



What's New in PSCAD v4.5.4

(since v4.5.3)

Written for PSCAD™ X4 version 4.5.4

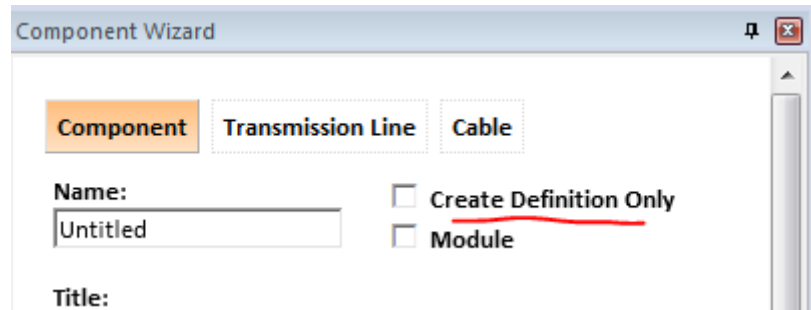
December 3, 2014



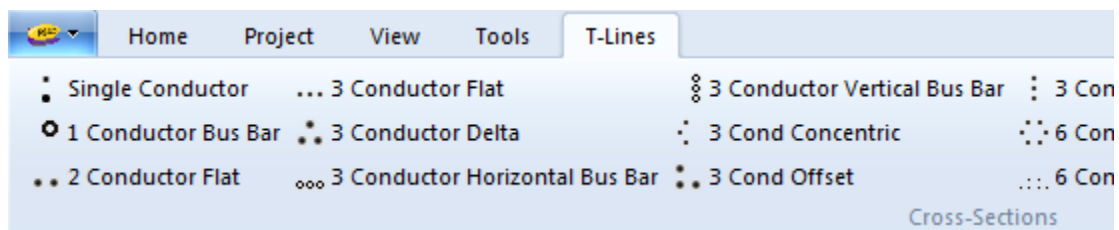
PSCAD

Deficiency Fixes:

1. **Option to Create a New Definition Only:** An option was provided to the component wizard to allow for the creation of a component definition, without a corresponding instance (#4430).

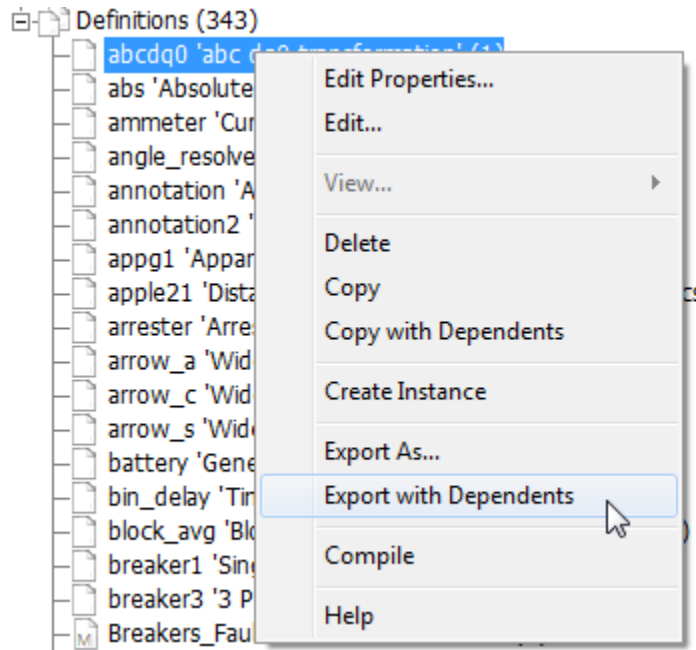


2. **Meter Nodes No Longer Counted When Validating Project Size for Licensed Edition:** A new node counting algorithm has been added, which does not consider extra nodes generated by the use of ammeters and multi-meters (#4547).
3. **Top-Level Subroutine No longer Labelled 'DS':** The top-level module in all projects is no longer referred to as 'DS' when generating project Fortran subroutines; a legacy term that can be traced back to PSCAD V2. As of v4.5.4 and onward, the Fortran subroutine associated with the top-level module will be named after itself (#3687).
4. **Ribbon Control Bar Updated for T-Lines and Cables:** The ribbon control bar has been updated by including new tabs for T-Lines and Cables. Each tab will appear when inside the corresponding editor. Towers and cable cross-sections may now be conveniently added without the need to use right-click menus (#4637).

