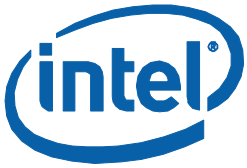

Intel® Smart Connect Technology

Setup & Configuration Guide

June 2013

Revision 1.2

Intel Confidential

Document Number: 507303

Contents

Figures

Tables

Revision History

Document Number	Revision Number	Description	Revision Date
507303	0.5	• 4.0 version based on 3.0 version	October 2012
	0.8	• Updated Introduction chapter (Chapter 1) • Updated Installation System Requirements (Chapter 2) • Updated Creating OEM Default Values (Chapter 2) • Added Remote Wake chapter (Chapter 4)	October 2012
	0.9	• New section added for Remote Wake register setting (Section 4.2; Chapter 4)	November 2012
	1.0	• Clarified "Reset All To Defaults" effects only user configurable GUI controls. • Updated to 4.2 version • Updated registry settings (section 2.5)	May 2013
	1.1	• Updated with Bay Trail M/D information	June 2013
	1.2	• Updated for final 4.2 GUI • Added dashboard description • Added update capability description • Added section on Automatic Update feature (section 2.4.1)	June 2013

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1 Introduction

1.1 Purpose of this Document

This document provides an overview of the installation and configuration process for Intel® Smart Connect Technology. In addition, a section on troubleshooting various issues that may occur is included.

Intel Smart Connect Technology is a feature of the platform in which the software on the platform and combination of NIC (LAN/WLAN/WWAN) features provides content updates during periods of PC is asleep and not otherwise able to receive information. These can be categorized as:

- Always On/Always Updated:
  - Intel Smart Connect Technology Agent schedules platform to wake up from S3 periodically to allow network applications to obtain new data (email updates, social media applications…) and then transitions back to S3.
  - Extended wake duration if the platform is connected to AC and lid is open (mobile). Extended wake duration allows for larger content download. Once network activity falls below 100KB for 10 seconds, the platform is transitioned back to S3.
  - During wakeup, Intel Smart Connect Technology OS Service (Agent) places platform into a lower power S0 state (e.g. panel turned off, CPU in lowest P-state). This state can be referred to as S0-ISCT.
  - Factors of thermal considerations and amount of data to update factor into "Always Updated" period of activity.
- Intel Energy Efficient Always On Connectivity (EE-AOC) – mobile only:
  - WLAN running in S3 (AC/Battery) with NetDetect FW allows NIC to scan for WiFi networks that match a configured profile list and if a match is found, the platform wakes to S0-ISCT to get connected and update content.
- Remote Wake (not applicable to Bay Trail M/D):
  - Allows platform in S3 / S4 sleeps states to be woken by remote application software. Once local application is done, platform goes back to existing sleep state.

For mobile platforms, special attention to thermal monitoring and control is defined to ensure safety and reliability for systems confined to areas where thermals may rise unexpectedly due to insulating qualities of the environment (e.g. operation in a book bag or briefcase).

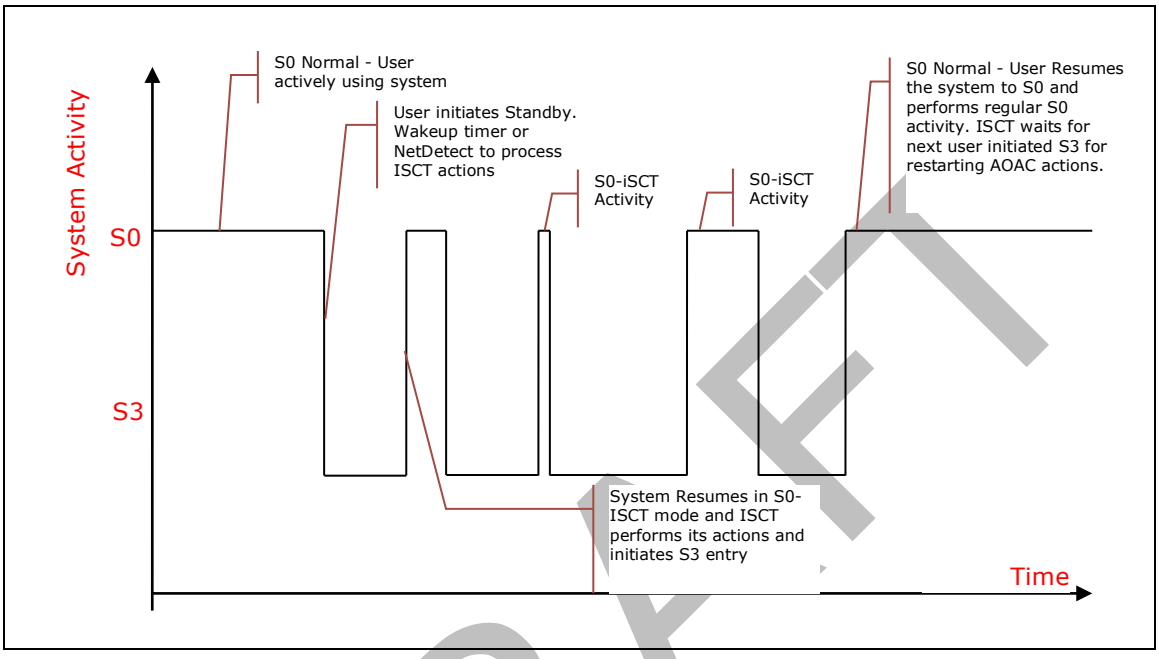
Intel® Smart Connect Technology Life Cycle

The Intel Smart Connect Technology Agent, once installed and configured to be active, periodically wakes up the system from S3 and performs network content update and initiates re-entry to S3 to wake up after a set time interval or based on network

presence. For RTC wake events enabled by the user or other software residing on the platform, ISCT treats the RTC wake as user initiated wake event and the system will enter full S0 and not iSCT-S0 state.

An example time sequence diagram is shown in Figure 1-1.

Figure 1-1. Typical Intel Smart Connect Technology Activity



1.2 Reference Documents

Document	Document Number
ACPI / Power Management	http://www.acpi.info/
ACPI / Power Management in Microsoft Operating Systems	http://www.microsoft.com/whdc/system/pnppwr/powermgmt/default.mspx
Intel® Smart Connect Technology 4.0 Platform Design Guide	507302
Intel® Smart Connect Technology 4.0 Compliancy Test Plan	507304

1.3 Terminology

Term	Description
Agent	Intel® Smart Connect Technology OS Service
CRB	Customer Reference Board
CRV	Chief River
EC	Embedded Controller/Keyboard Controller
EE-AOC	Intel energy efficient always on connectivity
Intel® ME	Intel® Management Engine
SCT	Intel Smart Connect Technology
RW	Remote Wake
S0-ISCT	Reduced S0 power model that the Intel Smart Connect Technology Agent runs to update content
Wireless Local Area Network (WLAN)	A local area communications network based on wireless technology
Wireless Wide Area Network (WWAN)	A wide area communications network based on cellular technology

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2 Installation

2.1 System Requirements

The following are required on a system:

- System BIOS supporting and enabled for Intel® Smart Connect Technology
- Microsoft* Windows* 7 SP1 (32 or 64 bit version) or Microsoft* Windows* 8/8.1 (32 or 64 bit version)
- Intel® Processor
- Close any running applications to avoid installation problems.
- Remove any previously installed versions of the software from the system before installing the Intel® Smart Connect Technology software
- Remote Wake over LAN feature requires Intel® ME Firmware enabled. Please see Intel® Smart Connect Technology: Remote Wake (Section: 4 in this document) for more details.

2.2 Installation Steps

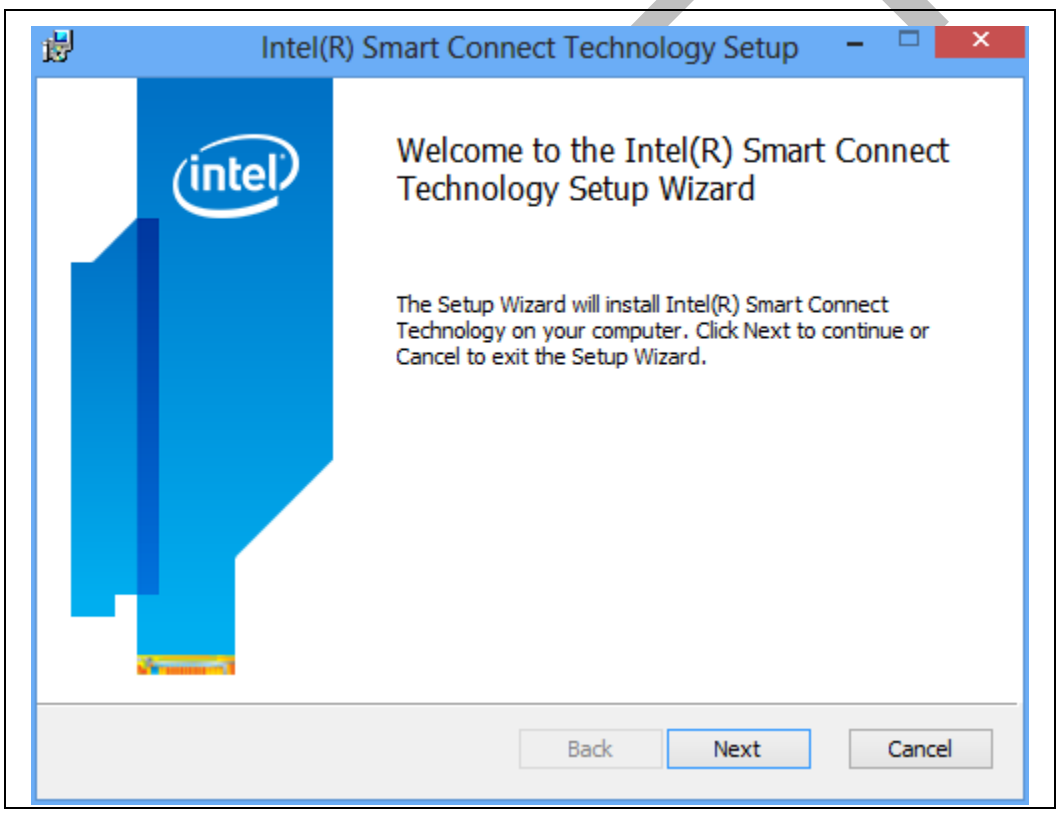
Intel Smart Connect Technology supports two methods of installation

- Silent
- Manual

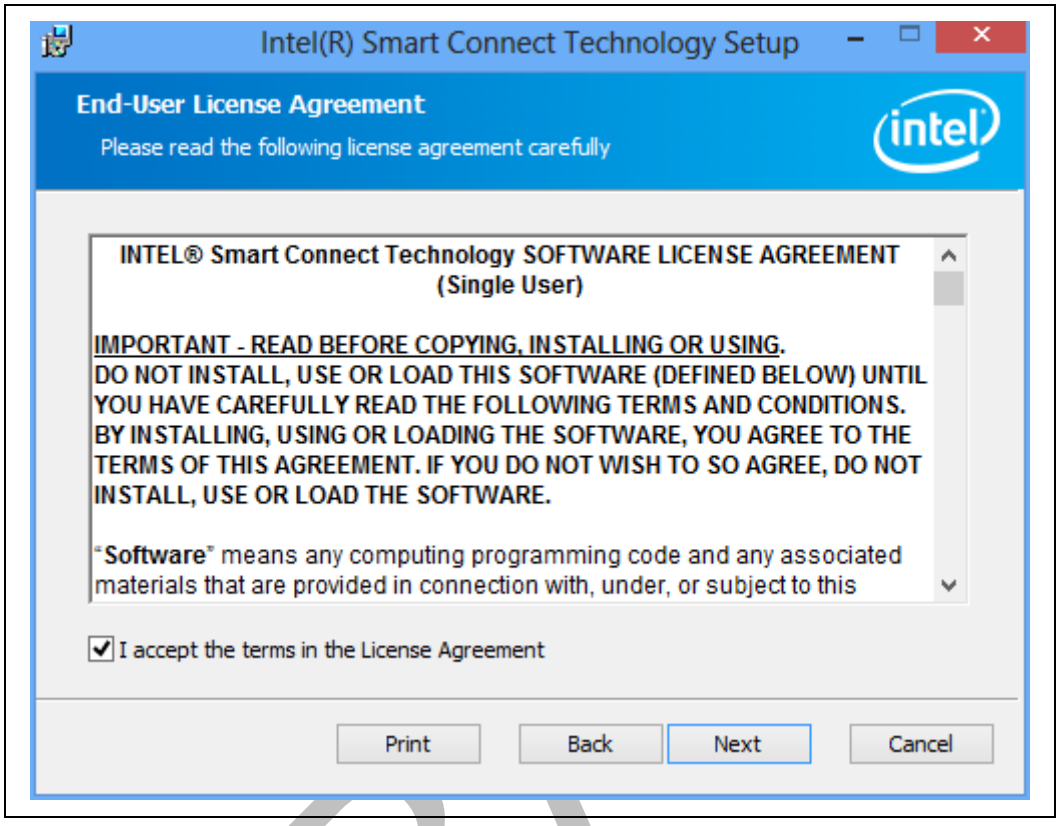
For Silent installation, run the command "setup.exe –s"

For Manual installation, run the command "setup.exe". If prompted for running with administrative privileges, select yes.

