

**DASP-52032**  
**16 Isolated D/I and &**  
**16 Relay Output Card**  
**User's Manual**

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## **ESD Precautions**

Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:

Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.

Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This helps to discharge any static electricity on your body.

Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

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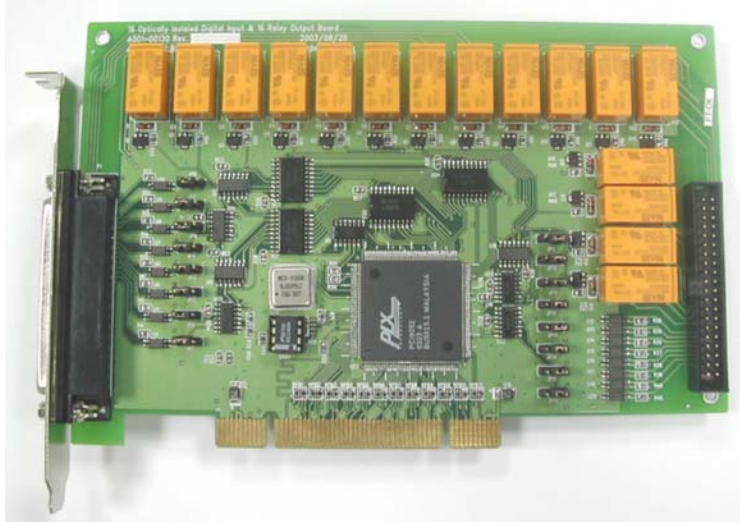
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## Chapter 1 Introduction



The DASP-52032 is a PCI-bus, 16 isolated D/I and 16 relay output card. It supports not only optical isolation (2500VDC), but also over-voltage protection (50VDC) to enhance the reliability of the system. The DASP-52032 also supports two types of relay actuator-SPDT & SPST, making it suitable for controls and sensing applications such as load switching, external switching detection, and contact closure.

### Easy to Troubleshoot Hardware Resource- PCI Scan Utility

The PCI scan utility can scan all the DASP products within the system, and can show users all system resources, such as serial numbers, IRQ, and I/O addresses. This lets users clearly see through and immediately know whether all DASPs are working normally, decreasing the time of searching confirmation.

## 1.1 Features

- **16 optically isolated digital input channels**
- **8 SPDT & 8 SPST relay output channels**
- **On board relay status LED indicator**
- **AC/DC polarity-free isolated input**
- **Output status read-back**
- **Optical isolation on input channels (2500VDC) and high**
- **Over-voltage protection (50VDC)**
- **Serial number on EEPROM supported**
- **Windows® 98/NT/2000/XP and Labview 6.0/7.0 driver supported**
- **Complete sample program- VB, VC, BCB, Delphi**

## 1.2 Specifications

### Isolated Digital Inputs

- **Channels: 16**
- **Optical isolated: 2500VDC**
- **Photo-coupler: PC-3H4**
- **Photo-isolator response time: 20  $\mu$  s**
- **Over-voltage protect: 50VDC**
- **Input voltage:**
  - VIH (max.) 36VDC
  - VIH (min.) 4VDC
  - VIL (max.) 3VDC
  - Low Logic 0-3VDC
  - High Logic 4-36VDC

- **Input current:**
  - 10 VDC 2.9mA (typical)
  - 12 VDC 3.6mA (typical)
  - 24 VDC 7.5mA (typical)
  - 36 VDC 11.5mA (typical)

### Relay Outputs

- **Output channels: 16**
- **Relay type: 8 SPDT & 8 SPST**
- **Rating (resistive): 10 A @120 VAC, 6 A @ 250 VAC, 5 A @ 30 VDC**
- **Relay on/off time: 10ms typical**
- **Max. switching power: 62.5VA ,60W**
- **Max. switching voltage: 250VAC,220VDC**
- **Breakdown voltage: 750 Vrms (1 sec)**
- **Operate time: 5ms**
- **Release time: 4ms**
- **Life expectancy: 10,000,000 operations**

### General Environment

- **I/O connector: 2 sets 37-pin D-Sub type female**
- **Power consumption:**
  - +5 V @ 250 mA (typical)
  - +5 V @ 800 mA (max.)
- **Operation temperature: 0 ~ 60°C**
- **Storage temperature: -20 ~ 70°C**
- **Humidity: 0 to 90% non-condensing**
- **Dimensions: 185mm x 122mm**

## **1.3 Accessories**

To make the DASP-52032 functionality complete, we carry a versatility of accessories for different user requirements in the following items:

### **Wiring Cable**

- **CB-89037-2:**  
37-pin male D-sub type cable with 2m length
- **CB-89037-5:**  
37-pin male D-sub type cable with 5m length  
The shielded D-sub cable with 2m and 5m are designed for the DASP-52032 connector, respectively.

