DBK2JP
Laser Control Card
User's Manual

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Release Notes

Version	Revision Personnel	Revision Time	Definition
V1.0	Yunchao Wu	20200916	Original version

Note: Hardware design of the DBK2JP laser control card was optimized. Please operate the product in strict line with this manual to avoiding mixing.

CATALOG

◆SAFETY INSTRUCTION

- Before use the product, please read this section carefully. For any question about this manual, please contact us.
- **To avoid injuries by uncontrollable laser beams, power on the computer, the product, the galvanometer and the laser in sequence. It is suggested to use an optical gate and wear safety goggles in operation to avoid the injuries.**
- The control card is designed to control a laser scanning system. Please abide by all safety instructions about laser (including but not limited to the sections describing the laser and the galvanometer and the related sections herein). Please understand and put into practice all the safety instructions about the laser system. Please abide by the safety instructions and be independently responsible for safety of the laser system. Please follow all the related local safety regulations that may differ with country.
- Before running the software, please inspect carefully. The system may stop responding because of any software error. In this case, both the galvanometer and the laser are uncontrollable.
- Keep the product from moisture, dust, corrosives and external shocks.
- When using or storing the product, keep it from electromagnetic field and static electricity both tending to damage the electronic parts on it. Store the product in an anti-static packing bag; handle the product while wearing well-grounded anti-static gloves.
- Use the product at 0℃ to +45℃ and store it at -20℃ to +60℃.

◆OVERVIEW

The product is developed for the marking machines of **pulse fiber lasers, UV lasers and CO_2 lasers**. See Fig.2-1 Dimensions of Base Board of DBK2JP, Fig.2-2 External Dimensions of DBK2JP Laser Control Card.

