PCIS-LVIEW

VIs for LabVIEW® Windows 98/NT/2000

Function Reference

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Hardware Support

ADLink will periodically upgrades PCIS-LVIEW to add support for new NuDAQ PCI-bus data acquisition cards. This release of PCIS-LVIEW supports the following hardware:

- PCI-6208V/6216V: 8/16 channels 16-bit voltage output card

- PCI-6208A: 8 channels 16-bit current output card

- PCI-6308V: Isolated 8-channel voltage output card

- PCI-6308A: Isolated 8-channel voltage and current output card

- PCI-7200/cPCI-7200: high speed 32 digital I/O card with bus mastering DMA transfer capability

- PCI-7224: 24-bit digital I/O card

- PCI-7230/cPCI-7230: 32 channels isolated Digital I/O card

- PCI-7233/PCI-7233H : Isolated 32 channels DI card with COS detection

- PCI-7234 : 32-channel isolated digital output card

- PCI-7248/cPCI-7248: 48-bit digital I/O card

- cPCI-7249R : 3U CompactPCI 48 parallel digital I/O card

- PCI-7250: 8 relay output and Isolated Input card

- cPCI-7252 : 8 relay output and 16 isolated input card

- PCI-7296: 96-bit digital I/O card

- PCI-7300A/cPCI-7300A : 40 Mbytes/sec Ultra-high speed 32 channels digital I/O card with bus mastering DMA transfer supporting scatter gather technology

- PCI-7432/cPCI-7432 : 32 isolated channels DI & 32 isolated channels DO card

- PCI-7433/cPCI-7433 : 64 isolated channels DI card

- PCI-7434/cPCI-7434 : 64 isolated channels DO card

- cPCI-7433R : Isolation 64 Digital Inputs Module with Rear I/O

- cPCI-7434R : Isolation 64 Digital Outputs Module with Rear I/O

- PCI-9111: advanced multi-function card

- PCI-9112/cPCI-9112: advanced multi-function card with bus mastering DMA transfer capability

- PCI-9113: 32 channels single-ended isolation A/D card

- PCI-9114: 32 channels high resolution multi-function card

- PCI-9118: advanced multi-function card with bus mastering DMA transfer capability

- PCI-9812/10: 20M Ultra-high Speed A/D card with bus mastering DMA transfer capability

- cPCI-9812/10: 20M Ultra-high Speed A/D card with bus mastering DMA transfer capability

VI Function Descriptions

The functionality of PCIS-LVIEW 98, NT, or 2000 version VIs can be classified to the following capabilities:

1. Card Configuration:
  - Initialization & Release: Initialize and release the hardware.
  - Operation configuration:
    * Setting clock source, trigger mode, etc before continuous AI/DI/DO operation
    * Setting *Voltage to Current* mode of PCI-6208A or PCI-6308A card
    * Setting the direction (Input or output) configuration of the selected port for
      PCI-7224/7248/7249/7296.
2. Analog Input:
  - Perform one-shot single-channel analog input operation
  - Perform continuous single/multiple-channel analog input operation
3. Analog Output:
  - Performs single-channel analog output operation
4. Digital I/O:
  - Input/output digital signals
  - Perform continuous digital I/O operation on PCI-7200 or PCI-7300A
  - Pattern generation on PCI-7300A
5. Timer/Counter:
  - Timer/counter functions

Appendix "*Function Support*" shows which NuDAQ PCI-bus card each PCIS-LVIEW VI supports.

In addition, several sample programs are also included. Thorough understanding of these sample programs will help you understand how to use the library more quickly. And you are welcome to modify the sample programs for your application needs.

Initial VIs (6208V Initial, …)

The NuDAQ PCI cards are initialized by these VIs. They include **6208V Initial**, **7200 Initial**, **7230 Initial**,…„etc. Each one is used to initialize one kind of NuDAQ PCI cards. NuDAQ PCI cards have to be initialized by Initial VI before using other VIs. All of these Vis get the same input and output terminals. Only the **6208V Initial** interface chart is shown below:

U16	**Card Order :**	The sequence number of the card with ***the same card type*** or belonging to ***the same card type series*** (Except PCI-7300A_RevA and PCI-7300A_RevB) plugged in the PCI slot. The card sequence number setting is according to the PCI slot sequence in the mainboard. The first card (in the most prior slot) is with *Card Order*=0. For example, if there are one PCI-9111DG card (in the first PCI slot) and one PCI-9111HR card and two PCI-9112 cards plugged on your PC, the PCI-9111DG card should be initialized with *Card Order*=0, and the PCI-9111HR card with *Card Order* =1. The PCI-9112 card in the prior slot should be initialized with *Card Order* =0, and the other one with *Card Order* =1.
I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. The Initial VI is often the first sub VI called in your diagram, and you may not

need to wire this input. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.

U16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 31. The value of this output terminal is used as the value of input terminal *Card Number* of other PCIS-LVIEW VIs.
I16	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI 9111 Config

Set the transfer mode and trigger mode for the PCI-9111 card with card ID *Card Number*. You must call this function before calling function to perform continuous analog input operation on this PCI-9111 card.

|		
U16	**Card Number :**	The card id of the card that want to perform this operation.
U16	**TrigSource :**	The continuous A/D conversion trigger source. Valid values: **1:** on-board Programmable pacer **2:** external signal trigger
U16	**PreTrgEn :**	Enable or Disable Pre-Trigger mode. **0:** disable pre-trigger mode **1:** enable pre-trigger mode
U16	**TraceCnt :**	The number of data will be accessed after a specific trigger event.
I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
U16	**Card Number :**	The same number as input terminal *Card Number*.
I16	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI 9112 Config

Set the trigger source for the PCI-9112 card with card ID *Card Number*. You must call this function before calling function to perform continuous analog input operation on this PCI-9112 card.

|		
U16	**Card Number :**	The card id of the card that want to perform this operation.
U16	**TrigSource :**	The continuous A/D conversion trigger source. Valid values: **1:** on-board programmable pacer **2:** external signal trigger
I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
U16	**Card Number :**	The same number as input terminal *Card Number*.
I16	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI 9113 Config

Set the trigger source for the PCI-9113 card with card ID *Card Number*. You must call this function before calling function to perform continuous analog input operation on this PCI-9113 card.

|		
`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**TrigSource :**	The continuous A/D conversion trigger source. Valid values: **1:** on-board programmable pacer
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

## AI 9114 Config

Set the trigger source for the PCI-9114 series card with card ID *Card Number*. You must call this function before calling function to perform continuous analog input operation on this PCI-9114DG/HG card.

|		
`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**TrigSource :**	The continuous A/D conversion trigger source. Valid values: **1:** on-board programmable pacer
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI 9118 Config

Set the trigger source, trigger mode, and trigger properties for the PCI-9118 series card with card ID *Card Number*. You must call this function before calling function to perform continuous analog input operation on this PCI-9118DG/HG/HR card.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**ModeCtrl :**	The setting for A/D mode control. This argument is an integer expression formed from one or more of the manifest constants defined in DASK.H. There are four groups of constants: (1) **A/D Polarity Control** **0:** AI Bipolar **1:** AI Unipolar (2) **A/D Channel Input Mode** **0:** Single Ended **2:** Differential

(3) **External Gate Enable**
 4: 8254 counter is controlled by TGIN pin
(4) **External Trigger Enable**
 8: External Hardware Trigger Mode
  enabled
When two or more modes want to be set, the correspondent constants can be added.

|		
`U16`	**FunCtrl :**	The setting for A/D Function. This argument is an integer expression formed from addition of one or more of the following constants. There are four groups of constants: (1) **Digital Trigger Polarity** **0:** Digital trigger negative active **16 (10H):** Digital trigger positive active (2) **External Trigger Polarity** **0:** External trigger negative active **32 (20H):** External trigger positive active (3) **Burst Mode Enable** **64 (40H):** Burst Mode is enabled (4) **Burst Mode with Sample and Hold Mode Enable** **128 (80H):** Burst mode with sample and hold is enabled Two or more constants of different groups can be added to form the needed setting.
`U16`	**BurstCnt :**	The burst number
`U16`	**PostCnt :**	The number of data will be accessed after a specific trigger event.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, *Error Codes*, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI 9812 Config

Set the trigger source, trigger mode, and trigger properties for the PCI-9812/10 card with card ID *Card Number*. You must call this function before calling function to perform analog input operation on this PCI-9812/10 card.

|		
`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**TrgMode :**	The setting for A/D trigger mode. The valid trigger modes are as follows: **0:** Soft-trigger (No Trigger) **1:** Post-trigger **2:** Pre-trigger **3:** Delay-trigger **4:** Middle-trigger
`U16`	**TrgSrc :**	The A/D trigger source. The valid trigger sources are as follows: **0:** AI channel 0 **8:** AI channel 1 **16 (10H):** AI channel 2 **24 (18H):** AI channel 3

32 (20H): External digital trigger

| `U16` | **TrgPol :** | Trigger polarity. The valid values are:
0: Positive slope trigger
64 (40H): Negative slope trigger |

| `U16` | **TrgLevel :** | The setting of Trigger level. The relationship between the value of *Trgger Level* and trigger voltage is listed in the following: |

Trigger voltage ± 1V		**Trigger voltage ± 5V**	
255 (FFH)	0.992V	255 (FFH)	4.96V
254 (FEH)	0.984V	254 (FEH)	4.92V
.	.		
.	.		
.	.		
129 (81H)	0.008V	129 (81H)	0.04V
128 (80H)	0.000V	128 (80H)	0.00V
.	.		
.	.		
.	.		
1 (1H)	-0.992V	1 (1H)	-4.96V
0 (0H)	-1.000V	0 (0H)	-5.00V

| `U16` | **ClkSel :** | A/D clock source. This argument is an integer expression formed from addition of one or more of the following constants. There are two groups of constants:
(1) **A/D Clock Frequency**
  128 (80H): freq. of A/D clock is greater than PCI clock freq.
  0: freq. of A/D clock is less than PCI clock freq.
(2) **The ADC clock source**
  0: Internal clock
  256 (100H): External sin wave clock
  512 (200H): External square wave clock
Two constants of different groups can be added to form the needed setting. |

| `U16` | **PostCnt :** | The post count value setting for Middle-trigger mode or Delay-trigger mode. This argument is expressed as:
Middle-trigger mode: the number of data accessed for each selected channel after a specific trigger event
Delay-trigger mode: the counter value for deferring to access data after a specific trigger event |

| `I16` | **Error In :** | The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, *Error Codes*, for a code descriptions. |

| `U16` | **Card Number :** | The same number as input terminal *Card Number*. |

| `I16` | **Error Out :** | Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI. |

AI Async Check

Check the current status of the asynchronous analog input operation.

| `U16` | **Card Number :** | The card id of the card that want to perform this operation. |

| `I16` | **Error In :** | The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the |

Appendix, **Error Codes**, for a code descriptions.

`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I8`	**Stopped :**	Whether the asynchronous continuous analog input operation has completed. If *Stopped* = 1, the analog input operation has stopped. Either the number of A/D conversions indicated in the call that started the asynchronous analog input operation has completed or an error has occurred. If *Stopped* = 0, the operation is not yet complete.
`U32`	**AccessCnt :**	In the condition that the trigger acquisition mode is not used, A*ccessCnt* returns the number of A/D data that h as been transferred at the time calling **AI Async Check**. If any trigger mode is enabled by calling **AI 9111 Config**, **AI 9812 Config**, or **AI 9118 Config**, and double-buffered mode is enabled, *AccessCnt* returns the next position after the position the last A/D data is stored in the circular buffer at the time calling **AI Async Check**.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI Async Clear

Stop the asynchronous analog input operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U32`	**AccessCnt :**	In the condition that the trigger acquisition mode is not used, A*ccessCnt* returns the number of A/D data that has been transferred at the time calling **AI Async Clear**. If any trigger mode is enabled by calling **AI 9111 Config**, **AI 9812 Config**, or **AI 9118 Config**, and double-buffered mode is enabled, *AccessCnt* returns the next position after the position the last A/D data is stored in the circular buffer at the time calling **AI Async Clear**.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI Async Double Buffer Half Ready

Checks whether the next half buffer of data in circular buffer is ready for transfer during an asynchronous double-buffered analog input operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.

