SR_FRS_1W350

Walkie Talkie Transceiver /Data transfer Module

UHF(350M-390M)

DATA SHEET
(V101)
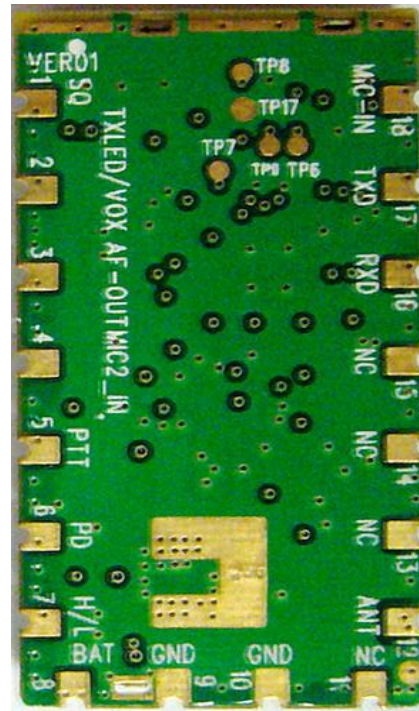
DATE: 2012-11-15

2. Product Outline

The SR_FRS_1W350 is a low cost but high performance integrated walkit talkie module. With built-in high performance micro controller, narrow band rf transceiver and standard Uart interface,it can be easily used and succeed in all the walkie talkie function with good quality voice and long distance transmission. Users only need to connect external audio amplifiers, microphone or speaker with this module ,then it can work as a small walkie talkie with 1W output . In open area, it can come to performance of 5Km communication. Simplified interface and ultra small size make this module into a wide range of applications, also can conveniently embed into various handheld devices,to improve the comprehensive performance of end products.

Besides the excellent voice intercom, The more important feature is this module has the data/SMS transfer ability; up to 100 byte can be sent at one time; it is compliance with the standard UART transfer protocol;

3. Product performance

- FM demodulation technique Based on digital signal processing technology；
- Frequency Range：UHF 350M～390MHZ；
- Frequency step：5K/6.25K/12.5K/25K；
- RF Output Power： 1W
- voice encryption (scrambling): 8 type.
- Voice Compression- Expansion ；
- SMS Receive /Transformer，The space Baut : 1200；
- CTCSS（38 group）+ CDCSS（83 group） ；
- Automatic elimination tail ；
- Volume adjustable（1-9）；
- Vox level adjustable（0-8）；
- SQ level adjustable（0-9）；

- MIC sensitivity level adjustable（1-8）

- The ultra low power dissipation in Sleep Mode（0.1uA）；

- Power supply ：DC 3.3～5.0V

- Ultra small size：18 * 35 * 3.2MM；

- Communication distance：more than 5 KM in open area .
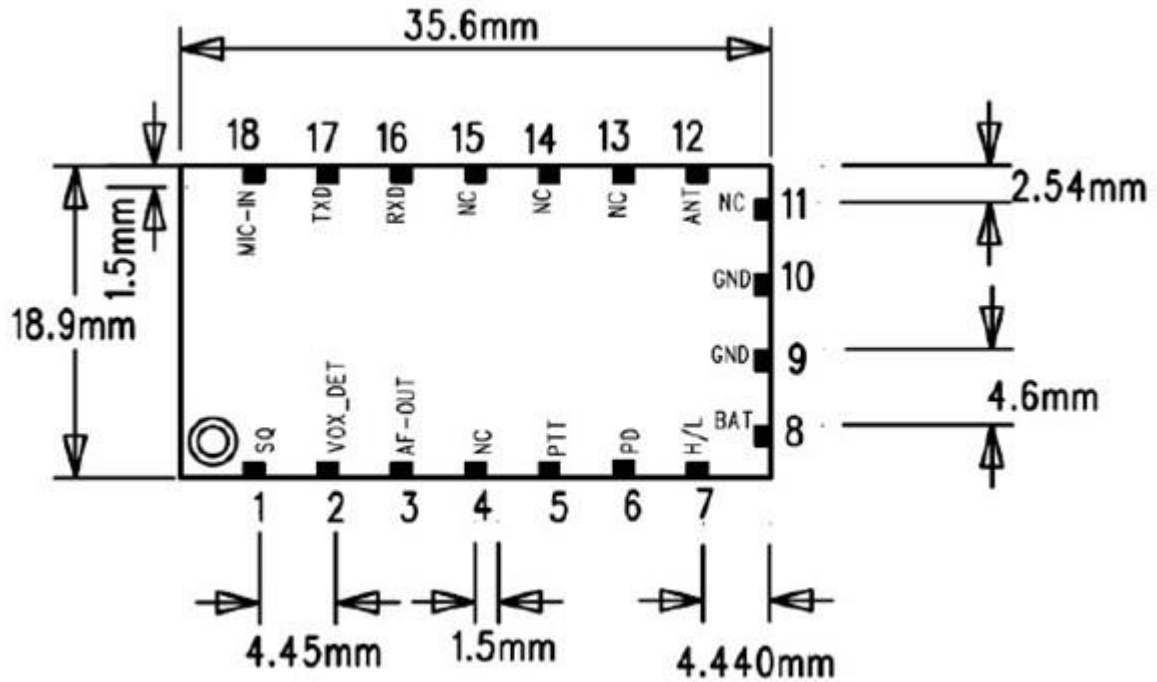
Applications：

