Alv.llb VI Function Descriptions

The functionality of VIs in Alv.llb can be classified to the following capabilities:

1. **Card Configuration:**
   - Initialization & Release: Setup hardware base I/O address or release the hardware.
   - Operation configuration:
     * Setting trigger mode, etc before continuous AI operation
     * Setting the direction (Input or output) configuration of the selected port for ACL-7122, ACL-7124, or PET-48DIO.
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
5. **Timer/Counter:**
   - Timer/counter functions

Appendix "*Function Support*" shows which NuDAQ ISA-bus card each Alv.llb 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.

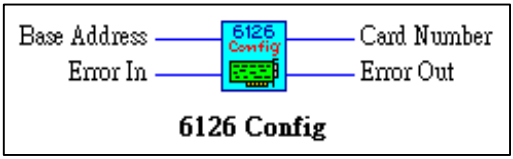
48DIO Config

A PET-48DIO card is configured according the corresponding base address. Every PET-48DIO digital I/O card has to be configured by this VI before using other VI.

I16	**Base Address :**	the I/O port base address of the card. See PET-48DIO manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
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 **`48DIO Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

6126 Config

An ACL-6126 card is configured according the corresponding base address. Every ACL-6126 multi-function card has to be configured by this VI before using other VI.



I16	**Base Address :**	the I/O port base address of the card. See ACL-6126 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
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 **`6126 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

6128 Config

An ACL-6128 card is configured according the corresponding base address. Every ACL-6128 analog output card has to be configured by this VI before using other VI.

I16	**Base Address :**	the I/O port base address of the card. See ACL-6128 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
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 **`6128 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

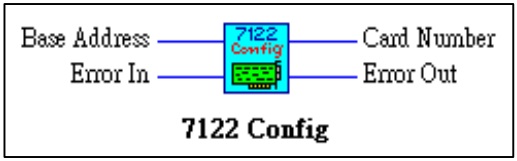
7120 Config

An ACL-7120 card is configured according the corresponding base address. Every ACL-7120 digital I/O card has to be configured by this VI before using other VI.

I16	**Base Address :**	the I/O port base address of the card. See ACL-7120 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
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 **`7120 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

7122 Config

An ACL-7122 card is configured according the corresponding base address. Every ACL-7122 digital I/O card has to be configured by this VI before using other VI.



I16	**Base Address :**	the I/O port base address of the card. See ACL-7122 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
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 **`7122 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

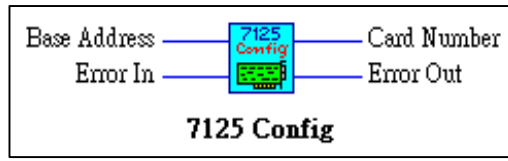
7124 Config

An ACL-7124 card is configured according the corresponding base address. Every ACL-7124 digital I/O card has to be configured by this VI before using other VI.

I16	**Base Address :**	the I/O port base address of the card. See ACL-7124 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
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 **`7124 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

7125 Config

An ACL-7125 card is configured according the corresponding base address. Every ACL-7125 digital I/O card has to be configured by this VI before using other VI.



I16	**Base Address :**	the I/O port base address of the card. See ACL-7125 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
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 **`7125 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

7130 Config

An ACL-7130 card is configured according the corresponding base address. Every ACL-7130 digital I/O card has to be configured by this VI before using other VI.

I16	**Base Address :**	the I/O port base address of the card. See ACL-7130 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
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 **`7130 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

7225 Config

An ACL-7225 card is configured according the corresponding base address. Every ACL-7225 digital I/O card has to be configured by this VI before using other VI.

I16	**Base Address :**	the I/O port base address of the card. See ACL-7225 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
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 **`7225 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

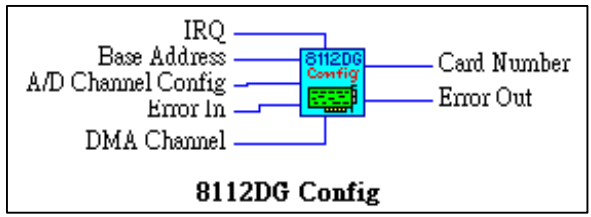
8111 Config

An ACL-8111 card is configured according the corresponding base address. Every ACL-8111 multi-function card has to be configured by this VI before using other VI.

