

## RFM Prototypes Shields

### RFM prototype shields for Moteino, MiniWireless WeMos Lolin32

#### 1 Motivation

While testing several Moteino and RFM transceivers, I have decided to design a RFM shield for the various transceivers, this to be able to use different types of transceivers and frequencies on a bare Moteino Rx.

With this version a RFM69(H)W shield for WeMos LOLIN32 is also foreseen

Of course, ideally an actual printed circuit board shall be designed, however, due to the small quantity of items, I propose the following design.

Because of the different size and number of pins, different shields are necessary for each type of transceiver.

No shield is foreseen for RFM12B.

The main part used is a pin-out adaptive printed circuit board providing connection between, 2mm, 1,27mm and 2,54mm pin layout (see bill of material RFM shield transceiver PCB).

#### 2 Bill of Material

The following list is the summary of the passive components used to build the shields (from aliexpress).

- 2 mm headers and pins

<https://www.aliexpress.com/item/20PCS-Lot-1x40-Pin-2-mm-Single-Row-Female-Male-Pin-Header-Connector/32639596843.html?spm=2114.13010608.0.0.fEfNqg>

- 2.54 mm headers and pins

[https://www.aliexpress.com/store/product/20PCS-Lot-1x40-Pin-2-54mm-Single-Row-Female-Male-Pin-Header-Connector/1815642\\_32625720896.html?spm=2114.12010612.0.0.tNJGEK](https://www.aliexpress.com/store/product/20PCS-Lot-1x40-Pin-2-54mm-Single-Row-Female-Male-Pin-Header-Connector/1815642_32625720896.html?spm=2114.12010612.0.0.tNJGEK)

- RFM shield transceivers PCB

<https://www.aliexpress.com/item/10-pcs-1-27MM-2-0MM-2-54MM-12-Pin-Adapter-Board-For-Wireless-Modules/32761740335.html?spm=2114.13010608.0.0.EHF0iw>

- Moteino Driver PCB

[https://www.aliexpress.com/item/2-pcs-lot-Single-Side-10x20cm-Prototype-Stripboard-Veroboard-vero-FR-4-Fibreglass-100x200mm-PCB-Stripboard/32779865738.html?spm=2114.01010208.3.262.9OEhls&ws\\_ab\\_test=searchweb0\\_0,searchweb201602\\_4\\_10152\\_10208\\_10065\\_10151\\_10068\\_5330012\\_10304\\_10136\\_1037\\_10060\\_10302\\_10155\\_10062\\_437\\_10154\\_10056\\_10055\\_10054\\_10059\\_303\\_100031\\_10099\\_10103\\_5320014\\_10102\\_10096\\_10052\\_10053\\_10142\\_10107\\_10050\\_10051\\_10084\\_10083\\_10080\\_10082\\_10081\\_10177\\_10110\\_519\\_10111\\_10112\\_10113\\_10114\\_10182\\_10078\\_10079\\_5260014\\_10073\\_10123\\_10189\\_142\\_searchweb201603\\_13\\_ppcSwitch\\_3&btsid=30ca61b1-ce77-423b-9f34-c343c8f22a7f&algo\\_expid=d8faeca7-7d0e-410e-9d1b-80a28e338d35-34&algo\\_pvid=d8faeca7-7d0e-410e-9d1b-80a28e338d35](https://www.aliexpress.com/item/2-pcs-lot-Single-Side-10x20cm-Prototype-Stripboard-Veroboard-vero-FR-4-Fibreglass-100x200mm-PCB-Stripboard/32779865738.html?spm=2114.01010208.3.262.9OEhls&ws_ab_test=searchweb0_0,searchweb201602_4_10152_10208_10065_10151_10068_5330012_10304_10136_1037_10060_10302_10155_10062_437_10154_10056_10055_10054_10059_303_100031_10099_10103_5320014_10102_10096_10052_10053_10142_10107_10050_10051_10084_10083_10080_10082_10081_10177_10110_519_10111_10112_10113_10114_10182_10078_10079_5260014_10073_10123_10189_142_searchweb201603_13_ppcSwitch_3&btsid=30ca61b1-ce77-423b-9f34-c343c8f22a7f&algo_expid=d8faeca7-7d0e-410e-9d1b-80a28e338d35-34&algo_pvid=d8faeca7-7d0e-410e-9d1b-80a28e338d35)

