

# Intel® Integrator Toolkit

## Package Version 4.0.2

### Release

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#### Viewing Note:

This Readme document is designed for viewing on a Microsoft Windows\*-based system. If needed while using Microsoft MS-DOS\*-based systems, print out the Readme information for fonts and text formats to appear correctly.

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# 1. Toolkit Introduction

## NOTICE

*Intel Integrator Toolkit allows customization of system BIOS settings and is intended for use only by professional PC system integrators. Incorrect system BIOS settings may cause a system to malfunction, fail to boot, or operate with decreased performance. Incorrect BIOS settings may affect system stability and functionality.*

The Intel® Integrator Toolkit assists system integrators in the configuration and manufacturing of computer systems using Intel® Desktop Boards. There are three Intel Integrator Toolkit interfaces available:

- Microsoft\* Windows\*-based Intel Integrator Toolkit (a configuration tool only)
- Microsoft\* MS-DOS\*-based Intel Integrator Toolkit (a configuration and installation tool)
- Microsoft Windows Preinstallation Environment (Windows PE)-based Intel Integrator Toolkit (a configuration and installation tool)

The Windows-based Intel Integrator Toolkit configuration tool is a virtual system builder which allows you to configure BIOS and SMBIOS settings and create INI files without a reference system. These features require an Intel Integrator Toolkit-enabled BIOS (an .itk file in the BIOS package).

## 1.1. Which Tool Do I Use?

### 1.1.1. Configure System Settings:

The Windows version of the Intel Integrator Toolkit configuration tool supports newer platforms and BIOS files. Use this interface when the system's Intel Desktop Board has an Intel® 945 or newer chipset.

You may also use the DOS- and Windows PE-based interfaces as configuration tools.

### 1.1.2 Install System Settings to Target Systems:

There are three installation tools available:

- **Intel Integrator Toolkit's Microsoft\* MS-DOS\*-based Interface:**  
The DOS-based installation tool works with INI files generated by the Windows-based Intel Integrator Toolkit configuration tool. Use the DOS-based interface to extract BIOS settings, SMBIOS parameters, and bill-of-material information (deprecated) from a reference system into an INI file and to also install the INI file settings onto target systems. Editable tokenized settings also permit extracting and installing only the CMOS settings that are needed.  
**Note:** Refer to the HIMEM.SYS information in Section 3.2.
- **Intel Integrator Toolkit's Datalight\* ROM-DOS\*-based Interface:**  
The ROM-DOS-based installation tool also works with INI files generated by the Intel Integrator Toolkit configuration tool.  
**Note:** Datalight\* ROM-DOS\* was validated with the Intel Integrator Toolkit version 3.0 and higher.  
**Note:** Refer to the HIMEM.SYS information in Section 3.2.
- **Intel Integrator Toolkit's Windows PE-based Interface:**  
The Windows PE-based installation tool works with INI files generated by the Windows-based Intel Integrator Toolkit configuration tool. Use the Windows PE-based interface to extract BIOS settings and SMBIOS parameters from a reference system into an INI file and to also install the INI file settings onto target systems.

The table below compares the features of the DOS- and Windows PE-based interfaces:

Feature	DOS-based Interface	Windows PE-based Interface
Extract config	X	X
Extract SMBIOS	X	X
Extract BOM	X	
Extract tokens	X	X
Log file	X	X
Install config	X	X
Install SMBIOS	X	X
Install tokens	X	X
Flash bio file	X	X
Flash splash image		X
Reboot	X	
Remove config	X	X
Remove SMBIOS	X	X
Report BOM	X	
Verify BOM	X	

## 1.2. Toolkit Functions

The toolkit functions include:

- Ability to modify SMBIOS and BIOS settings and then save them with the Custom BIOS Update utility to replicate on target systems.
- Extraction of BIOS settings, SMBIOS, and Bill-of-Material (DOS only) information from a reference system.
- Flash capability to automatically update BIOS versions, if needed.
- Replication of extracted BIOS settings, and SMBIOS settings onto a target system.
- Verification that the target system was built with the correct hardware configuration.
- Ability to customize a BIOS splash screen and place a custom logo.

## 1.3. Toolkit Version Features

Features added to the Intel Integrator Toolkit (versions 4.0.1 and 4.0.2) include:

- Added support for Microsoft Windows 7 operating system.
- Added support for new Intel Desktop Boards

The new features in the 4.0 version of Intel Integrator Toolkit include:

- A new user interface for the Microsoft Windows-based Intel Integrator Toolkit configuration tool.
- Automatic download of the BIOS when connected to the Internet.
- Voluntary participation in a survey about using the tool.

