



DBK2JW-B2

Laser Control System

User Manual



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Release Notes

Version	Revision Personnel	Revision Time	Description
V1.0	Xiaofang Chen	20240524	Original version

Note:

The DBK2JW-B2 control card hardware design has been optimized. Please strictly follow the instruction manual of the corresponding model and do not confuse.

CATALOG

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1 Safety Tips

- Please read this section carefully before installing and using the DBK2JW-B2 control card. If you have any questions about this document, please contact Changsha Basiliang.
- Please turn on the machine power in the following order: computer, DBK2JW-B2 control card, galvanometer, laser. Otherwise, you may be injured by uncontrollable laser beams. We recommend that you use a shutter to avoid injuries caused by uncontrollable lasers and wear protective goggles when operating the laser.
- The DBK2JW-B2 control card is designed to control a laser scanning system. Please follow all safety instructions for the laser (including but not limited to those described in the laser, galvanometer and relevant sections of this document). All safety instructions for the laser system should be understood and implemented by the customer. The customer must strictly follow the relevant safety operating instructions and be independently responsible for the safety of the laser system used. Safety regulations may vary from country to country. The customer is responsible for complying with all local regulations.
- Please check carefully before running the software. Software errors may cause the system to stop responding. In this case, the galvanometer and laser are uncontrollable.
- Please avoid damage to the board from moisture, dust, corrosion and impact of foreign objects.
- When storing and using the board, please avoid damage from electromagnetic fields and static electricity. They may damage the electronic components on the board. Please use anti-static packaging bags to store the board; please wear well-grounded anti-static protective gloves when touching the board.
- Please ensure that the board is stored in an environment of -20°C to +60°C Celsius. The allowable working environment temperature is 0°C to +45°C.

2 Overview

The DBK2JW-B2 control card is developed for marking machines using pulsed fiber lasers, UV lasers, and CO2 lasers. See Figure 2-1 for the control card dimensions:

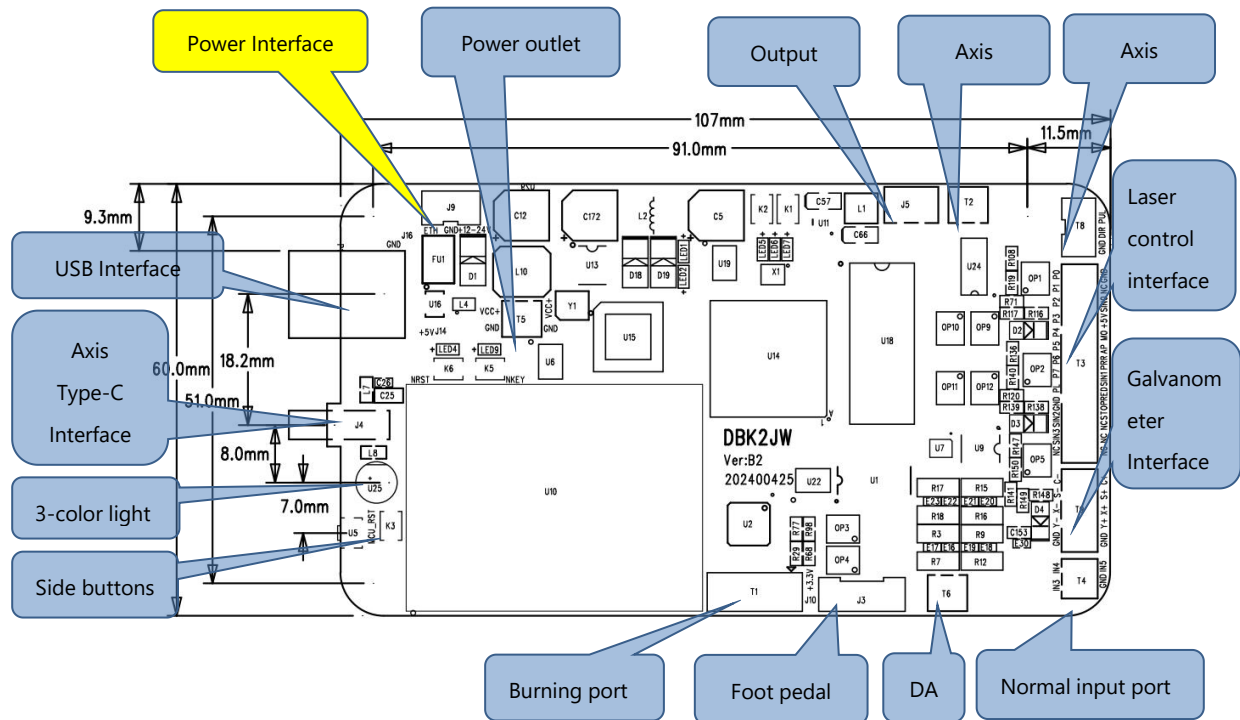


Figure 2-1 DBK2JW-B2 control card dimensions

Interface Overview:

- White 2X13X2.0;26P socket is used to output laser control signal, which is directly connected to the pulse fiber laser through the adapter cable.
- White 2X5X2.0;10P socket is used to output galvanometer signal. The galvanometer control signal is a digital signal, which can be directly connected to the internationally used digital galvanometer through the XY-100 protocol.
- 3-way expansion axis (stepper motor/servo motor) output: direction/pulse signal can be output to control the stepper motor (or servo motor), which can be used for rotating shaft or splicing.
- 5-way optocoupler input signal. IN1 and IN2 are foot pedal and safety door signals, of which IN3 ~ IN5 are reserved optocoupler inputs.
- 4-way TTL output signal.
- 3-way expansion axis, 2-way white segment single-end direction/pulse control, 1-way Type-C interface differential output control.
- DA output.
- Three-color light, side button.
- Power output interface, supports 12-24V voltage output interface, can be controlled by FPGA output.
- Power interface. Supports 12~24V DC power supply voltage.
- USB2.0 interface connected to PC.

3 Electrical Connection

3.1 Interface Description

3.1.1 Power supply interface

As shown in Figure 2-1 Power Interface, note that the right side of the J9 interface is the positive pole of the 12~24V power supply, the middle is GND, and the left side is ETH.

3.1.2 USB interface

Use USB2.0 interface to connect to PC.

3.1.3 Galvanometer control interface

The galvanometer control interface T9 uses a white 2X5X2.0;10P socket. The galvanometer control signal is a digital signal and can be directly connected to the digital galvanometer. Since the digital signal transmission protocols used by digital galvanometers are not exactly the same, it is necessary to confirm which transmission protocol the digital galvanometer uses.

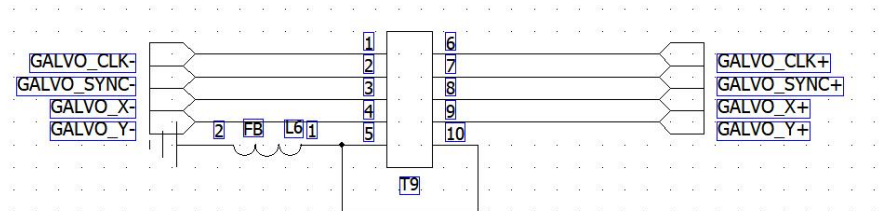


Figure 3-1
Galvanometer control
pin definition

The following table 3-1 is the pin definition description:

Table 3-1 Galvanometer control pin description

Pin NO.	Signal Name	Description
1, 6	CLK - / CLK +	Clock signal - / Clock signal +
2, 7	SYNC - / SYNC +	Sync signal - / Sync signal +
3, 8	X Channel - / X Channel +	Galvanometer X signal - / Galvanometer X signal +
4, 9	Y Channel - / Y Channel +	Galvanometer Y signal - / Galvanometer Y signal +
5, 10	Ground	Ground

Note: Differential digital signals must be connected using shielded twisted pair cables.

3.1.4 Fiber laser control interface

The fiber laser control interface T3 uses a white 2X13X2.0;26P socket, and the 25-pin socket of the fiber laser is connected through a conversion cable.