`I8`	**HalfReady :**	Whether the next half buffer of data is available. If *HalfReady* = 1, you can call **AI DB Transfer** VI to copy the data to your user buffer.
`I8`	**StopFlag :**	Whether the continuous trigger analog input operation has completed. If *StopFlag* = 1, the analog input operation has stopped. If *StopFlag* = 0, the operation is not yet complete. This output terminal is useful when trigger mode (pre-trigger, about-trigger, ...) is used.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI Async Double Buffer Mode

Enables or disables double-buffered data acquisition mode.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`I8`	**Enable :**	Whether the double-buffered mode is enabled or not. **1:** enable double-buffered mode **0:** disable double-buffered mode
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI Async Double Buffer Transfer 2-byte / AI Async Double Buffer Transfer 4-byte

Copies half of the data of the circular buffer to user buffer. You can execute this function repeatedly to return sequential half buffers of the data. For the cards with 4-byte A/D data, PCI-9113 and PCI-9114, please use **AI Async Double Buffer Transfer 4-byte** VI, the other cards please use **AI Async Double Buffer Transfer 2-byte** VI.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16` or `U32`	**Buffer :**	An integer array to contain the acquired data. The size of *Buffer* must equal to or greater than the half size of the circular buffer. Please refer to Appendix, **AI Data Format**, for the data format of each data in *Buffer*.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U16` or `U32`	**Buffer :**	An integer array to contain the acquired data.

| `I16` | **Error Out :** | Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI. |

AI Cont Read Channel 2-byte / AI Cont Read Channel 4-byte

This VI starts a continuous A/D conversions on the specified analog input channel. For the cards with 4-byte A/D data, PCI-9113 and PCI-9114, please use **AI Cont Read Channel 4-byte** VI, the other cards please use **AI Cont Read Channel 2-byte** VI.

| `U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**Channel :**	Analog input channel number. Range: PCI-9111: 0 through 15 PCI-9112: 0 through 15 PCI-9113: 0 through 31 PCI-9114: 0 through 31 PCI-9118: 0 through 15 PCI-9812/10: 0
`U16`	**AdRange :**	The analog input range the specified channel is setting. Please refer to the Appendix, *AI Range Codes*, for valid range values.
`U16` or `U32`	**Buffer :**	An integer array to contain the acquired data. *Buffer* must has a length equal to or greater than the value of input terminal *Read Count*. Please refer to Appendix, *AI Data Format*, for the data format of each data in *Buffer*.
`U32`	**ReadCount :**	The number of A/D conversions to be performed. **Note:** if the card is PCI-9111, PCI-9113, or PCI-9114, this VI uses FIFO-Half-Full interrupt transfer mode. So the value of *Read Count* must be the multiple of 512.
`DBL`	**SampleRate :**	The sampling rate you want for analog input in hertz (samples per second). Your maximum rate depends on the card type and your computer system. If you set A/D trigger source as external trigger by calling **9111 AI Config, 9113 AI Config, 9114 AI Config, 9112 AI Config, 9118 AI Config,** or **9812 AI Config** VI, the sampling rate is determined by an external trigger source, please set this argument as 10000.
`U16`	**SyncMode :**	Whether this operation is performed synchronously or asynchronously. If any trigger mode is enabled by using **AI 9118 Config** VI, this operation should be performed **asynchronously**. **1:** synchronous continuous AI operation, that is, the function does not return until the continuous A/D operation complete. **2:** asynchronous continuous AI operation
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, *Error Codes*, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U16` or `U32`	**Buffer :**	An integer array to contain the acquired data.
`U32`	**Transfer Count :**	the actual number of A/D conversions performed.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

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value. Otherwise, *Error Out* describes the error status of this VI.

AI Cont Read Channel To File

This VI starts a continuous A/D conversions on the specified analog input channel and saves the acquired data in a disk file. The data is written to disk in binary format, with the lower byte first (little endian). Please refer to Appendix D, *Data File Format* for the data file structure and Appendix C, *AI Data Format* for the format of the data in the data file.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.

`U16`	**Channel :**	Analog input channel number.
		Range:
		    PCI-9111: 0 through 15
		    PCI-9112: 0 through 15
		    PCI-9113: 0 through 31
		    PCI-9114: 0 through 31
		    PCI-9118: 0 through 15
		    PCI-9812/10: 0

`U16`	**AdRange :**	The analog input range the specified channel is setting. Please refer to the Appendix, **AI Range Codes**, for valid range values.
`abc`	**FileName :**	Name of data file which stores the acquired data
`U32`	**ReadCount :**	The number of A/D conversions to be performed. **Note:** if the card is PCI-9111, PCI-9113, or PCI-9114, this VI uses FIFO-Half-Full interrupt transfer mode. So the value of *Read Count* must be the multiple of 512.
`DBL`	**SampleRate :**	The sampling rate you want for analog input in hertz (samples per second). Your maximum rate depends on the card type and your computer system. If you set A/D trigger source as external trigger by calling **9111 AI Config, 9113 AI Config, 9114 AI Config, 9112 AI Config, 9118 AI Config,** or **9812 AI Config** VI, the sampling rate is determined by an external trigger source, please set this argument as 10000.

`U16`	**SyncMode :**	Whether this operation is performed synchronously or asynchronously. If any trigger mode is enabled by using **AI 9118 Config** VI, this operation should be performed **asynchronously**.
		    1: synchronous continuous AI operation, that is, the function does not return until the continuous A/D operation complete.
		    2: asynchronous continuous AI operation

`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U32`	**Transfer Count :**	the actual number of A/D conversions performed.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI Cont Read Mutiple Channels

This function starts a continuous A/D conversions on the specified analog input channels. This VI takes advantage of the hardware auto-scan functionality to perform multi-channel analog input. This VI is for PCI-9118 series card only.

|		
`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**NumChans:**	The number of analog input channels in the array *Channels*. The valid values are 1 through 255.
`U16`	**Chans :**	Array of analog input channel numbers. The channel order for acquiring data is the same as the order you set in *Channels*. You can set the channel order as you wish.
`U16`	**AdRanges :**	An integer array of length *NumChans* that contains the analog input range for every channel in array *Channels*. Please refer to Appendix, **AI Range Codes**, for valid range values.
`U16`	**Buffer :**	An integer array to contain the acquired data. The length of *Buffer* must be equal to or greater than the value of input terminal *ReadCount*. The acquired data is stored in interleaved sequence. For example, if the value of *NumChans* is 4, and the numbers in *Channels* are 2, 8, 15, and 3, then this function input data from channel 2, then channel 8, then channel 15, then channel 3, then channel 2, then channel 8, ... The data acquired is put to *Buffer* by order. So the data read from channel 2 is stored in *Buffer*[0], *Buffer*[3], *Buffer*[6], ... The data from channel 8 is stored in *Buffer*[1], *Buffer*[4], *Buffer*[7], ... The data from channel 15 is stored in *Buffer*[2], *Buffer*[5], *Buffer*[8], ... Please refer to Appendix, **AI Data Format**, for the data format of each 16-bit data.
`U32`	**ReadCount :**	The number of A/D conversions to be performed.
`DBL`	**SampleRate :**	The sampling rate you want for analog input in hertz (samples per second). Your maximum rate depends on the card type and your computer system. If you set A/D trigger source as external trigger by calling **9118 AI Config** VI, the sampling rate is determined by an external trigger source, please set this argument as 10000.
`U16`	**SyncMode :**	Whether this operation is performed synchronously or asynchronously. If any trigger mode is enabled by using **AI 9118 Config** VI, this operation should be performed **asynchronously**. **1:** synchronous continuous AI operation, that is, the function does not return until the continuous A/D operation complete. **2:** asynchronous continuous AI operation
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U16`	**Buffer :**	An integer array to contain the acquired data.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI Cont Read Mutiple Channels To File

This function performs continuous A/D conversions on the specified analog input channels and saves the acquired data in a disk file. The data is written to disk in binary format, with the lower byte first (little endian). Please refer to Appendix D, *Data File Format* for the data file structure and Appendix C, *AI Data Format* for

the format of the data in the data file. This VI takes advantage of the hardware auto-scan functionality to perform multi-channel analog input. This VI is for PCI-9118 series card only.

|		
`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**NumChans:**	The number of analog input channels in the array *Channels*. The valid values are 1 through 255.
`U16`	**Chans :**	Array of analog input channel numbers. The channel order for acquiring data is the same as the order you set in *Channels*. You can set the channel order as you wish.
`U16`	**AdRanges :**	An integer array of length *NumChans* that contains the analog input range for every channel in array *Channels*. Please refer to Appendix, ***AI Range Codes***, for valid range values.
`abc`	**FileName :**	Name of data file which stores the acquired data
`U32`	**ReadCount :**	The number of A/D conversions to be performed.
`DBL`	**SampleRate :**	The sampling rate you want for analog input in hertz (samples per second). Your maximum rate depends on the card type and your computer system. If you set A/D trigger source as external trigger by calling `9118 AI Config` VI, the sampling rate is determined by an external trigger source, please set this argument as 10000.
`U16`	**SyncMode :**	Whether this operation is performed synchronously or asynchronously. If any trigger mode is enabled by using `AI 9118 Config` VI, this operation should be performed **asynchronously**. **1:** synchronous continuous AI operation, that is, the function does not return until the continuous A/D operation complete. **2:** asynchronous continuous AI operation
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

## AI Cont Scan Channels 2-byte / AI Cont Scan Channels 4-byte

This VI starts continuous A/D conversions on the specified continuous analog input channels. This VI takes advantage of the hardware auto-scan functionality to perform multi-channel analog input. For the cards with 4-byte A/D data, PCI-9113 and PCI-9114, please use `AI Cont Scan Channels 4-byte` VI, the other cards please use `AI Cont Scan Channels 2-byte` VI.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**Channel :**	Analog input channel number. Range: **PCI-9111:** 0 through 15. Due to the hardware design, the channel scan order is ascending. So if *AI Channel* = n, the channel scan order is 0, 1, 2, 3, .„. n, 0, 1, .„.n, … **PCI-9112:** 0 through 15. Due to the hardware design, the channel scan order is descending. So if *AI Channel* = n, the channel scan order is n, n-1, n-2, .„.0, n, n-1, n-2, .„.0, …

PCI-9113: 0 through 31. Due to the hardware design, the channel scan order is ascending. So if *AI Channel* = n, the channel scan order is 0, 1, 2, 3, .„. n, 0, 1, .„.n, …

PCI-9114: 0 through 31. Due to the hardware design, the channel scan order is ascending. So if *AI Channel* = n, the channel scan order is 0, 1, 2, 3, .„. n, 0, 1, .„.n, …

PCI-9118: 0 through 15. The channel scan order is ascending. So if *AI Channel* = n, the channel scan order is 0, 1, 2, 3, .„.n, 0, 1, .„.n, …

PCI-9812/10: 0, 1, or 4. Due to the hardware design, the channel scan order is ascending. So if *AI Channel* = n, the channel scan order is 0, 1, 2, .„. n, 0, 1, .„.n, …

|		
`U16`	**AdRange :**	The analog input range is setting. Please refer to the Appendix, **AI Range Codes**, for valid range values.
`U16` or `U32`	**Buffer :**	An integer array to contain the acquired data. *Buffer* must has a length equal to or greater than the value of input terminal *Read Count.* Please refer to Appendix, **AI Data Format**, for the data format of each data in *Buffer.*
`U32`	**ReadCount :**	The number of A/D conversions to be performed. **Note:** if the card is PCI-9111, PCI-9113, or PCI-9114, this VI uses FIFO-Half-Full interrupt transfer mode. So the value of *Read Count* must be the multiple of 512.
`DBL`	**SampleRate :**	The sampling rate you want for analog input in hertz (samples per second). Your maximum rate depends on the card type and your computer system. If you set A/D trigger source as e xternal trigger by calling `9111 AI Config, 9113 AI Config, 9114 AI Config, 9112 AI Config, 9118 AI Config,` or `9812 AI Config` VI, the sampling rate is determined by an external trigger source, please set this argument as 10000.
`U16`	**SyncMode :**	Whether this operation is performed synchronously or asynchronously. If any trigger mode is enabled by using `AI 9118 Config` VI, this operation should be performed **asynchronously**. **1:** synchronous continuous AI operation, that is, the function does not return until the continuous A/D operation complete. **2:** asynchronous continuous AI operation
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number.*
`U16` or `U32`	**Buffer :**	An integer array to contain the acquired data.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI Cont Scan Channels To File

This VI starts continuous A/D conversions on the specified continuous analog input channels and saves the acquired data in a disk file. The data is written to disk in binary format, with the lower byte first (little endian). Please refer to Appendix D, *Data File Format* for the data file structure and Appendix C, *AI Data Format* for the format of the data in the data file. This VI takes advantage of the hardware auto-scan functionality to perform multi-channel analog input.