The new features in the 3.4 version of Intel Integrator Toolkit include:

- Ability to choose a background color (black or white) for the Intel® logo.
- Support for 1280x800 logo images with BIOSs that support this resolution.
- Support for hard drive password replication using the Windows PE-based Intel Integrator Toolkit with BIOSs that support this feature.

Please note that the DOS-based Intel Integrator Toolkit application does NOT support hard disk drive password replication. However, known failures that occurred with BIOSs that support hard drive password support are now fixed in this version of the DOS-based Intel Integrator Toolkit.

Other changes in v3.4:

- The Bill of Material (BOM) feature of the Intel Integrator Toolkit has been deprecated. Deprecated features are no longer supported and may not be available in future releases of the application. Contact [itk-feedback@intel.com](mailto:itk-feedback@intel.com) for comments or concerns.

Features in the 3.3 version of Intel Integrator Toolkit include:

- Ability to modify BIOS settings and then save them with the Custom BIOS Update utility to replicate on target systems.

Features in the 3.2.0 version of Intel Integrator Toolkit include:

- Ability to generate a BIOS capsule that includes SMBIOS and BIOS settings in addition to Flex Module settings.

Features in the 3.0 version of Intel Integrator Toolkit include:

- Added the Intel Integrator Toolkit command line for Microsoft Windows PE.

Features added to the Intel Integrator Toolkit (version 2.10) include:

- Tokens Extract/Install provides extraction of individual BIOS settings from a reference system using a user-editable plain-text format. Settings may be edited, placed into the INI file, and then installed on target system(s). (DOS-based interface only and Intel® desktop board must have an Intel 945 or higher chipset)
- Sets the system BIOS to provide notification when Intel Integrator Toolkit modifies BIOS settings. Requires a compliant BIOS. (Framework Edition and DOS only).

Features added to the Intel Integrator Toolkit (version 2.9.1) include:

- Ability to select, lock or hide multiple BIOS settings by using standard controls such as Shift+click for group selection, Ctrl+click for individual selection, and Ctrl+A for select all. (Framework Edition only)
- Ability to select multiple SMBIOS settings using the same selection techniques described above. (Framework Edition only)
- Added a user feedback capability for presenting comments or suggestions to the software developers of Intel Integrator Toolkit. The contact menu option is in Framework Edition only.
- Any version of the Intel Integrator Toolkit's DOS-based tool that generates INI files (with INI version 2.7) will be compatible with this version of Intel Integrator Toolkit Framework Edition (2.9.1) and all previous versions of Framework Edition that generate INI files with INI version 2.7.

The features added to Intel Integrator Toolkit (version 2.9) include:

- Added support for Flex Modules on Intel Desktop Boards based on an Intel® 945 and higher chipset and support for flash image configuration.

The features added to Intel Integrator Toolkit (version 2.8) include:

- Support for Intel Desktop Boards based on an Intel® 945 and higher chipset.

The features added to Intel Integrator Toolkit (version 2.7) include:

- Displays the parallel ATA and serial ATA drive in reports and in extracted INI files, regardless of how drives are configured in the BIOS. However, if the BIOS is configured not to enable certain parallel ATA or serial ATA drives, those drives will not be displayed in reports and extracted INI files.
- Supports expanded SMBIOS functionality, allowing expanded board support for the toolkit.
- Supports additional image types and logo placement options. For information on which image types are supported, refer to the Known Issues section in the readme file.
- Supports transferring the Flex Modules when updating workspaces, if the new BIOS supports the Flex Modules from the old BIOS.
- Supports the ability to restore defaults by type: all system defaults, BIOS setting defaults, and Flex Modules defaults.

## 2. System Requirements

The minimum hard disk space required before installation is double the total size of the Intel Integrator Toolkit.

## 2.1. Microsoft Windows\* Memory Requirements

Refer to the minimum requirements for the Intel Integrator Toolkit supported Windows operating system you are using.

## 2.2. Minimum Recommended Display Configuration

The minimum recommended display is a desktop space supporting 800 x 600 pixels with 16 colors.

