A-822 PGL/H

Software Manual
[For Windows 95/98 and NT]

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1. INTRODUCTION

The A-822PGH/L is a multifunction, 12-bit resolution A/D, D/A and digital I/O card. The feature of the A-822PGH/L are given as below:

- A/D=12 bits, 16 channels(single-ended) or 8 channels(differential)
- A-822PGL : low gain (1/2/4/8), the analog input signal range configuration code is given in Sec. 2.1
- A-822PGH : high gain (1/10/100/1000), the analog input signal range configuration code is given in Sec. 2.1
- DA=12 bits, 2 channels, 0-5V or 0-10V output by **hardware JP1 setting**
- 16 channels TTL compatible digital input
- 16 channels TTL compatible digital output

The A822.DLL and A822.Vxd (or A822.sys) are a collection of data acquisition subroutines for A822PG for Windows 95/98 (or NT) Applications. These subroutines are written with C language and perform a variety of data acquisition operations.

The subroutines in A822.DLL are easy understanding as its name standing for. It provides powerful, easy-to-use subroutine for developing your data acquisition application. Your program can call these DLL functions by VC++, VB, Delphi and Borland C++ Builder easily. To speed-up your development process, some demonstration source programs are provided.

The A822 consists of these DLLs and device driver:

For Windows 95/98

- A822.dll → Libraries for A822 PGL/PGH card
- A822.Vxd → Device driver for Windows 95/98

For Windows NT

- A822.dll → Libraries for A822 PGL/PGH card
- A822.sys, Napwnt.sys → Device driver for Windows NT

1.1 REFERENCES

Please refer to the following user manuals:

- **Readme.txt:**
  Describes what files install into your system, and where can find it our.

- **Whatnew.txt:**
  Describes what is the difference in the versions.

- **SoftInst.pdf:**
  How to install the software package under Windows 95/98/NT/2000.

- **CallDll.pdf:**
  How to call the DLL functions with VC++5, VB5, Delphi3 and Borland C++ Builder 3.

- **ResCheck.pdf:**
  How to check the resources I/O Port address, IRQ number and DMA number for add-on cards under Windows 95/98/NT/2000.

1.2 RANGE CONFIGURATION

The AD converter of A822PGH/L is 12 bits under all configuration code. If the analog input range is configured to +/- 5V range, the resolution of one bit is equal to 2.44 mV. If the analog input range is configured to +/- 2.5V range, the resolution will be 1.22 mV. If the analog input signal is about 1 V, use configuration 0/1/2 (for A822PGL) will get nearly the same result **except resolution. So choose the correct configuration code can achieve the highest precision measurement.**

A-822PGL Input Signal Range Configuration Code Table

Bipolar/Unipolar	Input Signal Range	Configuration Code
Bipolar	**+/- 5V**	**0**
Bipolar	**+/- 2.5V**	**1**
Bipolar	**+/- 1.25V**	**2**
Bipolar	**+/- 0.0625V**	**3**
Unipolar	**0V ~ 10V**	**4**
Unipolar	**0V ~ 5V**	**5**
Unipolar	**0V ~ 2.5V**	**6**
Unipolar	**0V ~ 1.25V**	**7**
Bipolar	**+/- 10V**	**8**

A-822PGH Input Signal Range Configuration Code Table

Bipolar/Unipolar	Input Signal Range	Configuration Code
Bipolar	**+/- 5V**	**0**
Bipolar	**+/- 0.5V**	**1**
Bipolar	**+/- 0.05V**	**2**
Bipolar	**+/- 0.005V**	**3**
Unipolar	**0 ~ 10V**	**4**
Unipolar	**0 ~ 1V**	**5**
Unipolar	**0 ~ 0.1V**	**6**
Unipolar	**0 ~ 0.01V**	**7**
Bipolar	**+/- 10V**	**8**
Bipolar	**+/- 1V**	**9**
Bipolar	**+/- 0.1V**	**10**
Bipolar	**+/- 0.01V**	**11**

2. DECLARATION & DEMO

Please refer to user manual "CallDLL.pdf".

For Windows 95/98:

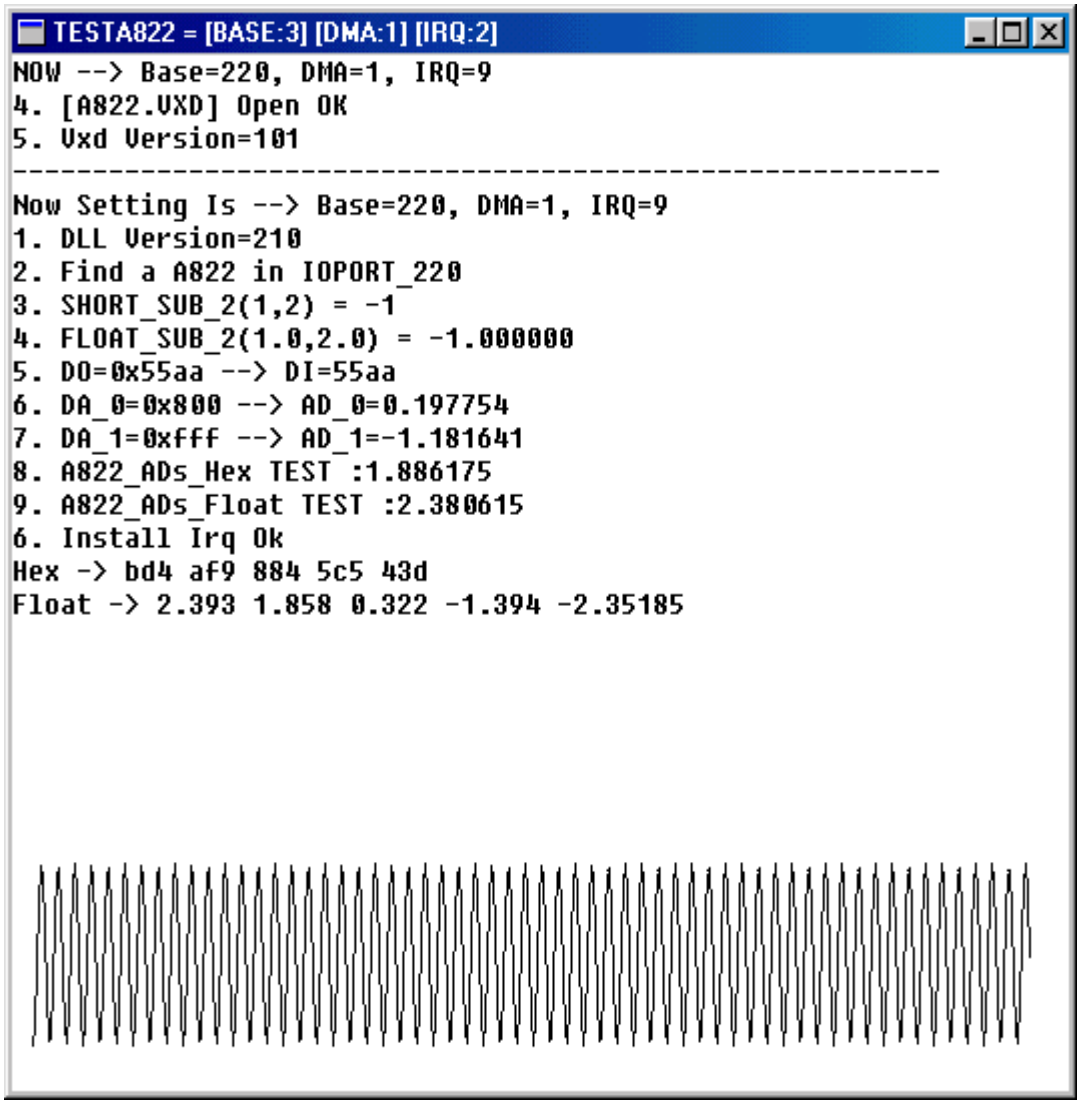
```
|--\Driver
    |--\A822.DLL      ← Dynamic Linking Library
    |--\A822.Vxd      ← Device driver for A822PG
    |
    |--\BCB           ← For Borland C++ Builder
    |    |--\A822.H   ← Header file
    |    +--\A822.Lib ← Import Library for BCB only
    |
    |--\Delphi        ← For Delphi
    |    +--\A822.pas ← Declaration file
    |
    |--\VB            ← For Visual Basic
    |    +--\A822.bas ← Declaration file
    |
    +--\VC            ← For Visual C++
         |--\A822.H   ← Header file
         +--\A822.Lib ← Import Library for VC only
```

For Windows NT:

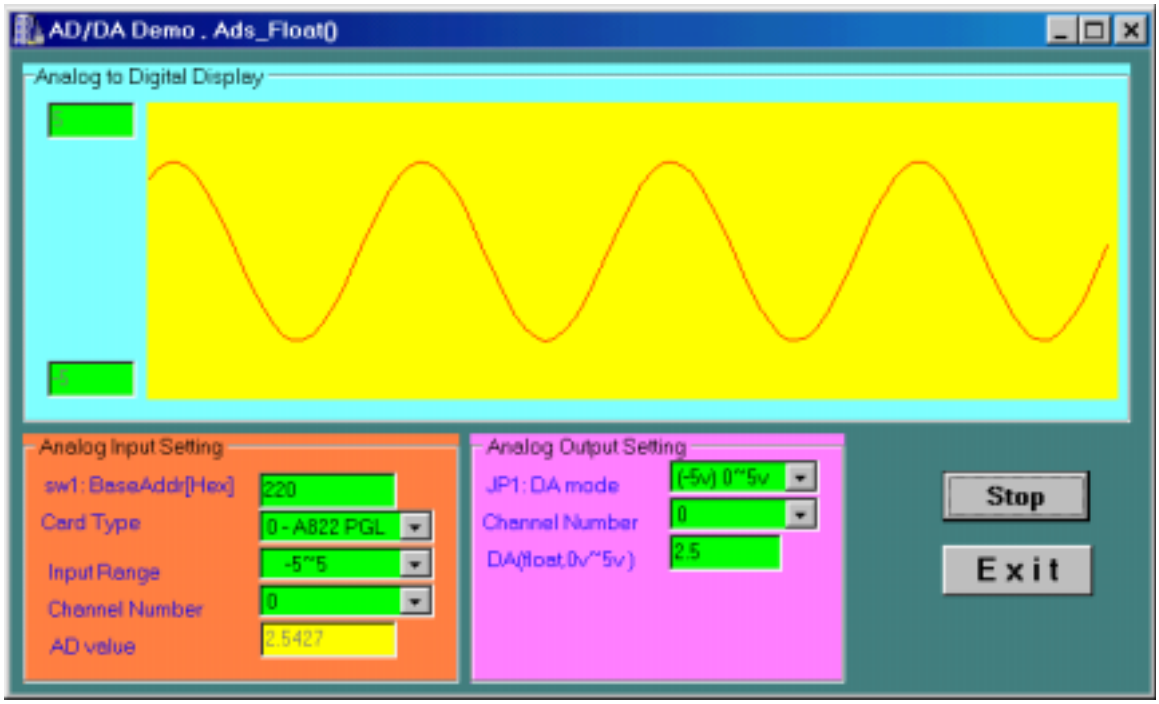
```
|--\Driver
    |--\A822.DLL      ← Dynamic Linking Library
    |--\A822.sys      ← device driver
    |--\Napwnt.sys    ← device driver
    |
    |--\BCB           ← For Borland C++ Builder
    |    |--\A822.H   ← Header file
    |    +--\A822.Lib ← Import Library for BCB only
    |
    |--\Delphi        ← For Delphi
    |    +--\A822.pas ← Declaration file
    |
    |--\VB            ← For Visual Basic
    |    +--\A822.bas ← Declaration file
    |
    +--\VC            ← For Visual C++
         |--\A822.H   ← Header file
         +--\A822.Lib ← Import Library for VC only
```

2.1 USING VC++ & BC++BUILDER

2.1.1 THE VC++ DEMO RESULT



2.1.2 BC++ BUILDER DEMO RESULT



2.1.3 A822.H (FOR WIN 95/98)

```
#ifdef __cplusplus
    #define EXPORTS extern "C" __declspec (dllimport)
#else
    #define EXPORTS
#endif

/***************** DEFINE A822 RELATIVE ADDRESS *****************/
#define A822_TIMER0             0x00
#define A822_TIMER1             0x01
#define A822_TIMER2             0x02
#define A822_TIMER_MODE         0x03
#define A822_AD_LO              0x04 // Analog to Digital, Low Byte
#define A822_AD_HI              0x05 // Analog to Digital, High Byte
#define A822_DA_CH0_LO          0x04 // Digit to Analog, CH 0
#define A822_DA_CH0_HI          0x05
#define A822_DA_CH1_LO          0x06 // Digit to Analog, CH 1
#define A822_DA_CH1_HI          0x07
#define A822_DI_LO              0x06 // Digit Input
#define A822_DO_LO              0x0D // Digit Output

#define A822_CLEAR_IRQ          0x08
#define A822_SET_GAIN           0x09
#define A822_SET_CH             0x0A
#define A822_SET_MODE           0x0B
#define A822_SOFT_TRIG          0x0C

#define A822_POLLING_MODE           1
#define A822_DMA_MODE               2
#define A822_INTERRUPT_MODE         6
```

```
/*** define the gain mode ***/
#define A822_BI_1          0
#define A822_BI_10         1
#define A822_BI_100        2
#define A822_BI_1000       3
#define A822_UNI_1         4
#define A822_UNI_10        5
#define A822_UNI_100       6
#define A822_UNI_1000      7
#define A822_BI_05         8
#define A822_BI_5          9
#define A822_BI_50         10
#define A822_BI_500        11

#define A822_BI_2          1
#define A822_BI_4          2
#define A822_BI_8          3
#define A822_UNI_2         5
#define A822_UNI_4         6
#define A822_UNI_8         7

#define A822PGL            0
#define A822PGH            1

#define A822_NoError                    0
#define A822_DriverOpenError            1
#define A822_DriverNoOpen               2
#define A822_GetDriverVersionError      3
#define A822_InstallIrqError            4
#define A822_ClearIntCountError         5
#define A822_GetIntCountError           6
#define A822_GetBufferError             7
#define A822_AdError1                   100
#define A822_AdError2                   -200.0
#define A822_InstallBufError            10
#define A822_AllocateMemoryError        11
#define A822_CardTypeError              12
#define A822_TimeoutError               13
#define A822_OtherError                 14
#define A822_ConfigCodeError            15
```

```
#define A822_IntStopError               16
#define A822_IntRemoveError             17
#define A822_IntInstallEventError       18
#define A822_BufferFull                 19
#define A822_NoChannelToScan            20
#define A822_IntInstallChannelError     21
#define A822_IntInstallConfigError      22
#define A822_GetDmaStatusError          23

// Function of Driver
EXPORTS WORD   CALLBACK A822_DriverInit(void);
EXPORTS void   CALLBACK A822_DriverClose(void);
EXPORTS WORD   CALLBACK A822_DELAY
        (WORD wBase, WORD wDownCount);
EXPORTS WORD   CALLBACK A822_Check_Address(WORD wBase);
EXPORTS void   CALLBACK A822_SetTriggerMode(WORD wTriggerMode );

// Function of Test
EXPORTS short  CALLBACK A822_SHORT_SUB_2(short nA, short nB);
EXPORTS float  CALLBACK A822_FLOAT_SUB_2(float fA, float fB);
EXPORTS WORD   CALLBACK A822_Get_DLL_Version(void);
EXPORTS WORD   CALLBACK A822_GetDriverVersion
        (WORD *wDriverVersion);

// Function of Counter
EXPORTS void   CALLBACK A822_SetCounter
        ( WORD wBase, WORD wCounterNo,
          WORD bCounterMode, DWORD wCounterValue);
EXPORTS DWORD CALLBACK A822_ReadCounter
        (WORD wBase, WORD wCounterNo, WORD bCounterMode);

// Function of DI/DO
EXPORTS WORD   CALLBACK A822_DI(WORD wBase);
EXPORTS void   CALLBACK A822_DO(WORD wBase, WORD wHexValue);

EXPORTS void  CALLBACK A822_OutputByte
          (WORD wPortAddr, UCHAR bOutputVal);
EXPORTS void  CALLBACK A822_OutputWord
          (WORD wPortAddr, WORD wOutputVal);
EXPORTS WORD  CALLBACK A822_InputByte(WORD wPortAddr);
EXPORTS WORD  CALLBACK A822_InputWord(WORD wPortAddr);
```

```
// Function of AD
EXPORTS WORD  CALLBACK A822_SetChGain
        (WORD wBase, WORD wChannel, WORD wConfig, WORD wCardType);
EXPORTS WORD  CALLBACK A822_Fast_AD_Hex(WORD *wVal);
EXPORTS WORD  CALLBACK A822_Fast_AD_Float(float *fVal);

EXPORTS WORD  CALLBACK A822_AD_Hex
        (WORD wBase, WORD wChannel,
         WORD wConfig, WORD wCardType, WORD *wVal);
EXPORTS WORD  CALLBACK A822_AD_Float
        (WORD wBase, WORD wChannel,
         WORD wConfig, WORD wCardType, float *fVal);
EXPORTS WORD  CALLBACK A822_ADs_Hex
        (WORD wBase, WORD wChannel, WORD wConfig,
         WORD wType, WORD wBuf[], WORD wCount);
EXPORTS WORD  CALLBACK A822_ADs_Float
        (WORD wBase, WORD wChannel, WORD wConfig,
         WORD wType, float fBuf[], WORD wCount);
EXPORTS WORD  CALLBACK A822_Hex2Float(WORD wConfig,
         WORD wCardType, WORD wHex, float *fVal);

// Please uses the A822_AD_Float() function
EXPORTS float CALLBACK A822_AD(WORD wBase, WORD wChannel,
          WORD wConfig, WORD wType);

// Function of DA
EXPORTS void  CALLBACK A822_DA
          (WORD wBase, WORD wChannel, WORD wHexValue);
EXPORTS void  CALLBACK A822_Uni5_DA
          (WORD wBase, WORD wChannel, float fValue);
EXPORTS void  CALLBACK A822_Uni10_DA
          (WORD wBase, WORD wChannel, float fValue);

// Function of Interrupt
// Please uses the A822_Intxxxx series function set
EXPORTS WORD  CALLBACK A822_InstallIrq(WORD wBase,
          WORD wIrq, HANDLE *hEvent, DWORD dwCount);
EXPORTS WORD  CALLBACK A822_AD_INT_Start(WORD wCardType,
          WORD Ch, WORD Gain, WORD c1, WORD c2);
EXPORTS WORD  CALLBACK A822_AD_INT_Stop(void);
EXPORTS WORD  CALLBACK A822_GetIntCount(DWORD *dwVal);
EXPORTS WORD  CALLBACK A822_GetBuffer
          (DWORD dwNum, WORD wBuffer[]);
EXPORTS WORD  CALLBACK A822_GetFloatBuffer
          (DWORD dwNum, float fBuffer[]);
```

```
// Function of Interrupt
EXPORTS WORD  CALLBACK A822_IntInstall(WORD wBase,
          WORD wIrq, HANDLE *hEvent, DWORD dwCount);
EXPORTS WORD  CALLBACK A822_IntStart(WORD wCardType,
          WORD wChannel, WORD wGain, WORD c1, WORD c2);
EXPORTS WORD  CALLBACK A822_IntGetCount(DWORD *dwVal);
EXPORTS WORD  CALLBACK A822_IntGetHexBuf
          (DWORD dwNum, WORD wBuf[]);
EXPORTS WORD  CALLBACK A822_IntGetFloatBuf
          (DWORD dwNum, float  fBuf[]);
EXPORTS WORD  CALLBACK A822_IntStop(void);
EXPORTS WORD  CALLBACK A822_IntRemove(void);

// Function of DMA
EXPORTS WORD  CALLBACK A822_AD_DMA_InstallIrq
          (WORD wBase, WORD wIrq, WORD wDmaChan);
EXPORTS WORD  CALLBACK A822_AD_DMA_RemoveIrq(void);
EXPORTS WORD  CALLBACK A822_AD_DMA_Start
          (WORD wCardType, WORD Ch, WORD Gain,
          WORD c1,WORD c2, DWORD cnt, WORD wPassOut[]);
EXPORTS WORD  CALLBACK A822_AD_DMA_Stop(void);
EXPORTS WORD  CALLBACK A822_AD_DMA_IsNotFinished(void);
EXPORTS WORD  CALLBACK A822_AD_DMA_GetBuffer(WORD *wBuf);
EXPORTS WORD  CALLBACK A822_AD_DMA_GetFloatBuffer(float *fBuf);

// Function of Channel-Scan with Polling
EXPORTS void CALLBACK A822_ChScan_Clear(void);
EXPORTS WORD CALLBACK A822_ChScan_Add
        (WORD wChannel, WORD wConfig);
EXPORTS WORD CALLBACK A822_ChScan_Set
        (WORD wChannel[], WORD wConfig[], WORD wChNum);
EXPORTS WORD CALLBACK A822_ChScan_PollingHex
        (WORD wBase, WORD wCardType,
        WORD wBuf[], WORD wNumPerCh);
EXPORTS WORD CALLBACK A822_ChScan_PollingFloat
        (WORD wBase, WORD wCardType, float fBuf[], WORD wNumPerCh);
```

```
// Function of Channel-Scan with Interrupt
EXPORTS WORD CALLBACK A822_ChScan_IntInstall
        (WORD wBase, WORD wIrq, HANDLE *hEvent, DWORD dwNumPerCh);
EXPORTS WORD CALLBACK A822_ChScan_IntStart
         (WORD c1, WORD c2, WORD wCardType);
EXPORTS WORD CALLBACK A822_ChScan_IntGetCount(DWORD *dwVal);
EXPORTS WORD CALLBACK A822_ChScan_IntGetHexBuf(WORD wBuf[]);
EXPORTS WORD CALLBACK A822_ChScan_IntGetFloatBuf(float fBuf[]);
EXPORTS WORD CALLBACK A822_ChScan_IntStop(void);
EXPORTS WORD CALLBACK A822_ChScan_IntRemove(void);
```

