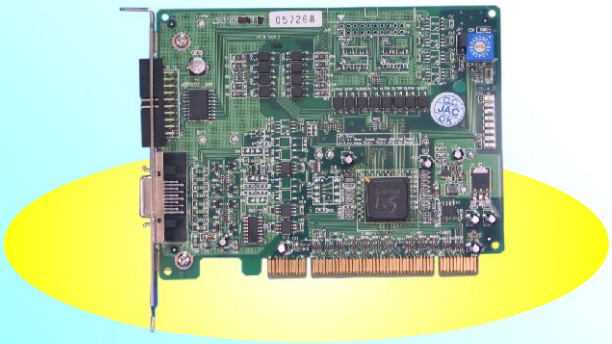
LSI3101/A

Single-axis Quadrature Encoder Counter Card



Features

- PCI plug and play function with card ID for 16 identical cards
- High noise immunity with magnetic / photo-coupler isolation
- Supports DIN rail mounted wiring board
- 32-bit timer based on 1us time base
- 8 photo-coupler isolated digital input
- 8 photo-coupler isolated digital output
- Software debounce for digital input
- Software programmable I/O polarity
- Interrupt from IN00 ~ IN07
- 32-bit counter
- 16 MHz max. Quadrature input rate (LSI3101A)
  8 MHz max. Quadrature input rate (LSI3101)
- Quadrature, pulse/direction and up / down counting
- Programmable multiple rate at x1, x2, x4
- Software debounce for input signals
- Multiple counter reset (homing) modes
- Differential or single-end input signal
- Compare mode : single, auto increment and FIFO compare mode
- Output gated and segment mask off
- Programmable duration for Compare output

Introduction

The LSI3101/A is a one-axis high speed quadrature counter card, providing on the fly compare and counting function.

DLL is provided for WinXP, Win7 and later or Linux platform, sample source code in VB and Linux Qt are also available.

Encoder Interface

The input signals are magnetic coupled and signal type of single end or differential can be set at wiring board. The software debounce time is programmable to filter the unwanted glitches.

Counters and compare function

The signal input of the counter can configure as quadrature (multiple rate at 1, 2, 4), single pulse or dual pulse mode and the counter is 32-bit width sampled at 33MHz. Together with the counter, there are 7 Homing modes (Counter clear mode) to choose. The counter also provides 3 compare functions : single, auto-increment and FIFO compare. All these mode can have programmable output pulse width. The compare FIFO can be managed by fill, clear, threshold setting. The status out of FIFO : full, near empty and empty can trigger the interrupt service routine.

External Gate and Segment Mask Off

The compare output can be gated by IN00 (for compare out). Except for external gate, the segment mask off function provides more flexible control. There are 3 programmable coordinate segments, any or all of the 3 segments can be configured exterior or interior to mask off the compare out signal without effecting the compare function of auto increment or FIFO.

Timer

A 32-bit timer based on 1MHz clock can work as a hardware periodic timer to trigger sampling event.

Digital I/O

8 photo-coupler isolated digital input and 8 photo-coupler isolated digital output of standard digital I/O interface can connect to any type of the ADP9201DIN wiring board. Need no extra digital I/O card, in small applications. There are digital filters for the digital input and programmable polarity to adjust the logic to convenient state and the input transition can generate the request of interrupt

Applications

- Event counting
- Frequency counter
- Pulse signal receiver / display
- Linear Scale / encoder F/B
- CCD Image Capture Trigger on the fly

Specifications (With Matched Wiring Board)

Counter

- Number of axes : 1
- Input : 5 magnetic isolation (A, B, Z, CLEAR, HOME input), TTL level
- Output : 1 magnetic isolation (compare out), TTL level
- Maximum quadrature input frequency :
  8MHz @x1, x2, x4 (LSI3101)
  16MHz @x1, x2, x4 (LSI3101A)
- Encoder Type : Single-end or differential
  (with ADP3101 DIN wiring board)
- Input software debounce :
  for LSI-3101 : 512k, 1M, 2M, 4M, 8M (programmable)
  for LSI-3101A : 512k, 1M, 2M, 4M, 8M, 10M, 16M (programmable)
- Input multiple rate : x1, x2, x4 programmable (quadrature signal only)
- Counter length : 32-bit
- Counter Mode : (QUADRATURE), (CLOCK/DIRECTION), (UP CLOCK/ DOWN CLOCK)
- Compare Mode : Single compare
  Auto-Increment compare
  FIFO compare
- Sample clock frequency : 33MHz
- FIFO depth : 1023
- Compare out one shot duration : 1~65535us

Digital

- Input : 8 photo-coupler isolated
- ON state : 2.8Vdc(max) 4.5mA(min)
- OFF state : 8Vdc(min) 3mA(max)
- Switching speed : 10KHz max. (limit by photo coupler speed and debounce filter)
- Software debounce : 100Hz, 200Hz, 1KHZ,. No debounce (programmable)
- Interrupt at IN00 ~ IN07
- Output : 8 photo-coupler isolated
- Output range : Open collector 0 ~ 45Vdc (on card)
- Output rating : (With ADP3101DIN wiring board)
  3A @250Vac, 30Vdc (Relay)
  1A @ 24Vdc (PMOS)
  2A @ 240Vac (SSR)
- Sink current : 500mA(peak) per channel (on card)
- Switching speed : 20KHz(max)(MOS out only)

