

# Testing RS232/RS485 Data Radio Modem with Serial Port Tool V1.10

This document demonstrates how to test the communication of RS232/RS485 interface data radio modem DRF4432D20I-043L1/2, DRF1278DL1/2 and DRF1276DL1/2 with tool Advanced Serial Port Monitor from AGG Software and USB converter board.

USB Type	Description	Compatible Modules
DAC13	USB-to-RS232	DRF4432D20I-L1, DRF1278DL1, DRF1276DL1, DRF1278DX2
DAC23	USB-to-RS485	DRF4432D20I-L2, DRF1278DL2, DRF1276DL2, DRF1278DX3

Table 1: Compatible USB Boards for Data Radio Modem

## 1. USB BOARD DEFINITIONS



Figure 1: USB-to-RS232 converter board DAC13



Figure 2: USB-to-RS485 converter board DAC13

Pin	Name	Description
1	VCC	5V
2	GND	Ground (0V)
3	TXD	It connects the TXD pin of the host (module)
4	RXD	It connects the RXD pin of the host (module)
5	SET	Jumper open: High, Jumper shorted: GND
6	CS	

#### Table 2: USB Board DAC02

If it is the first time for the users to use the USB board, the corresponding USB driver should be installed in advance, which can be downloaded from the link below:

http://www.dorji.com/pro/tool/DACx3\_USB\_Driver.rar



## 2. DRF4432D20I-043L1/L2 MODULES

All of the data radio modems in the table can be configured with new parameters through the DRF Tool provided by DORJI. The table 3 below shows the data radio modems with corresponding DRF Tool.

DRF Tool Name	Supported Modules
DRF4432D20I-043L1/2	DRF4432D20I-043L1, DRF4432D20I-043L2
DRF127xDL/X series	DRF1278DL1/2, DRF1276DL1/2, DRF1278DX2/3
	•

 Table 3: DRF Tool vs Data Radio Modems

For **DRF4432D20-043L1 and DRF4432D20I-043L2**, the operation methods are the same as soon as they are connected to DAC13 and DAC23 correspondingly. In configuration mode, the SET should be connected to GND so the jumper on the USB board should be kept to connect the SET pin to GND on the board.

Pin	DAC13	DAC23	DRF4432D20I-043L1	DRF4432D20I-043L2
1	VCC	VCC	VCC	VCC
2	GND	GND	GND	GND
3	TXD	TXD	TXD	TXD
4	RXD	RXD	RXD	RXD
5	SET	SET	SET	SET
6	CS	CS	CS	CS

Table 4: Connecting USB board to DRF4432D20I-043L1/2 module

When the module is connected to the USB board correctly, users can insert the USB kit into computer and then run the configuration tool. When the tool is opened, the Model and Version area is gray (Figure . Users can check which COM ports the tool occupies by right-click my computer, choose properties and click device manager. When the right COM port is chosen from the window of the tool, users can click the OPEN button to activate the tool.



Tool for Si44	3x Modules with I	D			×
	W	WW.DOR	JI.CO	M	
Model		Version			COM1 -
N-+ D-					OPEN 🥥
NET ID	00000000	NODE ID	0000		
men nø			D 1	R	SET
Baud Rate	9600 👻	Parity	None	-	READ
Baud Rate	9600 💌	Parity	None		READ
Data Dit	•	erek	1		
RF Parame	ters				DEFAULT
Band	433 💌		9600	-	
Channel	20 💌	Power	7	-	1151.5
Frequency	433.92 MHz				HELP
vice Not Four	nd !				

Figure 3: The Interface of inactivated DRF4432D20I Tool



Figure 4: The Interface of activated DRF4432D20I Tool



The DEFAULT button is used to restore the module to the factor parameters. The READ button can be used to read out the present parameters inside the module and the SET button is used to set the modules with new parameters. The picture below shows the interface after the DEFAULT button is pressed.

