

DMMR

Specification

Rev V1



Table Of Content

1. INTRODUCTION	0
1.1. DEFINITIONS, ABBREVIATION AND ACRONYMS	0
2. DMMR DESCRIPTION	4
2.1. BLOCK DIAGRAM	4
2.2. OPERATIONAL MODES.....	0
2.2.1. <i>Software and FPGA Downloading</i>	0
2.3. BOARD LAYOUT AND SIZE	6
3. ELECTRICAL PERFORMANCE	0
3.1. RECEIVE UNIT	0
3.2. TRANSMIT UNIT	0
3.2.1. <i>PSK Transmit Mode</i>	0
3.2.2. <i>FSK Transmit Mode</i>	10
3.2.3. <i>Antenna</i>	0
3.3. ENVIRONMENTAL CONDITIONS	0

1. Introduction

The following document describes the technical specification of the Enhanced Meter & Monitoring Reader (called DMMR) for the USA market.

The DMMR is a compact RF Receiver/Transmitter unit operating at 900MHz ISM band (multi frequency).

The DMMR is used for wireless data collection (transmitted from water meters).

Following the data collection, the collected data is transmitted via the RF Transmitter to another DMMR

1.1. *Definitions, Abbreviation and Acronyms*

TBD

2. DMMR Description

2.1. Block Diagram

A block diagram of the DMMR is described below.