2.1.4 A822.H (FOR WIN NT)

```
#ifdef __cplusplus
    #define EXPORTS extern "C" __declspec (dllimport)
#else
    #define EXPORTS
#endif

/***************** DEFINE A822 RELATIVE ADDRESS *****************/
#define A822_TIMER0             0x00
#define A822_TIMER1             0x01
#define A822_TIMER2             0x02
#define A822_TIMER_MODE         0x03
#define A822_AD_LO              0x04 // Analog to Digital, Low Byte
#define A822_AD_HI              0x05 // Analog to Digital, High Byte
#define A822_DA_CH0_LO          0x04 // Digit to Analog, CH 0
#define A822_DA_CH0_HI          0x05
#define A822_DA_CH1_LO          0x06 // Digit to Analog, CH 1
#define A822_DA_CH1_HI          0x07
#define A822_DI_LO              0x06 // Digit Input
#define A822_DO_LO              0x0D // Digit Output

#define A822_CLEAR_IRQ          0x08
#define A822_SET_GAIN           0x09
#define A822_SET_CH             0x0A
#define A822_SET_MODE           0x0B
#define A822_SOFT_TRIG          0x0C

#define A822_POLLING_MODE           1
#define A822_DMA_MODE               2
#define A822_INTERRUPT_MODE         6
```

```
/*** define the gain mode ***/
#define A822_BI_1          0
#define A822_BI_10         1
#define A822_BI_100        2
#define A822_BI_1000       3
#define A822_UNI_1         4
#define A822_UNI_10        5
#define A822_UNI_100       6
#define A822_UNI_1000      7
#define A822_BI_05         8
#define A822_BI_5          9
#define A822_BI_50         10
#define A822_BI_500        11

#define A822_BI_2          1
#define A822_BI_4          2
#define A822_BI_8          3
#define A822_UNI_2         5
#define A822_UNI_4         6
#define A822_UNI_8         7

#define A822PGL            0
#define A822PGH            1

#define A822_NoError                    0
#define A822_DriverOpenError            1
#define A822_DriverNoOpen               2
#define A822_GetDriverVersionError      3
#define A822_InstallIrqError            4
#define A822_ClearIntCountError         5
#define A822_GetIntCountError           6
#define A822_GetBufferError             7
#define A822_AdError1                   100
#define A822_AdError2                   -200.0
#define A822_InstallBufError            10
#define A822_AllocateMemoryError        11
#define A822_CardTypeError              12
#define A822_TimeoutError               13
#define A822_OtherError                 14
#define A822_ConfigCodeError            15
```

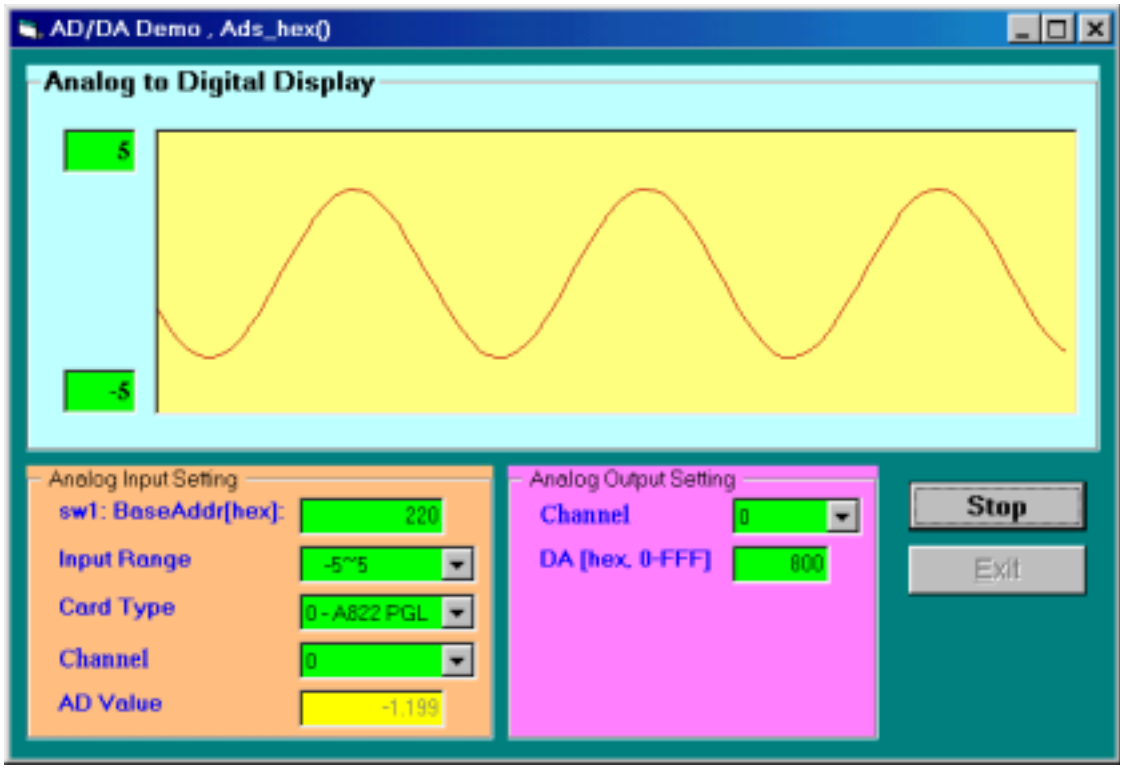
```
#define A822_IntStopError               16
#define A822_IntRemoveError             17
#define A822_IntInstallEventError       18
#define A822_BufferFull                 19
#define A822_NoChannelToScan            20
#define A822_IntInstallChannelError     21
#define A822_IntInstallConfigError      22


// Function of Driver
EXPORTS WORD   CALLBACK A822_DriverInit(void);
EXPORTS void   CALLBACK A822_DriverClose(void);
EXPORTS WORD   CALLBACK A822_DELAY
        (WORD wBase, WORD wDownCount);
EXPORTS WORD   CALLBACK A822_Check_Address(WORD wBase);
EXPORTS void   CALLBACK A822_SetTriggerMode(WORD wTriggerMode );

// Function of Test
EXPORTS short  CALLBACK A822_SHORT_SUB_2(short nA, short nB);
EXPORTS float  CALLBACK A822_FLOAT_SUB_2(float fA, float fB);
EXPORTS WORD   CALLBACK A822_Get_DLL_Version(void);
EXPORTS WORD   CALLBACK A822_GetDriverVersion
        (WORD *wDriverVersion);

// Function of Counter
EXPORTS void   CALLBACK A822_SetCounter
        ( WORD wBase, WORD wCounterNo,
          WORD bCounterMode, DWORD wCounterValue);
EXPORTS DWORD CALLBACK A822_ReadCounter
        (WORD wBase, WORD wCounterNo,
         WORD bCounterMode);

// Function of DI/DO
EXPORTS WORD   CALLBACK A822_DI(WORD wBase);
EXPORTS void   CALLBACK A822_DO(WORD wBase, WORD wHexValue);

EXPORTS void   CALLBACK A822_OutputByte
          (WORD wPortAddr, UCHAR bOutputVal);
EXPORTS void   CALLBACK A822_OutputWord
          (WORD wPortAddr, WORD wOutputVal);
EXPORTS WORD  CALLBACK A822_InputByte(WORD wPortAddr);
EXPORTS WORD  CALLBACK A822_InputWord(WORD wPortAddr);
```

```
// Function of AD
EXPORTS WORD  CALLBACK A822_SetChGain(WORD wBase,
        WORD wChannel, WORD wConfig, WORD wCardType);
EXPORTS WORD  CALLBACK A822_Fast_AD_Hex(WORD *wVal);
EXPORTS WORD  CALLBACK A822_Fast_AD_Float(float *fVal);

EXPORTS WORD  CALLBACK A822_AD_Hex
        (WORD wBase, WORD wChannel,
         WORD wConfig, WORD wCardType, WORD *wVal);
EXPORTS WORD  CALLBACK A822_AD_Float
        (WORD wBase, WORD wChannel,
         WORD wConfig, WORD wCardType, float *fVal);
EXPORTS WORD  CALLBACK A822_ADs_Hex
         (WORD wBase, WORD wChannel, WORD wConfig,
          WORD wType, WORD wBuf[], WORD wCount);
EXPORTS WORD  CALLBACK A822_ADs_Float
         (WORD wBase, WORD wChannel, WORD wConfig,
          WORD wType, float fBuf[], WORD wCount);
EXPORTS WORD  CALLBACK A822_Hex2Float(WORD wConfig,
          WORD wCardType, WORD wHex, float *fVal);

// Please uses the A822_AD_Float() function
EXPORTS float CALLBACK A822_AD(WORD wBase, WORD wChannel,
          WORD wConfig, WORD wType);

// Function of DA
EXPORTS void  CALLBACK A822_DA
          (WORD wBase, WORD wChannel, WORD wHexValue);
EXPORTS void  CALLBACK A822_Uni5_DA
          (WORD wBase, WORD wChannel, float fValue);
EXPORTS void  CALLBACK A822_Uni10_DA
          (WORD wBase, WORD wChannel, float fValue);

// Function of Interrupt
// Please uses the A822_Intxxxx series function set
EXPORTS WORD   CALLBACK A822_InstallIrq(WORD wBase,
          WORD wIrq, HANDLE *hEvent, DWORD dwCount);
EXPORTS WORD   CALLBACK A822_AD_INT_Start(WORD wCardType,
          WORD Ch, WORD Gain, WORD c1, WORD c2);
EXPORTS WORD   CALLBACK A822_AD_INT_Stop(void);
EXPORTS WORD   CALLBACK A822_GetIntCount(DWORD *dwVal);
EXPORTS WORD   CALLBACK A822_GetBuffer
          (DWORD dwNum, WORD wBuffer[]);
EXPORTS WORD   CALLBACK A822_GetFloatBuffer
          (DWORD dwNum, float fBuffer[]);
```

```
// Function of Interrupt
EXPORTS WORD   CALLBACK A822_IntInstall(WORD wBase,
          WORD wIrq, HANDLE *hEvent, DWORD dwCount);
EXPORTS WORD   CALLBACK A822_IntStart(WORD wCardType,
          WORD wChannel, WORD wGain, WORD c1, WORD c2);
EXPORTS WORD   CALLBACK A822_IntGetCount(DWORD *dwVal);
EXPORTS WORD   CALLBACK A822_IntGetHexBuf
          (DWORD dwNum, WORD wBuf[]);
EXPORTS WORD   CALLBACK A822_IntGetFloatBuf
          (DWORD dwNum, float  fBuf[]);
EXPORTS WORD   CALLBACK A822_IntStop(void);
EXPORTS WORD   CALLBACK A822_IntRemove(void);

// Function of Channel-Scan with Polling
EXPORTS void       CALLBACK A822_ChScan_Clear(void);
EXPORTS WORD   CALLBACK A822_ChScan_Add
        (WORD wChannel, WORD wConfig);
EXPORTS WORD   CALLBACK A822_ChScan_Set
        (WORD wChannel[], WORD wConfig[], WORD wChNum);
EXPORTS WORD   CALLBACK A822_ChScan_PollingHex (WORD wBase,
        WORD wCardType, WORD wBuf[], WORD wNumPerCh);
EXPORTS WORD   CALLBACK A822_ChScan_PollingFloat
         (WORD wBase, WORD wCardType, float fBuf[], WORD wNumPerCh);

// Function of Channel-Scan with Interrupt
EXPORTS WORD   CALLBACK A822_ChScan_IntInstall(WORD wBase,
        WORD wIrq, HANDLE *hEvent, DWORD dwNumPerCh);
EXPORTS WORD   CALLBACK A822_ChScan_IntStart
          (WORD c1, WORD c2, WORD wCardType);
EXPORTS WORD   CALLBACK A822_ChScan_IntGetCount(DWORD *dwVal);
EXPORTS WORD   CALLBACK A822_ChScan_IntGetHexBuf(WORD wBuf[]);
EXPORTS WORD   CALLBACK A822_ChScan_IntGetFloatBuf(float fBuf[]);
EXPORTS WORD   CALLBACK A822_ChScan_IntStop(void);
EXPORTS WORD   CALLBACK A822_ChScan_IntRemove(void);
```

