



# **HyperLynx® SI/PI/Thermal Release Highlights**

Software Version 9.4.1

November 2016

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# Introduction

This document provides a high-level summary of the HyperLynx® SI/PI/Thermal v9.4.1 release. Refer to the Release Notes on SupportNet for the list of specific known issues and workarounds.

This document includes a summary of the new features in this release. It also includes, if applicable, any authorization code changes required, any major installation changes, and any transitioning issues you should be aware of before installing. Additionally, any last-minute issues found in the final stages of testing are included.

Changes may be added to this document after the release. Refer to the Release Highlights documents on SupportNet for the most up-to-date release information.

## New Features in HyperLynx SI/PI/Thermal v9.4.1

### HyperLynx SI/PI/Thermal v9.4.1 - Overview

HyperLynx v9.4.1 is a minor release that adds some new features to HyperLynx's signal integrity, SERDES (including 3D electromagnetic), power-integrity, and EMC simulation capabilities. The release also offers compatibility with Mentor's latest PCB-design tools and improved integration with the Xpedition® VX.2.1 PCB flow. Finally, HyperLynx v9.4.1 includes a number of defect fixes and improvements.

### New Automated PCI Express Compliance Checking

The specification for 3<sup>rd</sup>-generation PCI Express (8 GB/s) does an excellent job of defining worst-case conditions for the drivers and receivers, including having well-defined pre-emphasis and equalization settings. As such, it is possible to predict driver and receiver behavior to determine the compliance of a PCI Express channel based on the passive channel characteristics alone, without the need to explicitly assign any models.

#### **Additional Selection in the Touchstone Viewer**

Similar to the Channel Operating Margin (COM) capability that was introduced in HyperLynx 9.3, the new PCI Express Compliance check is now available in the Touchstone Viewer. It can be run on any S-parameter model, including those extracted in HyperLynx using a combination of 2D and 3D EM solvers. The output is an HTML report with Pass/Fail indications and details of the measurements.

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## HTML Report

The PCI Express compliance check will generate a nicely-formatted HTML report indicating Pass/Fail status for the channel as well as detailed measurements taken by the compliance test.

## New HTML Report for COM Analysis

The Channel Operating Margin analysis utility in the Touchstone Viewer has been enhanced to generate a more sophisticated HTML report, which includes Pass/Fail indications as well as detailed information from the analysis. The report also allows the user to view different frequency-domain metrics by clicking on links in the report, to better understand causes of failures when they occur.

## Restoration of EMC Simulation

The EMC simulation capability has been restored in this release. This capability simulates trace radiation on the net and board level. The capability was removed in HyperLynx 9.0 when the internal HyperLynx simulator was upgraded, since the new simulator lacked the ability to output trace currents needed for EMC simulation. That capability has now been added back into the simulator for EMC simulation.

## 3D Via Model and 3D Area Enhancements

Both the 3D via models (part of LineSim GHZ) and the 3D area solving in BoardSim have been enhanced to support capabilities which already exist in the built-in 2D solvers. This includes support for trapezoidal traces, a capability which is enabled on the Manufacturing tab of the Stackup Editor to model the etching effect of real traces on a board. When this is enabled, the traces that get sent to the HyperLynx Full Wave Solver have their width shrunk to equal the average width of the trapezoidal shape to very closely mimic the effect of etching. This same effect is also modeled in the Advanced Decoupling Wizard. In addition, the 3D via models in LineSim now use the proper “local” stackup in designs with multiple stackups (example: rigid-flex designs, a capability added in HyperLynx 9.4).

## Support for 2666MT/s and 3200MT/s Data Rates in DDRx Wizard

A specification for DDR4 2666 and 3200 DRAMS has emerged, so support has been added into the DDRx Wizard to support these data rates.

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## IBIS Enhancements

IBIS support for signal integrity simulations has been enhanced as well. This includes integration of the latest IBIS parser in the Visual IBIS Editor – version 6.1.2 from the IBIS committee. This also includes support for multiple D\_to\_A converters with polarity. Also added was support for true differential models with [Model Selector].

## Advanced Batch Reporting

The Advanced Batch Wizard has been enhanced to output results in .csv and .xml format, similar to the other batch wizards. Now, every run of Advanced Batch generates several .csv files and an .xml report in a unique time stamped directory. This includes 3 .csv files – results\_summary.csv, results\_dleay\_and\_SI.csv, and results\_crosstalk.csv – and results.xml. Additionally, waveforms are saved in .wdb and .csv format along with the report.