I16	**Base Address :**	the I/O port base address of the card. See ACL-8111 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
I16	**IRQ :**	IRQ level used to transfer A/D data. The valid values are 2 through 7. Please make sure the IRQ doesn't conflict with other devices.
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 **`8111 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

8112DG Config

An ACL-8112DG card is configured according the corresponding base address. Every ACL-8112DG multi-function card has to be configured by this VI before using other VI.

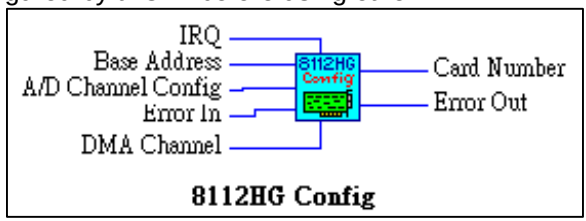


I16	**Base Address :**	the I/O port base address of the card. See ACL-8112DG manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
I16	**A/D Channel Config:**	A/D input mode. The input value must match the setting of JP3 on the card. **1:** single-ended **2:** differential
I16	**IRQ :**	IRQ level used to transfer A/D data or stop DMA. The input value must match the setting of JP5 on the card.
I16	**DMA Channel :**	DMA channel used for DMA transfer. The input value must match the setting of JP7 and JP8 on the card.
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 **`8112DG Config`** 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.

I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

8112HG Config

An ACL-8112HG card is configured according the corresponding base address. Every ACL-8112HG multi-function card has to be configured by this VI before using other VI.

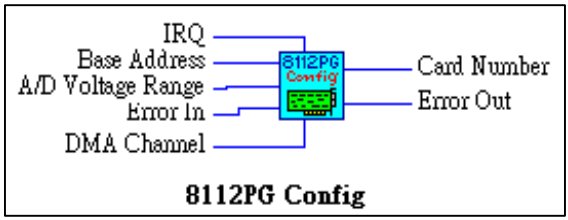


I16	**Base Address :**	the I/O port base address of the card. See ACL-8112HG manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
I16	**A/D Channel Config:**	A/D input mode. The input value must match the setting of JP3 on the card. **1:** single-ended **2:** differential
I16	**IRQ :**	IRQ level used to transfer A/D data or stop DMA. The input value must match the setting of JP5 on the card.
I16	**DMA Channel :**	DMA channel used for DMA transfer. The input value must match the setting of JP7 and JP8 on the card.

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 **`8112HG Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

8112PG Config

An ACL-8112PG card is configured according the corresponding base address. Every ACL-8112PG multi-function card has to be configured by this VI before using other VI.



I16	**Base Address :**	The I/O port base address of the card. See ACL-8112PG manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.

A/D Voltage Range: the voltage range jumper setting (JP8) on the card. The valid value is either 5 or 10.

IRQ : IRQ level used to transfer A/D data or stop DMA. The input value must match the setting of JP3 on the card.

DMA Channel : DMA channel used for DMA transfer. The input value must match the setting of JP1 and JP2 on the card.

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 **`8112PG Config`** 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.

Card Number : A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-LVIEW VIs.

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.

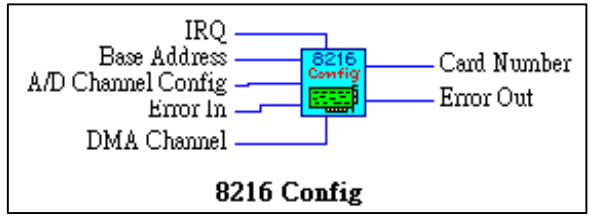
8113 Config

An ACL-8113 card is configured according the corresponding base address. Every ACL-8113 multi-function card has to be configured by this VI before using other VI.

