ADVANTECH EmbCore

Embedded Software & Modules

SUSI-SQFlash

User's Manual

Version 1.0.1802.1

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Part No.
Version: 1.0.1802.1

Printed in Taiwan 2009-06-16

Version History

Date	Version	Remark
2008-11-20	0.1	First release
2008-12-03	0.2	Update Tool
2008-12-15	0.3	Update naming & PN
2009-01-06	1.0	Add UnInitializeCF API
2009-01-19	1.1	Update SMART attribute
2009-01-20	1.2	Update PN table
2009-02-12	1.3	Add Flash Lock Feature
2009-03-05	1.0.1505.1	1. Preventing multiple instances 2. “Endurance Remain Life” -> “Endurance Check” 3. Sync document version with tool version
2009-05-13	1.0.1711.1	1. Add Clear Security ID function 2. Bug fixed
2009-05-25	1.0.1725.1	1. Update Demo Product key to “ASAQ5-3ZTH3-Y37QS-ADYP9-FVHII-CT78N-85VAA” 2. Provide debug version library SQFlash-CF_d.lib. 3. Add protected project into release pack.
2009-06-16	1.0.1802.1	1. Integrate all SQFlash projects (CF, PDM, SSD) into one solution. 2. Disable SID function if unused sectors cannot be found. 3. Change all APIs to SQFlash_xxx() formate.

Table of Contents

Introduction

SUSI-SQFlash software package is a flash management package contains utility and API to access Advantech flash storages. It supports Software Protection (Security ID Read/Write & Flash Lock) and Life Monitoring (S.M.A.R.T.) features. Product key protected package provides user a safe environment not only protect application itself but also prevents Security ID not to be read without the same product key while writing. Based on CF 3.0 specification, user can “Lock” SQFlash via Flash Lock function and “Unlock” by BIOS while booting. A locked SQFlash cannot be read by any card reader or boot from other platforms without a BIOS with “Unlock” feature. S.M.A.R.T. attribute contains Max/Average Program and Erase Cycles, Power On Time, ECC count and Endurance Check. User can monitor it directly by SUSI-SQFlash utility or implement into application by SUSI-SQFlash API. Life-span detection mechanism can be designed through the information of Endurance Check.

Benefits

- **Faster Time to Market**
  The Utility is ready to run without modifications. System developers can use it to control the SQFlash without knowing the controller specs of the SQFlash. API and sample code ready for software developers to implement flash management mechanism into their applications.
- **Protect Your Intellectual Property**
  In order to help protect customers’ intellectual property, Advantech has designed in Security ID feature for Advantech SQFlash. Customers can easily implement security functions on their applications base on encrypted utility and library. Flash Lock feature helps user to lock SQFlash to protect flash data not to be read.
- **Monitor SQFlash Health**
  Advantech SQFlash management package provides utility and API to get Self-Monitoring, Analysis, and Reporting Technology (S.M.A.R.T.) information from SQFlash cards. Customer can monitor the flash storage health and design an early warning mechanism by life-span detection.

System Requirements

Hardware

Following hardware are required to run Advantech SUSI-SQFlash Utility for Windows XP：

1. Processor

   Minimum Requirement： A 200 megahertz (MHz) processor, such as the Intel Pentium/Celeron family, AMD K6/Athlon/Duron family, or compatible processor.

2. RAM

   Minimum Requirement： RAM size is dependent on the running applications and using XPE features.

3. CompactFlash

   Requirement： Advantech SQFlash in IDE slot

Part Number	Description
SQF-P10S1-1G-CTE	Advantech SQFlash 1G CF NR, DMA (0~70°C)
SQF-P10S2-2G-CTE	Advantech SQFlash 2G CF NR, DMA (0~70°C)
SQF-P10S2-4G-CTE	Advantech SQFlash 4G CF NR, DMA (0~70°C)
SQF-P10S2-8G-CTE	Advantech SQFlash 8G CF NR, DMA (0~70°C)
SQF-P10S2-16G-CTE	Advantech SQFlash 16G CF NR, DMA (0~70°C)
SQF-P10S1-1G-ETE	Advantech SQFlash 1G CF NR, DMA (-40~85°C)
SQF-P10S2-2G-ETE	Advantech SQFlash 2G CF NR, DMA (-40~85°C)
SQF-P10S2-4G-ETE	Advantech SQFlash 4G CF NR, DMA (-40~85°C)
SQF-P10S2-8G-ETE	Advantech SQFlash 8G CF NR, DMA (-40~85°C)
SQF-P10S2-16G-ETE	Advantech SQFlash 16G CF NR, DMA (-40~85°C)

.

