SUSI® Library

Version 1.2

User's Manual

Advantech Co. Ltd.

No. 1, Alley 20, Lane 26,
Rueiguang Road, Neihu District,
Taipei 114, Taiwan, R. O. C.

www.advantech.com

Copyright Notice

Part No.
Version: 1.2

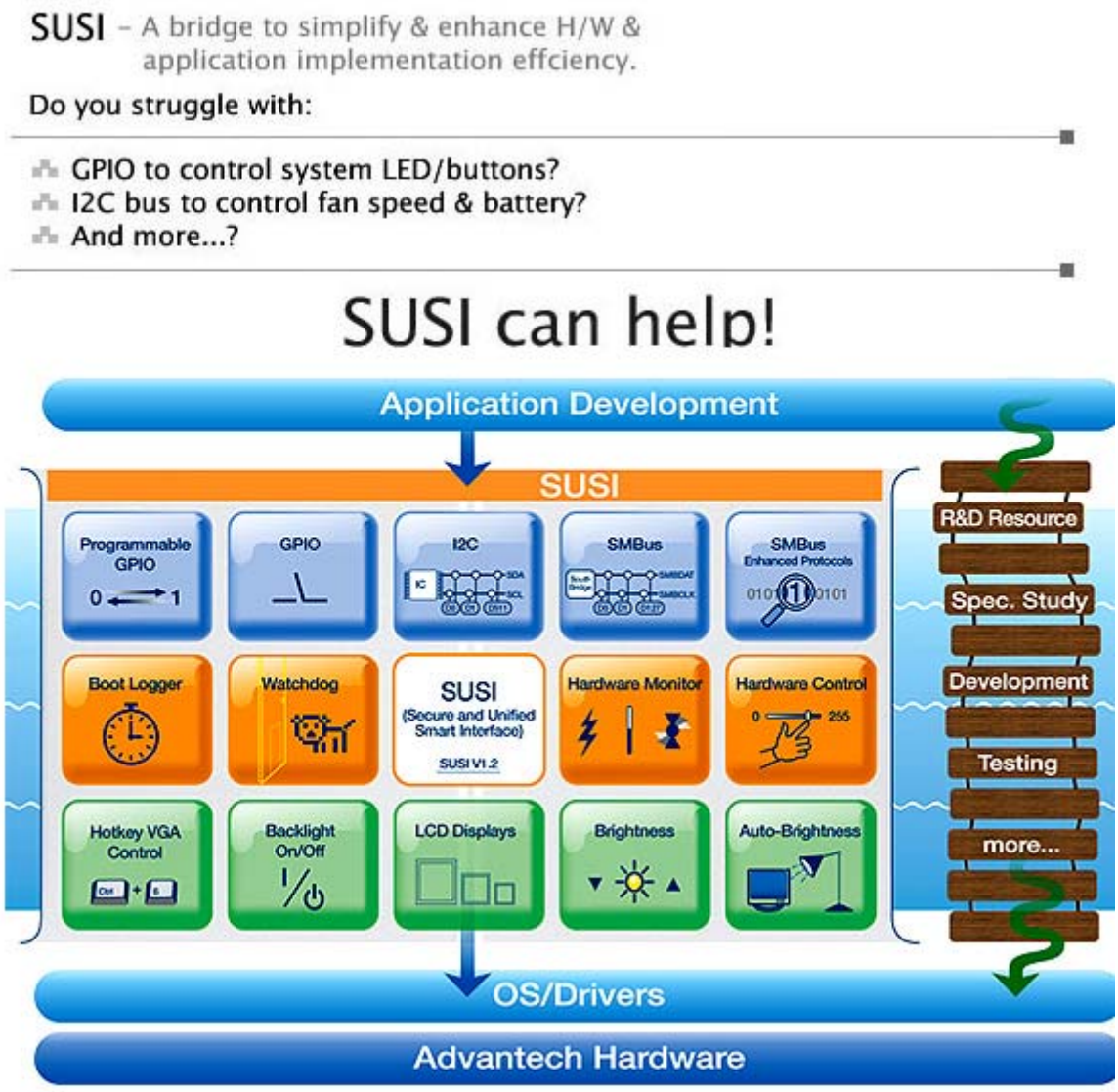
Printed in Taiwan 2007-07-16

Version History

Date	Version	Part no	Remark
2006-7-27	1.0		New release
2006-9-29	1.1		Add hardware monitoring support for SOM-4472/SOM-4475/SOM-4481/SOM-4486
2007-6-27	1.2		Add many new functionalities over Control APIs Programmable GPIO, SMBus Enhanced Protocols Monitoring APIs Boot Counter and Running Timer, H/W Control Display APIs Auto-Brightness, Hotkey VGA Control Debug API Get last error code About new SUSI-enabled platforms, please refer to Appendix A

Table of Contents

Introduction



When developers want to write an application that involves hardware access, they have to study the specifications to write the drivers. This is a time-consuming job and requires lots of expertise.

Advantech has done all the tasks for our customers by the release of a suite of APIs (Application Programming Interfaces), called the **Secured & Unified Smart Interface** (SUSI).

SUSI provides not only the underlying drivers required but also a rich set of user-friendly, intelligent and integrated interfaces, which speeds development, enhances security and offers add-on value for Advantech platforms. SUSI plays the

role of catalyst between developer and solution, and makes Advantech embedded platforms easier and simpler to adopt and operate with customer applications.

Benefits

- **Faster Time to Market**
  SUSI's unified API helps developers write applications to control the hardware without knowing the hardware specs of the chipsets and driver architecture.
- **Reduced Project Effort**
  When customers have their own devices connected to the onboard bus, they can either: study the data sheet and write the driver & API from scratch, or they can use SUSI to start the integration with a 50% head start. Developers can reference the sample program on the CD to see and learn more about the software development environment.
- **Enhances Hardware Platform Reliability**
  SUSI provides a trusted custom ready solution which combines chipset and library function support, controlling application development through SUSI enhances reliability and brings peace of mind.
- **Flexible Upgrade Possibilities**
  SUSI supports an easy upgrade solution for customers. Customers just need to install the new version SUSI that supports the new functions.

SUSI Contains 3 + 1Categories of Features:

- **Control**
  Control to the devices connected with GPIO, I2C and SMBus buses
- **Display**
  Adjust the brightness of LCD panels or turn on/off the power of display devices
- **Monitor**
  Monitor the system status, including voltage, temperature, fan speed and Watchdog function to restart if it freezes or crashes.
- **Debug**
  Let’s go easy debug with SUSI**.** When an SUSI API call fails, the error code helps programmers to know what exactly the error is. All the possible errors have been listed.

Control

- **GPIO**

General Purpose Input/Output is a flexible parallel interface that allows a veriety of custom connections. It supports various Digital I/O devices – input devices like buttons, switches; output devices such as cash drawers, LED lights…etc, allows users to monitor the level of signal input or set the output status to switch on/off the device.

- **Programmable GPIO**

The Programmable GPIO API allows developers to dynamically set the GPIO input or output status, GPIO in/out status is usually defined in BIOS, if customers need to have different settings, they must modify the BIOS. Now with the new Programmable GPIO, customers can change the settings in their application by calling the SUSI API; greatly saving development time.

- **SMBus**

SMBus is the System Management Bus defined by Intel® Corporation in 1995. It is used in personal computers and servers for low-speed system management communications. Today, SMBus is used in all types of embedded systems.
The SMBus API allows a developer to interface a Windows XP or CE PC to a downstream embedded system environment and transfer serial messages using the SMBus protocols, allowing multiple simultaneous device control.

- **SMBus Enhanced protocols**

New SMBus protocols allow developers to control and access devices easily. SMBus is used more and more in embedded system design for many low-bandwidth devices. This new API saves a lot of R&D development effort.

- **I²C**

I²C is a bi-directional two wire bus that was developed by Philips for use in their televisions in the 1980s. Today, I²C is used in all types of embedded systems.
The I²C API allows a developer to interface a Windows XP or CE PC to a downstream embedded system environment and transfer serial messages using the I²C protocols, allowing multiple simultaneous device control.

Monitor

- **Watchdog**

A watchdog timer (WDT) is a device or electronic card that performs a specific operation after a certain period of time if something goes wrong with an electronic system and the system does not recover on its own.
A watchdog timer can be programmed to perform a warm boot (restarting the system) after a certain number of seconds during which a program or computer fails to respond following the most recent mouse click or keyboard action.

- **Hardware Monitor**

The Hardware Monitor (HWM) API is a system health supervision API that inspects certain condition indexes, such as fan speed, temperature and voltage.

- **Boot Logger**

The Boot Logger API can be used to monitor the device boot times and running hours. Customers can read the log data to decide when to replace a new device before it runs to the end of its life, or use it as an index to take action.

- **Hardware Control**

The Hardware Control API allows developers to set the PWM (Pulse Width Modulation) value to adjust Fan Speed or other devices; can also be used to adjust the LCD brightness.

Display

- **Brightness Control**

The Brightness Control API allows a developer to interface Windows XP and Windows CE PC to easily control brightness.

- **Auto-Brightness**

The Auto-Brightness function contains a new API and a Light Sensor IC, so systems can have an Auto-Brightness adjustment utility built-in.

- **Backlight**

The Backlight API allows a developer to control the backlight (screen) on/off in Windows XP and Windows CE. Users can press CTRL + ALT + “1” or “0” for on or off.

- **Hotkey VGA Control**

The Hotkey VGA Control API provides a Hotkey for VGA Control; users can press CTRL + ALT + “+” or “-” to increase or decrease brightness. Pressing Ctrl ALT + “6” will get 60% brightness.

Environments

The operating systems that SUSI supports:

- Windows CE .NET
- Windows XP Embedded
- Windows XP Pro or Home Edition

For the complete list of SUSI-enabled platforms, please refer to Appendix A. Note that the list may be changed without any notifications. For the latest support list, please check it out on the web site at. http://www.advantech.com.tw/ess/SUSI.asp Should you have any questions about your Advantech boards, please contact us by a direct phone call or E-mail.

Package Content

SUSI currently supports two operating systems - Windows CE and Windows XP. The content for users is listed below:

Operating System	Location	Installation
Windows XP(e)	C:\Program Files\SUSI\V12	Setup.exe
Windows CE	\Program Files\SUSI\V12	Image Built-in
Directory	**Contents**	
User Manual	SUSI.pdf	
Library Files	• Susi.lib Function export • Susi.dll Dynamic link library	
Include Files	• Susi.h • Debug.h / Errdrv.h / Errlib.h	
SusiDemo	• SusiDemo.exe Demo program execution file • Susi.dll Dynamic link library	
SusiDemo\SRC\ C#	Source code of SusiDemo program in C#, VS2005	
SusiDemo\SRC \VB.NET	Source code of Watchdog of SusiDemo program in VB.NET, VS2005	

Additional Programs

VGA Control Hotkey Utility

The VGA control hotkey utility, **SusiHotkey.exe**, automatically runs during system startup in both Windows XP and Windows CE. It provides users with an easy access to VGA functionalities with the following hotkey assignment.

Key	Action
Ctrl + Alt + '+'	Increase brightness by 10%
Ctrl + Alt + '-'	Decrease brightness by 10%
Ctrl + Alt + '6'	Set brightness to 60 %
Ctrl + Alt + '1'	Turn VGA display on
Ctrl + Alt + '0'	Turn VGA display off

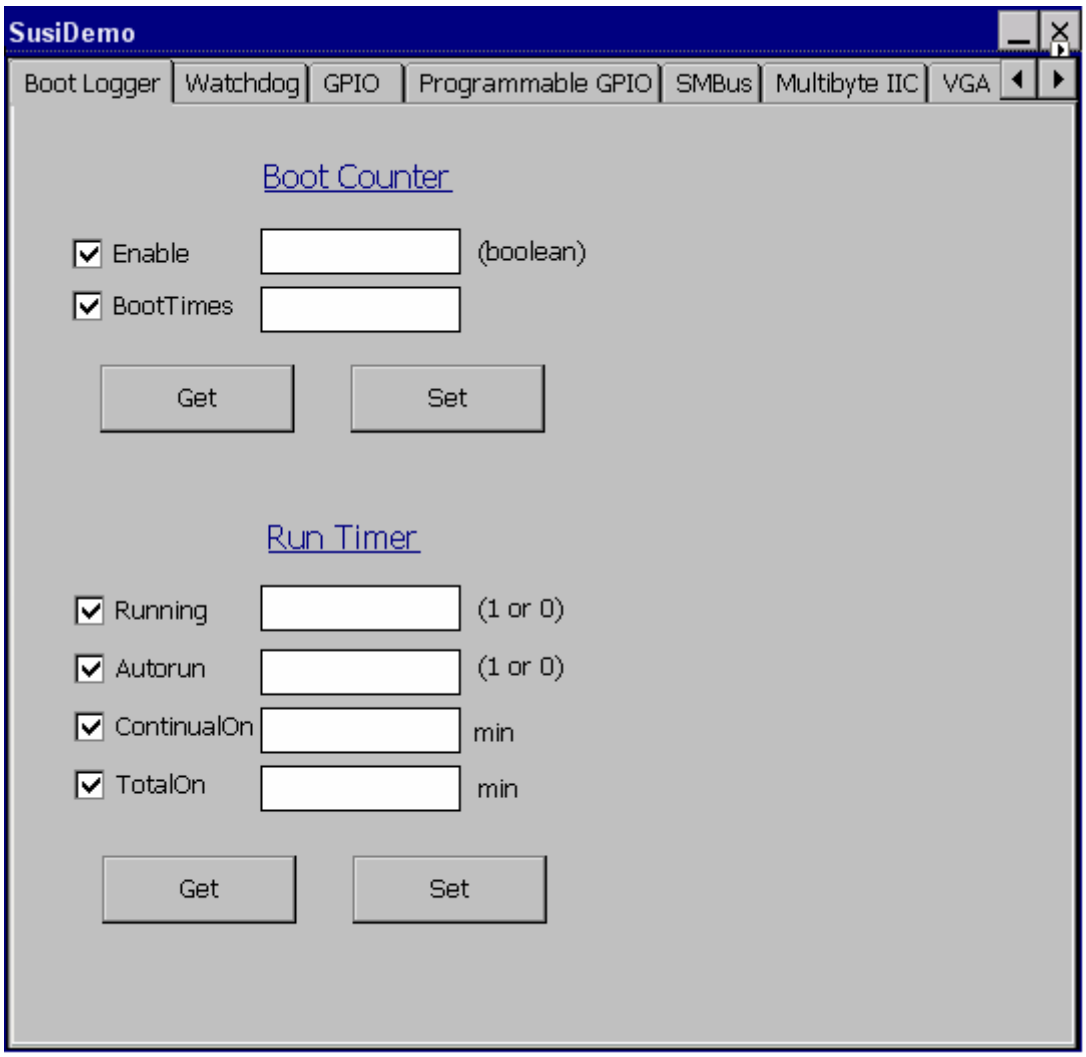
Demo Programs

The SUSI demo programs demonstrate how to incorporate SUSI APIs into user's own applications written in either C# or VB.NET:

- **SusiDemo** is written in C# and based upon .NET Compact Framework 2.0, Visual Studio 2005. It contains all the SUSI features. The execution file, **SusiDemo.exe**, released with source code can be run on both Windows XP and Windows CE.
- **SUSI_WDT_VB** is written in VB and based upon .NET Compact Framework 2.0, Visual Studio 2005. It demonstrates how to use SUSI with VB.NET.
  The execution file, **SUSI_WDT_VB.exe**, released with source code can be run on both Windows XP and Windows CE.

The following pages are a detailed introduction to the **SusiDemo** program:

Boot Logger



This part belongs to the feature Core in SUSI APIs.

- Check the CheckBox to select the information of a certain item to be got or set in its TextBox.