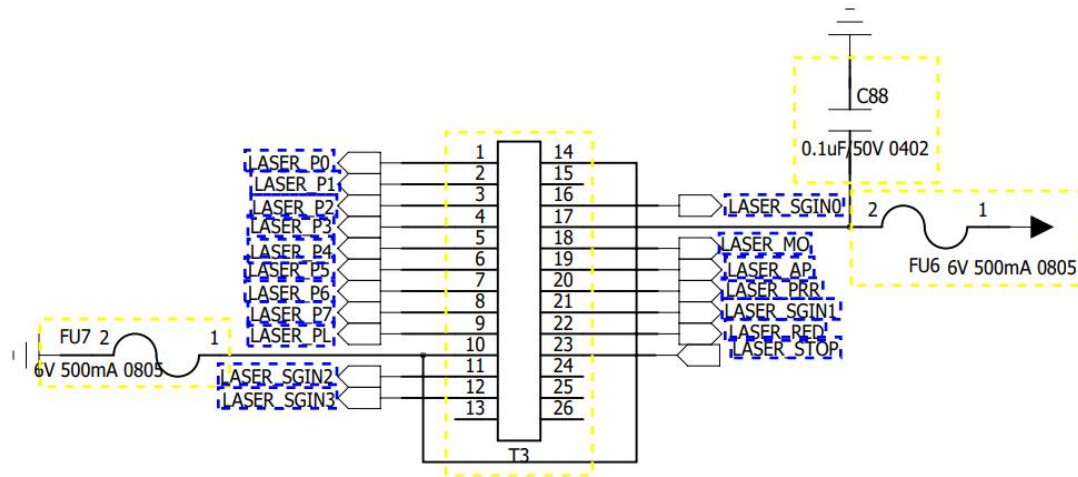


Figure 3-2 Laser control pin definition

Table 3-2 below is the pin definition description:

Table 3-2 Laser control pin definition description

Pin NO.	Signal Name	Description
1~8	P0~P7	Laser power. TTL output. (Pin 2 can be multiplexed as serial data input, and pin 3 can be multiplexed as serial clock input.)
9	PLATCH	Power latch signal. TTL output.
10, 14	GND	Control card reference ground.
16, 21, 11, 12	SGIN0~3	Laser status input
17	VCC	Control card 5V power supply output.
18	MO	Master oscillator switch signal. TTL output.
19	AP	Power amplifier switch signal. TTL output.
20	PRR	Repetitive pulse frequency signal. TTL output.
22	RedLight/ PWM Enable	Laser red light indication signal, can be multiplexed as pulse width adjustment ENABLE, TTL output.
23	EMSTOP	Emergency stop switch signal. TTL output.
24	RST	Reset signal. TTL output.
13, 15, 25, 26	NULL	This pin is floating and not connected.

Note: Control interface description

1) P0 ~ P7 is an 8-bit bus used to set the power. P0 is the LSB and P7 is the MSB. The input range is 0~255, corresponding to 0~100% of the nominal power value.

Table 3-3 P0 ~ P7 power definition

	Setting 1	Setting 2	Setting 3	Setting 4	Setting 5
P0	0	1	1	1	1
P1	0	1	1	1	1
P2	0	1	1	1	1
P3	0	1	1	1	1
P4	0	1	1	1	1
P5	0	1	1	1	1
P6	0	0	1	0	1
P7	0	0	0	1	1
Output Nominal Power	0%	25%	50%	75%	100%

2) Pins 11, 12, 16 and 21 are laser status inputs, which represent different states according to different lasers. For example, the laser status input only defines the use of two bits of pins 16 and 21. These two bits represent the following states of the laser:

Pin 16	Pin 21	Definition of Laser Status Input
L	L	Laser temperature exceeds operating temperature range*.
L	H	Normal status
H	H	MO abnormal

3) The other pin definitions of the laser control interface meet the general fiber laser drive requirements. Different lasers may have small differences in drive timing. The application software that works with them can be set in the interface to make the laser work in the best state. In general, the laser can work normally after being connected to the control interface of DBK2JW-B2 according to the definition.

