M66-DS Reference Design

GSM/GPRS Module Series

Rev. A

Date: 2016-03-14

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History

Revision	Date	Author	Description
A	2016-03-14	Felix YIN	Initial

Contents

1 Reference Schematic

1.1. Introduction

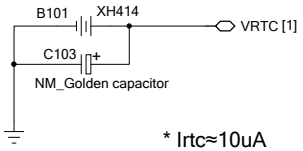
This document is a reference design for M66-DS module. The schematics included in this document are preliminary and are subject to change without notice.

1.2. Schematics

Module Design

Charge golden capacitor or battery when VBAT is applied.

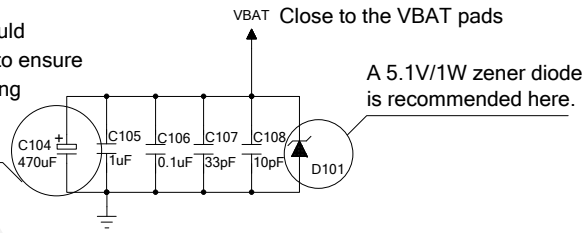
If unused, keep VRTC open.



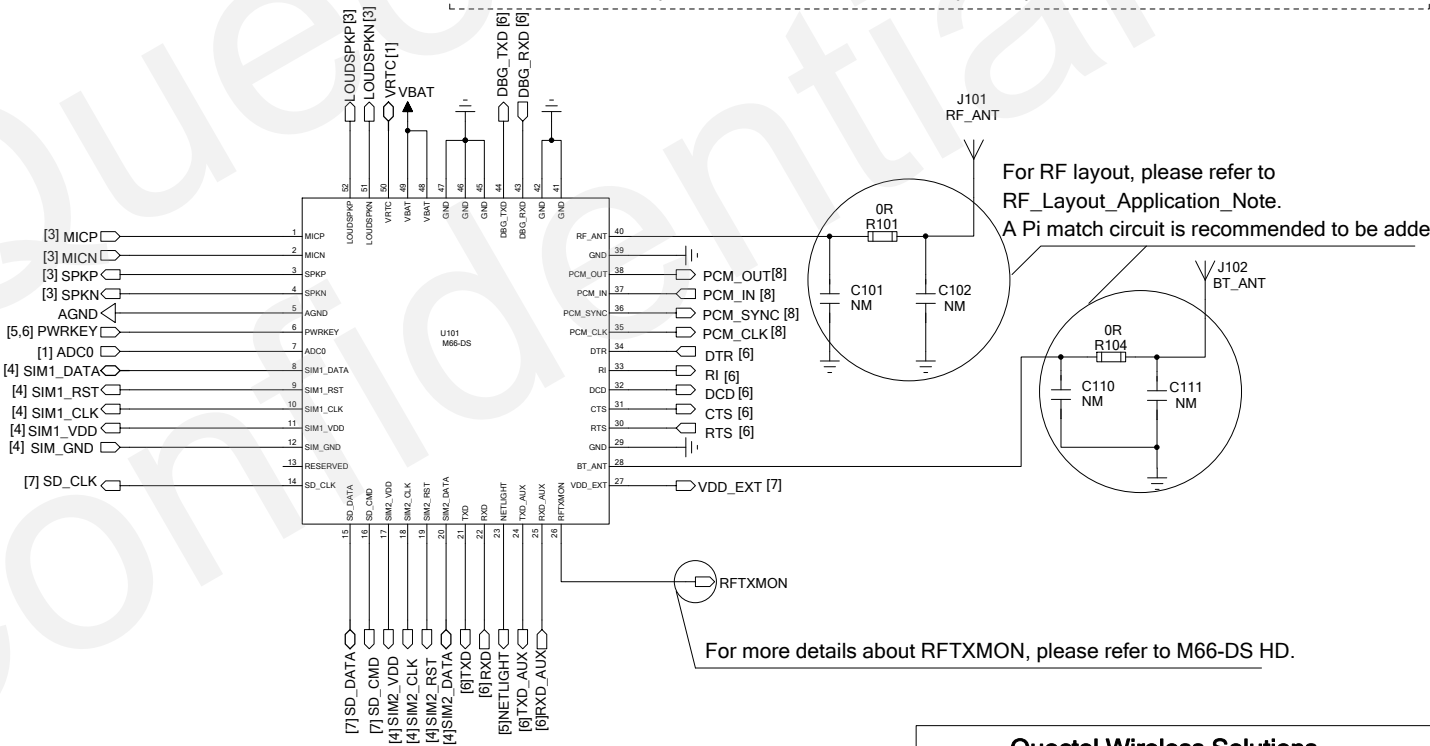
* Irtc≈10uA

* As only powering the VRTC pin to keep the RTC will lead an error for about 5 minutes a day, it is recommended to power VBAT and VRTC pin at the same time when RTC function is needed. For more details, please refer to M66-DS HD.

Capacitance of C104 should be chosen by debugging to ensure the max voltage drop during the burst transmission does not exceed 400mV.



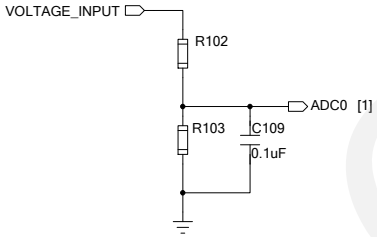
1. VBAT ranges from 3.3V to 4.6V.
