



晶發科技有限公司  
**GI FAR TECHNOLOGY CO.,LTD**

No. 11, Lane 249, Sec. 2, Chung Shan Rd., Shulin City, Taipei Hsien, Taiwan, R.O.C.

GFR-2400M

# SPECIFICATIONS

**CUSTOMER :** \_\_\_\_\_  
**SAMPLE CODE :**           **GFR-2400M**            
**DRAWIG NO. :** \_\_\_\_\_  
**DATE :**           **2008.07.03**          

Customer Sign	Sales Sign	Approved By	Prepared By

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GFR-2400M

## Wireless Data Transmitting Controller Instruction Manual

Model: GFR-2400M





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## Important Event

- This product is in general use for the equipment on the premise of the development, design, manufacture. Do not use that require high security purposes, such as machinery or medical, aviation equipment, machinery and transport-related deaths are directly or indirectly related to the system.
- This product should be in this brochure by the instructions of the types and rated voltage power under the current proper use. If violation of this statement by the safety records of the supply operation, I am afraid our company can not afford any of the responsibility.
- Do not self-decomposition, alteration, repair of the products also will cause fire, electric shock, fault, and dangerous. In addition, their decomposition, alteration, repair the product, failure is not within the scope of warranty.
- The products are not waterproof, so please do not use and touch water. Take off and on also please note. Rain, spray, drinks, steam, sweat may be a failure.
- Use of this product, please be sure to use according to the statement recorded by the use of methods to operate. Please do not violate particular attention to the matter reminded to use.
- Failure on the products, our company is under certain conditions guarantee maintenance.
- Please respect this statement recorded by the note. When consumers in contravention of this statement recorded note of the operation, I am afraid our company could not shoulder any responsibility.
- Products are defective, the Company will be responsible for free to amend the flaws, or to the same flawless product or its equivalent products in exchange. However, the Company does not assume based on the requirements of the flaw and loss responsibility.
- The Company reserves the right to retain without notice to users of the cases, the product of hardware / software (version upgrade) is with the right to edit.

## ■ Declaration

This product can accord with telecommunication regulation FCC/CE norms of various countries according to using setting up different frequency.

## ■ Certificate

This product can be set to different frequencies, to comply with the national telecommunications laws and FCC/ CE norms.



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## ■ Warranty

The warranty time is within one year from purchased date. The warranty scope are used in normal situation and none vandalism. (Some function harmful out of warranty scope and Vandalism are Un-warranty).

Un-warranty Scope Description:

- Because the natural disaster, accident or human factor to cause the bad damage.
- Violate the product instruction manual to cause the damage of the products.
- The improper assemble causes damage.
- The products used the unsanctioned accessory to cause damaged.
- Overstep the allowed used environment to cause the products damaged.

## ■ Contact Us

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## Introduce

GFR-2400M is for a two-way wireless data transmission products and work for the 868 ~ 928 MHz frequency, mainly to provide two-way wireless transmission. GFR-2400M provide a RS-232 (TTL level) and 485 interface (CMOS level), as long as the user interface in support of the application of internal and RS-485 or RS-232 communications, will be the standard Serial interface for wireless data transmission. There are several transfer modes as following:

- Broadcasting mode: a transmitter can be connected with all distances in the launch of the GFR-2400M.
- Point-to-point transmission mode: through the instructions set, it will send the information required to specify the ID on the GFR-2400M.

In this paper, a detailed description of GFR-2400M two-way wireless data transmission modules related hardware interface and instructions for use. GFR-2400M as a complete collection of RF circuit, particularly suited for wireless products, such as monitoring, scheduling, data transmission, industrial control, wireless meter reading system. It can also direct as end products, information transmission,

