

Manufacturing Work Bench

User Guide

**NCData Services
Manufacturing Software Solutions**

P.O. Box 3954
Show Low, AZ 85901

www.NCDataServices.com

NCData@frontiernet.net

(928) 532-8045

Revised 08-MAR-2006

What's New	4
Revision 04/25/2005	4
Installing Manufacturing Work Bench	5
Postprocessing a CATIA aptsource file with MfgWB and verify installation.	5
Creating a CATProcess for use with VMC4X machine tool	5
Postprocessing a CATIA aptsource file without MfgWB.	5
AZpost File Structure.....	6
APT File Structure	7
The Manufacturing Work Bench user interface.....	9
User interface function fly-over identification	11
APTsource Drive selection	12
APTsource file type filtering	13
Command Button Functions	15
Deleting files.....	15
Postprocessing.....	16
Postprocessor Progress/Status Window	17
Edit command button.....	18
Edit file window.....	19
Print command button.....	20
Install PostProcessor command button	21
Help command button.....	22
Postprocessor syntax Window	23
Remove postprocessor command button	24
MfgWB Customization.....	25
The customization files	25
MfgWB.cfg	27
USEREDIT.BAT	29
USERPP.BAT (for long APTsource file names).....	30
RUNPP.BAT (Option for APTsource files with short names)	31
USER1.BAT	32
INSTPP.BAT	33
MfgBatchCmd.bat.....	34

What's New

Revision 04/25/2005

[Added customizable labels for User 1, User 2 and User 3 command buttons](#)

Installing Manufacturing Work Bench.

1. Detach [MfgWB.zip](#) and unzip into any temporary folder.
2. Double click [Setup.exe](#) to start MfgWB install (follow default instructions).
(MfgWB should successfully install to \Program Files\MfgWB)
3. You may also optionally create a desktop shortcut to \Program Files\MfgWB\MfgWB.exe

Postprocessing a CATIA aptsource file with MfgWB and verify installation.

1. Start + all programs + [NCData Services Manufacturing Work Bench](#).
2. Select a [CATIA aptsource](#) folder by double clicking through folder levels (ie. \apt).
3. Select [APTsource](#) from File Type pull-down.
4. Select the [CATIA aptsource](#) from file list.
5. Select the [VMC4X](#) Postprocessor from postprocessor list.
6. Select the [Postprocess](#) command button. Once you see the postprocessing results in the window type enter until the window closes.
(Postprocessor output files including the machine code file .NCD will be created in the same folder as the CATIA aptsource)
7. Select [NCData](#) from File Type pull-down.
8. Select the [.NCD](#) file from file list.
9. The file can be [Edited](#), [Printed](#), [Deleted](#), or processed by a [User](#) defined application.

Creating a CATProcess for use with VMC4X machine tool.

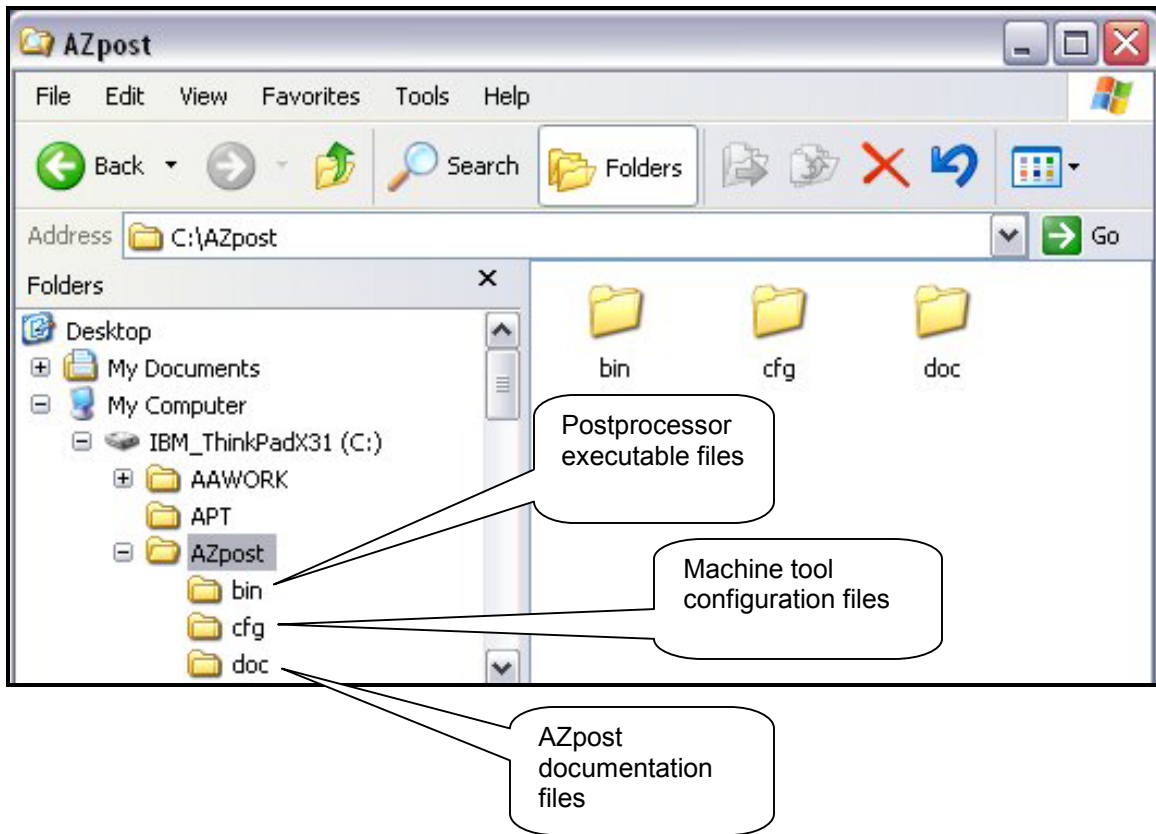
1. Start CATIA and/or open an existing CATIA manufacturing [CATProcess](#)
2. Open [Part Operation](#) panel
3. Select [Machine Icon](#)
4. Select [HAASVF.pptable](#) from pull-down list
5. [OK](#)
6. File + [Save](#) CATProcess
7. [Generate NC](#) output in Batch (name aptsource 8 characters + .APT)

