

L76 Series

Reference Design

GNSS Module Series

Rev. B

Date: 2016-05-17



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About the Document

History

Revision	Date	Author	Description
A	2016-04-26	Storm BAO	Initial
B	2016-05-17	Storm BAO	Added I2C information of L76-L

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1 Introduction

1.1. Introduction

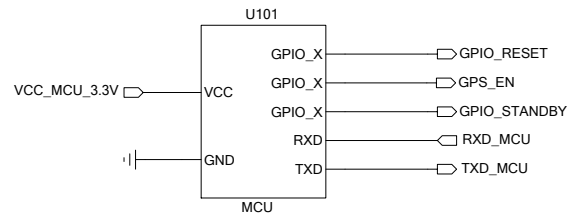
This document is a reference design for L76 series module. The schematics included in this document are preliminary and are subject to change without prior notice.

1.2. Schematics

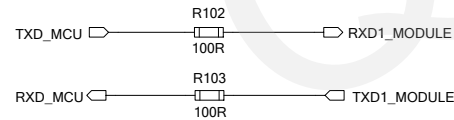
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3.3V Power Supply and UART Circuit

Customer's MCU

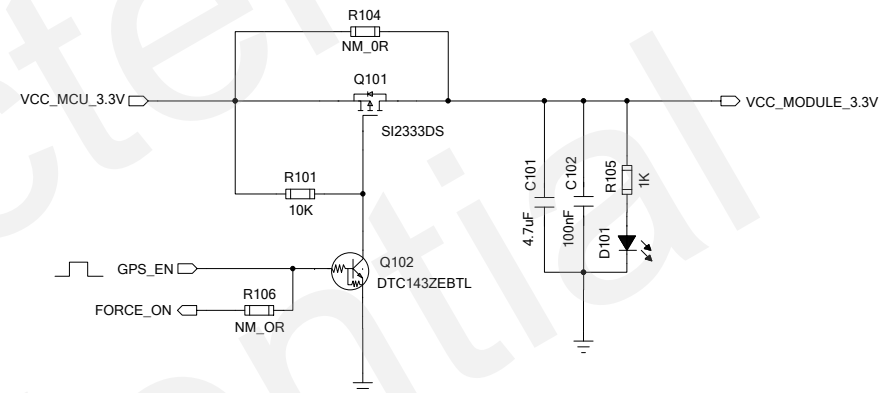


UART Circuit



R102, R103 are reserved for debugging the waveform of UART, and they are also beneficial to ESD protection.
Generally, 100R for R102 and R103 is recommended, but 0R also works well.

Power Management Circuit (Optional)



There are two ways to enter into backup mode and back to full on mode, you can choose the dedicated way base on your requirement.

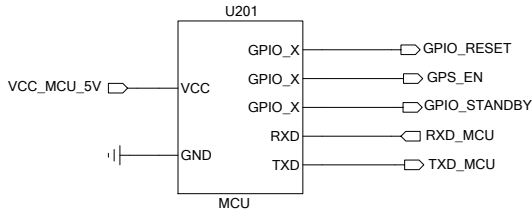
1. Send command "\$PMTK225,4*2F" to enter into backup mode forever. The only way to wake up the module is pulling the FORCE_ON high. Here, Q101, Q102, R101 are not mounted; R104 and R106 are 0 ohm.
2. Cutting off VCC and keeping V_BCKP powered will make the module enter into backup mode from full on mode. As long as the VCC pin is powered, the module will enter into full on mode immediately. Here, Q101, Q102, R101 are mounted; R104 and R106 are not mounted.

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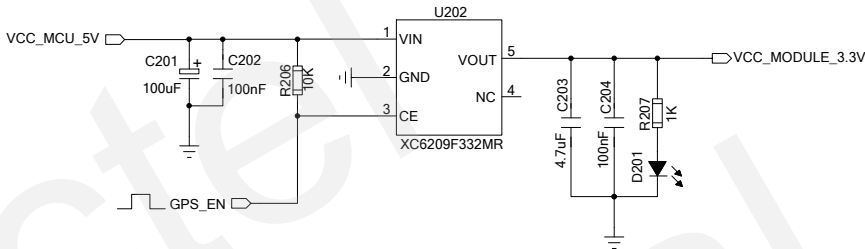
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CHECKED BY Tony GAO	SIZE A2	VER B
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5V Power Supply and UART Circuit

