MMC/RTC

Peripheral Board

Technical Manual

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BiPOM Electronics

WARRANTY:

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1. Overview

MMC/RTC board is a storage flash device which is designed specifically for storage applications.

MMC/RTC board has   built-in SanDisk MultiMediaCard(MMC). The MultiMediaCard provides up to 32 million bytes of memory using SanDisk Flash memory chips which were designed by SanDisk especially for use in mass storage applications. In addition to the mass storage specific flash memory chip, the MultiMediaCard includes an on-card intelligent controller which manages interface protocols and data storage and retrieval, as well as Error Correction Code (ECC) algorithms, defect handling and diagnostics, power management and clock control. Flash is the ideal storage medium for portable, battery-powered devices. It features low power consumption and is non-volatile, requiring no power to maintain the stored data. It also has a wide operating range for temperature, shock and vibration.

MMC/RTC board has DS1307 serial real time clock from Dallas Semiconductor also. The DS1307(RTC) is a low power full BCD clock/calendar plus 56 bytes of nonvolatile SRAM. Address and data are transferred serially via I2C bus. The clock/calendar provides   seconds, minutes, hours, day, date,month and year information. MMC/RTC board has the 3V standard lithium battery which allows the timekeeping function be continued when the input voltage falls below V battery.

The board directly interface via expansion connector to Single Board Computer (SBC) systems from BiPOM Electronics such as PRO-MAX/51,MINI-MAX/51,MINI-MAX/908. This family of SBC provides all the essential elements of a computer system such as microprocessor, memory, serial port, parallel ports, timers, counters and interrupt handlers on a single chip. The data acquisition system such as logger is a very easy task with an using of these boards.

BiPOM Electronics offers also RTC board. The RTC board contains only Real Time Clock section.

This board is full analog of MMC/RTC board without MMC and electronic components which are supporting SanDisk MultiMediaCard.

2. Specifications

MMC/RTC board has the following configuration:

- SH1S007V1A, MultiMediaCard connector

- DS1307, Real Time Clock/Calendar

- BH500, Battery holder

- CR/BR 1220, 3V standard lithium battery

- LM2937, 3.3 voltage regulator

- SN74, 3.3V interface to MultiMediaCard

- Jumper block

- Expansion connector

RTC board has the following configuration:

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- BH500, Battery holder

- CR/BR 1220, 3V standard lithium battery

- Expansion connector

Dimensions are 2.35 X 2.40 inches (5.97 X 6.10 centimeters).

Mounting holes of 0.138 inches (3.5 millimeters) on four corners.

0°- 70°C operating, -40°- +85°C storage temperature range.

