

# **ETMW-150U**

# **RF Specification**

**Rev V2**



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## **1. Introduction**

The following document describes the technical specification of the second generation of Water Meter transceiver board (called ETMW-UNIVERSAL) for the USA market.

The ETMW-UNIVERSAL is actually a water odometer, offering Automatic Meter Reading – AMR.

The ETMW-UNIVERSAL is 2-Way RF communicator built-in water meter. The RF capabilities enable the transmission of the meter reading and some extra information to a Collecting unit. In addition specific parameters can be programmed via the RF link.

The ETMW-UNIVERSAL consists of the following units: RF Transmitter & Receiver with integral Antenna that operates at 916.3 MHz and a Microcontroller plus simple Digital Logic and interface (to external reed switches).

### **1.1. Definitions, Abbreviation and Acronyms**

RFD : RF Dialog

## 2. ETMW-UNIVERSAL Description

### 2.1. Block Diagram

A block diagram of the ETMW-UNIVERSAL is described below.

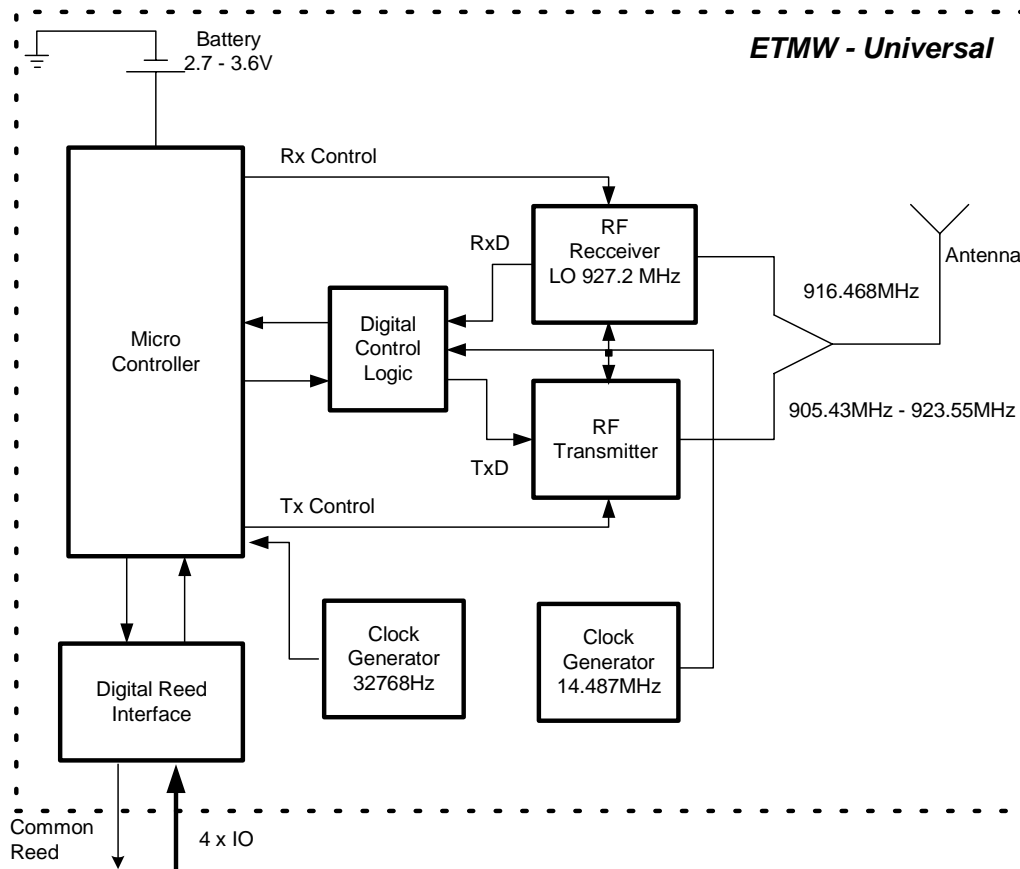


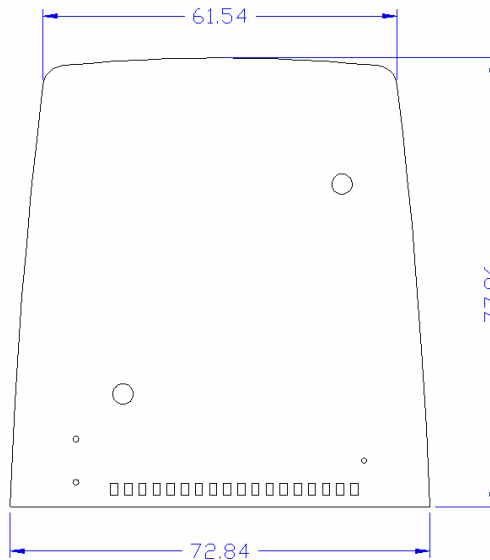
Figure 1: ETMW-UNIVERSAL Block Diagram

## 2.2. Operational Modes

Table 1 – Operational Modes					
Mode	Microcontroller	Reed SW	Digital Logic	RF Receiver	RF Transmitter
Transmit	On (fast clock)	Disabled	On	Off	On
Receive	On (fast clock)	Disabled	On	On	Off
Reading Reeds SW	On (fast clock)	Enabled	Off	Off	Off
Idle/Sleep	On (32768Hz clock)	Disabled	Off	Off	Off

## 2.3. Board Dimension

The following figure describes the mechanical layout of the PCB. All dimensions are in millimeters.