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### 3 Connections

#### 3.1 Chart

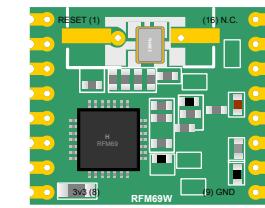
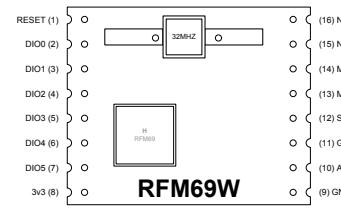
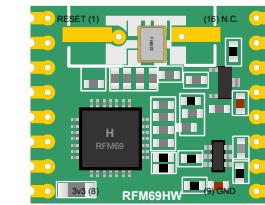
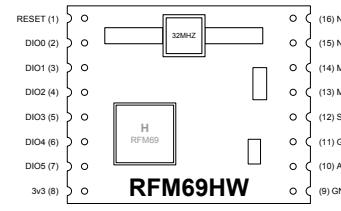
RFM69W	RFM69HW	RFM69CW	RFM69HCW	RFM95/96/97/98W	ESP8266 Assembly	WeMos D1 mini	WeMos LOLIN32	Comments
3V3 (8)	3V3 (8)	3V3 (2)	3V3 (13)	3V3 (13)	3V3	3v3	3V3	
GND (9)	GND (9)	GND (3)	GND (8)	GND (8)	GND	GND	GND	
DIO2 (4)	DIO2 (4)	DIO2 (16)	DIO2 (16)	DIO2 (16)	GPIO4	D2	A17 (27)	This pin is used for RFM OOK Data
MISO (13)	MISO (13)	MISO (8)	MISO (2)	MISO (2)	GPIO12	D6	MISO (19)	
MOSI (14)	MOSI (14)	MOSI (5)	MOSI (3)	MOSI (3)	GPIO13	D7	MOSI (23)	
SCK(2)	SCK(12)	SCK(6)	SCK(4)	SCK(4)	GPIO14	D5	SCK (18)	
DIO0(2)	DIO0(2)	DIO0(9)	DIO0 (14)	DIO0 (14)	GPIO15	D8	A16 (14)	Used as Interrupt (default SS)
NSS (15)	NSS (15)	NSS (7)	NSS (5)	NSS (5)	GPIO16	D0	SS (5)	Used as Slave Select
ANT (10)	ANT (10)	ANT (1)	ANT (9)	ANT (9)				Antenna

#### 3.2 RFM Layout (scale x 2.5)

Basically, four physical types of drivers have to be build according to the transceiver layout.

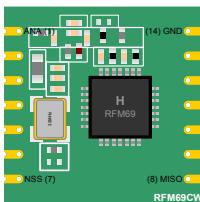
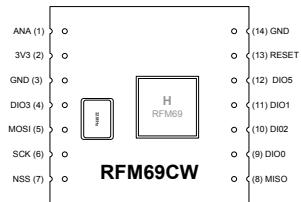
- One for RFM69(H)W Moteino
- One for RFM69(H)W WEMOS LOLIN32
- One for RFM69CW
- One for RFM69HCW and RFM95/96/97/98

##### 3.2.1 RFM69 (H)W

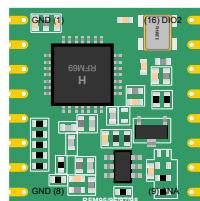
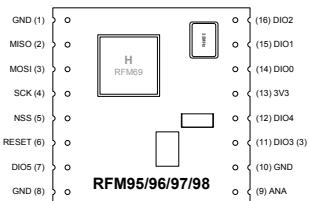
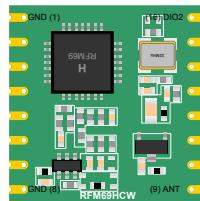
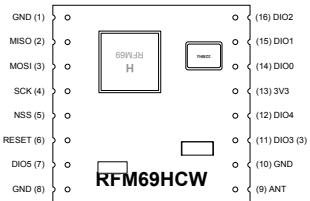


