GSM RTC Application Note

GSM/GPRS Module Series

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Our aim is to provide customers with timely and comprehensive service. For any assistance, please contact our company headquarters:

Quectel Wireless Solutions Co., Ltd.
Office 501, Building 13, No.99, Tianzhou Road, Shanghai, China, 200233
Tel: +86 21 5108 6236
Mail: info@quectel.com

Or our local office, for more information, please visit:
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About the Document

History

Revision	Date	Author	Description
1.0	2015-03-04	Winter CHEN	Initial

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1 Introduction

This document introduces interface specifications and electrical characteristic of RTC, which will help you get an accurate time in different RTC application condition.

2 Time Synchronization

2.1. Hardware Interface

Table 1: VRTC Interface

Pin Name	I/O	Description	DC Characteristics	Comment
VRTC	I/O	Power supply for RTC power domain	VImax=3.3V VImin=1.5V VInorm=2.8V VOmax=3V VOmin=2V VOnorm=2.8V Iout(max)=2mA Iin≈10uA	If unused, keep this pin open.

Table 2: GSM Module Power-down Consumption Features

Function	GSM Module
Power Down Current Consumption on VBAT	150uA
VRTC Current Consumption	10uA

2.2. RTC Power Source

If the module is only powered by VRTC, the real time will have an error about 5 minutes a day. There are several effective ways to get reliable and accurate system time.

- **Use VBAT as the RTC power source**

When the module is turned off and the main power supply (VBAT) is remained, the real time clock is still active as the RTC core is supplied by VBAT, in this condition, the error is about 3 seconds in 48 hours. It

is recommended to keep connection with VBAT all the time if you want to get an accurate time. A reference circuit is shown as below.

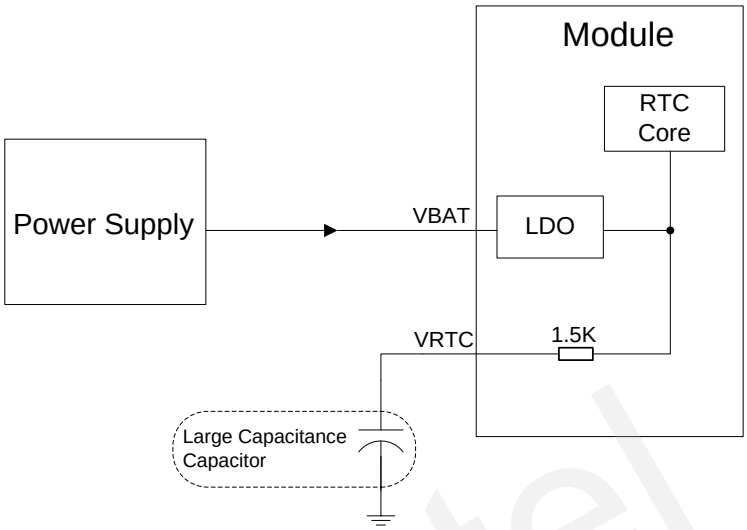

Figure 1: RTC is Supplied by VBAT

- **Use backup power as the RTC power source**

When VBAT power is switched off for a long time, a backup power such as a super-capacitor can be used to supply the VBAT pin to keep the real time clock active, the reference design for backup power is shown as below.

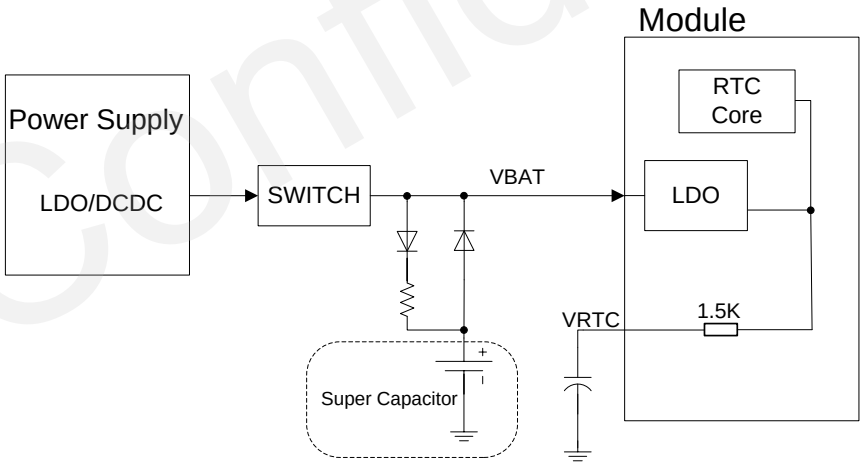

Figure 2: RTC is Supplied by a Backup Power

2.3. Time Synchronization by NITZ or NTP

In general, there are two ways to realize time synchronization.

- **NITZ (Network Identity and Time Zone)**

AT+QNITZ can be used to set the module to synchronize RTC via GSM network. **AT+CTZU** can be used to set module to update time zone via NITZ automatically. This function needs the support of local GSM network and it will not generate GPRS data traffic.

- **NTP (Network Time Protocol)**

If the local GSM network does not support NITZ, you can select NTP to get local time. The module can be set by the command **AT+QNTP** and it will generate GPRS data traffic.