

TR-32B

Transceiver Module

Data Sheet

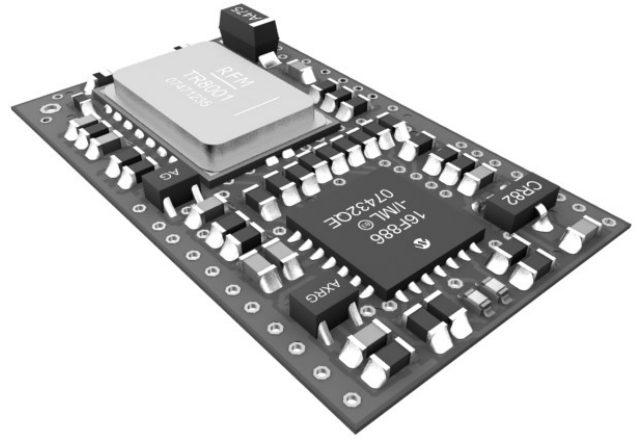
- TR-32B-868
- TR-32B-916



Simple way to smarter wireless solutions

Description

TR-32B 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 predetermines these modules for use in battery powered applications.



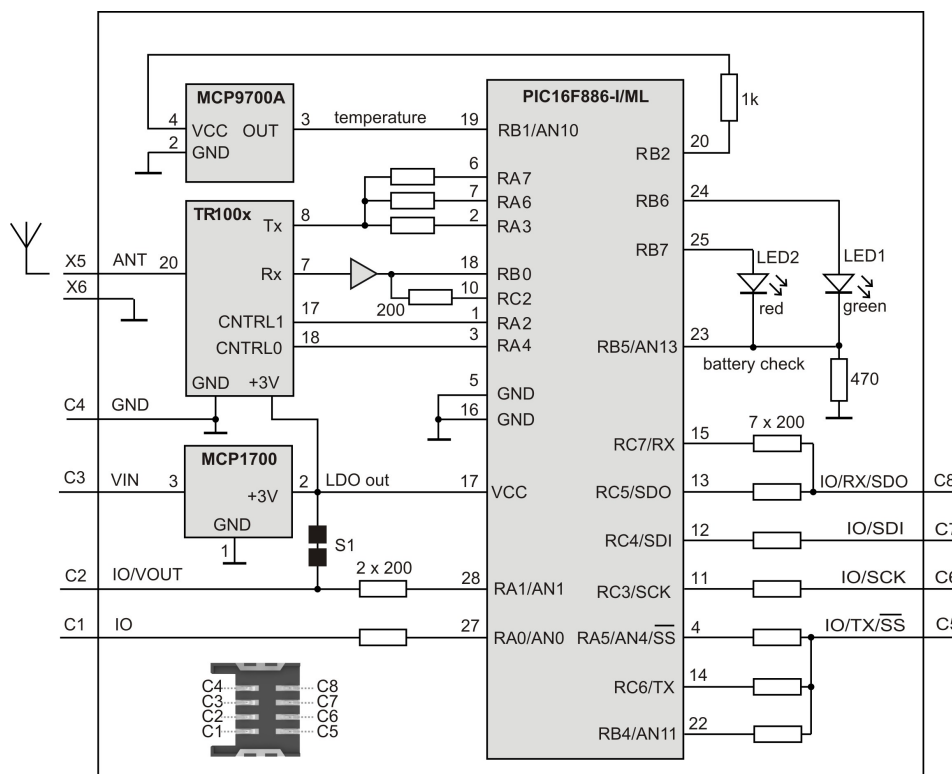
Applications

- 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
- Extended RF power
- MCU with extended Flash memory
- Ultra low power consumption, low cost
- 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)

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 µA @ 3.0V 2.6 µA @ 3.6V
Run mode ¹	0.9 mA @ 8 MHz 0.5 mA @ 4 MHz 0.25 mA @ 1 MHz 170 µA @ 125 kHz 30 µA @ 31 kHz
Rx mode	5.0 mA @ 8 MHz
Tx mode	4.0 mA @ 8 MHz, Txpower = 7, transmitting '0' 29 mA @ 8 MHz, Txpower = 7, transmitting '1' 6 mA @ 8 MHz, Txpower = 1, balanced '0' / '1' 9 mA @ 8 MHz, Txpower = 2, balanced '0' / '1' 13 mA @ 8 MHz, Txpower = 4, balanced '0' / '1' 16.5 mA @ 8 MHz, Txpower = 6, balanced '0' / '1' 18 mA @ 8 MHz, Txpower = 7, balanced '0' / '1'
Additional supply current when LED(s) on	2 mA
RF sensitivity	-104 dBm
RF output power	up to 10 dBm, programmable in 7 levels of Txpower
Frequency range	868.35 MHz (TR-32B-868) 916.50 MHz (TR-32B-916)
RF data modulation	ASK (amplitude-shift-keyed)
RF data transmission bit rate	20 kb/s
RF data transmission bit rate (true speed) ³	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 kΩ max.
Temperature sensor accuracy	±2 °C max. (not calibrated) ±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-32BA)

Note 1: TR800x in standby mode, BOR disabled, WDT disabled.

Note 2: RF range strongly depends on module orientation and surroundings.

Note 3: True speed of RF data transmission strongly depends on transmitted data structure.

Users have to ensure observing local provisions and restrictions relating to the use of short range devices by software, e.g. the CEPT ERC/REC 70-03 Recommendation and subsequent amendments in EU.