portable intercom and paging systems；

wireless data transmission；

mobile phones and other   embedded in radio   functions   product 。

Portable walkie-talkie,

Outdoor sports equipment,
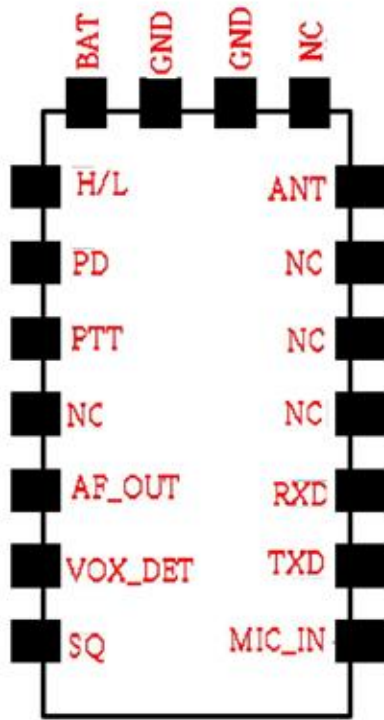
Building security,

Audio monitor system

4. Module mechanical size

bottom view

FRS TOP View
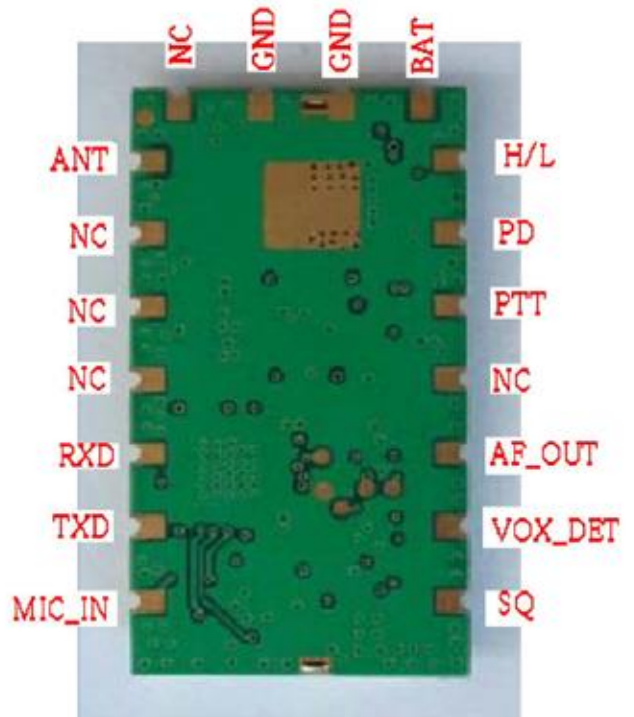
FRS Bottom View

5. Module pin assignment

J1 pin name	Pin number	Function description
SQ	1	Squelch control 0: active
VOX_DET	2	1）with VOX mode，it is the VOX state indication； 　　0： Talk finished； 　　1： Talking； 2）without VOX，it is the transmitter state indication； 　　0： receive state 　　1： transmitter state
AF_OUT	3	Audio output
MIC1(NC)	4	NC
PTT	5	PTT control 1：Receive； 0：Transmit
PD	6	Sleep control，

		0： into sleep state
		1： Running
H/L	7	NC.
BAT	8	Power supply: DC 3.3V - 5V
GND	9	GND
GND	10	GND
NC	11	NC
ANT	12	Rf Antenna input;
NC	13	NC
NC	14	NC
NC	15	NC
RXD	16	UART - Rxd
TXD	17	UART - Txd
MIC_IN	18	Microphone input;

