Intel® Processor Diagnostic Tool

Help Documentation

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1   Purpose of Intel® Processor Diagnostic Tool

The purpose of the Intel® Processor Diagnostic Tool is to verify the functionality of an Intel® microprocessor. The diagnostic checks for brand identification, verifies the processor operating frequency, tests specific processor features and performs a stress test on the processor.

The diagnostic can be configured to execute with various features enabled or disabled. For more details, see IPDT Features & Parameters

2   IPDT Test System Requirements

Multiprocessor Systems
The Intel® Processor Diagnostic Tool is compatible with multiprocessor systems. It is essential that only one Intel® processor is tested at a time in this system configuration. Intel® Processor Diagnostic Tool does not support multiple processors inserted into a multiprocessor system configuration.

Motherboard & Processor
It is essential that the motherboard you use to test your processor is fully compatible with your Intel® processor. Consult your motherboard manufacturer's support to ensure the motherboard supports your processor. If you are using an Intel® Motherboard please use this utility Intel® Processors and Boards Compatibility Tool

Motherboard BIOS
It is essential that the motherboards BIOS is at the minimum BIOS revision specified to support your Intel® processor. Consult your motherboard manufacturer's support to ensure the BIOS revision is at the correct revision.

Motherboard Architecture
IPDT is only compatible with motherboards built using Intel® Architecture.

Over-Clocking
Over-Clocking should be disabled while running Intel® Processor Diagnostic Tool.

Power Management
Some power management features (e.g. [Intel SpeedStep® technology](#)) throttle or reduce the operating frequency of components within the system. These types of power management features may result in very low tested frequency results. This does not mean that the processor is operating at degraded performance levels. It means that the enabled power management feature is optimizing the efficiency of the processor, either to save power or reduce heat within the system.

We recommend you disable any power management features such as Intel SpeedStep® technology and configure your system to its optimal power management settings, when running Intel® Processor Diagnostic Tool. For instructions on how to disable these power management features, please contact your system manufacturer.

Operating Systems
The Windows® version of the Intel® Processor Diagnostic Tool is compatible with the following operating systems (Please download and install the relevant IPDT installer for your Operating System – 32Bit or 64Bit):
- Windows 10® 32 & 64 Bit (all versions) – except Windows® RT
- Windows 8.1® 32 & 64 Bit (all versions) – except Windows® RT
- Windows 8® 32 & 64 Bit (all versions) – except Windows® RT
- Windows 7® SP1 32 & 64 Bit
- Windows Server 2012® 32 & 64 Bit Standard/Enterprise
- Windows Server 2008® R2 32 & 64 Bit Standard/Enterprise

3 Acronyms

Acronym	Definition
CPU	Central Processing Unit
GUI	Graphical User Interface
QPI	QuickPath Interconnect
IMC	Integrated Memory Controller
IPDT	Intel® Processor Diagnostic Tool
MSR	Model Specific Register
AVX	Advanced Vector Extensions
OS	Operating System

4   Software Required

The following software is required to run IPDT in the Windows® environment and must be installed prior to installing IPDT

IPDT 32 Bit Software Requirements

- Windows® Installer 3.1 Redistributable (v2).
  Click here to download or copy the following URL into the browser
  https://www.microsoft.com/en-us/download/details.aspx?id=25

- Microsoft® .NET Framework Version 4.5.2 Redistributable Package (x86_x64).
  Click here to download or copy the following URL into the browser
  https://www.microsoft.com/en-us/download/details.aspx?id=42642

- Microsoft® Visual C++ 2015 (x86) Runtime Libraries.
  Click here to download or copy the following URL into the browser
  https://www.microsoft.com/en-us/download/details.aspx?id=48145

- *If your Intel Processor supports AVX, your Operating System will also need to support AVX in order to run IPDT AVX test.*
  Operating System minimum requirements for running IPDT AVX test:
  Microsoft Windows: supported in Windows 7 SP1 and Windows Server 2008 R2 SP1. Hotfix 2517374 available for non-SP1 version of Windows Server 2008 R2.

IPDT 64 Bit Software Requirements

- Windows® Installer 3.1 Redistributable (v2).
   Click here to download or copy the following URL into the browser
   https://www.microsoft.com/en-us/download/details.aspx?id=25

- Microsoft® .NET Framework Version 4.5.2 Redistributable Package (x86_x64).
   Click here to download or copy the following URL into the browser
   https://www.microsoft.com/en-us/download/details.aspx?id=42642

- Microsoft® Visual C++ 2015 (x86) Runtime Libraries.
   Click here to download or copy the following URL into the browser
   https://www.microsoft.com/en-us/download/details.aspx?id=48145

   The IPDT Installer program will check for the presence of the above prerequisites on
      your system.
   If your system is connected to the internet the prerequisites will be downloaded and
      installed on your system.

- *If your Intel Processor supports AVX, your Operating System will also need to
   support AVX in order to run IPDT AVX test.*
   Operating System minimum requirements for running IPDT AVX test:
   Microsoft Windows: supported in Window 7 SP1 and Windows Server 2008 R2 SP1.
   Hotfix 2517374 available for non-SP1 version of Windows Server 2008 R2.
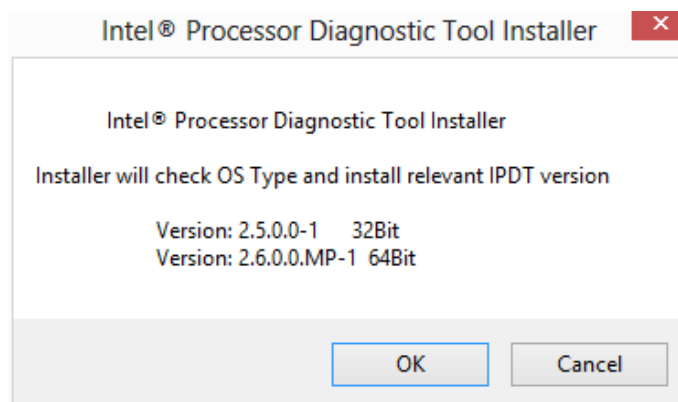
5   Installing IPDT in the Windows Environment

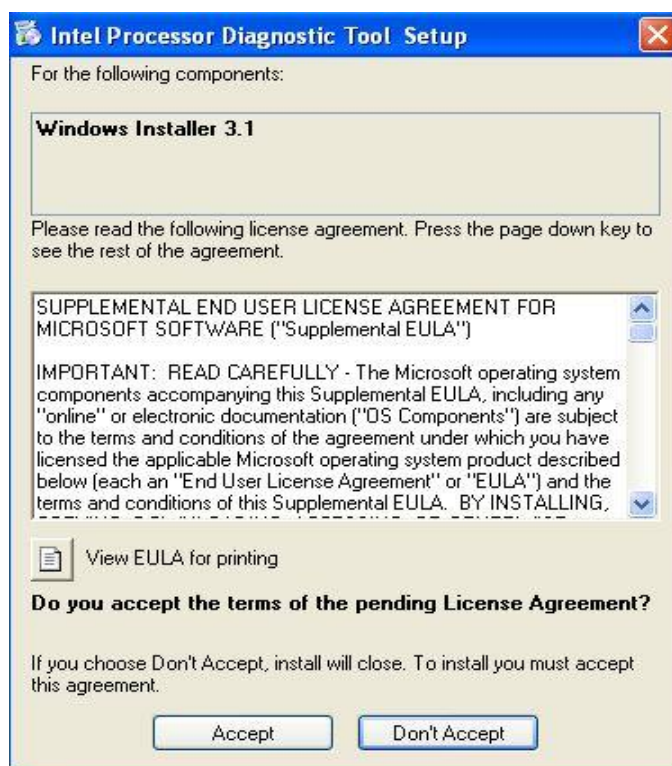**Installation Process**
Copy the IPDT Installer program to the desktop. Double-click on it and the dialog box below will be shown.

Click Ok to continue to the IPDT prerequisite check.
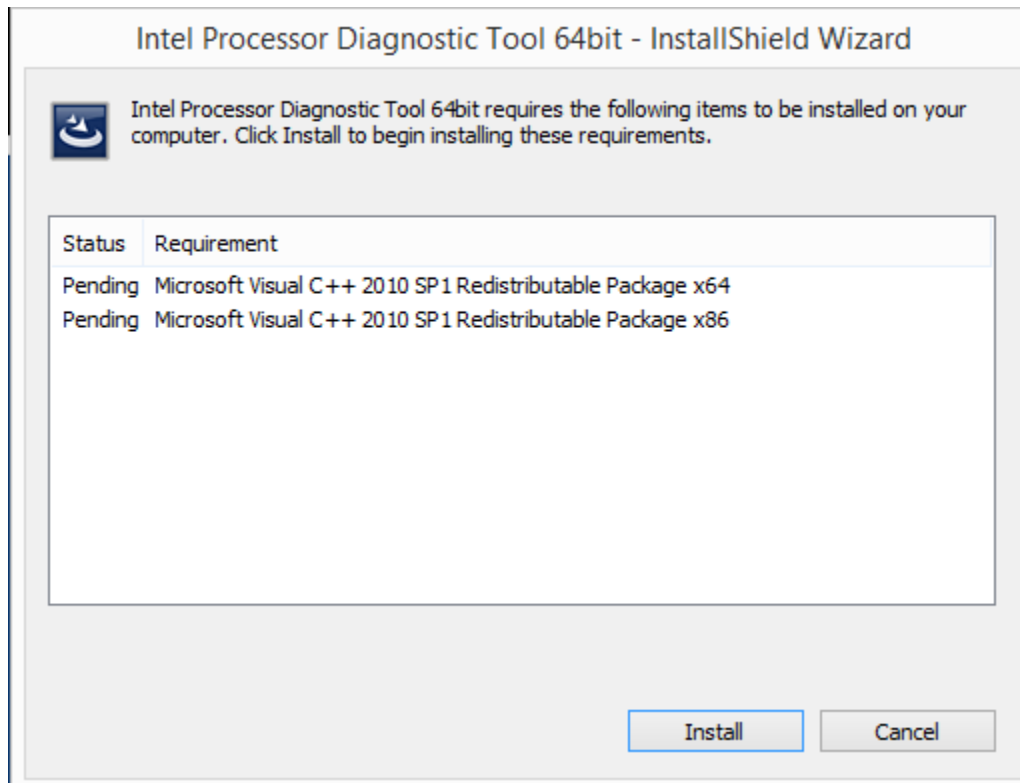
Initial Installer Screen