Tool for Si44	3x Modules with ID			
	WW	/W.DOR	JI.COM	
Model	DRF4432D20I-	Version	4.66	COM4
Net Param	eters			
NET ID	DRF4432D20I-L	HODE IS	10000 L	× SET
Serial Para	me Defaul	t paramete	rs successfully	y!
Baud Rate Data bit	9	ОК		READ
- RF Parame	ters			DEFAULT
	400	Data Rate	9600 👻	
Band	433 -			
Band Channel	433 <b>•</b> 20 <b>•</b>	Power	7 •	

Figure 5: Command Button in the Tool



3. DRF1278DL1/2, DRF1276DL1/2/ & DRF1278DX2/3 MODULES

This section shows how to use the configuration tool to configure the modules and test the communication of modules through serial port tool.

Pin	DAC13	DAC23	DRF1278DL1	DRF1278DL2	DRF1276DL1	DRF1276DL2	DRF1278DX2	DRF1278DX3
1	VCC	VCC	VCC	VCC	VCC	VCC	VCC	VCC
2	GND	GND	GND	GND	GND	GND	GND	GND
3	TXD	TXD	TXD	TXD	TXD	TXD	TXD	TXD
4	RXD	RXD	RXD	RXD	RXD	RXD	RXD	RXD
5	SET	SET						
6	CS	CS						

Table 5: Connecting USB board to DRF1278DL1/2 & DRF1276DL1/2 & DRF1278DX2/3 module

DRF1278DL1/2 & DRF1276DL1/2 & DRF1278DX2/3 modules use the same firmware so they are compatible in communication and the usages of them are the same so we will use DRF1278DL2 as example in this section. For configuring and testing purpose we will use 2pcs USB-to-RS485 boards DAC23, 2pcs DRF1278DL2 and 2pcs antenna & wire cables.

Assuming the USB driver being installed, we insert the USB kit into computer and keep the right connection between USB board and DRF1278DL2 modules. Since AUX pin of DRF1278DL2 is used to provide the indication of data in/out, it is not needed to be connected in configuring and simple testing in this section. We then run the <u>configuration tool</u> and choose the right COM port

MORJI RF TOOL-	LORA Modem ×
Usart Open COM4 BaudRate 9600 Parity NO	
	Node ID Breath Net ID Power 2s V D 7 V Serial Port Configuration BaudRate 9600 V Parity NO V
DORJ Applied Technology	Write All Read All
Closed	15:30

Figure 6: Configuration Tool for DRF127xDL Modules



Now we can click the OPEN button and then click the Read All button at the right bottom of the tool. The default parameters will be showed in the interface and the status indication area at the bottom of the tool will show "Successful". We can replace this module with another and repeat the process to check if the two modules have the same parameters. If you want to change the parameters, you can revise the values and click Write All button to make the change come into effect.

😹 DORJI RF TOOL	LORA Modem	×
Usart Close COM4 BaudRate 9600 Parity NO	FF_frequency       434.00 MHz       F       F	RF_Factor 2048 V Chips
	Standarc  Mode  Node ID Breath 2s	Net ID 7 7 125K Power 7 7
DORJ Applied Technolog	BaudRate 9600	Parity ND
Opened	Successful	15:34

Figure 7: Read the Default Parameters

Now we can close the start to test the communication between two modules. Being sure you connect two modules with USB kits to the computer and close the configuration tool to release the COM port. We run the Advanced serial port monitor (or other serial port tool) twice to open two interfaces.

Since the default serial port data format of DRF1278DL2 is (9600bps, 8-bit data, no parity check), we also choose the same setting for the serial port tool in order to make successful connection, open correct COM port for corresponding module and click OPEN button to activate the tool.