2. Module drains the maximum current around 1.6A in burst time (577us).
3. The width of VBAT trace is recommeded to be more than 2mm.
4. Capacitance is arranged in ascending order, with the smallest one closing to the VBAT pad, and all capacitance as close to the VBAT pad as possible.



For RF layout, please refer to RF_Layout_Application_Note.
A Pi match circuit is recommended to be added.

For more details about RFTXMON, please refer to M66-DS HD.

Reference Circuit of ADC



* The voltage range of ADC input channel is from 0 to 2.8V.
* Please select a high-precision divider resistance.

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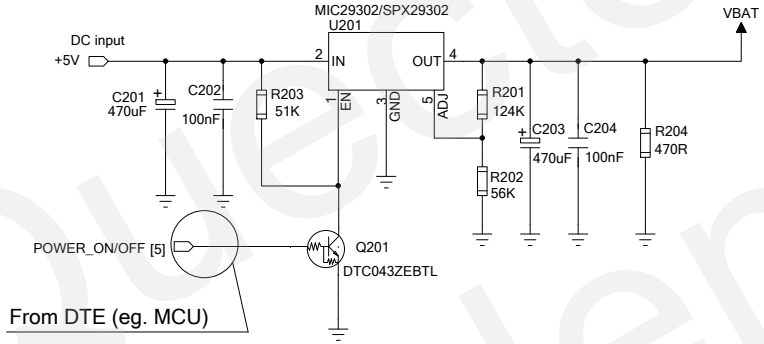
Power Supply

NOTE

The voltage converter should provide a minimum current of 2.0A.

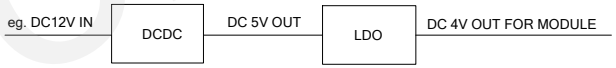
LDO Application

It is used when the DC input voltage is below 7V.



DC-DC Application

1. It can be used when the input voltage is above 7V in vehicle application.
2. Use DCDC to convert high input voltage to 5V and LDO will generate 4V typical voltage for the module.