3.1.5 Three-color Light

The three-color light indicator and side buttons are controlled by the MCU on the board

3.1.6 Input and output interfaces

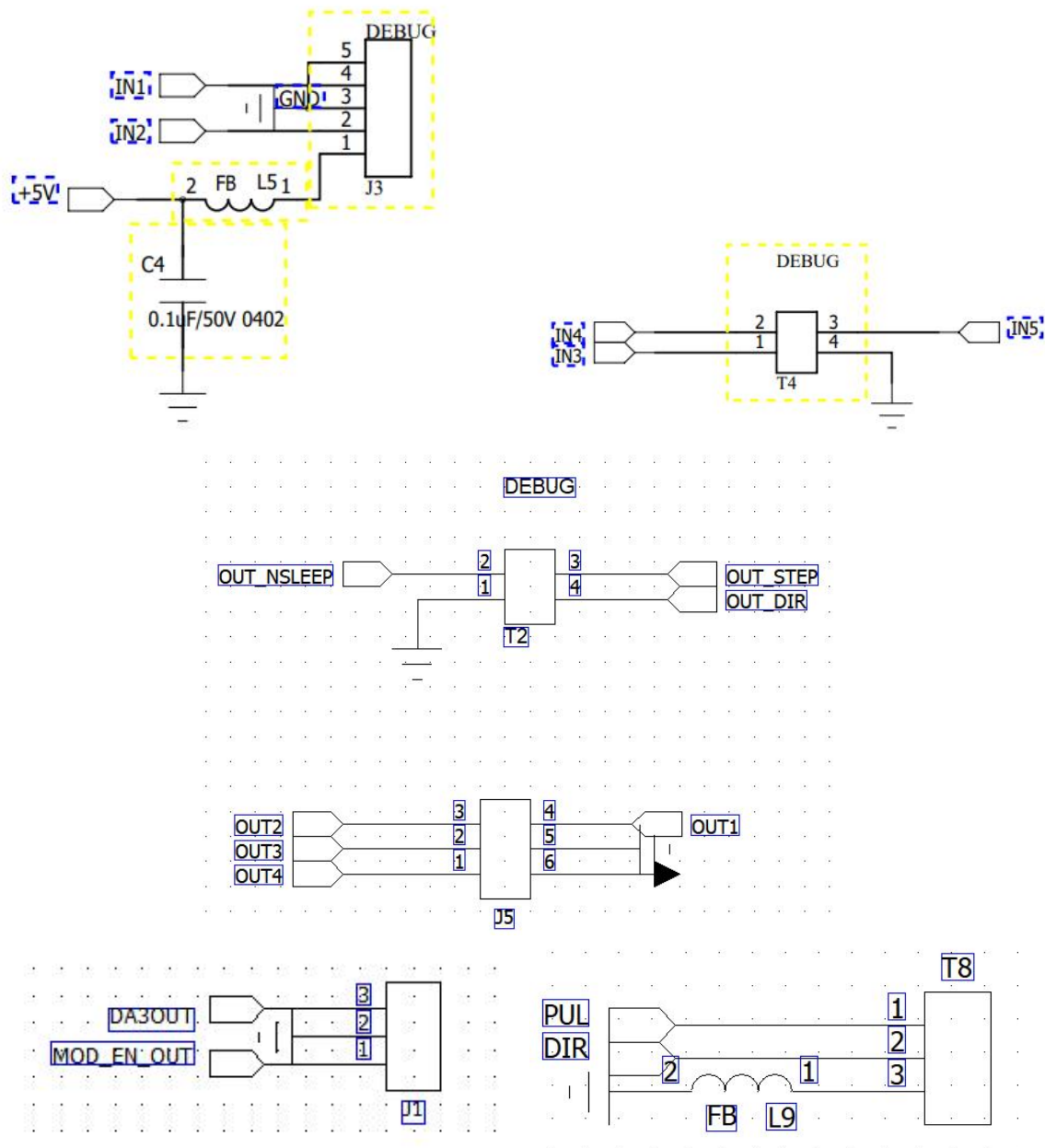


Figure 3-3 J3, T4 are optocoupler input interfaces,
 T2, J5 are TTL output interfaces,
 J1 is DA output port
 T8 is expansion axis output interface

Table 3-5 IO interface definition

Interface	Pin NO.	Signal Name	Description
J3	1	5V	5V power output of control card
	2	IN2	Safety door, general TTL input signal, low effective
	3, 5	GND	Power reference ground
	4	IN1	Foot signal, general TTL input signal, low effective
T4	1,2,3	IN3, IN4, IN5	Optocoupler input signal, low effective
	4	GND	Power reference ground
T2	1	GND	Power reference ground
	2	NS	Motor controller enable
	3	STEP	Pulse output
	4	DIR	Direction output
J5	1-4	OUT4-1	General TTL output signal
	5	GND	Power reference ground
	6	5V	5V power output of control card
J1	1	MODEN	Laser PWM signal
	2	GND	Power reference ground
	3	DA	Analog output
T8	1	PUL	Extension axis pulse output
	2	DIR	Extension axis direction output
	3	GND	Power reference ground

