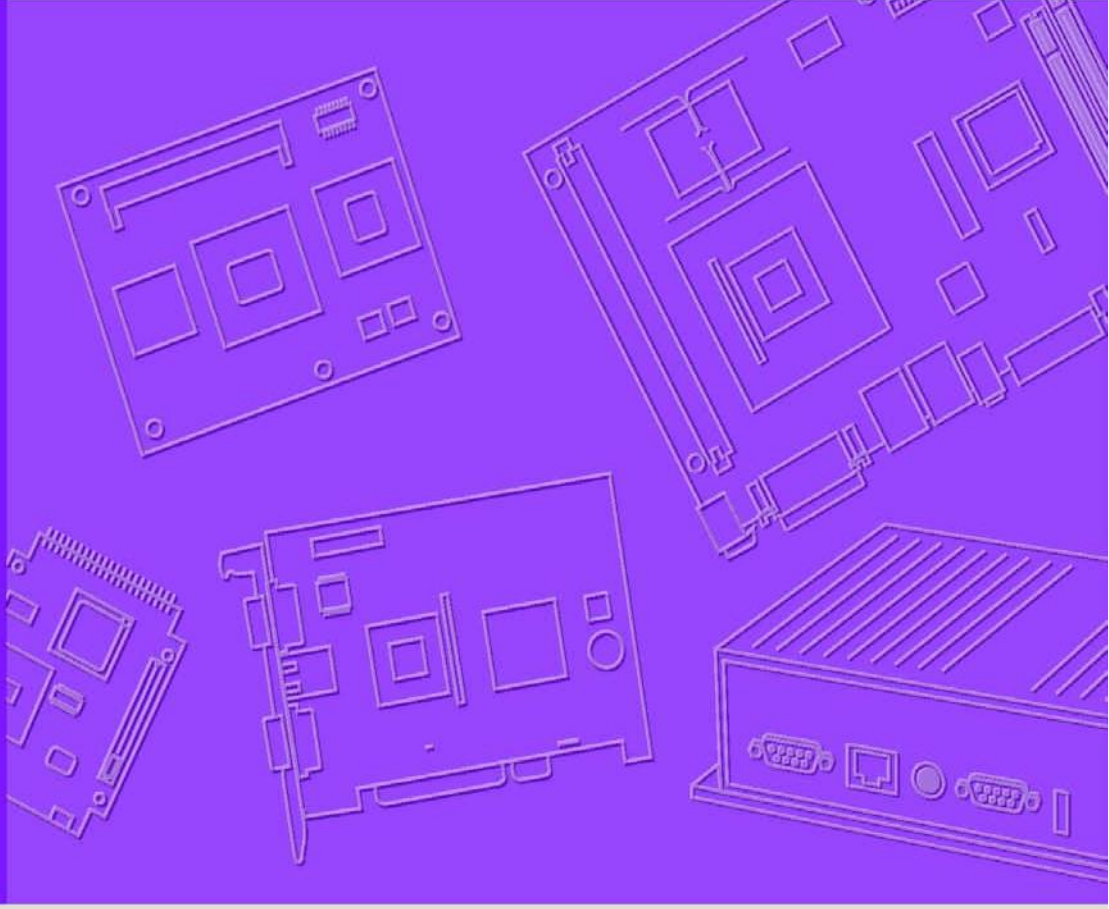

User Manual

SUSI IoT

Secured & Unified Smart Interface Software for Internet of Things APIs

ADVANTECH EmbCore

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Contents

1 Introduction

SUSI IoT – A Bridge to Simplify & Enhance H/W & Application Implementation Efficiency

When developers want to get or control H/W, they have to study all of the specifications. This is a time-consuming job and requires lots of expertise.

Advantech has done all the hard work for our customers with the release of a suite of Software APIs (Application Programming Interfaces), called **Secured & Unified Smart Interface for Internet of Things** (SUSI IoT).

SUSI IoT provides a rich set of user-friendly, intelligent and integrated interfaces, which speeds development, enhances security and offers add-on value for Advantech platforms. SUSI IoT plays the role of catalyst between developer and solution, and makes Advantech embedded platforms easier and simpler to adopt and operate with customer applications.