I16	**Base Address :**	the I/O port base address of the card. See ACL-8113 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
I16	**IRQ :**	IRQ level used to transfer A/D data. The valid values are 2 through 7. Please make sure the IRQ doesn't conflict with other devices.
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 **`8113 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0 and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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.

8216 Config

An ACL-8216 card is configured according the corresponding base address. Every ACL-8216 multi-function card has to be configured by this VI before using other VI.



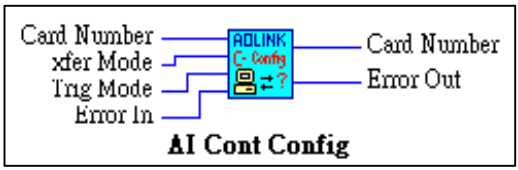
I16	**Base Address :**	the I/O port base address of the card. See ACL-8216 manual for details. Make sure the hardware DIP switch setting for base address is the same as software setting.
I16	**A/D Channel Config:**	A/D input mode. The input value must match the setting of JP3 on the card. **1:** single-ended **2:** differential
I16	**IRQ :**	IRQ level used to transfer A/D data or stop DMA. The input value must match the setting of JP5 on the card.
I16	**DMA Channel :**	DMA channel used for DMA transfer. The input value must match the setting of JP7 and JP8 on the card.
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 **`8216 Config`** 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.
I16	**Card Number :**	A numeric card id for the card initialized. The range of *Card Number* is between 0

and 15. The value of this output terminal is used as the value of input terminal *Card Number* of other ACLS-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 Cont Config

Set the transfer mode and trigger mode for the card with card ID *Card Number*. You must call this function before calling function to perform continuous analog input operation on this card. If you changed the jumpers that affect the analog input configuration, this function also needs to be called.



I16 **Card Number :** The card id of the card that want to perform this operation.

I16 **xfer Mode :** The transfer mode of continuous analog input. Valid values:
1: DMA
2: interrupt

I16 **Trig Mode :** 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

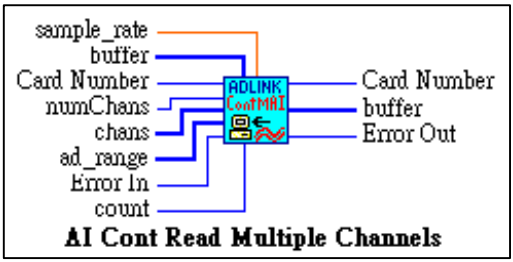
not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.

I16 **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 Read Multiple Channels

This function performs continuous A/D conversions on the specified analog input channels in specified A/D ranges at a rate as close to the rate you specified. Since no ADLink ISA bus card supported by Alv.llb has hardware auto-scan capability, this operation has to use interrupt mode, DMA mode is not allowed.



I16 **Card Number :** The card id of the card that want to perform this operation.

I16 **numChans:** The number of analog input channels in the array *chans*. The valid values are 1 through 16.

chans :

Array of analog input channel numbers. The channel order for acquiring data is the same as the order you set in *chans*. You can set the channel order as you wish. The valid values in *chans*:

ACL-8111: 0 through 7
ACL-8112DG/HG/PG: 0 through 15
ACL-8216: 0 through 15

ad_range :

An integer array of length *numChans* that contains the analog input range for every channel in array *chans*. Please refer to the Appendix, ***AI Range Codes***, for valid range values.

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 *count*. The acquired data is stored in interleaved sequence. For example, if the value of *numChans* is 4, and the numbers in *chans* 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 the description of input terminal *buffer* in **`AI Cont Read Single Channel`** VI for the data format of each 16-bit data.

count :

The number of A/D conversions to be performed.

sample_rate : 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 **`AI Cont Config`** VI, the sampling rate is determined by an external trigger source, you an ignore this input.

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.

