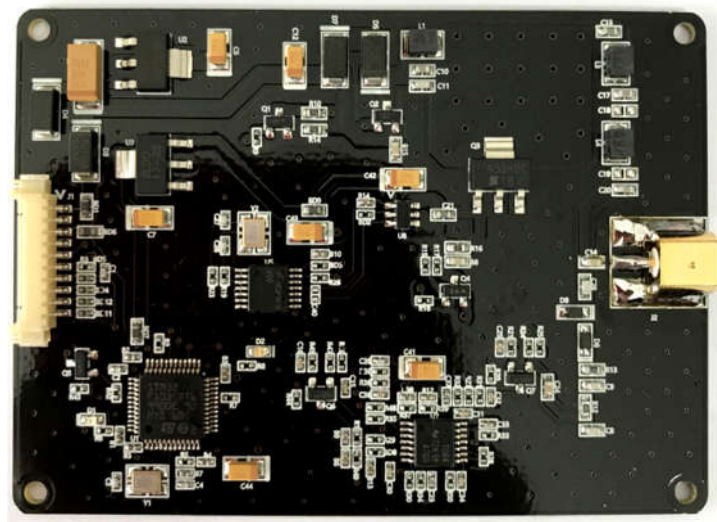


FSR HF RFID Reader User Manual FSR-H3



1. Specification

Parameter	Min.	Typ.	Max.	Unit	Condition / Note
RF Frequency		13.56		MHz	
Power Supply	7	9	12	VDC	Use switching regulator
Current Consumption	50	300	500	mA	@9V
RF Data Rate		26		Kbps	ISO15693-3
Host Interface					UART, USB(Virtual COM)
Host Data Rate	9600		115,200	bps	6 step (Initial set 115,200)
RF Power	1.2	1.5	2	W	
Reading Range		30	40	Cm	@FSR-A5 Antenna
Visual Indicators					Optical 2 LED
Anticollision			200	ea	
Operating Temperature	0		80	°C	

Standard ISO15693 13.56MHz RFID TAG Read/Write & Anticollision

Standard ISO15693-3 protocol full support

MCU : ARM 32bit Cortex M3 72MHz 64KB Flash (STMicroelectronics)

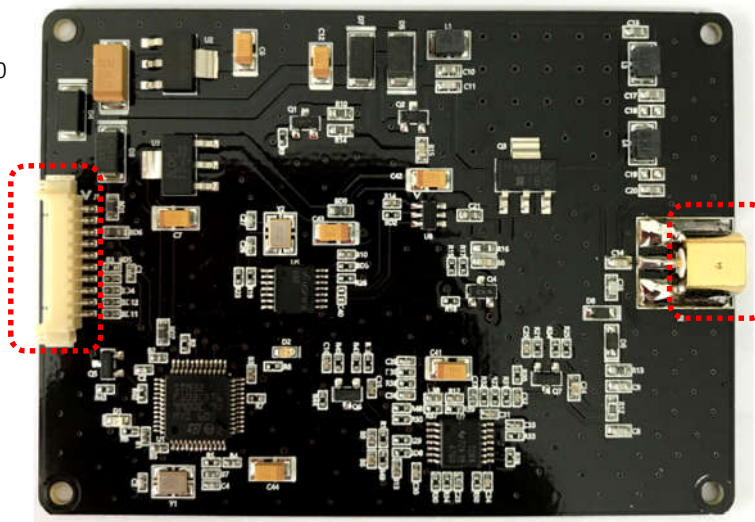
2. Module Description (last version 1.5)

Opposite

MOLEX 51021-10

Pitch 1.25mm

1. VIN
2. VIN
3. GND
4. GND
5. OC
6. BOOT0
7. USBDP
8. USBDM
9. RXD1 (TTL)
10. TXD1 (TTL)



MCX Jack

PIN 1,2 : DC 7~12V (recommnd 9V **switching regulator**)

PIN 5,6 : NC (Not Connected)

FSR-H3 protocol DataSheet (fsrnd.com / DataSheet last ver. download)

'GridCOM.exe' for Windows PC (fsrnd.com / Demo SW download)

USB VCOM Driver (fsrnd.com / USB Driver download)

■ **USART connection**

PIN 9(RXD1) , 10(TXD1) , 3 or 4(GND) → Master TXD , RXD , GND
3.3V (5V tolerant)

■ **USB connection**

PIN 7(USB DP) , 8(USB DM) , 3 or 4(GND) → PC USB port DP , DM , GND
Virtual com port (Baud Rate free)

■ **Firmware Update procedure (via USART)**

Power off → PIN 6(BOOT0) & 7(USB DP) short circuit → Power on (FW Update mode)