Postprocessing a CATIA aptsource file without MfgWB.

(note: aptsource file names will be truncated to 12 characters, so it is best to name files with 8 characters and .APT extension)

1. Create a desktop shortcut to [VMC4X.exe](#)
2. Open a Windows [browser](#) (ie. my computer)
3. Find and select a [CATIA aptsource](#) file (ie. the aptsource created above)
4. Drag and drop the [aptsource](#) on top of the [VMC4X icon](#) (on the desktop shortcut)
(The postprocessor output files including the machine code file .NCD will be created in the same folder as the CATIA aptsource)

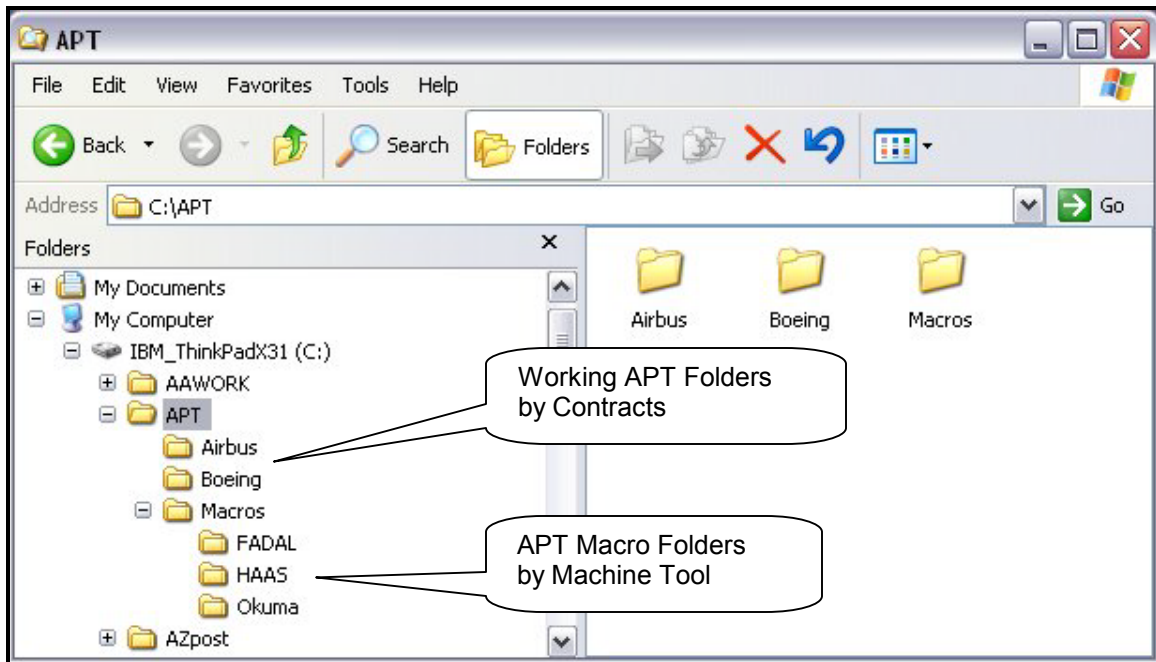
AZpost File Structure



The working AZpost folder contains (3) subfolders as follows:

- The **bin** folder contains all the postprocessor executable files (**.EXE**)
- The **cfg** folder contains all the machine tool configuration files (**.CFG**)
- The **doc** folder contains AZpost documentation files (**.DOC** and **.PDF**)

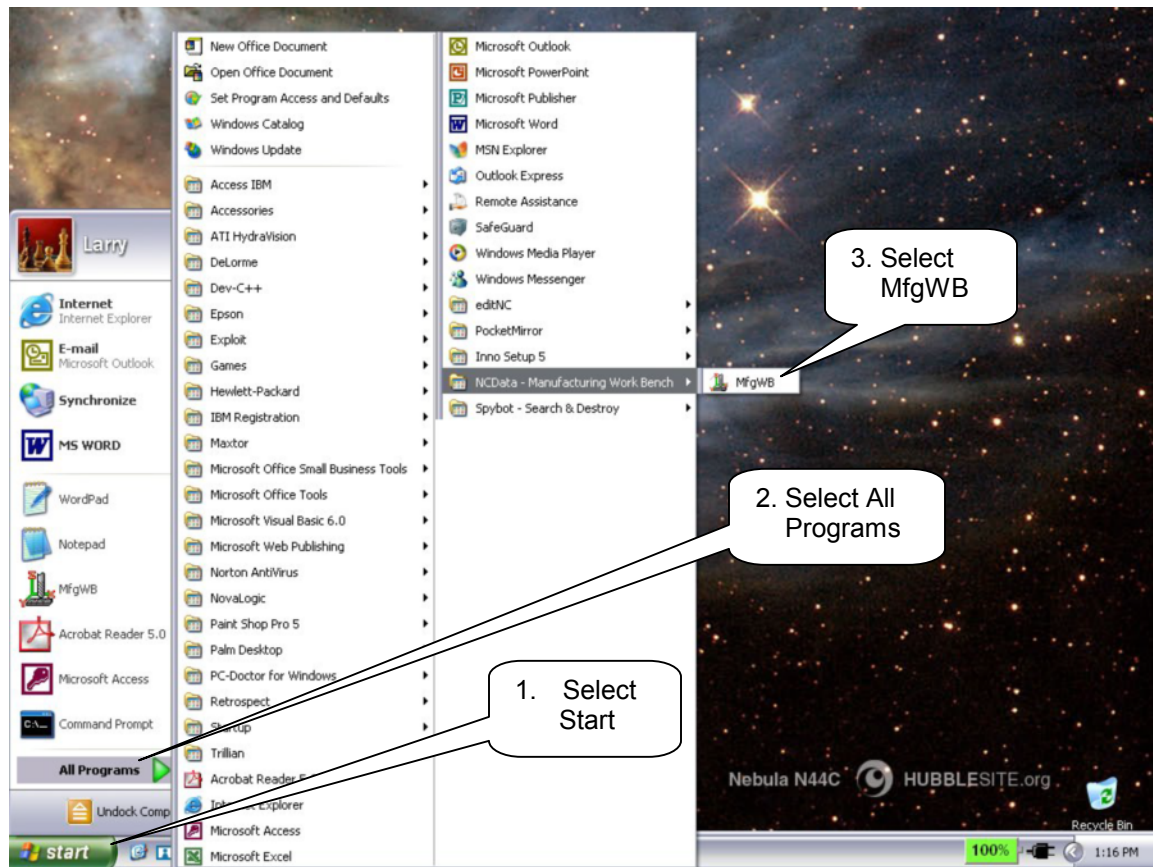
APT File Structure



The **APT** folder can be sub-divided into working contract folders. These working folders can be where the aptsource, postprocessor listing, and machine code files are created and stored.

A **Macro** folder can be created as a sub-folder for storing APT macros used by the postprocessors. The Macro folder can be further sub-divided by machine tool. This allows different macros with the same name to be created and stored for use with each machine tool. This method can be used to keep the aptsource independent of the machine tool.