## Function Block Diagram

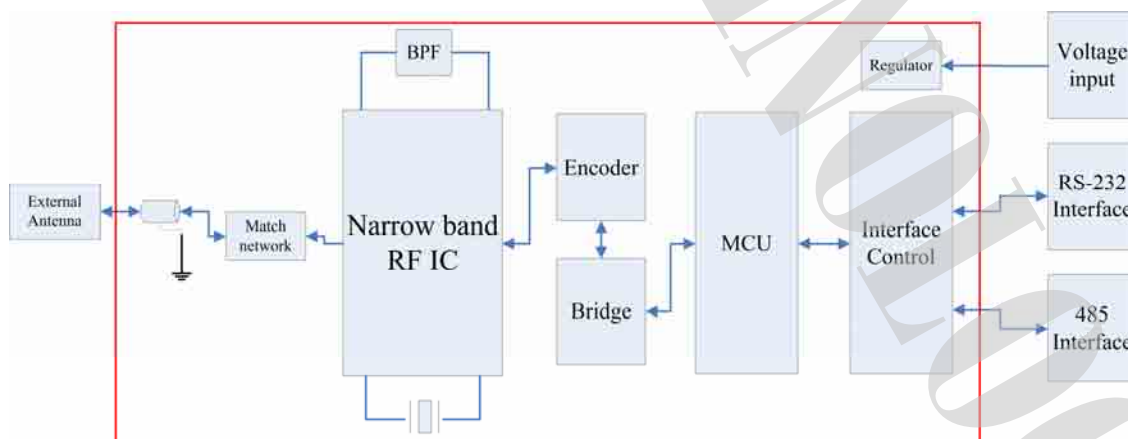


Chart 1 GFR-2400M

### function block diagram

GFR-2400M sets a complete circuit and RF transceiver interface, Figure 1 is for the GFR-2400M features diagram. The main components include: MCU processor, RF circuits, memory, power and system connector. It can be an external antenna. Besides, the system connector can connect an external power supply, serial interface, RS-485 interface. In Figure 1, red box for the GFR-2400M within the various components of the motherboard, but the red line is for the external interface. GFR-2400M motherboard completed a wireless data transmission of all the features, including RF norms and RF data encryption, such as radio frequency calibration instructions. There is also: RS-232 interface and RS-485 interface, LED indicator light. And followings will be briefed on the motherboard and external interfaces, and other parts of the function.





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## Feature Brief

### A. MCU Processor

MCU processor is to complete all the GFR-2400M signal processing functions, including information on the RF transceiver, LED light's instructions, the key judgment, RS-232/RS-485 data processing.

### B. RF Circuit

Radio frequency circuit is to provide a 868 ~ 928 MHz transceiver channels, including the reception circuit, firing circuit, Synthesis circuit.

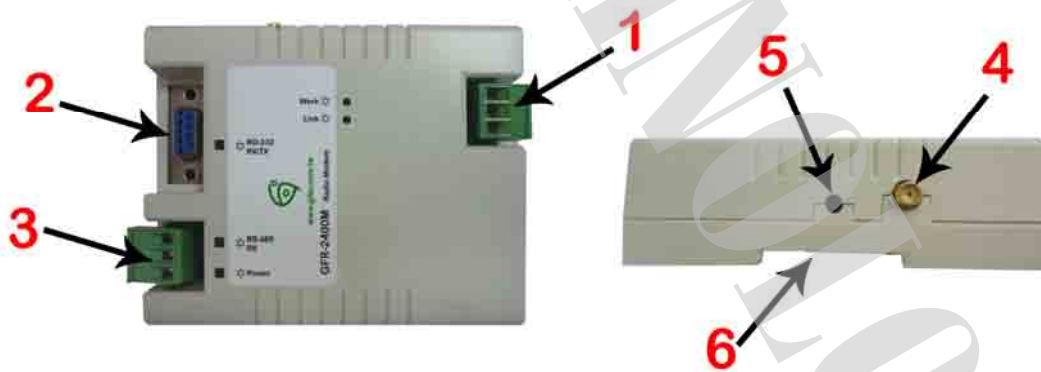
### C. Memory

Main memory used is to store the current operating frequency and RF transmission rate.

### D. Power Circuit

It can be AC or DC input.

## Connection Plans



Indication Position	Item	Description
1	AC/DC INPUT	Outer Power Input
2	RS-232	RS-232 (TTL)
3	RS-485	RS-485 (CMOS)
4	Antenna	Antenna input position
5	Settings Button	Within the parameters of Laws
6	Track	Put into the alum. Track position



