Installation Guide for ATP-Related Programs

Software and installation recommendations for Windows 7 computers.

October 18, 2016

Contents

Bonneville Power Administration

Brief Introduction

ATP-EMTP

The original EMTP (ElectroMagnetic Transient Program) was developed at Bonneville Power Administration (BPA) in the 1970's and 80's primarily for modeling power system transients. The primary EMTP developers were Dr. Hermann Dommel, Dr. Scott Meyer and Dr. Tsu-huei Liu. The development on the EMTP was discontinued in the 1980's. The terms EMTP and EMT programs are now generic terms that refer to a number of similar transient programs such as: ATP, EMTP-RV, EMTDC, PSCAD and RSCAD-RTDS.

The ATP (Alternate Transients Program) is a widely-used version of EMTP and available to most individuals around the world essentially free of charge. The ATP solves linearized differential equations of system components with numerical integration using the trapezoidal method. It can perform time-domain simulations or frequency scans.

The EEUG or European EMTP-ATP User Group provides the following program description:

> *"ATP is a universal program system for digital simulation of transient phenomena of electromagnetic as well as electromechanical nature. With this digital program, complex networks and control systems of arbitrary structure can be simulated. ATP has extensive modelling capabilities and additional important features besides the computation of transients. It has been continuously developed through international contributions over the past 20 years."*

Regarding licensing the following is an excerpt from the EEUG:

> *"ATP is a royalty-free EMTP (Electromagnetic Transients Program), but not a public domain program. Each potential user of ATP must agree not to disclose any ATP information to unauthorized persons and / or organizations. A non-disclosure agreement (ATP License Form) to this effect must be signed by each user and approved by the user group, before access to ATP information will be granted."*

Two often-used versions of ATP include MingW32 and Watcom. MingW32 is a Win32 native application and as such the recommended version for Windows systems.

The beginning of an ATP simulation, when running the tpbig.exe file, is shown in Figure 1. The ATP then reads in "card images" with formatted data describing the electrical network or control system. These card images may either be created by using a text editor or through a GUI such as ATP Draw. The ATP Rule Book provides a description of how the case must be assembled, along with each card image type and its format.

Figure 1 Simulation Start using a MingW32 ATP version

ATP GUI's

ATPDraw

Although a number of Graphical User Interfaces (GUIs) are available to run ATP, often a new ATP user will use ATPDraw since it is easier to learn and does not generally require that card images be manually created.

The ATPDRAW.net web page describes the program as follows:

> *"ATPDraw is a graphical pre-processor to ATP and is used to create and edit circuit files. The output of ATPDraw is a file you can use as input to the ATP program. The program is developed by Dr. Hans Kr. Høidalen at SINTEF Energy Research/Norwegian University of Science and Technology in Norway, sponsored by Bonneville Power Administration, Portland-Oregon-USA. Multi-phase developments and Vector Graphics in the v5 version is sponsored the EEUG organization. The developers are not responsible for any erroneous results produced by ATPDraw. This 32-bit Windows program runs under MS-Windows 9x/NT/2000/XP/Vista/Windows7."*

Figure 2 shows a typical ATPDraw window and circuit diagram following execution of the Atpdraw.exe and creation of a new case.

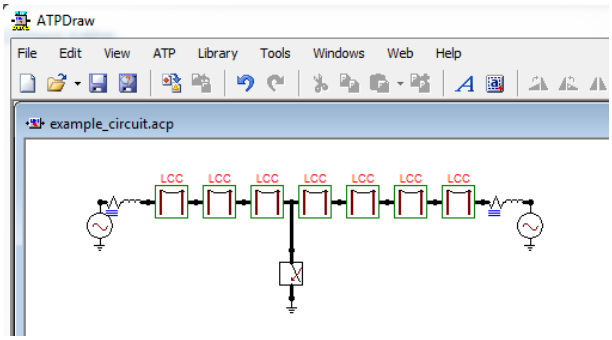

Figure 2 ATPDraw Example Circuit

Plotting Programs

There are a number of programs for plotting the time-dependent waveform outputs or frequency scan outputs of the ATP, each with its own features and limitations. PlotXY can be used for quick examination of a case immediately follow execution and ATP Analyzer can be used for detailed analysis.

ATP Analyzer – Recommended plotting program

The ATP Analyzer program was written by Glen Fortner (now at PacifiCorp) between about 1999 and 2011. It has since been updated by Joe Matsuoka of BPA. As stated in the ATP Analyzer Instruction Manual:

> *"The ATP Analyzer program is royalty free. The proprietary rights of ATP Analyzer belong to the Bonneville Power Administration USA, which financed program development."*

For additional details please refer to the Instruction Book and Quick User Guide.