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### 3.2.2 RFM69CW



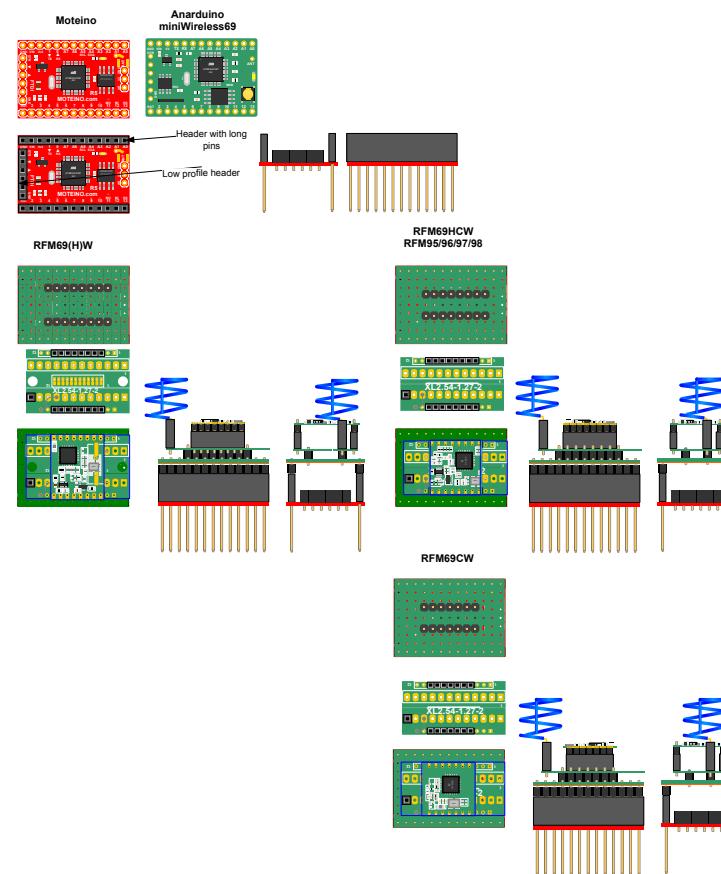
### 3.2.3 RFM69HCW & RFM95/96/97/98



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### 4 The final result

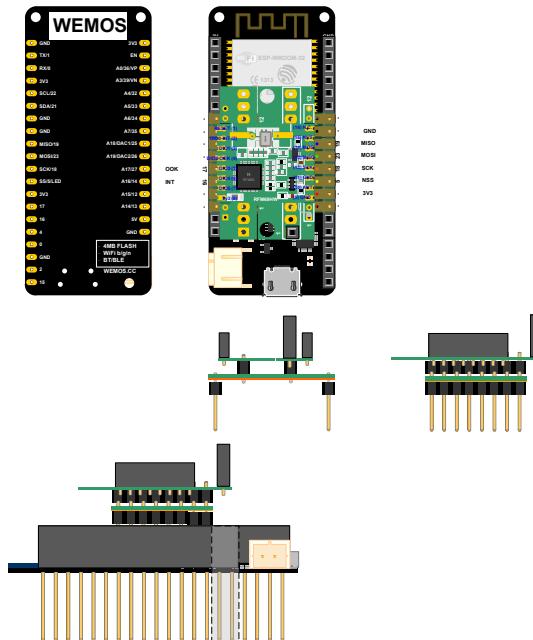
#### 4.1 Moteino



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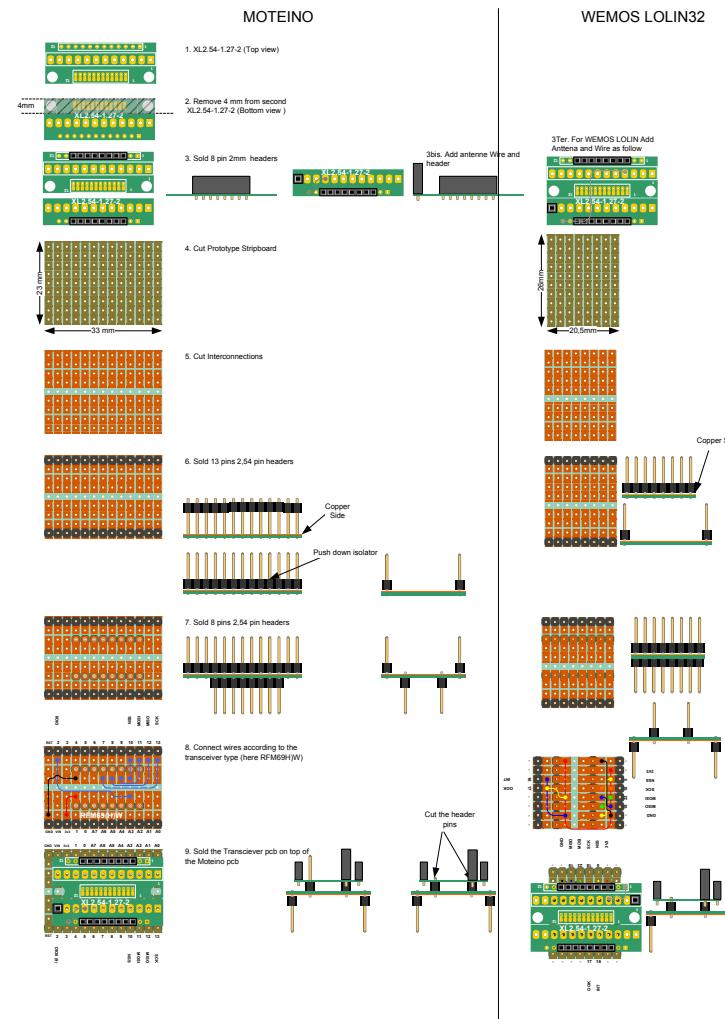
### 4.2 WeMos LOLIN 32



