

TR-11A

Transceiver Module

Data Sheet

- TR-11A-868
- TR-11A-916



Simple way to smarter wireless solutions

Description:

TR-11A 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 high integrated ready-to-use design requires no external components (excluding antenna). The microcontroller with built-in operating system, excellent development support, integrated LDO regulator and temperature sensor dramatically reduce time of application development. Low power consumption of TR-11A predetermines these modules for use in battery powered applications.



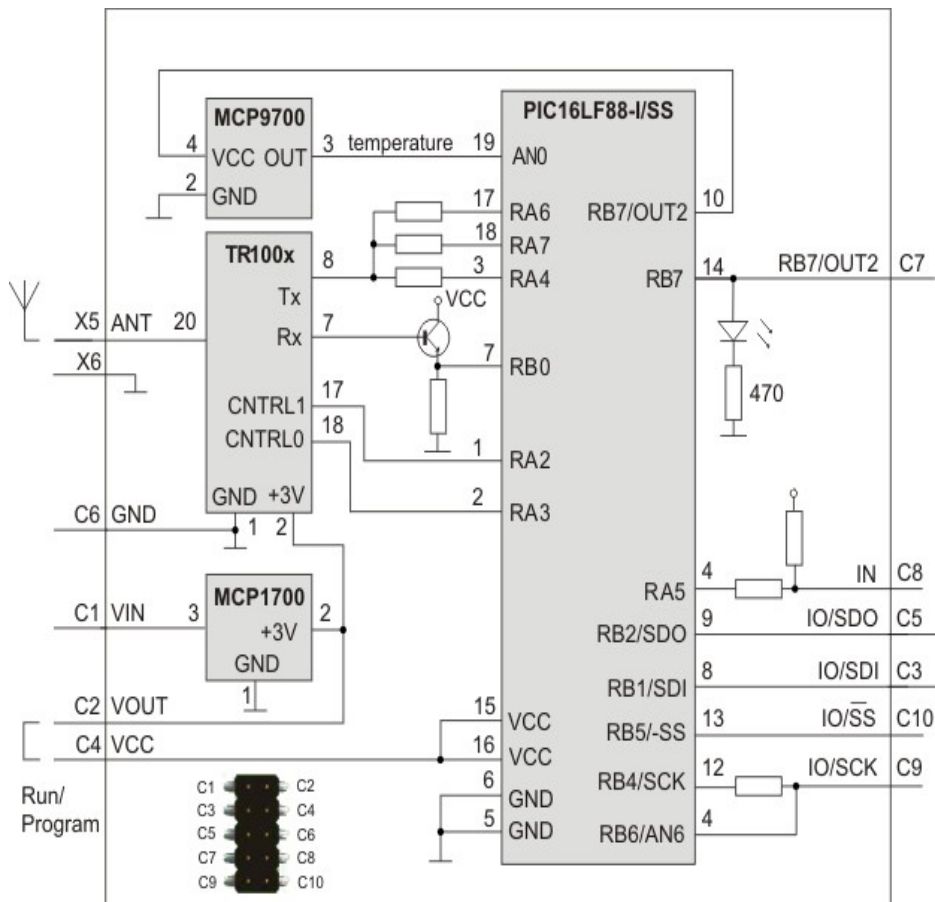
Applications:

- Telemetry
- Home 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
- Low power consumption
- SPI Interface supported by OS (in background)
- Battery monitoring
- On-board temperature sensor
- +3 V LDO regulator output

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: 170 µA
 Rx mode: 3.95 mA @ 8 MHz
 Tx mode: 3.0 mA @ 8 MHz, Txpower = 7, transmitting '0'
 12.4 mA @ 8 MHz, Txpower = 7, transmitting '1'
 4.0 mA @ 8 MHz, Txpower = 1, balanced '0' / '1'
 8.0 mA @ 8 MHz, Txpower = 7, balanced '0' / '1'

Additional supply current when LED on: 2 mA

RF sensitivity: -95 dBm
 RF output power: up to 1.5 dBm, programmable in 7 levels of TXpower
 Frequency range: 868.35 MHz (TR-11A-868)
 916.50 MHz (TR-11A-916)
 RF data modulation: ASK (amplitude-shift-keyed)
 RF data transmission bit rate: 20 kbps
 RF data transmission bit rate (true speed) ¹: up to 13 kbps
 LDO output (VOUT): +3 V, 100 mA max.
 Temperature sensor accuracy: ±4 °C max. (not calibrated)
 ±0.1 °C min. (calibrated)
 Size (L x W): 29.5 mm x 20.3 mm

Note 1: True speed of RF data transmission strongly depends on transmitted data structure.