COM port COM	18 🗸 Baud rate 960	0 🗸 Data bits 8 🗸 🛁	🖹 🎺 🗎
Parity type Non	e 🗸 Stop bits 1	🗸 Auto delay 🗌 🛛 500 🖨	
		✓ Send	🙆 Cl <u>o</u> se
	100		
and the second			
Write to file •	Clear		
Write to file •   OM is opened	🥒 Clear 🛛 💻 💷 - 1ode> Manual Sour	uuluuuluu ce> String	
Write to file •	Iclear ■■ □- 1ode> Manual Sour	uuluuluu ce> String	
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Write to file + OM is opened 1 M Advanced S File View Edi	Clear Clear Clear Court	ce» String .1 build 1021 — E rce Mode Plugins Help	×
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Write to file + OM is opened Advanced S File View Edi COM port CON	Clear Clear Sour Clear Sour Control Sour Control Sour Coptions Data sou Coptions Da	ce> String 7.1 build 1021 — E rce Mode Plugins Help 10 V Data bits 8 V	) ×
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Write to file + OM is opened Advanced S File View Edi COM port CON Parity type Nor	Image: Clear       Image: Clear       Image: Clear         Mode> Manual       Sour         erial Port Monitor 3.7         to Options       Data sour         14       Baud rate       960         e       Stop bits       1	ce>String 7.1 build 1021 — E rce Mode Plugins Help 0 ♥ Data bits 8 ♥ ♥ Auto delay ☐ 500 ♥ ♥ Send	] X
Write to file + OM is opened Advanced S File View Edi COM port CON Parity type Nor	✓ Clear ← ↓ ✓ Ande> Manual Source erial Port Monitor 3.7 t Options Data sou 14 ✓ Baud rate 960 e ✓ Stop bits 1	ce> String 7.1 build 1021 — E rce Mode Plugins Help 0 ♥ Data bits 8 ♥ ♥ Auto delay ☐ 500 ♥ Send	] ×
Write to file • OM is opened 1 OM advanced S File View Edi COM port CON Parity type Nor	✓ Clear ← ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	ce» String 7.1 build 1021 — E rce Mode Plugins Help 0 V Data bits 8 V M Auto delay 500 V Send	] X
Write to file + OM is opened 1 M Advanced S File View Edi COM port CON Parity type Nor	<ul> <li>✓ Clear</li> <li>✓ Ande&gt; Manual</li> <li>Sour</li> <li>Port Monitor 3.7</li> <li>Options</li> <li>Data sou</li> <li>✓ Baud rate 960</li> <li>✓ Stop bits 1</li> </ul>	ce> String 7.1 build 1021 — E rce Mode Plugins Help 0 ☑ Data bits 8 ☑ ☑ Auto delay ☐ 500 ♀ ☑ Send	] X
Write to file • OM is opened 1 OM advanced S File View Edi COM port CON Parity type Nor	<ul> <li>✓ Clear</li> <li>✓ Ande&gt; Manual</li> <li>Source</li> <li>Source</li> <li>Ande&gt; Manual</li> <li>Source</li> <li>Source</li> <li>Options</li> <li>Data source</li> <li>Data source</li> <li>Manual</li> <li>Stop bits 1</li> </ul>	ce> String 7.1 build 1021 — E rce Mode Plugins Help 0 ♥ Data bits 8 ♥ ♥ <u>Auto delay</u> 500 ♥	] X
Write to file • OM is opened 1 OM advanced S File View Edi COM port CON Parity type Nor	✓ Clear ← ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	ce» String 7.1 build 1021 — E rce Mode Plugins Help 0 V Data bits 8 V M Auto delay 500 V Send	] X
Write to file • OM is opened 1 M Advanced S File View Edi COM port CON Parity type Nor	✓ Clear ←  ✓ Clear Source ✓ Ande> Manual Source erial Port Monitor 3.7 Coptions Data source 14 ✓ Baud rate 960 e ✓ Stop bits 1	ce» String C.1 build 1021 — E rce Mode Plugins Help 0 ♥ Data bits 8 ♥ ♥ Auto delay ☐ 500 ♥ ♥ Send	] X
Write to file + OM is opened 1 M Advanced S File View Edi COM port CON Parity type Nor	✓ Clear ← ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	ce> String 7.1 build 1021 — E rce Mode Plugins Help 0 ♥ Data bits 8 ♥ ♥ Auto delay ☐ 500 ♥ ♥ Send	] X
Write to file + OM is opened I Advanced S File View Edi COM port CON Parity type Nor	✓ Clear ← ↓ Aode> Manual Sour erial Port Monitor 3.7 t Options Data sou 14 ♥ Baud rate 960 e ♥ Stop bits 1	ce> String 7.1 build 1021 — E rce Mode Plugins Help 0 ♥ Data bits 8 ♥ ♥ Auto delay ☐ 500 ♥ Send	] X

