LSI3123/A/L

Quadrature Encoder Counter Card

User's Manual (V1.3)

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Correction record

Version	Record
V1.1->V1.2	1. Correct 3.1 specification data
	2. Delete description of Chapter 11,12 register function description (user may request for reference)
V1.2->V1.3	Modify 2. Feature-Delete Software key function

Contents

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 LSI3123 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:

LSI3101 one-axis Quadrature Encoder Counter Card (up to 8MHz quadrature input) (PCI bus)

LSI3101A one-axis Quadrature Encoder Counter Card (up to 16MHz quadrature input) (PCI bus)

LSI3104 4 axes encoder/linear scale counter card (PCI bus)

LSI3134 4 axes quadrature encoder/linear scale counter card with 1 axis FIFO compare mode (PCI bus)

LSI3144 4 axes quadrature encoder/linear scale counter card with 2 axes FIFO compare mode (PCI bus)

LSI5123 3 axes quadrature encoder counter interface (USB)

LSI5123L 3 axes quadrature encoder counter interface (no external trigger latch mode) (USB)

LSI5123A 3 axes quadrature encoder counter interface (High noise immunity , Accurite linear scale absolute coordinate mode) (USB)

Any comment is welcome,
please visit our website
http://www.automation.com.tw/
http://www.automation-js.com/ 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 multiple 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

2.2 Din rail mounted wiring board

2.2.1 D-type 25 pin connector to screw wiring board

3. Specifications

3.1 LSI3123 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 multiple 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 , 5.2(W)*4.1(H)in

3.2 Din rail mounted dummy wiring board

ADP3123DIN

3.2.1 Power requirement — 12Vdc ~ 24Vdc

3.2.2 On Board Build-in s.p.s. — +5Vdc 500mA (max)

3.2.3 Differential to single-end conversion for LSI3123/A/L

3.2.4 Specific Input — 3-Axis A+, A-,B+,B-,C+,C-

3.2.5 Connector — One D-type 25-pin male connector

3.2.6 Operation Temperature — 0 to +70 degree C

3.2.7 Operation Humidity — RH5~95%, non-condensing

3.2.8 Dimension — 86(W) *113(L)*47(H) mm, 3.4(W)*4.5(L)*1.9(H) in

JS51050

3.2.9 Connection cable — D-type 25P cable to connect main and wiring board

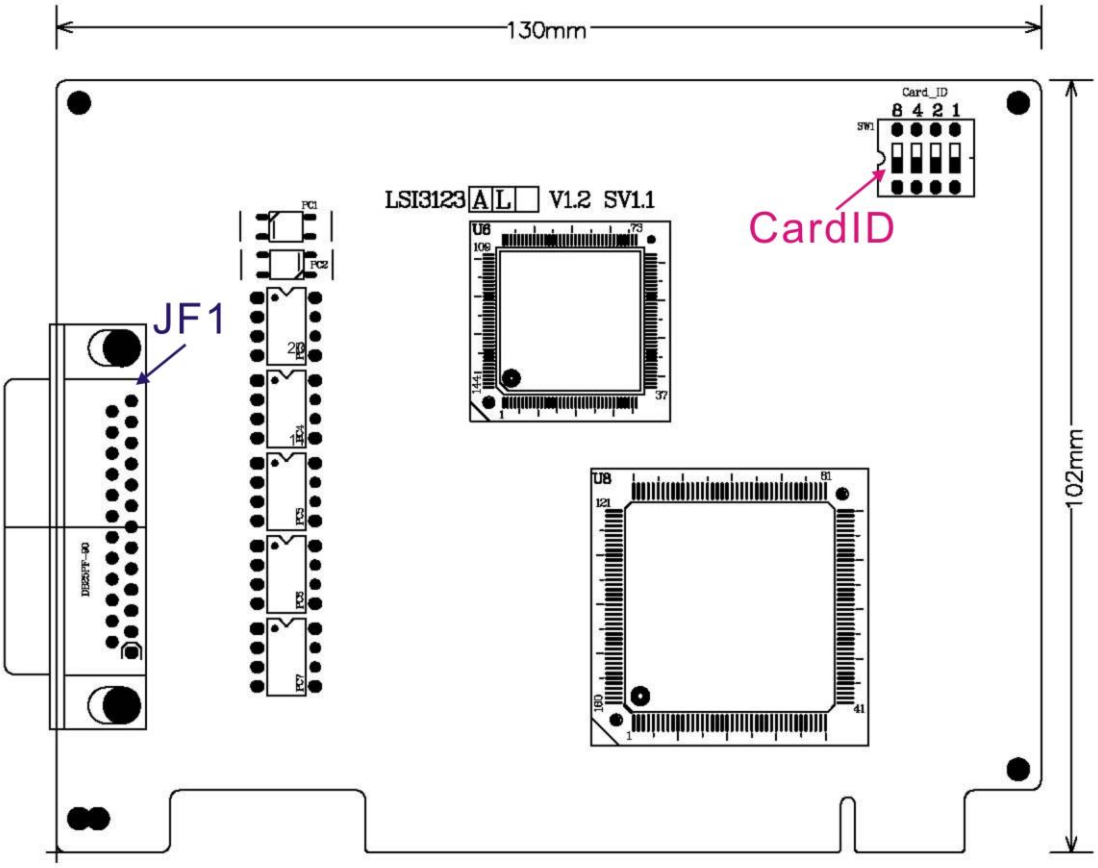
3.2.10 Dimension — 86(W)*79(L)*52(H)mm , 3.4(W)*3.2(L)*2.1(H)in

