MMR-FH200

Specification

Rev V1

Table Of Content

1. Introduction

The following document describes the technical specification of the Meter & Monitoring Reader board (called MMR-FH200) for the USA market.

The MMR-FH200 is a compact RF Receiver/Transmitter unit operates at 900MHz ISM band (multi frequency).
The MMR-FH200 is used for wireless data collection (transmitted from water meters). Following the data collection, the collected data is transmitted via the RF Transmitter (Spread Spectrum Frequency Hopping)

1.1. Definitions, Abbreviation and Acronyms

TBD

2. MMR-FH200 Description

2.1. Block Diagram

A block diagram of the MMR-FH200 is described below.

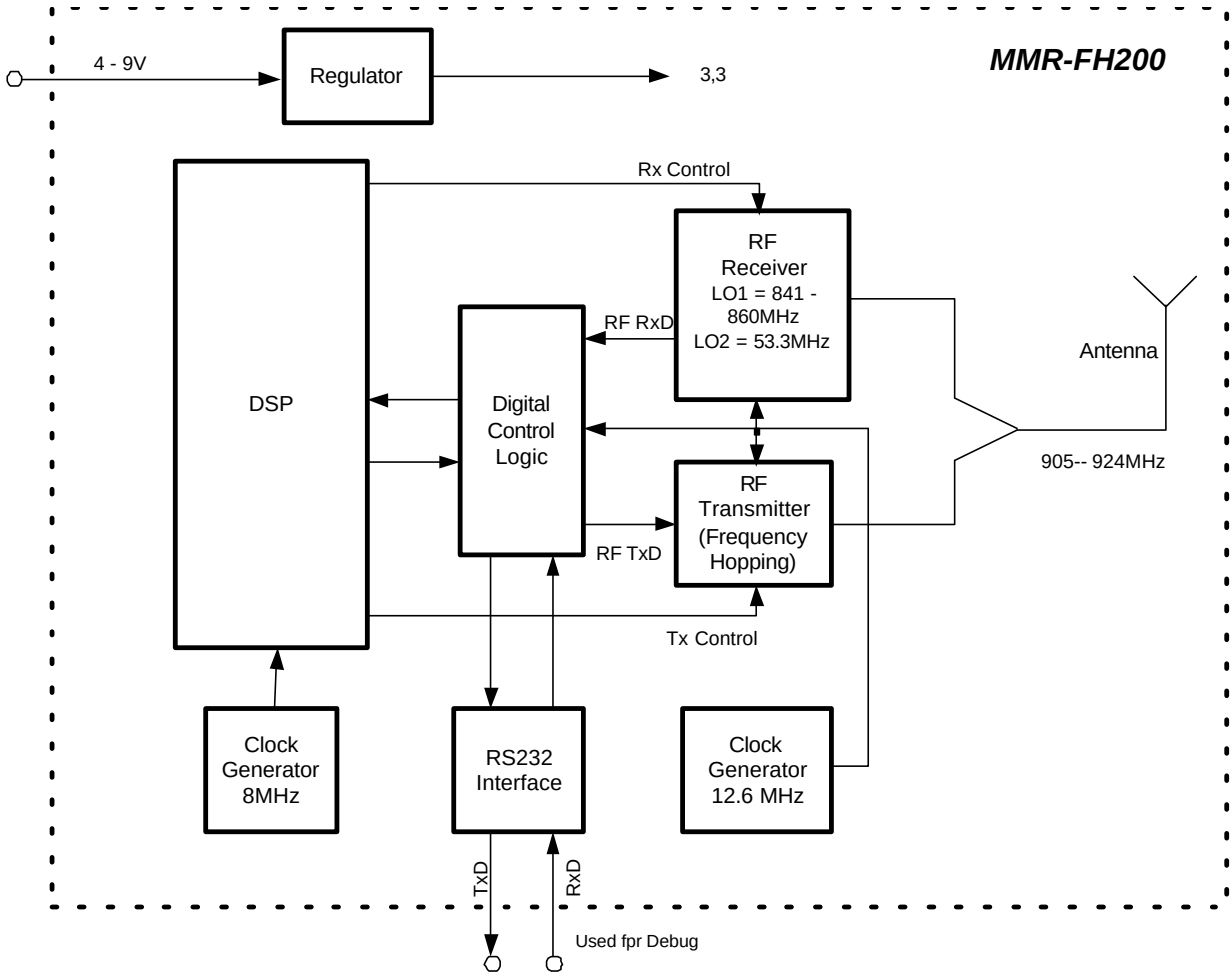

Figure 1: MMR-FH200 Block Diagram

2.2. Operational Modes

The MMR – Rep has 3 operational modes:

Power Down Mode

The unit is swutched off except the Timer. The Timer shall wake the unit when its time expired. The sleep time (power down) is programmable.

Receive Mode

The Receiver is enabled and collects data transmitted by water meters.. The received data is decoded and saved in the internal memory.

Transmit Mode

The Transmitter is enabled. The data collected during receive is transmitted towards the Concentrator.