2.2 USING VISUAL BASIC

2.2.1 THE VB DEMO RESULT



2.2.2 A822.BAS (FOR WIN 95/98)

```
Attribute VB_Name = "A822"

'***************** DEFINE A822 RELATIVE ADDRESS *****************/
Global Const A822_TIMER0            = &H0
Global Const A822_Timer1            = &H1
Global Const A822_TIMER2            = &H2
Global Const A822_TIMER_MODE        = &H3
Global Const A822_AD_LO             = &H4  ' Analog to Digital, Low Byte
Global Const A822_AD_HI             = &H5  ' Analog to Digital, High Byte
Global Const A822_DA_CH0_LO         = &H4  ' Digit to Analog, CH 0
Global Const A822_DA_CH0_HI         = &H5
Global Const A822_DA_CH1_LO         = &H6  ' Digit to Analog, CH 1
Global Const A822_DA_CH1_HI         = &H7
Global Const A822_DI_LO             = &H6  ' Digit Input
Global Const A822_DO_LO             = &HD  ' Digit Output

Global Const A822_CLEAR_IRQ         = &H8
Global Const A822_SET_GAIN          = &H9
Global Const A822_SET_CH            = &HA
Global Const A822_SET_MODE          = &HB
Global Const A822_SOFT_TRIG         = &HC

Global Const A822_POLLING_MODE          = 1
Global Const A822_DMA_MODE              = 2
Global Const A822_INTERRUPT_MODE        = 6

'*** define the gain mode ***/
Global Const A822_BI_1          = 0
Global Const A822_BI_10         = 1
Global Const A822_BI_100        = 2
Global Const A822_BI_1000       = 3
Global Const A822_UNI_1         = 4
Global Const A822_UNI_10        = 5
Global Const A822_UNI_100       = 6
Global Const A822_UNI_1000      = 7
Global Const A822_BI_05         = 8
Global Const A822_BI_5          = 9
Global Const A822_BI_50         = 10
Global Const A822_BI_500        = 11
```

```
Global Const A822_BI_2          = 1
Global Const A822_BI_4          = 2
Global Const A822_BI_8          = 3
Global Const A822_UNI_2         = 5
Global Const A822_UNI_4         = 6
Global Const A822_UNI_8         = 7

Global Const A822PGL     = 0
Global Const A822PGH     = 1

Global Const A822_NoError                   = 0
Global Const A822_DriverOpenError           = 1
Global Const A822_DriverNoOpen              = 2
Global Const A822_GetDriverVersionError     = 3
Global Const A822_InstallIrqError           = 4
Global Const A822_ClearIntCountError        = 5
Global Const A822_GetIntCountError          = 6
Global Const A822_GetBufferError            = 7
Global Const A822_AdError1                  = 100
Global Const A822_AdError2                  = -200#
Global Const A822_InstallBufError           = 10
Global Const A822_AllocateMemoryError       = 11
Global Const A822_CardTypeError             = 12
Global Const A822_TimeoutError              = 13
Global Const A822_OtherError                = 14
Global Const A822_ConfigCodeError           = 15

Global Const A822_IntStopError              = 16
Global Const A822_IntRemoveError            = 17
Global Const A822_IntInstallEventError      = 18
Global Const A822_BufferFull                = 19
Global Const A822_NoChannelToScan           = 20
Global Const A822_IntInstallChannelError    = 21
Global Const A822_IntInstallConfigError     = 22
Global Const A822_GetDmaStatusError         = 23

'******* Driver Functions ***********
Declare Function A822_DriverInit Lib "A822.DLL" () As Integer
Declare Sub A822_DriverClose Lib "A822.DLL" ()
Declare Function A822_DELAY Lib "A822.DLL" (ByVal wBase As Integer, _
      ByVal wDownCount As Integer) As Integer
Declare Function A822_Check_Address Lib "A822.DLL" _
      (ByVal wBase As Integer) As Integer
Declare Sub A822_SetTriggerMode Lib "A822.DLL" _
      (ByVal wTriggerMode As Integer)
```

```
'******* Test Functions ***********
Declare Function A822_SHORT_SUB_2 Lib "A822.DLL" _
      (ByVal nA As Integer, ByVal nB As Integer) As Integer
Declare Function A822_FLOAT_SUB_2 Lib "A822.DLL" _
      (ByVal fA As Single, ByVal fB As Single) As Single
Declare Function A822_Get_DLL_Version Lib "A822.DLL" () As Integer
Declare Function A822_GetDriverVersion Lib "A822.DLL" _
      (wDriverVersion As Integer) As Integer

'********* Counter Functions ***********
Declare Sub A822_SetCounter Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wCounterNo As Integer, _
       ByVal bCounterMode As Integer, ByVal wCounterValue As Long)
Declare Function A822_ReadCounter Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wCounterNo As Integer, _
       ByVal bCounterMode As Integer) As Long

'******* DI/DO Functions ***********
Declare Function A822_DI Lib "A822.DLL" (ByVal wBase As Integer) As Integer
Declare Sub A822_DO Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wHexValue As Integer)

Declare Sub A822_OutputByte Lib "A822.DLL" _
      (ByVal wPortAddr As Integer, ByVal bOutputVal As Byte)
Declare Sub A822_OutputWord Lib "A822.DLL" _
      (ByVal wPortAddr As Integer, ByVal wOutputVal As Integer)
Declare Function A822_InputByte Lib "A822.DLL" _
      (ByVal wPortAddr As Integer) As Integer
Declare Function A822_InputWord Lib "A822.DLL" _
      (ByVal wPortAddr As Integer) As Integer

'******* AD Functions ***********
Declare Function A822_SetChGain Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal wConfig As Integer, ByVal wCardType As Integer) As Integer
Declare Function A822_Fast_AD_Hex Lib "A822.DLL" _
      (wVal As Integer) As Integer
Declare Function A822_Fast_AD_Float Lib "A822.DLL" _
      (fVal As Single) As Integer
```

```
Declare Function A822_AD_Hex Lib "A822.DLL" (ByVal wBase As Integer, _
      ByVal wChannel As Integer, ByVal wConfig As Integer, _
      ByVal wCardType As Integer, wVal As Integer) As Integer
Declare Function A822_AD_Float Lib "A822.DLL" (ByVal wBase As Integer, _
      ByVal wChannel As Integer, ByVal wConfig As Integer, _
      ByVal wCardType As Integer, fVal As Single) As Integer
Declare Function A822_Hex2Float Lib "A822.DLL" _
      (ByVal wConfig As Integer, ByVal wCardType As Integer, _
       ByVal wHex As Integer, fVal As Single) As Integer
Declare Function A822_ADs_Hex Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal wConfig As Integer, ByVal wType As Integer, _
       wBuf As Integer, ByVal wCount As Integer) As Integer
Declare Function A822_ADs_Float Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal wConfig As Integer, ByVal wType As Integer, _
       fbuf As Single, ByVal wCount As Integer) As Integer

' Please uses the A822_AD_Float() function
Declare Function A822_AD Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal wConfig As Integer, ByVal wType As Integer) As Single

'******* DA Functions ***********
Declare Sub A822_DA Lib "A822.DLL" (ByVal wBase As Integer, _
      ByVal wChannel As Integer, ByVal wHexValue As Integer)
Declare Sub A822_Uni5_DA Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal fValue As Single)
Declare Sub A822_Uni10_DA Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal fValue As Single)
```

```
'******* Interrupt Functions ***********
' Please uses the A822_Intxxxx series function set
Declare Function A822_InstallIrq Lib "A822.DLL" _
       (ByVal wBase As Integer, ByVal wIrq As Integer, _
        hEvent As Long, ByVal dwCount As Integer) As Integer
Declare Function A822_AD_INT_Start Lib "A822.DLL" _
       (ByVal wCardType As Integer, ByVal Ch As Integer, _
        ByVal Gain As Integer, ByVal c1 As Integer, _
        ByVal c2 As Integer) As Integer
Declare Function A822_AD_INT_Stop Lib "A822.DLL" () As Integer
Declare Function A822_GetIntCount Lib "A822.DLL" (dwVal As Long) As Integer
Declare Function A822_GetBuffer Lib "A822.DLL" _
       (ByVal dwNum As Long, wBuffer As Integer) As Integer
Declare Function A822_GetFloatBuffer Lib "A822.DLL" _
       (ByVal dwNum As Integer, fbuffer As Single) As Integer

'******* Interrupt Functions ***********
Declare Function A822_IntInstall Lib "A822.DLL" _
       (ByVal wBase As Integer, ByVal wIrq As Integer, _
        hEvent As Long, ByVal dwCount As Integer) As Integer
Declare Function A822_IntStart Lib "A822.DLL" _
       (ByVal wCardType As Integer, ByVal Ch As Integer, _
        ByVal Gain As Integer, ByVal c1 As Integer, _
        ByVal c2 As Integer) As Integer
Declare Function A822_IntGetCount Lib "A822.DLL" (dwVal As Long) As Integer
Declare Function A822_IntGetHexBuf Lib "A822.DLL" _
       (ByVal dwNum As Long, wBuffer As Integer) As Integer
Declare Function A822_IntGetFloatBuf Lib "A822.DLL" _
       (ByVal dwNum As Integer, fbuffer As Single) As Integer
Declare Function A822_IntStop Lib "A822.DLL" () As Integer
Declare Function A822_IntRemove Lib "A822.DLL" () As Integer
```

```
'******* DMA Functions ***********
Declare Function A822_AD_DMA_InstallIrq Lib "A822.DLL" _
       (ByVal wBase As Integer, ByVal wIrq As Integer, _
        ByVal wDmaChan As Integer) As Integer
Declare Function A822_AD_DMA_RemoveIrq Lib "A822.DLL" () As Integer
Declare Function A822_AD_DMA_Start Lib "A822.DLL" _
       (ByVal wCardType As Integer, ByVal Ch As Integer, _
        ByVal Gain As Integer, ByVal c1 As Integer, ByVal c2 As Integer, _
        ByVal cnt As Integer, wPassOut As Integer) As Integer
Declare Function A822_AD_DMA_Stop Lib "A822.DLL" () As Integer
Declare Function A822_AD_DMA_IsNotFinished Lib "A822.DLL" () As Integer
Declare Function A822_AD_DMA_GetBuffer Lib "A822.DLL" _
       (data As Integer) As Integer
Declare Function A822_AD_DMA_GetFloatBuffer Lib "A822.DLL" _
       (fbuf As Single) As Integer

' Function of Channel-Scan with Polling
Declare Sub A822_ChScan_Clear Lib "A822.DLL" ()
Declare Function A822_ChScan_Add Lib "A822.DLL" _
       (ByVal wChannel As Integer, ByVal wConfig As Integer) As Integer
Declare Function A822_ChScan_Set Lib "A822.DLL" _
       (wChannel As Integer, wConfig As Integer, _
        ByVal wChNum As Integer) As Integer
Declare Function A822_ChScan_PollingHex Lib "A822.DLL" _
       (ByVal wBase As Integer, ByVal wCardType As Integer, _
        wBuf As Integer, ByVal wNumPerCh As Integer) As Integer
Declare Function A822_ChScan_PollingFloat Lib "A822.DLL" _
       (ByVal wBase As Integer, ByVal wCardType As Integer, _
        fBuf As Single, ByVal wNumPerCh As Integer) As Integer

' Function of Channel-Scan with Interrupt
Declare Function A822_ChScan_IntInstall Lib "A822.DLL" _
       (ByVal wBase As Integer, ByVal wIrq As Integer, _
        hEvent As Long, ByVal dwNumPerCh As Long) As Integer
Declare Function A822_ChScan_IntStart Lib "A822.DLL" _
       (ByVal c1 As Integer, ByVal c2 As Integer, _
        ByVal wCardType As Integer) As Integer
Declare Function A822_ChScan_IntGetCount Lib "A822.DLL" _
       (dwVal As Long) As Integer
Declare Function A822_ChScan_IntGetHexBuf Lib "A822.DLL" _
       (wBuf As Integer) As Integer
Declare Function A822_ChScan_IntGetFloatBuf Lib "A822.DLL" _
       (fBuf As Single) As Integer
Declare Function A822_ChScan_IntStop Lib "A822.DLL" () As Integer
Declare Function A822_ChScan_IntRemove Lib "A822.DLL" () As Integer
```

2.2.3 A822.BAS (FOR WIN NT)

```
Attribute VB_Name = "A822"

'***************** DEFINE A822 RELATIVE ADDRESS *****************/
Global Const A822_TIMER0            = &H0
Global Const A822_Timer1            = &H1
Global Const A822_TIMER2            = &H2
Global Const A822_TIMER_MODE        = &H3
Global Const A822_AD_LO             = &H4  ' Analog to Digital, Low Byte
Global Const A822_AD_HI             = &H5  ' Analog to Digital, High Byte
Global Const A822_DA_CH0_LO         = &H4  ' Digit to Analog, CH 0
Global Const A822_DA_CH0_HI         = &H5
Global Const A822_DA_CH1_LO         = &H6  ' Digit to Analog, CH 1
Global Const A822_DA_CH1_HI         = &H7
Global Const A822_DI_LO             = &H6  ' Digit Input
Global Const A822_DO_LO             = &HD  ' Digit Output

Global Const A822_CLEAR_IRQ = &H8
Global Const A822_SET_GAIN  = &H9
Global Const A822_SET_CH    = &HA
Global Const A822_SET_MODE  = &HB
Global Const A822_SOFT_TRIG = &HC

Global Const A822_POLLING_MODE          = 1
Global Const A822_DMA_MODE              = 2
Global Const A822_INTERRUPT_MODE        = 6

'*** define the gain mode ***/
Global Const A822_BI_1          = 0
Global Const A822_BI_10         = 1
Global Const A822_BI_100        = 2
Global Const A822_BI_1000       = 3
Global Const A822_UNI_1         = 4
Global Const A822_UNI_10        = 5
Global Const A822_UNI_100       = 6
Global Const A822_UNI_1000      = 7
Global Const A822_BI_05         = 8
Global Const A822_BI_5          = 9
Global Const A822_BI_50         = 10
Global Const A822_BI_500        = 11
```

```
Global Const A822_BI_2   = 1
Global Const A822_BI_4   = 2
Global Const A822_BI_8   = 3
Global Const A822_UNI_2 = 5
Global Const A822_UNI_4 = 6
Global Const A822_UNI_8 = 7

Global Const A822PGL     = 0
Global Const A822PGH     = 1

Global Const A822_NoError                    = 0
Global Const A822_DriverOpenError            = 1
Global Const A822_DriverNoOpen               = 2
Global Const A822_GetDriverVersionError      = 3
Global Const A822_InstallIrqError            = 4
Global Const A822_ClearIntCountError         = 5
Global Const A822_GetIntCountError           = 6
Global Const A822_GetBufferError             = 7
Global Const A822_AdError1                   = 100
Global Const A822_AdError2                   = -200#
Global Const A822_InstallBufError            = 10
Global Const A822_AllocateMemoryError        = 11
Global Const A822_CardTypeError              = 12
Global Const A822_TimeoutError               = 13
Global Const A822_OtherError                 = 14
Global Const A822_ConfigCodeError            = 15

Global Const A822_IntStopError               = 16
Global Const A822_IntRemoveError             = 17
Global Const A822_IntInstallEventError       = 18
Global Const A822_BufferFull                 = 19
Global Const A822_NoChannelToScan            = 20
Global Const A822_IntInstallChannelError     = 21
Global Const A822_IntInstallConfigError      = 22

'******* Driver Functions ***********
Declare Function A822_DriverInit Lib "A822.DLL" () As Integer
Declare Sub A822_DriverClose Lib "A822.DLL" ()
Declare Function A822_DELAY Lib "A822.DLL" (ByVal wBase As Integer, _
      ByVal wDownCount As Integer) As Integer
Declare Function A822_Check_Address Lib "A822.DLL" _
      (ByVal wBase As Integer) As Integer
Declare Sub A822_SetTriggerMode Lib "A822.DLL" _
      (ByVal wTriggerMode As Integer)
```

```
'******* Test Functions ***********
Declare Function A822_SHORT_SUB_2 Lib "A822.DLL" _
      (ByVal nA As Integer, ByVal nB As Integer) As Integer
Declare Function A822_FLOAT_SUB_2 Lib "A822.DLL" _
      (ByVal fA As Single, ByVal fB As Single) As Single
Declare Function A822_Get_DLL_Version Lib "A822.DLL" () As Integer
Declare Function A822_GetDriverVersion Lib "A822.DLL" _
      (wDriverVersion As Integer) As Integer

'********* Counter Functions ***********
Declare Sub A822_SetCounter Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wCounterNo As Integer, _
       ByVal bCounterMode As Integer, ByVal wCounterValue As Long)
Declare Function A822_ReadCounter Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wCounterNo As Integer, _
       ByVal bCounterMode As Integer) As Long

'******* DI/DO Functions ***********
Declare Function A822_DI Lib "A822.DLL" (ByVal wBase As Integer) As Integer
Declare Sub A822_DO Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wHexValue As Integer)

Declare Sub A822_OutputByte Lib "A822.DLL" _
      (ByVal wPortAddr As Integer, ByVal bOutputVal As Byte)
Declare Sub A822_OutputWord Lib "A822.DLL" _
      (ByVal wPortAddr As Integer, ByVal wOutputVal As Integer)
Declare Function A822_InputByte Lib "A822.DLL" _
      (ByVal wPortAddr As Integer) As Integer
Declare Function A822_InputWord Lib "A822.DLL" _
      (ByVal wPortAddr As Integer) As Integer

'******* AD Functions ***********
Declare Function A822_SetChGain Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal wConfig As Integer, ByVal wCardType As Integer) As Integer
Declare Function A822_Fast_AD_Hex Lib "A822.DLL" _
      (wVal As Integer) As Integer
Declare Function A822_Fast_AD_Float Lib "A822.DLL" _
      (fVal As Single) As Integer
```