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## Electric Characteristic

Item	Specification	Remarks
Voltage Range	AC : 9~30V ; DC : 8V~28V	
Frequency Range	868~928MHz	
Output Power	10mW	
Antenna	1/4λ wire antenna	Gain of 2.14 dBi or less
Antenna Power	Within 8 +20% -50%	Contact (50 Ω)
Modulation System	Binary FSK	
Oscillation System	PLL synthesizer system	
Radio Communication Speed	1.2~250Kbps	
Number of Channels	4800	Channel span 12.5KHz
Receiver Sensitivity	-112dBm(1200bps)	Packet error rate 1% (253 bytes/1 packet)
Working Temperature	-40°C ~+85°C	
Storage Temperature	-50°C ~+150°C	
Consumption Current	31mA I/O Port Open 5mA I/O Port Close	Sleep Mode (Operating Voltage 15V)
Consumption Current	51mA I/O Port Open 25mA I/O Port Close	Standby Mode (Operating Voltage 15V)
Consumption Current	55mA	RF Operating Mode (Operating Voltage 15V)
External Dimensions	109 mm × 86.4 mm × 33.3 mm (W × D × H)	
Unit Weight	23.5g	
Interface	RS-232/ RS-485	



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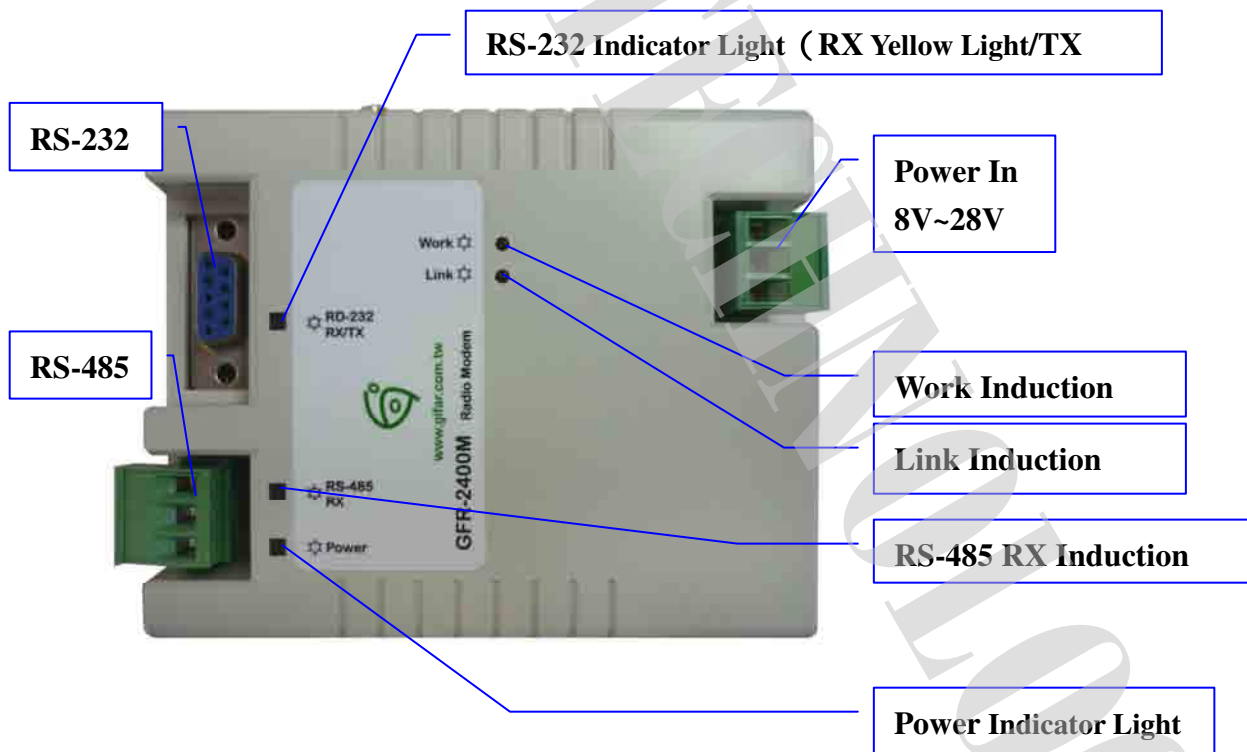
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## UART Interface Specifications

Item	Specification
Communication Method	Serial communication (RS232C format)
Synchronization	Start-stop (asynchronous)
Data Speed	1,2K / 2,4K / 4,8K / 9,6K / 19,2K / 38,4K / 56K /115.2K bps
Other Parameters	Data length 8 bits, no parity, stop bits 1 or 2

➤ **GFR-2400M provides five LED indicator**





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## ➤ *Description of the functions of lights*

### **Power supply indicator:**

When the light turn on the power and it is representative of electricity.

