

Programmable Ultrasonic Board

OPERATION MANUAL

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1. Introduction

Information contained in this manual is used for installation and use of US4A Programmable Ultrasonic Board. Due to the sensitive nature of the equipment, installation must be carried out in accordance with this manual step by step. The company will decline all responsibility for the possible quality problems or damage of the product caused by user's breach of operation procedures of this manual in the operation. Information contained in this manual will help you to install and debug US4A. Background information is provided for re- installation in the future if needs.

2. System Requirements

2.1 Hardware requirements:

Celeron 2.0GHz processor or above
256M memory or more
500M hard disk space or more

2.2 Software requirements:

Operating system: Windows2000 or above
Programming environment:VC++ 6.0 or VB6.0

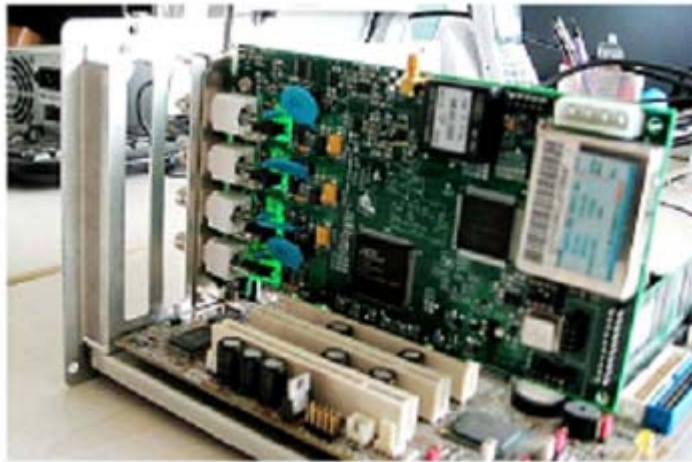
Please do not use programming environment of NET , We do not guarantee that this product can stably work on the programming environment of NET

3. Hardware Installation

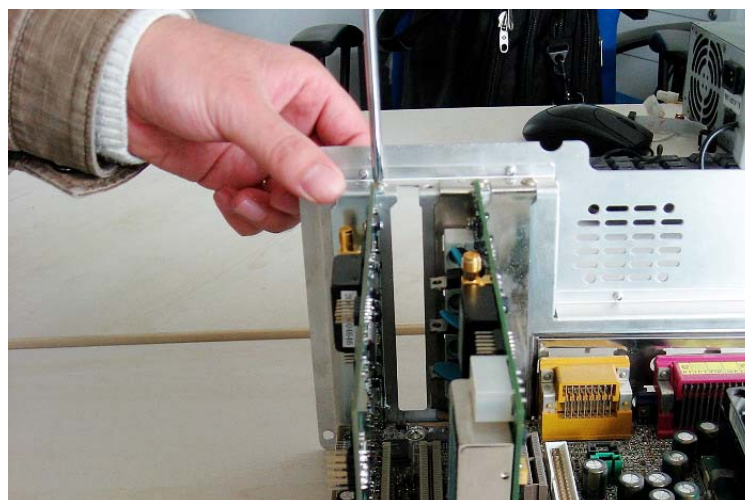
● Open the case, to find PCI slots for the ultrasonic card and for the acquisition card.



- Insert the ultrasonic card and the acquisition card into PCI slots



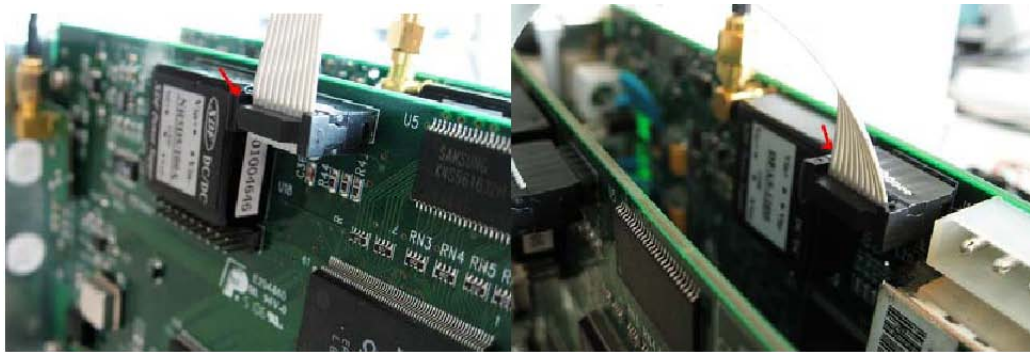
- Tighten the screw.



