

LSI-3123/A/L

**Quadrature Encoder
Counter Card**

User's Manual (V1.2)

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Correction record

Version	Record
1.1->1.2	1. Correct 3.1 specification data
	2. Delete description of Chapter 11,12 register function description (user may request for reference)

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Notes on hardware installation

Please follow step by step as you are installing the control cards.

1. Be sure your system is power off.
2. Be sure your external power supply for the wiring board is power off.
3. Plug your control card in slot, and make sure the golden fingers are put in right contacts.
4. Fasten the screw to fix the card.
5. Connect the cable between the card and wiring board.
6. Connect the external power supply for the wiring board.
7. Recheck everything is OK before system power on.
8. External power on.

Congratulation! You have it.

For more detail of step by step installation guide, please refer the file “installation.pdf “ on the CD come with the product or register as a member of our user’s club at:

<http://automation.com.tw/>

to download the complementary documents.

1. **Forward**

Thank you for your selection of our LSI-3123 quadrature encoder counter card.

In the field of automation, encoder and linear scale as feedback or measuring element is common used in the microprocessor control system. But for the versatile application in PC based control, only a few selections you can make.

We integrate 3 axes (channels) and specific external trigger (for touch probe, like Renishaw ...) in one card with the state of the art technology of FPGA chip and provide photo coupler isolation in each phase input with 32 bit counter length. Low cost and high performance makes this card a better choice to use in the servo control feedback , 3D measuring system and other applications may concerning encoder or linear scale .

Other encoder/linear scale interface card:

- LSI-3101 One axis quadrature encoder/linear scale counter card (PCI bus)
- LSI-3104 4 axes encoder/linear scale counter card (PCI bus)
- LSI-3134 4 axes quadrature encoder/linear scale counter card
with 1 axis FIFO compare mode (PCI bus)
- LSI-3144 4 axes quadrature encoder/linear scale counter card
with 2 axes FIFO compare mode (PCI bus)
- LSI-5123 3 axes quadrature encoder counter interface, single end input type (USB)
- LSI-5123L 3 axes quadrature encoder counter interface, single end input, probe trigger input (USB)
- LSI-5123A 3 axes quadrature encoder counter interface, differential input, probe trigger input,
relay out (USB)

Any comment is welcome,
please visit our website: www.automation.com.tw for the up to date information.

2. Features

2.1 Main card

- 2.1.1 High noise immunity with photo-coupler isolation ^{*1}
- 2.1.2 1 MHz max. Quadrature input rate
- 2.1.3 Three 32-bit counters
- 2.1.4 Quadrature, pulse/direction and up/down counting
- 2.1.5 Programmable multiply rate at X1, X2, X4
- 2.1.6 Load preset value to counter by external trigger or software trigger ^{*1}
- 2.1.7 Latch counter value by external trigger ^{*1}
- 2.1.8 Build-in touch probe interface ^{*1}
- 2.1.9 Counter reset (homing) modes
- 2.1.10 LED of touch probe hardware synchronized with probe status ^{*1}
- 2.1.11 Supports DIN rail mounted wiring board
- 2.1.12 Software key function

2.2 Din rail mounted wiring board

- 2.2.1 D-type 25 pin connector to screw wiring board

3. Specifications

3.1 LSI-3123 Main card

- 3.1.1 Photo coupler Isolation Voltage — 2500 Vac 1 min ^{*1}
- 3.1.2 Isolation Resistance — 100M Ohm(min)1000Vdc ^{*1}
- 3.1.3 Counter width — 32 Bits
- 3.1.4 Card ID — 4 bits
- 3.1.5 Input channel — 3 channels X, Y, Z, totally 3 compatible device units can be hooked
- 3.1.6 Input signal type — photo-coupler isolated single-end input ^{*2}
- 3.1.7 Input pulse multiply rate — X1, X2, X4 programmable (quadrature signal only)
- 3.1.8 Maximum quadrature input frequency — 1MHz @X1, 1MHz @X2, 1MHz @X4
- 3.1.9 Input Mode — (QUADRATURE) , (CLOCK/DIRECTION) ,
(UP CLOCK/ DOWN CLOCK)
- 3.1.10 Latch input — 2 for external trigger latched counter data at buffer ^{*1}
- 3.1.11 Homing (reset) counter method — one software trigger mode and one H/W trigger mode ^{*1}
- 3.1.12 Polarity — all input signals are software programmable
- 3.1.13 Operation temp — 0 to 70° C
- 3.1.14 Operation humidity — RH5~95%, non-condensing
- 3.1.15 Dimension — 130(W)*102(H)mm , 5.12(W)*4.02(H)in