Software

- SUSI-SQFlash **v1.0.1802.1** utility and API are required
- Dot Net Framework 2.0 required
- SQFlash firmware version 2.M0J

Environments

Operating Systems that SUSI-SQFlash supports include:

- Windows XP Embedded
- Windows XP Pro or Home Edition

Installation

SUSI-SQFlash software package doesn’t need to install into your operation system. However, you must have Advantech SQFlash in your IDE slot and a valid product key to access the utility or API. Please contact Advantech to get legal access code.

SUSI-SQFlash-CF Utility

SUSI-SQFlash is a utility to manage Advantech SQFlash card to access security zone and S.M.A.R.T. information. Key features:

- Product key protected
- Security ID Read/Write
- Flash Lock
- Protecting sample code generator
- S.M.A.R.T. attribute

This utility package contains 9 files:

File Name	Description
SUSI-SQFlash-CF.exe	Main program
SQFlash-CF_Dll.dll	SUSI-SQFlash-CF Utility Library
PieChartControls.dll	SUSI-SQFlash-CF Utility Library
Cpp-ProtCode.txt	Protected sample code in C++
SQFlash-CF.lib	SUSI-SQFlash-CF Static Library
SQFlash-CF_d.lib	SUSI-SQFlash-CF Debug mode Static Library
SQFlash-CF.h	SUSI-SQFlash-CF Header File
ePFlash.sys	BIOS Flash Driver
SQFlash-CF_PID.pdf	Access Code

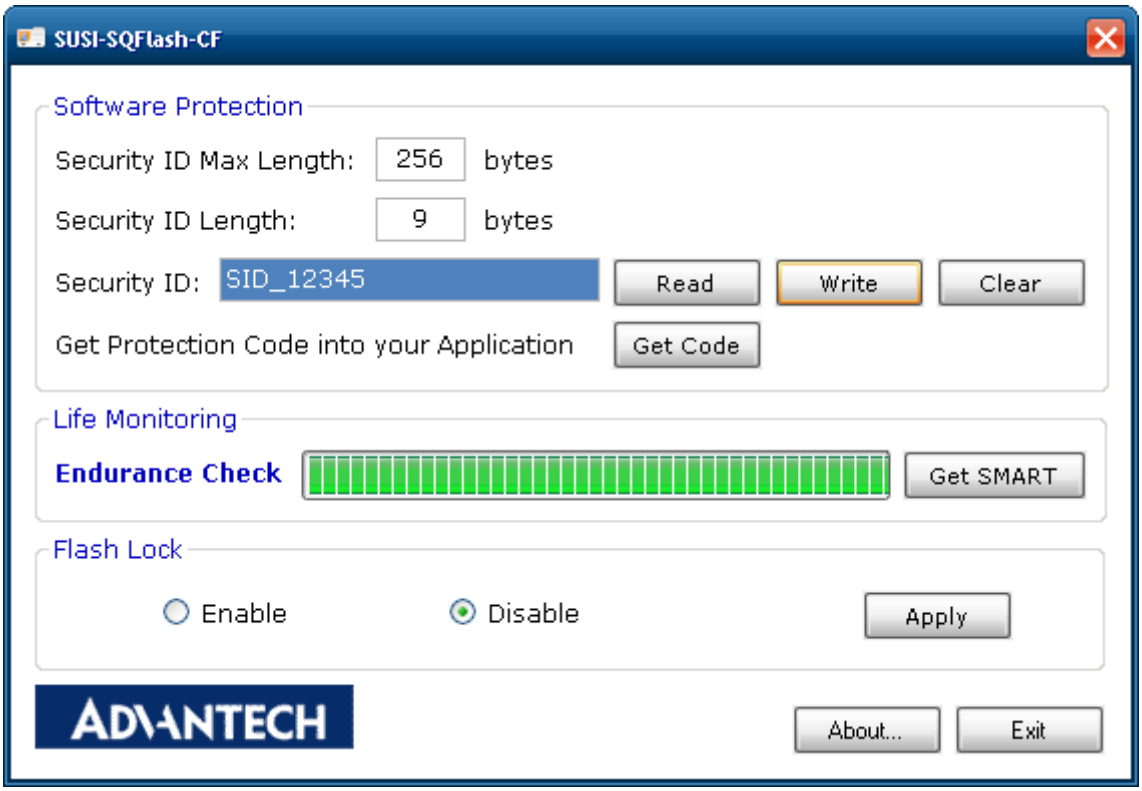
For security concern, please import static library SQFlash-CF.lib to implement your protecting mechanism. Every user who wants to adopt SUSI-SQFlash package should apply Access Code from Advantech first. Once you enter a legal access code, you’re not allowed to change another product key on the same SQFlash.