['Flash Loader Demonstrator'](#) (STMicroelectronics)

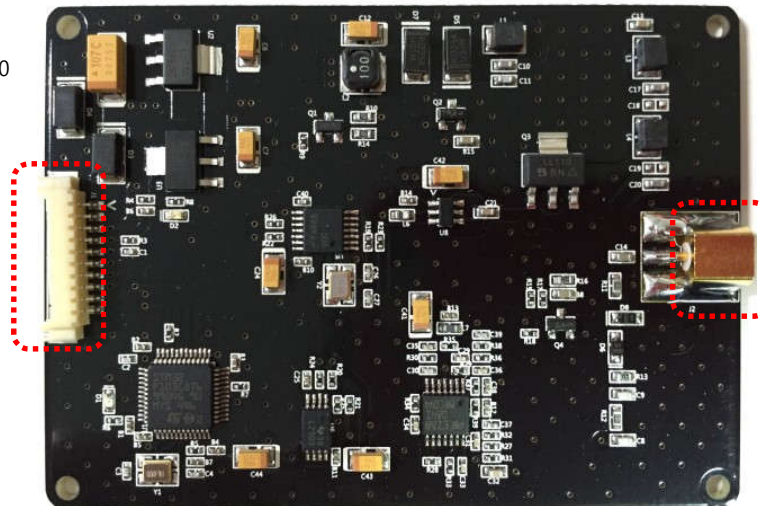
2. Module Description (old version)

Opposite

MOLEX 51021-10

Pitch 1.25mm

1. VIN
2. VIN
3. WKU
4. BOOT0
5. USBDP
6. USBDM
7. RXD1 (TTL)
8. TXD1 (TTL)
9. GND
10. GND



MCX Jack

PIN 1,2 : DC 7~12V (recommend 9V **switching regulator**)

PIN 3,4 : NC (Not Connected)

FSR-H3 protocol DataSheet (fsrnd.com / DataSheet last ver. download)

'GridCOM.exe' for Windows PC (fsrnd.com / Demo SW download)

USB VCOM Driver (fsrnd.com / USB Driver download)

■ **USART connection**

PIN 7(RXD1) , 8(TXD1) , 9 or 10(GND) → Master TXD , RXD , GND
3.3V (5V tolerant)

■ **USB connection**

PIN 5(USBDP) , 6(USBDM) , 9 or 10(GND) → PC USB port DP , DM , GND
Virtual comport (Baud Rate free)

■ **Firmware Update procedure (via USART)**

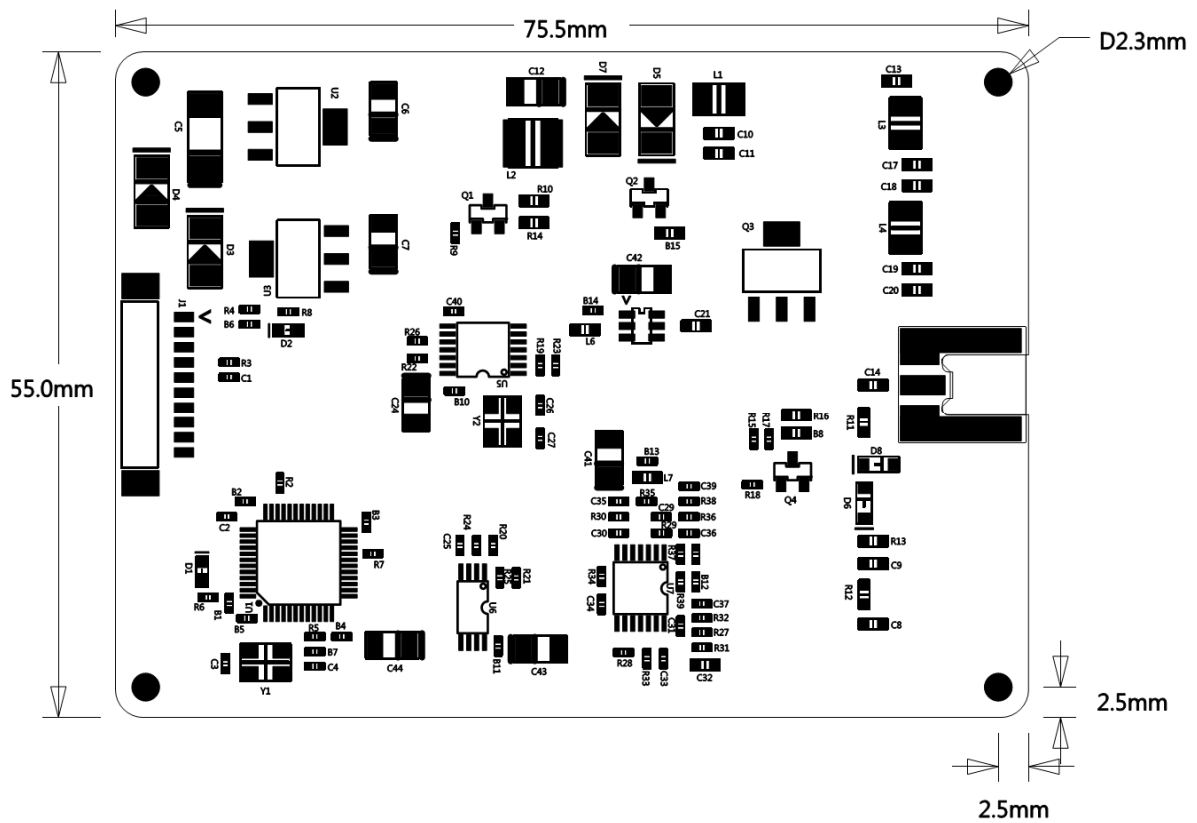
Power off → PIN 4(BOOT0) & 5(USBDP) short circuit → Power on (FW Update mode)

