What's New in ASPEN *OneLiner* V15.6

This maintenance release contains fixes for software bugs, plus some program improvements.

Run the OneLinerV15.6Setup.exe that you downloaded to update an existing *OneLiner* V15 installation or to create a new *OneLiner* V15.6 installation on your computer.

***Note**: This is a maintenance release, and no new parameters are introduce for any network or relay objects. This means that the data files generated by OneLiner V15.6 are fully compatible with the earlier releases of OneLiner V15.5 and V15.4. (More on differences between a maintenance release and a major release can be found on the last page of this document).*

Please write to support@aspeninc.com in English (suporte@aspeninc.com in Spanish and Portuguese) or call us (650-347-3997) if you have questions.

Program Improvements between Versions 15.5 and 15.6

1. **Implemented the "Q-priority" logic in the converter-interfaced resources (CIR) model.** In essence, the Q-priority logic seeks to reduce the MW generation or consumption to make room for the positive-sequence reactive current when necessary. In prior versions, including V15.5, the Q-priority logic was used *only* when the positive-sequence slope is positive and the negative-sequence slope is zero. In V15.6, Q-priority adjustments are made regardless of the value of the negative-sequence slope. This change leads to a slightly different short-circuit solution when the negative-sequence slope is no zero. The power-factor angle in the solution is usually a little higher as a result.

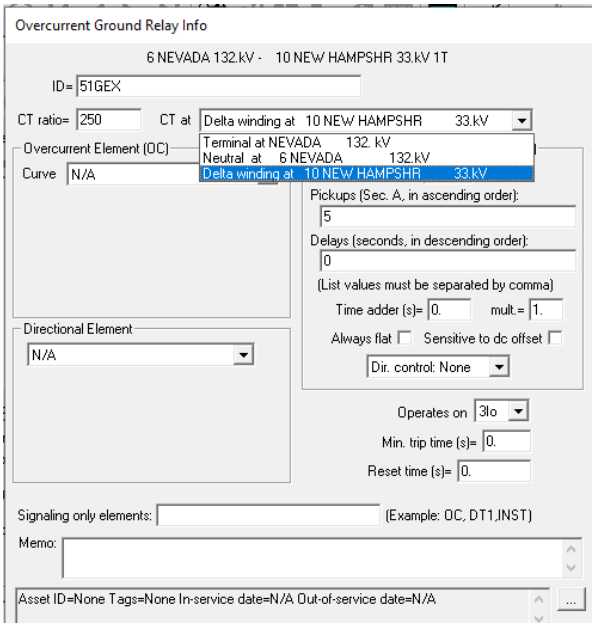
2. **Fixed a number of issues in the simulation of type-3 wind plants.**
   Many of you have reported to us that the type-3 wind plants do not converge. Even when the solution converges, one or more of the following symptoms were seen in fault solution:
   - The current at some buses do not add up to zero, as required by Kirchhoff's current law.
   - The output from type-3 wind plants is not zero after they were shut down due to low voltage.

   These problems were most acute when:
   - There are MW loads in the network.
   - The "unit MW generation" of the wind plants is not zero.
   - Transformers near the wind plants have off-nominal taps.

   We have changed the type-3-wind-plant model in V15.6 to fix these problems.

3. **Streamlined the iterative solution logic for type-3 wind plants, CIRs and VCCS:** Compared to previous versions of OneLiner, fault calculations for networks with large number of these devices run significantly faster in V15.6 due to this effort.

4. **New CT at "Delta winding" option** for ground overcurrent relay (shown in the dialog box picture below): For ground faults, this option lets users simulate ground overcurrent relays that detect the circulating current in the delta winding of wye-delta transformer.