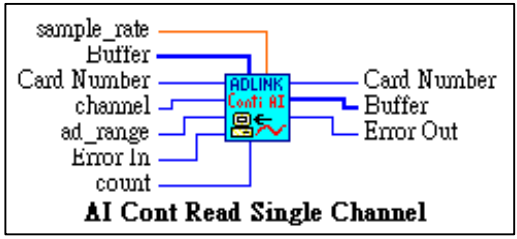
Card Number : The same number as input terminal *Card Number*.

buffer : An integer array to contain the acquired data.

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 Single Channel

This VI performs continuous A/D conversions on the specified analog input channel at a rate as close to the rate you specified.



I16 **Card Number :** The card id of the card that want to perform this operation.

I16 **channel :** Analog input channel number.
Range:
ACL-8111: 0 through 7
ACL-8112DG/HG/PG: 0 through 15
ACL-8216: 0 through 15

I16 **ad_range :** The analog input range the specified channel is setting. Please refer to the Appendix, ***AI Range Codes***, for valid range values.

I16 **Buffer :** An integer array to contain the acquired data. *Buffer* must has a length equal to or greater than the value of input terminal *count*. The data format of each 16-bit data in *Buffer* is described as below:

Every 16-bit integer data:

D15 D14 D13 ..... D1 D0

ACL-8111, ACL-8112DH/HG/PG:
D15, ... , D12 : ignore; D11,…, D0: A/D converted data

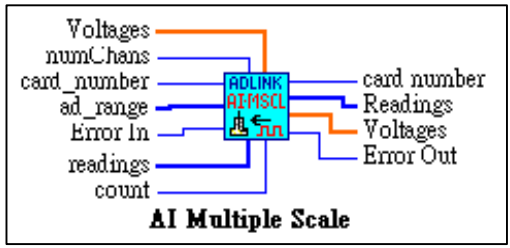
ACL-8216:
D15, ... , D0: A/D converted data

I32 **count :** The number of A/D conversions to be performed.

SGL	**sample_rate :**	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 **`AI Cont Config`** VI, the sampling rate is determined by an external trigger source, you can ignore this input.
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	**Card Number :**	The same number as input terminal *Card Number*.
I16	**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 Multiple Scale

Converts the values of an array of binary data to the actual input voltages.



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

numChans : The total number of Analog input channel. The valid values are 1 through 16.

ad_range : An integer array of length *numChans* that contains the analog input ranges used to scale the binary values in the array *Readings*. Please refer to the Appendix, ***AI Range Codes***, for valid range values.

count : The total number of samples in the array *readings*.

readings : An array of binary values. The binary values should be arranged in interleaved sequence. For example, if *numChans* is 2, range values in *ad_range* are AD_B_5_V and AD_B_10_V, then *readings*[0] is scaled with AD_B_5_V, *readings*[1] is scaled with AD_B_10_V, *readings*[2] is scaled with AD_B_5_V, *readings*[3] is scaled with AD_B_10_V, ...

Voltages : An array to contain the input voltage measured. *Voltages* must has a length equal to or greater than the value of input terminal *count*.

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.

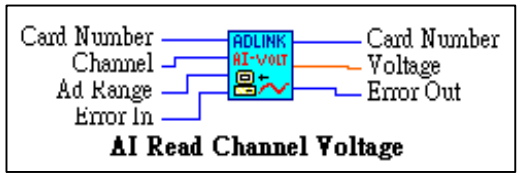
Card Number : The same number as input terminal *Card Number*.

Voltages : The output of floating-point voltage values that correspond to the input binary values.

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 Voltage

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



I16 **Card Number :** The card id of the card that want to perform this operation.

I16 **Channel :** Analog input channel number.
Range:
ACL-111: 0 through 7
ACL-8112DG/HG/PG: 0 through 15
ACL-8216: 0 through 15

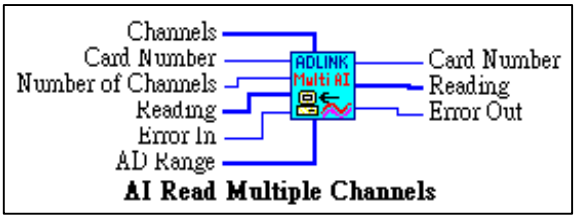
I16 **Ad Range :** The analog input range the specified channel is setting. Please refer to the Appendix, ***AI Range Codes***, for valid range values.