	Card Number :	The card id of the card that want to perform this operation.
`U16`		

	Channel :	Analog input channel number.
`U16`		Range:

    PCI-9111: 0 through 15. Due to the hardware design, the channel scan order is ascending. So if *AI Channel* = n, the channel scan order is 0, 1, 2, 3, .„. n, 0, 1, .„.n, …

    PCI-9112: 0 through 15. Due to the hardware design, the channel scan order is descending. So if *AI Channel* = n, the channel scan order is n, n-1, n-2, .„.0, n, n-1, n-2, .„.0, …

    PCI-9113: 0 through 31. Due to the hardware design, the channel scan order is ascending. So if *AI Channel* = n, the channel scan order is 0, 1, 2, 3, .„. n, 0, 1, .„.n, …

    PCI-9114: 0 through 31. Due to the hardware design, the channel scan order is ascending. So if *AI Channel* = n, the channel scan order is 0, 1, 2, 3, .„. n, 0, 1, .„.n, …

    PCI-9118: 0 through 15. The channel scan order is ascending. So if *AI Channel* = n, the channel scan order is 0, 1, 2, 3, .„.n, 0, 1, .„.n, …

    PCI-9812/10: 0, 1, or 4. Due to the hardware design, the channel scan order is ascending. So if *AI Channel* = n, the channel scan order is 0, 1, 2, .„. n, 0, 1, .„.n, …

	AdRange :	The analog input range is setting. Please refer to the Appendix, ***AI Range Codes***, for valid range values.
`U16`		

	FileName :	Name of data file which stores the acquired data
`abc`		

	ReadCount :	The number of A/D conversions to be performed.
`U32`		**Note:** if the card is PCI-9111, PCI-9113, or PCI-9114, this VI uses FIFO-Half-Full interrupt transfer mode. So the value of *Read Count* must be the multiple of 512.

	SampleRate :	The sampling rate you want for analog input in hertz (samples per second). Your maximum rate depends on the card type and your computer system. If you set A/D trigger source as external trigger by calling `9111 AI Config, 9113 AI Config, 9114 AI Config, 9112 AI Config, 9118 AI Config,` or `9812 AI Config` VI, the sampling rate is determined by an external trigger source, please set this argument as 10000.
`DBL`		

	SyncMode :	Whether this operation is performed synchronously or asynchronously. If any trigger mode is enabled by using `AI 9118 Config` VI, this operation should be performed **asynchronously**.
`U16`		**1:** synchronous continuous AI operation, that is, the function does not return until the continuous A/D operation complete.
		2: asynchronous continuous AI operation

	Error In :	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`I16`		

	Card Number :	The same number as input terminal *Card Number*.
`U16`		

	Error Out :	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.
`I16`		

AI Cont Status

While performing continuous A/D conversions, this function is called to get the A/D status. Please refer to the manual for your device for the AI status the device might meet.

U16	**Card Number :**	The card id of the card that want to perform this operation.

I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.

U16	**Card Number :**	The same number as input terminal *Card Number*.

U16	**Status :**	The continuous AI status returned. The description of the parameter *Status* for various card types is the following:

PCI-9111DG/HR, PCI-9113, PCI-9114DG/HG:
>   bit 0 : '0' indicates FIFO is empty
>   bit 1 : '0' indicates FIFO is Half Full
>   bit 2 : '0' indicates FIFO is Full, the data might have been lost
>   bit 3: '0' indicates AD is busy, the A/D data hasn' t been latched into FIFO yet
>   bit 4 ~ 15 : not used

PCI-9112:
>   bit 0 : '1' indicates A/D conversion is Completed (Ready)
>   bit 1 : '1' indicates A/D conversion is Over-Run
>   bit 2 ~ 15 : not used

PCI-9118DG/HG/HR:
>   bit 0 : '1' indicates A/D conversion is Completed (Ready)
>   bit 1 : '1' indicates A/D conversion is Over-Run
>   bit 2 : '1' indicates A/D conversion is Over-Speed
>   bit 3 : '1' indicates Burst Mode of A/D conversion is Over-Run
>   bit 4 : '1' indicates External Digital Trigger ever happened
>   bit 5 : '1' indicates About Trigger of A/D conversion is Completed
>   bit 6 : '0' indicates A/D FIFO is empty
>   bit 7 : '0' indicates FIFO is Half Full
>   bit 8 : '0' indicates FIFO is Full
>   bit 9 ~ 15 : not used

PCI-9812/10:
>   bit 0 : '1' indicates FIFO is ready for Input (Not Full)
>   bit 1 : '1' indicates FIFO is at least Half-Full
>   bit 2 : '1' indicates FIFO is ready for Output (Not Empty)
>   bit 3 : '3' indicates the post trigger counter reaches zero
>   bit 4 ~ 15 : not used

| I16	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI Cont Vscale 2-byte / AI Cont Vscale 4-byte

This VI converts the values of an array of acquired binary data from an continuous A/D conversion call to the actual input voltages. The acquired binary data in the reading array might include the channel information (Please refer to Appendix, **AI Data Format**, for the data format of each data in *readingArray*); however, the calculated voltage values in the voltage array returned will not include the channel message. For the cards with 4-byte A/D data, PCI-9113 and PCI-9114, please use **AI Cont VScale 4 -byte** VI, the other cards please use **AI Cont VScale 2-byte** VI.

U16	**Card Number :**	The card id of the card that want to perform this operation.

U16	**AdRange :**	The analog input range the specified channel is setting. Please refer to the Appendix, **AI Range Codes**, for valid range values.

U16 or	**readingArray :**	Acquired continuous analog input data array

`U32`		
`U32`	**Count :**	Total number of data in readingArray
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, *Error Codes*, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`DBL`	**voltageArray :**	computed voltages array returned
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI Initial Memory Allocated

This VI returns the available memory size for analog input in the device driver in output terminal *MemSize*. The continuous analog input transfer size can not exceed this size.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, *Error Codes*, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U32`	**MemSize :**	The available memory size for continuous AI in device driver of this card. The unit is Kbyte (1024 bytes).
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI Read Channel

This VI performs a software triggered A/D conversion (analog input) on an analog input channel and returns the value converted.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**Channel :**	Analog input channel number. Range: PCI-9111: 0 through 15 PCI-9112: 0 through 15 PCI-9113: 0 through 31 PCI-9114: 0 through 31 PCI-9118: 0 through 15 PCI-9812/10: 0
`U16`	**AdRange :**	The analog input range the specified channel is setting. Please refer to the Appendix, *AI Range Codes*, for valid range values.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the

Appendix, **Error Codes**, for a code descriptions.

|		
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U16`	**Value :**	The A/D converted value. Please refer to Appendix, **AI Data Format**, for the data format of *Value*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI VRead Channel

This VI performs a software triggered A/D conversion (analog input) on an analog input channel and returns the value scaled to a voltage in units of volts.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**Channel :**	Analog input channel number. Range: PCI-9111: 0 through 15 PCI-9112: 0 through 15 PCI-9113: 0 through 31 PCI-9114: 0 through 31 PCI-9118: 0 through 15 PCI-9812/10: 0
`U16`	**AdRange :**	The analog input range the specified channel is setting. Please refer to the Appendix, **AI Range Codes**, for valid range values.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`DBL`	**Voltage :**	The measured voltage value returned and scaled to units of voltage.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AI VScale

This VI converts the result from an `AI Read Channel` call to the actual input voltage.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**AdRange :**	The analog input range the specified channel is setting. Please refer to the Appendix, **AI Range Codes**, for valid range values.
`I16`	**reading :**	The result of the A/D Conversion.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.

| DBL | **voltage :** | Computed voltage value |

| I16 | **Error Out :** | Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI. |

AO 6208A Config

Set the Voltage to Current Mode of a PCI-6208A card.

| U16 | **Card Number :** | The card id of the card that want to perform this operation. |

| U16 | **V2A Mode :** | The voltage to current mode. The valid modes are:
0: 0 ~ 20mA
1: 5 ~ 25mA
3: 4 ~ 20mA |

| I16 | **Error In :** | The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions. |

| U16 | **Card Number :** | The same number as input terminal *Card Number*. |

| I16 | **Error Out :** | Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI. |

AO 6308A Config

Set the Voltage to Current Mode of a PCI-6308A card.

| U16 | **Card Number :** | The card id of the card that want to perform this operation. |

| U16 | **V2A Mode :** | The voltage to current mode. The valid modes are:
0: 0 ~ 20mA
1: 5 ~ 25mA
3: 4 ~ 20mA |

| I16 | **Error In :** | The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions. |

| U16 | **Card Number :** | The same number as input terminal *Card Number*. |

| I16 | **Error Out :** | Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI. |

AO 6308V Config

Informs PCIS-LVIEW library of the polarity (unipolar or bipolar) that the output channel is configured for the analog output and the reference voltage value selected for analog output channel of PCI-6308V. You can configure each channel to use an internal reference of 10V or an external reference (0V ~ +10V) by setting related jumpers. You must call this function before calling function to perform voltage output operation.

| U16 | **Card Number :** | The card id of the card that want to perform this operation. |

|		
`U16`	**Channel :**	**0:** Channel 0~3 **1:** Channel 4~7
`U16`	**OutputPolarity :**	The polarity (unipolar or bipolar) of the output channel. **0:** unipolar **1:** bipolar
`DBL`	**refVoltage :**	Voltage reference value. If the D/A reference voltage source your device use is internal reference, the valid values for *refVoltage* is 10. If the D/A reference voltage source your device use is external reference, the valid range for *refVoltage* is 0 to +10.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AO 9111 Config

Informs PCIS-LVIEW library of the polarity (unipolar or bipolar) that the output channel is configured for the analog output of PCI9111. You must call this function before calling `AO VWrite Channel` or `AO Vscale` VI to perform voltage output operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**OutputPolarity :**	The polarity (unipolar or bipolar) of the output channel. **0:** unipolar **1:** bipolar
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

## AO 9112 Config

Informs PCIS-LVIEW library of the reference voltage source (internal or external) and the reference voltage value selected for an analog output channel of PCI9112. You can configure each channel to use an internal reference of –5V (default) or –10V or an external reference (-10V ~ +10V) by setting related jumpers. You must call this function before calling function to perform voltage output operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**Channel :**	The AO channel number configured.
`DBL`	**refVoltage :**	Voltage reference value. If the D/A reference voltage source your device use is internal reference, the

valid values for *refVoltage* is –5 and –10.
If the D/A reference voltage source your device use is external reference, the valid range for *refVoltage* is –10 to +10.