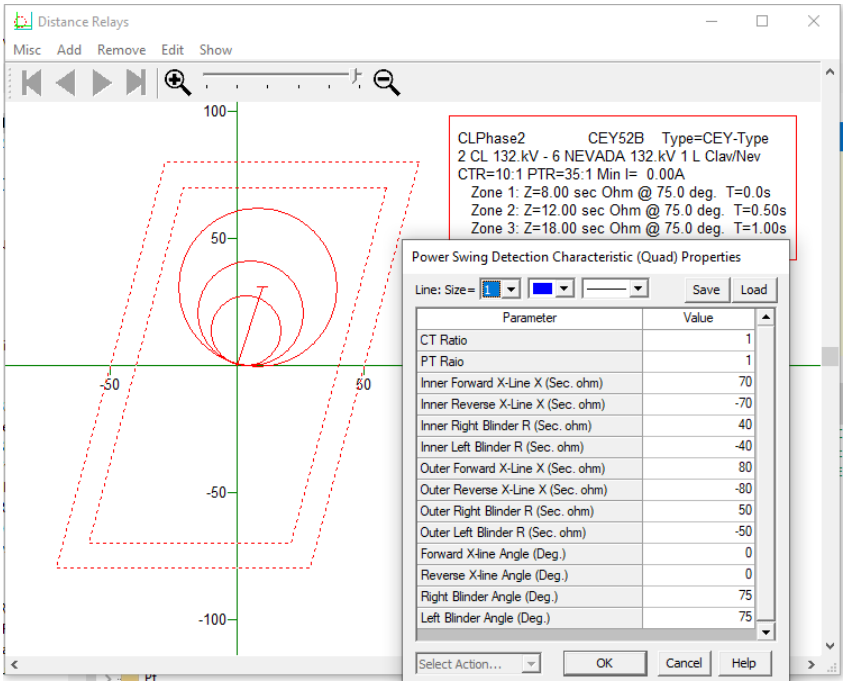
5. **New parallel processing capability in the Check Relay Operation Using Stepped-Events:** In *OneLiner* V15.6, we have made it possible for users to deploy parallel processing command using multiple instances of the *OneLiner* program running on either:
    - A computer with a multiple-core CPU or
    - Multiple computers on a network.

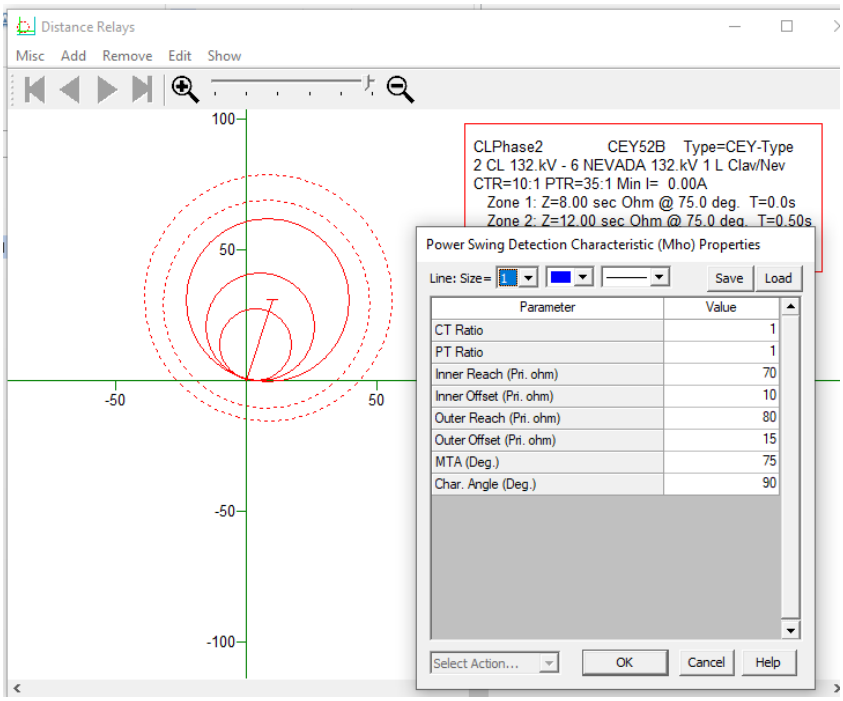
    This feature will significantly speed up the execution time of PRC-027 compliance coordination checks for large networks.

    To facilitate parallel execution of the command, *OneLiner* automatically generates the following helper files in the same folder where you had selected to save the CSV report files:
    - CheckCoordSysWide.cfg: The relay-checking parameters of the current run.
    - CheckCoordSysWide.bas: A *PowerScript* program that launches the check-relay operations-using-stepped-event command API with the configuration parameters in the CheckCoordSysWide.cfg file.
    - CheckCoordSysWide.bat: A Windows batch command file to start a new instance of *OneLiner*, open the *OneLiner* data file and execute the *PowerScript* program CheckCoordSysWide.bas. You can simply open this command file in Windows