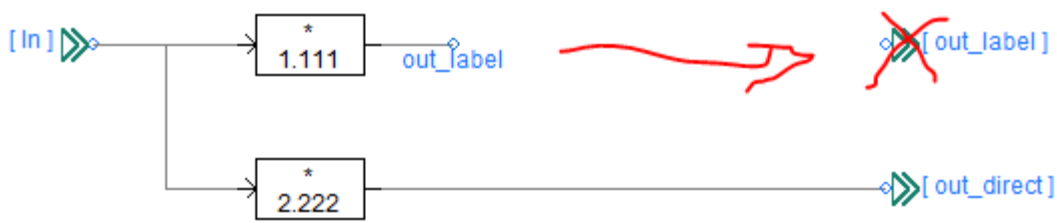
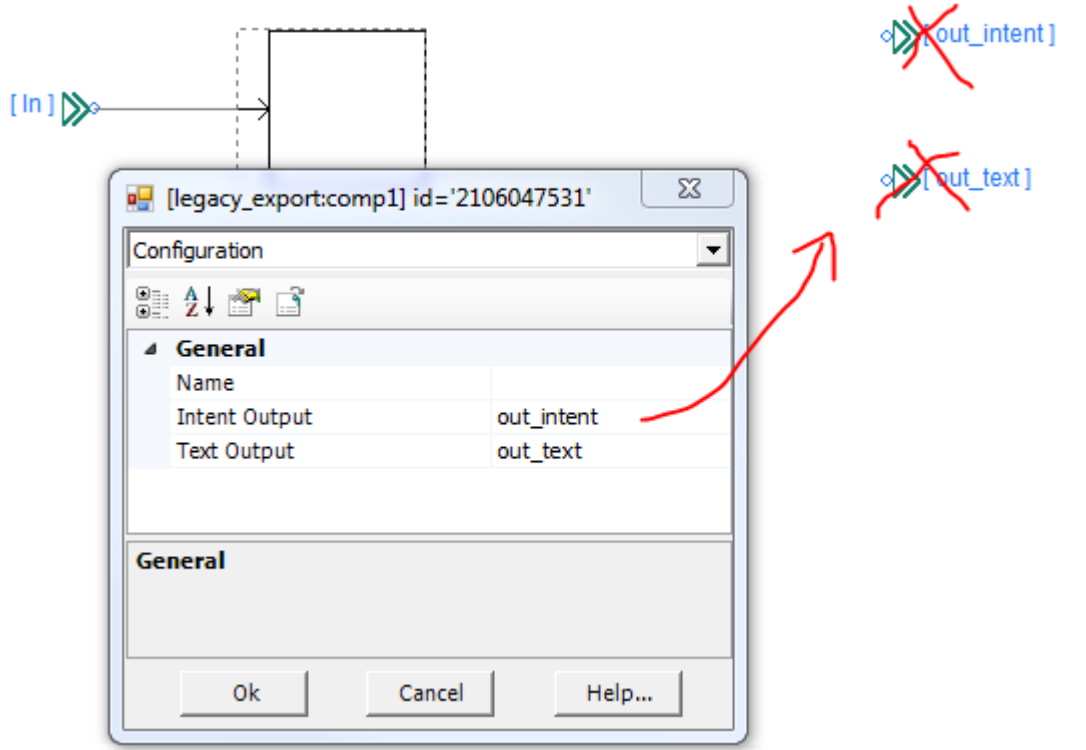


5. **Copy/Paste between PSCAD Instances:** It is once again possible to copy and paste selected components between instances of PSCAD (#4827).
6. **Logical Parameter Type:** Component parameters of type logical are now supported. They function in a similar fashion to the Real and Integer types. However, literal values can only be .TRUE. or .FALSE. (#5076).


- Export Definition With Dependents:** Module definitions that are exported to file (i.e. *.psdx) using *Export with Dependents*, now include all dependent module definitions. In other words, if the module definition being exported contains a module hierarchy, all definitions involved in the hierarchy will be included in the export file. When this file is imported, all definitions are imported and linked together, maintaining the original module hierarchy (#3289/#5116).