['Flash Loader Demonstrator'](#) (STMicroelectronics)

3. Dimension

75.5 x 55 x 5.2 mm

Weight : 30g



FSR-H3 Protocol (Ver.1.0)

Command	Request	Response	Description
Read	SF 0x06 0xA1 FN NB EF	SF NUM 0x1A FN NB UID BD EF	UID+(Block) read
	SF 0x0E 0xA1 UID FN NB EF	SF 0x05 0x1A FAILURE EF	
Write	SF NUM 0xA2 FN NB BD EF	SF 0x05 0x2A SUCC/FAIL EF	Block write
	SF NUM 0xA2 UID FN NB BD EF		
Write (TI only)	SF NUM 0xA4 FN NB BD EF	SF 0x05 0x4A SUCC/FAIL EF	Block write (TI only)
	SF NUM 0xA4 UID FN NB BD EF		
Lock Block	SF 0x05 0xA3 BN EF	SF 0x05 0x3A SUCC/FAIL EF	Lock block (one time)
	SF 0x0D 0xA3 UID BN EF		
Lock Block (TI only)	SF 0x05 0xA5 BN EF	SF 0x05 0x5A SUCC/FAIL EF	Lock block (one time) (TI only)
	SF 0x0D 0xA5 UID BN EF		
Reading Stay	SF 0x04 0xB1 EF	SF 0x05 0x1B 0x01 EF	UID Reading Stay mode
Reading NonStop	SF 0x04 0xB2 EF	SF 0x05 0x2B 0x01 EF	UID Reading Continue mode
UID		SF 0x0C 0x3B UID EF	@Reading mode
RF ON/OFF	SF 0x05 0xC1 ON/OFF EF	SF 0x05 0x1C 0x01 EF	RF carrier On/Off STOP
Reader Check	SF 0x04 0xC2 EF	SF 0x05 0x2C 0x01 EF	Reader acknowledge
Write AFI	SF 0x05 0xD1 AFI EF	SF 0x05 0x1D SUCC/FAIL EF	Undefined 1byte memory
	SF 0x0D 0xD1 UID AFI EF		
Write AFI (TI only)	SF 0x05 0xD7 AFI EF	SF 0x05 0x7D SUCC/FAIL EF	Undefined 1byte memory (TI only)
	SF 0x0D 0xD7 UID AFI EF		
Lock AFI	SF 0x04 0xD2 EF	SF 0x05 0x2D SUCC/FAIL EF	Note : Can not unlock!
	SF 0x0C 0xD2 UID EF		
Lock AFI (TI only)	SF 0x04 0xD8 EF	SF 0x05 0x8D SUCC/FAIL EF	Note : Can not unlock! (TI only)
	SF 0x0C 0xD8 UID EF		
Write DSFID	SF 0x05 0xD3 DSFID EF	SF 0x05 0x3D SUCC/FAIL EF	Undefined 1byte memory
	SF 0x0D 0xD3 UID DSFID EF		
Write DSFID (TI only)	SF 0x05 0xD9 DSFID EF	SF 0x05 0x9D SUCC/FAIL EF	Undefined 1byte memory (TI only)
	SF 0x0D 0xD9 UID DSFID EF		
Lock DSFID	SF 0x04 0xD4 EF	SF 0x05 0x4D SUCC/FAIL EF	Note : Can not unlock!
	SF 0x0C 0xD4 UID EF		
Lock DSFID (TI only)	SF 0x04 0xDA EF	SF 0x05 0xAD SUCC/FAIL EF	Note : Can not unlock! (TI only)
	SF 0x0C 0xDA UID EF		
Get system information	SF 0x04 0xD5 EF	SF 0x12 0x5D IF UID DSFID AFI BSN NBB IMC EF	Tag information
	SF 0x0C 0xD5 UID EF	SF 0x05 0x5D FAILURE EF	
Get block security status	SF 0x06 0xD6 FN NB EF	SF NUM 0x6D FN NB BSS*NB EF	Block(4bytes) status : lock(1)/unlock(0)
	SF 0x0E 0xD6 UID FN NB EF	SF 0x05 0x6D FAILURE EF	

