

# RF Exposure REPORT

**Applicant:** SHENZHEN WLINK TECHNOLOGY CO., LIMITED

**Address of Applicant:** 319, YiBen Electronic Business Building, NO.1063 ChaGuang Road, XiLi, NanShan District, ShenZhen, China

**Manufacturer/Factory:** SHENZHEN WLINK TECHNOLOGY CO., LIMITED

**Address of Manufacturer/ Factory:** 319, YiBeng Building, ChaGuang Road, XiLi town, NanShan District, Shenzhen, GuangDong, China

**Equipment Under Test (EUT)**

Product Name: Industrial 3G/4G Cellular RTU

Model No.: WL-D82

**Applicable standards:** EN 62311: 2008

**Date of sample receipt:** March 05, 2019

**Date of Test:** March 06-25, 2019

**Date of report issue:** April 01, 2019

**Test Result :** PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

The CE mark as shown below can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The protection requirements with respect to electromagnetic compatibility contained in Directive 2014/53/EU are considered.



**Robinson Lo**

**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

Report No.	Version No.	Date	Description
GTS201903000029E03	00	March 25, 2019	Original
GTS201903000031E03	01	April 01, 2019	Change model number, applicant, manufacturer and factory

Prepared By:

*Bill. Yuan*

Date:

April 01, 2019

Project Engineer

Check By:

*Robinson*

Date:

April 01, 2019

Reviewer

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## 4 General Information

### 4.1 General Description of EUT

Product Name:	Industrial 3G/4G Cellular RTU
Model No.:	WL-D82
Power Supply:	Adapter: Model: SAW12D-120-1000G Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 12V, 1000mA
<b>GSM</b>	
Support Band:	GSM 900/DCS1800
Tx Frequency Range:	GSM 900: 880~915MHz DCS1800: 1710~1785MHz
Rx Frequency Range:	GSM900:925~960MHz DCS1800:1805 ~1880MHz
Modulation Type:	GMSK for GSM/GPRS 8PSK for EGPRS
GPRS/EGPRS Class:	12
Antenna Type:	External antenna
Antenna Gain:	4.0dBi(Max)
<b>WCDMA</b>	
Support Band:	WCDMA Band I / VIII
Tx Frequency Range:	WCDMA BAND I: 1920MHz-1980MHz WCDMA BAND VIII: 880MHz-915MHz
Rx Frequency Range:	WCDMA BAND I: 2110MHz-2170MHz WCDMA BAND VIII: 925MHz-960MHz
Modulation Type:	QPSK/16QAM(WCDMA uplink/HSUPA) QPSK/64QAM(WCDMA downlink/HSDPA)
Antenna Type:	External antenna
Antenna Gain:	4.0dBi(Max)
<b>LTE</b>	
Support Band:	LTE Band 1/3/7/8/20/38/40
Tx Frequency Range:	LTE Band 1: 1920-1980MHz LTE Band 3: 1710-1785MHz LTE Band 7: 2500-2570MHz LTE Band 8: 880-915MHz LTE Band 20: 832-862MHz LTE Band 38: 2570-2620MHz LTE Band 40: 2300-2400MHz
Rx Frequency Range:	LTE Band 1: 2110-2170MHz LTE Band 3: 1805-1880MHz

	LTE Band 7: 2620-2690MHz LTE Band 8: 925-960MHz LTE Band 20: 791-821MHz LTE Band 38: 2570-2620MHz LTE Band 40: 2300-2400MHz
Modulation Type:	QPSK/16QAM(uplink) QPSK/64QAM(downlink)
Antenna Type:	External antenna
Antenna Gain:	4.0dBi(Max)

## 4.2 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

● **FCC —Registration No.: 381383**

Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files. Registration 381383.

● **Industry Canada (IC) —Registration No.: 9079A-2**

The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-2.

● **NVLAP (LAB CODE:600179-0)**

Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP). LAB CODE:600179-0.

## 4.3 Test Location

All tests were performed at:

Global United Technology Services Co., Ltd.

No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China

Tel: 0755-27798480

Fax: 0755-27798960

## 4.4 Description of Support Units

None.

## 4.5 Deviation from Standards

None.

## 4.6 Abnormalities from Standard Conditions

None.

## 4.7 Other Information Requested by the Customer

None.

## 5 Technical Requirements Specification in EN 62311

Test Requirement:	EN 62311																																																												
Test Method:	EN 62311																																																												
General Description of Applied Standards	EN 62311 Generic standard to demonstrate the compliance of electronic and electrical apparatus with the basic restrictions related to human exposure to electromagnetic fields (0 Hz–300 GHz) is to demonstrate the compliance of apparatus with the basic restrictions or reference levels on exposure of the general public related to electric, magnetic, electromagnetic fields as well as induced and contact current.																																																												
Limit:	<p>According to EN 62311, the criteria listed in the below table shall be used to evaluate the environmental impact of human exposure to radio-frequency (RF) radiation as specified table 2 of Council Recommendation 1999/519/EC.</p> <p style="text-align: center;"><b>Reference levels for electric, magnetic and electromagnetic fields (0 Hz to 300 GHz, unperturbed rms values)</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Frequency range</th> <th style="text-align: center;">E-field strength (V/m)</th> <th style="text-align: center;">H-field strength (A/m)</th> <th style="text-align: center;">B-field (μT)</th> <th style="text-align: center;">Equivalent plane wave power density <math>S_{eq}</math> (W/m<sup>2</sup>)</th> </tr> </thead> <tbody> <tr> <td>0-1 Hz</td> <td style="text-align: center;">—</td> <td style="text-align: center;"><math>3,2 \times 10^4</math></td> <td style="text-align: center;"><math>4 \times 10^4</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>1-8 Hz</td> <td style="text-align: center;">10 000</td> <td style="text-align: center;"><math>3,2 \times 10^4/f^2</math></td> <td style="text-align: center;"><math>4 \times 10^4/f^2</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>8-25 Hz</td> <td style="text-align: center;">10 000</td> <td style="text-align: center;"><math>4\ 000/f</math></td> <td style="text-align: center;"><math>5\ 000/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,025-0,8 kHz</td> <td style="text-align: center;"><math>250/f</math></td> <td style="text-align: center;"><math>4/f</math></td> <td style="text-align: center;"><math>5/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,8-3 kHz</td> <td style="text-align: center;"><math>250/f</math></td> <td style="text-align: center;">5</td> <td style="text-align: center;">6,25</td> <td style="text-align: center;">—</td> </tr> <tr> <td>3-150 kHz</td> <td style="text-align: center;">87</td> <td style="text-align: center;">5</td> <td style="text-align: center;">6,25</td> <td style="text-align: center;">—</td> </tr> <tr> <td>0,15-1 MHz</td> <td style="text-align: center;">87</td> <td style="text-align: center;"><math>0,73/f</math></td> <td style="text-align: center;"><math>0,92/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>1-10 MHz</td> <td style="text-align: center;"><math>87/f^{1/2}</math></td> <td style="text-align: center;"><math>0,73/f</math></td> <td style="text-align: center;"><math>0,92/f</math></td> <td style="text-align: center;">—</td> </tr> <tr> <td>10-400 MHz</td> <td style="text-align: center;">28</td> <td style="text-align: center;">0,073</td> <td style="text-align: center;">0,092</td> <td style="text-align: center;">2</td> </tr> <tr> <td>400-2 000 MHz</td> <td style="text-align: center;"><math>1,375\ f^{1/2}</math></td> <td style="text-align: center;"><math>0,0037\ f^{1/2}</math></td> <td style="text-align: center;"><math>0,0046\ f^{1/2}</math></td> <td style="text-align: center;"><math>f/200</math></td> </tr> <tr> <td>2-300 GHz</td> <td style="text-align: center;">61</td> <td style="text-align: center;">0,16</td> <td style="text-align: center;">0,20</td> <td style="text-align: center;">10</td> </tr> </tbody> </table> <p><b>Notes:</b> 1. <math>f</math> as indicated in the frequency range column.</p>	Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density $S_{eq}$ (W/m <sup>2</sup> )	0-1 Hz	—	$3,2 \times 10^4$	$4 \times 10^4$	—	1-8 Hz	10 000	$3,2 \times 10^4/f^2$	$4 \times 10^4/f^2$	—	8-25 Hz	10 000	$4\ 000/f$	$5\ 000/f$	—	0,025-0,8 kHz	$250/f$	$4/f$	$5/f$	—	0,8-3 kHz	$250/f$	5	6,25	—	3-150 kHz	87	5	6,25	—	0,15-1 MHz	87	$0,73/f$	$0,92/f$	—	1-10 MHz	$87/f^{1/2}$	$0,73/f$	$0,92/f$	—	10-400 MHz	28	0,073	0,092	2	400-2 000 MHz	$1,375\ f^{1/2}$	$0,0037\ f^{1/2}$	$0,0046\ f^{1/2}$	$f/200$	2-300 GHz	61	0,16	0,20	10
Frequency range	E-field strength (V/m)	H-field strength (A/m)	B-field (μT)	Equivalent plane wave power density $S_{eq}$ (W/m <sup>2</sup> )																																																									
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Test method:	<p>According to the Far field calculation formula:</p> <p style="text-align: center;"><b>Far Field Calculation Formula</b></p> $E = \frac{\sqrt{30PG(\theta, \phi)}}{r}$ <p><math>G</math> = antenna gain relative to an isotropic antenna  <math>\theta, \phi</math> = elevation and azimuth angles to point of investigation  <math>r</math> = distance from observation point to the antenna</p> <p>The antenna of the product, under normal use condition is at least 20cm away from the body of the user. Warning statement of the user for keeping 20cm separation distance and the prohibition of operating to a person has been printed on the user manual. So, this product under normal use is located on electromagnetic far field between the human body.</p>																																																												
Result:	Pass																																																												

**Measurement Data:**

Test Mode	Frequency (MHz)	EIRP max (dBm)	EIRP max (W)	E Field Strength (V/m)	Limit (V/m)	Result
GSM 900	880~915	32.50	1.78	36.52	40.79	Pass
DCS1800	1710~1785	29.50	0.89	25.85	56.86	Pass
WCDMA Band I	1920~1980	23.50	0.22	12.96	60.25	Pass
WCDMA Band VIII	880~915	23.50	0.22	12.96	40.79	Pass
LTE Band 1	1920~1980	23.50	0.22	12.96	60.25	Pass
LTE Band 3	1710~1785	23.50	0.22	12.96	56.86	Pass
LTE Band 7	2500~2570	23.50	0.22	12.96	61.00	Pass
LTE Band 8	880~915	23.50	0.22	12.96	40.79	Pass
LTE Band 20	832~862	23.50	0.22	12.96	38.73	Pass
LTE Band 38	2570~2620	23.50	0.22	12.96	61.00	Pass
LTE Band 40	2300~2400	23.50	0.22	12.96	61.00	Pass

**Remark:**

Pass: The EUT complies with the essential requirements in the standard.

-----End-----





## Verification of Compliance

**Verification No.:** GTS201903000031EV1  
**Applicant:** SHENZHEN WLINK TECHNOLOGY CO., LIMITED  
**Address of Applicant:** 319, YiBen Electronic Business Building, NO.1063 ChaGuang Road, XiLi, NanShan District, ShenZhen, China  
**Product Name:** Industrial 3G/4G Cellular RTU  
**Model No.:** WL-D82

### The radio equipment meets the following essential requirements:

Article 3.1 a): Health and Safety	Conform
Article 3.1 b): Electromagnetic Compatibility	Conform
Article 3.2: Effective and Efficient Use of Radio Spectrum	Conform
Additional Essential Requirements:	Not applicable



**Robinson Lo**  
**Laboratory Manager**



**April 12, 2019**

### Note

1. The verification is only valid for the equipment and configuration described, in conjunction with the test reports detailed below. The product is in conformity with the essential requirements of Article 3.1 (a) the protection of the health, 3.1 (b) an adequate level of electromagnetic compatibility and 3.2 effective use of the spectrum of 2014/53/EU.
2. The CE mark as shown above can be used, under the responsibility of the manufacturer, after completion of an EC Declaration of Conformity and compliance with all relevant EC Directives. The affixing of the CE marking presumes in addition that the conditions in all relative Directive are fulfilled.
3. Copyright of this verification is owned by Global United Technology Services Co., Ltd. and may not be reproduced other than in full and with the prior approval of the General Manager. This verification is subjected to the governance of the General Conditions of Services, printed overleaf.