Note: If the -10V D/A reference voltage is selected, the D/A output range is 0V~10V. On the other hand, if the +10V is selected, the D/A output range -10V~0V.

|		
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AO VScale

Scales a voltage to a binary value.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**Channel :**	Analog output channel number. Range: PCI-9111: 0 PCI-9112: 0 or 1 PCI-9118: 0 or 1 PCI-6208V/6208A: 0 through 7 PCI-6216V: 0 through 15
`DBL`	**Voltage :**	The value to be scaled and written to the analog output channel. The range of voltages depends on the type of device, on the output polarity, and on the voltage reference (external or internal).
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**binValue :**	the converted binary value returned
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AO VWrite Channel

Accepts a voltage value, scales it to the proper binary value and writes a binary value to the specified analog output channel.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**Channel :**	Analog output channel number. Range: PCI-9111: 0 PCI-9112: 0 or 1

PCI-9118: 0 or 1
PCI-6208V/6208A: 0 through 7
PCI-6216V: 0 through 15

`DBL`	**Voltage :**	The value to be scaled and written to the analog output channel. The range of voltages depends on the type of device, on the output polarity, and on the voltage reference (external or internal).
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, *Error Codes*, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

AO Write Channel

Writes a binary value to the specified analog output channel.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.

`U16`	**Channel :**	Analog output channel number.
		Range:
		    PCI-9111: 0
		    PCI-9112: 0 or 1
		    PCI-9118: 0 or 1
		    PCI-6208V/6208A: 0 through 7
		    PCI-6216V: 0 through 15

`I16`	**Value :**	The value to be written to the analog output channel.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, *Error Codes*, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

CTR 8554 CK1 Config

Select the source of CK1.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.

`U16`	**ClockSource :**	The source of CK1. The valid values:
		    0: C8M
		    1: COUT11

`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, *Error Codes*, for a code descriptions.

U16	**Card Number :**	The same number as input terminal *Card Number*.
I16	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

CTR 8554 ClkSrc Config

Select PCI-8554 counter #1 ~ #10 clock source. (Clock source of counter #11 is 8MHz and clock source of counter #12 is from COUT11, both are fixed.)

U16	**Card Number :**	The card id of the card that want to perform this operation.
U16	**Counter :**	The counter number. Range 1~10.
U16	**ClockSource :**	The clock source of the specified counter. Valid values: **0:** external clock source (ECKn) **1:** the cascaded counter output (COUT n-1) **2:** internal clock source CK1 **3:** output of the counter 10 (COUT10)
I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
U16	**Card Number :**	The same number as input terminal *Card Number*.
I16	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

CTR 8554 Debounce Config

Select debounce clock.

|		
U16	**Card Number :**	The card id of the card that want to perform this operation.
U16	**DebounceClock :**	**0:** output of counter 11 **1:** 2MHz
I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
U16	**Card Number :**	The same number as input terminal *Card Number*.
I16	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

CTR Read

Reads the current contents of the selected counter without disturbing the counting process.

U16	**Card Number :**	The card id of the card that want to perform this operation.

`U16` **Ctr :**	The counter number.
	Range:
	  PCI-9112: 0
	  PCI-9113: 0
	  PCI-9114: 0
	  PCI-9118: 0
	  PCI-7248: 0, 1, or 2
	  PCI-7296: 0, 1, or 2
	  PCI-8554: 1 ~ 12	

`U16` **Ctr :**   The counter number.
Range:
  PCI-9112: 0
  PCI-9113: 0
  PCI-9114: 0
  PCI-9118: 0
  PCI-7248: 0, 1, or 2
  PCI-7296: 0, 1, or 2
  PCI-8554: 1 ~ 12

`I16` **Error In :**   The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.

`U16` **Card Number :**   The same number as input terminal *Card Number*.

`U32` **Value :**   Returns the current count of the specified counter. 0 through 65536 for binary mode (default). 0 through 9999 for BCD counting mode.

`I16` **Error Out :**   Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

CTR Reset

Sets the output of the selected counter to the specified state.

`U16` **Card Number :**   The card id of the card that want to perform this operation.

`U16` **Ctr :**   The counter number.
Range:
  PCI-9112: 0
  PCI-9113: 0
  PCI-9114: 0
  PCI-9118: 0
  PCI-7248: 0, 1, or 2
  PCI-7296: 0, 1, or 2
  PCI-8554: 1 ~ 12

`U16` **State :**   The logic state to which the counter is to be reset.
Range: 0 or 1

`I16` **Error In :**   The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.

`U16` **Card Number :**   The same number as input terminal *Card Number*.

`I16` **Error Out :**   Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

CTR Setup

Configures the selected counter to operate in the specified mode.

`U16` **Card Number :**   The card id of the card that want to perform this operation.

`U16`	**Ctr :**	The counter number.
		Range:
		PCI-9112: 0
		PCI-9113: 0
		PCI-9114: 0
		PCI-9118: 0
		PCI-7248: 0, 1, or 2
		PCI-7296: 0, 1, or 2
		PCI-8554: 1 ~ 12

`U16`	**Mode :**	The mode in which the counter is to operate. Valid values:
		0: Toggle Output
		1: Programmable One-Shot
		2: Rate Generator
		3: Square Wave Rate Generator
		4: Software-triggered Strobe
		5: Hardware-triggered Strobe

| `U32` | **Count :** | The period from one output pulse to the next. |

`U16`	**BinBcd :**	Whether the counter operates as a 16-bit binary counter or as a 4-decade binary-coded decimal (BCD) counter. Valid values:
		0: 16-bit binary counter
		1: 4-decade BCD counter

| `I16` | **Error In :** | The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions. |

| `U16` | **Card Number :** | The same number as input terminal *Card Number*. |

| `I16` | **Error Out :** | Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI. |

DI 7200 Config

Set the trigger source, and input mode selected for PCI-7200 with card ID *Card Number*. You must call this function before calling function to perform continuous digital input operation.

| `U16` | **Card Number :** | The card id of the card that want to perform this operation. |

`U16`	**TrigSource :**	The trigger mode for continuous digital input. Valid values:
		1: on-board Programmable pacer
		2: external signal trigger
		3: handshaking

`U16`	**ExtTrigEn :**	External Trigger Enable, the valid values are:
		0: input sampling starts immediately
		2: digital input sampling waits rising or falling edge of I-TRG to start DI

`U16`	**TrigPol :**	Trigger Polarity, the valid values are:
		0: I-TRG is falling edge active
		4: I-TRG is rising edge active

`U16`	**I_REQ_Pol :**	I-REQ Polarity (for handshaking mode), the valid values are:
		0: I-REQ is falling edge active
		8: I-REQ is rising edge active

| `I16` | **Error In :** | The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the |

Appendix, **Error Codes**, for a code descriptions.

|		
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI 7300 RevA Config

Set the input mode selected for PCI-7300A Rev.A with card ID *Card Number*. You must call this function before calling function to perform continuous digital input operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**PortWidth :**	The width of digital input port (PORT A). The valid value is 0, 8, 16, or 32.
`U16`	**TrigSource :**	The trigger mode for continuous digital input. Valid values: **1:** on-board programmable pacer timer 0 **2:** external signal trigger **3:** handshaking **4:** 10MHz clock **5:** 20MHz clock
`U16`	**WaitStatus :**	DI Wait Trigger Status, the valid values are: **0:** input sampling starts immediately **1:** digital input sampling waits rising or falling edge of I_TRG to start DI
`U16`	**Terminator :**	Port A Terminator On/Off: **0:** terminator off **1:** terminator on
`U16`	**I_REQ_Pol :**	I-REQ Polarity (for handshaking mode), the valid values are: **0:** I-REQ is falling edge active **1:** I-REQ is rising edge active
`I8`	**ClearFifo :**	Whether or not clear the data in on-board FIFO before continuous DI operation. **0:** retain the FIFO data **1:** clear FIFO data before perform continuous digital input
`I8`	**DisableDI :**	Whether or not disable digital input when DMA transfer completes. **0:** digital input operation still active after DMA transfer complete. The input data still put into FIFO **1:** disable digital input operation immediately when DMA transfer complete
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI 7300 RevB Config

Set the input mode selected for PCI-7300A Rev.B with card ID *Card Number*. You must call this function before calling function to perform continuous digital input operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.

|		
U16	**PortWidth :**	The width of digital input port (PORT A). The valid value is 0, 8, 16, or 32.
U16	**TrigSource :**	The trigger mode for continuous digital input. Valid values: **1:** on-board programmable pacer timer 0 **2:** external signal trigger **3:** handshaking **4:** 10MHz clock **5:** 20MHz clock
U16	**WaitStatus :**	DI Wait Trigger Status, the valid values are: **0:** input sampling starts immediately **1:** digital input sampling waits rising or falling edge of I_TRG to start DI
U16	**Terminator :**	Port A Terminator On/Off: **0:** terminator off **1:** terminator on

U16	**I_Cntrl_Pol :**	The polarity configuration. This argument is an integer expression formed from one or more of the manifest constants defined in DASK.H. There are three groups of constants:
		(1) DIREQ
		    0: DIREQ signal is rising edge active
		    1: DIREQ signal is falling edge active
		(2) DIACK
		    0: DIACK signal is rising edge active
		    2: DIACK signal is falling edge active
		(3) DITRIG
		    0: DITRIG signal is rising edge active
		    4: DITRIG signal is falling edge active

I8	**ClearFifo :**	Whether or not clear the data inon-board FIFO before continuous DI operation. **0:** retain the FIFO data **1:** clear FIFO data before perform continuous digital input
I8	**DisableDI :**	Whether or not disable digital input when DMA transfer completes. **0:** digital input operation still active after DMA transfer complete. The input data still put into FIFO **1:** disable digital input operation immediately when DMA transfer complete
I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
U16	**Card Number :**	The same number as input terminal *Card Number*.
I16	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Async Check

Check the current status of the asynchronous digital input operation.

U16	**Card Number :**	The card id of the card that want to perform this operation.
I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
U16	**Card Number :**	The same number as input terminal *Card Number*.

`I8`	**Stopped :**	Whether the asynchronous continuous digital input operation has completed. If *Stopped* = 1, the digital input operation has stopped. Either the number of input data indicated in the call that started the asynchronous digital input operation has completed or an error has occurred. If *Stopped* = 0, the operation is not yet complete.
`U32`	**AccessCnt :**	The number of digital input data that has been transferred at the time the call to `DI Async Check` VI.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Async Clear

Stop the asynchronous digital input operation.

|		
`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U32`	**AccessCnt :**	The number of digital input data that has been transferred at the time the call to `DI Async Clear` VI.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Async Double Buffer Half Ready

Checks whether the next half buffer of data in circular buffer is ready for transfer during an asynchronous double-buffered digital input operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I8`	**HalfReady :**	Whether the next half buffer of data is available. If *HalfReady* = 1, you can call `DI DB Transfer` VI to copy the data to your user buffer.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Async Double Buffer Mode

Enables or disables double-buffered data acquisition mode.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.