6. Typical application Block diagram

6.1 without MCU, it works alone
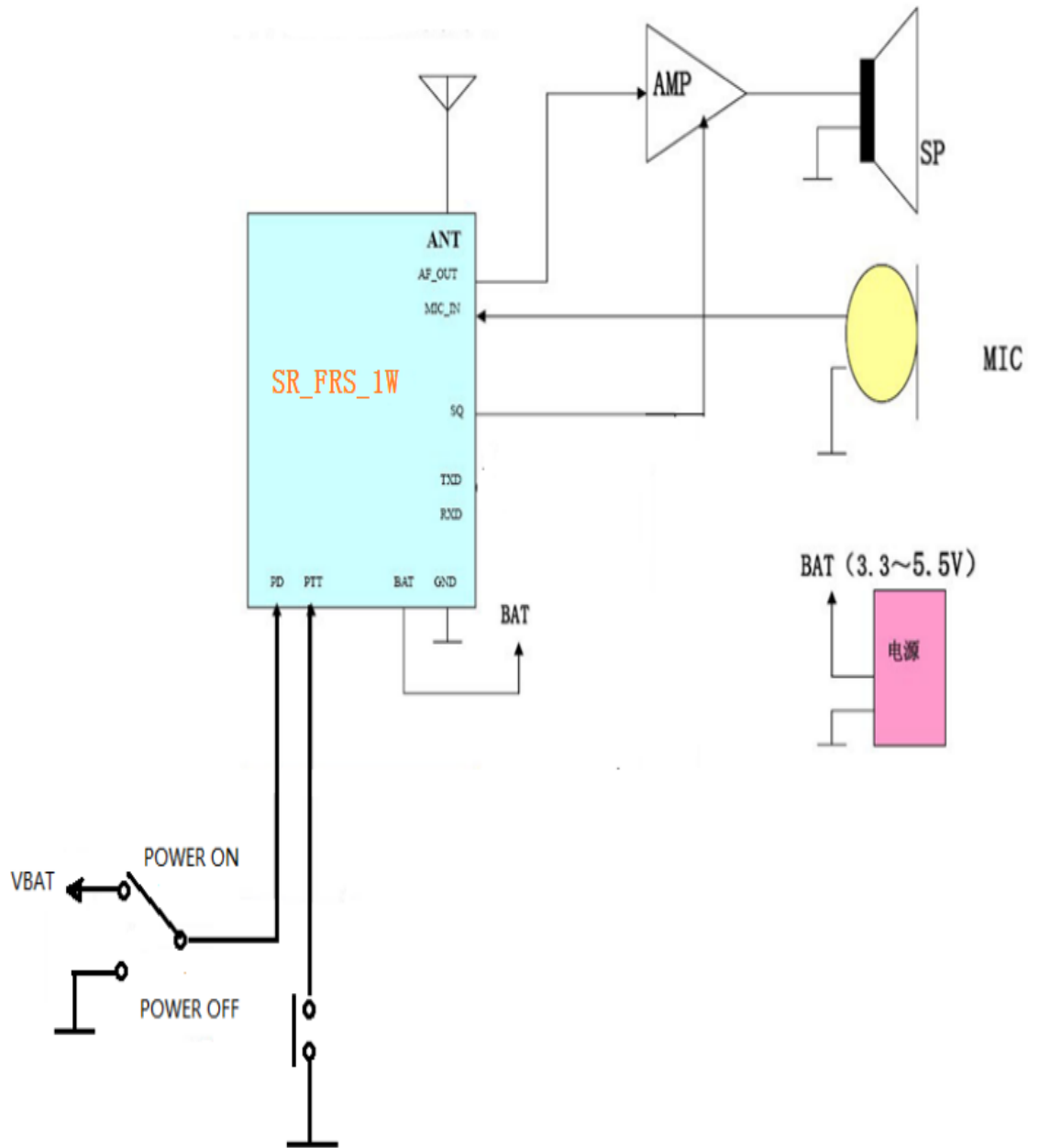
6.2 Works with MCU