1.1 Benefits

- ✓ **Faster Time to Market**

  SUSI IoT's unified API helps developers easy to get data or 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 use SUSI IoT to start the integration with a 50% head start. Developers can reference the sample program to see and learn more about the software development environment.

- ✓ **Enhances Hardware Platform Reliability**

  SUSI IoT provides a trusted custom ready solution which combines HW and sensor device, controlling application development through SUSI IoT enhances reliability and brings peace of mind.

- ✓ **Flexible Upgrade Possibilities**

  SUSI IoT supports an easy upgrade solution for customers. Customers just need follow SUSI IoT Module porting guide and their module.

1.2 Environment Requirements

1.2.1 Operating Systems

Windows XP Embedded

Windows XP Pro or Home Edition 32-bit

Windows 7 (x86 / x64)

WES7 (x86 / x64)

Windows 8 Desktop (x86 / x64)

2 SUSI IoT Definition

SusiIoT.h file includes the API declaration, constants and flags that are required for programming.

2.1 Status Codes

All SUSIIoT API functions immediately return a status code from a common list of possible errors. Any function may return any of the defined status codes. See the Appendix for more detailed information.

#define SUSIIOT_STATUS_NOT_INITIALIZED 0xFFFFFFFF

Description

The SUSIIOT API library is not yet or unsuccessfully initialized. SusiIoTInitialize needs to be called prior to the first access of any other SUSIIOT API functions.

Actions

Call SusiIoTInitialize.

#define SUSIIOT_STATUS_INITIALIZED 0xFFFFFFFE

Description

Library is initialized.

Actions

None.

#define SUSIIOT_STATUS_ALLOC_ERROR 0xFFFFFFFD

Description

Memory Allocation Error.

Actions

Free memory and try again.

#define SUSIIOT_STATUS_DRIVER_TIMEOUT 0xFFFFFFFC

Description

Time out in driver. This is Normally caused by hardware/software semaphore timeout.

Actions

Retry.

#define SUSIIOT_STATUS_INVALID_PARAMETER 0xFFFFFEFF

Description

One or more of the SUSIIOT API functions call parameters are out of defined range.

Actions

Verify Function Parameters.

#define SUSIIOT_STATUS_INVALID_BLOCK_ALIGNMENT 0xFFFFFEFE

Description

The Block Alignment is incorrect.

Actions

Use Inputs and Outputs to correctly select input and outputs.

#define SUSIIOT_STATUS_INVALID_BLOCK_LENGTH 0xFFFFFEFD

Description

This means that the Block length is too long.

Actions

Use Alignment Capabilities information to correctly align write access.

#define SUSIIOT_STATUS_INVALID_DIRECTION 0xFFFFFEFC

Description

The current Direction Argument attempts to set GPIOs to a unsupported direction. I.E. Setting GPI to Output.

Actions

Use Inputs and Outputs to correctly select input and outputs.

#define SUSIIOT_STATUS_INVALID_BITMASK 0xFFFFFEFB

Description

The Bitmask Selects bits/GPIOs which are not supported for the current ID.

Actions

Use Inputs and Outputs to probe supported bits.

#define SUSIIOT_STATUS_RUNNING 0xFFFFFEFA

Description

Watchdog timer already started.

Actions

Call SusiWDogStop before retrying.

#define SUSIIOT_STATUS_UNSUPPORTED 0xFFFFFCFF

Description

This function or ID is not supported at the actual hardware environment.

Actions

None.

#define SUSIIOT_STATUS_NOT_FOUND 0xFFFFFBFF

Description

Selected device was not found

Actions

None.

#define SUSIIOT_STATUS_TIMEOUT 0xFFFFFBFE

Description

Device has no response.

Actions

None.

#define SUSIIOT_STATUS_BUSY_COLLISION 0xFFFFFBFD

Description

The selected device or ID is busy or a data collision is detected.

Actions

Retry.

#define SUSIIOT_STATUS_READ_ERROR 0xFFFFFAFF

Description

An error is detected during a read operation.

Actions

Retry.

#define SUSIIOT_STATUS_WRITE_ERROR 0xFFFFFAFE

Description

An error is detected during a write operation.

Actions

Retry.