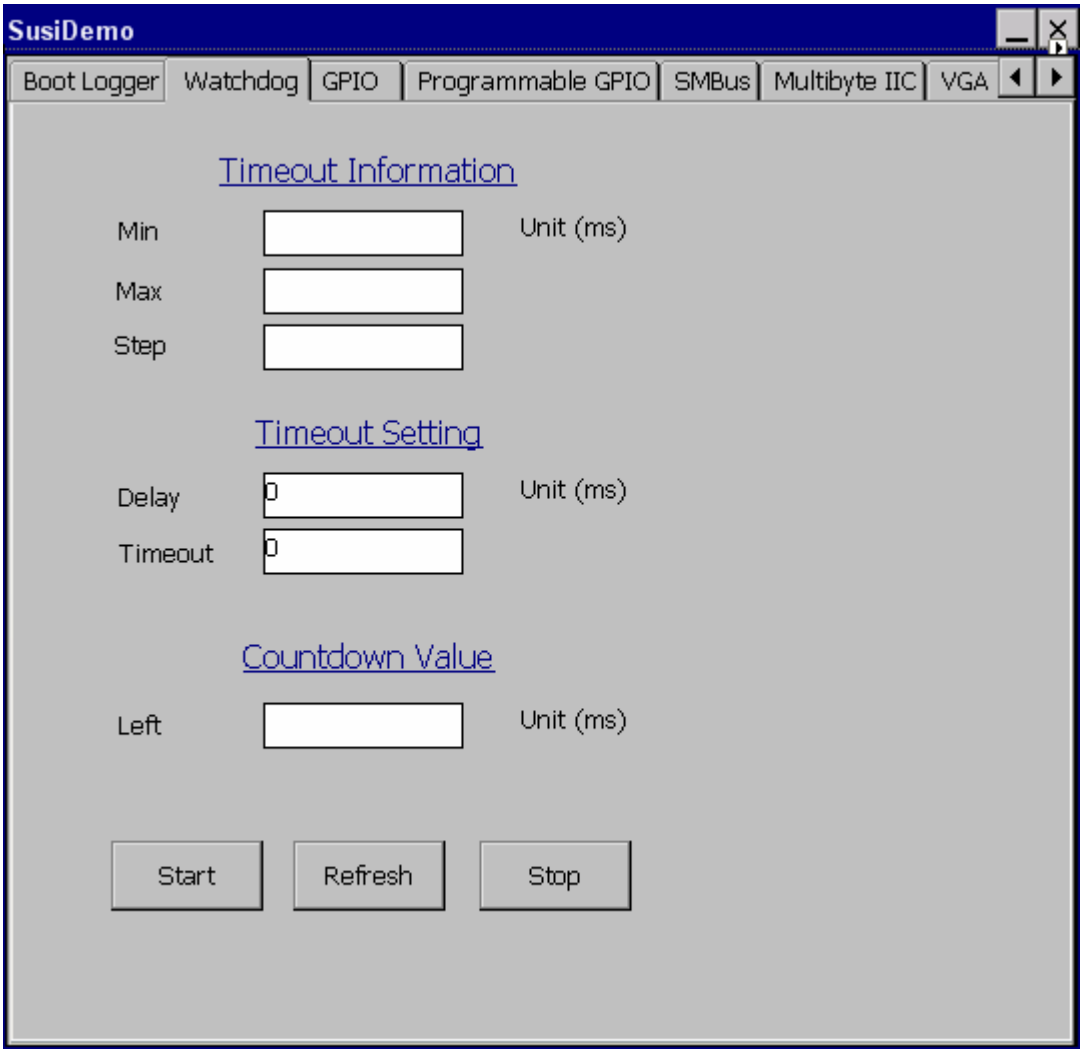
In Boot Counter

- If you want to reset the **BootTimes** to 0, just text a 0 in its TextBox with its CheckBox being checked, and then press Button “Set”.

In Run Timer

- If you set 1 to “Running”, the timer starts counting, a 0 to stop.
- If you set 1 to “Autorun”, the timer will start next time when the system restarts.

Watchdog

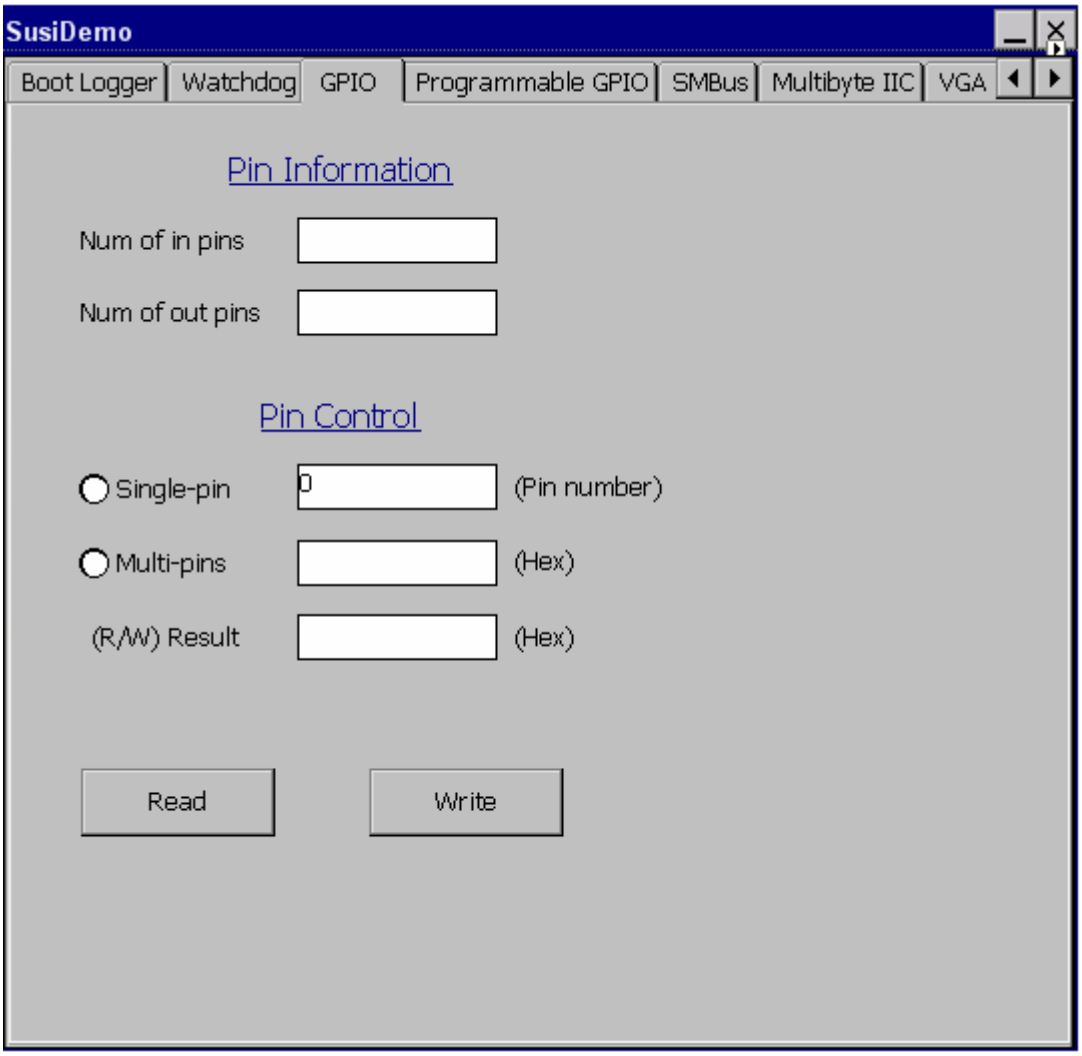


When SusiDemo program executes, it shows watchdog information in "Timeout Information" field - "Min", "Max", and "Step" of timeout in milliseconds. For example, a range 1-255-second watchdog will have a 1000 min timeout, a 255000 max timeout, and a 1000 timeout step.

Here is an example of how to use it:

- Set the timeout value, say 3000 (3 sec.) in TextBox of "Timeout" and set delay value 2000 (2 sec.) in TextBox of "Delay" (optional), and click the "Start" Button. The TextBox of "Left" will show the approximate countdown value the watchdog is currently running. (This is a software timer in the demo program, not the actual watchdog hardware timer so it is not very accurate)
- Before the timer counts down to zero, you may reset the timer by click the "Refresh" Button, or just "Stop" it.

GPIO



This page is only for backward compatible with previous old APIs that are direction unchangeable. So in new GPIO supported platforms in SUSI V12, this page will not be shown. **We highly recommend our users to use the new Programmable GPIO.**

When SusiDemo program executes, it displays the fixed numbers of input pins and output pins in “Pin Information” field. You can click RadioButton to choose from the operations of either “Single-pin” or “Multi-pins”. For GPIO pins information on platforms, please refer to Appendix **.**

Read Single Input Pin

- Click the RadioButton of “Single-Pin”.
- Key in the input pin number to read the status from. Pin number begins from 0 to (total number of input pins minus 1).

- Click Button “Read” and then the status of GPIO pin will be shown in “(R/W) Result”.

Read Multiple Input Pin

- Click the RadioButton of “Multiple-Pins”.
- Key in the pin number from ‘0x01’ to ‘0x0F’ to read the statuses of the input pins. The pin numbers are bitwise-ORed, i.e. bit 0 stands for input pin 0, bit 1 stands for input pin 1, etc. For example, if you want to read input pin 0, 1, and 3, the value assigned in TextBox of “Multiple-Pins” should be ‘0x0B’.
- Click Button “Read” and then the statuses of GPIO pins will be shown in “(R/W) Result”.

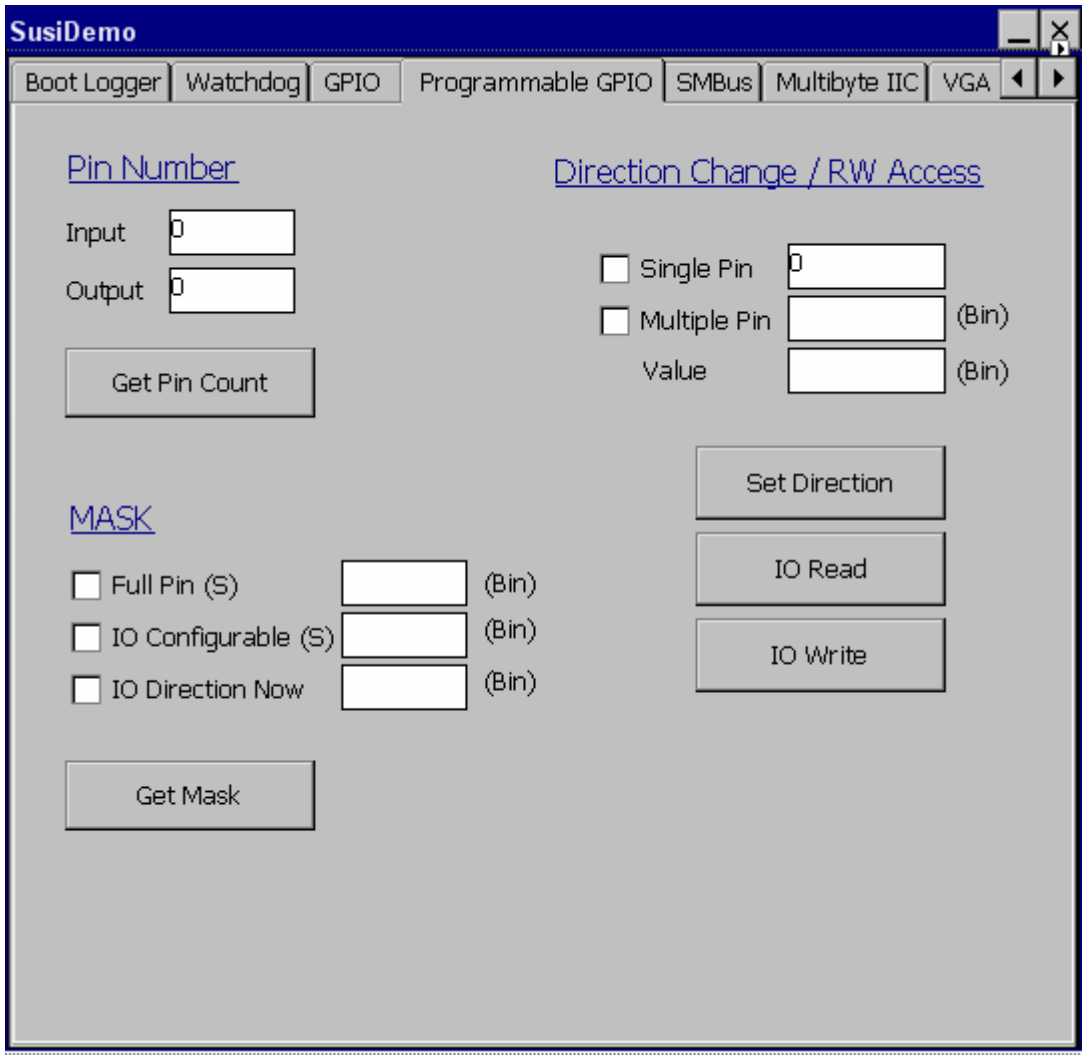
Write Single Output Pin

- Click the RadioButton of “Single-Pin”.
- Key in the output pin number to write the status to. Pin number begins from 0 to (total number of output pins minus 1).
- Key in either '0' or '1' in “(R/W) Result” to set the output status as low or high.
- Click Button “Write” to perform the operation.

Write Multiple Output Pins

- Click the RadioButton of “Multi-Pins”.
- Key in the pin number from ‘0x01’ to ‘0x0F’ to choose the output pins to write. The pin numbers are bitwise-ORed, i.e. bit 0 stands for output pin 0, bit 1 stands for output pin 1, etc. For example, if you want to write output pin 0, 1, and 3, the pin numbers should be ‘0x0B’.
- Key in the value in TextBox of “(R/W) Result” from ‘0x01’ to ‘0x0F’ to set the statuses of output pins. Again, the pin statuses are bitwise-ored, i.e. bit 0 stands for the desire status of output pin 0, bit 1 for output pin 1, etc. For example, if you want to set pin 0 and 1 high, 3 to low, the value given in TextBox of “(R/W)Result” should be ‘0x0A’.
- Click Button “Wrtie” to perform the operation.

Programmable GPIO



Pin Number

- Get the numbers of input pins and output pins respectively. Each number may vary with the direction of current pins, but the sum remains the same.

MASK

- Choose the mask of interest by check its CheckBox. And click “Get Mask”.

Direction Change / RW Access

- Choose the operation to be of either “Single Pin” or “Multiple Pin”.
- The possible values set to TextBox of “Single Pin” ranges from 0 to (total number of GPIO pins minus 1).

Single Pin Operation – "IO Write" / "Set Direction"

- Give a value of '1'(output status high/input direction) or '0'(output status low/ output direction) to set to the pin when it comes with the button click "IO Write" or "Set Direction".

Single Pin Operation – "IO Read"

- Click "IO Read" to get the pin input status.

Multiple Pin Operation – "IO Write" / "Set Direction"

If there are total 8 GPIO pins:

- If you want to write the statuses of GPIO output pin 0, 1, 6, 7. Give TextBox of "Multiple Pin" with a value 11000011. Bit 0 stand for GPIO 0, bit 1 stand for GPIO 1, and so on.

  If you want to set pin 0 as high, pin 1 as low, pin 6 as high and pin 7 as low. Give TextBox of "Value" with 01XXXX01, X is for don't care pin, please simply assign a 0 for it, i.e. 1000001.
- To set the direction of GPIO pin 0, 1, 6, 7. Give TextBox of "Multiple Pin" with a value 11000011. Again bit 0 stand for GPIO 0, bit 1 stand for GPIO 1, and so on. If you want to set pin 0 as input, pin 1 as output, pin 6 as input and pin 7 as output. Give TextBox of "Value" with 01XXXX01, X is for don't care, please simply assign a 0 for it, i.e. 1000001.