Timer

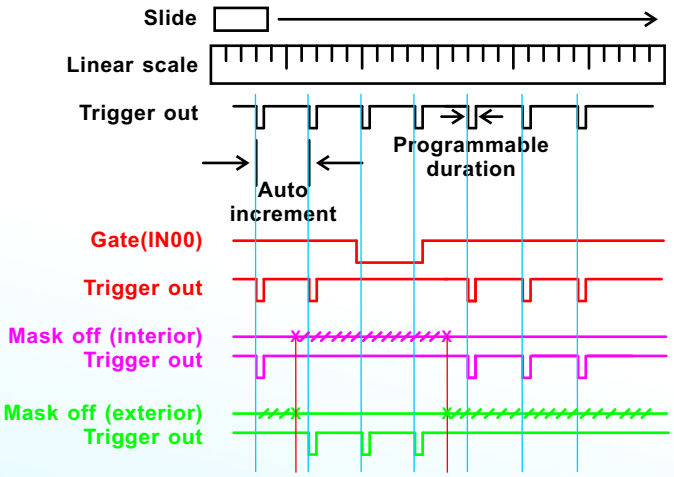
- Timer time base : 1us
- Timer/counter length : 32-bit

Main Card General

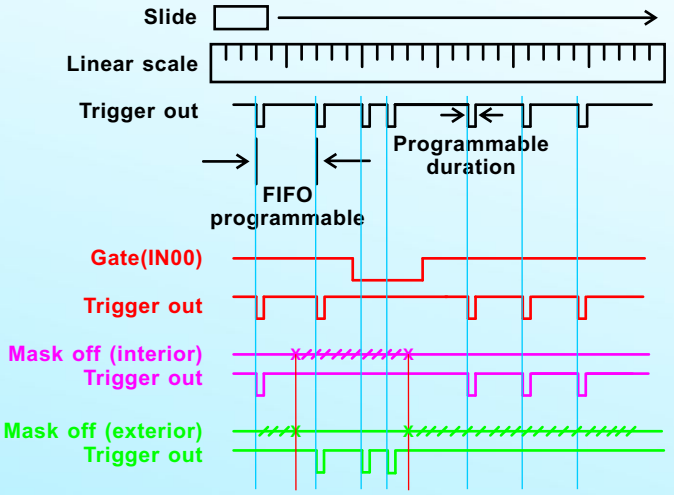
- Card ID : 4-bit, 16 position
- Insulation resistance : 1000Mohm (min) at 1000Vdc
- Isolation voltage : 2500Vac 1 min
- Connector : One 20 pin SCSI-II female connector
  One 20 pin flat cable connector
- Operation temperature : 0 °C ~ +70 °C
- Storage temperature : -20 °C ~ +80 °C
- Operation humidity : 5-95% RH, non-condensing
- Dimension : 130(W) * 102(H)mm, 5.2(W) * 4.1(H)in

Application Tips

Auto increment

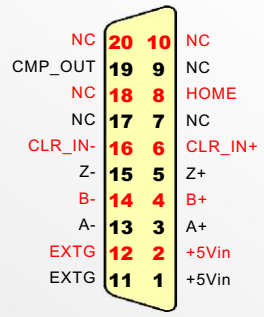


FIFO programmable

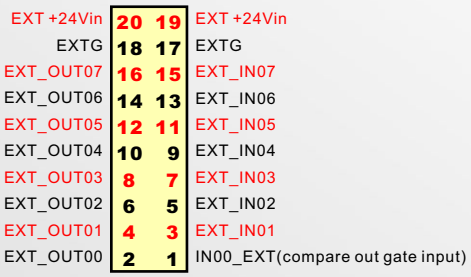


Pin Assignments

JF1



ADP9201_JM1



Software Support

➤PC OS Support

WinXP, Win and later or Linux O.S.
Embedded XP, Win CE (at request)

➤Library

DLLs, VI library

➤Develop Software

Visual C++, Visual Basic,
Borland C/C++ Builder, LabVIEW etc

➤Example Source Code

Visual Basic

Ordering Information

- ➤**LSI3101 :** Single-axis Quadrature Encoder Counter Card(up to 8MHz quadrature input)
- ➤**LSI3101A :** Single-axis Quadrature Encoder Counter Card(up to 16MHz quadrature input)
- ➤**ADP3101DIN :** DIN rail mounted wiring board for LSI3101 quadrature counter related function (for JF1) P.41
- ➤**M262020150 :** 20-pin SCSI II centronic cable 1.5 M for JF1 I.18
- ➤**M262020300 :** 20-pin SCSI II centronic cable 3.0 M for JF1 I.18
- ➤**ADP9201DIN(R) :** DIN rail mounted wiring board with 16 I/O LED indicators and Relay output for 8 DI, 8DO (for JM1) P.79
- ➤**ADP9201DIN(P) :** DIN rail mounted wiring board with 16 I/O LED indicators and PMOS output for 8 DI, 8DO (for JM1) P.79
- ➤**ADP9201DIN(S) :** DIN rail mounted wiring board with 16 I/O LED indicators and SSR output for 8 DI, 8DO (for JM1) P.79
- ➤**JS51053 :** DIN rail mounted dummy wiring board for general digital I/O, Transistor out (for JM1) I.12
- ➤**M23207 :** 20-pin flat cable 1.5 M for ADP9201_JM1 I.17
- ➤**M23209 :** 20-pin flat cable 3.0 M for ADP9201_JM1 I.17

Note