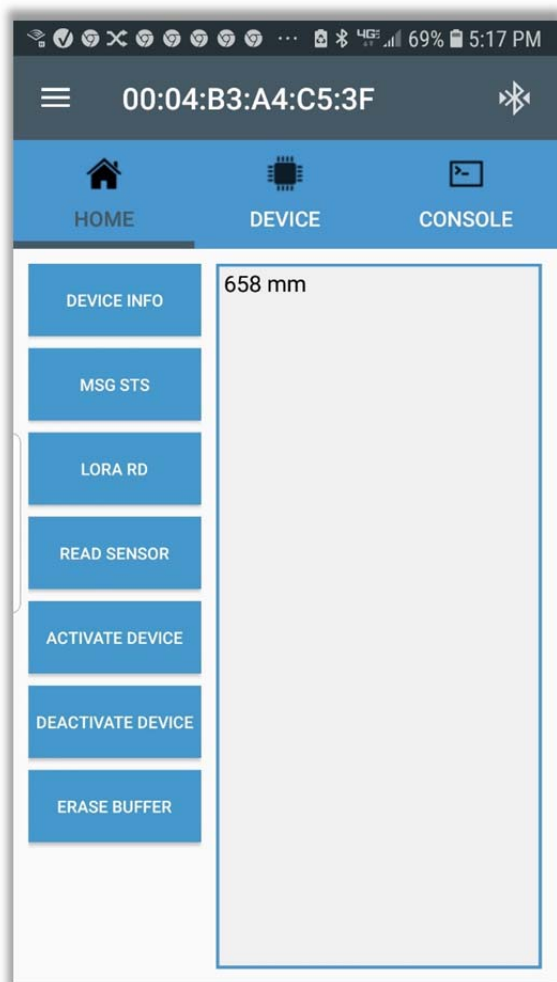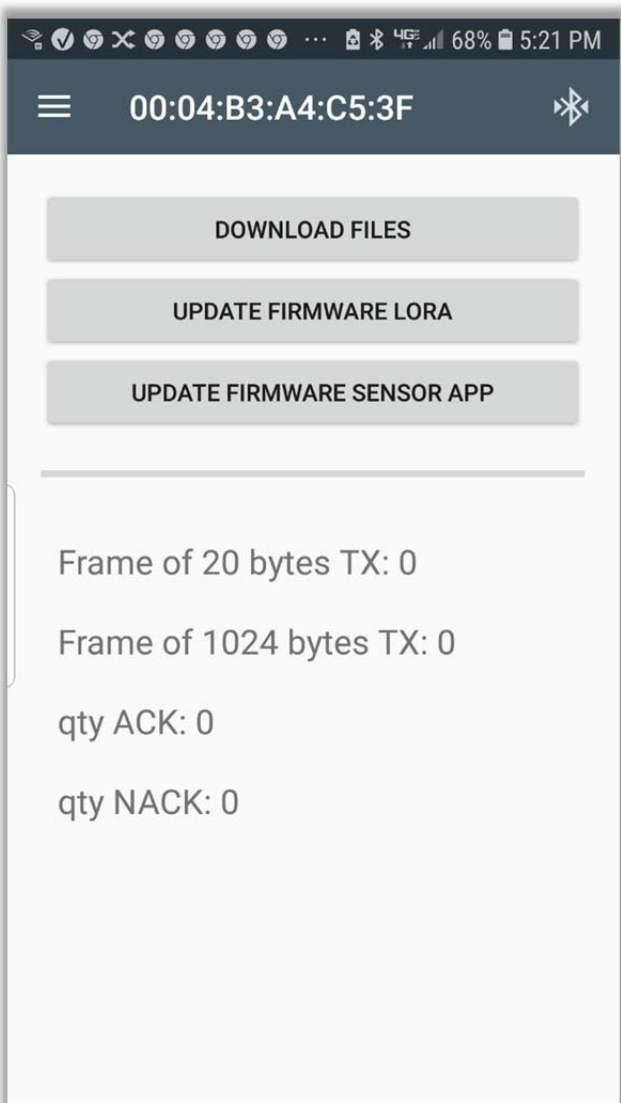
GET INFO (End Device Configuration)

MSG INFO (Firmware Version)

Message Configuration

Firmware Updates

FCC Notices

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

The user is cautioned changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC

This equipment is compliant with FCC sec 2.1093 Radiofrequency radiation exposer limits for portable devices

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