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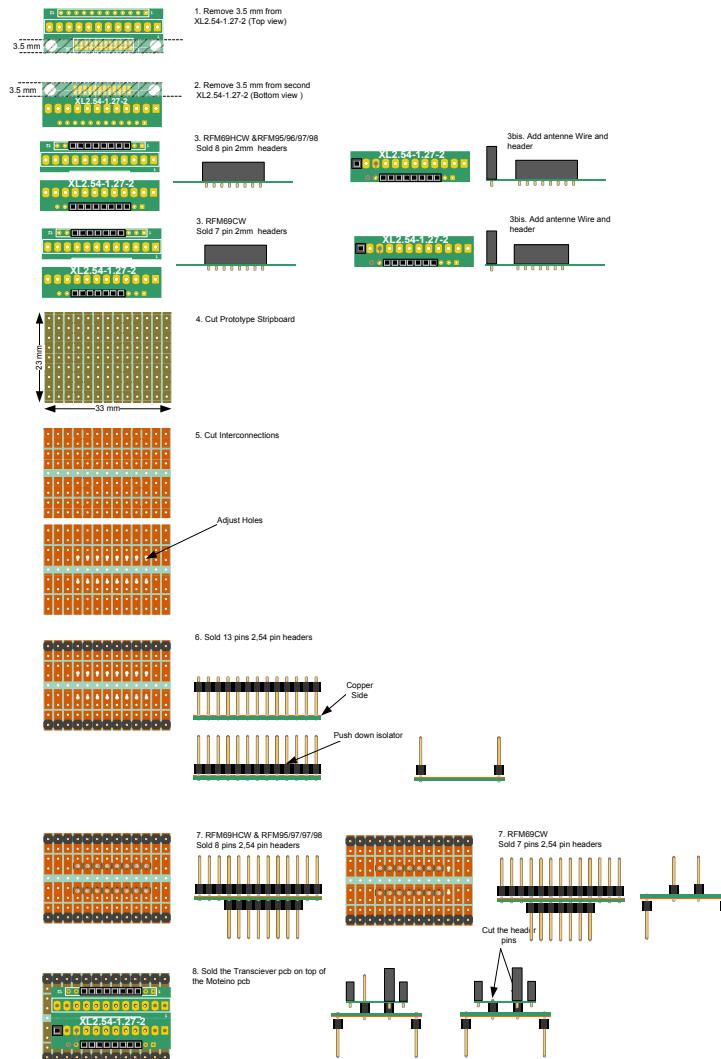
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### 4.3 RFM69(H)W shield (Moteino & WEMOS LOLIN32)



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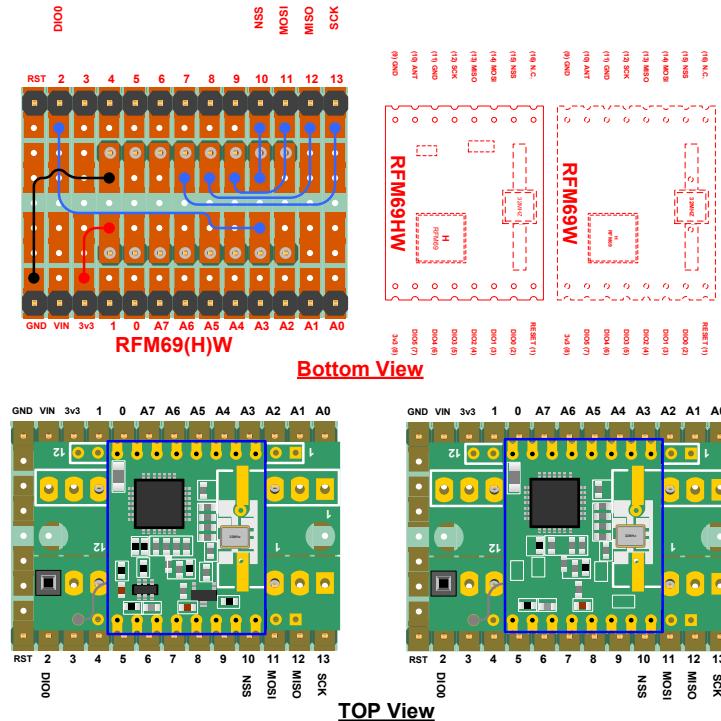
### 4.4 RFM69CW and RFM69HCW & RFM95/96/97/98