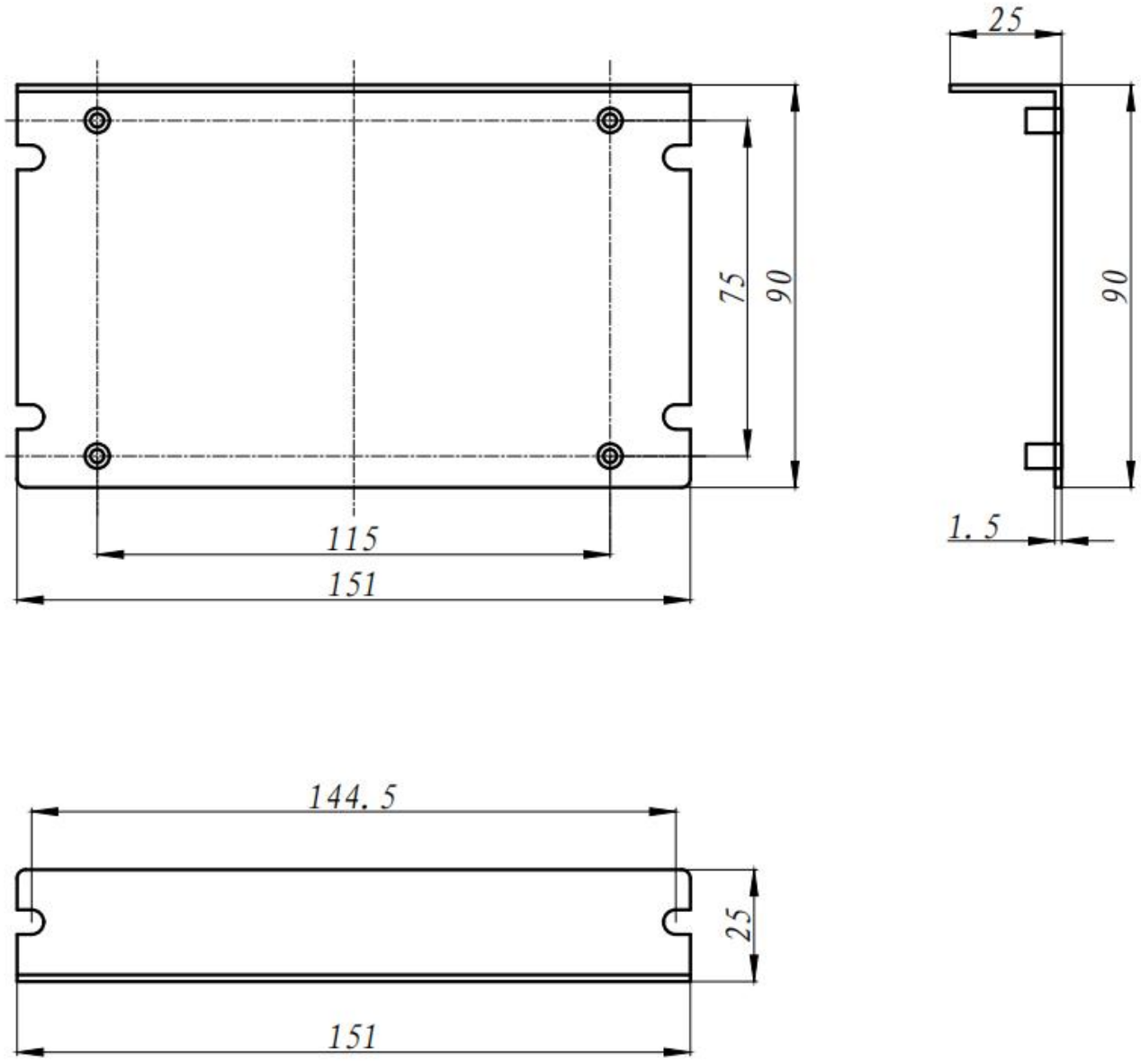

Fig.2-1 Dimensions of Base Board of DBK2JP

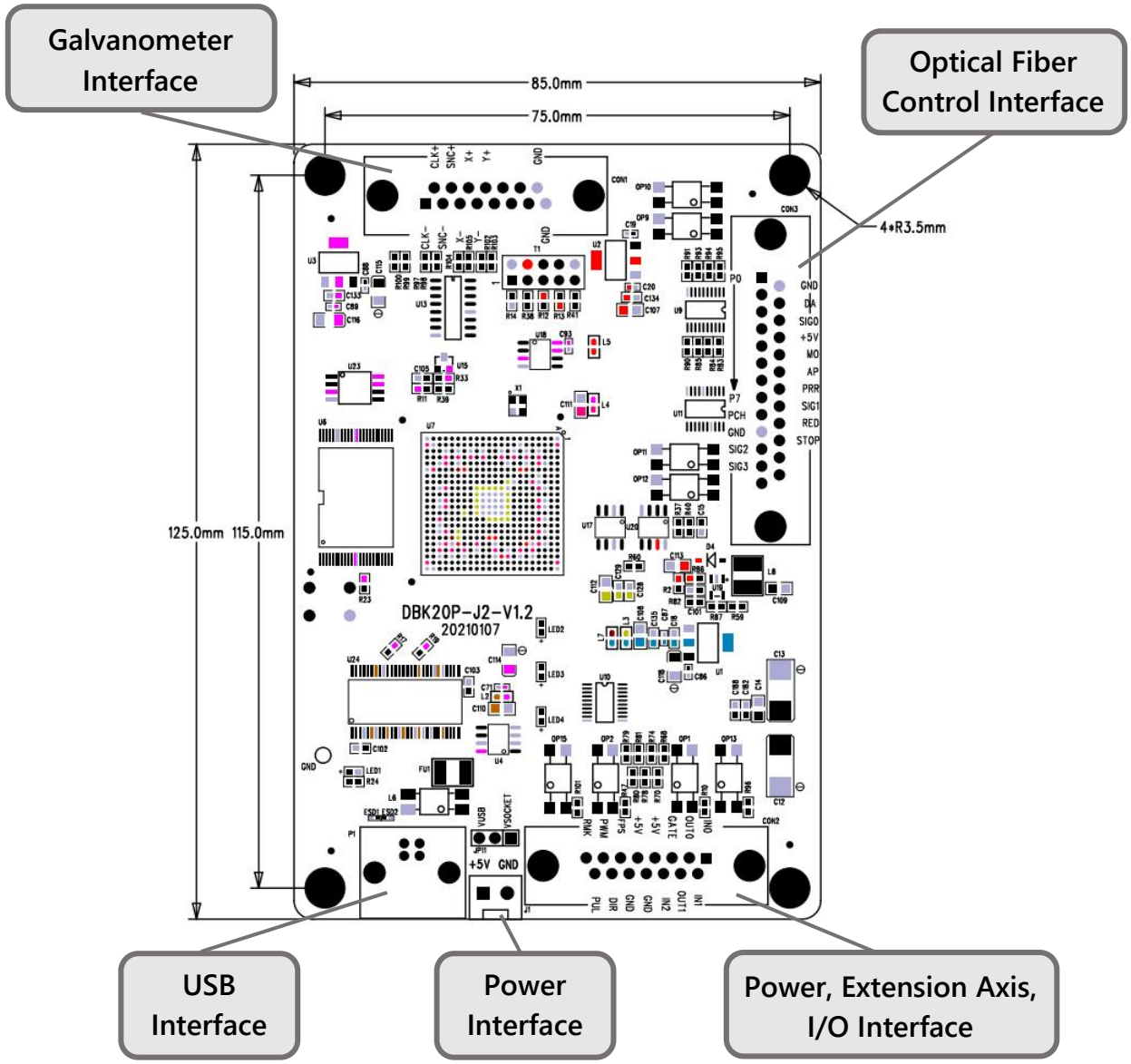

Fig.2-2 External Dimensions of DBK2JP Laser Control Card

- It outputs laser control signals via a DB25 socket and is directly connected with a pulse fiber laser through a 25-pin cable.
- It outputs digital galvanometer control signals via a DB15 socket and can be directly connected with an internationally universal digital galvanometer through a XY-100 protocol.
- Output via extension axis (stepping motor/servo motor): Direction/pulse signals for controlling a stepping motor (or a servo motor) for purpose of the spindle or splicing
- Two universal output digital signals (Out0 and Out1) that are TTL output signals
- Connection with a PC via a USB2.0 interface.

◆ELECTRIC CONNECTION

● Interface Description

➢ Power Interface

The product needs a 5VDC power supply with a voltage of 4.75V to 5.25V. A 5V/2A direct current power supply is recommended. The power supply can be connected via pins 4/5/12/13 (4/5: positive pole; 12/13: negative pole (GND)) of a CON6 socket. The CON6 socket is defined in section "**Power, extension axis and I/O interface**".

Besides, the product has a separate power interface (Fig.2-1) for controlling the product's power supply. Power supply for the product can be realized via this power interface when jumper JP11 is at the VSOCKETend, or via the USB interface when jumper JP11 is at VUSB end.

