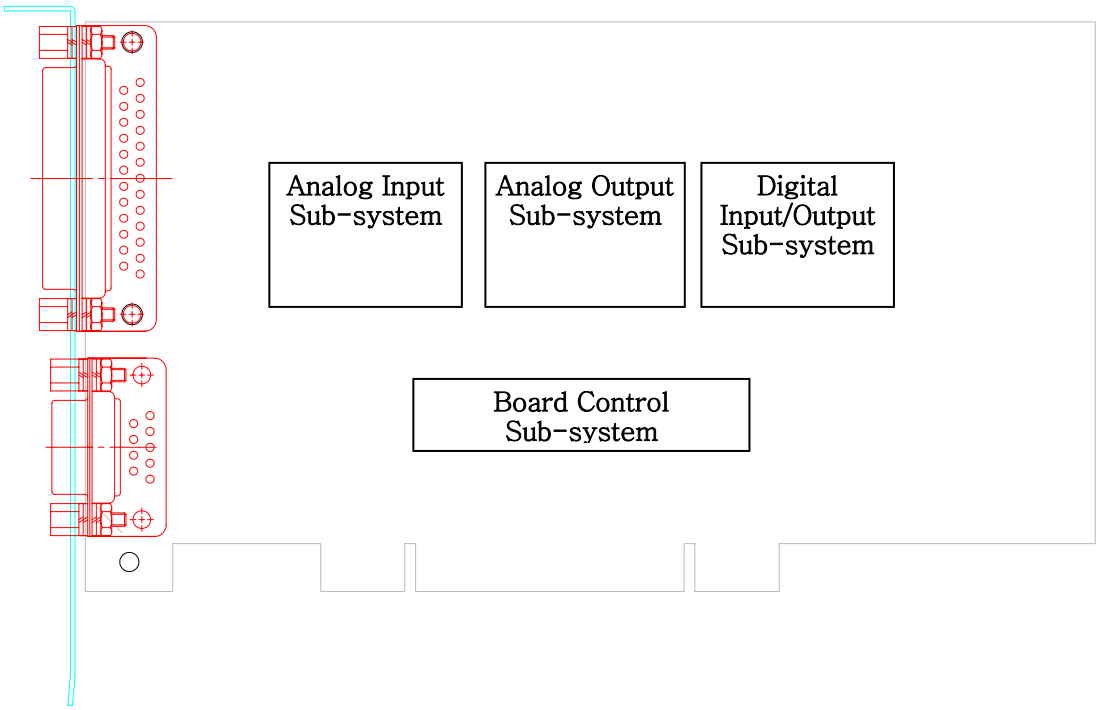
General information on PCI board API

Board Outline and Functional sub-systems



<Functional blocks of Multi-Function PCI board>

We can separate the board function into four functional sub-systems in the software control view point.

Board Control Sub-system

Controls over-all board operation.

Analog Input Sub-system

Controls the functions related with analog input operation.

Analog Output Sub-system

Controls the functions related with analog output operation.

Digital Input/Output Sub-system

Controls the functions related with digital input/output operation.

[note] To get information on each sub-systems capability, please refer to each board manual.

Board Level API Functions

Overview

int **OpenDAQDevice**(void)

BOOL **ResetBoard**(int nBoard)

BOOL **CloseDAQDevice**(void)

OpenDAQDevice

int **OpenDAQDevice**(void)

Return Value:

If the function succeeds, it returns the number of boards which were detected.

If the function fails, the return value is zero, it means there is no device in the system.

ResetBoard

BOOL **ResetBoard**(int nBoard)

Parameters:

nBoard :

The ordinal number of board which you want to initialize. You can get how may boards are installed in this system using **OpenDAQDevice** function.

You may call this function at the very first time you run the program and some suspicious operation.

Return Value:

It returns TRUE in case of the success of reset and initialization.

If you get FALSE you should not use any API call functions with the board and call **CloseDAQDevice** the board.

CloseDAQDevice

BOOL **CloseDAQDevice**(void)

The CloseDAQDevice function closes all opened devices(boards).

Return Value:

It the function succeeds, it returns TRUE.

Analog Input API Functions

Overview

BOOL **AI_Init**(int nBoard)

BOOL **AI_Reset**(int nBoard)

BOOL **AI_Close**(int nBoard)

BOOL **AI_SetInterrupt**(int nBoard, BOOL bEnable, IntHandler lpISR)

DWORD **AI_ReadData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

DWORD **AI_WriteData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

DWORD **AI_ReadReg**(int nBoard, DWORD Offset)

DWORD **AI_ReadRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

DWORD **AI_WriteReg**(int nBoard, DWORD Offset)

DWORD **AI_WriteRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

AI_Init

Initialize analog input sub-system

BOOL **AI_Init**(int nBoard)

Parameters:

nBoard :

The ordinal number of board which you want to initialize the analog input sub-system.

Return Value:

If the function succeeds, it returns TRUE.

AI_Reset

Reset analog input sub-system

BOOL **AI_Reset**(int nBoard)

Parameters:

nBoard :

The ordinal number of board which you want to reset.