- Exported and Local Signals Must Now Be Distinct:** Exported and locally declared signals must now be distinct from each other. In other words, you can no longer use an export tag with the same name as a local signal. This is a necessary change in order to avoid critical problems with generated Fortran code, which can potentially lead to inaccurate results. For example, the following is no longer allowed (#5077/#5160):



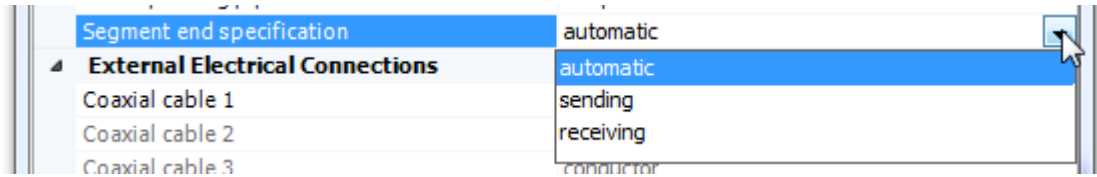
PSCAD will now automatically fix your projects on load.

v4.x Legacy Import/Load	
Obsolete datatap2 components	No action
Parameter Synchronization	No action
Obsolete #DEFINE directives	No action
 Exported signal distinction	Make exported and local signals distinct
Orphaned global substitutions	No action

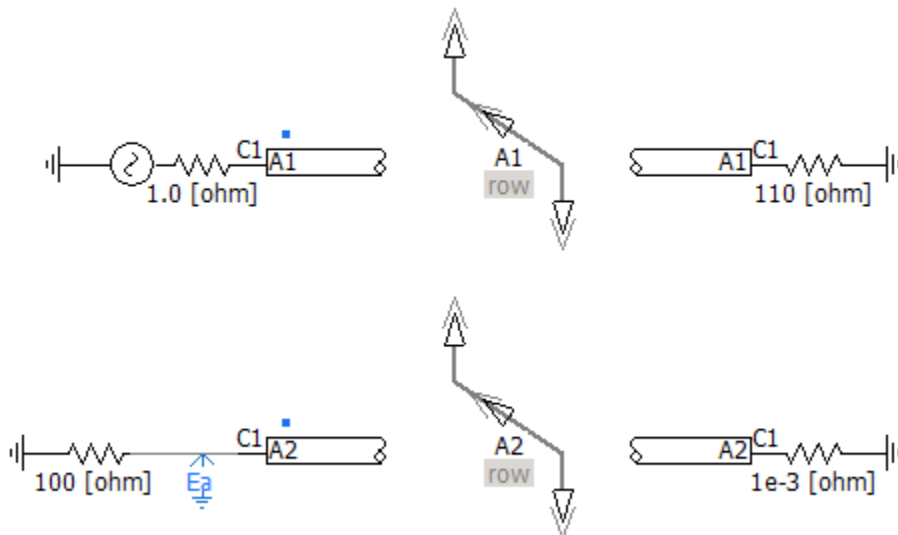
On load then, projects will be modified as follows:

- Renaming the export tag and corresponding port to 'x_<name>'.
- A data label will be appended to the export tag, and given the name of the local signal.

9. **Remote End Specification:** Transmission line and cable remote end components may now be specified as sending or receiving end. This is very important when working with mutually coupled systems in remote-end mode, in order to ensure proper node/subsystem mapping and EMTDC runtime results. Specifying ends is not necessary for non-mutually coupled systems, but is recommended nonetheless.



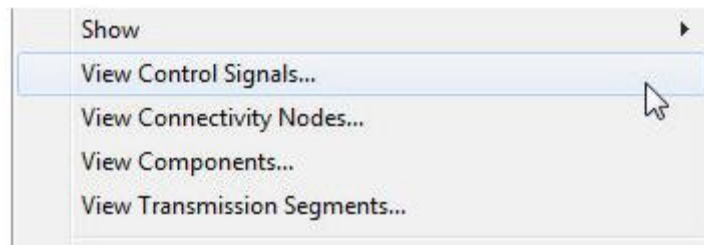
The default setting is 'automatic' in order to support older projects. A grey dot will appear to indicate an 'automatic setting. Ends specified as 'sending' will display a blue dot (#5067).