Note: It would be the best to use a 1A USB interface for power supply.

➢ Galvanometer Control Interface

The galvanometer control signals are digital ones. The signal scan be connected to a digital galvanometer directly. Different digital galvanometers use different digital signal transmission protocols. Therefore, please check the transmission protocol the digital galvanometer uses.

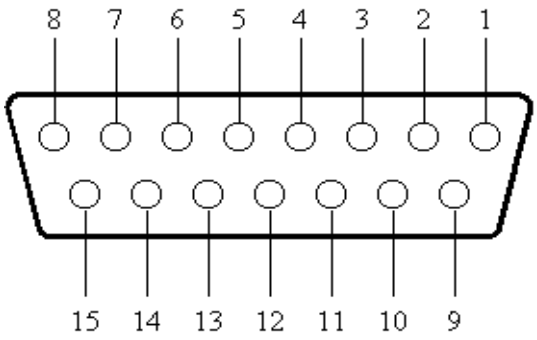

Fig.3-1 Definitions of Pins of Galvanometer Control Interface that is a DB15 Female Socket (Top View)

The pins are defined in Table 3-1 below.

Pin No.	Signal Name	Definition
1, 9	CLK－/ CLK＋	Clock signal－ /Clock signal＋
2, 10	SYNC－/ SYNC＋	Synchronizing signal－ /Synchronizing signal＋
3, 11	X Channel－/ X Channel＋	Galvanometer X signal－ / Galvanometer X signal＋
4, 12	Y Channel－/ Y Channel＋	Galvanometer Y signal－ / Galvanometer Y signal＋
5, 6, 7, 13, 14	NULL	Reserved
8, 15	GND	Ground

Table 3-1 Definitions of Pins of Galvanometer Control Interface

Note: Differential digital signals need to be transmitted through a shielded twisted pair cable.

➢ Fiber Laser Control Interface

The fiber laser control interface is a standard DB25 female socket. It is connected with the 25-pin socket of the fiber laser through a 25-pin cable.