3.2 JS51050 25P Din rail mounted dummy wiring board

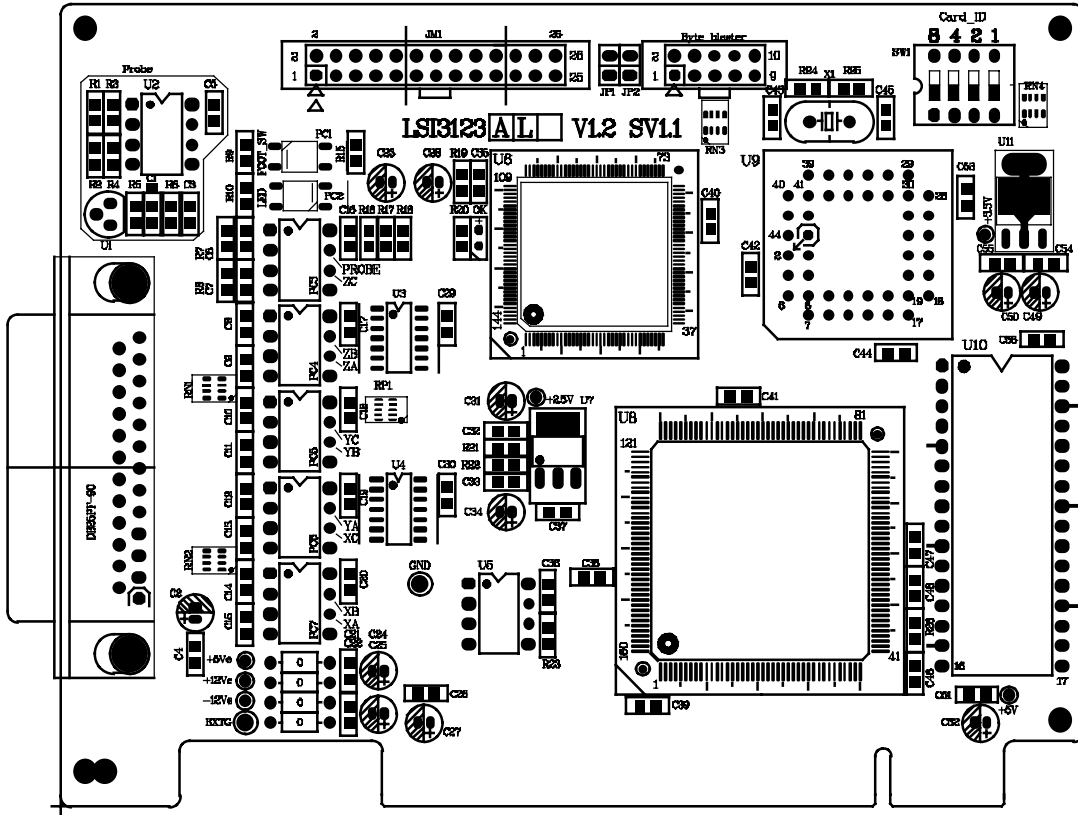
- 3.2.1 External supply — DC 5V
- 3.2.2 Connection cable — D type 25P cable to connect main and wiring board
- 3.2.3 Operation temp — 0 to 70° C
- 3.2.4 Dimension — 86(W)*79(L) *52(L)mm , 3.39(W)*3.11(L)*2.05(H)in

^{*1} : not available for LSI-3123L.