First Window – Access Code

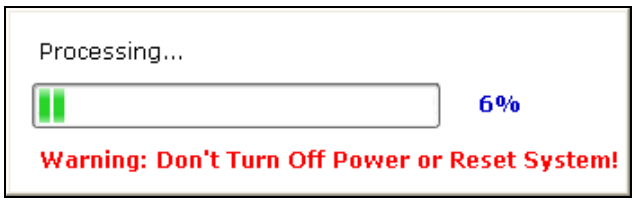
Please input a valid product key into this dialog. You can find the product key in SQFlash-CF_PID.pdf. Once you type valid access code with this utility, system will keep record and you won't need to type access code next time.

Main Window – SUSI-SQFlash-CF

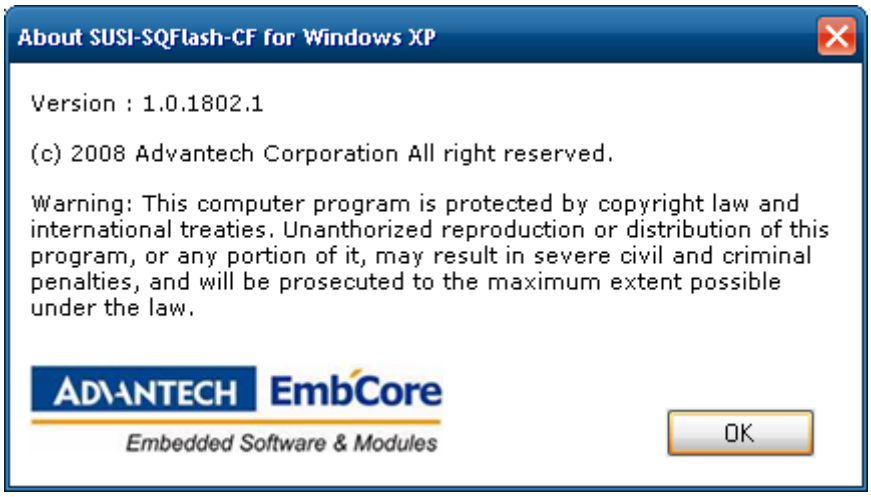
- Software Protection
  - Detect max and user-defined length of Security ID
  - Read or Write Security ID into hidden area
  - Get protection code into application (C++ sample)
- Life monitoring: Endurance Check
- Flash Lock: Enable/Disable Flash Lock feature



Flash Lock feature needs to be supported by Advantech BIOS and support list as Appendix. If target platform didn't support this feature, Flash Lock buttons will be gray out. While user press Enable or Disable to change the status of Flash Lock, a progress dialog as follows will be pop-up.