Features:

- Can plot pl4 files (native output of transient ATP cases), COMTRADES, ASCII Table files and more
- Plots in a single window: XY, multiple axes waveforms, multiple axes overlaid waveforms, and digital signals to work well for ATP or digital fault recorder files
- Extensive built-in analysis tools for mathematical, waveform modifications, calculations (power, impedance…), FFT, Boolean, relay characteristics
- Can combine and compare different waveform files, resample, truncate, write out
- Lacks the ability to easily copy figures for reports, so a print screen application needs to be used
- Newest version – can save channel selections for multiple overlay plots from one file to the next, reducing time required for repetitive plotting

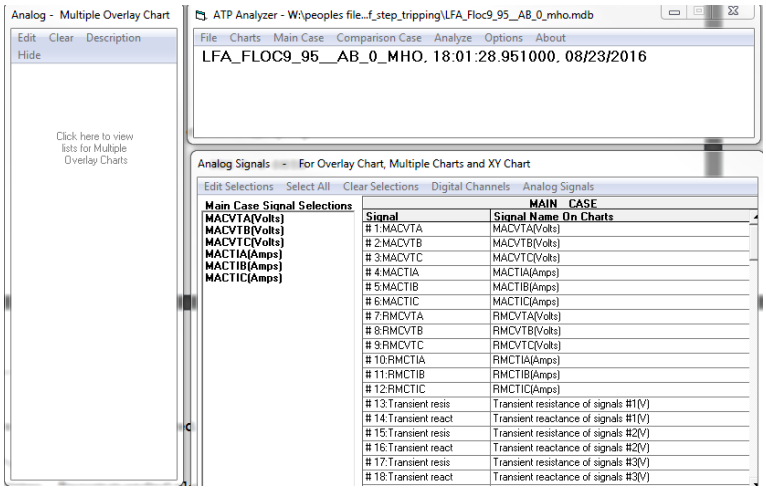

Figure 3 ATP Analyzer

Plot XY

The program documentation provides the following history:

"PlotXY was created initially in 1998 as an answer to the need of the community that used the well-known electromagnetic transients program EMPT/ATP to have a Windows-based fast and practical program to make plots. The programs available at those times were mainly based on old Microsoft DOS and were, in the opinion of the writer, either too slow or a bit tricky to use."

Features:

- Can view binary pl4 files (native output of transient ATP cases), COMTRADES, Open Modelica and more
- Is quick to open and plot files for review
- Easy to copy out figures for reports
- Plots up to four windows with single-axis, overlaid plots
- Does not have extensive analysis tools like ATP Analyzer

User Groups & Program Sources

For licensing, software and support.

Canadian American User Group (CAUG)

www.emtp.org (currently down, use EEUG)

European EMTP-ATP Users Group (EEUG)

www.eeug.org

Japanese ATP User Group (JAUG)

http://gundam.eei.eng.osaka-u.ac.jp/atpwww/index-e.htm

List Server

The ATP list server uses e-mail as a forum to ask, answer, and inform. It is recommended to join the list server as an ATP user.

ATPDraw

www.atpdraw.net

ATPDraw can be obtained directly from Hans Høidalen's atpdraw.net website. You will need to register, and pass an EMTP quiz, to download a copy for free.

Plot XY

Dipartimento Di Sistemi Elettrici E Automazione (DSEA)
http://www.dsea.unipi.it/Members/ceraolow/Software/plotxy/plotxy-april-2014/view

PlotXY is available from Massimo Ceraolo's web site provided above.

ATP Analyzer

Contact Christine Goldsworthy via e-mail, at cegoldsworthy@bpa.gov.

ATP Program

www.eeug.org

Prior to installation, obtain a free ATP license by following instructions from your local User Group. When obtaining the free ATP license, you can also request software copies and documentation. There is usually a fee for this. Another source for the software, after a license is obtained, is from another licensed user.

"Everyone who is licensed can use the program free of royalty, but the program is not in the public domain and it is not available via anonymous FTP. The program disks and printed materials (Rule Book, Theory Book, User Manuals) can be ordered from the EEUG by filling out the appropriate Order Form."

"Alternatively you also have right asking that materials from any other [licensed] ATP users, if he or she is willing to share it with you, as it is stated in the license form: ("...The sharing of ATP materials among authorized users is encouraged. If one authorized user has newer or better materials than a second, the first user is encouraged to share with the second...")."

