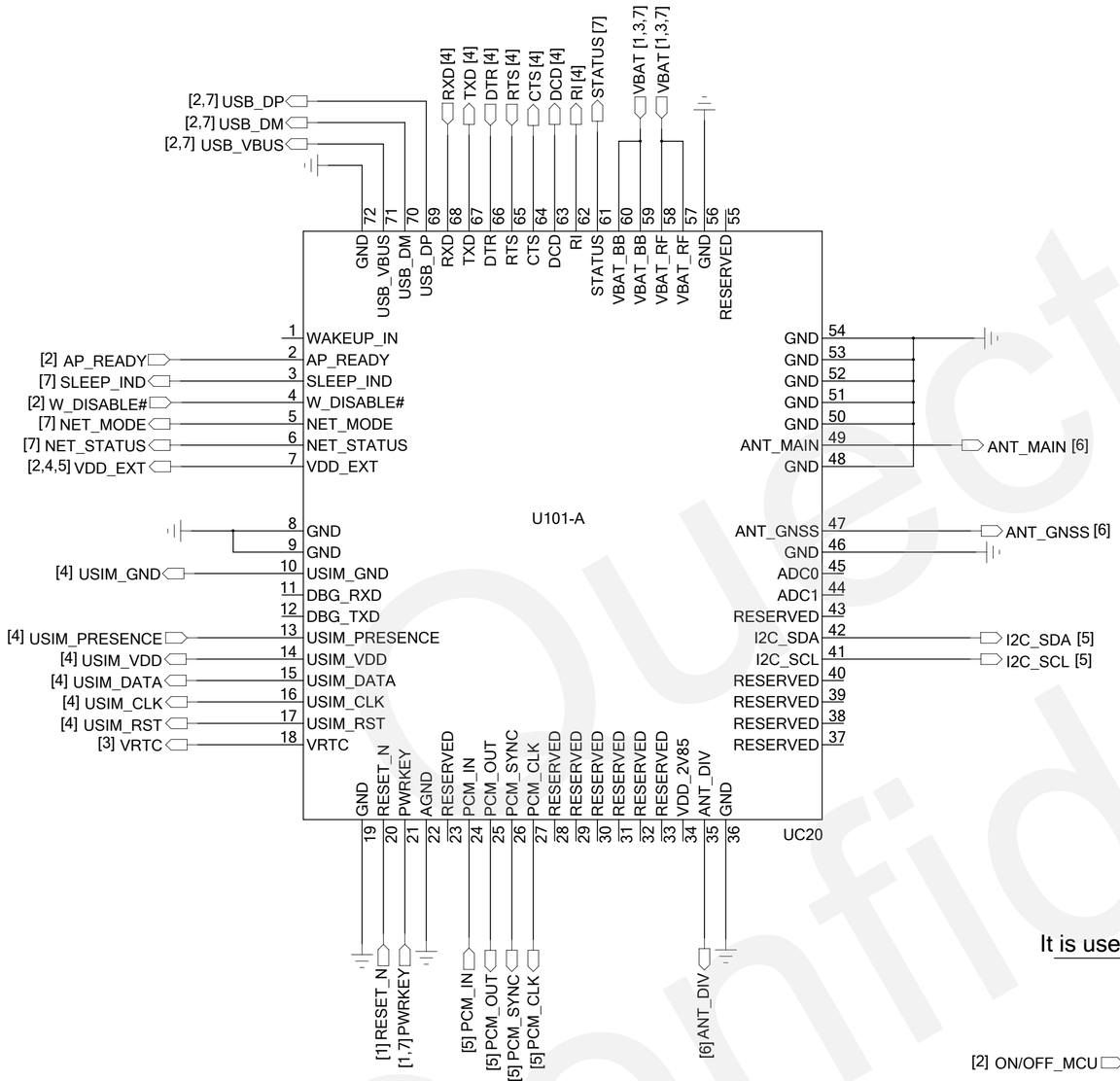
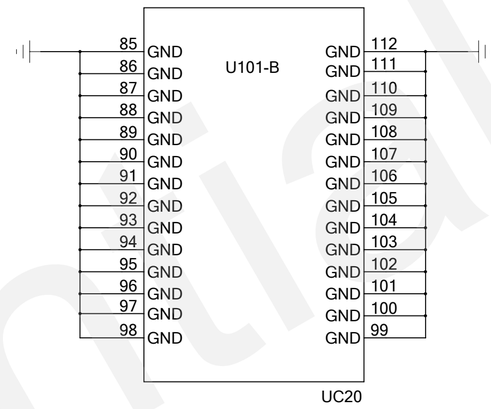
Module Interface