## 2.3. Microsoft\* MS-DOS\* and Datalight\* ROM-DOS Memory Requirements

The minimum amount of conventional memory required to run Intel® Integrator Toolkit depends on operations requested. Approximately 510 KB of conventional memory should be sufficient for most operations. Note that the iFlash/iFlash2 process may need more than 640 KB of conventional memory if you use Intel Integrator Toolkit to perform the flash function. The DOS-based interface of the toolkit, if there is not enough system memory for the toolkit to run properly, may fail without providing an explanatory error message. Also see Section 3.2 for additional DOS based information.

## 2.4. Microsoft Windows PE Memory Requirements

**For Windows PE based on Windows XP and Server 2000:** The minimum amount of memory required to run Intel Integrator Toolkit depends on operations requested. Approximately 256 MB of memory should be sufficient for most operations. However, in certain flash features, 512 MB of memory is required due to BIOS requirements.

**For Windows PE based on Windows 7 and Windows Vista:** The minimum amount of memory required to run Intel Integrator Toolkit depends on operations requested. Approximately 512 MB of memory should be sufficient for most operations. However, in certain flash features, 1 GB of memory is required due to BIOS requirements.

To obtain the required amount of memory, stop other operations when performing a BIOS flash, remove some image components, or add more RAM.

## 2.5. Required Operating Systems and Optional Software Tools/Files

The following table summarizes required Intel software, operating systems, third-party software or other optional support tools and files needed to run the toolkit (see the Integrators Guide for more detailed information). Note that you will need administrative rights to the operating system to install applications.

**Software Required for the Windows-based Tool**

Product	Version	Vendor Description	Status
Computer Operating System	Microsoft Windows 7 (release candidate or higher) (32 and 64 bit versions)  Microsoft Windows Vista* (32 and 64 bit versions)  Microsoft* Windows XP* (32 and 64 bit versions)  Note: Not validated on any 64-bit PE version of the above Microsoft operating systems.	Microsoft* Windows* Operating System	One of the listed operating systems is required
iTKFEGUI.exe		Intel® Integrator Toolkit	Required

### Software Required for the DOS-based Tool

Product	Version	Vendor Description	Status
MS-DOS	6.22	Microsoft Operating System	Required
ROM-DOS	7.1	Datalight* Operating System	Optional
iToolkit.exe		Intel® Integrator Toolkit	Required
ansi.sys		Permits color display	Optional
autoexec.bat	Customized	Customized as needed by user	Optional
command.com		Provides the command interpreter	Required
config.sys	Customized	Customized as needed by user	Optional
iFlash	1.0 and up	Intel® Flash Memory Update Utility	Required (based on the version shipped with your BIO file) for Flash command
iFlash2	1.0 and up	Intel® Flash Memory Update Utility	Required (based on the version shipped with your BIO file) for Flash command
BIOS files		Intel BIOS file	Required for Flash command
.itk file		Intel Integrator Toolkit BIOS file	Required to use Windows-based interface
.ini file		Contains configuration information	Generated by toolkit

### Software Required for the Windows PE-based Tool:

Product	Version	Vendor Description	Status
Microsoft Windows PE	Windows PE image must be based on Windows XP Pro, Window Server 2003, Windows Vista*, or Windows 7	Microsoft Operating System	Required
iToolkitW.exe		Intel® Integrator Toolkit	Required
iToolkitW.dll			Required
ltoolkitWRes.dll			Required
EfiVar.dll			Required
Variable.sys			Required
TianoFlexCom.dll			Required
EfiInvoker.dll			Required for Flash command
Invoker.sys			Required for Flash command
Preferences.ini			Optional
BIOS files		Intel BIOS file	Required for Flash command
.itk file		Intel Integrator Toolkit BIOS file	Required to use Windows-based interface

#### Note:

You can also use Intel® BIOS Graphics Splash Screen and Logo Processing Utility to change screen images, but the program is not used by Intel Integrator Toolkit.

## 2.6. File/Folder Naming Conventions

The DOS-based Intel Integrator Toolkit only uses short file names (the 8.3 Microsoft DOS file naming convention). Note that this also applies to the OEM Splash Screen utility. This short file name restriction does not apply to the Windows PE-based Intel Integrator Toolkit.

## 2.7. Intel® Desktop Board Requirements (Target System)

Your system or platform must include an Intel Desktop Board based on an Intel 945 or newer chipset. If needed, contact your Intel Technical Marketing Engineer (TME) for more information.