– EEUG.org, September 2016

Installation

Program Installation

Determining which method to use depends on the programs you are using. If you have the InstallShield versions of ATPDraw with ATP, then method two is recommended. If you do not, use method one. Examples of program versions:

Figure 4 ATP Program Files

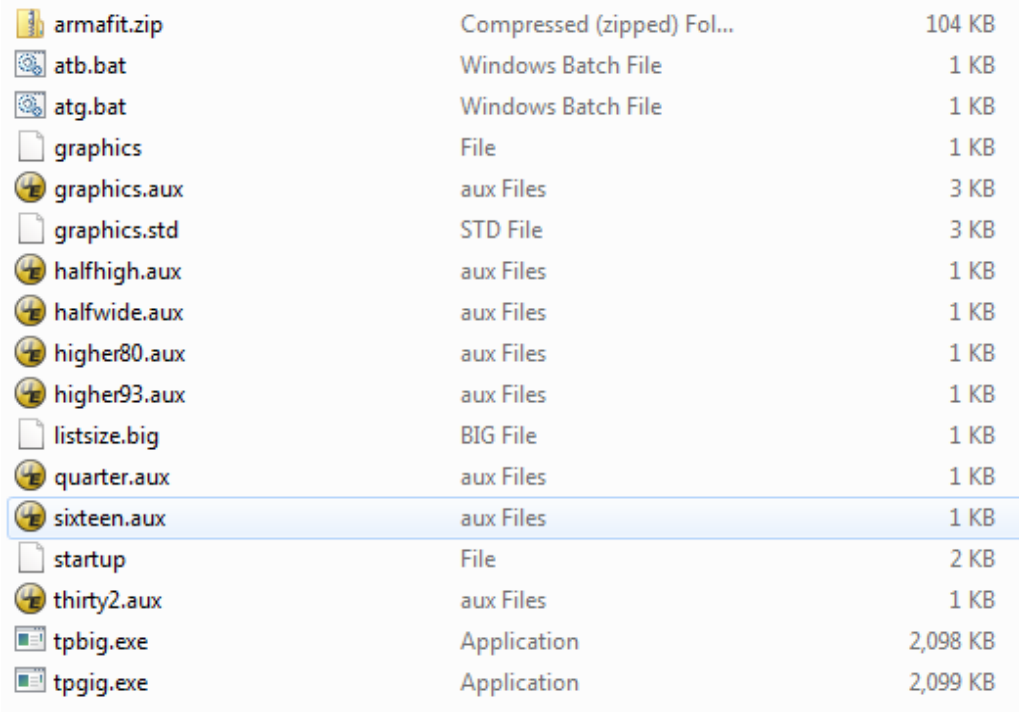

Figure 5 ATP Engine - MingW 10-29-2015.zip Opened

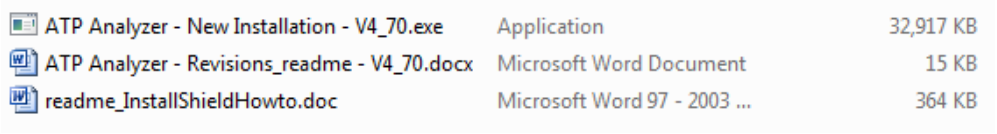

Figure 6 ATP Analyzer InstallShield Version 4.70

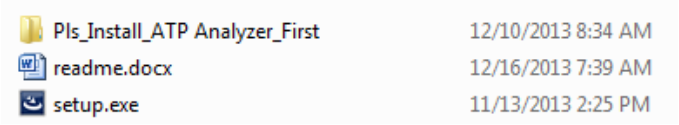

Figure 7 ATPDraw InstallShield Version 5.8

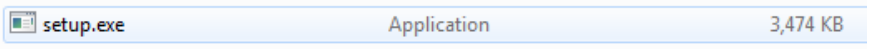

Figure 8 ATPDraw Install Version 6.1

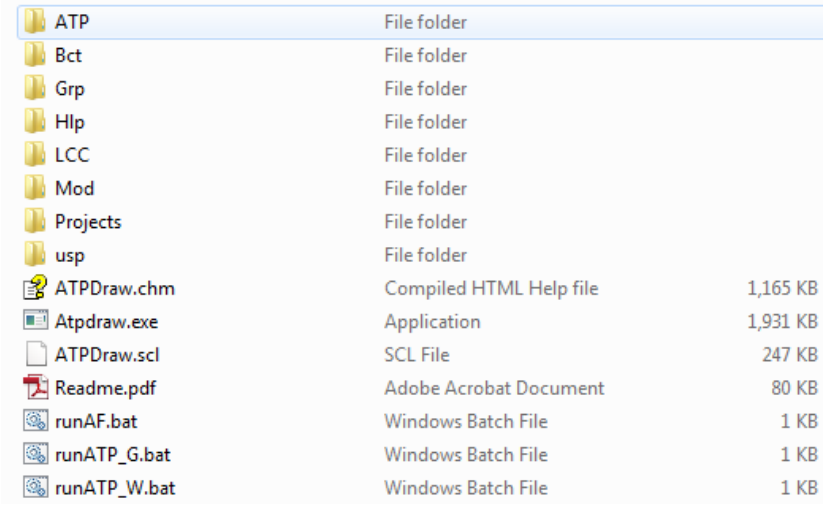

Figure 9 ATPDraw Image Version 6.1

Installation Method 1 – Manually

Manually install ATPDraw, ATP Analyzer and ATP in the recommended folder locations, then point ATPDraw to the applications. Note that there are multiple ways and places to install. This is just one tested and recommended method.

Copy ATPDraw, ATP Analyzer and ATP install files to your local computer before starting. Extract zipped files as necessary.

Install ATPDraw

ATPDraw typically comes in an install and image format. The install version will run an installation wizard and automatically install the application. The image version allows you to copy and paste the new files and overwrite the older version. Both methods will work for installation. The install version is recommended for first time installations.

The only caution is to not embed ATPDraw in too many folders. ATP will be stored in the same location, and has limited characters in file names. Similarly, the file and folder names cannot contain any spaces. If this is a problem, ATP will not run.