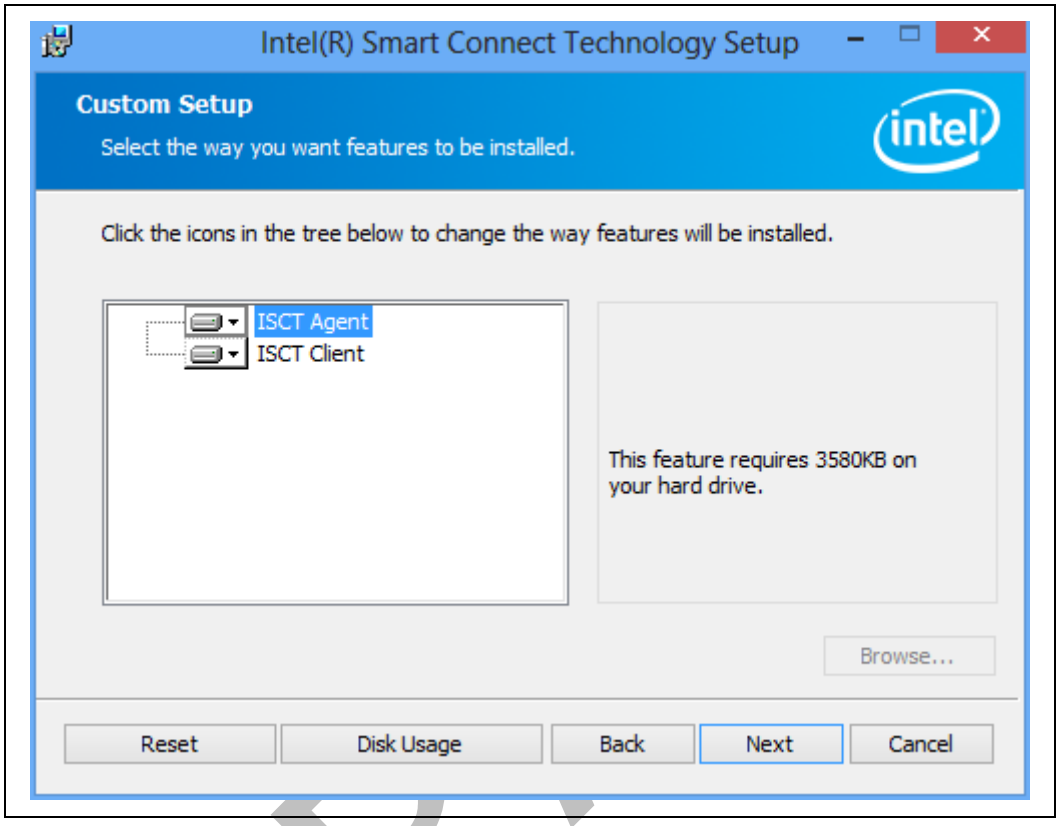
The installation will now begin and the following window is displayed (version removed in the picture):



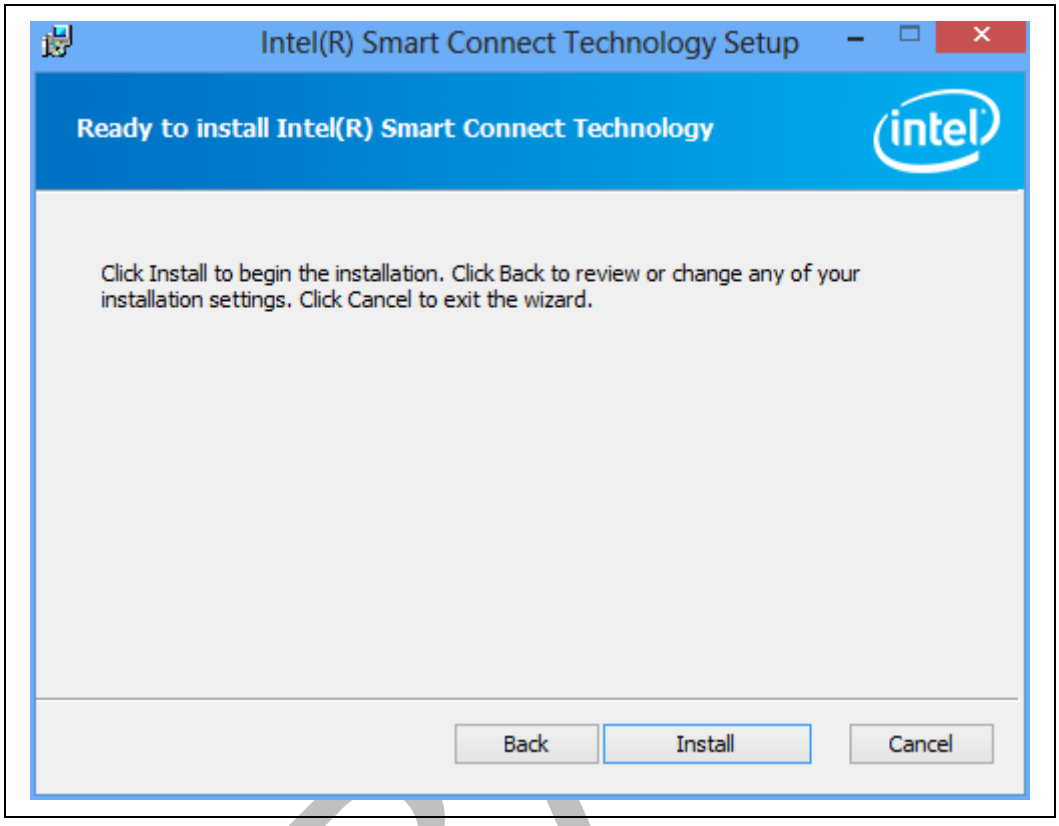
Select "Next" and the following window is display:



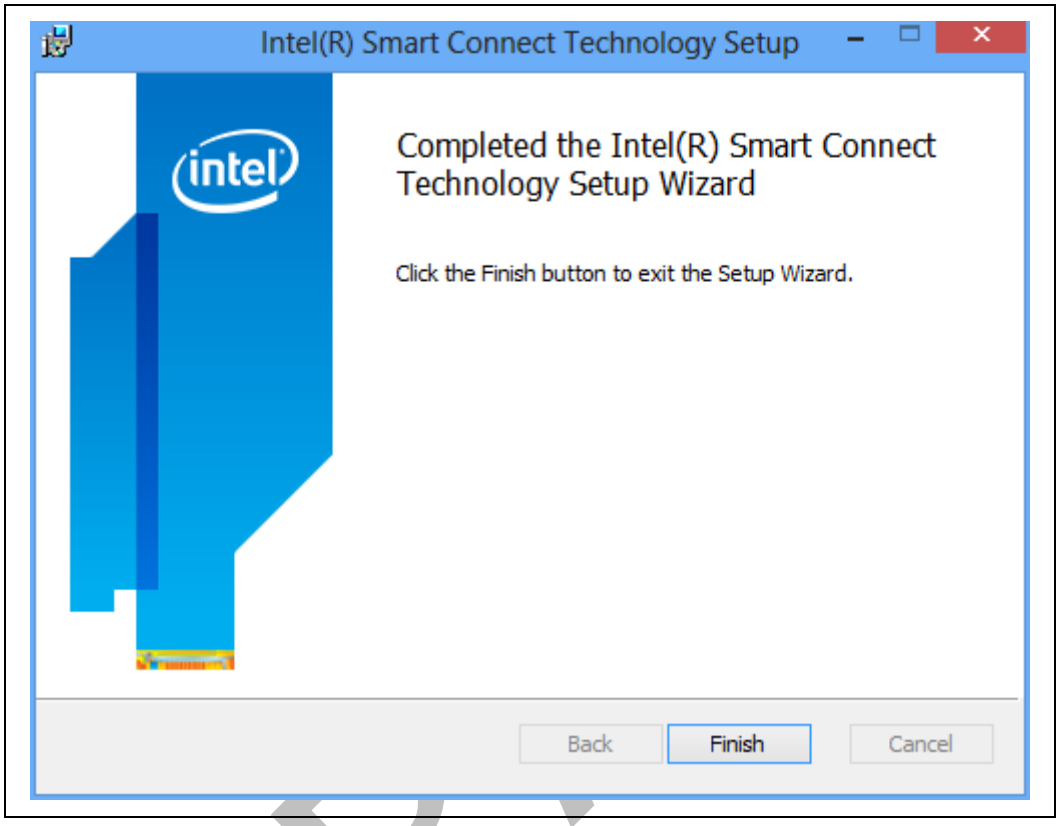
Check the checkbox labeled: "I accept the terms in the License Agreement" and select the "Next" to display:



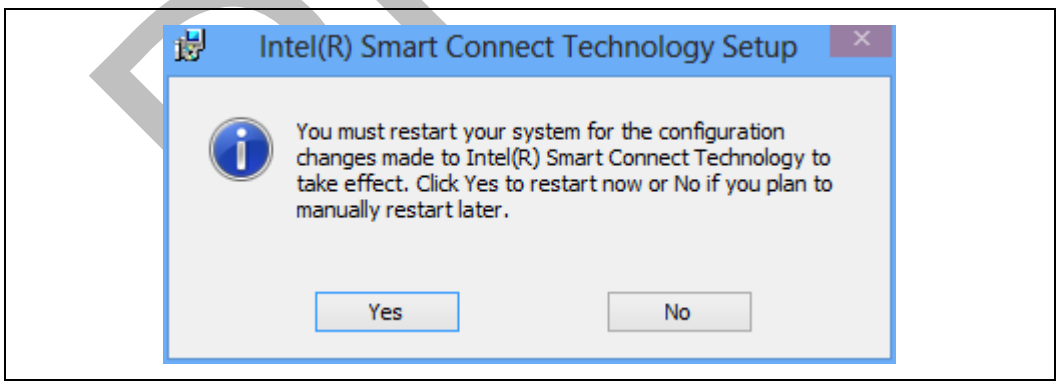
Select "Next" and the following window is displayed:



Select "Install" and after several progress windows are display, the following window is displayed:



Select "Finish" and the following window is displayed:



You must select "Yes" to have the installation complete correctly as a system restart is required.

2.3 Verifying Installation

To verify Intel® Smart Connect Technology was installed correctly, follow these steps:

1. Creation of the "Intel® Smart Connect Technology" program item in the "Intel" program group of the "Start" menu for Windows* 7; "Apps" and "Start" screen for Windows* 8.

2. Installation and status of the "Intel® Smart Connect Technology" is "Started" in the "Status" column of the Services tab of the Computer Management application.

2.4 Intel® Smart Connect Technology Configuration

By default, Intel Smart Connect Technology is configured for the following:

- Always Updated (Periodic Update) turned off
- Always Reachable (Remote Wake) turned off
- Default update period of 15 minutes (when Periodic Updated enabled)
- Extended Hours of 10pm to 6am
- Application Whitelist disabled (no registry entry)

The Intel® Smart Connect Technology Configuration Table below lists all of the various parameters configurable for the Intel® Smart Connect Technology Agent and the associated default value.

To allow OEMs flexibility in their usage of the Intel® Smart Connect Technology, they may wish to provide their own override values in the following registry key:

[HKEY_LOCAL_MACHINE\SOFTWARE\Intel\Intel Smart Connect Technology\OEM]

"OEM" denotes those keys in the table. All other keys in the table are in the registry key:

[HKEY_LOCAL_MACHINE\SOFTWARE\Intel\Intel Smart Connect Technology\Always Updated]

The Agent reads the registry values when it begins execution after a reboot and if the values are within the minimum and maximum ranges, the Agent uses those values instead of the default values.

Note: When a registry value is updated, the Intel Smart Connect Technology Agent must either be restarted or the system rebooted for the values to take effect.

Table 2-1. Intel Smart Connect Technology Configuration Values

Name	Registry Key	Min	Max	Default	UI
Daytime Intel® Smart Connect Technology Update Frequency	S3SleepDurationSeconds	15 min	60 min	15 min	√
Night time Start Range h:mins	NightTimeDuskMinutes	0h 00min	24h 00min	22h 00min	√
Night time Stop Range h:mins	NightTimeDawnMinutes	0h 00min	24h 00min	6h 00min	√
Battery Life % before disabling Intel® Smart Connect Technology	DCBatteryThresholdHalt	Current OS Suspend setting	95%	15%	
S0-Maxiumum-time-wake-duration	S0WakeDurationLimitSeconds	10 sec	180 sec	45 sec	
CPU Thermal Threshold of when ISCT increases sleep duration	ThermalThresholdCentigrade	60°C below TJ-	40°C below TJ-MAX	45°C below TJ-MAX	
WhiteList	OEM\WhiteList		10 entries		
Audio Settings Delay when entering S0-ISCT mode	AudioDelayMilliSeconds	0		2000 (2 seconds)	
Periodic Wake Enablement	OEM\PeriodicWakePref	0	1	0	√
NetDetect Enablement	OEM\NetDetectPref	0	1	1	
NetDetect / Rapid Start Co-existence	OEM\NDFFSCoExist	0	1	0	
Remote Wake Enablement	OEM\RemoteWakePref	0	1	0	√
Hide “Updates” in “?” menu and disables automatic checking	EnableCheckUpdate	0	1	1	√
Enable logging	LoggingEnabled	0	4 for dgview, 2 for iSCT.Log	0	
Logging Level	LoggingLevel	0	16	0	

Wake Duration *is the amount of time the system spends in the SCT S0 state under normal conditions (no thermal issues).*

The values S0-Maxiumum-time-wake-duration *is used to specify the amount of time allowed for a platform to stay in ISCT (ISCT-S0) when iSCT determines that it has been in iSCT-S0 mode for longer period of time due to large data transfers. This ensures skin temperature does not exceed Intel thermal guideline*

Expose in UI *are the possible values that can be configured in the Intel Smart Connect Technology UI. The OEM can choose to display a subset of these values to have a simple UI to expose minimal configuration to the user.*

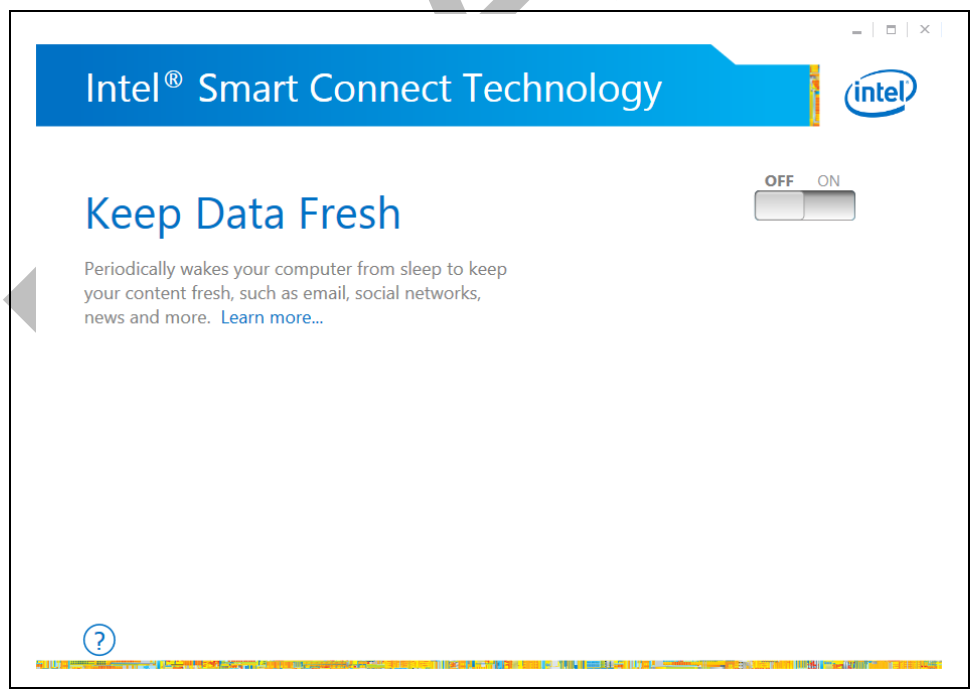
2.4.1 Automatic Updates

Intel® Smart Connect Technology is designed to notify the user when a software update becomes available. The notification is sent via a popup balloon in the System Tray Icon and a message in the user interface. Clicking on the popup balloon will open the Smart Connect Configuration Utility, if not already open. From there, the user can click on the message as highlighted in the red box, and be directed to Intel's download page for Smart Connect Technology. The user can also choose to ignore this update by clicking the 'x' on the top right corner of the message. If the OEM does not desire this functionality, the registry entry *EnableCheckUpdate* in the registry section ([HKEY_LOCAL_MACHINE\SOFTWARE\Intel\Intel Smart Connect Technology\Always Updated]) is for OEM to disable automatic update checking feature on the system. When EnableCheckUpdate = 0, automatic update checking is disabled and the option from the "?" button on the Configuration Utility UI is removed.