If you require .net 4.5 prerequisite, please click Accept to install .net prerequisite.
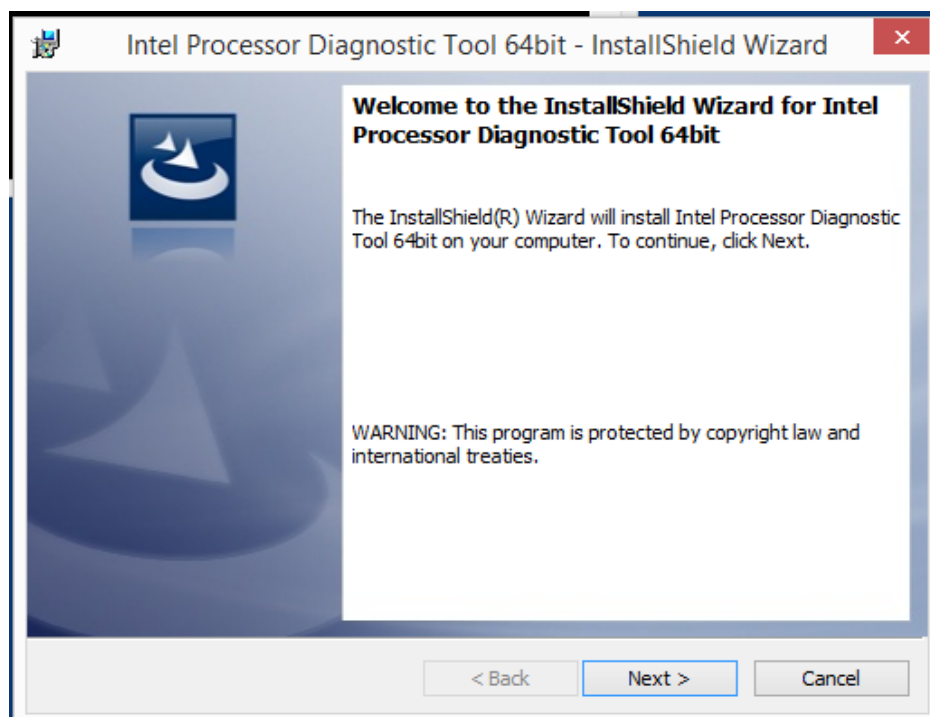Click Accept to install Windows Installer 3.1 prerequisite.

The Intel® Processor Diagnostic Tool - Help

Click "Install" to install any prerequisite software needed to run Intel Processor Diagnostic Tool.
IPDT prerequisites will start downloading from the internet.

Intel Processor Diagnostic Tool 64bit - InstallShield Wizard

Intel Processor Diagnostic Tool 64bit requires the following items to be installed on your computer. Click Install to begin installing these requirements.

Status	Requirement
Pending	Microsoft Visual C++ 2010 SP1 Redistributable Package x64
Pending	Microsoft Visual C++ 2010 SP1 Redistributable Package x86

Install   Cancel

Click "Next" to continue IPDT installation.

Intel Processor Diagnostic Tool 64bit - InstallShield Wizard

Welcome to the InstallShield Wizard for Intel Processor Diagnostic Tool 64bit

The InstallShield(R) Wizard will install Intel Processor Diagnostic Tool 64bit on your computer. To continue, click Next.

WARNING: This program is protected by copyright law and international treaties.

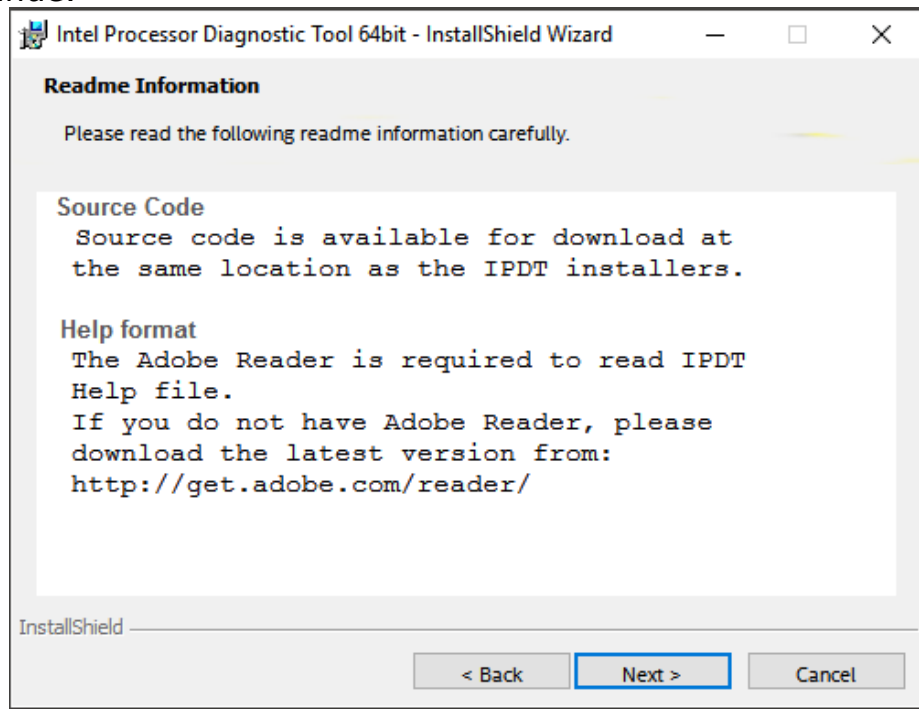< Back   Next >   Cancel

The Intel® Processor Diagnostic Tool - Help

Intel Processor Diagnostic Tool source code is available from the same location as the IPDT installers at www.intel.com.
Adobe Reader is required to view the Intel Processor Diagnostic Tool help file.Click "Next" to continue.

Read License Agreement & Select "I accept…", click "Next" button to continue.
You must click Agree in order for the installation process to continue.
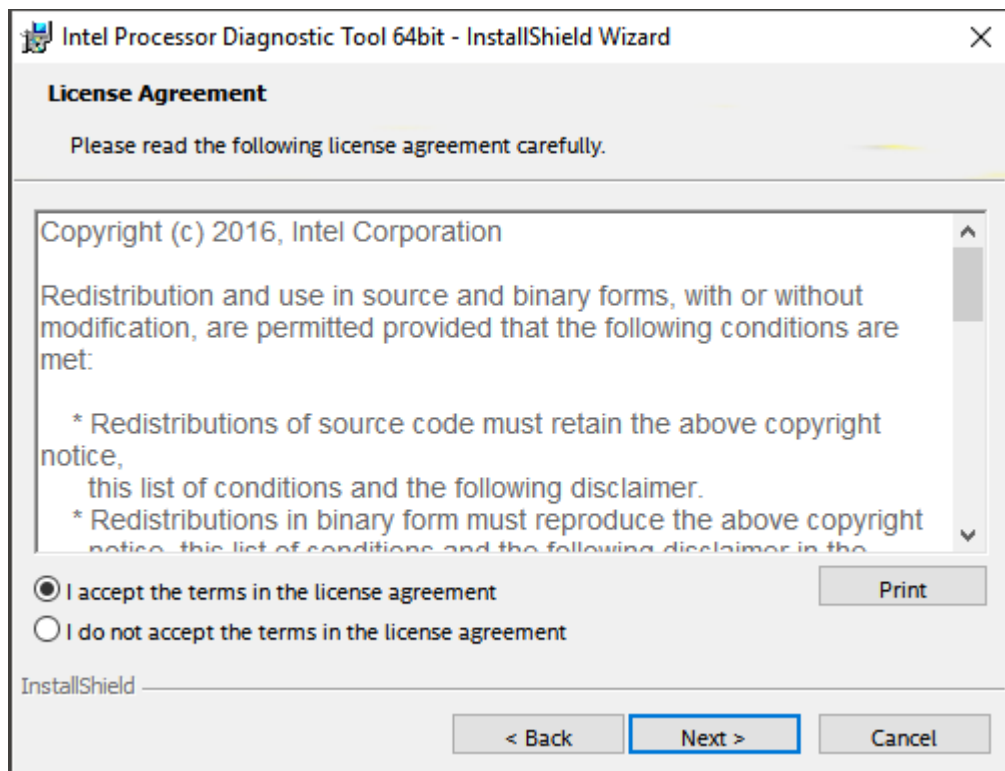
The "Select Destination Folder" location is now displayed. Click "Change" if you wish to change installation folder location.
Click "Next" to continue.
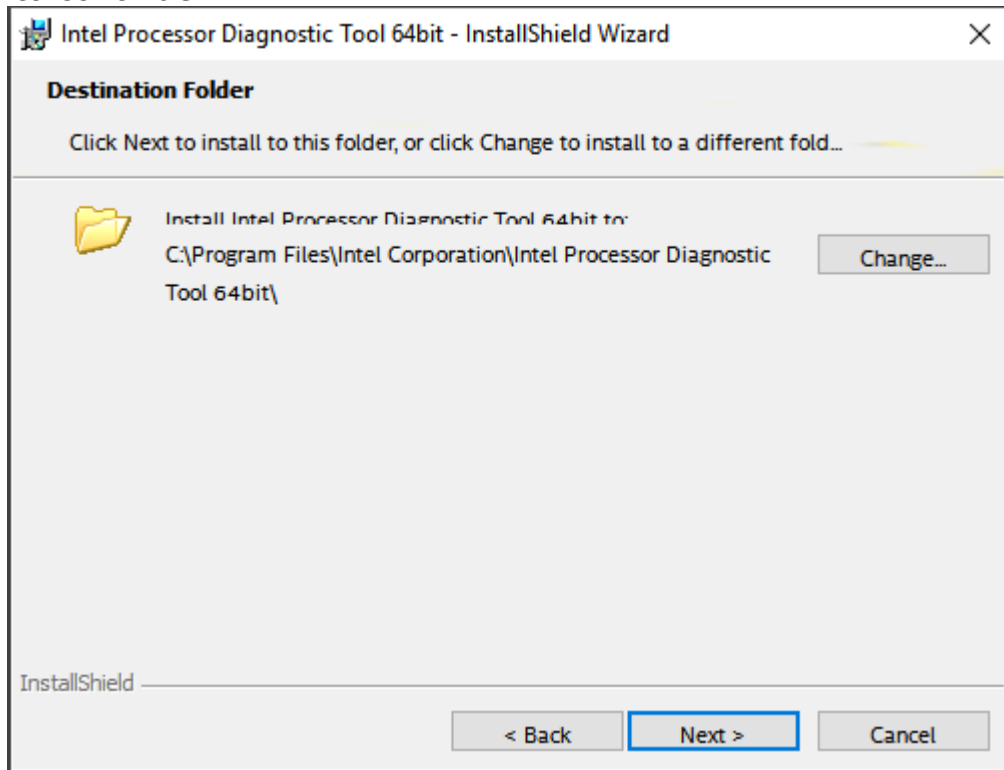
Click "Finish" button to finish installation.
If "Launch the program" is selected IPDT will launch when you click "Finish".