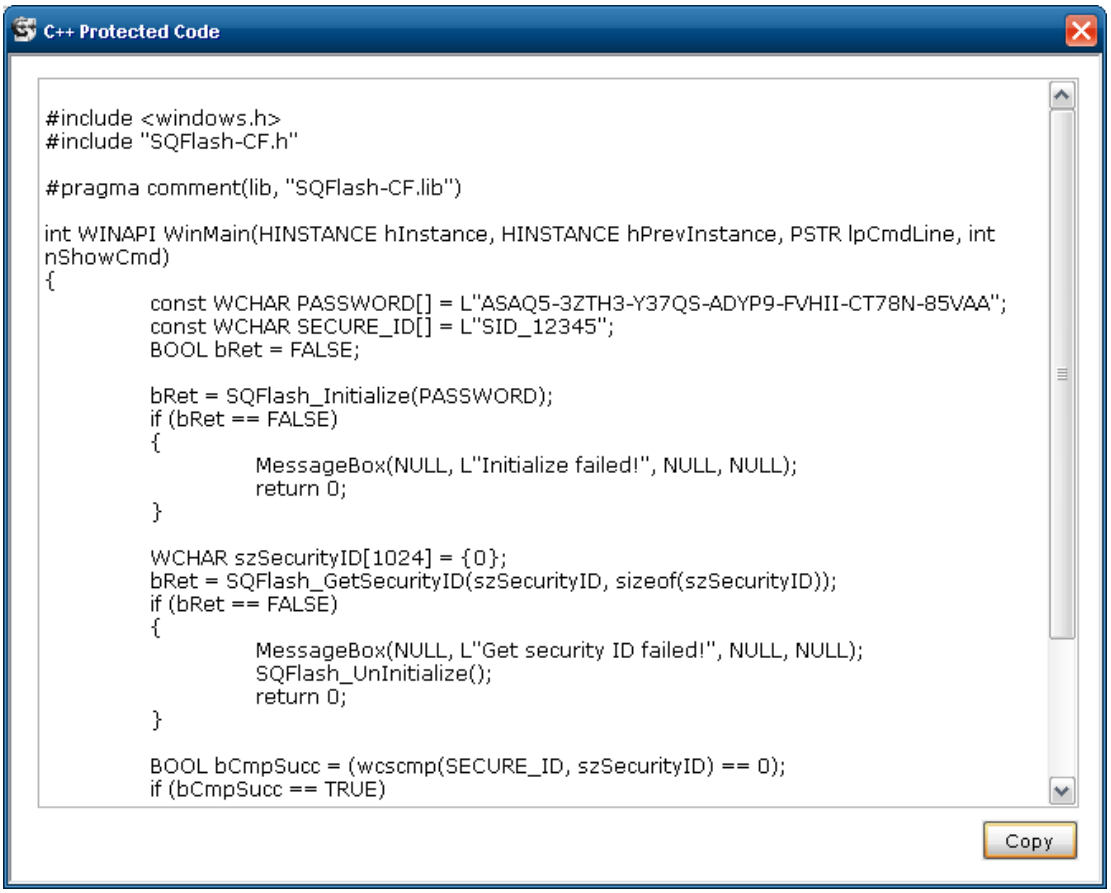
About Window – Advantech Copyright



Get Code Window – Protecting Sample Code

Click “Get Code” to show C++ protected sample code in a new dialog.