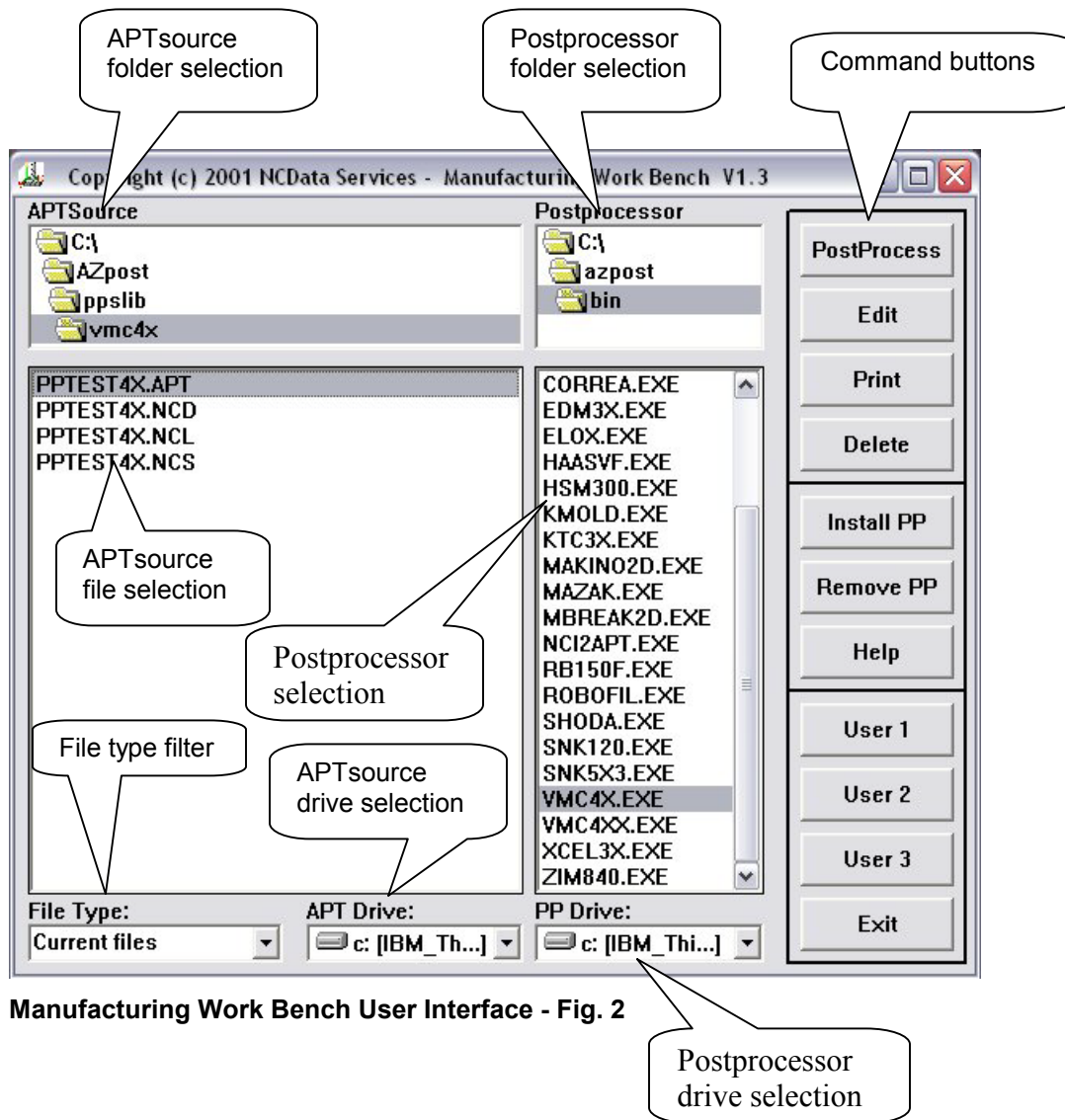
Starting the Manufacturing Work Bench



Starting the Manufacturing Work Bench - Fig. 1

The Manufacturing Work Bench user interface

The Manufacturing Work Bench user interface is composed of eight functions as shown below in figure 2.