Multiple Pin Operation – "IO Read"

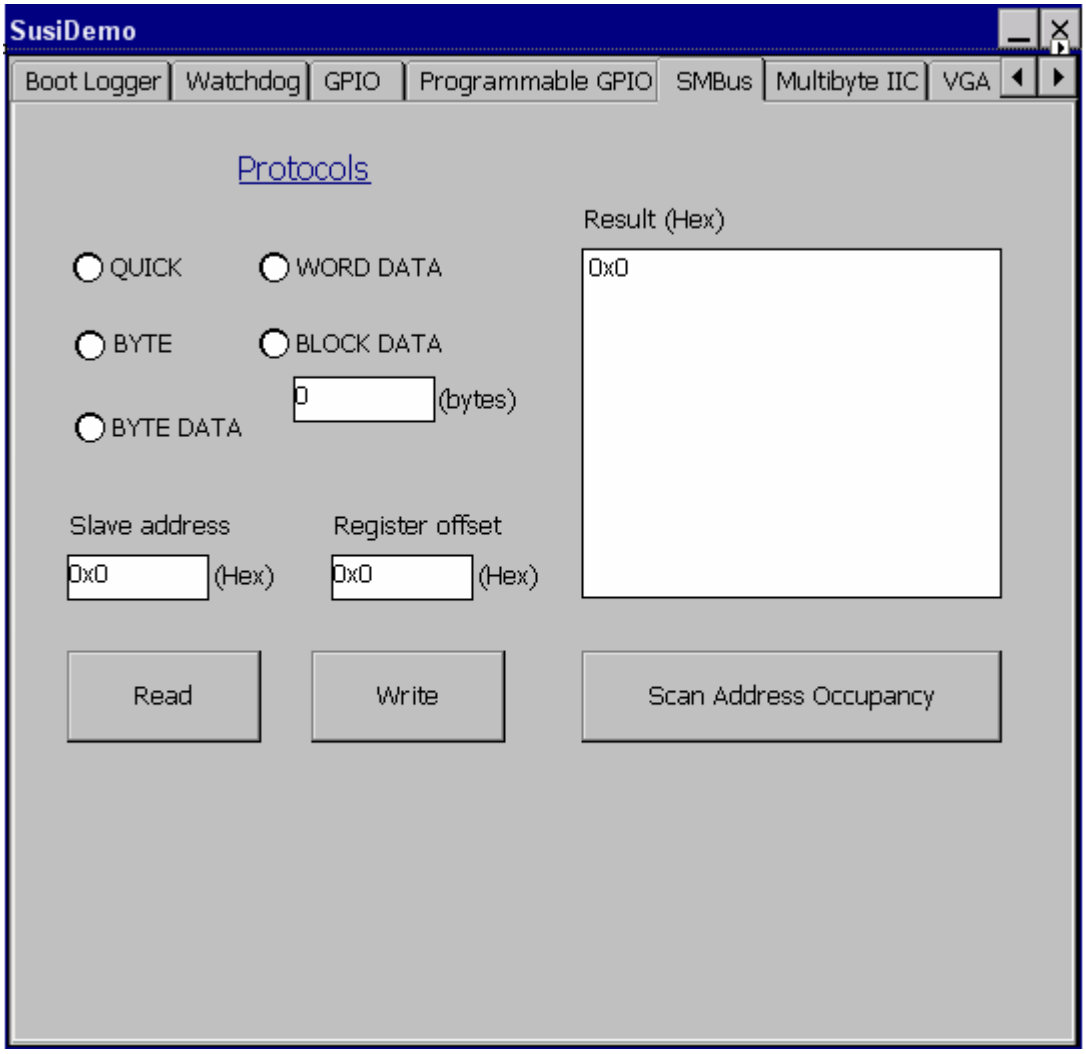
- For example, if you want to read the statuses of GPIO pin 0, 1, 6, 7. Give TextBox of "Multiple Pin" with a value 11000011. Bit 0 stand for GPIO 0, bit 1 stand for GPIO 1, and so on. Again, if the pin is in status high, the value got in relevant bit in TextBox of "Value" will be 1. If the pin is in status low, it will be zero.

[Note]

1. "IO Write" can only be performed on pins with direction output.
2. "Set Direction" can only be performed on direction changeable pins.
3. "IO Read" can get the statues of both input and output pins.

Please get the information first in the "MASK" field.

SMBus



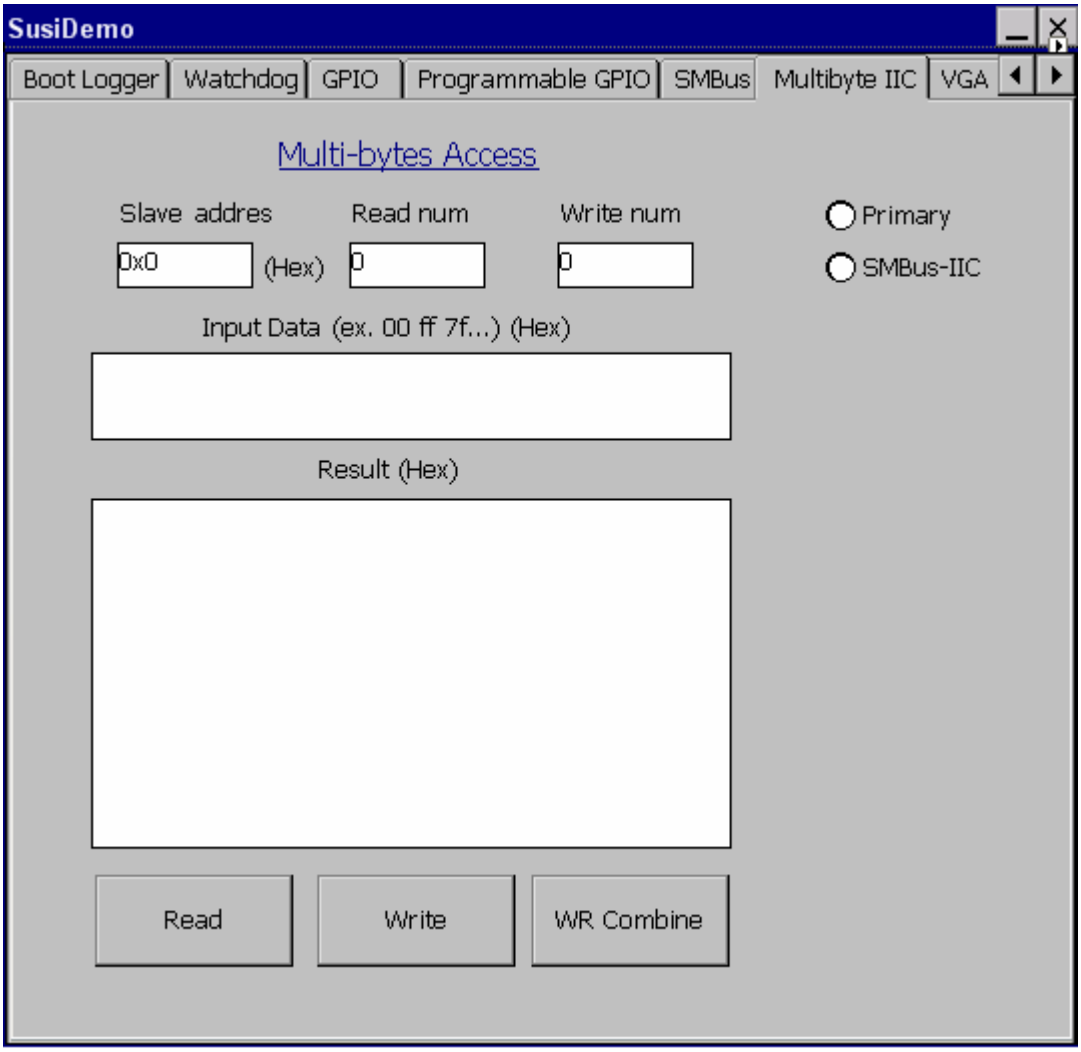
Protocols

- Choose RadioButton to be one of the protocol operations.
- Give the proper value to the TextBox of “Slave address” and “Register offset” (some without).
- Click Button “Read” for read/receive operation, and “Write” for a write/send operation.
- The values read or to be written are in the TextBox of ”Result (Hex)”

Button “Scan Address Occupancy”

- Click to get the addresses currently taken by slave devices connected to the SMBus.
- The occupied addresses will be shown in the TextBox of ”Result (Hex)”. The addresses are already in an 8-bit format.

Multibyte IIC



- Select the RadioButton to be either “Primary” or “SMBus-IIC”. If one of them is not supported, its RadioButton will be shown as disabled.

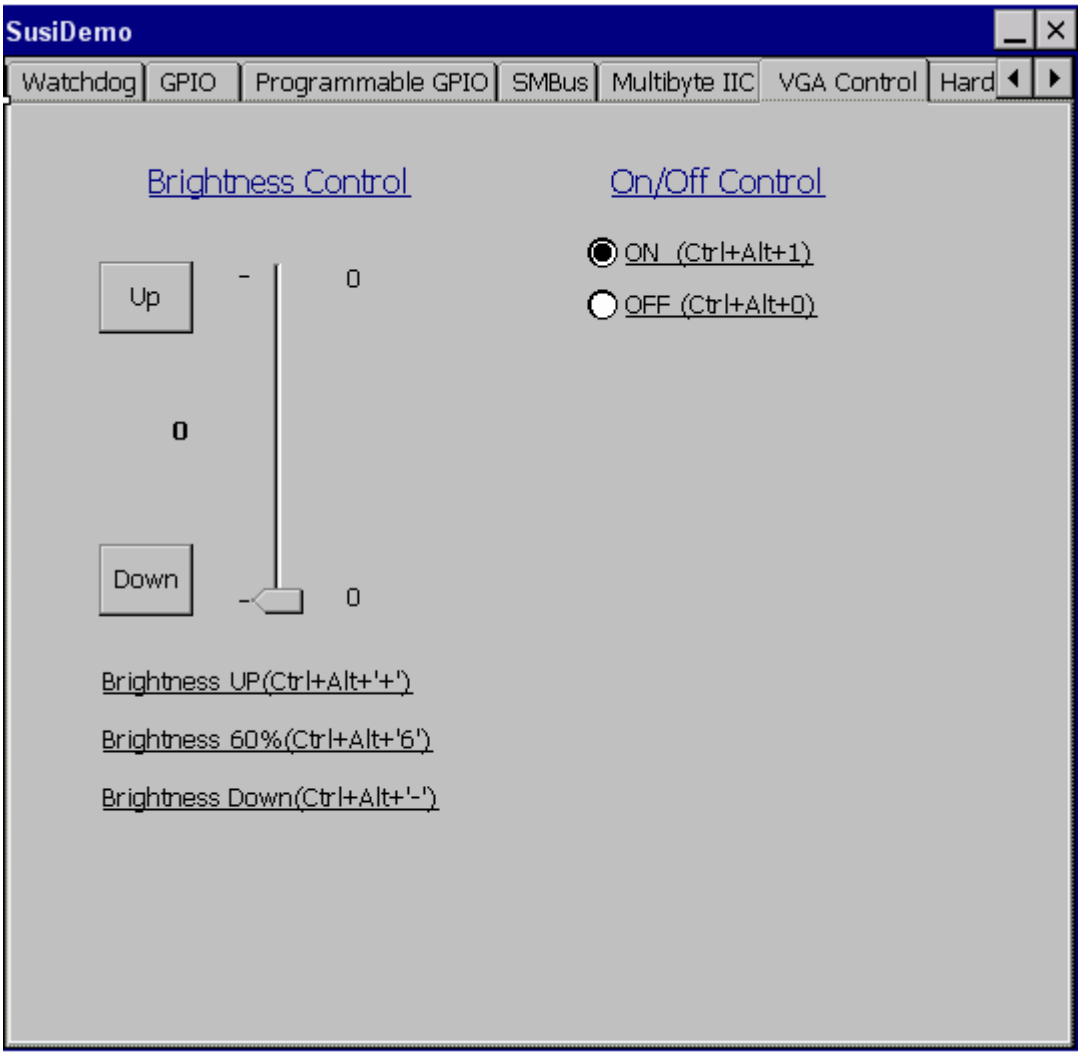
Primary

- Connect the IIC devices to the IIC connector.
- Text in the data bytes to be written in TextBox of “Input Data”
- The bytes read will be shown in TextBox of “Result”

SMBus-IIC

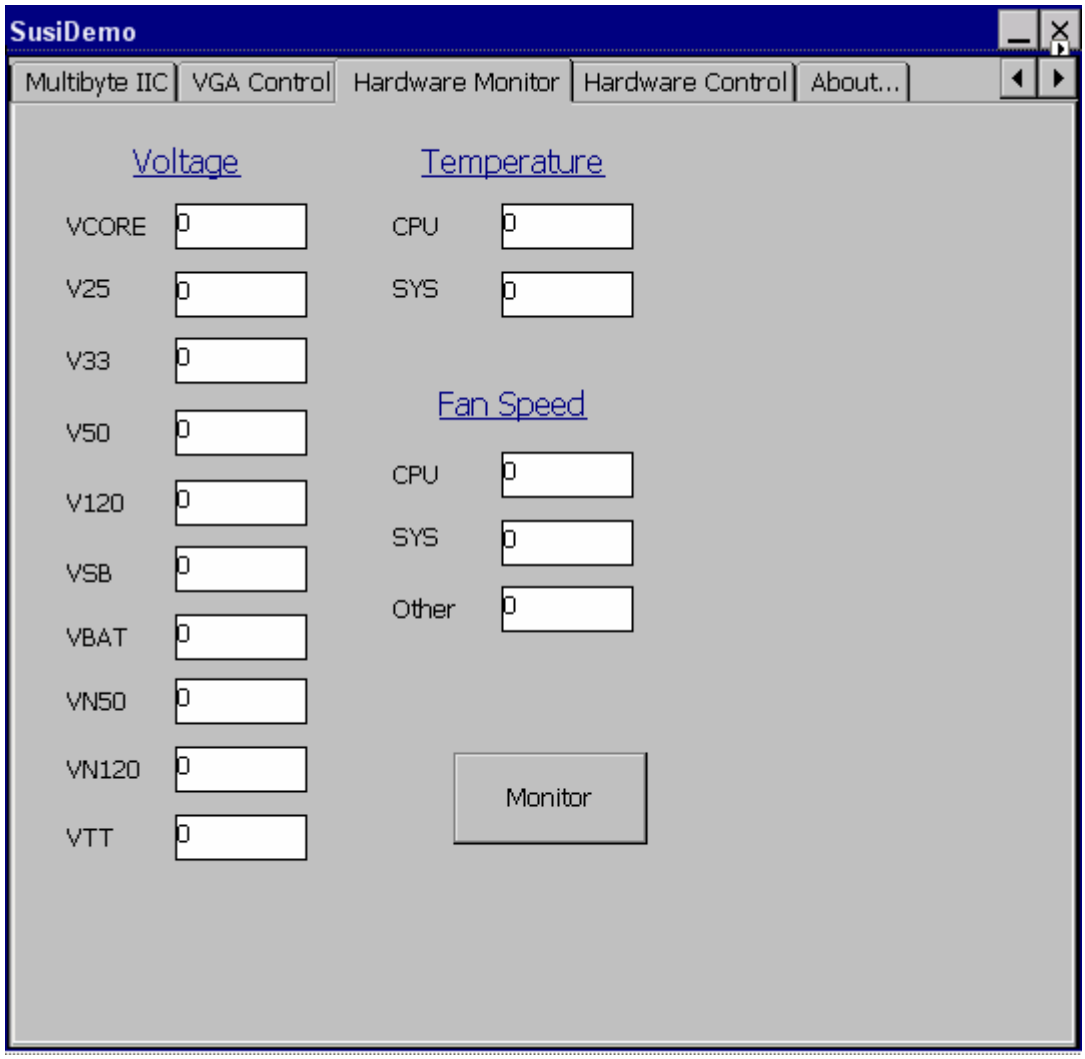
- Connect the IIC devices to the SMBus connector.
- In AMD platforms, all the IIC functions are fully supported.
- In Intel or VIA platforms, only Read and Write with “Read num” = 1 or “Write num” = 1. And “WR Combine” is not supported.

