

SER100_RF_ModemTechnical Specifications Manual

版本 (Version)	修改日期 (Modified Date)	修改说明 (Modify the description)	修改人 (Modify people)	适用范围 (Applicable scope)
V1.0	2016-01-13	首版 Initial Release	李文科 (Weike Li)	MSi4463 PCB491 V1.7 软件:由 RF 模块定
V1.1	2016-3-10	文件名由 CWM100_RF_Modem 技术说明书 V1.0_2016011 更改为 SER100_RF_Modem 技术说明书 V1.1_20160310 (The file name is changed from CWM100_RF_Modem technical manual V1.0_2016011 to SER100_RF_Modem technical specification V1.1_20160310)	李文科 (Weike Li)	MSi4463 PCB491 V1.8 软件:由 RF 模块定
V1.2	2016-8-16	修正 3.2 RF 通讯参数 (Correction 3.2 RF communication parameters)	何洪彬 (hongbing He)	MSi4463 PCB491 V1.8 软件:由 RF 模块定
V1.3	2017-05-08	FCC 认证修改 (FCC certification changes)	黄行禧 (Xingxi Huang)	说明书技术要求以适用 FCC 认证要求 (认证实验室用)

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1 模块介绍 (Module introduction)

1.1 概述 (Outline)

SER100 RF Modem 是一款基于 Silicon Labs Si443210mW 的无线传输模块，工作在 433MHz

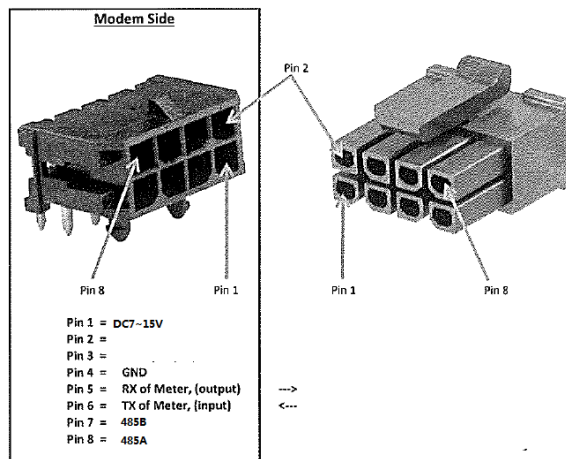
频段，使用 RS232 接口进行数据通讯，RS485 可拓展。应用于无线数据传输。它具有功率密度集中，传输距离远，成本低，稳定性高，抗干扰能力强的优势。（SER100 RF Modem is a Silicon Labs Si4432 10mW wireless transmission module, working in the 433MHz band, the use of RS232 interface for data communication, RS485 can be expanded. Used in wireless data transmission. It has the power density concentration, transmission distance, low cost, high stability, strong anti-interference ability）

1.2 串口通讯（serial communication） 可用串口通讯软件指令与模块通讯，操作说明见串口通讯说明书。（Serial communication software can be used to communicate with the module instructions, see the serial communication protocol）

2 功能简介（Introduction to features）

2.1 引脚定义（Pin Definition）

SER100 RF Modem 硬件接口主要定义：（SER100 RF Modem Hardware Interface main definitions:）



序号 (NO.)	接口名称 (Interface name)	I/O	描述 (Description)
1	Viso	电 源 (Power)	Supply voltage DC7V ~ 15V, the recommended value DC9V, input current 100mA。
2	NC	NC	保留 (Reserved)
3	NC	NC	保留 (Reserved)
4	GND	地	电路接地。(Circuit Ground)
5	RS32_Txd	O	RS232 Port Transmit Data (from SER100)
6	RS32_Rxd	I	RS232 Port Receive Data (to SER100)
7	RS485_B		RS485 Port Receive -

8	RS485_A	RS485 Port Receive +
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SER100 RF Modem 与 Mk10 的接口连接示意图见下: (SER100 RF Modem and Mk10 interface connection diagram below :)