Mode	DSP	Digital Logic	RF Receiver	RF Transmitter
Transmit	On (fast clock)	On	Off	On
Receive	On (fast clock)	On	On	Off
Power Down (Timer mode)	Off	All digital logic is off except the Timer	Off	Off

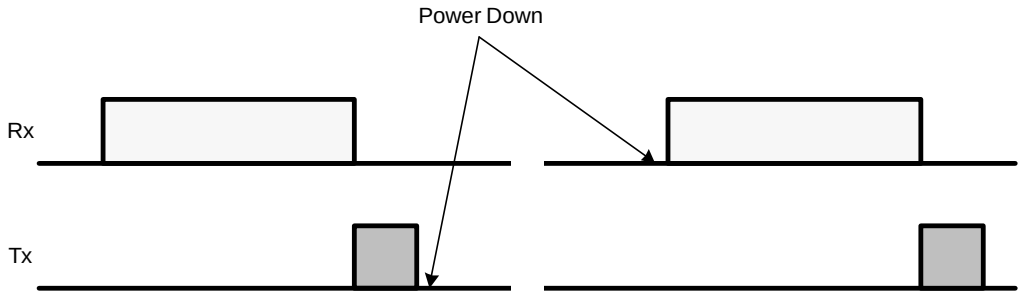

Figure 2: MMR- REP Operation Cycle

2.3. Board Layout and Size

Board Size: 125 x 100 x 28

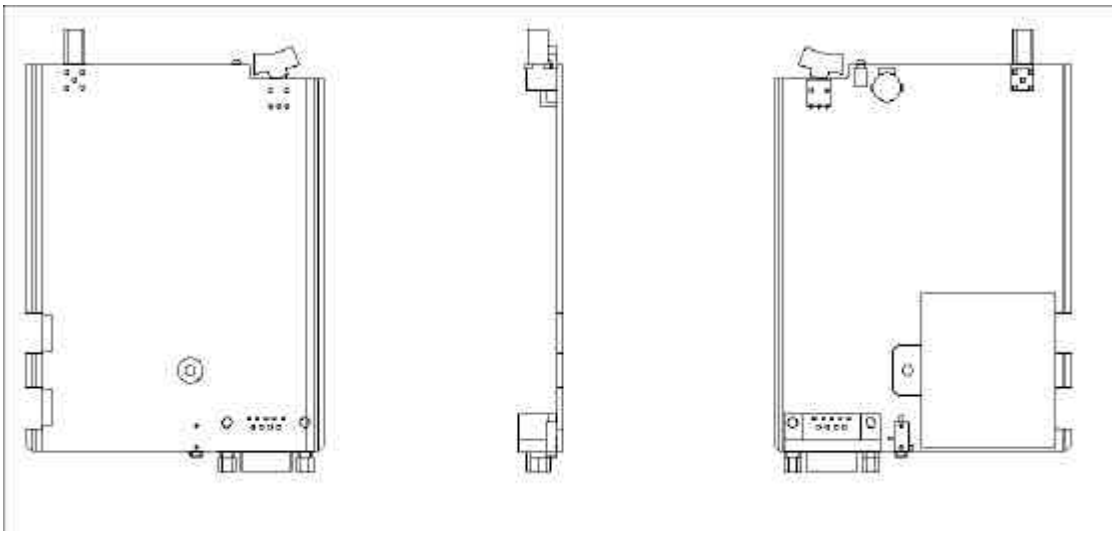

Figure 2: Board Layout

3. Electrical Performance

3.1. Receive Unit

3.1.1. Receive Parameters

Table 1 – Receive Parameters

Parameter	Value
Receive frequency	Programmable in the range 905MHz – 924MHz
Sensitivity (BER 1E-3)	-102dBm
Modulation	FSK
Frequency deviation	100 kHz
Bit rate	60 Kbps
Coding	Manchester

3.2. Transmit Unit

3.2.1. Transmit Parameters

Table 2 – Transmit Parameters

Parameter	Value
Transmit Frequency	905MHz – 924MHz
RF Type	Spread Spectrum Frequency Hopping (26 hopping Frequencies)
Modulation	FSK
Modulation Coding	Manchester
Bit rate (net data rate)	60 kbps
Frequency deviation	100 kHz
20dB Bandwidth of hopping channel	400kHz ± 50kHz
Frequency stability (including initial stability, temperature and aging)	±2.5 ppm
Peak Output power (without Antenna)	21dBm
Harmonics	< - 54dBm

3.2.2. Frequency Hopping Parameters

- A Transmit cycle consists of 26 consecutive transmissions, each transmission frame (less than 400ms) is performed in different frequency (1 out of 26).
- The maximum occupancy time on any frequency is less than 400ms within a 10 second period. This is under the limit of 400ms in a 10 sec window.
- The FH carrier hops on a predetermined, pseudo random pattern (see table below).
- All channels are used equally

Frequency Hopping Sequence Table

	Frequency [MHz]	Frequency Assignment
1.	916.2999	F1
2.	913.0274	F2
3.	909.1516	F3
4.	910.3006	F4
5.	907.3999	F5
6.	920.0465	F6
7.	914.7650	F7
8.	913.5562	F8
9.	911.3666	F9
10.	915.6513	F10
11.	917. 8524	F11
12.	908.4797	F12
13.	905.6002	F13
14.	922.4692	F14
15.	916.8810	F15
16.	919.1790	F16
17.	912.4007	F17
18.	907.9308	F18
19.	906.6656	F19
20.	910.8174	F20
21.	921.2262	F21
22.	906.1438	F22
23.	923.1750	F23
24.	921.7514	F24
25.	909.7223	F25
26.	914.1498	F26

3.3. Antenna

Antenna gain: maximum 6dBi (excluding cable lose).

There is no direct access to the antenna connector of the unit. In order to connect the antenna, special plastic cover of the connector should be removed by extracting two screws holding the cover. After connecting the antenna, the cover should be returned to its original position (using the same screws) with antenna connector covered completely by the cover.
The connection of the antenna shall be performed only by professional personnel responsible for the operating of the unit.

3.4. External Interfaces

The MMR-FH200 includes the following interfaces:

- Asynchronous Serial Communication port (for debug)
- External Battery 4 – 9 Volt

3.5. Environmental Conditions

Operating Temperature: -30° C to + 85° C
Storage Temperature: -40° C to +85° C
Humidity: Up to 95%