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.

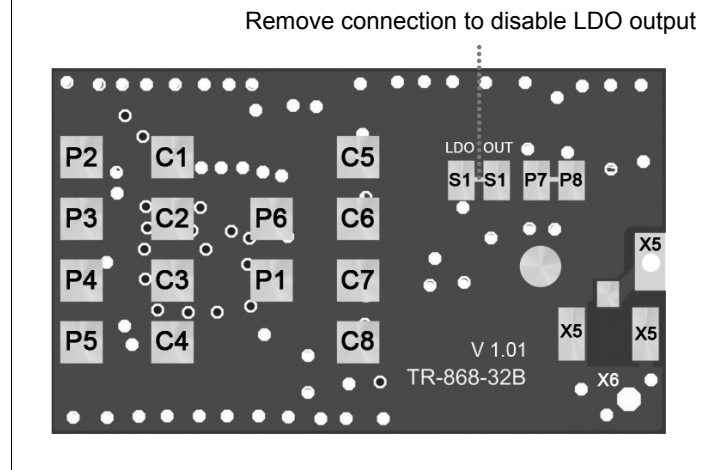
Supply voltage (VCC)	5.5 V
Storage temperature	-50 °C to +100 °C
Ambient temperature under bias	-40 °C to +85 °C

For more information refer to datasheets of ICs used:

IC	type	manufacturer
MCU	PIC16F886-I/ML	Microchip
RF	TR8001 (868 MHz) / TR8000 (916 MHz)	RF Monolithics (RFM)
LDO voltage regulator	MCP1700	Microchip
Temperature sensor	MCP9700A	Microchip

Pin	Name	Description
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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	Analog A/D input
	-SS	SPI Slave select
	RC6	General I/O pin
	TX	UART TX
	RB4	General I/O pin, Interrupt on change
	AN11	Analog A/D input
C6	IO/SCK/SCL	
	RC3	General I/O pin
	SCK	SPI clock
	SCL	I2C clock
C7	IO/SDI/SDA	
	RC4	General I/O pin
	SDI	SPI data in
	SDA	I2C data
C8	IO/RX/SDO⁴	
	RC7	General I/O pin
	RX	UART RX
	RC5	General I/O pin
	SDO	SPI data out
X5	ANT	Antenna input
X6	GND	Ground (for dipole antenna)
P1–P8		For factory programming only

Bottom view


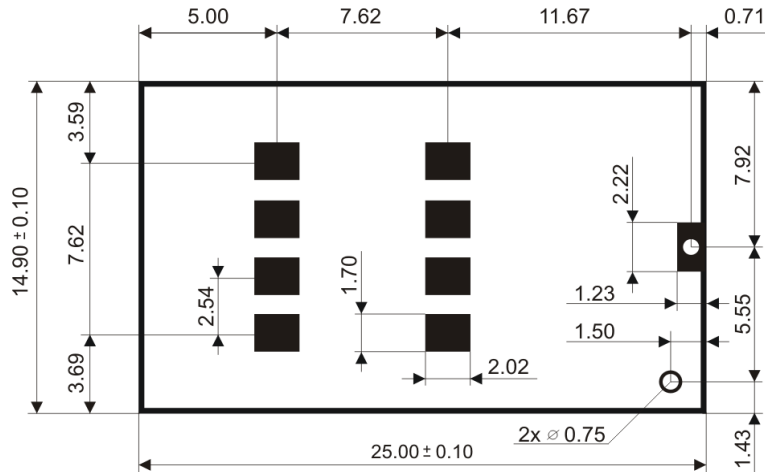
Note 4: This pin is used as output during initial ~250 ms boot-up to recognize programming mode.

Application

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

Dimensions

TR-32B, TR-32BK, TR-32BC



Units: mm

Recommended SIM connector: KON-SIM-01

Ordering codes

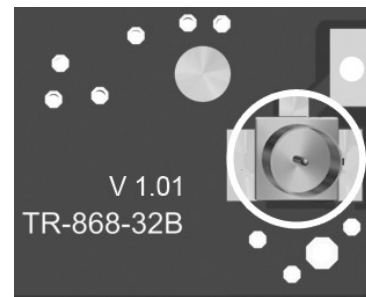
Type	frequency [MHz]	locality	antenna connector
TR-32B-868	868	EU	—
TR-32BK-868	868	EU	for AN-868-03 (¼ whip)
TR-32BC-868	868	EU	KON-U.FL-R-SMT (mini coax) for AN-05-C or CAB-U.FL
TR-32B-916	916	USA	—
TR-32BK-916	916	USA	for AN-916-03 (¼ whip)
TR-32BC-916	916	USA	KON-U.FL-R-SMT (mini coax) for AN-05-C or CAB-U.FL



TR-32B



TR-32BK



TR-32BC

Document history

- 100506 Note 4 added and information about local restrictions enhanced.
- 100421 Slightly revised and updated.
- 090611 First release.

Sales and Service

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Partners and distribution

Please visit www.iqrf.org/partners

Quality management

ISO 9001 : 2000 certified

*Complies with ETSI directives EN 30279 V.1.2.1:99, ETS 30683:97, ETSI EN 301489-1:00,
ETSI EN 300220-1:00, ETSI EN 300390-2V.1.1.1:00*

Complies with FCC directives FCC CFR, Title 47, Part 15, Section 15.209, FCC CFR, Title 47, Part 15, Section 15.249

Complies with Directive 2002/95/EC (RoHS)



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