Puloli

RU700A 1.0

User Manual

v1.1

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Version v1.1

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Legal Notice

Puloli RU700A 1.0 is intended for the specific use described in this manual. It requires specialized knowledge and skill and is not intended as a general consumer product. The product shall not be re-sold or re-purposed.

The product shall not be used in connection with applications requiring fail-safe performance or in applications where the failure of the product would reasonably be expected to result in personal injury or death, significant property damage, or serious physical or environmental damage. Examples of such use include control and operation of life support machines or other essential services.

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

Contacting Puloli, Inc.

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Contents

1. About RU700A

The RU700A 1.0 is a research and development device intended for OEM integrators in specific industrial use as described in this document. It is not intended for general public consumer use-cases. It is strongly advised to consult the relevant references and to develop an understanding of the applicable underlying technology, tools, and methods before using this product.

The RU700A 1.0 provides NB-IoT connectivity over the Upper 700 MHz A-Block frequency band, and is intended primarily as a tool for validation of network coverage and certain industrial use-cases. As such, it can only be operated on a network which supports such technology and the channelization scheme specific to the Upper 700 MHz A-Block. Contact Puloli to get current information on coverage locations.

2. References

[1] Pycom GPy specification: https://pycom.io/product/gpy

[2] Pycom Expansion Board V3: https://docs.pycom.io/datasheets/boards/expansion3

[3] Pycom Pycase enclosure: https://pycom.io/product/pycase-grey

3. Product Support and Contact Info

For all questions regarding the product and network coverage, please contact support at support@puloli.com.

4. Hardware Specification

The RU700A 1.0 utilizes Puloli's software stack, running on a hardware platform based on modules from Pycom and Sequans. Please refer to the documentation from Pycom for additional hardware details ([1], [2], [3]).

The figure below shows the base unit of the RU700A 1.0:

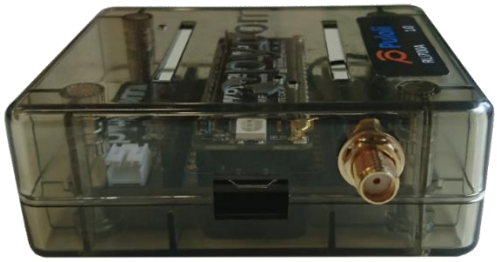

Figure 1. RU700A 1.0 base unit

In order to power the device, the included USB AC adapter must be connected to the corresponding micro-USB port on the RU700A 1.0 base unit. At all times when powered on, one of the specified antenna options must be connected to the SMA jack in order to avoid damage to the unit.

The standard indoor antenna attaches directly to the base unit, as shown in the figure below.

Figure 2. Indoor antenna configuration

Optionally, a fixed-mount, directional Yagi antenna may be employed in place of the standard indoor antenna, by connecting through an attenuator and an SMA-male to N-male coaxial patch cable (see below). Use of the attenuator is required when using the Yagi antenna. The antenna should be mounted outdoors and pointed towards the nearest network transmitter to improve signal coverage.

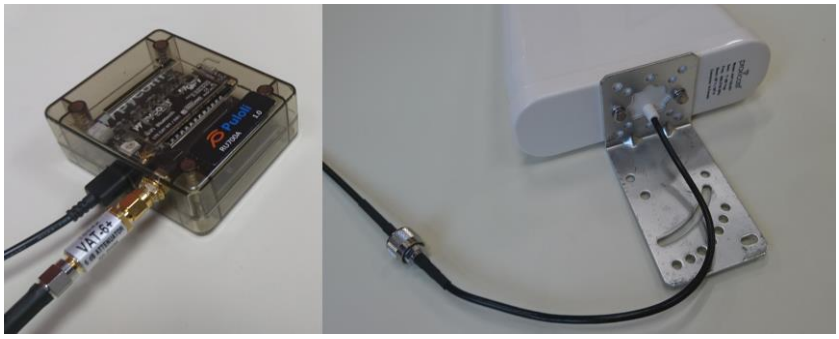

Figure 3. Yagi antenna with attenuator and SMA-male to N-male coaxial patch cable

The table below summarizes key attributes of the device.