### **RS-232 light (RX yellow / TX blue):**

When RS-232 data received a yellow light, it is extinguished once. When RS-232 or RS-485 transmission of data, it will flash a blue light.

### **RS-485 RX indicator:**

When RS-485 receipt of data, RS-485 RX indicator will light that flashes once.

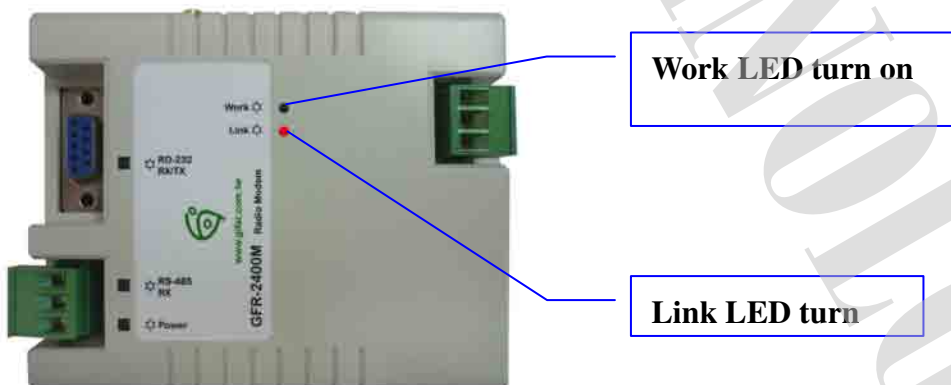
### **Work lights:**

The normal work of state-to-hang, the data sent or received data in the process will not be bright, shiny handle the latter is the continued (such as the wrong message will be flashing three seconds).

### **Link indicator:**

Normal state, such as the information received, Link LED lights will be bright and 30 seconds.

**First, set into the model: Link LED lights extinguished, Work LED lights will be flashing.**





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Second, when the set after the completion: Link LED and Work LED lights will be flashing alternately for five times.



Link LED and Work LED  
will ordinate flashes 5

Third, link LED lights flashing, Work LED lights: a representative of the frequency effect is working now.



Work LED goes

Link LED flash



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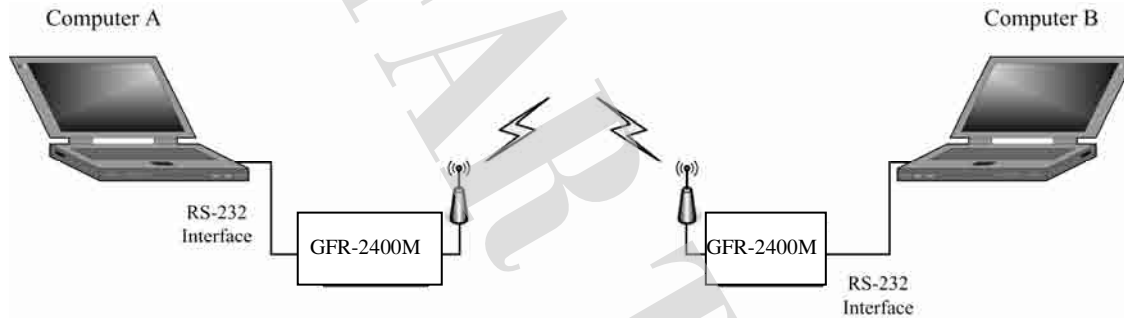
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## Application

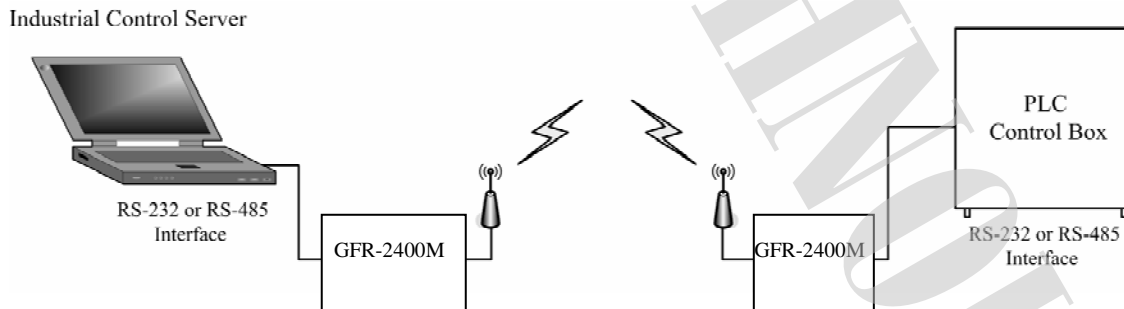
### ➤ Example 1 :

Computer through the RS-232 interface link to GFR-2400M, can be small and remote data transmission network functions.



