ALCDEFVerify
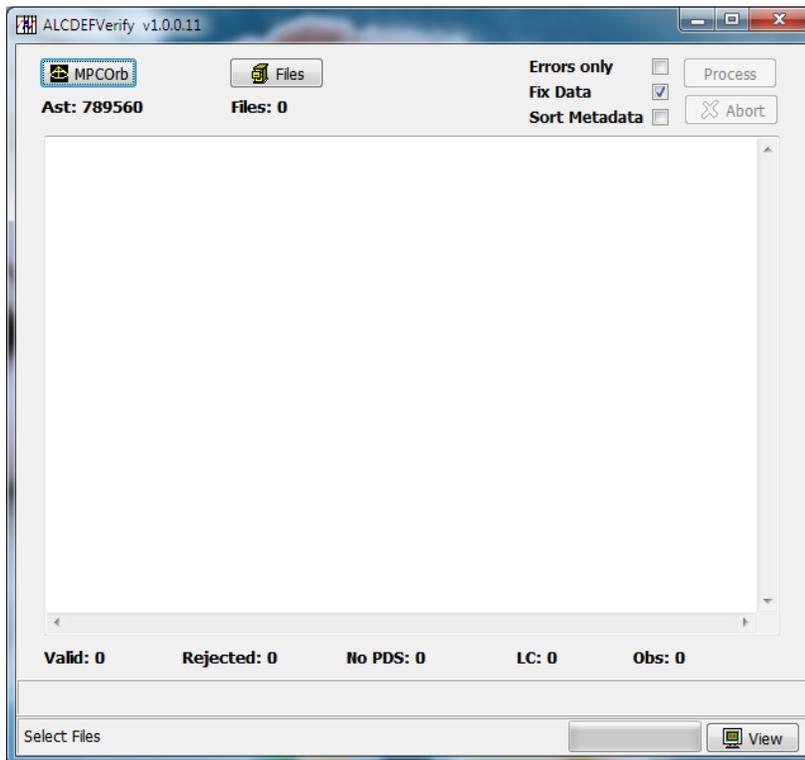

Overview

ALCDEFVerify allows validating ALCDEF files prior to submitting them on the ALCDEF web site at *http://alcdef.org*. It is a 32-bit Windows program with no external dependencies (.NET, VC redistributables, a specific database engine, etc.). It has been tested on Windows 7 and 10.

The primary purpose of ALCDEFVerify is to help debug personal scripts or programs that generate ALCDEF files or to certify that a third-party utility is producing ALCDEF-compliant files.

1. ALCDEFVerify works only with files using the full ALCDEF standard. It does *not* check files that are compliant with the S-ALCDEF (Simple-ALCDEF) format.

With the introduction of ALCDEF v2.2 (A2.2 from here on), new keywords were added and the allowed values for some keywords were changed. This was done in preparation of the ALCDEF database being part of NASA's Small Bodies Node and to provide the option of having data submitted via the ALCDEF web site be automatically submitted to NASA's Planetary Data System (PDS from here on) on a periodic basis.

A critical change to A2.2 was the inclusion of two required "opt-in" keywords that affect if and how data are distributed.

The current ALCDEF documentation is available on the ALCDEF web site at

> *http://alcdef.org*.

Installing ALCDEFVerify

ALCDEFVerify and this document are distributed in a ZIP file found on the ALCDEF web site:

> *http://alcdef.org*

1. Download the ZIP file to your computer.

2. Unzip the contents to an existing or new directory.

   It's recommended that you create a directory named x:\ALCDEFVerify where x:\ is the root of hard drive x. It is also recommended that the program not be put in or a subdirectory of C:\Program Files or C:\Program Files (x86).

   For the rest of this manual, it's assumed the program was put in C:\ALCDEFVerify.

