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Spec No: 002-05173

Spec Title: AN205173 - F2MC-8FX Family, MB95410H/470H Series One Phase Power Meter (RN8209) Real Time Clock and Data storage Operation

Replaced by: None

AN205173

F²MC-8FX Family, MB95410H/470H Series One Phase Power Meter (RN8209) Real Time Clock and Data Storage Operation

This application note describes how to use One Phase Power Meter (RN8209) solution's real time clock and data storage function.

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1 Introduction

This application note describes how to use One Phase Power Meter (RN8209) solution's real time clock and data storage function.

Chapter 2 explains the background.

Chapter 3 explains the HW diagram of real time clock and data storage function.

Chapter 4 explains the HW reference SCH.

Chapter 5 explains the FW diagram.

Chapter 6 explains the FW function list.

2 Background

Background of Realtime Clock and Data Storage Function

2.1 Overview

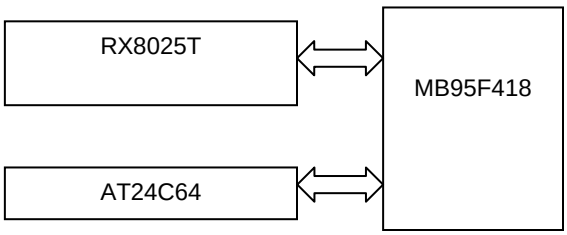
In the power meter solution, real time clock unit is RX8025T, and data storage unit is AT24C64. The communication method between MCU and these two units is I^2C communication.

3 HW Diagram

Hardware diagram of real time clock unit and data storage unit

3.1 The HW diagram of real time clock unit and data storage unit

Figure 1. Hardware diagram



4 HW Reference SCH

Hardware reference SCH of real time clock unit and data storage unit

Figure 2. Realtime Clock Unit

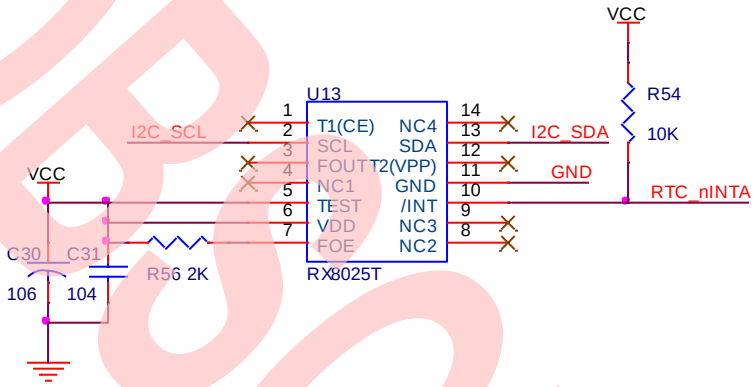
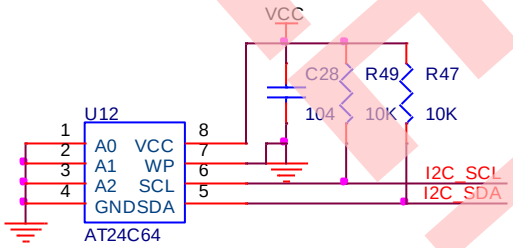


Figure 3. Data Storage Unit



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5 FW diagram

Firmware system diagram

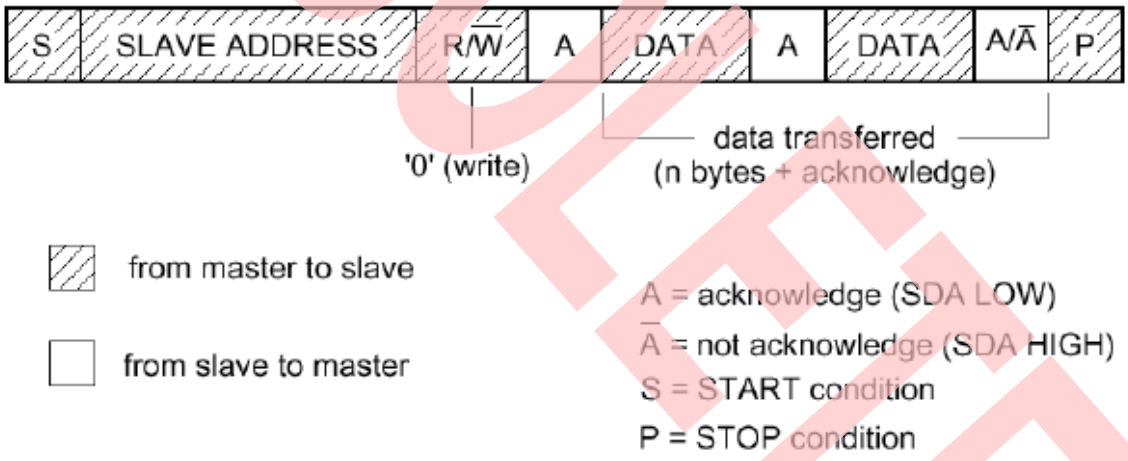
5.1 Real time Clock Unit Communication Protocol

For RTC function's communication protocol, refer to the IIC bus protocol which is shown in Figure 4.

