

ICradio Stick 2.4G

I. FEATURES

The *ICradio Stick 2.4G* is a compact and flexible to use radio, specified for *ZigBee / IEEE 802.15.4* network applications. The *ICradio Stick 2.4G* is based on the powerful *ATmega1281* controller and the new *AT86RF230* 2.4GHz radio chip of Atmel and is fully compatible to Atmel's 802.15.4 Software MAC.

The UART interface of the *ATmega1281* is connected to the UART to USB Bridge *CP2102*. After installing the drivers for the USB2.0 controller, a virtual COM port appears, which can be used to interact with the *ATmega1281* with up to 1MBit. Drivers for Windows and popular Linux distributions are available at our webpage under <http://www.ic-board.de/> or at Silicon Laboratories.

Thanks to the high adaptability of the *AT86RF230* the module can be used for proprietary protocols as well.

The *ATmega1281* serves the purpose of a free programmable protocol controller and can be programmed with low-cost programmers, JTAG-Debuggers and free development software like GCC or AVR Studio.

The LED located on the *ICradio Stick 2.4G* is connected to port *PG5* of the *ATmega1281*. The LED lights up when the pin is driven low.

II. PINOUT OF THE ATMEGA1281

The connections between the *ATmega1281* and the *AT86RF230* are listed in table 1. The Pins *TOSC1* and *TOSC2* are tied to a 32.768kHz crystal. The clock output of the *AT86RF230* is connected to the timer input *T1*, to ensure a proper synchronisation.

Pos	AVR Port	AT86RF230
1	PB0(/SS)	SEL
2	PB1(SCK)	SCK
3	PB2(MOSI)	MOSI
4	PB3(MISO)	MISO
5	PB4	SLP_TR
6	PB5	/RF_Reset
7	PD4	IRQ
8	PD6	CLKM

table 1. Pinout of the ATmega1281



Figure 1. *ICradio Stick 2.4G*

Summary:

- built-in antenna
- small physical dimensions: 55.9 x 16.8 x 4.5 mm (incl. USB plug), suitable plastic housing is available
- low current consumption vs. high transmission power
- *AT86RF230* provides link budget of up to 103dBm
- HF- data rate up to 250 kbps
- range >50m
- on board micro controller *ATmega1281* for protocol and control tasks
- free development tool chain
- temperature range -40°C to +85°C
- word-wide registration free usage in the 2.4 GHz ISM band
- development board available
- fully compatible to Atmel's 802.15.4 Software MAC

III. PINOUT OF THE SMD PADS

Some highly integrated SMD pads are located on the bottom side of the stick to provide the connection to the *ICradio Application Development Board*. The *ICradio Stick 2.4G* snaps into mounting brackets on the *ICradio ADB* to connect the JTAG pins, ISP pins and a couple IO pins. Figure 2 shows the location of pin 1 and table 2 represents a listing of the pinout.

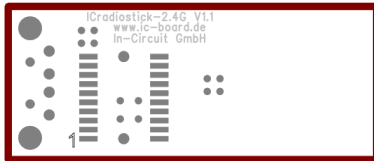


Figure 2. bottom view

Pos	Name	Pos	Name
1	TDI	2	PC3
3	TDO	4	PC2
5	TMS	6	PC1
7	TCK	8	PC0
9	/Reset	10	SDA
11	PE0(PDI)	12	SCL
13	PE1(PDO)	14	IRQ
15	SCK	16	/RF_Reset
17	TDI	18	SLP_TR
19	TDO	20	SEL

table 2. pinout of SMD Pads

IV. BOOTLOADER

The *ICradio Stick 2.4G* is equipped with a bootloader. This enables the user to do firmware updates or load In-Circuit's demo applications over the COM port. To use the bootloader, two PC tools are provided under <http://www.ic-board.de>. To load own applications the tool *ICload* is appropriated or to load In-Circuit's demo applications use the *ICAppLoader*.

When delivered the *ICradio Stick 2.4G* already holds an RS232-radio application. To transmit and receive data between to devices the following settings are required:

- Baud rate: 19200
- Data bits: 8
- Parity: none
- Stopp bits: 1
- Flow control: Xon/Xoff

After transmitting a character to the *ICradio Stick 2.4G* the demo application starts.