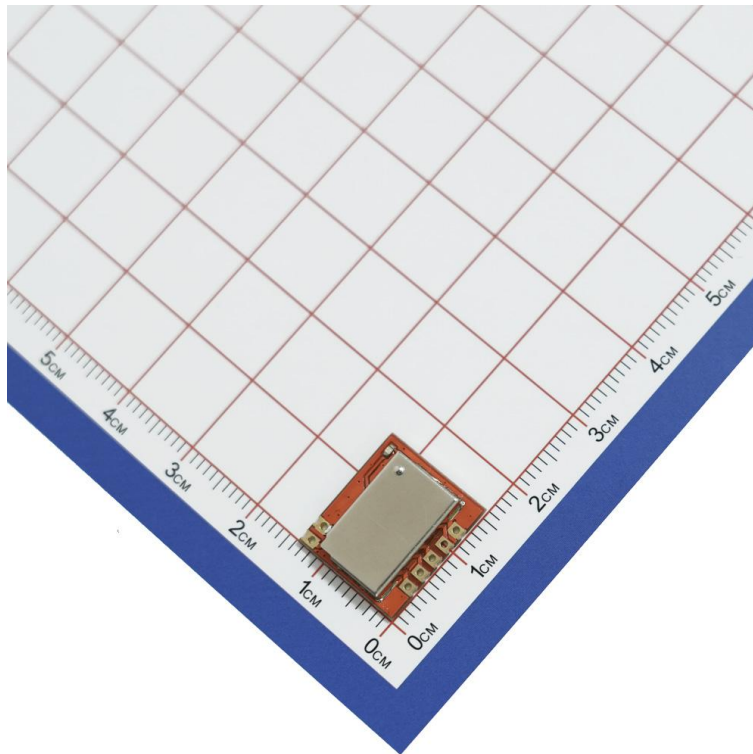




Ling-T1 mini Remote Control Transmitter Module



Item	Content
Product Model	Ling-T1 mini
Document Version	V1.1
Release Date	2026-07-17
Brand	FNRF



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1 Product Overview

Ling-T1mini is a 433.92 MHz ASK remote control transmitter module integrating an RF transmitter circuit and FB1527 digital encoding. The module has one million random address codes. Connect buttons directly to K0-K2 to transmit the corresponding remote-control code; it is suitable for compact, low-power 4four-key remote-control terminals.

The module can be used with Ling-R1mini, Ling-R1, Ling-R1pro, or other receivers compatible with 1527-type encoding. The open-field line-of-sight reference range is approximately 80 m; actual range depends on the receiver, antenna, power supply, battery internal resistance, enclosure, installation orientation, and co-channel interference.

2 Product Features

- 433.92 MHz ASK remote-control transmission.
- Integrated FB1527 one-million-code encoding; no external encoder IC required.
- Operating voltage: 2.2-3.6 V; 3.0 V typical.
- Transmit power: 10 dBm typical at 3 V; transmit current: 10 mA typical at 3 V.
- Standby current below 1 μ A, suitable for battery-powered remote controls.
- Supports K0, K2, and two combination keys, for four key values in total.
- Button inputs have internal pull-ups and trigger transmission at low level.
- 15.78 mm $\times$ 13.86 mm miniature module, approximately 3.00 mm thick.

3 Typical Applications

- Wireless remote controls and wireless switches
- Remote control of lights, fans, and small appliances
- Wireless doorbells and call buttons
- Smart-home trigger terminals
- Toys, security products, and low-reporting-frequency IoT devices



4 Technical Parameters

Parameter	Minimum	Typical	Maximum	Unit	Conditions / Notes
Operating Frequency	-	433.92	-	MHz	ASK remote-control transmission.
Operating Voltage	2.2	3.0	3.6	V	Between VCC and GND.
Transmit Current	-	10	-	mA	VCC = 3 V, POUT = 10 dBm.
Standby Current	-	-	1	uA	No button triggered.
Transmit Power	-	10	-	dBm	VCC = 3 V, typical.
Encoding Format	-	FB1527	-	-	Random address code.
Supported Key Values	-	4	-	Keys	K0, K2, and two combination keys.
Reference Range	-	80	-	m	Open-field line-of-sight reference value; verify in the end product.
Overall Dimensions	-	15.78 × 13.86 × 3.00	-	mm	L × W × H, including shield.
Operating Temperature	-20	-	70	°C	Verify by end-product testing.
Antenna Interface	-	50	-	ohm	Pin A; a matched 433.92 MHz antenna is recommended.

4.1 Absolute Maximum Ratings

Item	Minimum	Maximum	Unit	Description
VCC Pin Voltage	-0.3	4.0	V	Not a recommended operating condition.
I/O Pin Voltage	-0.3	VCC+0.3	V	Must not exceed device supply limits.
Operating Temperature	-20	70	°C	Module ambient temperature.
Storage Temperature	-40	125	°C	Non-operating condition.
ESD	-	2	kV	Device-level reference value; end-product protection design is still required.