## Annex

Sufficient samples of the product have been tested and found to be in conformity with:

	<b>Applicable standards:</b>	<b>Test report number:</b>
Article 3.1 a): Health and Safety	EN 62311:2008	GTS201903000031E03
	EN 60950-1:2006+A11:2009+ A1:2010+A12:2011+A2:2013	GTS201903000031S01
Article 3.1 b): Electromagnetic Compatibility	ETSI EN 301 489-1 V2.1.1 (2017-02)	GTS201903000031E01
	Draft ETSI EN 301 489-52 V1.1.0 (2016-11)	
	EN 55032:2015	
	EN 55035:2017	
Article 3.2: Effective and Efficient Use of Radio Spectrum	EN 61000-3-2:2014	
	EN 61000-3-3:2013	
	ETSI EN 301 511 V12.5.1 (2017-03)	GTS201903000031E02
	ETSI EN 301 908-1 V11.1.1 (2016-07)	
	ETSI EN 301 908-2 V11.1.2 (2017-08)	
	ETSI EN 301 908-13 V11.1.2 (2017-07)	

# IR dispozitiv de citire a datelor de la contor

## Caracteristici:

- Performanțe ridicate și consum mic de energie;
- Trasmiterea datelor prin linia RS-485;
- Protocol de comunicare Modbus;
- Selectarea tipului de contor (se prevede pe viitor)
- Standart IEC 62056-21
- Marimi mici a carcasei dispozitivului.

Aspectul exterior a dispozitivului de citire a datelor de la contor (IRH-1) prin port infrarosu este prezentat în figura 1.



**Figura 1.** Aspectul exterior al dispozitivului IRH-1.

## Pinout:

În figura 2 este prezentat cablul de conectare a dispozitivului IRH-1.



**Figura 2.** Cablul de conectare.

Semnificația fiecarui fir al cablului (figura 2) este explicată în tabelul 1.

**Tabelul 1.** Semnificația frelor cablului de conectare.

Numarul firului	Semnificația
1	Gnd
2	+V
3	A (data +)
4	B (data -)

### Caracteristici electrice:

Caracteristicile electrice ale dispozitivului IRH-1 sunt prezentate în tabelul 2.

**Tabelul 2.** Caracteristici electrice ale dispozitivului IRH-1

Simbol	Parametru	Min	Tipic	Max	Unitatea de masura
GND	Pamintul	0	0	0	V
+V	Teniunea de alimentare	4,0	5	5,5	V
	Curetul de consum	25	28	35	mA

### Descrierea reginstrilor Modbus

Dispozitivul IRH-1 are la baza sa protocolul de comunicare Modbus, care permite de al conecta prin intermediul interfeței RS-485 la calculatorul master. Conform protocolului Modbus sunt realizare 2 comenzi: 03h și 06h.

Adresa dispozitivului este 1, dar poate fi schimbată după preferință.

Comanda 03h servește pentru a citi datele din regiștri dispozitivului IRH-1, iar comanda 06h servește pentru a inscrie date în regiștri dispozitivului IRH-1.

În versiunea curentă a firmware-ului, dispozitivului IRH-1, este realizată citirea datelor din contorul de energie electrică de model **Iskra**, din acest motiv în document sunt reflectați doar regiștri protocolului modbus ce conțin informația despre datele din acest contor.

În tabelul 3 sunt prezentati regiștri modbus.

**Tabelul 3** Regiștri modbus a dispozitivului IRH-1.

Nr regiștrului	Semnificația	Notă
0	Pornirerea citirii datelor	
1	Capacitatea ramasa bateriei	/100

2	Tensiunea din rețeaua electrică la momentul executării citii	
3	Curentul ce trece prin contor la momentul citirii	/100
4	Consumul total registul 1	
5	Consumul total registul 2	
6	Consumul total zecimalele	
7	Consumul tarif 1 registul 1	
8	Consumul tarif 1 registul 2	
9	Consumul tarif 1 zecimalele	/1000
10	Consumul tarif 2 registul 1	
11	Consumul tarif 2 registul 2	
12	Consumul tarif 2 zecimalele	/1000
13	Consumul tarif 3 registul 1	
14	Consumul tarif 3 registul 2	
15	Consumul tarif 3 zecimalele	/1000

### Descrierea modului de lucru cu IRH-1

Pentru a citi datele din contor este necesar de a seta valoarea "1" în registrul de pornire a citirii datelor din contor, folozind comanda 06h. Îndată ce IRH-1 a primit această comandă, se incepe citirea datelor din contor.

Din motiv că transferul de date dintre contor și dispozitivul IRH-1 este de viteză mică (300 baud/s) trebuie să treacă ceva timp ca mai apoi să fie posibilă citirea datelor contorului din registri Modbus. În cazul contorului Iskra acest interval de așteptare nu trebuie sa fie mai mic de 3.5 minute.

În cazul citirii valorii puterii consumate valoarea finală trebuie asamblată din trei regiștri.

Exempu:

Se transmite comanda de start: 01h 06h 00h 00h 00h 01h 48h 0Ah

Se așteaptă nu mai puțin de 3.5 minute

Se transmite comanda de citire a datelor

Citirea datelor tuturor registrilor: 01h 03h 00 h 00h 00h 10h 44h 06

Se va prezenta exemlu de asamblare a datelor finale pentru puterea consumată a consumului total de energie.

Se presupune că în urma citirii datelor în registrii cu numărul 4,5,6 au fost obținute următoarele date

Registrul 4 conține numărul 45

Registrul 5 conține numărul 716

Registrul 6 conține numărul 39 (vezi tabelu 3)

Valoarea finală asamblată este 45716.039

La fel se execută aceiși operație și cu cele trei tarife.

### **În curînd**

1. Posibilitatea de a selecta tipul contorului.
2. Opțiunea de setare a dispozitivului IRH-1 sa funcționeze în regim de canal transparent cu adresare (în caz că pe o linie RS-485 sunt mai multe dispozitive).
3. Salvarea configurării în memorie EEPROM.

# Контролер питания

## Основные характеристики:

- Напряжения питания: +12В;

## Регистры Modbus

Для настройки/работы с устройством используется протокол Modbus из которого поддерживаются функции **03h**, **06h** и **10h**.

Параметры порта канала Modbus: **9600, 8N1**.

Адрес устройства: **0x19**.

Фиксированный адрес: **0xFE**

В данном модуле используется тип данных, регистрах Modbus, **Int** (с знаком).

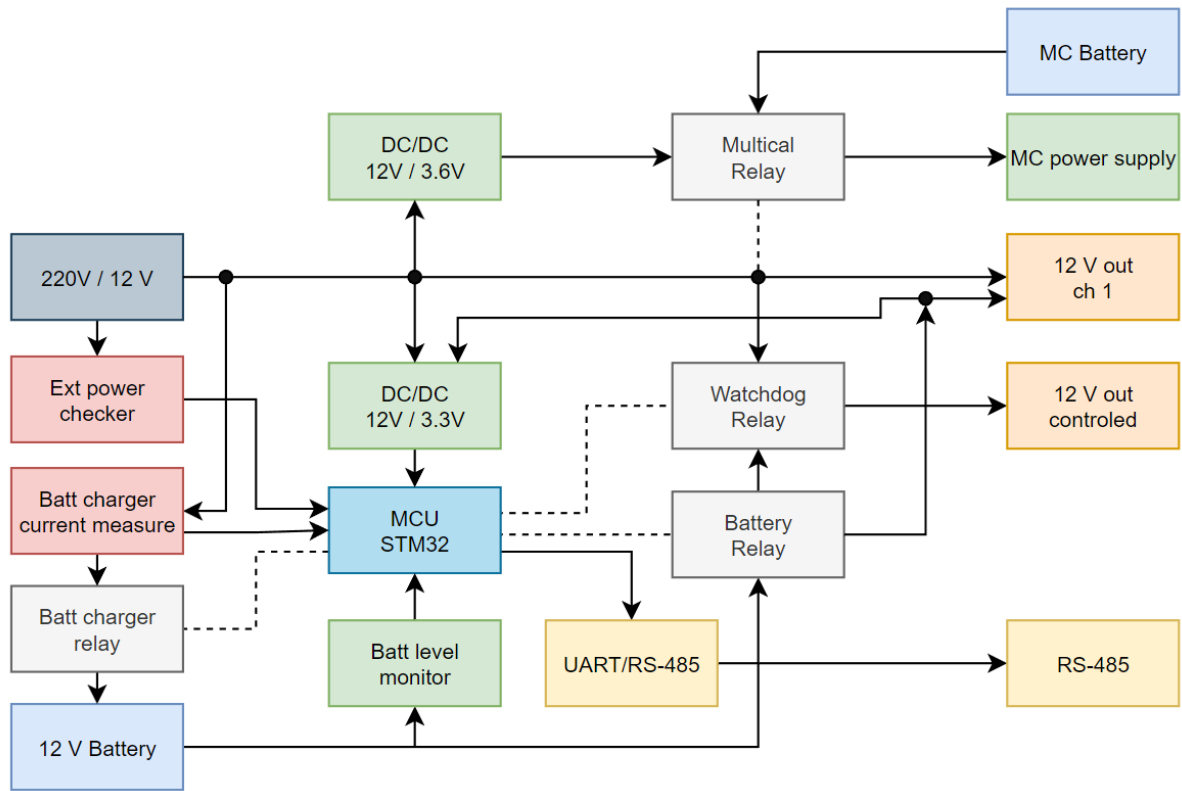
Таблица 2

№ регистра	Назначения	Диапазон значений.	Примечания
0	Не используется		
1	Превышения максимально допустимого тока зарядки батареи в 2 А	0/1	0-ток меньше 2 А. 1-ток больше 2А. При превышении тока батареи в 2 А отключается вся нагрузка от нее и сама батарея от цепи питания.
2	Напряжения батареи	0 ... 20 000 мВ	
3	Ток зарядки батареи	0 ... 1000 мА	
4	Показатель присутствия подключения батареи к плате	0/1	0-батарея не подключена или напряжения на самой батарее меньше 5 В. 1-батарея подключена.
5	Показатель присутствия сетевого напряжения	0/1	0-отсутствует. 1-присутствует.
6	Время вачдога	0...15000 с	Время, после которого контролер сбросит питание выделенного канала. По умолчанию 300 с.
7	Активация вачдога	0/1	0-не активирован. 1-активирован.

			По умолчанию вачдог отключен.
8	Сброс таймера вачдога	0/1	1-збрасывает на заданное значения. При успешном сбросе значения в регистре поменяется на 0.
25	Modbus адрес самого устройство. При необходимости можно перезаписать. По умолчанию адрес: 0x12	0...127	
26	Не используется		
27	Позволяет сохранить параметры в энергонезависимую память. Для этого нужно записать в этот регистр значения 1. После перезапуска, устройства будет использовать сохраненные параметры.		
28	Сброс контролера	0/1	1-процесор сделает ресет.



# Block schema PowerController (PCR3.6)



# PT500 – 8 каналов

## Основные характеристики:

- Напряжения питания: +12В;
- 1 канал RS-485;
- 8 каналов для подключения датчиков температуры PT500

Габариты устройства PT500 и распиновка клемм подключения к плате представлены на рисунке 1.

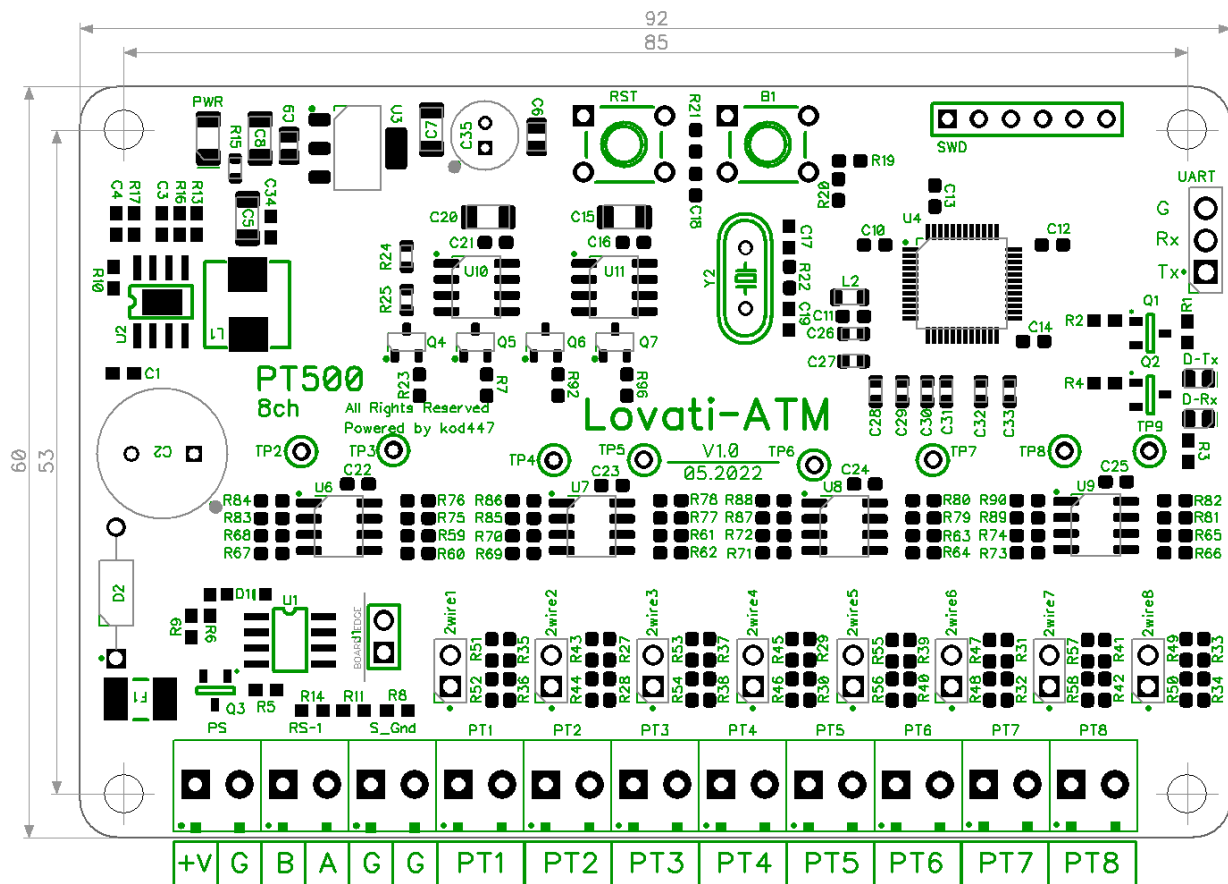


Рис 1. Габариты платы

Назначения клемм на плате модуля PT500 показаны в таблице 1.