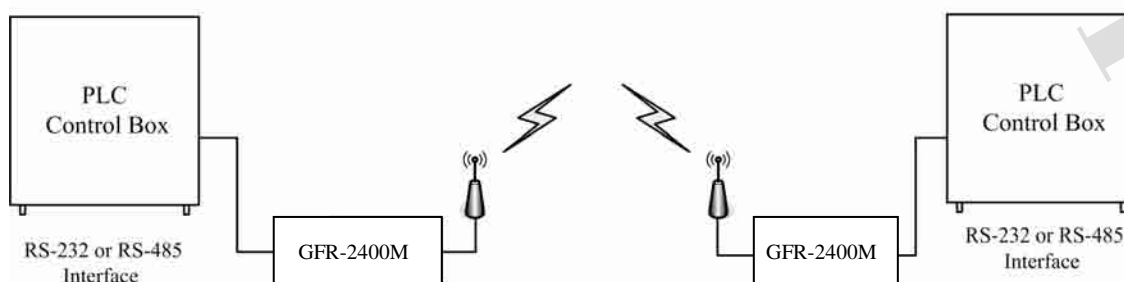
### ➤ Example 2 :

Computer and industrial control through RS-232/RS-485 interface link to GFR-2400M, and it can be remote-control and data monitoring functions.



### ➤ Example 3 :

Industrial control through RS-232/RS-485 interface and link to GFR-2400M, it can be remote data transmission and monitoring functions.





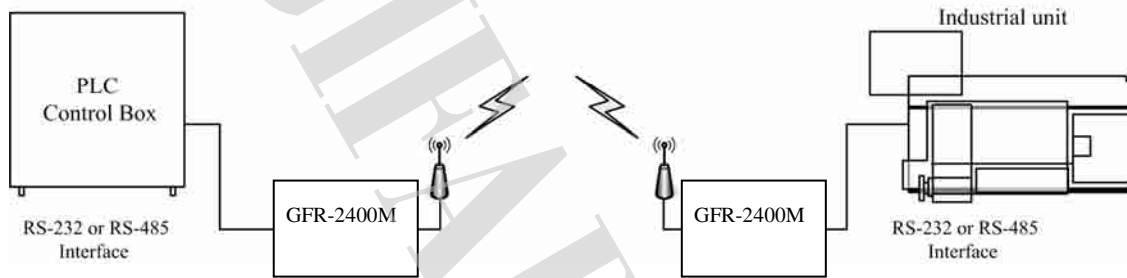
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➤ **Example 4 :**

Industrial control me through RS-232/RS-485 interface and link to GFR-2400M, it can be remote controlled industrial control equipment.





## Interface Description

### A. Power

GFR-2400M can be used AD/DC to supply power. The voltage is 9V~28V. In order to guarantee the module is working normally, the DC power should have the output ability for 100mA peak current.

### B. Serial Interface

- GFR-2400M provides a standard RS-232/RS-485 serial interface, users can through serial interface to send and receive information. Please refer to specific interface connection of this P.5 system.
- Use the back of the GFR-2400M switch means for 1,2,3,4 (ON allocated to 1) to select the transmission rate of the number and choice of RS-232 or RS-485's user interface. Please see table 1.

Means for switching 4	Means for switching 3	Means for switching 2	Means for switching 1	Rate	Interface
0	0	0	0	1.2Kbps	RS-232
0	0	0	1	2.4Kbps	RS-232
0	0	1	0	4.8Kbps	RS-232
0	0	1	1	9.6Kbps	RS-232
0	1	0	0	19.2Kbps	RS-232
0	1	0	1	38.4Kbps	RS-232
0	1	1	0	56Kbps	RS-232
0	1	1	1	115.2Kbps	RS-232
1	0	0	0	1.2Kbps	RS-485
1	0	0	1	2.4Kbps	RS-485
1	0	1	0	4.8Kbps	RS-485
1	0	1	1	9.6Kbps	RS-485
1	1	0	0	19.2Kbps	RS-485
1	1	0	1	38.4Kbps	RS-485
1	1	1	0	56Kbps	RS-485
1	1	1	1	115.2Kbps	RS-485

Chart 1.