- Connect the acquisition card to the ultrasonic card with signal cable.

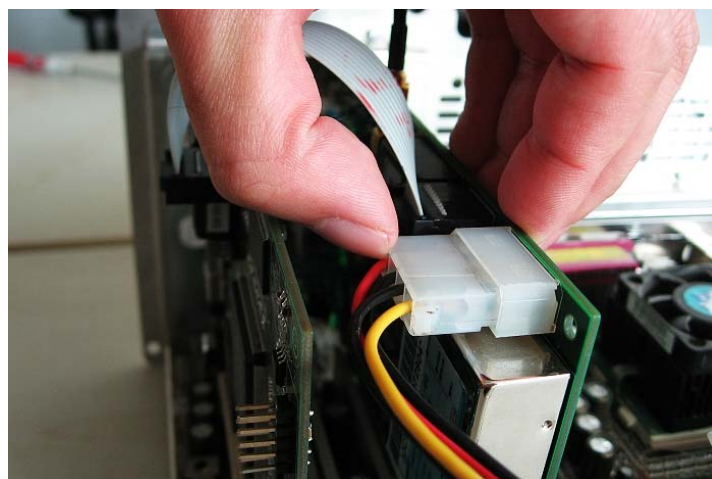


- Connect the acquisition card to the ultrasonic card with data lines.



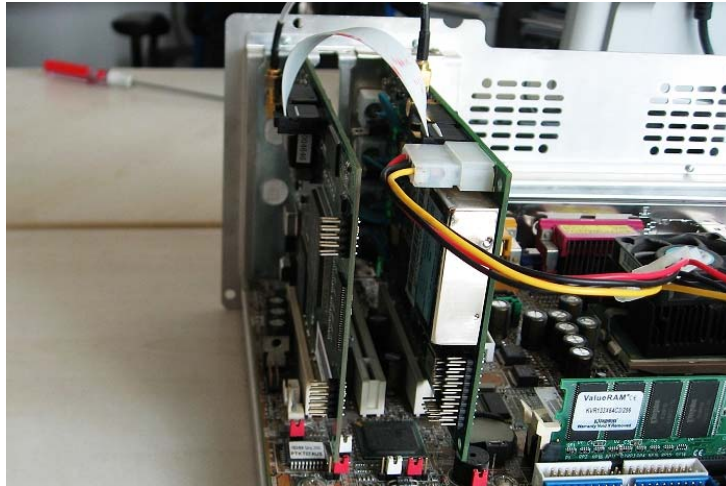
Note : The red arrow points to the wire No.1

- Put the power cord into the power port on the Ultrasonic card.



Please pay attention to the position of yellow wire

- Hardware installation is done.



4. Description of Dynamic Link Function

4.1 Initialization of the ultrasonic card and the acquisition card

Function prototype: `int _stdcall ADUT_InitAll (void)`

Input parameter: None

Return value = 1 The acquisition card is not found
= 0 The ultrasonic card is not found
= n The number of ultrasonic cards installed.

Description:

Fine installed acquisition card and ultrasonic card and do some basic initialization work. The function will be called only once when the program starts.

Sample:

```
int sn = ADUT_InitAll ();
if (sn == -1)
{
    AfxMessageBox ("acquisition card is not found");
    exit (0);
}
if (sn == 0)
{
    AfxMessageBox ("the ultrasonic card is not found");
    exit (0);
}
```

4.2 Open the acquisition card and the ultrasonic card

Function prototype: int _stdcall ADUT_OpenAll (unsigned short chanEnable)

Input parameter: chanEnable = 16 bit channel **mask**

Return value = 1

Description:

Make ultrasonic card work. For a single channel card, parameters chanEnable are not required. Before calling this function you need to setup ultrasonic parameters.

Sample:

```
ADUT_OpenAll (0x05);
```

4.3 Close the acquisition card and the ultrasonic card

Function prototype: int _stdcall ADUT_CloseAll (void)

Input parameter: None

Return value = 1

Description:

Close ultrasonic card. Call the ultrasonic & acquisition card to stop working.

Sample:

```
ADUT_CloseAll ();
```

4.4 **Setup sampling parameters**, if there is change, then change the starting point of sampling or sampling depth.

