LMC2015_DIGIT_M_CUH_V4(0)

USBLMC Client Use Handbook

Digital Control Board

Version recorder

versio n	Date	Comment
V4	2015-08-	LMCV4-DIGIT-M Control Board

Content

Safety During Installation And Operation

Please read these operating instruction completely before you proceed with installing and operating this product. If there are any questions regarding the contents of this manual, please contact BJJCZ.

1. Steps For Safe Operation
   - Carefully check your application program before running it. Programming errors can cause a break down of the system. In this case neither the laser nor the scan head can be controlled.
   - Protect the board from humidity, dust, corrosive vapors and mechanical stress.
   - For storage and operation, avoid electromagnetic fields and static electricity. These can damage the electronics on the product. For storage, always use the antistatic bag.
   - The allowed operating temperature range is 25℃ ± 10℃.
   - The storage temperature should be between –20℃ and +60℃.
2. Laser Safety
   - This product is intended for controlling a laser scan system. Therefore all relevant laser safety directives must be known and applied before installation and operation. The customer is solely responsible for ensuring the laser safety of the entire system.
   - All applicable laser safety directives must be adhered to. Safety regulation may differ from country to country. It is the responsibility of the customer to comply with all local regulations.
   - Please observe all laser safety instructions as described in you scan head or scan module manual, and this manual.
   - **Always turn on the power of this product and the power supply for the scan head first before turning on the laser. Otherwise there is the danger of uncontrolled deflection of the laser beam.**
     We recommend the use of a shutter to prevent uncontrolled emission of laser radiation.

. Common Digital Module

1.1 How to identify a LMCV4-Digit-M board.

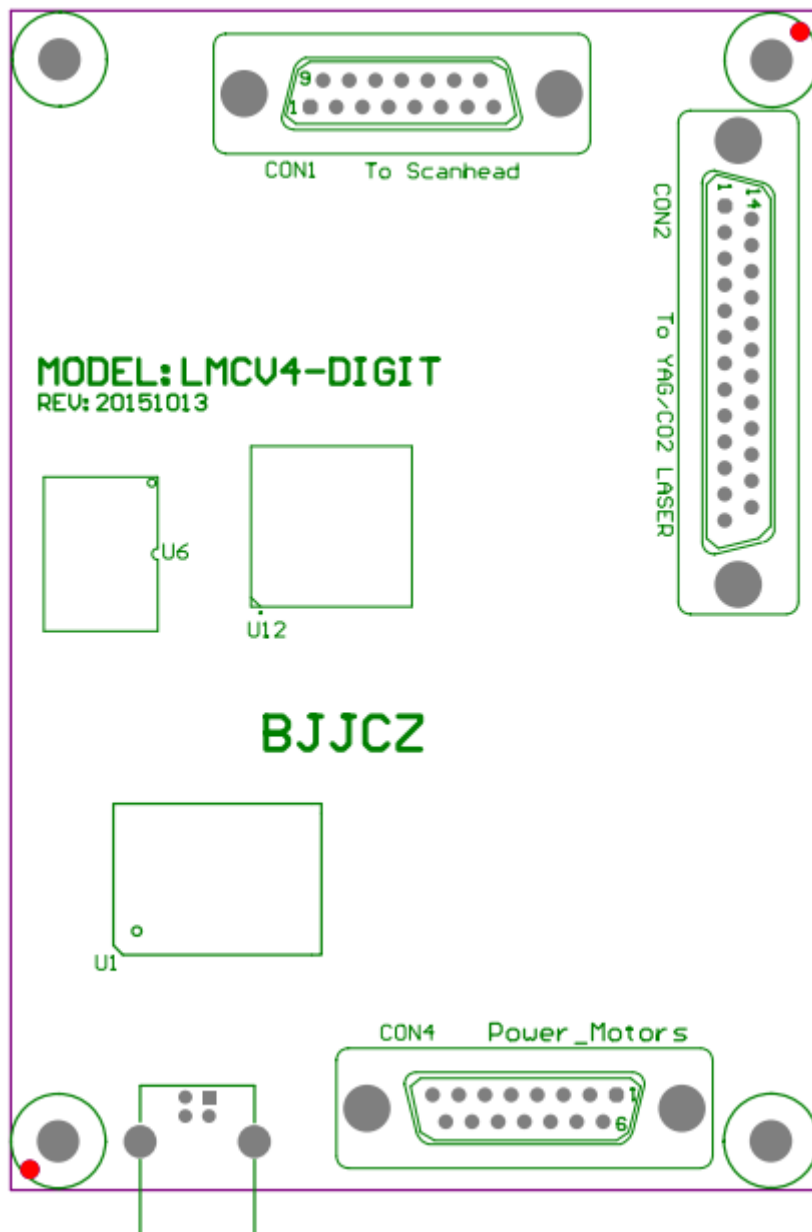Place the board like the following picture. Then you will see a label marked MODEL：LMCFIBER and REV：20151013

