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# Xyce™ Parallel Electronic Simulator Release Notes

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## Minor Release 1.0.1

### Addendum

This document identifies the changes to the Xyce<sup>®</sup> circuit simulator associated with Version number 1.0. The version number 1.0.1 is used by the Xyce Release and Distribution Management documentation.

This is the first minor release of Xyce Version 1.0. This minor release includes several crucial bug fixes as well as a number of nonlinear convergence enhancements that improve robustness and performance. Users should see a performance improvement in robustness and time-to-solution for most circuits.

This document is an addendum to the full set of release notes for Version 1.0 (available at the website below), and as such is not a stand-alone document. Information found in this document includes:

- Any defects fixed since the last release.
- Any new features added since the last release.

For information pertaining to hardware requirements, software requirements, and known defects, see the Version 1.0 Release Notes.

For up-to-date information not available at the time these notes were produced, please visit the Xyce web page at <http://www.cs.sandia.gov/xyce>.

## Defects Fixed in this Release

Defect	Description
Syntax errors in B Source Poly statement cause core dumps [bug 67]	Syntax error in the B-Source Poly statement cause Xyce to terminate with a fatal error if an expression is unparseable. Previously the error went undetected, and the code would generally fail with an exception.
Capacitor initial conditions [bug 128]	Previous to this release, capacitor initial conditions specified by <code>IC=&lt;voltage&gt;</code> on the instance line did not force the potential drop across the capacitor to be the given voltage at the operating point, but merely forced the charge stored on the capacitor to be the capacitance multiplied by the initial voltage. This was compatible with SPICE 3F5 without the "UIC" keyword on the <code>.tran</code> line. Now Xyce places a voltage source in parallel with the capacitor that forces the potential drop to be that specified by <code>IC=&lt;voltage&gt;</code> during the operating point, and does nothing after the operating point.
BJT "TNOM" specification [bug 159]	Versions of Xyce prior to 1.0.1 had a bug in the BJT model. If "TNOM" was specified, the value given was not converted from the value given in Celsius to Kelvin, but simply used as is. Specifying "TNOM=27" did not do what was expected; the user would expect this to set the nominal temperature to 27 °C (the default value), but what it really did was set the nominal temperature to 27 K°.
Level 3 diode [bug 163]	Versions of Xyce prior to 1.0.1 had a bug in the Jacobian matrix load that would cause Xyce to fail in strange ways if the diode was wired just right, or if the "RS" parameter was non-zero.
Level 3 diode saturation current [bug 161]	The parameter <code>IS</code> (saturation current) was not recognized by versions of Xyce prior to 1.0.1.
Windows installation [bug 114]	The "Readme" files distributed with the Microsoft Windows installations now correctly display text.
Inconsistent netlist analysis and print types [bug 80]	Inconsistent analysis and print types are now flagged as an error and Xyce to abort with an appropriate error message. Inconsistent types are the result of requesting a transient analysis with a request to print DC solution values, or vice versa, a DC analysis together with a request to print transient solution values.
Use of ChileSPICE style <code>".output"</code> statements causes core dump [bug 173]	Xyce now checks that an <code>.OUTPUT</code> line is preceded by a <code>.OPTIONS OUTPUT</code> line as required. If an <code>.OUTPUT</code> line is found without the preceding <code>.OPTIONS OUTPUT</code> line, Xyce aborts with an

Defect	Description
	appropriate error message. Previously, this situation caused a core dump.
Initial condition fixes for inductor [bug 174]	Inductor initial condition handling was fixed. The user should no longer use the UIC option on the .TRAN line to bypass the operating point calculation as was previously needed when initial conditions were specified.
Time integration parameter dtmax was not supported [bug 120]	dtmax, or the "maximum time step size" is the 4th argument to a .TRAN analysis statment. It is an optional parameter. Up until now, if the user specified this argument, Xyce would ignore it. Now, it applies it. Netlists that specify this parameter may now take a much larger number of time steps.
Error in restart example in User's Guide [bug 116]	On p. 78 of the Xyce User's Guide, the example for changing checkpoint intervals shows the same .OPTIONS line as the one for constant checkpoint intervals.

## Known Defects and Workarounds

Defect	Description & Workaround
Incorrect Indexing for expressions in the BSRC for <i>parallel runs only</i> . [bug 175 - targeted for Release 1.1]	Expressions that include currents through voltage sources are not correctly evaluated when the code is run in parallel. This will be fixed in the Version 1.1 Release scheduled for April, 2003. No workaround at this time.

### Using DTMAX (Maximum time step)

As mentioned above (see bug 120), Xyce now supports the specification of a maximum time step as the fourth argument on a .TRAN line of a netlist. Please note, however, that this parameter should be used only as a "last resort" to help difficult problems. In fact, running Xyce with a DTMAX parameter that may have been used with PSpice or ChileSPICE, may cause a "Time step too small" error from Xyce. If this occurs, try removing the DTMAX parameter on the .TRAN line of a netlist if one exists.

## Specific Features and Enhancements

### Convergence tests and tolerances

- Changed the stagnation test in the nonlinear solver so that if the solver makes even minor progress, the time integrator will evaluate the solution's Local Truncation Error (LTE) for acceptability as opposed to simply cutting the step size.
- Changed some of the step-error control values for the time integrator to make it less aggressive in its increasing of the time step size. This has decreased the instances of the "Time-step too small" errors since increasing the time-step size too rapidly can cause the time-integrator to cut the size drastically when this aggressive approach fails.

### Netlist Support

- Support for inline comments has been added. An inline comment is denoted with a ";" on a netlist line. Everything after the ";" is a designated a comment and is ignored by the parser.
- A user may now optionally request that the index in the standard output format be suppressed. This feature is turned on by the `FORMAT` option of the `.PRINT` statement a value of `NOINDEX` as in the following example:

```
.PRINT TRAN FORMAT=NOINDEX V(1) V(2) I(Vmon)
```

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