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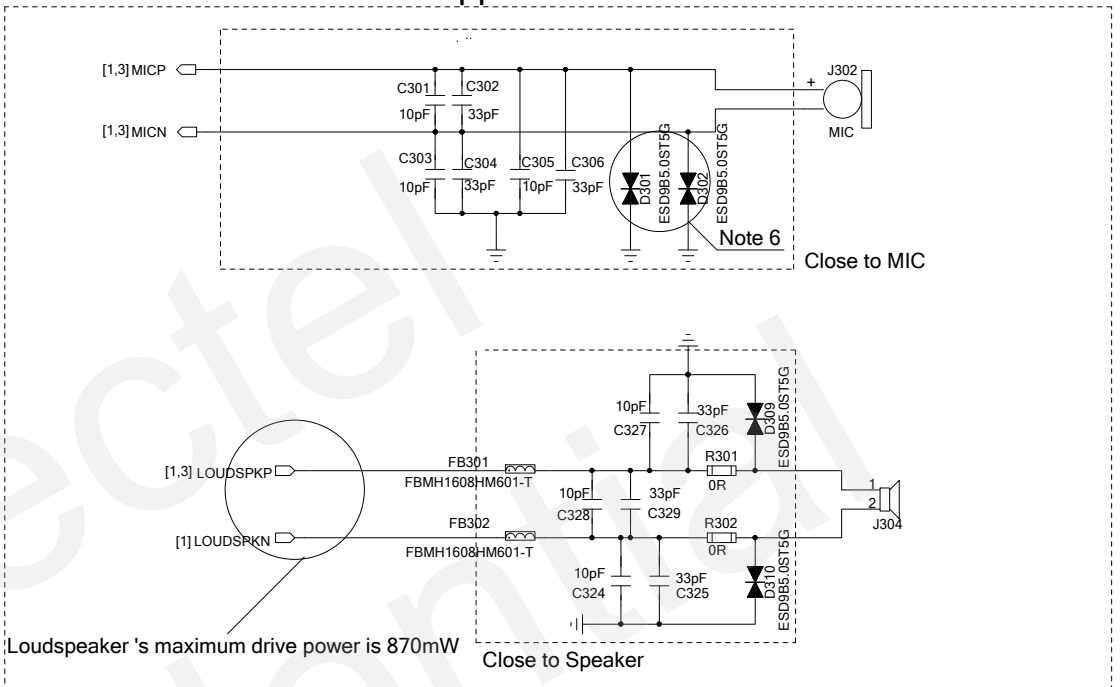
Audio Design

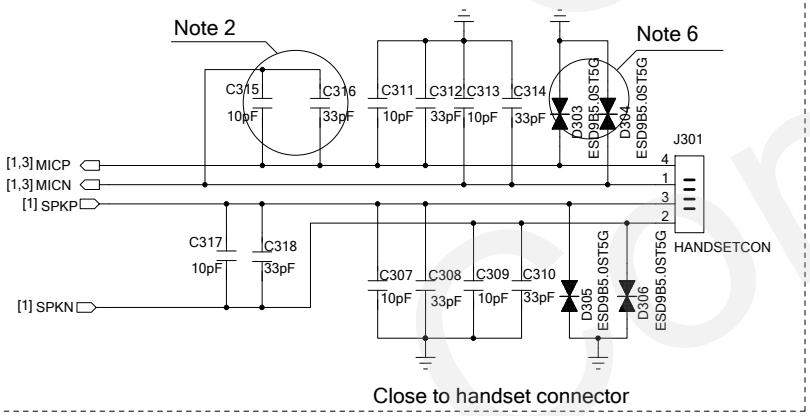
NOTES

1. AGND is reommended to be routed separately.
2. 10p&33p capacitors are used for filtering TDD noise.
3. AIN has bias voltage of microphone.
4. AOUT1 is capable of driving 32ohm load.
5. AOUT2 is capable of driving 8ohm load and Earphone.
6. These components are used to enhance the ESD performance of MIC lines, and thus it is strongly recommended to reserve them.