Fig 1-1 LMCV4- Digit-M illustration

In this picture,

CON1：scanhead control socket, DB15

CON2：laser control socket, DB25

CON4：power supply ,extension axis control and i/o, DB15

1.2 main feature

- Galvo control signal is digital, which can be connect to most scanhead directly.
  Multiple boards on 1 computer: One computer can control up to 8 control board to mark different pattern simultaneously

- Extension axis(step motor or sever motor): one set of direction/pulse signal can be used to control 1 step(server)　motors.

- 2 general input signals(TTL campatible): XORG0(IN14), IN15.

- 2 general output signals(TTL campatible): OUT4-OUT5 coming out of Con4.

- Remark function: this function is used to remark what ever is in the memory of the board, especially convenient for high speed marking of a same pattern.

- Compatible with USB2.0 specifications.

2 electrical wiring

2.1 pin definition

2.1.1 power supply

The control board need a 5V DC power supply. We recommend a 5V/3A DC supply. The Vcc and Gnd pin are 4/5 and 11/12/13 of CON4 respectively.

CON4 pins	Name	function
4， 5	VCC	+5V power supply.
11, 12，13	GND	Reference ground of the power supply.

2.1.2 CON1 ：DB15 scanhead control

The signals that control scanhead are digital, therefore can be connected to the digital scanhead directly. Because the protocols that every manufacturer used are not always the same, you need to conform which protocol is used. We also provide a D/A converter in the package. The digital signal converted by which can be connected to a analog scanhead.
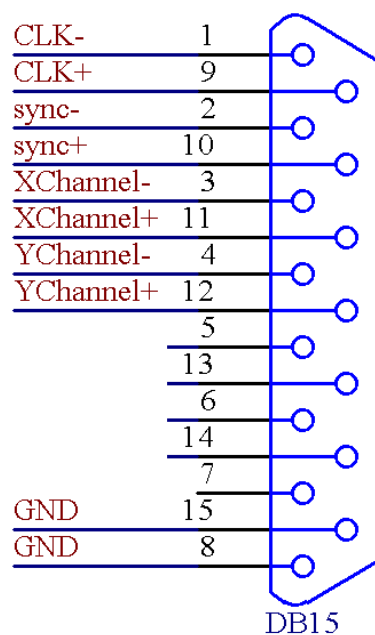
Fig 2-1 pin definition of CON1

Pin	Name	Function
1，9	CLK－ / CLK＋	Clock signal－ / Clock signal＋
2，10	SYNC－ / SYNC＋	Synchronization signal － / Synchronization signal＋
3，11	X Channel－ / X Channel＋	Scanhead signal X－ / Scanhead signal X＋
4，12	Y Channel－ / Y Channel＋	Scanhead signal Y－ / Scanhead signal Y＋
5，13	Z Channel－ / Z Channel＋	Scanhead signal Z－ / Scanhead signal Z＋
6，14，	Status-/Status+	Reserved
7	NULL	Reserved
8，15	GND	Reference signal

    To a commonly used two dimension scanhead, connecting CLK, SYNC, four wires for XChannel and Ychanne and the GND would be enough. We recommend a shielded twisted pair for all digital signal.