VGA Control



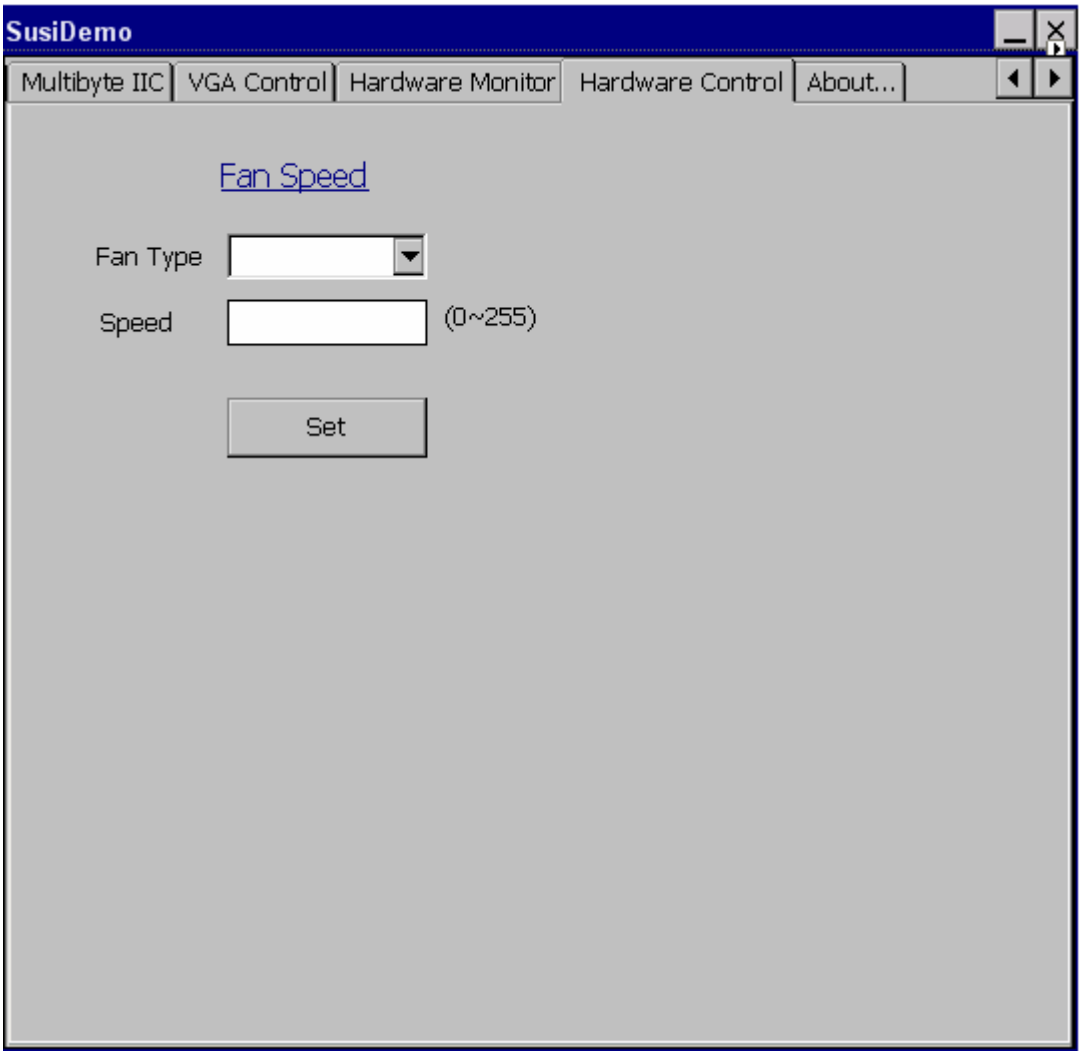
You may control the VGA functionalities in the TabPage or directly by the hotkey.
If the brightness control is not supported, the control parts will be shown as color grey (disabled)

Hardware Monitor



Click “Monitor” to get and display the hardware monitor values. If a certain data value is not supported in the platform, its TextBox will be shown as color gray (disabled).

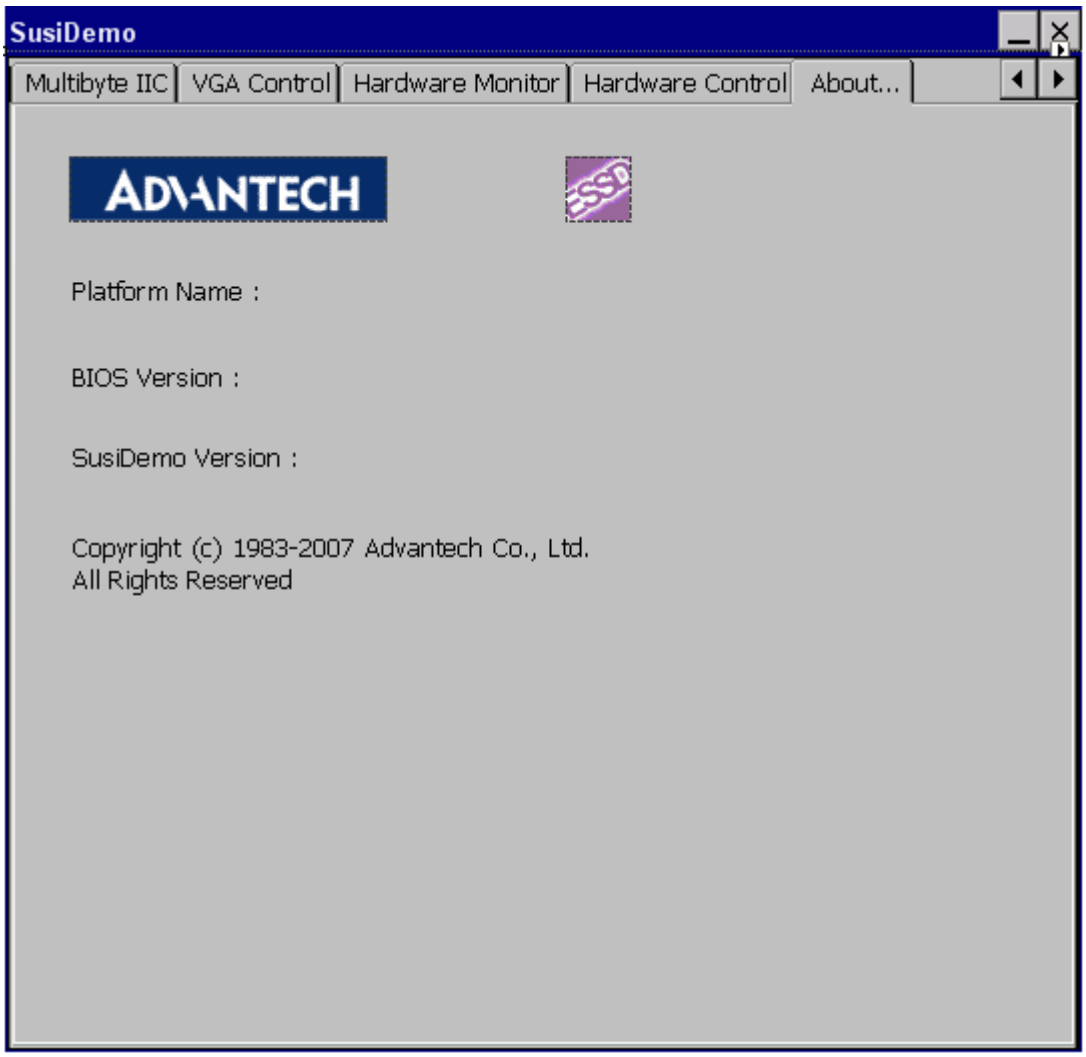
Hardware Control



The function now contains the Pulse Width Modulation (PWM) control over devices, such as the fan speed, the panel brightness...etc.

The bigger the value given, the higher the duty cycle (power) of the pulse, e.g. the fan will have a higher speed in RPM.

About



This page contains the platform name, the BIOS version...etc, i.e. the information retrieve by SUSI APIs.

Programming Overview

Header Files

- SUSI.H includes API declaration, constants and flags that are required for programming.
- DEBUG.H / ERRDRV.H / ERRLIB.H are for debug code definition.
  DEBUG.H – Function index codes
  ERRLIB.H – Library error codes
  ERRDRV.H – Driver error codes

Library Files

- Susi.lib is for library import and Susi.dll is a dynamic link library that exports all the API functions.

Demo Program

- `SusiDemo` program, released with source code, demonstrates how to fully use SUSI APIs. The program is written in the latest programming language C#.

Drivers

There are totally seven drivers for SUSI –CORE /WDT/GPIO/SMBus/IIC/VC/HWM.
E.g. Driver CORE is for `SusiCore-` prefixed APIs, and so on.
To note that a driver will be loaded only if its corresponding function set is supported by a platform.

Installation File

In Windows CE, files and drivers mentioned above are already built-in in image.
In Windows XP, you have to run Setup.exe for installation. To avoid double installation, please make sure you have removed any existing SUSI drivers, either by the Setup.exe or do it manually in Device Manger.

Dll functions

`SusiDll-` APIs are driver-independent, i.e. they could be called without any drivers. In Windows XP, after drivers having been installed, users have to call `SusiDllInit` for initialization before using any other APIs that are not `SusiDll-` prefixed. Before the application terminates, call `SusiDllUnInit` to free allocated system resources.

And Once API call fails, use `SusGetLastError` to get the error report. An error value will be either

Function Index Code + Library Error Code, or

Function Index Code + Driver Error Code

The Function Index Code tells from calling which API the error results and the library/Driver Error Code indicates the actual error type, i.e. is it an error in library or in driver. For a complete list of error codes, please refer to Appendix

- `SusiDllInit`
- `SusiDllUnInit`
- `SusiDllGetLastError`
- `SusiDllGetVersion`

Core functions

`SusiCore-` APIs are available for all Advantech SUSI-enabled platforms to get the board information, such as the platform name and BIOS version. New **Boot Logger** feature available with APIs `SusiCoreAccessBootCounter` and `SusiCoreAccessBootCounter` for monitoring system reboot times, total OS run time and continual run time.

- `SusiCoreGetPlatformName`
- `SusiCoreGetBIOSVersion`
- `SusiCoreAccessBootCounter`
- `SusiCoreAccessRunTimer`

Watchdog (WD) functions

Hardware watchdog timer is a common feature among all Advantech platforms. In user's application, call `SusiWDSetConfig` with specific timeout value to start the watchdog timer countdown, meanwhile create a thread or timer to periodically refresh the timer by `SusiWDTrigger` before it expires. If application ever hangs, it will fail to refresh the timer, thus watchdog reset will cause a system reboot.

- `SusiWDGetRange`
- `SusiWDSetConfig`
- `SusiWDTrigger`
- `SusiWDDisable`

GPIO (IO) functions

There are two sets of GPIO functions. It is highly recommended to use the new one.

With input pins statuses read and output pins statuses write, more flexibility is added to allow easy pin direction change as needed, and also the capability of reading the statuses of output pins.

New programmable GPIO function set:

- `SusiIOCountEx`
- `SusiIOQueryMask`
- `SusiIOSetDirection`
- `SusiIOSetDirectionMulti`
- `SusiIOReadEx`
- `SusiIOReadMultiEx`
- `SusiIOWriteEx`
- `SusiIOWriteMultiEx`

Previous function set:

- `SusiIOCount`
- `SusiIOInitial`
- `SusiIORead`
- `SusiIOReadMulti;`
- `SusiIOWrite`
- `SusiIOWriteMulti`

To know the board pins allocation and their default direction, please refer to Appendix.

SMBus functions

We support the SMBus 2.0 compliant protocols in `SusiSMBus-` APIs :

- Quick Command – `SusiSMBusReadQuick/SusiSMBusWriteQuick`
- Byte Receive/Send – `SusiSMBusReceiveByte/SusiSMBusSendByte`
- Byte Data Read/Write – `SusiSMBusReadByte/SusiSMBusWriteByte`
- Word Data Read/Write – `SusiSMBusReadWord/SusiSMBusWriteWord`

An additional API used for probing, which is very useful:

- `SusiSMBusScanDevice`

According to specification, address to each slave device (slave address) is expressed as a 7-bit Hex number ranging from 0x00 to 0x7F, however the actual addresses used for R/W are

8-bit write address = 7-bit address <<1(left shift one) with LSB 0(for write)

8-bit read address = 7-bit address <<1(left shift one) with LSB 1(for read)

E.g. Given a 7-bit slave address 0x20, the write address is 0x40 and the read address is 0x41.

Here in all APIs (except for `SusiSMBusScanDevice`), parameter `SlaveAddress` is the 8-bit address and users don't need to care about giving it as a R or W address since the actual R/W is taken care by the API itself, i.e. you could even give write address, say 0x41 for APIs with write operation and get the right result, and vice versa.

`SusiSMBusScanDevice` is used to probe whether an address is currently used by certain devices on a platform. By scanning from 0x00 to 0x7f, you could know which addresses are occupied, i.e. if you want to connect a new device, avoid those addresses; or by probing before and after connecting the new device, you could quickly know its address. The `SlaveAddress_7` parameter given in this API is with 7-bit address.

IIC functions

The APIs here cover IIC standard mode operations with a 7-bit device address:

- `SusiIICRead`
- `SusiIICWrite`
- `SusiIICWriteReadCombine`

IIC versus SMBus - compatibility

About platforms that do not have IIC but SMBus, i.e. a call to `SusiIICAvailable` returns `SUSI_IIC_TYPE_SMBUS` (2). Users might be able to use SMBus as a substitute; however, whether it's with fully or partially support depends on the types of SMBus controllers.

In AMD platforms, we have implemented the SMBus driver to be totally IIC standard mode compatible; users could use the IIC APIs implemented by the SMBus controller with `IICType` = `SUSI_IIC_TYPE_SMBUS` to communicate with all kinds of IIC devices.

In Intel and VIA's platforms, the currently compatible protocols are

- `SusiIICRead` with `ReadLen` = 1
- `SusiIICWrite` with `WriteLen` = 1

Among all platforms that have SMBus support, the IIC devices with 7-bit slave addresses could also be scanned by `SusiSMBusScanDevice`.

We are now working on more IIC compatible APIs in Intel and VIA's controllers, they will be supported soon.

For more details on platform IIC/SMBus support, please refer to Appendix A.

VGA Control (VC) functions

`SusiVC-` functions supports VGA signal ON/OFF on all SUSI-enabled platforms and also LCD brightness adjustment.

- `SusiVCScreenOn`
- `SusiVCScreenOff`
- `SusiVCGetBrightRange`
- `SusiVCGetBright`
- `SusiVCSetBright`

One of the user scenarios of `SusiVCScreenOn` and `SusiVCScreenOff` is to have the the display signal disabled when system idles after certain period of time to expand the panel life span.

Hardware Monitoring (HWM) functions

`SusiHWM-` functions support the system health supervision by retrieving the values of board sensors of voltage, temperature and fan. In some platforms, it is possible to control the fan speed of CPU/System fans, please use it cautiously.

- `SusiHWMAvailable`
- `SusiHWMGetFanSpeed`
- `SusiHWMGetTemperature`
- `SusiHWMGetVoltage`
- `SusiHWMSetFanSpeed`

Migration from Early Versions

- Almost all APIs are compatible with SUSI V11, except for 2 APIs. A call to `SusiSMBusReadByteMulti` or `SusiSMBusWriteByteMulti` equals calls to `SusiSMBusReadByte` or `SusiSMBusWriteByte` with a loop. They have nothing to do with certain IIC/SMBus protocols in official specifications. For clarification, we decided to get rid of them in SUSI V12.
  For a complete list of backward compatible APIs, please refer to SUSI.h

- The API return types have been unified in SUSI V12. The return type can be either
  1. BOOL with TRUE (a value 1 for success) or FALSE (a value 0 for failure)
  2. int with -1 (Fail), 0 (not exist/not support) and other positive values with different meanings

SUSI API Programmer's Documentation

All the APIs are with `BOOL` return type, except the `Susi*Available` ones or some special cases that are with type `int`. If any function call fails, i.e. `BOOL` with FALSE, or `int` with -1, the error code could always be retrieved by an immediate call to `SusiGetLastError`.