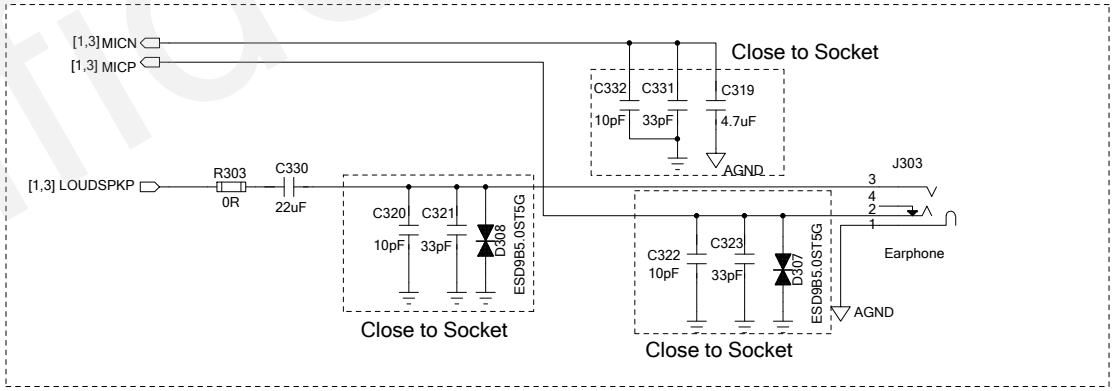
Hands-free Application of AIN/AOUT2



Handsets Application of AIN/AOUT1



Earphone Application of AIN/AOUT2



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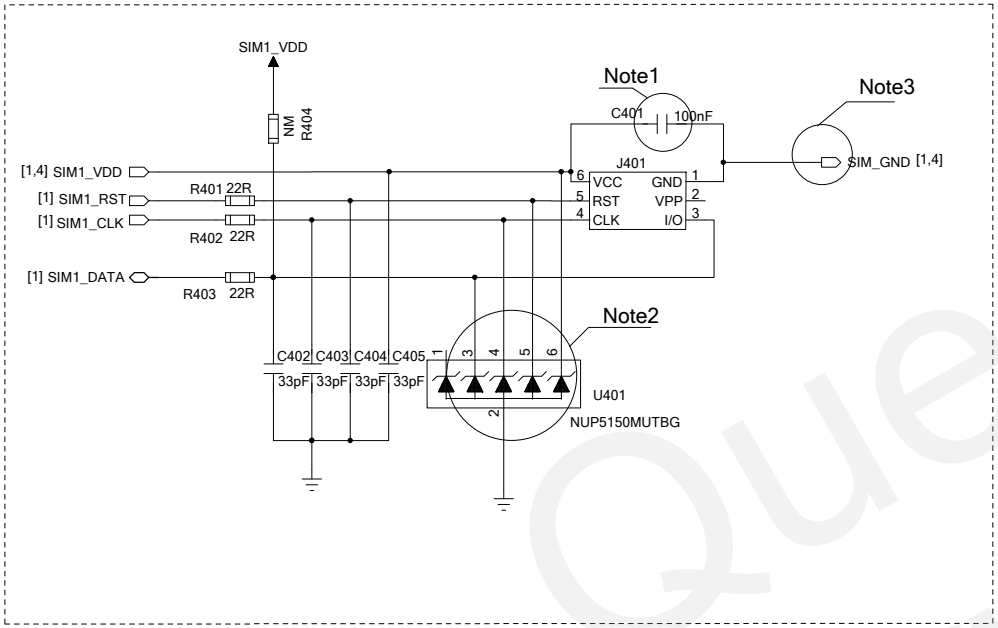
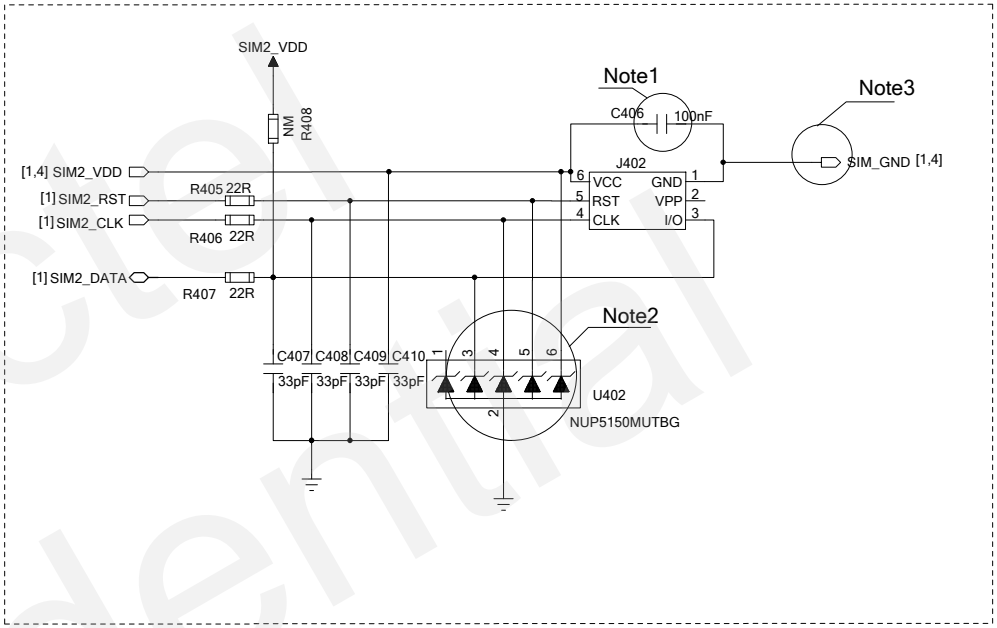
SIM Card