2.1.3 CON2 ： DB25　Laser Control
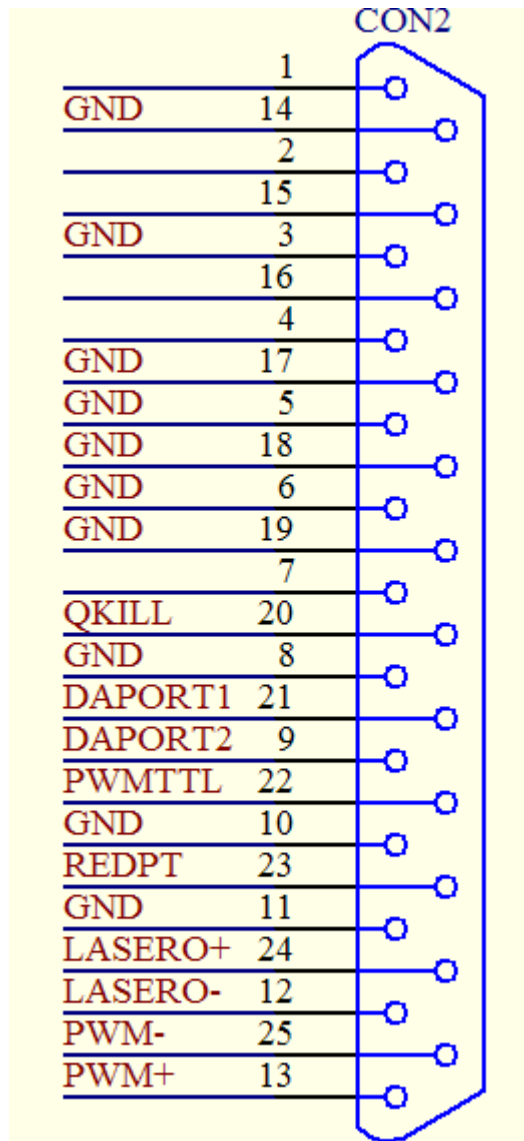
Pin no.	Name	illustration
3, ,5， 6, 8, 10, 11, 14， 17, 18，19	GND	Reference ground of the board, also the cathode of the 5V power supply. Any pin without specific declaration sees this signal as reference ground.
20	QKILL	First pulse kill signal.
9	DAPORT2	Analog signal for frequency control also can be used as analog first pulse killer, ranging from 0 to 5V, maxim driving current 5mA.
21	DAPORT1	Analog signal for power control. Ranging from 0 to 10V, maxim driving current 5mA.

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23	RedPt / OUT8	Guide laser control/ general output 8. TTL
12	LaserO-	Laser on/off signal, TTL, low level effective.
24	LaserO+	Laser on/off signal, TTL, high level effective.
25, 13	PWM-/PWM+	PWM, differential pair.
22	PWMTTL	PWM, TTL. For a CO2 laser module, this signal controls the power and also be used as tickle signal. For YAG laser module this is used as a frequency control for the Q switch.