#define SUSIIOT_STATUS_MORE_DATA 0xFFFFF9FF

Description

The amount of available data exceeds the buffer size. Storage buffer overflow was prevented. Read count was larger than the defined buffer length.

Actions

Either increase the buffer size or reduce the block length.

#define SUSIIOT_STATUS_ERROR 0xFFFFF0FF

Description

Generic error message. No further error details are available.

Actions

None.

```
#define SUSIIOT_STATUS_SUCCESS 0
```

Description

The operation is successful.

Actions

None.

```
#define SUSIIOT_STATUS_JSON_TYPE_ERROR 0XFFFFF8FF
```

Description

The json type is not correctly.

Actions

None.

```
#define SUSIIOT_STATUS_JSON_OBJECT_EMPTY 0XFFFFF8FE
```

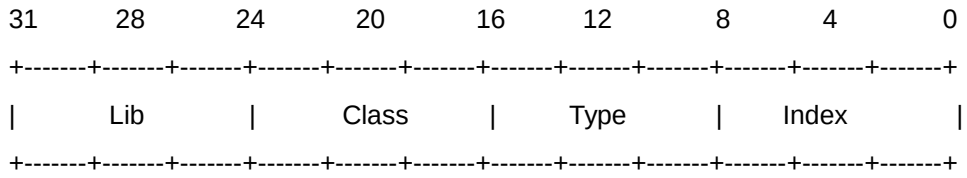
Description

The json type is empty.

Actions

None.

2.2 ID format




```
#define SUSI_IOT_ID_GET_LIB(Id)                    (((Id) & 0xFF000000) >> 3*8)
#define SUSI_IOT_ID_GET_CLASS(Id)                  (((Id) & 0x00FF0000) >> 2*8)
#define SUSI_IOT_ID_GET_TYPE(Id)                   (((Id) & 0x0000FF00) >> 1*8)
#define SUSI_IOT_ID_GET_INDEX(Id)                                ((Id) & 0xFF)
```

2.2.1 Lib

Module library class code, ex: SUSI, SAB2000 and so on.

0x00~0x7F is reserved for Advantech device. 0x80~0xFF is reserved for OEM device.

2.2.2 Class

Main Class code, ex: HWM, WDT, SMBus...

0x00~0x7F is reserved for Advantech device. 0x80~0xFF is reserved for OEM device.

If you want to add your data into Advantech Class, you can follow the ID below:

0x01: Platform Information

0x02: Hardware Monitor

0x04: GPIO

0x05: Backlight:

2.2.3 Type

Type code, ex: Temperature, Voltage...

0x00~0x7F is reserved for Advantech device. 0x80~0xFF is reserved for OEM device.

If you want to add your data into Advantech Type, you can follow the ID below:

0x01: Temperature

0x02: Voltage

0x03: Fan Speed

0x04: Current:

0x05: CaseOpen

2.2.4 Index

The index of type items

3 SUSIIOT API

The SUSIIOT APIs provide functions to control ADVANTECH platforms and sensor device. SUSIIOT API functions are based on a dynamic library. SUSIIOT API can be implemented in various other programming languages.

3.1 Initialization Functions

3.1.1 SusiIoTInitialize

uint32_t SUSI_IOT_API SusiIoTInitialize(void)

Description:

General initialization of the SUSIIOT API. Prior to calling any SUSIIOT API functions, the library needs to be initialized by calling this function. The status code for all SUSI API function will be SUSIIOT_STATUS_NOT_INITIALIZED unless this function is called.

Parameters:

None

Return Status Code:

Condition	Return Value
Library initialized	SUSIIOT_STATUS_INITIALIZED
Fail	SUSIIOT_STATUS_NOT_INITIALIZED
Success	SUSIIOT_STATUS_SUCCESS

3.1.2 SusiIoTUninitialize

uint32_t SUSI_IOT_API SusiIoTUninitialize(void)

Description:

General function to uninitialize the SUSIIOT API library that should be called before program exit. In a dynamic library environment this function is not expected to replace the native uninitialized routines. It is expected that in this environments this function has no functionality.