10. **Electrical Signal Glyphs:** The electrical signal glyphs are now colour-coded to graphically indicate the type of electrical signal (#5324):

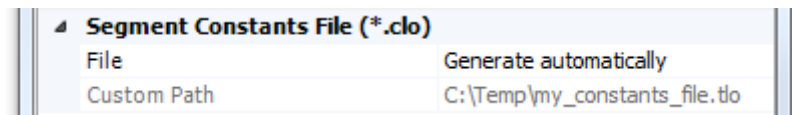
- **Green:** Indicates an active node
- **Brown:** Indicates a ground node
- **Grey:** Indicates a removed node
- **Red:** Indicates a removed node

11. **Transmission Segment Table:** A new transmission segment viewer has been added for the purpose of organizing and viewing all transmission segments in a project (#5403).



	Instance	Line Name	Steady State Frequency	Length	Dimension	Connection Mode	Couple Enabled
1	310323642	CNT_3	1000000	0.00869	1	Local connection	Disabled
2	1194138762	CNT_4	1000000	0.079	1	Local connection	Disabled
3	926351712	CNT_5	1000000	0.03	1	Local connection	Disabled
4	1346041279	CNT_6	1000000	0.335	1	Local connection	Disabled

12. **Custom LCP Constants (*.tlo/*.clo) File:** It is now possible to use custom generated constants (*.tlo/*.clo) files to represent a transmission line or cable segment. The default functionality is the same as in previous versions. However on rare occasions, some expert users prefer to generate their own constants file, and so a new parameter control has been added to the *Transmission Line* and *Cable Configuration* components to provide this functionality.



If enabled, the constants file specified by the *Custom Path* parameter will be copied from its current location and pasted to the temporary folder. It will also be automatically renamed to the *Segment Name* of the segment, and its extension modified to either *.tlo or *.clo, depending on whether the segment is an aerial line or a cable. (#1976)

13. **Legacy Case Mismatch Detection and Correction:** When this new application option is enabled, all case mismatches between module parameters and ports and their corresponding import or export tags will be detected and corrected. In past versions, name matching was case insensitive due to the case insensitivity of the Fortran language. However, other programming languages, such as C, are case sensitive, which is the reason for the change. (#5536)

v4.x Legacy Import/Load	
Obsolete datatap2 components	No action
Parameter Synchronization	Synchronize with definition
Obsolete #DEFINE directives	No action
→ Parameter/port to import/export tag name	Discover and correct case mismatch
Exported signal distinction	Make exported and local signals distinct
Orphaned global substitutions	No action

Bug Fixes:

1. Only one unique tab window will open for each unique file. Previously, multiple windows would open if the same file was accessed more than once (#4078).
2. Removed second, redundant dialog that would appear when attempting to save a scenario of the same name as an existing one (#4450).
3. Module parameters of intent output no longer accept literal data, which is an illegal programming condition (#3523).
4. **Proper display of global node and subsystem numbers in flybys now occurs when using inter-project module instances (#4515).**
5. Simulation set menu items are now disabled if no sets exist in the workspace (#4426).
6. **PSCAD no longer crashes when the Associations page is accessed within Windows 8. This occurred due to a missing 'external_tools.xml' file (#4482).**
7. Library pop-up menu now lists newly created components (#4484).
8. **Parallel line constants program process spawning no longer fails for high counts of transmission lines and cables (#4476).**
9. Undo/redo now handles the movement of single components about the canvas properly (#4624).
10. Transmission line components, such as ground and towers, now have the proper namespace prepended when t-line or cables are created using the component wizard (#4502).
11. **Found and fixed a 'crash on exit' bug. This turned out to be a simple problem with object deletion during the destruction sequence on exit (#4600/4577).**
12. The ctrl + c hotkey will now perform a copy in the build messages window (#4390).
13. **PSCAD no longer crashes if either sticky text or graphic labels contain the character sequence ']]>' (#3981).**
14. Parameter dialog layout is no longer affected by windows settings. That is, the dialog is scaled appropriately when windows font size is adjusted (#3150).