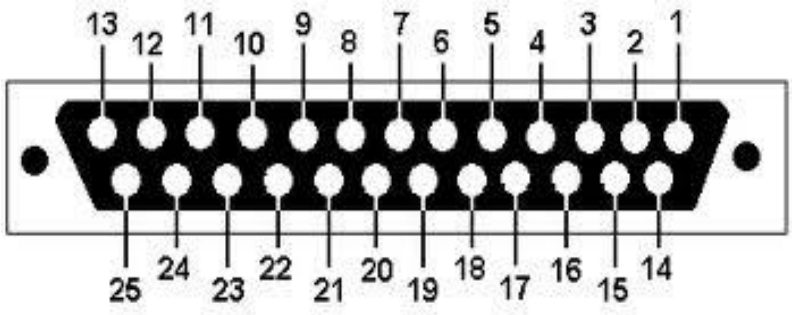

Fig.3-2 Definitions of Pins of fiber Laser Control Interface that is a DB25 Female Socket (Top View)

The pins are defined in Table 3-2 below.

Pin No.	Signal Name	Definition
1, 2, 3, 4, 5, 6, 7, 8	P0~P7	Laser power. TTL output (pin 2 can be reused for serial data input; pin 3 can be reused for serial clock input)
9	PLATCH	Power latching signal. TTL output
10, 14	GND	Reference ground of the product
16, 21, 11, 12	SGIN0~3	Laser status input
15	DA1	D/A output when the CO2 laser is being driven
17	VCC	5V power output of the product
18	MO	Master oscillator switching signal. TTL output
19	AP	Power amplifier switching signal. TTL output
20	PRR	Pulse recurrence frequency signal. TTL output
22	Red Light/ Pulse width adjustment enable	Infrared indication signal of the laser, that can be reused as pulse width adjustment ENABLE, TTL output
23	EMSTOP	Emergency stop switching signal. TTL output
13, 24, 25	NULL	Hung in the air, not connected

Table 3-2 Definitions of Pins of Fiber Laser Control Interface

Note: Description of fiber laser control interface

(1) P0 to P7 are an eight-bit bus for power setting; P0 is LSB; P7 is MSB; the input range is 0% to 100% of the nominal power.

	Setting 1	Setting 2	Setting 3	Setting 4	Setting 5
P0	0	0	0	0	1
P1	0	0	0	0	1
P2	0	0	0	0	1
P3	0	0	0	0	1
P4	0	0	0	1	1
P5	0	0	1	1	1
P6	0	1	1	1	1
P7	1	1	1	1	1
Output Nominal Power	50%	75%	87．5%	93．75%	100%

(2) Pins 11, 12, 16 and 21 are for laser status input, suggesting different statuses of different lasers. At present, only pins 16 and 21 are used for defining the laser status as below.

Pin 16	Pin 21	Definition of Laser Status Input
L	L	The laser temperature is not in the operating temperature range. *
L	H	Normal status
H	H	MO abnormal

(3) Definitions of other pins of the fiber laser control interface meet the general driving requirements of fiber lasers. Different lasers may have slightly different driving timing and corresponding applications can be set on the interface to make the laser work in the best status. Usually, the fiber laser can work normally after connected with the related control interface of the product.

- **Power, extension axis and I/O interface**

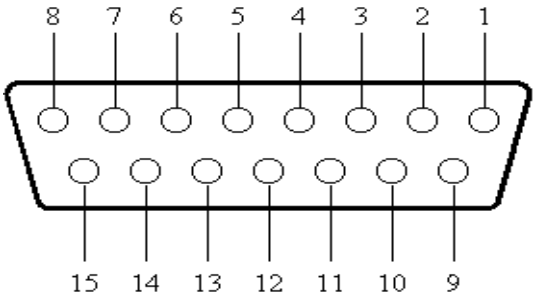

Fig.3-3 Definitions of Pins of DB15 Female Socket that is a Power and I/O Interface

The pins are defined in Table 3-6 below.

Pin No.	Signal Name	Definition
1	IN0（ORG）	This is the general input signal 0, which is also used as the zero signal of the extension axis. It forms a loop with the GND pins (pins 12 and 13) of the product. When using this signal, connect the signal GND with two ends of the switch respectively. This signal is an input signal.
9	IN1（LIMIT）	This is the general input signal 1, which is also used as the limit signal of the extension axis. It forms a loop with the GND pins (pins 12 and 13) of the product. When using this signal, connect the signal GND with two ends of the switch respectively. This signal is an input signal.
2	OUT0	It is a universal output signal 0 . It is a TTL output signal based on GND signal.
10	OUT1	It is a universal output signal 1 . It is a TTL output signal based on GND signal.
3	LASER	It is a laser switching signal (optical gate signal)， It is a TTL output signal based on GND signal.