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### 5 Wiring and final results

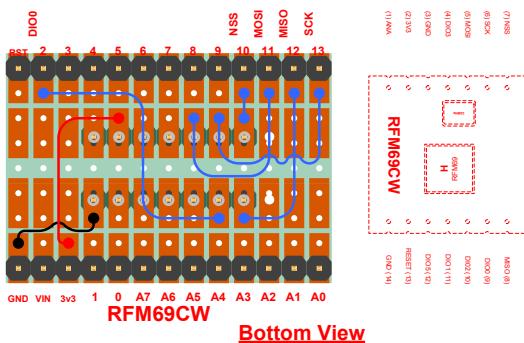
#### 5.1 RFM69(H)W for Moteino (scale x2)



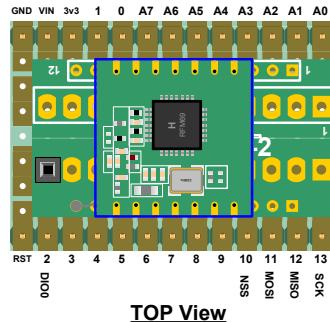
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### 5.2 RFM69CW for Moteino (scale x2)

Warning only 2\* 7 pins are used to connect the transceiver

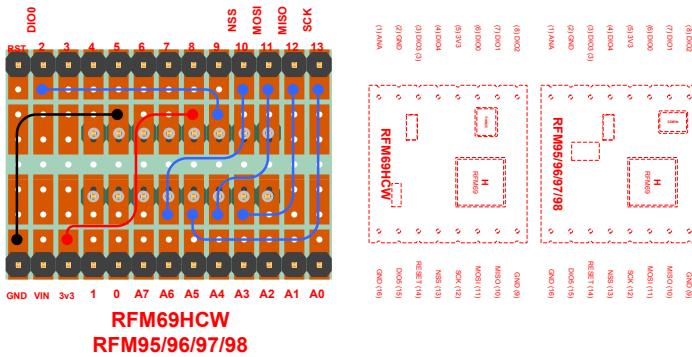


**Bottom View**



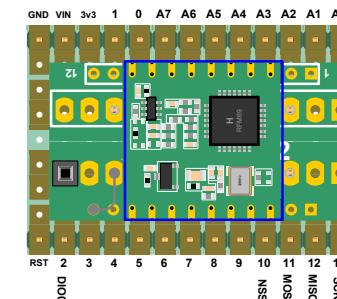
**TOP View**

### 5.3 RFM69HCW & RFM95/96/97/98 for Moteino (scale x2)



**Bottom View**

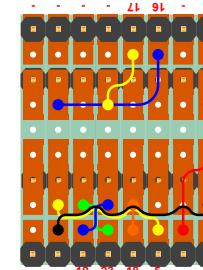
## RFM Prototypes Shields



**TOP View**

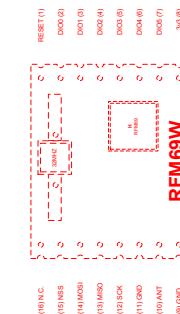
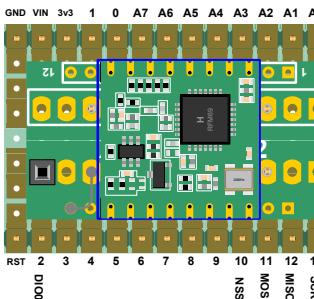
### 5.4 RFM69(H)W for WEMOS LOLIN32 (scale x2)

DIO  
INT  
OK



**RFM69(H)W**

**Bottom View**



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