## 2.8. List of Supported Intel® Desktop Boards

For the most current support information on Intel Integrator Toolkit (version 4.0.2) with specific Intel Desktop Boards, go to one of the following Intel websites:

- <http://www.intel.com/go/itk>
- <http://www.intel.com/design/motherbd/software/itk>

## 3. Known Issues, Workarounds, and Hints

No issues were reported for the 4.0 through 4.0.2 releases of Intel Integrator Toolkit.

The following issues were reported for the 3.4.1 release of Intel Integrator Toolkit:

- The application encounters a runtime error if you try to run a Custom BIOS Update (CBU) from a USB drive that also includes the Intel Integrator Toolkit command line tool for Microsoft Windows\* PE (IToolkitW.EXE and associated files) in the same folder as the CBU package. To prevent this error from happening, do not have the CBU and Windows PE files in the same folder on the USB drive.
- The Send Feedback link in the Menu bar fails to launch. The workaround for this is to click Help in the Menu bar and choose Help Topics. Once the Help file is open, go to the *Send Feedback To Tool Developers* topic located under the Overview section of the Help file.

There were no issues reported for the 3.4 release of Intel Integrator Toolkit.

The following are known issues for the 3.3.1 release of Intel Integrator Toolkit:

- Token installation is known to fail on some DQ35JO and DQ35MP BIOS releases with the DOS Installation Tool. Use the Windows PE Installation Tool to work around this issue.
- When using the Windows PE-based Intel Integrator Toolkit, extract and install of tokens may cause an internal error if BIOS settings have been installed with a previous version of the BIOS.
- When using the Windows PE-based Intel Integrator Toolkit, some invalid characters may appear when displaying certain SMBIOS strings using the OEMDMI command.

The following issue was reported for a previous release:

Intel® Management Engine and Intel® Active Management Technology (Intel® AMT) settings cannot be programmed using Intel Integrator Toolkit. Settings related to the Intel Management Engine and Intel Active Management Technology (Intel AMT) will not be listed for configuration using the Intel Integrator Toolkit configuration application. These settings cannot be added to INI files during an EXTRACT operation, either in the BIOS Image or as tokens.

The following sections list issues reported specific to the tool being used.

### 3.1. Windows-based Tools:

#### 3.1.1. Memory Issues:

None listed.

#### 3.1.2. General Windows Issues:

- In the displayed fields for SMBIOS, previous values appear in the background of the value entry field, though new values you enter will be accepted.

- If you manually enter the drive letter of an inaccessible network drive or an unformatted or non-existent disk, you will receive an error. The toolkit may close, losing the changes you have made.
- The application does not yet prevent setting the same boot device to multiple priorities. As a workaround, do not select duplicate priorities. For example, set the floppy drive to priority 1, set the hard disk drive to priority 2, and set the CD-ROM drive to priority 3.

### 3.1.3. Other Hints and Limitations:

- In general, image formats supported are .BMP and .JPG. Note that within JPEG, only a subset of formats are supported as listed below:
  1. Images generated by Adobe\* Photoshop\* 7.0.1 (and up), Microsoft\* Paint, and Jasc\* Paint Shop Pro\* 7 (and up) are supported.
  2. Sequential JPEG is supported (but progressive, lossless, and hierarchical are not supported).
  3. Huffman coding is supported (but arithmetic coding is not supported).
- Because the toolkit is a reference-free tool, it must display all possible drive options in the "Boot" menu, even if they are not valid for actual system configurations.

### 3.1.4. Help file issue:

If text does not show in the help file, change the color scheme in the display properties to any color scheme that has black window text.