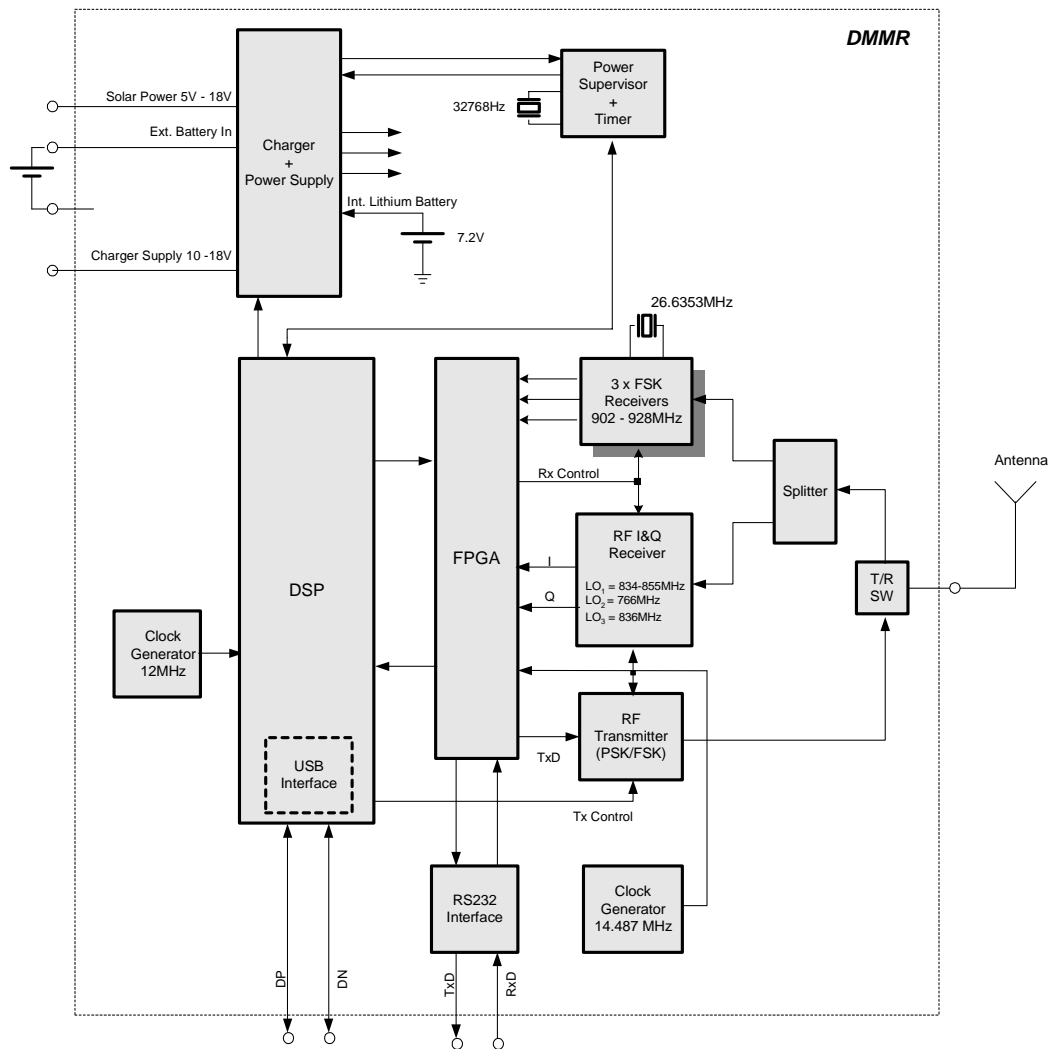


Figure 1 - DMMR Block Diagram

2.2. Operational Modes

The DMMR has 3 operational modes:

Power Down Mode

The unit is switched 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 or transmitted via the RS232/USB to external PC/Lap Top/Pocket PC.

Transmit Mode

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

Mode	DSP	Digital Logic	Power Supervisor + Timer	RF Receiver	RF Transmitter
Transmit	On	On	On	Off	On
Receive	On	On	On	On	Off
Power Down (Timer mode)	Off	Off	On	Off	Off

2.2.1. Software and FPGA Downloading

By connecting the DMMR to a PC via their USB interface, software and FPGA files can be downloaded into the DMMR.

2.3. Board Layout and Size

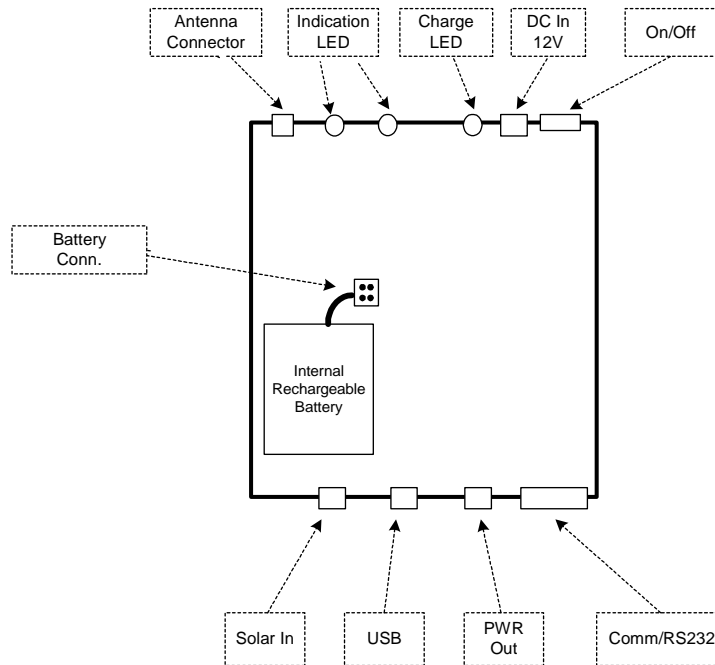
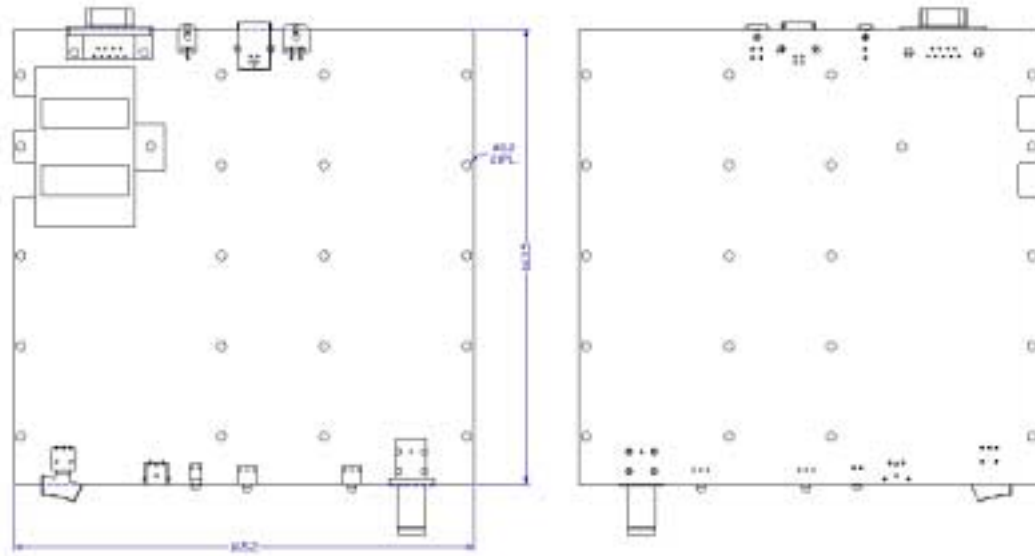