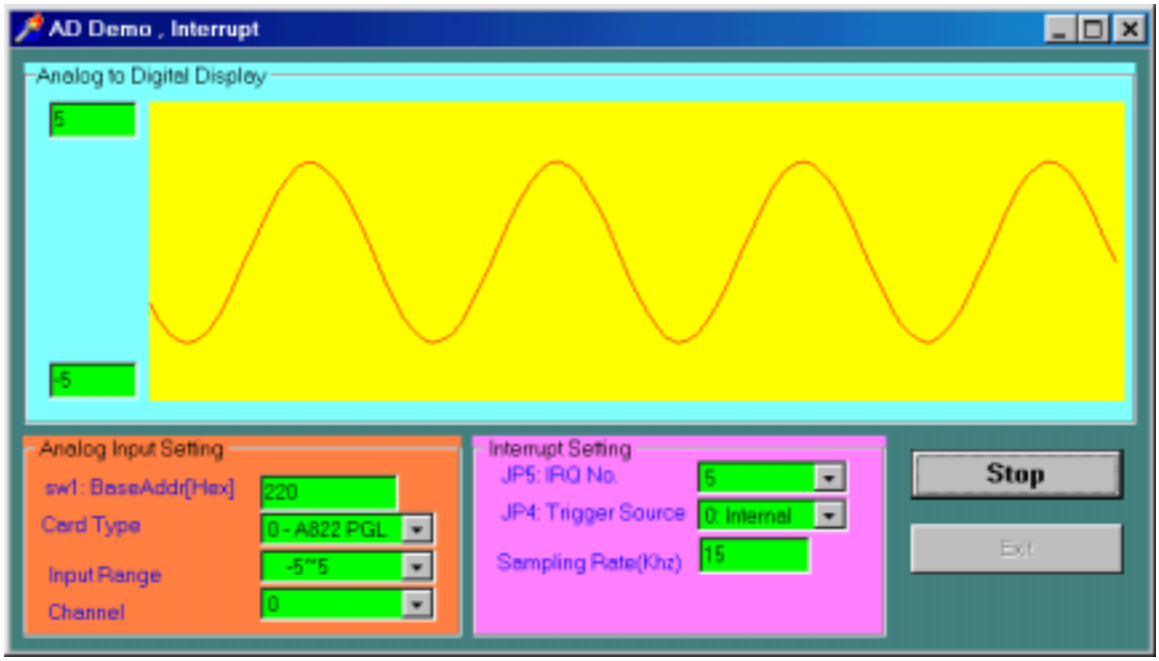
```
Declare Function A822_AD_Hex Lib "A822.DLL" (ByVal wBase As Integer, _
      ByVal wChannel As Integer, ByVal wConfig As Integer, _
      ByVal wCardType As Integer, wVal As Integer) As Integer
Declare Function A822_AD_Float Lib "A822.DLL" (ByVal wBase As Integer, _
      ByVal wChannel As Integer, ByVal wConfig As Integer, _
      ByVal wCardType As Integer, fVal As Single) As Integer
Declare Function A822_Hex2Float Lib "A822.DLL" _
      (ByVal wConfig As Integer, ByVal wCardType As Integer, _
       ByVal wHex As Integer, fVal As Single) As Integer
Declare Function A822_ADs_Hex Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal wConfig As Integer, ByVal wType As Integer, _
       wBuf As Integer, ByVal wCount As Integer) As Integer
Declare Function A822_ADs_Float Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal wConfig As Integer, ByVal wType As Integer, _
       fbuf As Single, ByVal wCount As Integer) As Integer

' Please uses the A822_AD_Float() function
Declare Function A822_AD Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal wConfig As Integer, ByVal wType As Integer) As Single

'******* DA Functions ***********
Declare Sub A822_DA Lib "A822.DLL" (ByVal wBase As Integer, _
      ByVal wChannel As Integer, ByVal wHexValue As Integer)
Declare Sub A822_Uni5_DA Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal fValue As Single)
Declare Sub A822_Uni10_DA Lib "A822.DLL" _
      (ByVal wBase As Integer, ByVal wChannel As Integer, _
       ByVal fValue As Single)
```

```
'******* Interrupt Functions ***********
' Please uses the A822_Intxxxx series function set
Declare Function A822_InstallIrq Lib "A822.DLL" _
       (ByVal wBase As Integer, ByVal wIrq As Integer, _
        hEvent As Long, ByVal dwCount As Integer) As Integer
Declare Function A822_AD_INT_Start Lib "A822.DLL" _
       (ByVal wCardType As Integer, ByVal Ch As Integer, _
        ByVal Gain As Integer, ByVal c1 As Integer, _
        ByVal c2 As Integer) As Integer
Declare Function A822_AD_INT_Stop Lib "A822.DLL" () As Integer
Declare Function A822_GetIntCount Lib "A822.DLL" (dwVal As Long) As Integer
Declare Function A822_GetBuffer Lib "A822.DLL" _
       (ByVal dwNum As Long, wBuffer As Integer) As Integer
Declare Function A822_GetFloatBuffer Lib "A822.DLL" _
       (ByVal dwNum As Integer, fbuffer As Single) As Integer

'******* Interrupt Functions ***********
Declare Function A822_IntInstall Lib "A822.DLL" _
       (ByVal wBase As Integer, ByVal wIrq As Integer, _
        hEvent As Long, ByVal dwCount As Integer) As Integer
Declare Function A822_IntStart Lib "A822.DLL" _
       (ByVal wCardType As Integer, ByVal Ch As Integer, _
        ByVal Gain As Integer, ByVal c1 As Integer, _
        ByVal c2 As Integer) As Integer
Declare Function A822_IntGetCount Lib "A822.DLL" (dwVal As Long) As Integer
Declare Function A822_IntGetHexBuf Lib "A822.DLL" _
       (ByVal dwNum As Long, wBuffer As Integer) As Integer
Declare Function A822_IntGetFloatBuf Lib "A822.DLL" _
       (ByVal dwNum As Integer, fbuffer As Single) As Integer
Declare Function A822_IntStop Lib "A822.DLL" () As Integer
Declare Function A822_IntRemove Lib "A822.DLL" () As Integer
```

```
' Function of Channel-Scan with Polling
Declare Sub A822_ChScan_Clear Lib "A822.DLL" ()
Declare Function A822_ChScan_Add Lib "A822.DLL" _
        (ByVal wChannel As Integer, ByVal wConfig As Integer) As Integer
Declare Function A822_ChScan_Set Lib "A822.DLL" _
        (wChannel As Integer, wConfig As Integer, _
         ByVal wChNum As Integer) As Integer
Declare Function A822_ChScan_PollingHex Lib "A822.DLL" _
        (ByVal wBase As Integer, ByVal wCardType As Integer, _
         wBuf As Integer, ByVal wNumPerCh As Integer) As Integer
Declare Function A822_ChScan_PollingFloat Lib "A822.DLL" _
        (ByVal wBase As Integer, ByVal wCardType As Integer, _
         fBuf As Single, ByVal wNumPerCh As Integer) As Integer

' Function of Channel-Scan with Interrupt
Declare Function A822_ChScan_IntInstall Lib "A822.DLL" _
        (ByVal wBase As Integer, ByVal wIrq As Integer, _
         hEvent As Long, ByVal dwNumPerCh As Long) As Integer
Declare Function A822_ChScan_IntStart Lib "A822.DLL" _
        (ByVal c1 As Integer, ByVal c2 As Integer, _
         ByVal wCardType As Integer) As Integer
Declare Function A822_ChScan_IntGetCount Lib "A822.DLL" _
        (dwVal As Long) As Integer
Declare Function A822_ChScan_IntGetHexBuf Lib "A822.DLL" _
        (wBuf As Integer) As Integer
Declare Function A822_ChScan_IntGetFloatBuf Lib "A822.DLL" _
        (fBuf As Single) As Integer
Declare Function A822_ChScan_IntStop Lib "A822.DLL" () As Integer
Declare Function A822_ChScan_IntRemove Lib "A822.DLL" () As Integer
```

2.3 USING DELPHI

2.3.1 DELPHI DEMO RESULT



2.3.2 A822.PAS (FOR WIN 95/98)

```
unit A822;

interface

type PSingle=^Single;
    PWord=^Word;
    PInteger=^Integer;

Const
//***************** DEFINE A822 RELATIVE ADDRESS *****************/
 A822_TIMER0            =  $00;
 A822_TIMER1            =  $01;
 A822_TIMER2            =  $02;
 A822_TIMER_MODE        =  $03;
 A822_AD_LO             =  $04;   //* Analog to Digital, Low Byte */
 A822_AD_HI             =  $05;   //* Analog to Digital, High Byte */
 A822_DA_CH0_LO         =  $04;   //* Digit to Analog, CH 0 */
 A822_DA_CH0_HI         =  $05;
 A822_DA_CH1_LO         =  $06;   //* Digit to Analog, CH 1 */
 A822_DA_CH1_HI         =  $07;
 A822_DI_LO             =  $06;   //* Digit Input */
 A822_DO_LO             =  $0D;    //* Digit Output */

 A822_CLEAR_IRQ         =  $08;
 A822_SET_GAIN          =  $09;
 A822_SET_CH            =  $0A;
 A822_SET_MODE          =  $0B;
 A822_SOFT_TRIG         =  $0C;

 A822_POLLING_MODE          =  1;
 A822_DMA_MODE              =  2;
 A822_INTERRUPT_MODE        =  6;
```

```
//*** define the gain mode ***/
 A822_A822_BI_1          =  0;
 A822_A822_BI_10         =  1;
 A822_A822_BI_100        =  2;
 A822_A822_BI_1000       =  3;
 A822_A822_UNI_1         =  4;
 A822_A822_UNI_10        =  5;
 A822_A822_UNI_100       =  6;
 A822_A822_UNI_1000      =  7;
 A822_A822_BI_05         =  8;
 A822_A822_BI_5          =  9;
 A822_A822_BI_50         =  10;
 A822_A822_BI_500        =  11;

 A822_A822_BI_2          =  1;
 A822_A822_BI_4          =  2;
 A822_A822_BI_8          =  3;
 A822_A822_UNI_2         =  5;
 A822_A822_UNI_4         =  6;
 A822_A822_UNI_8         =  7;

 A822PGL           =  0;
 A822PGH           =  1;

 A822_NoError                    = 0;
 A822_DriverOpenError            = 1;
 A822_DriverNoOpen               = 2;
 A822_GetDriverVersionError      = 3;
 A822_InstallIrqError            = 4;
 A822_ClearIntCountError         = 5;
 A822_GetIntCountError           = 6;
 A822_GetBufferError             = 7;
 A822_AdError1                   = 100;
 A822_AdError2                   = -200;
 A822_InstallBufError            = 10;
 A822_AllocateMemoryError        = 11;
 A822_CardTypeError              = 12;
 A822_TimeoutError               = 13;
 A822_OtherError                 = 14;
 A822_ConfigCodeError            = 15;
```

```
 A822_IntStopError              = 16;
 A822_IntRemoveError            = 17;
 A822_IntInstallEventError      = 18;
 A822_BufferFull                = 19;
 A822_NoChannelToScan           = 20;
 A822_IntInstallChannelError    = 21;
 A822_IntInstallConfigError     = 22;
 A822_GetDmaStatusError         = 23;

// Function of Driver
Function  A822_DELAY(wBase,wDownCount:WORD):WORD; StdCall;
Function  A822_Check_Address(wBase:WORD):WORD; StdCall;
Function  A822_DriverInit:WORD; StdCall;
Procedure A822_DriverClose; StdCall;
Procedure A822_SetTriggerMode( wTriggerMode:WORD ); StdCall;

// Function of Test
Function  A822_SHORT_SUB_2(nA, nB : SmallInt):SmallInt; StdCall;
Function  A822_FLOAT_SUB_2(fA, fB : Single):Single; StdCall;
Function  A822_Get_DLL_Version:WORD; StdCall;
Function  A822_GetDriverVersion
        (var wDriverVersion:WORD):Word; StdCall;

// Function of Counter
Procedure A822_SetCounter( wBase:WORD;       wCounterNo:WORD;
        bCounterMode:WORD; wCounterValue:LongInt); StdCall;
Function  A822_ReadCounter( wBase:WORD;       wCounterNo:WORD;
                bCounterMode:WORD ):LongInt; StdCall;

// Function of DI/DO
Procedure A822_DO(wBase, wHexValue:Word); StdCall;
Function  A822_DI(wBase:Word):Word; StdCall;

Procedure A822_OutputByte
        (wPortAddr:WORD; bOutputVal:Byte); StdCall;
Procedure A822_OutputWord
        (wPortAddr:WORD; wOutputVal:WORD); StdCall;
Function  A822_InputByte(wPortAddr:WORD):WORD; StdCall;
Function  A822_InputWord(wPortAddr:WORD):WORD; StdCall;
```

```
// Function of AD/DA
Function  A822_SetChGain(wBase:WORD; wChannel:WORD;
        wConfig:WORD; wCardType:WORD):Word; StdCall;
Function  A822_Fast_AD_Hex(var wVal:WORD):Word; StdCall;
Function  A822_Fast_AD_Float(var fVal:Single):Word; StdCall;

Function  A822_AD_Hex(wBase:WORD; wChannel:WORD; wConfig:WORD;
        wCardType:WORD; var wVal:WORD):Word; StdCall;
Function  A822_AD_Float( wBase:WORD; wChannel:WORD; wConfig:WORD;
        wCardType:WORD; var fVal:Single):Word; StdCall;
Function  A822_Hex2Float(wConfig:WORD; wCardType:WORD;
        wHex:WORD; var fVal:Single):Word; StdCall;
Function  A822_ADs_Hex(  wBase,wChannel,wConfig,wType:WORD;
        wBuf:PInteger; wCount:WORD):WORD; StdCall;
Function  A822_ADs_Float(wBase,wChannel,wConfig,wType:WORD;
        fBuf:PSingle; wCount:WORD):WORD; StdCall;

// Please uses the A822_AD_Float() function
Function  A822_AD(wBase, wChannel, wConfig, wType:WORD)
        :Single; StdCall;

// Function of DA
Procedure A822_DA(wBase, wChannel, wHexValue:WORD); StdCall;
Procedure A822_Uni5_DA
        (wBase, wChannel:Word; fValue:Single); StdCall;
Procedure A822_Uni10_DA
        (wBase, wChannel:Word; fValue:Single); StdCall;

// Function of Interrupt
// Please uses the A822_Intxxxx series function set
Function  A822_InstallIrq(wBase, wIrq:WORD; var hEvent:LongInt;
        dwCount:LongInt):WORD; StdCall;
Function  A822_GetBuffer
        (dwNum:LongInt; wBuffer:PInteger):WORD; StdCall;
Function  A822_GetFloatBuffer
        (dwNum:LongInt; fBuffer:PSingle):WORD; StdCall;
Function  A822_GetIntCount(var dwVal:LongInt):WORD; StdCall;
Function  A822_AD_INT_Start
        (wCardType,Ch,Gain,c1,c2:WORD):WORD; StdCall;
Function  A822_AD_INT_Stop:WORD; StdCall;
```

```
// Function of Interrupt
Function  A822_IntInstall(wBase, wIrq:WORD;
        var hEvent:LongInt; dwCount:LongInt):WORD; StdCall;
Function  A822_IntStart
        (wCardType,Ch,Gain,c1,c2:WORD):WORD; StdCall;
Function  A822_IntGetCount(var dwVal:LongInt):WORD; StdCall;
Function  A822_IntGetHexBuf
        (dwNum:LongInt; wBuffer:PInteger):WORD; StdCall;
Function  A822_IntGetFloatBuf
        (dwNum:LongInt; fBuffer:PSingle):WORD; StdCall;
Function  A822_IntStop:WORD; StdCall;
Function  A822_IntRemove:WORD; StdCall;

// Function of DMA
Function  A822_AD_DMA_InstallIrq
        (wBase,wIrq,wDmaChan:WORD):WORD; StdCall;
Function  A822_AD_DMA_RemoveIrq:WORD; StdCall;
Function  A822_AD_DMA_Start(wCardType,Ch,Gain:WORD; c1,c2:WORD;
        cnt:integer; wPassOut:PInteger):WORD; StdCall;
Function  A822_AD_DMA_Stop:WORD; StdCall;
Function  A822_AD_DMA_IsNotFinished:WORD; StdCall;
Function  A822_AD_DMA_GetBuffer(wData:PWORD):WORD; StdCall;
Function  A822_AD_DMA_GetFloatBuffer
        (fBuf:PSingle):WORD; StdCall;

// Function of Channel-Scan with Polling
procedure A822_ChScan_Clear; StdCall;
Function  A822_ChScan_Add
        ( wChannel:WORD; wConfig:WORD):WORD; StdCall;
Function  A822_ChScan_Set(wChannel:PWord; wConfig:PWord;
        wChNum:WORD):WORD; StdCall;
Function  A822_ChScan_PollingHex(wBase:WORD; wCardType:WORD;
        wBuf:PWord; wNumPerCh:WORD):WORD; StdCall;
Function  A822_ChScan_PollingFloat(wBase:WORD; wCardType:WORD;
        fBuf:PSingle; wNumPerCh:WORD):WORD; StdCall;

// Function of Channel-Scan with Interrupt
Function  A822_ChScan_IntInstall(wBase:WORD; wIrq:WORD;
        var hEvent:LongInt; dwNumPerCh:LongInt):WORD; StdCall;
Function  A822_ChScan_IntStart
        (c1:WORD; c2:WORD; wCardType:WORD):WORD; StdCall;
Function  A822_ChScan_IntGetCount(var dwVal:LongInt):WORD; StdCall;
Function  A822_ChScan_IntGetHexBuf(wBuf:PWord):WORD; StdCall;
Function  A822_ChScan_IntGetFloatBuf(fBuf:PSingle):WORD; StdCall;
Function  A822_ChScan_IntStop:WORD; StdCall;
Function  A822_ChScan_IntRemove:WORD; StdCall;
```

```
implementation

// Function of Driver
Function  A822_DriverInit;                  external 'A822.DLL'
   name 'A822_DriverInit';
Procedure A822_DriverClose;                 external 'A822.DLL'
   name 'A822_DriverClose';
Function  A822_DELAY;                       external 'A822.DLL'
   name 'A822_DELAY';
Function  A822_Check_Address;               external 'A822.DLL'
   name 'A822_Check_Address';
Procedure A822_SetTriggerMode;              external 'A822.DLL'
   name 'A822_SetTriggerMode';

// Function of Test
Function  A822_SHORT_SUB_2;                 external 'A822.DLL'
   name 'A822_SHORT_SUB_2';
Function  A822_FLOAT_SUB_2;                 external 'A822.DLL'
   name 'A822_FLOAT_SUB_2';
Function  A822_Get_DLL_Version;             external 'A822.DLL'
   name 'A822_Get_DLL_Version';
Function  A822_GetDriverVersion;            external 'A822.DLL'
   name 'A822_GetDriverVersion';

// Function of Counter
Procedure A822_SetCounter;                  external 'A822.DLL'
   name 'A822_SetCounter';
Function  A822_ReadCounter;                 external 'A822.DLL'
   name 'A822_ReadCounter';

// Function of DI/O
Procedure A822_DO;                          external 'A822.DLL'
   name 'A822_DO';
Function  A822_DI;                          external 'A822.DLL'
   name 'A822_DI';

Procedure A822_OutputByte;                  external 'A822.DLL'
   name 'A822_OutputByte';
Procedure A822_OutputWord;                  external 'A822.DLL'
   name 'A822_OutputWord';
Function  A822_InputByte;                   external 'A822.DLL'
   name 'A822_InputByte';
Function  A822_InputWord;                   external 'A822.DLL'
   name 'A822_InputWord';
```

```
// Function of AD
Function  A822_SetChGain;                    external 'A822.DLL'
   name 'A822_SetChGain';
Function  A822_Fast_AD_Hex;                  external 'A822.DLL'
   name 'A822_Fast_AD_Hex';
Function  A822_Fast_AD_Float;                external 'A822.DLL'
   name 'A822_Fast_AD_Float';

Function  A822_AD_Hex;                       external 'A822.DLL'
   name 'A822_AD_Hex';
Function  A822_AD_Float;                     external 'A822.DLL'
   name 'A822_AD_Float';
Function  A822_Hex2Float;                    external 'A822.DLL'
   name 'A822_Hex2Float';
Function  A822_ADs_Hex;                      external 'A822.DLL'
   name 'A822_ADs_Hex';
Function  A822_ADs_Float;                    external 'A822.DLL'
   name 'A822_ADs_Float';

// Please uses the A822_AD_Float() function
Function  A822_AD;                           external 'A822.DLL'
   name 'A822_AD';

// Function of DA
Procedure A822_DA;                           external 'A822.DLL'
   name 'A822_DA';
Procedure A822_Uni5_DA;                      external 'A822.DLL'
   name 'A822_Uni5_DA';
Procedure A822_Uni10_DA;                     external 'A822.DLL'
   name 'A822_Uni10_DA';

// Function of Interrupt
// Please uses the A822_Intxxxx series function set
Function  A822_InstallIrq;                   external 'A822.DLL'
   name 'A822_InstallIrq';
Function  A822_AD_INT_Start;                 external 'A822.DLL'
   name 'A822_AD_INT_Start';
Function  A822_AD_INT_Stop;                  external 'A822.DLL'
   name 'A822_AD_INT_Stop';
Function  A822_GetIntCount;                  external 'A822.DLL'
   name 'A822_GetIntCount';
Function  A822_GetBuffer;                    external 'A822.DLL'
   name 'A822_GetBuffer';
Function  A822_GetFloatBuffer;               external 'A822.DLL'
   name 'A822_GetFloatBuffer';
```

```
// Function of Interrupt
Function  A822_IntInstall;                external 'A822.DLL'
   name 'A822_IntInstall';
Function  A822_IntStart;                  external 'A822.DLL'
   name 'A822_IntStart';
Function  A822_IntGetCount;               external 'A822.DLL'
   name 'A822_IntGetCount';
Function  A822_IntGetHexBuf;              external 'A822.DLL'
   name 'A822_IntGetHexBuf';
Function  A822_IntGetFloatBuf;            external 'A822.DLL'
   name 'A822_IntGetFloatBuf';
Function  A822_IntStop;                   external 'A822.DLL'
   name 'A822_IntStop';
Function  A822_IntRemove;                 external 'A822.DLL'
   name 'A822_IntRemove';

// Function of DMA
Function  A822_AD_DMA_InstallIrq;             external 'A822.DLL'
   name 'A822_AD_DMA_InstallIrq';
Function  A822_AD_DMA_RemoveIrq;              external 'A822.DLL'
   name 'A822_AD_DMA_RemoveIrq';
Function  A822_AD_DMA_Start;                  external 'A822.DLL'
   name 'A822_AD_DMA_Start';
Function  A822_AD_DMA_Stop;                   external 'A822.DLL'
   name 'A822_AD_DMA_Stop';
Function  A822_AD_DMA_IsNotFinished;          external 'A822.DLL'
   name 'A822_AD_DMA_IsNotFinished';
Function  A822_AD_DMA_GetBuffer;              external 'A822.DLL'
   name 'A822_AD_DMA_GetBuffer';
Function  A822_AD_DMA_GetFloatBuffer;         external 'A822.DLL'
   name 'A822_AD_DMA_GetFloatBuffer';

// Function of Channel-Scan with Polling
procedure A822_ChScan_Clear;              external 'A822.DLL'
   name 'A822_ChScan_Clear';
Function  A822_ChScan_Add;                external 'A822.DLL'
   name 'A822_ChScan_Add';
Function  A822_ChScan_Set;                external 'A822.DLL'
   name 'A822_ChScan_Set';
Function  A822_ChScan_PollingHex;         external 'A822.DLL'
   name 'A822_ChScan_PollingHex';
Function  A822_ChScan_PollingFloat;       external 'A822.DLL'
   name 'A822_ChScan_PollingFloat';
```

```
// Function of Channel-Scan with Interrupt
Function  A822_ChScan_IntInstall;          external 'A822.DLL'
   name 'A822_ChScan_IntInstall';
Function  A822_ChScan_IntStart;            external 'A822.DLL'
   name 'A822_ChScan_IntStart';
Function  A822_ChScan_IntGetCount;         external 'A822.DLL'
   name 'A822_ChScan_IntGetCount';
Function  A822_ChScan_IntGetHexBuf;        external 'A822.DLL'
   name 'A822_ChScan_IntGetHexBuf';
Function  A822_ChScan_IntGetFloatBuf;      external 'A822.DLL'
   name 'A822_ChScan_IntGetFloatBuf';
Function  A822_ChScan_IntStop;             external 'A822.DLL'
   name 'A822_ChScan_IntStop';
Function  A822_ChScan_IntRemove;           external 'A822.DLL'
   name 'A822_ChScan_IntRemove';

end.
```

