深圳市尚瑞思电子有限公司
Shen Zhen Sunrise Electronics CO.,Ltd
TEL: +86-755-23093179-802 FAX: +86-755-23093179-816
www.sunrisedigit.com/en sales@sunrisedigit.com

UART communication protocol

VER01

Rm 505, 5/F, Meilan Int'l Business Center, #32 Xixiang Rd,
Baoan District, Shenzhen City, Guangdong Province, China

1 Outline

SR-FRS-2WUS module has a standard AT command interface, it is easily to communicate with and control the module;

The AT command involved all the inquiry and control to the module, You may select the command to use as needed.

1.1 AT command type

1) Command without parameter:

AT+<command>, eg.: AT+DMOCONNECT

2) Command with parameter:

AT+<command>=<par1>,<par2>,<par3>…

3) Response command format are as below :

<CR><LF><command string><CR><LF>

<CR> Enter，0x0D

<LF> Newline，0x0A。

1.2 AT Command format

All the AT command started with "AT", And ended with<CR>。

The UART port default setting are as below:

- 8 bit data,
- 1 bit stop,
- without parity,
- CTS/RTS,
- 9600 baut

AT command response format:

<CR><LF><command string><CR><LF>

2 the communication command format

2.1 The command frame format define

The communication format are as AT instruction。

All data are as **ASCII** code, except the Length of SMS are **Hex** code.

The control command format:

AT+DMOXXX

The module response command format:

+DMOXXX

2.2 The control command list

2.2.1 AT+DMOGRP (Group setting command)

Description	Bandwidth, frequency, CTCSS, SQ setting command;	
Command	AT+DMOGRP=RFV,TFV,RXCT,TXCT,Flag,Flag1	
Example	Host Command	AT+DMOGRP=450.02500,450.02500,7006, 7006,0,0 **(enter)**
	Module Response command	**+DMOGRP:0** Success **+ DMOGRP:1** Failure
comment	**TFV**：Transmit frequency: UHF: 400.0000M-470.0000M HZ （It should be the integer multiple of 6.25K or 5K ）	
	RFV：Receive frequency： UHF: 400.0000M-470.0000M HZ （It should be the integer multiple of 6.25K or 5K ）	
	RXCT ： CTCSS/CDCSS ， for receive coding **TXCT** ： CTCSS/CDCSS ， for transmit coding 2bytes,(HEX code); RXCT lower 4 bit is for decimal part , if no setting then filled with “FF FF” Eg: CTCSS: 67.7 HZ D0D1 = 0X77 0X06 CDCSS: D023N D0D1 = 2380 D023N D0D1 = 4482 D023N D0D1 = 23C0 D023N D0D1 = 51C2	

	FLAG ： (ASCII format) Bit0 : busy locking / 0:OFF 1:ON Bit1: band setting / 0: Wide 1:Narrow FLAG 1：(ASCII format) Bit0 : HI/LO transmit power/ 0: 2W 1: 0.5W Bit1: Middle transmit power / 0: 2W/0.5W 1: 1w

1)Command example:

41 54 2B 44 4D 4F 47 52 50 3D 34 35 30 2E 30 32 35 30 30 2C 34 35 30 2E 30 32 35 30 30 2C FF FF 2C FF FF 2C 30 2C 30 0D 0A

2) Comment for CTCSS /CDCSS setting:

A) for analog CTCSS setting

Eg1： 67.0 treated as 4 digit integer 0670; while D0 D1 should be 0x70 0x06 , so the RXCT/TXCT should be setting to be 7006

Eg2 250.3 treated as 4 digit integer 2503; while D0 D1 should be 0x03 0x25 , so the RXCT/TXCT should be setting to be 0325

B) for digital CDCSS setting

For Positive CDCSS code: MSB of D1 is 8;

eg: D023N D0 D1=23 80

D244N D0 D1=44 82

For Negative CDCSS code: MSB of D1 is C;

Eg: D023I D0 D1=23 C0

D251I D0 D1=51 C2

3) FLAG /FLAG1 Setting

BIT1 BIT0 is BCD type;

If BIT1 is set to 1, then its BCD1 is 2, otherwise it should be 0;

If BIT0 is set to 1, then its BCD0 is 1, otherwise it should be 0;

So the final value of FLAG/FLAG1 equal the sum of BCD1 and BCD0;

Eg:

1) FLAG:

Bit1 = 1; bit0 = 0

The BCD of FLAG is 2 + 0 = 2; FLAG = 2;

2) FLAG:

Bit1 = 1; bit0 = 1

The BCD of FLAG is 2 + 1 = 3; FLAG = 3;

2) FLAG:

Bit1 = 0; bit0 = 1

The BCD of FLAG is 0 + 1 = 1; FLAG = 1;

2.2.3 AT+DMOSAV (Auto power save command)

Description	Module auto power save setting	
Command	AT+DMOSAV=X	
Example	Host command	AT+DMOSAV=0**(Enter)**
	Module Response command	+DMOSAV:**0** Success +DMOSAV:**1** Failure
comment	X: 0 Enable power save （default） 1 Disable power save	

Comment：

1. When for message sending/Data transfer application，Please disable power save for fast transmit and receive。
2. When for VOX application, Please disable power save.