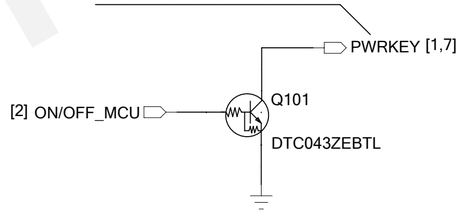


Note:

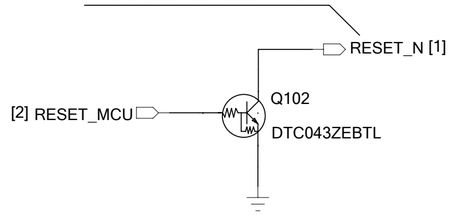
Pin 73~84 are used for factory test, and they are unused in the design.

You can ignore them and don't design them in schematic and PCB decal.

It is used to turn on or off the module.



It is used to reset the module.

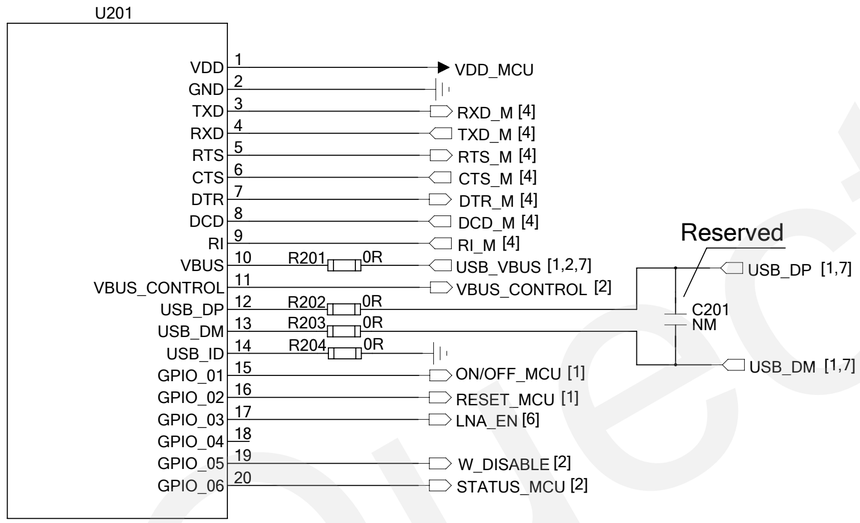


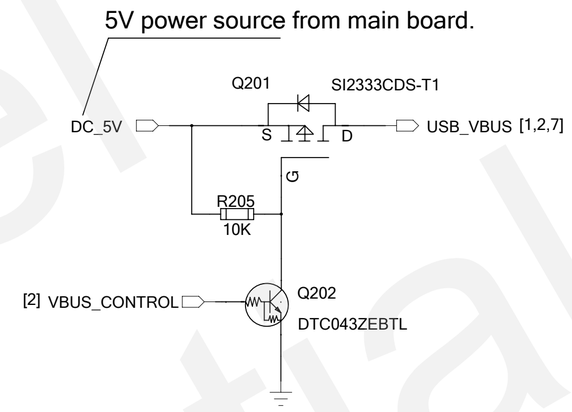
Notes:

1. Keep all RESERVED and unused pins unconnected.
2. AP_READY should be designed in your circuit. Refer to the document <UC20_Hardware_Design> for more details.