2.1.4 CON4 ：DB15 power supply and extension axis control and IO.
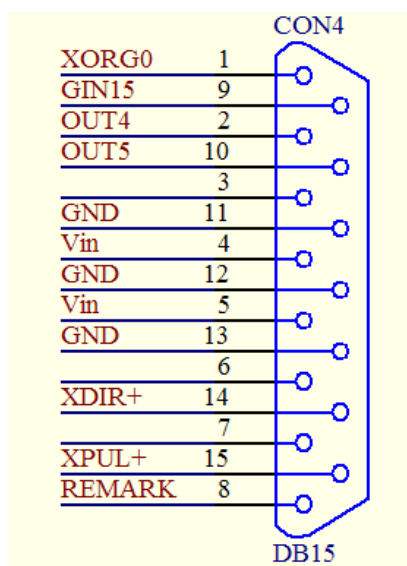
Pic 2-3 CON4 pin definition

| Pin	NAME	Function
1	XORG0	The home signal of extension axis X. To use this pin just connect it and GND to a switch. In software In14 represents this pin.
2	GIN15	General input in15, using GND as a reference ground.
2，10	OUT4, OUT5	General Output Out 4—Out 5, using GND as reference ground. They are all TTL output .
4，5	Vin	Input pin for 5V power supply.
11,12，13	Gnd	Reference ground of 5V power supply
14	XDIR+	Direction signal of extension axis X. It is a TTL output. For common anode, use VCC and XDIR+ signals, and VCC is

| 15 | XPUL+- | anode signal. |
| | | Pulse signal of extension axis X.   It is a TTL output. For common anode, use VCC and XDIR+ signals, and VCC is anode signal. |
| 8 | ReMark | Repeat marking signal. Use GND as a reference ground, to use this signal just connect a switch between this pin and GND. When it is activated the control will mark the content in the cache. |

2.3 wiring for digital I/O.

2.3.1 I/O that can be connect to GND

As name suggested these kind of I/O can be connected to switch and then to the ground. , ReMark ,XORG0,GIN15, Remark are of these kind.

The following schematics are typical wiring for these kind of signal.
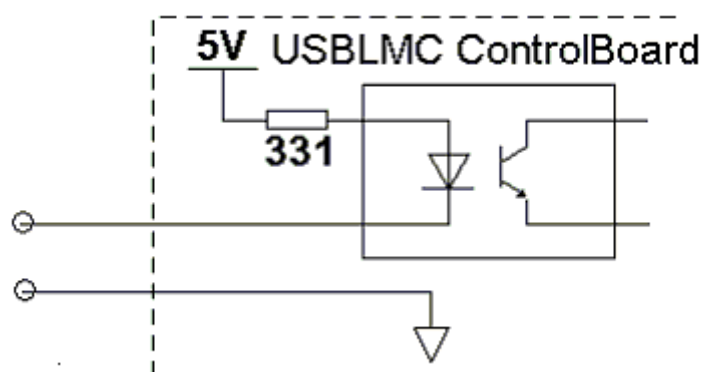
Pic 2-7 wiring for general input pins
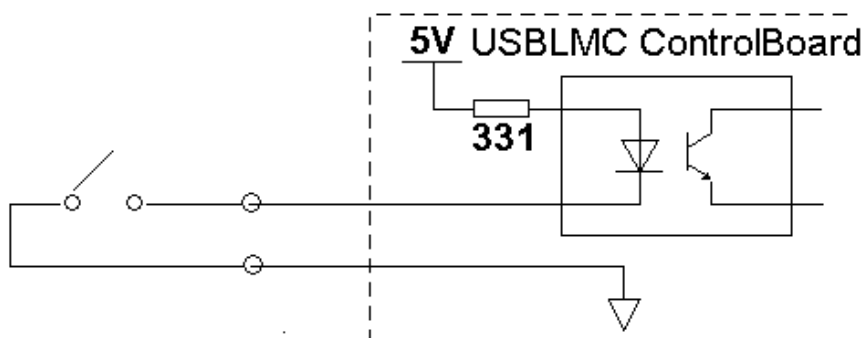
Pic 2-8 recommended wiring for general input pins

For these pins the resistor of the switch should be below 100ohm.

2.3.3 Out4, Out5 .

Out4, Out5   are   TTL   signal.

If a output is in TTL mode, The output must not be short circuited or wire to GND directly. Otherwiser the board can be damaged.

3 Control Board size