`I8`	**Enable :**	Whether the double-buffered mode is enabled or not. **1:** enable double-buffered mode **0:** disable double-buffered mode
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Async Double Buffer Transfer 8 / DI Async Double Buffer Transfer 16 / DI Async Double Buffer Transfer 32

Copies half of the data of the circular buffer to user buffer. You can execute this function repeatedly to return sequential half buffers of the data. The 8, 16, and 32 indicates the port width. Since the port width of PCI-7200's input port is 32, only **DI Async Double Buffer Transfer 32** is available for PCI-7200. For PCI-7300A, please use the VI corresponding to the port with you set with **DI 7300 RevA Config** or **DI 7300 RevB Config** VI.

|		
`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U8` or `U16` or `U32`	**Buffer :**	An integer array to contain the input data. The size of *Buffer* must equal to or greater than the half size of the circular buffer.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U8` or `U16` or `U32`	**Buffer :**	An integer array to contain the input data.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Cont Read Port 8 / DI Cont Read Port 16 / DI Cont Read Port 32

This VI starts a continuous digital input on the specified digital input port. The 8, 16, and 32 indicates the port width. Since the port width of PCI-7200's input port is 32, only **DI Cont Read Port 32** is available for PCI-7200. For PCI-7300A, please use the VI corresponding to the port with you set with **DI 7300 RevA Config** or **DI 7300 RevB Config** VI.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.

|		
`U16`	**Port :**	Digital input port number. For PCI-7200 and PCI-7300A, this argument must be set to 0.
`U8` or `U16` or `U32`	**Buffer :**	An array to contain the acquired data. *Buffer* must has a length equal to or greater than the value of input terminal *ReadCount*.
`U32`	**ReadCount :**	The number of input operation to be performed.
`DBL`	**SampleRate :**	The sampling rate you want for digital input in hertz (samples per second). Your maximum rate depends on the card type and your computer system. If the *Trigger Source* was set as external signal trigger, 10MHz Clock, 20MHz Clock, or handshaking by calling **DI 7200 Config**, **DI 7300 RevA Config**, or **DI 7300 RevB Config** VI, the sampling rate is determined by an external trigger source, please set this argument as 10000.
`U16`	**SyncMode :**	Whether this operation is performed synchronously or asynchronously. **1:** synchronous continuous DI operation, that is, the function does not return until the continuous DI operation complete. **2:** asynchronous continuous DI operation
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U8` or `U16` or `U32`	**Buffer :**	An array to store the acquired data.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Cont Read Port To File

This VI starts a continuous digital input on the specified digital input port and saves the input data in a disk file. The data is written to disk in binary format, with the lower byte first (little endian). Please refer to Appendix D, *Data File Format* for the data file structure.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**Port :**	Digital input port number. For PCI-7200 and PCI-7300A, this argument must be set to 0.
`abc`	**FileName :**	Name of data file which stores the input data
`U32`	**ReadCount :**	The number of input operation to be performed.
`DBL`	**SampleRate :**	The sampling rate you want for digital input in hertz (samples per second). Your maximum rate depends on the card type and your computer system. If the *Trigger Source* was set as external signal trigger, 10MHz Clock, 20MHz Clock, or handshaking by calling **DI 7200 Config**, **DI 7300 RevA Config**, or **DI 7300 RevB Config** VI, the sampling rate is determined by an external trigger

source, please set this argument as 10000.

`U16`	**SyncMode :**	Whether this operation is performed synchronously or asynchronously.
		1: synchronous continuous DI operation, that is, the function does not return until the continuous DI operation complete.
		2: asynchronous continuous DI operation
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Cont Status

While performing continuous DI operation, this function is called to get the DI status. Please refer to the manual for your device for the DI status the device might meet.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U16`	**Status :**	The continuous DI status returned. The description of the parameter *Status* for various card types is the following:

PCI-7200:
    bit 0 : '1' indicates D/I FIFO is Full (Over-Run)
    bit 1 : '1' indicates D/O FIFO is Empty (Under-Run)
    bit 2 ~ 15 : not used

PCI-7300A Rev.A, PCI-7300A Rev.B:
    bit 0 : '1' indicates DI FIFO is full during input sampling and some data were lost. Writes ' 1' to clear this bit
    bit 1 : '1' indicates DI FIFO is full
    bit 2 : '1' indicates DI FIFO is empty
    bit 3 ~ 15 : not used

|		
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Initial Memory Allocated

This VI returns the available memory size for digital input in the device driver in output terminal *MemSize*. The continuous digital input transfer size can not exceed this size.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.

U16	**Card Number :**	The same number as input terminal *Card Number*.

U32	**MemSize :**	The available memory size for continuous DI in device driver of this card. The unit is Kbyte (1024 bytes).

| I16	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Read Line

Read the digital logic state of the specified digital line in the specified port.

U16	**Card Number :**	The card id of the card that want to perform this operation.

U16	**Port :**	Digital input port number. The valid value:

PCI-6208V/16V/08A: 0
PCI-6308V/08A: 0
PCI-7200: 0
cPCI-7200: 0, 1 (auxiliary input port)
PCI-7230: 0
PCI-7233: 0
PCI-7248:
   0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper
   5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper
cPCI-7249R:
   0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper,
   10: P1A Extend, 11: P1B Extend, 12: P1C Extend
   5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper
   15: P2A Extend, 16: P2B Extend, 17: P2C Extend
PCI-7250/51: 0 through 3
cPCI-7252: 0
PCI-7296:
   0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper
   5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper
   10: P3A, 11: P3B, 12: P3C, 13: P3C Lower, 14: P3C Upper
   15: P4A, 16: P4B, 17: P4C, 18: P4C Lower, 19: P4C Upper
PCI-7396:
   0: P1A, 1: P1B, 2: P1C
   5: P2A, 6: P2B, 7: P2C
   10: P3A, 11: P3B, 12: P3C
   15: P4A, 16: P4B, 17: P4C
PCI-7300A: 1 (auxiliary digital input port)
PCI-7432: 0
PCI-7433: 0 (lower 16-bit), 1 (higher 16-bit)
PCI-8554: 0
PCI-9111: 0 (DI), 1 (EDI)
PCI-9112: 0
PCI-9114: 0
PCI-9118: 0

U16	**Line :**	The digital line to be read. The valid value:

PCI-6208V/16V/08A: 0 through 3
PCI-6308V/08A: 0 through 3
PCI-7200: 0 through 31
cPCI-7200: 0 through 31 for DI port, 0 through 3 for auxiliary input port
PCI-7230: 0 through 15
PCI-7233: 0 through 31
PCI-7248: 0 through 7

cPCI-7249R: 0 through 7
PCI-7250/51: 0 through 7
cPCI-7252: 0 through 15
PCI-7296: 0 through 7
PCI-7396: 0 through 7
PCI-7300A: 0 through 3
PCI-7432: 0 through 31
PCI-7433: 0 through 31
PCI-8554: 0 through 7
PCI-9111: 0 through 15
PCI-9112: 0 through 15
PCI-9114: 0 through 15
PCI-9118: 0 through 3

`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U16`	**State :**	Returns the digital logic state, 0 or 1, of the specified line.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DI Read Port

Read digital data from the specified digital input port.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**Port :**	Digital input port number. The valid value:

        PCI-6208V/16V/08A: 0
        PCI-6308V/08A: 0
        PCI-7200: 0
        cPCI-7200: 0, 1 (auxiliary input port)
        PCI-7230: 0
        PCI-7233: 0
        PCI-7248:
          0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper
   5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper
        cPCI-7249R:
          0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper,
          10: P1A Extend, 11: P1B Extend, 12: P1C Extend
          5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper
          15: P2A Extend, 16: P2B Extend, 17: P2C Extend
        PCI-7250/51: 0 through 3
        cPCI-7252: 0
        PCI-7296:
          0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper
          5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper
          10: P3A, 11: P3B, 12: P3C, 13: P3C Lower, 14: P3C Upper
          15: P4A, 16: P4B, 17: P4C, 18: P4C Lower, 19: P4C Upper
        PCI-7396:
          0: P1A, 1: P1B, 2: P1C, 30: Channel1 (P1A, P1B, and P1C)
          5: P2A, 6: P2B, 7: P2C, 31: Channel2 (P2A, P2B, and P2C)
          10: P3A, 11: P3B, 12: P3C, 32: Channel3 (P3A, P3B, and P3C)

15: P4A, 16: P4B, 17: P4C, 33: Channel4 (P4A, P4B, and P4C)
                    PCI-7300A: 1 (auxiliary digital input port)
                    PCI-7432: 0
                    PCI-7433: 0 (lower 16-bit), 1 (higher 16-bit)
                    PCI-8554: 0
                    PCI-9111: 0 (DI), 1 (EDI)
                    PCI-9112: 0
                    PCI-9114: 0
                    PCI-9118: 0

I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
U16	**Card Number :**	The same number as input terminal *Card Number*.
U32	**Value :**	Returns the digital data read from the specified port.

                                                 PCI-6208V/16V/08A: 4-bit data
                    PCI-6308V/08A: 4-bit data
                    PCI-7200/cPCI-7200: 32-bit data (DI port), 4-bit data (auxiliary input of cPCI-7200)
                    PCI-7230: 16-bit data
                    PCI-7233: 32-bit data
                    PCI-7248: 8-bit data
                    cPCI-7249R: 8-bit data
                    PCI-7250/51: 8-bit data
                    cPCI-7252: 16-bit data
                    PCI-7296: 8-bit data
                    PCI-7300A: 4-bit data
                    PCI-7396:
                        24-bit data (for Channel*n*, where *n* is the channel number) or
                        8-bit data (for P*n*A, P*n*B, P*n*C , where *n* is the channel number)
                    PCI-7432: 32-bit data
                    PCI-7433: 32-bit data
                    PCI-8554: 8-bit data
                    PCI-9111: 16-bit data for DI port, or 4-bit data for EDI channels
                    PCI-9112: 16-bit data
                    PCI-9114: 16-bit data
                    PCI-9118: 4-bit data

I16	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DIO Port Config

    Set the direction (Input or output) configuration of the selected port.

U16	**Card Number :**	The card id of the card that want to perform this operation.
U16	**Port :**	Digital input port. The valid value:

                                                 PCI-7248, cPCI-7249R:
                        0: P1A, **1:** P1B, **2:** P1C, **3:** P1C Lower, **4**: P1C Upper
                        5: P2A, **6,** P2B, **7:** P2C, **8:** P2C Lower, **9:** P2C Upper
                    PCI-7296:
                        0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, **4:** P1C Upper
                        5: P2A, **6:** P2B, **7:** P2C, **8:** P2C Lower, **9:** P2C Upper
                        10: P3A, **11:** P3B, **12:** P3C, **13:** P3C Lower, **14:** P3C Upper
                        15: P4A, **16:** P4B, **17:** P4C, **18:** P4C Lower, **19:** P4C Upper

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PCI-7396:
> **0:** P1A, **1:** P1B, **2:** P1C, **30:** Channel1, **34:** Channel1 Extend
> **5:** P2A, **6:** P2B, **7:** P2C, **31:** Channel2, **35:** Channel2 Extend
> **10:** P3A, **11:** P3B, **12:** P3C, **32:** Channel3, **36:** Channel3 Extend
> **15:** P4A, **16:** P4B, **17:** P4C, **33:** Channel4, **37:** Channel4 Extend

> **Note:** If the *Port* is set to Channel*n* Extend, the channel *n* will be configured as INPUT port (the input terminal *Direction* is of no use here) and the digital input of channel *n* is controlled by external clock.