5 Pin Assignment



Bottom View

No.	Pin Name	Type	Function	Description
1	VCC	Power	Power Positive	2.2-3.6 V; 3.0 V typical.
2	K2	Input	Button Input	Internal pull-up; low-level trigger; key value 1 when triggered alone.
3	K1	Input	Combination-Key Input	Use with K0 or K2; not a standalone key value.
4	K0	Input	Button Input	Internal pull-up; low-level trigger; key value 4 when triggered alone.
5	GND	Power	Power Ground	Connect to system ground.
6	G	Power	Power Ground	Connect to system ground.
7	A	RF	Antenna Interface	50 ohm; connect a matched 433.92 MHz antenna.



6 Key Values and Encoding

Button Action	Transmitted Key Value	Ling-R1mini Corresponding Output	Description
K0 Pulled Low	4	D0	Recognized in both switch-output and UART modes.
K2 Pulled Low	1	D1	Recognized in both switch-output and UART modes.
K0+K1 Pulled Low Simultaneously	8	Key Value Output in UART Mode	The R1mini two-channel switch-output mode has no independent output pin.
K1+K2 Pulled Low Simultaneously	2	Key Value Output in UART Mode	The R1mini two-channel switch-output mode has no independent output pin.

K1 is used only for combination keys. For a combination key, both inputs must be low at nearly the same time. Mechanical-button bounce, long-wire coupling, and MCU I/O switching timing may affect combination-key recognition; validate the actual circuit before mass production.

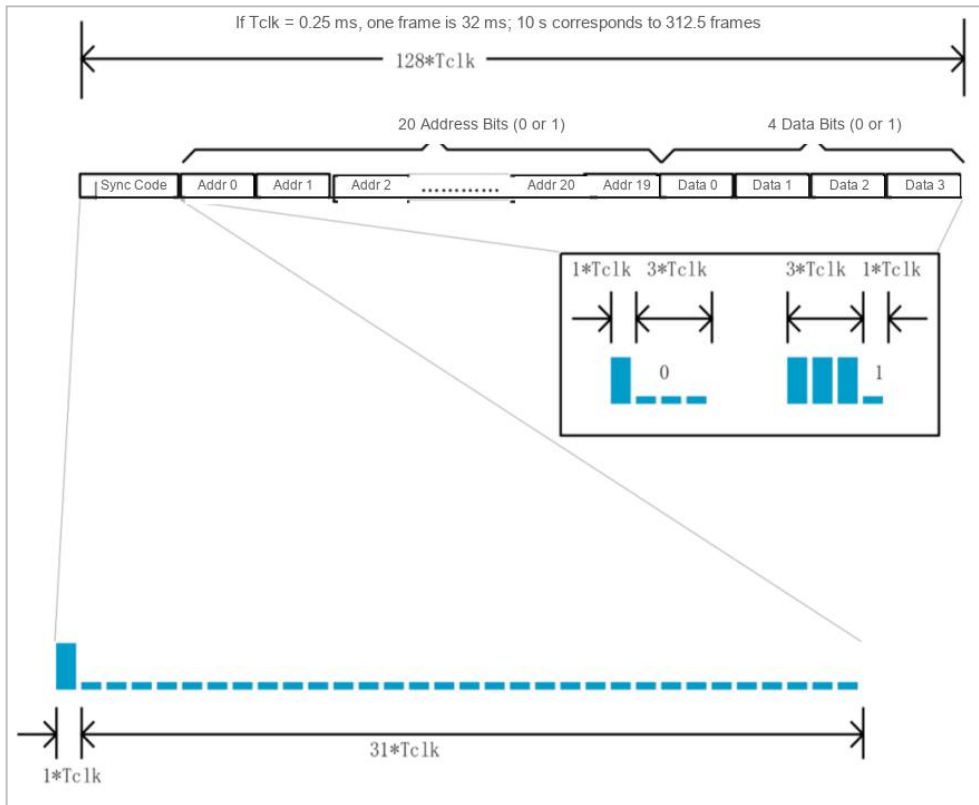
Key values can be viewed with the Development Assistant:





Output Encoding Format (FB1527 Code)

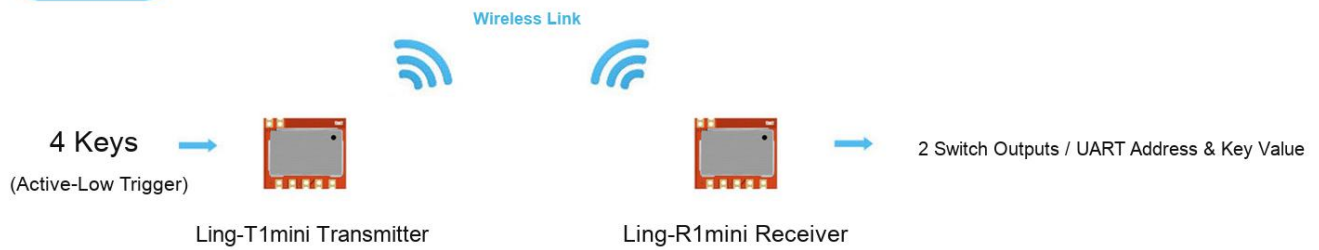
20 address bits + 4 key-value bits.