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.

I16	**Card Number :**	The same number as input terminal *Card Number*.
SGL	**Voltage :**	The floating-point voltage value measured on the specified *Channel*, scaled to units of volts.
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 Multiple Channels

This VI does one software triggered A/D conversion (analog input) on each of the analog input channels specified in array *Channels*, and returns the values converted in the array *Reading*.

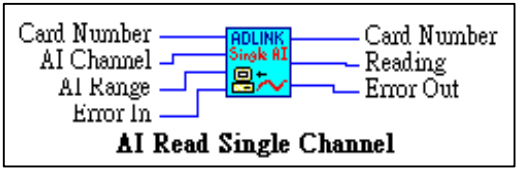


I16	**Card Number :**	The card id of the card that want to perform this operation.
I16	**numChans:**	The number of analog input channels in the array *Channels*. The valid values are 1 through 16.
I16	**Channels :**	Array of analog input channel numbers. The channel order for acquiring data is the same as the order you set in *Channels*. You can set the channel order as you wish.

I16	**AD Range :**	An integer array of length *numChans* that contains the analog input range for every channel in array *Channels*. 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.
I16	**Card Number :**	The same number as input terminal *Card Number*.
I16	**Reading :**	the array used to store the converted binary values from each analog input channel.
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 Single Channel

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



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

AI Channel : Analog input channel number.
Range:
ACL-8111: 0 through 7
ACL-8112DG/HG/PG: 0 through 15
ACL-8216: 0 through 15

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

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.

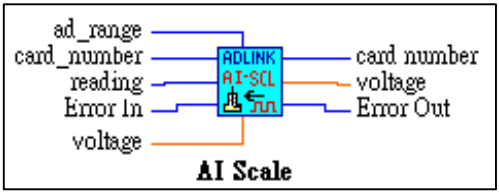
Card Number : The same number as input terminal *Card Number*.

Reading : The A/D converted value.

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 Scale

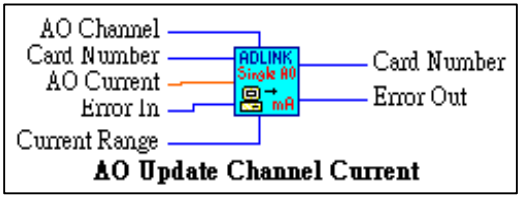
Converts the binary A/D conversion result to the actual input voltage.



I16	**Card Number :**	The card id of the card that want to perform this operation.
I16	**ad_range :**	The analog input range used to scale the binary value. Please refer to the Appendix, ***AI Range Codes***, for valid range values.
I16	**reading :**	The binary A/D conversion value.
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	**Card Number :**	The same number as input terminal *Card Number*.
SGL	**voltage :**	The voltage value corresponds to the value of *reading* with *ad_range* as range.
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 Update Channel Current

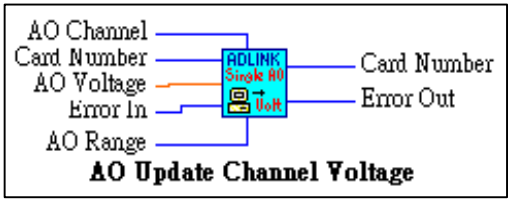
This VI is used to analog output current. The resolution of analog output channel is 12-bit, the current range is from 4mA to 20mA or 0 to 20mA.