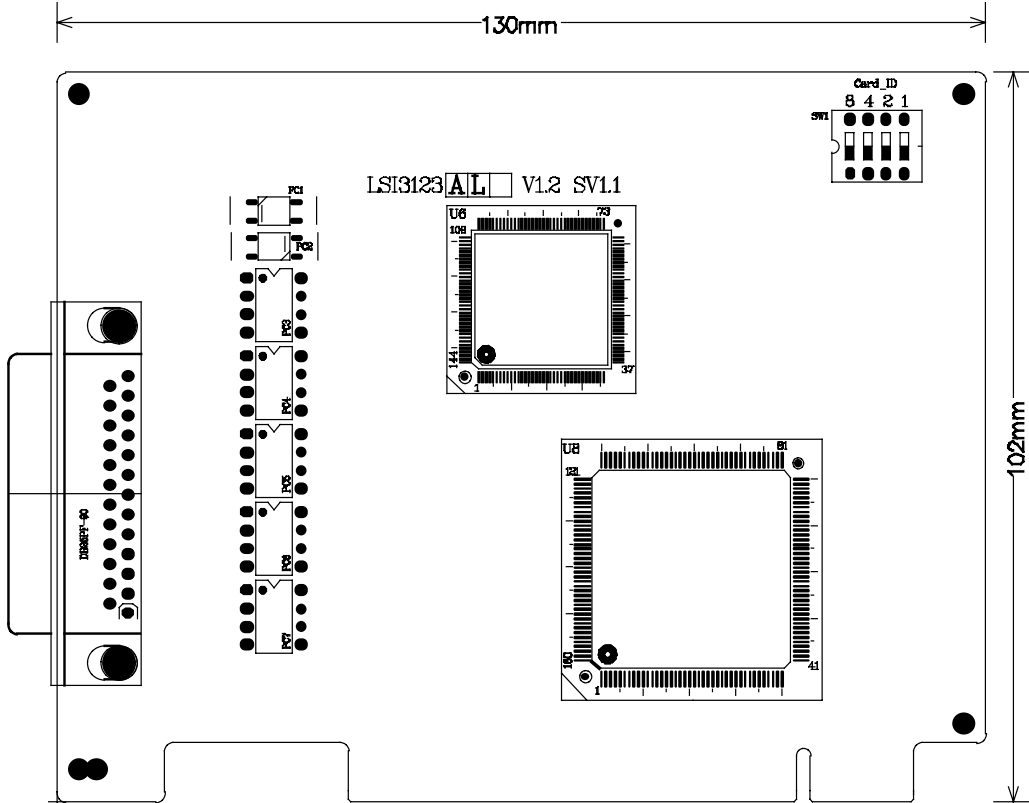
^{*2} : for LSI-3123L only TTL interface.

