Bluetooth V4.1 Low Energy
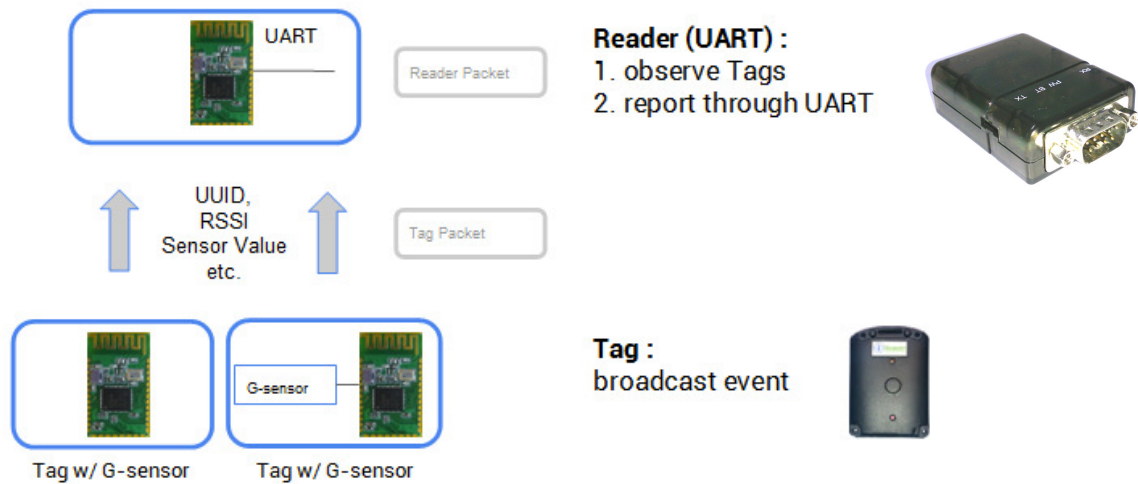# Active RFID RS-232 Reader

Model: BLE-R

Application:

- Location system: Asset, Passenger, Patient, Trailer
- Access control: Garage, Enterprises, Bank, Vehicle, Factory, Hospital, Superstore, School, Warehouse
- Logistic management, Cargo tracking, Airport baggage management
- Local Area Real Time Location Systems (RTLS)
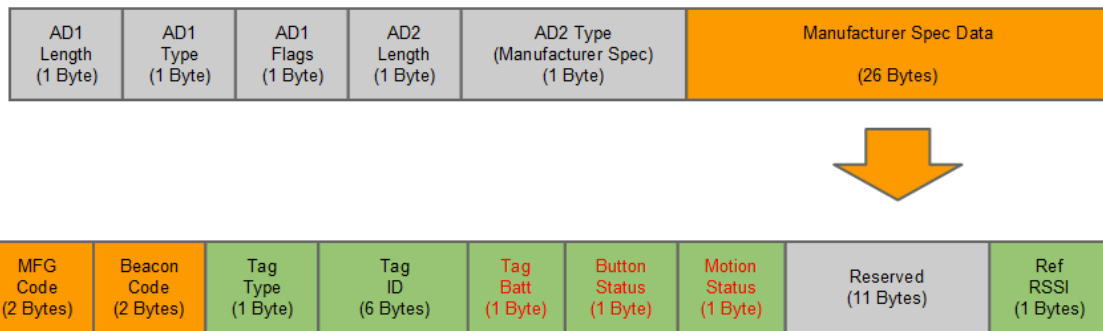- Asset Management, Internet of Things (IOT) application

Specifications:

|	
Frequency band	2.4GHz ISM (2.40000 – 2.4835GHz)
Microcontroller	32-bit ARM Cortex M0
On-air data rate	250 kbps, 1 Mbps or 2 Mbps
Modulation	GFSK
Output power	Programmable: +4 to -20dBm in 4dB steps
Sensitivity	-93dBm *Bluetooth* low energy
	-96dBm at 250kb
	-90dBm at 1Mbs
	-85dBm at 2Mbs
Radio current consumption LDO at 1.8V	16mA – TX at +4dBM output power
	10.5mA – TX at 0dBm output power
	13mA – RX at 1Mbs
Radio current consumption DC-DC at 3V	10.5mA – TX at +4dBm output power
	8.1mA – TX at 0dBm output power
	9.5mA – RX at 1Mbs
System current consumption	420nA – No RAM retention
	530nA - 8k RAM retention
	2µA – All peripherals in IDLE mode
Hardware Security	128-bit AES ECB/CCM/AAR co-processor

System Architecture:

Reader (UART) :
1. observe Tags
2. report through UART

UUID, RSSI Sensor Value etc.