## Setup Wireless Transfer Rate and the Frequency Mode

Press the button settings (SETUP KEY), GFR-2400M that is set into the state. Work LED lights flash, Link LED lights-out, and then PC or micro-controller may be RS-485 or RS-232 interface under instructions to amend GFR-2400M wireless transmission frequency and wireless transmission rate. After GFR-2400M settings will be automatically deposited, it will return to have completed at the same data, and return of a PC or microcontrollers at finally.





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## ➤ **Instruction Format**

Frequency and wireless transmission rate of 0 XABCDEFGHIJKLMN written instructions were nine bytes with 16-band. If it is more than nine bytes, less than nine bytes or two before the byte is not equivalent to 0 x1234, the GFR-2400M are disregarded.

ABCD is fixed leader orders for its information "1234 H".

E is fixed at 0 H.

F is for the wireless transmission rate settings.

Value	0	1	2	3	4	5	6	7	8	9	A	E
Speed bps	1200	2400	4800	9600	19.2K	38.4K	50K	76.8K	100K	153.6K	200K	250K
Note: When transmission rate is getting lower, the translation distance is getting farther. The initial value is 9600bps.												

GHIJKL is wireless transmission frequency settings, each is based to 10KHz.

For example, 868MHz = 015310H

922.56MHz = 016860H (initial value of 925MHz)

MN is for the GFR-2400M of the ID number (the initial value of 0 x00).

Following is an example of that value:

RF transmission rate of 19.2Kbps

Operating frequency is: 868.00MHz, GFR-2400M ID code is 10, fixed packet length of 251 bytes.



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BIT47	BIT46	BIT45	BIT44	BIT43	BIT42	BIT41	BIT40
0	0	0	1	0	0	1	0
Location information instructions A (fixed leader script)				Location information instructions B (fixed leader script)			
BIT39	BIT38	BIT37	BIT36	BIT35	BIT34	BIT33	BIT32
0	0	1	1	0	0	1	1
Location information instructions C (fixed leader script)				Location information instructions D (fixed leader script)			
BIT31	BIT30	BIT29	BIT28	BIT27	BIT26	BIT25	BIT24
0	0	0	0	0	1	0	0
E location information directive				Directive location information F (wireless transmission rate set)			
BIT23	BIT22	BIT21	BIT20	BIT19	BIT18	BIT17	BIT16
0	0	0	0	0	0	0	1
Directive location information G (frequency settings)				Command position information H (frequency settings)			
BIT15	BIT14	BIT13	BIT12	BIT11	BIT10	BIT9	BIT8
0	1	0	1	0	0	1	1
Directive location information I (frequency settings)				Directive location information J (frequency settings)			
BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
0	0	0	1	0	0	0	0
Directive location information K (frequency settings)				Directive location information L (frequency settings)			
BIT7	BIT6	BIT5	BIT4	BIT3	BIT2	BIT1	BIT0
0	0	0	1	0	0	0	0
Directive location information M (GFR-2400M ID)				Directive location information N (GFR-2400M ID)			
1	1	1	1	1	0	1	1
Directive location information O (packet length)				Directive location information P (packet length)			



## Command Communication Mode

### Read equipment parameters of command:

Send value = 0 x1234567868ACFD

Return = 03 01 69 54 02

03 = wireless transmission rate (9600 Kbps), 01 69 54 = equipment frequency (925 MHz),

02 = equipment ID code (2)

### Read RSSI parameters of command:

Send value = 0 x1234567868ACFE

Return value = BC

BC = RSSI value

### SLEEP MODE parameters of command:

Send value = 0 x1234567868ACFF

After the equipment sent immediately into Sleep mode, as long as the serial received information will be automatically wake-up equipment into standby mode.

### Point-to-point transmission mode parameters of command:

Send value = 0 x1234567868AC0000SSTDDDDDDDDDD

SS is on behalf of the GFR-2400M for the ID number,

TT is on behalf of the ID number of receiver.

DDDD is on behalf of data (not set this mode, GFR-2400M are broadcasting operation.)