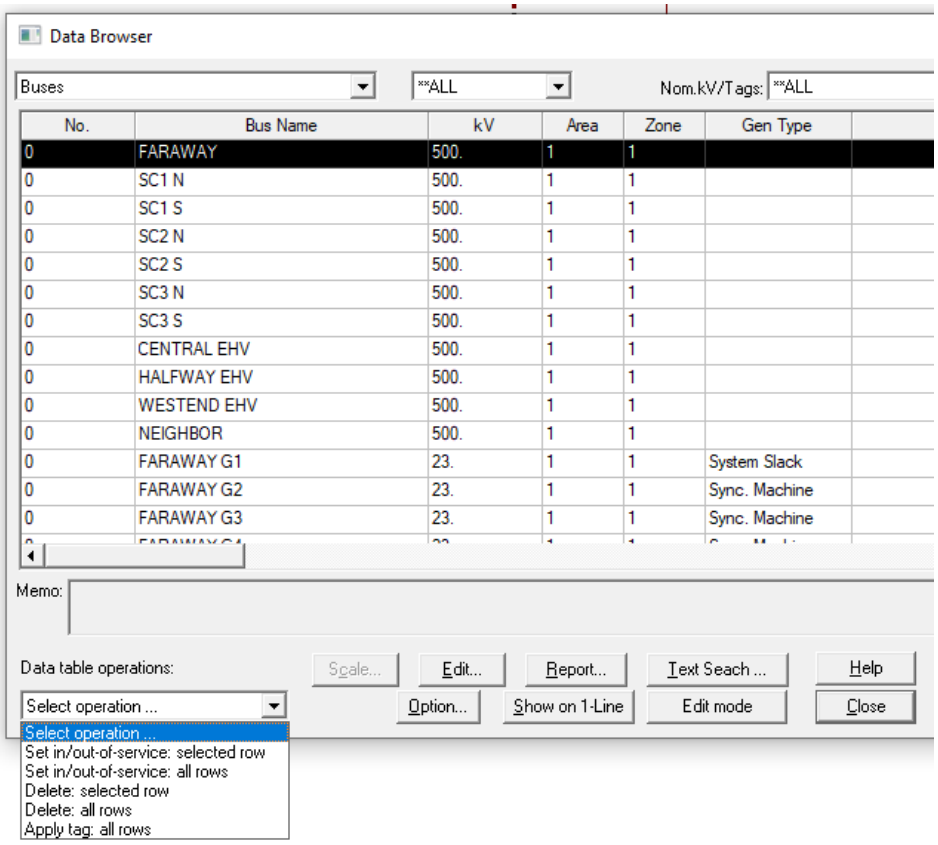
File Explorer to start a new instance of *OneLiner* and run the checking command in parallel.

6. **Implemented two new graphic shape types in the distance relay window** that you can use to add the Quad and Mho power swing detection characteristics of distance relays to the R-X diagram display. Two examples are shown in the pictures below.





7. **Implemented a new "Data table operation" combo box** in the Data Browser to group together commands that will affect selected data rows or all rows in the table. This new combo box is shown in the screen capture picture below.



8. **Sped up processing of tag string** to improve the program responsiveness in network with a large number of tags.

9. **Simplified requirements for simulation of close-in fault on transformers:** The program no longer requires a relay group on the transformer branch before running a close-in fault.

10. **Increased the COMTRADE reader data channel capacity** to 100 channels. This limit was 50 in previous *OneLiner* versions.

11. **Enhancements in the fault locator command:** The command can now import TXT file with the fault and prefault phasor quantities.

12. **New command to Import/Update from the ASPEN Relay DB**: This command allow users to import/update *OneLiner* relay settings from the ASPEN relay database (RDB). The command correlates selected data fields in *OneLiner* model and the RDB relay data table to automatically place newly imported relays as well as to identify and update existing relays in the *OneLiner* network.