3. Open Windows Explorer

4. Navigate to C:\ALCDEFVerify

5. Right-click over the icon for ALCDEFVerify

6. Select Properties from the popup menu

7. Select the Compatibility tab

8. Check the "Run as Administrator" box.

   Do _not_ check the "Compatibility mode | Run this program in compatibility mode for" box

9. Click OK to save the change.

Steps 5-9 may not be required. The program does need the rights to write to an INI file in its directory and to create/write to two subdirectories under its directory: ALCDEF and BATCH.

✥ The installation includes the file PJ2000.DAT. This must be in the same directory as the program. It is a set of planetary positions from 1995-2050 that allow including the more important perturbations when calculating an asteroid's position.

   If you have other MPO software installed, e.g., MPO Canopus, this file will be in the \MPO\COMMON directory, but ALCDEFVerify **will not** find that copy.

Using ALCDEFVerify

ALCDEFVerify requires a recent copy of the MPCORB file. A utility within ALCDEFVerify is used to download the required files from the MPC web site and then run the conversion to a local, in-memory table with indexes.

Program Startup

Run the program. This brings up the main form.
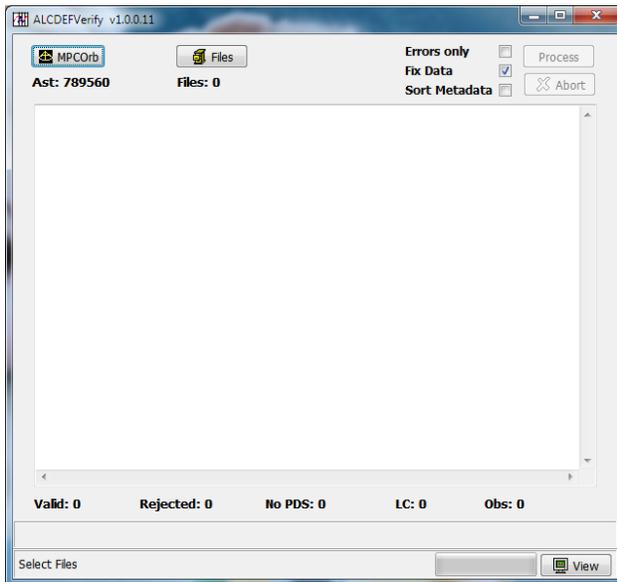
Note the "Loading MPCOrb file and creating indexes…" message. If this is the first time the program is being run or the C:\ALCDEFVerify\MPCORB_MemTable.dat file is not found, this message may not appear at all.

When the program first runs, it automatically creates two subdirectories: ALCDEF and BATCH. The ALCDEF directory is the default location for any files that you want to verify. The BATCH directory stores log files that are created each time a verification run is made.

MPCOrb (Button)

This button displays the MPCORB conversion utility. If the label under the <MPCOrb> button indicates 0 or very few asteroids, you should run the utility before proceeding.

1. Click <MPCOrb>. This displays the conversion utility.
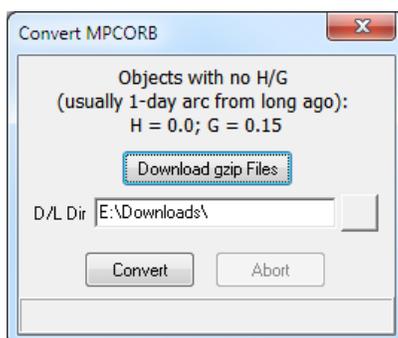
2. To change the default location to where the MPC files will be downloaded, enter a valid directory path, including the trailing path delimiter. You can also click the button to the right of the field to display a directory selection dialog box.

3. If you want to download recent versions of MPCORB and NUMBEREDMPS (the latter is used to store the the current MPC designation for numbered asteroids), click the <Download gzip Files> button. Assuming you have a valid Internet connection, the two files are automatically downloaded to the directory indicated in the "D/L Dir" field.

    ✎ The URLs to the files cannot be changed at this time.

4. Once the files are downloaded, or are already in the director given in the "D/L Dir" field, click the <Convert> button. The button is disabled and the <Abort> button is enabled should you want to stop the conversion.