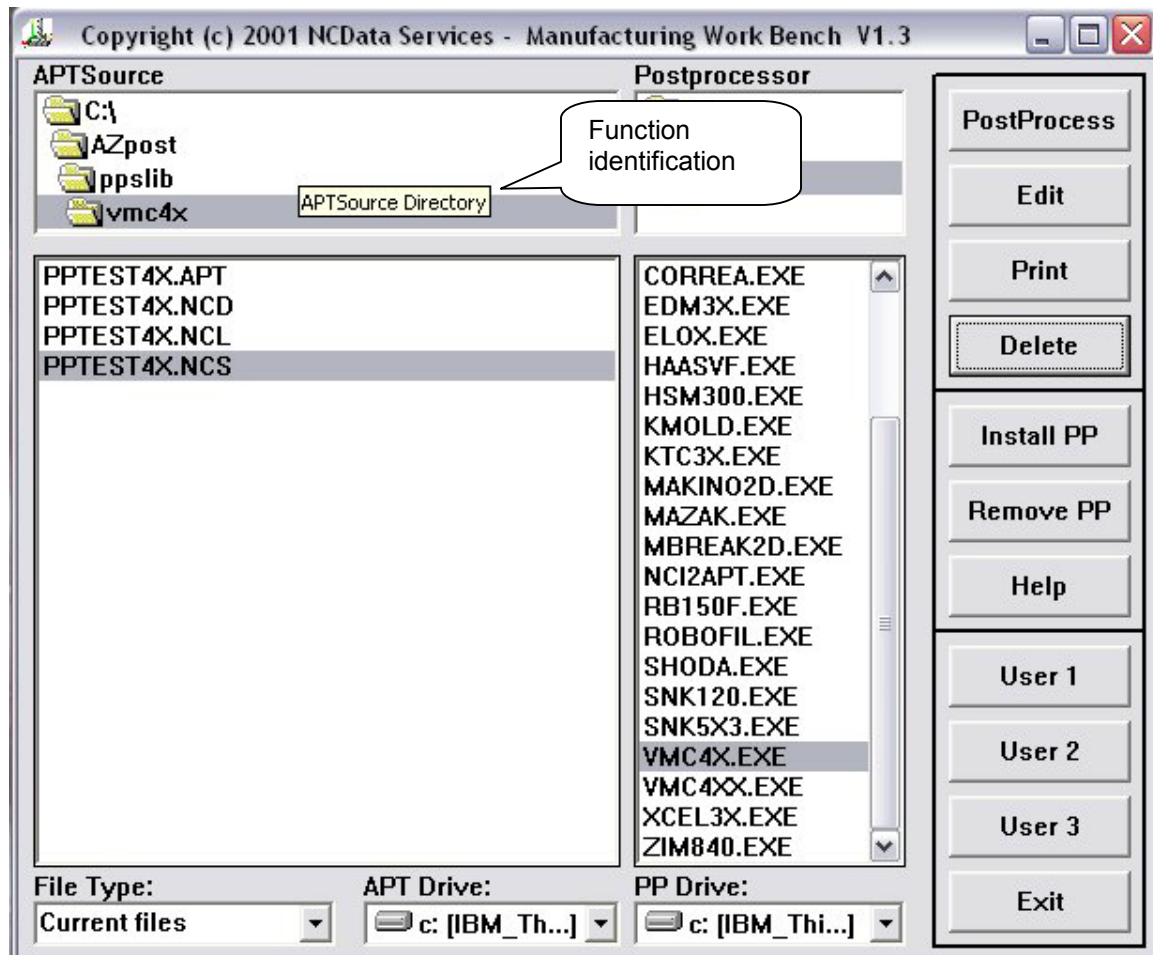
Manufacturing Work Bench User Interface - Fig. 2

1. **APTsource folder selection** for selecting the desired APTsource folder. Folders can be expanded by double clicking. This will expose the subfolders for selection. The default folder is **apt**, but can be customized as desired (see Customizing MfgWB).
2. **Postprocessor folder selection** for selecting the desired Postprocessor bin folder. The default folder is **AZpost\bin** and can not be changed.

3. **Command buttons** are used to provide the user interface functions.
4. **APTsource file selection** is used to select the desired file from the APTsource folder.
5. The **file type** filter is a pull-down menu that allows the user to specify filtering of files by their extension names.
6. **APTsource drive selection** is a pull-down menu that allows selection of the APTsource drive.
7. **Postprocessor selection** is used to select the desired postprocessor from the postprocessor folder \AZpost\bin.
8. **Postprocessor drive selection** is used to select the postprocessor drive.