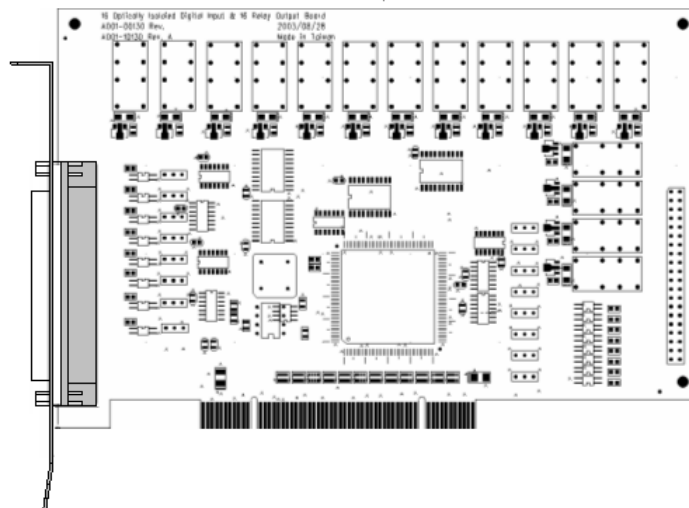
### **Terminal Block**

- **TB-88037:**  
D-sub 37P female terminal block with DIN-rail mounting  
The terminal block is directly connected to I/O connector CON1 and CON2 of the DASP-52032.



## Chapter 2 Hardware Installation

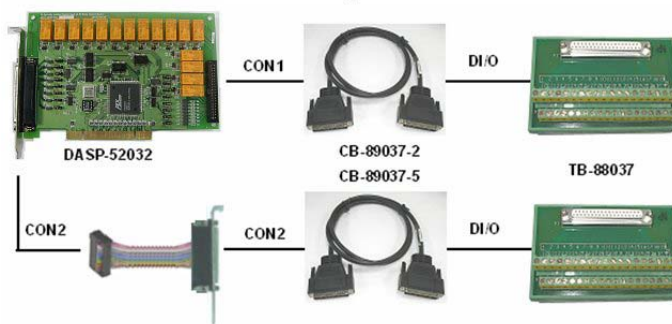
### 2.1 Board Layout



Board Layout for DASP-52032

## 2.2 Signal Connections

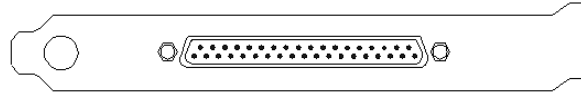
### 2.2.1 Signal Connection Descriptions



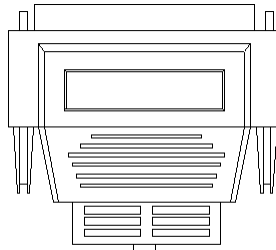
Signal Connections for DASP-52032

- **CON1:**  
The I/O connector CON1 on the DASP-52032 is a 37-pin D-sub female connector for digital input signals. CON1 enables you to connect to accessories, the terminal block TB-88037, with the shielded D-sub cable CB-89037-2 or CB-89037-5.
- **CON2:**  
The I/O connector 40-pin header box connector CON2 on the DASP-52032 is transformed into a 37-pin D-sub female connector for digital input signals. CON2 enables you to connect to accessories, the terminal block TB-88037, with the shielded D-sub cable CB-89037-2 or CB-89037-5.

