LR71 Datasheet

Amp'ed RF Technology, Inc.

LR71 Product Specification

Preliminary

Description

The LR71 module supports long range Mesh networks, from a surface mount PCB module.

This module integrates MCU, LoRaNet or LoRaWAN, and LoRa radio into a single module, with simple to use AT command interface. Mesh networking data is sent over a network of long range bearers (LoRa) and connect to a gateway device such as the LR288 Gateway.

Customized firmware for peripheral device interaction, power optimization, security, and other proprietary features may be supported and can be ordered pre-loaded and configured.

General Features

- On module LoRa Protocol Stack
- Range 8 km
- FCC/IC/CE certified (pending)

RF Features

- Long range transceiver, 860Mhz to 960Mhz band
- Bluetooth 2.4Ghz transceiver
- RX sensitivity: -146 dBm
- TX power: 31 dBm
- LoRa modulations: 0.3 to 38.4 kbps

MCU Features

- 1M bytes RAM, 2M byte Flash memory
- UART/I2S/I2C/SPI
- 6 GPIO
- Analog ADC

Firmware Features

- LoRaNet and LoRaWAN protocols
- Mesh support
- Firmware upgrade over UART

Applications

- Remote metering
- Building automation
- Smart city
- Internet of Things (IoT)

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1. Hardware Specifications

General Conditions (V_{IN}= 3.3V and 25°C)

2.1. Recommended Operating Conditions

Rating	Min	Typical	Max	Unit
Operating Temperature Range	-40	-	85	°C
Supply Voltage VIN	2.8	3.3	5.5	Volts
Supply Voltage VDD PA	3.0	5.0	5.25	Volts
Signal Pin Voltage	-	$0.7V_{VDDIO}$~ V_{DDIO}	-	Volts
RF Frequency, LoRA	860		930	MHz

2.2. Absolute Maximum Ratings

Rating	Min	Typical	Max	Unit
Storage temperature range	-55	-	+150	°C
Supply voltage VIN	-0.3	-	+5.0	Volts
I/O pin voltage VIO	-0.3	-	+5.5	Volts
RF input power	-	-	0	dBm