I16	**Card Number :**	The card id of the card that want to perform this operation.
I16	**AO Channel :**	Analog output channel number. Range: **ACL-6126:** 0 through 5 **ACL-6128:** 0 or 1
I16	**Current Range :**	The current range selected by the jumper on the card. This value must be set correctly or the output *AO current* will be incorrect. **0:** 4 to 20mA **1:** 0 to 20mA **ACL-6126:** 0 **ACL-6128:** 0 or 1
SGL	**AO Current :**	The floating-point current value to be scaled and written to 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.
I16	**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 Update Channel Voltage

This VI scales the voltage value to the proper binary number, then writes that number to D/A converter.



I16 **Card Number :** The card id of the card that want to perform this operation.

I16 **AO Channel :** Analog output channel number.
Range:
ACL-6126: 0 through 5
ACL-6128: 0 or 1
ACL-8111: 0
ACL-8112DG/HG/PG: 0 or 1
ACL-8216: 0 or 1

I16 **AO Range :** The analog output range selected by the jumper on the card.
1: Bipolar –10V to +10V
2: Bipolar -5V to +5V
3: Unipolar 0 to +10V
4: Unipolar 0 to +5V

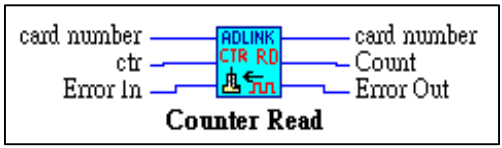
ACL-6126, ACL-6128: 1, 2, 3, or 4
ACL-8111, ACL-8112DG/HG/PG: 3 or 4

SGL **AO Voltage :** The floating-point voltage value to be scaled and written to analog output channel. The voltage value must be within the range of analog output range specified by the input terminal *AO Range*.

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	**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.

Counter Read

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

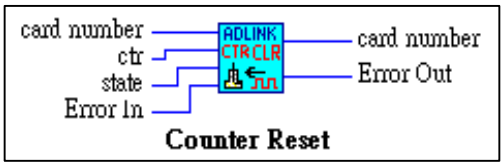


I16	**Card Number :**	The card id of the card that want to perform this operation.
I16	**ctr :**	The counter number. Range: **ACL-7120:** 0 through 5 **ACL-7130:** 0, 1, or 2 **ACL-8111:** 0 **ACL-8112DG/HG/PG:** 0 **ACL-8216:** 0

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.
I16	**Card Number :**	The same number as input terminal *Card Number*.
U32	**Count :**	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.

Counter Reset

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

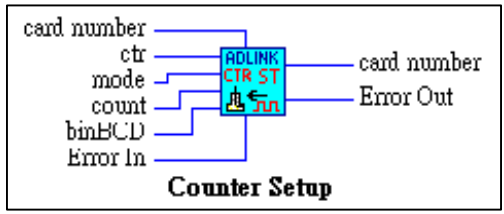


I16	**Card Number :**	The card id of the card that want to perform this operation.

I16	**ctr :**	The counter number. Range: **ACL-7120:** 0 through 5 **ACL-7130:** 0, 1, or 2 **ACL-8111:** 0 **ACL-8112DG/HG/PG:** 0 **ACL-8216:** 0
I16	**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.
I16	**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.

Counter Setup

Configures the selected counter to operate in the specified mode.



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

ctr : The counter number.
Range:
ACL-7120: 0 through 5
ACL-7130: 0, 1, or 2
ACL-8111: 0
ACL-8112DG/HG/PG: 0
ACL-8216: 0

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

count : The period from one output pulse to the next.

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

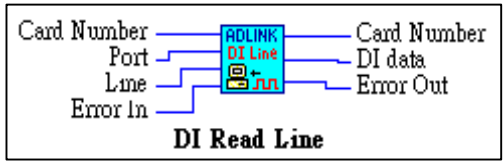
Error In : The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.

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 Read Line

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



I16 **Card Number :** The card id of the card that want to perform this operation.