SIM Card Interface





NOTES

1. The value of C401 and C406 should be less than 1uF.
2. U401 and U402 is used for protecting SIM card against ESD, and the junction capacitance should be less than 50pF. It should be placed nearby SIM card holder.
3. For M66-DS module, ground of SIM card is recommended to be routed to the Pin 12 ("SIM_GND") of the module separately.

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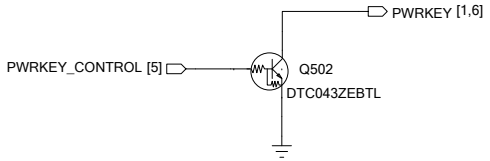
Driver

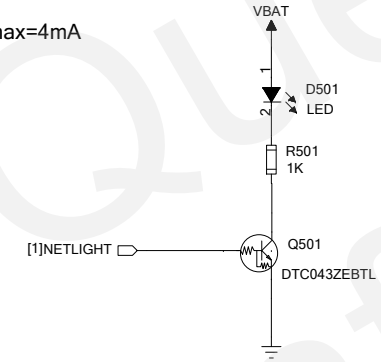
Turn On/Off



Recommended circuit for turning on/off the module.

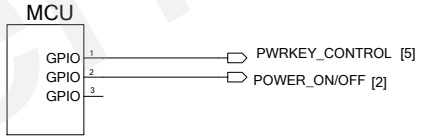
LED Indication

Iout_max=4mA



Pin "NETLIGHT" indicates the network status.

MCU GPIO



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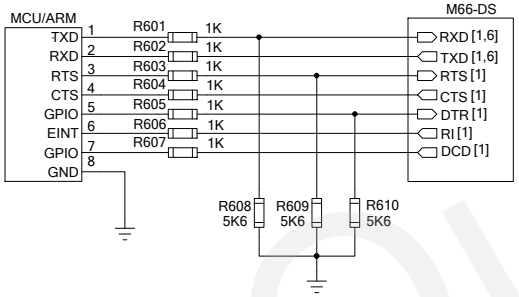
Serial Interface

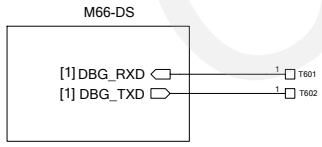
Electric characteristics of the module's input and output port:
VOHmin=0.85*VDD_EXT
VOLmax=0.15*VDD_EXT
VILmax=0.25*VDD_EXT
VIHmin=0.75*VDD_EXT
VIHmax=VDD_EXT+0.2V
VDD_EXT=2.8V (typical value)

Connection of All Functional UART Port for 3.3V System



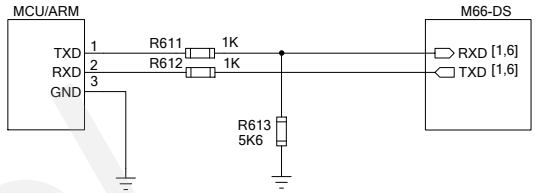
NOTES

1. CTS&RTS will be used for HW flow control when mass data has been sent.
2. When AT+QSCLK=1 is set on the module, customer's application can control the module to enter into or exit from the sleep mode through the pin DTR. When DTR is set to high level, and there is no on-air or hardware interrupt, such as GPIO interrupt or data on serial port, the module will enter into sleep mode automatically.
3. RI will output an indication signal when activity such as voice call or SMS is coming.
4. DCD is mainly applied in modem communication (PPP). The active status represents the communication link has been set up.
5. Please pay attention to the level match of UART in product application.