## HyperLynx v9.4.1 Compatible PCB Flows

HyperLynx v9.4.1 is fully compatible with the following Mentor PCB flows:

- Xpedition Enterprise X-ENTP VX.2.1
- Xpedition Package Integrator X-PI VX.2.1
- PADS Professional VX.2.1
- PADS VX.2.1

Generally, if you integrate to your layout tool (Mentor or 3<sup>rd</sup>-party) only through .HYP, .CCE, or ODB++ layout files, then HyperLynx v9.4.1 is very likely to work in all respects with your designs, even with pre-VX.2.1 versions of Xpedition or PADS / PADS Professional. This is also applicable to BSXE V.10. If you use a Mentor PCB tool (Xpedition, PADS Professional, or PADS) and rely on “deeper” integration between HyperLynx and the PCB flow (for example, passing of data between Constraint Manager and LineSim / BoardSim), you should use HyperLynx v9.4.1 only with one of the specific VX.2.1 tool versions listed above.

One integration feature, use of the Analysis Control plug-in to run DC-drop simulations from directly within Xpedition Layout, is limited to the following two flows and versions:

- Xpedition Enterprise VX.2.1
- Xpedition Package Integrator VX.2.1

**Note:** When Analysis Control is used for DC-drop simulation in Xpedition, both Xpedition and HyperLynx must match in bit count, i.e., only the combinations of 32-bit Xpedition and 32-bit HyperLynx –or– 64-bit Xpedition and 64-bit HyperLynx function properly together.

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## HyperLynx v9.4 Platform Support Changes

There are no platform changes for HyperLynx v9.4.1. However, this will be the last release in which RHEL6.5 and prior versions of RHEL6 will be supported.

## Licensing

The HyperLynx v9.4.1 release updates the Mentor Standard Licensing to v2015\_1 with patch 2. This version requires a FLEXnet license server running at version v11.13.1.2 or higher. If you use floating licenses and your license server is not at FLEXnet v11.13.1.2 or higher, you will need to update the license server. If you see an error message that says “vendor daemon too old,” that is usually an indicator that the license server needs to be updated to run this version of the client software. For additional information on licensing, refer to the Licensing Mentor Graphics Software manual.

## Authorization Codes

To use HyperLynx v9.4.1, you must be on support contracts for these products as of November 2016. For more information about "Exact Access" authorization code formats, see the explanation on SupportNet at:

[http://supportnet.mentor.com/about/other-info/exact\\_access.cfm](http://supportnet.mentor.com/about/other-info/exact_access.cfm)

You may download your site's existing authorization codes from SupportNet at:

<http://supportnet.mentor.com/myaccount/index.cfm?fa=user.licenses>

For additional information on licensing, refer to the *Licensing Mentor Graphics Software* manual.

## Installation Information

This release uses the Mentor Graphics Standard Installation program. For additional information on installation, refer to *Managing Mentor Graphics PCB Systems Software* manual and the help system within the installation software. You can view this manual at the top level of the CD and on SupportNet.

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## Support Information

If you have questions about this software release, please log in to SupportNet. You may search the KnowledgeBase with thousands of technical solutions or open a Service Request online at:

<http://www.mentor.com/supportnet>

If you do not have a SupportNet login, you may easily request one by filling out a short form:

<http://www.mentor.com/supportnet/quickaccess/SelfReg.do>

For phone support in the United States or Canada, please call 1-800-547-4303. For phone support in other locations, please contact your local sales office or distributor. All Customer Support contacts can be found on our web site at:

[http://www.mentor.com/supportnet/support\\_offices.html](http://www.mentor.com/supportnet/support_offices.html)

## Supported Platforms

### Overall Notes

- Specified patches below are minimum levels. Later versions of the patches are valid, supported configurations.
- Except as noted, all products are supported on all platforms.
- Processor and Memory requirements vary based on the mix of applications being used, the design complexity, and infrastructure requirements. Individual needs may vary from those published below.

### Processor Note for Intel/AMD Processors

All Windows and Linux OS variants run on Intel or AMD x86 or x64 processors. In the past, the processor GHz speed determined the performance, but recent changes in the internal architecture of both Intel and AMD processors have made these comparisons difficult. Therefore, the following recommendations are being made for **all** Windows and Linux systems:

- Supported processors and systems are those manufactured since 2008 which conform to the subsequent requirements
- Intel Celeron processors are not recommended
- Minimum requirement is a dual-core (or dual processor) system. A quad core is recommended for improved overall system performance. A hyper-threaded processor should be considered a single processor, not a dual processor.
- For best results, maximize processor speed and L1/L2/L3 processor cache memory.
- Typically, cost is the best indicator of performance, and extra investment in processor capability returns better system performance.

