SDL400 USER MANUAL

1. Specification of SDL400

General		
Operating Voltage	7.4V	
Communication Mode	Half-Duplex	
Channel Spacing	12.5KHz/25kHz	
Frequency Range	410～470MHz	
Type Of Emission	GMSK	
Communication protocol	SOUTH，Trimtalk450s	
Air baudrate	9600bps or 19200bps	
Frequency Stability	≤±1.0ppm	
Rated Emission power	High	3W@7.4V
	Medium	2W@7.4V
	Low	1W@7.4V
Power Consumption(Typical)	High	7.5W@7.4V
	Medium	6W@7.4V
	Low	5W@7.4V
Receiving power consumption (Typical)	0.75W@7.4V	
Size H×W ×D(mm)	70x47x11mm	
Operation Temperature	-20℃～+55℃	
Store Temperature	-40℃～+85℃	
Antenna Connector	MCX	
Antenna Impedance	50ohm	
Data Interface	30Pin　145046030630829+	

Transmitter		
Transmitted power	High	34.8±1dBm@7.4V
	Medium	33±1dBm @7.4V
	Low	30±1dBm @7.4V
Power Stability	±1dB	
Frequency Stability	±1ppm	
Spurious Emission	≤3.2uW(-56dBm)@30～1000MHz	
Adjacent Channel power	≤-58dBc@12.5kHz channel	

Receiver	
Sensitivity	≥-115dBm@BER 10^{-3},9600bps
Same Channel Rejection	> -12dB
Adjacent Channel Selectivity	≥52dB@25kHz，≥51dB@12.5kHz
Spurious Rejection	> 56dB

2. Brief introduction of SDL400

SDL400 is a small size and low power radio module for wireless data communication. Its working frequency range is from 410 MHz to 470 MHz and it is totally compatible with SOUTH communication protocol. There are three kinds of transmitting power, high power, medium power and low power and the maximum power is 3W. Since all the spare parts are standard ones, it makes the SDL400's production and test much simpler and quicker.

3. SDL400 testing fixture

In order to produce and test SDL400, we designed a special testing fixture board, SDL400_DKIT_1.0. Showed as the picture below, on the board, there are power interface, power switch, indication lights, modes switch, RS232 electrical level, DB9 serial port, RF connector and so on.
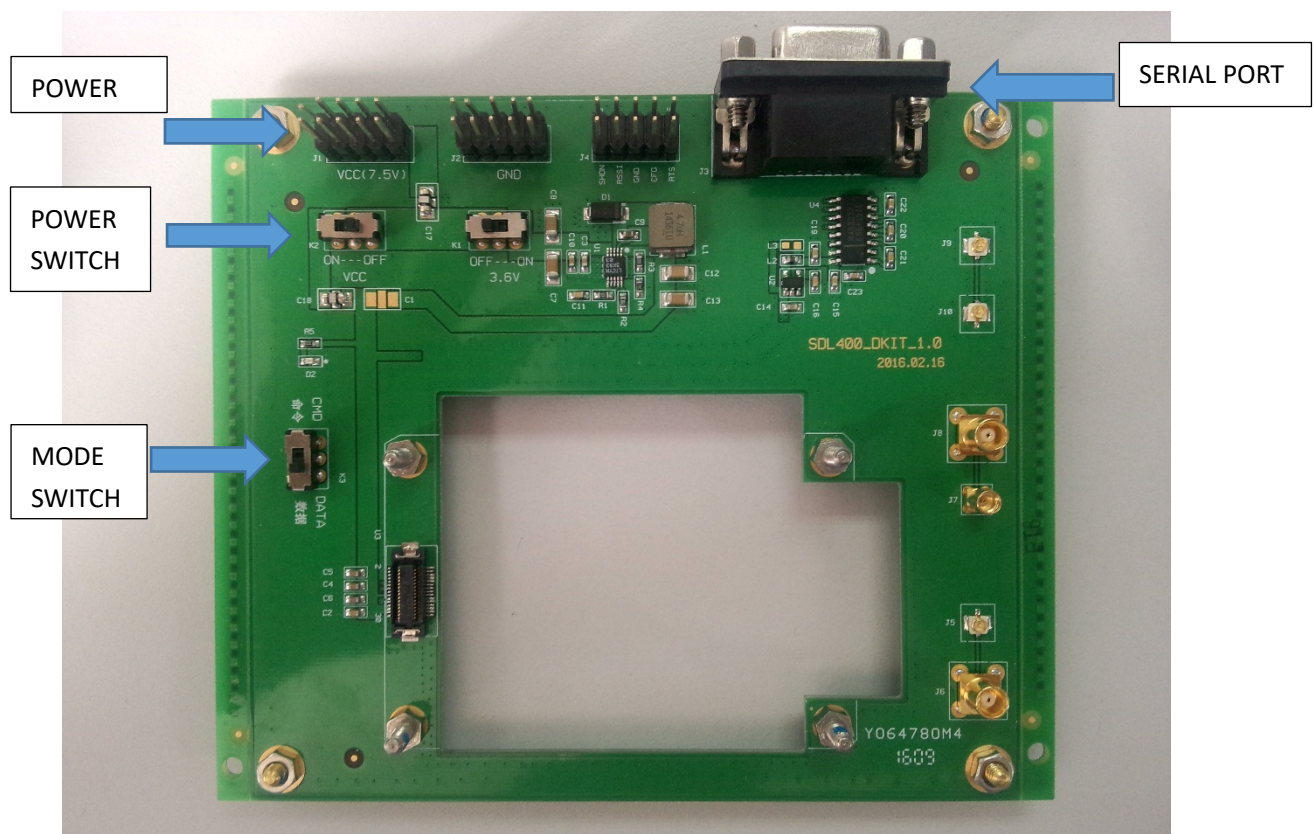
The power supply should be 7.5V, switch K2 is used to control the power, switch K3 is used to change the SDL400 working modes between COMMAND and DATA. When SDL400 is at COMMAND mode, we can set parameters; when SDL400 is at DATA mode, then we can test the transmitting power. Normally, we'll only use the DATA mode while testing the transmitting performance; the other operations are done under the COMMAND mode. All the serial port communications with SDL400 are achieved with the help of the DB9 port on the fixture. The serial port baud rate can be configured according to the real time requirement and the default baud rate is 19200bps.