Note 2: When the operating temperature is limited to 60°C, the time required to switch from transmit to receive is dramatically less for short transmissions.

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.

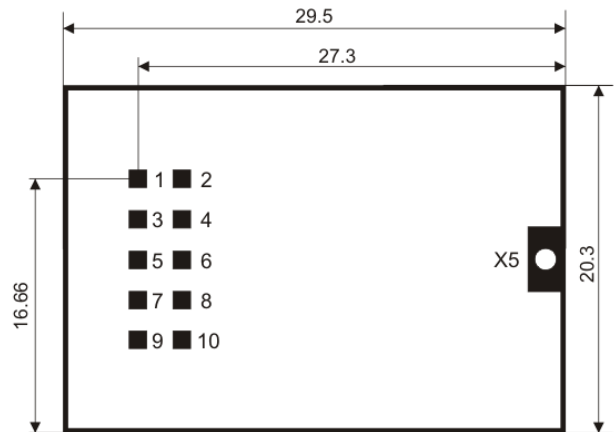
Supply voltage (VCC): 6.5 V
 Storage temperature: -50 °C to +100 °C
 Ambient temperature under bias: -40 °C to +85 °C

For more information see datasheets of ICs used:

| IC | type | manufacturer |
|------------------------------|-------------------------------------|----------------------|
| MCU | PIC16LF88-I/SS | Microchip |
| RF | TR1001 (868 MHz) / TR1000 (916 MHz) | RF Monolithics (RFM) |
| LDO voltage regulator | MCP1700 | Microchip |
| Temperature sensor | MCP9700 | Microchip |

| Pin | Name | Description |
|-----|---------------------------|---|
| C1 | VIN | Power supply voltage |
| C2 | VOUT | Output from on-board LDO regulator (+3 V). |
| C3 | IO/SDI | |
| | RB1 | General I/O pin |
| | SDI | SPI data in (SPI enabled) |
| C4 | VCC | Supply voltage of microcontroller. Connect to VOUT. |
| C5 | IO/SDO³ | |
| | RB2 | General I/O pin |
| | SDO | SPI data out (SPI enabled) |
| C6 | GND | Ground |
| C7 | RB7/OUT2 | |
| | RB7 | General I/O pin. Interrupt-on-change pin. |
| | OUT2 | Output pin, connected to LED |
| C8 | IN | |
| | RA5 | General digital input pin (with pull-up) |
| C9 | IO/SCK | |
| | RB4 | General I/O pin. Interrupt-on-change pin. |
| | SCK | SPI clock input (SPI enabled) |
| | IO/AN5 | Internally connected to RB4 |
| | RB6 | General I/O pin. Interrupt-on-change pin. |
| | AN5 | Analog input channel 5 |
| C10 | IO/-SS | |
| | RB5 | General I/O pin. Interrupt-on-change pin. |
| | -SS | SPI Slave select input (SPI enabled) |
| X5 | ANT | Antenna input |
| X6 | GND | Ground (for dipole antenna) |

Bottom view:



Dimensions in mm.

Note 3: 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.

Ordering codes:

| Type | frequency [MHz] | locality |
|-------------------|-----------------|----------|
| TR-11A-868 | 868 | EU |
| TR-11A-916 | 916 | USA |

Datasheet revision history:

- 100506 Note 3 added and information about local restrictions enhanced.
- 100421 Slightly revised, ordering codes updated
- 080920 Pictures and visual aspects modified, some parameters added
- 070216 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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