SusiDllInit

Initialize the Susi Library.

```
BOOL SusiDllInit(void);
```

Parameters

None.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

An application must call `SusiDllInit` before calling any other non SusiDll-functions.

SusiDllUnInit

Uninitialize the Susi Library.

```
BOOL SusiDllUnInit(void);
```

Parameters

None.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Before an application terminates, it must call `SusiDllUnInit` if it has successfully called `SusiDllInit`. Calls to `SusiDllInit` and `SusiDllUnInit` can be nested but must be paired.

.

SusiDllGetVersion

Retrieve the version numbers of SUSI Library.

```
void SusiDllGetVersion(WORD *major, WORD *minor);
```

Parameters

`major`

`[out]` Pointer to a variable containing the major version number.

`minor`

`[out]` Pointer to a variable containing the minor version number.

Return Value

None.

Remarks

This function returns the version numbers of SUSI. It's suggested to call this function first and compare the numbers with the constants `SUSI_LIB_VER_MJ` and `SUSI_LIB_VER_MR` in header file SUSI.H to insure the library compatibility.

SusiDllGetLastError

This function returns the last error code value.

```
int SusiDllGetLastError(void);
```

Parameters

`None`

Return Value

The code of error reason for the last function call with failure.

Remarks

You should call the `SusiDllGetLastError` immediately when a function's return value indicates failure.

The return error code will be either

Function Index Code + Library Error Code, or

Function Index Code + Driver Error Code

The Function Index Code tells from calling which API the error results and the library/Driver Error Code indicates the actual error type, i.e. is it an error in library or in driver. For a complete list of error codes, please refer to Appendix.

SusiCoreAvailable

Check if Core driver is available.

```
int SusiCoreAvailable (void);
```

Parameters

None.

Return Value

value	Meaning
-1	The function fails.
0	The function succeeds; the platform does not support SusiCore- APIs.
1	The function succeeds; the platform supports Core.

Remarks

After calling `SusiDllInit` successfully, all `Susi*Available` functions are use to check if the corresponding features are supported by the platform or not. So it is suggested to call `Susi*Available` before using any `Susi*-` functions.

SusiCoreGetBIOSVersion

Get the current BIOS version.

```
BOOL SusiCoreGetBIOSVersion(TCHAR *BIOSVersion, DWORD
*size);
```

Parameters

BIOSVersion

[out] Pointer to an array in which the function returns the string of BIOS version.

size

[in/out]

Pointer to a variable that specifies the size, in TCHAR, of the array pointed to by the BIOSVersion parameter.

If BIOSVersion is given as NULL, when the function returns, the variable will contain the array size required for the BIOS version.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Call the function twice, first by giving BIOSVersion as NULL to get the array size required for the string. Then allocate a TCHAR array with the size required and give the array with its size as parameters to get the BIOS version. Note that the BIOS version cannot be correctly got if it's in released version.

SusiCoreGetPlatformName

Get the current platform name.

```
BOOL SusiCoreGetPlatformName(TCHAR *PlatformName, DWORD
*size);
```

Parameters

PlatformName

[out] Pointer to an array in which the function returns the string of platform name.

size

[in/out]

Pointer to a variable that specifies the size, in TCHAR, of the array pointed to by the PlatformName parameter.

If PlatformName is given as NULL, when the function returns, the variable will contain the array size required for the platform name.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Call the function twice, first by giving PlatformName as NULL to get the array size required for the string. Then allocate a TCHAR array with the size required and give the array with its size as parameters to get the platform name. Note that the platform name cannot be correctly got if the BIOS is in released version.

SusiCoreAccessBootCounter

Access the information of boot counter. A boot counter is used to count the number of boot times.

```
BOOL SusiCoreAccessBootCounter(DWORD mode, DWORD OPFlag,
BOOL *enable, DWORD *value);
```

Parameters

mode

[in] The value can be either

ESCORE_BOOTCOUNTER_MODE_GET (0)

- To get information from counter.

ESCORE_BOOTCOUNTER_MODE_SET (1)

- To set information to counter.

OPFlag

[in] The operation flag can be the combination of

ESCORE_BOOTCOUNTER_STATUS (1)

- The operation is on the parameter enable

ESCORE_BOOTCOUNTER_VALUE (2)

- The operation is on the parameter value

enable

[in/out]

If OPFlag contains ESCORE_BOOTCOUNTER_STATUS (1):

With mode equals ESCORE_BOOTCOUNTER_MODE_GET(0), when the function returns, enable will contain the status of the counter as TRUE (enabled) or FALSE (disabled).

With mode equals ESCORE_BOOTCOUNTER_MODE_SET(1), enable is a pointer to a variable that contains the status to set. A TRUE to start the counter, FALSE to stop.

value

[in/out]

If OPFlag contains ESCORE_BOOTCOUNTER_VALUE (2):

With mode equals ESCORE_BOOTCOUNTER_MODE_GET(0), when the function returns, value will contain the number of reboot count.

With mode equals ESCORE_BOOTCOUNTER_MODE_SET(1), value is a pointer to a variable that contains the reboot count to set.

Give a value 0 to clear the count or any other values for counting from.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

In windows XP, the boot counter information is stored in registry values

HKEY_LOCAL_MACHINE \SYSTEM\SusiBootCounter\Enable

HKEY_LOCAL_MACHINE \SYSTEM\SusiBootCounter\BootTimes

In windows CE,

HKEY_CURRENT_USER\Software\Advantech\Susi\Core\BootCounter\Enable

HKEY_CURRENT_USER\Software\Advantech\Susi\Core\BootCounter\BootTimes

The information will be lost only if the registry values have been wiped out.

For definition of boot counter flags, please refer to Appendix.

SusiCoreAccessRunTimer

Access the information of run timer. A run timer is used to count the system running time.

```
BOOL SusiCoreAccessRunTimer(DWORD mode, PSSCORE_RUNTIMER pRunTimer);
```

Parameters

mode

[in] The value can be either

ESCORE_BOOTCOUNTER_MODE_GET (0)

- Get information from counter.

ESCORE_BOOTCOUNTER_MODE_SET (1)

- Set information to counter.

pRunTimer

[in/out]

Pointer to a SSCORE_RUNTIMER structure to set or get the timer information, please see next page.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

In windows XP, the information is stored in registry values

HKEY_LOCAL_MACHINE\SYSTEM\SusiRunTimer\Running

HKEY_LOCAL_MACHINE\SYSTEM\SusiRunTimer\Autorun

HKEY_LOCAL_MACHINE\SYSTEM\SusiRunTimer\ContinualOnTime

HKEY_LOCAL_MACHINE\SYSTEM\SusiRunTimer\TotalOnTime

In windows CE, they are in

HKEY_CURRENT_USER\Software\Advantech\Susi\Core\RunTimer\Running

HKEY_CURRENT_USER\Software\Advantech\Susi\Core\RunTimer\Autorun

HKEY_CURRENT_USER\Software\Advantech\Susi\Core\RunTimer\ContinualOnTime

HKEY_CURRENT_USER\Software\Advantech\Susi\Core\RunTimer\TotalOnTime

The information will be lost only if the registry values have been wiped out.

For detail definition about structure SSCORE_RUNTIMER, please refer to next page.

SSCORE_RUNTIMER

This structure represents the run timer information.

```
typedef struct {
  DWORD dwOPFlag;
  BOOL  isRunning;
  BOOL  isAutorun;
  DWORD dwTimeContinual;
  DWORD dwTimeTotal;
} SSCORE_RUNTIMER, *PSSCORE_RUNTIMER;
```

Members

dwOPFlag

The operation flag can be the combination of

`ESCORE_RUNTIMER_STATUS_RUNNING` (1)

- The operation is on the member `isRunning`

`ESCORE_RUNTIMER_STATUS_AUTORUN` (2)

- The operation is on the member `isAutorun`

`ESCORE_RUNTIMER_VALUE_CONTINUALON(4)`

- The operation is on the member `dwTimeContinual`

`ESCORE_RUNTIMER_VALUE_TOTALON(8)`

- The operation is on the member `dwTimeTotal`

isRunning

TURE indicates the timer is running now, FLASE indicates not.

isAutorun

TRUE states the timer will start automatically upon startup, i.e. it will be running each time when the system reboots.

dwTimeContinual

Specify the system continual-on time in minutes, i.e. the OS running time without a system reboot. Once reboot, it will be reset to 0.

dwTimeTotal

Specify the system total-on time in minutes, i.e. the total time accumulates while OS is running.

SusiWDAvailable

Check if watchdog driver is available.

```
BOOL SusiWDAvailable(void);
```

Parameters

None.

Return Value

value	Meaning
-1	The function fails.
0	The function succeeds; the platform does not support SusiWD- APIs.
1	The function succeeds; the platform supports Watchdog.

Remarks

After calling `SusiDllInit` successfully, all `Susi*Available` functions are use to check if the corresponding features are supported by the platform or not. So it is suggested to call `Susi*Available` before using any `Susi*-` functions.

SusiWDGetRange

Get the step, minimum and maximum values of watchdog timeout.

```
BOOL SusiWDGetRange(DWORD *minimum, DWORD *maximum,
DWORD *stepping);
```

Parameters

minimum

[out] Pointer to a variable to get the minimum timeout value in milliseconds.

maximum

[out] Pointer to a variable to get the maximum timeout value in milliseconds.

stepping

[out] Pointer to a variable to get the resolution of timeout value in milliseconds.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

The values may vary from platform to platform; depend on the hardware implementations of watchdog timer. For example, if minimum timeout is 1000, maximum timeout is 63000, and the step is 1000, it means the watchdog timeout can be 1, 2, 3, …, 63 seconds.

SusiWDSetConfig

Start watchdog timer with specified timeout value.

```
BOOL SusiWDSetConfig(DWORD delay, DWORD timeout);
```

Parameters

delay

[in] Specifies a value in milliseconds which will be added to “the first” timeout period. This allows the application to have sufficient time to do initialization before the first call to `SusiWDTrigger` and still be protected by the watchdog.

timeout

[in] Specifies a value in milliseconds for the watchdog timeout.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure

Remarks

Once the watchdog has been activated, its timer begins to count down. The application has to periodically call `SusiWDTrigger` to refresh the timer before it expires, i.e. reload the watchdog timer within the specified timeout or the system will reboot if it counts to 0.

Actually a subsequent call to `SusiWDTrigger` equals a call to `SusiWDSetConfig` with `delay` 0 and the original `timeout` value, so if you want to change the timeout value, give a call to `SusiWDSetConfig` with new `timeout` value instead of `SusiWDTrigger.`

Use `SusiWDGetRange` to get the acceptable timeout values.

SusiWDTrigger

Reload the watchdog timer back to its timeout value given originally in SusiWDSetConfig to prevent the system from reboot.

```
BOOL SusiWDTrigger(void);
```

Parameters

None

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

A watchdog protected application has to call `SusiWDTrigger` continuously to indicate that it is still working properly to prevent a system restart. The first call to `SusiWDTrigger` in the middle of delaying resulting from a previous call to `SusiWDSetConfig` causes the delay timer to be canceled immediately and starts watchdog timer countdown from timeout value. So it is always a good choice for users to have a longer delay time in `SusiWDSetConfig`.

SusiWDDisable

Disable the watchdog, stop its timer countdown.

```
BOOL SusiWDDisable(void);
```

Parameters

None

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

If watchdog protection is no longer required by an application, it can call `SusiWDDisable` to disable the watchdog. A call to `SusiWDDisable` in the middle of delaying resulting from a previous call to `SusiWDSetConfig` causes the delay timer to be canceled immediately and stops watchdog timer countdown. Only a few hardware implementations that the watchdog timer cannot be stopped once it has been activated, if this is the case, the call will return with FALSE.

SusiIOAvailable

Check if GPIO driver is available.

```
int SusiCoreAvailable (void);
```

Parameters

None.

Return Value

value	Meaning
-1	The function fails.
0	The function succeeds; the platform does not support SusiIO- APIs.
1	The function succeeds; the platform supports GPIO.

Remarks

After calling `SusiDllInit` successfully, all `Susi*Available` functions are use to check if the corresponding features are supported by the platform or not. So it is suggested to call `Susi*Available` before using any `Susi*-` functions.

SusiIOCountEx

Query the current number of input and output pins.

```
BOOL SusiIOCountEx(DWORD *inCount, DWORD *outCount)
```

Parameters

inCount

[out] Pointer to a variable in which this function returns the count of input pins.

outCount

[out] Pointer to a variable in which this function returns the count of output pins.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

The number of total GPIO pins equals the number of input pins plugs the number of output pins. With this constant pin number, the numbers of input and output pins may vary in accordance with current pin direction.

SusiIOQueryMask

Query the GPIO mask information.

```
BOOL SusiIOQueryMask(DWORD flag, DWORD *Mask)
```

Parameters

flag

[in] Value given to indicate the type of mask to retrieve, it can be one of the following values:

Static masks

ESIO_SMASK_PIN_FULL (1)

ESIO_SMASK_CONFIGURABLE (2)

Dynamic masks

ESIO_DMASK_DIRECTION (0x20)

Mask

[out] Pointer to a variable in which this function returns the queried mask.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

A mask is expressed as a series of binary digits. Each bit value stands for different meaning for each pin (bit 0 for pin 0, bit 1 for pin 1, bit 2 for pin 2, …), depends on the mask type:

A bit value **1** stands for a pin with

1. **I**nput direction
2. Status HIGH
3. Direction changeable.

Or a bit value **0** stands for a pin with

1. **O**utput direction
2. Status LOW
3. Direction unchangeable

Here are the definitions for masks:

- ESIO_SMASK_PIN_FULL
  - If there are total 8 GPIO pins (GPIO 0 ~ 7) in a platform, the full pin mask would be 0xFF, or in binary 11111111, i.e. the number of 1s corresponds to

the number of pins.

- `ESIO_SMASK_CONFIGURABLE`
  - This is the mask to indicate which pins are directions changeable. If all the 8 pins are changeable, the mask would be 0xFF.
- `ESIO_DMASK_DIRECTION`
  - The current direction of pins. If the mask is 0xAA, or in binary 10101010, it means the even pins are output pins and the odd pins are input pins.

SusiIOSetDirection

Set direction of one GPIO pin as input or output.

```
BOOL SusiIOSetDirection(BYTE PinNum, BYTE IO, DWORD
*PinDirMask);
```

Parameters

PinNum

[in] Specifies the GPIO pin demanded to be changed, ranging from 0 ~ (total number of GPIO pins minus 1).

IO

[in] Specifies the pin direction to be set.

PinDirMask

[out] Pointer to a variable in which the function returns the latest direction mask after the pin direction is set.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

An `IO` with 1 to set the pin as input, 0 to set the pin as output.

The function can only set the direction of one of the pins that is direction configurable. If the pin number specified is an in-configurable pin or an invalid pin, the function call will fail and return with FALSE.

SusiIOSetDirectionMulti

Set directions of multiple pins at once.

```
BOOL SusiIOSetDirectionMulti(DWORD TargetPinMask, DWORD
*PinDirMask);
```

Parameters

TargetPinMask

[in] Specifies the mask of GPIO output pins demanded to be written.

PinDirMask

[in/out]

Specifies the directions of pins to be set in a Bitwise-ORed manner. After the function call returns with TRUE, it contains the latest direction mask after set.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

For example, if you set to the directions of GPIO pin 0, 1, 6, 7. Give parameter `TargetPinMask` with a value 11000011, or 0xC3. Bit 0 stand for GPIO 0, bit 1 stand for GPIO 1, and so on.