Таблица 1

Названия клеммы	Описания
+V	Напряжения питание модуля, 6 ... 15 В
G	Общий провод, земля
A	Коммуникационные линии стандарта RS-485
B	
PT1, PT2, PT3, PT4, PT5, PT6, PT7, PT8,	Клеммы для подключения датчика PT500

Назначения светодиодов на плате модуля M-bus switch показаны в таблице 2.

Названия светодиода	Описания
PWR	Показывает наличие питания модуля
D-Rx	Индикация передачи и приема данных по каналу RS485
D-Tx	

### Блок схема модуля M-bus switch

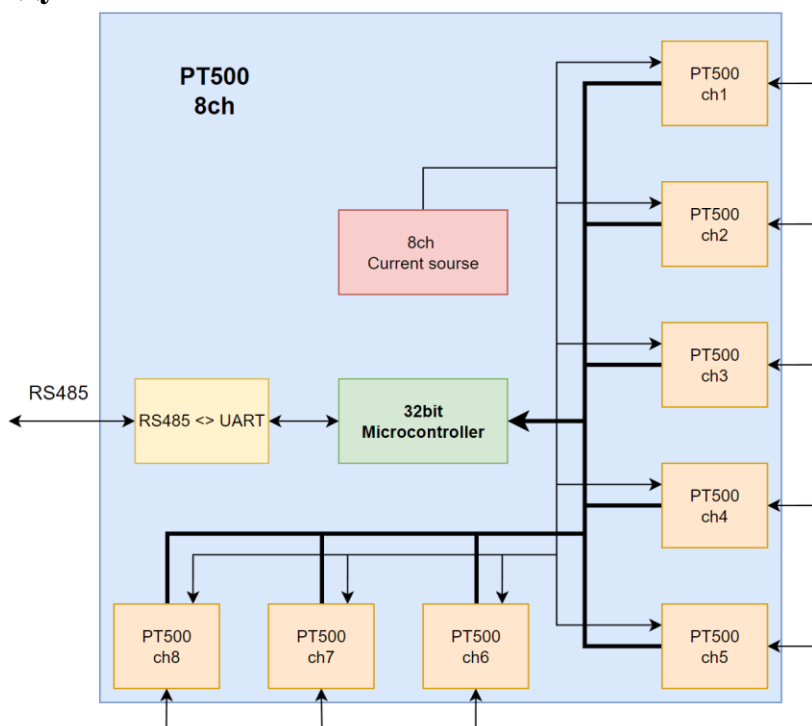


Рис 2. Блок схема

### Регистры Modbus

Для настройки работы устройства PT500 8ch используется протокол Modbus. Из которого поддерживаются функции **03h**, **06h** и **10h**.

Параметры порта канала Modbus: **9600**, **8N1**.

Адрес устройства: **0x12**.

Фиксированный адрес: **0xFE**

В данном модуле используется тип данных, регистрах Modbus, **Int** (с знаком).

Таблица 2

№ регистра	Назначения	Диапазон значений.	Примечания
0	Не используется		
1	Данные датчика температуры подключённым к порту PT1	0...15000	Все значения указывают температуру в
2	Данные датчика температуры подключённым к порту PT2		

3	Данные датчика температуры подключённым к порту RT3		градусах цельсия умножено на 100. То есть считываемое значение, для правильного отображения, нужно поделить на 100.	
4	Данные датчика температуры подключённым к порту RT4			
5	Данные датчика температуры подключённым к порту RT5			
6	Данные датчика температуры подключённым к порту RT6			
7	Данные датчика температуры подключённым к порту RT7			
8	Данные датчика температуры подключённым к порту RT8			
9	Калибровка канала RT1, коррекция АЦП показания.	100..300		Значения указывается в единицах АЦП. Модуль поставляется откалиброванный, без <b>строгой</b> необходимости данные не менять.
10	Калибровка канала RT2, коррекция АЦП показания.			
11	Калибровка канала RT3, коррекция АЦП показания.			
12	Калибровка канала RT4, коррекция АЦП показания.			
13	Калибровка канала RT5, коррекция АЦП показания.			
14	Калибровка канала RT6, коррекция АЦП показания.			
15	Калибровка канала RT7, коррекция АЦП показания.			
16	Калибровка канала RT8, коррекция АЦП показания.			
17	Коррекция показания канала RT1.	± 0...1000	Для коррекции данных с датчиков в данных регистрах записывается значения в сотых градусов с указанием знакового бита.	
18	Коррекция показания канала RT2.			
19	Коррекция показания канала RT3.			
20	Коррекция показания канала RT4.			
21	Коррекция показания канала RT5.			
22	Коррекция показания канала RT6.			
23	Коррекция показания канала RT7.			
24	Коррекция показания канала RT8.			
25	Modbus адрес самого устройство. При необходимости можно перезаписать. По умолчанию адрес: 0x12	0...127		
26	Не используется			
27	Позволяет сохранить параметры в энергонезависимую память. Для этого нужно записать в этот регистр значения 1. После перезапуска, устройства будет использовать сохраненные параметры.			

## Подключения датчиков 2х проводное

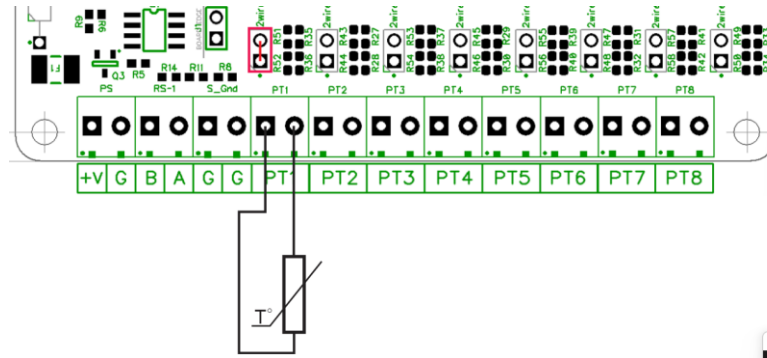


Рис. 3 Двухпроводное подключения

Таким же образом подключается и другие каналы чтения. Джемпер 2wire устанавливается.

## 3х проводное

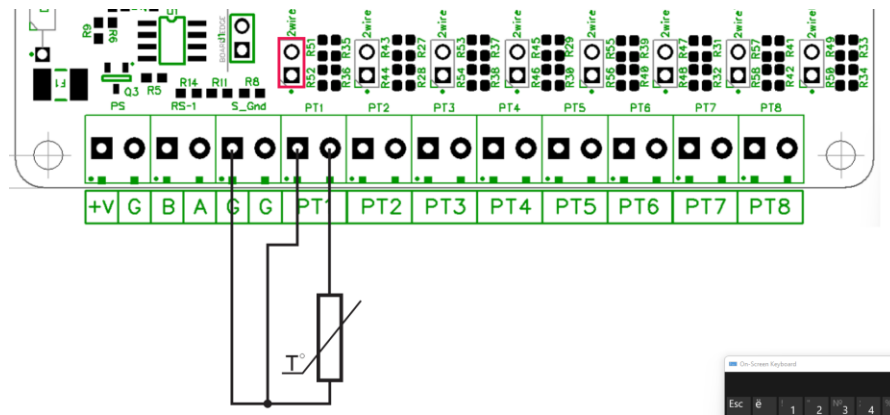


Рис. 4 Трехпроводное подключения

Таким же образом подключается и другие каналы чтения. Джемпер 2wire **НЕ** устанавливается.

# M-BUS SWITCH

## Основные характеристики:

- Напряжения питания: +12В;
- 1 основной канал RS-232;
- 1 канал RS-485;
- 1 дополнительный канал RS-232;
- 3 канала M-Bus

Габариты устройства M-bus switch и распиновка клемм подключения к плате представлены на рисунке 1.

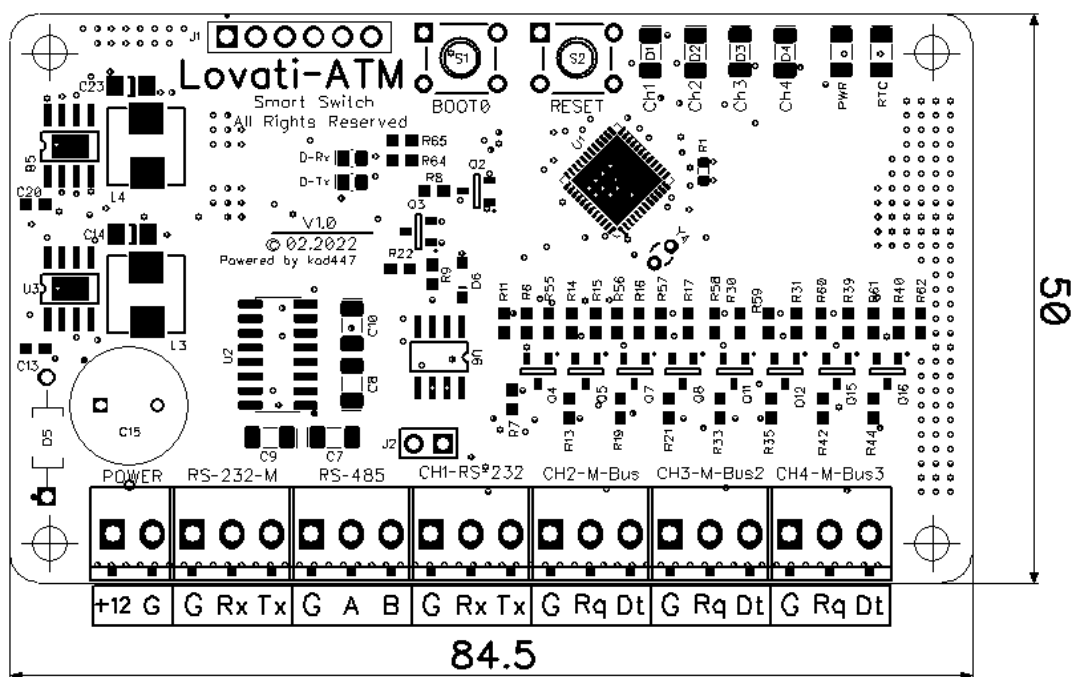


Рис 1. Габариты платы

Назначения клемм на плате модуля M-bus switch показаны в таблице 1.

Таблица 1

Названия клеммы	Описания
+12	Напряжения питание модуля, 6 ... 15 В
G	Общий провод, земля
Rx	Линия приема данных по стандарту RS-232
Tx	Линия передачи данных по стандарту RS-232
Rq	Линия передачи данных по стандарту M-Bus
Dq	Линия приема данных по стандарту M-Bus
A	Коммуникационные линии стандарта RS-485
B	

Назначения светодиодов на плате модуля M-bus switch показаны в таблице 2.