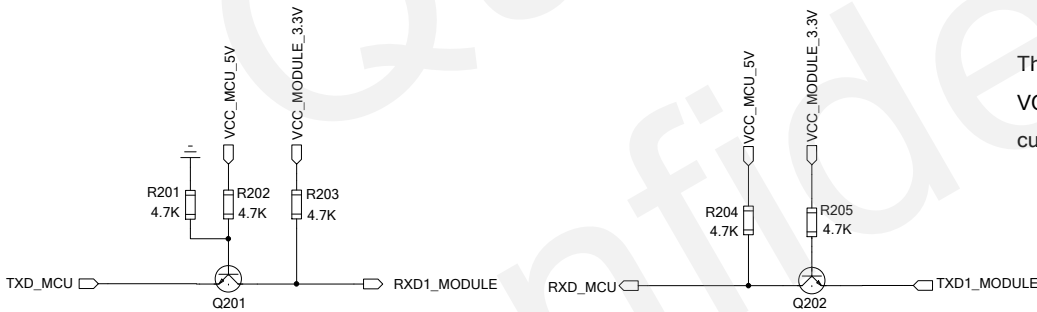
Customer's MCU



LDO Circuit



Level Shifting for UART



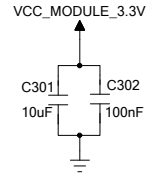
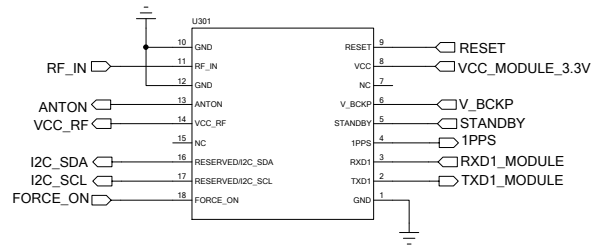
The transistor circuit will realize the voltage level shifting between VCC_MCU_5V and VCC_MODULE_3.3V, and block the leakage current from one power-on device to another power-off device.

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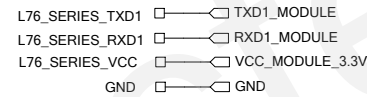
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Module Interface

Module Interface

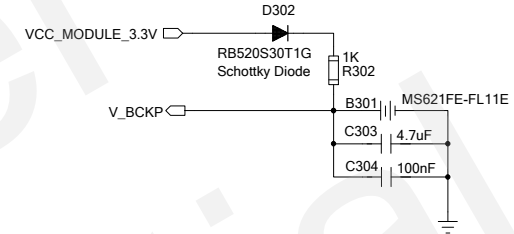


Test Points



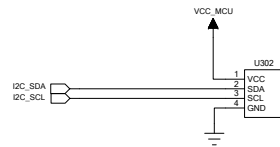
1. UART1 can be used to output NMEA message as well as to upgrade firmware.
2. For L76-L, pin16 and pin17 are I2C_SDA and I2C_SCL, respectively .
For L76/L76B, pin16 and 17 are reserved,and please keep them open.
3. The test points are reserved for debugging the GNSS module.

Charge Circuit for RTC Logic



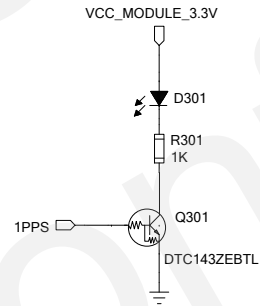
V_BCKP is designed to supply power for L76 series RTC logic circuit when VCC_MODULE_3.3V is powered off.

I2C Circuit for L76-L



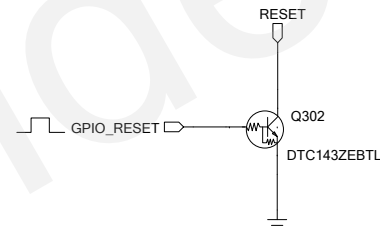
1. I2C_SDA/I2C_SCL is pulled up to 2.8V inside L76-L moule. There is no need to add a pull-up resistor externally.
2. The voltage threshold of I2C is 2.8V. If the system voltage is not consistent with it,a level shifter circuit must be used.

Indicating Circuit



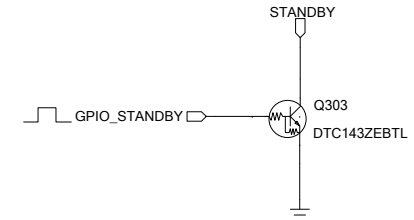
The 1PPS indicator will blink at 1Hz frequency after fixing the position.