2.2.4 AT+DMOVER (Inquiry module version command)

Description	Inquiry the module software version	
command	AT+DMOVERQ	
Example	Host command	AT+DMOVER(Enter)
	Module Response command	+DMOVER： V0.1
comment	The response of module is the module software version.	

2.2.5 AT+DMOVOL (Volume setting command)

Description	Volume setting	
Command	AT+DMOVOL=X	
Example	Host command	AT+DMOVOL=1**(enter)**
	Module response command	+DMOVOL：0 Success +DMOVOL：1 Failure
Comment	X： 1-8 （default: 8）	

2.2.6 AT+DMOVOX (Acoustic control command)

Description	Acoustic control setting	
Command	AT+DMOVOX=X	
Example	Host command	AT+DMOVOX=0**(enter)**
	Module response command	+DMOVOX: 0 Success +DMOVOX: 1 Failure
Comment	X：Acoustic control level (0-8) （0: Means VOX OFF, default value）; LEVEL1=12MV LEVLE5=7MV LEVEL8=5MV	

Tips:

1) The number more big, the sensitivity more high;
2) When VOX ON, the Auto power off should be disabled,
that is : AT+DMOAUTOPOWCONTR=1;

2.2.7 AT+DMOFUN (extension function setting)

Description	Microphone sensitivity & Voice scram setting command	
Command	AT+DMOFUN=SQL，MICLVL, TOT，SCRAMLVL ,COMP	
Example	Host command	AT+DMOFUN=3,1,0,0,0**(enter)**
	Module response command	+DMOFUN：0 Success +DMOFUN：1 Failure

Comment	MICLVL：Mic sensitivity level (1-8), default value is 6 ; The lever is more big ,and the sensitivity is more high;
	SQ：Squelch level：(**0-9**, 0：Monitor mode） MICLVL：Mic sensitivity level: (**0-7**) TOT：Transmit timer limit（**0~15** minute , 0: means OFF） SCRAMLVL：voice scram (**0-7**, 0: means OFF) COMP: Compress and extend setting: 0: OFF. 1: ON

2.2.8 AT+DMOMES (Short message sending / Data transfer command)

Description	Host send message or data to module for transmit	
Command	AT+DMOMES=[Message Lenth]XXX	
Example	Host command	AT+DMOMES=7ABCDEFG**(enter)** (41 54 2B 44 4D 4F 4D 45 53 3D 07 41 42 43 44 45 46 47 0D 0A)
	Module response command	+ DMOMES:0 Success + DMOMES:1 Failure
Comment	[Message Lenth]: the message length (Max **60** Bytes)， it is HEX code, only one Byte.	
	XXX：is the message contents.	

Tips：

1. For fast transmit and receive SMS， Please disable Auto power off;

   That is : (AT+DMOSAV =1);

2. [Message Lenth] is HEX code.

   If send the command from PC, Please be noted that , once type the command by "**TEXT**", the [Message Lenth] would be treated as one or two bytes, it caused the wrong message be sent. So, it is necessary to modify the message length into one byte by hand under the "HEX" mode before send the message.

   For example: AT+DMOMES=7ABCDEFG

   The length number 7 would be treated as 37;

   AT+DMOMES=12ABCDEFABCDEF

   The length number 12 would be treated as 31 32

2.2.9 +DMOMES (The module received the message and automatically send to HOST)

Description	The module received the message and automatically send to HOST	
Command	+DMOMES=[Message Lenth]XXX	
Example	Module send the message to Host	+DMOMES =7ABCDEFG (2B 44 4D 4F 4D 45 53 3D 07 41 42 43 44 45 46 47 0D 0A)
	Host response to Module	AT+DMOMES：**0** Success AT+DMOMES：**1** Failure
Comment	[Message Lenth]：is the message length(Max 100 bytes)，**HEX** code。	
	XXX：is the message contents.	

Tips:

1. If the message length is Odd number, a “space” should be added behind the last character of message;
2. Host response to Module command is not must.