Названия светодиода	Описания
CH1	Показывает что выбран канал 1
CH2	Показывает что выбран канал 2
CH3	Показывает что выбран канал 3
CH4	Показывает что выбран канал 4
PWR	Показывает наличие питания модуля
RTC	Работает в режиме мигания, показывает что контролер на плате работает и не завис
D-Rx	Индикация передачи и приема данных между модуля и измерительным устройством
D-Tx	

**Примечание:** в исправном модуле светодиоды CH1, CH2, CH3, CH4 не должны гореть одновременно с исключением случая сброса настроек модуля (см. Сброс на заводские настройки)

### Блок схема модуля M-bus switch

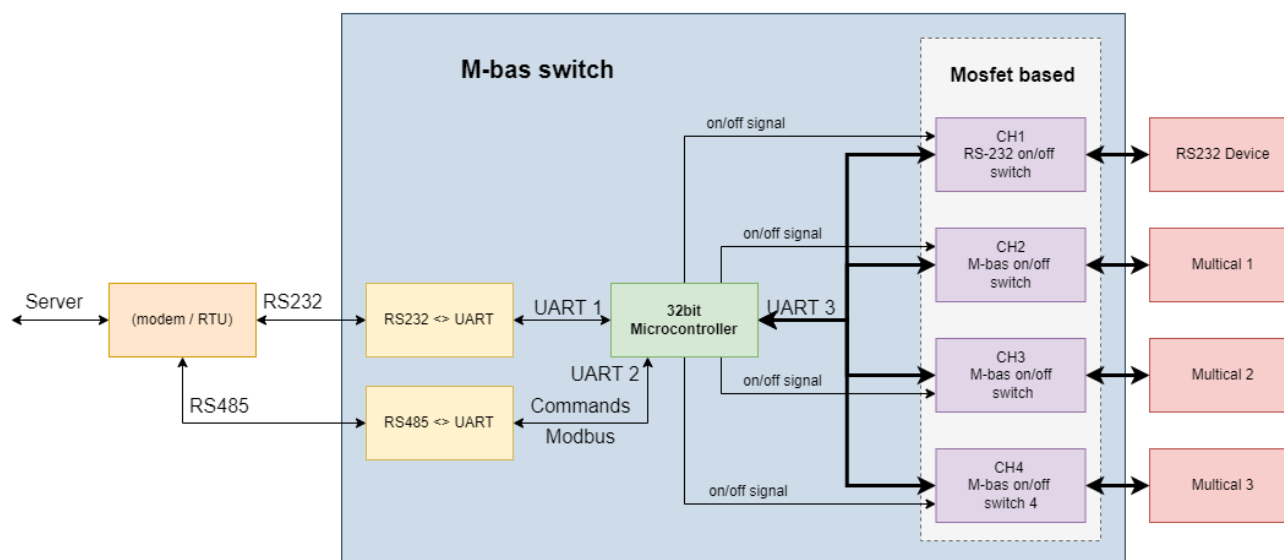


Рис 2. Блок схема

### Регистры Modbus

Для настройки работы устройства M-bus switch используется протокол Modbus. Из которого поддерживаются функции **03h**, **06h** и **10h**.

Параметры порта канала Modbus: **9600**, **8N1**.

Адрес устройства: **0x11**.

Фиксированный адрес: **0xFE**

Таблица 2

№ регистра	Назначения	Диапазон значений.
0	<p>Выбор канала к которому подключен измерительный прибор.</p> <p><b>Пример:</b> для выбора передачи данных через канал 1, в регистр 0 нужно записать номер канала, который соответствует значению в регистре. То есть 1.</p> <p>Если приборов несколько, при каждом обращении к желаемому прибору нужно записать в регистр номер порта.</p>	1, 2, 3, 4
1	<p>Выбор скорости главного порта RS-232.</p> <p>Нужно записать желаемое значения скорости.</p>	300, 1200, 2400, 4800, 9600
2	Количество стоп битов главного порта RS-232	1 или 2
3	<p>Установка проверки на четность.</p> <p>0 – проверка отключена 1 – включена проверка на четность (EVEN) 2 - включена проверка на нечетность (ODD)</p>	0, 1, 2
4	Выбор скорости передачи данных 1-го канала.	300, 1200, 2400, 4800, 9600
5	Выбор скорости приёма данных 1-го канала.	300, 1200, 2400, 4800, 9600
6	Количество стоп битов 1-го канала.	1 или 2
7	<p>Установка проверки на четность 1-го канала.</p> <p>0 – проверка отключена 1 – включена проверка на четность (EVEN) 2 - включена проверка на нечетность (ODD)</p>	0, 1, 2
8	Выбор скорости передачи данных 2-го канала.	300, 1200, 2400, 4800, 9600
9	Выбор скорости приёма данных 2-го канала.	300, 1200, 2400, 4800, 9600
10	Количество стоп битов 2-го канала.	1 или 2
11	<p>Установка проверки на четность 2-го канала.</p> <p>0 – проверка отключена 1 – включена проверка на четность (EVEN) 2 - включена проверка на нечетность (ODD)</p>	0, 1, 2
12	Выбор скорости передачи данных 3-го канала.	300, 1200, 2400, 4800, 9600
13	Выбор скорости приёма данных 3-го канала.	300, 1200, 2400, 4800, 9600
14	Количество стоп битов 3-го канала.	1 или 2
15	<p>Установка проверки на четность 3-го канала.</p> <p>0 – проверка отключена 1 – включена проверка на четность (EVEN) 2 - включена проверка на нечетность (ODD)</p>	0, 1, 2
16	Выбор скорости передачи данных 4-го канала.	300, 1200, 2400, 4800, 9600
17	Выбор скорости приёма данных 4-го канала.	300, 1200, 2400, 4800, 9600



18	Количество стоп битов 4-го канала.	1 или 2
19	Установка проверки на четность 4-го канала. 0 – проверка отключена 1 – включена проверка на четность (EVEN) 2 - включена проверка на нечетность (ODD)	0, 1, 2
20	Зарезервирован	
21	Зарезервирован	
22	Зарезервирован	
23	Зарезервирован	
24	Modbus адрес самого устройство. При необходимости можно перезаписать. По умолчанию адрес: 0x11	0...127
25	Позволяет сохранить параметры в энергонезависимую память. Для этого нужно записать в этот регистр значения 1. После перезапуска, устройства будет использовать сохраненные параметры.	1

### Сброс на заводские настройки

Сброс настроек можно провести в двух случаях: когда параметры портов не правильные а возможность перенастроить нету, при первом запуске контролера (когда был получен с завода изготовитель).

Для сброса нужно установить перемычку между крайними контактами колодки J1 (рисунок 3).

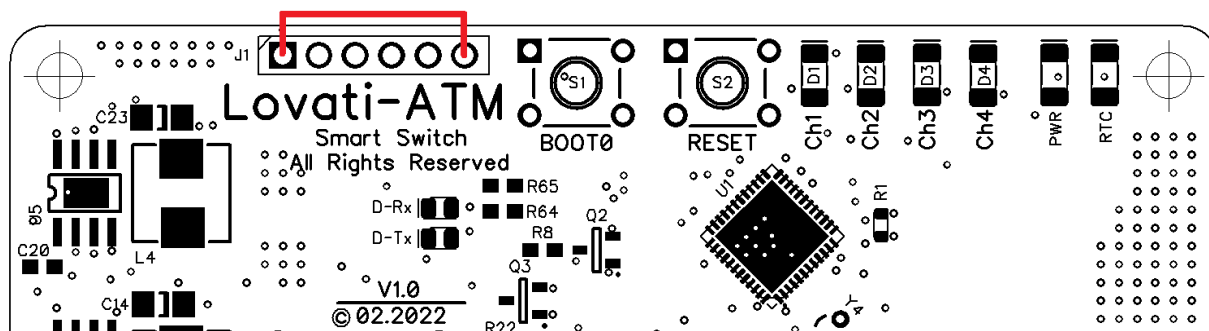


Рис. 3. Замыкание контактов для сброса параметров

Далее нужно нажать на кнопку RESET на плате. После некоторое время загорятся все светодиоды в правом верхнем углу (рисунок 4).

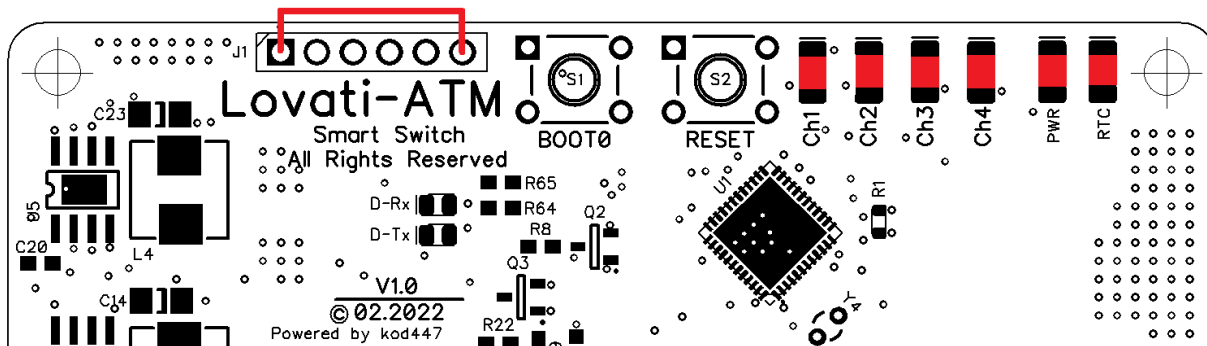


Рис. 4. Индикация об успешном сбросе настроек

После нужно удалить перемычку с колодки J1 и нажать ещё раз кнопку RESET.



WLINK

# User Manual

---Apply to D82 Dual-COM 4G/3G IP Modem

V1.2

<http://www.wlink-tech.com>

Feb, 2019



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# 1

## Product Introduction

### 1.1 Product Overview

The rugged D82 Dual-COM(Data Terminal Unit) which is a cellular modem have been developed especially for M2M application. It provides one RS232 and one RS-485 interfaces, three DI and one DO ports as default, and equipped with PPP, TCP/IP protocol, it could convert the user data into 4G/3G/2G network and transmits the data to the customer's data service center through complete transparent data channel, allows a simple and rapid integration of cellular network connectivity into M2M application.

With the robust, reliable, long life and compact metal case design, the D82 ideally adapts to onboard standard, easy to deploy and maintenance, it has been widely applied in many fields worldwide, such as power SCADA, oil field, coal mine, weather forecast, environment protection, water conservancy, heating, natural gas, petroleum and so on.

### 1.2 Typical Application Diagram

WLINK 4G/3G/2G D82 widely used in AMR, Oil, transportation, power grid, mining and other industries fields.

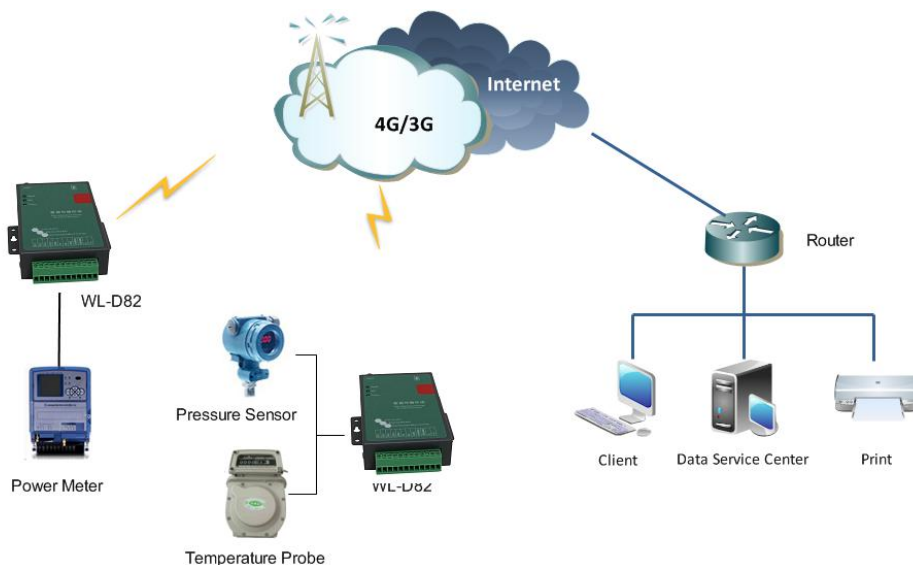


Figure 1-1 Network Topology

## 1.3 Features

- Various cellular module optional, 4G/3G/2G optional
- Optimized EMC design
- Standard PPP, TCP/IP and UDP/IP protocol
- Industrial pluggable terminal block
- Industrial 4G/3G/2G wireless module
- Support One RS232 and one RS485 ports as default
- Support 2 DI and 2 DO ports
- Support APN and VPDN wireless private network
- Support short message service (SMS)
- Support transparent data transmission
- Support data service center with dynamic IP address
- Support LED status indication
- Wide range voltage input
- Smart power management
- External power on/off control
- Reliable, flexible and easy to deploy

# 2 Hardware Installation

This chapter is mainly for installation introduction, there would be some difference between the scheme and real object. But the difference doesn't have any influence to products performance.