*1 : not available for LSI3123L.

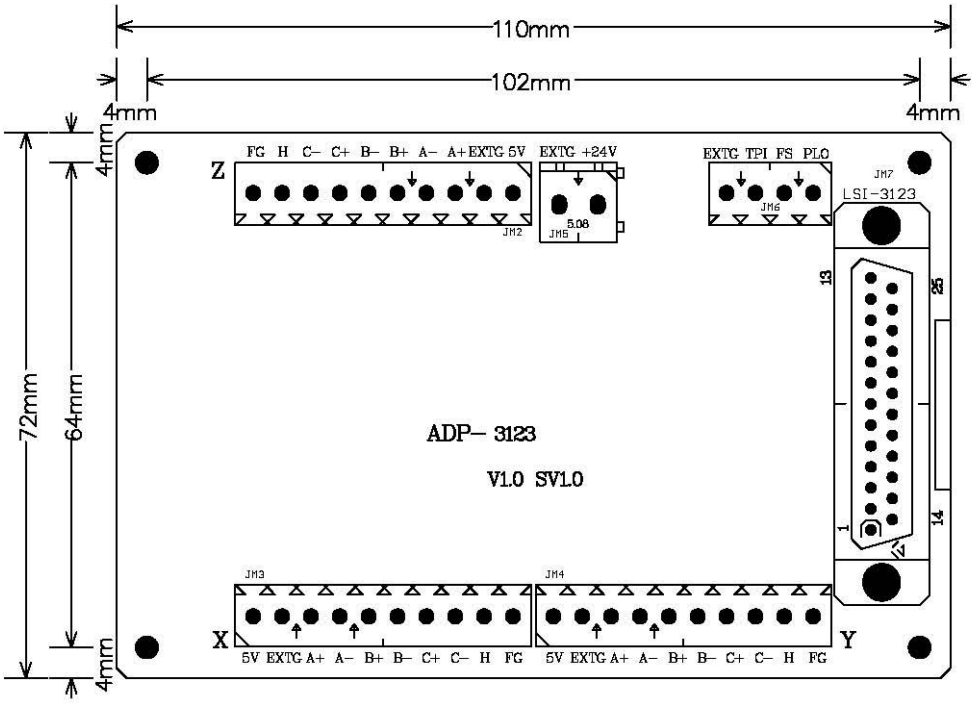
*2 : for LSI3123L only TTL interface.