If you want to set pin 0 as input, pin 1 as output, pin 6 as input and pin 7 as output. Give value in parameter `PinDirMask` as 01XXXX01, X is for don't care, you could simply assign a 0 for it, i.e. 0x41.

SusiIOReadEx

Read current status of one GPIO input or output pin.

```
BOOL SusiIOReadEx(BYTE PinNum, BOOL *status)
```

Parameters

PinNum

[in] Specifies the GPIO pin demanded to be read, ranging from 0 ~ (total number of GPIO pins minus 1).

status

[out] Pointer to a variable in which the pin status returns.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

If the pin is in status high, the value got in `status` will be 1. If the pin is in status low, it will be zero. The function is capable of reading the status of either an input pin or an output pin.

SusiIOReadMultiEx

Read current statuses of multiple pins at once regardless of the pin directions.

```
BOOL SusiIOReadMultiEx(DWORD TargetPinMask, DWORD
*StatusMask);
```

Parameters

TargetPinMask

[in] Specifies the mask of GPIO pins demanded to be read.

StatusMask

[out] Statuses of pins in Bitwise-ORed. For pins that are not specified in `TargetPinMask`, the related bit value is invalid.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

For example, if you want to read the statuses of GPIO pin 0, 1, 6, 7. Give parameter `TargetPinMask` with a value 11000011, or 0xC3. Bit 0 stand for GPIO 0, bit 1 stand for GPIO 1, and so on. Again, if the pin is in status high, the value got in relevant bit of `StatusMask` will be 1. If the pin is in status low, it will be zero.

SusiIOWriteEx

Set one GPIO output pin as status high or low.

```
BOOL SusiIOWriteEx(BYTE PinNum, BOOL status);
```

Parameters

PinNum

[in] Specifies the GPIO pin demanded to be written, ranging from 0 ~ (total number of GPIO pins minus 1).

status

[in] Specifies the GPIO status to be written.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

The function can only set the status of one of the output pins. If the pin number specified is an input pin or an invalid pin, the function call will fail and return with FALSE. A `status` with 1 to set the pin as output high, 0 to set the pin as output low.

SusiIOWriteMultiEx

Set statuses of multiple output pins at once.

```
BOOL SusiIOWriteMultiEx(DWORD TargetPinMask, DWORD
StatusMask);
```

Parameters

TargetPinMask

[in] Specifies the mask of GPIO output pins demanded to be written.

StatusMask

[in] Statuses of pins to be set in Bitwise-ORed. For pins that are not specified in `TargetPinMask`, the related bit value is invalid.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

For example, if you want to write the statuses of GPIO output pin 0, 1, 6, 7. Give parameter `TargetPinMask` with a value 11000011, or 0xC3. Bit 0 stand for GPIO 0, bit 1 stand for GPIO 1, and so on.

If you want to set pin 0 as high, pin 1 as low, pin 6 as high and pin 7 as low. Give parameter `StatusMask` with a value 01XXXX01, X is for don't care pin, you could simply assign a 0 for it, i.e. 0x41.

SusiSMBusAvailable

Check if SMBus driver is available.

```
int SusiSMBusAvailable(void);
```

Parameters

None.

Return Value

value	Meaning
-1	The function fails.
0	The function succeeds; the platform does not support SusiSMbus- APIs.
1	The function succeeds; the platform supports SMBus.

Remarks

After calling `SusiDllInit` successfully, all `Susi*Available` functions are use to check if the corresponding features are supported by the platform or not. So it is suggested to call `Susi*Available` before using any `Susi*-` functions.

SusiSMBusScanDevice

Scan if the address is taken by one of the slave devices currently connected to the SMBus.

```
int SusiSMBusScanDevice(BYTE SlaveAddress_7)
```

Parameters

SlaveAddress

[in] Specifies the 7-bit device address, ranging from 0x00 – 0x7F.

Return Value

value	Meaning
-1	The function fails.
0	The function succeeds; the address is not occupied.
1	The function succeeds; there is a device to this address.

Remarks

There could be as much as 128 devices connected to a single SMBus. For more information about how to use this API, please refer to "Programming Overview", part "SMBus functions".

SusiSMBusReadQuick

Turn a SMBus device function on (off) or enable (disable) a specific device mode.

```
BOOL SusiSMBusReadQuick(BYTE SlaveAddress);
```

Parameters

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF. Whether to give a 1 (read) or 0 (write) to the LSB of `SlaveAddress` could be ignored.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

For more information about how to use this API, please refer to "Programming Overview", part "SMBus functions".

SusiSMBusWriteQuick

Turn a SMBus device function off (on) or disable (enable) a specific device mode.

```
BOOL SusiSMBusWriteQuick(BYTE SlaveAddress);
```

Parameters

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF. Whether to give a 1 (read) or 0 (write) to the LSB of `SlaveAddress` could be ignored.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

For more information about how to use this API, please refer to "Programming Overview", part "SMBus functions".

SusiSMBusReceiveByte

Receive information in a byte from the target slave device in the SMBus.

```
BOOL SusiSMBusReceiveByte(BYTE SlaveAddress, BYTE
*Result);
```

Parameters

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF.
Whether to give a 1 (read) or 0 (write) to the LSB of `SlaveAddress` could be ignored.

Result

[out] Pointer to a variable in which the function receives the byte information.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

A simple device may have information that the host needs to be received in the parameter `Result`.

For more information about how to use this API, please refer to "Programming Overview", part "SMBus functions".

SusiSMBusSendByte

Send information in a byte to the target slave device in the SMBus.

```
BOOL SusiSMBusSendByte(BYTE SlaveAddress, BYTE Result);
```

Parameters

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF. Whether to give a 1 (read) or 0 (write) to the LSB of SlaveAddress could be ignored.

Result

[in] Specifies the byte information to be sent.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

A simple device may recognize its own slave address and accept up to 256 possible encoded commands in the form of a byte given in the parameter Result.

For more information about how to use this API, please refer to "Programming Overview", part "SMBus functions".

SusiSMBusReadByte

Read a byte of data from the target slave device in the SMBus.

```
BOOL SusiSMBusReadByte(BYTE SlaveAddress, BYTE
RegisterOffset, BYTE *Result);
```

Parameters

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF. Whether to give a 1 (read) or 0 (write) to the LSB of `SlaveAddress` could be ignored.

RegisterOffset

[in] Specifies the offset of the device register to read data from.

Result

[out] Pointer to a variable in which the function reads the byte data.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

For more information about how to use this API, please refer to "Programming Overview", part "SMBus functions".

SusiSMBusWriteByte

Write a byte of data to the target slave device in the SMBus.

```
BOOL SusiSMBusWriteByte(BYTE SlaveAddress, BYTE
RegisterOffset, BYTE Result);
```

Parameters

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF. Whether to give a 1 (read) or 0 (write) to the LSB of `SlaveAddress` could be ignored.

RegisterOffset

[in] Specifies the offset of the device register to write data to.

Result

[in] Specifies the byte data to be written .

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

For more information about how to use this API, please refer to "Programming Overview", part "SMBus functions".

SusiSMBusReadWord

Read a word (2 bytes) of data from the target slave device in the SMBus.

```
BOOL SusiSMBusReadWord(BYTE SlaveAddress, BYTE
RegisterOffset, WORD *Result);
```

Parameters

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF.
Whether to give a 1 (read) or 0 (write) to the LSB of SlaveAddress could be ignored.

RegisterOffset

[in] Specifies the offset of the device register to read data from.

Result

[out] Pointer to a variable in which the function reads the word data.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

The first byte read from slave device will be placed in the low byte of Result, and the second byte read will be placed in the high byte.

For more information about how to use this API, please refer to "Programming Overview", part "SMBus functions".

SusiSMBusWriteWord

Write a word (2 bytes) of data to the target slave device in the SMBus.

```
BOOL SusiSMBusWriteWord(BYTE SlaveAddress, BYTE
RegisterOffset, WORD Result);
```

Parameters

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF.
Whether to give a 1 (read) or 0 (write) to the LSB of `SlaveAddress` could be ignored.

RegisterOffset

[in] Specifies the offset of the device register to write data to.

Result

[in] Specifies the word data to be written .

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

The low byte of `Result` will be send to the slave device first and then the high byte. For more information about how to use this API, please refer to "Programming Overview", part "SMBus functions"

SusiIICAvailable

Check if I^2C driver is available and also get the IIC type supported.

```
int SusiIICAvailable();
```

Parameters

None.

Return Value

value	Meaning
-1	The function fails.
0	The function succeeds; the platform does not support any SusiIIC - APIs.
SUSI_IIC_TYPE_PRIMARY (1)	The function succeeds; the platform supports only primary IIC.
SUSI_IIC_TYPE_SMBUS (2)	The function succeeds; the platform supports only SMBus implemented IIC.
SUSI_IIC_TYPE_BOTH (3)	The function succeeds; the platform supports both primary IIC and SMBus IIC.

Remarks

After calling `SusiDllInit` successfully, all `Susi*Available` functions are use to check if the corresponding features are supported by the platform or not. So it is suggested to call `Susi*Available` before using any `Susi*-` functions.

SusiIICRead

Read bytes of data from the target slave device in the I^2C bus.

```
SUSI_API BOOL SusiIICRead(DWORD IICType, BYTE SlaveAddress,
BYTE *ReadBuf, DWORD ReadLen);
```

Parameters

IICType

[in] Specifies the I^2C type, the value can either be
SUSI_IIC_TYPE_PRIMARY (1)
SUSI_IIC_TYPE_SMBUS (2)

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF.
Whether to give a 1 (read) or 0 (write) to the LSB of SlaveAddress could be ignored.

ReadBuf

[out] Pointer to a variable in which the function reads the bytes of data.

ReadLen

[in] Specifies the number of bytes to be read.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Call SusiIICAvailable first to make sure the support I^2C type. For more information about how to use this API, and the relationship between IIC and SMBus, please refer to "Programming Overview", parts "SMBus functions" to "IIC versus SMBus – compatibility"

SusiIICWrite

Write bytes of data to the target slave device in the I^2C bus.

```
BOOL SusiIICWrite(DWORD IICType, BYTE SlaveAddress, BYTE
*WriteBuf, DWORD WriteLen);
```

Parameters

IICType

[in] Specifies the I^2C type, the value can either be
SUSI_IIC_TYPE_PRIMARY (1)
SUSI_IIC_TYPE_SMBUS (2)

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF.
Whether to give a 1 (read) or 0 (write) to the LSB of SlaveAddress could be ignored.

WriteBuf

[in] Pointer to a byte array which contains the bytes of data to be written.

WriteLen

[in] Specifies the number of bytes to be written.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Call SusiIICAvailable first to make sure the support I^2C type. For more information about how to use this API, and the relationship between IIC and SMBus, please refer to "Programming Overview", parts "SMBus functions" to "IIC versus SMBus – compatibility".

SusiIICWriteReadCombine

A sequential operation to write bytes of data followed by bytes read from the target slave device in the I^2C bus.

```
BOOL SusiIICWriteReadCombine(DWORD IICType, BYTE
SlaveAddress, BYTE *WriteBuf, DWORD WriteLen, BYTE *ReadBuf,
DWORD ReadLen);
```

Parameters

IICType

[in] Specifies the I^2C type, the value can either be
SUSI_IIC_TYPE_PRIMARY (1)
SUSI_IIC_TYPE_SMBUS (2)

SlaveAddress

[in] Specifies the 8-bit device address, ranging from 0x00 – 0xFF.
Whether to give a 1 (read) or 0 (write) to the LSB of SlaveAddress could be ignored.

WriteBuf

[in] Pointer to a byte array which contains the bytes of data to be written.

WriteLen

[in] Specifies the number of bytes to be written.

ReadBuf

[out] Pointer to a variable in which the function reads the bytes of data.

ReadLen

[in] Specifies the number of bytes to be read.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

The function is mainly for EEPROM I^2C devices - the bytes written first are used to locate to a certain address in ROM, and the following bytes read will retrieve the data bytes starting from this address.

Call SusiIICAvailable first to make sure the support I^2C type. For more information about how to use this API, and the relationship between IIC and SMBus, please refer to "Programming Overview", parts "SMBus functions" to "IIC versus SMBus – compatibility"

SusiVCAvailable

Check if VC driver is available and also get the feature support information.

```
BOOL SusiVCAvailable(void);
```

Parameters

None.

Return Value

value	Meaning
-1	The function fails.
0	The function succeeds; the platform does not support any SusiVC- APIs.
SUSI_VC_BRIGHT_CONTROL_AVAILABLE (1)	The function succeeds; the platform supports only brightness APIs.
SUSI_VC_VGA_CONTROL_AVAILABLE (2)	The function succeeds; the platform supports only screen on/off APIs.
SUSI_VC_BOTH_AVAILABLE (3)	The function succeeds; the platform supports all SusiVC- APIs.

Remarks

After calling `SusiDllInit` successfully, all `Susi*Available` functions are use to check if the corresponding features are supported by the platform or not. So it is suggested to call `Susi*Available` before using any `Susi*-functions`.

SusiVCGetBrightRange

Get the step, minimum and maximum values in brightness adjustment.

```
BOOL SusiVCGetBrightRange(BYTE *minimum, BYTE *maximum,
BYTE *stepping);
```

Parameters

minimum

[out] Pointer to a variable to get the minimum brightness value.

maximum

[out] Pointer to a variable to get the maximum brightness value.

stepping

[out] Pointer to a variable to get the step of brightness up and down

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Call `SusiVCAvailable` first to make sure if the brightness control is available. The values may vary from platform to platform; depend on the hardware implementations of brightness control. For example, if minimum is 0, maximum is 255, and stepping is 5, it means the brightness can be 0, 5, 10, …, 255.

SusiVCGetBright

Get the current panel brightness.

```
BOOL SusiVCGetBright(BYTE *brightness);
```

Parameters

brightness

[out] Pointer to a variable in which this function returns the brightness.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Call `SusiVCAvailable` first to make sure if the brightness control is available.

SusiVCSetBright

Set current panel brightness.

```
BOOL SusiVCSetBright(BYTE brightness);
```

Parameters

brightness

[in] Specifies the brightness value to be set.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Call `SusiVCAvailable` first to make sure if the brightness control is available.

In some implementations, the higher the brightness value, the higher the voltage fed to the panel. So please make sure the voltage toleration of your panel prior to the API use.

SusiVCScreenOn

Turn on VGA display signal.

```
BOOL SusiVCScreenOn(void);
```

Parameters

None.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

The function enables both the LCD and CRT display signals.

SusiVCScreenOff

Turn off VGA display signal.

```
BOOL SusiVCScreenOff(void);
```

Parameters

None.

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

The function disables both the LCD and CRT display signals.

SusiHWMAvailable

Check if the hardware monitor driver is available.

```
int SusiHWMAvailable();
```

Parameters

None.

Return Value

value	Meaning
-1	The function fails.
0	The function succeeds; the platform does not support SusiHWM- APIs.
1	The function succeeds; the platform supports HWM.

Remarks

After calling `SusiDllInit` successfully, all `Susi*Available` functions are use to check if the corresponding features are supported by the platform or not. So it is suggested to call `Susi*Available` before using any `Susi*-` functions.

SusiHWMGetFanSpeed

Read the current value of one of the fan speed sensors, or get the types of available sensors.

```
BOOL SusiHWMGetFanSpeed(WORD fanType, WORD *retval, WORD
*typeSupport = NULL);
```

Parameters

fantype

[in] Specifies a fan speed sensor to get value from. It can be one of the flags

FCPU (1) – CPU Fan

FSYS (2) – System / Chassis fan

retval

[out] Point to a variable in which this function returns the fan speed in RPM

Typesupport

[out]

If the value is specified as a pointer (non-NULL) to a variable, it will return the types of available sensors in flags bitwise-ORed

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Call the function first with a non-NULL `typesupport` to know the available fan sensors and a following call to get the fan speed required.