Return Value:

If the function succeeds, it returns TRUE.

AI_Close

Close analog input sub-system, this function will stop all analog input operation

BOOL **AI_Close**(int nBoard)

Parameters:

nBoard :

The ordinal number of board which you want to close.

Return Value:

If the function succeeds, it returns TRUE.

AI_SetInterrupt

Set hander function which will be called automatically by DLL in case interrupt service is required.

BOOL **AI_SetInterrupt**(int nBoard, BOOL bEnable, IntHandler lpISR)

Parameters:

nBoard :

The board number which you want to set up the interrupt handler.

bEnable :

If TRUE, enables analog output interrupt, FALSE disables the interrupt.

lpISR :

Interrupt handler callback function.

Return Value:

If the function succeeds, it returns TRUE.

Interrupt handler function definition

```
typedef DWORD (CALLBACK *IntHandler)(DWORD dwStatus)
```

in application program, the callback function need to be defined as shown below

```
DWORD testHandler(DWORD dwIntStatus)
{
    ….,
}
```

and call the AI_SetInterrupt like this

```
AI_SetInterrupt(1, TRUE, testHandler);
```

AI_ReadData

Read analog input data from the buffer or fifo mapped in memory space.

DWORD **AI_ReadData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be read.

buf :

The buffer address to receive the analog data.

Return Value:

The number of data received in DWORD size.

AI_WriteData

Write data to analog-input subsystem.

DWORD **AI_WriteData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be sent.

buf :

The buffer address to send to analog data.

Return Value:

The number of data be sent in DWORD size.

AI_ReadReg

Read register value which is related with analog input operation.

DWORD **AI_ReadReg**(int nBoard, DWORD Offset)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

Return Value:

The value of register.

AI_ReadRegMul

Read register multiple, this function reads multiple data from IO space register. Some fifo are mapped to IO space.

[note] In reading multilple data from IO space, there is no address auto-increment operation.

DWORD **AI_ReadRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be read.

buf :

The buffer address to receive the data.

Return Value:

The number of data received in DWORD size.

AI_WriteReg

Write register value which is related with analog input operation.

DWORD **AI_WriteReg**(int nBoard, DWORD Offset)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

Return Value:

The value of register after writing.

AI_WriteRegMul

Write register multiple, this function writes multiple data to IO space. Some fifo are mapped to IO space.

[note] In writing multilple data to IO space, there is no address auto-increment operation.

DWORD **AI_WriteRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The board number.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be written.

buf :

The buffer address to send to AI register.

Return Value:

The number of data written to in DWORD size.

Analog Output API Functions

Overview

BOOL **AO_Init**(int nBoard)

BOOL **AO_Reset**(int nBoard)

BOOL **AO_Close**(int nBoard)

BOOL **AO_SetInterrupt**(int nBoard, BOOL bEnable, IntHandler lpISR)

DWORD **AO_ReadData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

DWORD **AO_WriteData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

DWORD **AO_ReadReg**(int nBoard, DWORD Offset)

DWORD **AO_ReadRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

DWORD **AO_WriteReg**(int nBoard, DWORD Offset)

DWORD **AO_WriteRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

AO_Init

Initialize analog output sub-system

BOOL **AO_Init**(int nBoard)

Parameters:

nBoard :

The ordinal number of board which you want to initialize the analog output sub-system.

Return Value:

If the function succeeds, it returns TRUE.

AO_Reset

Reset analog output sub-system

BOOL **AO_Reset**(int nBoard)

Parameters:

nBoard :

The ordinal number of board which you want to reset.

Return Value:

If the function succeeds, it returns TRUE.

AO_Close

Close analog output sub-system, this function will stop all analog output operation

BOOL **AO_Close**(int nBoard)

Parameters:

nBoard :

The ordinal number of board which you want to close.

Return Value:

If the function succeeds, it returns TRUE.

AO_SetInterrupt

Set hander function which will be called automatically by DLL in case interrupt service is required.

BOOL **AO_SetInterrupt**(int nBoard, BOOL bEnable, IntHandler lpISR)

Parameters:

nBoard :

The board number which you want to set up the interrupt handler.

bEnable :

If TRUE, enables analog output interrupt, FALSE disables the interrupt.

lpISR :

Interrupt handler callback function.

Return Value:

If the function succeeds, it returns TRUE.

Interrupt handler function definition

```
typedef DWORD (CALLBACK *IntHandler)(DWORD dwStatus)
```

in application program, the callback function need to be defined as shown below

```
DWORD testHandler(DWORD dwIntStatus)
{
    ….,
}
```

and call the AO_SetInterrupt like this

```
AO_SetInterrupt(1, TRUE, testHandler);
```

AO_ReadData

Read analog output data from the buffer or fifo mapped in memory space.

DWORD **AO_ReadData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be read.

buf :

The buffer address to receive the analog data.

Return Value:

The number of data received in DWORD size.

AO_WriteData

Write data to analog-input subsystem.

DWORD **AO_WriteData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be sent.

buf :

The buffer address to send to analog data.

