

Read this manual before operation

- The content include of electric connections and operating
- Read the manual to operate the systems

# RDACC-FIBER-V2.0

## User manual

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# CERTIFICATION DECLARATION



## CE

The product has been certified by the CE (Commutate European) safety certification. It has passed the corresponding conformity assessment procedure and the manufacturer's declaration of conformity, in accordance with the relevant EU directive。



## ROHS

This product has been certified by EU legislation (Restriction of Hazardous Substances) Safety certification; comply with relevant EU environmental regulations



## FCC

This product has been certified by the Federal Communications Commission for safety, Comply with us electronic safety regulations。

# SAFETY INFORMATION

When using this system, please make sure the operation is correct and safe. Some signs or text will be used to remind you to pay attention to the danger and some important information.



## **Dangerous:**

Indicates a serious danger. In the process of use, if the operation is improper or the way of use is wrong, it may cause serious injury or even death to the user. Please do not operate it easily until you have made sure that the operation method is correct and the way of use is correct.



## **Warning:**

If the operation is improper or the operation is not done with rules, which may cause the injury to operators, please do not operate the machine with out any rules and protection. Ensure the correct operation before use.



## **Cautious:**

Note the potential risk of the product. In the process of use, if the operation is wrong, it may cause damage to the product. Please do not use it until user has ensured that the operation method is correct and the usage is correct.



## **Important:**

Represents important information to be noticed when operate the product. Please do not ignore this information, this information will guide user to do a correct operation..



This sign indicates laser radiation, which is usually posted on products with laser output. Please be careful with laser and pay attention to safety when using this kind of equipment.

# Package, Delivery and Check

The product with metal shell can protect the external electrical components from damage. The products are packed in anti-static bags. If there is any external damage to the package, check the equipment and notify the carrier and carrier in writing of the damage.



## Important:

After receiving the product, please check whether the package is damaged or not. check whether the product is complete after unpacking and whether all parts are complete. If any damage is found, please contact ruida immediately.

The accessories of RDACC-FIBER-V2.0 fiber transfer module is shown as the table below:


Accessories	QTY	Note
Fiber laser controller transfer module	1	RDACC-FIBER-V2.0
3.81mm KF-4P socket	4	
User manual	1	

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# Chapter 1 Overview

## **CONTENTS:**

-  Dimension
-  Product description





## 1.2 Product Overview

RDACC-FIBER-V2.0 fiber laser transfer module (hereinafter referred to as fiber module) is transfer module developed by Ruida Technology for low-power fiber laser interface (with a digital interface, usually with a DB25 port), providing repetition frequency and 8-bit digital laser power. The new 2-inch LCD screen and buttons make the operation more intuitive and user-friendly.。

The main functions are as follows:

- (1) Compatible with CW FIBER lasers ,MOPA laser and pulse laser.. pulse width , repeat frequency and laser power can be set.。
- (2)Compatible with IPG, Max photonics, Raycus, JPT lasers and other laser in the market.
- (3) 2 inch LCD screen on Module, laser parameters and status can be set and displayed.
- (4) Laser repeat frequency, laser power, laser pulse width can be set.
- (5) Input analog calibration. Make the power more precise according to the calibrated analog.
- (6) Laser alarm indication, recording and output for external device.
- (7) MO control selection, the MO control can be defined to be enabled by external signals or internal signals on board.
- (8) Support Chinese and English languages

## Chapter 2 Hardware definition

### **CONTENTS:**

- Hardware interface description
- System wiring diagram
- Configuration instructions

## 2.1 Adapter board interface definition

The adapter board is connected to the main board, and with a voltage of 5V.

Table 2.1 shows the interface definition

Table 2.1

CN1	Signal	Definition
PIN1	+5V	Power supply for module. Current >200mA
PIN2	GND	Signal ground
PIN3	AD	External analog input, from 0—5V. usually connect to L-an signal on RD controllers
PIN4	MO_IN	External signal for Mo enable. Usually connect to Status signals on RD controllers. This signal for fiber laser can close the MO module in the fiber laser and disable the residual power. The residual power usually smaller than 50mW
CN2	Signal	Definition
PIN1	ALARM_OUT1	Laser alarm output
PIN2	ALARM_OUT0	Laser alarm output
PIN3	EMSSTP	Emergency stop
PIN4	GATE_IN	Laser control signal. "H" valid.

