DDS-3005 USB SDK manual

DDS-3005 USB offers the agile interface of second time development for users, and offers examples for many languages and the editor .Users can use the functions interface in DDSCON.DLL to implement all functions of DDS-3005 USB, and to be inserted into other auto-measuring systems.

Let's explain every function interface using VC. Interface of any language implement complete same functions. It's used to reference. The declaration of interface can reference second time development that our company offers for you. Users pay attention to the questions of the variable type and address's transfer.

1 Control memory setting

```
//Optional parameters
#define     SINGLE_WAVE                    0x01
//Single waveform
#define     CONSTANT_WAVE                  0x00
//Constant   waveform
#define       EXT_RAISING_TRIG             0x02
//External raising trigger
#define  EXT_FALLING_TRIG     0x00              //
External falling trigger
#define     EXT_TRIG_EN                    0x04
//External trigger
```

#define INT_TRIG_EN 0x00
//Intramural trigger
#define START_OUTPUT 0x00
// Start output
#deine STOP_OUTPUT 0x10
//Stop output

#define FRQ_TEST 0x00
/Frequency test state
#define COUNTER 0x80
//Counter state
#define COUT_LATCH 0x00 // F
#define COUT_NOT LATCH 0x40
//Output latch
__declspec(dllimport) BOOL WINAPI SetCON(unsigned char d,int index);

Parameters introduction：d unsigned 8 bits integer.
Index device number to operate
Return value：If return true, it express successful setup, else express failing setup.
Example：BOOL Flag;

```
Flag=SetCON(CONSTANT_WAVE|
        EXT_FALLING_TRIG|
        INT_TRIG_EN|
            FRQ_TEST|
            COUT_NOT LATCH,0);
```

Note：The hardware of signal controls the state of signal set by 8 bits control memory（Bit7 to Bit0）.
Bit0：

If return 1, it express output waveform is single waveform，The trigger touch off one single waveform every time。If isn't single, the voltage will hold the state of last sample.

If return 0, it express output continuous. If be touched off (From inside or exterior), it will output periodic waveform hour after hour.

Bit1：

If return 1, it express to appear raising trigger.

If return 0, it express to appear falling trigger.

Bit2：

If return 1, it express to external trigger work.

If return 0, it express to intramural trigger work.

Bit3：hold

Bit4：

If return 0, it express to start wave output.

If return 1, it express to stop waveform output and wait for trigger.

Bit5：hold

Bit6：

If return 0, it express to frequency counter's output latch then counter signal.

If return 0, it express to connect directly. If the counter works, it should first be latch then read, last latch.

Bit7：

If return 0, it express state that the frequency test, reset frequency counter.

If return 1, it express the counter works , being not effected by intramural gating signal.

2 8 bits digital I/O control

__declspec(dllimport) BOOL WINAPI DigitalInOut(unsigned char d,unsigned char *o,int index);

Parameters：d 8 bits unsigned integer， express 8 bits output I/O
Index device number to operate
Value:
O point to 8 bits unsigned integer pointer, saving the 8 bits I/O result to the address.

Return value：If return true ,it express successful operation，else express failing operation.
Example：BOOL Flag;
Unsigned char OutVal=0xaa;
Unsigned char InVal;
Flag= DigitalInOut(OutVal,&InVal,0);

3 Set frequency of output sample point

__declspec(dllimport) BOOL WINAPI SetAD9850(unsigned long d,int index);

Parameters：d unsigned long integer.
Index device number to operate
Return value：If return true ,it express successful operation，else express failing operation.
Example：BOOL Flag;
Unsigned Long FrqVal=10000;

Flag= SetAD9850 (FrqVal ,0);

Note: Set out frequency of sample point is F, d is 32 bits parameter, then:

F=100 * d / 4294967296 （MHz）

4 Set relay state

```
//optional parameters
#define MASK_FIR_NOT_5M   0x01          //Filter cut-off frequency less than 5M
#define MASK_FIR_PAS_5M   0x02          //Filter cut-off frequency is 5M
#define MASK_AMP_D15FU    0x10          //Waveform normal scope
#define MASK_AMP_N10DB    0x20          //Waveform output attenuate 20dB
#define MASK_OUT_HZ       0x04          //Output closed
#define MASK_OUT_EN       0x08          //Output opened
#define MASK_COP_AC       0x40          /Input frequency AC coupling
#define MASK_COP_DC       0x80          //Input frequency DC coupling
__declspec(dllimport) BOOL WINAPI SetRelay(unsigned char d,int index);
```

Parameters：D 8 bits unsigned integer

Index device number to operate

Return value：If return true ,it express successful operation，else express failing operation.

Example：BOOL Flag;

Flag= SetRelay(MASK_OUT_EN,0);

Note: There are four Relays in the signal fountain, control them by value in optional parameters. This operation will cost 100ms, that is the filter execute time.

5 Select frequency counter input

//optional parameters

#define FRQ_DC_20M 0x01 /Select low frequency input

#define FRQ_10M_2700M 0x00 //Select high frequency input

__declspec(dllimport) BOOL WINAPI SetFinSource(unsigned char d,int index);

Parameters: d 8 bits unsigned integer

Index device number to operate.

Return value：If return true ,it express successful operation，else express failing operation.

Example：BOOL Flag;

Flag= SetFinSource (FRQ_10M_2400M ,0);

Note: There are two interface of signal input, one is high frequency input (10 to 2.7GHz), another is low frequency input(DC to 20M).

