

iDwaRF-NodeBoard

Evaluation Board for the iDwaRF-168 Radio Module.

The iDwaRF-NodeBoard is a demonstration platform for the iDwaRF-168 programmable radio module and the iDwaRF-Net Wireless Protocol Software. The NodeBoard provides several sensor components connected to the iDwaRF Sensor module.

Features

- connector for an iDwaRF-168 module
- batterie clip (3xAAA)
- 3.3V voltage regulator for iDwaRF module and onboard components
- status LED (sensor is active or free programmable)
- push button
- LM75 digital thermometer with I²C interface
- light sensor (LDR)
- battery monitor
- expansion header with identical pinout as iDwaRF-168
- AVR ISP header (6 pins)



iDwaRF-NodeBoard

Scope of Delivery

The iDwaRF-NodeBoard comes as complete SMD assembled board – the battery clip, light sensor and ISP header can be assembled easily. For operating the NodeBoard with batteries, three standard AAA-cells are required. Alternatively a permanent supply voltage (DC >3.6V, e.g. wall power supply) can be connected to the battery clip pads.

Onboard Components

The picture on the right shows the location of the onboard components.

Voltage Regulator

A low drop out voltage regulator (LDO) is used to generate constant 3.3V from the battery voltage to supply the iDwaRF module and all onboard components.

Temperature Sensor

The NodeBoard provides an LM75 temperature sensor, which is connected via I²C bus (PORT2, PORT3) to the iDwaRF module.

Light Sensor

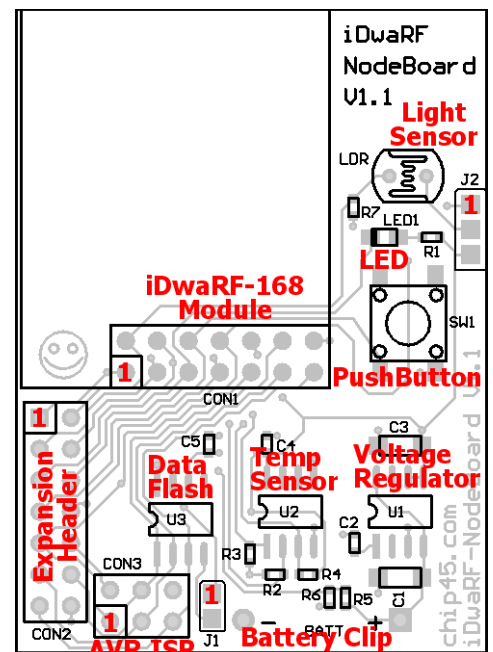
A resistive light sensor (LDR) is used to detect the luminance of ambient light. It is connected as a voltage divider to PORT1 (ADC input) of the iDwaRF module. By setting jumper J2 to position 1-2, PORT7 can be used to supply power to the LDR, i.e. by driving PORT7 high, the LDR is supplied with 3.3V and by driving the port low, it is turned off and doesn't consume power during sleep mode. By setting J2 to 2-3, the LDR is permanently supplied with battery power.

Push Button

A standard normally-open push button is connected from PORT5 to GND. By enabling the AVR's internal pull up resistor, a low is asserted to PORT5 when the button is pressed.

LED

A small SMT light emitting diode (LED) can be used as a simple status indicator, e.g. turned on when the radio module is in active mode and turned off during sleep mode. Is is connected to PORT4 low active, i.e. when the

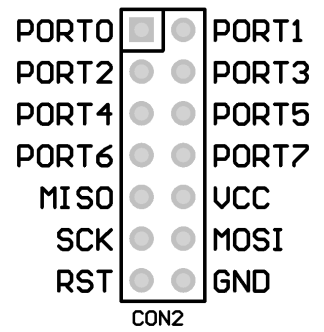


iDwaRF-NodeBoard Components

port pin outputs a low, the LED goes on.

Expansion Header

The picture to the right shows the pinout of the expansion header. For convenience the pinout is identically to the iDwaRF-168 module's pinout. The mapping of the ATmega168 signals to the PORT numbers is show below.



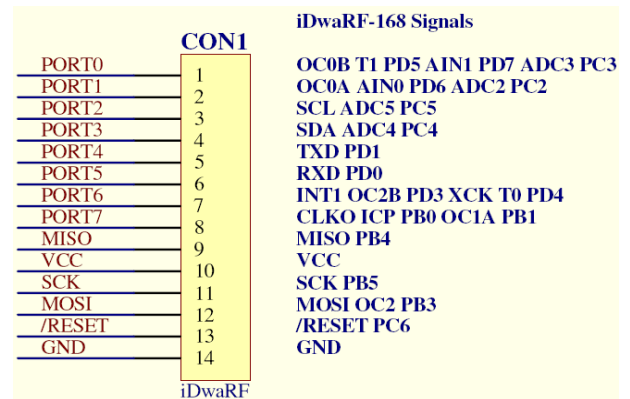
Expansion Header Pinout

Data Flash Memory

Optionally a data flash memory in SOIC-8 package (e.g. Atmel AT45DB081D) can be soldered to U3 and is connected via SPI to the iDwaRF module. PORT7 can be used as chip select. Note, that in this case PORT7 can no longer be used to power the LDR.

iDwaRF-168 Module

The iDwaRF-168 module can be plugged into a 14 pin double row pin header, which is preassembled as SMT component. It turned out, that this pin header is a little bit sensitive to bending the iDwaRF module after is is plugged into it. By bending the module too much, single contact headers of the connector can break away from the PCB, hence no longer providing good contact. It is usually no problem to resolder them with a small soldering tip, but it is recommended to take care not to stress the connector too much.



iDwaRF-168 Signals

Board Schematic

For complete reference of the the iDwaRF-NodeBoard PCB, the board schematic is available for download at www.chip45.com/iDwaRF-NodeBoard.

iDwaRF-Net Firmware

The wireless N:1 network protocol software iDwaRF-Net has been ported to the new NodeBoard, i.e. the examples coming along with the software make use of all onboard components (especially the terminal example). The latest version of the iDwaRF-Net firmware is available at www.chip45.com/iDwaRF-Net.

Development Tools

The iDwaRF-Net firmware has been developed with the free WinAVR GCC C/C++ toolchain (<http://winavr.sourceforge.net>). Currently the firmware is distributed as C-library for WinAVR and cannot be used with another compiler suite.

Further Informations

Data sheets of the onboard components as well as the boards schematics can be downloaded at www.chip45.com/iDwaRF. The official Atmel AVR homepage is www.atmel.com/avr. A valuable source of information on AVR microcontroller ist www.avrfreaks.net.

Disclaimer – Erik Lins makes no warranty for the use of its products and assumes no responsibility for any errors which may appear in this document nor does it make a commitment to update the information contained herein. Erik Lins products are not intended for use in medical, life saving or life sustaining applications. Erik Lins retains the right to make changes to these specifications at any time, without notice.

All product names referenced herein are trademarks of their respective companies. chip45.com is a registered trademark of Erik Lins.