

TR-xxx-31B

Transceiver Module

Data Sheet

- TR-868-31B
- TR-916-31B



Simple way to smarter wireless solutions

Description:

TR-xxx-31B is a family of IQRF transceiver modules operating in the 868 MHz or 916 MHz license free ISM (Industry, Scientific and Medical) frequency band. Its highly integrated ready-to-use design requires no external components. The microcontroller with built-in operating system, excellent development support, integrated LDO regulator and temperature sensor dramatically reduce time of application development. Ultra low power consumption of TR-xxx-31B predetermines these modules for use in battery powered applications.



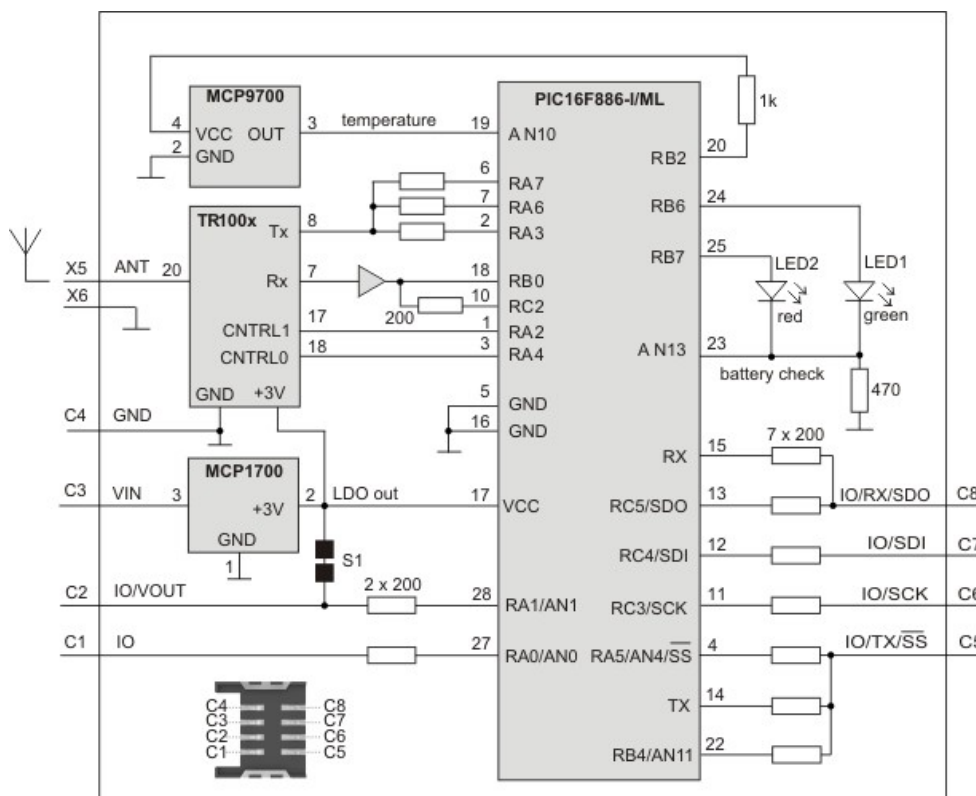
Applications:

- Telemetry
- Buildings automation
- Wireless control & regulation
- Access control
- Remote data acquisition
- Communications links
- RF connectivity in many other areas

Key features:

- Complete solution with operating system
- Easy to use - fast learning curve
- Low cost
- Ultra low power consumption
- SPI Interface supported by OS (on background)
- On-board temperature sensor and battery monitoring
- +3 V LDO regulator output
- Dual LED
- 5/6 I/Os, 3 analog inputs (A/D)
- SIM card format
- Coaxial antenna connector (optional)
- On-board antenna (optional)

Simplified schematics:



Electrical specifications
(typical values unless otherwise stated)

Supply voltage (VCC): 3.0 V to 5.3 V
 Operating temperature: 0 °C to +70 °C
 -40 °C to +85 °C (Industrial) available on request

Supply current :

Sleep mode: 2.5 μ A @ 3.0V
 2.6 μ A @ 3.6V

Run mode¹: 1.0 mA @ 8 MHz
 565 μ A @ 4 MHz
 265 μ A @ 1 MHz
 170 μ A @ 125 kHz
 17 μ A @ 31 kHz

Rx mode: 4.0 mA @ 8 MHz

Tx mode: 3.0 mA @ 8 MHz, Txpower = 7, transmitting '0'
 12.5 mA @ 8 MHz, Txpower = 7, transmitting '1'
 3.5 mA @ 8 MHz, Txpower = 1, balanced '0' / '1'
 5.0 mA @ 8 MHz, Txpower = 2, balanced '0' / '1'
 6.2 mA @ 8 MHz, Txpower = 4, balanced '0' / '1'
 7.6 mA @ 8 MHz, Txpower = 6, balanced '0' / '1'
 7.6 mA @ 8 MHz, Txpower = 7, balanced '0' / '1'