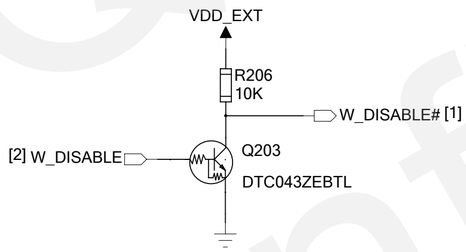
Quectel Wireless Solutions		
DRAWN BY <Mountain.ZHOU>	PROJECT <UC20 Reference Design>	TITLE <Module Interface>
CHECKED BY <Bruce.YU>	SIZE A2	VER 1.05
	SHEET 1 of 7	<2014.10>

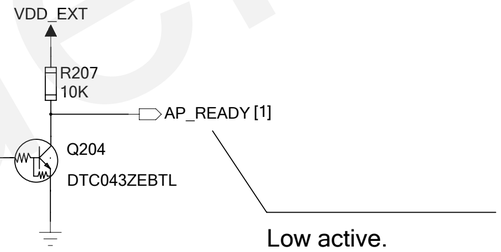
MCU Interface





VBUS_CONTROL = High level, Q201 conducts.





Low active.

Refer to hardware design document.

Notes:

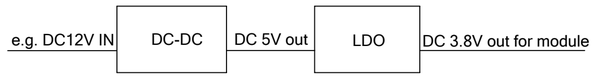
1. U201 represents customer's MCU.
2. Pay attention to the UART connection of RTS/CTS.
3. UC20 can only work as a USB device and support FS/HS mode. To communicate with USB interface, MCU needs to support USB host or OTG function.
   The VBUS pins of MCU and UC20 need to be provided by 5V power for USB detection, and VBUS_CONTROL turns on and off VBUS power supply.
4. Please pay attention to LNA_EN voltage level translation if the voltage domain of MCU is 5V.

Quectel Wireless Solutions		
DRAWN BY <Mountain.ZHOU>	PROJECT <UC20 Reference Design>	TITLE <MCU Interface>
CHECKED BY <Bruce.YU>	SIZE A2	VER 1.05
	SHEET 2 of 7	<2014.10>

Power Supply Design

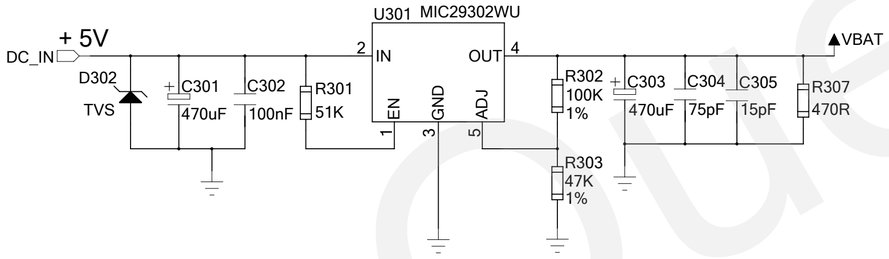
DC-DC Application

It is used when the input voltage is above 7V. Use DC-DC to convert high input voltage to 5V, and LDO will generate 3.8V typical voltage for the module.