`I16`	**Direction :**	The port direction of PIO port. The valid values: **1:** Input **2:** Output
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DO 7200 Config

Set the trigger source and output mode selected for PCI-7200 with card ID *Card Number*. You must call this function before calling function to perform continuous digital output operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**TrigSource :**	The trigger mode for continuous digital output. Valid values: **1:** on-board Programmable pacer **3:** handshaking
`U16`	**OutReqEn :**	Output REQ Enable, the valid values are: **0:** output REQ is disable **16:** output REQ is enabled, an O-REQ strobe is generated after output data is strobe
`U16`	**OutTrigSig :**	Output Trigger Signal, the valid values are: **0:** O-TRIG signal goes low **32:** O-TRIG signal goes high
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DO 7300 RevA Config

Set the output mode selected for PCI-7300A Rev.A with card ID *Card Number*. You must call this function before calling function to perform continuous digital output operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**PortWidth :**	The width of digital input port (PORT A). The valid value is 0, 8, 16, or 32.
`U16`	**TrigSource :**	The trigger mode for continuous digital output. Valid values: **1:** on-board programmable pacer timer 1 **3:** REQ/ACK handshaking **4:** 10MHz clock **5:** 20MHz clock
`U16`	**WaitStatus :**	DO Wait Trigger Status, the valid values are: **0:** digital output starts immediately **1:** digital output waits rising or falling edge of O_TRG to start **2:** delay output data until FIFO is not almost empty **3:** delay output data until O_TRG active and FIFO is not almost empty
`U16`	**Terminator :**	Port B Terminator On/Off: **0:** terminator off **1:** terminator on
`U16`	**O_REQ_Pol :**	O-REQ Polarity (for handshaking mode), the valid values are: **0:** O-REQ is falling edge active **1:** O-REQ is rising edge active
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DO 7300 RevB Config

Set the output mode selected for PCI-7300A with card ID *Card Number.* You must call this function before calling function to perform continuous digital output operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**PortWidth :**	The width of digital input port (PORT A). The valid value is 0, 8, 16, or 32.
`U16`	**TrigSource :**	The trigger mode for continuous digital output. Valid values: **1:** on-board programmable pacer timer 1 **3:** REQ/ACK handshaking **4:** 10MHz clock **5:** 20MHz clock **6:** burst handshaking mode by using timer1 output as output clock **7:** burst handshaking mode by using 10MHz clock as output clock **8:** burst handshaking mode by using 20MHz clock as output clock
`U16`	**WaitStatus :**	DO Wait Trigger Status, the valid values are: **0:** digital output starts immediately **1:** digital output waits rising or falling edge of O_TRG to start **2:** delay output data until FIFO is not almost empty **3:** delay output data until O_TRG active and FIFO is not almost empty
`U16`	**Terminator :**	Port B Terminator On/Off: **0:** terminator off **1:** terminator on

U16	**O_Cntrl_Pol :**	The polarity configuration. This argument is an integer expression formed from one or more of the manifest constants defined in DASK.H. There are three groups of constants:

     (1) DOREQ
        0: DOREQ signal is rising edge active
        8: DOREQ signal is falling edge active
     (2) DOACK
        0: DOACK signal is rising edge active
        16: DOACK signal is falling edge active
     (3) DOTRIG
        0: DOTRIG signal is rising edge active
        32: DOTRIG signal is falling edge active

U32	**FIFOThreshold :**	programmable almost empty threshold of both PORTB FIFO and PORTA FIFO (if output port width is 32).
I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **_Error Codes_**, for a code descriptions.
U16	**Card Number :**	The same number as input terminal _Card Number_.
I16	**Error Out :**	Error code. If the _Error In_ indicated an error, the _Error Out_ contains the same value. Otherwise, _Error Out_ describes the error status of this VI.

DO Async Check

Check the current status of the asynchronous digital output operation.

U16	**Card Number :**	The card id of the card that want to perform this operation.
I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **_Error Codes_**, for a code descriptions.
U16	**Card Number :**	The same number as input terminal _Card Number_.
I8	**Stopped :**	Whether the asynchronous continuous digital output operation has completed. If _Stopped_ = 1, the digital output operation has stopped. Either the number of output data indicated in the call that started the asynchronous digital output operation has completed or an error has occurred. If _Stopped_ = 0, the operation is not yet complete.
U32	**AccessCnt :**	The number of digital output data that has beentransferred at the time the call to `DO Async Check` VI**.**
I16	**Error Out :**	Error code. If the _Error In_ indicated an error, the _Error Out_ contains the same value. Otherwise, _Error Out_ describes the error status of this VI.

DO Async Clear

Stop the asynchronous digital output operation.

U16	**Card Number :**	The card id of the card that want to perform this operation.
I16	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the

Appendix, **Error Codes**, for a code descriptions.

| `U16` | **Card Number :** | The same number as input terminal *Card Number*. |

| `U32` | **AccessCnt :** | The number of digital output data that has been transferred at the time the call to `DO Async Clear` VI. |

| `I16` | **Error Out :** | Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI. |

DO Cont Status

While performing continuous DO operation, this function is called to get the DO status. Please refer to the manual for your device for the DO status the device might meet.

| `U16` | **Card Number :** | The card id of the card that want to perform this operation. |

| `I16` | **Error In :** | The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions. |

| `U16` | **Card Number :** | The same number as input terminal *Card Number*. |

| `U16` | **Status :** | The continuous DI status returned. The description of the parameter *Status* for various card types is the following:
PCI-7200:
    bit 0 : '1' indicates D/I FIFO is Full (Over-Run)
    bit 1 : '1' indicates D/O FIFO is Empty (Under-Run)
    bit 2 ~ 15 : not used
PCI-7300A Rev.A, PCI-7300A Rev.B:
    bit 0 : '1' indicates DO FIFO is empty during data output and some output data were written twice. Writes ' 1' to clear this bit
    bit 1 : '1' indicates DO FIFO is full
    bit 2 : '1' indicates DO FIFO is empty
    bit 3 ~ 15 : not used |

| `I16` | **Error Out :** | Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI. |

DO Cont Write Port 8 / DO Cont Write Port 16 / DO Cont Write Port 32

This VI starts continuous digital output on the specified digital output port. The 8, 16, and 32 indicates the port width. Since the port width of PCI-7200' s output port is 32, only `DO Cont Write Port 32` is available for PCI-7200. For PCI-7300A, please use the VI corresponding to the port with you set with `DO 7300 RevA Config` or `DO 7300 RevB Config` VI.

| `U16` | **Card Number :** | The card id of the card that want to perform this operation. |

| `U16` | **Port :** | Digital output port number. For PCI-7200 and PCI-7300A, this argument must be set to 0. |

| `U8` or `U16` or `U32` | **Buffer :** | an array to contain the output data. *Buffer* must has been allocated for enough space to store output data. |

|		
`U32`	**WriteCount :**	The number of output operation to be performed.
`U16`	**Iterations :**	the number of times the data in *Buffer* to output to the Port. A value of 0 means that digital output operation proceeds indefinitely. If the digital output operation is performed **synchronously**, this argument must be set as **1**.
`DBL`	**SampleRate :**	The sampling rate you want for digital output in hertz (samples per second). Your maximum rate depends on the card type and your computer system. This argument is only useful if the DO trigger mode was set as internal programmable pacer by calling `DO 7200 Config, DO 7300 RevA Config,` or `DO 7300 RevB Config()`. For the other settings, you have to set this argument as 10000.

`U16`	**SyncMode :**	Whether this operation is performed synchronously or asynchronously.
		   1: synchronous continuous digital output operation, that is, the function does not return until the continuous digital output operation complete.
		   2: asynchronous continuous digital output operation

`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DO Initial Memory Allocated

This VI returns the available memory size for digital output in the device driver in output terminal *MemSize*. The continuous digital output transfer size can not exceed this size.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`U32`	**MemSize :**	The available memory size for continuous DO in device driver of this card. The unit is Kbyte (1024 bytes).
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DO PG Start 8 / DO PG star 16 / DO PG Start 32

This VI performs pattern generation for digital output with the data stored in *Buffer* at a rate as close to the rate you specified. This VI is only available for PCI-7300A. Please use the VI corresponding to the port with you set with `DO 7300 RevA Config` or `DO 7300 RevB Config` VI.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U8` or	**Buffer :**	An array to contain the output data for pattern generation. *Buffer* must has been allocated for enough space to store output data.

`U16` or		
`U32`		

`U32`	**WriteCount :**	The total number of pattern generation samples.
`DBL`	**SampleRate :**	The sampling rate you want for pattern generation in hertz (samples per second). This argument is only useful if the DO trigger mode was set as internal programmable pacer by calling `DO 7200 Config, DO 7300 RevA Config,` or `DO 7300 RevB Config()`. For the other settings, you have to set this argument as 10000.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DO PG Stop

This VI stops pattern generation operation.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DO Read Line

Read back the digital logic state of the specified digital output line in the specified port.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**Port :**	Digital output port number. The valid value:

    PCI-6208V/16V/08A: 0
    PCI-6308V/08A: 0
    PCI-7200: 0
    cPCI-7200: 0, 1 (auxiliary output)
    PCI-7250/51: 0 through 3
    cPCI-7252: 0
    PCI-7248:
       0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper
       5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper
    cPCI-7249R:
       0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper,

10: P1A Extend, 11: P1B Extend, 12: P1C Extend
                                    5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper
                                    15: P2A Extend, 16: P2B Extend, 17: P2C Extend
                                PCI-7296:
                                    0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper
                                    5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper
                                    10: P3A, 11: P3B, 12: P3C, 13: P3C Lower, 14: P3C Upper
                                    15: P4A, 16: P4B, 17: P4C, 18: P4C Lower, 19: P4C Upper
                                PCI-7300A: 1 (auxiliary output)
                                PCI-7396:
                                    0: P1A, 1: P1B, 2: P1C
                                    5: P2A, 6: P2B, 7: P2C
                                    10: P3A, 11: P3B, 12: P3C
                                    15: P4A, 16: P4B, 17: P4C
                                PCI-9118: 0

| U16 | **Line :**   The digital line to be read. The valid value:
                                PCI-6208V/16V/08A: 0 through 3
                                PCI-6308V/08A: 0 through 3
                                PCI-7200: 0 through 31
                                cPCI-7200: 0 through 31 for DI port, 0 through 3 for auxiliary input port
                                PCI-7250/51: 0 through 7
                                cPCI-7252: 0 through 7
                                PCI-7248: 0 through 7
                                cPCI-7249R: 0 through 7
                                PCI-7296: 0 through 7
                                PCI-7300A: 0 through 3
                                PCI-7396: 0 through 7
                                PCI-9118: 0 through 3

| I16 | **Error In :**   The error condition occurred before this VI executes. This code default to no
                                error. If an error has already occurred, this VI does not perform any operation.
                                A value of 0 means no error, a negative value means an error. Refer to the
                                Appendix, *Error Codes*, for a code descriptions.

| U16 | **Card Number :**   The same number as input terminal *Card Number*.

| U16 | **Value :**   Returns the digital logic state, 0 or 1, of the specified digital output line.

| I16 | **Error Out :**   Error code. If the *Error In* indicated an error, the *Error Out* contains the same
                                value. Otherwise, *Error Out* describes the error status of this VI.