### Notice:

The PIN3 of CN2 is the external emergency stop input port, which is directly connected to the pin 23 of the laser port DB25. If there is no external emergency stop input, it can be kept floating. The emergency input are disabled in default. If user want to connect to a external switch to realize a emergency stop, a normally open switch is recommended. The switch connect to the GND and the emergency input(EMSSTP). When the switch is closed, the laser will be disabled and stop laser emission.

## 2.2 System wiring diagram

The overall wiring is shown in Figure 2.2.1.



Figure 2.2.1 Wiring diagram

### 2.2.1 MO external control

Low power Mopa, pulse or CW fiber laser has a residual laser emission which is less than 50mW even when laser on signal disabled. This is caused by the laser module in the laser source. Mo signal can switch off the laser module and there will be no any laser emission. So user can connect the MO on the laser to the STATUS signal on the motion controller. When start a cutting job, the status will keep low level. This will make the MO enable and the laser module works. When finish the cutting job, the status signal will keep high level and keep the MO disabled. So this control method can be avoid of the residual laser power when the system is idle.

RDC633XX series board pin wiring diagram MO control is controlled by the external board as shown in Figure 2.2.2:

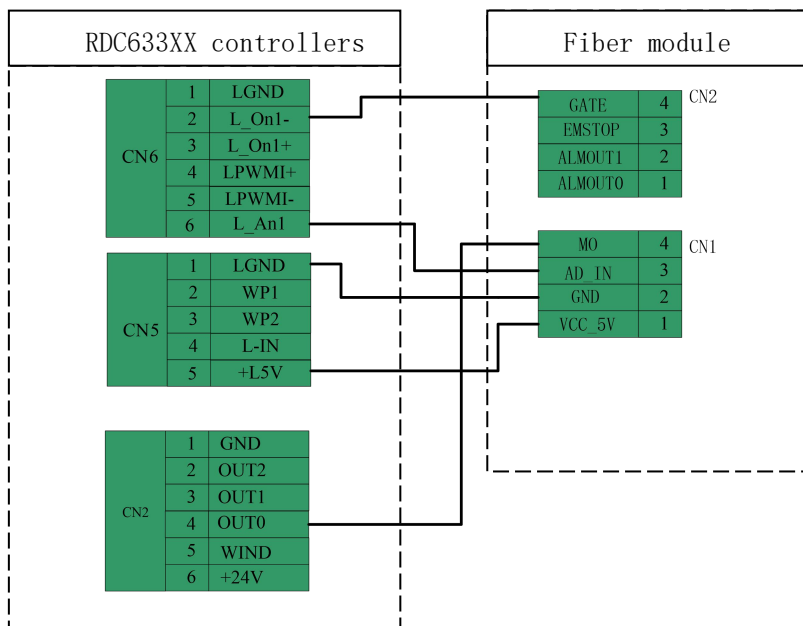


Figure 2.2.3 RDC6442X series motherboard connection diagram (MO external control)

## 2.2.2 MO internal control

If there is no residual laser power, keep the MO of CN1 floating and select "internal" in the "MO control" in the system settings. The wiring diagram is as follows:

RDC633XX series board pin wiring diagram MO control is controlled by the internal board as shown in Figure 2.2.3:

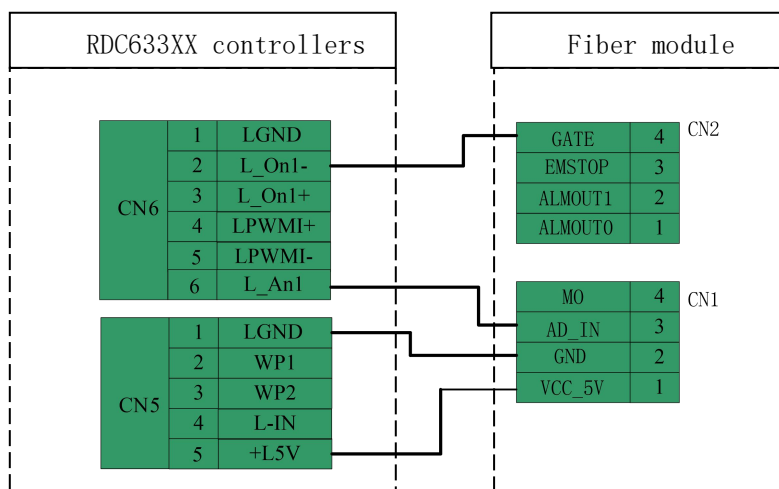


Figure 2.2.3 RDC633X series motherboard connection diagram (MO internal control)

RDC6442X series controller wiring diagram MO control is controlled by the internal board as shown in Figure 2.2.4:

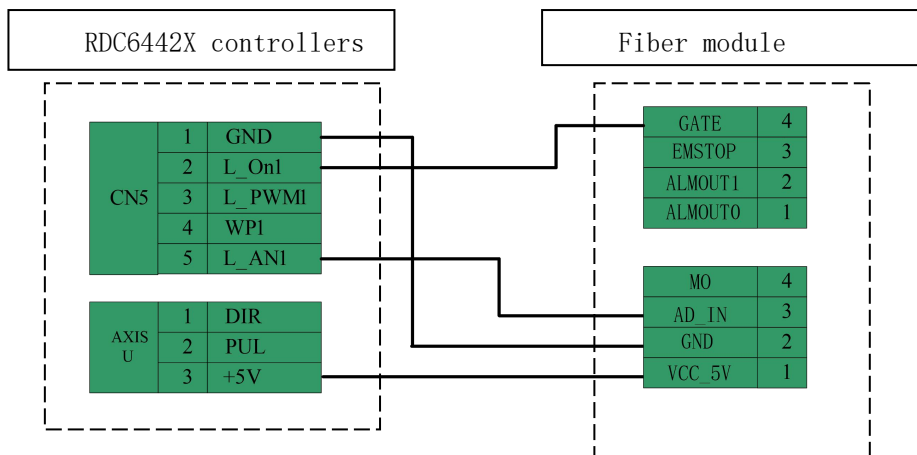


Figure 2.2.4 RDC6442X series motherboard connection diagram (MO internalcontrol)

### 2.2.3 Fiber laser module -RS232 port

The fiber module provides an RS232 standard serial port which you can communicate with your computer. Table 2.2 shows the RS232 interface definition.

Table 2.2

PIN	Signal	Definition	Description
1	NC	float	
2	TXD	send	Connect to RXD on other device
3	RXD	receive	Connect to TXD on other device
4	NC	float	
5	GND	Referenced ground	
6	NC	float	
7	NC	float	
8	NC	float	
9	NC	float	

## 2.2.4 Laser interface

The adapter board provides a laser DB25 female interface that is compatible with the general laser DB25 interface. Table 2.5 shows the laser interface definition.

**Table 2.5**

PIN	Signal	Definition	Description
1	D0	Fiber laser power control	TTL, 8bit。 D0~D7; 0-255 (0x00-0xff) refer to 0%-100% fiber laser power The bits value does not have a linear relationship with the actual power
2	D1		
3	D2		
4	D3		
5	D4		
6	D5		
7	D6		
8	D7		
9	LATCH	Lath signal	TTL, latch on the rising edge
10	GND	Referenced ground	
11	ALARM_IN0	Fiber laser alarm status	
12	ALARM_IN1	Fiber laser alarm status	
13	GND	referenced ground	
14	GND	referenced ground	
15	GND	referenced ground	
16	ALARM_IN2	Fiber laser alarm status	
17	+5V	5V power supply(output)	For photo isolators
18	MO	MO control	TTL, high level valid
19	GATA	Laser on	TTL, high level valid
20	PRR	Repeat frequency	TTL, 50% pulse width
21	ALARM_IN3	Fiber laser alarm status	
22	RED/ENABLE	Red beam guide/pulse modulation enable	TTL, High level enable the red beam guide Rising edge enable the laser pulse modulation
23	EMSTOP	Emergency stop	TTL, low level valid