User interface function fly-over identification

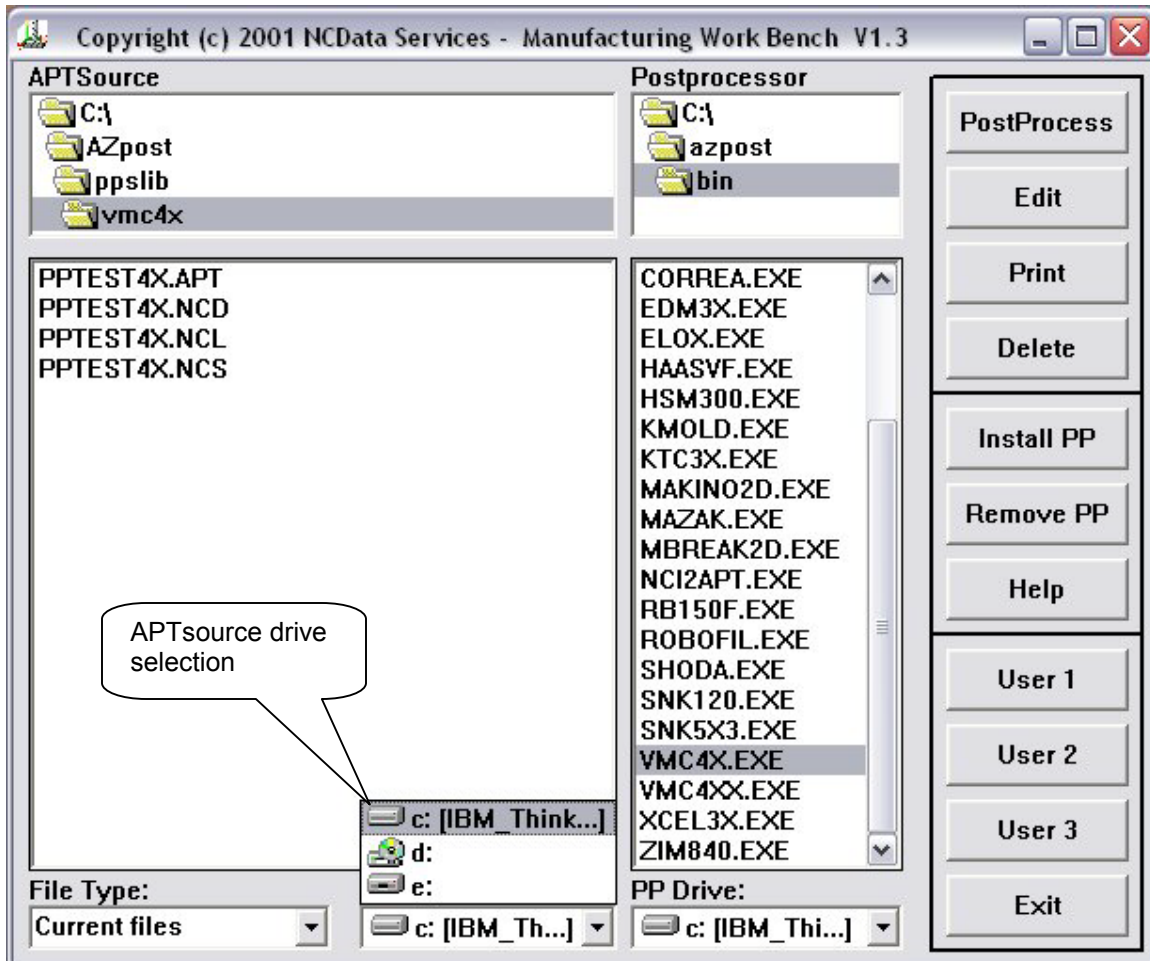
If the mouse is used to position the cursor over a user interface function a short function identification is displayed as shown below in figure 3.



APTsource Directory List - Fig. 3

APTsource Drive selection

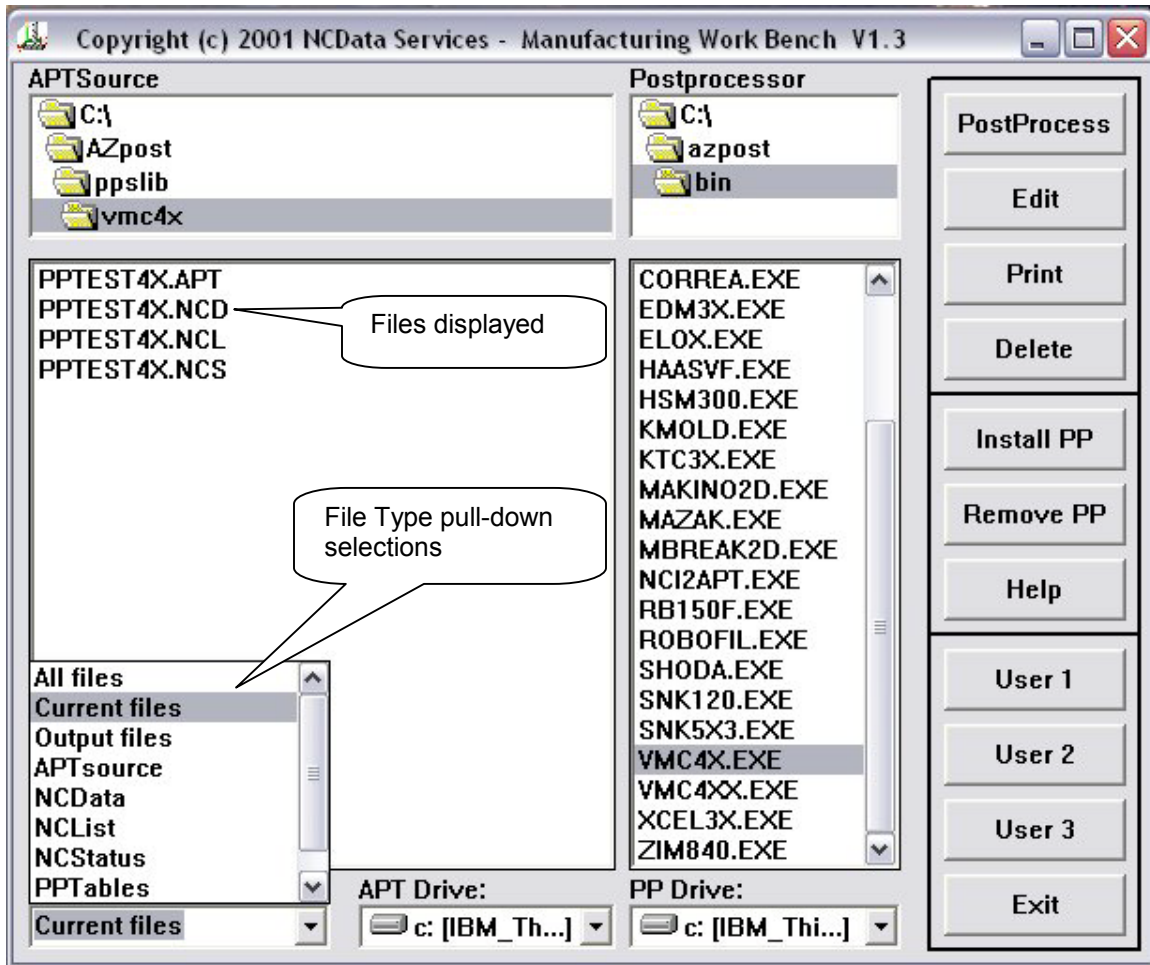
The desired drive for the APTsource folder can be selected from the APTsource Drive pull-down as shown below in Figure 4.