6 Reset counter and startup frequency one time test

__declspec(dllimport) BOOL WINAPI StartFrqMeasure(int index);

Parameters: Index device number to operate

Return value：If return true ,it express successful operation，else express failing operation.

Example：BOOL Flag;

Flag= StartFrqMeasure(0);

Note: When it works in the frequency test state, it reset counter and bring one time intramural gating signal. The signal persists 1000ms, and carry through frequency counter. When it is the counter state, the function only reset the counter.

7 Set address counter’s last address

__declspec(dllimport) BOOL WINAPI SetEndAddr(unsigned long d,int index);

Parameters： d unsigned long integer.

Index device number to operate

Return value：If return true ,it express successful operation，else express failing operation.

Example：BOOL Flag;

Unsigned Long AddrVal=10000;

Flag= SetEndAddr (AddrVal,0);

Note: There is a 256K unit of 16 bit width in the signal fountain. So the address of end area is from 0000H to 3FFFF.This function should execute before send the waveform data to signal set. After that, reset address counter and stop it. Wait for the user sending over the data.

8 Set output filter cut-off frequency

//optional parameter
#define FIR_1K 0x00
#define FIR_10K 0x02
#define FIR_100K 0x01
#define FIR_1M 0x03
__declspec(dllimport) BOOL WINAPI SetFir(unsigned char d,int index);

Parameter ：d 8 bits unsigned integer.
Index device number to operate
Return value ：If return true ,it express successful operation，else express failing operation.
Example ：BOOL Flag;
Flag= SetFir (FIR_10K, 0);
Note ：No other than the relay is set to output filter cut-off frequency that is less 5MHz, the function exerts operation. Otherwise it will is still 5MHz, cut-off frequency is not effected by functions setting.

9 Clear the address counter and start

__declspec(dllimport) BOOL WINAPI FrameNegtivePulse(int index);

Paramemter: Index device number to operate
Result：If return true ,it express successful operation，else express failing operation.
Example：BOOL Flag;
Flag= FrameNegtivePulse(0);
Note：The function should be use after transfer Wave form data to inside of the signal fountain. After the function that set address counter's last address is used, the address counter has stopped and waited for program carry data of waveform to signal RAM. When transfer stop, function is used and start address counter again and send the signal fountain output waveform.

10 Read the value of the counter.

__declspec(dllimport) unsigned long WINAPI GetFrqMeasureResult(int index);
Parameter**:** Index device number to operate
result：The value of the counter.
example：Long CounterVal;
CounterVal= GetFrqMeasureResult (0);
Note：When you are testing frequency ,the function should be use after starting one time frequency test for 1000ms,When the counter is working, the function should

be use after enable the flip-latch of the counter. Then Unable the flip-latch of the counter.

11 Transfers Wave form data to the signal fountain

__declspec(dllimport) BOOL WINAPI SendDataPackage64(unsigned char *d,unsigned int n,int index);

Parameter：d waveform buffer the first pointer.
n the number of bits in the waveform buffer.
Index device number to operate
Result ： If return true ,it express successful operation，else express failing operation.
Example ：

```
Unsigned char Buf[200];
FlagSetAD9850 (1000000);          //Set the rate of renovation
for(int i=0;i<100;i++) //Compute one cycle sine wave form
{
unsigned int Temp = (unsigned int)(8192 + 8000 * sin(i * 3.14159265 * 2 / 100));
Buf[2 * i] = Temp % 256;
Buf[2 * i + 1] = Temp / 256;
}
SetEndAddr (99);                  //Setting the last address of the address counter
SendDataPackage64(Buf, 200,0); //Transfers Waveform
```

data to RAM of the signal fountain.

FrameNegtivePulse(0); //Clear the address counter and start work.

Note：One sample point has two bytes，but the efficiency width are 14 bits. The value is relation of linearity with the output voltage. 0000H is correspond with -10V，3FFFH is correspond with +10V.The low 8 bits of every sample point are save at low address of the buffer. The high 8 bits of every sample point are save at high address of the buffer. The samples give us a program that transfers 100 points to the signal fountain.

If the return of the interface function is False, it express the communication with USB interface is failed. User can use the interface functions reference the samples of many languages.

12 Read Address

__declspec(dllimport) BOOL WINAPI Read24C01(unsigned char Addr,unsigned int *Dat,int index);

Parameters:

addr:the pipe number to operator

Dat the buffer for receive data.

Index device number to operate

Result ： If return true ,it express successful operation，else express failing operation.

Example ：

unsigned int temp;

If(!Read24C01(0,&temp,0)

MessageBox(¡°Read Error!¡±);

Else

MessageBox(¡°Read OK!¡±);

Note:

Read Address.

13 Write Address

__declspec(dllimport) BOOL WINAPI Write24C01(unsigned char Addr,unsigned int Dat,int index)

Parameters: addr:the pipe number to operate

Dat the buffer for sending out data.

Index Device number to operate

Result ： If return true ,it express successful operation，else express failing operation.

Example ：

Unsigned int buf;

If(Read24C01(0,buf,0))

MessageBox(¡°Write OK¡±);

Else

MessageBox(¡°Write Error!¡±

Note:

Write Address.

14 Initialize USB Device

__declspec(dllimport) int WINAPI GetItemNum(int *addr,int

&len);

Parameters:addr array for device index

Len the length of add

Result ： If return 0, it express successful operation.

If return 1, express failing operation.

Example ：

```
Int addr[127],len;
Int res=GetItemNum(addr,len);
If(res==0)
{
    Return OK;
}
Else
{
    Return ERROR;
}
```

Note: initialize all devices, and get the number of devices.

You must call this function before operation.