The System Configuration Interface On Toshiba Laptops

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1 Overview

The System Configuration Interface (SCI) is a software interface that allows applications to read or setup configurations on Toshiba portable computers. It aims to conceal differences in hardware between different models from the software.

The System Configuration Interface is implemented using the System Management Mode (SMM) of the Intel processor. To call the SCI the necessary registers are loaded with the values to indicate what function we wish to ask and a value is then read from port B2h. On reading from port B2h the SMM mode of the processor is enabled, whatever function requested is carried out and execution of the software

The calls to the SCI can take place at *any* time and in whatever mode the processor happens to be in at the time i.e. real, protected, virtual8086 etc. While a call to the SCI is in progress all other functions of the processor are queued pending completion of the call. This includes all maskable and non-maskable interrupts.

2 General

With the SCI the calling software can check whether SCI is implemented or not on a target machine. Read the current configuration, and/or set a new configuration. They can also set the default configuration. The caller must first open the interface to the SCI before reading or setting the current configuration and close the interface after it has finished. This enables the caller to ensure it has exclusive access to the SCI, as when the interface is open further request to open the interface will fail.

When the reading the current configuration, you can also get all possible configurations on the target system, if it is possible to change the configuration and whether any change will require a reboot before it takes effect.

3 Interface

Reading a byte from port B2h into the AL register activates the interface. The function that is then executed depends on the value held in the AX register, according to the following list.

    F000h Support Check
    F100h Open Interface
    F200h Close Interface
    F300h Get System Configuration
    F400h Set System Configuration
    F500h Set Default Configuration

3.1 Support Check

This function allows the caller to determine if the system's BIOS supports the SCI functionality and if so which version is supported.

Call:
    AX = F000h
Return successful:
    CF = 0
    AX = 0044h
    DH = major version number
    DL = minor version number
Return unsuccessful:
    CF = 1
    AH = 86h - SCI not present

3.2 Open Interface

This function opens the SCI interface and allows the calling program to start getting and setting the system configuration. If another program has already opened the SCI interface this function will return with the carry flag set and ah=81h. To ensure that software has exclusive access to the SCI programs should halt at this point. After this function has been called, the Close, Get, Set and Default SCI calls are activated.

Call:
    AX = F100h
Return successful:
    CF = 0
    AX = 0044h
Return unsuccessful:
    CF = 1
    AH = 81h - Interface already opened
        86h - SCI not present

3.3 Close Interface

When a program has finished getting or setting the system configuration it should call this function. Until the interface has been closed other programs will be unable to open the SCI and will be locked out. After this function has been called, the Close, Get, Set and Default SCI calls are disabled.

Call:
    AX = F200h
Return successful:
    CF = 0
    AX = 0044h
Return unsuccessful:
    CF = 1
    AH = 82h - Interface not opened
        86h - SCI not present

3.4 Get System Configuration

This returns the current system configuration information. The configuration required is selected by placing the configuration code in the BX register. Due to the nature by which this document was compiled it is unlikely that all possible configuration codes are covered.

The **attribute** returned in AL shows extra information of specified function, such as indicating whether or not modification of system configuration is valid only after system reboot. The **data type** returned in BX defines the format of data stored in **current setting** in CX register and **possible settings**

in DX register. The **possible settings** shows the range of valid settings on the target machine. The SI register holds the factory default for configuration, and the value it will be set to if the Default SCI call is made.

Call:
    AX = F300h
    BX = configuration code
Return successful:
    CF = 0
    AH = 00h
    AL = attribute
    BX = data type
    CX = current setting
    DX = possible settings
    SI = default setting
Return unsuccessful:
    CF = 1
    AH = 80h - Function not supported
        82h - Interface not opened yet
        86h - SCI not present
        8Eh - Device not installed

3.5 Set System Configuration

This function sets a new system configuration. The new configuration is selected by placing the configuration code in the BX register, and the setting in the CX register. Due to the nature by which this document was compiled it is unlikely that all possible configuration codes are covered. The **attribute** returned in AL indicates if whether the system needs rebooting before the new configuration takes effect.