The Intel® Processor Diagnostic Tool - Help
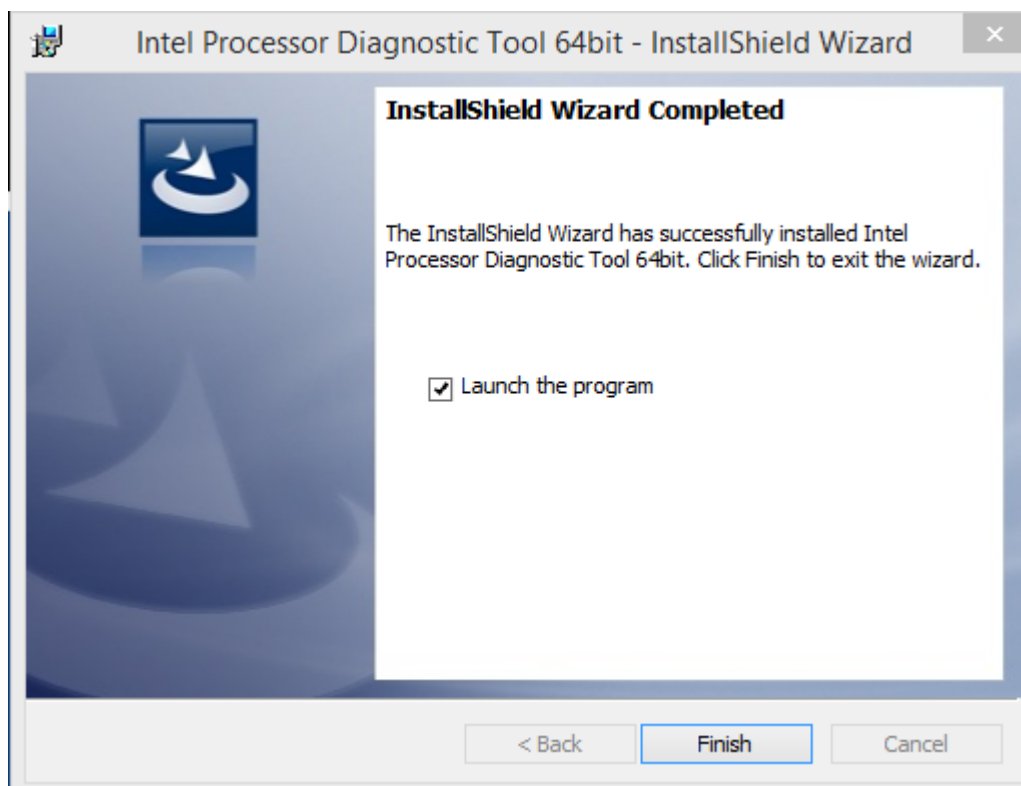
6   Running IPDT from GUI

Running IPDT from the GUI
IPDT can be launched using the GUI by double-clicking on the Intel® Processor Diagnostic Tool Icon located on the desktop or by selecting Start → Programs → Intel Corporation → Intel Processor Diagnostic Tool.
When IPDT is launched the IPDT Control Window shown below will open and IPDT starts testing the CPU using the default configuration.
IPDT will check your systems configuration first and after a few seconds will then launch the diagnostic.
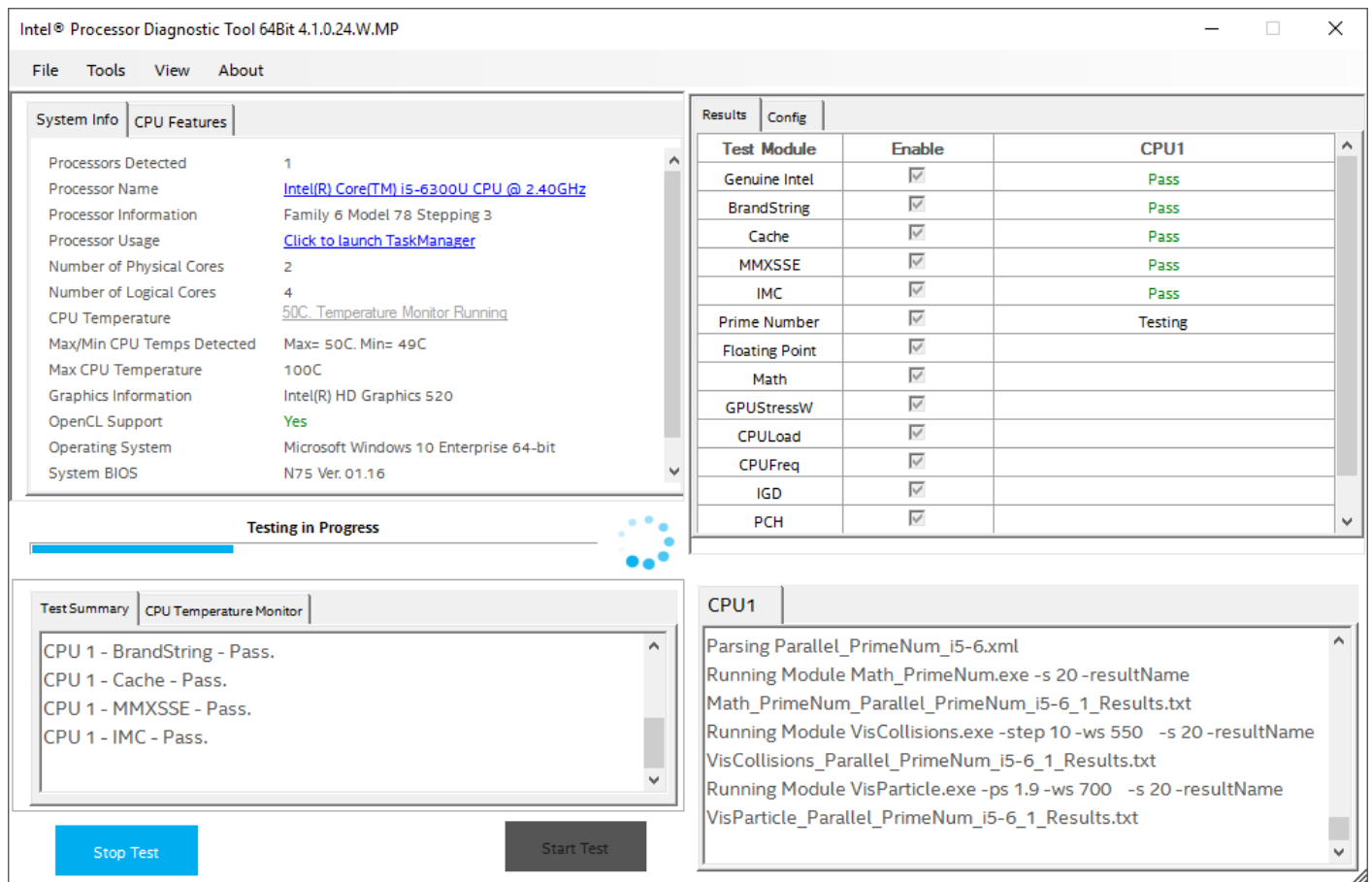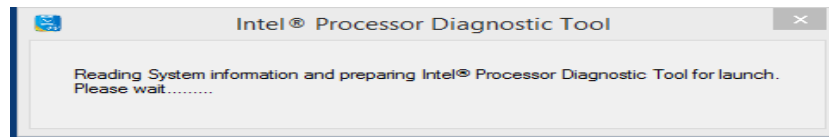
System information is shown in the top left window along with Temperature Monitor.
Test Summary window with progress bar is shown in the bottom left window.
Test Results and configuration settings are shown in the top right window.
Detailed test output is shown in the bottom right.

IPDT automatically checks for updated version

When IPDT is launched it will automatically check if an updated version of IPDT exists at www.intel.com
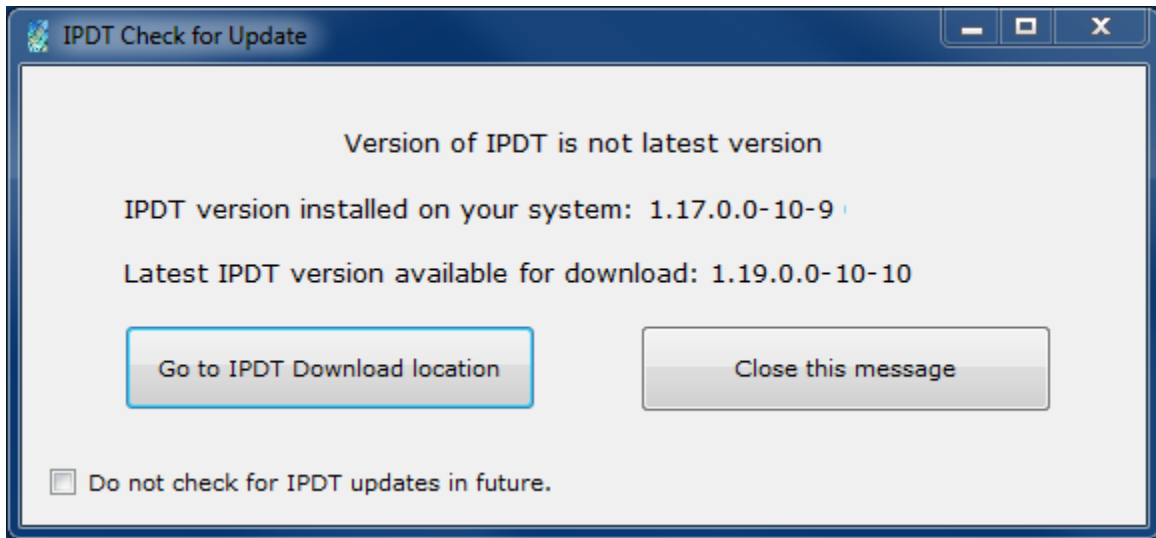

If you would like to update your version of IPDT simply click on the option "Go to IPDT Download location". This will take you to the download location of the latest version of IPDT on www.intel.com website.

If you do not wish to download the latest version of IPDT at this time, simply select the option "Close this message". IPDT will check for the latest version of IPDT on subsequent launches of IPDT.