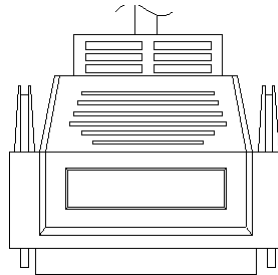
- **Digital Input Connector CON1 and CON2**



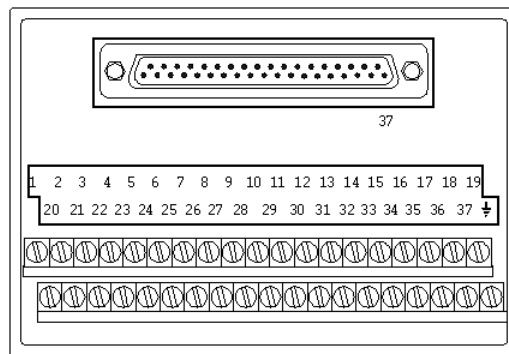
CON1/2



CB-89037

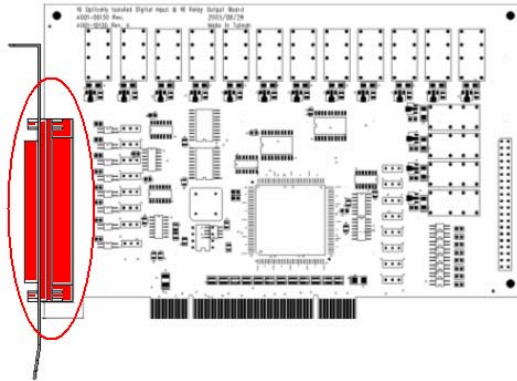


TB-88037



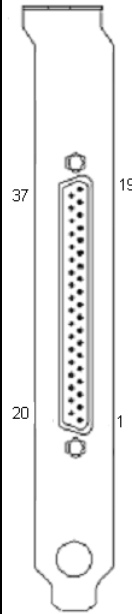
DIO Signal Connections for DASP-52032

The pin assignment of CON1 of DASP-52032 is listed as follows.

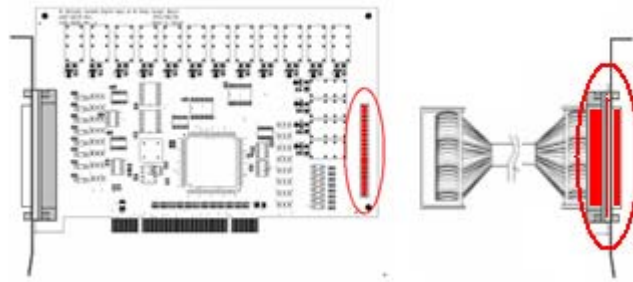


**D-Sub 37-pin Connector for DASP-52032 CON1**

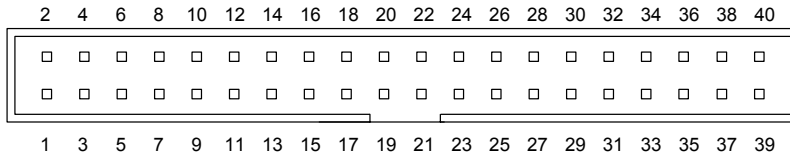
Pin	Description	Pin	Description
37	DIL_7	19	DIH_7
36	DIL_6	18	DIH_6
35	DIL_5	17	DIH_5
34	DIL_4	16	DIH_4
33	DIL_3	15	DIH_3
32	DIL_2	14	DIH_2
31	DIL_1	13	DIH_1
30	DIL_0	12	DIH_0
29	GND	11	COM_7
28	COM_6	10	NO_7
27	NO_6	9	NC_2
26	COM_5	8	COM_2
25	NO_5	7	NO_2
24	COM_4	6	NC_1
23	NO_4	5	COM_1
22	NC_3	4	NO_1
21	COM_3	3	NC_0
20	NO_3	2	COM_0
		1	NO_0



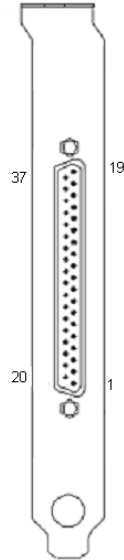
- **NO  $n$** : normal open of the channel  $n$
- **GND**: ground
- **COM  $n$** : common of the channel  $n$
- **DI  $nH$** : digital input signal (+) of the channel  $n$
- **NC  $n$** : normal close of channel  $n$
- **DI  $nL$** : digital input signal (-) of the channel  $n$