Pin No.	Signal Name	Definition
11	IN2	This is the general input signal 2. It forms a loop with the GND pins (pins 12 and 13) of the product. When using this signal, connect the signal GND with two ends of the switch respectively. This signal is an input signal.
4, 5	+5V	The 5V input power is a positive polarity end. The signal is an input signal.
12, 13	GND	The 5V input power is a negative polarity end. The signal is an output signal.
6	FPS	It is a first pulse suppression signal, It is a TTL output signal based on GND signal.
14	XDIR	It is the direction signal of extension axis X. It is a TTL output signal based on GND signal.
15	XPUL	It is pulse signal of extension axis X. It is a TTL output signal based on GND signal.
7	PWM	It is a PWM signal for controlling light outlet and power of the CO2/UV laser. It is a TTL output signal based on GND signal.
8	ReMark	It is a remarking signal. It forms a loop with the GND pins (pins 12 and 13) of the product. When using this signal, connect the signal GND with two ends of the switch respectively and the product will be marked with the content saved in the cache during last marking. This signal is an input signal.

Table 3-6 Definitions of Pins of Power and Extension axis Interface

Single-ended extension axis method:

Connect PUL+ of the extension axis controller with XPUL of the product; connect DIR+ of the extension axis controller with XDIR of the product; connect PUL- and DIR- of the extension axis controller with GND of the product.

● Connection of I/O signals

➢ Use of Universal Single-ended Input Signal

Fig. 3-4 is the internal circuit of pins 1, 8, 9 and 11 of the universal single-ended input signal (such as CON2).

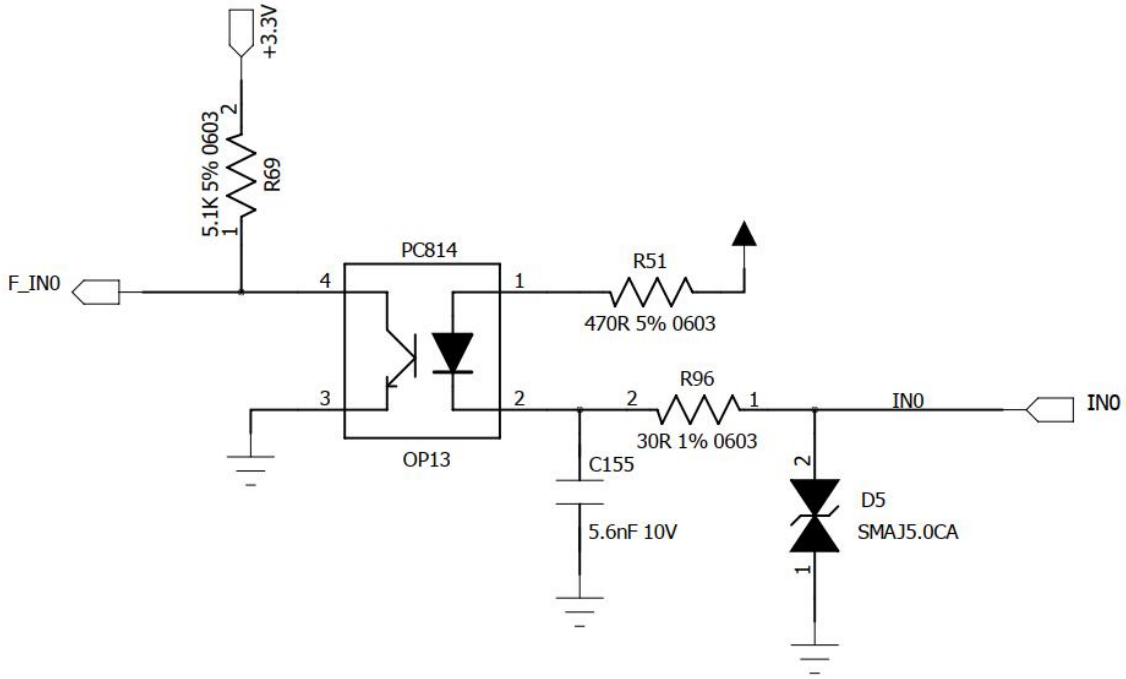

Fig.3-4 Circuit of Universal Single-ended Input Signal

For such an input signal, it only needs to be connected to the terminal (GND) through the switch. Certainly, the external circuit can use an electronic switch too. When the input signal is connected to the GND terminal, the input is "0"; when it is disconnected, the input is "1".