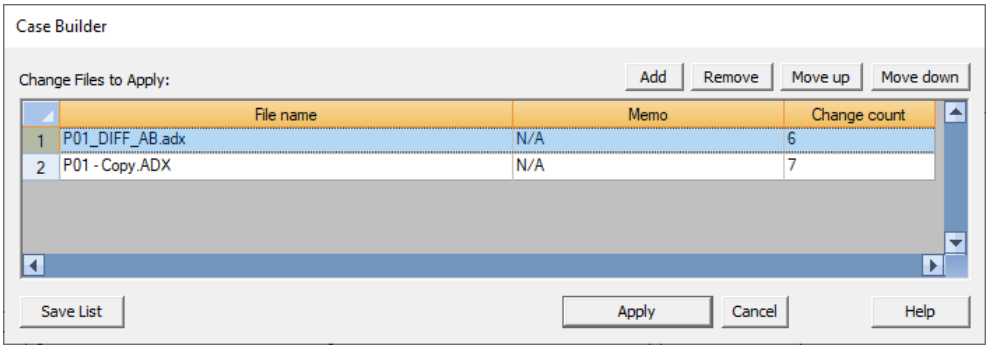
13. **Performance enhancements in relay data transfer from the ASPEN Relay Database**. This improvement allows users to carry out batch relay-data transfer significantly faster than in previous *OneLiner* versions.

14. **New Network Correlation methods in the Compare file command:** In addition to the existing option of “using bus name and kV”, users can select the options of “Using bus number” or “Using bus GUID”. The new correlation methods may work better when comparing an *OneLiner* file to a network converted from another software where bus number or bus GUID is the key bus identifier.

15. **New option “Retain tie branches”** in the command Delete All in the data browser’s bus table. Retaining tie branches when deleting a part of the network will allow you to correctly join the retained network to a new version of the deleted network from another *OneLiner* file.

16. **New report file format options of “HTML”** in the Main program window command “Check Relay Performance During Stable Power Swing” and in the Distance Relays window command “Add Unstable Power Swing Region”.

17. **New Case Builder File** to facilitate the process of applying ADX change files to a base case to build at a new study case. In the Case Builder dialog box, after you have selected the list of ADX change files to apply, click on the Save List button to store the selection in a *OneLiner* Case Builder file with .CBX extension:



To apply the same set of change files to a difference base case, you can simply run the Case Builder command and open that .CBX file that you have saved previously.

Bugfixes between Versions 15.5 and 15.6

- Fixed error in type-3 wind plant pre-fault calculation.
- Fixed error in the logic of iterative calculation of type-3 and CIR in pre-fault.
- Bugfix in the type-3 read logic of the high voltage shutdown limit
- Bugfix in text data import logic for lines
- Bugfix in scripting engine API PostData() OC relay logic
- Bugfix in in compare file 2-w xfmr logic
- Bugfix in ADX ADD logic for LTC and LTC3
- Bugfix in Coordinating pair comparison logic
- Bugfix in the INSERTTAPBUS API
- Bugfixed in scale/shift 1-line logic for GenWx symbols
- Bugfix in PostData() lastChanged date logic
- Added logic to the Stepped event analysis command to prevent buffer overflow when there are too many events
- Bugfix in ADX log file writing logic: Before/After values were not printed correctly in some cases
- Bugfix in simulation of phase open fault that caused program crash in network with VCCS and GenWx units.
- Bugfix in the relay import wizard
- Fixed bug that causes the program fails to import relay data from SEL-5030 files in some cases
- Bugfix in the read logic for annotations.
- Bugfix in the scripting engine logic that that affected the FAULTLOCATOR API.
- Bugfix in the Check Primary and Backups coordination logic that affected mutually coupled line outage report.
- Bugfix in the display logic for relay group with recloser.
- Fix a bug that caused error in fault simulation with the prefault-voltage option of "From a Power Flow solution".
- Show advisory message about OC window grid color selection limitations in dark background mode.
- Fixed a buffer size error in the FindBusByName() API.
- Bugfix for updating 3-winding transformer status with change file.
- Bugfix: GenW3 and GenW4 edit command Undo logic was missing.
- Bugfix: Display long relay name when importing from the SEL-5303 file.
- Made adjustment to GenW4 solution to improve convergence and the solution speed.
- Fixed Data browser’s Edit mode issues: Area/Zone table; Virtual mode data update.
- Bugfix in ADX logic for zone/area.
- Bugfix in the LTC dialog box and save binary command logic to preserve existing LTC data when the movable tap is set to none.
- Bugfix in differential relay secondary current calculation.
- Modified the check data anomalies for MU Pairs auto-fix logic to set the FileChanged flag when the data are modified.
- Fixed a bug in Compare file dialog box area/zone filter logic.

