

# WIRELESS M-BUS MODULE FOR AMR IN THE NETHERLANDS

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*Wireless M-Bus is the preferred radio communication standard for utility meter readings in the Netherlands, from gas and water meters to electricity meters. Radiocrafts has recently launched a compact module which contains all hardware and firmware to meet this specification.*

**W**ireless M-Bus (EN 13757-4:2005) is a wireless standard specifically targeting the reading of electricity, gas/water/heat meters and heat allocators. The Netherlands Technical Agreement, NTA 8130, specifies Wireless M-Bus as an option for the communication protocol between the electricity meter (concentrator) and gas/water/heat meters in the P2 interface.

The Wireless M-Bus T2 mode specifies a two-way link between the concentrator (ie the electricity meter) and the meter being read. It is implemented as an asymmetrical link, using a different frequency, data rate and encoding in each direction. The link from the meter to the concentrator is operating at 868.95 MHz, with 100 kchip/s using 3-of-6 coding, while the other direction uses 868.3 MHz with 32.768 kchip/s using Manchester coding. The asymmetric behaviour is fully controlled by the module itself after being configured either as master (concentrator) or slave (meter).

The communication is always initiated by the meter. In the normal case, the meter wakes up every hour, does a transmission, listens for 2-3 ms, and then goes to sleep. Only when the concentrator wants to send data to the meter is the message acknowledged, and the meter will stay powered for further two-way communication.

Acknowledgement has to be sent by the concentrator within 3 ms after the initial slave transmission, which can be a challenge with a slow host interface. To comply with this timing requirement, and reduce the processing requirements to the host, acknowledge is sent automatically by the RF module itself. Only meters that are registered in the concentrator module are acknowledged, and only when the acknowledge flag is set for a specific meter.

## INSTALLATION

The module supports safe and easy installation of new meters. When a meter is to be installed, it should send the Access Demand Install (ADI) message every minute.

The module at the concentrator side should be set in Installation mode, which means it will accept all ADI messages. The ADI message, including the equipment ID, is then passed on to the host, where it is typically displayed in a list to the user (installer). If a certain meter is to be connected to the concentrator, the address must be registered in the module by using the bind command.

## ENCRYPTION AND KEY DISTRIBUTION

The concentrator requests the utility for a new encryption key for a specific meter, and will receive the new key in two formats: as plain text and as an encrypted version using the meter's Default key. This means the utility must have a register of all meters and their default keys.

The encrypted key is sent to the slave. When this key is written to the Key register inside the slave module, the new key is decrypted internally. In this way the new key is kept secure all the way to the meter.

The plain version of the new key is written into the concentrator module, which can keep up to 8 encryption keys (paired with the address binding registers).

During data communication, the RC1180-MBUS2 module handles the AES-128 encryption internally. When the Signature field indicates that a message shall be encrypted, and the encryption flag associated with a bound device is set, the module performs AES-128 encryption on-the-fly with a minimum time delay.

## LOW POWER CONSUMPTION

The slave meter is very often a battery-operated gas or water meter. It is therefore important that these meters use low power modes, or sleep modes, completely turning off the power to the RF circuitry when not in use. After a transmission, the RF receiver is powered on for only 2-3 ms, before the module returns to sleep mode. This ensures average current consumptions in the order of 1 uA, and very long battery lifetime.

## CONCLUSION

The RC1180-MBUS2 module contains all the features to implement an NTA 8130 compliant concentrator or meter. The module has support for automatic message acknowledgement, encryption, address recognition and message filtering. These features ensure that all time-critical operations are handled within the module. With these features integrated in an off-the-shelf module, the time to market for NTA compliant equipment is shortened.

Radiocrafts will soon extend the MBUS2 feature set supporting the NTA standard to also comply with the German Open Metering Standard/MUC specification. ■

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**WIRELESS  
M-BUS MODULE**

*Radiocrafts offers the first RF module in the world with an embedded wireless M-Bus protocol.*

- ✓ Supports EN 13757-4:2005 modes S, T and R2
- ✓ Easy-to-use UART interface
- ✓ Configurable Manufacturer ID and SN#
- ✓ Ultra low power modes
- ✓ AES -128 Encryption

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