The recommended file location for ATPDraw is at the root level: "C:\ATPDraw\".

Install ATP Analyzer – InstallShield Version

ATP Analyzer has been added to a custom InstallShield for properly installing on a Windows 7 machine.

Follow the instructions with the InstallShield for installation. The location for ATP Analyzer is not important and can be in "Program Files" because it will be linked in ATPDraw.

Install ATP & Link Applications in ATPDraw

1. Extract atpmingw.zip to "c:\ATPDraw\ATP_MingW32". You will need to create the folder.
2. Copy the batch file "runATP_MingW32.bat2" to "C:\ATPDraw\ATP_MingW32".
3. Change the extension to .bat, "runATP_MingW32.bat". Depending on the method you received the batch file, renaming may not be necessary.
4. When you open ATPDraw for the first time it will inform that there are folders missing that it is by default linked to. You can click yes to all of the defaults and let the program create those folders for you.
5. In ATPDraw, go to "Tools > Options > Preferences".
6. Under the Programs section, "ATP:" browse to the "runATP_MingW32.bat" file, "C:\ATPDraw\ATP_MingW32\runATP_MingW32.bat".
7. Under the Programs section, "Plot Program:" browse to ATP Analyzer, "C:\Program Files (x86)\ATP Analyzer\ATPAnalyzer.exe". If the browse button is not working, type directly into the text area.
8. Your options should look similar to Figure 10 below when complete. Hit Save, and OK.

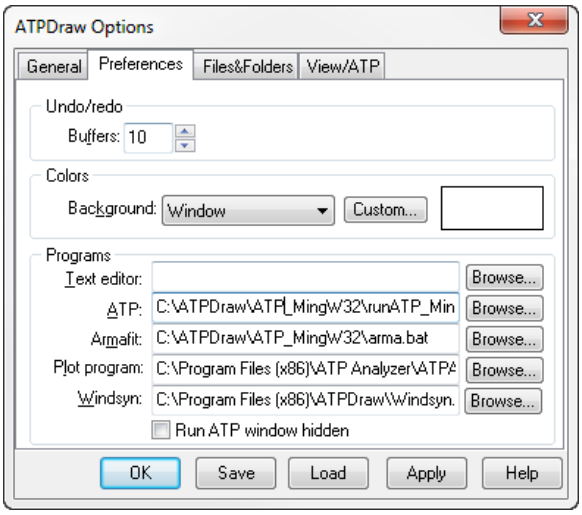

Figure 10

9. Other recommended File&Folders options. Check the "Results in current project folder" checkbox.

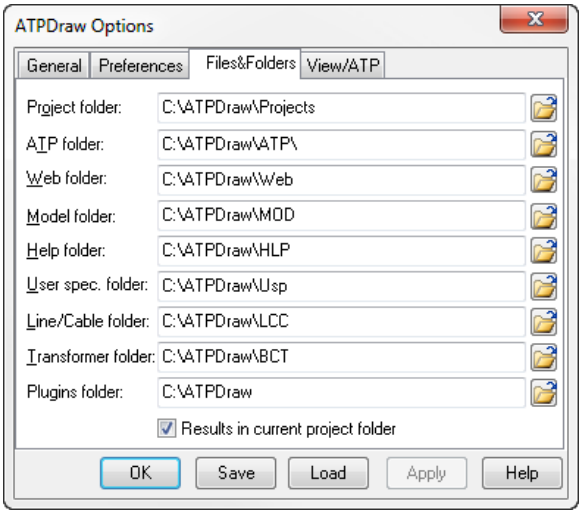

Figure 11

10. In ATPDraw, save a second time by selecting "Tools > Save Options". This second save has been found to be necessary at times to insure ATPDraw actually does save the changes.