Function prototype: int _stdcall ADUT_SetSamPara (int i, int start, int width, int pcount)

Input parameter: I = channel No.

start = starting point of sampling: - pulse displacement

width = sampling width - Scan Depth

pcount = data length per waveform (should be in the range

of:1-2048)

Return value = 1

Description:

- width must be greater than pcount x 2
- (start + width) must be less than 100M / repeat frequency
- For a single channel card , i = 0

4.5 Setup data compression mode

Attention : this feature does not contained in the basic function module , make sure you hold this feature or don't .

Function prototype: int _stdcall ADUT_SetMaxmin (int sn, int i, int d)

Input parameter: sn = Card No.

i = channel No. on the card: (0-3)

d = probe work mode (single / double)

d = 0 For MAXMIN mode, two values of MAX and MIN will be returned in each compression region.

d = 1 For MAXM mode, one value of MAX will be returned in

each compression region.

Return value = 1

Tips: To improve accuracy you should use MAXMIN mode when working in thickness meter mode ,. The data rate of total ultrasonic data returned is 1:1 when using MAXMIN mode. Each sampling interval is 10ns and the maximum amount of data is 4000 witch equals to pcount in 4.3.In this case, the width value of 4.4should be the same with pcount.

Sample:

ADUT_SetSamPara (0, 0, 4000, 4000)

4.6 Setup Rectif. function

Function prototype: int _stdcall ADUT_EnableCommute (int sn, int enable)

Input parameter: sn = Card No.

enable = 1 for Rectif. function

enable = 0 for RF waveform

Return value = 1

Description:

Set up data acquisition mode, for a single channel card, sn = 0

4.7 Setup repeat frequency

Function prototype: int _stdcall ADUT_SetRepfreq (int sn, int i, int repfreq)

Input parameter: sn = Card No.

i = channel No. on the card: (0-3)

repfreq = repeat frequency

Return value = 1

Description:

Set up repeat frequency : for a single channel card, sn = 0; i = 0. Please see demo programs (call function void Utbg:: SetCfpl (CString para)).

4.8 Setup pulse width

Function prototype: int _stdcall ADUT_SetPulWidth (int sn, int i, int pulwidth)

Input parameter: sn = Card No.

i = channel No. on the card: (I = 0-3)

pulwidth = pulse width

Return value = 1

Description:

Set up pulse width, for a single channel card , sn = 0; i = 0. Please see demo programs (call function void Utbg:: SetMckd (CString para)).

4.9 Setup gain

Function prototype: int _stdcall ADUT_SetRcvatten (int sn, int i, float rcvatten)

Input parameter: sn = Card No.

i = channel No. on the card: (I = 0-3)

rcvatten, float, 0.1 Step

Return value = 1

Description:

Set the gain, gain range = 0-80dB, step = 0.1dB.

For a single channel card sn = 0; i = 0.

4.10 setup pulse amplitude

Function prototype: int _stdcall ADUT_SetPulvolt (int sn, int pulvolt)

Input parameter: sn = Card No.

pulvolt = pulse voltage

Return value = 1

Description:

Setup the pulse amplitude.

Note: This function is a preserved function. In order to avoid board damage, please do not call this function.

4.11 Setup emission intensity

Function prototype: int _stdcall ADUT_SetVoltHiLow (int sn, BOOL hi)

Input parameter: sn = Card No.

hi = emission intensity

hi = 1 for high

hi = 0 for low

Return value = 1

Description:

Setup emission intensity, for a single channel card , sn = 0.

4.12 Setup probe work mode

Function prototype: int _stdcall ADUT_SetCh (int sn, int i, int

d)

Input parameter: sn = Card No.

i = channel No. on the card: (I = 0-3)

d = probe work mode

d =0 for single probe work mode

d =1 for double probe work mode

Return value = 1

Description:

Setup probe work mode, for a single channel card , sn = 0 ; i = 0.

4.13 Get data length

Function prototype: int _stdcall ADUT_GetData (void)

Input parameter: None

Return value: data length

Description:

Get the total length of waveform data.

