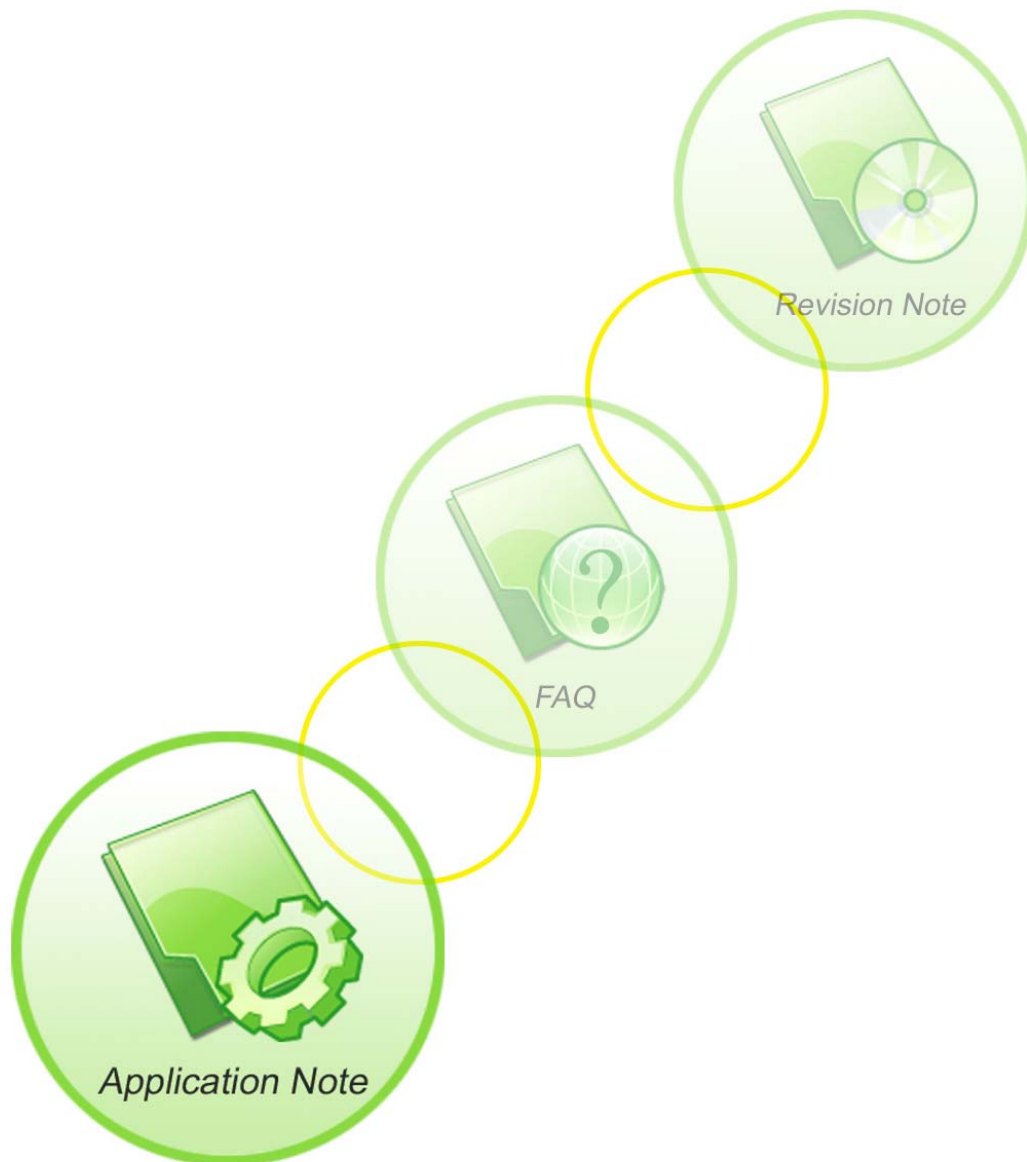# SIM68V Power Saving Mode Application Note

AN_Interface Design_V1.00

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Version history

Date	Version	Description of change	Author
2013-09-30	V1.00	initial	Ma Honggang

1 Introduction

This document aims to guide customer design the battery based products which are sensitive to the consumption, including the hardware design and system configuration, and this document applies to SIM28, SIM68R, SIM68VB and SIM68RB modules.