15. **PSCAD will now ensure that, before it goes into a ready state following a stop or terminate of the previous run, it has cleaned up all processes spawned by it – either friendly or forcibly. This resolves the issue regarding an inaccessible communication base port (#4725).**
16. The ctrl + s hotkey will now perform a save while working in the file editor (#4388).
17. Definition list icons now visually differentiate between module, non-module and t-line definitions (#4288).
18. The flyby tooltips are now functioning in the ribbon control bar (#5038).
19. A redundant dialog window that would pop up when selecting multiple components and pressing Ctrl + left mouse click, has been removed (#5034).
20. A currently selected component will now be included in a multiple selection when the user includes other components by pressing the Ctrl key (#5028).
21. The project in the workspace tree will now indicate it is modified following a change to a component parameter value (#5029).
22. The splitter position in the component parameter dialogs will now remain constant when the dialog width is expanded (#4928).
23. Projects may now be saved while in unlicensed mode (#5017).
24. Pressing the Ctrl key during a drag operation no longer causes unexpected behaviour (#5003).
25. When selecting multiple components from the ribbon, only the last component selected is now appended to the mouse pointer (#3807).
26. The make/map file viewing pane will no longer lose its contents when opening the make/map files for viewing as a schematic tab (#4393).
27. A post-link message is no longer displayed following the load of a library where no post-linking occurs (#4991).
28. The drop indicator arrow now appears properly on control panels when dragging and dropping an online control or output channel (#4987).
29. The build warning message 'Parameter <xxx> is expecting an undeclared signal. A declaration was created.' has been changed to an informational message (#4910).
30. Double-clicking the PSCAD tab in the ribbon control bar will no longer close the application (#4890).
31. Components no longer become selected is using Ctrl + Shift to pan the schematic (#5050).
32. Trace properties are no longer lost when curve is copied via Ctrl + left mouse drag (#4410).
33. The delete scenario button in the ribbon is now disabled when on the base scenario (#4982).
34. Curve names are now properly set following undo/redo of a cut or delete action (#4474).
35. Colorized text is now included when printing component definition script segments (#4031).
36. PSCAD will now forcibly kill a simulation process via the stop button, if the process is no longer responding. Pressing stop once will initiate an attempt to terminate the simulation processes in a 'friendly' way. If still not terminated, pressing the stop button a second time will forcibly kill all processes. This resolves the issue of PSCAD failing to bind to a new simulation process because a previous process is not responding (#4923).
37. The start page will no longer attempt to log in to the MyCentre server when username and password are empty (#5008).

38. If the canvas settings for a particular module definition do not exist, PSCAD will now create them when the canvas settings dialog is invoked (#4966).
39. PSCAD will now detect improper signal type conversions, specifically when transferring signals through ports. Improper type conversions would sometimes lead to simulation result inaccuracy (#4620).
40. Parameter symbol names are no longer removed from conditional statements when the user chooses not to remove them on delete of the parameter (#5055).
- 41. PSCAD no longer crashes when a really long variable name (improper syntax) exists in the component definition script (#5063).**
- 42. Animated graphics now function properly when situated in an inter-project module instance (#5031).**
- 43. PSCAD no longer crashes when adding a control to a scenario in a project that does not possess a default parameter list (i.e. corrupted) (#5065).**
44. Sticky note pointers no longer disappear when sticky fill style is set to transparent (#5104).
45. The graph y-axis scale display will no longer truncate from the left when the display values are long (in terms of decimal places) (#5102).
46. Output and snapshot file name substitutions are now working again in the project settings runtime tab (#4812).
- 47. PSCAD no longer crashes when editing text in the rich text in the component definition script section, if the script is very large and overruns the buffer (#5108).**
- 48. Fixed a crash point that would occur when attempting to build a corrupt case (null pointer check) (#5101).**
- 49. Fixed a crash point that would occur when a single line of Fortran that exceeds 1024 characters (buffer overflow) (#5103).**
- 50. The start page is now working again. Changes to Microsoft Internet Explorer 11 broke the ability to view it (#4989).**
51. Ribbon control bar text is no longer truncated when application window is shrunk to a small size (#5089).
52. Compile module and blackbox module functions now function properly on inter-namespace modules (#4674).
53. The Ctrl + c/v hotkeys now function properly to copy/paste a component following editing parameters in the component t parameter pane (#4983).
54. Navigating from an observer to its source will now highlight the actual curve, not the graph where it resides (#4218)
55. Auto-scroll, or dynamic pan, is now available via clicking and holding the center mouse button (#4342).
56. Newly added computation variables are now updated immediately, avoiding a compilation error that the new variable does not exist (#5118).
57. The about box now displays the current username (#5143).
58. Navigate to component from a curve and vice-versa, is now functioning properly (#5154).
59. PSCAD no longer crashes when loading or importing a project with a recursive module hierarchy (i.e. a module nested within itself) (#4735).