Reader Packet

Tag Packet

Tag w/ G-sensor   Tag w/ G-sensor

Tag :
broadcast event

Tag Packet:

| AD1 Length (1 Byte) | AD1 Type (1 Byte) | AD1 Flags (1 Byte) | AD2 Length (1 Byte) | AD2 Type (Manufacturer Spec) (1 Byte) | Manufacturer Spec Data (26 Bytes) |

| MFG Code (2 Bytes) | Beacon Code (2 Bytes) | Tag Type (1 Byte) | Tag ID (6 Bytes) | Tag Batt (1 Byte) | Button Status (1 Byte) | Motion Status (1 Byte) | Reserved (11 Bytes) | Ref RSSI (1 Bytes) |

BLE ADV:

AD1 (Length, Type, Flags)	BLE Advertising Flags
AD2 Length	fixed to 27 (type + manufacturer spec data)
AD2 Type	fixed to 0xFF (for manufacturer)
Manufacturer Spec Data	manufacturer defined payload

Manufacturer Spec Data:

Field	Description	Field Offset
MFG Code	Manufacturer vendor code, fixed	0
Beacon Code	Magic Code to identify packet format, fixed to 0xBCAA	2
Tag Type	type of tag ex. 1: tag w/o g-sensor, 2: tag w/ g-sensor ..	4
Tag ID	6 bytes ID of tag	5
Tag Batt	batt voltage of tag in 1/10 volt unit	11
Tag Button Status	button status ex. 0: released, 1: pushed	12
Tag Motion Status	motion status ex. 0: non-moving, 1: moving	13
Reserved	reserved for sensor data (11 bytes)	14
Ref RSSI	calibrated rssi at 1 M for approaching usage	25

Tag setup APP:
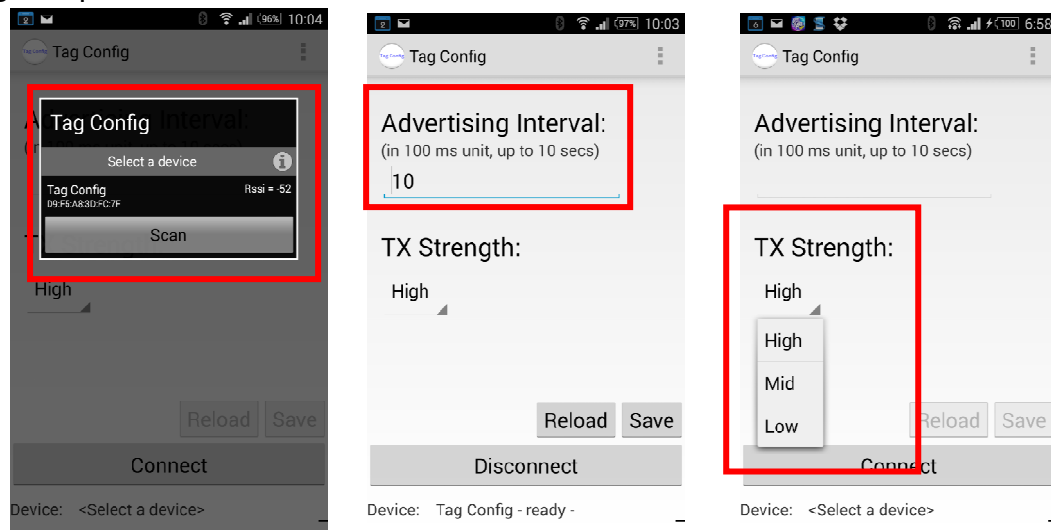
Reader Output Format:

$<msg type>,<reader id>,<tag type>,<tag id>,<tag batt>,<button status>,<motion status>,<reserved>,<tag rssi>#

Field	Description
$	start of report
msg type	Type of message ex. 0: general scanner, 1: tag scanner
reader id	6 bytes ID of reader in hex => 12 chars
tag type	type of tag ex. 1: tag w/o g-sensor, 2: tag w/ g-sensor ..
tag id	6 bytes ID of tag in hex => 12 chars
tag batt	batt voltage of tag in 1/10 volt unit
tag button status	button status ex. 0: released, 1: pushed
tag motion status	motion status ex. 0: non-moving, 1: moving
reserved	Reserved for external sensor data (11 bytes)
tag rssi	tag read rssi
#	end of report

Reader UART is fixed at 115200,8,N,1
example:

    $1,E2C69918FD94,1,FFC98B7FC1A9,32,0,0,,-55#
    $1,E2C69918FD94,1,FFC98B7FC1A9,32,1,1,,-55#
    $1,E2C69918FD94,1,FFC98B7FC1A9,32,1,1,,-54#
    $1,E2C69918FD94,1,FFC98B7FC1A9,32,1,1,,-63#
    $1,E2C69918FD94,1,FFC98B7FC1A9,32,0,0,,-56#
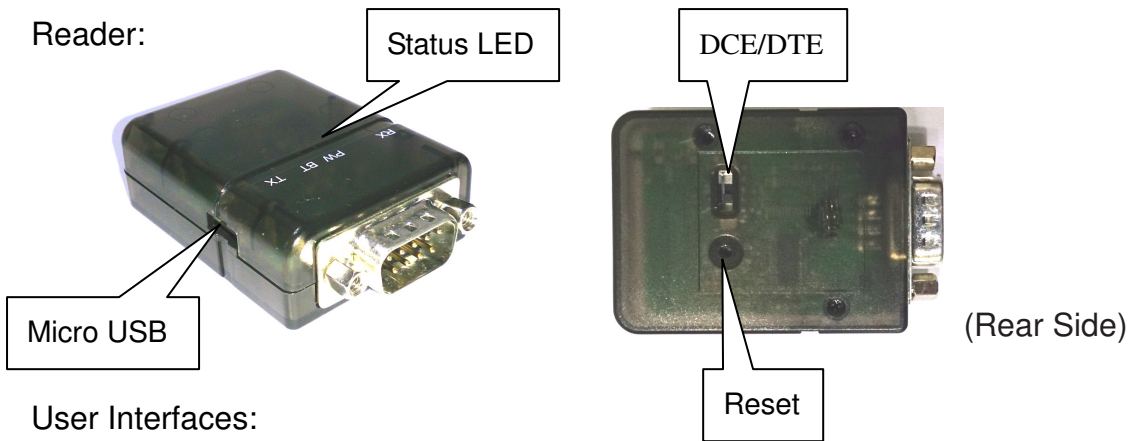
Default Tag Adv Period: 1000 ms
Panic Mode Tag Adv Period: 300 ms

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Test Video:

http://youtu.be/Vs_hOSBHfns
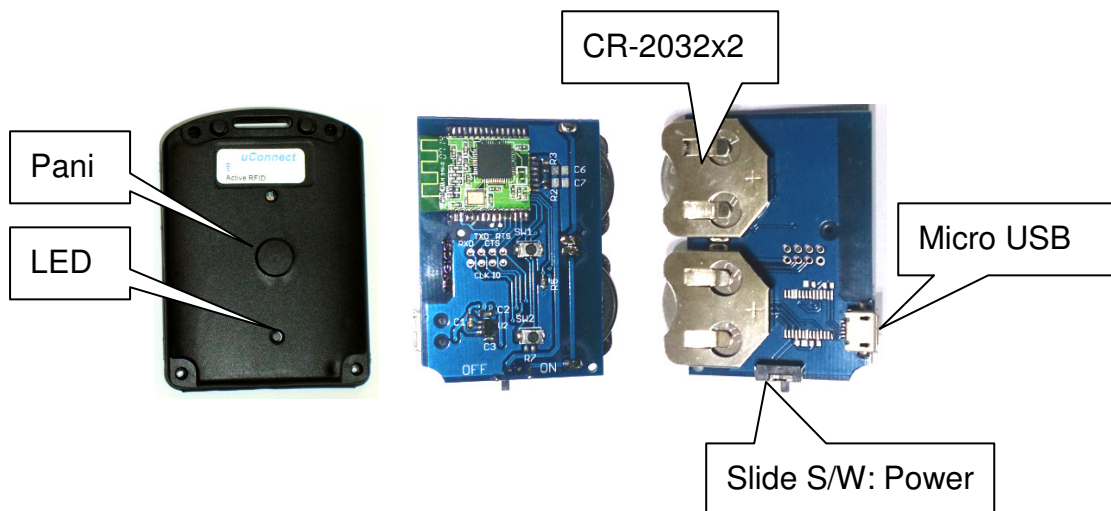
Reader:

Status LED

DCE/DTE

Micro USB

(Rear Side)

Reset

User Interfaces:

1. DB9 Male

2. Micro USB (side): Power input

3. Slide switch (Rear side): DCE/DTE

4. Tact switch (Rear side): Reset to default setting

Tag:

CR-2032x2

Pani

LED

Micro USB

Slide S/W: Power

Remark: All contents are subject to change without notice.