AMP

SP

ANT
AF_OUT
MIC_IN

MIC

SR_FRS_1W

SQ

TXD
RXD

BAT（3.3~5.0V）

PD   PTT VOX_DET   BAT GND

电源

VBAT

MCU

LCD

KEY

6. Electrical Characteristics

6.1 DC Electrical Characteristics (Recommended)
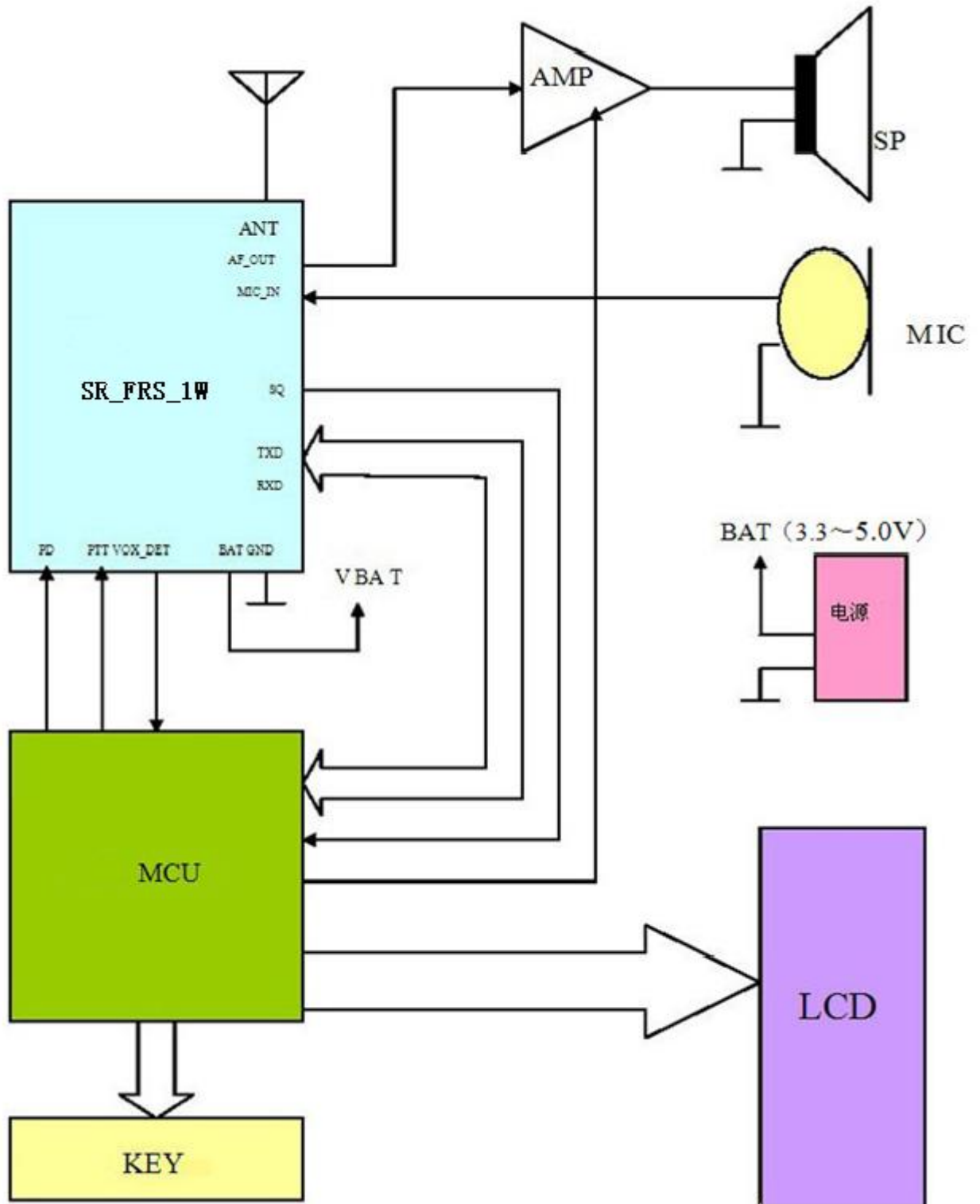
Symbol	Description	Min	Typical	Max	unit
VBAT	Power supply	3.3	3.7	4.2	V
Tamb	Ambient temperature	-20	27	60	℃
	Internal Initialize Time when power on	400	500		ms
	CMOS low level	0		0.6	V
	CMOS high level	2.4		3	V

Notes: VCC = 3V(for control port voltage)

6.2 DC Electrical Characteristics (Maximum)

Symbol	description	Min	Typical	Max	unit
VBAT	Power supply	3.3	4.2	5.0	V
Tamb	Ambient temperature	-30		85	℃
I_{IN}	I/O input current	-5		5	mA
V_{IN}	I/O input voltage)	-0.3		3.3	V