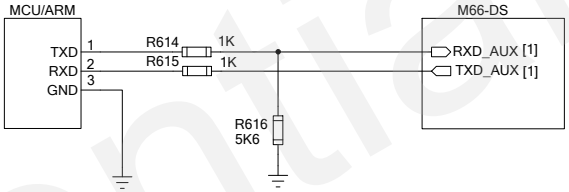
It is recommended to reserve the points for debug port.

Connection of Three-line UART Port for 3.3V System



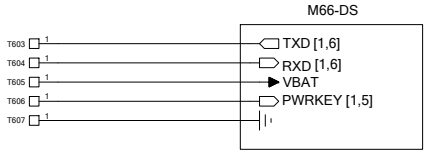
* Please pay attention to the level match of UART in product application.

Connection of Three-line AUX_UART Port for 3.3V System



* Please pay attention to the level match of UART in product application.

It is recommended to reserve the points for upgrading the firmware.



* Please pay attention to the level match of UART in product application.

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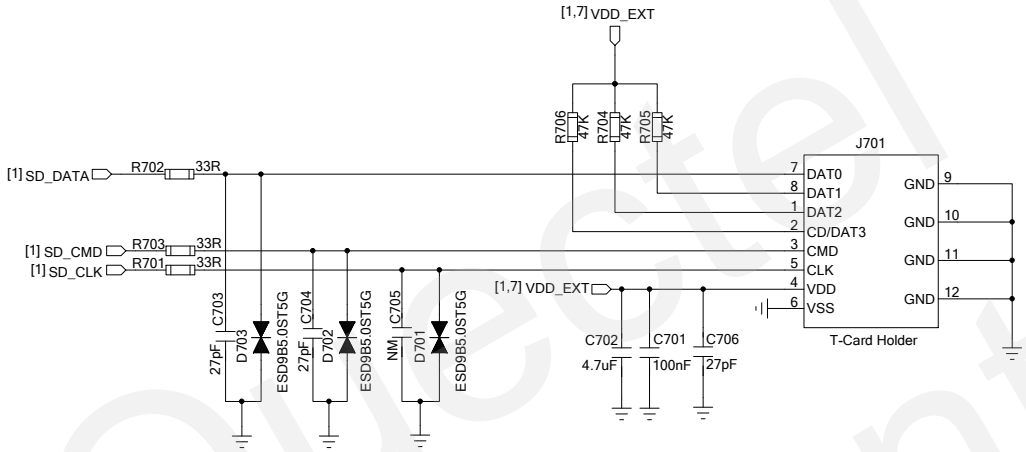
SD Card Interface



Design Notes:

1. SPI mode memory card is not supported.
2. Hot plug is not supported.
3. It is recommended to add transient voltage suppressor with less than 15pF junction capacitance for ESD protection.

Layout Notes:

1. Keep all SD card lines far away from the power and RF trace.
2. Route all SD card signals as short as possible. Ensure the length of every trace does not exceed 100mm.
3. The SD_CLK, SD_DATA and SD_CMD trace should be routed together. Keep trace difference of SD card signals less than 10mm.
4. Reserve external pull-up resistor for other data lines except the DATA0.
5. The SD_CLK and SD_DATA signals must be protected by ground in order to improve EMI.

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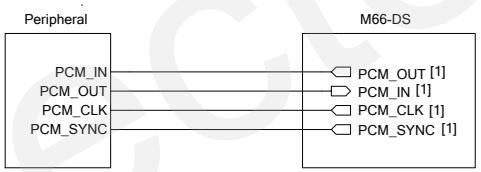
PCM Design



Note:

For more details about PCM, please refer to M66-DS HD.

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