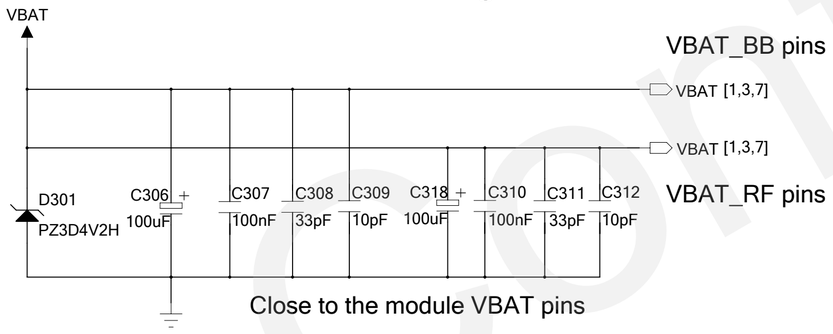
LDO Application

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



VBAT = (R302/R303+1)*1.24 = 3.88V

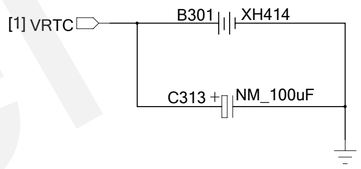
VBAT Design



Note:

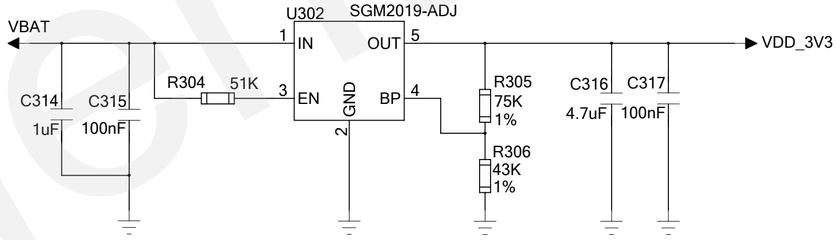
VBAT should be routed in star mode to VBAT_BB and VBAT_RF pins.

VRTC Design



If VRTC function is not used, keep VRTC pin open.

Supply Power to PCM Codec Circuit

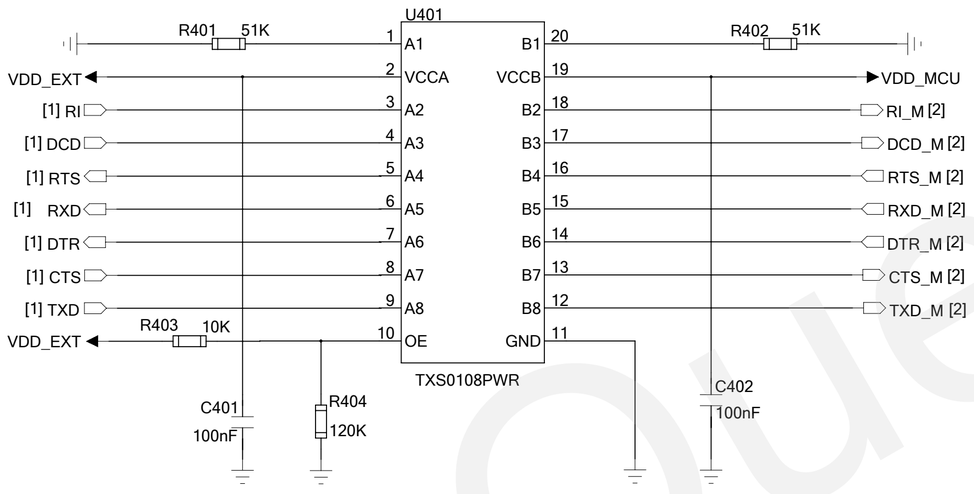


VDD_3V3 = (R305/R306+1)*1.207 = 3.3V

Quectel Wireless Solutions		
DRAWN BY <Mountain.ZHOU>	PROJECT <UC20 Reference Design>	TITLE <Power Supply Design>
CHECKED BY <Bruce.YU>	SIZE A2	VER 1.05
	SHEET 3 of 7	<2014.10>