    ✎ Do not try to verify ALCDEF files until you've successfully completed a full conversion. If you stop the conversion, the data file and its internal indexes will not have the full data set.

    Note the text above the <Download gzip Files> button. This is saying that some entries in the MPCORB file, usually long lost objects, may have no H value or it's 0.0. While orbital elements are available, any estimate of position and/or brightness is highly suspect.

5. The progress panel at the bottom tracks the conversion process. Converting the data goes quickly on most machines.

6. When the data have been converted, the program updates three index files. An "Activating Indexes" message appears in the progress panel. This will take up to one minute, usually less. If the indexes were updated during the conversion, it would take many minutes to complete the conversion.

7. Once completed, the table is saved as C:\ALCDEFVerify\MPCORB_MemTable.dat and the number of asteroids in the table is displayed in the progress panel, e.g., "Asteroid Count: 781801." Its size with this number of asteroids was about 113 MB.

    ✎ *Do not delete the MPCORB_MemTable.dat file*. If it's found when the program starts, you won't have to go through the conversion process again. However, the *indexes are not saved* and will be rebuilt when the program is started.

8. When done, click the "X" button at top right to close the utility. The label under the <MPCOrb> button should show the same number of asteroids.

Why is MPCORB Needed?
Part of the validation process is to make sure that values for the OBJECTNUMBER, OBJECTNAME, and MPCDESIG keywords all refer to the same object. If an asteroid is numbered but the MPCDESIG value is empty, it will be set to the object defined by the number and/or name.

Sometimes a lightcurve block will be found invalid even though the designation and name are correct when the asteroid data were taken. However, if the designation was changed at some later date, this may cause a disagreement among the three values. If this happens, use

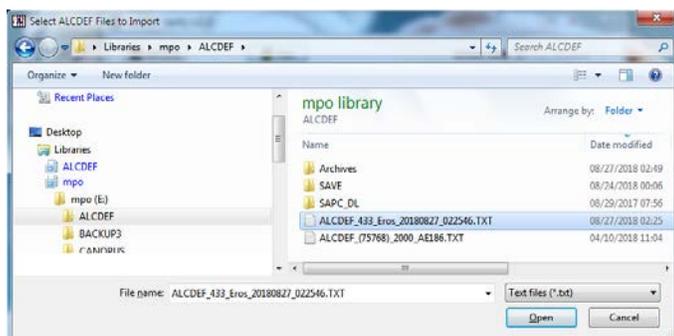   *https://www.minorplanetcenter.net/iau/mpdes.html*

to try to find the current designation for the asteroid using the original designation and then edit the ALCDEF file(s) to use the new designation. Then try validating the edited files again.

Files (Button)

Assuming there is a valid MPCOrb table available,

1. Click the <Files> button. This displays a file selection form.

2. Navigate to the directory where the files to be verified are found.

   The first time the program is run, the default directory is C:\ALCDEFVerify\ALCDEF. If a different directory is used, that directory becomes the default for the current program run *and* the next time the program is run.

3. This is a standard Windows multi-select form. Select one or more files.

4. Click the <Open> button. This closes the form and the label under the <Files> button shows the number of files that were selected.

   Files *cannot* be selected from more than one directory at a time. Also, each time you click the <Files> button, the existing list of files is cleared.

Errors only (Check box)

Check this box to have the batch log include messages for only those lightcurve blocks that were invalid. If not checked, all messages appear, including "SUCCESS…" for valid lightcurve blocks.

Fix Data (Check box, v.1.0.0.10 and beyond)

Check this box to have the program compare the position of the asteroid given by OBJECTRA and OBJECTDEC (ORADC for short) against the position computed using the current orbital elements for the date/time given by SESSIONDATE and SESSIONTIME.

If the box is checked and the positions are more than 2° apart, the program automatically overrides the values for OBJECTRA, OBJECTDEC, PABL, PABB, and PHASE with the computed positions.

In v1.0.0.10 and later, corrections are also made to *some* missing comp star data. The file will be rejected if [CompX]Magnitude or if CIBAND is missing and CICORRECTION=TRUE.