If you would like to turn off the automatic checking for updated versions of IPDT on future launches of IPDT, simply tick the box "Do not check for IPDT updates in future".

You can turn off/on Auto Checking for IPDT updates in the menu at the Pass and Fail screens of IPDT, under the "Help" menu.

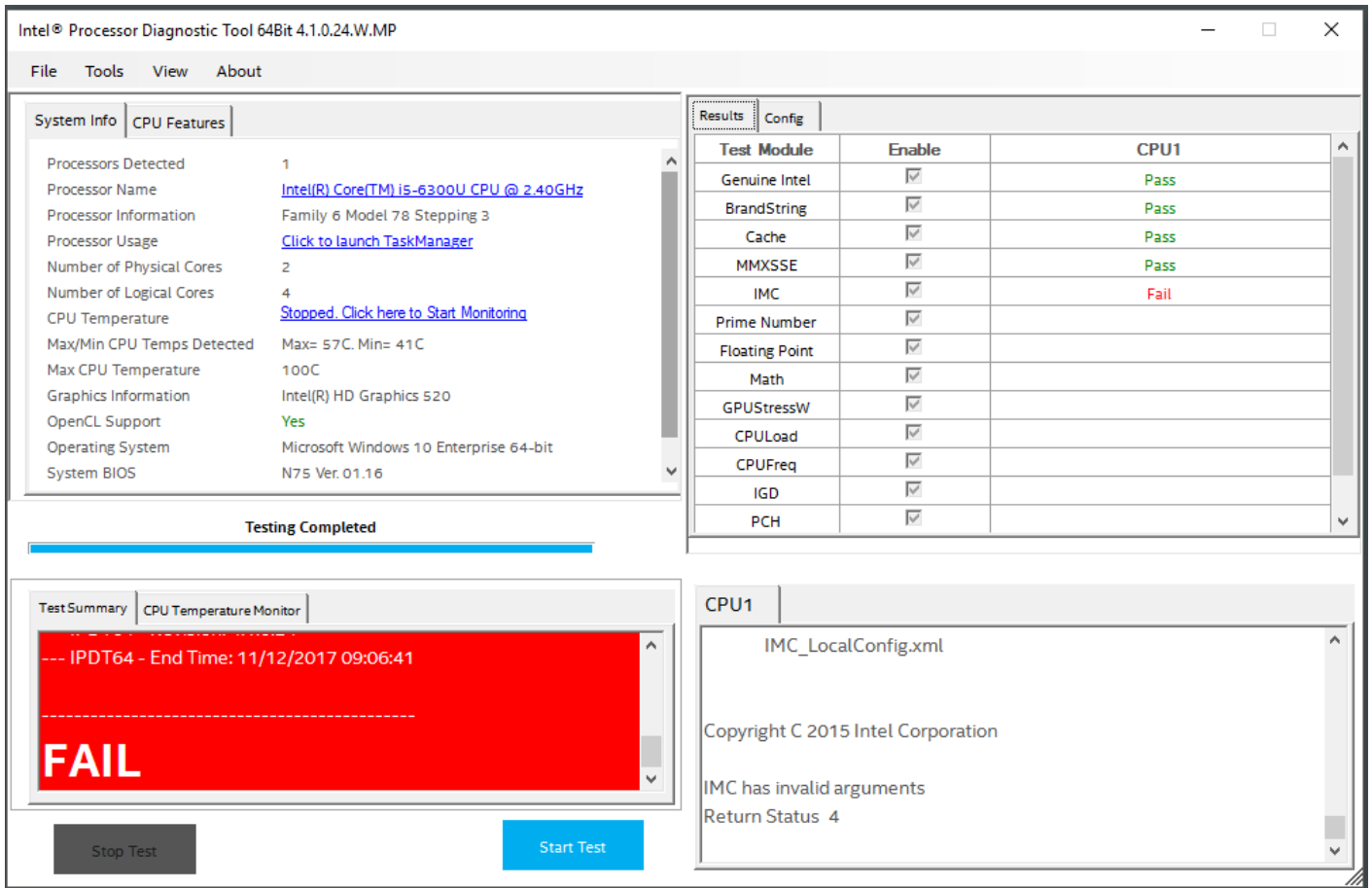When IPDT completes, the Testing Status will display either a PASS or FAIL.

The PASS screen is shown below.

| Intel® Processor Diagnostic Tool 64Bit 4.1.0.24.W.MP | — □ ✕ |

File   Tools   View   About

System Info | CPU Features

Processors Detected	1
Processor Name	Intel(R) Core(TM) i5-6300U CPU @ 2.40GHz
Processor Information	Family 6 Model 78 Stepping 3
Processor Usage	Click to launch TaskManager
Number of Physical Cores	2
Number of Logical Cores	4
CPU Temperature	Stopped. Click here to Start Monitoring
Max/Min CPU Temps Detected	Max= 58C. Min= 38C
Max CPU Temperature	100C
Graphics Information	Intel(R) HD Graphics 520
OpenCL Support	Yes
Operating System	Microsoft Windows 10 Enterprise 64-bit
System BIOS	N75 Ver. 01.16

Testing Completed

Results | Config

Test Module	Enable	CPU1
Genuine Intel	☑	Pass
BrandString	☑	Pass
Cache	☑	Pass
MMXSSE	☑	Pass
IMC	☑	Pass
Prime Number	☑	Pass
Floating Point	☑	Pass
Math	☑	Pass
GPUStressW	☑	Pass
CPULoad	☑	Pass
CPUFreq	☑	Pass
IGD	☑	Pass
PCH	☑	Pass

Test Summary | CPU Temperature Monitor

--- IPDT64 - End Time: 11/12/2017 09:04:40

PASS

CPU1

..Retrieved Processor Manufacturer
GenuineIntel

..Retrieved Processor Brand String
IntelR CoreTM i5-6300U CPU 2.40GHz

IntelR spbc Module Test -- Pass --

| Stop Test | Start Test |

The FAIL screen is shown below.

At the top of the Window is a Menu Bar. The "File" Menu allows you to open the TestResults.txt file using Notepad, and allows you to exit IPDT.
You may also view the full historical test results file to show all IPDT test results from each subsequent test run. See below
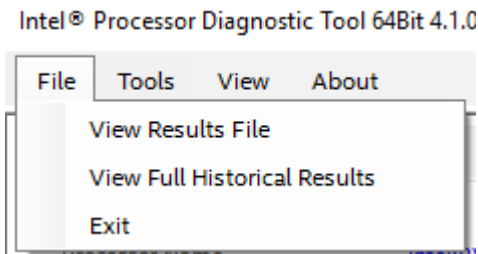
The "Tools" menu will allow you to open Config menu, turn off/on Looping, Check for Update, Launch TaskManager and Shutdown System. See below
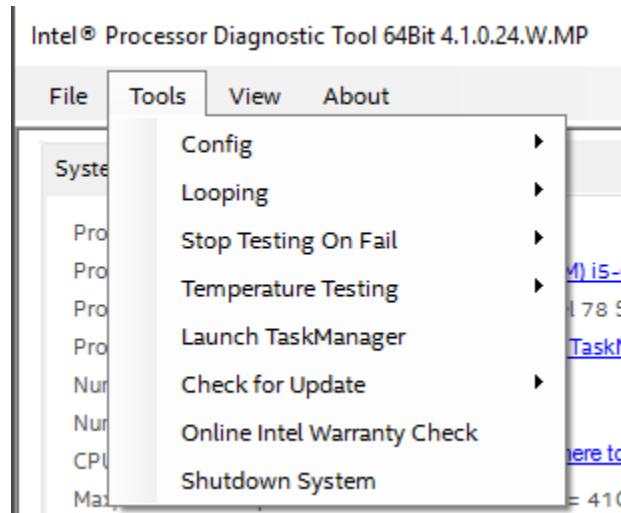
Tools → Config menu is only available when IPDT has finished testing.
Tools → Config → Reset to Defaults. This will reset your Features & Parameters to default values.
Tools → Config → Edit. This will allow you to edit and Enable/Disable test modules.
Tools → Config → Presets allows you to set IPDT to 3 preset settings of operation
     Presets → Quick Test sets all IPDT features to disabled. Run Genuine Intel, Brand String and Frequency Test.
     Presets → Full Functional (Default) enables all IPDT features and runs IPDT stress test for 4 minutes. This is the default IPDT setting.
     Presets → Burn-In Test enables all IPDT features and runs IPDT stress tests. You may also turn on looping with this Burn-In setting.