60. Table parameters can no longer be added to module definitions (not supported anyway) (#5146).
- 61. Navigating into a page module directly following an undo operation no longer now goes to the proper instance, instead of the definition page (#5178).**
62. A warning dialog is now displayed when attempting to stop a simulation set. This dialog may be disabled after the first occurrence (#5190).
63. PSCAD no longer issues an error message when loading a workspace that contains a case project that is loaded before a dependent library project, where the case project was last saved viewing an external module (#5195).
64. Some inconsistencies within the ribbon control bar, specifically drop lists have been cleaned up (#5203).
65. Build all projects now functions properly, even when no simulation sets are present in the workspace (#4181).
- 66. PSCAD no longer hangs at start up if the internet connection is poor or non-existent (#5171).**
- 67. Multiple minor issues with node search have been fixed. In addition, the results display for node search has been cleaned up and is more intuitive (#5142).**
68. Feedback is now provided in the build messages table when the 'clean' button is used to clear the project temporary folder(s) (#5207).
69. A new application option has been added to disable scaling (zooming) in the workspace pane. Scalability was found to be the cause of graphical artifacts appearing while scrolling this pane (#4650).
70. A new module will now be properly instantiated and placed on the project call stack when the definition of the parent module has an instance count of 0 (#5212).
71. The component definition instance count is now properly set when deleting and or switching the reference of a component (#5222).
72. The 'Clean All' and 'Build All' ribbon functions will now work properly when no project is in focus (#5223).
- 73. The socket buffer is now able to send the date using the current device (i.e. fix for WinSock Error = 10054). This was fixed by expanding the buffer size from 4kB to 64kB (#5229).**
74. Cut/copy/paste hotkeys (i.e. ctrl + c or x, and ctrl + v) now function when working in the map or make file panes (#5209).
- 75. PSCAD no longer crashes when navigating away from a module schematic, whose definition has been delinked by unloading its parent library project (#5198).**
76. Incorrect project storage requirements, which were set and displayed before the output channel dimension had been included, have now been corrected (#5245).
- 77. PSCAD no longer allows the top-level module definition to be deleted from the project (#5166).**
- 78. PSCAD will no longer claim that the graphics canvas resize is invalid when making the canvas larger (#5255/#4439).**
79. Text input fields in component parameter dialogs will now check for inadvertent Unicode characters and immediately convert to ASCII upon entering (by replacing the offending character with a question mark) (#5253).

80. It is now possible to name a case project 'pscad.pscx' or 'tline.pscx'. This was previously not possible, but changes to the way projects are launched internally has allowed for the removal of this restriction (#3779).
81. The start page display setting is now remembered between PSCAD sessions (#5213).
82. The workspace tree now maintains its view position during tree actions, such as instantiating curves from the definitions branch (#5275).
83. Object display ordering modifications are now saved properly upon exit of the graphic editor (#5250).
84. The ctrl + right-click menu now immediately shows newly created component and module definitions in dependent library projects (#4484).
- 85. PSCAD no longer crashes when switching to the schematic canvas if a new grouped parameter is added while in categorize by group mode (#5296).**
86. Binary files are no longer viewable from the workspace temporary folder branch (#5246).
87. PSCAD now provides better handling and messaging when attempting to load a *.pscx and/or *.psmx file that contains illegal characters or corrupted data (#5252).
88. Build messages sourced from the top-level module are now given proper, navigable links (#5247).
89. Parameter rows no longer get moved during adjustment of the splitter in the component parameter editor (#5269).
90. The module hierarchy tree and the project tree in the workspace are now navigable via a single-click, as opposed to a double-click (#5051).
91. Right-click context menu can no longer be invoked while there is a floating component attached to the mouse pointer (#5016).
92. Copy/paste of the top parameter in a category in the parameter editor no longer rearranges the parameter list. This would occur occasionally directly following the copy/paste of another parameter from another category (#5270).
93. PSCAD issues a warning message if the snapshot file is out of date (when starting from a snapshot file) (#5311).
94. Keyboard shortcuts now function properly inside script section of the component design editor (#1401).
95. Proper file naming rules are now enforced when saving a project as another (#5317).
96. Message table messages are now written to file properly when containing Japanese and other non-standard character sets (#5082).
- 97. Selecting new workspace while a simulation is running is no longer possible. Previously, doing so would cause PSCAD to crash (#5340).**
98. The build message table now consistently uses namespace as opposed to filename. This inconsistency was causing minor formatting problems (#5341).
99. It is now possible to stop line constants program processes using the Stop button (#5346).
- 100. A crash point caused by encompassing a global substitution default unit with square brackets '[]', has been fixed by implementing a check when this parameter attribute is modified (#5344/#5351).**