## General Communication Mode

1. Choice RS-485 or RS-232 ports to be information communication.
2. Allocate to 4 switch "on" state, and it is the choice of RS-485 port. Or choose RS-232 ports only.
3. The port set up a total of eight kinds of work rate option, please refer to P.11 Table 1. In normal working condition, it changes its means for switching the location, GFR-2400M will automatically update the rate set port.
4. Connect the power cord and a good port and power lines.
5. Press the button set into the mode of all groups within the GFR-2400M RF work rate and the frequency set to work, otherwise it will not be able to send information. After re-electricity, GFR-2400M will automatically call the last set of work rate and frequency, as the current work rate and frequency.
6. Through the port to send data to the GFR-2400M, its members only in the receiving group within the scope of its information can be received and transmitted through its port user group.



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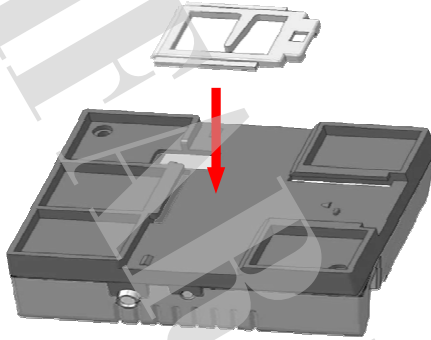
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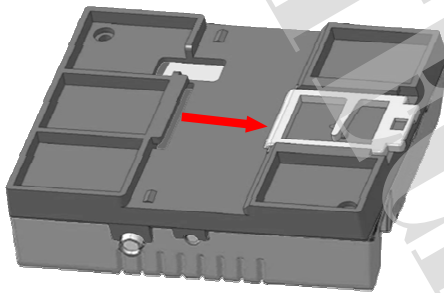
## Installation

- **Add to industrial control box aluminum track**

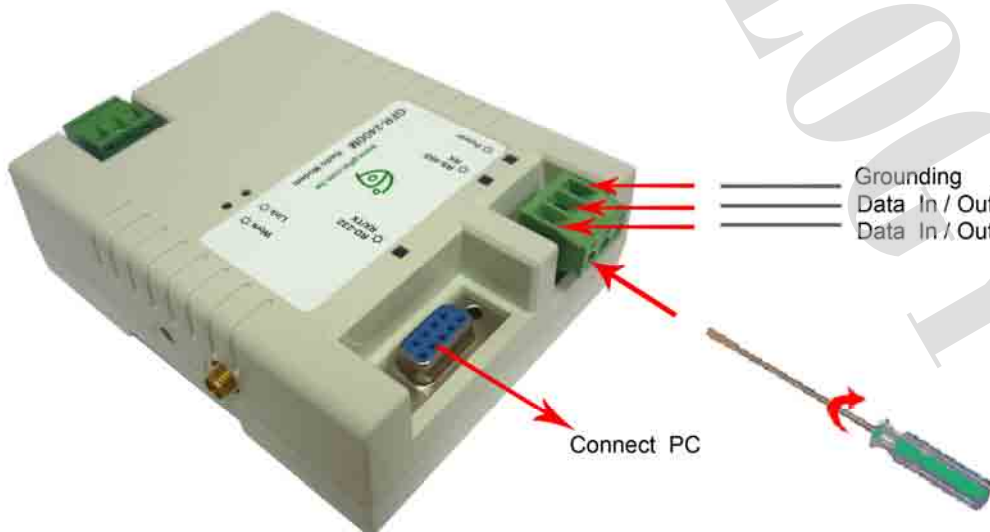
Step 1 :



Step 2 :