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## HyperLynx-Specific Recommendations

The following are general recommendations, based on typical usage. Memory consumption varies significantly depending on the size and other details of your designs.

If you plan to use the following features, it is recommended that you install at least **8 GB of RAM in your machine**:

- Simulation sweeps (if a large number of parameter variations are enabled simultaneously)
- DDRx batch simulation under certain circumstances (especially with the “power-aware” option enabled)

**For these features, 8 GB and preferably 16 GB are recommended:**

- Power-integrity analysis of post-layout designs in BoardSim
- 3D EM simulation in the HyperLynx Full-Wave Solver (from either LineSim or BoardSim)

**For this feature, 16 GB and possibly 32 GB are recommended:**

- “Advanced decoupling analysis” using the new 2.5D power-integrity engine

On a 32-bit Windows system, even basic signal-integrity analysis of large boards may require you to boot Windows in the “/3GB mode” (see Microsoft documentation for details), to force Windows to allow applications to access more than 2GB of the 4GB total memory. Advanced analysis features (like the power-integrity and 3D EM features listed above) are not likely to run at all; a 64-bit OS and the 64-bit version of HyperLynx are recommended instead.

In the sections below, the memory requirements do *not* assume use of these memory-intensive features.

## Red Hat Enterprise Linux WS 6 (RHEL6.0 – 6.7)

This release supports both the 32-bit and 64-bit versions of RHEL6. Customers running AMD64-based systems or Intel Pentium4 or Xeon-based systems should use 64-bit operating systems together with 32-bit applications support.

Given the recent announcement from RedHat to end support for RHEL6 Update 5 and prior Update versions, we have adjusted our test and support strategy to support the following RHEL6 OS release versions:

- RHEL6.6
- RHEL6.7



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**Notice:** We strongly urge you to make plans, if you have not already, to move forward to one of the supported RHEL OS releases *as this will be the last release where RHEL6.5 and prior versions will be supported*. In the meantime we have not changed our environment check routine to preclude you from running on the RHEL OS versions supported in our prior releases in order to provide you the time to migrate your environment forward.

When OS updates are applied they may upgrade libraries to a newer, unsupported version. You are advised not to apply any OS updates until you know it will not directly or indirectly (through dependencies on other packages which may be automatically selected for installation) update the libraries required by Mentor Graphics applications. More details are available on SupportNet at this location: <https://supportnet.mentor.com/portal?do=reference.technote&id=MG591739>

### OS Version:

```
$ uname -rs  
Linux 2.6.32-71      (RHEL6 Upd1 or newer up to Upd7)
```

### Recommended Installation:

Select the following options on the Package Groups offered from the interactive install:

Install set - Software Development Workstation

### IT Administration Notes:

Optionally disable firewall and SELinux.

1. Applications->SystemSettings-> Security Level
2. Firewall Options tab select Security Level: Disable firewall
3. SELinux tab uncheck "Enabled (Modification Requires Reboot)"
4. Reboot the system

**Minimum Required OS Patches:** None

**Processor:** Dual-core Intel or AMD processor minimum. See [Processor Note for Intel/AMD Processors](#) above.

**Memory:** 8 GB Minimum

**Swap Space:** 2X the amount of RAM

**Kernel Parameters:** No changes required

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## Red Hat Enterprise Linux WS 7 (RHEL7)

This release supports the 64-bit versions of RHEL7 (baseline version through Update2). Customers running AMD64-based systems or Intel Pentium4 or Xeon-based systems with EM64T capabilities should use 64-bit operating systems together with 32-bit applications support.

Note: The version numbers of the packages shown below as output of the `uname` or `rpm` command are for the RHEL Update noted in parentheses, and are included as examples of the output. For RHEL Updates supported but whose package versions are not shown below, the version information may vary, but the package is required, and must be the version that is delivered with that RHEL Update.