2.3.3 A822.PAS (FOR WIN NT)

```
unit A822;

interface

type PSingle=^Single;
    PWord=^Word;
    PInteger=^Integer;

Const
//***************** DEFINE A822 RELATIVE ADDRESS *****************/
 A822_TIMER0            =  $00;
 A822_TIMER1            =  $01;
 A822_TIMER2            =  $02;
 A822_TIMER_MODE        =  $03;
 A822_AD_LO             =  $04;   //* Analog to Digital, Low Byte */
 A822_AD_HI             =  $05;   //* Analog to Digital, High Byte */
 A822_DA_CH0_LO         =  $04;   //* Digit to Analog, CH 0 */
 A822_DA_CH0_HI         =  $05;
 A822_DA_CH1_LO         =  $06;   //* Digit to Analog, CH 1 */
 A822_DA_CH1_HI         =  $07;
 A822_DI_LO             =  $06;   //* Digit Input */
 A822_DO_LO             =  $0D;    //* Digit Output */

 A822_CLEAR_IRQ         =  $08;
 A822_SET_GAIN          =  $09;
 A822_SET_CH            =  $0A;
 A822_SET_MODE          =  $0B;
 A822_SOFT_TRIG         =  $0C;

 A822_POLLING_MODE          =  1;
 A822_DMA_MODE              =  2;
 A822_INTERRUPT_MODE        =  6;
```

```
//*** define the gain mode ***/
 A822_A822_BI_1          =  0;
 A822_A822_BI_10         =  1;
 A822_A822_BI_100        =  2;
 A822_A822_BI_1000       =  3;
 A822_A822_UNI_1         =  4;
 A822_A822_UNI_10        =  5;
 A822_A822_UNI_100       =  6;
 A822_A822_UNI_1000      =  7;
 A822_A822_BI_05         =  8;
 A822_A822_BI_5          =  9;
 A822_A822_BI_50         =  10;
 A822_A822_BI_500        =  11;

 A822_A822_BI_2          =  1;
 A822_A822_BI_4          =  2;
 A822_A822_BI_8          =  3;
 A822_A822_UNI_2         =  5;
 A822_A822_UNI_4         =  6;
 A822_A822_UNI_8         =  7;

 A822PGL     =  0;
 A822PGH     =  1;

 A822_NoError                    = 0;
 A822_DriverOpenError            = 1;
 A822_DriverNoOpen               = 2;
 A822_GetDriverVersionError      = 3;
 A822_InstallIrqError            = 4;
 A822_ClearIntCountError         = 5;
 A822_GetIntCountError           = 6;
 A822_GetBufferError             = 7;
 A822_AdError1                   = 100;
 A822_AdError2                   = -200;
 A822_InstallBufError            = 10;
 A822_AllocateMemoryError        = 11;
 A822_CardTypeError              = 12;
 A822_TimeoutError               = 13;
 A822_OtherError                 = 14;
 A822_ConfigCodeError            = 15;
```

```
 A822_IntStopError              = 16;
 A822_IntRemoveError            = 17;
 A822_IntInstallEventError      = 18;
 A822_BufferFull                = 19;
 A822_NoChannelToScan           = 20;
 A822_IntInstallChannelError    = 21;
 A822_IntInstallConfigError     = 22;

// Function of Driver
Function      A822_DELAY(wBase,wDownCount:WORD):WORD; StdCall;
Function      A822_Check_Address(wBase:WORD):WORD; StdCall;
Function      A822_DriverInit:WORD; StdCall;
Procedure     A822_DriverClose; StdCall;
Procedure     A822_SetTriggerMode( wTriggerMode:WORD ); StdCall;

// Function of Test
Function      A822_SHORT_SUB_2(nA, nB : SmallInt):SmallInt; StdCall;
Function      A822_FLOAT_SUB_2(fA, fB : Single):Single; StdCall;
Function      A822_Get_DLL_Version:WORD; StdCall;
Function      A822_GetDriverVersion
        (var wDriverVersion:WORD):Word; StdCall;

// Function of Counter
Procedure     A822_SetCounter( wBase:WORD;       wCounterNo:WORD;
        bCounterMode:WORD; wCounterValue:LongInt); StdCall;
Function      A822_ReadCounter( wBase:WORD;       wCounterNo:WORD;
          bCounterMode:WORD ):LongInt; StdCall;

// Function of DI/DO
Procedure     A822_DO(wBase, wHexValue:Word); StdCall;
Function      A822_DI(wBase:Word):Word; StdCall;

Procedure     A822_OutputByte
        (wPortAddr:WORD; bOutputVal:Byte); StdCall;
Procedure     A822_OutputWord
        (wPortAddr:WORD; wOutputVal:WORD); StdCall;
Function      A822_InputByte(wPortAddr:WORD):WORD; StdCall;
Function      A822_InputWord(wPortAddr:WORD):WORD; StdCall;
```

```
// Function of AD/DA
Function      A822_SetChGain(wBase:WORD; wChannel:WORD;
        wConfig:WORD; wCardType:WORD):Word; StdCall;
Function      A822_Fast_AD_Hex(var wVal:WORD):Word; StdCall;
Function      A822_Fast_AD_Float(var fVal:Single):Word; StdCall;

Function  A822_AD_Hex(wBase:WORD; wChannel:WORD; wConfig:WORD;
        wCardType:WORD; var wVal:WORD):Word; StdCall;
Function  A822_AD_Float( wBase:WORD; wChannel:WORD; wConfig:WORD;
        wCardType:WORD; var fVal:Single):Word; StdCall;
Function  A822_Hex2Float(wConfig:WORD; wCardType:WORD;
        wHex:WORD; var fVal:Single):Word; StdCall;
Function  A822_ADs_Hex(  wBase,wChannel,wConfig,wType:WORD;
        wBuf:PInteger; wCount:WORD):WORD; StdCall;
Function  A822_ADs_Float(wBase,wChannel,wConfig,wType:WORD;
        fBuf:PSingle; wCount:WORD):WORD; StdCall;

// Please uses the A822_AD_Float() function
Function  A822_AD(wBase, wChannel, wConfig, wType:WORD)
        :Single; StdCall;

// Function of DA
Procedure A822_DA(wBase, wChannel, wHexValue:WORD); StdCall;
Procedure A822_Uni5_DA
        (wBase, wChannel:Word; fValue:Single); StdCall;
Procedure A822_Uni10_DA
        (wBase, wChannel:Word; fValue:Single); StdCall;

// Function of Interrupt
// Please uses the A822_Intxxxx series function set
Function  A822_InstallIrq(wBase, wIrq:WORD; var hEvent:LongInt;
        dwCount:LongInt):WORD; StdCall;
Function  A822_GetBuffer
        (dwNum:LongInt; wBuffer:PInteger):WORD; StdCall;
Function  A822_GetFloatBuffer
        (dwNum:LongInt; fBuffer:PSingle):WORD; StdCall;
Function  A822_GetIntCount(var dwVal:LongInt):WORD; StdCall;
Function  A822_AD_INT_Start
        (wCardType,Ch,Gain,c1,c2:WORD):WORD; StdCall;
Function  A822_AD_INT_Stop:WORD; StdCall;
```

```
// Function of Interrupt
Function  A822_IntInstall(wBase, wIrq:WORD;
        var hEvent:LongInt; dwCount:LongInt):WORD; StdCall;
Function  A822_IntStart
        (wCardType,Ch,Gain,c1,c2:WORD):WORD; StdCall;
Function  A822_IntGetCount(var dwVal:LongInt):WORD; StdCall;
Function  A822_IntGetHexBuf
        (dwNum:LongInt; wBuffer:PInteger):WORD; StdCall;
Function  A822_IntGetFloatBuf
        (dwNum:LongInt; fBuffer:PSingle):WORD; StdCall;
Function  A822_IntStop:WORD; StdCall;
Function  A822_IntRemove:WORD; StdCall;

// Function of Channel-Scan with Polling
procedure A822_ChScan_Clear; StdCall;
Function  A822_ChScan_Add
        ( wChannel:WORD; wConfig:WORD):WORD; StdCall;
Function  A822_ChScan_Set(wChannel:PWord; wConfig:PWord;
        wChNum:WORD):WORD; StdCall;
Function  A822_ChScan_PollingHex(wBase:WORD; wCardType:WORD;
        wBuf:PWord; wNumPerCh:WORD):WORD; StdCall;
Function  A822_ChScan_PollingFloat(wBase:WORD; wCardType:WORD;
        fBuf:PSingle; wNumPerCh:WORD):WORD; StdCall;

// Function of Channel-Scan with Interrupt
Function  A822_ChScan_IntInstall(wBase:WORD; wIrq:WORD;
        var hEvent:LongInt; dwNumPerCh:LongInt):WORD; StdCall;
Function  A822_ChScan_IntStart
        (c1:WORD; c2:WORD; wCardType:WORD):WORD; StdCall;
Function  A822_ChScan_IntGetCount(var dwVal:LongInt):WORD; StdCall;
Function  A822_ChScan_IntGetHexBuf(wBuf:PWord):WORD; StdCall;
Function  A822_ChScan_IntGetFloatBuf(fBuf:PSingle):WORD; StdCall;
Function  A822_ChScan_IntStop:WORD; StdCall;
Function  A822_ChScan_IntRemove:WORD; StdCall;
```

```
implementation

// Function of Driver
Function  A822_DriverInit;                  external 'A822.DLL'
   name 'A822_DriverInit';
Procedure A822_DriverClose;                 external 'A822.DLL'
   name 'A822_DriverClose';
Function  A822_DELAY;                       external 'A822.DLL'
   name 'A822_DELAY';
Function  A822_Check_Address;               external 'A822.DLL'
   name 'A822_Check_Address';
Procedure A822_SetTriggerMode;              external 'A822.DLL'
   name 'A822_SetTriggerMode';

// Function of Test
Function  A822_SHORT_SUB_2;                 external 'A822.DLL'
   name 'A822_SHORT_SUB_2';
Function  A822_FLOAT_SUB_2;                 external 'A822.DLL'
   name 'A822_FLOAT_SUB_2';
Function  A822_Get_DLL_Version;             external 'A822.DLL'
   name 'A822_Get_DLL_Version';
Function  A822_GetDriverVersion;            external 'A822.DLL'
   name 'A822_GetDriverVersion';

// Function of Counter
Procedure A822_SetCounter;                  external 'A822.DLL'
   name 'A822_SetCounter';
Function  A822_ReadCounter;                 external 'A822.DLL'
   name 'A822_ReadCounter';

// Function of DI/O
Procedure A822_DO;                          external 'A822.DLL'
   name 'A822_DO';
Function  A822_DI;                          external 'A822.DLL'
   name 'A822_DI';

Procedure A822_OutputByte;                  external 'A822.DLL'
   name 'A822_OutputByte';
Procedure A822_OutputWord;                  external 'A822.DLL'
   name 'A822_OutputWord';
Function  A822_InputByte;                   external 'A822.DLL'
   name 'A822_InputByte';
Function  A822_InputWord;                   external 'A822.DLL'
   name 'A822_InputWord';
```

```
// Function of AD
Function  A822_SetChGain;                    external 'A822.DLL'
   name 'A822_SetChGain';
Function  A822_Fast_AD_Hex;                  external 'A822.DLL'
   name 'A822_Fast_AD_Hex';
Function  A822_Fast_AD_Float;                external 'A822.DLL'
   name 'A822_Fast_AD_Float';

Function  A822_AD_Hex;                       external 'A822.DLL'
   name 'A822_AD_Hex';
Function  A822_AD_Float;                     external 'A822.DLL'
   name 'A822_AD_Float';
Function  A822_Hex2Float;                    external 'A822.DLL'
   name 'A822_Hex2Float';
Function  A822_ADs_Hex;                      external 'A822.DLL'
   name 'A822_ADs_Hex';
Function  A822_ADs_Float;                    external 'A822.DLL'
   name 'A822_ADs_Float';

// Please uses the A822_AD_Float() function
Function  A822_AD;                           external 'A822.DLL'
   name 'A822_AD';

// Function of DA
Procedure A822_DA;                           external 'A822.DLL'
   name 'A822_DA';
Procedure A822_Uni5_DA;                      external 'A822.DLL'
   name 'A822_Uni5_DA';
Procedure A822_Uni10_DA;                     external 'A822.DLL'
   name 'A822_Uni10_DA';

// Function of Interrupt
// Please uses the A822_Intxxxx series function set
Function  A822_InstallIrq;                   external 'A822.DLL'
   name 'A822_InstallIrq';
Function  A822_AD_INT_Start;                 external 'A822.DLL'
   name 'A822_AD_INT_Start';
Function  A822_AD_INT_Stop;                  external 'A822.DLL'
   name 'A822_AD_INT_Stop';
Function  A822_GetIntCount;                  external 'A822.DLL'
   name 'A822_GetIntCount';
Function  A822_GetBuffer;                    external 'A822.DLL'
   name 'A822_GetBuffer';
Function  A822_GetFloatBuffer;               external 'A822.DLL'
   name 'A822_GetFloatBuffer';
```

```
// Function of Interrupt
Function  A822_IntInstall;                    external 'A822.DLL'
   name 'A822_IntInstall';
Function  A822_IntStart;                      external 'A822.DLL'
   name 'A822_IntStart';
Function  A822_IntGetCount;                   external 'A822.DLL'
   name 'A822_IntGetCount';
Function  A822_IntGetHexBuf;                  external 'A822.DLL'
   name 'A822_IntGetHexBuf';
Function  A822_IntGetFloatBuf;                external 'A822.DLL'
   name 'A822_IntGetFloatBuf';
Function  A822_IntStop;                       external 'A822.DLL'
   name 'A822_IntStop';
Function  A822_IntRemove;                     external 'A822.DLL'
   name 'A822_IntRemove';

// Function of Channel-Scan with Polling
procedure A822_ChScan_Clear;                  external 'A822.DLL'
   name 'A822_ChScan_Clear';
Function  A822_ChScan_Add;                    external 'A822.DLL'
   name 'A822_ChScan_Add';
Function  A822_ChScan_Set;                    external 'A822.DLL'
   name 'A822_ChScan_Set';
Function  A822_ChScan_PollingHex;             external 'A822.DLL'
   name 'A822_ChScan_PollingHex';
Function  A822_ChScan_PollingFloat;           external 'A822.DLL'
   name 'A822_ChScan_PollingFloat';

// Function of Channel-Scan with Interrupt
Function  A822_ChScan_IntInstall;             external 'A822.DLL'
   name 'A822_ChScan_IntInstall';
Function  A822_ChScan_IntStart;               external 'A822.DLL'
   name 'A822_ChScan_IntStart';
Function  A822_ChScan_IntGetCount;            external 'A822.DLL'
   name 'A822_ChScan_IntGetCount';
Function  A822_ChScan_IntGetHexBuf;           external 'A822.DLL'
   name 'A822_ChScan_IntGetHexBuf';
Function  A822_ChScan_IntGetFloatBuf;         external 'A822.DLL'
   name 'A822_ChScan_IntGetFloatBuf';
Function  A822_ChScan_IntStop;                external 'A822.DLL'
   name 'A822_ChScan_IntStop';
Function  A822_ChScan_IntRemove;              external 'A822.DLL'
   name 'A822_ChScan_IntRemove';

end.
```

3. FUNCTION DESCRIPTION

These function in DLL are divided into several groups as following:

1. Not supported functions
2. The Driver functions
3. The Test functions
4. The Counter functions
5. The DI/O functions
6. The DA functions
7. The AD Polling functions
8. The AD Interrupt functions
9. The AD DMA functions
10. The AD Channel-Scan Polling functions
11. The AD Channel-Scan Interrupt functions

(Ps. The DMA functions support the Windows 95/98 only.)