4 Typical Connection

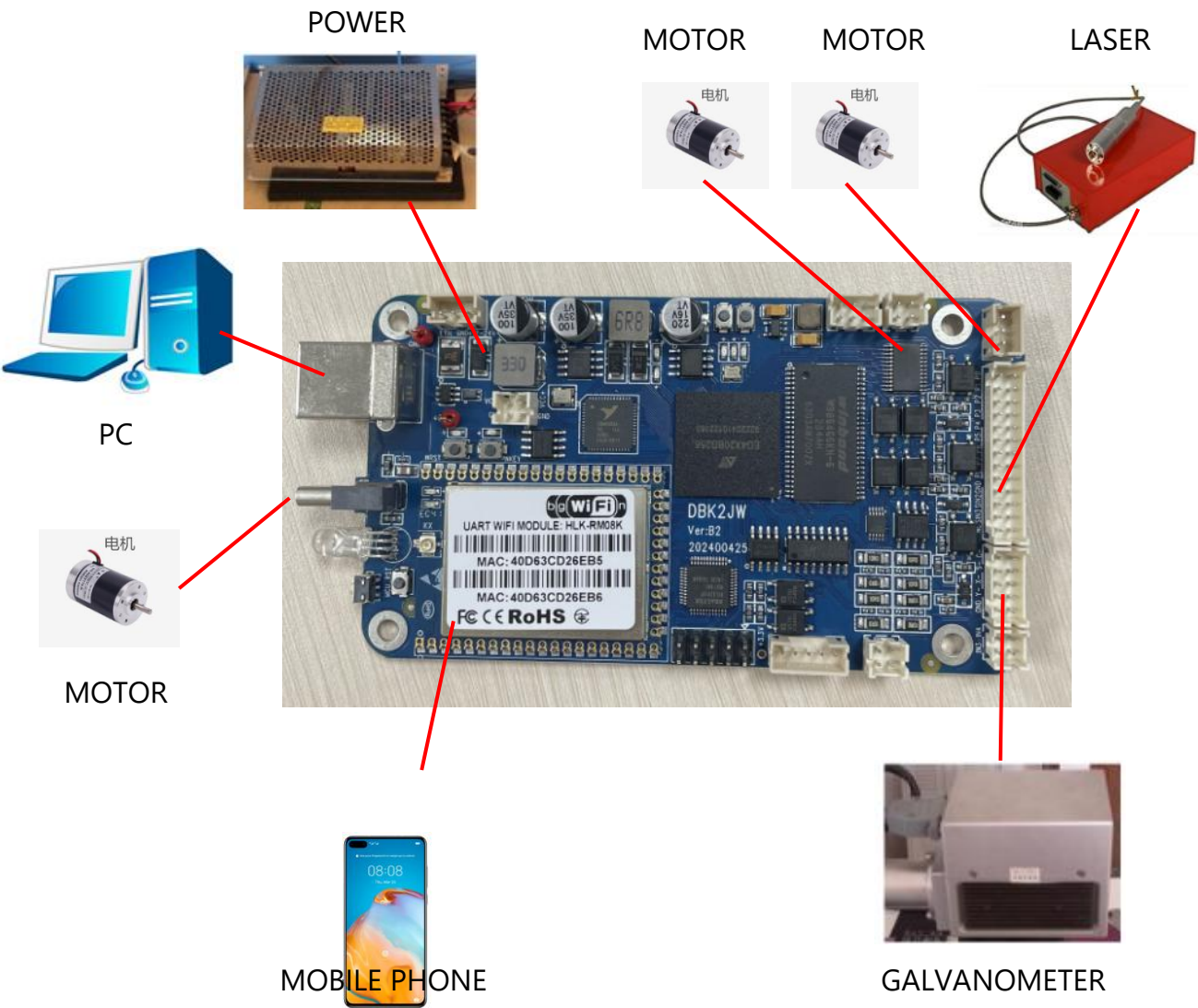


Figure 4-1 Typical connection diagram of DBK2JW-B2 control card