Installation Method 2 – InstallShield with Updating Method

Use the two InstallShield executables that will automatically install ATPDraw with ATP, and ATP Analyzer in the correct folder locations, and point ATPDraw to the applications for you. The only downside to this method is that the installer is not always updated as new versions of the software comes out, so after the installer is complete the ATPDraw, ATP or ATP Analyzer executables may need to be replaced with more recent versions. The benefit of this automatic method is that you do not have to worry about folder locations or linking applications – the InstallShield will do that for you.

Copy ATP Analyzer InstallShield, ATPDraw InstallShield, and any later versions of ATPDraw, ATP or ATP Analyzer to your local computer. Extract zipped files as needed.

1. Install the ATP Analyzer InstallShield first following the instructions that come with it.
2. Install the ATPDraw InstallShield version following the instructions that come with it. This is the version that will also install ATP, and link the three applications. If all of the applications are the most recent the installation instructions would stop here.
3. If needed, update ATPDraw to the latest version by copying the highlighted files in Figure 12, that are included with the "image" version, and pasting them to your local hard drive under C:\ATPDraw\. The remaining non-highlighted folder contents can be copied over individually as needed. It is recommended to back up the current version into an archive folder prior to updating.

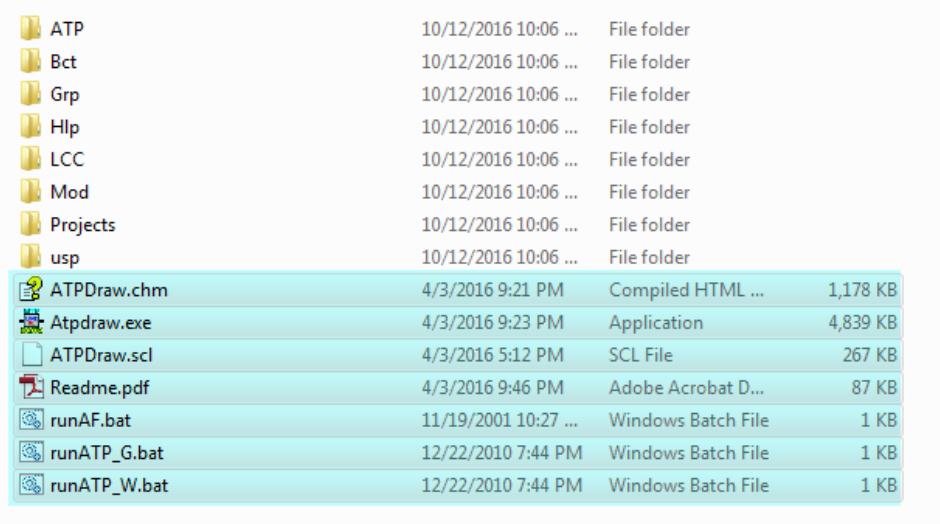

Figure 12

4. If needed, update programs by replacing the ATP executable (e.g. tpbig.exe) and/or the ATP Analyzer executable (ATPAnalyzer.exe) with newer versions in their appropriate folders. It is recommended to back up the current version into an archive fold prior to updating.

Testing Applications after Installation

At this point, the ATP can be executed in ATPDraw when the user has a project file open, and selects the "Run ATP (F2)" command in ATPDraw.

A successful ATP run will look similar to this:

Figure 13

An unsuccessful ATP run will look similar to this, usually with error messages and likely insults included:

Figure 14

To test ATP Analyzer, after a successful ATP time-dependent execution and plot file creation, hit "run Plot (F8)". ATP Analyzer should automatically open and read in the new pl4 file ready to plot. ATP Analyzer can also be tested with other file types such as COMTRADE files.

References

ATP Analyzer 4_12 Manual *[DOC] (2007, February).*

European EMTP-ATP Users Group. Sep. 2016. <www.eeug.org>.

Hoidalen, Hans K. *ATPDraw*. Sep. 2016. <www.atpdraw.net>.

PlotXY History and Road Map [PDF]. (2015, May).

Rifaldi, A., & Lastra, R. B., ATP Rulebook *[PDF]. (2001, December).*