I16 **Port :** Digital input port number. The valid value:

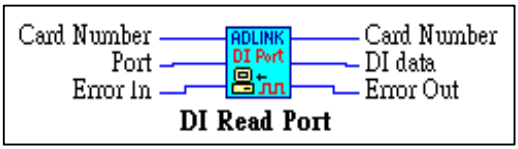
ACL-6126: 0 or 1
ACL-7120: 0 through 3
ACL-7122: 0 through 17
ACL-7124: 0 through 2
ACL-7125: 0
ACL-7225: 0 or 1
ACL-8111: 0 or 1
ACL-8112DG/HG/PG: 0 or 1
ACL-8216: 0 or 1
PET-48DIO: 0 through 5

I16 **Line :** The digital line to be read. The valid values are 0 through 7.

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	**Card Number :**	The same number as input terminal *Card Number*.
U8	**DI Data :**	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.

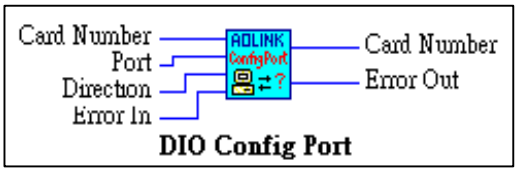


I16	**Card Number :**	The card id of the card that want to perform this operation.

I16	**Port :**	Digital input port number. The valid value: **ACL-6126:** 0 or 1 **ACL-7120:** 0 through 3 **ACL-7122:** 0 through 17 **ACL-7124:** 0 through 2 **ACL-7125:** 0 **ACL-7225:** 0 or 1 **ACL-8111:** 0 or 1 **ACL-8112DG/HG/PG:** 0 or 1 **ACL-8216:** 0 or 1 **PET-48DIO:** 0 through 5
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	**Card Number :**	The same number as input terminal *Card Number*.
U8	**DI Data :**	Returns the 8-bit digital data read from the specified port.
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 Config Port

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



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

Port : Digital input port. The valid value:

ACL-7122: 0 through 17
ACL-7124: 0 through 2
PET-48DIO: 0 through 5

0: PA0, **1:** PB0, **2:** PC0,
3: PA1, **4:** PB1, **5:** PC1,
6: PA2, **7:** PB2, **8:** PC2,
9: PA3, **10:** PB3, **11:** PC3,
12: PA4, **13:** PB4, **14:** PC4,
15: PA5, **16:** PB5, **17:** PC5

Direction : The port direction of PIO port. The valid values:

1: Input
2: Output

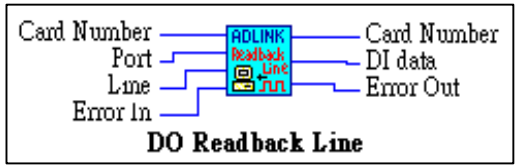
Error In : The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.

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

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 Readback Line

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



I16 **Card Number :** The card id of the card that want to perform this operation.

I16 **Port :** Digital output port number. The valid value:

ACL-7122: 0 through 17
ACL-7124: 0 through 2
PET-48DIO: 0 through 5
(**0:** PA0, **1:** PB0, **2:** PC0,
3: PA1, **4:** PB1, **5:** PC1,
6: PA2, **7:** PB2, **8:** PC2,
9: PA3, **10:** PB3, **11:** PC3,
12: PA4, **13:** PB4, **14:** PC4,
15: PA5, **16:** PB5, **17:** PC5)

ACL-6126: 0 or 1
ACL-7120: 0 through 3
ACL-7125: 0
ACL-7225: 0 or 1
ACL-8111: 0 or 1
ACL-8112DG/HG/PG: 0 or 1
ACL-8216: 0 or 1

I16 **Line :** The digital output line to be read. The valid values are 0 through 7.

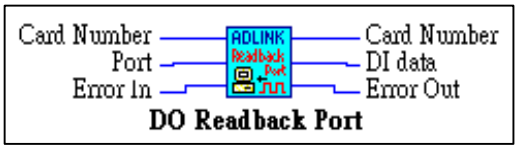
I16 **Error In :** The error condition occurred before this VI executes. This code default to no error. If an error has already occurred, this VI does not perform any operation. A value of 0 means no error, a negative value means an error. Refer to the Appendix, ***Error Codes***, for a code descriptions.