### OS Version:

```
$ uname -rs  
Linux 2.7.xx-xx (RHEL7 Baseline or newer up to Upd2)
```

### Recommended Installation:

Select the following options on the Package Groups offered from the interactive install:

Install set - Software Development Workstation

**Minimum Required OS Patches:** None

**Processor:** Dual-core Intel or AMD processor minimum. See [Processor Note for Intel/AMD Processors](#) above.

**Memory:** 8 GB Minimum

**Swap Space:** 2X the amount of RAM

**Kernel Parameters:** No changes required

## SuSE Linux Enterprise 11 (SLES 11.2 – 11.3)

### OS Version:

```
$ uname -rs  
  
Linux 2.6.16.32 (SuSE Linux Enterprise Server 11 or later  
  
Linux 3.0. (SuSE Linux Enterprise Server 11 or later)
```

### Windowing System:

```
$ /bin/rpm -q gdm  
gdm-2.24  
$ /bin/rpm -q xorg-x11-server
```

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Xorg-x11-server-6.9

Xorg-x11-server-7.4

### **RPMs Required**

Gnome Desktop Mgr – RPM gdm-2.24 or higher

X Windows – RPM xorg-x11-server

32-bit Compat C++ Libraries (for 64-bit SLES11) – RPM libstdc++33-32bit

Compat C++ Libraries – RPM libstdc\_\_33-3

Open Motif – RPM openmotif22

Libexpat0 Library – RPM libexpat0

**NOTE:** The OpenMotif and libexpat0 RPMs are not delivered with SLES11, and must be separately downloaded from [opensuse.org](http://opensuse.org).

Individual files required – These are provided by the above RPMs

32 bit libXm.so - /usr/lib/libXm.so

32 bit libexpat.so.0 - /usr/lib/libexpat.so.0

**Minimum Required OS Patches:** None

**Processor:** Dual-core Intel or AMD processor minimum. See [Processor Note for Intel/AMD Processors](#) above.

**Memory:** 4 GB Minimum, 8 GB Recommended

**Swap Space:** 2X the amount of RAM

**Kernel Parameters:** No changes required

## **Microsoft Windows 7 SP1**

Microsoft Windows 7 (32 and 64 bit versions), Professional Edition, Ultimate Edition, and Enterprise Edition are supported with SP1.

While there is no known issue with running Microsoft Windows 7 Starter Edition and Microsoft Windows 7 Home Premium Edition, the product has not been tested with these editions, and therefore is not supported.

**Kernel Configuration:** N/A

**Processor:** Dual-core Intel or AMD processor minimum. See [Processor Note for Intel/AMD Processors](#) above.

**Memory:** 4GB Minimum, 8GB recommended

**Swap Space:** 2x the amount of RAM

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## Microsoft Windows 8.1

Microsoft Windows 8.1 (32 and 64 bit versions), Professional Edition, Ultimate Edition, and Enterprise Edition are supported.

**Kernel Configuration:** N/A

**Processor:** Dual-core Intel or AMD processor minimum. See [Processor Note for Intel/AMD Processors](#) above.

**Memory:** 8GB recommended

**Swap Space:** 2x the amount of RAM

## Microsoft Windows 10

Microsoft Windows 10 (32 and 64 bit versions), Enterprise Edition and Pro Edition are supported.

While there is no known issue with running Microsoft Windows 10.0 Home Edition or Educational Edition, the product has not been tested with these editions, and therefore is not supported.

**Warning:** The new Microsoft Edge Browser delivered with Windows 10 is not supported with HyperLynx. Users should continue to use the default browser Internet Explorer delivered with Windows 10, or download and install Firefox or Chrome Browsers.

**Kernel Configuration:** N/A

**Processor:** Dual-core Intel or AMD processor minimum. See [Processor Note for Intel/AMD Processors](#) above.

**Minimum RAM:** 8GB recommended

**Swap Space:** 2x the amount of RAM

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## Windows Server 2008 R2

Additional OS Patches (the following configurations are supported):

- Microsoft Windows Server 2008 R2, Standard Edition with all current updates via Windows Update, on 64-bit versions.
- While we expect no issues unique to Microsoft Windows Server 2008 R2, Enterprise Edition or Datacenter Edition, they have not been tested and therefore are unsupported.

**Processor:** Dual-core Intel or AMD processor minimum. See Processor Note for Intel/AMD Processors above.

**Minimum RAM:** 8GB (per simultaneously logged in user)

**Swap Space:** 2X the amount of RAM

## Windows Server 2012 & 2012 R2

Additional OS Patches (the following 64-bit configurations are supported):

- Microsoft Windows Server 2012, with all current updates via Windows Update
- Microsoft Windows Server 2012 R2, with all current updates via Windows Update

**Processor Minimum:** Dual-core Intel or AMD processor minimum. See Processor Note for Intel/AMD Processors above.

**Minimum RAM:** 8GB (per simultaneously logged in user)

**Virtual Memory:** 2X the amount of RAM