If any changes are made, a revised version of the original file is stored in the same directory using the original file name but with _AUTOCOR_xxxxx before the extension. The 'xxxxx' represents a autoincrement number so that previous versions are not overwritten. For example, on the first run

    C:\ALCDEFFiles\1600_Vyssotsky.txt => C:\ALCDEFFiles\1600_Vyssotsky_AUTOCOR_00001.txt

If the box is not checked and the ORACD position differ by more than 2°, an error is reported back and the entire lightcurve block tied to the metadata block being processed is rejected.

Sort Metadata (Check box, v.1.0.0.10 and beyond)
Check this box to rewrite the file *even if no errors are found or corrections made*.

There is no required order of the keywords in the ALCDEF metadata block. However, to make the block more human-friendly (quicker to scan), the keywords should appear in groups of similar information with the groups identifying the object, date/time, and contact name/information being towards the top.

Checking this box will create a copy of the original with the keywords in the suggested order.

Process (Button)
Click <Process> to start the validation. The bottom-most panel and its progress meter are updated. If only a few small files were selected, these may be reset to the start position almost immediately.
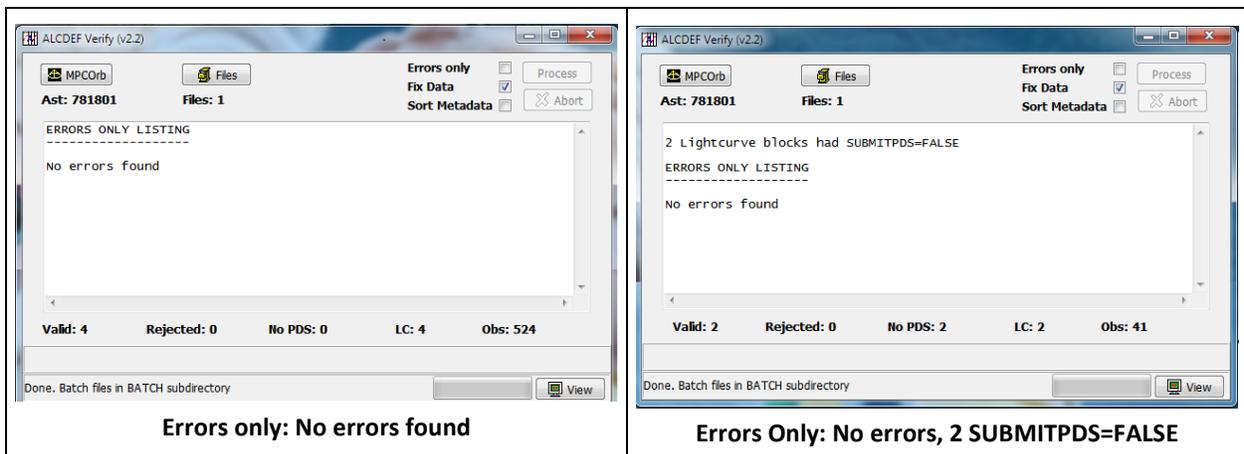
When done, the log appears in the read-only memo control and the labels under the memo (viewer) control are updated:
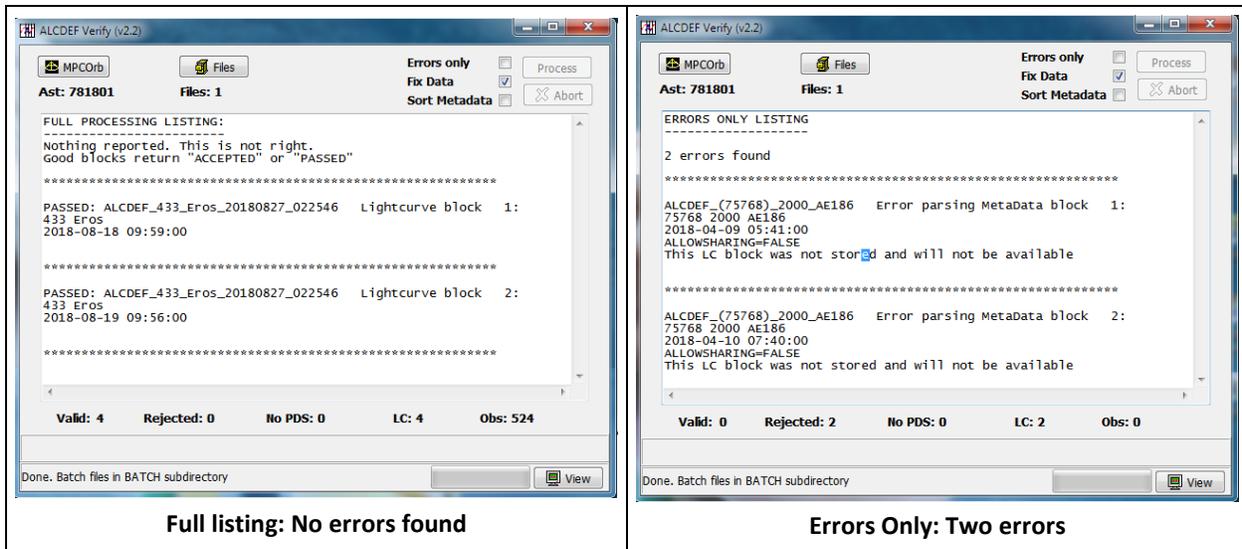
Valid:	The number of valid lightcurve blocks, not necessarily files.
Rejected:	The number of invalid lightcurve blocks.
No PDS:	The number of valid lightcurve blocks where the SUMBITPDS=TRUE lines was missing or SUBMITPDS=FALSE was found. Those lightcurve blocks can be uploaded to the ALCDEF site but they will not be automatically submitted to the PDS during periodic updates.
LC:	The total number of lightcurve blocks that were reviewed.
Obs:	The total number of observations that were in valid lightcurve blocks.