### 3. Electrical Performance

#### 3.1. Transmit Unit

Each ETMW-UNIVERSAL board has two transmit modes:

- FSK (see table 2)
- PSK (see table 3)

The transmit mode is controlled by the software.

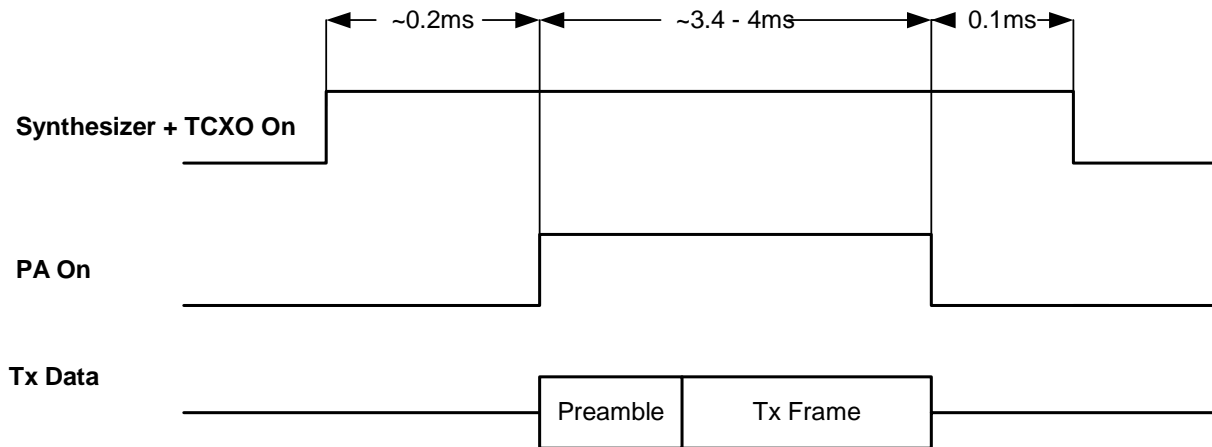
##### 3.1.1. FSK Mode

<b>Table 2 – FSK Transmit Parameters</b>	
<b>Parameter</b>	<b>Value</b>
Transmit Frequency	Programmable in the range 905.43MHz - 923.55MHz
Modulation	Digital Modulation – Wide Band BFSK
Modulation Coding	Manchester
Bit rate (net data rate)	60.3625 kbps
Frequency deviation	190 kHz
Bandwidth (@6dB)	500kHz – 700kHz
Frequency stability (including initial stability, temperature and aging)	<12 ppm
Peak Output power (without Antenna)	< 17dBm
Peak Output power spectral density (without Antenna) in any 3kHz	3dBm to 8dBm
Harmonics	< - 54dBm
Tx Pulse duration	~4ms
Transmission duty cycle	Programmable. Less than 0.10%

**3.1.2. PSK Mode**

<b>Table 3 – PSK Transmit Parameters</b>	
<b>Parameter</b>	<b>Value</b>
Transmit Frequency	Programmable in the range 905.43MHz - 923.55MHz
Modulation	DSSS BPSK
Bit rate	60.3625 kbps
Chip rate	905.4375 kChip/sec
Bandwidth (@6dB)	700 kHz – 1300kHz
Frequency stability (including initial stability, temperature and aging)	<12 ppm
Output power (without Antenna)	< 22dBm
Output power spectral density (without Antenna) in any 3kHz	2dBm to 8dBm
Harmonics	< - 54dBm
Tx Pulse duration	~3.4ms
Transmission duty cycle	Programmable. Less than 0.10%

### 3.1.3. Tx Timing





### 3.2. *Receive Unit*

#### 3.2.1. *Receive Parameters*

**Table 6 – Receive Parameters**

<b>Parameter</b>	<b>Value</b>
Receive frequency	916.468 MHz
Sensitivity (BER 1E-3)	-90 dBm
Modulation	FSK
Frequency deviation	190 kHz
Bit rate	41.156 kbps
Coding	Manchester

### **3.3. Antenna**

The ETMW-UNIVERSAL has an integral Antenna.

The Antenna type is Printed Inverted "F" Antenna. The Antenna is Omni Directional in horizontal plane. The max gain is 5dBi. The Antenna is printed on the board.

### **3.4. Power Source and Current Consumption**

Battery rated voltage 3.6V.

Operating voltage: 2.7-3.6V



**3.5. *Environmental Conditions***

Operating Temperature: -40° C to + 85° C

Storage Temperature: -40° C to +85° C

Humidity: Up to 95%