Additional supply current when LED(s) on: 2 mA

RF sensitivity: -101 dBm
 RF output power: up to 1.5 dBm, programmable in 7 levels of Txpower
 RF range³: up to 100 m for TR-xxx-31BA (*preliminary information*)

Frequency range: 868.35 MHz (TR-868-31A)
 916.50 MHz (TR-916-31A)

RF data modulation: ASK (amplitude-shift-keyed)
 RF data transmission bit rate: 20 kb/s
 RF data transmission bit rate (true speed)²: up to 13 kb/s

LDO output (VOUT): +3 V, 100 mA max.

A/D converter: 10 b, 3 inputs (multiplexed S&H, successive approximation)
 Input A/D impedance: 10 k Ω max.

Temperature sensor accuracy: \pm 4 °C max. (not calibrated)
 \pm 0.1 °C min. (calibrated)

Size (L x W x H): 25.0 mm x 14.9 mm x 3.0 mm
 41.8 mm x 14.9 mm x 3.0 mm (TR-XXX-31BA)

Note 1: TR1001 in standby mode, BOR disabled, WDT disabled

Note 2: True speed of RF data transmission strongly depends on transmitted data structure.

Note 3: RF range strongly depends on module orientation and surroundings.

Absolute maximum ratings

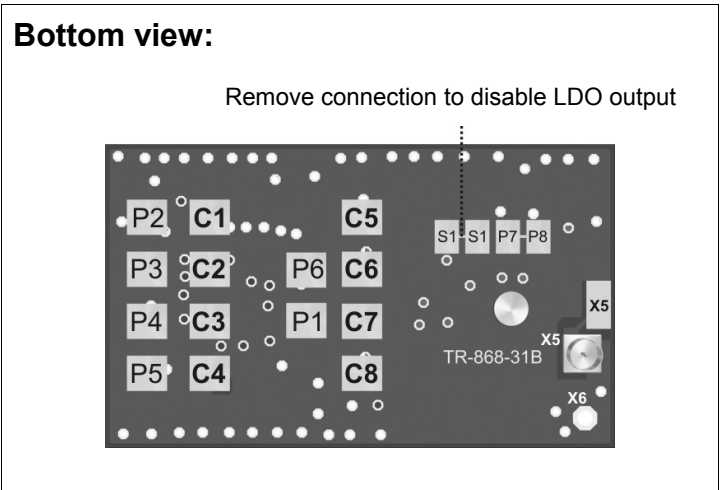
Stresses above those values may cause permanent damage to the device. Exposure to maximum rating conditions for extended periods may affect device reliability.

Supply voltage (VCC): 5.5 V
 Storage temperature: -50 °C to +100 °C
 Ambient temperature under bias: -40 °C to +85 °C

For more information refer to datasheets of ICs used:

IC	type	manufacturer
MCU	PIC16F886-I/ML	Microchip
RF	TR1001 (868 MHz) / TR1000 (916 MHz)	RF Monolithics (RFM)
LDO voltage regulator	MCP1700	Microchip
Temperature sensor	MCP9700	Microchip

Pin	Name	Description
C1	IO/AN	
	RA0	General I/O pin
	AN0	Analog A/D input
C2	IO/AN/ VOUT	
	RA1	General I/O pin (S1 disconnected)
	AN1	Analog A/D input (S1 disconnected)
	VOUT	On-board +3 V LDO output (S1 connected – default)
C3	VIN	Power supply voltage
C4	GND	Ground
C5	IO/AN/TX/-SS	
	RA5	General I/O pin
	AN4, AN11	Analog A/D input
	TX	UART TX
	-SS	SPI Slave select input (SPI enabled)
	RB4	General I/O pin, Interrupt on change
C6	IO/SCK	
	RC3	General I/O pin
	SCK	SPI clock input (SPI enabled)
C7	IO/SDI	
	RC4	General I/O pin
	SDI	SPI data in (SPI enabled)
C8	IO/RX/SDO	
	RC5	General I/O pin
	RX	UART RX
	SDO	SPI data out (SPI enabled)
X5	ANT	Antenna input
X6	GND	Ground (for dipole antenna)
P1–P8		For factory programming only