In this chapter, we use some keywords to indicate the attribute of Parameters.

Keyword	Setting parameter by user before calling this function ?	Get the data/value from this parameter after calling this function ?
[In]	Yes	No
[Out]	No	Yes
[In, Out]	Yes	Yes

Note: All of the parameters need to be allocated spaces by the user.

3.1 ERROR CODE

Error Code	Description
A822_NoError	OK!
A822_DriverOpenError	Fail to open the device driver. Please check does the card have plug in your system and check does the device driver have installed. Or, please try to plug the card in the other slot and try to re-install the device driver.
A822_DriverNoOpen	Users have to call the A822_DriverInit() function before calling into other A822 functions.
A822_GetDriverVersionError	Fail to communication with device driver. Please check does the driver have installed? Or, try to re-install driver again.
A822_InstallIrqError	Fail to install the ISR with the specified IRQ/DMA number. Please check does the driver have installed? Check does the IRQ/IO address and DMA resources conflicts with other device? And check the system's resource and free some resource.
A822_ClearIntCountError	Fail to communication with device driver. Please check does the driver have installed? Or, try to re-install driver again.
A822_GetIntCountError	Fail to communication with device driver. Please check does the driver have installed? Or, try to re-install driver again.
A822_GetBufferError	Fail to communication with device driver. Please check does the driver have installed? Or, try to re-install driver again.
A822_AllocateMemoryError	Fail to allocate memory for data buffer. Please check your system's resource and free some memory.

A822_CardTypeError	The CardType should be 0: A822PGL or 1:A822PGH
A822_TimeoutError	For A/D (Analog Input) functions, the DLL functions waiting for A/D converter to complete the operation. The Max. time to waiting is 500ms. It may always returns the A822_TimeoutError, if the card setting the Trigger-Mode to External-Trigger by jumper. (Thus, software-trigger will not function.) Please check your hardware settings of Base address. Try to plug the card in other slot.
A822_ConfigCodeError	For valid configuration code, please refer to Section "1.2 Range Configuration".
A822_IntStopError	Fail to communication with driver, or fail to stop the interrupt. Please check does the driver have installed? Or, try to re-install driver again.
A822_IntRemoveError	Fail to communication with driver, or fail to remove the ISR/DMA. Please check does the driver have installed? Or, try to re-install driver again.
A822_IntInstallEventError	Fail to install the event-object into device driver. Please check does the driver have installed? And check the system's resource and free some resource. Or, try to re-install driver again.
A822_BufferFull	The buffer size of the Channel-Scan List is 100. Program can't add channels more than 100.
A822_NoChannelToScan	Before calling the Channel-Scan Polling or Interrupt, users have to setting the channels into the Channel-Scan List by calling related functions. Please refer to A822_ChScan_Clear(), A822_ChScan_Add() and A822_ChScan_Set() functions.

A822_IntInstallChannelError	Fail to copy the channels of Channel-Scan List into device driver. Please check does the driver have installed? And check the system's resource and free some resource. Or, try to re-install driver again.
A822_IntInstallConfigError	Fail to copy the configuration-code of Channel-Scan List into device driver. Please check does the driver have installed? And check the system's resource and free some resource. Or, try to re-install driver again.
A822_GetDmaStatusError	Fail to communication with driver, or fail to get the DMA completion status. Please check does the driver have installed? Or, try to re-install driver again.

3.2 NOT SUPPORTED FUNCTION

The following "Not supported functions" may not work in the further versions.

Not Supported function	Descriptions
A822_AD()	Please refer to A822_AD_Float() function. This new function separates the error-code and A/D value.
A822_InstallIrq(), A822_AD_INT_Start(), A822_GetIntCount(), A822_GetBuffer(), A822_GetFloatBuffer(), A822_AD_INT_Stop()	Please refer to the following new functions… A822_IntInstall(), A822_IntStart(), A822_IntGetCount(), A822_IntGetHexBuf(), A822_IntGetFloatBuf(), A822_IntStop(), A822_IntRemove() These new function set has the better performance. User's program just have to allocate the event-object and data buffer once.

3.3 DRIVER FUNCTIONS

3.3.1 A822_DriverInit

- **Description:**
  This subroutine will initialize the device driver and allocate the resource.

- **Syntax:**
  WORD A822_DriverInit(void);

- **Parameter:**
  None

- **Return:**
  Refer to "Section 3.1 Error Code".

3.3.2 A822_DriverClose

- **Description:**
  This subroutine will close the device driver and free the resource.

- **Syntax:**
  void A822_DriverClose(void);

- **Parameter:**
  None

- **Return:**
  None

3.3.3 A822_DELAY

- **Description:**
  This subroutine will delay **wDownCount** (machine independent timer).
  This function uses the Counter0 to implement delay and will be used by the A/D related functions. The unit of A822_DELAY() is 0.5uSeconds. (2MHz ➔ 2000K times/sec).
  For Example: A822_DELAY(2000); ➔ delays 1 mSeconds.

- **Syntax:**
  WORD A822_DELAY(WORD wBase, WORD wDownCount);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wDownCount : [In] Number of count will be delay, 2 count = 1 uSeconds.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.3.4 A822_Check_Address

- **Description:**
  This subroutine will detect the A-822PGH/L in I/O base address = **wBase**. This subroutine will perform one A/D conversion, if success → find a A-822PGH/L. This function will always return 0 if the user set the trigger mode to external. Refer to the function "A822_SetTriggerMode".

- **Syntax:**
  WORD A822_Check_Address(WORD wBase);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220

- **Return:**
  Refer to "Section 3.1 Error Code".

3.3.5 A822_SetTriggerMode

- **Description:**

  This subroutine will set the trigger mode for internal or external. The default value is setting to internal trigger mode if the user does not use this function. The user have to call this function before calling any AD function (include the function "A822_Check_Address") if the user uses external trigger mode.

  Please refer to the hardware manual to setting the jumper JP4(A/D Trigger Source Selection). The JP4 default setting is "INTTRG"(Internal-Trigger).

- **Syntax:**

  void A822_SetTriggerMode(WORD wTriggerMode)

- **Parameter:**

  wTriggerMode : [In] 0: Internal Trigger Mode
  1: External Trigger Mode

- **Return:**

  None

3.4 TEST FUNCTION

3.4.1 A822_SHORT_SUB_2

- **Description:**
  Compute C=A-B in **short** formats, **short=16 bits sign integer.** This function is provided for testing purpose.

- **Syntax:**
  short A822_SHORT_SUB_2(short nA, short nB);

- **Parameter:**
  nA : [In] short integer
  nB : [In] short integer

- **Return:**
  return=nA-nB → short integer

3.4.2 A822_FLOAT_SUB_2

- **Description:**
  Compute A-B in **float** format, **float=32 bits floating pointer number.** This function is provided for testing purpose.

- **Syntax:**
  float A822_FLOAT_SUB_2(float fA, float fB);

- **Parameter:**
  fA : [In] floating point value
  fB : [In] floating point value

- **Return:**
  return=fA-fB → floating point value

3.4.3 A822_Get_DLL_Version

- **Description:**
  Read the software version of the A822.DLL.

- **Syntax:**
  WORD A822_Get_DLL_Version(void) ;

- **Parameter:**
  None

- **Return:**
  Returns the DLL's version, for example 0x200 → Version 2.00
  (WORD=16 bits unsigned integer)

3.4.4 A822_GetDriverVersion

- **Description:**
  This subroutine will get the version number about the device driver.

- **Syntax:**
  WORD A822_GetDriverVersion(WORD *wDriverVersion);

- **Parameter:**
  wDriverVersion :[Out] Returns driver's version.
  For example: wDriverVerion=0x210 → version 2.10

- **Return:**
  Refer to "Section 3.1 Error Code".

3.5 COUNTER FUNCTION

3.5.1 A822_SetCounter

- **Description:**
  This subroutine will set the 8254 counter mode and value.

- **Syntax:**
  void A822_SetCounter(WORD wBase, WORD wCounterNo,
  WORD bCounterMode, DWORD wCounterValue);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wCounterNo : [In] Counter Number 0 to 2 for the 8254
  wCounterMode : [In] Counter Mode 0 to 5 for the 8254
  wCounterValue : [In] Counter Value 0 to 65535 for the 8254

- **Return:**
  None

3.5.2 A822_ReadCounter

- **Description:**
  This subroutine will read the 8254 counter value.

- **Syntax:**
  DWORD A822_ReadCounter(WORD wBase, WORD wCounterNo,
  WORD bCounterMode);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wCounterNo : [In] Counter Number 0 to 2 for the 8254
  wCounterMode : [In] Counter Mode 0 to 5 for the 8254

- **Return:**
  Return the counter's value and only the lower WORD is valid.

3.6 DI/DO FUNCTION

3.6.1 A822_DI

- **Description:**
  This subroutine will read the 16 bits data from the digital input port.

- **Syntax:**
  WORD A822_DI(WORD wBase);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220

- **Return:**
  16 bit data read from the digital input port

3.6.2 A822_DO

- **Description:**
  This subroutine will send the 16 bits data to digital output port.

- **Syntax:**
  void A822_DO(WORD wBase, WORD wHexValue);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wHexValue : [In] 16 bit data send to digital output port

- **Return:**
  None

3.6.3 A822_OutputByte

- **Description:**
  This subroutine will send the 8 bits data to the desired I/O port.

- **Syntax:**
  void A822_OutputByte(WORD wPortAddr, UCHAR bOutputVal);

- **Parameter:**
  wPortAddr : [In] I/O port address, for example, 0x220
  bOutputVal : [In] 8 bit data send to I/O port

- **Return:**
  None

3.6.4 A822_OutputWord

- **Description:**
  This subroutine will send the 16 bits data to the desired I/O port.

- **Syntax:**
  void A822_OutputByte(WORD wPortAddr, WORD wOutputVal);

- **Parameter:**
  wPortAddr : [In] I/O port address, for example, 0x220
  wOutputVal : [In] 16 bit data send to I/O port

- **Return:**
  None

3.6.5 A822_InputByte

- **Description:**
  This subroutine will input the 8 bit data from the desired I/O port.

- **Syntax:**
  WORD A822_InputByte(WORD wPortAddr);

- **Parameter:**
  wPortAddr : [In] I/O port address, for example, 0x220

- **Return:**
  16 bits data with the leading 8 bits are all 0

3.6.6 A822_InputWord

- **Description:**
  This subroutine will input the 16 bit data from the desired I/O port.

- **Syntax:**
  WORD DIO_InputWord(WORD wPortAddr);

- **Parameter:**
  wPortAddr : [In] I/O port address, for example, 0x220

- **Return:**
  16 bits data.

3.7 AD FUNCTIONS

3.7.1 A822_SetChGain

- **Description:**
  This subroutine will set the multiplexer to the specified channel and configuration-code and delays for the settling time.
  Users have to call the function before calling into A822_Fast_AD_Hex() and/or A822_Fast_AD_Float() functions.

- **Syntax:**
  WORD A822_SetChGain(WORD wBase, WORD wChannel,
  WORD wConfig, WORD wCardType);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wChannel : [In] A/D channel number,
  wConfig : [In] Configuration code,
  refer to Section 1.2 for detail information
  wCardType : [In] 0 → A-822PGL, 1→ A-822PGH

- **Return:**
  Refer to "Section 3.1 Error Code".

3.7.2 A822_Hex2Float

- **Description:**
  Compute the Hex(WORD) to floating value.

- **Syntax:**
  WORD A822_Hex2Float(WORD wConfig, WORD wCardType,
  WORD wHex, float *fVal);

- **Parameter:**
  wConfig : [In] Refer to Section "1.2 Range Configuration".
  wCardType : [In] 0 → A-822PGL, 1→ A-822PGH
  wVal : [In] The Hex(WORD) value need to compute.
  fVal : [Out] Return the value in floating format.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.7.3 A822_Fast_AD_Hex

- **Description:**
  This subroutine will perform an A/D conversion by polling. The A/D converter is 12 bits for A822PGH/L.
  Users have to call the A822_SetChGain() function before calling this functions. In actually,
  A822_AD_Hex() = A822_SetChGain() + A822_Fast_AD_Hex().

- **Syntax:**
  WORD A822_Fast_AD_Hex(WORD* wVal);

- **Parameter:**
  wVal : [Out] Return the A/D value in WORD format.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.7.4 A822_Fast_AD_Float

- **Description:**
  This subroutine will perform an A/D conversion by polling. The A/D converter is 12 bits for A822PGH/L. This subroutine will compute the result according to the **configuration code**.
  Users have to call the A822_SetChGain() function before calling this functions. In actually,
  A822_AD_Float() = A822_SetChGain() + A822_Fast_AD_Float().

- **Syntax:**
  WORD A822_Fast_AD_Float(float* fVal);

- **Parameter:**
  fVal : [Out] Return the A/D value in floating format.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.7.5 A822_AD_Hex

- **Description:**
  This subroutine will perform an A/D conversion by polling. The A/D converter is 12 bits for A822PGH/L.

- **Syntax:**
  WORD A822_AD_Hex(WORD wBase, WORD wChannel, WORD wConfig,
  WORD wCardType, WORD* wVal);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wChannel : [In] A/D channel number,
  wConfig : [In] Configuration code,
  refer to Section 1.2 for detail information
  wCardType : [In] 0 → A-822PGL, 1→ A-822PGH
  wVal : [Out] Return the A/D value in WORD format.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.7.6 A822_AD_Float

- **Description:**
  This subroutine will perform an A/D conversion by polling. The A/D converter is 12 bits for A822PGH/L. This subroutine will compute the result according to the **configuration code**.

- **Syntax:**
  WORD A822_AD_Float(WORD wBase, WORD wChannel, WORD wConfig,
  WORD wCardType, float* fVal);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wChannel : [In] A/D channel number,
  wConfig : [In] Configuration code,
  refer to Section 1.2 for detail information
  wCardType : [In] 0 → A-822PGL, 1→ A-822PGH
  fVal : [Out] Return the A/D value in floating format.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.7.7 A822_ADs_Hex

- **Description:**

  This subroutine will perform a number of A/D conversions by polling. This subroutine is very similar to A822_AD except that this subroutine will perform wCount of conversions instead of just one conversion. The A/D conversing at the ISA bus's max. speed. The sampling rate is about 90K samples/second which testing under Pentium-133 CPU. After A/D conversing, the A/D data are stored in a buffer in Hex format. The **wBuf** is the starting address of this data buffer.

- **Syntax:**

  WORD A822_ADs_Hex(WORD wBase, WORD wChannel, WORD wConfig,
  WORD wType, WORD wBuf[], WORD wCount);

- **Parameter:**

  wBase : [In] I/O port base address, for example, 0x220
  wChannel : [In] A/D channel number
  wConfig : [In] Configuration code,
  refer to Section 1.2 for detail information
  wType : [In] 0 → A-822PGL, 1→ A-822PGH
  wBuf : [Out] Data buffer stores the AD value (In WORD format)
  Users have to allocate spaces for this buffer and send the address into the function. This function will fill the data into this buffer. Users can analyze these data from the buffer after calling this function.

  wCount : [In] Number of A/D conversions will be performed

- **Return:**

  Refer to "Section 3.1 Error Code".

3.7.8 A822_ADs_Float

- **Description:**
  This subroutine will perform a number of A/D conversions by polling. This subroutine is very similar to A822_AD except that this subroutine will perform wCount of conversions instead of just one conversion. The A/D conversing at the ISA bus's max. speed. The sampling rate is about 90K samples/second which testing under Pentium-133 CPU. Then the A/D data are stored in a data buffer in Float format. The **fBuf** is the starting address of this data buffer.

- **Syntax:**
  WORD A822_ADs_Float(WORD wBase, WORD wChannel, WORD wConfig,
  WORD wType, float fBuf[], WORD wCount);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wChannel : [In] A/D channel number
  wConfig : [In] Configuration codes, refer to 1.2 for detail information
  wType : [In] 0 → A-822PGL, 1→ A-822PGH
  fBuf : [Out] Data buffer stores the AD value (In float format)
  Users have to allocate spaces for this buffer and send the address into the function. This function will fill the data into this buffer. Users can analyze these data from the buffer after calling this function.

  wCount : [In] Number of A/D conversions will be performed

- **Return:**
  Refer to "Section 3.1 Error Code".

3.8 DA FUNCTIONS

3.8.1 A822_DA

- **Description:**
  This subroutine will send the 12 bits data to D/A analog output. The output range of D/A maybe 0-5V or 0-10V **setting by hardware jumper, JP1.** The software **can not detect** the output range of D/A converter. **For examples, if hardware select -5V, the 0xfff will send out 5V. If hardware select -10V, the 0xfff will send out 10V. The factory setting select 0-5V D/A output range.**

- **Syntax:**
  void A822_DA(WORD wBase, WORD wChannel, WORD wHexValue);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wChannel : [In] D/A channels number, valid range is 0 to 1
  wHexValue : [In] 12 bit data send to D/A converter

- **Return:**
  None

3.8.2 A822_Uni5_DA

- **Description:**
  This subroutine will send the 12 bits data to D/A analog output. The output range of D/A dependent on **setting by hardware jumper, JP1 (-5v or –10v) , JP10/JP11 (Bipolar or Unipolar).** The software **can not detect** the output range of D/A converter. This subroutine can be used only when the jumper's settings are **: Unipolar , -5v .** The **output range is between 0.0v and 5.0v.** Please refer to hardware manual to setting jumpers.

- **Syntax:**
  void A822_Uni5_DA(WORD wBase, WORD wChannel, float fValue);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wChannel : [In] D/A channels number, valid range is 0 to 1
  fValue : [In] 12 bit data send to D/A converter

- **Return:**
  None

3.8.3 A822_Uni10_DA

- **Description:**
  This subroutine will send the 12 bits data to D/A analog output. The output range of D/A dependent on **setting by hardware jumper, JP1 (-5v or –10v) , JP10/JP11 (Bipolar or Unipolar).** The software **can not detect** the output range of D/A converter. This subroutine can be used only when the jumper's settings are **: Unipolar , -10v .** The **output range is between 0.0v and 10.0v.** Please refer to hardware manual to setting jumpers.