I16 **Card Number :** The same number as input terminal *Card Number*.

U8	**DO Data :**	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.

DO Readback Port

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

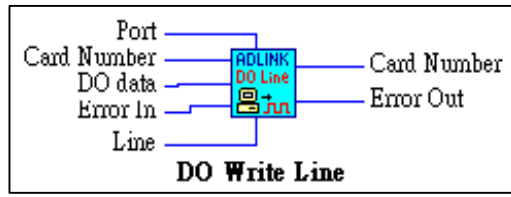


I16	**Card Number :**	The card id of the card that want to perform this operation.
I16	**Port :**	Digital output port number. The valid value: **ACL-7122:** 0 through 17 **ACL-7124:** 0 through 2 **PET-48DIO:** 0 through 5 (**0:** PA0, **1:** PB0, **2:** PC0, **3:** PA1, **4:** PB1, **5:** PC1, **6:** PA2, **7:** PB2, **8:** PC2, **9:** PA3, **10:** PB3, **11:** PC3, **12:** PA4, **13:** PB4, **14:** PC4, **15:** PA5, **16:** PB5, **17:** PC5) **ACL-6126:** 0 or 1 **ACL-7120:** 0 through 3 **ACL-7125:** 0 **ACL-7225:** 0 or 1 **ACL-8111:** 0 or 1 **ACL-8112DG/HG/PG:** 0 or 1 **ACL-8216:** 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.
I16	**Card Number :**	The same number as input terminal *Card Number*.
U8	**DO Data :**	Returns the 8-bit digital data read from the specified output port.
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.



I16	**Card Number :**	The card id of the card that want to perform this operation.

Port :

Digital output port number. The valid value:

ACL-7122: 0 through 17
ACL-7124: 0 through 2
PET-48DIO: 0 through 5
(**0:** PA0, **1:** PB0, **2:** PC0,
3: PA1, **4:** PB1, **5:** PC1,
6: PA2, **7:** PB2, **8:** PC2,
9: PA3, **10:** PB3, **11:** PC3,
12: PA4, **13:** PB4, **14:** PC4,
15: PA5, **16:** PB5, **17:** PC5)

ACL-6126: 0 or 1
ACL-7120: 0 through 3
ACL-7125: 0
ACL-7225: 0 or 1
ACL-8111: 0 or 1
ACL-8112DG/HG/PG: 0 or 1
ACL-8216: 0 or 1

Line :

The digital line to write to. The valid values are 0 through 7.

DO Data :

The new digital logic state, 0 or 1.

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.

Card Number :

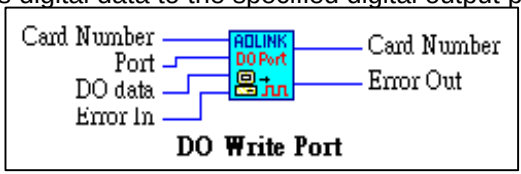
The same number as input terminal *Card Number*.

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.



I16 **Card Number :** The card id of the card that want to perform this operation.

I16 **Port :** Digital output port number. The valid value:

ACL-7122: 0 through 17
ACL-7124: 0 through 2
PET-48DIO: 0 through 5
(**0:** PA0, **1:** PB0, **2:** PC0,
3: PA1, **4:** PB1, **5:** PC1,
6: PA2, **7:** PB2, **8:** PC2,
9: PA3, **10:** PB3, **11:** PC3,
12: PA4, **13:** PB4, **14:** PC4,
15: PA5, **16:** PB5, **17:** PC5)

ACL-6126: 0 or 1
ACL-7120: 0 through 3
ACL-7125: 0
ACL-7225: 0 or 1
ACL-8111: 0 or 1
ACL-8112DG/HG/PG: 0 or 1
ACL-8216: 0 or 1

U8 **DO Data :** 8-bit digital data that is written to the specified port.

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	**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 16 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.

I16	**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.