Call:
    AX = F400h
    BX = configuration code
    CX = new configuration to be set
Return successful:
    CF = 0
    AH = 00h
    AL = attribute
    BX = data type
    CX = current setting
    DX = possible settings
    SI = default setting
Return unsuccessful:
    CF = 1
    AH = 80h - Function not supported
        82h - Interface not opened yet
        83h - Input data error
        84h - Write Protect error
        86h - SCI not present
        8Eh - Device not installed

3.6 Set Default Configurations

This function sets *all* system configuration parameters to their default values and updates the CMOS. There is no way to set individual configurations to their default values.

Call:
    AX = F500h
Return successful:
    CF = 0
    AH = 00h
    AL = 01h
Return unsuccessful:
    CF = 1
    AH = 82h - Interface not opened
           86h - SCI not present

4 Data Types

5 Configuration Codes

5.1 Power-Up Mode

This setting controls the the power up mode of the computer is boot or suspend/resume (Case 1). On models that support hibernation it also controls whether the power up mode is Hibernation or Quick Hibernation (Case 2).

Get

Call:
    BX   = 0100h
Return successful Case 1:
    CF   = 0
    AH   = 00h
    BX   = 0000h - Binary data type
    CX   = 0000h - Boot mode
             0001h - Resume mode
    SI   = default setting
Return successful Case 2:
    CF   = 0
    AH   = 00h
    BX   = 8009h - Power up mode type
    CX   = 0000h - Boot mode
             0001h - Resume mode
             0002h - Hibernation mode
             0003h - Quick Hibernation mode
    SI   = default setting
Return unsuccessful:
    CF   = 1
    AH   =80h - Function not supported
           82h - Interface not opened

           86h - SCI not present

Set

Call:
    BX   = 0100h
    CX   = 0000h - Boot mode
             0001h - Resume mode
             0002h - Hibernation mode
             0003h - Quick Hibernation mode
Return successful:
    CF   = 0
    AH   = 00h
Return unsuccessful:
    CF   = 1
    AH   = 80h - Function not supported
           82h - Interface not opened
           83h - Input data error
           86h - SCI not present

5.2 Alarm Power On (Date)

5.3 Alarm Power On (Time)

This function controls the time of the alarm power on function. If the system supports **Disable** and **Enable (hh:mm)** it returns DX=0FFFh. When setting the time it updates the CMOS checksum after storing the new configuration in the CMOS RAM

Get

Call:
    BX   = 010Fh
Return successful:
    CF   = 0
    AH   = 00h
    BX   = 8004h - Time data type
    CX   = the current mode
    DX   = possible modes
    SI   = default setting
Return unsuccessful:
    CF   = 1
    AH   =80h - Function not supported
           82h - Interface not opened
           86h - SCI not present

Set

Call:
    BX   = 012Dh
    CX   = new configuration
Return successful:
    CF   = 0
    AH   = 00h

Return unsuccessful:
    CF   = 1
    AH   = 80h - Function not supported
              82h - Interface not opened
              83h - Input data error
              86h - SCI not present

5.4   Hibernation Mode

This setting controls whether the hibernation mode
is enabled or disabled.

Get

Call:
    BX   = 012Dh
Return successful:
    CF   = 0
    AH   = 00h
    BX   = 0000h - Binary data type
    CX   = 0000h - Disabled
              0001h - Enabled

    SI   = default setting
Return unsuccessful:
    CF   = 1
    AH   =80h - Function not supported
              82h - Interface not opened
              86h - SCI not present

Set

Call:
    BX   = 012Dh
    CX   = 0000h - Disable
              0001h - Enable
Return successful:
    CF   = 0
    AH   = 00h
Return unsuccessful:
    CF   = 1
    AH   = 80h - Function not supported
              82h - Interface not opened
              83h - Input data error
              86h - SCI not present