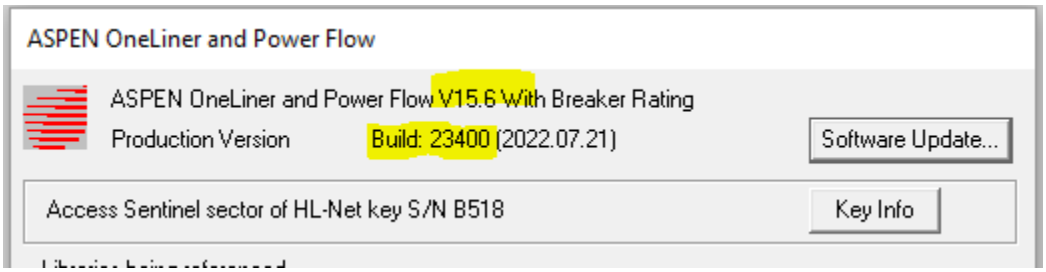
- Bugfix in the data browser edit mode logic.
- Fixed a bug in the check data anomalies for MU Pairs.
- Fixed some typos in the check relay setting report.
- RDB1L.DLL: Implemented Close and Free logic enhancements to avoid issues in Enoserv connections.
- Fixed a bug in PostData() validation logic for MU pairs.
- Bugfix in series RC UDF field file save logic.
- Bugfix in insert tap bus logic: new lines have identical GUID.
- DoFault() outage list logic bug fix.
- Bugfix in ADX Tag/Memo logic and DS relay logic
- Implemented the "Q-priority" logic in the simulation of GenW4 units having both positive- and negative sequence current injection slopes.
- Bugfix in the line drawing logic.
- Fixed a bug in CHF file logic that caused bus name truncation to 12 characters.
- Fixed bug in the ADX logic for adding new LTC and LTC3.
- Fixed memory bug in CCGEN data-export logic.
- No longer allow leading and trailing spaces in the bus location field.
- Fixed bug in the merge and ADX logic for line In-service date file.
- Fixed bug in the ADX logic for bus slack bus field.
- Bugfix in the simulation of GenW4 in an island without real generator.
- Bugfix in DIFF and ADX logic for recloser.
- Bugfix in file comparison and ADX logic for MU pairs.
- Bugfix in the file comparison and ADX logic for relay groups and relays on XFMR3.
- Bugfix in parallel transformer with same cktID check logic.
- Fixed a bus name typo in the report COMPARISON OF EQUIVALENT SOURCE REF. ANGLE
- Fixed a bug in the Undo logic for VCCS in the Delete all in/outside region command.
- Fixed calculation of power-factor angle when simulating unbalanced fault with nonzero + and - sequence slope.
- Bugfix in RDBI logic for compatible OneLiner type list box- Fixed a bug in the Undo logic for VCCS in the Delete all in/outside region command.
- Fixed a bug in file comparison logic for RDBX data.
- Fixed a bug in Voltage relay dialog box OnOK logic for the delay fields.
- Fixed a bug in the mapping script selection dialog box of the RDB link wizard.
- Fixed problem in the file comparison logic for mutual pair and coordination pair data.
- Added logic to fix or remove invalid data in breaker protected equipment list.
- Fix an error during the solution of a balanced fault for a GenW4, the positive-sequence reactive current of a GenW4 was in phase with the positive-sequence voltage. The positive-sequence current should be 90 degrees lagging the positive-sequence voltage.
- Bugfix in fault locator two ends method logic for reading TXT data input.
- Fixed bugs in PowerScript function MakeOutageList
- Fixed bugs in UDF field logic of Xfmr, Xfmr3 and PShifter dialog boxes
- Fixed bugs in GenW4 simulation output. These bugs were introduced in the program since 1/13/2022.