**D-Sub 37-pin Connector for DASP-52032 CON2**

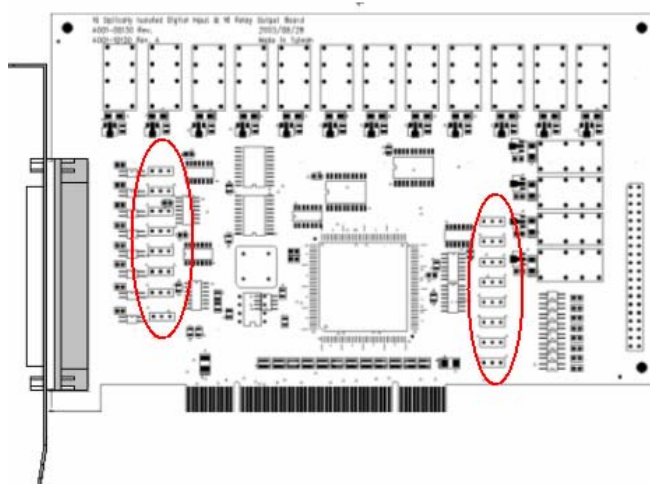


Pin	Description	Pin	Description
37	DIL_15	19	DIH_15
36	DIL_14	18	DIH_14
35	DIL_13	17	DIH_13
34	DIL_12	16	DIH_12
33	DIL_11	15	DIH_11
32	DIL_10	14	DIH_10
31	DIL_9	13	DIH_9
30	DIL_8	12	DIH_8
29	GND	11	COM_15
28	COM_14	10	NO_15
27	NO_14	9	NC_10
26	COM_13	8	COM_10
25	NO_13	7	NO_10
24	COM_12	6	NC_9
23	NO_12	5	COM_9
22	NC_11	4	NO_9
21	COM_11	3	NC_8
20	NO_11	2	COM_8
		1	NO_8



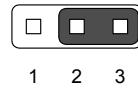
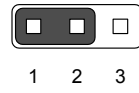
## 2.3 Jumper Setting

Each digital input channel of DASP-52032 can be configured to AC type or DC type independently. Jumper 1 ~ Jumper 8 relates DI0~DI7, and Jumper 9 ~ Jumper 16 relates DI8~DI15, as listed in the following table. When the AC input type of a specific channel is configured, the input path of the channel is automatically attached to an AC filter with a time constant of 1.2ms (60Hz low pass).



Jumper 0~7 and Jumper 8~15 of DASP-52032

Jumper	Channel	Jumper	Channel
JP1	DI_0	JP9	DI_8
JP2	DI_1	JP10	DI_9
JP3	DI_2	JP11	DI_10
JP4	DI_3	JP12	DI_11
JP5	DI_4	JP13	DI_12
JP6	DI_5	JP14	DI_13
JP7	DI_6	JP15	DI_14
JP8	DI_7	JP16	DI_15



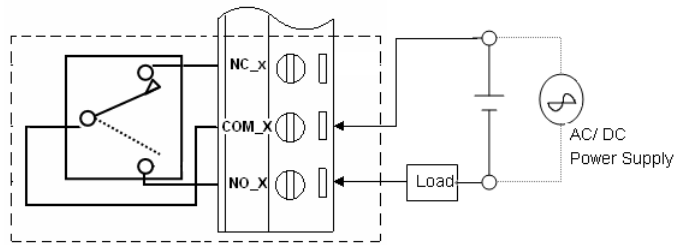
<b>Jumper</b>	DC signal input	AC signal input with filter
<b>JPn</b>	1-2	3-4



## 2.4 DI/DO Circuits and Wiring

### 2.4.1 SPDT Relay: Single Pole Double Throw

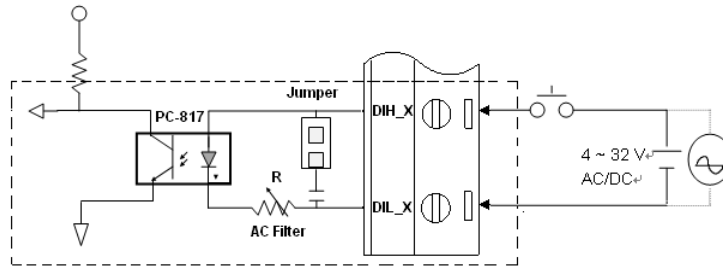
The contact rating of the relay output is 120V AC/10A, 250V AC/6A, and 30V DC/5A. The basic layout and wiring is presented as below.



Block Diagram of Internal Circuits and Wiring of SPDT Relay Digital Output for DASP-52032

### 2.4.2 Isolated Input: AC/DC Polarity-Free

The normal input voltage range is AC/DC 4-32V (AC 50-500 Hz). The basic layout is presented as below.



