

## FM 868 radio modem

With the FM868 radio modem, the user gets a module for data radio in the frequency band for SRD (Short Range Devices) recommended by the European Telecommunications Standardization Institute ETSI without registration or fees. This frequency band is available or will be available in all of the countries that are part of the ETSI. Thus, users can use standardized products in almost all European countries for the first time. For details regarding this, read the document CEPT ERC Recommendation 70-03 of the ETSI.

The FM 868 has certification according to the Telecommunications Certification Ordinance (TKZulV) according to the stipulations of EN 300 220-1.

With the FM 868 radio modem, unidirectional or bidirectional half-duplex data transfers can be carried out in the simplest manner. For this, the FM 868 has a combined transmitting and receiving unit, as well as a serial interface with a CMOS level. The module can also be optionally integrated into an adaptor and then represents a V.24-interface.

Due to the small construction size, the FM 868 is well suited for integration in existing devices or devices to be designed. For this, the following connections are present:

- CTS** = Request send permission
- RTS** = Signaling readiness to receive
- TXD** = Data output of the modem
- RXD** = Data input of the modem
- GND** = Mass
- +3V** = Power supply

The external antenna is connected by means of an MMS-plug.

### Function Description

The FM 868 radio modem is attached to an application by means of a serial interface with a CMOS-level and to a 3V power supply. The basic condition after the connection of the supply current is "receive" on channel 01. Received data is then directly distributed and concluded with "ETX".

Data to be sent must be transferred to the modem from the application as ASCII figures in blocks with a maximum length of 128 Bytes. The end of the data block is marked by the block end mark "ETX". The data is sent off directly thereafter. The modem then switches to receive mode.

The following structure is used to change the system settings of the modem:

```
00#[Command][Parameter]ETX
```

(This sequence cannot appear in data to be transferred)



The following system settings are possible:

	Command	Parameter (e.g.)
Channel change	f	06
Channel request	k	-
Version request	v	-
Change ETX	b	0x11 (Ctrl-Q)
Switch off receive	s	-

An answer follows each valid request.

The optional selection of a block end mark gives the user the possibility of variably adapting software to his special requirements. To ensure HF data transmission, the data is prepared accordingly (error correction, CRC).

9 channels are available in the frequency range from 868.1 to 868.6 MHz in the 50-kHz grid for data transmission.

The usable range is certified for a maximum duty cycle of 1% according to the valid regulation Reg. TP 324 ZV 131. The user must ensure that the transmission duration of his application does not exceed this value. One hour is the basis for time calculation.

Received data will only be distributed to the interface after positive examination. The output of received data/order answers can be controlled with the CTS control line.

With RTS, the modem controls the readiness to receive data/orders by means of the UART.

For addressing and repeat algorithms, the user himself is responsible.

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### Technical data

Operating frequency:	868.1 MHz to 868.6 MHz 9 channels in the 50-kHz-grid
Frequency preparation:	Synthesizer-Technology
Operating voltage:	+3 V DC $\pm$ 10%
Current consumption:	Transmission mode approx. 90 mA Receive mode approx. 34 mA
Transmitter power:	+14 dBm (25 mW)
Receiver sensitivity:	approx. -105 dBm at $10^{-3}$ BER
Range:	up to 600 m in free space
Availability:	approx. 380 ms after connection VCC
Switchover time between transmitting and receiving:	approx. 0.8 ms
Channel switchover time:	approx. 0.8 ms
Data rate on the HF-channel:	4,800 Baud
Transmission protocol:	Biphasic coding, FEC, CRC
Interface:	RS232 with CMOS-level ( $\pm$ 0 V to VCC) RXD; TXD; RTS; CTS protocol
Interface format:	9,600 Baud 8 Bit data, 1 stop bit, no parity
Antenna:	50- $\Omega$ -connection (MMS-socket)
Measurements:	48 mm x 62 mm x 6 mm
Operating temperature range:	from -10°C to +55°C