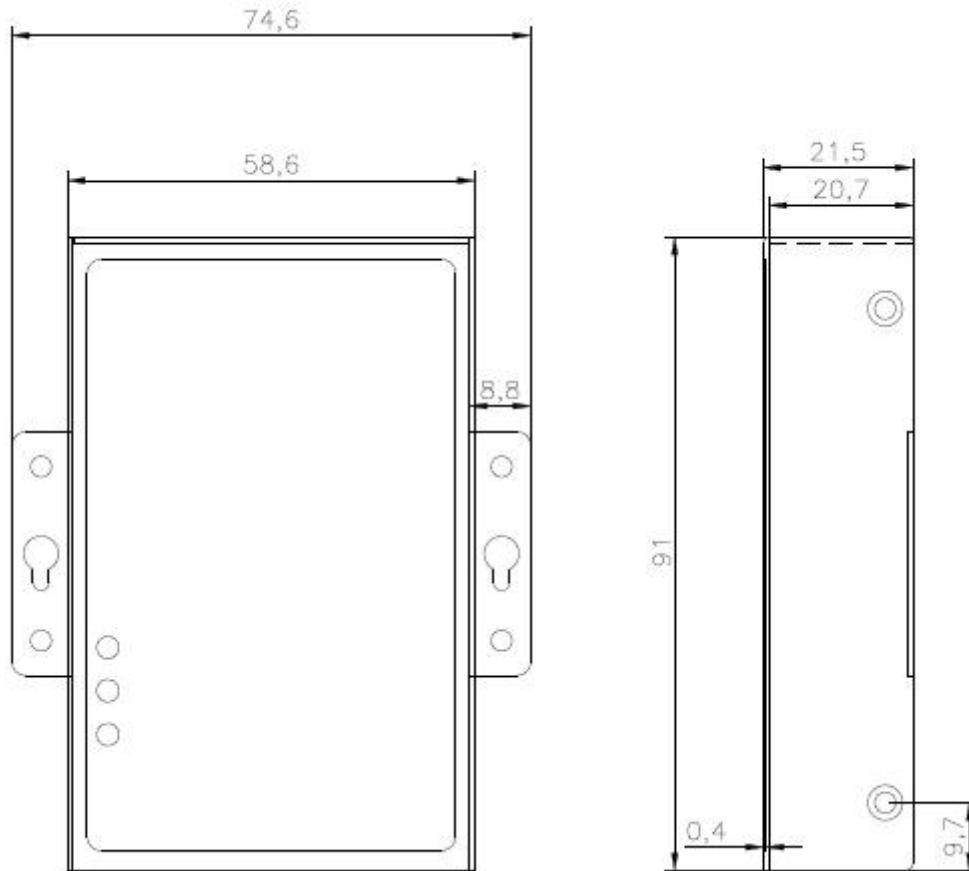
## 2.1 LED Status

LED indicator Status

Silk-screen	Status	Indication
Signal	Light Off	CSQ<12, no signal or weak signal
	Blinking	13<CSQ<22, common CSQ
	Constant Light	23<CSQ<31, good signal
Net	Light on 2s,Light off 1s	Standby
	Light on 1s, Light off 2s	Online
	Blinking	Self-checking
Power	Constant Light	D82 system running



## 2.2 Dimension



## 2.3 How to Install

### 2.3.1 SIM/UIM card installation

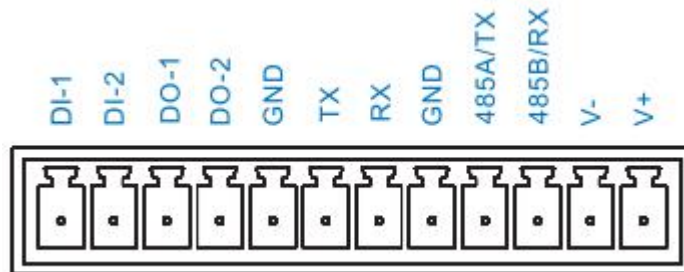
Open SIM shelter by screw-driver, then insert SIM/UIM card.



**CAUTION**

Before connecting, please disconnect any power resource of D82

### 2.3.2 Interface Panel



Pin	Interface	Description
1	V+	Power Vin+, Anti reverse
2	V-	Power Vin-, Anti reverse
3	RS484 B	RS485 B, 57600bps as default
4	RS485 A	RS485 A RX, 57600bps as default
5	GND	GND for serial port communication
6	TX	RS232 TX, 57600bps as default
7	RX	RS232 RX, 57600bps as default
8	GND	GND for serial port communication
9	DO2	Digital Output, 0~3.3V
10	D01	Digital Output(0~+5V), Dry Contact

---

11	DI2	Digital Output(0~+5V), Dry Contact
12	DI1	Digital Output(0~+5V), Dry Contact

---

### 2.3.4 Power Supply

In order to get high reliability, adapt wide voltage input: +7.5V~+32VDC, support hot plug and complex application environment.

### 2.3.5 Review

After insert the SIM/UIM card, connect serial cable, necessary antenna, then connect power cable.



Please connect the antenna before connect the power cable, otherwise because of impedance mismatching, the signal maybe poor.

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Notice:

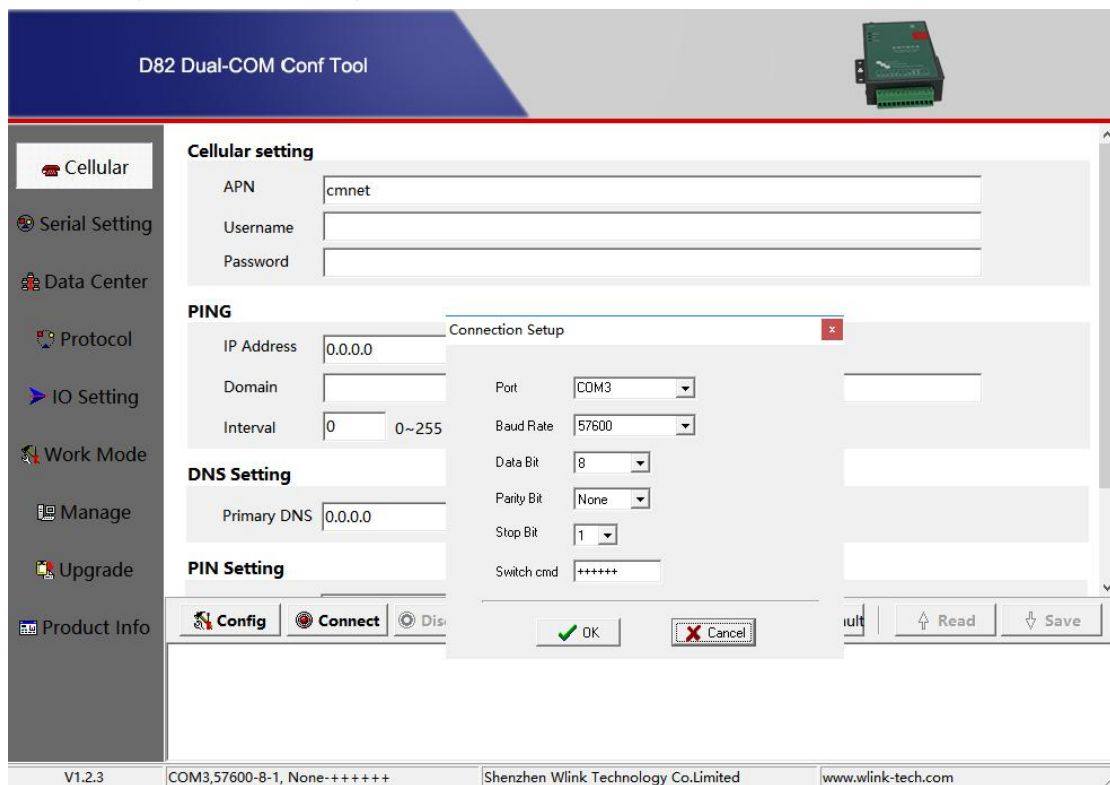
- Step 1 Check antenna connection.
- Step 2 Check SIM/UIM card, configure SIM/UIM card is available.
- Step 3 Power on D82.

# 3 Configuration

## 3.1 Serial Port Settings

Run D82 Dual-COM Conf Tool and select serial port, then setup serial port parameters in the bottom of Config Tool as below.

Run Config Tool, click Config button to setup serial port parameters as below.



Baud Rate: 57600bps

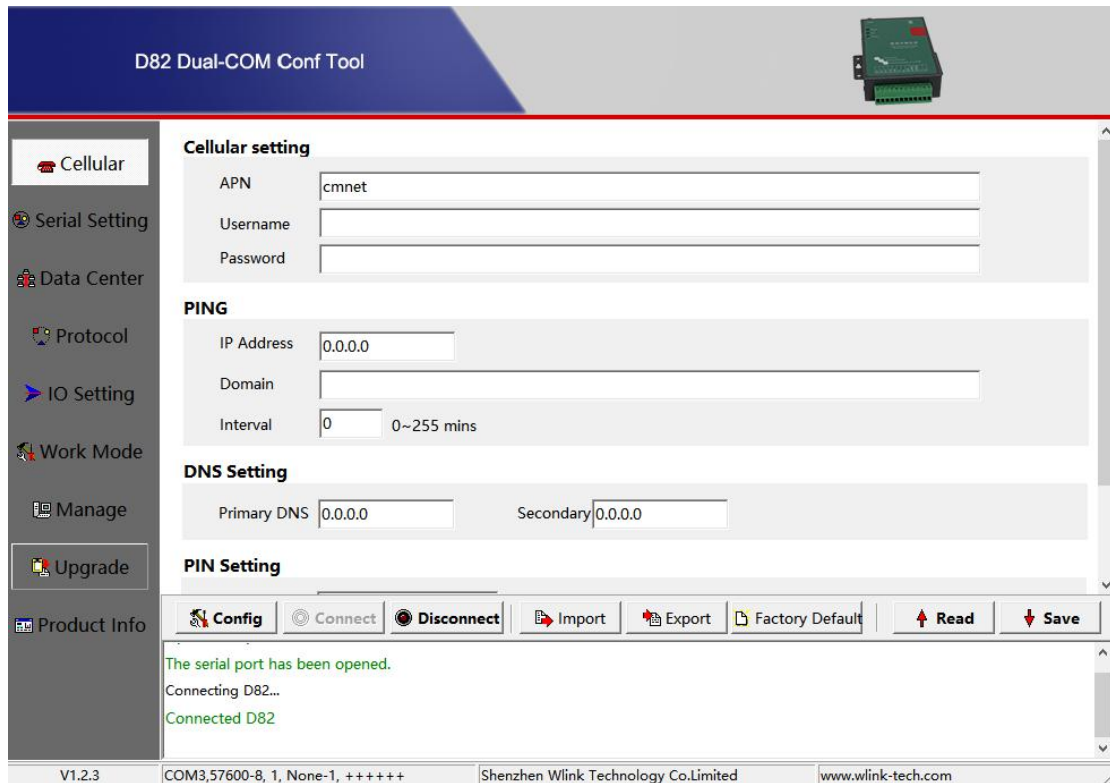
Data Bit: 8bit

Parity: None

Stop Bit: 1bit



Click Connect button, modem will be connected to the tool and enter configuration mode. If the connection is successful, it will display Connected dialog box as below.



**【Config】** Tool Serial port configuration.

**【Connect】** Connect D82.

**【Disconnect】** Close serial port to leave configuration mode.

**【Import】** Import configuration file into Config tool.

**【Export】** Export current settings to file. It's convenient for butch setup.

**【Factory Default】** Setup D82 to default settings.

**【Read】** Inquiry current D82 setting.

**【Save】** Save settings to D82.

## 3.2 D82 Dual-COM Modem Configuration

### 3.2.1 Cellular Settings

#### Cellular settings instruction

Parameters	Description	Instruction	Default
APN	SIM information for dial up	1~63bytes	cmnet
User name		0~63bytes	NULL
Password		0~63bytes	NULL
Ping IP address	Check destination IP address		0.0.0.0
Domain Name	Check destination domain name. If IP 0.0.0.0 and domain name is null, Ping is disable.	0~63byts	NULL
Interval	PING check interval when idle.	0~255mins 0 indicates PING is disable status.	0
Primary DNS	Defined Primary DDNS server IP address	If configured 0.0.0.0, D82 will use default DNS IP address as domain name resolution server.	0.0.0.0
Secondary DNS	Defined secondary DDNS server IP address	If main DNS for 0.0.0.0, the secondary DNS will be invalid.	0.0.0.0

Parameters	Description	Instruction	Default
PIN	SIM card PIN code	If SIM card is defined PIN code. It need to be configured the correct PIN code in D82. Otherwise, D82 won't identify SIM.  If configured an error PIN code in D82, SIM card will be damage.  We suggest not pre-configure PIN code in SIM card.	NULL
Network Type	Network type options.	[AUTO] Modem will automatically connect cellular network regarding to local network signal  [4G] Force modem to connect 4G [3G] Force modem to connect 3G. [2G] Force modem to connect 2G.	

### 3.2.2 Serial Settings

#### COM1 settings instruction.

Parameters	Description	Instruction	Default
Baud rate	Serial port properties	300/600/1200/2400/4800/9600/19200/38400/57600/115200 optional.  RS232 Port for 115200bps as default. RS485 Port for 115200bps as default.	
Data bits		8	8
Stop bits		1/2	1

Parameters	Description	Instruction	Default
Parity		NULL/ODD/EVEN	NULL
Protocol	Transmission protocol between D82 and device. Under command mode, terminal might setup D82 configuration.	Transparent and Command modem are optional. The default is for transparent protocol.	Transparent
Max Package Length	The max transmission unit. Once data package length exceeds to MTU, D82 will split data package as MTU.	1~1024bytes	1024bytes
Min Interval	The Min Interval is the waiting time interval for transmitting the data package that is less the MTU. If the last package equals to the MTU, D82 will transmit it immediately.	100~1000ms	300ms

### 3.2.3 Data Center Settings

The screenshot displays the configuration interface for the D82 Dual-COM Modem. On the left is a navigation menu with options: Cellular, Serial Setting, Data Center (selected), Protocol, IO Setting, Work Mode, Manage, Upgrade, and Product Info. The main area is titled 'Data Center1 Setting' and contains the following fields:

- IP: 0.0.0.0
- Port: 40009
- Protocol: TCP (dropdown)
- Domain: detran.3322.org

Below this is the 'Data Center2 Setting' section with identical fields for IP, Port, Protocol, and Domain.