4.14 Data obtained from a specified channel (by Channel No).

Function prototype: int _stdcall ADUT_GetDataByChannel (int sn, int n, int buf [] [4096], int * iobuf, int head)

Input parameter: sn = Card No.

n = channel No.

buf = two-dimensional array

iobuf = iobuf [256]

head = 0 (head pointer)

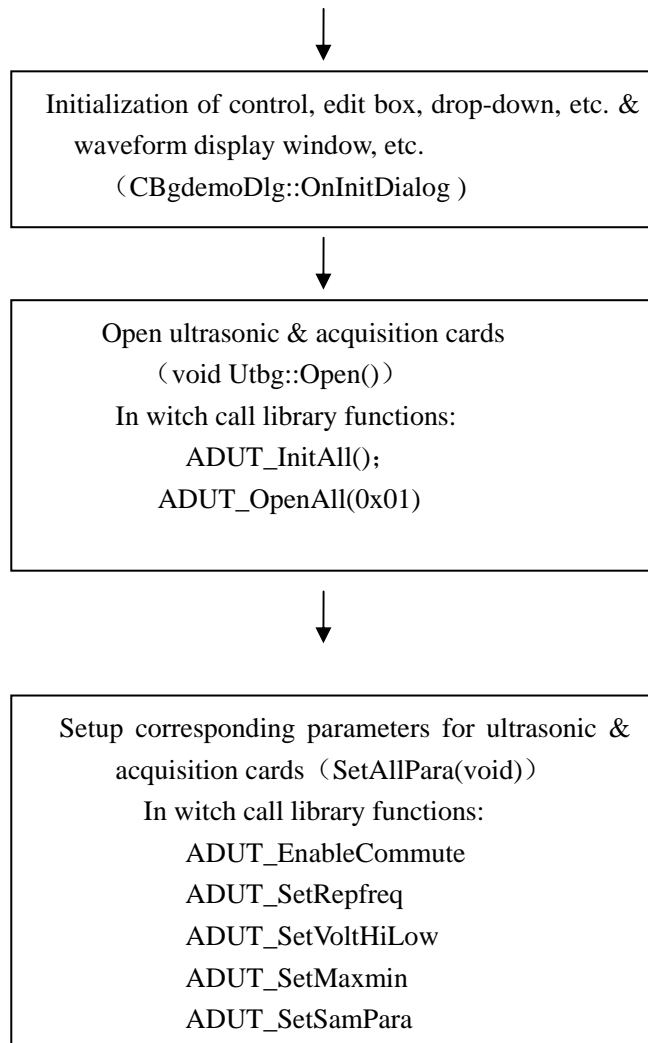
Export: to return the two-dimensional data array

Description:

Data get from a specified channel and stored in a two-dimensional array (buf [256] [4096]) . for a single channel card, sn = 0; n = 0.

5. VC++ DEMO process reference

Programming Process

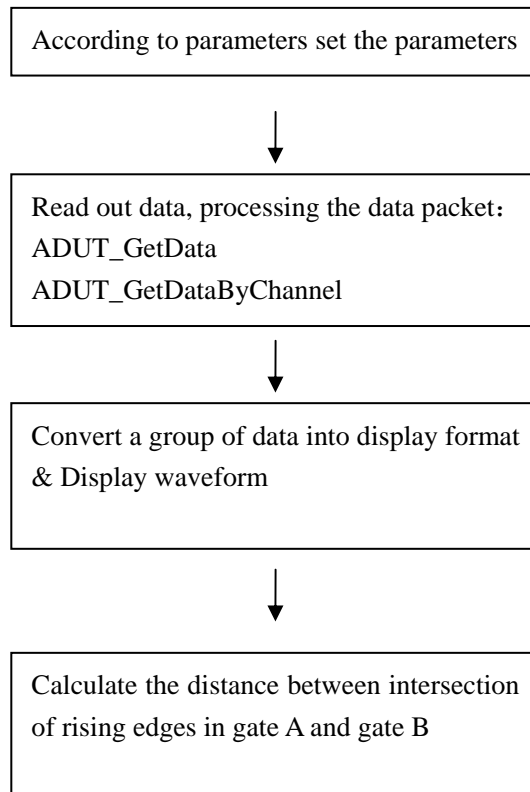




Attention

For thickness measurement , collecting data must be set to maximum and minimum mode : call ADUT_SetMaxmin (0, 0, 0); when setup sample width, sample width should be the same as actual return data, that is ADUT_SetSamPara (int i, int start, int width , int pcount); in witch width = pcount.

● Timer processing



6. Function Index

Function name	Function	Location
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ADUT_GetData	Get data length	4.13
ADUT_GetDataByChannel	Data obtained from a specified channel	4.14
ADUT_InitAll	Initialization of the ultrasonic card and the acquisition card	4.1
ADUT_OpenAll	open the ultrasonic card and the acquisition card	4.2
ADUT_SetCh	Setup probe work mode	4.12
ADUT_SetMaxmin	Setup data compression mode	4.5
ADUT_SetPulvoltage	Setup pulse amplitude	4.10
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