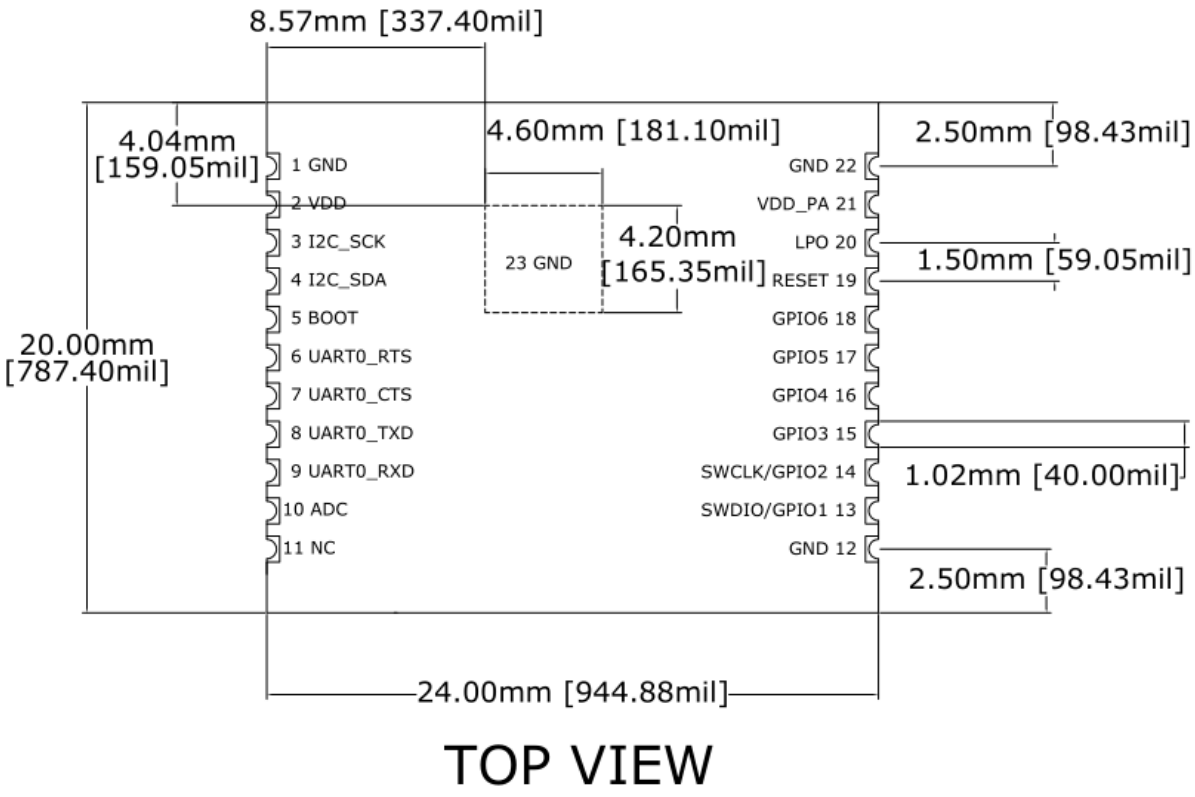
2.3. Current Consumption

Modes (Typical Power Consumption) LoRA repeater operation	Avg	Unit
Deep sleep mode		uA
Sleep mode		uA
Idle mode		mA
Rx mode		mA
Tx mode		mA

2.4. Pin Assignment

Name	Type	Pin #	Description
UART Interface			
TXD	O	8	Transmit data
RXD	I	9	Receive data
CTS	I	7	Clear to send (active low)
RTS	O	6	Request to send (active low)
Power and Ground			
VDD		2	Voltage supply
VDD_PA		21	Voltage supply PA
GND		1	GND
GND		12	GND
GND		22	GND
GND		23	GND
Reset			
RESETN	I	19	Reset input
Fast boot			
BOOT	I	5	Boot mode
GPIO			
I2C_SDA	I/O	4	I2C data
I2C_SCL	I/O	3	I2C clock
GPIO1	I/O	13	General purpose
GPIO2	I/O	14	General purpose
GPIO3	I/O	15	General purpose
GPIO4	I/O	16	General purpose
GPIO5	I/O	17	General purpose
GPIO6	I/O	18	General purpose
ADC	I	10	Analog to digital
Misc			
NC		11	NC
LPO		20	Low power oscillator (optional)

2.5. Layout Drawing



24.0 mm x 20.0 mm x 3.2 mm (+/- 0.4mm, height tolerance))

2. Hardware Design

Notes

- All unused pins should be left floating; do not ground.
- All GND pins must be well grounded.
- The area around the antenna should be free of any ground planes, power planes, trace routings, or metal for at least 5 mm in all directions.
- Traces should not be routed underneath the module.

3.1. Module Reflow Installation

The LR71 is a surface mount connectivity module supplied on a 22 pin, 4-layer PCB. The final assembly recommended reflow profiles are:

For RoHS/Pb-free applications, Sn96.5/Ag3.0/Cu0.5 solder is recommended.

- Maximum peak temperature of 230° - 240°C (below 250°C).
- Maximum rise and fall slope after liquidous of < 2°C/second.
- Maximum rise and fall slope after liquidous of < 3°C/second.
- Maximum time at liquidous of 40 – 80 seconds.

3.2. GPIO Interface

All GPIOs are capable of sinking and sourcing 6mA of I/O current.

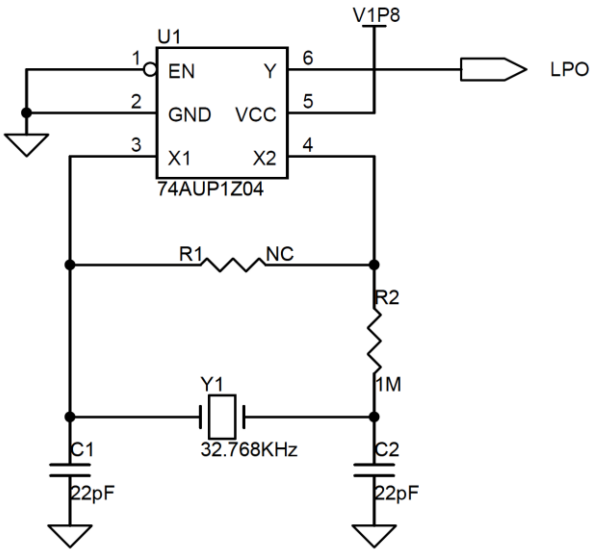
3.3. PCB Layout Guidelines

TBD

3.4. External LPO Input Circuit

An external source may optionally supply the slow clock to the LPO pin. The source must be a digital signal 1.2 to 1.8V. The accuracy of the slow clock frequency must be 32.768 KHz ±100 ppm.

3.4.1. External LPO circuit example



External LPO Reference Circuit

3.5. Application Reference Design

TBD

3. Ordering Information

Part Name	Description
LR71-M9	Long Range Mesh module 860-960 Mhz LoRA band.

4. Revision History

Date	Revision	Description
27, March 2025	1.0	Initial version
16, April 2025	1.1	Add ground pad on layout