Table 1. RU700A 1.0 attributes

Attribute	Description
Dimensions	65mm x 77mm x 28.5mm
Weight	75g
USB Power Supply	The device shall only be used with the included AC adapter, which supplies 5V via a micro-USB connector when connected to a 100-240V 50/60Hz AC outlet. The power supply is ETL and FCC certified.
RF connector	SMA female, Taoglas CAB.011
Attenuator	Mini-Circuits VAT-6+ (for use with Yagi antenna)
Antenna	Standard indoor antenna: Linx Technologies ANT-LTE-WS-SMA Optional external Yagi antenna: Proxicast ANT-128-001 *Note: The device must always be operated with one of these two antennas connected.*
Cellular IoT	Rated output power (at antenna connector): Dipole antenna: 17 dBm +/- 1 dB Yagi antenna: 20 dBm +/- 1 dB Transmit band: 787 - 788 MHz Receive band: 757 - 758 MHz Radio interface: NB-IoT, 3GPP Release 13

5. Operation of RU700A

First connect either the standard indoor antenna or the optional external Yagi antenna, as described earlier. In the case of the Yagi antenna, a suitable outdoor mounting and orientation should be performed according to the antenna specifications.

Secondly, connect the provided USB power supply to a 100-240V 50/60Hz AC outlet and connect the micro-USB of the power supply to the USB port of the RU700A 1.0.

The device will power up, initialize, perform a network search, and register itself on the network if coverage is available. The device status is indicated by an LED, as described below.

Table 2. LED status indicator

LED Color	Description
Orange (steady)	Initializing
Green (rapid blink)	Initialization successful
Yellow (slow blink)	Searching for network
Magenta (slow blink)	Registered on network, idle
Magenta (rapid blink)	Transmitting data to network
Red (solid)	Error condition; automatic reboot after 20 seconds
Blue (slow blink)	Device in diagnostic mode; manual restart required

Upon connecting to an authorized network, the device will periodically send internally-generated diagnostic and status messages to the network, as well as any use-case-dependent IoT data.

The device can be re-started either by cycling the power or by pressing the reset button next to the LED, accessible through a small hole in the outer case, as shown below.

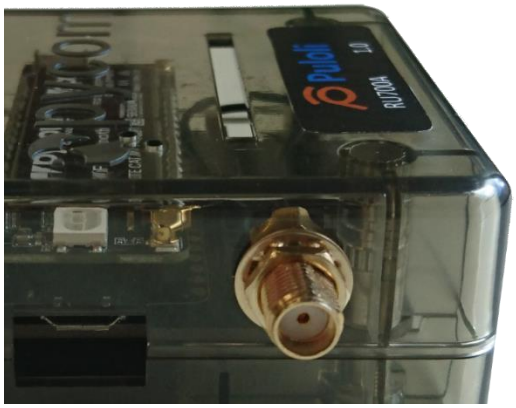

Figure 4. Access to reset button

6. Regulatory Information

RU700A 1.0.

This product contains FCC ID 2ASLSRU700A10.

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.

2. This device must accept any interference received, including interference that may cause undesired operation.

CAUTION: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: 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 Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

In the event the conditions of use as described in this document cannot be met, then the FCC authorization is no longer considered valid and the FCC IDs referenced in this document and the device cannot be used in any such use-cases. The end-user is explicitly prohibited from using the devices in any manner inconsistent with instructions and guidelines in this document.

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator & your body.

Upgrade Firmware:

The application software that is supplied with the module may be upgraded from time to time. Such upgrades will not be capable to affect any RF parameters as certified for the FCC for this module, in order to prevent compliance issues.