The 'Data Transmission Setting' section includes two dropdown menus:

- Serial to Data Center: One-to-One
- Data Center to Serial: One-to-One

At the bottom of the configuration area is a toolbar with buttons: Config, Connect, Disconnect, Import, Export, Factory Default, Read, and Save. The status bar at the very bottom shows: V1.2.2, COM1,57600-8-1, None-+++++, Shenzhen Wlink Technology Co.Limited, and www.wlink-tech.com.

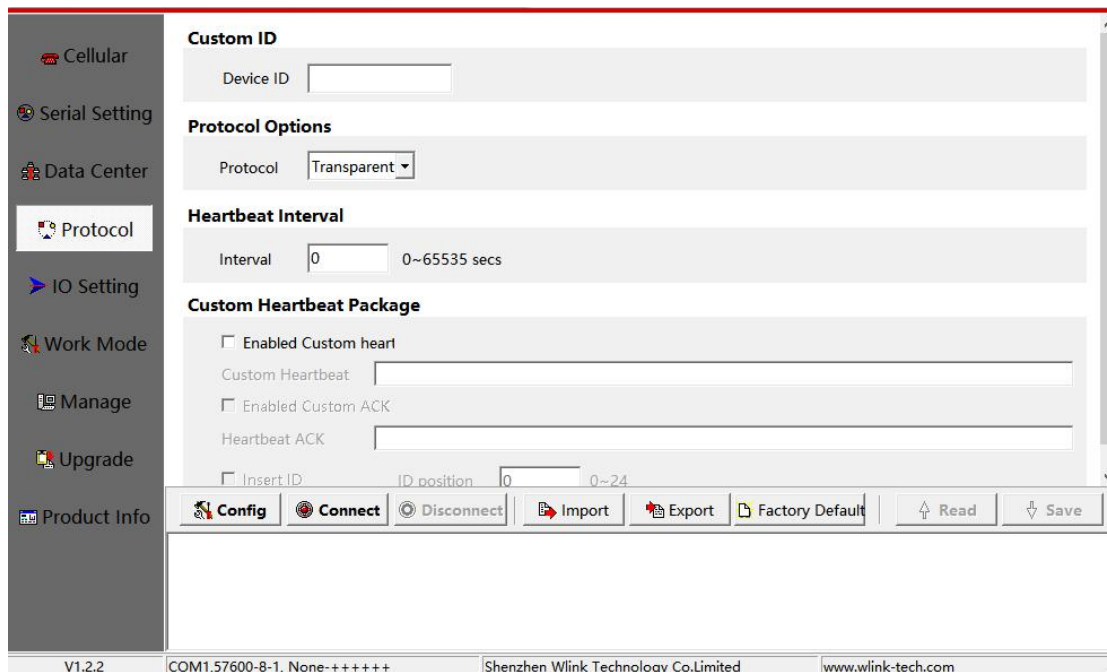
#### COM2 settings instruction.

Parameters	Description	Instruction	Default
Data center IP	Data server center IP address(static IP address)	D82 will transmit COM1 data to Data center 2	0.0.0.0
Port		0~65535	40001
Protocol	UDP/TCP		UDP
Domain name	No static IP for server	It's just available when center IP is configured as 0.0.0.0,	NULL



Parameters	Description	Instruction	Default
Data Transmission	The data flow direction from serial port to data or from data to serial port.	<p>[Serial to Data Center] Defined serial port data direction such as one-to-one, Data center1, Data center2 or mass.</p> <p>[Data Center to Serial] Defined Data Center data direction such as one-to-one, Serial1, Serial2 or mass.</p>	

### 3.2.4 Protocol settings



#### Communication Protocol settings instruction

Parameters	Description	Instruction	Default
Custom ID	Identify D82 in data server center	4byte length	NULL
Protocol Options	Transparent/WLINK/DDP	<p>[Transparent] Transparent transmission.</p> <p>[WLINK]WLINK transmission protocol.</p> <p>[HDDDP] Reserved</p>	Transparent
fID Position	ID insert data package in order to identify which D82 sent data.	0~24bytes	1
Heartbeat Interval	0~65535s	<p>D82 will automatically send heartbeat to data server as defined setting. It will keep the connection between D82 and data center.</p> <p>0 means no heartbeat</p>	0

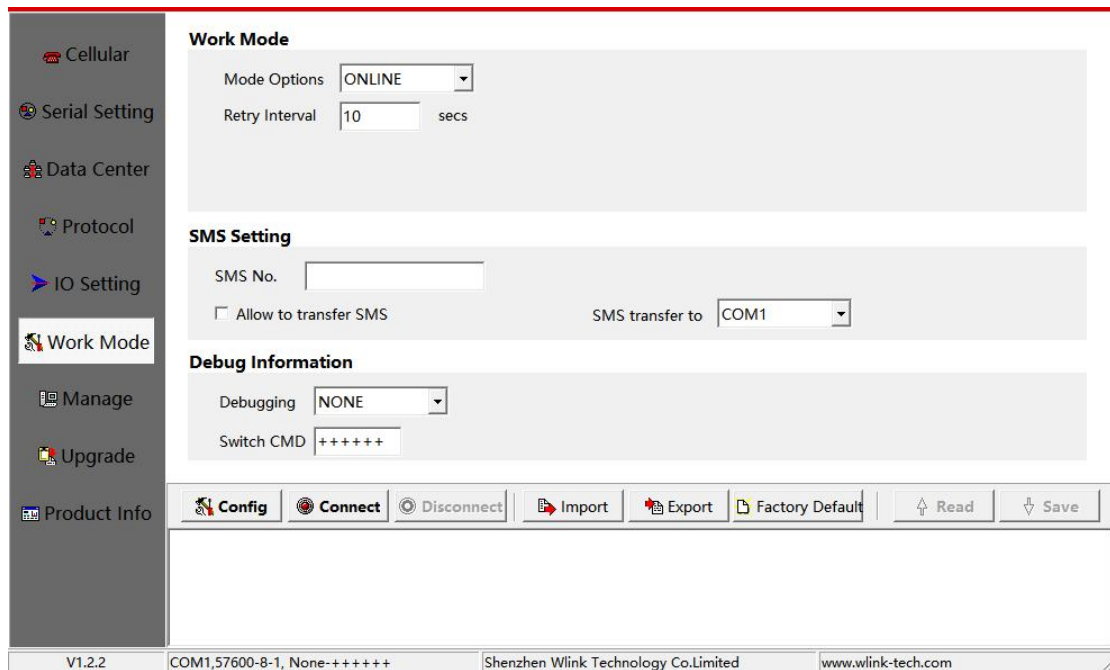
Parameters	Description	Instruction	Default
ID Position	ID insert data package in order to identify which D82 sent data.	0~24bytes	0
Custom Heartbeat Package	D82 log in data center server and keep connection.	0~24bytes	NULL
Custom ACK Package	D82 receive ACK after sent heartbeat. If no ACK 3times in succession, D82 will reconnect to data center server.	0~24bytes	NULL

### 3.2.5 IO Settings

#### IO Control settings instruction

Parameters	Description	Instruction	Default
DI Alarm	Trigger DI to alarm.	Disabled/Rising-edge/falling-edge options	disabled
Triggered Action		SMS/LOW High options	SMS
Alarm SMS	Configure Action for SMS	Short message content, Max 64bytes	NULL

### 3.2.6 Work Mode Setting



Parameters	Description	Instruction	Default
Mode Select	ONLINE/WAKEUP	<b>[ONLINE]</b> After powered on, D82 automatically connect and reconnect to data center server to keep online always. <b>[WAKEUP]</b> After Powered on, D82 will work on standby mode. Once D82 received wake up short message from defined phone number, or received the triggering data from terminal, D82 will dial up and connect to data center server. After idle time, D82 will re-enter wake up mode. <b>[SMS]</b> DTU works short message mode.	NULL
Retry Interval	D82 reconnect to data center server after interval time when connection is failed.	5~65535s	300s
Idle Interval		5~65535s	300s
Discard WAKEUP DATA			
SMS No.	Short message and call wake up and short message configuration from the specified number.	0~31bytes	NULL
Allow to Transfer SMS	D82 will transmit any short message to terminal	Enable/Disable	Disable
Transfer SMS	Transfer SMS to COM1/COM2	COM1/COM2 Options	COM1
Debugging	Control serial port debug information	NONE/DEBUG/STATUS/AT. Configure AT	

Parameters	Description	Instruction	Default
		<p>level during testing with PC. Configure NULL, then connect D82 to device.</p> <p><b>[NONE]</b> D82 won't send any information to serial port.</p> <p><b>[DEBUG]</b> D82 sends simple information to serial port. It's convenient to test D82.</p> <p><b>[Status]</b> D82 sends operation status, signal strength to serial.</p> <p><b>[AT]</b> D82 sends all debug information to serial port. It's convenient to test D82</p>	
Switch CMD	D82 will be switched to configuration mode from transmission mode. After switched to configuration mode, The D82 will enter command mode to communicate with terminal.	6 visible characters	++++++

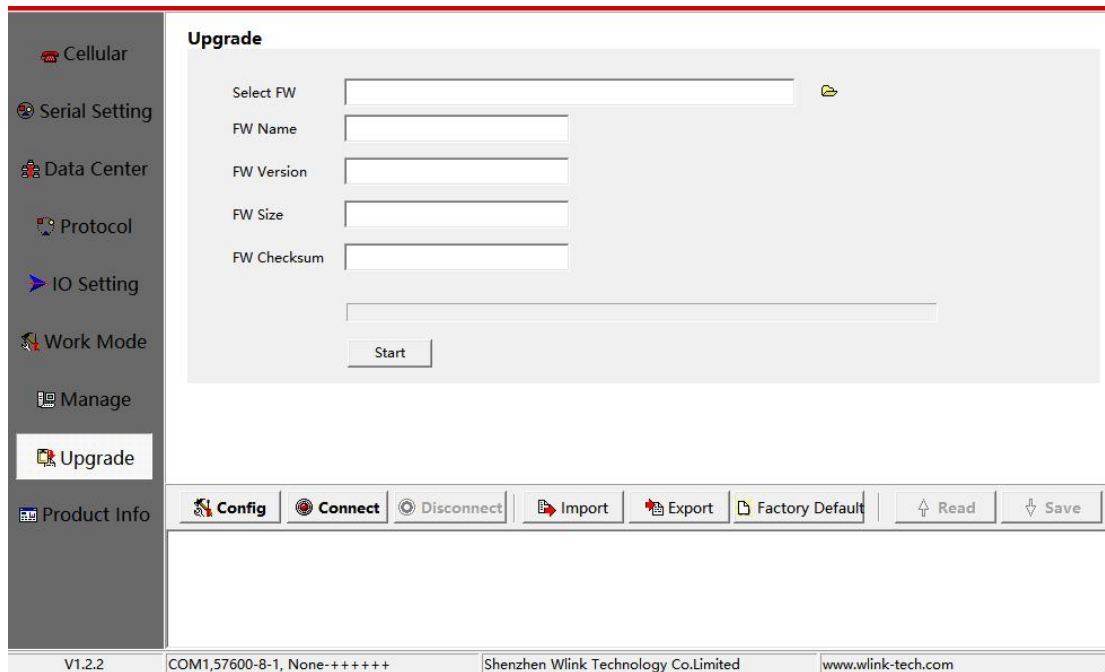
### 3.2.7 Manage settings

#### Remote management settings instruction

Parameters	Description	Instruction	Default
Run Mode		Online/Timing mode options	Online
Start Interval	D82 will connect to remote management software as this start interval time.	0 means this function is invalid.	
Reconnection	D82 will reconnect to remote	0~65535s	1440s

Parameters	Description	Instruction	Default
	management software as this interval time when the connection is down.		
Remote IP	WLINK remote management platform IP address in HQ	D82 will automatically login WLINK management platform so that customers might manage and monitor D82 in platform	0.0.0.0
Port		0~65535	51010
Domain Name	No static IP in HQ	Domain name is available when the IP address is setup 0.0.0.0	NULL

### 3.2.8 Upgrade settings



#### Upgrade settings instruction

Parameters	Description	Instruction	Default
Select Firmware	Select firmware	The firmware is Bin file	
Firmware Name	Firmware name		
Firmware Version	Firmware version		
Firmware Size	Firmware size		
Firmware Checksum	Firmware Verification		
Start	Upgrade firmware	Click Start button to upgrade firmware. Restart D82 modem after upgrade is	

Parameters	Description	Instruction	Default
		completed.	