---

24	GND	referenced ground	
25	GND	referenced ground	



## Chapter 3 Functions Introduction

### **CONTENTS:**

- HMI introduction
- HMI operation

### 3.1 Introduction to HMI Functions

The RDACC-FIBER-V2.0-HMI panel (hereafter referred to as the “panel”) is equipped with a 2” LCD screen and four buttons. The panel can display various parameters of the laser and adjust the parameter values by the keys on the film.

### 3.2 Introduction to HMI Main Interface

User can set the parameters by the HMI. The parameters include of processing parameters, alarm information, function menu, calibration, sel-test mode and system configuration.

#### 3.2.1 Parameter display and setting

The display interface is shown in Figure 3.2.1:



Figure 3.2.1 Parameter display interface

Press **【up】** and **【down】** can move the white bar to different line. When an item is selected, the bar with white color will locate on the item. When the **【Set】** button is pressed, then go to the page for the selected item modification.

The parameter settings are shown in Figure 3.2.2:

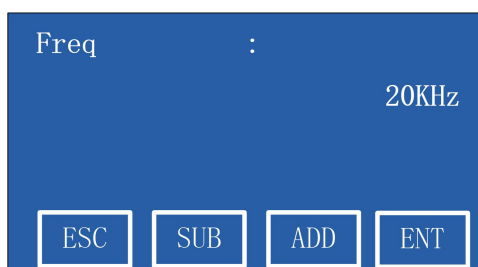


Figure 3.2.2 parameter setting interface

Select the laser frequency and press **【Set】**, the interface will go to the parameter setting interface of the laser frequency, press **【SUB】** and **【ADD】** to adjust the parameters. Short press will increase or decrease the value of the parameters slowly. Long press will increase or decrease the value of the parameters fastly.

### 3.2.2 Function menu interface

The function of menu is shown in Figure 3.2.3:

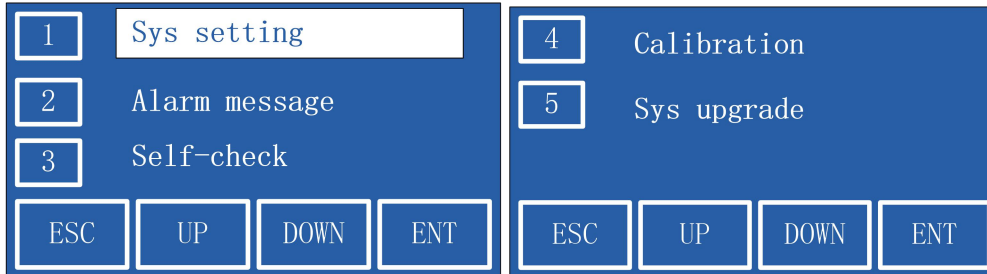


Figure 3.2.3 Function menu interface

Press **Menu** to go to the menu function. press **up** and **down** to different items and different pages. press **ENT** to select, press **ESC** to jump to the parameter display interface. The function menu consists of “Sys Settings”, “Alarm Info”, “Self-check”, “Calibration”, and “Sys Upgrade”.

- **“Sys Settings”**: The laser type, system language, and MO control mode can be set.
- **“Alarm Info”**: You can enter the alarm information interface to view the detailed alarm records. You can record up to the last 9 alarms and clear them.
- **“Self-check”**: Laser self-test interface, the adapter plate performs light emission, frequency, pulse width, and induced light test.
- **“Calibration”**: Voltage calibration can be performed on the analog quantity of power to reduce the error.
- **“Firmware update”**: Reserve system upgrade.