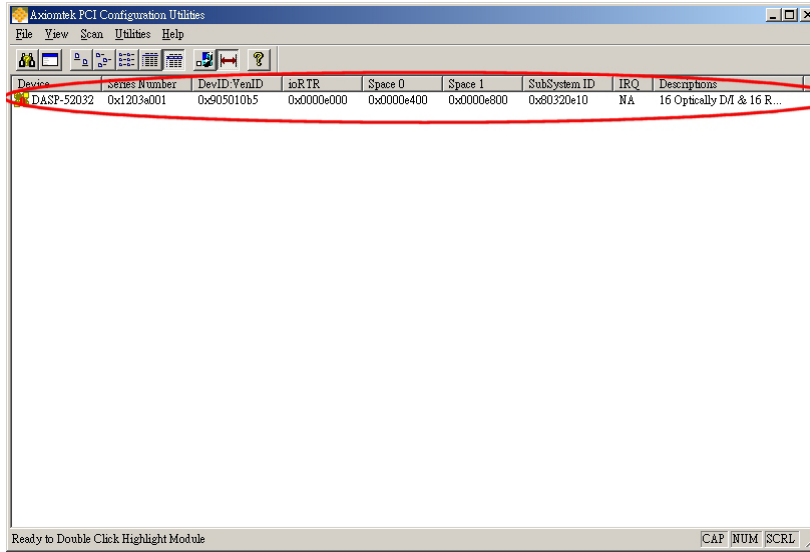
Block Diagram of Internal Circuits and Wiring of Isolated Digital Input for DASP-52032

## 2.5 Quick Setup and Test

To install a new DASP-52032 into an IBM PC compatible computer, at first, power-off the PC and open its chassis, then plug the DASP-52032 into a PCI slot of mother-board. The DASP-52032 is a plug and play device for MS Windows, and the OS will detect your DASP-52032 after you power on the PC. The detail of driver and software installation is described in software manual of DASP-52032.

After the hardware and software installation, user can emulate and test DASP-52032 step by step as follows.

- **To perform a complete test of DASP-52032, we can route the input signals of DASP-52032 with a specific input pattern for read-back. And the output status of each channel can be observed directly from the on-board led indicator of each channel, or to estimate the mechanical movement of the SPDT relay of each channel. And then, by following the DASP-52032 test branch of the *ToolWorkShop* which will fully test all the digital I/O channels of the DASP-52032 as described in the following paragraphs.**
- **Launch the '*PCI Configuration Utility*' of DASP-52032 to ensure that the resource of DASP-52032 is properly dispatched by the OS. Press the scan button in the toolbar of the '*PCI Configuration Utility*' to find the installed DASP-52032, and then check the resource list.**

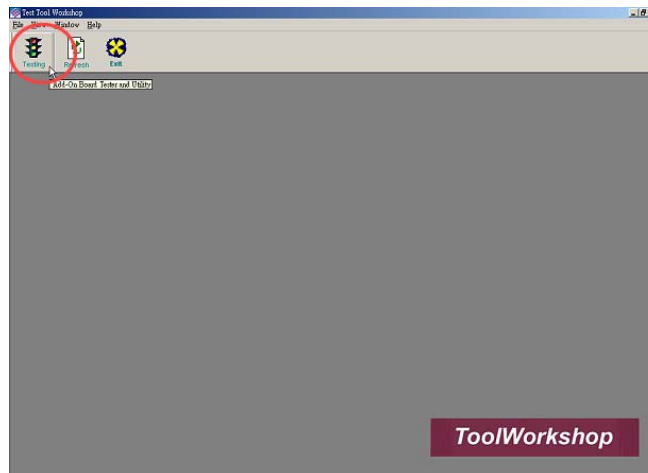


**Scan DASP-52032 with PCI Configuration Utility and Check the Dispatched Resource**

- Exit the '*PCI Configuration Utility*' and launch the '*ToolWorkShop*' for DASP-52032.