2.4.2 Remote Wake Registry Setting

The registry entry *RemoteWakePref* in the OEM registry section ([HKEY_LOCAL_MACHINE\SOFTWARE\Intel\Intel Smart Connect Technology\OEM]) is for OEM to enable/disable Remote Wake (RW) feature on the system. OEM can configure to remove RW configuration settings from Intel® Smart Connect Technology Configuration Utility.

If RemoteWakePref = 0, RW will be permanently "Disabled" and there will not be any RW settings shown on the Configuration Utility. The end user cannot turn on Remote Wake.



2.4.3 Application White List

The Intel Smart Connect Technology provides the ability to control the periodic wake of the platform or NetDetect enablement by checking prior to entering S3 if an application is running from a defined list of applications ("White List").

- If the list is populated (non-empty), The Intel Smart Connect Technology Agent will schedule a periodic wake (or enable NetDetect) if one of the applications defined in the white list is running prior going into S3 mode.
- If no application defined in the white list is running, then no periodic wake is scheduled or NetDetect enablement performed.
- If the list is empty or non-existing, the Intel Smart Connect Technology Agent will schedule a periodic wake or enable NetDetect.

The White List is stored in the OS Registry under the key of:

[HKEY_LOCAL_MACHINE\SOFTWARE\Intel\Intel Smart Connect Technology\OEM]

in the "WhiteList" string. The list supports a maximum of 10 applications. The " " (blank space) separated entries are the application executable name. The list is read at the start of the Intel Smart Connect Technology Agent.

2.4.4 Creating OEM Default Values

The Intel® Smart Connect Technology installation process allows an OEM to specify their default values thru the usage of an INI file at the time that setup.exe is invoked. The installer will read the contents of the "SmartConnect.ini" file from the current directory or the directory of setup.exe and populate the OEM registry key with those values.

Below is an example INI file that enables logging to the ISCT log file, enables NetDetect, NetDetect and Intel® Rapid Start Technology co-existence, enables Remote Wake and sets the default sleep duration to 30 minutes.

Note ";" this comment must remain as the first visible line in the file

Example of a SmartConnect.ini file:

```
; OEM registry customization settings

[OEM]

PeriodicWakePref=1

NetDetectPref=1

RemoteWakePref=1

NDFFSCoExist=1

WhiteList=REG_MULTI_SZ, "Outlook.exe","wlmail.exe"
```

Note: the installer does not validate the settings at install time; the Agent does this. If an entry is not a valid entry (e.g. misspelled) or their values are not within the accepted range, the Agent does not allow the OEM override and displays an error message in the log file. The OEM must keep the first two lines the same as in the above example.

2.4.4.1.1 Event Logging

The Intel Smart Connect Technology uses the OS Event Log to store log information in the "Applications" Log. The "Source" field is "ISCTAgent".

2.4.5 Intel® Rapid Start Technology Co-existence with NetDetect

Note: This section is not applicable to Bay Trail M/D

When Intel Rapid Start Technology is available on a platform that supports Intel Smart Connect Technology, the Intel Smart Connect Technology Agent will enable NetDetect when the platform enters Rapid Start S4 if the following registry settings are created:

- HKEY_LOCAL_MACHINE \SOFTWARE\Intel\Intel Smart Connect Technology\OEM\NDFFSCoExist = 1
- HKEY_LOCAL_MACHINE \SOFTWARE\Intel\Intel Smart Connect Technology\OEM\NetDetectPref = 1

3 Using Intel® Smart Connect Technology

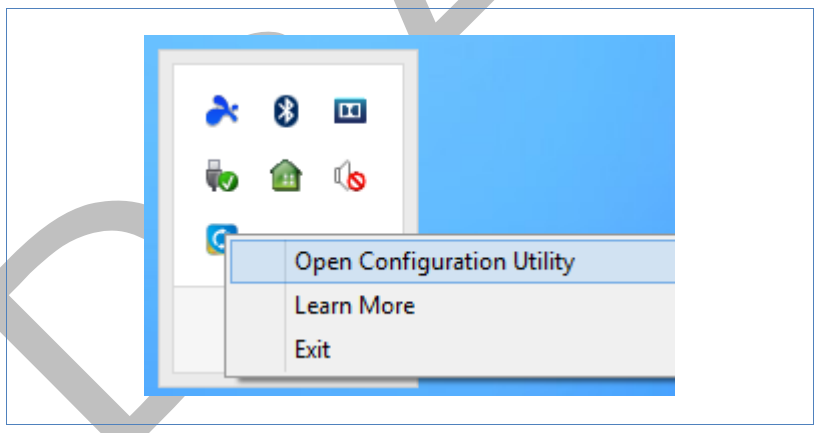
This section details how to use the Intel® Smart Connect Technology on your platform.

3.1 System Tray Icon

The System Tray Icon for Intel Smart Connect Technology provides a convenient shortcut for invoking the configuration applications and obtaining status.

If you right mouse click (context click) on the icon, the following short cut menu is displayed with these options:

- *Open Configuration Utility* opens the Intel Smart Connect Technology Settings application for general settings and additional information.
- *Learn More* opens the help file.
- *Exit* dismisses the context menu.

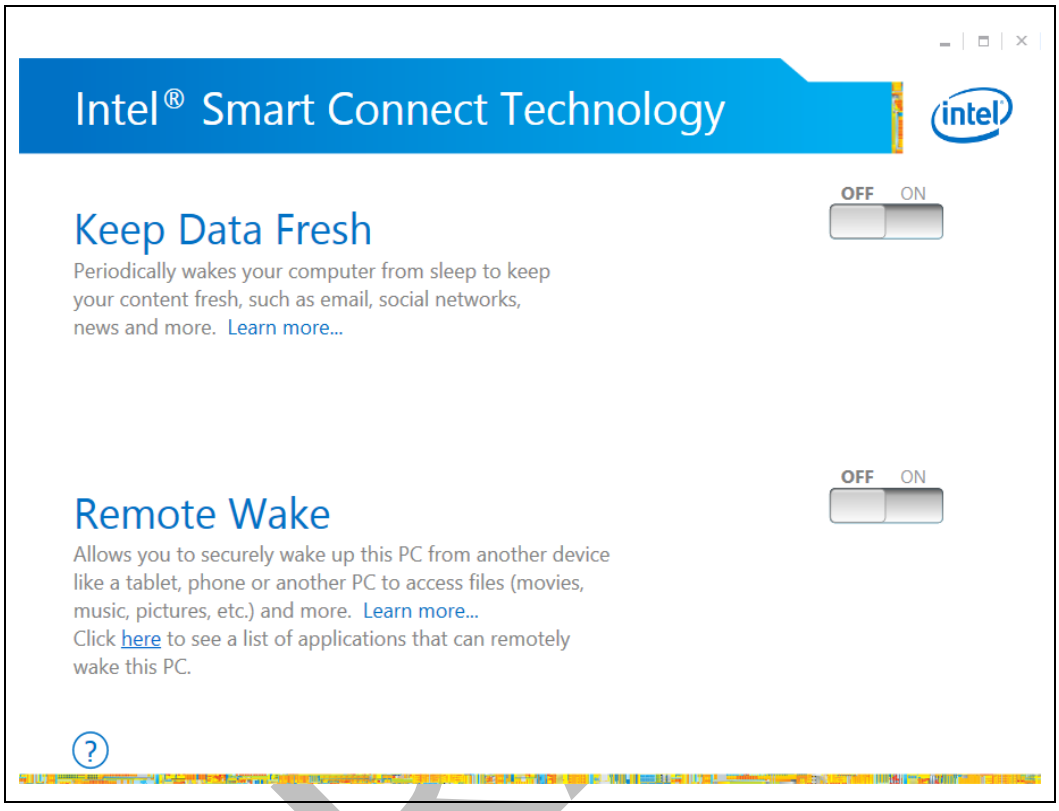


If the System Tray icon displays a yellow bang as shown in the following figure, then an error has occurred and the user can open the Configuration Utility and go to the Event History screen to view the issue.

3.2 Configuration Utility

The Intel Smart Connect Technology Configuration Utility allows configuration of the sleep duration, extended hours sleep duration, and viewing of the Event History along with other settings.

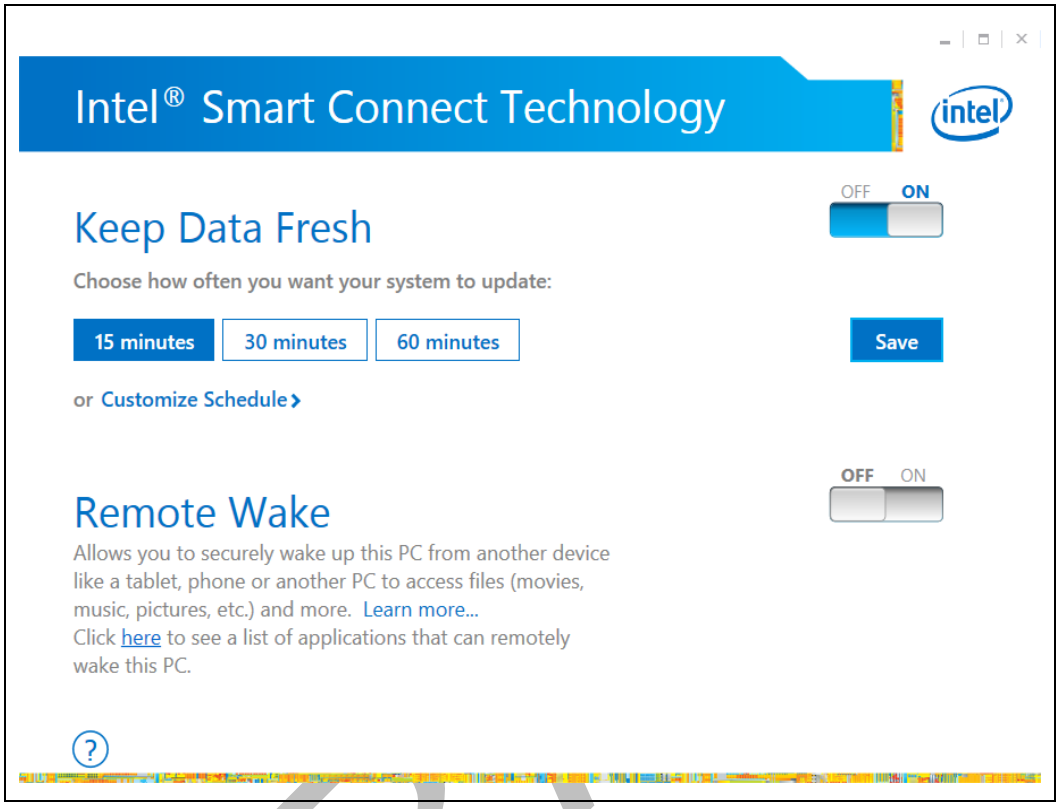
To launch the application, select the application "Intel® Smart Connect Technology in the Start menu (Windows* 7) or Start screen (Windows* 8/8.1)to launch the configuration GUI. Once launched, the following is presented:



Note: If Remote Wake is not supported, then the bottom section of the screen will not be displayed

When Smart Connect Technology GUI is launched for the very first time, both "Keep Data Fresh" and "Remote Wake" feature will be "OFF" by default (unless overridden in the registry settings). Users will simply turn "ON" each feature with the respective ON/OFF buttons. A brief description about each feature is described under each feature title. User can also get more information about each feature by clicking on the "Learn more" links.

When the "Keep Data Fresh" button is turned "ON" (switch in the ON position), the GUI changes to the following:



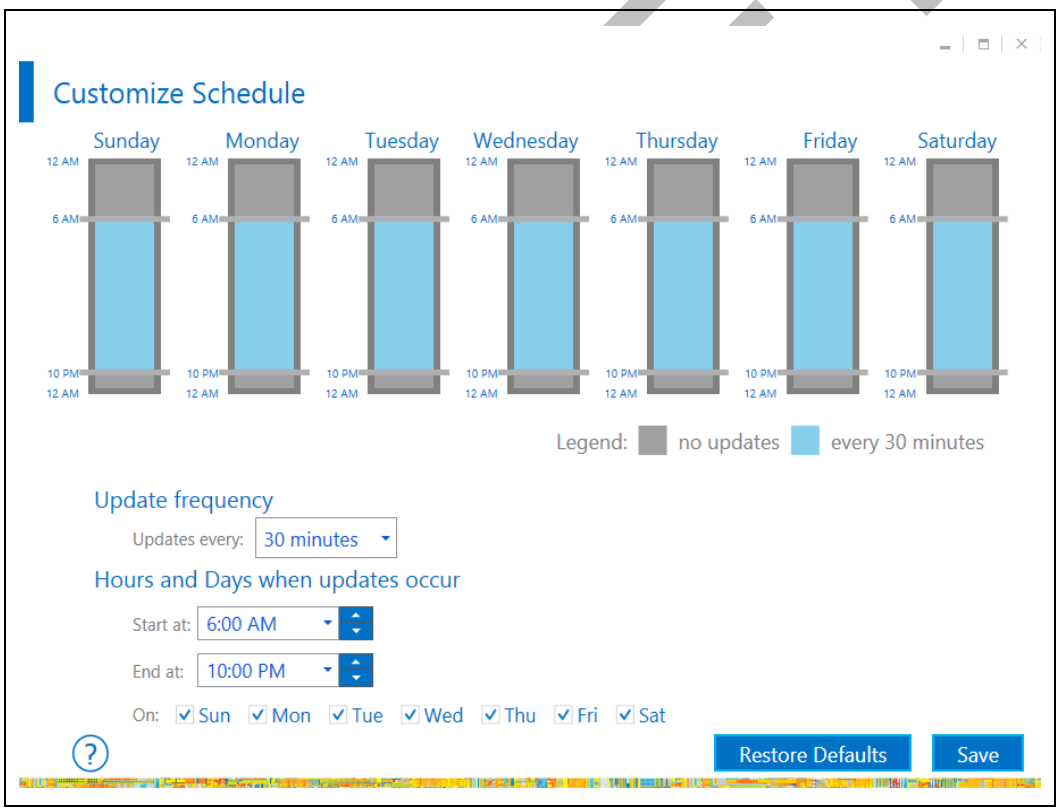
Note: If Remote Wake is not supported, then the bottom section of the screen will not be displayed

Choose how often the system will update. Choose from every 15, 30, or 60 minutes intervals. This is the minimum setting required to start "Keep Data Fresh". Click "Save".

For advanced settings, go to "Customize Schedule" for more options. You can set two more options, setting the hours when updates occur and selecting which days when updates occur. This screen also has time bars that visually depict the choice while making the change. This is commonly known as when Intel Smart Connect Technology enters the Extended Power Savings time. During this time no updates occur to reduce the power consumed during normal usage hours. If Intel® Rapid Start Technology is enabled on the platform, the Intel Smart Connect Technology Agent will instruct the Intel Rapid Start Technology to immediately transition to its low power deep sleep S3 (DS3) state upon entrance to S3. Thus saving additional power (in battery mode). The Intel Smart Connect Technology Agent will schedule a wake at the end of the time. To change the days of the week that updates occur, check or un-check the days of the week at the bottom.