3. Functional Blocks

Figure 1 shows the block diagram of the MMC/RTC board.
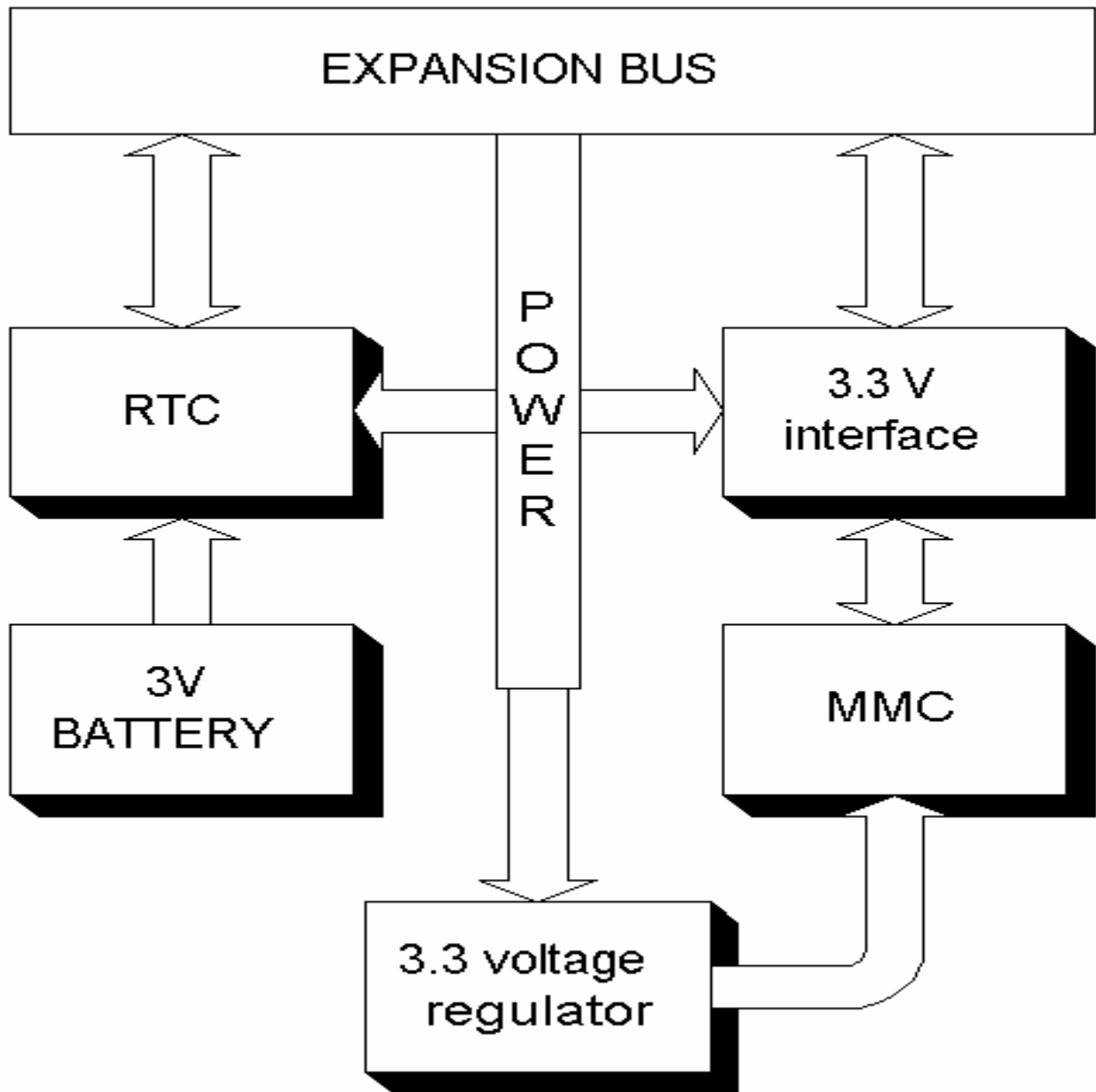

Figure 1

Multi Media Card

The MultiMediaCard is a very small (32mm x 24mm x 1.4mm), non-volatile removable flash storage card. It's designed specifically for applications requiring small form factor, low power and low cost. The MultiMediaCard is the ideal storage card for portable devices.The MultiMediaCard includes an on-card microcontroller, which manages the interface protocols, data storage and retrieval, Error Correction Code (ECC), defect handling, diagnostics, power management and clock control. All device and interface configuration data are stored on the MultiMediaCard. The MultiMediaCard has a seven pin serial interface, which allows for easy integration into any design regardless of the microprocessor used. All the lines for driving of MMC are provided on a 20-pin expansion bus for interfacing to peripherals and other external circuits. All these lines have standard TTL levels.

More information on the MultiMediaCard can be obtained from SanDisk web site at www.sandisk.com.

Real Time Clock/Calendar

MMC/RTC has an DS1307 (IC1) full BCD clock/calendar from Dallas Semiconductor. The RTC is controlled via an I2C-compatible serial bus. SCL and SDA lines of RTC are provided on a 20-pin expansion bus for interfacing to peripherals and other external circuits. The clock/calendar provides seconds, minutes, hours, day, date,month and year information. The clock operates in either the 24-hour or 12-hour format with AM/PM indicator. The DS1307 has a built-in power sense circuit which detects power failures and automatically switches to the battery supply.

More information on the DS1307 can be obtained from Dallas Semiconductor web site at www.dal-semi.com.

Battery and Battery Holder

MMC/RTC has an BH500 battery holder (BAT1) which is tolerant to CR/BR 1216,1220,1225 3V lithium battery. As VCC falls below V Bat the RAM and timekeeper of RTC are switched to the external 3V battery. In this way the timekeeping function continues uneffected by the low input voltage. A lithium battery with 35mAh or greater will back up the DS1307 for more than 10 years in the absence of power.

3.3 voltage regulator

MMC/RTC has an on-board 3.3 Volt regulator LM2937 (IC3). Voltage range of MultiMediaCard is 2.7-3.6V. The MultiMediaCard is powered from this voltage regulator.

3.3 voltage interface

The MultiMediaCard's bus operates at voltage range between 2.7 to 3.6 VDC. If the host uses a 5VDC microprocessor/microcontroller, the voltage ranges must be translated between the host and the MultiMediaCard. The SN74CBTD3384DWR chip (IC2) on the board is performing the required task.