### 3.2.3 System Settings Interface

The system settings are shown in Figure 3.2.4:

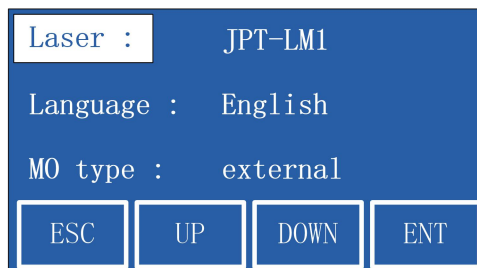


Figure 3.2.4 System Setting Interface

The **“Laser”**, **“Language”**, and **“MO”** settings can be modified in the system settings.

Laser can support JPT, MAX PHOTINICS, RAYCUS, IPG laser source. Language now supports Chinese and English. Mo can be selected to be controlled ext or internal.

### 3.2.4 Alarm Information Interface

The alarm information is shown in Figure 3.2.5:



Figure 3.2.5 Alarm Information Interface

The alarm information interface is to record the alarm information when the alarm information is prompted. The page is turned up by "upward" and "downward", and pressing "OK" will clear the information. When the laser sends out an alarm signal, it immediately stops the light output signal and pops up an alarm message.

### 3.2.5 Laser power calibration

The lasers self-check is shown in Figure 3.2.6:

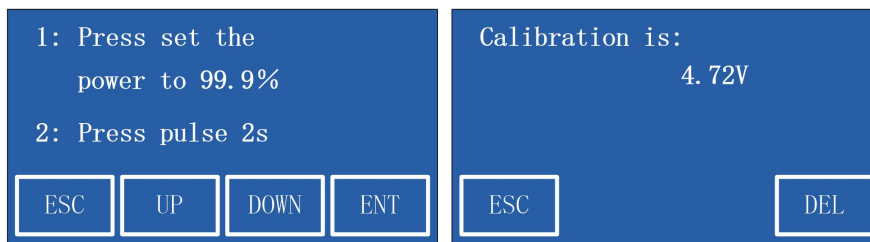


Figure 3.2.6 Laser Self-Test Interface

In laser self-check mode, the module will neglect the input of the analog and laser on signal and generate laser control signals automatically. Press **【ENT】** will output the laser control signals. This function used to test the module itself to ensure the function is good or not.

### 3.2.6 Power calibration

The power calibration is shown in Figure 3.2.7:

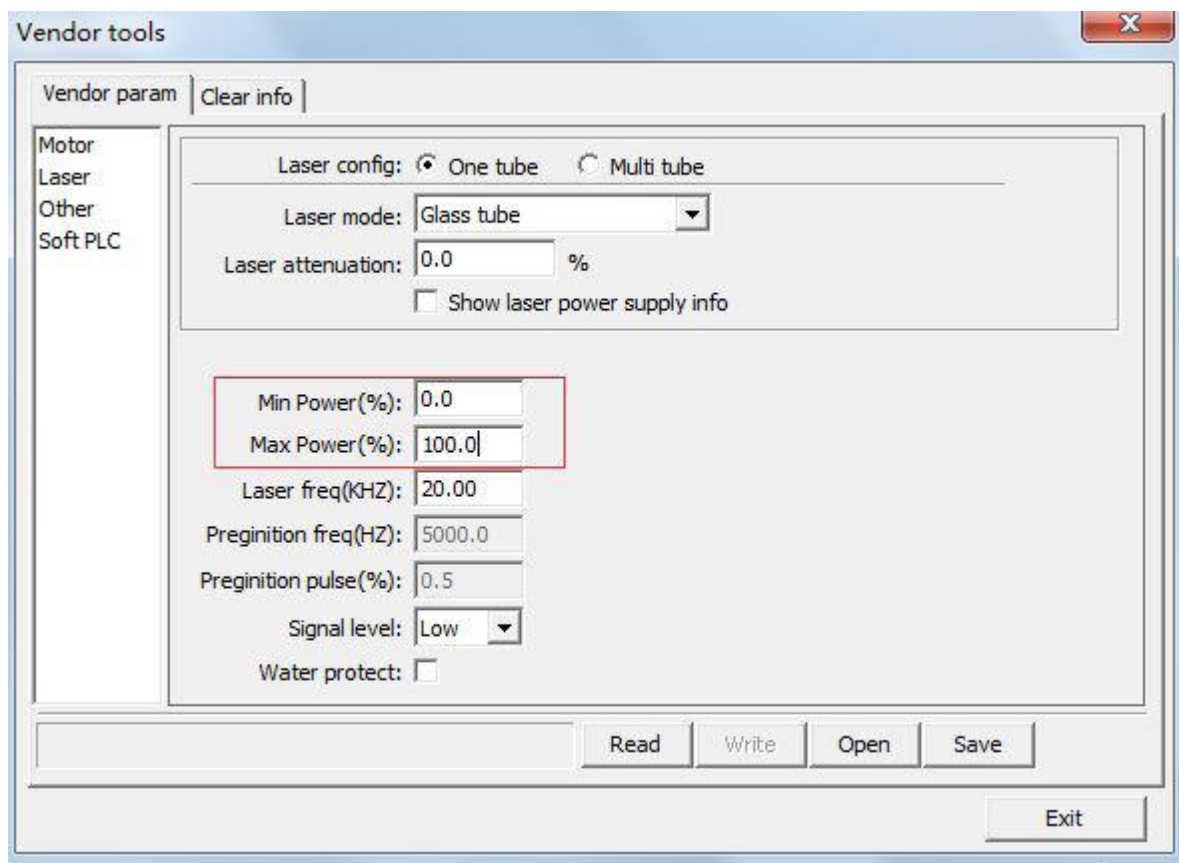


**Figure 3.2.7 Power Calibration Interface**

In order to make a precise relationship between the motion controller power and the fiber module laser power, the calibration should be done. Build up a linear relationship for the motion controller laser power and the fiber module laser power.

The specific steps are as follows:

- 1、 Modify the laser maximum power limit in the vendor parameter. Shown as figure 3.2.8



**Figure 3.2.8: maximum laser power**

- 2、 The maximum energy modified is 100%. Click "Write Parameters" to write the parameters.
- 3、 Set the laser pulse mode to be continuous mode in the operating panel.
- 4、 In the power calibration interface of the fiber module, long press the "PULSE" key to keep a long time laser shooting. The time should be longer than 3s. then the calibration will be done and a calibration finished message will be popped up. Press "ENT" to set the current calibration value.

### 3.3 User button description

The panel is equipped with 4 user buttons, which can be used for function selection, parameter page up and down, parameter adjustment, viewing alarm information, and clearing alarm information.

Table 3.1 shows the panel buttons and function definitions.

Table 3.1

Key	definition
Esc	cancel
—	“decrease ”or“up”
+	“increase”or “down”
Enter	enter

In the parameter setting interface, the “+” or “—” button can change the value of the parameters. Short press on the keys will make the value increase or decrease by 1 unit. If user long press the key more than 2s, the value will increase or decrease by 10 unit. If the long press time more than 10s, the value will change by 100 unit.

## Chapter 4 Parameters and Alarms

### **CONTENTS:**

- Parameter definition
- Alarm type description

## 4.1 Parameter definition

- Laser power: The percentage of the average power of the laser.
- Laser frequency: The repeat frequency of the pulsed laser.
- Laser pulse width: The pulse width of the laser.

## 4.2 Parameter limitation

Table 4.1 shows the parameter value range and parameter resolution.

Table 4.1

Parameter	Min.value	Max. value	unit	resolution
Laser power	1	100	%	0.1
Laser frequency	Reference to laser source	Reference to laser source	Khz	1
Laser pulse width	Reference to laser source	Reference to laser source	ns	—

Note: Different types of lasers have different laser frequency and limits of the laser pulse. After selecting the model of the laser, the laser frequency and pulse width will be set to the upper and lower limits of the selected laser.

## 4.3 Alarm output definition

Table 4.2 shows the types of alarms and the status of the alarm outputs.

Table 4.2

Type of alarm	ALARM_IN0	ALARM_IN1	ALARM_IN2	ALARM_IN3
Laser temperature alarm	low	X	low	low
normal	low	X	low	high
Power supply for laser source alarm	high	X	low	low
Laser module alarm of laser source	low	X	high	low
System alarm	low	X	high	high
Laser source not ready alarm	high	X	low	high



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