The Intel® Processor Diagnostic Tool - Help
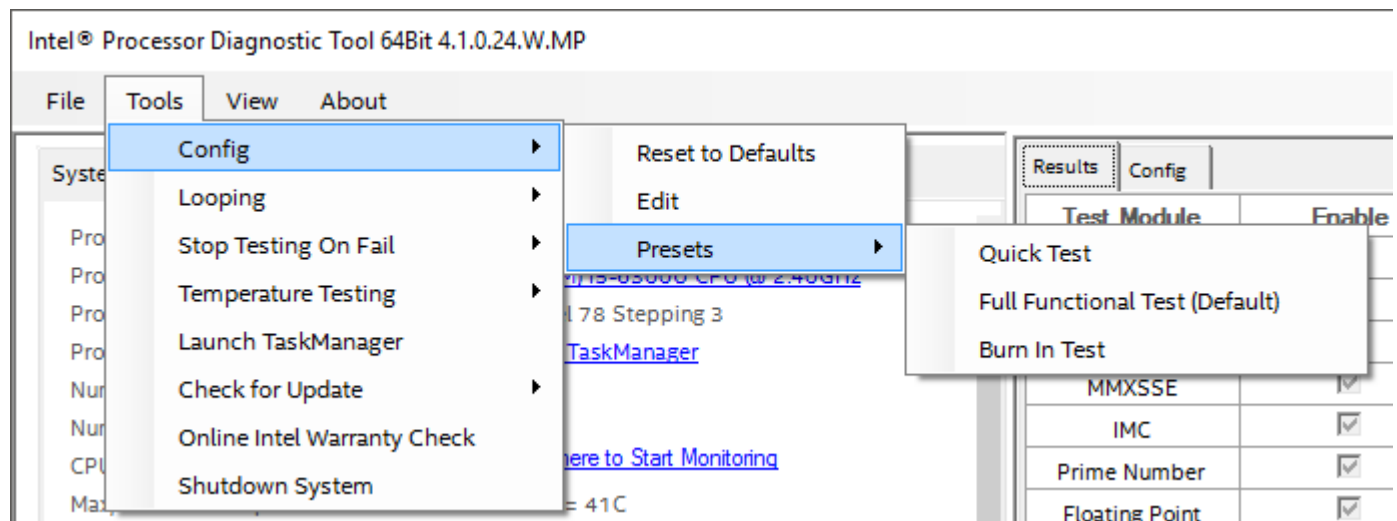
Tools → Looping → On or Off. Set to ON, this will loop/test IPDT continuously until you turn Looping to OFF. IPDT stops on a failure. See below.
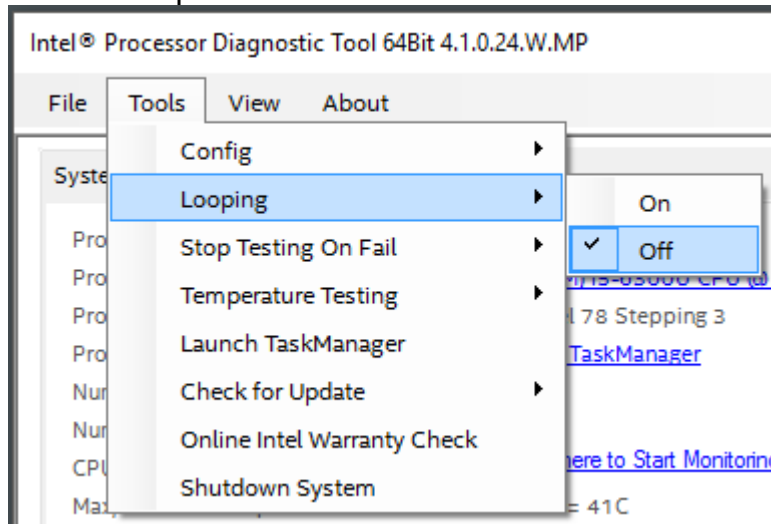
Tools → "Stop Testing On Fail" will allow you to set IPDT to stop when a failure is detected or continue to test all other modules after a failure.
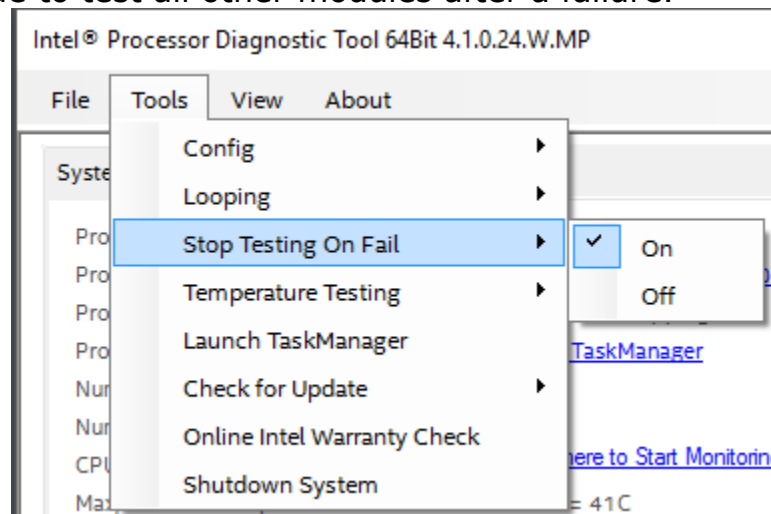
Tools → "Temperature Testing" will allow you to select if you want to enable or disable Temperature monitoring while IPDT runs.
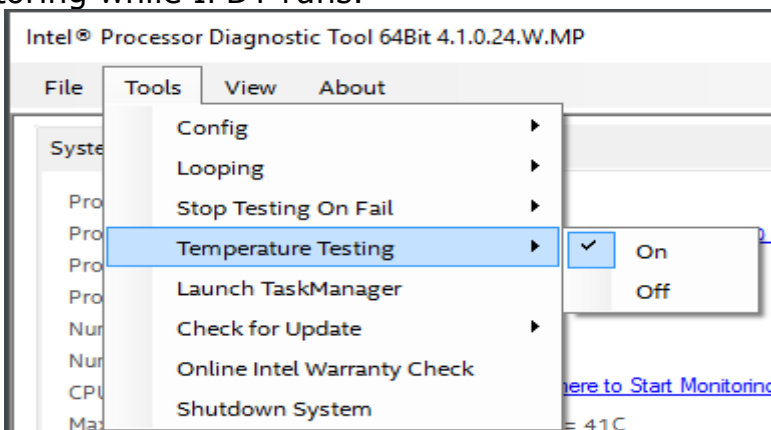
Tools → "Launch TaskManager" will launch your systems Task manager, where you can view the systems performance whilst IPDT is running.

Tools → Check for Update → "Check for Update Now" will check your version of IPDT against the latest IPDT version online and display a message if your version of IPDT is lower.

Tools → Check for Update → "Auto Update Check On" will enable IPDT to check its version online every time IPDT is launched. "Auto Update Check On" will turn off IPDT checking online when IPDT launches.
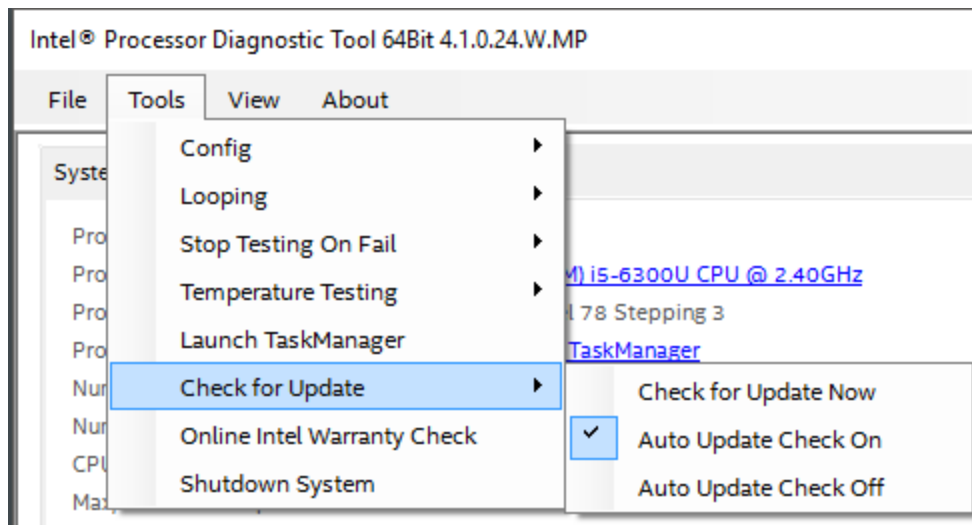
Tools → "Online Warranty Check" will bring you directly to Intel's online warranty support page where you can check the warranty for your Intel Processor.

Tools → "Shutdown System" will shut down your system. A warning message is displayed to ensure you really want to shut down your system.

View → "Full". This will display the full IPDT view.
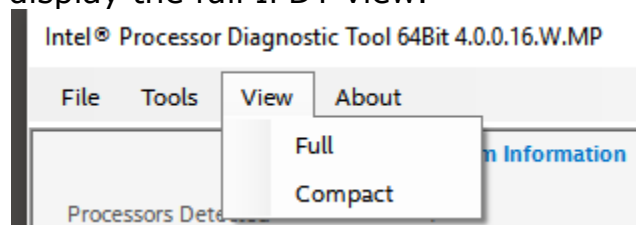
View → "Compact". Will display a compact view of IPDT. Useful when running IPDT whilst viewing Task manager. See below for compact IPDT view.
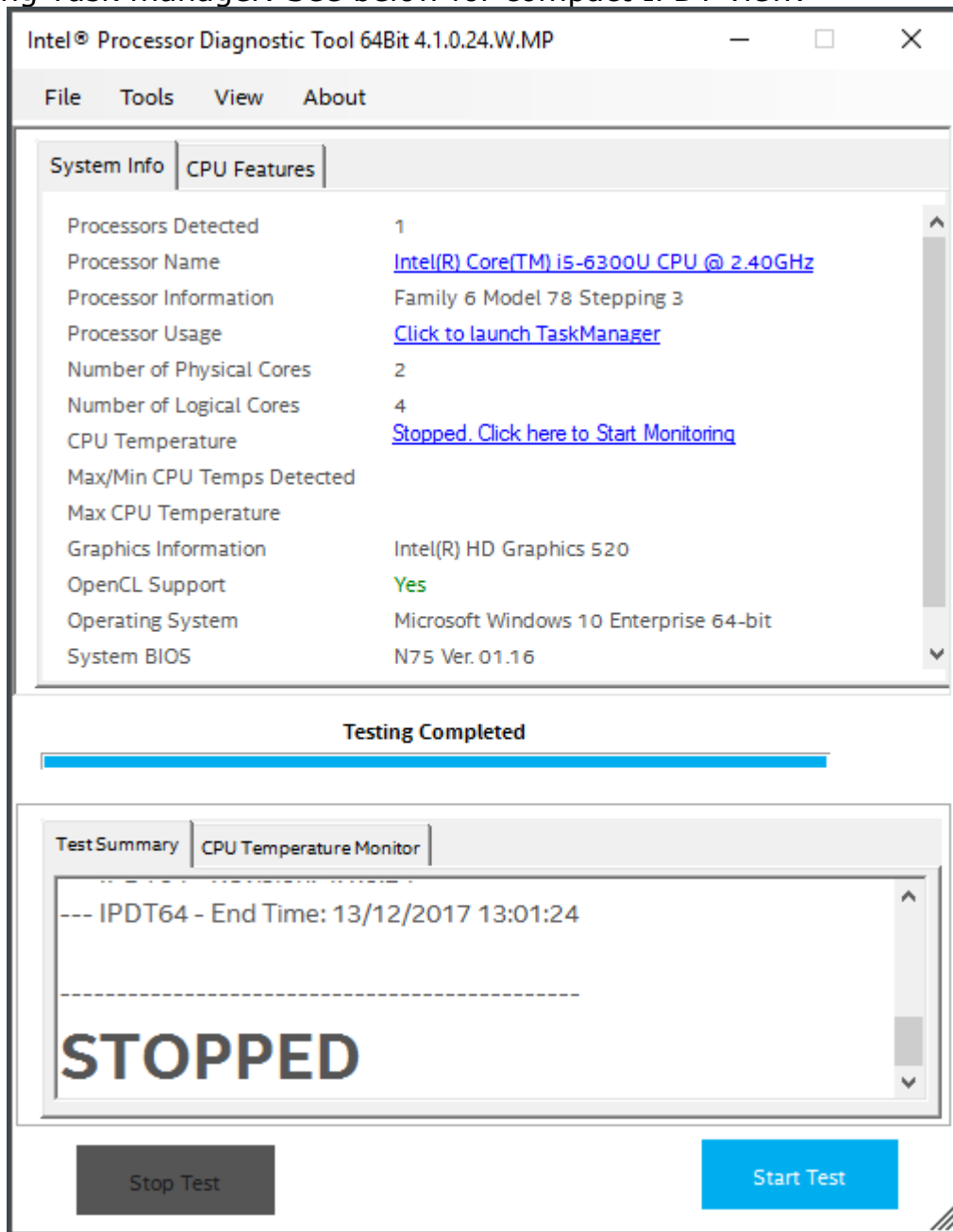
About → "Help" Menu opens this IPDT help document. See below.
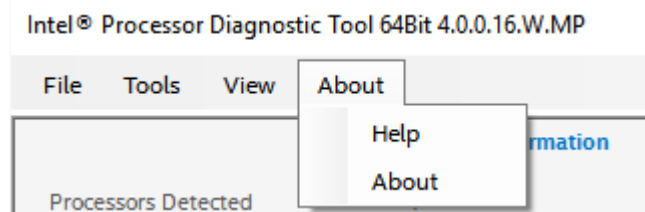
The Intel® Processor Diagnostic Tool - Help