Reset Circuit



1. If the reset function is unused, the RESET pin can be connected to the VCC directly.
2. RESET has been pulled up internally.

Standby Circuit



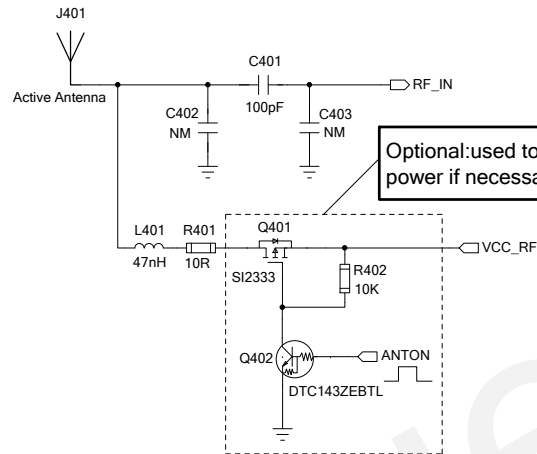
1. STANDBY has been pulled up internally.
 2. Enter into standby mode: change the STANDBY pin from high to low level.
 3. Exit from standby mode: change the STANDBY pin from low to high level.
- For more details, please refer to L76 Series Hardware Design.

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Antenna Interface

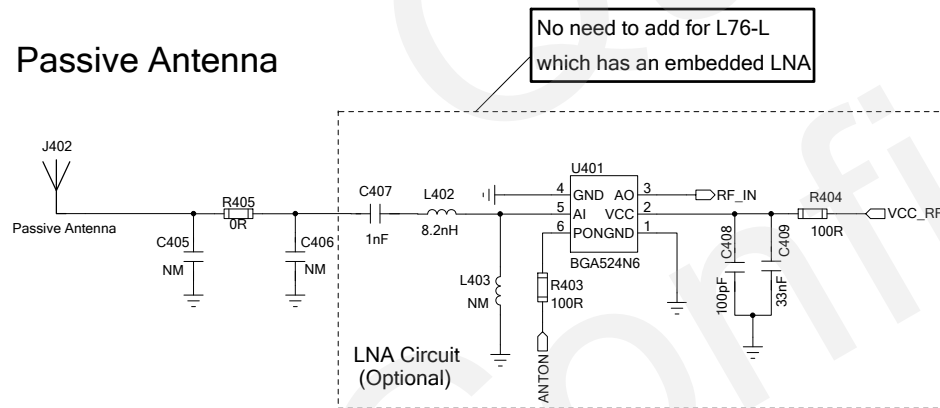
Active Antenna



1. Pi circuit (C401, C402, C403) is reserved for impedance matching for antenna. By default, C402 and C403 are not mounted; C401 is 100pF.
2. VCC_RF can be used as power supply for active antenna. Its typical value is 3.3V, and the voltage ranges from 2.8V to 4.3V (VCC_RF=VCC). If it does not meet the requirement of the active antenna, an external LDO could be used.
3. The voltage level of ANTON will be pulled down in standby mode.
4. If the L76 series module never enter into standby mode in the design, the ANTON pin should be kept floated.
5. Impedance of RF trace should be controlled as 50 ohm and the trace length should be kept as short as possible.

For more details, please refer to L76 Series Hardware Design.

Passive Antenna



1. There is no need to use an external LNA for L76-L module because an embedded LNA is already used inside the module.
2. Pi circuit (R405, C405, C406) is reserved for impedance matching for antenna. By default, C405 and C406 are not mounted; R405 is 0R.
3. If an external LNA is added between passive antenna and L76/76B module, the total sensitivity will be improved by about 3dB, which is beneficial for improving TTFF.
4. One typical reference circuit with BGA524N6 is given in the left figure. Here, C407, L402 and L403 form a reserved matching circuit for the LNA BGA524N6. By default, C407 is 1nF; L402 is 8.2nH; and L403 is not mounted.
5. VCC_RF can be used as power supply for LNA. Its voltage range is from 2.8V to 4.3V, and its typical value is 3.3V (VCC_RF=VCC)
6. ANTON is an optional pin which can be used to control the enable pin of an external LNA. If "ANTON" function is not used, please connect the pin "LNA ENABLE" to VCC to keep LNA always on.
7. Impedance of RF trace should be controlled as 50 ohm and the trace length should be kept as short as possible.

For more details, please refer to L76 Series Hardware Design.

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