The "Restore Defaults'" button is available to restore to factory defaults. The defaults are: update frequency every 15 minutes, occurring every day of the week from 6am to 10pm.

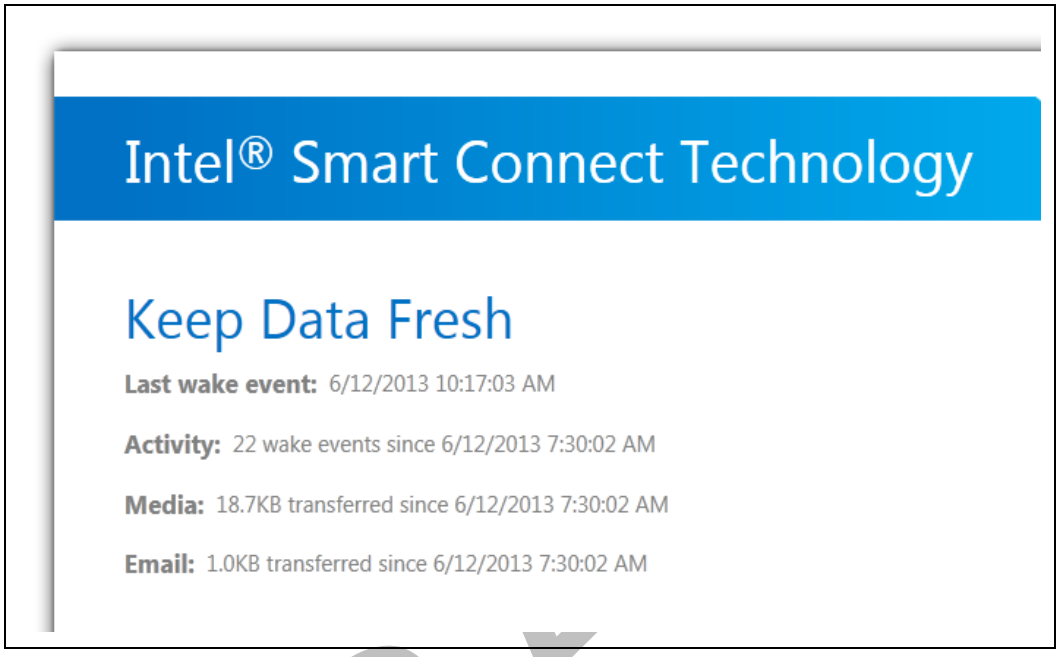
When done making changes, click the "Save" button to exit the screen.



Once settings are saved, 'Keep Data Fresh' will be operational. The UI will automatically be redirected to the open screen or what is referred to as the "dashboard screen". You can go back and change the settings at anytime by clicking the "Change Settings" link on the dashboard screen. The dashboard will be empty on the very first use. Once the system goes to sleep, the dashboard will begin tracking the activity of Intel Smart Connect Technology.

There are two modes for the dashboard, Consumer and Enterprise mode.

In consumer mode, the dashboard will display this information:



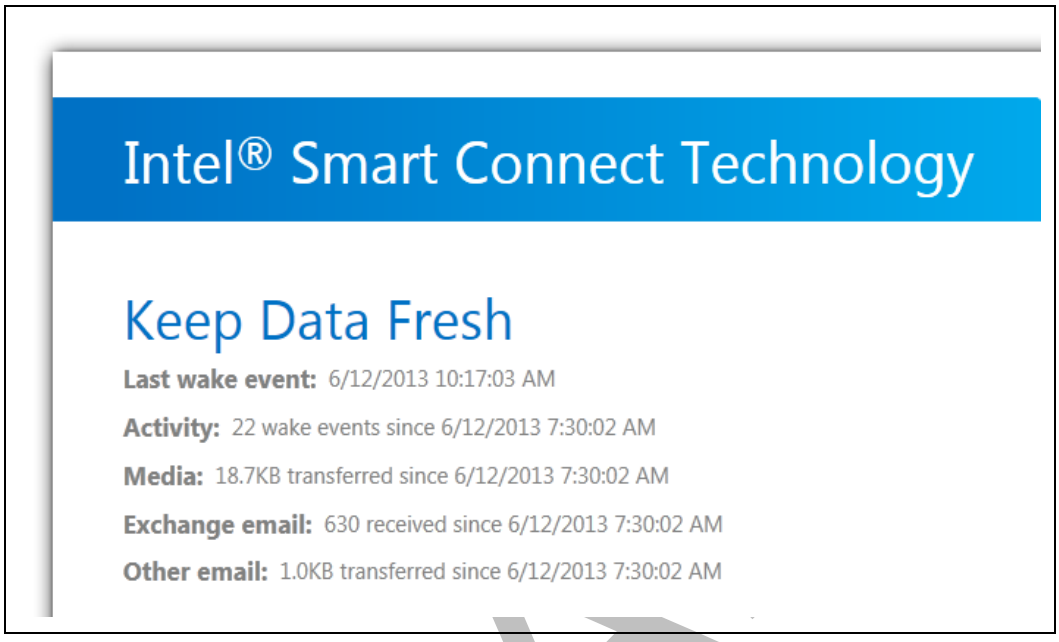
Last wake event – the time of the most recent wake event when Smart Connect updated the system

Activity – the number of Smart Connect wakes since the user last put the system to sleep

Media – the number of media bytes transferred since the user last put the system to sleep. This is all general TCP traffic. If a browser hosted email application is used, this will be show here.

Email – the number of email bytes transferred by IMAP or POP3 mail programs since the user last put the system.

A slightly modified dashboard will be displayed for enterprise users. Enterprise mode consists of users that are inside an enterprise domain with Microsoft* Outlook installed.



Last wake event – the time of the most recent wake e

vent when Smart Connect updated the system

Activity – the number of Smart Connect wakes since the user last put the system to sleep

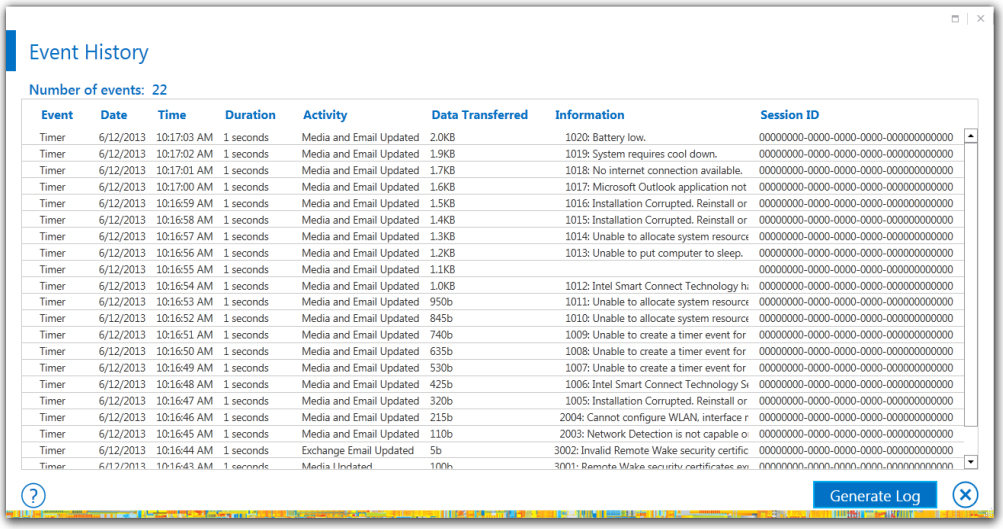
Media – the number of media bytes transferred since the user last put the system to sleep. This is all general TCP traffic. If a browser hosted email application is used, this will be show here.

Exchange email – the number of Microsoft* Exchange emails received since the user last put the system to sleep

Other Email – other emails aside from exchange (i.e., POP3 or IMAP), the number of bytes transferred since the user last put the system to sleep

If Microsoft* Outlook is not installed on the machine, then the "Exchange email" line is not displayed (hidden).

For a detailed look at all events, Intel Smart Connect Technology provides a list of events. Users can easily view this list by clicking on the "Event History" link on the Dashboard screen.



The Event History will provide this information for each event:

Event – which event woke the system from sleep, it can be Timer, User Initiated, OS Initiated, Network Detected, Remote Wake on LAN, or Remote Wake on WLAN

Date – Date when the event occurred

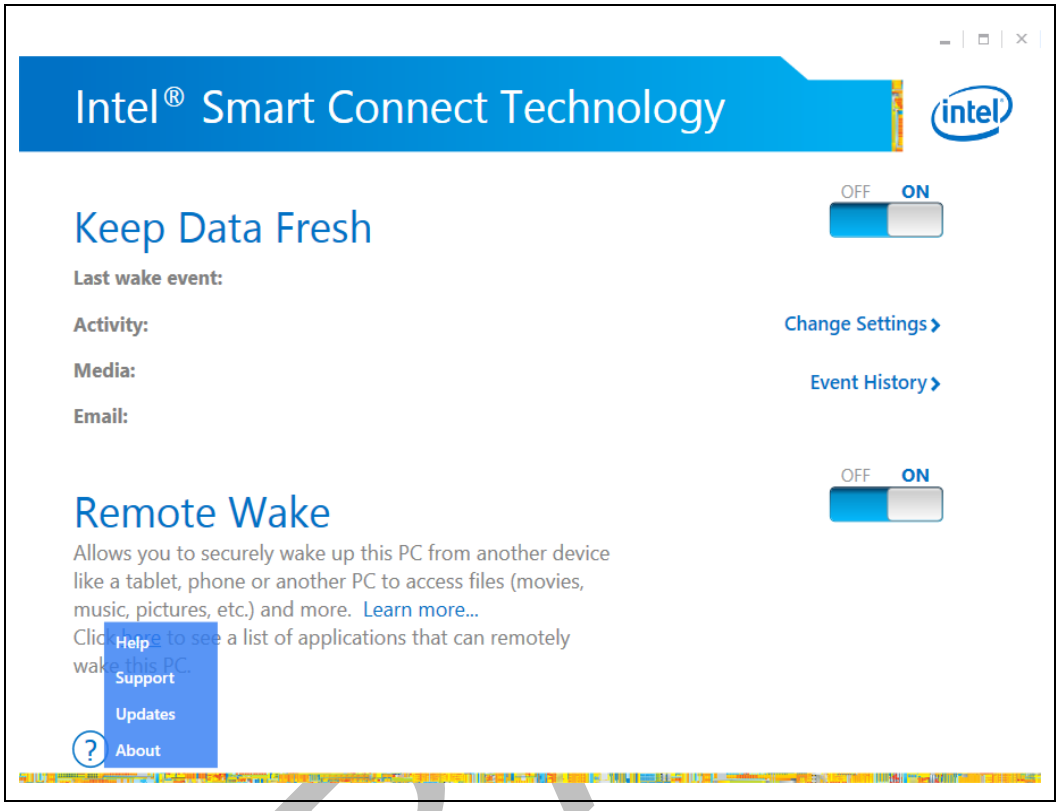
Time – Time when the event occurred

Duration – the number of seconds the system stayed awake during the update

Note: If Remote Wake is not supported, then the "Session ID" column is not displayed (hidden).

When users contact their vendor for Intel Smart Connect support, the support personnel may require the system logs for troubleshooting the issue. The logs can be retrieved from the "Generate Log'" button in the Event History window.

The "?" button in the upper right hand corner provides support information for using Intel Smart Connect Technology.



Help – displays most frequently asked questions

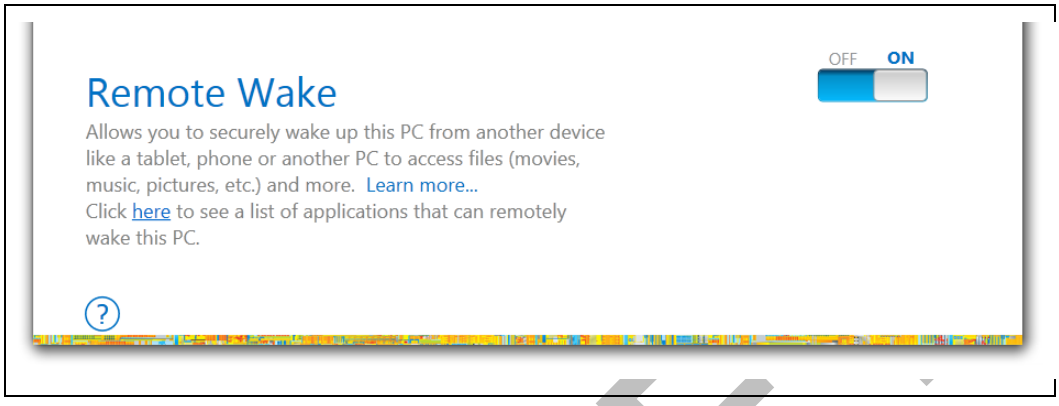
Support – A link to Intel Smart Connect Technology's Support page

Updates – A link to check for the latest update of Intel Smart Connect Technology

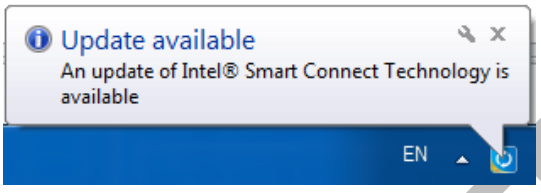
About – displays the version, description, and link to learn more about Intel Smart Connect Technology

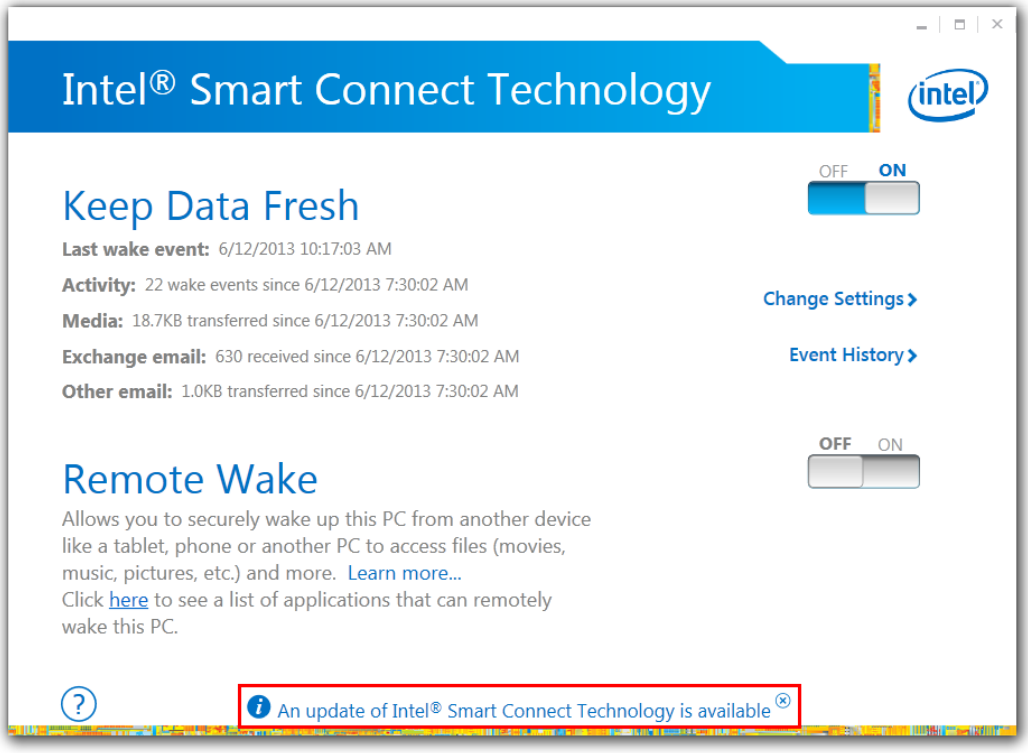
Note: If Remote Wake is not supported, then the bottom section of the screen will not be displayed

Turning on "Remote Wake" will allow the user to securely wake up the platform from another device (if supported on platform). The other device will need to have an application installed on it capable of remotely waking Intel Smart Connect Technology Remote Wake enabled PC's. A list of available ISV applications can be found on the main screen in the "here" link.



