UHF modem

Wireless module 2.0

firmware 1.08

general information

This module was engineered to provide an easy-to-use RF solution that provides reliable transmission of wireless commands. Module transfers standard asynchronous serial data packet, operates in ISM band at 915 MHz on 9.6 kbps.

features

Data packet is 22 bytes long, contains CRC16 checksum at the end. Modem can send one data packet in 500 ms time frame only, it's used for control signals, not for large data stream transmissions.

Receiver sensitivity is -120 dBm, so the range is about 400 meters in open space.

Module uses the same printed circuit board for U.S. and European market. European version has 12 VDC DC/DC changer integrated on the board, U.S. version is powered by 5 VDC only and DC/DC changer is not installed. Power consumption depends on the concrete type and frequency range. When module receives, the 5 VDC version needs about 30 mA, at transmitting it's about 580 mA maximum. The 12 VDC version has the currents lower.
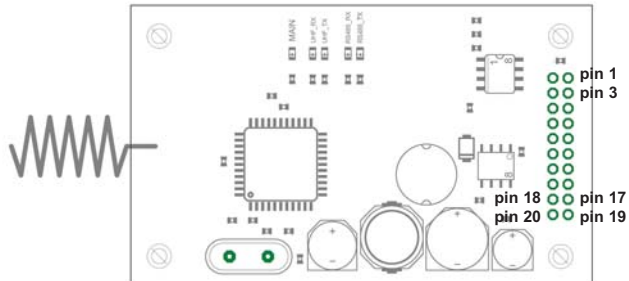
top view – 20pin connector is at the bottom

data bus connector

Pin 1 – GND
Pin 2 – VCC 5 VDC input (for 5 VDC version only)
Pin 3 – n.c.
Pin 4 – n.c.
Pin 5 – USART DATA IN (for 5 VDC version data input)
Pin 6 – USART DATA OUT (for 5 VDC version data output)
Pin 7 – n.c.
Pin 8 – n.c.
Pin 9 – RS485 SEND (for an external RS485 driver sending switch)
Pin 10 – n.c.
Pin 11 – n.c.
Pin 12 – RS485A bus

Pin 13 – n.c.
Pin 14 – RS485B bus
Pin 15 – n.c.
Pin 16 – GND
Pin 17 – n.c.
Pin 18&20 – 12 VDC power supply (+) pole (European version only)
Pin 19 – n.c.

Not connected pins (n.c.) must be unconnected. There could be some signals at futures versions.

power connection

If 5 VDC version powered, the Pins 18 and 20 are unconnected. If 12 VDC version powered, the Pin 2 is unconnected. For some special applications, from the Pin 2 can be taken power for some external components with maximum 200 mA power consumption.

5 VDC version (U.S. 915 MHz) has no DC/DC changer components installed.

terminator + bias setup

RS485 version has the RS485 bus driver chip. This version has RS485 bus terminator and bias setup.

Those pads can be soldered depending to the function we need. If the modem is the last module on RS485 bus, it must have the terminator connected. If the RS485 bus needs a bias setup, the two pads at the sides must be soldered together. Each soldering does a shortcut between the concrete two pads.

network working

Each module has own network number. It's stand-alone unit with own microchip processor. In the RS485 bus have the modems own layer, beginning with "m" before the number (for example m002 – modem with network number 002). It means, every modem must have own network number and needs the proper setup. Never install more modems together, because default network number is m001 and more modules with the same network number will do data disturbance. You have to install one module, set up the network number, next follow with the another one, etc.

an setup example

For example – replacement in MerlinFireIII system:

- switch off the module
- remove the old modem type – carefully, they're on double-side tape
- install the new modem (connector is on the bottom side)
- turn on the module
- open the Test form window in MerlinFire software
- check the "UHF modems"
- read the network
- select the modem and renumber that (it's good idea to have the same number at the modem and at the module, for example module 003 with modem m003)

LEDs

On the module are some indicators:

▣ MAIN	**MAIN LED**
▣ UHF_RX	**UHF Rx LED**
▣ UHF_TX	**UHF Tx LED**
▣ RS485_RX	**RS485 Rx LED**
▣ RS485_TX	**RS485 Tx LED**

MAIN LED flashes slowly when the module works. The another LEDs indicate status of the RS485 bus and UHF transmission/receiving.

After power-on wait until the MAIN red LED begins to flashing. That could take up to 9 seconds, until the RF module is initialized.

(OEM) Integrator has to assure compliance of the entire end-product incl. the integrated RF Module. For 15 B (§15.107 and if applicable §15.107) compliance, the host manufacturer is required to show compliance with 15 while the module is installed and operating.

Furthermore the module should be transmitting and the evaluation should confirm that the module's intentional emissions (15C) are compliant (fundamental / out-of-band). Finally the integrator has to apply the appropriate equipment authorization (e.g. Verification) for the new host device per definition in §15.101.

Integrator is reminded to assure that these installation instructions
will not be made available to the end user of the final host device.

The final host device, into which this RF Module isintegrated" hasto be labelled
with an auxilliary lable stating the FCC IDofthe RF
Module, such as "Contains FCC ID: 2AQWF-FWRFM20

"This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:
(1)this devicemay not cause harmful interference, and
(2)this devicemust accept any interference received, including
interference thatmay cause undesired operation."

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection
against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
--Reorient or relocate the receiving antenna.
--Increase the separation between the equipment and receiver.
--Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
--Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Module statement

The single-modular transmitter is a self-contained, physically delineated, component for which compliance can be demonstrated independent of the host operating conditions, and which complies with all eight requirements of § 15.212(a)(1) as summarized below.

1) The radio elements have the radio frequency circuitry shielded.

2) The module has buffered modulation/data inputs to ensure that the device will comply with Part 15 requirements with any type of input signal.

3) The module contains power supply regulation on the module.

4) The module contains a permanently attached antenna.

5) The module demonstrates compliance in a stand-alone configuration.

6) The module is labeled with its permanently affixed FCC ID label

7) The module complies with all specific rules applicable to the transmitter, including all the conditions provided in the integration instructions by the grantee.

8) The module complies with RF exposure requirements.

This transmitter/module must not be collocated or operating in conjunction with any other antenna or transmitter.