Description is as below:

1. Master sends a start condition and a byte data including 7 bits slave address and 1 bit R/W.RTC's salve address is 0110010.
2. Master waits ACK from slave.
3. Master sends a byte RTC register address (0~F), which is shown in Figure 5.
4. Master waits ACK from slave.
5. Master sends n bytes data to slave. And at the end of each byte master needs to wait slave's ACK.
6. Master sends a stop condition to slave.

Figure 4. RTC Communication Protocol



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Figure 5. RTC's register Description

Address	Function
0	SEC
1	MIN
2	HOUR
3	WEEK
4	DAY
5	MONTH
6	YEAR
7	RAM
8	MIN Alarm
9	HOUR Alarm
A	WEEK Alarm DAY Alarm
B	Timer Counter 0
C	Timer Counter 1
D	Extension Register
E	Flag Register
F	Control Register

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5.2 Data Storage Unit Communication Protocol

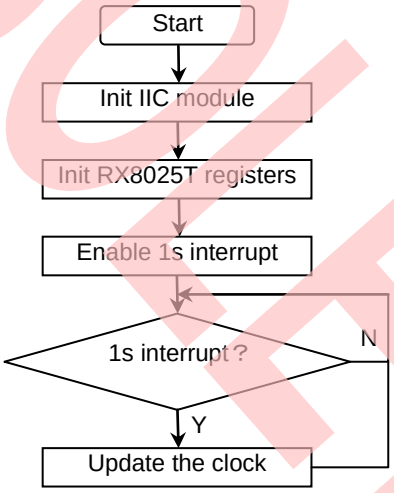
For EEPROM function's communication protocol, refer to the IIC bus protocol which is shown in Figure 4.

Description is as below:

1. Master sends a start condition and a byte data including 7 bits slave address and 1 bit R/W.EEPROM's salve address is 1010000.
2. Master waits ACK from slave.
3. Master sends 2 bytes EEPROM data address (0x0000~0xFFFF).First sends the address high byte. Then sends the address low byte. And in the end of each byte master needs to wait slave's ACK.
4. Master sends n bytes data to slave. And in the end of each byte master need to wait slave's ACK.
5. Master sends a stop condition to salve.

5.3 Firmware System Diagram

Figure 6. Firmware System Diagram



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6 FW Function List

6.1 API

Table 1. FW API List

Function Prototype	Description
void RTC_Config(void)	Config working mode for RTC RX8025T
void RTC_IntDisable(void)	Disable interrupt output for RTC
void RTC_Read(void)	Read RTC RX8025T calendar data
void RTC_Write(void)	Set RTC RX8025T calendar data
void EEPROM_Write(INT8U *eeBuff)	Write a series of data byte to EEPROM
void EEPROM_Read(INT8U *eeBuff)	Read a series of data byte from EEPROM
INT8U EEPROM_Write_Verify(INT8U *eeBuff)	Write a series of data byte to EEPROM and verify the result
INT8U EEPROM_Read_Verify(INT8U *eeBuff)	Read a series of data byte from EEPROM and validate checksum

6.2 HAL

Table 2. FW HAL List

Function Prototype	Description
void IIC_Init(void)	Init IIC bus
INT8U IIC_Acknowledge(void)	waitting ACK from slave
INT8U IIC_Start(INT8U slave_address)	Master generates a START condition on IIC bus and transmit slave_address
INT8U IIC_Restart(INT8U slave_address)	Master generates a RESTART condition on IIC bus
INT8U IIC_Stop(void)	Master generates a STOP condition on IIC bus
INT8U IIC_SendByte(INT8U outDat)	Master send out a byte of data and return with ACK/NACK
INT8U IIC_Write(INT8U *buff, INT8U total)	Master write a string of bytes through IIC us
INT8U IIC_ReadByte(void)	Master read a byte of data and set ACK/NACK
INT8U IIC_Read(INT8U *buff, INT16U total)	Master read a string of data bytes through IIC us

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8 Document History

Document Title: AN205173 - F²MC-8FX Family, MB95410H/470H Series One Phase Power Meter (RN8209) Real Time Clock and Data storage Operation

Document Number: 002-05173

Revision	ECN	Orig. of Change	Submission Date	Description of Change
**	-	HUAL	06/01/2011	Initial release
*A	5247871	HUAL	06/17/2016	Migrated Spansion Application Note MCU-AN-500114-E-10 to Cypress format There is no information on how/where to acquire the RN8209 source code, so this AN is for obsolete.

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