Set EAS	SF 0x04 0xE1 EF	SF 0x05 0x1E SUCC/FAIL EF	Set the EAS bit to '1'. Enable the EAS.
	SF 0x0C 0xE1 UID EF		
Reset EAS	SF 0x04 0xE2 EF	SF 0x05 0x2E SUCC/FAIL EF	Reset the EAS bit to '0'. Disable the EAS.
	SF 0x0C 0xE2 UID EF		
Lock EAS	SF 0x04 0xE3 EF	SF 0x05 0x3E SUCC/FAIL EF	Fix the EAS bit in the current state. (Note : Can not unlock!)
	SF 0x0C 0xE3 UID EF		
EAS Alarm	SF 0x04 0xE4 EF	SF 0x24 0x4E EAS(32bytes) EF	If the EAS bit is set to '1', The EAS Sequence Data(32byte) output.
	SF 0x0C 0xE4 UID EF	SF 0x05 0x4E FAILURE EF	
Set Baud Rate	SF 0x05 0xC3 BR EF	SF 0x05 0x3C SUCC/FAIL EF	Save to Flash memory
Set Start Mode	SF 0x05 0xC4 MD EF	SF 0x05 0x4C SUCC/FAIL EF	Save to Flash memory

TAG Anti-collision Output (Reading)	SF 0x0C 0x3B UID(8byte) EF
<ul style="list-style-type: none"> ▶ When powered on, the reader is a start mode state. (User setting) ▶ The number of read block : 0x00 ~ 0x1C (if NB='0x00', output UID only) ▶ TAG UID(Unique Identification) 8bytes ▶ Incorrect command request is no response. ▶ Address of TAG block supports up to 0x00 ~ 0x1B. ▶ 1 block is 4 bytes. (4bytes * NB) ▶ Read NUM Variable (NB*4+8+6) ▶ Write NUM Variable (NB*4+6) ▶ Lock Block 0x00 ~ 0x1B (Can not unlock! , Can not re-writing! , Reading only) ▶ RF ON/OFF is non-modulation signal (RF carrier only) → used for domestic and international certification. ▶ TTL-3.3V (5V tolerant) USART Baud Rate (6 step user setting / Initial set 115,200) 9600, 14400, 19200, 38400, 57600, 115200 bps (Data8-Stop1-ParityNone) ▶ Virtual comport USB support (VCOM driver on STMicroelectronics) 	

SF	NUM	CMD	DATA	EF
0x33	Number of bytes	Command	Variable	0x99
Abbreviation	Value	Description		
UID (Unique ID)	8bytes	The tag unique ID 8bytes		
NUM (Number of bytes)	variable	Number of bytes (include SF, EF)		
FN (First Block Number)	0x00 ~ 0x1B	First block number (1byte)		
NB (Number of Block)	0x00 ~ 0x1C	Number of block (1byte)		
BN (Block Number)	0x00 ~ 0x1B	Block number to lock (1byte)		
BD (Block Data)	4bytes = 1block	Block data to write (4bytes)		
SUCCESS / FAILURE	0x01 / 0x00			
ON / OFF	0x01 / 0x00			
NBB (Number of Byte in Block)	0x04	ISO15693 Standard		

IMC (IC manufacturer Code)	0x04	NXP
AFI (Application Family Identifier)	1byte	Initial value 0x00
BSS (Block Security Status)	0x01(Locked) / 0x00(Unlock)	Note : Can not unlock!
DSFID (Data Storage Format Identifier)	1byte	Initial value 0x00
BSN (Block Size Number)	1byte	28blocks(0x1C), 112bytes
IF (Information Flag)	1byte	Reference ISO15693

4. Datasheet Revision History

Rev. 2016/05

Power Supply : Use switching regulator

Updated Current Consumption

USART Baud Rate : Initial set 115,200 bps

Rev. 2017/09

Version 1.5 Module Description update

Change pin J1 assignment