- Changed GenW4 limits: P- slope max from 10 to 30, P-slope max from 6 to 30 max current limit from 2.5 to 3.
- Bugfix in CaseCompare() and GetLatest() api.
- Memory bug fix in the Diff logic.
- Bugfix in updateOCRelayParamsEx() TOK_RDB_OC_POLAR token logic.
- Fixed position of real- and reactive-power arrows when showing power-flow solution.
- Fixed a bug in OlxAPIDoSteppedEvent() multi event logic.
- Fixed a bug in GetSteppedEvent() logic for fault description.
- RDB1L.DBB: Fixed a bug that causes the program always attempt to connect to RDB when retrieving relay setting for linked relays, regardless of the data source type- Fixed a bug in the APCGetI() logic: HND_SC was missing.
- Fixed a bug in the PrintObj1lpf() logic caused problem in some PowerCalc API.
- Fixed a bug in OC window trial/adjustment logic for OC ground relays.
- Fixed a bug in ADX logic for SERIESRC UDF logic.
- Enhancement in GenW4 current injection logic.
- Fixed a bug in the branch text block coordination calculation logic.
- Make use of long bus name in GenWx warning messages.
- Fixed a bug in GenWx text import logic that affected the minV and.
  some other settings
- Use tabs in the Set Generator Ref Angle dialog box to make the bus ids easier to see.
- PTI.EXE: Bugfix in phase shifter data export.
- Fixed a bug in CHF file generating logic.
- Fixed a bug in the ground current calculator. The generator current direction should be reversed to get correct ground current when the fault is on the ground mat.
- Enhancement in GenW4 simulation.
- ANAFAS.EXE Conversion Program:
  + Bugfix in UDF export logic
  + Added logic to make the high side of 2-winding wye-delta transformer lead the low side.
  + Also added logic to make sure lines with impedance no less than 1.0E-4.
  + Enhancements in GenW4 translation.
  + Changed version to 15.5.
- Fixed a bug in recloser write logic
- Fixed a bug in file comparison logic for Reclosers
- Fixed a bug in PCC file annotation logic.
- Changed pGenW4->fMinV default value to zero.
- Memory bug fix in the fault simulation logic that caused the program to crash when there are too many GenW3 and 4 in the network.
- Fixed a DXT export problem in the ANAFAS data conversion program.
- Fixed a bug in the GenWx shut down simulation logic.
- Fixed a bug in Enosrv import logic.
- Fixed a relay name buffer length issue that caused program crash in the CheckPriBack, relay report and read change file commands.
- Logic scheme copy/paste bug fix.
- FullRelayName() API relay name buffer bug fix.

- Fixed bug in readTokenizedFieldRlyGroup() that affected the file comparison results of the Trip logic setting.
- Added the Logic scheme OnOK logic to check for ID uniqueness.
- Added Logic scheme duplicate ID check to the Check network anomalies logic.
- Fixed bug in the file comparison logic for relay group trip logic setting.
- Enforce Logic scheme ID uniqueness in the dialog box.
- Added Logic scheme duplicate ID check to the Check network anomalies logic.
- Fixed the Case builder command to make the old GUI the default.
- Additional enhancements for genW3s and genW4s simulation.
- Merge bus logic enhancement.
- Enhancements in solution of type-3 wind generator model.
- Fixed the Case builder command to make the old GUI the default.
- Misc update of shutdown and BSVolt logic for genW3s and genW4s.
- Show GenW4 shut-down condition on report, one-line, and phasor probe.
- EliminateZZBranch() API logic bug fix and enhancement.
- Bugfix in OLR file read logic for Outaged comm channel data.
- Improve the reliability of the relay coordination check summary file write logic.
- Fixed a bug in the Line dialog box logic for I2T field.

OneLiner Version and Build numbers

OneLiner's version number consists of two integers separated by a period. The program build number is a single integer. The *OneLiner's* "Help | About this program" dialog box in the picture below shows version V15.6 Build 23400.



Major version number, 15 in the above example, is incremented between major software releases, when major changes in program features, network and relay models happen.

Minor version number, 6 in the above example, is incremented between maintenance software releases. Maintenance releases consist of mostly fixes for software bugs, and also some new and enhanced program features. However no new parameters are introduced for any network or relay objects in maintenance releases. *This means that the OLR data files generated by OneLiner relases having the same major version number are 100% compatible.*

ASPEN regularly creates new builds of the program with fixes for software bugs when they are found and makes them available to users on demand. Both major and minor version numbers are kept unchanged in these builds. Only program build number, 23400 in the above example, is incremented.

Backward and Forward OLR files compatibility between major version releases

Backward compatibility: *OneLiner* can read olr data files generated by previous versions (3.1 or later) with no loss of information. Version 3.1 was released in 1990.

Forward compatibility: *OneLiner* can read olr files generated by future versions. For example, *OneLiner* V14 can read olr files generated by V15, except new objects and new parameters not available in V14 will be omitted by the V14's read-file logic.

Backward and Forward Compatibility of DXT files

Text data files with extension DXT were intended to be a medium of data transfer between data conversion programs and *OneLiner* of the same major version. Due to popular demand, *OneLiner* V15 can read DXT files generated by *OneLiner* v14. This is the only exception.