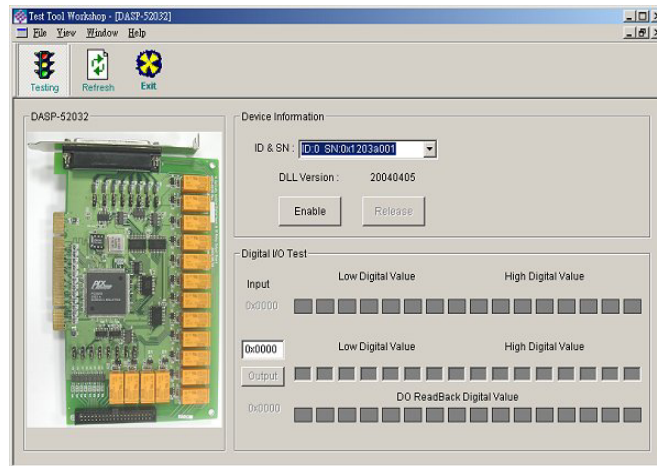
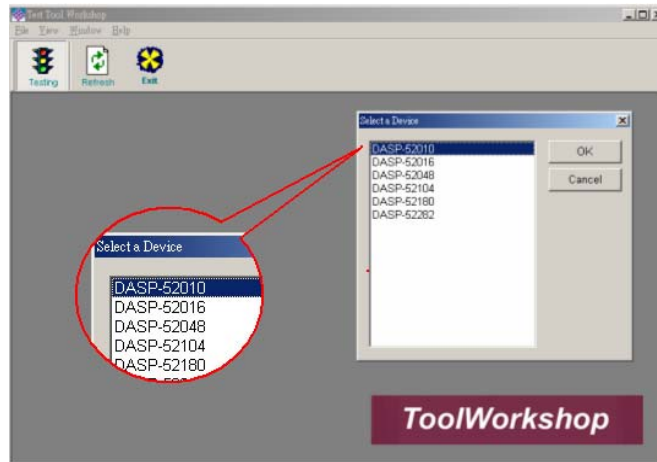


Launch ToolWorkShop

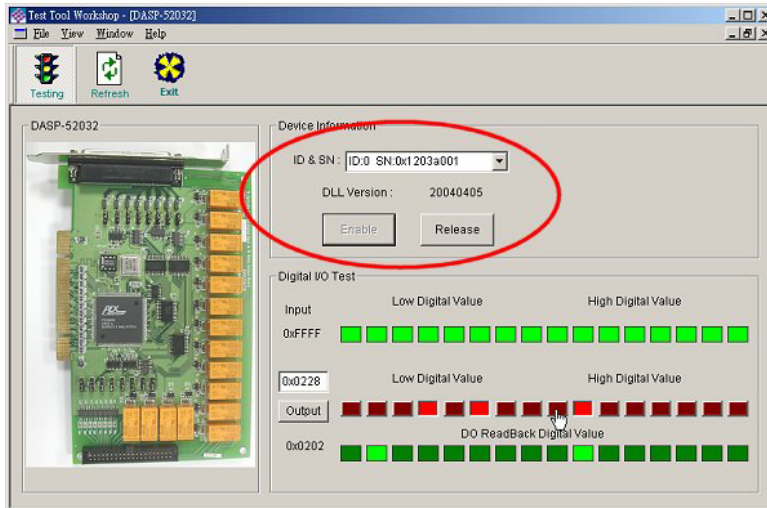


Select board test

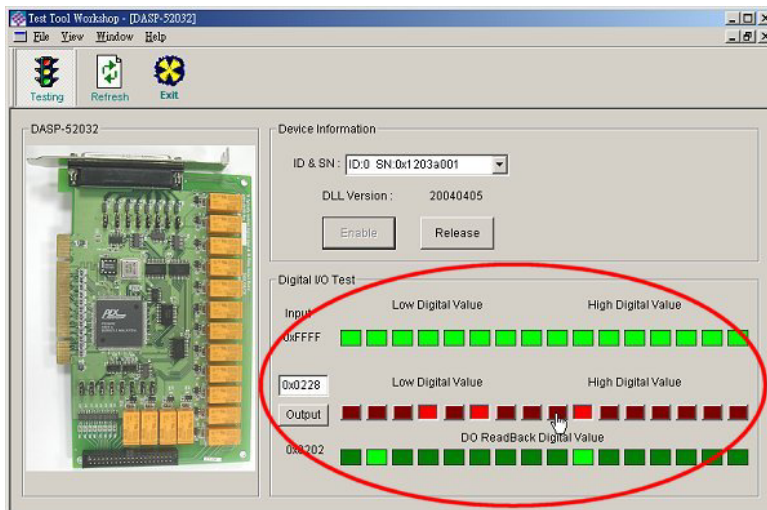
- **Perform Timer/Counter and DIO test of DASP-52032**



Select test Target: DASP52032



Check Device Information and Press 'Enable' Button to Load DASP-52032 Library



Perform Digital Input/Output Test by Set the DO Port Value and Read Back the DO Port Value of DASP-52032

- **Before exiting 'ToolWorkShop', press 'Release' button to release DASP-52032 library.**

## Chapter 3

### Register Structure and Format

#### 3.1 Overview

The DASP-52032 board occupies 4 consecutive I/O address. The address of each register is defined as the board's base address plus an offset. The I/O registers and their corresponding functions are listed in the followings.