UART and USIM Design

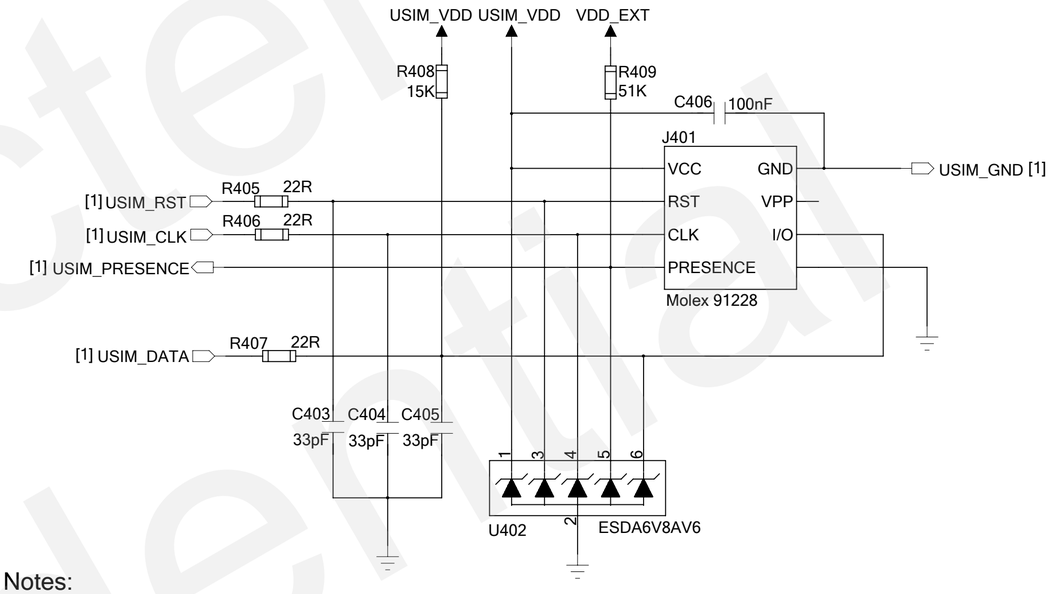
UART Level Translator



Notes:

1. The voltage domain of UC20 UART is 1.8V.
   Use TXS0108 to realize the voltage level translation between UC20 and MCU.
2. VCCA should not exceed VCCB.
   For more information about TXS0108, please refer to the datasheet from TI website.
3. DTR is pulled up by software. Driving DTR to low level wakes up the module.
4. TXS0108 is compatible with TXB0108, and can be used to replace TXB0108 directly.

USIM Design



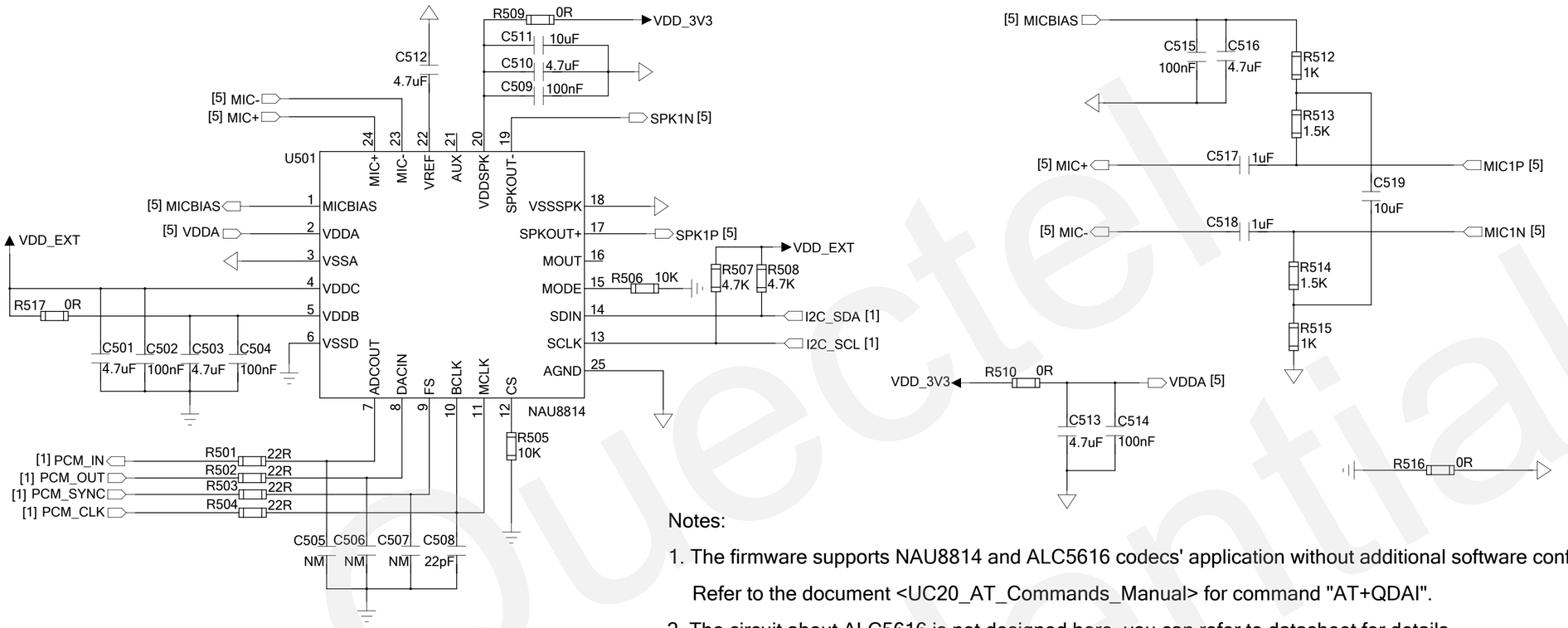
Notes:

1. R405~R407 are applied to suppress the EMI spurious transmission and enhance the ESD protection.
2. R408 can improve anti-jamming capability of the USIM circuit.
3. UC20 supports USIM card hot-plugging, which can be implemented through USIM_PRESENCE and configured to high-level active or low-level active through command "AT+QSIMDET".
   The circuit above is designed for low-level detection.
4. The value of C406 should be less than 1uF.

Quectel Wireless Solutions		
DRAWN BY <Mountain.ZHOU>	PROJECT <UC20 Reference Design>	TITLE <UART and USIM Design>
CHECKED BY <Bruce.YU>	SIZE A2	VER 1.05
	SHEET 4 of 7	<2014.10>

Audio Design

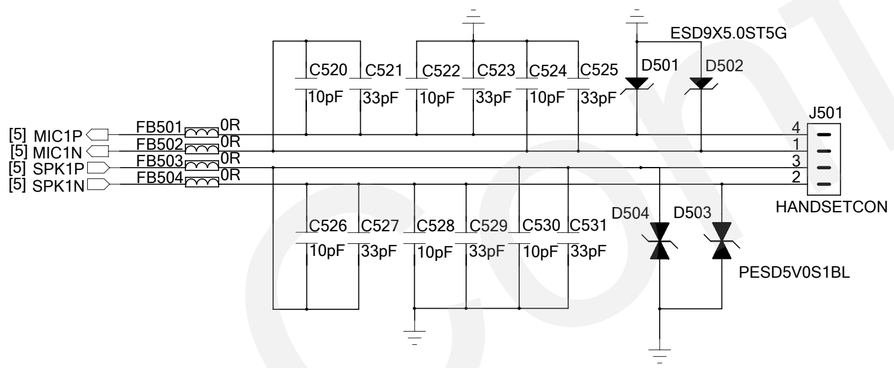
PCM Codec Circuit



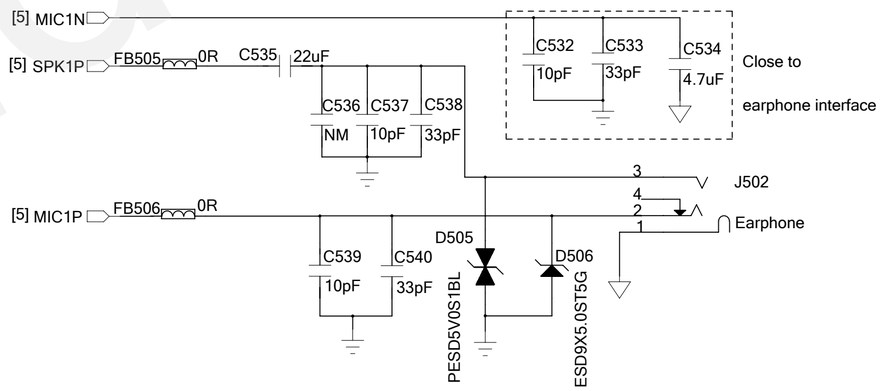
Notes:

1. The firmware supports NAU8814 and ALC5616 codecs' application without additional software configuration.
   Refer to the document <UC20_AT_Commands_Manual> for command "AT+QDAI".
2. The circuit about ALC5616 is not designed here, you can refer to datasheet for details.

Audio Channel - Handset



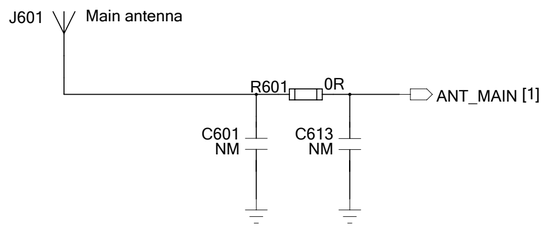
Audio Channel - Earphone



Quectel Wireless Solutions		
DRAWN BY <Mountain.ZHOU>	PROJECT <UC20 Reference Design>	TITLE <Audio Design>
CHECKED BY <Bruce.YU>	SIZE A2	VER 1.05
	SHEET 5 of 7	<2014.10>

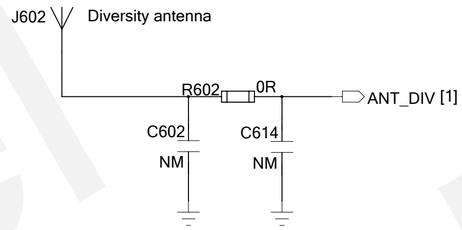
RF and GNSS Design

Main Antenna Interface



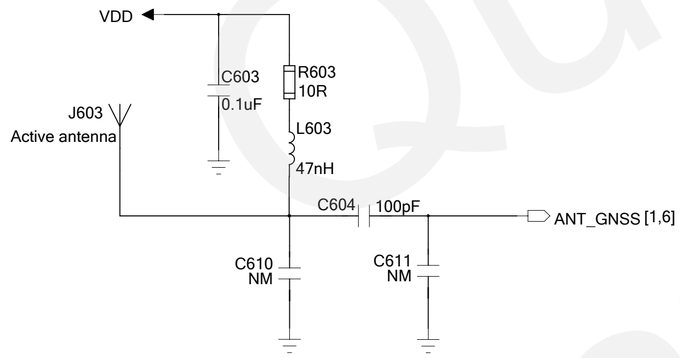
C601 and C613 are reserved for impedance matching.

Diversity Antenna Interface



ANT_DIV is used to improve UMTS receiving performance.

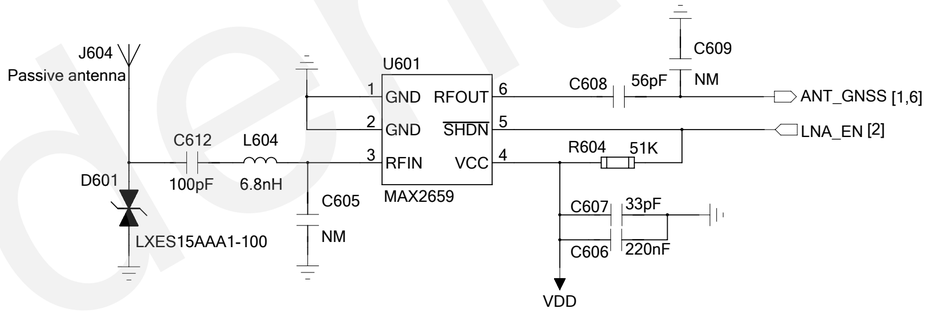
GNSS Active Antenna Circuit



Notes:

1. If you design the antenna circuit with passive antenna, the R603 and L603 are not needed.
2. You can choose an external LDO to supply power (VDD above) to the active antenna and LNA circuit.