SusiHWMGetTemperature

Read the current value of one of the temperature sensors, or get the types of available sensors.

```
BOOL SusiHWMGetTemperature(WORD tempType, float *retval,
WORD *typeSupport = NULL);
```

Parameters

tempType

[in] Specifies a temperature sensor to get value from. It can be one of the flags

TCPU (1) – CPU temperature

TSYS (2) – System / ambient temperature

retval

[out] Point to a variable in which this function returns the temperature in Celsius.

Typesupport

[out]

If the value is specified as a pointer (non-NULL) to a variable, it will return the types of available sensors in flags bitwise-ORed

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Call the function first with a non-NULL typesupport to know the available temperature sensors and a following call to get the temperature required.

SusiHWMGetVoltage

Read the current value of one of the voltage sensors, or get the types of available sensors.

```
BOOL SusiHWMGetVoltage(DWORD voltType, float *retval,
DWORD *typeSupport = NULL);
```

Parameters

voltType

[in] Specifies a voltage sensor to get value from. It can be one of the flags

VCORE (1<<0)
V25 (1<<1)
V33 (1<<2)
V50 (1<<3)
V120 (1<<4)
VSB (1<<5)
VBAT (1<<6)
VN50 (1<<7)
VN120 (1<<8)
VTT (1<<9)

retval

[out] Point to a variable in which this function returns the voltage in Volt.

Typesupport

[out]

If the value is specified as a pointer (non-NULL) to a variable, it will return the types of available sensors in flags bitwise-ORed

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

Call the function first with a non-NULL typesupport to know the available fan sensors and a following call to get the voltage required.

SusiHWMSetFanSpeed

Control the speed of one of the fans, or get the types of available fans.

```
BOOL SusiHWMSetFanSpeed(WORD fanType, BYTE setval, WORD
*typeSupport = NULL);
```

Parameters

fantype

[in] Specifies a fan to be controlled. It can be one of the flags

FCPU (1) – CPU Fan

FSYS (2) – System / Chassis fan

setval

[in] Specifies the value to set, ranging from 0 to 255.

Typesupport

[out]

If the value is specified as a pointer (non-NULL) to a variable, it will return the types of available fans in flags bitwise-ORed

Return Value

TRUE (1) indicates success; FALSE (0) indicates failure.

Remarks

The fan speed is controlled by Pulse Width Modulation (PWM):

Duty cycle (%) = (setval/ 255) * 100%

And the default duty cycle is set to 100%, i.e. the maximal fan speed.

Call the function first with a non-NULL typesupport to know the available fan sensors and a following call to set the fan speed.

Appendix A - Support Platform List

Windows XP

Platform	Programmable GPIO	GPIO	I²C	SMBus	SMBus Enhance Procotols	Boot Logger	Watchdog	H/W Monitor	Hardware Control	HotKey VGA Control	Backlight On/Off	Brightness	Auto-Brightness
EmbeddedATX													
AIMB-240	O	O	--	--	--	O	O	--	--	--	--	--	--
AIMB-250	O	O	--	--	--	O	O	O	O	--	--	--	--
AIMB-251	O	O	--	--	--	O	O	O	O	--	--	--	--
AIMB-340	O	O	--	--	--	O	O	O	O	--	--	--	--
AIMB-350	O	O	--	--	--	O	O	O	O	O	O	--	--
AIMB-554	O	O	--	--	--	O	O	--	--	--	--	--	--
AIMB-640	O	O	--	--	--	O	O	O	O	O	O	--	--
AIMB-641	O	O	--	--	--	O	O	--	--	O	O	--	--
ISA SBC													
PCA-6773	--	--	--	--	--	O	O	O	O	O	O	--	--
PCI SBC													
PCI-6870	--	--	--	--	--	O	O	O	O	--	--	--	--
PCI-6872	--	--	--	--	O	O	O	O	--	O	O	--	--
PCI-6880	O	O	--	--	O	O	O	O	O	O	O	--	--
PCI-6881	O	O	--	--	--	O	O	O	O	O	O	--	--
PCI-6886	--	--	--	--	--	O	O	O	O	O	O	--	--
PC/104													
PCM-3353	O	O	--	O	O	O	O	--	--	O	O	--	--
PCM-3370	--	--	--	--	--	O	O	O	--	O	O	--	--
PCM-3372	O	O	--	--	--	O	O	--	--	O	O	--	--
PCM-3375	O	O	--	--	--	O	O	O	--	O	O	--	--
PCM-3380	--	--	--	--	--	O	O	O	--	O	O	--	--
PCM-3386	--	--	--	--	--	O	O	O	--	O	O	--	--
PCM-4153	O	O	--	O	O	O	O	--	--	O	O	--	--
PCM-4170	--	--	--	--	--	O	O	O	--	O	O	--	--

Platform	Programmable GPIO	GPIO	I²C	SMBus	SMBus Enhance Procotols	Boot Logger	Watchdog	H/W Monitor	Hardware Control	HotKey VGA Control	Backlight On/Off	Brightness	Auto-Brightness
EPIC													
PCM-4372	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-4380	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-4386	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-4390	O	O	--	--	--	O	O	O	O	O	O	--	--
3.5" SBC													
PCM-9371	--	--	--	--	--	O	O	O	--	O	O	--	--
PCM-9372	--	--	--	--	--	O	O	O	--	O	O	--	--
PCM-9373	--	--	--	--	--	O	O	O	--	O	O	--	--
PCM-9375	O	O	--	O	O	O	O	--	--	O	O	O	O *
PCM-9377	O	O	--	O	O	O	O	O	--	O	O	--	--
PCM-9380	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-9381	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-9386	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-9387	O	O	--	--	--	O	O	O	O	O	O	--	--
5.25" SBC													
PCM-9577	O	O	--	--	--	O	O	--	--	O	O	--	--
PCM-9579	--	--	--	--	--	O	O	--	--	O	O	--	--
PCM-9580	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-9581	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-9582	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-9586	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-9584	O	O	--	--	--	O	O	O	O	O	O	--	--
PCM-9587	O	O	--	--	--	O	O	O	O	O	O	--	--

Platform	Programmable GPIO	GPIO	I²C	SMBus	SMBus Enhance Procotols	Boot Logger	Watchdog	H/W Monitor	Hardware Control	HotKey VGA Control	Backlight On/Off	Brightness	Auto-Brightness
SOM (System On Module)													
SOM-4455(A1)	--	--	O	O	O	O	O	O	O	O	O	--	--
SOM-4455(A2)	--	--	O	O	O	O	O	O	O	O	O	--	--
SOM-4475(A1)	--	--	--	O	O	O	O	O	--	O	O	--	--
SOM-4475(A2)	--	--	O	O	O	O	O	O	O	O	O	--	--
SOM-4477	--	--	O	O	O	O	O	O	O	O	O	--	O *
SOM-4481(A1)	--	--	O	O	O	O	O	O	O	O	O	--	--
SOM-4481(A2)	--	--	O	O	O	O	O	O	O	O	O	--	--
SOM-4481(A3)	--	--	O	O	O	O	O	O	O	O	O	--	--
SOM-4486(A1)	--	--	O	O	O	O	O	O	O	O	O	--	--
SOM-4486(A2)	--	--	O	O	O	O	O	O	O	O	O	--	--
SOM-4486(A3)	--	--	O	O	O	O	O	O	O	O	O	--	--
SOM-5780	O	O	O	O	O	O	O	O	O	O	O	O	O *
SOM-5782	O	O	O	O	O	O	O	O	O	O	O	O	O *
Embedded Box Computers													
ARK-1370	--	--	--	--	--	O	O	--	--	--	--	--	--
ARK-1380	--	--	--	--	--	O	O	O	O	--	--	--	--
ARK-3380	O	O	--	--	--	O	O	O	O	O	O	O	O *
ARK-3381	O	O	--	--	--	O	O	O	O	O	O	O	O *
ARK-3382	O	O	--	--	--	O	O	O	O	O	O	O	O *
ARK-3383	O	O	--	--	--	O	O	O	O	O	O	O	O *
ARK-3384	O	O	--	--	--	O	O	O	O	O	O	O	O *
ARK-3389	O	O	--	--	--	O	O	O	O	O	O	O	O *
ARK-5280	O	O	--	--	--	O	O	O	O	O	O	--	--
EBPC-3500	O	O	--	--	--	O	O	O	O	O	O	O	O *
EBPC-5250-82	O	O	--	--	--	O	O	O	O	O	O	--	--
EBPC-5250-84	O	O	--	--	--	O	O	O	O	O	O	--	--

Platform	Programmable GPIO	GPIO	I²C	SMBus	SMBus Enhance Procotols	Boot Logger	Watchdog	H/W Monitor	Hardware Control	HotKey VGA Control	Backlight On/Off	Brightness	Auto-Brightness
PCI-ISA (PICMG 1.0) Single Board Computers (SBC)													
PCA-6186	--	--	--	--	--	O	O	O	O	--	--	--	--
PCA-6187	--	--	--	--	--	O	O	O	O	--	--	--	--
PCA-6190	--	--	--	--	--	O	O	O	O	--	--	--	--
SHB Express (PICMG 1.3) System Host Boards (SHB)													
PCE-5120	--	--	--	--	--	O	O	O	O	--	--	--	--
PCE-7210	O	O	--	--	--	O	O	O	O	--	--	--	--
Medical Computing Platforms													
POC-125	O	O	--	O	O	O	O	O	O	O	O	O	O*
POC-175	O	O	--	O	O	O	O	O	O	O	O	O	O*
POC-S155	O	O	--	O	O	O	O	O	O	O	O	O	O*
POC-S175	O	O	--	O	O	O	O	O	O	O	O	O	O*
Panel PC													
PPC-155T	--	--	--	--	--	O	O	--	--	O	O	O	O
PPC-L106T	O	O	--	O	O	O	O	--	--	O	O	O	O*
PPC-L127T	O	--	--	O	O	O	O	--	--	O	O	O	O*

Note1: -- Not Support

Note2: ◯* need to have a light sensor IC

Windows CE

Platform	Programmable GPIO	GPIO	I²C	SMBus	SMBus Enhance Procotols	Boot Logger	Watchdog	Hardware Monitor	Hardware Control	HotKey VGA Control	Brightness	Backlight On/Off	Auto-Brightness
ISA SBC													
PCA-6773	--	--	--	--	--	O	O	--	--	O	--	O	--
PC/104													
PCM-3353	--	--	--	--	--	O	O	O	O	O	--	O	--
PCM-3370	--	--	--	--	--	O	O	--	--	O	--	O	--
PCM-3375	--	--	--	--	--	O	O	O	O	O	--	O	--
PCM-3380	--	--	--	--	--	O	O	O	O	O	--	O	--
PCM-3386	--	--	--	--	--	O	O	O	O	O	--	O	--
PCM-4153	--	--	--	--	--	O	O	O	O	O	--	O	--
PCM-4170	--	--	--	--	--	O	O	O	O	O	--	O	--
EPIC													
PCM-4380	--	--	--	--	--	O	O	O	O	O	--	O	--
PCM-4386	--	--	--	--	--	O	O	O	O	O	--	O	--
3.5" SBC													
PCM-9371	--	--	--	--	--	O	O	--	--	O	--	O	--
PCM-9372	--	--	--	--	--	O	O	--	--	O	--	O	--
PCM-9373	--	--	--	--	--	O	O	--	--	O	--	O	--
PCM-9375	O	O	--	O	O	O	O	--	--	O	O	O	O
PCM-9377	O	O	--	O	O	O	O	--	--	O	--	O	--
PCM-9380	O	O	--	--	--	O	O	O	O	O	--	O	--
PCM-9381	O	O	--	O	O	O	O	O	O	O	--	O	--
PCM-9386	O	O	--	--	--	O	O	O	O	O	--	O	--
PCM-9387	O	O	--	O	O	O	O	O	O	O	--	O	--

Platform	Programmable GPIO	GPIO	I²C	SMBus	SMBus Enhance Procotols	Boot Logger	Watchdog	Hardware Monitor	Hardware Control	HotKey VGA Control	Brightness	Backlight On/Off	Auto-Brightness
5.25" SBC													
PCM-9577	O	O	--	--	--	O	O	--	--	O	--	O	--
PCM-9579	--	--	--	--	--	O	O	--	--	O	--	O	--
PCM-9581	O	O	--	--	--	O	O	O	O	O	--	O	--
PCM-9586	O	O	--	--	--	O	O	O	O	O	--	O	--
SOM (System On Module)													
SOM-4455	--	--	O	O	O	O	O	O	O	O	--	O	--
SOM-4475	--	--	--	O	O	O	O	--	--	O	--	O	--
	--	--	O	O	O	O	O	--	--	O	--	O	--
SOM-4481	--	--	O	O	O	O	O	O	O	O	--	O	--
	--	--	O	O	O	O	O	--	--	O	--	O	--
SOM-4486	--	--	O	O	O	O	O	O	O	O	--	O	--
	--	--	O	O	O	O	O	--	--	O	--	O	--
Embedded Box Computers													
ARK-1370	--	--	--	--	--	O	O	--	--	--	--	--	--
ARK-1380	--	--	--	--	--	O	O	O	O	--	--	--	--
ARK-3380	O	O	--	--	--	O	O	O	O	O	O	O	--
ARK-3381	O	O	--	--	--	O	O	O	O	O	O	O	--
ARK-3382	O	O	--	--	--	O	O	O	O	O	O	O	--
ARK-3383	O	O	--	--	--	O	O	O	O	O	O	O	--
ARK-3384	O	O	--	--	--	O	O	O	O	O	O	O	--
ARK-3389	O	O	--	--	--	O	O	O	O	O	O	O	--

Appendix B - GPIO Information

Look up the table for the GPIO pins assignment and the default pins direction for a platform. E.g. AIMB-330(CN19) means that the platform name is AIMB-330 and its GPIO pins are located in CN19 on the board.

AIMB-330(CN19)/ AIMB-340(CN19)/ AIMB-640(CN18)

The number of GPIO pins：4 Inputs, 4 outputs

Pin	Signal	Pin	Signal
Pin-1	IN0	Pin-2	+5V
Pin-3	IN1	Pin-4	***OUT0 (Max 1A)***
Pin-5	IN2	Pin-6	GND
Pin-7	IN3	Pin-8	***OUT1 (Max 1A)***
Pin-9	GND	Pin-10	+12V
Pin-11	Key	Pin-12	Key
Pin-13	POUT3	Pin-14	GND
Pin-15	OUT2	Pin-16	+12V

***.** It should add the pull-up resistors to *OUT0*, *OUT1* on **AIMB-330**, **AIMB-340** and **AIMB-640**.

---

*PCM-3350(CN36,CN37)/PCM-3353(CN36,CN37)/PCM-3372(CN2,CN23)/PCM-4153(CN36,CN37)

`*PCM-XXXX(IN,OUT)`

The number of GPIO pins：4 Inputs, 4 outputs

IN		OUT	
Pin	**Signal**	**Pin**	**Signal**
Pin-1	VCC	Pin-1	OUT0
Pin-2	IN0	Pin-2	OUT1
Pin-3	IN1	Pin-3	OUT2
Pin-4	IN2	Pin-4	OUT3
Pin-5	IN3	Pin-5	GND

PCM-4372(CN2)/PCM-4386(CN7)/PCM-4380(CN7)/ PCM-4390(CN6)/PCM-9374(CN4)/PCM-9375(CN9)/ PCM-9377(27)/PCM-9380(CN7)/PCM-9386(CN7)/ PCM-9577(CN25)/PCM-9584(CN16)/PCM-9586(CN9)/ PCM-9679(CN7)

The number of GPIO pins：4 Inputs, 4 outputs

Pin	Signal	Pin	Signal
Pin-1	VCC	Pin-2	OUT0
Pin-3	IN0	Pin-4	OUT1
Pin-5	IN1	Pin-6	OUT2
Pin-7	IN2	Pin-8	OUT3
Pin-9	IN3	Pin-10	GND

*. It should add the pull-up resistors to the input pins on **PCM-9577** for logic level.