The CPU Features tab will display all the features supported by your processor

Intel® Processor Diagnostic Tool 64Bit 4.1.0.24.W.MP   —   ☐   ✕

File   Tools   View   About

System Info | CPU Features

MMX Support	Yes	AES Support	Yes
SSE Support	Yes	PCLMULQDQ Support	Yes
SSE2 Support	Yes	AVX512-BW Support	No
SSE3 Support	Yes	AVX512-CD Support	No
SSSE3 Support	Yes	AVX512-DQ Support	No
SSE4.1 Support	Yes	AVX512-ER Support	No
SSE4.2 Support	Yes	AVX512F Support	No
AVX OS Support	Yes	AVX512-IFMA52 Support	No
AVX Support	Yes	AVX512-PF Support	No
AVX2 Support	Yes	AVX512-VBMI Support	No
FMA3 Support	Yes	AVX512-VL Support	No

Testing Completed

Test Summary | CPU Temperature Monitor

--- IPDT64 - End Time: 13/12/2017 13:01:24

STOPPED

Stop Test   Start Test

The Intel® Processor Diagnostic Tool - Help

7   Running IPDT Test Modules from command line

Individual IPDT Test Modules may be launched directly using the standalone IPDT Test Modules .exe executable located in the C:\Programs Files\Intel Corporation\Intel Processor Diagnostic Tool\ folder.

This allows for IPDT Test Modules to be easily integrated into a 3rd party diagnostic or to be run manually from a command window.

To run IPDT Test Modules from a command window:
Open a Command Prompt Window, right click and select "Run as administrator"
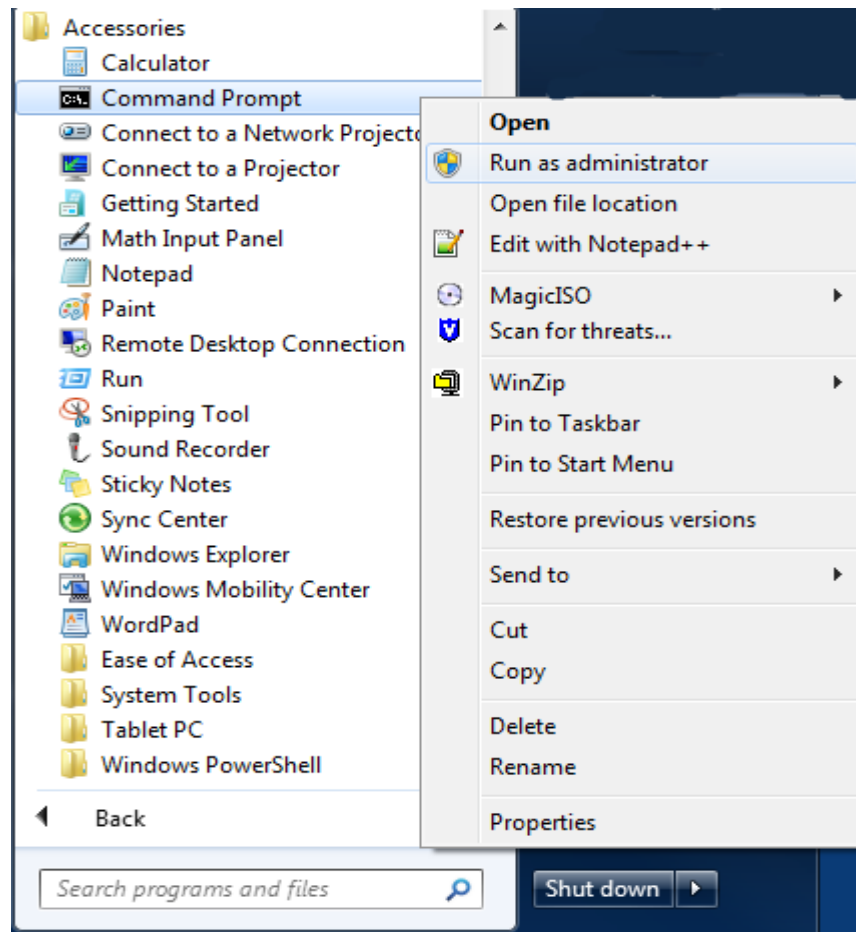
The following IPDT Test Modules may be run in command line:
Run <ModuleName.exe> -h to view the specific command line options for each IPDT Test Module, example Genintel –h

IPDT Test Module	Description	Command line switches
SPBC.exe	Sample Production Bit Checker. (Optional download)	-h -c
Genintel.exe	Checks if Processor is a Genuine Intel Processor	-h -c
Temperature.exe	Checks thermal processor temperature delta from xxx in degrees	-h -usp –f -c
Brandstring.exe	Checks the brand string of the processor	-h -c
CPUFreq.exe	Tests the Processor operating frequency	-h -htlr -ltlr –nc –runtsc –rqty –qpitlr –skipqpi –skiptest –c -d
Math_FP.exe	Floating Point Test	-h -nc –s –errstop -c
Math_PrimeNum.exe	Prime Number Test	-h -nc –s –errstop -c
Cache.exe	Processor Cache Test	-h –pa -c
MMXSSE.exe	MMX and SSE Test	-h –pa -c
AVX.exe	AVX Test	-h –pa -s -c
FMA3.exe	FMA Test	-h -pa -s -c
IMC.exe	Integrated Memory Test	-h –nc –skipsize –skipstress –c –expsize -sizetol
PCH.exe	Platform Controller Hub Test	-h –nc –skipenum -c -d
IGD.exe	Integrated Graphics Test	-h –c -plx
GFX.exe	Visual Graphics Test	-h –c –s -spin
CPULoad.exe	Processor Load Test	-h –c –hrs –m –s –d -pa

-h = help	-ltlr = Low Tolerance
-nc = No Compare. Skip comparison test.	
-c = Use color display. Red for Fail. Green for Pass. Yellow for indeterminate.	-runtsc = Use only TSC method for CPUFreq calculation
-pa = Pause app on completion.	-rqty = Loops to run CPUFreq calculation
-usp = User Set Point. Used for Temperature test.	-qpitlr =QPI Tolerance in %
-f = Run forever. Used for Temperature Test.	-skipqpi = Skip CPU Frequency QPI test
-htlr = High Tolerance	–skiptest = Skip CPUFreq Test
-skipsize = Skip IMC Size Test	-skipstress = Skip IMC Memory Stress
-expsize = Set Expected Memory Size	-sizetol = IMC Memory Size tolerance %
-skipenum – Skip PCH Enumeration	-plx = Display local config xml
-spin = GFX Spin Speed	-hrs = Hours –s = Seconds –m= Minutes

8 Running IPDT in a Multi-Processor System

The 64bit version of IPDT can test multiple Intel Processors installed in a Multi-Processor capable system. IPDT will automatically detect if you have multiple Intel Processors installed and run the IPDT test modules on each processor.

9   IPDT Configuration

Windows IPDT Configuration

You can configure IPDT from the Tools → Config → Edit menu.
IPDT may only be configured after IPDT testing has been stopped or has completed testing.
Test Modules can be enabled or disabled. Parameters can be changed in value.
See here for more description on each IPDT feature and parameter.
Click on each Test Module to get an output of the -h (help) for that module.
Please note: Running IPDT with settings other than the default settings could possibly give a result that may not indicate a genuine fault with your Intel Processor.

Example of CPULoad Module set to run for 240 seconds.

11   IPDT Features & Parameters

Test Module	Sample Production Bit Checker (Optional)

Description and Options	Module Executable = SPBC.exe
	The purpose of spbc.exe is to determine if the processor under test is either a sample or production processor
	
	..Options are as follows: -
	 -h = This message..
	            Example:
	            spbc.exe -h
	
	 -c = If present, this option will output to display the results
	            information using the following color scheme:
	            - 'green' - 'PASS' scenario / production unit detected..
	            - 'red' - 'FAIL' scenario / sample unit detected..
	            - 'yellow' - warning message indicating SPBC could not determine
	              if unit is either a sample or production processor..
	            Example:
	            spbc.exe -c
	
	 -info = Information switch that publishes parallel information
	            using the following scheme:
	            "parallel:no|socket:yes|core:yes"
	            Example:
	            spbc.exe -info
	
	 -resultName = The resultName switch provides a way to name the results file
	              as desired. Otherwise, SPBC will generate 'spbc_Results.txt'
	              file containing the results information of the test run..
	              Example:
	              spbc.exe -resultName spbc_Results_0001.txt
	
	Dependencies:
	            spbc_LocalConfig.xml
	            For Windows 64 bit operation:
	                WinRing0x64.dll
	                WinRing0x64.sys
	
	            For Windows 32 bit operation:
	                WinRing0.dll
	                WinRing0.sys

Test Module	Genuine Intel Test

Description and Options	Module Executable = GenIntel.exe
	GenIntel.exe reads the General Specific Register and compares it to "GeniunIntel". If the read value matches the expected value, the test will pass.
	