2 Application Circuit

At the beginning of the design, customer should pay attention to the consumption of the product, for the SIM68V supports power saving mode, so the appropriate design would take great benefits to the customer and the consumption can reach to the best.
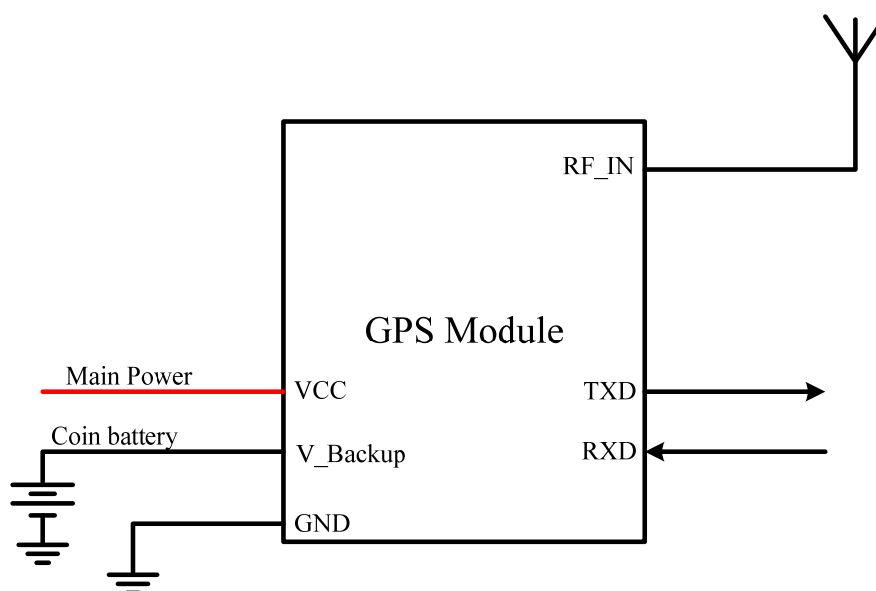

Figure 1: Application circuit

3 Hardware Design Note

The main power of the module PIN VCC can be powered by a battery, the voltage is from 2.8V to 4.3V. The key of the power saving mode is V_BACKUP PIN of the module, which is the power interface of the internal RTC circuit, a coin battery or a larger capacitance is suggested as the above figure shows, customer should notice that the module does not support battery charging function, and if a coin battery applied in the design, the charging circuit should be taken into consideration.

4 Power Saving Mode Configuration

SIM68V supports power saving modes for reducing average power consumption like sleep mode, Backup mode, periodic mode and AlwayLocate[TM] mode. Customers can send PMTK commands to set module enter the modes mentioned above.

Table 0: Classification of power saving mode

Power saving mode	Sleep mode	
	Backup mode	
	Periodic mode	Periodic backup mode
		Periodic Sleep mode
	AlwaysLocate mode	AlwayLocateTM Sleep mode
		AlwayLocateTM backup mode

4.1 Sleep Mode

In this mode the receiver stays at full on power state. This mode can be waked up by the host by sending the command through the communication interface.

Sleep mode means a low quiescent (340uA type.) power state, non-volatile RTC, and backup RAM block is powered on. Other internal blocks like digital baseband and RF are internally powered off. The power supply input VCC shall be kept active all the time, even during sleep mode.

Waking up from and entering into sleep mode is controlled by UART interface, any byte typing-in will drag SIM68V out of sleep mode.

Table 0: How to enter sleep mode

DataField: PMTK161,Type			
Example: $PMTK161,0*28<CR><LF>			
Name	**Unit**	**Default**	**Description**
Type	--	--	Sleep type： '0' = Stop mode '1' = Sleep mode
*Enter any byte the module can be waked up from SLEEP mode.			

4.2 Backup Mode

In this mode the SIM68V must be supplied by the backup battery and it can help to count down the time for backup mode. Software on host side to send the command through the communication interface to into the backup mode. Module in backup mode can reach the lowest consumption of about 14uA.

User can refer to table 3 to config module to backup mode. Set "Type" as "4" to enter perpetual backup mode.

4.3 Periodic Mode

In this mode the SIM68V enters tracking and backup modes according to the interval configured by users in the commands. See table 3 for details.
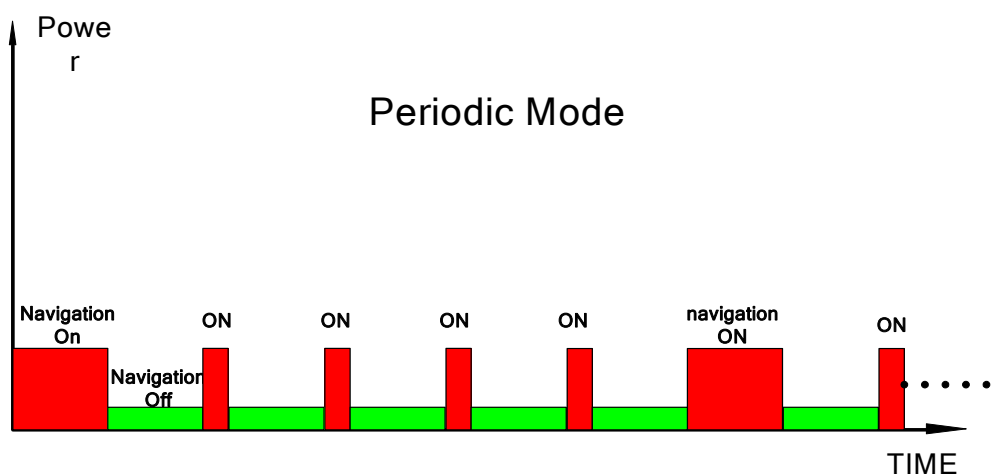