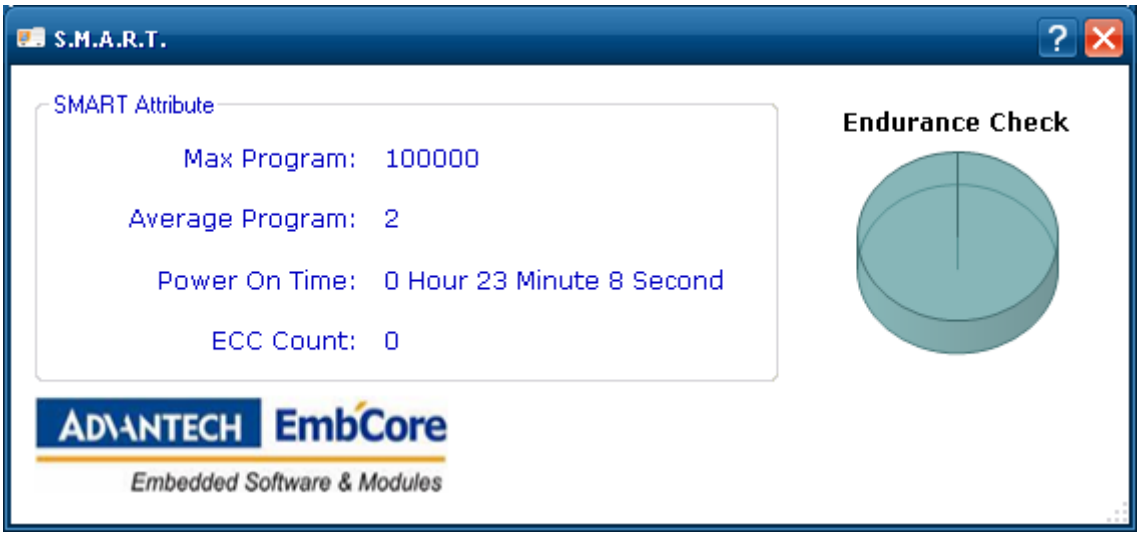
- C++ sample code
- Product key and Security ID required



SMART Window – Get SMART attribute

Click “Get SMART” to S.M.A.R.T. attribute in a new dialog.

- Max Program
  In CF card max program and erase cycles.
- Average Program
  In CF card average program and erase cycles.
- Power On Time;
  Power on accumulates time.
- ECC Count;
  Error correct code number of times counting.
- Endurance Check;
  Endurance Check(%) is the result of (Average P/E cycles) / (Max P/E cycles).



SUSI-SQFlash-CF API

Programming Overview

SQFlash-CF.lib is a static link library that exports all the API functions.

1. **SQFlash_Initialize**
   Input valid access code in order to initial SUSI-SQFlash

2. **SQFlash_UnInitialize**
   Uninitialize SQFlash library

3. **SQFlash_GetSmartAttribute**
   S.M.A.R.T. attribute contains 5 data in Advantech SQFlash
   - Max Program
     In CF card max program and erase cycles.
   - Average Program
     In CF card average program and erase cycles.
   - Power On Time;
     Power on accumulates time.
   - ECC Count;
     Error correct code number of times counting.
   - Endurance Check;
     Endurance Check(%) is the result of (Average P/E cycles) / (Max P/E cycles).

4. **SQFlash_IsUnusedSectorExist**
   Find available sector to restore security ID

5. **SQFlash_SetSecurityID**
   Support maximum length to 256 bytes security string which will write into the hidden area of Advantech SQFlash.

6. **SQFlash_GetSecurityID**
   Read Security ID from hidden area

7. **SQFlash_ClearSecurityID**
   Clear Security ID from hidden area

8. **SQFlash_IsSupportFlashLock**
   Check target platform support Flash Lock or not.

9. **SQFlash_IsFlashLockEnable**
   Check target platform Flash Lock be enabled or not.

10. **SQFlash_EnableFlashLock**
    Enable Flash Lock feature.

11. **SQFlash_DisableFlashLock**
    Disable Flash Lock feature.

Initialize Function

Syntax:

BOOL SQFlash_Initialize(LPCSTR pszPassword);

Parameters:

pszPassword

[in] Valid SN

Return Value:

If the library was initialized successfully, the return value is TRUE. Otherwise, the return value is FALSE.

Syntax:

Void SQFlash_UnInitialize( );

Parameters:

None

Return Value:

None

GetSmartAttribute Function

Syntax:

```
BOOL SQFlash_GetSmartAttribute(PATA_SMART_ATTR_TABLE pASAT);
```

Parameters:

pASAT

[in] Pointer to a ATA_SMART_ATTR_TABLE structure to receive the Smart Attribute.

ATA_SMART_ATTR_TABLE Structure

The ATA_SMART_ATTR_TABLE Structure contains Smart Attributes.