	Possible options are as follows:
	 -h = Help or Usage (this message)
	          Example:
	          GenIntel.exe -h
	
	 -info = Information switch publishes parallel information
	          using the following scheme:
	          "parallel:yes|socket:yes|core:yes"
	          Example:
	          GenIntel.exe -info
	
	 -resultName = The resultName switch provides a way to name
	          the results file as desired.
	          This is for the convenience of the control program.
	          Example:
	          GenIntel.exe -resultName GenIntel_results_01.txt
	
	 -c = If present, this option will display text in various colors
	          Example:
	          GenIntel.exe -c

Test Module	Temperature Test

Description and Options	Module Executable = Temperature.exe
	Temperature test measures the CPU junction temperature in Celsius
	 and displays the value below the shutdown value of zero.
	 The default failing set point is 5 degrees Celsius,
	 so if the measured temperature is less than 5 from shutdown.
	 the test will fail.
	Possible options are as follows:
	 -h = Help or Usage (this message)
	        Example:
	        temperature.exe -h
	
	 -info = Information switch publishes parallel information
	        using the following scheme:
	        "parallel:yes|socket:yes|core:yes"
	        Example:
	        temperature.exe -info
	
	 -resultName = The resultName switch provides a way to name
	        the results file as desired.
	        This is for the convenience of the control program.
	        Example:
	        temperature.exe -resultName temperature_results_01.txt
	
	 -c = If present, this option will display text in various colors
	        Example:
	        temperature.exe -c
	
	 -usp = User set point option used to override the default
	        failing set point of 5 degrees. Valid range is 0 to 50.
	        Example:
	        temperature.exe -usp 15:
	
	 -f = Run forever option, followed by seconds between runs
	        Valid range in seconds is 1 to 1000.
	        Example:
	        temperature.exe -f 10
	
	NOTE: If the "-usp" option is used together with "-c" or "-f"
	    it must be specified as the first option in the command line.
	
	Dependencies:
	   For Windows 64 bit operation:
	      WinRing0x64.dll
	      WinRing0x64.lib
	      WinRing0x64.sys
	
	   For Windows 32 bit operation:
	      WinRing0.dll
	      WinRing0.lib
	      WinRing0.sys

Test Module	Brand String Test

Description and Options	Module Executable = BrandString.exe
	BrandString.exe reads the brand string parts from the CPU and compares them against parts from a configuration file. If all expected parts from the configuration file are found in the parts from the CPU, the test will pass.
	
	Possible options are as follows:
	 -h = Help or Usage (this message)
	         Example:
	         BrandString.exe -h
	
	 -info = Information switch publishes parallel information
	         using the following scheme:
	         "parallel:yes|socket:yes|core:yes"
	         Example:
	         BrandString.exe -info
	
	 -resultName = The resultName switch provides a way to name
	         the results file as desired.
	         This is for the convenience of the control program.
	         Example:
	         BrandString.exe -resultName BrandString_results_01.txt
	
	 -c = If present, this option will display text in various colors
	         Example:
	         BrandString.exe -c
	
	Dependencies:
	         BrandString_LocalConfig.xml

Test Module	CPU Frequency Test

Description and Options	Module Executable = CPUFreq.exe
	CPUFreq.exe compares the value between expected and detected CPU frequency, base clock frequency and QPI rate.
	
	Possible options are as follows:
	 -h = Help or Usage (this message)
	            Example:
	            CPUFreq.exe -h
	
	 -info = Information switch publishes parallel information
	            using the following scheme:
	            "parallel:yes|socket:yes|core:yes"
	            Example:
	            CPUFreq.exe -info
	
	 -resultName = The resultName switch provides a way to name
	            the results file as desired.
	            This is for the convenience of the control program.
	            Example:
	            CPUFreq.exe -resultName CPUFreq_results_01.txt
	
	 -c = If present, this option will display text in various colors
	            Example:
	            CPUFreq.exe -c
	
	 -htlr [d.dd] = Higher tolerance acceptable for detected CPU frequency
	            default is 0.05.
	            Example:
	            CPUFreq.exe -htlr 0.06
	
	 -ltlr [d.dd] = Lower tolerance acceptable for detected CPU frequency
	            default is 0.05.
	            Example:
	            CPUFreq.exe -ltlr 0.06
	
	 -nc = Skip the comparison test between expected and
	            detected CPU frequency, base clock and QPI rate
	            will only display CPU frequency, base clock and QPI rate.
	            Example:
	            CPUFreq.exe -nc
	
	 -runtsc = Use only TSC method to calculate detected CPU frequency
	            Example:
	            CPUFreq.exe -runtsc

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Test Module	CPU Frequency Test (Continued)

Description and Options	-rqty [d] = Number of loop to run the CPU calculation method
	               to get a more stabilised CPU frequency value,
	               default is 5, only applicable for APERF/MPERF method
	               Example:
	               CPUFreq.exe -rqty 10
	
	-qpitlr [d] = Acceptable tolerance for detected QPI rate
	               default is 5%.
	               Example:
	               CPUFreq.exe -qpitlr 5
	
	-skiptest = Skip CPUFreq test.
	               Example:
	               CPUFreq.exe -skiptest
	
	-skipqpi = Skip QPI rate test.
	               Example:
	               CPUFreq.exe -skipqpi
	
	-d = Debug option
	               Example:
	               CPUFreq.exe -d
	
	Dependencies:
	        GlobalConfig.xml
	        CPUFreq_LocalConfig.xml
	        WinRing0x64.dll
	        WinRing0x64.sys

Test Module	Floating Point Test

Description and Options	Math_FP.exe performs floating points mathematic operation.
	
	Possible options are as follows:
	 -h = Help or Usage (this message)
	              Example:
	              Math_FP.exe -h
	
	 -info = Information switch publishes parallel information
	              using the following scheme:
	              "parallel:yes|socket:yes|core:yes"
	              Example:
	              Math_FP.exe -info
	
	 -resultName = The resultName switch provides a way to name
	                  the results file as desired.
	                  This is for the convenience of the control program.
	                  Example:
	                  Math_FP.exe -resultName Math_FP_results_01.txt
	
	 -c = If present, this option will display text in various colors
	              Example:
	              Math_FP..exe -c
	
	 -nc = Skip the result, will display only.
	              Example:
	              Math_FP.exe -nc
	
	 -errstop = Stop on error, default is continue on error.
	              Example:
	              Math_FP.exe -errstop
	
	 -s [d] = Time in seconds to perform the test
	              default is 2 seconds.
	              Example:
	              Math_FP.exe -s 5

Test Module	Prime Number Generation Test

Description and Options	Module Executable = Math_PrimeNum.exe
	Math_PrimeNum.exe checks how fast the CPU can search for prime number.
	
	Possible options are as follows:
	-h = Help or Usage (this message)
	       Example:
	       Math_PrimeNum.exe -h
	
	-info = Information switch publishes parallel information
	       using the following scheme:
	       "parallel:yes|socket:yes|core:yes"
	       Example:
	       Math_PrimeNum.exe -info
	
	-resultName = The resultName switch provides a way to name
	       the results file as desired.
	       This is for the convenience of the control program.
	       Example:
	       Math_PrimeNum.exe -resultName Math_PrimeNum_results_01.txt
	
	-c = If present, this option will display text in various colors
	       Example:
	       Math_PrimeNum.exe -c
	
	-nc = Skip the result, will display only.
	       Example:
	       Math_PrimeNum.exe -nc
	
	-errstop = Stop on error, default is continue on error.
	       Example:
	       Math_PrimeNum.exe -errstop
	
	-s [d] = Time in seconds to perform the test
	       default is 2 seconds.
	       Example:
	       Math_PrimeNum.exe -s 5

Test Module	Cache Test

Description and Options	Module Executable = Cache.exe
	The purpose of CPU Cache test is to display the size of the
	L1, L2, and L3 Cache, whichever is present.
	The CPUID instruction is used to read the general purpose
	EAX, EBX, ECX, and EDX registers.
	The test retrieves the L1, L2, and L3 Cache size information
	
	Possible options are as follows:
	-h = Help or Usage (this message)
	          Example:
	          cache.exe -h
	
	-info = Information switch that publishes parallel information
	          using the following scheme:
	         "parallel:yes|socket:yes|core:yes"
	          Example:
	          cache.exe -info
	
	-resultName = The resultName switch provides a way to name
	           the results file as desired.
	           Example :
	           cache.exe -resultName cache_results_0001.txt
	
	-pa = pause app option
	          Example:
	          cache.exe -pa
	
	-c = This option will display text in various colors
	          Example:
	          cache.exe –c

Test Module	MMX/SSE Test

Description and Options	Module Executable = MMXSSE.exe
	This test detects which MMX & SSE, SSE2, SSE3, SSSE3, SSE4 instruction sets are supported on the processor being tested.
	If the instruction set is supported then the test will execute all MMX & SSE instructions for the supported instruction sets.
	The test will display which features were detected and what was tested.
	
	Possible options are as follows:
	-h = Help or Usage (this message)
	     Example:
	     MMXSSE.exe -h
	
	-info = Information switch that publishes parallel information using the following scheme:
	     "parallel:yes|socket:yes|core:yes"
	     Example:
	     MMXSSE.exe -info
	
	-resultName = The resultName switch provides a way to name the results file as desired.
	     Example :
	     MMXSSE.exe -resultName MMXSSE_results_0001.txt
	
	-pa = pause app option
	     Example:
	     MMXSSE.exe -pa
	
	-c = This option will display text in various colors
	     Example:
	     MMXSSE.exe -c

Test Module	AVX Test

Description and Options	Module Executable = AVX.exe
	Advanced Vector Extensions (AVX) is a 256 bit instruction set extension to SSE and is designed for applications that are Floating Point intensive. The purpose of the AVX test is to detect and test the presence of the following AVX features on your Intel processor :
	    AVX (Advanced Vector Extensions)
	    AES (Advanced Encryption Standard)
	    PCLMULQDQ (Carry-Less Multiplication of two 64 bit operands)
	Note: AVX capability is first detected on your Intel Processor and then it is detected, to check if your operating system supports AVX.
	Operating Systems that support AVX:
	Windows 10, Windows8, Windows 7 SP1, Windows Server 2008 R2 SP1,
	AVX Test Description :
	Execute a FIR (Finite Impulse Response) filter using conventional code instructions and then execute using AVX instructions.
	Compare the results of both methods of calculation end expect the same results. Also compare code execution times, expecting AVX optimized code to execute faster than conventional non AVX-optimized code.
	
	AES Test Description :
	Decrypt & Encrypt data using aesdec, aesdeclast, aesenc and aesenclast instructions. Also perform the InverseMixColumn aesimc and generate round key for AES encryption using aeskeygenassist instruction.
	
	PCLMULQDQ Test Description :
	Perform a Carry-less multiplication of one quadword of xmm2 by one quadword of xmm3/m128, returning a double quadword in register xmm1.
	