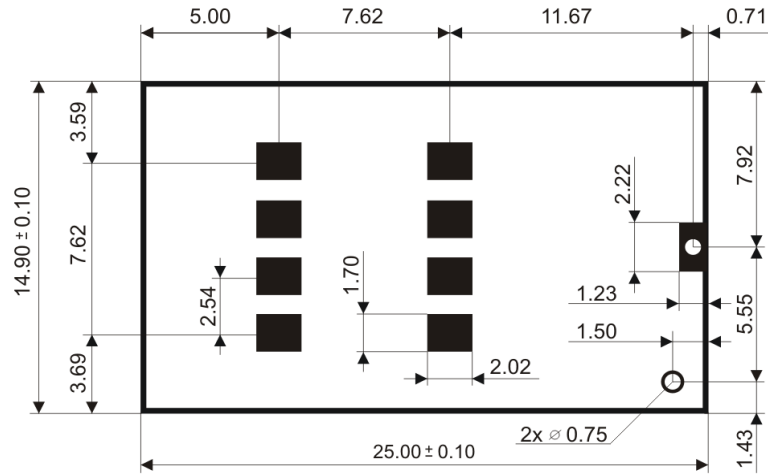


Application:

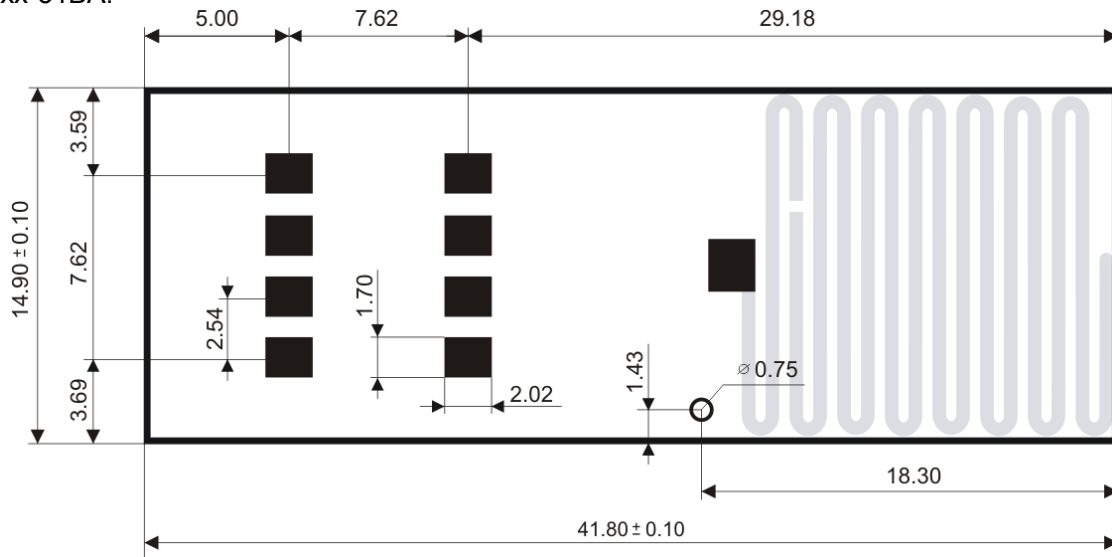
See IQRF OS User's manual, Application examples, www.iqrf.org and www.iq-esupport.com.

Dimensions:

TR-xxx-31B, TR-xxx-31BK, TR-xxx-31BC:



TR-xxx-31BA:

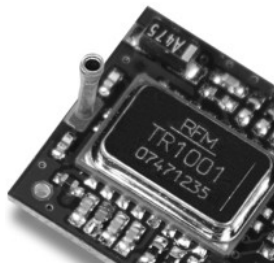


Units: mm

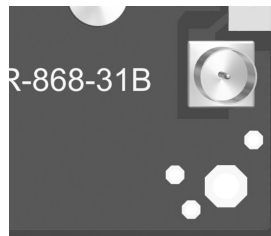
Recommended SIM connector: KON-SIM-01

Ordering codes:

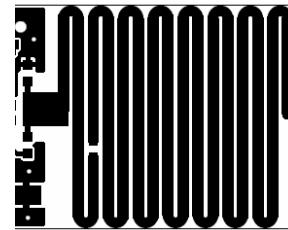
Type	frequency [MHz]	locality	antenna connector
TR-868-31B	868	EU	–
TR-868-31BK	868	EU	for AN-868-03 (¼ whip)
TR-868-31BC	868	EU	for AN-868-20 (coax)
TR-868-31BA	868	EU	built-in PCB antenna
TR-916-31B	916	USA	–
TR-916-31BK	916	USA	for AN-868-03 (¼ whip)
TR-916-31BC	916	USA	for AN-868-20 (coax)
TR-916-31BC	916	USA	built-in PCB antenna



TR-xxx-31BK



TR-xxx-31BC



TR-xxx-31BA

Sales and Service

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