## 3.2. DOS-based Tool:

### 3.2.1. DOS Issues:

- PCI devices listed in the INI file do not match the PCI devices section of the report.txt file. Note that the apparent difference is only in Hex/decimal representation.
- When an OEMDMI command is executed, Intel Integrator Toolkit switches are not supported.
- Under certain conditions, multiple values of a single token may be listed as default. Based on your system's configuration you can either allow the system to automatically choose the default or force the value. Note that duplicate value assignments for a single token setting will not generate an error. Please do not duplicate token settings in your INI file.
- On some systems with passwords installed, if you remove passwords manually through the BIOS Setup Program and then you attempt an itoolkit install with an INI file that contains passwords, the passwords in the INI file will not be installed. To enable the toolkit to accept passwords again, run itoolkit remove -config. You can also use the "Clear All Passwords" option in the BIOS Setup Program's Maintenance Mode.
- When setting verify value to VerifyExact=FALSE, the toolkit will not differentiate between ATA and ATAPI devices.
- The DOS-based interface of the toolkit does not support using commas to separate numbers within the INI file. This can be an issue if you are in a locale that uses commas where other locales use decimal points.
- RAID volume information is not detected (such as RAID0 vs. RAID1, total volume size, or number of drives in array). However, the physical drives are displayed. This may occur when generating a report or when extracting a Bill of Material (BOM).
- Add-in IDE controllers that do not conform to PCI specification will not be detected.
- Note that when extracting the BOM (Bill-of-Material) to an existing INI file, Intel Integrator Toolkit does not remove BOM sections that are no longer applicable. So residual BOM data stored in the INI file may remain from a previous BOM extraction. As a workaround, do one of the following:
  - Delete the existing INI file before extracting the new BOM.
  - Specify a different INI filename for the new BOM extraction.
- Adding a video card to a computer's AGP or PCI slot will prevent a disabled onboard video adapter from showing up under the listing "Disabled On Board Devices" in the BOM Report.

### 3.2.2. HIMEM.SYS Notes for Microsoft\* MS-DOS and Datalight\* ROM-DOS based interfaces:

The following commands for HIMEM.sys for both Microsoft\* MS-DOS\* and for Datalight\* ROM-DOS are needed to prevent error messages from appearing with BIOSes that don't support HIMEM.

- DEVICE=HIMEM.SYS
- DOS=HIGH,UMB

The above commands need to be included in the config.sys file, which is found in the root directory of DOS. Prevented error messages include:

- **No Extended Memory** -- An extended memory error condition can occur if the BIOS (via Int 15H, function 88H) notifies HIMEM that there is no extended memory. In this situation, HIMEM displays an appropriate error message and does not install.
- **Failure to Control the A20 Line** -- When HIMEM installs, it attempts to control the A20 line, which controls access to the HMA. HIMEM first attempts control via the AT method (using the 8259 keyboard control). If that fails, HIMEM then attempts control via the PS/2 method (using I/O port 60H). If both methods fail, HIMEM assumes it can't control the A20 line and displays the message A20 Control (OFF).

If either of these errors occur, try using the /A20, /A20+, or /PS2 in the HIMEM command line. Note also that some older programs might assume that the machine is a 1-MB 8086 which requires the A20 line to be disabled (OFF) during program execution. Current programs typically do not require the A20 line to be disabled.

### 3.3. Windows PE-based Tool:

#### 3.3.1. Windows PE Issues:

- When an OEMDMI command is executed, Intel Integrator Toolkit switches are not supported.

## 4. DOS Environment Considerations

The following considerations apply to the toolkit when used in the DOS environment:

- Running ITOOLKIT from a floppy disk in an environment without HIMEM.SYS can cause the application to run unusually slow. Loading DOS into high memory using HIMEM.SYS will significantly improve execution time.
- SMARTDrive (SMARTDRIVE.EXE) may interfere with IDE device detection. Intel recommends not running SMARTDrive when using the toolkit.
- The DOS utility program, Find.exe, is used by the program-generated batch file. If the Generate Media feature is used in conjunction with a bootable DOS diskette, Find.exe must be included on the diskette for the batch file to work correctly.

## 5. Documentation

The Intel Integrator Toolkit is documented using the following information sources:

- **Readme.RTF** — Provides information on release features, system requirements, known defects, and DOS considerations.
- **iToolkit.CHM** — Provides a non-DOS Windows HTML help file (Integrators Guide for the Intel Integrator Toolkit) that presents additional information.
- **Toolkit Overview.CHM** — Helps the user pick the correct Intel Integrator Toolkit interface that is needed for the Intel Desktop Board's chipset.

**Note:** Viewing the Integrators Guide requires a system that uses a Microsoft Windows based operating system (such as Windows 7, Windows Vista, Windows 2000 Professional, or Windows XP).

## 6. Legal

### 6.1 Product License

Before final installation of Intel Integrator Toolkit, refer to the product license presented for acceptance by the installation program. After installation, refer to the file: **license.txt**. (For example, the default path could be, *Program Files/Intel/Intel(R) Integrator Toolkit/license.txt*, unless an alternate path was used.) This file contains the Intel Software License Agreement for the Intel Integrator Toolkit software program.

### 6.2. Legal Disclaimer

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