➢ Use of Universal Output Signal

The universal output signal (such as Pins 2 and 10 of CON2) are a TTL output signal based on GND signal. Direct output can be realized. During output, avoid short circuit or grounding to prevent damage of the product, and make sure the output current is smaller than 30mA.

◆TYPICAL CONNECTION

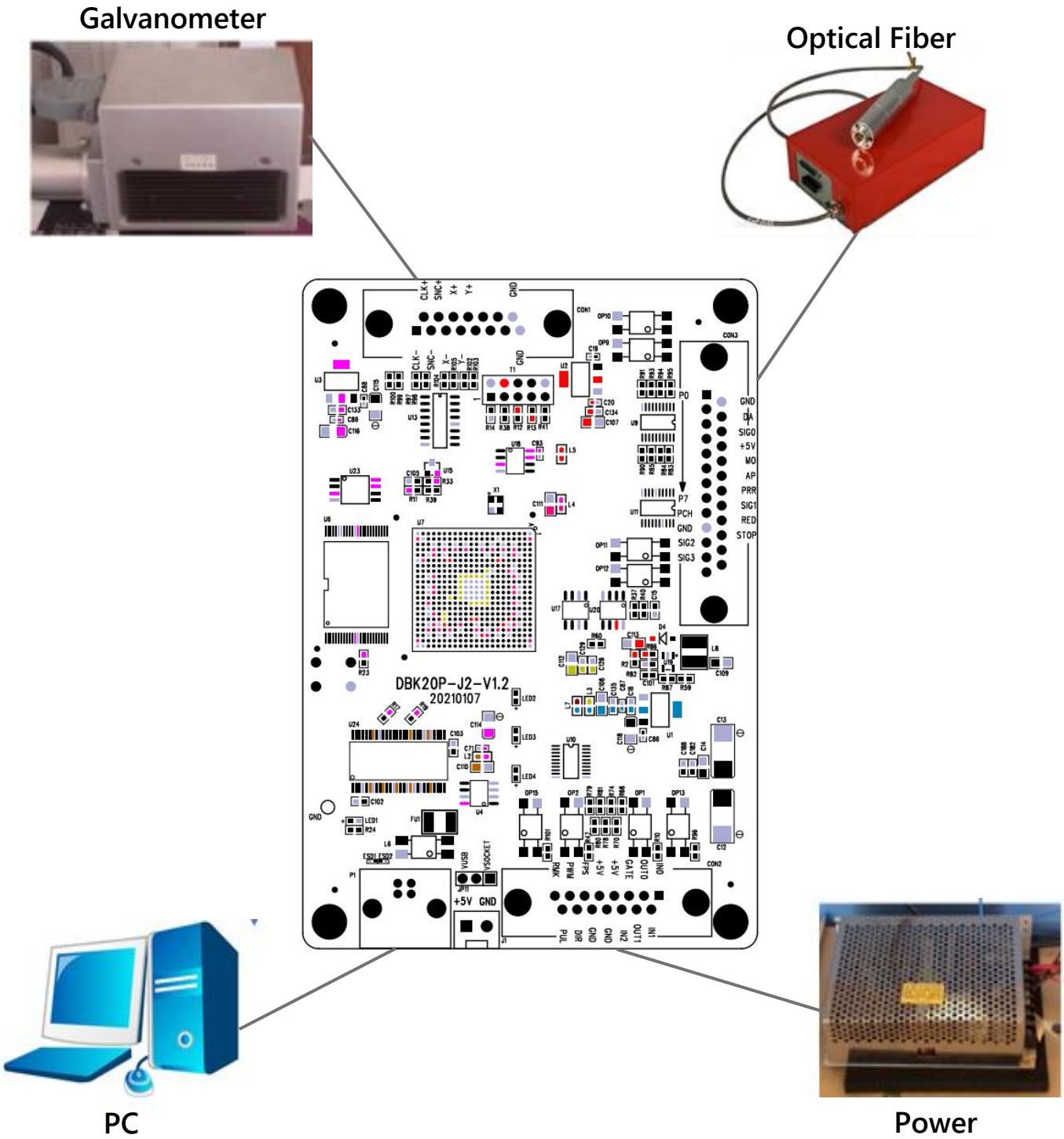

Fig.4-1 Typical Connection of DBK2JP Laser Control Card