- **Syntax:**
  void A822_Uni10_DA(WORD wBase, WORD wChannel, float fValue);

- **Parameter:**
  wBase : [In] I/O port base address, for example, 0x220
  wChannel : [In] D/A channels number, valid range is 0 to 1
  fValue : [In] floating value send to D/A converter

- **Return:**
  None

3.9 AD WITH INTERRUPT

3.9.1 A822_IntInstall

- **Description:**
  This subroutine will install interrupt handler for a specific IRQ level n. And allocate the data buffer in the device driver for required. For more detail information of using interrupt please refer to "Section 3.9.8 Architecture of Interrupt Mode".

- **Syntax:**
  WORD A822_IntInstall(WORD wBase, WORD wIrq,
  HANDLE *hEvent,DWORD dwCount);

- **Parameter:**

wBase	: [In] the I/O port base address for A822 card.
wIrq	: [In] the IRQ level .
hEvent	: [In] a pointer point to a event-object that created by user.
dwCount	: [In] the desired A/D entries count for interrupt transfer.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.9.2 A822_IntGetCount

- **Description:**
  This subroutine will read the transferred count of interrupt.

- **Syntax:**
  WORD A822_IntGetCount(DWORD *dwVal)

- **Parameter:**
  dwVal : [Out] return the counter-value of the interrupt transferred.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.9.3 A822_IntStart

- **Description:**
  This subroutine will start the interrupt transfer for a specific A/D channel and programming the gain code and sampling rate.

- **Syntax:**
  WORD A822_IntStart(WORD wCardType, WORD wChannel,
  WORD wGain, WORD c1, Word c2)

- **Parameter:**

wCardType	: [In] 0: for A822PGL, 1: for A822PGH
wChannel	: [In] the A/D channel. Valid range is 0 to 15.
wGain	: [In] the Gain-Code. Please refer to Section 1.2.
c1,c2	: [In] the sampling rate is 2M/(c1*c2) c1➔ Counter1, c2➔ Counter2 These values be used only when the Trigger-Mode setting to Internal-Trigger. Please refer to the function "A822_SetTriggerMode".

- **Return:**
  Refer to "Section 3.1 Error Code".

3.9.4 A822_IntGetHexBuf

- **Description:**
  This subroutine will copy the transferred interrupted data into the user's buffer.

- **Syntax:**
  WORD A822_IntGetHexBuf(DWORD dwNum, WORD wBuffer[])

- **Parameter:**
  dwNum : [In] data number to copied.
  wBuffer : [Out] the address of wBuffer(In WORD format).
  Users have to allocate spaces for this buffer and send the address into the function. This function will fill the data into this buffer. Users can analyze these data from the buffer after calling this function.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.9.5 A822_IntGetFloatBuf

- **Description:**
  This subroutine will copy the transferred interrupted data into the user's buffer.

- **Syntax:**
  WORD A822_IntGetFloatBuf(DWORD dwNum, float fBuffer[])

- **Parameter:**
  dwNum : [In] data number to be copied
  fBuffer : [Out] the address of fBuffer(In float format).
  Users have to allocate spaces for this buffer and send the address into the function. This function will fill the data into this buffer. Users can analyze these data from the buffer after calling this function.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.9.6 A822_IntStop

- **Description:**
  This subroutine will stop the interrupt transfer.

- **Syntax:**
  WORD A822_IntStop(void)

- **Parameter:**
  None

- **Return:**
  Refer to "Section 3.1 Error Code".

3.9.7 A822_IntRemove

- **Description:**
  This subroutine will remove the installed interrupt handler and free the data buffer in the device driver. Thus, users have to get the data before the data buffer been freed.

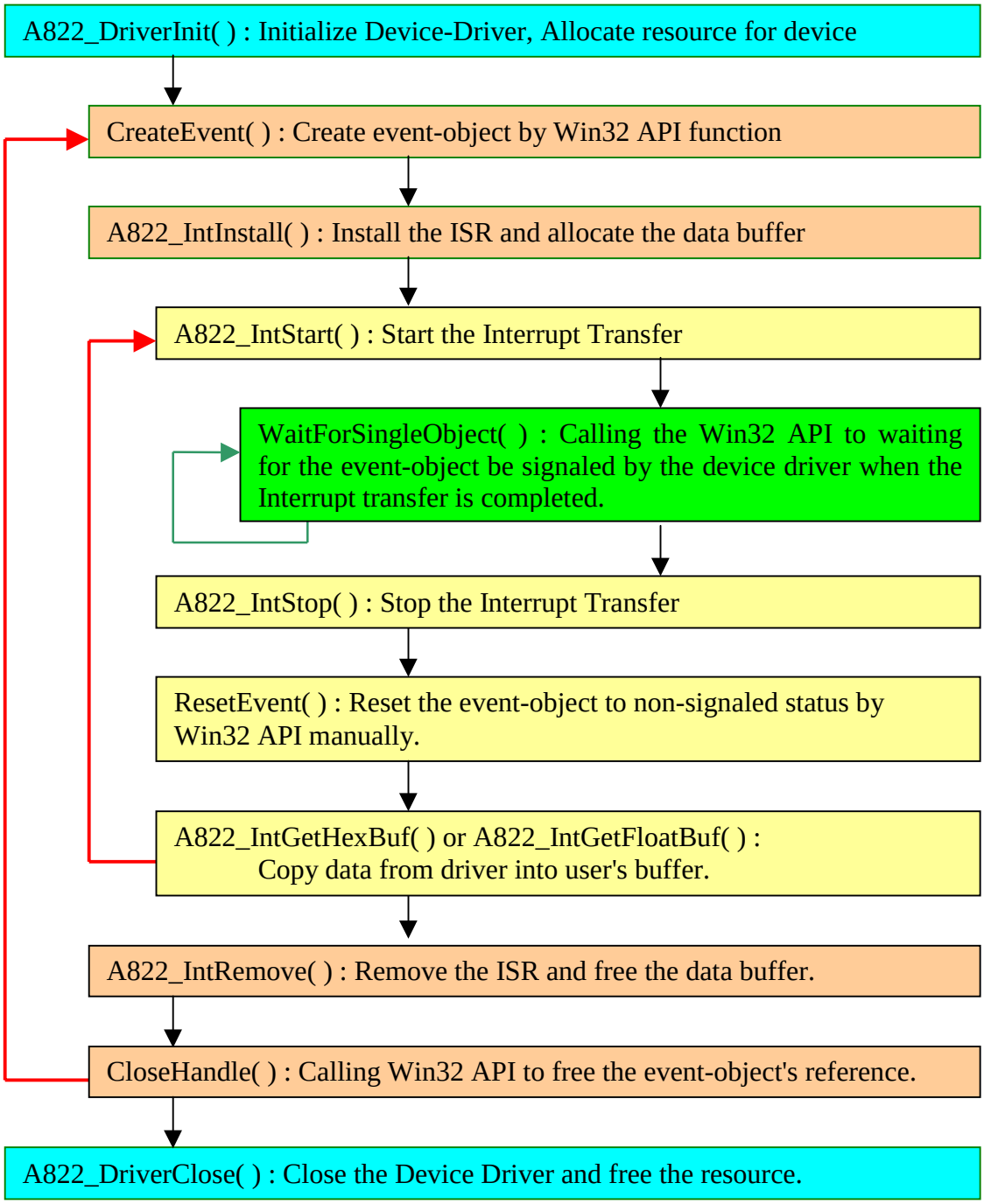
- **Syntax:**
  WORD A822_IntRemove(void)

- **Parameter:**
  None

- **Return:**
  Refer to "Section 3.1 Error Code".

3.9.8 Architecture of Interrupt mode

The 3.9.1 to 3.9.7 are these functions to perform the A/D conversion with interrupt transfer. The flow chart to program these functions is given as follows:



3.10 AD DMA FUNCTION

These DMA functions support Windows 95/98 only.

3.10.1 A822_AD_DMA_InstallIrq

- **Description:**
  This subroutine will install interrupt handler for a specific IRQ Level n and programming a DMA controller(8227) to handle DMA transfer for DMA Channel n. Usually, when a DMA transfer finished, a associated IRQ level n occur. For more detail information for using DMA, please refer to "Section 3.10.8 Architecture of DMA mode".

- **Syntax:**
  WORD A822_AD_DMA_InstallIrq
  (WORD wBase, WORD wIrq, WORD wDmaChannel);

- **Parameter:**
  wBase : [In] the I/O port base address for A822 card.
  wIrq : [In] the IRQ level n.
  wDmaChannel : [In] the DMA channel (1 or 3).

- **Return:**
  Refer to "Section 3.1 Error Code".

3.10.2 A822_AD_DMA_IsNotFinished

- **Description:**
  This subroutine is to detect if the DMA have finished.

- **Syntax:**
  WORD A822_AD_DMA_IsNotFinished(void)

- **Parameter:**
  None

- **Return:**
  0: the DMA transfer is finish.
  1: the DMA transfer is proceeding.

3.10.3 A822_AD_DMA_Start

- **Description:**

  This subroutine will allocate a DMA buffer in the system area, and programming the gain code and sampling rate. And starting the DMA transfer for a specific A/D channel.

- **Syntax:**

  WORD A822_AD_DMA_Start(WORD wCardType, WORD Ch, WORD Gain,
  WORD c1, Word c2, DWORD Count, WORD wPassOut[ ])

- **Parameter:**

  wCardType : [In] 0: A822PGL 1: A822PGH
  Ch : [In] the A/D channel. Valid range is 0 to 15.
  Gain : [In] the Gain code. Please refer to Section 1.2.
  c1,c2 : [In] the DMA sampling rate is 2M/(c1*c2)
  c1➔ Counter1, c2➔ Counter2
  These values be used only when the Trigger-Mode setting to Internal-Trigger. Please refer to the function "A822_SetTriggerMode".
  Count : [In] the desired A/D entries count for DMA transfer.
  wPassOut[] : [Out] Debug information, users have to allocate space for it.
  wPassOut[0] : [Out] 0 : successful in starting DMA transfer.
  Others: fail in starting DMA transfer.
  wPassOut[1] : [Out] system DMA buffer ID.
  wPassOut[2] : [Out] the I/O port base address.
  wPassOut[3] : [Out] the IRQ level for DMA.
  wPassOut[4] : [Out] the DMA channel no.
  wPassOut[5] : [Out] reserved.
  wPassOut[6] : [Out] reserved.
  wPassOut[7] : [Out] reserved.
  wPassOut[8] : [Out] the last 16 bits of physical address for DMA buffer in system area.
  wPassOut[9] : [Out] the first 16 bits of physical address for DMA buffer in system area.

- **Return:**

  Refer to "Section 3.1 Error Code".

3.10.4 A822_AD_DMA_GetBuffer

- **Description:**
  This subroutine will copy the transferred DMA data into the user's buffer.

- **Syntax:**
  WORD A822_AD_DMA_GetBuffer(WORD wBuffer[])

- **Parameter:**
  wBuffer : [Out] the address of wBuffer(In WORD format).
  Users have to allocate spaces for this buffer and send the address into the function. This function will fill the data into this buffer. Users can analyze these data from the buffer after calling this function.

- **Return:**
  Refer to Section "3.1 Error Code".

3.10.5 A822_AD_DMA_GetFloatBuffer

- **Description:**
  This subroutine will copy the transferred DMA data into the user's buffer.

- **Syntax:**
  WORD A822_AD_DMA_GetFloatBuffer(float fBuffer[])

- **Parameter:**
  fBuffer : [Out] the address of fBuffer(In float format).
  Users have to allocate spaces for this buffer and send the address into the function. This function will fill the data into this buffer. Users can analyze these data from the buffer after calling this function.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.10.6 A822_AD_DMA_Stop

- **Description:**
  This subroutine will free the allocated DMA buffer that in system area.

- **Syntax:**
  WORD A822_AD_DMA_Stop(void)

- **Parameter:**
  None

- **Return:**
  Refer to "Section 3.1 Error Code".

3.10.7 A822_AD_DMA_RemoveIrq

- **Description:**
  This subroutine will remove the interrupt handler installed by. A822_AD_DMA_InstallIrq(…).

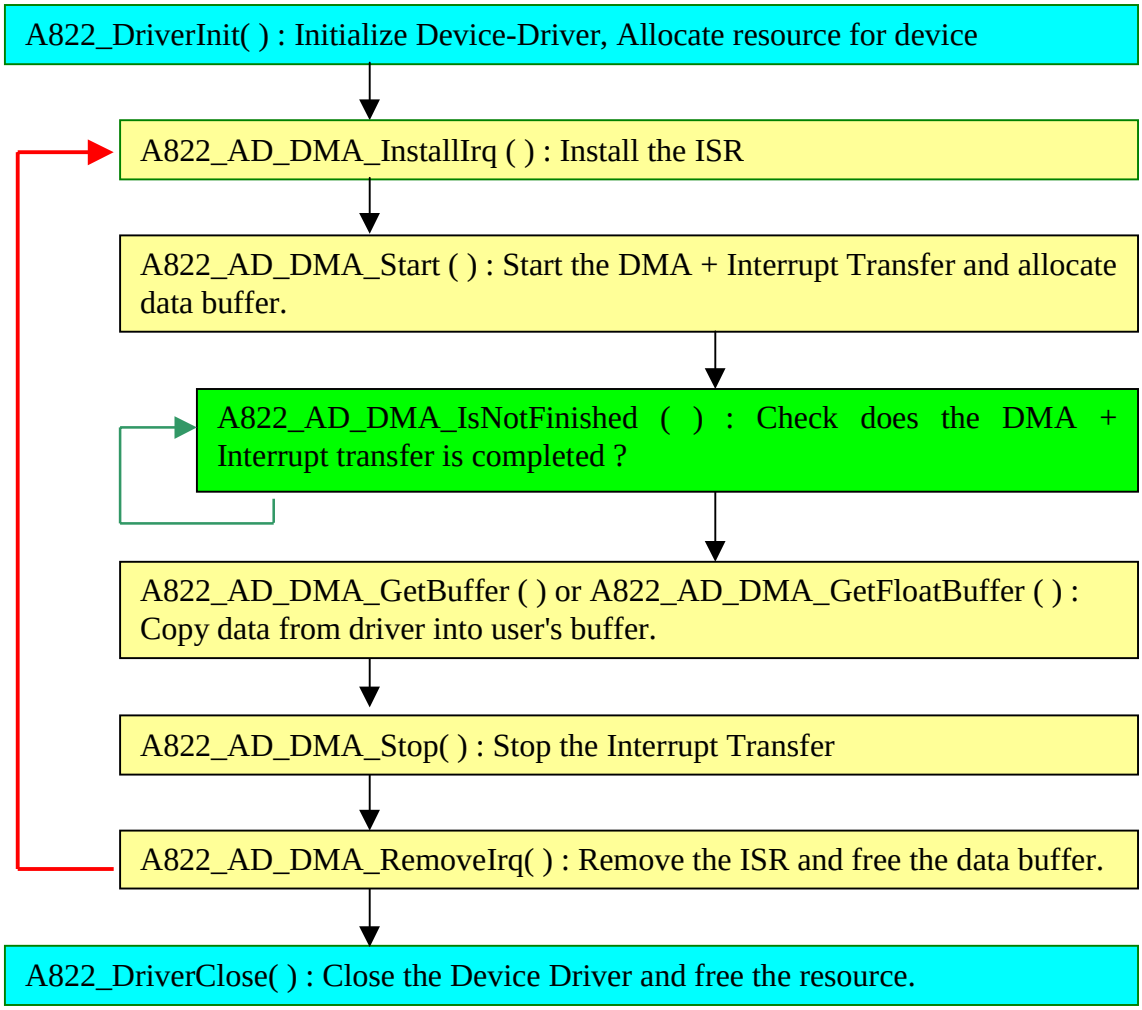
- **Syntax:**
  WORD A822_AD_DMA_RemoveIrq(void)

- **Parameter:**
  None

- **Return:**
  Refer to "Section 3.1 Error Code".

3.10.8 Architecture of DMA mode

The 3.10.1 to 3.10.7 are these functions to perform the A/D conversion with DMA transfer. The flow chart to program these functions is given as follows:

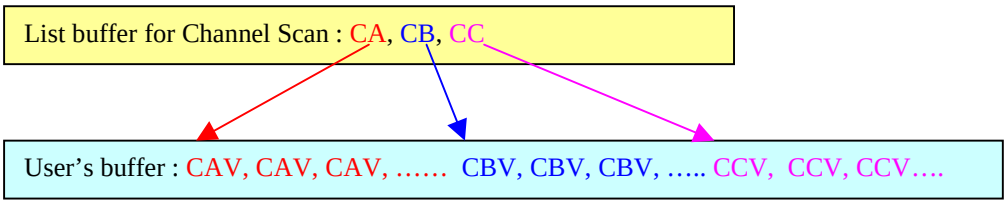


3.11 AD WITH CHANNEL SCAN

3.11.1 Introduction

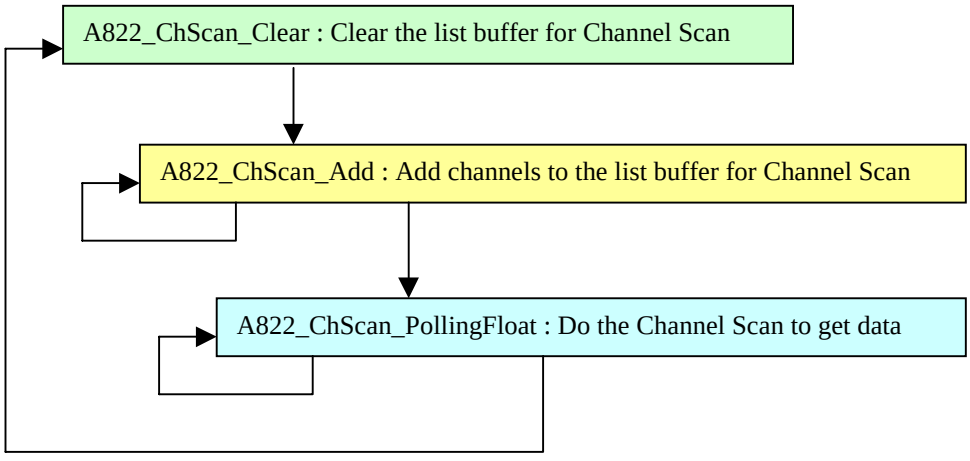
The user can specify channels into a list buffer. Other functions will do the ADC to get the data. And then read the list buffer to change to next channel and set to specify configuration code.