Expansion

All the control pins and power supply are available on the 20-pin Expansion connector(X1) for interfacing to existing SBC boards. MMC/RTC peripheral board can be connected either as a piggyback daughter-board on SDC board using standoffs or can be placed up away from SBC board using a 20-wire ribbon cable. Table 1 shows the pin assignments for Expansion connector.

Table 1. **Expansion connector (X1)**

Signal	Pin		Pin	Signal
P3.0	20		19	P3.1
P3.2	18		17	P3.3
P3.4	16		15	P3.5
P3.6	14		13	P3.7
P1.0	12		11	P1.1
P1.2	10		9	P1.3
P1.4	8		7	P1.5
P1.6	6		5	P1.7
VCC	4		3	GND
VCC	2		1	GND

Jumper Block

Jumper block allows to use P3.5 or P3.6 or GND as CS signal to MultiMediaCard.

Table 2 shows the jumper setting.

Table 2. **Jumper setting**

Signal	Connected	Disconnected
GND	JP1	JP2,JP3
P3.5	JP2	JP1,JP3
P3.6	JP3	JP1,JP2

4. Board Layout

Figure 2 shows positions of major components, connectors and terminals on the MMC/RTC board.

Figure 2

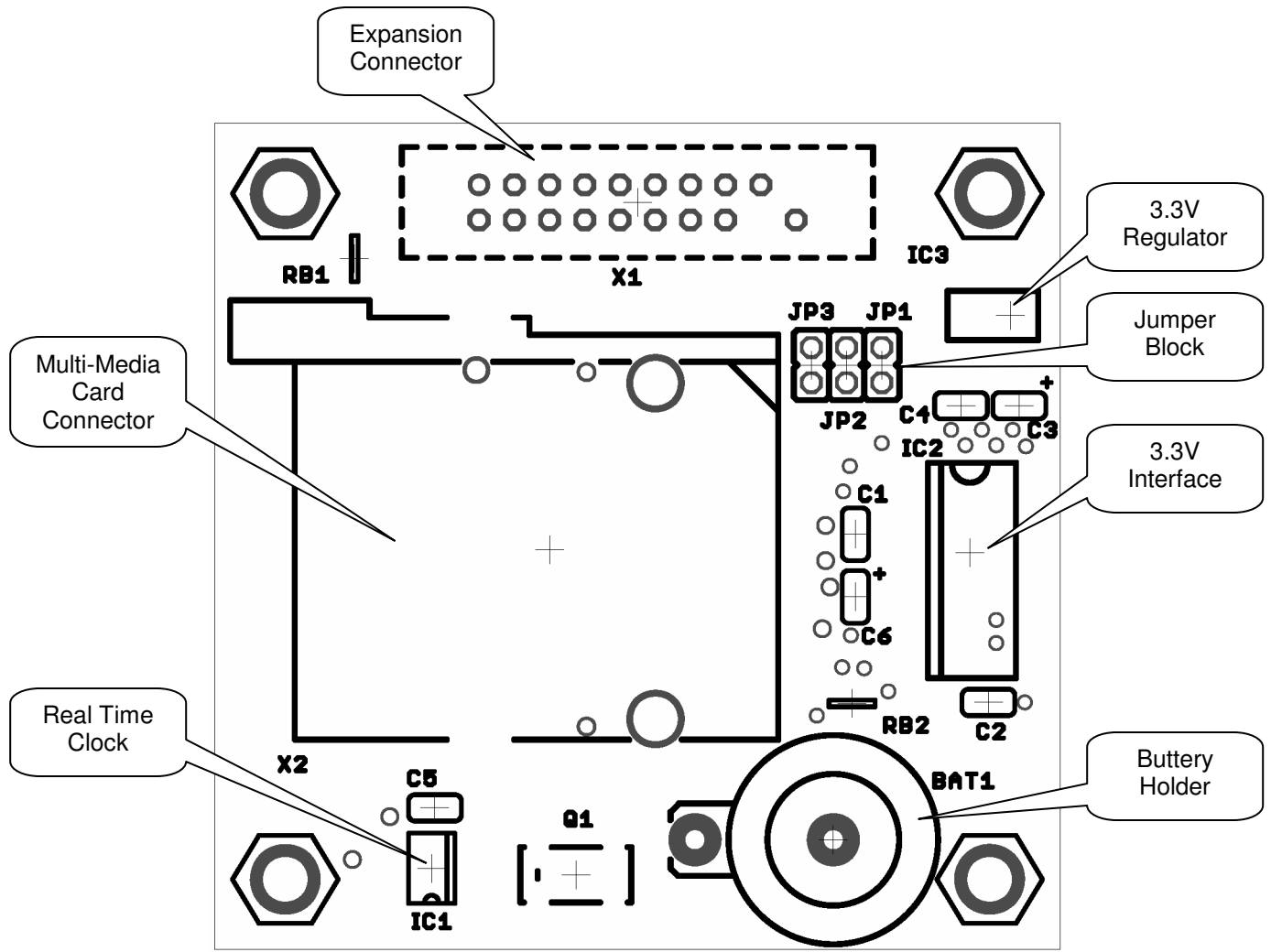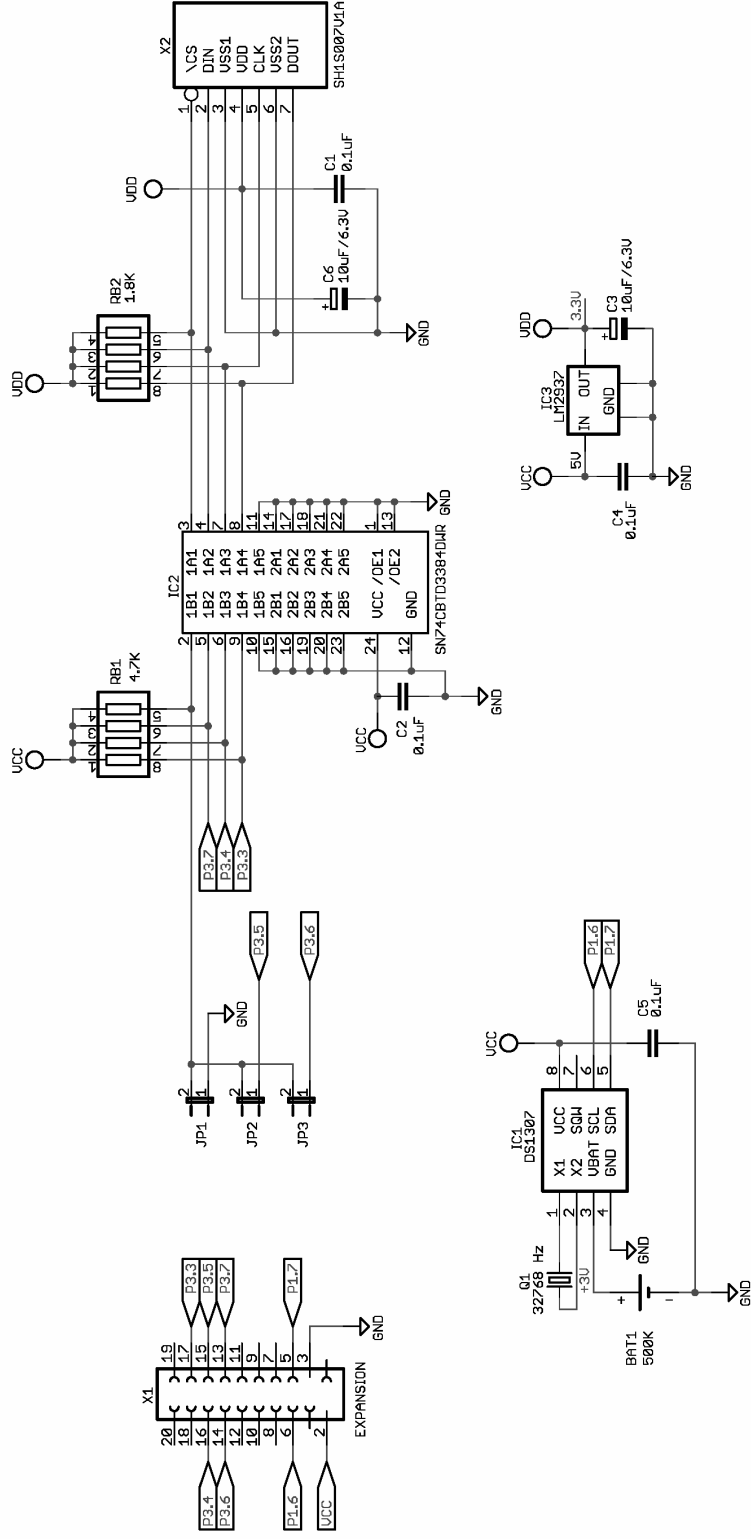## 5. Schematic

MMC/RTC Board

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