7 Use and Connections

Option 1

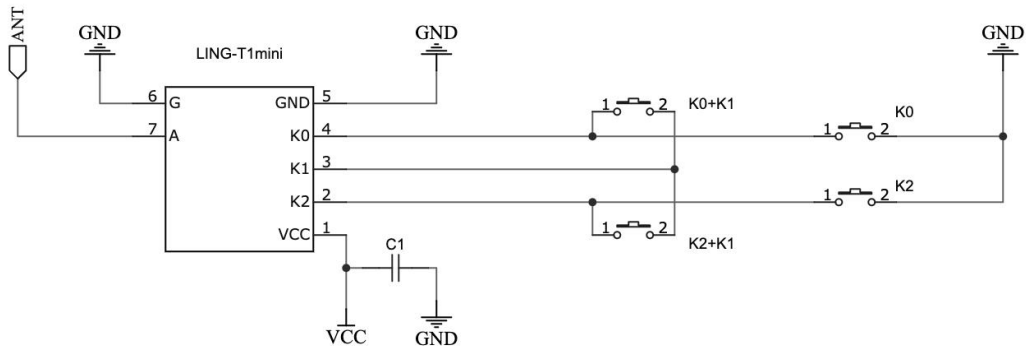


Option 2



Option 3





Typical Module Connections

Module Pin	Connection	Description
VCC	3.0 V Battery or Regulated Supply	Supply range: 2.2–3.6 V.
GND, G	Negative Supply	Connect both ground pins to system ground.
A	Matched 433.92 MHz Antenna	Keep the antenna away from batteries, metal, and noise sources.
K0, K2	Buttons to GND	Low-level trigger when a button is closed.
K1	Combination-Key Input	Pull low with K0 or K2 simultaneously to form a combination key.

8 Power-Supply Design Recommendations

- Keep the VCC trace short and wide. Place a 0.1 uF decoupling capacitor near the module; then configure a bulk capacitor according to the battery and load.
- Coin-cell applications should evaluate battery internal resistance, low temperature, late-discharge conditions, and voltage drop during transmission.
- Do not share a long, narrow power path with motors, relays, buzzers, or DC-DC inductors.
- If range decreases or transmission occasionally fails, use an oscilloscope at the VCC/GND pins to check voltage during button transmission rather than measuring only static voltage.



9 PCB, Antenna, and Mechanical Recommendations

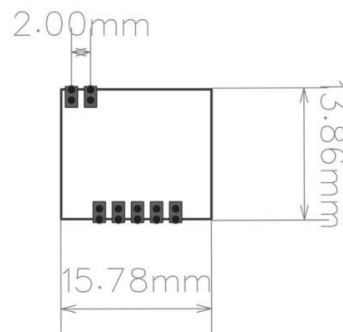
- Keep the RF trace from pin A to the antenna short and direct, and treat it as a 50 ohm RF trace.
- Maintain clearance around the antenna area; avoid large copper areas, batteries, metal enclosures, shields, high-speed signals, and high-current loops.
- Keep K0-K2 button wires short; exposed buttons or long wires require ESD, pull-up, and interference-immunity design.
- For the same product, fix the module position, antenna orientation, and enclosure structure to avoid range variation caused by assembly differences between batches.

10 EMC, Production, and Debugging Recommendations

- Verify transmission success rate separately for bare-board, enclosed, low-voltage, and load-operation conditions.
- Relay, motor, or coil operation may affect transmission through power-supply and spatial coupling; test under actual load conditions.
- For production testing, fix the receiver, distance, antenna orientation, and supply condition, then repeatedly trigger all four key values.
- Record the module address code, frequency, key value, current, and receiver model to prevent production mix-ups.
- If the end product requires FCC, CE, SRRC, or EMC certification, rely on final-product testing and formal reports.



11 Dimensions



12 Ordering and Technical Support

Before ordering, confirm operating frequency, power method, button connections, receiver model, antenna type, enclosure structure, and certification requirements. Technical documentation and test tools are available from the FNRf Wireless website:

WWW.FNRf-TECH.COM



Appendix Antennas、Development Tools

Antennas are important. No antenna or an unmatched antenna can seriously affect performance. Actual performance also depends on the PCB, enclosure, and mechanical structure; purchase several types for practical testing.

TT02		433MHz	27.5mm*5.0mm
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Development Tools:

Development Assistant	Signal Assistant
	
Difference: 1、Measures data values 2、Requires an encoding type (1527, etc.)	Difference: 1、Measures signal strength 2、No encoding restriction (ASK/OOK modulation)
Use: 1、Displays the address code and key value of a remote control/transmitter module 2、Displays remote-control frequency, pulse width, and encoding type 3、Volume testing of remote-control products	Use: 1. Displays signal strength of a remote control/transmitter module (relative value) 2. Compares antenna performance 3. Volume testing of remote-control products
Power Supply: TYPE-C	Power Supply: TYPE-C