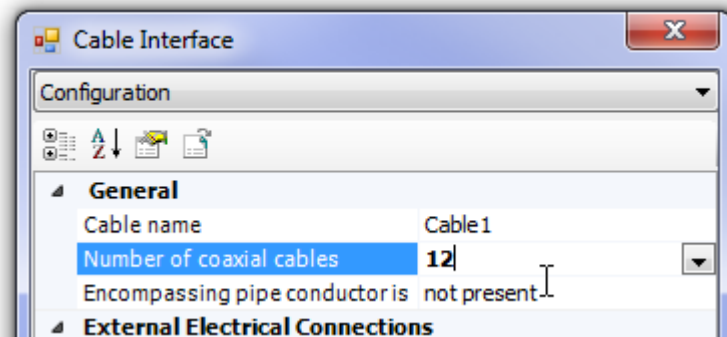
101. Schematic canvas zoom is now working more smoothly. The zoom focal point is the centre of the currently viewed area (#5354).
- 102. A crash no longer occurs if a module component electrical port does not have a matching xnode when the project is built (#5359).**
103. PSCAD will now indicate 0 subsystems if the project contains no electrical nodes. Previously, the map file would always indicate one subsystem (#5382).
- 104. Projects may now be built successfully while residing on an external drive (#5417).**
105. Control interfaces no longer become detached when their respective components are cut and pasted (#5420).
106. PSCAD no longer displays a negative memory value for allocated records in certain instances. This was caused by an integer overflow (#5402).
107. The workspace tree now updates properly following a double click to edit the properties of a simulation set (#5422).
108. Graph vertical axis label precision increased to accommodate numbers smaller than 1×10^{-15} . Numbers smaller are now displayed in scientific notation (#5430).
109. Bus name bounding box is no longer included as part of connection hit test. Previously PSCAD included the bus name as part of the wire in terms of connectivity (#5433).
110. Reworded confusing 'All system binaries' message to a more meaningful suggestion (#5427).
- 111. A crash problem generated by PSCAD exceeding the Windows GDI object limitation per application has been fixed (#5444).**
112. The start page will now attempt to connect multiple times before giving up (#5443).
113. Blackbox now ensures all make file paths are encompassed in double quotes. This avoids make utility errors when spaces exist in the folder path (#5465).
114. Both component instances and definitions may now be copied and pasted between two or more PSCAD application instances (#5457).
115. Projects that contain spaces in the project file name are now properly converted to proper syntax on import (#5337).
116. Undo now functions properly following a modification to a component parameter (#4984).
117. Simulation set tasks are no longer left orphaned when projects are unloaded using the unload all function (#5418).
118. The associated MATLAB application options now appear disabled when the GFortran compiler is selected (#5425).
119. Control interfaces within page modules no longer become detached from their associated control when the hierarchy is copied using copy with dependents (#5421).
120. The handling of 'short' connection port types has been corrected in the project importer (#3015).
121. Blackboxing no longer prefixes an additional comma in the created component script segment subroutine call if the original module contains a mixture of connection ports and output parameters (#5318).
122. Adding, modifying, removing and then adding a new table parameter in the component parameter editor no longer causes an exception (#5489).

123. When creating a stacked polygraph with digital signal for a multiple trace curve, traces other than the first are now configured as digital (#5479).
124. PSCAD no longer complains of undefined conditional statement variables, on access of the definition graphic, when these variables are defined as computations (#5505/5495).
- 125. Component graphics transparencies no longer get corrupted when you save a project while still inside the definition editor (#5507).**
- 126. Memory management has been vastly improved. PSCAD now consumes far less memory for loaded projects, and releases this memory when projects are unloaded (#4831).**
127. Module instance name display in the workspace pane is now functioning properly again (#5470).
128. It is no longer required to click a curve twice in order for it to gain focus (#4270).
129. Graph x and y boundaries no longer reset following modifying and running a project (#5472).