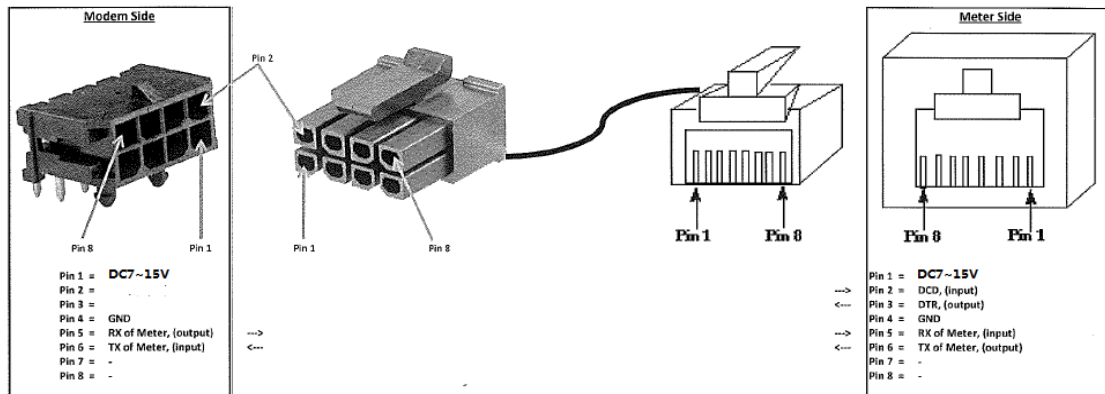


图 2.1.1 RS232 接口连接示意图(RS232 interface connection diagram)

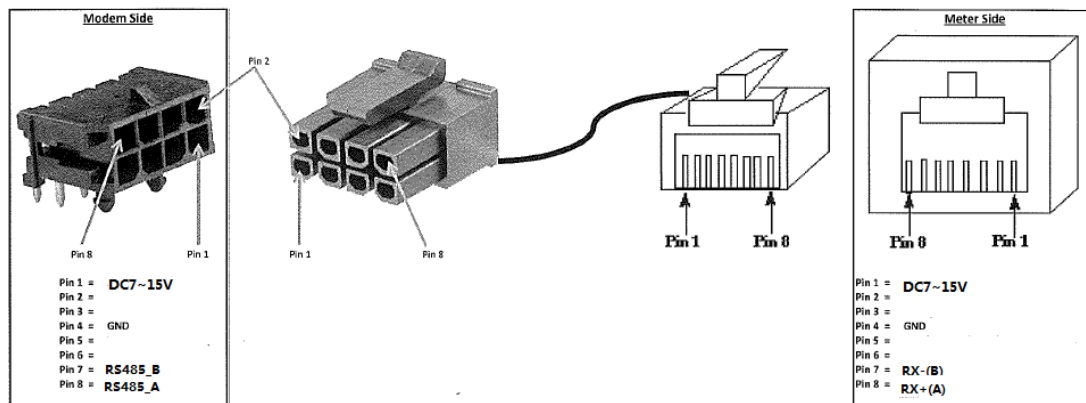


图 2.1.2 RS485 接口连接示意图(RS485 interface connection diagram)

2.2 外形结构图(Outline structure)

外形尺寸 (Dimensions): L*W*T=70x51x22mm;



图 2.2.1 模块实物图 (Module Exterior map)

2.3 天线要求 (Antenna requirements)

SER100 RF Modem 模块主要采用外置贴片天线，具体要求按天线规格书 (Specific requirements according to the antenna specifications)

[ER100 天线规格书 433MHz.pdf](#)

3 技术规格 (Technical specifications)

3.1 电气参数 (Electrical Parameters)

供电电压范围 (Supply voltage range)	DC7V~15V ;
工作电流 (Operating Current)	1) SER100 工作电压 DC9V 处于接收状态时工作电流 <20mA; (1) Operating current when the SER100 operating voltage DC 9V is in the receiving state <20mA;) 2) SER100 工作电压 DC9V 处于发送状态时工作电流 <50mA@+10dBm; (2) When the SER100 operating voltage DC 9V is in the transmit state, the operating current is <50mA @ + 10dBm)

3.2 RS232 或 RS485 通讯参数

支持的通讯参数

序号	协议	通讯参数
1	DLT2007_645	波特率 9600, 1 个起始位, 8 个数据位, 1 个偶校验位, 1 个停止位, 数据方向 MSB; (Baud rate 9600, 1 start bit, 8 data bits, 1 parity bit, 1 stop bit, data direction MSB;)
2	CommandLine	波特率 9600, 1 个起始位, 8 个数据位, 1 个偶校验位, 1 个停

		止位，数据方向 MSB；（Baud rate 9600, 1 start bit, 8 data bits, 1 parity bit, 1 stop bit, data direction MSB）
3	ANSI C12	波特率 9600，1 个起始位，8 个数据位，0 个校验位，1 个停止位，数据方向 MSB；（Baud rate 9600, 1 start bit, 8 data bits, 0 parity bit, 1 stop bit, data direction MSB;）
4*	CommandLine	波特率 9600，1 个起始位，8 个数据位，0 个校验位，1 个停止位，数据方向 MSB；（Baud rate 9600, 1 start bit, 8 data bits, 0 parity bit, 1 stop bit, data direction MSB;）
5	DLT2007_645	波特率 2400，1 个起始位，8 个数据位，1 个偶校验位，1 个停止位，数据方向 MSB；（Baud rate 2400, 1 start bit, 8 data bits, 1 parity bit, 1 stop bit, data direction MSB;）