- **Wiring Boost**





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## ➤ **Install Antenna**

Standard Antenna



Lengthened Antenna



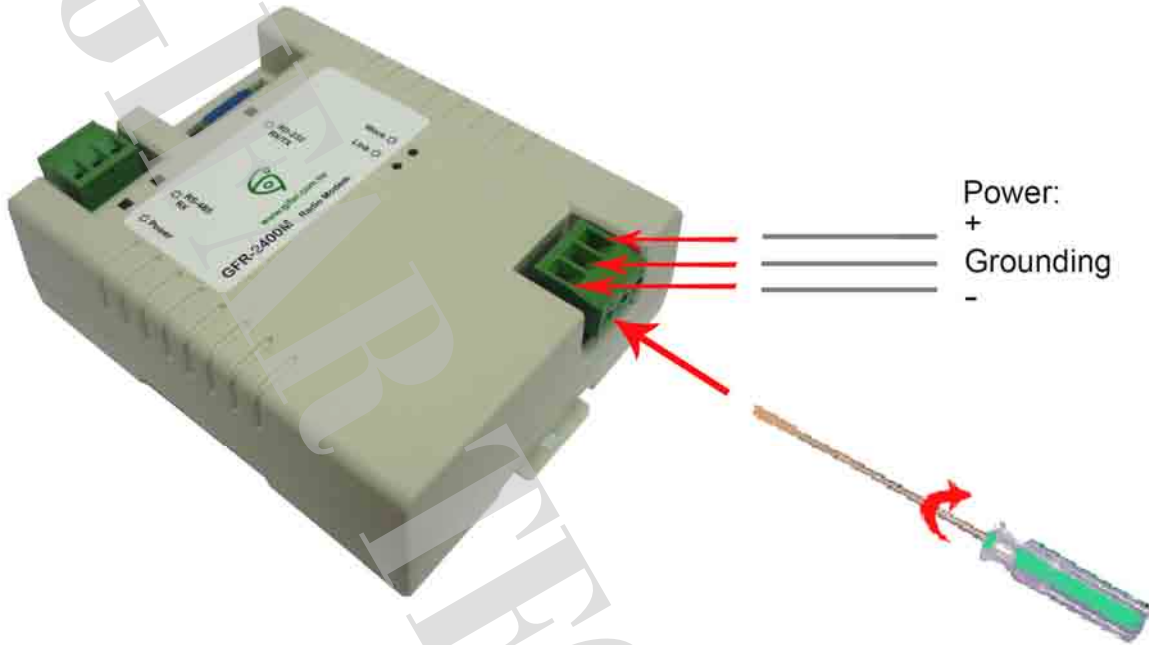


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## ➤ Connect Power



## The Reason of Un-Communication

1. Work LED is not bright, said the appliance or DSP processor is in question.
2. Work LED is bright, please re-set the work rate and RF frequency. After set the completion , please inspect Link LED Work LED will alternately flashing lights or not. If is not flashing, it said port communication has problems.

## The Reason of Communication Wrong

Q: Whether GFR-2400M can send the information over 253bytes?

A: GFR-2400M does not allow information over 253bytes to send a maximum of 251bytes.

Q: Whether or not the information at the first time with information on the second intermediate waiting for the short time interval at 8ms, and the high rate of a few interface, the wireless transmission rate set is too lower?

A: Solution—give time to wait for longer and fixed length of 251bytes packet sent as an example interval up to 50ms.




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## CE Caution Note (European Union)

Symbol of  It is on behalf of the devices is with EMC regulations (89/336 /EEC), and low-voltage requirements of the European Union (73/23 / EEC). To meet these standards on behalf of the EU to follow the following provisions (in brackets, and it is the international standards and regulations):

- EN 60950/A11: 1997 / (IEC 60950/A4: 1996), including e-commerce, information technology equipment safety
- EN 55024: 1998 (IEC 1000-4-2, 1000-4-3, 1000-4-4, 1000-4-5, 1000-4-6, 1000-4-8, 1000-4-11) -- "IT equipment - interference from properties - restrictions and testing methods"
- Chapter 2 - ESD (ESD) requirements
- Chapter 3 - Radiation electrostatic field needs
- Chapter 4 - rapid transmission of electronic / unexploded Chong (EFT) demand
- Chapter 5 - Surge demand
- Chapter 6 - radio frequency market demand led to the resistance
- Chapter 8 - demand for electrical frequency magnetic field
- Chapter 11 - Voltage dive, with a brief interruption voltage variation demand

## FCC Line with the Statement ( U.S.A. Only)

This equipment has passed the tests which is according to the FCC provisions of chapter 15 with class B digital device restrictions. These restrictions are designed to provide reasonable protection against installed in the home environment in the cause harmful interference.

This equipment maybe generates, uses, and radio frequency energy radiation .If your operation without in accordance with the manufacturer's instruction manual, it may interfere with wireless communications. However, there's no way to guarantee in a particular installation will not happen under interference. If the equipment does lead to harmful interference (can be opened and closed the equipment to be confirmed), we suggest that you try to use one or more of the following methods to try to interfere with that situation.

- Re-positioning receiver antenna or change its direction.
- Additional equipment and receiver of the separation.
- Requested that the equipment connected to the receiver of the circuit is different from the outlet.
- Please contact an experienced radio / TV technician for assistance.

Users can turn to the United States Federal Government Communications Commission published the following manuals: How to Identify and Resolve Radio-TV Interference Problems.

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