APTsource Drive - Fig. 4

APTsource file type filtering

Files in the APTsource folder can be filtered for display in the APTsource file selection by selecting the File type pull-down (as shown below in figure 5) and selecting a filter from the pull-down list.



File Type Filtering - Fig. 5

Files can be filtered for display and selection by file extension using the filters as follows:

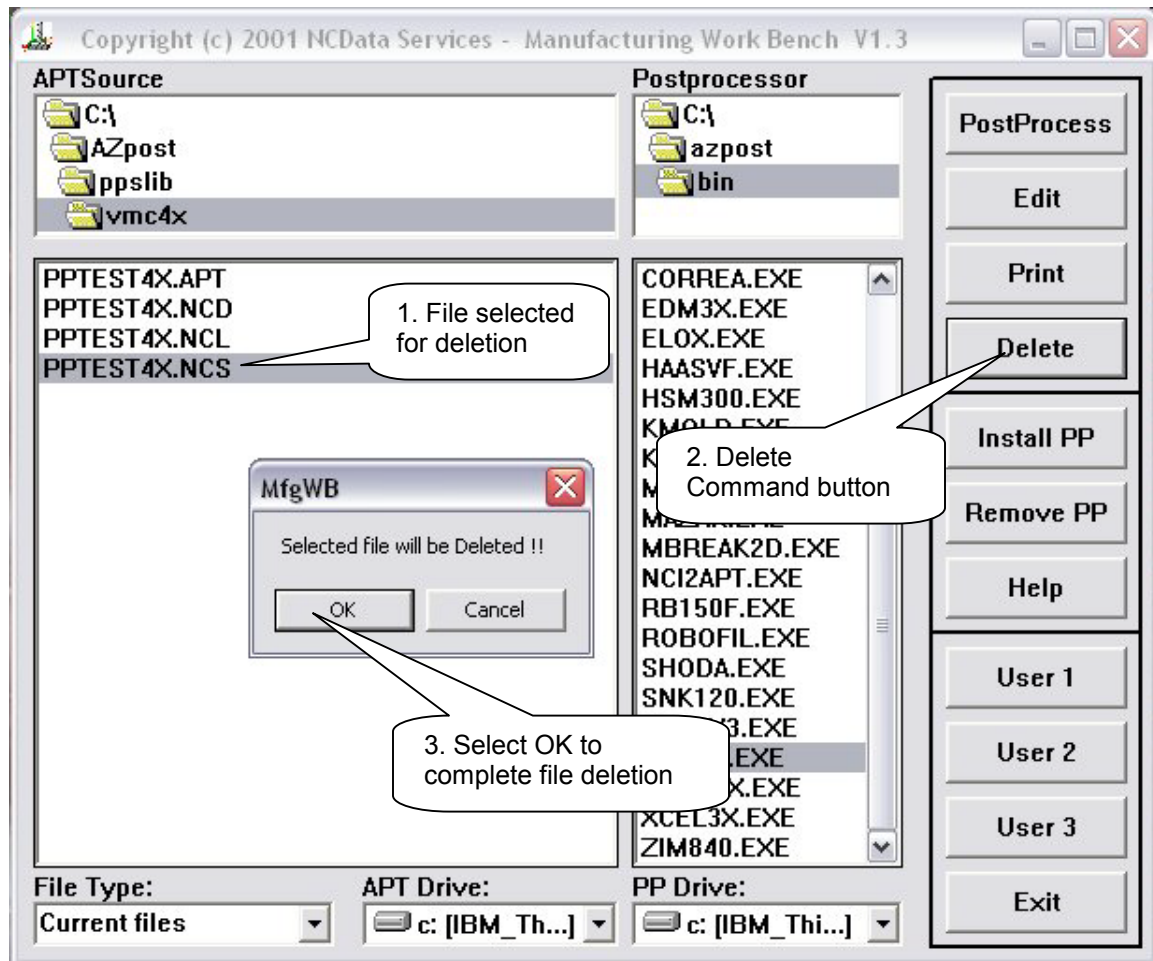
1. **All files.** All files in the folder will be displayed and if the number of files exceeds the window a vertical scroll bar is provided to scroll through the files for selection.
2. **Current files.** All files (extensions) with the same (current) file name will be displayed.