### 3.2.9 Production Info

#### Information instruction

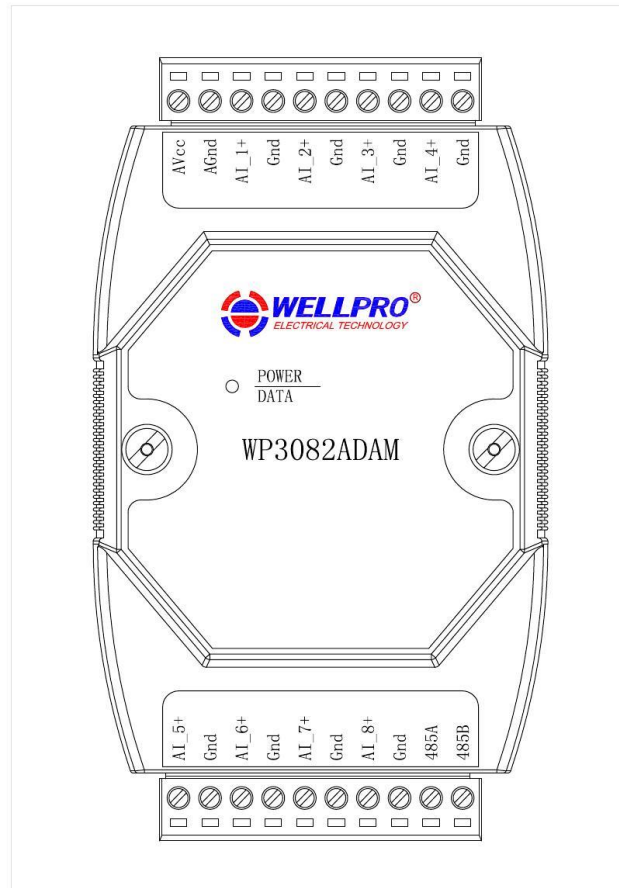
Parameters	Description	Instruction	Default
Product Name			
Product Model			
Serial Port Type			
Version			
SN			

---End

# WP3082ADAM

## User's Manual

### Version 1.42A



Shanghai Wellpro Electrical Technology Co., Ltd.  
[www.shwellpro.com](http://www.shwellpro.com)

### 1、Product description

- Eight current input channel: DC0~20mA / DC4~20mA
- RS485 MODBUS RTU standard communication protocol
- Netted with configuration software, PLC or industry touch panel
- Communication status LED
- Communication circuit designed for thunder protection and interference immunity
- Used for signal collection and control in industrial field

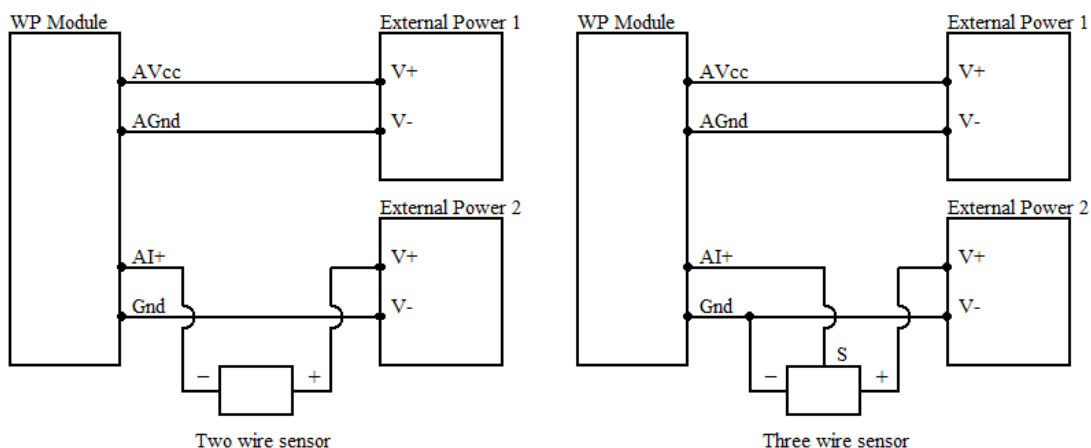
### 2、Specification

- Analog input channel 8ch
- Analog input range DC0~20mA / DC4~20mA
- Analog input accuracy ±0.02mA
- Working temperature -20~70°C
- External power supply DC9V~30V/2W
- Isolation protection DC1500V
- Installation method Standard DIN slide rail or screw
- Dimension 125×73×35mm

### 3、Interface description

AVcc	External power supply input positive
AGnd	External power supply input negative / Power ground
AI_1+	Current input channel 1 positive
Gnd	Current input channel negative / Common analog ground
AI_2+	Current input channel 2 positive
Gnd	Current input channel negative / Common analog ground
AI_3+	Current input channel 3 positive
Gnd	Current input channel negative / Common analog ground
AI_4+	Current input channel 4 positive
Gnd	Current input channel negative / Common analog ground
AI_5+	Current input channel 5 positive
Gnd	Current input channel negative / Common analog ground
AI_6+	Current input channel 6 positive
Gnd	Current input channel negative / Common analog ground
AI_7+	Current input channel 7 positive
Gnd	Current input channel negative / Common analog ground
AI_8+	Current input channel 8 positive
Gnd	Current input channel negative / Common analog ground
485B	RS485 signal B-
485A	RS485 signal A+

### 4、Analog input application diagram





## 5、Communication description

### 5.1、Communication parameter: 9600, None, 8, 1 (default setting)

Parameter	Description
9600	baud rate
None	check bit
8	data bit
1	stop bit

### 5.2、Command for analog input data reading

Send: 01 03 00 00 00 08 44 0C (example/hex)

data	byte	data description	remark
01	1	module address	address range:01-FE
03	1	function code	03-read holding register
0000	2	register address (4X type)	0000-starting register address
0008	2	register number	0008-read 8 registers
440C	2	CRC check code	CRC check code for all data

Receive: 01 03 10 09 CE 00 00 00 00 00 00 00 00 00 00 00 00 00 00 6C 5B (example/hex)

data	byte	data description	remark
01	1	module address	address range:01-FE
03	1	function code	03-read holding register
10	1	byte of data	10-read 16 bytes
09CE	16	read data	09CE-analog input channel 1 data
0000			0000-analog input channel 2 data
0000			0000-analog input channel 3 data
0000			0000-analog input channel 4 data
0000			0000-analog input channel 5 data
0000			0000-analog input channel 6 data
0000			0000-analog input channel 7 data
0000			0000-analog input channel 8 data
6C5B	2	CRC check code	CRC check code for all data

This command reads module's current input data.

The data of the analog input channel 1 is "09CE", it will be 2510 after converting to decimal data. Put it in the formula:  $I=DATA*20/4095=2510*20/4095\approx 12.26\text{mA}$ . The current of other analog input channel is 0mA.

### 5.3、Command for module address setting

Send: 00 06 00 64 00 01 08 04 (example/hex)

date	byte	data description	remark
00	1	module address	00-broadcast address
06	1	function code	06-write single holding register
0064	2	register address (4X type)	0064-module address register
0001	2	write data	0001- module address, range:0001-00FE
0804	2	CRC check code	CRC check code for all data

Receive: 00 06 00 64 00 01 08 04 (example/hex)

This command sets module address (slave address) as "01" (default setting). This setting could be saved when power off. This is a broadcast command. It needs to ensure that only one module is connected to the master. When module receives correct command, it will send response back to the master.

### 5.4. Command for communication parameter setting

Send: 01 06 00 65 00 02 18 14 (example/hex)

data	byte	data description	remark
01	1	module address	address range:01-FE
06	1	function code	06-write single holding register
0065	2	register address (4X type)	0065-communication parameter register
0002	2	write data	0001- 4800, None, 8, 1 0002- 9600, None, 8, 1 0003- 19200, None, 8, 1 0004- 38400, None, 8, 1 0005- 4800, Even, 8, 1 0006- 9600, Even, 8, 1 0007- 19200, Even, 8, 1 0008- 38400, Even, 8, 1
1814	2	CRC check code	CRC check code for all data

Receive: 01 06 00 65 00 02 18 14 (example/hex)

This command sets communication parameter as “9600, None, 8, 1” (default setting). This setting could be saved when power off.

When module receives correct command, it will send response back to the master.

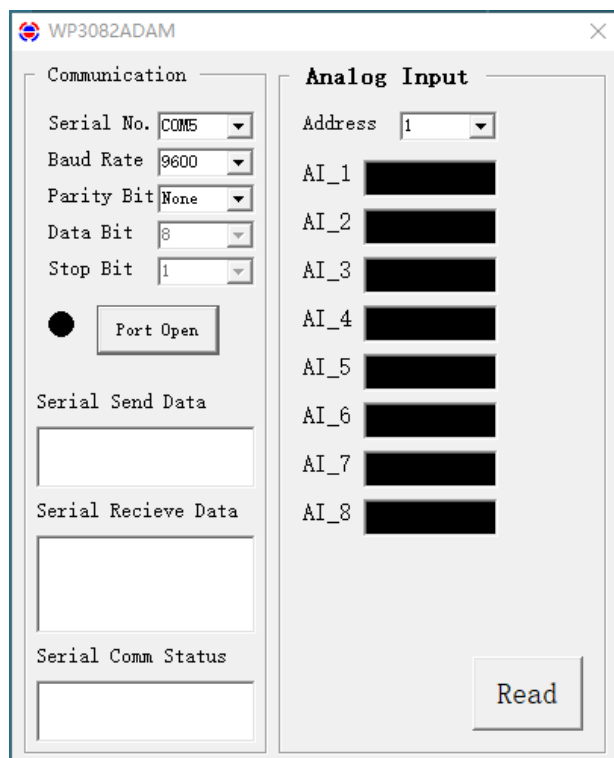
### 6. POWER/DATA LED description

- When module powered on, LED is green.
- When module is under communication, LED is twinkling.
- When module receives correct command, LED is green.
- When module receives incorrect command or other module’s command, LED is red.

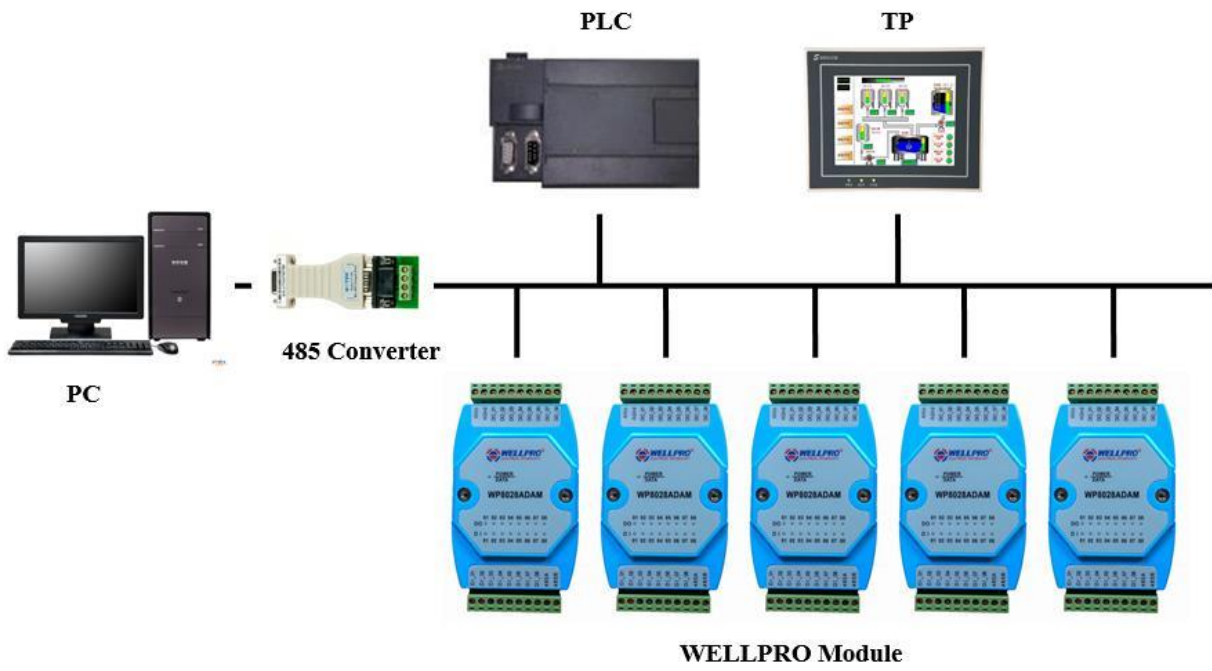
### 7. PC debugging description

We provide a debugging software for function testing and parameter setting. Please follow the steps below:

- Connect computer to module with RS485 converter.
- Connect DC12V or DC24V power to module and power on. To avoid any unnecessary damage, please make sure the power positive and negative terminals are correctly connected before power on.
- Open the software and select the model of module, you will see the window of function testing or parameter setting.
- Set communication parameter and open the serial port.
- Select corresponding setting and click “Read” or “Write” button.