*: 当前 MK10D+SER100 使用的是 4 号通讯参数；（The current MK10D + SER100 uses the No. 4 communication parameters;）

3.3 RF 通讯参数（RF communication parameters）

参 数 Parameters	指标要求(Indicator Requirements)	
工作频段 (Working frequency band)	433MHz	
工作频率 (Working Frequency)	433.3MHz,434.5MHz,433.3MHz, 434.5MHz,	
信道间隔 (Channel Spacing)	300KHz	
发射功率 (Transmit Power)	默认值：10dBm(10mW)	
接收灵敏度 (Receiving sensitivity)	优于-107dBm(PER 1%,20Bytes, 10kbps,DEV 25KHz,GFSK)	
调制方式 (Modulation)	GFSK	
空中速率 (Air rate)	10kbps	
频 偏 (Deviation)	20KHz	
接收带宽 (Receiving Bandwidth)	80KHz	
最大数据包长度 (Max)	MSi4432 模块支持：63bytes	

Data packet length)	
工作信道 (Working channel)	5 Channels
天线类型 (Antenna type)	外置贴片 PCB 天线; (External patch PCB)

3.4 工作环境(Operating Environment)

工作温度范围 (Operating Temperature Range)	-25°C~ 70°C
极限工作温度范围 (Limit Temperature Range)	-40°C~ 85°C
湿度范围(Humidity Range)	<95% (无凝露 No condensation);

4 模块功能特点: (Module Features)

- 1、RF 模块根据电表表号自动分配通讯信道，信道数默认为 16 个；(1, RF module automatically allocates the communication channel according to the meter table number, the default number of channels is 16;)
- 2、CIU 的通讯地址和信道号与电能表一致，保证 RF 实时通讯；(2, CIU's communication address and channel number and energy meter to ensure that RF real-time communication;)
- 3、CIU 显示界面和电能表一致，数据实时更新，更新时间默认值 30s；(3, CIU display interface and the same energy meter, real-time data updates, update the default value of 30s;)
- 4、该通讯方式优点保证各个信道独立通讯，减少单个信道由于数据通讯频繁和电表数量增多导致通讯失败。(4, the advantages of the communication mode to ensure that each channel independent communication, reduce the individual channels due to frequent data communication and the number of meters caused by communication failure.)

应用实例 Application cases:

CIU Model (HD16) ↔ Meter Model (Mk10D or Mk10E)

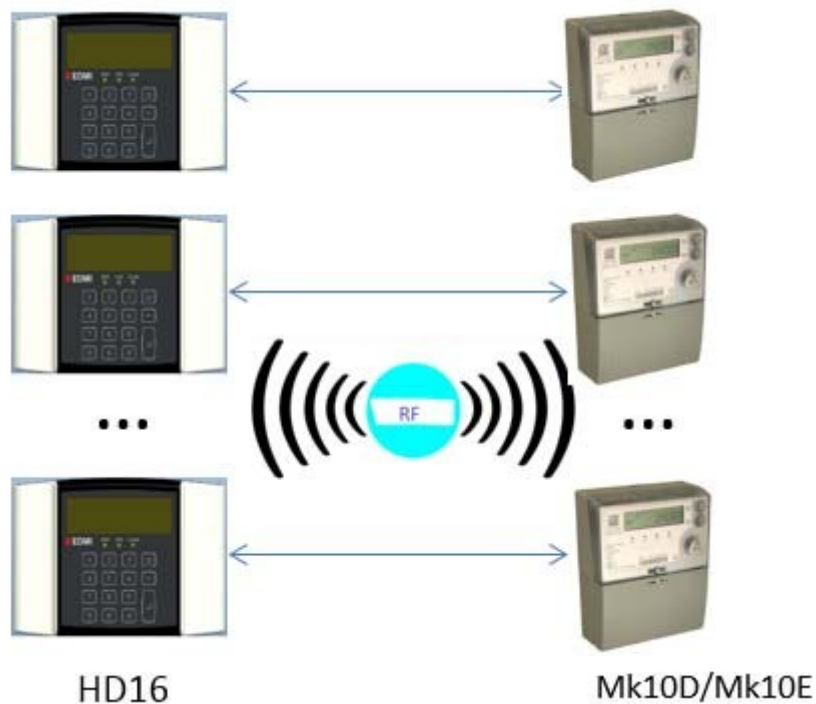


Figure 图 4.1:点对点网络结构图 Point-to-Point Network Structure Diagram

§ 15.19 Labelling requirements. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

§ 15.21 Information to user.

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

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.