	Possible options are as follows:
	-h = Help or Usage (this message)
	        Example:
	        AVX.exe -h
	
	-info = Information switch that publishes parallel information
	        using the following scheme:
	        "parallel:yes|socket:yes|core:yes"
	        Example:
	        AVX.exe -info
	
	-resultName = The resultName switch provides a way to name
	        the results file as desired.
	        Example :
	        AVX.exe -resultName AVX_results_0001.txt
	
	-pa = pause app option
	        Example:
	        AVX.exe -pa
	
	-c = This option will display text in various colors
	        Example:
	        AVX.exe -c

Test Module	FMA Test

Description and Options	Module Executable = FMA3.exe
	FMA3 Test Module detects and tests the following Intel Processor Features
	
	FMA3 - Fused Multiply Add Instruction
	
	Some features may be dependent on your Operating System
	Operating Systems that support FMA3:
	Windows 10, 8, 7 SP1, Windows Server 2008 R2 SP1,
	
	Possible options are as follows:
	-h = Help or Usage (this message)
	       Example:
	       fma3.exe -h
	
	-s = Time in seconds to perform the test
	       default is 5 seconds.
	       Example:
	       fma3.exe -s 10
	
	-m = Time in minutess to perform the test
	       default is 5 seconds.
	       Example:
	       fma3.exe -m 5
	
	-hrs = Time in hours to perform the test
	       default is 5 seconds.
	       Example:
	       fma3.exe -hrs 1
	
	-resultName = The resultName switch provides a way to name
	       the results file as desired.
	       Example :
	       fma3.exe -resultName fma3_results_0001.txt
	
	-c = This option will display text in various colors
	       Example:
	       fma3.exe -c
	
	-info = Information switch that publishes parallel information
	       using the following scheme:
	       "parallel:yes|socket:yes|core:yes"
	       Example:
	       fma3.exe -info
	
	-pa = pause app option
	       Example:
	       fma3.exe -pa
	
	Dependencies:
	   libmmd.dll
	    svml_dispmd.dll

Test Module	Integrated Memory Controller Test

Description and Options	Module Executable = IMC.exe
	IMC.exe displays or compares the value between expected and detected memory, performs simple memory patterns test.
	IMC.exe has memory size subtest and memory stress subtest.
	
	Possible options are as follows:
	 -h = Help or Usage (this message)
	        Example:
	        IMC.exe -h
	
	 -info = Information switch publishes parallel information
	        using the following scheme:
	        "parallel:yes|socket:yes|core:yes"
	        Example:
	        IMCreq.exe -info
	
	 -resultName = The resultName switch provides a way to name
	        the results file as desired.
	        This is for the convenience of the control program.
	        Example:
	        IMC.exe -resultName IMC_results_01.txt
	
	 -c = If present, this option will display text in various colors
	        Example:
	        IMC.exe -c
	
	 -nc = Skip the result, will display only.
	        Example:
	        IMC.exe -nc
	
	 -skipsize = Skip memory size test.
	        Example:
	        IMC.exe -skipsize
	
	 -skipstress = Skip memory stress test.
	        Example:
	        IMC.exe -skipstress
	
	 -expsize [d.d][kB|MB|GB]
	        Define expected memory size available.
	        Default is not tested, will only display
	        detected memory size available.
	        If define, it will compare the expected and
	        detected memory size with tolerance of 10%
	        Example:
	        IMC.exe -expsize 3.5gb

Test Module	Integrated Memory Controller Test (Continued)

Description and Options	-sizetol [d.d]
	       Define Tolerance accepted if '-expsize' is defined.
	       Default is 10%.(0.1)
	       Example:
	       IMC.exe -expsize 3.5gb -sizetol 0.3
	       IMC.exe -expsize 4gb -sizetol 0.2 -skipstress -nc -c
	
	 -d = Debug option
	       Example:
	       IMC.exe -d
	
	Dependencies:
	       GlobalConfig.xml

Test Module	Platform Controller Hub Test

Description and Options	Module Executable = PCH.exe
	PCH.exe displays the chipset information and external Device Enumeration.
	
	Possible options are as follows:
	 -h = Help or Usage (this message)
	       Example:
	       PCH.exe -h
	
	 -info = Information switch publishes parallel information
	       using the following scheme:
	       "parallel:yes|socket:yes|core:yes"
	       Example:
	       PCH.exe -info
	
	 -resultName = The resultName switch provides a way to name
	       the results file as desired.
	       This is for the convenience of the control program.
	       Example:
	       PCH.exe -resultName CPUFreq_results_01.txt
	
	 -c = If present, this option will display text in various colors
	       Example:
	       PCH.exe -c
	
	 -nc = Skip the result, will display only.
	       Example:
	       PCH.exe -nc
	
	 -skipenum = Skip PCH devices enumeration.
	       Example:
	       PCH.exe -skipenum
	
	 -d = Debug option
	       Example:
	       PCH.exe -d
	
	Dependencies:
	       PCH_LocalConfig.xml
	       WinRing0x64.dll
	       WinRing0x64.sys

Test Module	Integrated Graphics Device - IGD

Description and Options	Module Executable = IGD.exe
	IGD, or Integrated Graphics Device, is a test used to detect if
	Intel(R) Integrated Graphics are detected on the CPU being tested.
	Possible options are as follows:
	-h = Help or Usage (this message)
	          Example:
	          BrandString.exe -h
	
	-info = Information switch publishes parallel information
	          using the following scheme:
	          "parallel:yes|socket:yes|core:yes"
	          Example:
	          IGD.exe -info
	
	-resultName = The resultName switch provides a way to name
	          the results file as desired.
	          This is for the convenience of the control program.
	          Example:
	          IGD.exe -resultName IGD_results_01.txt
	
	-c = If present, this option will display text in various colors
	          Example:
	          IGD.exe -c
	
	Dependencies:
	          IGD_LocalConfig.xml
	
	          For Windows 64 bit operation:
	            WinRing0x64.dll
	            WinRing0x64.lib
	            WinRing0x64.sys
	
	          For Windows 32 bit operation:
	            WinRing0.dll
	            WinRing0.lib
	            WinRing0.sys

Test Library	Advanced Graphics Testing – VisCollisions

Description and Options	Module Executable = VisCollisions.exe
	visCollisions.exe is an OpenGL, 3D open-walled rotating cube, housing colliding bouncing balls. The purpose of visCollisions.exe is to provide a stress/load component to the GPU device of the Intel processor.
	
	Possible options are as follows:
	 -h = Help or Usage (this message)
	       Example:
	       viscollisions.exe -h
	
	 -info = Information switch publishes parallel information
	       using the following scheme:
	       "parallel:yes|socket:yes|core:yes"
	       Example:
	       viscollisions.exe -info
	
	 -resultName = The resultName switch provides a way to name
	       the results file as desired.
	       This is for the convenience of the control program.
	       Example:
	       viscollisions.exe -resultName viscollisions_results_01.txt
	
	 -ws = Windows Size (width x height), default is set to 400
	       Window size range is between 400 - 1000
	       Example:
	       viscollisions.exe -ws 500
	
	 -s = Run viscollisions for x number of seconds.
	       Example:
	       viscollisions.exe -s 15
	
	 -m = Run viscollisions for x number of minutes.
	       Example:
	       viscollisions.exe -m 10
	
	 -step = Increment ball count per loop, default increment value is 2
	       Increment value range is between 2 – 100
	       Example:
	       viscollisions.exe -step 5
	       Combination of window size with step value with either
	       minutes or seconds, and resultName is permitted.
	       Example:
	       visCollisions.exe -ws 750 -step 12 -m 5 -resultName Result_1.txt
	
	Dependencies:
	       freeglut.dll
	       texture1.bmp

Test Library	Advanced Graphics Testing – VisParticle

Description and Options	Module Executable = VisParticle.exe
	visParticle.exe is an OpenGL application with the purpose to provide a stress/load component to the GPU device of the Intel processor.
	
	Possible options are as follows:
	 -h = Help or Usage (this message)
	          Example:
	          visparticle.exe -h
	
	 -info = Information switch publishes parallel information
	          using the following scheme:
	          "parallel:yes|socket:yes|core:yes"
	          Example:
	          visparticle.exe -info
	
	 -resultName = The resultName switch provides a way to name
	          the results file as desired.
	          This is for the convenience of the control program.
	          Example:
	          visparticle.exe -resultName visparticle_results_01.txt
	
	 -ws = Windows Size (width x height), default is set to 400
	          Window size range is between 400 - 1000
	          Example:
	          visparticle.exe -ws 500
	
	 -s = Run visparticle for x number of seconds.
	          Example:
	          visparticle.exe -s 15
	
	 -m = Run visparticle for x number of minutes.
	          Example:
	          visparticle.exe -m 10
	
	 -ps = Increment particle size, default particle size is 1.0
	          Particle size range is between 0.05 - 2.5
	          Increasing the particle size, increases the workload on the GPU.
	          Example:
	          visParticle.exe -ps 1.5
	
	          Combination of window size with particle size with either
	          minutes or seconds, and resultName is permitted.
	          Example:
	          visParticle.exe -ws 700 -ps 2.1 -m 5 -resultName results_1.txt
	
	Dependencies:
	        freeglut.dll
	        square.bmp
	        squareTA.bmp

Test Module	CPU Load Test
Description and Options	Module Executable = CPULoad.exe CPULoad test loads the CPU to see if the CPU is able to withstand 100 percent load. It is expected that all logical cores will be loaded to 100 percent during the duration of the CPULoad test. Possible options are as follows: -h = Help or Usage (this message) -info = Information switch publishes parallel information for the control program. Format: "parallel : (yes or no) | socket : (yes or no) | core | (yes or no)" Example : CPULoad.exe -info "parallel:yes|socket:yes|core:yes" -resultName = The resultName switch provides a way to name the results file as desired. This is for the convenience of the control program. Example : CPULoad.exe -resultName CPULoad_results_0001.txt -c = If present, this option will display text in various colors -hrs = hours option ... Use: CPULoad -hrs <integer value> Indicating the number of hours CPULoad should run -m = minutes option ... Use: CPULoad -m <integer value> Indicating the number of minutes CPULoad should run -s = seconds option ... Use: CPULoad -s <integer value> Indicating the number of seconds CPULoad should run -d = debug option -pa = pause app option Example: CPULoad -s 45 In this example, CPULoad will run for 45 seconds. Dependencies: CPULoad_LocalConfig.xml

	Test Results File Name
Description	The output Test Results file is called TestResults.txt. A full listing of all subsequent test results is stored in TestResults_Full.txt

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