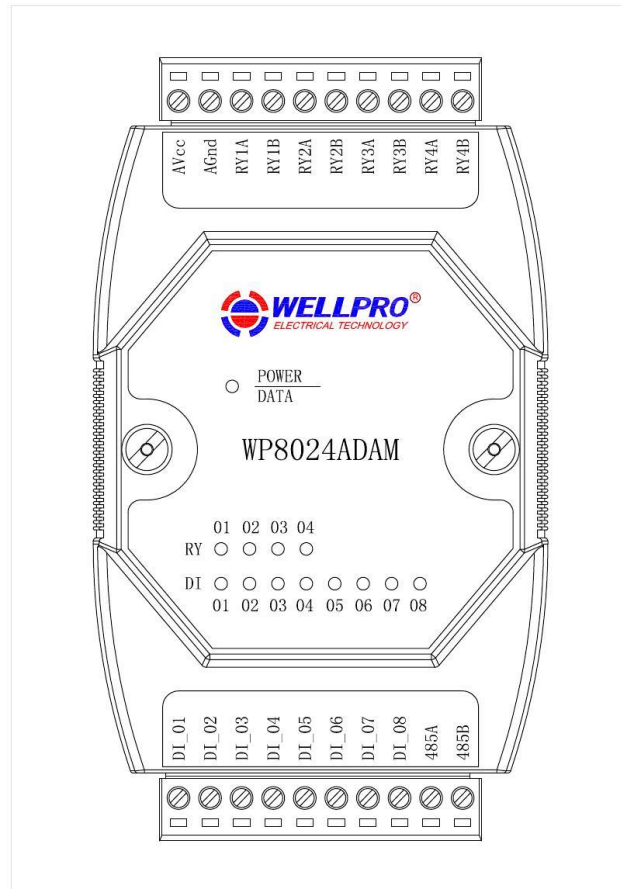
## 8、RS485 network diagram



# WP8024ADAM

## User's Manual

### Version 1.42A



### 1、 Product description

- Eight optoelectronic isolation digital input channel (Low level input)
- Four relay output channel (SPST)
- RS485 MODBUS RTU standard communication protocol
- Netted with configuration software, PLC or industry touch panel
- Communication, digital input and digital output status LED
- Communication circuit designed for thunder protection and interference immunity
- Used for signal collection and control in industrial field

### 2、 Specification

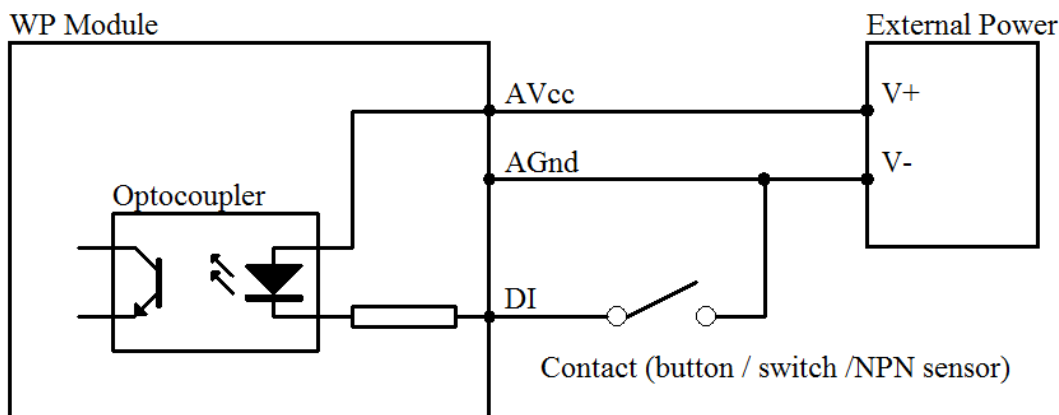
- Digital input channel 8ch (Low level input)
- Relay output channel 4ch (SPST)
- Relay contact capacity 2A/250VAC 2A/30VDC
- Working temperature -20~70°C
- External power supply DC9V~30V/5W
- Isolation protection DC1500V
- Installation method Standard DIN slide rail or screw
- Dimension 125×73×35mm

### 3、 Interface description

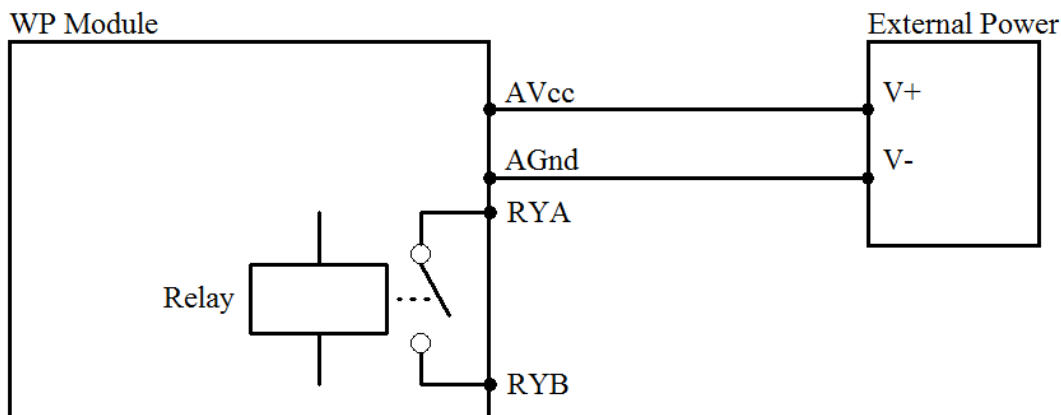
AVcc	External power supply input positive
AGnd	External power supply input negative / Power ground
RY1A	Relay output channel 1 normally open contact A
RY1B	Relay output channel 1 normally open contact B
RY2A	Relay output channel 2 normally open contact A
RY2B	Relay output channel 2 normally open contact B
RY3A	Relay output channel 3 normally open contact A
RY3B	Relay output channel 3 normally open contact B
RY4A	Relay output channel 4 normally open contact A
RY4B	Relay output channel 4 normally open contact B
DI_01	Digital input channel 1
DI_02	Digital input channel 2
DI_03	Digital input channel 3
DI_04	Digital input channel 4
DI_05	Digital input channel 5
DI_06	Digital input channel 6
DI_07	Digital input channel 7
DI_08	Digital input channel 8
485B	RS485 signal B-
485A	RS485 signal A+

### 4、 Digital application diagram

#### 4.1、 Digital input application diagram



4.2. Digital output application diagram



5. Communication description

5.1. Communication parameter: 9600, None, 8, 1 (default setting)

Parameter	Description
9600	baud rate
None	check bit
8	data bit
1	stop bit

5.2. Command for digital input data reading

Send: 01 02 00 00 00 08 79 CC (example/hex)

data	byte	data description	remark
01	1	module address	address range:01-FE
02	1	function code	02-read digital input register
0000	2	register address (1X type)	0000-starting register address
0008	2	register number	0008-read 8 registers
79CC	2	CRC check code	CRC check code for all data

Receive: 01 02 01 C2 20 19 (example/hex)

data	byte	data description	remark
01	1	module address	address range:01-FE
02	1	function code	02-read digital input register
01	1	byte of data	01-read 1 byte
C2	1	read data	C2-digital input data
2019	2	CRC check code	CRC check code for all data

This command reads module's digital input data.

The data of the digital input is "C2", it will be "11000010" after converting to binary data. The eight bits of data correspond to DI\_08~DI\_01. It means DI\_08, DI\_07 and DI\_02 are ON.

5.3. Command for digital output data setting (Control of multiple channels)

Send: 01 0F 00 00 00 04 01 03 7E 97 (example/hex)

data	byte	data description	remark
01	1	module address	address range:01-FE
0F	1	function code	0F-write multiple digital output register
0000	2	register address (0X type)	0000-starting register address
0004	2	register number	0004-write 4 registers
01	1	byte of data	01-write 1 byte
03	1	write data	03-digital output data
7E97	2	CRC check code	CRC check code for all data

Receive: 01 0F 00 00 00 04 54 08 (example/hex)

This command sets module to output multiple channels.

The data of the digital output is "03", it will be "00000011" after converting to binary data. The last four bits of data correspond to RY4~RY1. It means RY2 and RY1 are ON.

When module receives correct command, it will send response back to the master.

5.4. Command for digital output data setting (Control of single channel)

Send: 01 05 00 00 FF 00 8C 3A (example/hex)

data	byte	data description	remark
01	1	module address	address range:01-FE
05	1	function code	05-write single digital output register
0000	2	register address (0X type)	0000-digital output channel 1 register 0001-digital output channel 2 register 0002-digital output channel 3 register 0003-digital output channel 4 register
FF00	2	write data	FF00-ON, 0000-OFF
8C3A	2	CRC check code	CRC check code for all data

Receive: 01 05 00 00 FF 00 8C 3A (example/hex)

This command sets module to output single channel.

When module receives correct command, it will send response back to the master.

5.5. Command for digital output data reading

Send: 01 01 00 00 00 04 3D C9 (example/hex)

data	byte	data description	remark
01	1	module address	address range:01-FE
01	1	function code	01-read digital output register
0000	2	register address (0X type)	0000-starting register address
0004	2	register number	0004-read 4 registers
3DC9	2	CRC check code	CRC check code for all data

Receive: 01 01 01 03 11 89 (example/hex)

data	byte	data description	remark
01	1	module address	address range:01-FE
01	1	function code	01-read digital output register
01	1	byte of data	01-read 1 byte
03	1	read data	03-digital output data
1189	2	CRC check code	CRC check code for all data

This command reads module's digital output data.

The data of the digital output is "03", it will be "00000011" after converting to binary data. The last four bits of data correspond to RY4~RY1. It means RY2 and RY1 are ON.

## 5.6. Command for module address setting

Send: 00 06 00 64 00 01 08 04 (example/hex)

date	byte	data description	remark
00	1	module address	00-broadcast address
06	1	function code	06-write single holding register
0064	2	register address (4X type)	0064-module address register
0001	2	write data	0001- module address, range:0001-00FE
0804	2	CRC check code	CRC check code for all data

Receive: 00 06 00 64 00 01 08 04 (example/hex)

This command sets module address (slave address) as “01” (default setting). This setting could be saved when power off. This is a broadcast command. It needs to ensure that only one module is connected to the master. When module receives correct command, it will send response back to the master.

## 5.7. Command for communication parameter setting

Send: 01 06 00 65 00 02 18 14 (example/hex)

data	byte	data description	remark
01	1	module address	address range:01-FE
06	1	function code	06-write single holding register
0065	2	register address (4X type)	0065-communication parameter register
0002	2	write data	0001- 4800, None, 8, 1 0002- 9600, None, 8, 1 0003- 19200, None, 8, 1 0004- 38400, None, 8, 1 0005- 4800, Even, 8, 1 0006- 9600, Even, 8, 1 0007- 19200, Even, 8, 1 0008- 38400, Even, 8, 1
1814	2	CRC check code	CRC check code for all data

Receive: 01 06 00 65 00 02 18 14 (example/hex)

This command sets communication parameter as “9600, None, 8, 1” (default setting). This setting could be saved when power off. When module receives correct command, it will send response back to the master.

## 6. POWER/DATA LED description

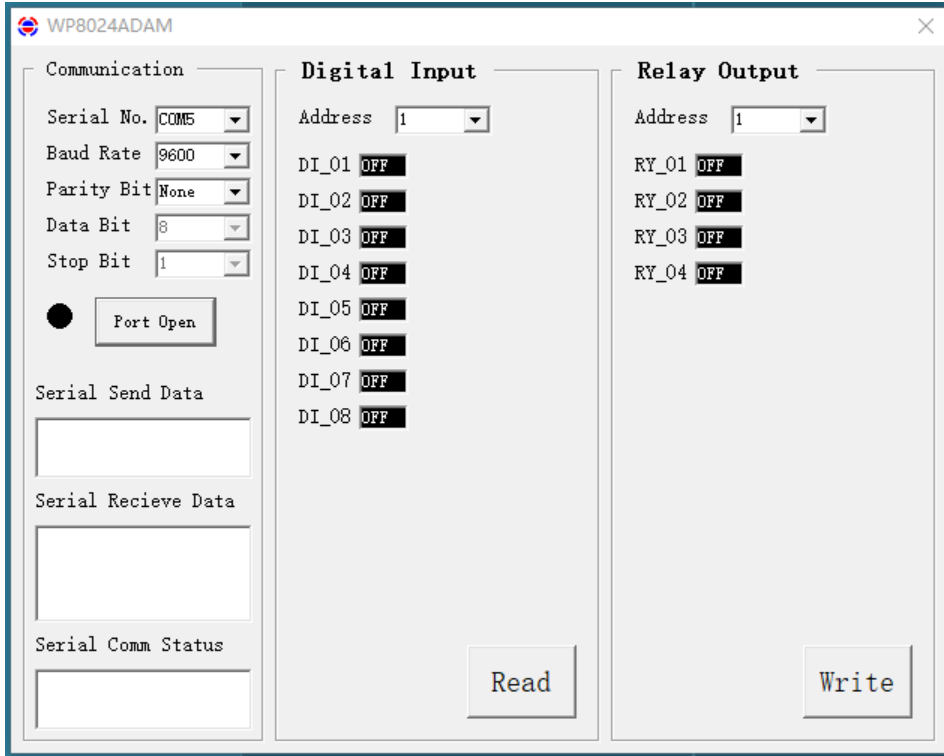
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- When module receives incorrect command or other module's command, LED is red.



## 7、PC debugging description

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- Open the software and select the model of module, you will see the window of function testing or parameter setting.
- Set communication parameter and open the serial port.
- Select corresponding setting and click “Read” or “Write” button.



## 8、RS485 network diagram