PCM-9381(CN7)/ PCM-9387(CN7)

The number of GPIO pins：4 Inputs

Pin	Signal
Pin-1	VCC
Pin-2	IN0
Pin-3	IN1
Pin-4	IN2
Pin-5	IN3

PCM-9578(CN5)

The number of GPIO pins：4 Inputs, 4 outputs

Pin	Signal	Pin	Signal
Pin-1	OUT0	Pin-2	OUT1
Pin-3	OUT2	Pin-4	OUT3
Pin-5	OUT4	Pin-6	OUT5
Pin-7	OUT6	Pin-8	OUT7
Pin-9	GND	Pin-10	GND

PCM-9580(CN16)

The number of GPIO pins：4 Inputs, 4 outputs

Pin	Signal	Pin	Signal
Pin-1	IN0	Pin-2	OUT0
Pin-3	IN1	Pin-4	OUT1
Pin-5	IN2	Pin-6	OUT2
Pin-7	IN3	Pin-8	OUT3
Pin-9	GND	Pin-10	GND

PCM-9581(CN9)/ PCM-9582(CN19)/ PCM-9586(CN9)/ PCM-9587(CN19)/PCI-6681(CN16)

The number of GPIO pins：4 Inputs, 4 outputs

Pin	Signal	Pin	Signal
Pin-1	IN0	Pin-2	OUT0
Pin-3	GND	Pin-4	GND
Pin-5	IN1	Pin-6	OUT1
Pin-7	VCC	Pin-8	NC
Pin-9	IN2	Pin-10	OUT2
Pin-11	GND	Pin-12	GND
Pin-13	IN3	Pin-14	OUT3

***.** It should add the pull-up resistors to *In2, In3, OUT0, OUT1* on **PCM-9581** and **PCM-9586**.

PCI-6880 (CN2)

The number of GPIO pins：4 Inputs, 4 outputs

Pin	Signal	Pin	Signal
Pin-1	IN0	Pin-2	OUT0
Pin-3	IN1	Pin-4	OUT1
Pin-5	IN2	Pin-6	OUT2
Pin-7	IN3	Pin-8	OUT3
Pin-9	VCC	Pin-10	GND

SOM-5780(U17)/SOM-5782(U14)

The number of GPIO pins：4 Inputs, 4 outputs

Pin	Signal	Pin	Signal
Pin-1	VCC 3.3V	Pin-16	GND
Pin-4	IN2	Pin-20	OUT3
Pin-5	IN3	Pin-21	OUT2
Pin-11	IN0	Pin-22	OUT1
Pin-12	IN1	Pin-23	OUT0

*. SOM-5780, SOM-5782 must combine with SOM-DB5700(carrier board).

SOM-DB5700(CN27)			
Pin-1	IN0	Pin-2	VCC
Pin-3	IN1	Pin-4	OUT0
Pin-5	IN2	Pin-6	OUT1
Pin-7	IN3	Pin-8	OUT2
Pin-9	GND	Pin-10	+12V
Pin-11	NC	Pin-12	NC
Pin-13	OUT3	Pin-14	NC
Pin-15	GND	Pin-16	+12V

PCM-3375(CN16)

The number of GPIO pins：4 Inputs, 4 outputs

Pin	Signal
Pin-1	-5V
Pin-2	GND
Pin-3	-12V

Pin-19	IN0
Pin-20	IN1
Pin-21	IN2
Pin-22	IN3
Pin-23	OUT0
Pin-24	OUT1
Pin-25	OUT2
Pin-26	OUT3

***.** There are two high drive digital outputs, *OUT0, OUT1* (24 VDC, 1 A max), two TTL level digital outputs, OUT2, OUT3 and four digital inputs (TTL level). You can configure the digital I/O to control the opening of the cash drawer and to sense the closing of the cash drawer. The above table explains how the digital I/O is controlled via software programming and how a 12 V solenoid or relay can be triggered. For completeness, please refer to the user manual of POS-563/POS-564/POS-761.

Appendix C – Programming Flags Overview

Hardware Monitor Flags

- ### Fan

Flag	Value	Description
FCPU	1u	CPU FAN
FSYS	2u	System FAN
F2ND	4u	3rd FAN

- ### Temperature

Flag	Value	Description
TCPU	1u	CPU Temperature
TSYS	2u	System Temperature

- ### Voltage

Flag	Value	Description
VCORE	1u	Vcore
V25	2u	2.5V
V33	4u	3.3V
V50	8u	5V
V120	16u	12V
VSB	32u	Voltage of standby
VBAT	64u	VBAT
VN50	128u	-5V
VN120	256u	-12V
VTT	512u	VTT

Boot Logger Flags

Bootcounter

Mode Flag	Value	Description
ESCORE_BOOTCOUNTER_MODE_GET	1u	Read Operation
ESCORE_BOOTCOUNTER_MODE_SET	2u	Write Operation

Element Flag	Value	Description
ESCORE_BOOTCOUNTER_STATUS	1u	Current Status (Is Enabled or Disabled?)
ESCORE_BOOTCOUNTER_VALUE	2u	Number of Reboot Times

Runtimer

Mode Flag	Value	Description
ESCORE_RUNTIMER_MODE_GET	1u	Read Operation
ESCORE_RUNTIMER_MODE_SET	2u	Write Operation

Element Flag	Val.	Description
ESCORE_RUNTIMER_STATUS_RUNNING	1u	Current Status (Is Enabled or Disabled?)
ESCORE_RUNTIMER_STATUS_AUTORUN	2u	Is AutoRun upon Startup?
ESCORE_RUNTIMER_VALUE_CONTINUALON	4u	OS continual run time (reset to 0 after a reboot)
ESCORE_RUNTIMER_VALUE_TOTALON	8u	Sum of OS total run time

GPIO Mask Flags

Flag	Value	Description
ESIO_SMASK_PIN_FULL	0x01	Series of binary 1s for the number of total pins
ESIO_SMASK_CONFIGURABLE	0x02	Direction Changeable Pins
ESIO_DMASK_DIRECTION	0x20	Current Direction of Pins

Appendix D - API Error Codes

An error value will be either

Function Index Code + Library Error Code, or

Function Index Code + Driver Error Code.

If you call an API and returns with fail. The `Function Index Code` in its error code combination does not necessarily equal to the index code of the API. This is because the API may make a call to another API.

Function Index Code

Index Code	Function Index
DLL	
00100000	`ESusiInit`
00200000	`ESusiUnInit`
00300000	`ESusiGetVersion`
00400000	`ESusiDllInit`
00500000	`ESusiDllUnInit`
00600000	`ESusiDllGetVersion`
00700000	`ESusiDllGetLastError`
Core	
10100000	`ESusiCoreInit`
10200000	`ESusiCoreAvailable`
10300000	`ESusiCoreGetBIOSVersion`
10400000	`ESusiCoreGetPlatformName`
10500000	`ESusiCoreAccessBootCounter`
10600000	`ESusiCoreAccessRunTimer`
10700000	`ESusiCoreRebootSystem`
10800000	`ESusiReserved8000000`
Watchdog	
20100000	`ESusiWDInit`
20200000	`ESusiWDAvailable`
20300000	`ESusiWDDisable`
20400000	`ESusiWDGetRange`

20500000	ESusiWDSetConfig
20600000	ESusiWDTrigger
GPIO	
30100000	ESusiIOInit
30200000	ESusiIOAvailable
30300000	ESusiIOCount
30400000	ESusiIOInitial
30500000	ESusiIORead
30600000	ESusiIOReadMulti
30700000	ESusiIOWrite
30800000	ESusiIOWriteMulti
30900000	ESusiIOCountEx
31000000	ESusiIOQueryMask
31100000	ESusiIOSetDirection
31200000	ESusiIOSetDirectionMulti
31300000	ESusiIOReadEx
31400000	ESusiIOReadMultiEx
31500000	ESusiIOWriteEx
31600000	ESusiIOWriteMultiEx
SMBus	
40100000	ESusiSMBusInit
40200000	ESusiSMBusAvailable
40300000	ESusiSMBusReadByte
40400000	ESusiSMBusReadByteMulti
40500000	ESusiSMBusReadWord
40600000	ESusiSMBusWriteByte
40700000	ESusiSMBusWriteByteMulti
40800000	ESusiSMBusWriteWord
40900000	ESusiSMBusReceiveByte
41000000	ESusiSMBusSendByte
41100000	ESusiSMBusWriteQuick
41200000	ESusiSMBusReadQuick
41300000	ESusiSMBusScanDevice
41400000	ESusiSMBusWriteBlock
41500000	ESusiSMBusReadBlock
IIC	

50100000	ESusiIICInit
50200000	ESusiIICAvailable
50300000	ESusiIICReadByte
50400000	ESusiIICWriteByte
50500000	ESusiIICWriteReadCombine
50600000	ESusiIICRead
50700000	ESusiIICWrite
50800000	ESusiIICScanDevice
50900000	ESusiIICWriteRegister
51000000	ESusiIICReadRegister
VGA Control	
60100000	ESusiVCInit
60200000	ESusiVCAvailable
60300000	ESusiVCGetBright
60400000	ESusiVCGetBrightRange
60500000	ESusiVCScreenOff
60600000	ESusiVCScreenOn
60700000	ESusiVCSetBright
Hardware Monitor	
70100000	ESusiHWMInit
70200000	ESusiHWMAvailable
70300000	ESusiHWMGetFanSpeed
70400000	ESusiHWMGetTemperature
70500000	ESusiHWMGetVoltage
70600000	ESusiHWMSetFanSpeed

Library Error Code

Error Code	Error Type
Driver Open Errors	
00000001	ERRLIB_CORE_OPEN_FAIL
00000002	ERRLIB_WDT_OPEN_FAIL
00000004	ERRLIB_GPIO_OPEN_FAIL
00000008	ERRLIB_SMB_OPEN_FAIL
00000016	ERRLIB_VC_OPEN_FAIL
00000032	ERRLIB_HWM_OPEN_FAIL
DLL Functions	
00000000	ERRLIB_SUCCESS
00000001	ERRLIB_RESERVED1
00000002	ERRLIB_RESERVED2
00000003	ERRLIB_LOGIC
00000004	ERRLIB_RESERVED4
00000005	ERRLIB_SUSIDLL_NOT_INIT
00000006	ERRLIB_PLATFORM_UNSUPPORT
00000007	ERRLIB_API_UNSUPPORT
00000008	ERRLIB_RESERVED8
00000009	ERRLIB_API_CURRENT_UNSUPPORT
00000010	ERRLIB_LIB_INIT_FAIL
00000011	ERRLIB_DRIVER_CONTROL_FAIL
00000012	ERRLIB_INVALID_PARAMETER
00000013	ERRLIB_INVALID_ID
00000014	ERRLIB_CREATEMUTEX_FAIL
00000015	ERRLIB_OUTBUF_RETURN_SIZE_INCORRECT
00000016	ERRLIB_RESERVED16
00000017	ERRLIB_ARRAY_LENGTH_INSUFFICIENT
00000032	ERRLIB_RESERVED32
00000050	ERRLIB_BRIGHT_CONTROL_FAIL
00000051	ERRLIB_BRIGHT_OUT_OF_RANGE
00000064	ERRLIB_RESERVED64
00000128	ERRLIB_RESERVED128
00000256	ERRLIB_RESERVED256

Core Functions	
00000500	ERRLIB_CORE_BIOS_STRING_NOT_FOUND
00000512	ERRLIB_RESERVED512
Watchdog Functions	
00001024	ERRLIB_RESERVED1024
GPIO Functions (N/A)	
SMBus Functions	
00001400	ERRLIB_SMB_MAX_BLOCK_SIZE_MUST_WITHIN_32
IIC Functions	
00001600	ERRLIB_IIC_GETCPUFREQ_FAIL
VGA Control Functions (N/A)	
Hardware Monitor Functions	
00002000	ERRLIB_HWM_CHECKCPUTYPE_FAIL
00002001	ERRLIB_HWM_FUNCTION_UNSUPPORT
00002002	ERRLIB_HWM_FUNCTION_CURRENT_UNSUPPORT
00002003	ERRLIB_HWM_FANDIVISOR_INVALID
00002048	ERRLIB_RESERVED2048
Reserved Functions	
00004096	ERRLIB_RESERVED4096
00008192	ERRLIB_RESERVED8192

Driver Error Code

Error Code	Error Type
00000000	ERRDRV_SUCCESS
Common to all Drivers	
00010000	ERRDRV_CTRLCODE
00010001	ERRDRV_LOGIC
00010002	ERRDRV_INBUF_INSUFFICIENT
00010003	ERRDRV_OUTBUF_INSUFFICIENT
00010004	ERRDRV_STOPTIMER_FAILED
00010005	ERRDRV_STARTTIMER_FAILED
00010006	ERRDRV_CREATEREG_FAILED
00010007	ERRDRV_OPENREG_FAILED
00010008	ERRDRV_SETREGVALUE_FAILED
00010009	ERRDRV_GETREGVALUE_FAILED
00010010	ERRDRV_FLUSHREG_FAILED
00010011	ERRDRV_MEMMAP_FAILED
Core Driver (N/A)	
Watchdog Driver (N/A)	
GPIO Driver	
00011200	ERRDRV_GPIO_PIN_DIR_CHANGED
00011201	ERRDRV_GPIO_PIN_INCONFIGURABLE
00011202	ERRDRV_GPIO_PIN_OUTPUT_UNREADABLE
00011203	ERRDRV_GPIO_PIN_INPUT_UNWRITTABLE
00011204	ERRDRV_GPIO_INITIAL_FAILED
00011205	ERRDRV_GPIO_GETINPUT_FAILED
00011206	ERRDRV_GPIO_SETOUTPUT_FAILED
00011207	ERRDRV_GPIO_GETSTATUS_IO_FAILED
00011208	ERRDRV_GPIO_SETSTATUS_OUT_FAILED
00011209	ERRDRV_GPIO_SETDIR_FAILED
SMBus Driver	
00011400	ERRDRV_SMB_RESETDEV_FAILED
00011401	ERRDRV_SMB_TIMEOUT
00011402	ERRDRV_SMB_BUSTRANSACTION_FAILED
00011403	ERRDRV_SMB_BUSCOLLISION

00011404	ERRDRV_SMB_CLIENTDEV_NORESPONSE
00011405	ERRDRV_SMB_REQUESTMASTERMODE_FAILED
00011406	ERRDRV_SMB_NOT_MASTERMODE
00011407	ERRDRV_SMB_BUS_ERROR
00011408	ERRDRV_SMB_BUS_STALLED
00011409	ERRDRV_SMB_NEGACK_DETECTED
00011410	ERRDRV_SMB_TRANSMITMODE_ACTIVE
00011411	ERRDRV_SMB_TRANSMITMODE_INACTIVE
00011412	ERRDRV_SMB_STATE_UNKNOWN
IIC Driver	
00011600	ERRDRV_IIC_RESETDEV_FAILED
00011601	ERRDRV_IIC_TIMEOUT
00011602	ERRDRV_IIC_BUSTRANSACTION_FAILED
00011603	ERRDRV_IIC_BUSCOLLISION
00011604	ERRDRV_IIC_CLIENTDEV_NORESPONSE
00011605	ERRDRV_IIC_REQUESTMASTERMODE_FAILED
00011606	ERRDRV_IIC_NOT_MASTERMODE
00011607	ERRDRV_IIC_BUS_ERROR
00011608	ERRDRV_IIC_BUS_STALLED
00011609	ERRDRV_IIC_NEGACK_DETECTED
00011610	ERRDRV_IIC_TRANSMITMODE_ACTIVE
00011611	ERRDRV_IIC_TRANSMITMODE_INACTIVE
00011612	ERRDRV_IIC_STATE_UNKNOWN
VGA Control Driver	
00011800	ERRDRV_VC_FINDVGA_FAILED
00011801	ERRDRV_VC_FINDBRIGHTDEV_FAILED
00011802	ERRDRV_VC_VGA_UNSUPPORTED
00011803	ERRDRV_VC_BRIGHTDEV_UNSUPPORTED
Hardware Monitor Driver (N/A)	