Return Value:

The number of data be sent in DWORD size.

AO_ReadReg

Read register value which is related with analog output operation.

DWORD **AO_ReadReg**(int nBoard, DWORD Offset)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

Return Value:

The value of register.

AO_ReadRegMul

Read register multiple, this function reads multiple data from IO space register. Some fifo are mapped to IO space.

[note] In reading multilple data from IO space, there is no address auto-increment operation.

DWORD **AO_ReadRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be read.

buf :

The buffer address to receive the data.

Return Value:

The number of data received in DWORD size.

AO_WriteReg

Write register value which is related with analog output operation.

DWORD **AO_WriteReg**(int nBoard, DWORD Offset)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

Return Value:

The value of register after writing.

AO_WriteRegMul

Write register multiple, this function writes multiple data to IO space. Some fifo are mapped to IO space.

[note] In writing multilple data to IO space, there is no address auto-increment operation.

DWORD **AO_WriteRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The board number.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be written.

buf :

The buffer address to send to AI register.

Return Value:

The number of data written to in DWORD size.

Digital Input Output API Functions

Overview

BOOL **DIO_Init**(int nBoard)

BOOL **DIO_Reset**(int nBoard)

BOOL **DIO_Close**(int nBoard)

BOOL **DIO_SetInterrupt**(int nBoard, BOOL bEnable, IntHandler lpISR)

DWORD **DIO_ReadData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

DWORD **DIO_WriteData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

DWORD **DIO_ReadReg**(int nBoard, DWORD Offset)

DWORD **DIO_ReadRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

DWORD **DIO_WriteReg**(int nBoard, DWORD Offset)

DWORD **DIO_WriteRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

DIO_Init

Initialize digital input output sub-system

BOOL **DIO_Init**(int nBoard)

Parameters:

nBoard :

The ordinal number of board which you want to initialize the digital input/output sub-system.

Return Value:

If the function succeeds, it returns TRUE.

DIO_Reset

Reset digital input/output sub-system

BOOL **DIO_Reset**(int nBoard)

Parameters:

nBoard :

The ordinal number of board which you want to reset.

Return Value:

If the function succeeds, it returns TRUE.

DIO_Close

Close digital input/output sub-system, this function will stop all digital input/output operation

BOOL **DIO_Close**(int nBoard)

Parameters:

nBoard :

The ordinal number of board which you want to close.

Return Value:

If the function succeeds, it returns TRUE.

DIO_SetInterrupt

Set hander function which will be called automatically by DLL in case interrupt service is required.

BOOL **DIO_SetInterrupt**(int nBoard, BOOL bEnable, IntHandler lpISR)

Parameters:

nBoard :

The board number which you want to set up the interrupt handler.

bEnable :

If TRUE, enables analog output interrupt, FALSE disables the interrupt.

lpISR :

Interrupt handler callback function.

Return Value:

If the function succeeds, it returns TRUE.

Interrupt handler function definition

```
typedef DWORD (CALLBACK *IntHandler)(DWORD dwStatus)
```

in application program, the callback function need to be defined as shown below

```
DWORD testHandler(DWORD dwIntStatus)
{
    ….,
}
```

and call the DIO_SetInterrupt like this

```
DIO_SetInterrupt(1, TRUE, testHandler);
```

DIO_ReadData

Read digital input/output data from the buffer or fifo mapped in memory space.

DWORD **DIO_ReadData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be read.

buf :

The buffer address to receive the analog data.

Return Value:

The number of data received in DWORD size.

DIO_WriteData

Write data to digital input/output subsystem.

DWORD **DIO_WriteData**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be sent.

buf :

The buffer address to send to digital data.

Return Value:

The number of data be sent in DWORD size.

DIO_ReadReg

Read register value which is related with digital input/output operation.

DWORD **DIO_ReadReg**(int nBoard, DWORD Offset)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

Return Value:

The value of register.

DIO_ReadRegMul

Read register multiple, this function reads multiple data from IO space register. Some fifo are mapped to IO space.

[note] In reading multilple data from IO space, there is no address auto-increment operation.

DWORD **DIO_ReadRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be read.

buf :

The buffer address to receive the data.

Return Value:

The number of data received in DWORD size.

DIO_WriteReg

Write register value which is related with digital input/output operation.

DWORD **DIO_WriteReg**(int nBoard, DWORD Offset)

Parameters:

nBoard :

The ordinal number of board.

Offset :

The offset from the base buffer address in BYTE size.

Return Value:

The value of register after writing.

DIO_WriteRegMul

Write register multiple, this function writes multiple data to IO space. Some fifo are mapped to IO space.

[note] In writing multilple data to IO space, there is no address auto-increment operation.

DWORD **DIO_WriteRegMul**(int nBoard, DWORD Offset, DWORD nCount, DWORD *buf)

Parameters:

nBoard :

The board number.

Offset :

The offset from the base buffer address in BYTE size.

nCount :

The number of DWORD to be written.

buf :

The buffer address to send to AI register.

Return Value:

The number of data written to in DWORD size.