Master Library

Deficiency Fixes:

1. **Maximum Number of Cables Increased:** The maximum number of cables per right-of-way has been increased from 8 to 12. These changes affect the cable interface component and the Line Constants Program (LCP) (#5014).



Bug Fixes:

1. Parameter options in the *Manual Entry of Y, Z* component are now consistent with category names (#4938).
2. The PSS2B stabilizer component will now accept 5th order, according to its upgrade to the IEEE Standard 421.5 (1992) (#1921).
3. The default name for new cable interface components, created with the component wizard, is now 'Cable_1' (#5030).

4. The *Frequency and Incremental Phase Measurement* component now measures the frequency properly when the voltage of the node, where the frequency is being measured, is below the set rated voltage (#4160).
5. **Fixed an unused variable problem (namely having to do with the *Initial Source Magnitude* parameter input) in the *Voltage Source Model 1* components (#5053).**
6. The multiple-run component will now give an error if used in a slave project (#5139).
7. EMTDC will now issue a message to the message table indicating that existing frequency scanner components are running when the project is launched (#4922).
8. The hydro governor 2 master library component (hy_gov) now responds properly to the droop setting (#5167).
9. The multi-mass model will now initialize properly when used at non-unity speeds (#5215).
10. The check used in the lens21 and apple 21 components to determine whether the two circles, which comprise the lens or the apple shapes, are too far away from each other now works correctly when polar coordinate format is used (#5282).
11. The apple21 component no longer complains when substituting variables (#5278).
12. A problem was corrected in the fixed_load component when it is used in constant power configuration. Previously a sudden jump in results would occur after about 10 cycles of simulation (#5277).
13. EMTDC no longer fails with T_GOV5 when compiled with GFortran (#5312).
14. Added regex checks in the RTP/COMTRADE component to disallow the ability to enter a name longer than 8 characters. Also added a runtime warning message if the name is adjusted to follow 8.3 format (#2705).
15. The cfilter master library model had both a parameter and a port with the same name ('C'), which resulted in incorrect Fortran script (#5435).
16. Leaving the multiple run output file name in the Multiple Run component empty, no longer crashes the simulation (#5176).

EMTDC

Bug Fixes:

1. The band limit proximity detection algorithm is now functioning properly (#4899).
2. Spelling/grammar mistakes have been corrected in some EMTDC sourced messages (#5377).

LCP

Deficiency Fixes:

1. The Line Constants Program now supports up to 12 cables, including all concentric conductors (#4917).
2. The traditional functional form method, used by the DC Correction algorithm, has been replaced with a new method. The new method is simple and robust and does not require the use of a constrained optimization method. The new algorithm also appears to have resolved convergence issues that occurred when using the previous method (#4860).

Bug Fixes:

1. Checks have been added to both the LCP and EMTDC to ensure the validity of calculated travel times (#4777).
2. The equivalent π -section component creator now works properly for large cable systems. A formatting error in the script segment was fixed (#5015).
3. The mutual earth impedance calculation no longer fails when two transmission lines or cables are separated by a significant distance (#4990).
4. The Line Constants Program now warns the user if negative or invalid time delays are calculated (#4328).
5. The Line Constants Program now checks for illegal, zero-length transmission segments (#5434).
6. The long line correction algorithm now provides the harmonic impedance solution with the correct hyperbolic functions at certain arguments (#5221).
7. The line constants program will now identify a zero DC resistance and stop further processing. Previously, a singularity error was output, but processing was not stopped (#5546).
8. The passivity check algorithm now displays the frequency range and corresponding maximum negative eigenvalue (#5556).
9. The Line Constants Program now provides the correct capacitance value when the last layer of cable is a conductor inside of a pipe (#5557).
10. Long line corrected values are displayed only if they are meaningful. The long line correction algorithm approximates the full solution, considering distributed effects to the equivalent π -circuit. Sometimes it is possible to have non-physical (i.e. negative R, L or C) values (#5558).