Figure 2: Periodic mode

4.4 AlwaysLocate Mode

AlwayLocate^{TM} is an intelligent controller of SIM68V periodic mode. Depending on the environment and motion conditions, SIM68V can adaptive adjust the on/off time to achieve balance of positioning accuracy and power consumption.
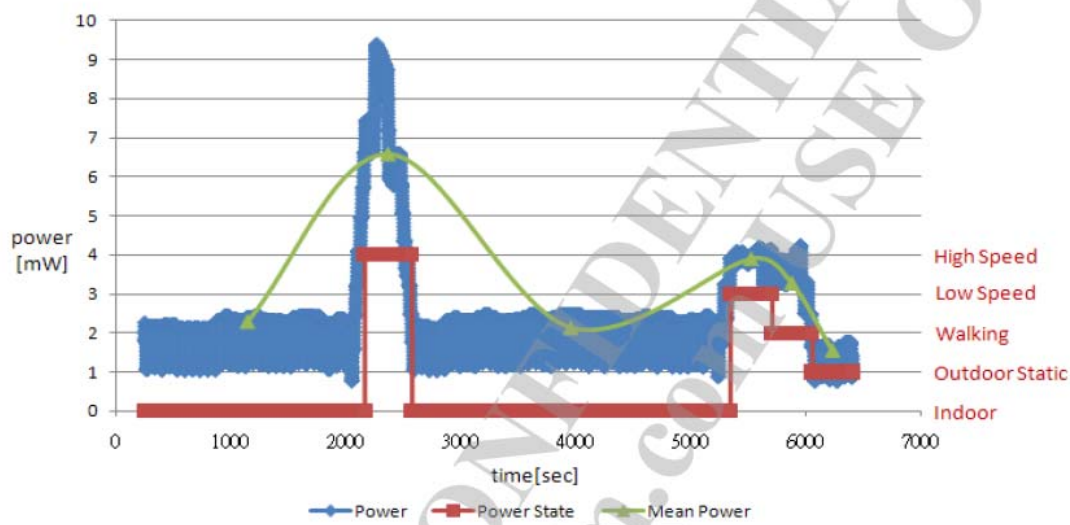
Figure 3: AlwaysLocate mode

Table 0: How to enter periodic mode and AlwaysLocate Mode

DataField: PMTK225, Type, Run time, Sleep time, Second run time, Second sleep time

Example: How to enter Periodic modes
    Periodic Backup mode
        PMTK225,0
        PMTK223,1,25,180000,60000
        PMTK225,1,3000,12000,18000,72000
    Periodic Sleep mode
    PMTK225,0
    PMTK223,1,25,180000,60000
    PMTK225,2,3000,12000,18000,72000
Example : How to enter AlwaysLocate modes
    AlwaysLocate Sleep
    PMTK225,0
    PMTK225,8
    AlwaysLocate Backup
    PMTK225,0
    PMTK225,9

Name	Unit	Default	Description

Type	--	--	Set operation mode of power saving :
			    '0': Back to normal mode
			    '1' Periodc backup mode
			    '2' Periodic Sleep mode
			    '4': Perpetual backup mode
			    '8': AlwaysLocate Sleep mode

			'9': AlwaysLocate backup mode

Run time	msec		Duration to fix for (or attempt to fix for) before switching from running mode back to a minimum power sleep mode.
			  '0': Disable
			  >= '1000': Enable
			Range: [1000~518400000]

Sleep time	msec		Interval to come out of a minimum power sleep mode and start running in order to get a new position fix. Range: [1000~518400000]

Second run time	msec		Duration [] to fix for (or attempt to fix for) before switching from running mode back to a minimum power sleep mode.
			   '0': Disable
			  >= '1000': Enable
			Range: [Second set both 0 or 1000~518400000]

Second sleep time	msec		Interval to come out of a minimum power sleep mode and start running in order to get a new position fix. Range: [Second set both 0 or 1000~518400000]

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