DO Read Port

Read back the output digital data from the specified digital output port.

| U16 | **Card Number :**   The card id of the card that want to perform this operation.

| U16 | **Port :**   Digital input port number. The valid value:
                                PCI-6208V/16V/08A: 0
                                PCI-6308V/08A: 0
                                PCI-7200: 0
                                cPCI-7200: 0, 1 (auxiliary output)
                                PCI-7250/51: 0 through 3
                                cPCI-7252: 0
                                PCI-7248:
                                    0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper
                                    5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper
                                cPCI-7249R:

<div style="text-align:center">

0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper,

10: P1A Extend, 11: P1B Extend, 12: P1C Extend

5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper

15: P2A Extend, 16: P2B Extend, 17: P2C Extend

PCI-7296:

0: P1A, 1: P1B, 2: P1C, 3: P1C Lower, 4: P1C Upper

5: P2A, 6: P2B, 7: P2C, 8: P2C Lower, 9: P2C Upper

10: P3A, 11: P3B, 12: P3C, 13: P3C Lower, 14: P3C Upper

15: P4A, 16: P4B, 17: P4C, 18: P4C Lower, 19: P4C Upper

PCI-7300A: 1 (auxiliary output)

PCI-7396:

0: P1A, 1: P1B, 2: P1C, 30: Channel1 (P1A, P1B, and P1C)

5: P2A, 6: P2B, 7: P2C, 31: Channel2 (P2A, P2B, and P2C)

10: P3A, 11: P3B, 12: P3C, 32: Channel3 (P3A, P3B, and P3C)

15: P4A, 16: P4B, 17: P4C, 33: Channel4 (P4A, P4B, and P4C)

PCI-9118: 0

</div>

`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **_Error Codes_**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.

`U32`	**Value :**	Returns the digital data read back from the specified output port.
		  PCI-6208V/16V/08A: 4-bit data
		  PCI-6308V/08A: 4-bit data
		  PCI-7200/cPCI-7200: 32-bit data (for DI port), 4-bit data (for auxiliary output port of cPCI-7200)
		  PCI-7248: 8-bit data
		  cPCI-7249R: 8-bit data
		  PCI-7250/51: 8-bit data
		  cPCI-7252: 16-bit data
		  PCI-7296: 8-bit data
		  PCI-7300A: 4-bit data
		  PCI-7396:
		    24-bit data (for Channel*n*, where *n* is the channel number) or
		    8-bit data (for P*n*A, P*n*B, P*n*C , where *n* is the channel number)
		  PCI-9118: 4-bit data

`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DO Write Line

Sets the specified digital output line in the specified digital port to the specified state. This VI is only available for those cards that support digital output read-back functionality.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.

`U16`	**Port :**	Digital output port number. The valid value:
		  PCI-7200: 0
		  PCI-7250/51: 0 through 3

`U16`	**Line :**	The digital line to write to. The valid value:
		  PCI-7200: 0 through 31
		  PCI-7250/51: 0 through 7

`U16`	**Value :**	The new digital logic state, 0 or 1.

|		
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

DO Write Port

Writes digital data to the specified digital output port.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.

`U16`	**Port :**	Digital output port number. The cards that support this function and their corresponding valid value are as follows:
		PCI-6208V/16V/08A: 0
		PCI-7200: 0
		PCI-7230: 0
		PCI-7234: 0
		PCI-7250/51: 0 through 3
		PCI-7248:
		  0: P1A, **1:** P1B, **2:** P1C, **3:** P1C Lower, **4:** P1C Upper
		  5: P2A, **6:** P2B, **7:** P2C, **8:** P2C Lower, **9:** P2C Upper
		PCI-7296:
		  0: P1A, **1:** P1B, **2:** P1C, **3:** P1C Lower, **4:** P1C Upper
		  5: P2A, **6:** P2B, **7:** P2C, **8:** P2C Lower, **9:** P2C Upper
		  10: P3A, **11:** P3B, **12:** P3C, **13:** P3C Lower, **14:** P3C Upper
		  15: P4A, **16:** P4B, **17:** P4C, **18:** P4C Lower, 19: P4C Upper
		PCI-7300A: 1 (auxiliary digital output port)
		PCI-8554: 0
		PCI-9111: 0 – DO port, 1 – EDO channels
		PCI-9112: 0
		PCI-9114: 0
		PCI-9118: 0

`U32`	**Value :**	Digital data that is written to the specified port. PCI-6208V/16V/08A: 4-bit data PCI-7200: 32-bit data PCI-7230: 16-bit data PCI-7234: 32-bit data PCI-7248: 8-bit data PCI-7250/51: 8-bit data PCI-7296: 8-bit data PCI-7300A: 4-bit data PCI-8554: 8-bit data PCI-9111: 16-bit data for DO port, or 4-bit data for EDO channels PCI-9112: 16-bit data PCI-9114: 16-bit data PCI-9118: 4-bit data
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.

|		
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

EDO 9111 Config

Set the mode of EDO channels for the PCI-9111 card with card ID *Card Number*.

`U16`	**Card Number :**	The card id of the card that want to perform this operation.
`U16`	**EDO_Fun :**	The mode of EDO ports. Valid values: **1:** EDO channels are used as input channels **2:** EDO channels are used as output channels **3:** EDO channels are used as channel number output
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`U16`	**Card Number :**	The same number as input terminal *Card Number*.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

Release Card

There are at most 32 cards that can be initialized simultaneously. This VI is used to tell the driver that this card is not used currently and can be released. This would make room for new card to initialize. Also at the last of an application, you need to use this VI to release all cards that were initialized.

|		
`U16`	**Card Number :**	The card id of the card that want to be released.
`I16`	**Error In :**	The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, **Error Codes**, for a code descriptions.
`I16`	**Error Out :**	Error code. If the *Error In* indicated an error, the *Error Out* contains the same value. Otherwise, *Error Out* describes the error status of this VI.

Appendix A Error Codes

The ***Error Codes*** for PCIS-LVIEW VIs.

Code	Name	Description
0	NoError	No error occurred
-2	InvalidCardNumber	The value of input terminal *Card Number* is out of range.
-3	TooManyCardInitialized	There have been 16 cards that were initialized.
-4	CardNotInitialized	No card is initialized successfully as the id as the value of input terminal *Card Number*.
-5	FuncNotSupport	The function is not supported by this type of card.
-6	InvalidIoChannel	The value of AI/AO channel or DI/O port is invalid.
-7	InvalidAdRange	The value of AI range is invalid.
-8	ContIoNotAllowed	This type of card does not support continuous data I/O.
-13	OpenDriverFailed	Open device driver failed.
-15	TransferCountTooLarge	The DMA or interrupt transfer size is larger than the memory allocated in driver.
-17	InvalidSampleRate	The value of input terminal *SampleRate* is invalid.
-18	InvalidCounterMode	The value of input terminal *Mode* is out of range.
-19	InvalidCounter	The value of input terminal *Ctr* is out of range.
-20	InvalidCounterState	The value of input terminal *State* is out of range.
-21	InvalidBinBcdParam	The value of input terminal *BinBcd* is out of range.
-35	DioConfigFailed	The operation of configuring the direction of DI/O port is failed.
-36	InvalidPortDirection	The value of input terminal *Direction* is out of range.
-38	InvalidPortWidth	The value of input terminal *PortWidth* is out of range.
-39	InvalidCtrSource	The value of clock source or debounce clock is invalid.
-40	OpenFileFailed	Fail to open a data file for storing input data.
-41	AllocateMemoryFailed	Fail to allocate an driver internal use memory.
-42	DaVoltageOutOfRange	The specified D/A voltage value is out of range.

Appendix B AI Range Codes

The *Analog Input Range* of NuDAQ PCI-bus Cards

Value	Range
1	Bipolar -10V to +10V
2	Bipolar -5V to +5V
3	Bipolar -2.5V to +2.5V
4	Bipolar -1.25V to +1.25V
5	Bipolar -0.625V to +0.625V
6	Bipolar -0.3125V to +0.3125V
7	Bipolar -0.5V to +0.5V
8	Bipolar -0.05V to +0.05V
9	Bipolar -0.005V to +0.005V
10	Bipolar -1V to +1V
11	Bipolar -0.1V to +0.1V
12	Bipolar -0.01V to +0.01V
13	Bipolar -0.001V to +0.001V
14	Unipolar 0 to +20V
15	Unipolar 0 to +10V
16	Unipolar 0 to +5V
17	Unipolar 0 to +2.5V
18	Unipolar 0 to +1.25V
19	Unipolar 0 to +1V
20	Unipolar 0 to +0.1V
21	Unipolar 0 to +0.01V
22	Unipolar 0 to +0.001V

Valid values for each card:

PCI-9111 DG/HR   : 1, 2, 3, 4, 5
PCI-9112   : 1, 2, 3, 4, 5, 15, 16, 17, 18
PCI-9113   : 1, 2, 7, 8, 10, 11, 15, 19, 20
PCI-9114DG   : 1, 2, 3, 4
PCI-9114HG   : 1, 10, 11, 12
PCI-9118 DG/HR   : 2, 3, 4, 5, 15, 16, 17, 18
PCI-9118 HG   : 2, 7, 8, 9, 15, 19, 20, 2
PCI-9812/10   : 2, 10

Appendix C AI Data Format

PCI-9111DG
16-bit signed integer data:
  D11 D10 D9 .... D1 D0 C3 C2 C1 C0

Where D11, D10, ... , D0 : A/D converted data
      C3, C2, C1, C0 : converted channel no.

PCI-9111HR
16-bit signed integer data:
  D15 D14 D13 .... D1 D0

where D15, D14, ... , D0 : A/D converted data

PCI-9112
16-bit unsigned integer data:
  D11 D10 D9 .... D1 D0 C3 C2 C1 C0

Where D11, D10, ... , D0 : A/D converted data
      C3, C2, C1, C0 : converted channel no.

PCI-9113

AI Read Single Channel VI
16-bit unsigned integer data:
  B15 ..B12 D11 D10 .…D1 D0

Where D11, D10, ... , D0 : 12-bit unsigned A/D converted data
      B15 ~ B12: don' t care

AI Cont Read Single Channel VI or **AI Cont Scan Channels** VI
32-bit unsigned integer data (including 12-bit unsigned A/D data):
  B31..B21 C4 C3 C2 C1 C0 B15 ..B12 D11 D10 ... D1 D0

Where D11, D10, ... , D0 : A/D converted data
      C3, C2, C1, C0 : converted channel no.
      B31 ~ B21 & B15 ~ B12: don' t care

PCI-9114

AI Read Single Channel VI
16-bit signed integer data:
  D15 D14 .…………… D1 D0

where D15, D14, ... , D0 : unsigned A/D converted data

AI Cont Read Single Channel VI or **AI Cont Scan Channels** VI
32-bit unsigned integer data (including 16-bit signed A/D data):
  B31 ..B21 C4 C3 C2 C1 C0 D15 D14 ... D1 D0

Where D15, D14, ... , D0 : A/D converted data
      C3, C2, C1, C0 : converted channel no.
      B31 ~ B21: don' t care

PCI-9118HR
16-bit signed integer data:
  D15 D14 D13 .... D1 D0

where D15, D14, ... , D0 : A/D converted data

PCI-9118DG/HG
16-bit unsigned integer data:
  D11 D10 D9 .... D1 D0 C3 C2 C1 C0

Where D11, D10, ... , D0 : A/D converted data
      C3, C2, C1, C0 : converted channel no.

PCI-9810

16-bit signed integer data:

D9 D8 D7 .... D1 D0 b5 b4 b3 b2 b1 b0

Where D11, D10, ... , D0 : A/D converted data

b2, b1, b0 : Digital Input data.

b3: trigger detection flag

PCI-9812

16-bit signed integer data:

D11 D10 D9 .... D1 D0 b3 b2 b1 b0

Where D11, D10, ... , D0 : A/D converted data

b2, b1, b0 : Digital Input data.

b3: trigger detection flag

Appendix D Data File Format

This appendix describes the file format of the data files generated by the functions performing continuous data acquisition followed by storing the data to disk.