Syntax:

```
typedef struct _ATA_SMART_ATTR_TABLE
{
    DWORD dwMaxProgram;
    DWORD dwAverageProgram;
    DWORD dwEnduranceRemainLife;
    DWORD dwPowerOnTime;
    DWORD dwEccCount;
} ATA_SMART_ATTR_TABLE, *PATA_SMART_ATTR_TABLE;
```

Members:

dwMaxProgram

Max Program/Erase Cycles

dwAverageProgram

Average Program/Erase Cycles

dwEnduranceRemainLife

Endurance (%) Remain Life

dwPowerOnTime

Power On Time second)

dwEccCount

ECC Count

SetSecurityID Function

Syntax:

BOOL SQFlash_IsUnusedSectorExist();

Parameters:

None

Return Value:

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE.

Syntax:

BOOL SQFlash_SetSecurityID(LPCSTR pszSecurityID);

Parameters:

pszSecurityID

[in] Pointer to a null-terminated string to be used as the new Security ID.

Return Value:

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE.

GetSecurityID Function

Syntax:

BOOL SQFlash_GetSecurityID(PCHAR pszSecurityID, DWORD cchBuffer);

Parameters:

pszSecurityID

[out] Pointer to the buffer that will receive the Security ID.

cchBuffer

[in] Specifies the maximum number of characters to copy to the buffer, including the NULL character.

Return Value:

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE.

ClearSecurityID Function

Syntax:

BOOL SQFlash_ClearSecurityID();

Parameters:

None

Return Value:

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE.

IsSupportFlashLock Function

Syntax:

BOOL SQFlash_IsSupportFlashLock(HWND hWnd, UINT msgID);

Parameters:

hWnd

[in] Handle to a window. This window will receive processing progress information by window message.

msgID

[in] User defined window message for processing progress information. The wParam with this message represents current progress and lParam is the maximum progress value.

Return Value:

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE.

IsFlashLockEnable Function

Syntax:

```
BOOL SQFlash_IsFlashLockEnable(HWND hWnd, UINT msgID);
```

Parameters:

hWnd

[in] Handle to a window. This window will receive processing progress information by window message.

msgID

[in] User defined window message for processing progress information. The wParam with this message represents current progress and lParam is the maximum progress value.

Return Value:

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE.

EnableFlashLock Function

Syntax:

BOOL SQFlash_EnableFlashLock(LPCSTR pszPassword, HWND hWnd, UINT msgID);

Parameters:

pszPassword

[in] Valid SN

hWnd

[in] Handle to a window. This window will receive processing progress information by window message.

msgID

[in] User defined window message for processing progress information. The wParam with this message represents current progress and lParam is the maximum progress value.

Return Value:

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE.

DisableFlashLock Function

Syntax:

BOOL SQFlash_DisableFlashLock(HWND hWnd, UINT msgID);

Parameters:

hWnd

[in] Handle to a window. This window will receive processing progress information by window message.

msgID

[in] User defined window message for processing progress information. The wParam with this message represents current progress and lParam is the maximum progress value.

Return Value:

If the function succeeds, the return value is TRUE.

If the function fails, the return value is FALSE.

About

Advantech's Embedded Core Service (Emb'Core) is an open business model that provides integrated software and module solutions to speed up application development. The key proficiencies of Embedded Core Services are software, firmware, and hardware module integration capability that offer customized solutions. For further information please email: EmbCore@advantech.com

About Advantech

Founded in 1983, Advantech is a global leading ePlatform services provider of web-based technology, computing platforms and customization services to empower innovations in the connected eWorld. Advantech cooperates closely with partners to help provide complete solutions for a wide array of applications in various industries. Advantech delivers more than a thousand products and platform solutions in 5 main categories: Industrial & Network Computing, Embedded Computing, Applied Computing, eVideo Solutions, and eAutomation. With more than 2,700 talented people, Advantech operates an extensive support, sales and marketing network in 18 countries and 36 major cities. Advantech delivers efficient time-to-market services to all worldwide customers. (Corporate Website: www.advantech.com).