Figure 2 - Board Layout

3. Electrical Performance

3.1. PSK Receive Unit

The DMMR receive unit consists of 4 receivers (the receivers work simultaneously):

- PSK Receiver
- 3 x FSK Receiver

3.1.1. PSK Receiver

Parameter	Value
Receive frequency	Programmable in the range 902 MHz – 928 MHz
Sensitivity (BER 1E-3)	-114dBm
Modulation	DPSK DSSS
Bit rate	~60 kbps
Chip rate	~900 kChip/sec
Bandwidth (@6dB)	800 kHz – 1100kHz
Frequency stability (including initial stability, temperature and aging)	<15 ppm

3.1.2. FSK Receiver

The DMMR consists of 3 x FSK Receivers. Every FSK receiver will be programmed separately according to the channel requirements

Table 2 – Receive Parameters	
Parameter	Value
Receive frequency	Programmable in the range 902 – 928 MHz
Sensitivity (BER 1E-3)	-102dBm (for 60 kbps)
Modulation	FSK
Frequency deviation	Programmable
Bit rate	Programmable
Coding	NRZ/Manchester
Frequency stability (including initial stability, temperature and aging)	<40 ppm

3.2. **Transmit Unit**

The DMMR transmit unit has two operational mode (selected by the software):

- PSK Mode
- FSK Mode

3.2.1. **PSK Transmit Mode**

Table 2 – PSK Transmit Parameters	
Parameter	Value
Transmit Frequency	Programmable in the range 905.44 MHz – 923.55 MHz
Modulation	DSSS BPSK
Bit rate	~60 kbps
Chip rate	~900 kChip/sec
Bandwidth (@6dB)	800 kHz – 1100kHz
Frequency stability (including initial stability, temperature and aging)	<15 ppm
Peak Output power (without Antenna)	21.34 dBm
Peak Output power spectral density (without Antenna)	<8 dBm in any 3kHz
Harmonics	< - 54dBm

3.2.2. FSK Transmit Mode

Parameter	Value
Transmit Frequency	Programmable in the range 905.44 MHz – 923.55 MHz
Modulation	Digital Modulation – Wide Band BFSK
Modulation Coding	Manchester
Bit rate (net data rate)	~40 kbps
Frequency deviation	170 kHz
Bandwidth (@6dB)	500 kHz – 650 kHz
Frequency stability (including initial stability, temperature and aging)	<15 ppm
Peak Output power (without Antenna)	14.24 dBm
Peak Output power spectral density (without Antenna)	<8 dBm in any 3 kHz
Harmonics	< - 54dBm

3.2.3. Antenna

Antenna gain: maximum 3dBi (excluding cable loss).

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.

3.3. Environmental Conditions

Operating Temperature: -30° C to + 85° C

Storage Temperature: -40° C to +85° C

Humidity: Up to 95%