The data file includes three parts, Header, ChannelRange (optional) and Data block. The file structure is as the figure below:

Header
ChannelRange (Optional)
DAQ data
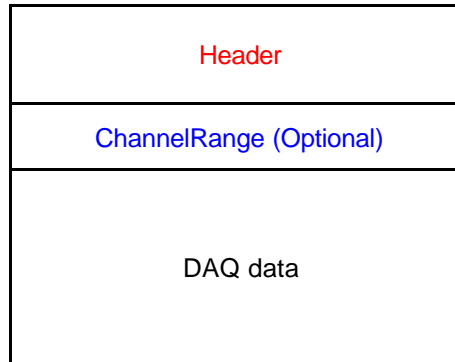
Header

The *header* part records the information related to the stored data and its total length is 60 bytes. The data structure of the file header is as follows:

Header			*Total Length: 60 bytes*
Elements	**Type**	**Size (bytes)**	**Comments**
ID	char	10	file ID *ex. ADLinkDAQ1*
card_type	short	2	card Type *ex. Pci7250, Pci9112*
num_of_channel	short	2	number of scanned channels *ex. 1, 2*
channel_no	unsigned char	1	channel number where the data read from (only available as the num_of_channel is 1) *ex. 0, 1*
num_of_scan	long	4	the number of scan for each channel (total count / num_of_channel)
data_width	short	2	the data width 0: 8 bits, 1: 16 bits, 2: 32 bits
channel_order	short	2	the channel scanned sequence 0: normal (ex. 0-1-2-3) 1: reverse (ex. 3-2-1-0) 2: custom* (ex. 0, 1, 3)
ad_range	short	2	the AI range code Please refer to Appexdix B

			ex. 0 (AD_B_5V)
scan_rate	double	8	The scanning rate of each channel (total sampling rate / num_of_channel)
num_of_channel_range	short	2	The number of ChannelRange* structure
start_date	char	8	The starting date of data acquisition *ex. 12/31/99*
start_time	char	8	The starting time of data acquisition *ex. 18:30:25*
start_millisec	char	3	The starting millisecond of data acquisition *ex. 360*
reserved	char	6	not used

* If the *num_of_channel_range* is 0, the *ChannelRange* block won' t be included in the data file.
* The *channel_order* is set to "custom" only when the card supports variant channel scanning order.

ChannelRange

The *ChannelRange* part records the channel number and data range information related to the stored data. This part consists of several channel & range units. The length of each unit is 2 bytes. The total length depends on the value of *num_of_channel_range* (one element of the file header) and is calculated as the following formula:

Total Length = $2 *$ num_of_channel_range bytes

The data structure of each ChannelRange unit is as follows:

ChannelRange Unit			
Length: 2 bytes			
Elements	**Type**	**Size (bytes)**	**Comments**
channel	char	1	scanned channel number *ex. 0, 1*
range	char	1	the AI range code of *channel* Please refer to Appexdix B *ex. 0 (AD_B_5V)*

Data Block

The last part is the data block. The data is written to file in 16-bit binary format, with the lower byte first (little endian). For example, the value 0x1234 is written to disk with 34 first followed by 12. The total length of the data block depends on the data width and the total data count.

The file is written in Binary format and can' t be read in normal text editor. You can use any binary file editor to view it or the functions used for reading files, e.g. fread, to get the file information and data value. PCIS-DASK provides a useful utility *DAQCvt* for you to convert the binary file. The *DAQCvt* main window is as the figure below:
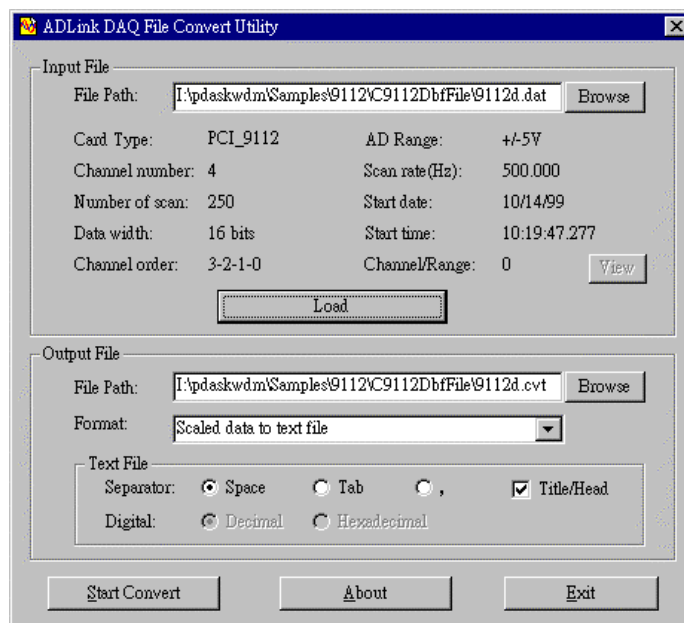
DAQCvt first translates the information stored in the header part and the ChannelRange part and then displays the corresponding information in the "Input File" frame of DAQCvt main window. After setting the properties (File Path, Format, ..etc) of the converted file and push "*Start Convert*" button in the "Output File" frame, DAQCvt gets rid of header and ChannelRange parts and converts the data in data block according to the card type and the data width. Finally, DAQCvt writes the converted data to disk. You thus can use any text editor or Excel to view or analyze the accessed data.

Appendix E Function Support

This appendix shows which NuDAQ PCI-bus card each PCIS-LVIEW NT or 98 version VI supports.

Function	PCI-6208A	PCI-6208V\6216V	PCI-6308A	PCI-6308V\6304V	PCI-7200	PCI-7230	PCI-7233	PCI-7234	PCI-7248\7224	PCI-7249	PCI-7250\7251	PCI-7252	PCI-7296	PCI-7300A RevA	PCI-7300A RevB	PCI-7396	PCI-7432	PCI-7433	PCI-7434	PCI-8554	PCI-9111DG	PCI-9111HR	PCI-9112	PCI-9113	PCI-9114DG	PCI-9114HG	PCI-9118DG	PCI-9118HG	PCI-9118HR	PCI-9810	PCI-9812
6208A Initial	•																														
6208V Initial		•																													
6308A Initial			•																												
6308V Initial				•																											
7200 Initial					•																										
7230 Initial						•																									
7233 Initial							•																								
7234 Initial								•																							
7248 Initial									•																						
7249 Initial										•																					
7250 Initial											•																				
7252 Initial												•																			
7296 Initial													•																		
7300 RevA Initial														•																	
7300 RevB Initial															•																
7396 Initial																•															
7432 Initial																	•														
7433 Initial																		•													
7434 Initial																			•												
8554 Initial																				•											
9111DG Initial																					•										
9111HR Initial																						•									
9112 Initial																							•								
9113 Initial																								•							
9114DG Initial																									•						
9114HG Initial																										•					
9118DG Initial																											•				
9118HG Initial																												•			
9118HR Initial																													•		
9810 Initial																														•	
9812 Initial																															•
AI 9111 Config																					•	•									
AI 9112 Config																							•								
AI 9113 Config																								•							
AI 9114 Config																									•	•					
AI 9118 Config																											•	•	•		
AI 9812 Config																														•	•
AI Async Check																					•	•	•	•	•	•	•	•	•	•	•
AI Async Clear																					•	•	•	•	•	•	•	•	•	•	•
AI Async DoubleBuffer Half Ready																					•	•	•	•	•	•	•	•	•	•	•
AI Async Double Buffer Mode																					•	•	•	•	•	•	•	•	•	•	•

Function	PCI-6208A	PCI-6208V\6216V	PCI-6308A	PCI-6308V\6304V	PCI-7200	PCI-7230	PCI-7233	PCI-7234	PCI-7248\7224	PCI-7249	PCI-7250\7251	PCI-7252	PCI-7296	PCI-7300A RevA	PCI-7300A RevB	PCI-7396	PCI-7432	PCI-7433	PCI-7434	PCI-8554	PCI-9111DG	PCI-9111HR	PCI-9112	PCI-9113	PCI-9114DG	PCI-9114HG	PCI-9118DG	PCI-9118HG	PCI-9118HDG	PCI-9118HHR	PCI-9810	PCI-9812
AI Async Double Buffer Transfer																					●	●	●	●	●	●	●	●	●	●	●	●
AI Cont Read Channel																					●	●	●	●	●	●	●	●	●	●	●	●
AI Cont Read Multiple Channels																											●	●	●			
AI Cont Scan Channels																					●	●	●	●	●	●	●	●	●	●	●	●
AI Cont Read Channel To File																					●	●	●	●	●	●	●	●	●	●	●	●
AI Cont Read Multiple Channels To File																											●	●	●			
AI Cont Scan Channels To File																					●	●	●	●	●	●	●	●	●	●	●	●
AI Cont Status																					●	●	●	●	●	●	●	●	●	●	●	●
AI Cont VScale																					●	●	●	●	●	●	●	●	●	●	●	●
AI Initial Memory Allocated																					●	●	●	●	●	●	●	●	●	●	●	●
AI Read Channel																					●	●	●	●	●	●	●	●	●	●	●	●
AI Vread Channel																					●	●	●	●	●	●	●	●	●	●	●	●
AI VScale																					●	●	●	●	●	●	●	●	●	●	●	●
AO 6208A Config	●																															
AO 6308A Config			●																													
AO 9111 Config																					●	●										
AO 9112 Config																							●									
AO Vscale	●	●	●	●																	●	●	●				●	●	●			
AO Vwrite Channel	●	●	●	●																	●	●	●				●	●	●			
AO Write Channel	●	●	●	●																	●	●	●				●	●	●			
CTR 8554 CK1 Config																				●												
CTR 8554 ClkSrc Config																				●												
CTR 8554 Debounce Config																				●												
CTR Read									●	●		●			●					●	●	●	●	●	●	●	●	●	●			
CTR Reset									●	●		●			●					●				●			●	●	●			
CTR Setup									●	●		●			●					●				●			●	●	●			
DI 7200 Config					●																											
DI 7300 RevA Config														●																		
DI 7300 RevB Config															●																	
DI Async Check					●									●	●																	
DI Async Clear					●									●	●																	
DI Async Double Buffer Half Ready					●																											
DI Async Double Buffer Mode					●																											
DI Async Double Buffer Transfer					●																											
DI Cont Read Port					●									●	●																	
DI Cont Read Port To File					●									●	●																	
DI Cont Status					●									●	●																	
DI Initial Memory Allocated					●									●	●																	
DI Read Line	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●		●	●	●	●			●	●	●	●	●	
DI Read Port	●	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●	●	●		●	●	●	●			●	●	●	●	●	
DIO Config Port									●	●			●			●																
DIO SetDualInterrupt						●	●		●	●			●			●	●	●														
DO 7200 Config					●																											
DO 7300 RevA Config														●																		
DO 7300 RevB Config															●																	
DO Cont Status					●									●	●																	
DO Cont Write Port					●									●	●																	
DO Async Check					●									●	●																	

Function	PCI-6208A	PCI-6208V\6216V	PCI-6308A	PCI-6308V\6304V	PCI-7200	PCI-7230	PCI-7233	PCI-7234	PCI-7248\7224	PCI-7249	PCI-7250\7251	PCI-7252	PCI-7296	PCI-7300A RevA	PCI-7300A RevB	PCI-7396	PCI-7432	PCI-7433	PCI-7434	PCI-8554	PCI-9111DG	PCI-9111HR	PCI-9112	PCI-9113	PCI-9114DG	PCI-9114HG	PCI-9118DG	PCI-9118HG	PCI-9118HR	PCI-9810	PCI-9812
DO Async Clear				●										●	●																
DO Initial Memory Allocated				●										●	●																
DO PG Start														●	●																
DO PG Stop														●	●																
DO Read Line	●	●	●	●	●				●	●	●	●	●	●	●	●											●	●	●		
DO Read Port	●	●	●	●	●				●	●	●	●	●	●	●	●											●	●	●		
DO Write Line				●							●	●																			
DO Write Port	●	●	●	●	●	●			●	●	●	●	●	●	●	●	●	●	●		●	●	●		●	●	●	●	●		
EDO 9111 Config																					●	●									
Release Card	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●