Intel Smart Connect Technology is designed to notify the user when a software update becomes available (if feature is not disabled in registry setting). The notification is sent via a popup balloon in the System Tray and a message in the user interface. Clicking on the popup balloon will open the Smart Connect UI, if not already open. From there, the user can click on the message as highlighted in the red box, and be directed to Intel's download page for Smart Connect Technology. The user can also choose to ignore this update by clicking the 'x' on the top right corner of the message.





3.3 Content Updating

Once the Intel® Smart Connect Technology is configured and enabled on the platform, content updating is performed by the platform periodically waking from S3 (or Rapid Start S4). The following steps illustrate a typical usage scenario.

1. Verify configuration settings with the Configuration application
2. If WhiteList applications are defined, verify one or more of the applications are running on the platform (Intel Smart Connect Technology will not enable periodic wake if an application in the WhiteList is not running prior to entering S3 if WhiteList feature is enabled in the registry).
3. The platform enters S3 either by the user suspending the platform or the unattended sleep timer expiring
4. After the sleep timer expires (value configured in the Configuration application), the platform wakes from S3 and applications running are given a short period of time (if network connection exists) to update the content
5. iSCT waits for a maximum of 15 seconds (20 seconds if VPN connection) for a network connection to become available. If there is no network connection, it immediately goes back to sleep.
6. Once a network connection has been established, iSCT checks if the connection is to the Internet, if no Internet connection is available, NetDetect is enabled and the platform goes back to sleep. If an Internet connection is present then iSCT monitors the network traffic rate to and from the machine. If the traffic rate falls below 100KB/sec for 10 seconds, iSCT immediately puts the system back into S3.
7. If at any time during a wake, the iSCT defined thermal limit has been reached or the battery has been drained past the defined limit, iSCT immediately puts the system back into S3.
8. If the system is running on Battery, and the maximum wake time has been exceeded, iSCT immediately puts the system back into S3. There is no maximum wake time when the system is running on AC.

3.4 NetDetect Operation

If the platform supports NetDetect (feature of selected WLAN NICs), the platform will only wake from S3 if a network access point which can be used for connectivity is found (user specified Access Point is found). This prevents unnecessary wakes from S3 if no network connection exists prior to the platform entering S3. The following steps illustrate a typical usage scenario.

1. The Intel Smart Connect Technology Agent determines no network connection exists prior to the platform entering S3
2. If the user transitions the platform to S3 (manually or via OS unattended timer), the Agent will require one periodic wake cycle to successfully enable NetDetect due to OS limitation of time allowed for Agent to transition to S3.

3. Once the periodic wake occurs, and the iSCT Agent finds that no network is currently available, it will configure NetDetect in the WLAN NIC and the request OS to transition platform to S3.

4. Platform remains in S3 until the WLAN card detects an AP with a SSID that is configured for 'Connect automatically". Upon detection, the platform is awoken and application content update occurs.

5. Because a network connection is found, periodic wake is configured and NetDetect disabled.

6. If in the following periodic wake, network connection is not found, then NetDetect is enabled, platform is placed in S3 and platform will not wake until a user specified Access Point is found.

Note: if Intel® Rapid Start Technology is enabled on the platform and active, NetDetect will not be enabled during the extended hours period.

3.4.1 Radio On/Off Handling with NetDetect

3.4.1.1 Systems with HW Switch Radio On/Off

If the WLAN radio is turned off prior to entering S3 and the platform leaves the radio powered in S3, then when the user upon turns the radio back on in S3, NetDetect will begin scanning for user configured Access Points if the turning on of the switch causes the platform to wake to S0-ISCT.

3.4.1.2 Systems with Function Key Radio On/Off

If the WLAN radio is turned off prior to entering S3, Intel® Smart Connect Technology Agent will not set either the timer or NetDetect. A soft switch has no ability to be turned on when the system is in S3. In this case, iSCT will not set either the timer or net detect and the system will not wake.

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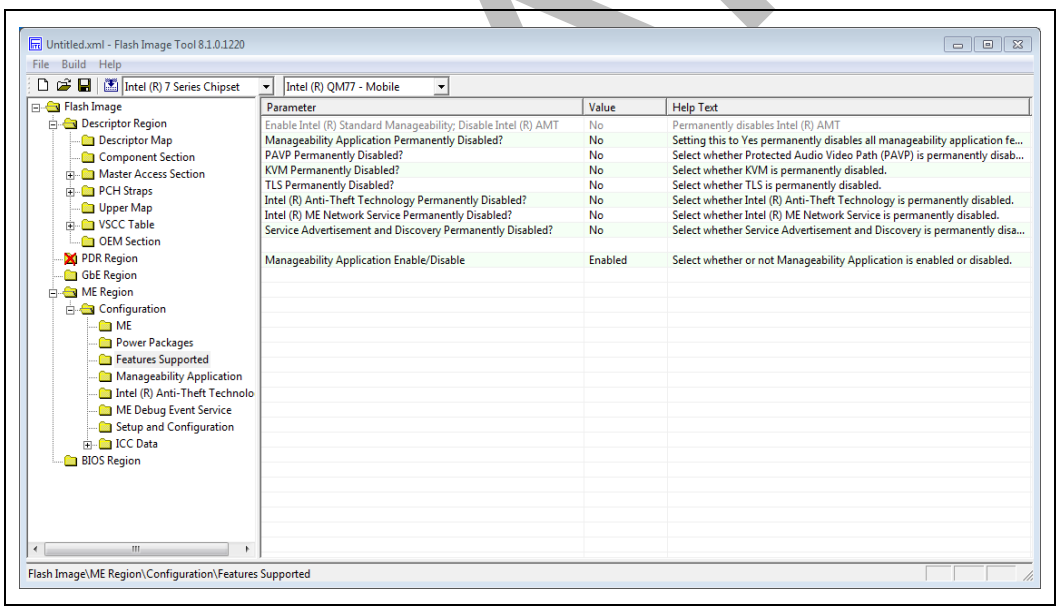
4 Intel® Smart Connect Technology: Remote Wake

Note: This section is not applicable to Bay Trail M/D or platforms that do not support Remote Wake

This chapter provides setup and reference guide to test Intel® Smart Connect Technology feature of Remote Wake on Shark Bay platforms for Microsoft* Windows* 8/8.1 (32- or 64 bit) operating system.

4.1 Remote Wake via LAN support (RW)

Remote Wake via Intel LAN device is managed by the Intel® ME in the S3/S4 state. The Intel® ME requires M3 support to remain on in the S3/S4 state. To enable this in the Intel® ME, the "Service Advertisement and Discovery" needs to be enabled when the Intel® ME settings are configured for the platform as the following example shows.

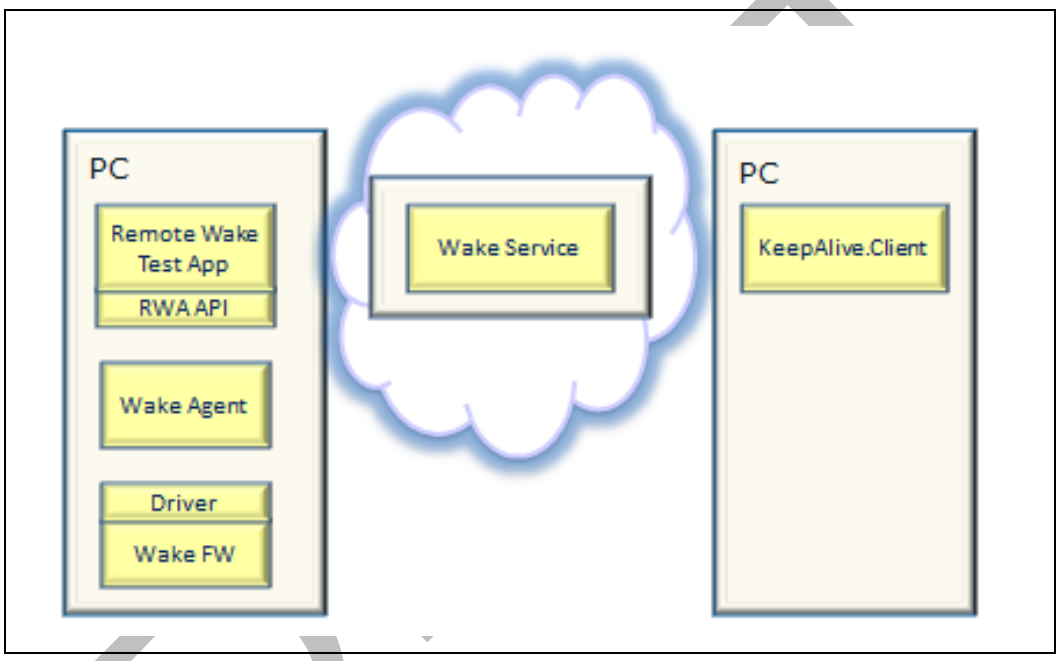


Note: Not all Intel® ME SKUs support enabling Remote Wake via Intel LAN device. If the feature is not available in the utility shown above, contact your Intel® ME representative for more information.

4.2 Remote Wake Testing

4.2.1 Test Components

Two PCs are required for end-to-end testing. One, as shown on the left below, installed with the Remote Wake components and another, as shown on the right for an application to issue a wake request. Both PCs require Internet access without proxiy servers or VPNs. The Remotely Wake-able machine should not have set a BIOS or HDD password if hibernate is being used for testing. Additionally, laptops in Sx will power down the LAN interface on Battery / DC mode. Therefore testing using the LAN interface requires the laptop operates on AC power. WLAN supports both AC and Battery / DC modes.



The Remote Wake Test framework requires; Remote Wake Test Application and Wake Service Client in the iSCT release kit.

The Remote Wake Test application provides a user interface for testing the PC client infrastructure. This application is not installed with Intel Smart Connect Technology. The Remote Wake Test app substitutes for an ISV's "3rd Party App" application and communicates with the Wake Agent via the Remote Wake Agent API. It does not communicate Session Id information with the cloud, instead displaying the remote wake platform status in a dialog box. This application is detailed below in Remote Wake Test Application.

The Wake Service Client framework described here uses a PC console based application as shown on the PC above on the right side. It will directly communicate with the Intel Cloud Wake Service. The test user needs to provide the session id information from the Remote Wake Test app PC on the left side for the PC on the right

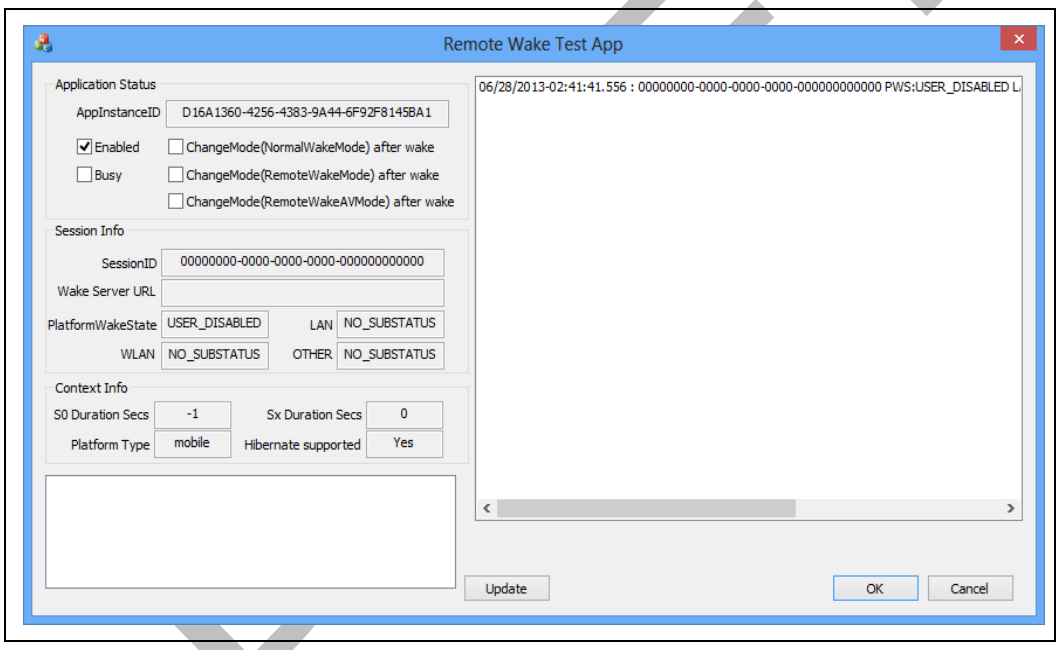
side which is using a wake request via the Wake service client test application. The Wake service client composes of three files: WakeService.KeepAlive.Client.exe, WakeService.KeepAlive.Client.exe.config and WakeService.Common.dll.

4.2.2 Remote Wake Test Application

Remote Wake Test Application called RWTestAppMFC.exe can be found in the Intel Smart Connect Technology Compliance Kit "<build_dir> \ ProductReleaseDrop \ Application" for 32 bit version and a 64 bit version can be found in "<build_dir>\ ProductReleaseDrop \ Application64".

Note: Remote Wake Test Application is only compatible with the associated release version of Intel® Smart Connect Technology.

RWTestAppMFC first issues an "Enable" command to the Remote Wake interface library and then issues a 'Register' command to the library. The Wake Agent sends the Session ID to the Test App which displays it with other status information.