6.3 Power Characteristics
(Test conditons: VBAT = 4.0V , T_A = -25 to 85 ℃)

Work mode	description	Test condition	Typical	unit
Continuous Receive	The receiver is in normal work mode	Input 350.050MHz,RF level -47dBm，AF=1KHz,MOD=1.5KHz	40	mA
Continuous Transmit	The transmitter is in normal work mode	Input 1KHz Modulated signal HI power LO power	650 350	MA MA

Receive Squelch power Save mode	The receiver is in power save state with standby condition.		12	mA
Deep sleep (PDN Is low)	Both the receiver and transmitter are all power off.	Within 500ms finish the power on process，switch to continuous receive/transmit mode。	0.1	uA

6.4 Overall electrical performance specifications

Frequency Range（MHz）	350-390
Channel spacing（KHz）	25 / 12.5KHZ
Antenna Impedance (Ω)	50
Operating temperature（℃）	-20～+55
Frequency Stability（ppm）	±2.5

6.5 Receive Performance

(unless special comment，Test condition VBAT = 4.0 V, TA = -25 ℃)

Symbol	description	Test condition	Min	Typical	Max	unit
f_{IN}	Rf frequency range	UHF	350		390	MHz
Sensitivity	Reference sensitivity	12dB S/N for Audio output	-120	-122		dBm
	Squelch Sensitivity	Adjustable by software		-120		
	Received SNR	1.5KHZ Deviation	52	55		
	Adjacent Channel Selectivity	12.5KHz Deviation	52	55		dB
	Intermodulation Immunity	12.5KHz Channel spacing	52	55		
	Spurious response rejection	12.5KHz Channel spacing	52	55		dB
AF OUT	Audio Output (RMS)	Fo=1KHz Adjustable by software		150	150	MV
	Audio output distortion	Fo=1KHz		1	3	%
	Audio response	300HZ 500HZ 1KHZ 3000HZ		+4.5 +5.5 0 -13		

6.6 Transmit Performance

(unless special comment，Test condition VBAT = 4.0 V, TA = -25 ℃)

Symbol	Description	Test condition	Min	Typical	Max	unit
Fout	Rf frequency range		350		390	MHz
Pout	Rf Transmit power Hi Lo		800 400	1000 500	1200 600	MW
	Transmit current Hi Lo			700 350	750 450	MA
	Maximum modulation frequency deviation limit	Narrow bandwidth Broadband			2.5 5.0	KHZ KHZ
	Modulation sensitivity	8 Level adjustable by software	5	7	12	MV
	Audio modulation distortion			1	3	%
	Modulation characteristics	300HZ 500HZ 1000HZ 3000HZ	-5 3	-13 -6 0 6	 -9 9	DB DB DB DB
SNR	S/N		40	42	45	dB
	Carrier suppression			-60		dBc
	IM3 Suppression			-60		dBc
	Adjacent Channel Power	12.5KHz offset		-60		dBc
	Stray radiation			-36		dBc

7. UART communication protocol

　　SR-FRS-1W350   module has the AT instruction interface, the AT instruction can be used to communicate with or control   the module；the   AT instruction covered all the inquiry and   control   command;   For detail please refer our company 《SR-FRS-1W350 UART

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communication protocol》

8.   Comment：

1、 The default parameter for this module after power on are as bellow:

GBW=12.5KHZHZ，

TFV=350.050MHZ,

RFV=350.050MHZ，

CTCSS=00，   （ For both Transfer and receive)

SQ=2,

2、 The PTT pin cann't be pulled to Lo when in data transfer mode.

Appendix:

Demo board for SR_FRS_1W350

1. FRS_DEMO_A

1）The demo board is only for SR_FRS_1W   module demonstration;

2）It can be used for either400M-480M,350M-390M or 136M-174M module demo.

3） It work alone without MCU；

4）It built in RS232 convert circuit, it is easy for user to connect the test board with the PC for parameter setting, or Data transfer demo;

5) It has the speaker Mic jack; Just through the speaker Mic you may implement the voice intercom; (it must use the speaker Mic we provided)

6) Power polarity protection;

7) Only one default frequency could be used.