Note: make sure the whole system has no power while install and uninstall the SDL400 from the fixture board.

4. DATA communication

After connecting the power, serial port and radio antenna on the testing fixture board, we can do the data communication test. Switch SDL400 into COMMAND mode at first, set parameters, make sure the transmitting part and receiving part have the same frequencies, protocol and bandwidth. Then switch SDL400 into DATA mode, input data through the serial port, and then the SDL400 in charge of transmitting will transmit those data, at the same time, the SDL400 in charge of receiving will receive the data and output the data through serial port.

5. How to set SDL400 parameters

To perfect SDL400 production test, we have added write radio SN function into the software Smartcube. To write radio SN, we need to connect the operation PC into company's server through internet. Below are the steps of how to write the SN.
Run Smartcube, open the serial port setting interface:

Select the right port and set the baud rate (default setting is 19200bps); and then click open serial port to enable the communication between serial port and fixture board.

Install SDL400 on the fixture board, power on and switch it into COMMAND mode, then we can set the parameter by Smartcube, please refer to the picture below.

After setting, the successful setting message will show up on the right area of the software. If there's no such message, it means the settings are not done. We can also click the Default setting to finish all the parameter settings at once.

6. HOW to upgrade firmware for SDL400

The SDL400 upgrading tool is TestSerial. The upgrading operation is very easy. Each time only one SDL400 can be upgraded. After upgrading, we need to exit and run the tool to do the next upgrading. It takes about 10 seconds for each upgrading. The tool interface is showed in the picture below:

Upgrading process:

1. Install SDL400 on the fixture board, connect the serial port to PC, run the upgrading tool TestSerial, click scan to select the right firmware, and set the right serial port and baud rate as 115200bps.

2. Click Open button, and power on the fixture board, the system will go to upgrading mode. During upgrading, the upgrading process will be showed at the bottom of the software.

3. After upgrading, exit the software. Please note: each time after upgrading, the tool needs to be exited so that we can do the next upgrading.

FCC Statement

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna.

• Increase the separation between the equipment and receiver.

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

• Consult the dealer or an experienced radio/TV technician for help.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. To satisfy FCC RF exposure requirements for mobile transmitting devices, a separation distance is based on the above them ranging from 33.3 cm to 105.3 cm between the antenna of this device and persons during device operation. To ensure compliance, operations at closer than this distance is not recommended. The antenna used for this transmitter must not be co-located in conjunction with any other antenna or transmitter.

Tx output power [dBm] / [W]	Antenna system gain [dBi / numeric]	Tx duty cycle [%], 6 min. average	Frequency [MHz]	Minimum safe distance [cm]
35.8/3.80	10 / 10	100%	410 / 470	105.23/98.29
		50%		74.41/6.50
	0/1.0	100%		33.28/31.08
		50%		23.53/21.98
34.8/3.02	10 / 10	100%	410 / 470	93.79/87.60
		50%		66.32/61.94
	0/1.0	100%		29.66/27.70
		50%		20.97/19.59
33.8/2.40	10 / 10	100%	410 / 470	83.59/78.07
		50%		59.11/55.21
	0/1.0	100%		26.43/24.69
		50%		18.69/17.46

34.0/2.51	10 / 10	100%	410 / 470	85.54/78.89
		50%		60.48/56.49
	0/1.0	100%		27.05/25.26
		50%		19.13/17.86
33.0/2.00	10 / 10	100%	410 / 470	76.24/71.20
		50%		53.91/50.35
	0/1.0	100%		24.11/22.52
		50%		17.05/15.92
32.0/1.58	10 / 10	100%	410 / 470	67.95/63.46
		50%		48.04/44.87
	0/1.0	100%		21.49/20.07
		50%		15.19/14.19
31.0/1.26	10 / 10	100%	410 / 470	60.56/56.56
		50%		42.82/39.99
	0/1.0	100%		19.15/17.89
		50%		13.54/12.65
30.0/1.00	10 / 10	100%	410 / 470	53.97/50.41
		50%		38.16/35.64
	0/1.0	100%		17.07/15.94
		50%		12.07/11.27
29.0/0.79	10 / 10	100%	410 / 470	48.10/44.93
		50%		34.01/31.77
	0/1.0	100%		15.21/14.21
		50%		10.76/10.05

Important Note:

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and is fully operational. In the event that these conditions cannot be met, then the FCC authorization is no longer considered valid and the FCC ID cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization. This module is certified for Fixed and Mobile Applications only, for portable applications you will require a new certification.

End Product Labeling

The final end product must be labeled in a visible area with the following" Contains FCC ID: 2ADP C-SDL400 ".

Manual Information to the End User

The OEM integrator has to be aware not to provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module.

The end user manual shall include all required regulatory information/warning as show in this manual.