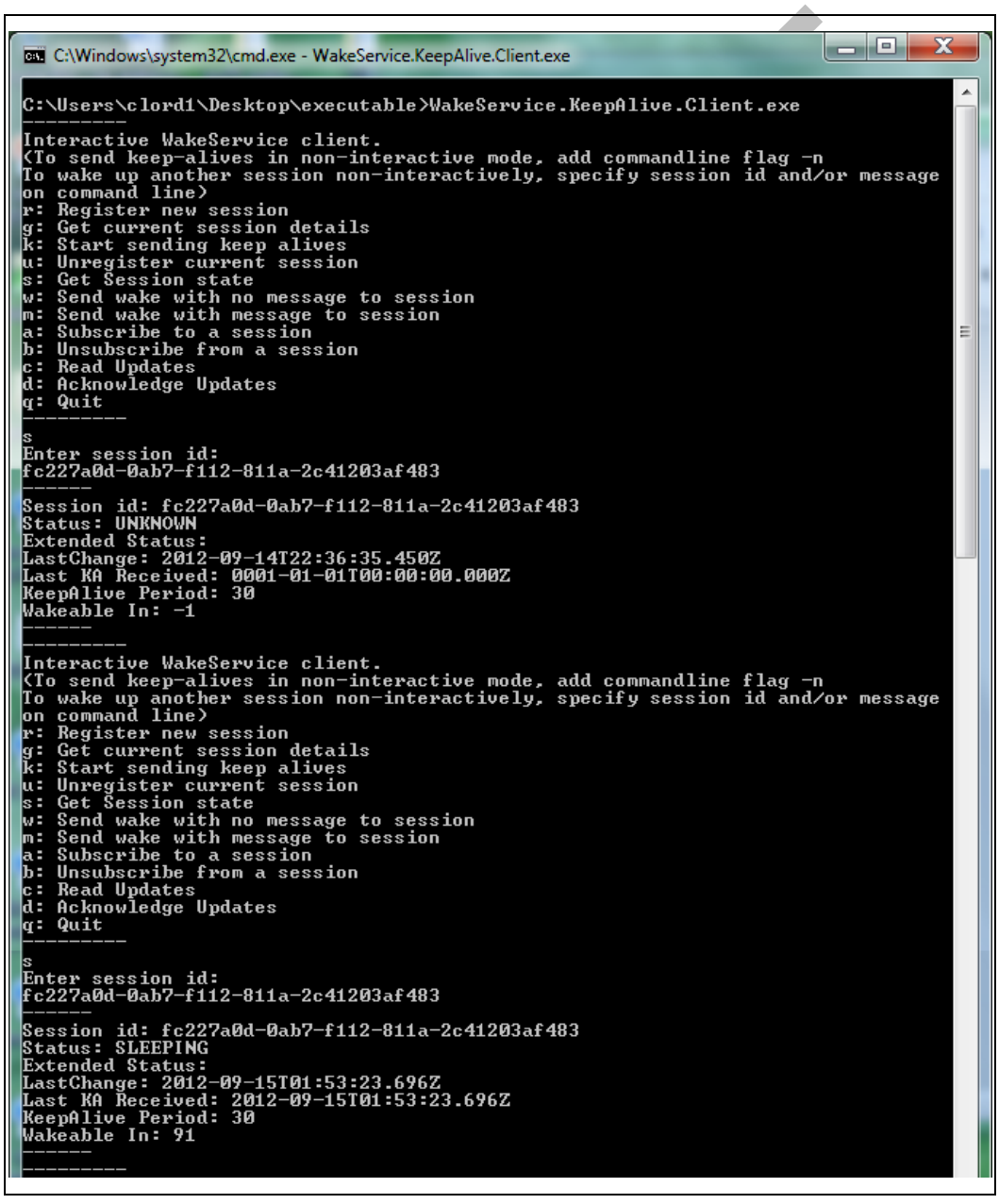


Note the *SessionID* GUID and the *PlatformWakeStatus* of AVAILABLE indicating the Wake Agent has successfully configured the underlying hardware and the Session ID will be used when the PC transitions to S3/S4. Note the LAN interface, shown as AVAILABLE, will be used to send Keep Alive packets as the WLAN indicates NO_SUBSTATUS. WLAN status will change if WLAN is used by Remote Wake App. Refer to the Remote Wake Agent API for detailed descriptions of *PlatformWakeStatus* and LAN/WLAN/Other states.

4.2.3 Wake Service Client

The PC with the Wake Service Client (using WakeService.KeepAlive.Client.exe) will be used on a separate PC to remotely wake the system under test.

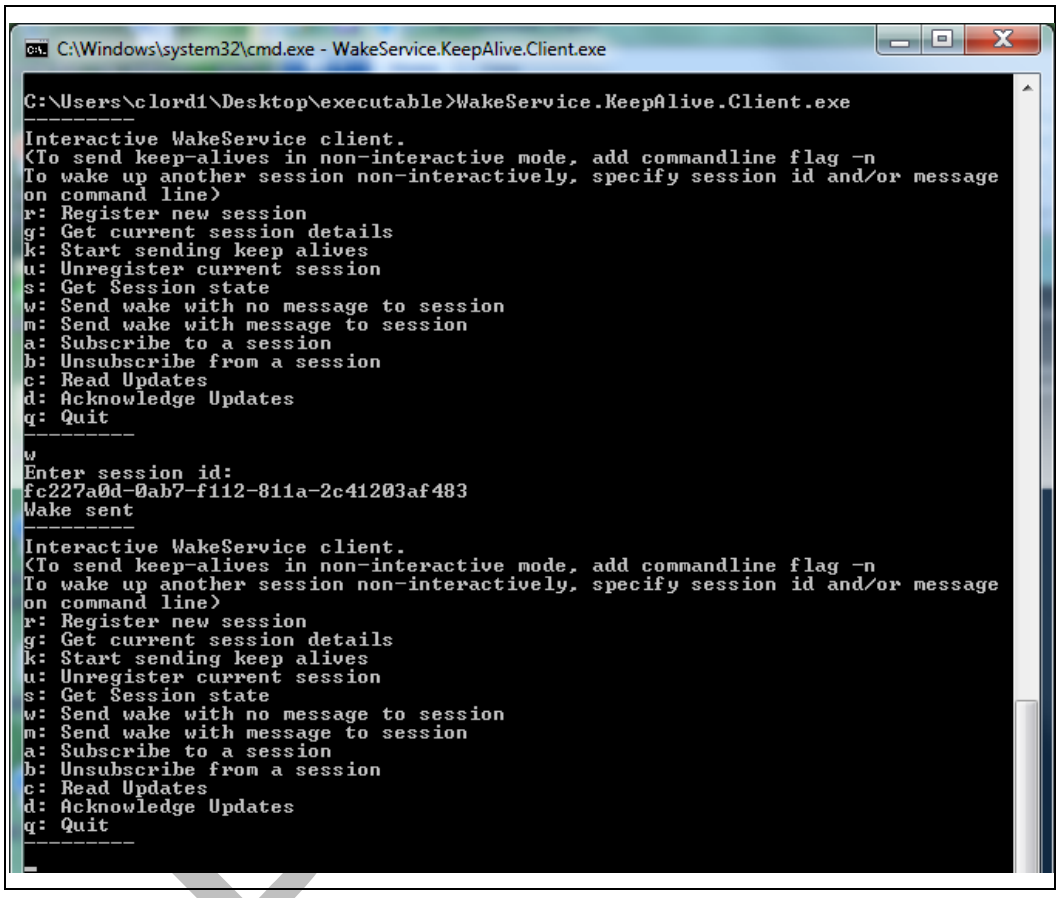
Open a command prompt, start the WakeService.KeepAlive.Client.exe from Web Service Client folder, and enter an "s"-command with the Session ID from the Remote Wake Test App's Session ID text box. The screen shot below shows the result. The Status: UNKNOWN state, this means a Remote Wake PC has registered but it is still not sleeping and sending Keep Alive packets.



The Remote Wake enabled PC can now be put into S3 (Sleep) or S4 (Hibernate). It will start to send Keep Alive packets to the cloud service. Enter an "s"-command and Session ID again. The results will be shown below Note the Status: SLEEPING.

The Remote Wake enabled PC can now be put into S3 (Sleep) or S4 (Hibernate). It will start to send Keep Alive packets to the cloud service. Enter an "s"-command and Session ID again. The results will be shown as illustrated in the screen shot below. Note the Status: SLEEPING.

Issue a "w" command to wake the PC without sending optional wake packet data.



Note the "Wake sent" response printed on the screen, the sleeping PC should now wakeup within a few seconds (depending on network topology).

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5 Intel® ME Co-existence with Intel® Smart Connect Technology

Note: This section is not applicable to Bay Trail M/D

Intel® Smart Connect Technology does not have any dependency on Intel® MEI driver or Intel ME FW. Additionally Intel® Smart Connect Technology does not consume SPI flash space. The Intel® Centrino® Wireless NetDetect feature is resident in the FW of the WLAN NIC.

5.1 Intel® ME WLAN Provisioning

When the Intel® ME is provisioned for WLAN support during its M3 state and the platform is on AC, NetDetect will not be functional as the Intel® ME will take ownership of the WLAN card. The following table illustrates the Intel® ME states and provisioning modes that effect Intel® Smart Connect Technology and NetDetect operations.

Table 5-1. Intel® ME Co-existence with Intel® Smart Connect Technology

System State	Intel® ME State	Intel WLAN Ownership	Provisioned	Power State	Intel® Smart Connect Technology	NetDetect Available
S0	M0	Host	Yes	AC	Yes	Yes
S3	M3	ME	Yes	AC	Yes	No
S4	M3	ME	Yes	AC	Yes	No
S3	Moff	Host	Yes	AC	Yes	Yes
S4	Moff	Host	Yes	AC	Yes	Yes
S3	Moff	Host	Yes	Battery	Yes	Yes
S4	Moff	Host	Yes	Battery	No	Yes
S3	M3	Host	No	AC	Yes	Yes
S4	M3	Host	No	AC	No	Yes
S3	Moff	Host	No	Battery	Yes	Yes
S4	Moff	Host	No	Battery	No	Yes

Note: Periodic wake is not available in the System State of OS S4 (Hibernate). If Intel® Rapid Start Technology is supported, then its S4 state is supported. NetDetect is only available in the S4 system state if the platform supports leaving power to the WLAN card in the S4 system state.

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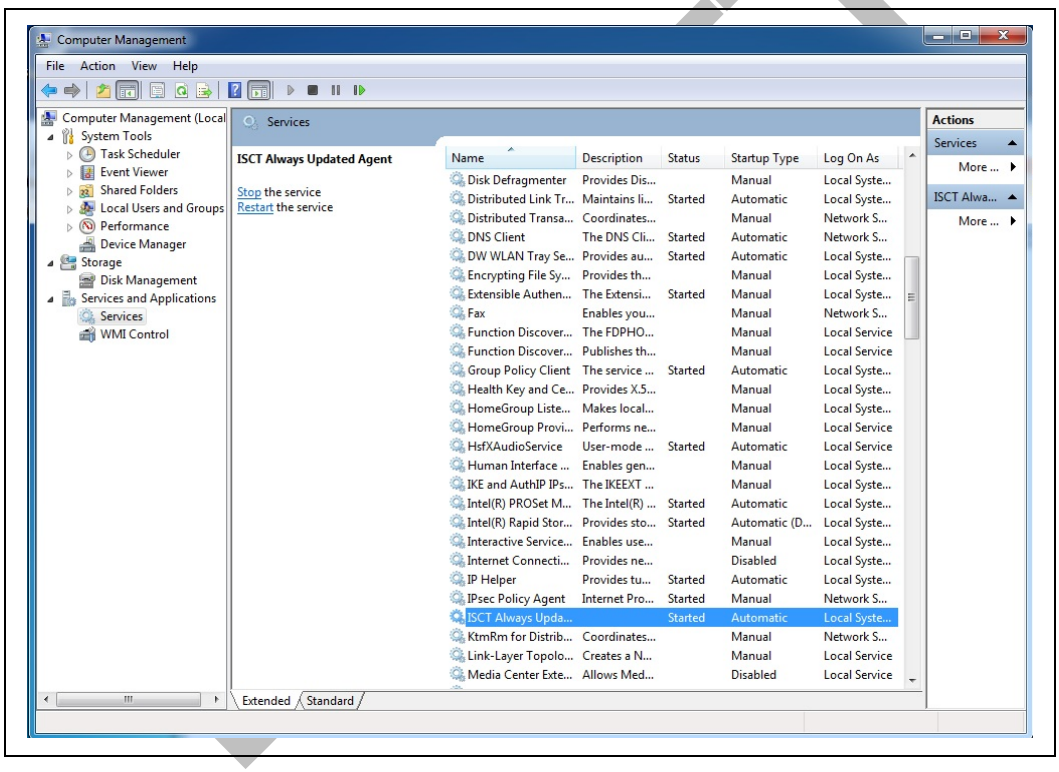
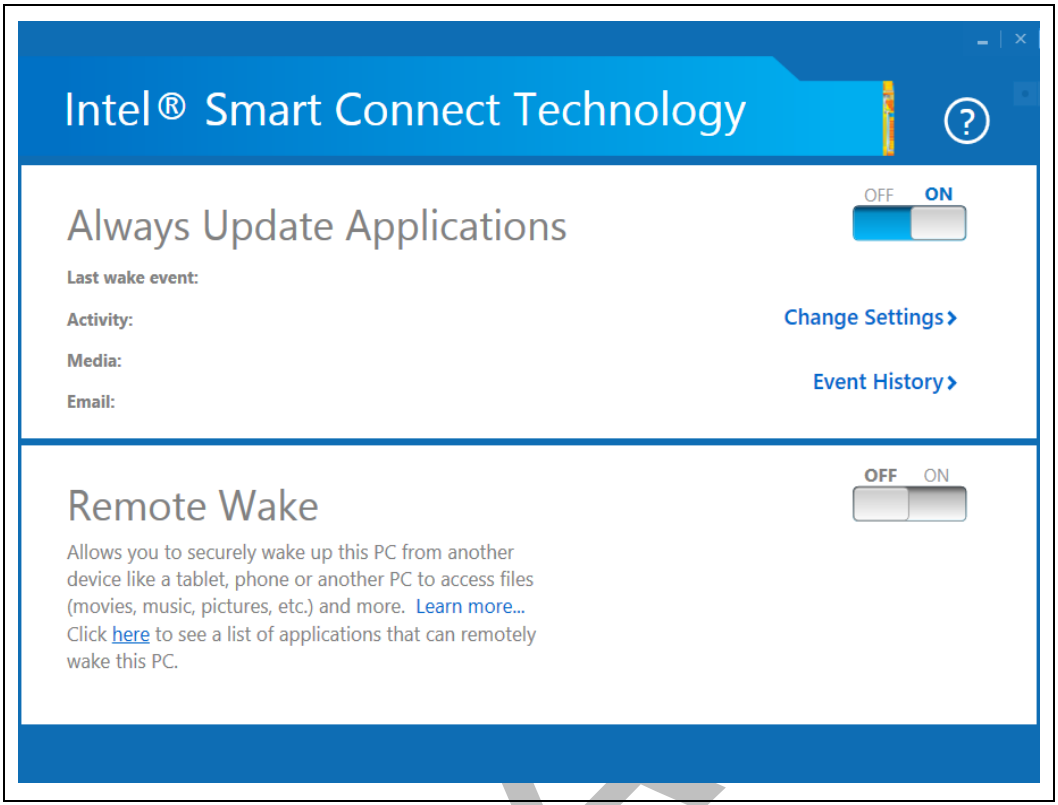
6 Troubleshooting

This section lists some steps that can be used to verify that your system is configured correctly for the Intel® Smart Connect Technology to work.