Parameters:

None

Return Status Code:

Condition	Return Value
Library uninitialized	SUSIIOT_STATUS_NOT_INITIALIZED
Success	SUSIIOT_STATUS_SUCCESS

3.2 Information Functions

3.2.1 SusiIoTGetPFCapability

uint32_t SUSI_IOT_API SusiIoTGetPFCapability(json_t *capability)

Description:

Getting all information and data about the hardware platform.

Parameters:

capability

Pointer to a buffer that receives the json's data.

Return Status Code:

Condition	Return Value
Library uninitialized	SUSIIOT_STATUS_NOT_INITIALIZED
capability==NULL	SUSIIOT_STATUS_ERROR
Success	SUSIIOT_STATUS_SUCCESS

3.2.2 SusiIoTGetPFCapabilityString

const char *SUSI_IOT_API SusiIoTGetPFCapabilityString()

Description:

Getting all information and data about the hardware platform by string.

Return Status Code:

Condition	Return Value
Success	Char String Value

3.3 Get Data Function

3.3.1 SusiIoTGetPFData

uint32_t SUSI_IOT_API SusiIoTGetPFData(uint32_t Id, json_t *data)

Description:

Getting all data about the hardware platform.

Parameters:

Id

SUSIIOT ID. See 2.2.

data

Pointer to a buffer that receives the json's data.

Return Status Code:

Condition	Return Value
Library uninitialized	SUSIIOT_STATUS_NOT_INITIALIZED
data==NULL	SUSIIOT_STATUS_INVALID_PARAMETER
Success	SUSIIOT_STATUS_SUCCESS

3.3.2 SusiIoTGetPFDataString

const char * SUSI_IOT_API SusiIoTGetPFDataString(uint32_t Id)

Description:

Getting all data about the hardware platform by string.

Parameters:

Id

SUSIIOT ID. See 2.2.

Return Status Code:

Condition	Return Value
Success	Char String Value

3.3.3 SusiIoTGetValue

uint32_t SUSI_IOT_API SusiIoTGetValue(uint32_t Id, json_t *jValue)

Description:

Getting all data about the hardware platform.

Parameters:

Id

SUSIIOT ID. See 2.2.

jValue

Pointer to a buffer that receives the json value.

Return Status Code:

Condition	Return Value
Library uninitialized	SUSIIOT_STATUS_NOT_INITIALIZED
Id invalid	SUSIIOT_STATUS_UNSUPPORTED
Module fail	SUSIIOT_STATUS_ERROR
Success	SUSIIOT_STATUS_SUCCESS

3.4 Set Data Function

3.4.1 SusiIoTSetPFData

uint32_t SUSI_IOT_API SusiIoTSetPFData(json_t *data)

Description:

Setting data to hardware platform.

Parameters:

data

Pointer to a buffer that set json's data.

Return Status Code:

Condition	Return Value
Library uninitialized	SUSIIOT_STATUS_NOT_INITIALIZED
data==NULL	SUSIIOT_STATUS_INVALID_PARAMETER
Success	SUSIIOT_STATUS_SUCCESS

3.4.2 SusiIoTSetPFDataString

uint32_t SUSI_IOT_API SusiIoTSetPFDataString(char* jsonString)

Description:

Setting data to hardware platform by string.

Parameters:

jsonString

Pointer to a buffer that set data json string.

Return Status Code:

Condition	Return Value
Library uninitialized	SUSIIOT_STATUS_NOT_INITIALIZED
jsonString == NULL	SUSIIOT_STATUS_INVALID_PARAMETER
jsonString != json string	SUSIIOT_STATUS_ERROR
Success	SUSIIOT_STATUS_SUCCESS

3.4.3 SusiIoTSetValue

uint32_t SUSI_IOT_API SusiIoTSetValue(uint32_t Id, json_t *jValue)

Description:

Setting value about the hardware platform.

Parameters:

Id

SUSIIOT ID. See 2.2.

jValue

Pointer to a buffer that set the json value.

Return Status Code:

Condition	Return Value
Library uninitialized	SUSIIOT_STATUS_NOT_INITIALIZED
Id invalid	SUSIIOT_STATUS_UNSUPPORTED
Module fail	SUSIIOT_STATUS_ERROR
Success	SUSIIOT_STATUS_SUCCESS