### Figure 8: Setting the Serial Port Tool

Please note that default COM ports in the tool interfaces are the same when you open the tool twice so you need to choose a different COM port for another module from the drop-down menu beside the COM port in the tool.



If we input "Welcome to use DRF1278DL modules" and click Send button in one tool, another tool will receive it and shows the same content in the display area. Since the module works in half-duplex way, we can make response by sending "Thank you!".

🖪 Advanced Serial Port Monitor 3.7.1 build 1021 — 🗆 🗙
File View Edit Options Data source Mode Plugins Help
COM port COM8 🗸 Baud rate 9600 🗸 Data bits 8 🗸 🛤 📑 🥔
Parity type None 🗸 Stop bits 1 🗸 Auto delay 🗌 500 荣
Welcome to use DRF1278DL modules Send Send
Velcome to use DRF1278DL modules [len=32] Thank you! [len=10]
Write to file  Clear  C
UM is opened Mode> Manual Source> String >> Bytes received :12
🖪 Advanced Serial Port Monitor 3.7.1 build 1021 — 🗆 🗙
File View Edit Options Data source Mode Plugins Help
COM port COM4 🗸 Baud rate 9600 🔽 Data bits 8 🔽 📑 🚅 👔
Parity type None 🗸 Stop bits 1 🗸 Auto delay 🗌 500 🚔
Thank you! Send 🥹 Clos
Jelcome to use DRF1278DL modules [len=32]
mank you: [Ien-Io]
Bernard B
Write to file - Clear ==

Figure 9: Testing Communication with Serial Port Tool



Since the DRF127xDL series are transparent data radio modules, they receive data from serial port and transmit the data out directly or receive the wireless data from another module and transfer the data to the serial port automatically. The usage of them are very simple and users only need to care about the wireless parameters (RF\_factor & RF\_BW) to the suitable RF data rate and sensitivity for the application.

SF	BW/kHz	equivalent BR /kbps	Sensitivity	SF	BW/kHz	equivalent BR /kbps	Sensitivity	SF	BW/kHz	equivalent BR /kbps	Sensitivity
7	500	21.88	-117	7	250	10.94	-120	7	125	5.47	-123
8	500	12.5	-120	8	250	6.25	-123	8	125	3.125	-126
9	500	7.032	-123	9	250	3.516	-126	9	125	1.758	-129
10	500	3.908	<mark>-126</mark>	10	250	1.954	-129	10	125	0.977	-132
11	500	2.148	-129	11	250	1.074	-132	11	125	0.537	-135
12	500	1.172	-132	12	250	0.586	-135	12	125	0.293	-138

Table 6: SF(RF\_factor) & BW(RF\_BW) vs RF data rate & Sensitivity

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Add.: Rm 212, Bldg A, Lanhaizhongchuan,	orders.
Tongxi Road 26, Bantian Jiedao, Bantian,	
Longgang district, Shenzhen, China	These products are not designed for use in life support
Tel: 0086-755-28156122	appliances, devices or other products where
Email: dorji@dorji.com	malfunction of these products might result in personal
Web: http://www.dorji.com	injury. Customers using these products in such
	applications do so at their own risk and agree to fully
	indemnify Dorji Industrial Group for any damages
	resulting from improper use.