GNSS Passive Antenna Circuit



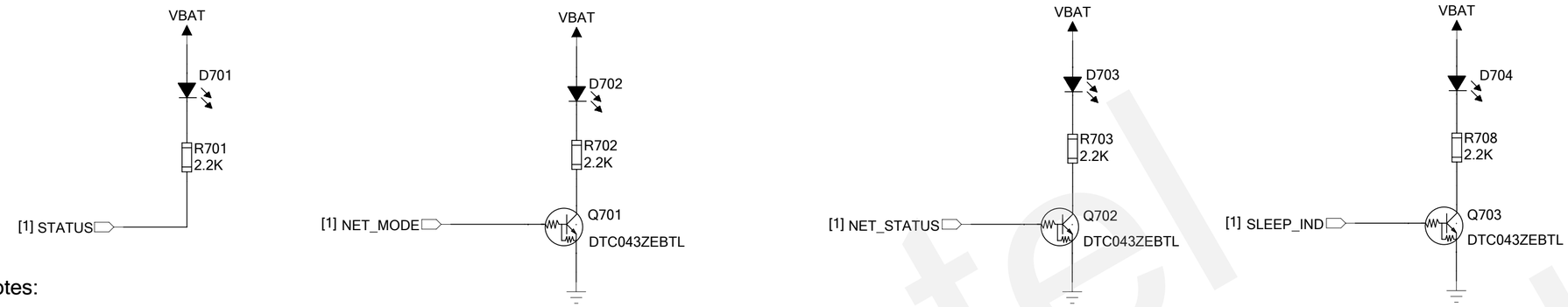
Notes:

1. One typical reference circuit based on MAX2659 is shown above.
2. You can use one GPIO to turn on or off the LNA U601.
3. The junction capacitance of D601 should be less than 1pF.

Quectel Wireless Solutions		
DRAWN BY <Mountain.ZHOU>	PROJECT <UC20 Reference Design>	TITLE <RF and GNSS Design>
CHECKED BY <Bruce.YU>	SIZE A2	VER 1.05
	SHEET 6 of 7	<2014.10>

Other Designs

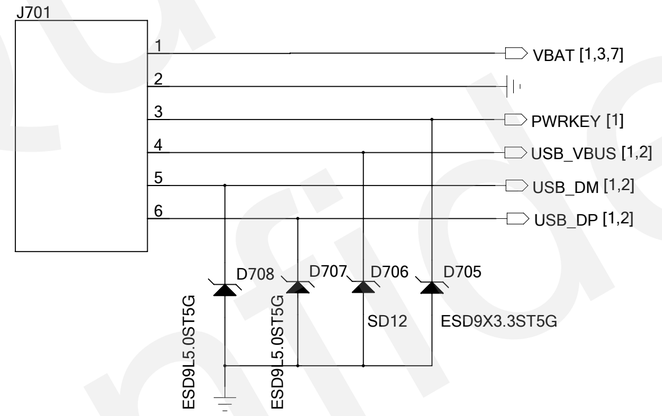
Indicators



Notes:

1. UC20 STATUS is open drain output.
2. Refer to the document <UC20_Hardware_Design> for more details about NET_MODE, NET_STATUS and SLEEP_IND.

Reserved Test Points



Notes:

1. These test points are recommended to be reserved for firmware upgrade.
2. Keep USB test points as close to USB pins as possible.

Quectel Wireless Solutions		
DRAWN BY <Mountain.ZHOU>	PROJECT <UC20 Reference Design>	TITLE <Other Designs>
CHECKED BY <Bruce.YU>	SIZE A2	VER 1.05
	SHEET 7 of 7	<2014.10>