

Application samples of RFM69HCW replacing RFM22B

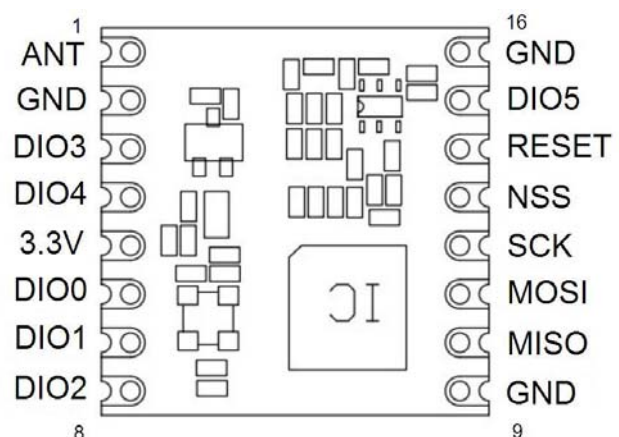
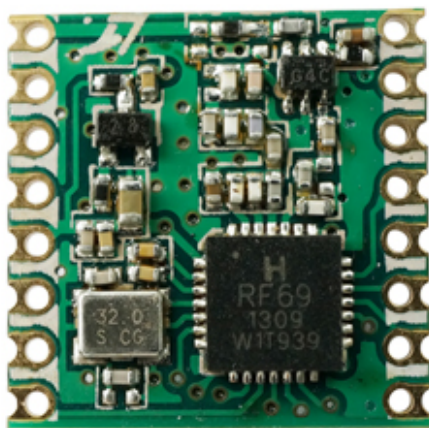
1. Brief introduction of application :

RFM69HCW is a transceiver module which developed with the purpose of compatible with performance parameters of RFM22B. This kind of module is based on the new generation of RF IC with high performance which shows another expansion of HopeRF. To help developers use RFM69HCW modules conveniently without the need to change the original RFM22B firmware design. We write this the comparison of RFM69HCW and RFM22B to help developers use RFM69HCW much better.

2. Firmware compatibility

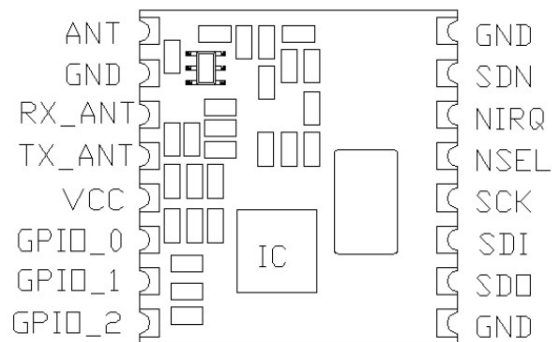
As the PCB size and bonding pad configuration of RFM69HCW and RFM22B are the same, designers don't need to change firmware design like typical application of using RFM22B. That is to replace the application of RFM22B directly what you need to do is changing the drive application software of RFM69HCW. The object diagrams and footprint-pin diagram are as following:

The object diagram and footprint-pin diagram of RFM69HCW:



Footprint pin diagram of RFM69HCW

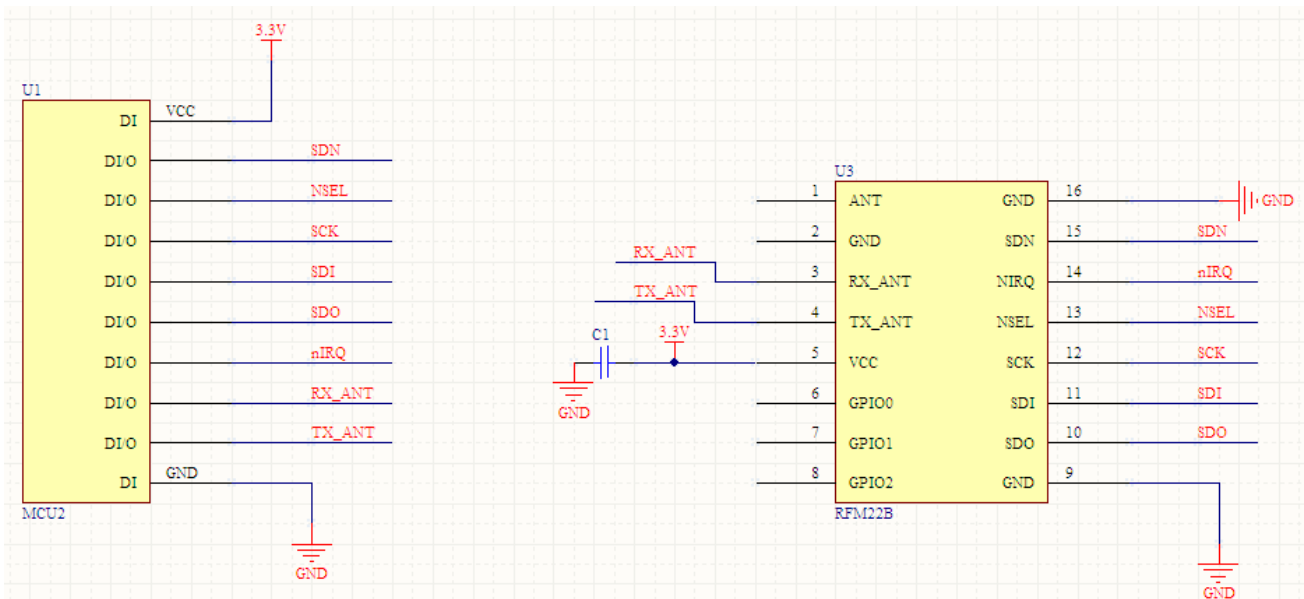
| Number | Name | Type | Description |
|--------|--------|------|----------------------------------|
| 1 | ANT | I/O | Transmitter RF Output / Input |
| 2、9、16 | GND | I | Ground |
| 3 | DIO3 | I/O | Digital I/O, software configured |
| 4 | DIO4 | I/O | Digital I/O, software configured |
| 5 | 3.3V | I | Supply voltage |
| 6 | DIO0 | I/O | Digital I/O, software configured |
| 7 | DIO1 | I/O | Digital I/O, software configured |
| 8 | DIO2 | I/O | Digital I/O, software configured |
| 10 | MISO | O | SPI Data output |
| 11 | MOSI | I | SPI Data input |
| 12 | SCK | I | SPI Clock input |
| 13 | NSS | I | SPI Chip select input |
| 14 | NRESET | I/O | Reset trigger input |
| 15 | DIO5 | I/O | Digital I/O, software configured |

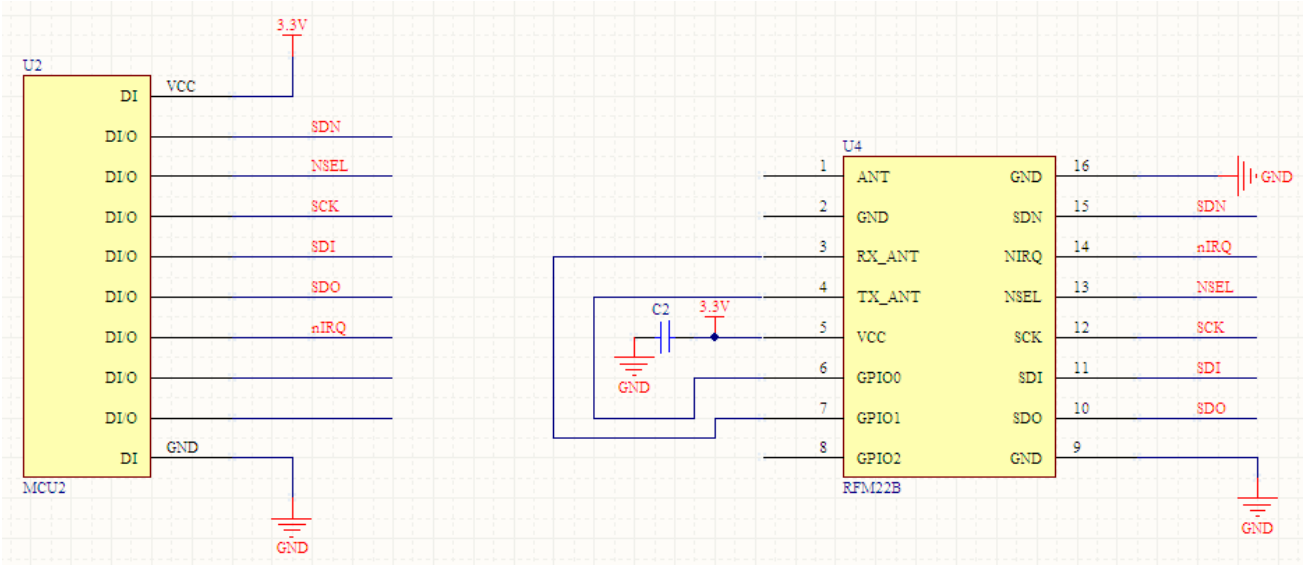
The object diagram and footprint-pin diagram of RFM22B:


Footprint pin diagram of RF22B

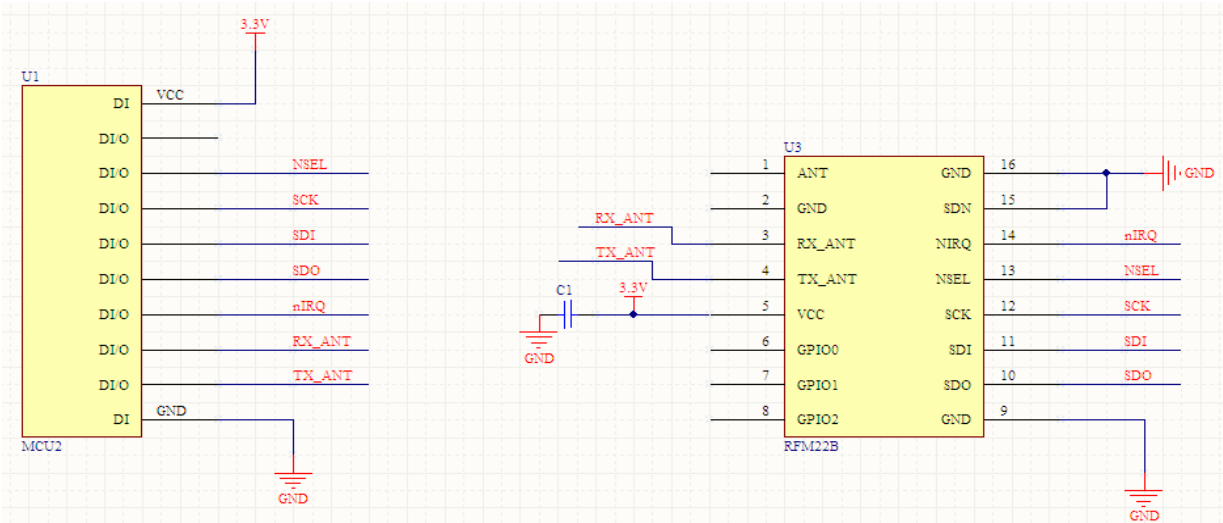
| | | | |
|--------|--------|-----|---|
| 1 | ANT | I/O | Transmitter RF Output |
| 2、9、16 | GND | I | Ground |
| 3 | RX_ANT | I | Rx Antenna Select input pin |
| 4 | TX_ANT | I | Tx Antenna Select input pin |
| 5 | VCC | I | Positive power supply |
| 6 | GPIO_0 | I/O | Digital I/O, software configured |
| 7 | GPIO_1 | I/O | Digital I/O, software configured |
| 8 | GPIO_2 | I/O | Digital I/O, software configured |
| 10 | SDO | O | SPI data output |
| 11 | SDI | I | SPI data input |
| 12 | SCK | I | SPI clock input |
| 13 | NSEL | I | SPI Chip select (active low) |
| 14 | NIRQ | O | General Microcontroller Interrupt status output |
| 15 | SDN | I | Shut down input |

There are some typical application circuits of RFM22B and RFM69HCW and some methods of how to use RFM69HCW to replace RFM22B. Typical firmware connection examples of these two modules can refer to bellowing diagrams:

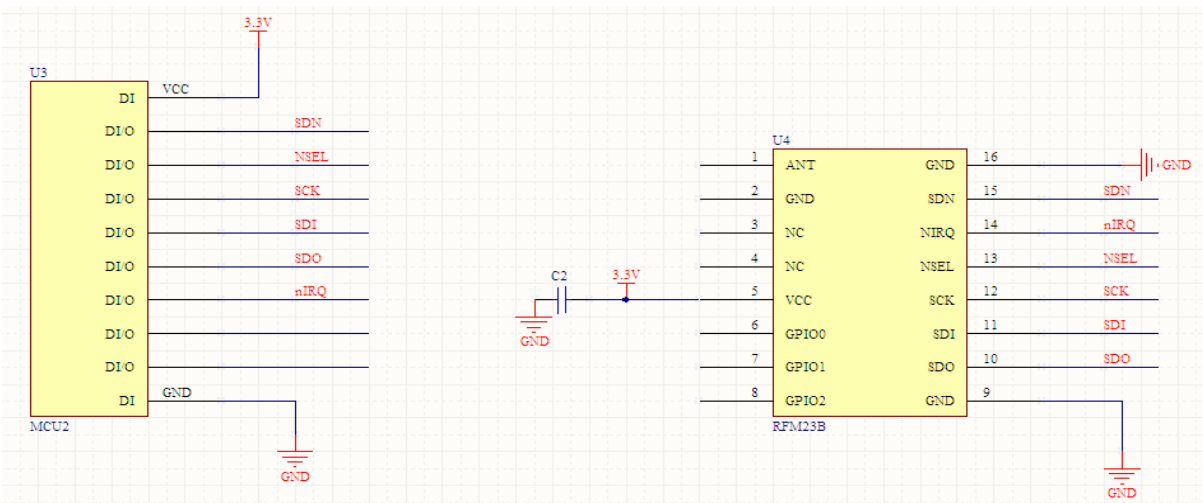

RFM22B typical application 1



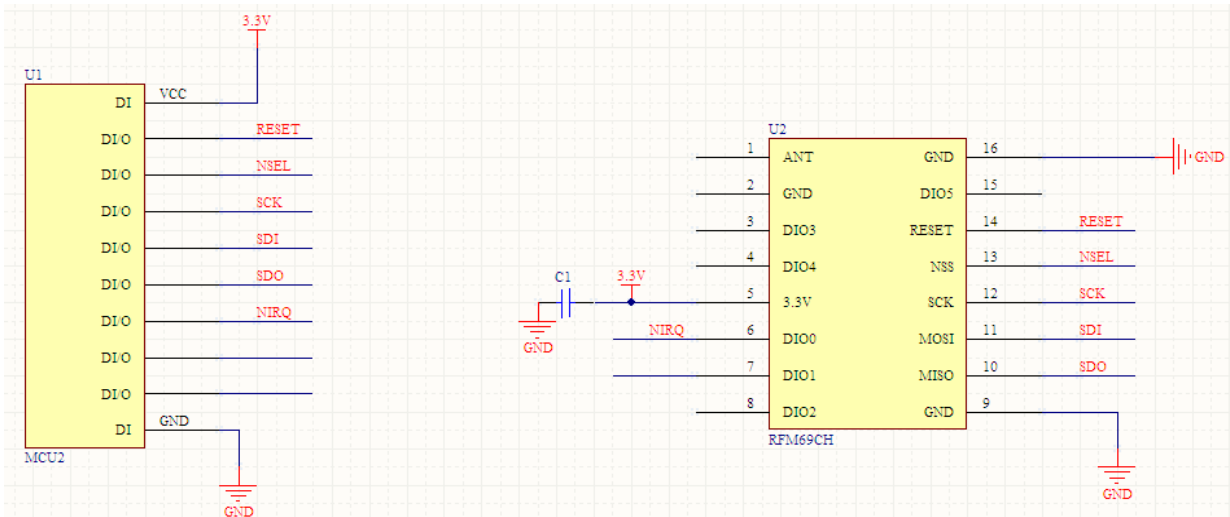
RFM22B typical application 2



RFM22B typical application 3



RFM23B typical application



RFM69HCW typical application

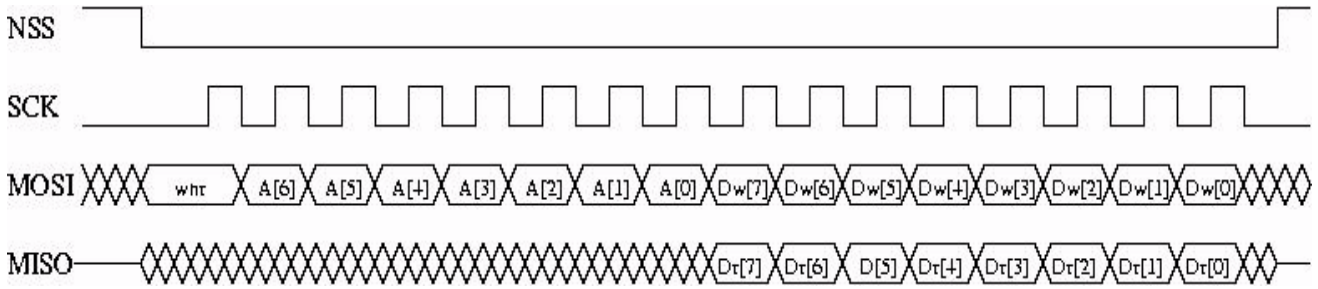
From these two typical application circuits we can learn that:

- When you are using typical circuit application 1 of RFM22B and your circuit connection is the typical circuit connection of RFM23B, you can use RFM69HCW to replace the old modules and don't need to change firmware design. About the software, clients need to make some changes such as the MCU port configuration and the drive application software of RFM69HCW because RFM69HCW need to check state register to get the working status via MCU not from firmware I/O.
- When you are using the typical circuit application 3 of RFM22B and without using CLK output, you can use RFM69HCW to replace the old modules directly. RFM69HCW can't replace RFM22B when the original design is using typical circuit 2. The original firmware design will be modify to use RFM69HCW. And this moment, RFM69HCW can't get interrupt signals from I/O port but from checking status register from MCU.

3. Application outline for the software:

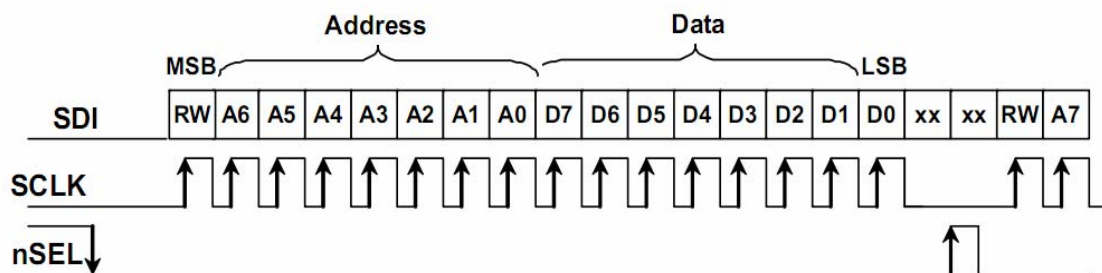
RFM69HCW and RFM22B are the same level and high performance wireless modules. To realize comprehensive replacement, what need to do is changing corresponding drive software settings. Bellowing are the introductions of the software application of these two modules:

- Configuration port of RFM69HCW is standard SPI interface, MCU can write or read register configuration data via SPI port. Sequence chart shows bellowing:



SPI sequence chart

- After initialization of RFM69HCW, DIO0~4 are defined as status map output footprint, with the configuration of register RegDioMapping, the DIO port means output kinds of status map. The function of DIO port of RFM69HCW is the same as interrupt output pin NIRQ of RFM22B.
- After setting TX status of RFM69HCW, you can write transmitter data into FIFO via SPI port, the module will send data out according to the set data format and parameters.
- As the module is in RX status and then receive valid data package, the received data will download data into FIFO automatically. you can read the RX data via SPI interface. FIFO needs emptied after dispose of each RX data.
- Configuration port of RFM22B is standard SPI interface, You can set instruction configuration data via SPI sequence. SPI Sequence chart shows bellowing:



SPI sequency chart

- After setting TX status of RFM22B, you can write transmitter data into FIFO via SPI port, the module will send data according to the set data format and parameters.
- As the module is in RX status and then receive valid data package, RFM22B will output low level interrupt signal through nIRQ and receive data into FIFO

simultaneously. FIFO needs emptied after dispose of each RX data.

4. samples codes:

The demo codes of RFM69HCW and RFM22B are on our website, you can download corresponding codes for software programming reference.

http://ww.hoperf.com/rf/fsk_module/RFM69H.htm

http://ww.hoperf.com/rf/fsk_module/RFM22B.htm

5. More application samples of modules, please log on ww.hoperf.com

HOPE MICROELECTRONICS CO.,LTD

Add: 2/F, Building 3, Pingshan Private Enterprise Science and Technology Park, Lishan Road, XiLi Town, Nanshan District, Shenzhen, Guangdong, China

Tel: 86-755-82973805

Fax: 86-755-82973550

Email: sales@hoperf.com

Website: <http://www.hoperf.com>

<http://www.hoperf.cn>

This document may contain preliminary information and is subject to change by Hope Microelectronics without notice. Hope Microelectronics assumes no responsibility or liability for any use of the information contained herein. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Hope Microelectronics or third parties. The products described in this document are not intended for use in implantation or other direct life support applications where malfunction may result in the direct physical harm or injury to persons. NO WARRANTIES OF ANY KIND, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE OFFERED IN THIS DOCUMENT.

©2006, HOPE MICROELECTRONICS CO.,LTD. All rights reserved.