4. Layout and dimensions

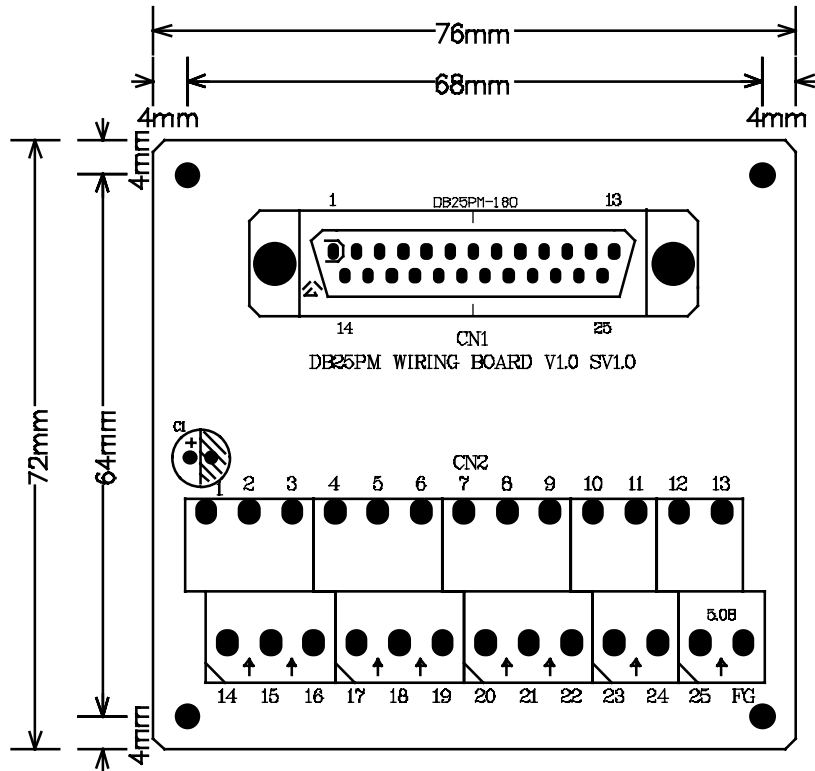
4.1 LSI-3123 Main card layout



4.2 LSI-3123 Main card dimension



4.3 JS51050 25P Din rail mounted dummy wiring board



5. Pin definitions for 25P D-type connector

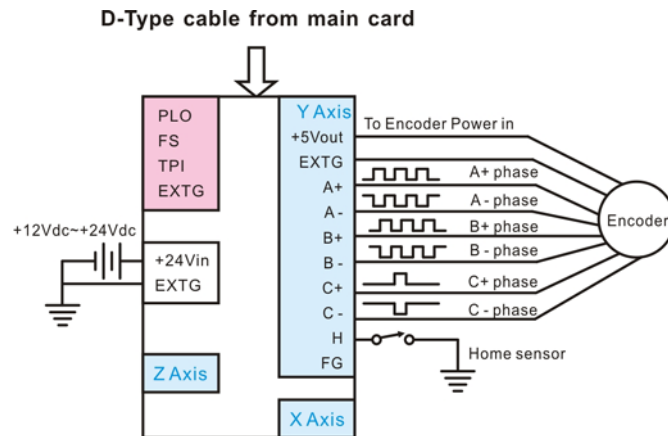
5.1 Pin definitions

PIN	DESCRIPTIONS		PIN	DESCRIPTIONS
1	+5V ,External 5V		14	+5V , External 5V power source for photo coupler ^{*4}
2	X_A , A phase input of X axis		15	NC.
3	X_B , B phase input of X axis		16	NC
4	X_C , C phase(zero phase) input of X axis		17	EXTG , External ground
5	Y_A , A phase input of Y axis		18	EXTG, External ground
6	Y_B , B phase input of Y axis		19	EXTG, External ground
7	Y_C , C phase(zero phase) input of Y axis		20	EXTG, External ground
8	Z_A , A phase input of Z axis		21	EXTG, External ground
9	Z_B , B phase input of Z axis		22	EXTG, External ground
10	Z_C , C phase(zero phase) input of Z axis		23	EXTG, External ground
11	PROBE IN , Renishaw touch probe input ^{*3}		24	EXTG, External ground
12	FOOT_SW_IN , push button input ^{*3}		25	EXTG, External ground
13	PROBE_LED_OUT , on-probe LED ^{*3} control			

^{*3} : Not available for LSI-3123L

^{*4} : For LSI-3123L, the +5V power comes from PC

6. External wiring diagram



7. Hardware settings

7.1 CARD ID Settings

Since PCI cards have plug and play function, the card ID is required for programmer to identify which card he/she will control without knowing the physical address assigned by the Windows. A 4 bits DIP (ROTARY) switch for distinguishing the 16 identical card.

8. Applications

- For counting pulses on the fly, such as:
 - Encoder on various kinds of servo motor
 - Encoder on DC/AC motor
 - Optical scale output signal
 - Magnetic linear scale output
 - Timing disc
 - Revolution sprocket
 - Proximity sensor/detector with relative motion
- Pulse signal receiver /display
- Renishaw (Touch Probe or non touch probe) ext-trigger to latch position
- X-Y Table linear Scale F/B

9. **Ordering information**

<u>PRODUCT</u>	<u>DESCRIPTIONS</u>
LSI-3123	3-axis Quadrature Encoder Counter Card
LSI-3123A	3-axis Quadrature Encoder Counter Card (with Accurite fast coordinate rebuilt function)
LSI-3123L	3-axis low cost Quadrature Encoder Counter Card
JS51050	DIN rail mounted dummy wiring board (D type 25-pin male to terminals)
M270325X4	D type 25p male-female cable 1.5M
M270325X4S	D type 25p male-female cable 1.5M, shielding
M270325X0	D type 25p male-female cable 3.0M
M270325X0S	D type 25p male-female cable 3.0M, shielding