4. Layout and dimensions

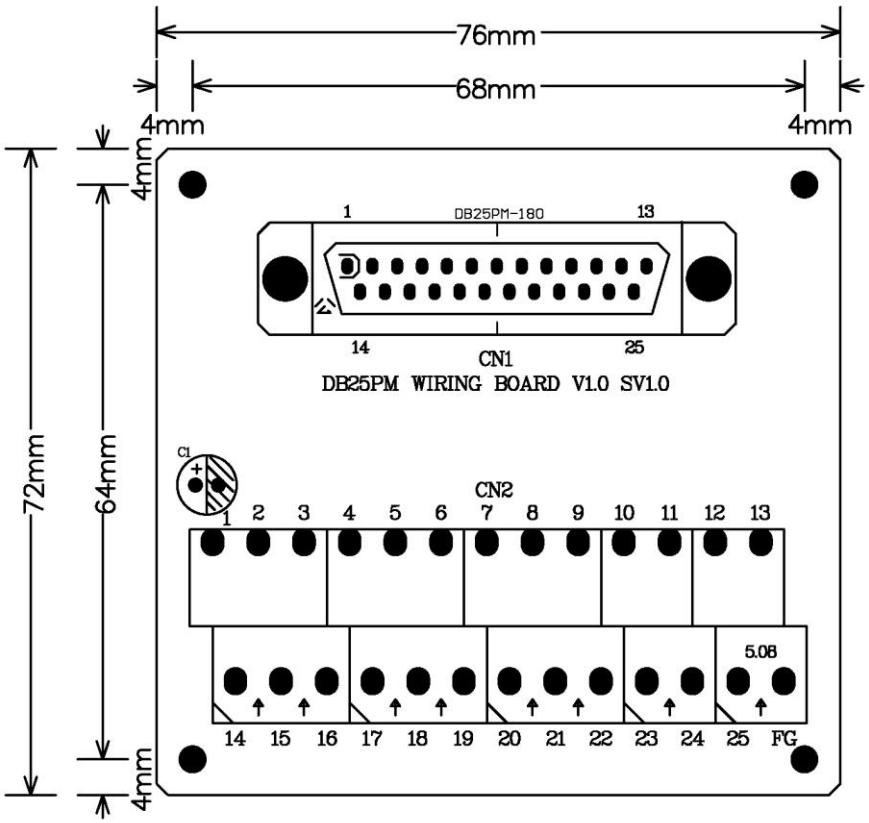
4.1 LSI3123 Main card



4.2 ADP3123DIN Din rail mounted dummy wiring board



4.3 JS51050 25P Din rail mounted dummy wiring board



5. Pin definitions for 25P D-type connector

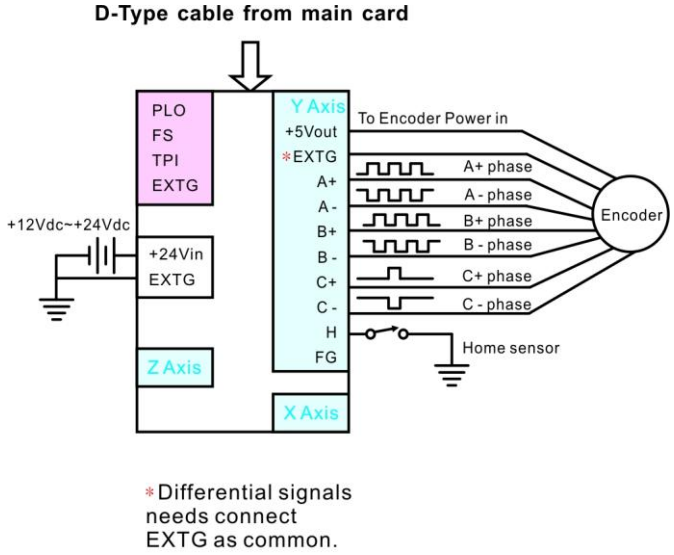
5.1 Pin definitions

PIN	DESCRIPTIONS		PIN	DESCRIPTIONS
1	+5V ,External 5V[*4]		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 LSI3123L

*4 : For LSI3123L, the +5V power comes from PC, other model if use ADP3123DIN, the +5V comes from step down power, no need external 5V. Only the dummy wiring board JS51050 need external +5V.

6. External wiring diagram



*Differential signals needs connect EXTG as common.

Pulse Input under various mode			
Input Terminal	Quadrature	Single Pulse	Dual Pulse
A+	A+	Clock+	CW+
A-	A-	Clock-	CW-
B+	B+	Dir+	CCW+
B-	B-	Dir-	CCW-
C+	C+	NA	NA
C-	C-	NA	NA

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

PRODUCT	DESCRIPTIONS
LSI3123	3-axis Quadrature Encoder Counter Card
LSI3123A	3-axis Quadrature Encoder Counter Card (with Accurite fast coordinate rebuilt function)
LSI3123L	3-axis low cost Quadrature Encoder Counter Card (no external trigger latch mode and photo isolation)
ADP3123DIN	DIN rail mounted wiring board matched LSI3123/A/L, differential to single-end
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