1) Verify the Intel Smart Connect Technology Agent (ISCT Always Updated Agent) is started in the Services tab of the Computer Management application. If the Agent is not running ("Started" does not appear in the "Status" column), right click and select the "Start" operation. If the Agent still does not start, verify that the BIOS APCI method GABS returns a 1 for bit 0. This indicates to the Agent that Intel Smart Connect Technology is enabled on the platform.



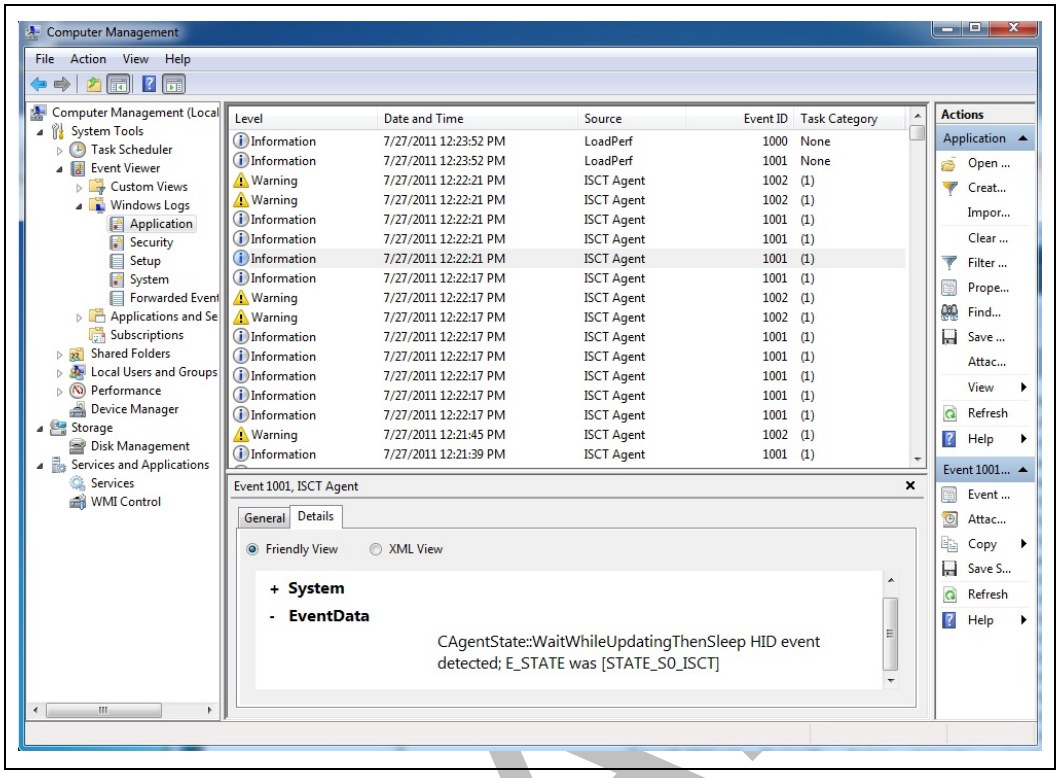
- Verify that the Intel Smart Connect Technology Configuration Utility has "Always Update Applications" slider control in the "ON" position as shown below:



Note: If Remote Wake is not supported, then the bottom section of the screen will not be displayed

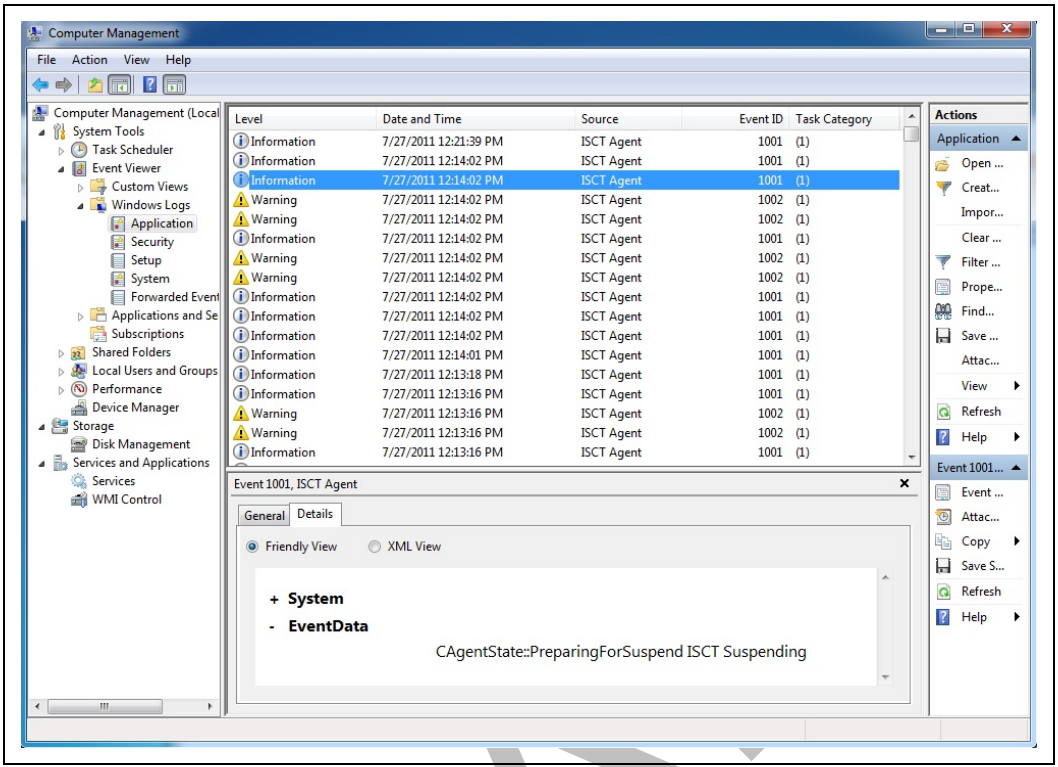
If the above two steps are successful and the platform does not wake or only wakes once or the sleep duration is not as expected, verify the following by checking the "Source" column of the Event Viewer Application Log for the Intel Smart Connect Technology Agent entries.

1. A HID event was received upon resume from S3. This could be caused by a "virtual keyboard" application that sends a HID event upon resume from S3 or the EC/BIOS reports a HID event in the _WAK ACPI method. If the HID event is received, the Event Viewer will have the following entry:



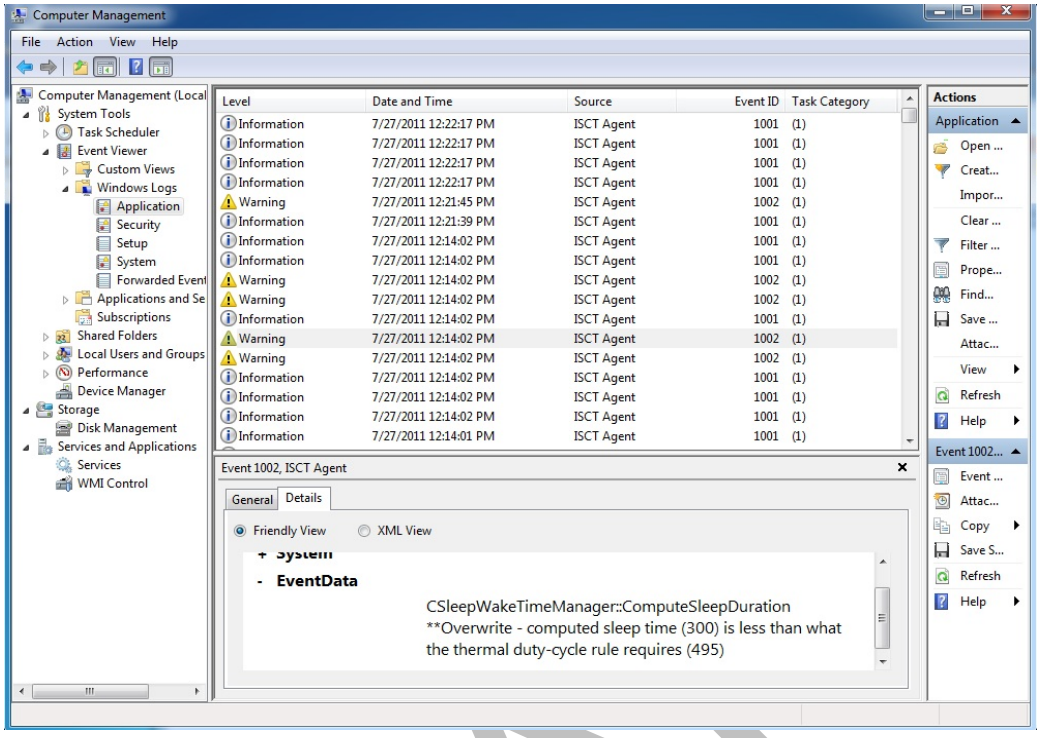
2. If you never see a wake after setting a sleep duration in the GUI and you have the Whitelist enabled in the Registry for Intel Smart Connect Technology, verify that one of the applications listed in the registry is running prior to placing the platform into S3. For more information on Whitelist, refer to section on Application Whitelist usage.

3. If the above step is okay, verify that a wake was scheduled by the Agent by looking for the following entry in the Event Viewer:

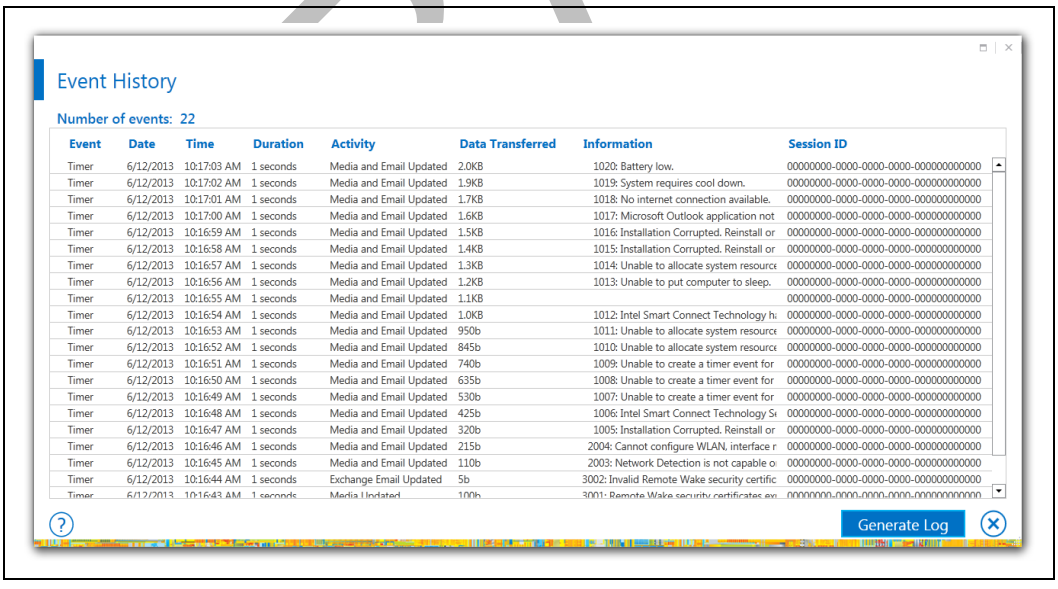


4. If the observed sleep duration is greater than the value set in the GUI, the reason is that the Agent takes into thermal conditions for the actual sleep time and if on battery, the current battery charge level.

5. For other issues, the ISCT Agent entries in the Event Viewer may provide information about how the Intel® Smart Connect Technology Agent is working.



In addition to the Event Viewer, the "Event History" of the iSCT Configuration Utility can be used. The following shows a detailed list of wake events and their reasons:



6.1 Enabling Logging

As mentioned above the Event Viewer provides logging information about Intel Smart Connect Technology Agent, however this information may be difficult to read and export for assistance.

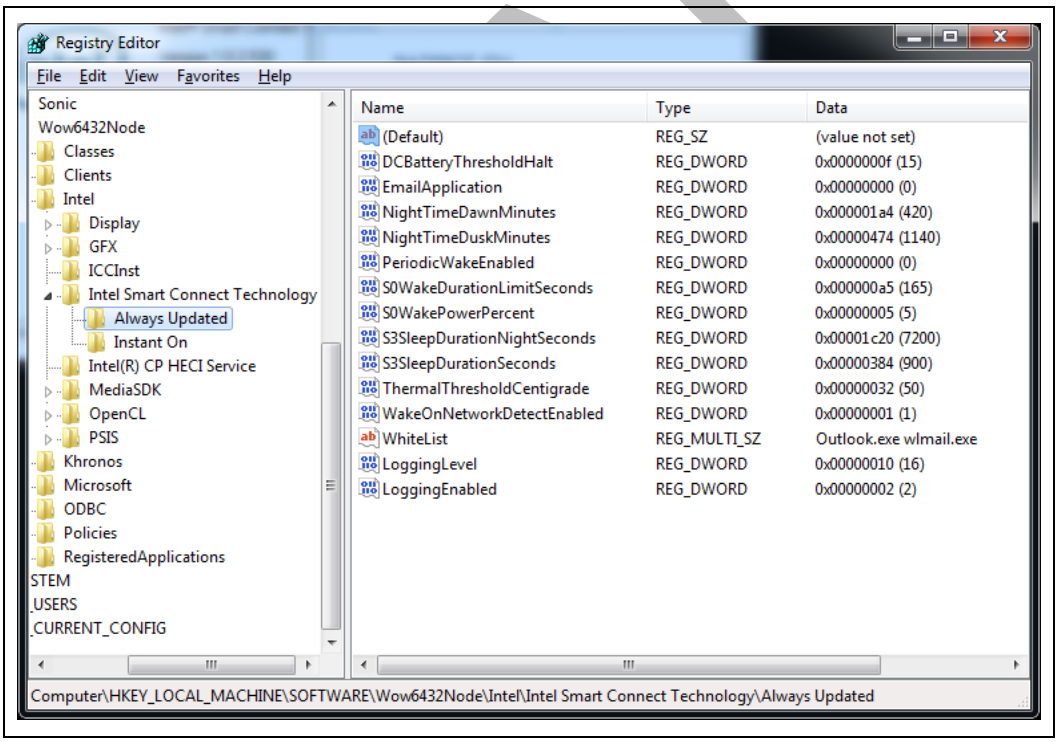
An alternative to the Event Viewer for logging information is the iSCTLog.txt file in the C:\ProgramData\Intel\iSCT directory. Note that the "C:\ProgramData" directory is hidden. This log file uses a circular buffer and after the file size reaches 5MB, the old data is removed (at the beginning of the file).

For troubleshooting, it is recommend enabling additional logging information by adding two registry entries:

- "LoggingLevel" with a DWORD value of 0x10
- "LoggingEnabled" with a DWORD value of 0x2

These registry entries are illustrated in Figure 6-1. For more information on the registry settings for the Intel Smart Connect Technology refer to the registry section of this document.