2. FRS_DEMO_B
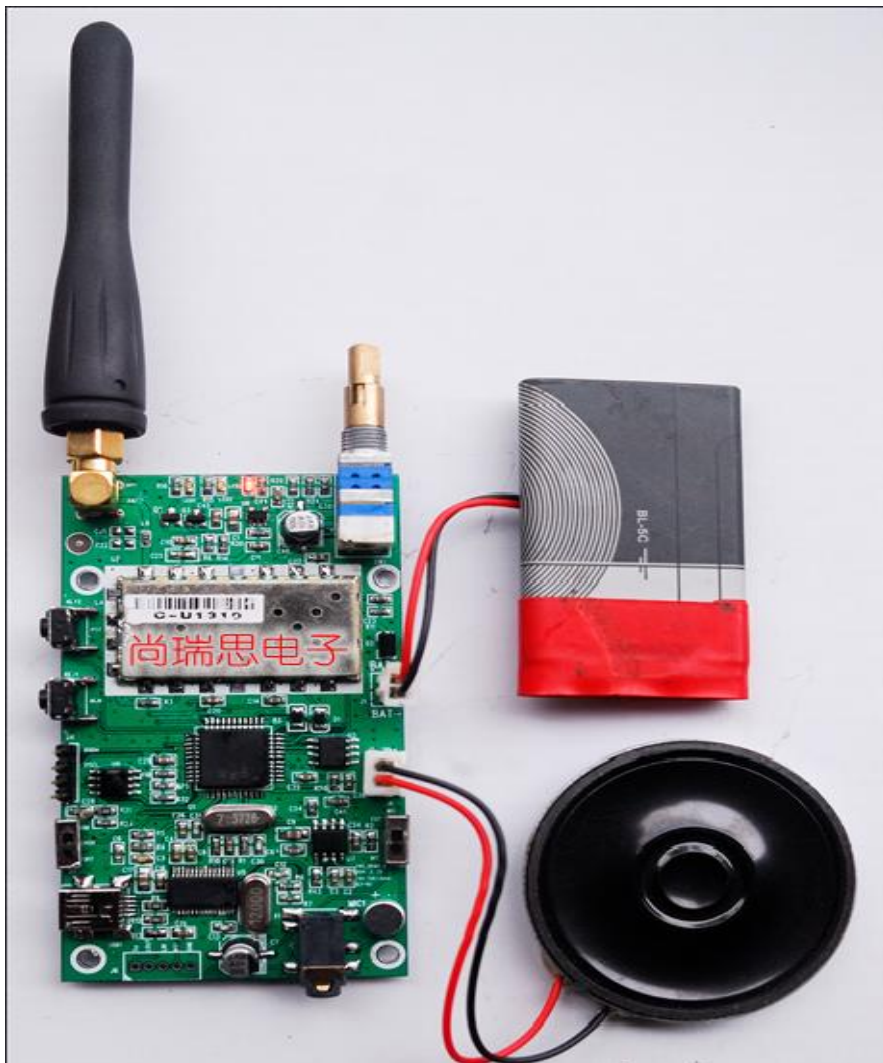
1） Can be used for   SR-FRS-1W U/V and SR_FRS_0W5 module demonstration;

2）It can support both UHF（400M-480M）,350M-390M and VHF(136M-174M)；

3）Power ON/OFF, Volume adjust, Channel adjust 3 in 1 switch；

4）16 Channels can be selected;

5）Enable or Disable VOX is easy by VOX switch control; The VOX sensitivity can be set via the PC；

6）Voice broadcast the channel number; Chinese/ English can be selected；

7）Monitor ON/OFF by [MON]key;

8）Voice intercom demo；

9）Data /SMS transfer demo；

10) Provide user interface: SQ,LINE_IN, LINE_OUT,PTT,GND;

11) Restore to be the factory setting;

12) USB interface for parameter setting by connect the demo board to the PC.

3. FRS_DEMO_D

1）   The demo board can   be used for   SR_FRS_0W5, SR_FRS_1W, SR_FRS_2W module demonstration;

2）   It support both UHF and VHF;

3）   LCD with 128X64 pix;

4）   Encode switch   with press switch make the operation is more easy;

5） All parameter can be set by the demo board itself or via the PC;

6） Both Tx frequency and Rx frequency can be set alone;

7） Both Tx CTCSS and Rx CTCSS can be set alone;

8） 100 channels;

9） Auto scan;

10） Monitor;

11） Many interface for the user;

12） Li battery charge;

For the complete demo board specification, please download from

our website: http://www.sunrisedigit.com/en/download.asp?fid=4

or   contact us to get it.