See the *ALCDEF standard documentation* for more information.

The contents of the memo field are automatically saved to the \ACLDEFVerify\BATCH directory using the name ALCDEF_BATCH_yyyymmdd_hhmmss.TXT with the current date/time used to complete the file name, e.g., ALCDEF_BATCH_20180827_110011.TXT

Below are screen shots of some of the possible results. The forms have been cropped to allow putting all the examples on a single page.

Errors only: No errors found

Errors Only: No errors, 2 SUBMITPDS=FALSE

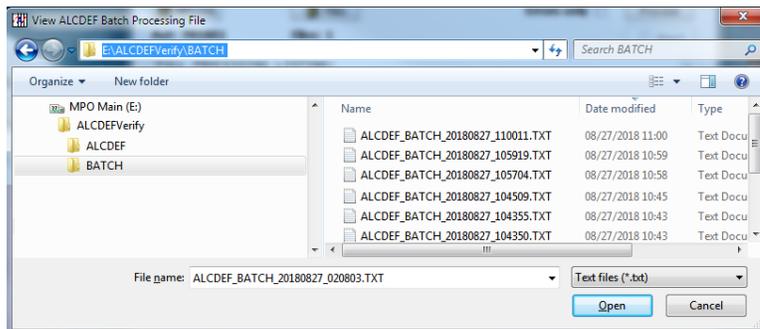| Full listing: No errors found | Errors Only: Two errors |

Viewing Batch Processing Logs

To view batch logs created in previous processing runs,

1. Click the <View> button. This displays a file selection dialog.

2. If necessary, navigate to where the batch files are found and select a file. Only one file can be selected.

   ✌ When this form is brought up for the first time, the default directory is \ALCDEFVerify\BATCH. If a file in a different directory is selected, that directory becomes the default for opening batch files (but not ALCDEF files). This persists while the program is in use *and* when the program is closed and then run again.

The contents of the memo (file viewer) window are read-only, but you can copy all or some of the contents to the clipboard and then paste into another program.