Figure 6-1. Logging Registry Settings



6.2 Using DebugView (Dbgview.exe)

DebugView (Dbgview.exe) is a publicly available utility that allows capture of kernel and application debug messages. It is extremely valuable for capture output

messages from the Intel Smart Connect Technology Agent for debugging/troubleshooting wake and transition to S3 issues. It is recommended to enable the logging and debug information for the Agent as documented earlier in this section ("LoggingLevel" and "LoggingEnabled" registry values). "LoggingEnabled" must be set to a value of "4" for DebugView output.

6.2.1 DebugView Configuration

DebugView must be invoked with Administrative privileges to capture kernel messages and other messages. In addition the following to screen shots show the recommended settings:

Figure 6-2. DebugView Capture Settings

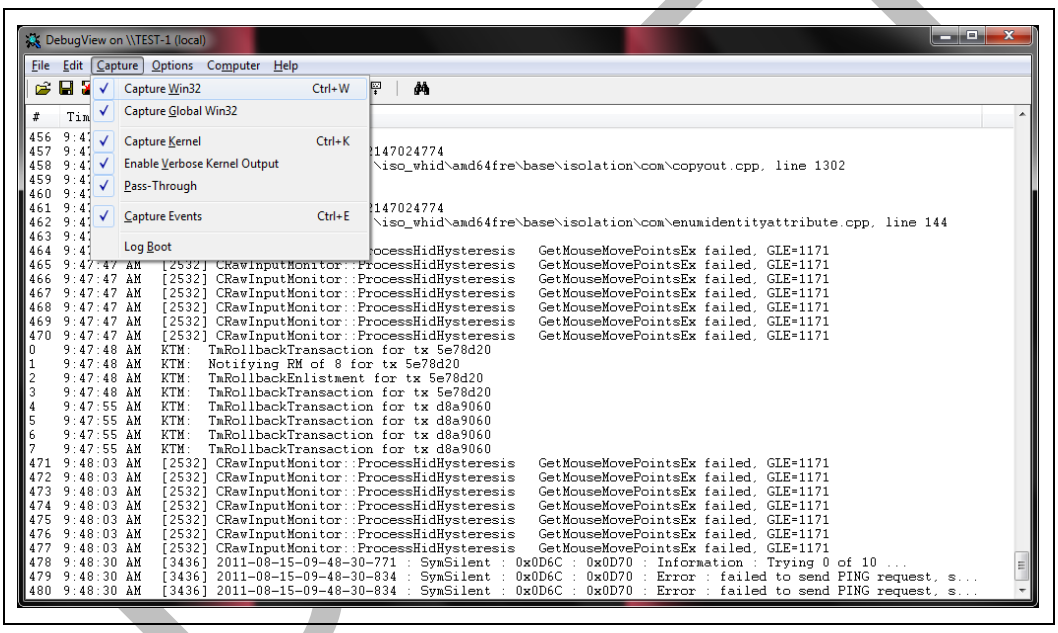
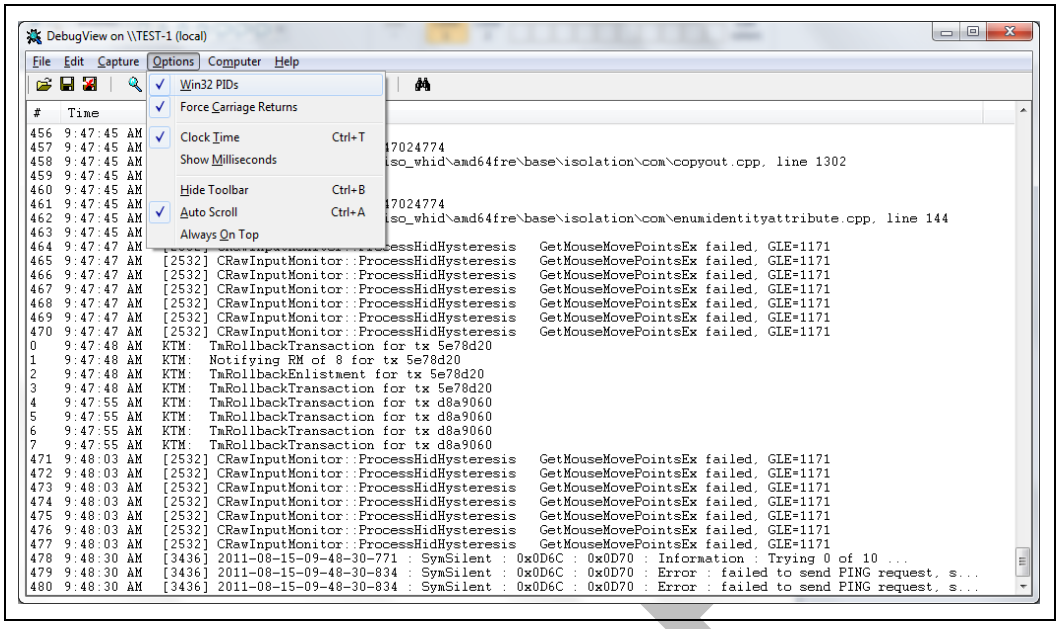


Figure 6-3. DebugView Options Settings



6.2.2 Example DebugView Output

6.2.2.1 Thermal Threshold Exceeded

In this example, the current CPU temperature exceeded the recommended delta between CPU TjMax and the current Intel Smart Connect Technology recommended values. The next wake period (sleep duration) was doubled to allow platform thermals to cool the platform.

00006511 11:26:29 AM [2200] CSleepWakeTimeManager::GetSleepDurationWithThermalBackoff ISCT Delta2TjMAX 49, thresh 50, over-temperature 1 times

00006512 11:26:29 AM [2200] CSleepWakeTimeManager::ComputeSleepDuration Use thermal based sleep time (battery based (600), the thermal based (1200))

00006513 11:26:29 AM [2200] CSleepWakeTimeManager::ComputeSleepDuration **********ISCTNextSleepDuration = 1200 seconds.

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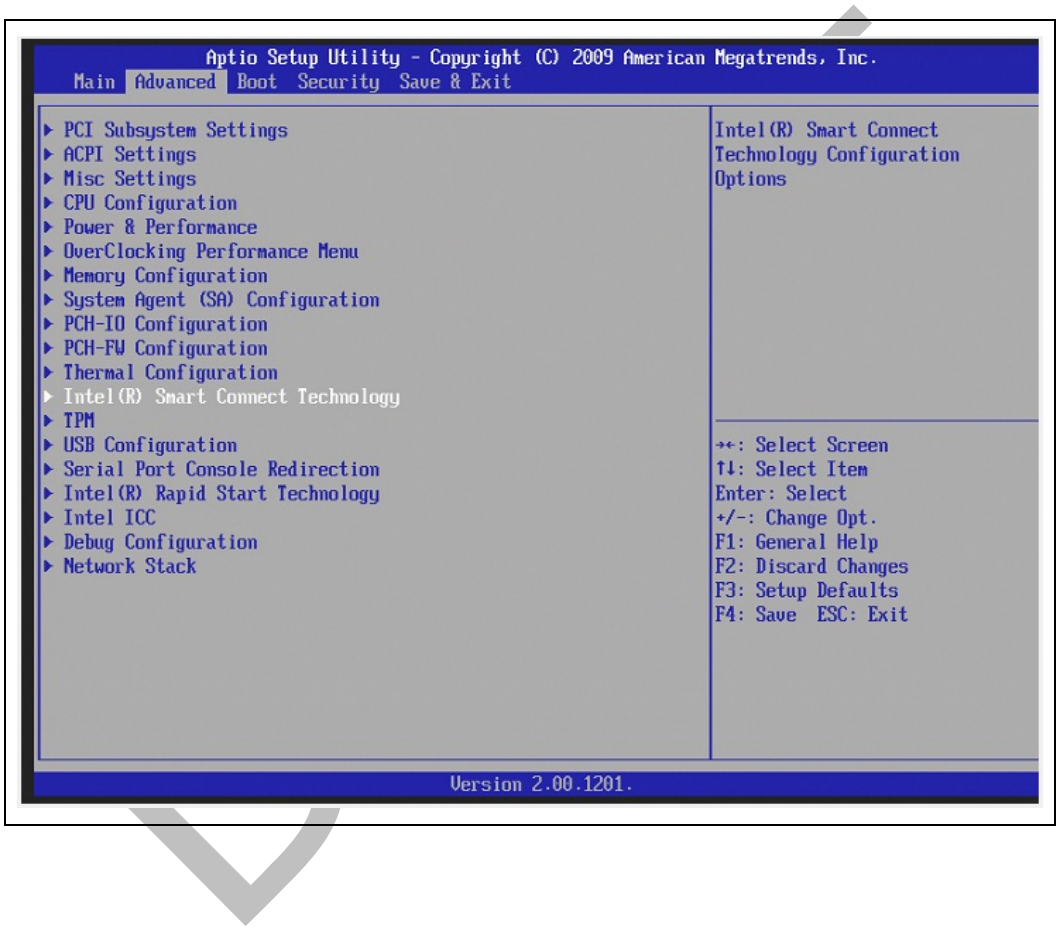
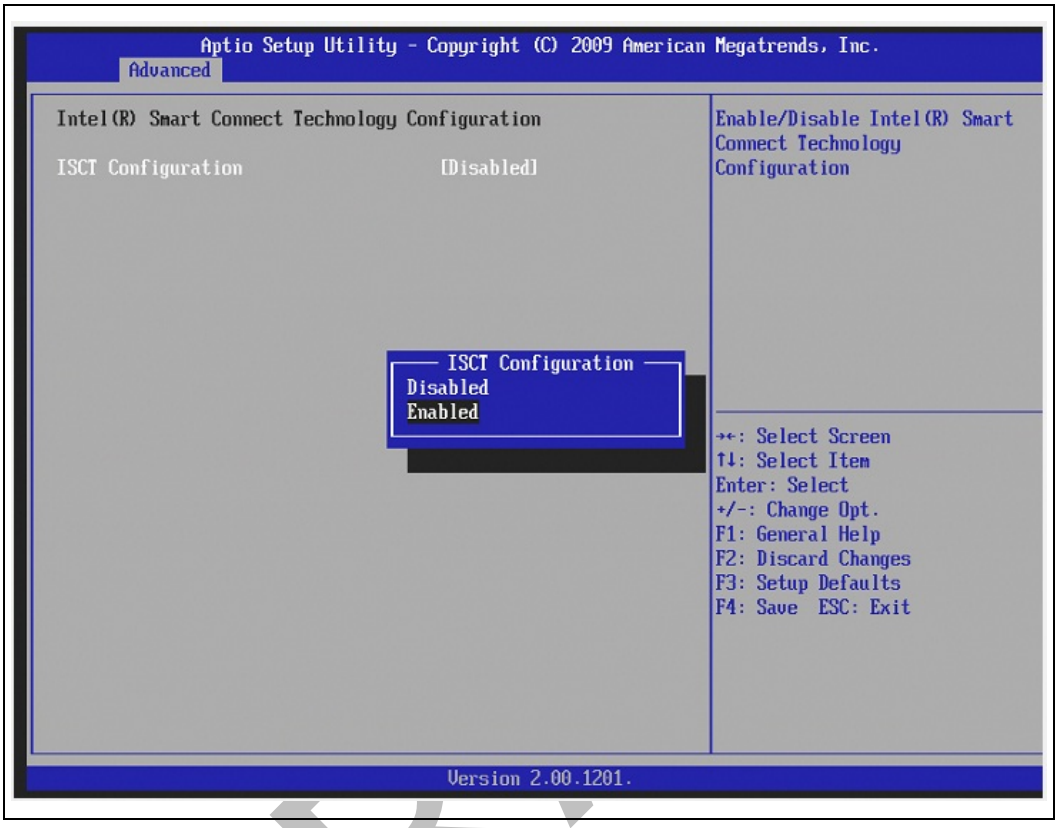
7 Intel CRB BIOS Settings

This section details the BIOS Settings for the Intel CRB to enable Intel® Smart Connect Technology.

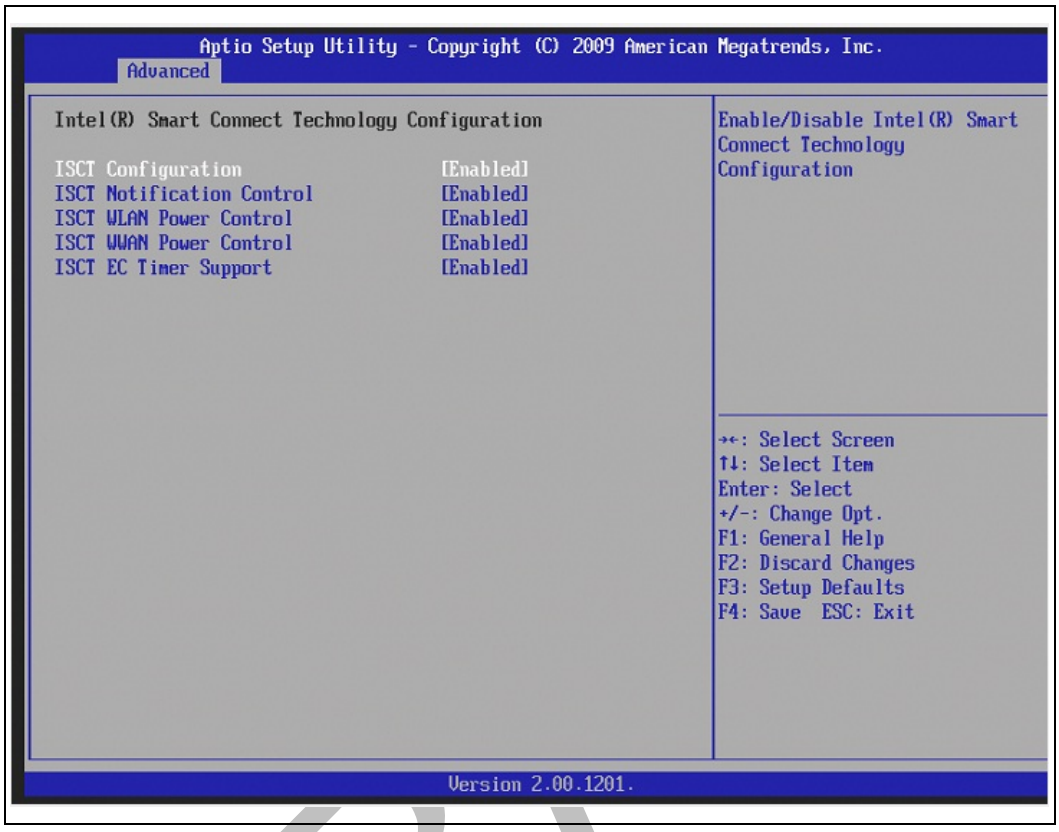
From the "Main" setup BIOS screen, select the "Advanced" tab.



Select "Intel(R) Smart Connect Technology Configuration" and change "Disabled" to "Enabled".



For each of the items in the Intel Smart Connect Technology options, set them to "Enabled".



Press "F4" to save the settings and reboot the CRB.

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