The data will be saved into the following style:



Note:
CA= Channel A; CB= Channel B; CC= Channel C
CAV= Channel A's value; CBV= Channel B's value;
CCV= Channel C's value

The user program's architecture as following:



3.11.2 A822_ChScan_Clear

- **Description:**
  This subroutine will clear the list buffer for the Channel Scan.

- **Syntax:**
  void A822_ChScan_Clear(void);

- **Parameter:**
  None

- **Return:**
  None

3.11.3 A822_ChScan_Add

- **Description:**
  This function will add the specified channel number and configuration-code into the list buffer for the Channel Scan. The max number of the list buffer for the Channel Scan is 100 channels.

- **Syntax:**
  WORD A822_ChScan_Add(WORD wChannel, WORD wConfig);

- **Parameter:**
  wChannel : [In] Which channel to be scanned.
  WConfig : [In] Specify the configuration-code for this channel.
  Please refer to "Section 1.2 Range Configuration".

- **Return:**
  Refer to "Section 3.1 Error Code".

3.11.4 A822_ChScan_Set

- **Description:**
  This function will clear the list buffer and then copy the specified list of channel(s) and configuration-code(s) into the list buffer for the Channel Scan. The max number of the list buffer for the Channel Scan is 100 channels.

- **Syntax:**
  WORD A822_ChScan_Set
  (WORD wChannel[], WORD wConfig[], WORD wChNum);

- **Parameter:**
  wChannel : [In] The list of channel(s) to be scanned.
  WConfig : [In] The list of configuration-code(s) for channel(s).
  Please refer to Section 1.2.
  wChNum : [In] Total channels pass into and to be scanned.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.11.5 A822_ChScan_PollingHex

- **Description:**

  This subroutine will perform a number of A/D conversions by polling. And after get the channel's data, it then read the list buffer for the Channel Scan to change to next channel and set to specified configuration code. The A/D conversing at the ISA bus's max. speed. After A/D conversing, the A/D data are stored in a buffer in Hex format.

  Before calling this function, the user have to call the A822_ChScan_Clear() and A822_ChScan_Add() or A822_ChScan_Set() functions to setup the list buffer for Channel Scan. Please refer to the "Section 3.11.1 Introduction" for more information.

- **Syntax:**

  WORD A822_ChScan_PollingHex(WORD wBase, WORD wCardType,
  WORD wBuf[], WORD wNumPerCh);

- **Parameter:**

  wBase : [In] the I/O port base address for A822 card.
  WCardType : [In] 0: A-822L 1: A-822H
  wBuf : [Out] Starting address of the data buffer (WORD format)
  Users have to allocate spaces for this buffer and send the address into the function. This function will fill the data into this buffer. Users can analyzes these data from the buffer after calling this function.

  The buffer size
  = Total-Channels * wNumPerCh * sizeof(WORD)

  wNumPerCh : [In] Number of A/D conversions will be performed for every channel.

- **Return:**

  Refer to "Section 3.1 Error Code".

3.11.6 A822_ChScan_PollingFloat

- **Description:**

  This subroutine will perform a number of A/D conversions by polling. And after get the channel's data, it then read the list buffer for the Channel Scan to change to next channel and set to specified configuration code. The A/D conversing at the ISA bus's max. speed. After A/D conversing, the A/D data are stored in a buffer in floating format.

  Before calling this function, the user have to call the A822_ChScan_Clear() and A822_ChScan_Add() or A822_ChScan_Set() functions to setup the list buffer for Channel Scan. Please refer to the "Section 3.11.1 Introduction" for more information.

- **Syntax:**

  WORD A822_ChScan_PollingFloat(WORD wBase, WORD wCardType,
  float fBuf[], WORD wNumPerCh);

- **Parameter:**

  wBase : [In] the I/O port base address for A822 card.
  WCardType : [In] 0: A-822L 1: A-822H
  fBuf : [Out] Starting address of the data buffer (floating format)
  Users have to allocate spaces for this buffer and send the address into the function. This function will fill the data into this buffer. Users can analyzes these data from the buffer after calling this function.

  The buffer size
  = Total-Channels * wNumPerCh * sizeof(float)

  wNumPerCh : [In] Number of A/D conversions will be performed for every channel.

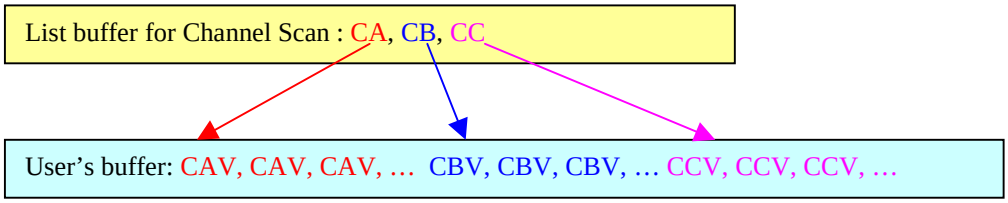
- **Return:**

  Refer to "Section 3.1 Error Code".

3.12 AD INTERRUPT, CHANNEL SCAN FUNCTION

3.12.1 Introduction

The user can specify channels into a list buffer. The other function will do the ADC to get the data. And then read the list buffer to change to next channel and set to specify configuration code.



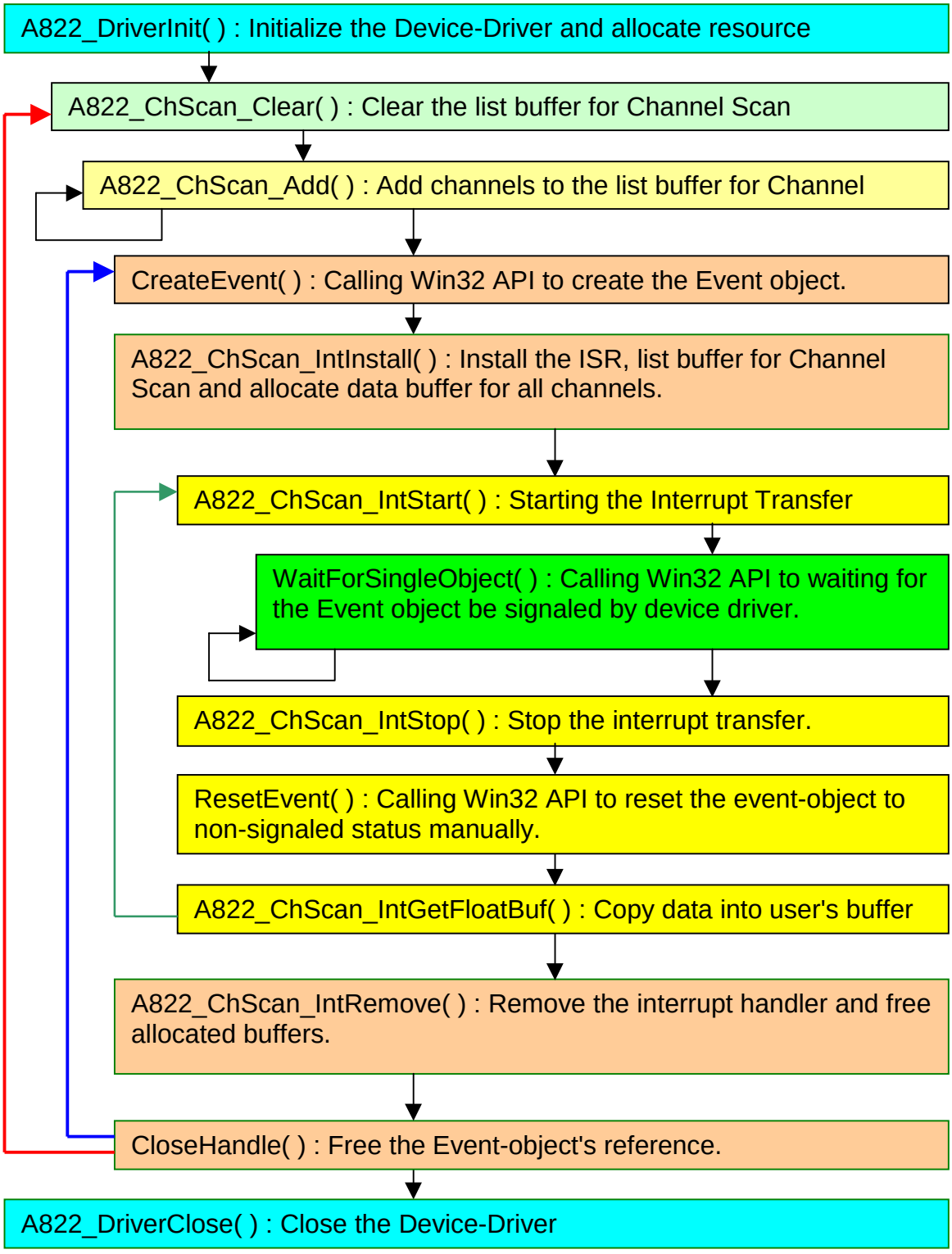
The data will be saved into the following style:

Note:
CA= Channel A; CB= Channel B; CC= Channel C
CAV= Channel A's value; CBV= Channel B's value;
CCV= Channel C's value

After setting to the next channel and specified configuration code, it have to delay for the settling time before next ADC. The interrupt service routinue doesn't delay for the settling time. Thus, to get the correct ADC data, the user have to slow-down the sampling-rate of interrupt.

The sampling-rate is for all channels.
For example:
The list buffer for the Channel Scan is setting to channel-2 and channel-0. The sampling-rate is setting to 10KHz. In actually, the cannel-2 has the sampling-rate 5KHz and the channel-0 also has the sampling-rate 5KHz.

The user program's architecture as following:



3.12.2 A822_ChScan_IntInstall

- **Description:**
  This subroutine will install interrupt handler, copy the list buffer for Channel Scan into kernel-mode driver and allocate buffers for every channels. Before install the interrupt, the user have to call the "A822_ChScan_Clear()" and "A822_ChScan_Add()" or "A822_ChScan_Set() functions to setup the list buffer for Channel Scan firstly. For more detail information of using interrupt please refer to "Section 3.12.1 Introduction".

- **Syntax:**
  WORD A822_ChScan_IntInstall(WORD wBase, WORD wIrq,
  HANDLE *hEvent, DWORD dwNumPerCh);

- **Parameter:**
  wBase : [In] the I/O port base address for A822 card.
  wIrq : [In] the IRQ level n.
  hEvent : [In] The Event handle that created by the user.
  dwNumPerCh : [In] The desired A/D count for every channels to transfer.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.12.3 A822_ChScan_IntStart

- **Description:**
  This subroutine will clear the interrupt-counter and start the interrupt transfer for the specific A/D channels and programming the gain code and sampling rate.

- **Syntax:**
  WORD A822_ChScan_IntStart(WORD c1, WORD c2, WORD wCardType);

- **Parameter:**
  c1,c2 : [In] the sampling rate is 2M/(c1*c2); c1=Counter1, c2=Counter2
  These counter's value only used when the Trigger-Mode is set to Internal-Trigger. Please refer to the "A822_SetTriggerMode" function.
  wCardType : [In] 0: A-822L 1: A-822H

- **Return:**
  Refer to "Section 3.1 Error Code".

3.12.4 A822_ChScan_IntStop

- **Description:**
  This subroutine will stop the interrupt transfer.

- **Syntax:**
  WORD A822_ChScan_IntStop(void);

- **Parameter:**
  None

- **Return:**
  Refer to "Section 3.1 Error Code".

3.12.5 A822_ChScan_IntRemove

- **Description:**
  This subroutine will remove the interrupt handler and free the buffers.

- **Syntax:**
  WORD A822_ChScan_IntRemove(void);

- **Parameter:**
  None

- **Return:**
  Refer to "Section 3.1 Error Code".

3.12.6 A822_ChScan_IntGetCount

- **Description:**
  This subroutine will read the transferred count of interrupt.

- **Syntax:**
  WORD A822_Int_GetCount(DWORD *dwVal)

- **Parameter:**
  dwVal : [Out] Returns the interrupt transferred count.

- **Return:**
  Refer to "Section 3.1 Error Code".

3.12.7 A822_ChScan_IntGetHexBuf

- **Description:**
  This subroutine will copy the transferred interrupted data into the user's buffer.

- **Syntax:**
  WORD A822_ChScan_IntGetHexBuf(WORD wBuf[])

- **Parameter:**
  wBuf : [Out] The address of wBuf(WORD format).
  Users have to allocate spaces for this buffer and send the address into the function. This function will fill the data into this buffer. Users can analyzes these data from the buffer after calling this function.
  Buffer size = Total-Channels * dwNumPerCh * sizeof(WORD)

- **Return:**
  Refer to "Section 3.1 Error Code".

3.12.8 A822_ChScan_IntGetFloatBuf

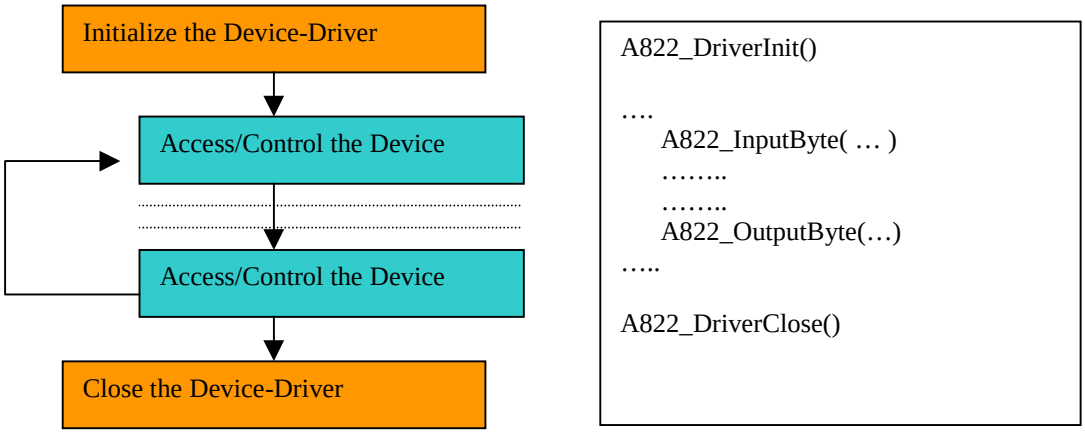
- **Description:**
  This subroutine will copy the transferred interrupted data into the user's buffer.

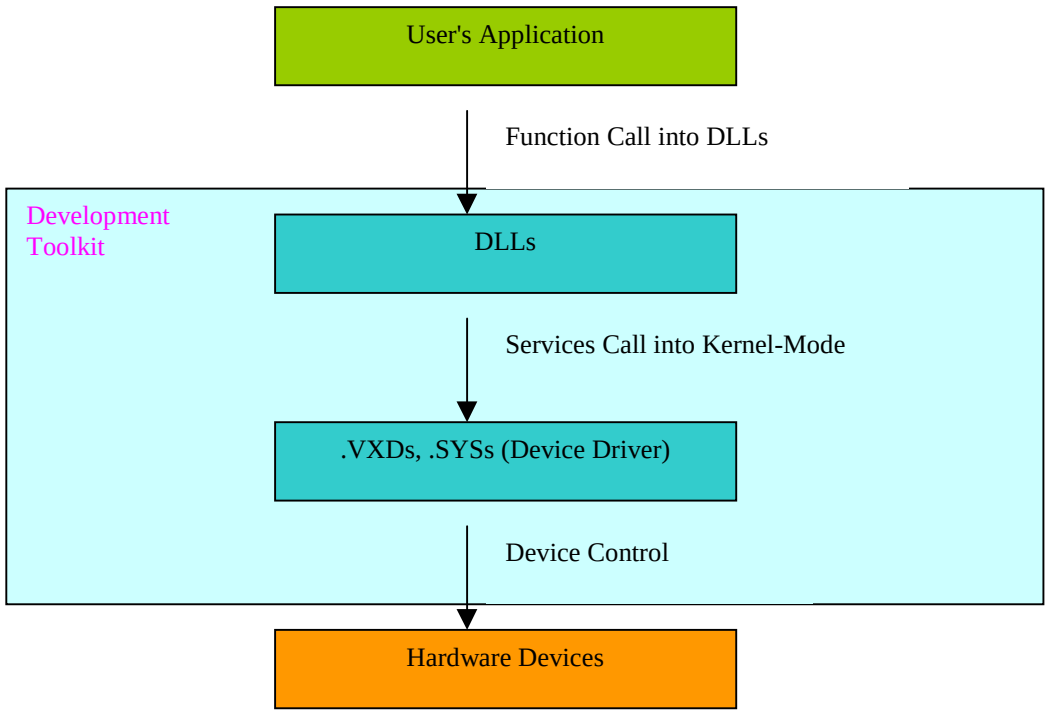
- **Syntax:**
  WORD A822_ChScan_IntGetFloatBuf(float fBuf[])

- **Parameter:**
  fBuf : [Out] The address of fBuf(float format).
  Users have to allocate spaces for this buffer and send the address into the function. This function will fill the data into this buffer. Users can analyze these data from the buffer after calling this function.
  Buffer size = Total-Channels * dwNumPerCh * sizeof(float)

- **Return:**
  Refer to "Section 3.1 Error Code".

4. PROGRAM ARCHITECTURE





5. PROBLEMS REPORT

Technical support is available at no charge as described below. The best way to report problems is send electronic mail to

Service@icpdas.com

on the Internet.

When reporting problems, please include the following information:

1) Is the problem reproducible? If so, how?

2) What kind and version of Operation Systems that you running? For example, Windows 3.1, Windows for Workgroups, Windows NT 4.0, etc.

3) What kinds of our products that you using? Please see the product's manual.

4) If a dialog box with an error message was displayed, please include the full text of the dialog box, including the text in the title bar.

5) If the problem involves other programs or hardware devices, what devices or version of the failing programs that you using?

6) Other comments relative to this problem or any Suggestions will be welcomed.

After we received your comments, we will take about two business days to testing the problems that you said. And then reply as soon as possible to you. Please check that we have received your comments? And please keeping contact with us.

E-mail: Service@icpdas.com
Web-Site: http://www.icpdas.com