Address	Write	Read
Base Address 0	PCI Bridge Configuration Registers in Memory Space	
Base Address 1	PCI Bridge Configuration Registers in I/O Space	
Base Address 2	Reserved	Readback of the output status
Base Address 3	Low byte	Low byte
	Relay output (CH0 ~ CH7)	Digital input (CH0~CH7)
	Relay output (CH8 ~ CH15)	Digital input (CH8~CH15)

#### 3.2 Relay Output

The DASP-52032 provides 8 relay output. The low 8 bits (D0 - D7) of the relay 0 ~ 7 outputs are stored in base address 0. For DASP-52032, the high 8 bits (D8 - D15) of the relay 8 ~ 15 outputs are stored in base address 0. A high bit turns the relay on while a low bit turns the relay off. The 8 bits of relay output register are shown in the following.

- **Relay output (Write):**

Base Address 3	D7	D6	D5	D4	D3	D2	D1	D0
Output Channel	7	6	5	4	3	2	1	0

- **Relay output (Write):**

Base Address 3	D15	D14	D13	D12	D11	D10	D9	D8
Output Channel	15	14	13	12	11	10	9	8

- **Read back of relay output (Read):**

Base Address 2	D7	D6	D5	D4	D3	D2	D1	D0
Read back Channel	7	6	5	4	3	2	1	0

- **Read back of relay output (Read):**

Base Address 2	D15	D14	D13	D12	D11	D10	D9	D8
Read back Channel	15	14	13	12	11	10	9	8

### 3.3 Isolated Input

The DASP-52032 provides 16 digital input. The 16 bits (D0 – D15) of the digital inputs are stored in base address 3. A high bit represents a high state while a low bit represent a low state. The 16 bits of isolated input register are shown in the following.

- **Relay input: (Read)**

Base Address 3	D7	D6	D5	D4	D3	D2	D1	D0
Input Channel	7	6	5	4	3	2	1	0

- **Relay input: (Read)**

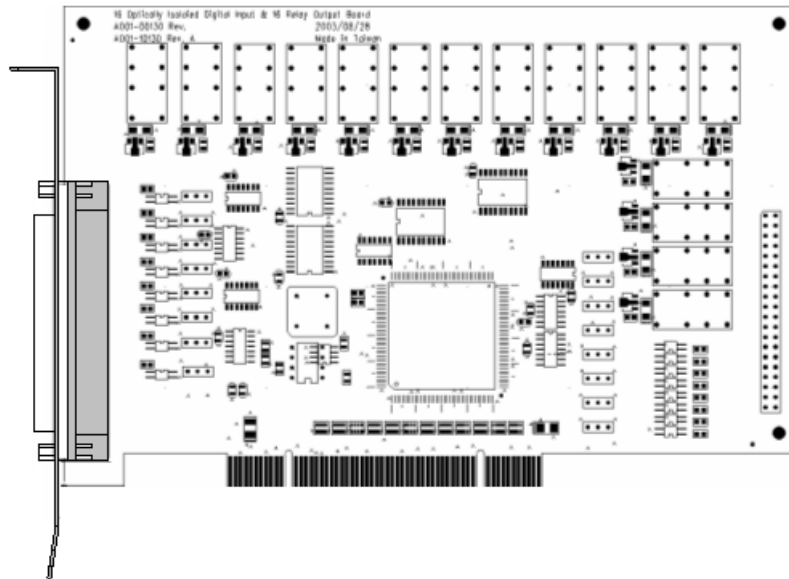
Base Address 3	D15	D14	D13	D12	D11	D10	D9	D8
Input Channel	15	14	13	12	11	10	9	8



## Appendix A

### Dimension of DASP-52032 and Accessories

- DASP-52032



- **TB-88037**