3. **Output files.** All files created by the postprocessors will be displayed. The files that have extensions beginning with “NC” will be displayed.
4. **APTsource.** All files with an extension beginning with “APT” will be displayed.
5. **NCData.** All files with extension “NCD” will be displayed.
6. **NCList.** All files with extension “NCL” will be displayed.
7. **NCStatus.** All files with extension “NCS” will be displayed.
8. **PPTables.** All files with extension “PPTable” will be displayed.
9. **CFG.** All files with extension “CFG” will be displayed.

Command Button Functions

Deleting files

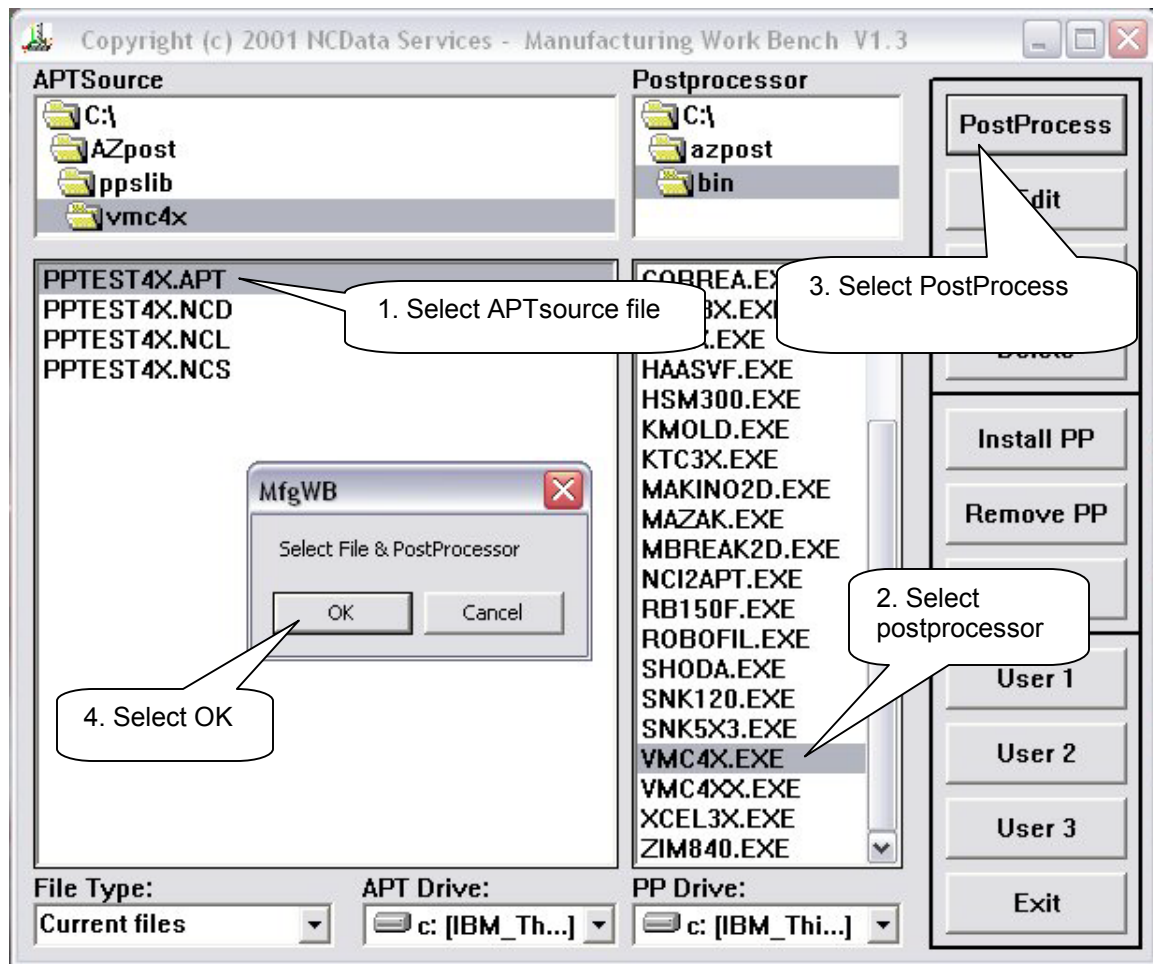
Files can be deleted from the APTsource folder by using the Delete command button as shown below in figure 6.



Deleting a file - Fig.6

Postprocessing

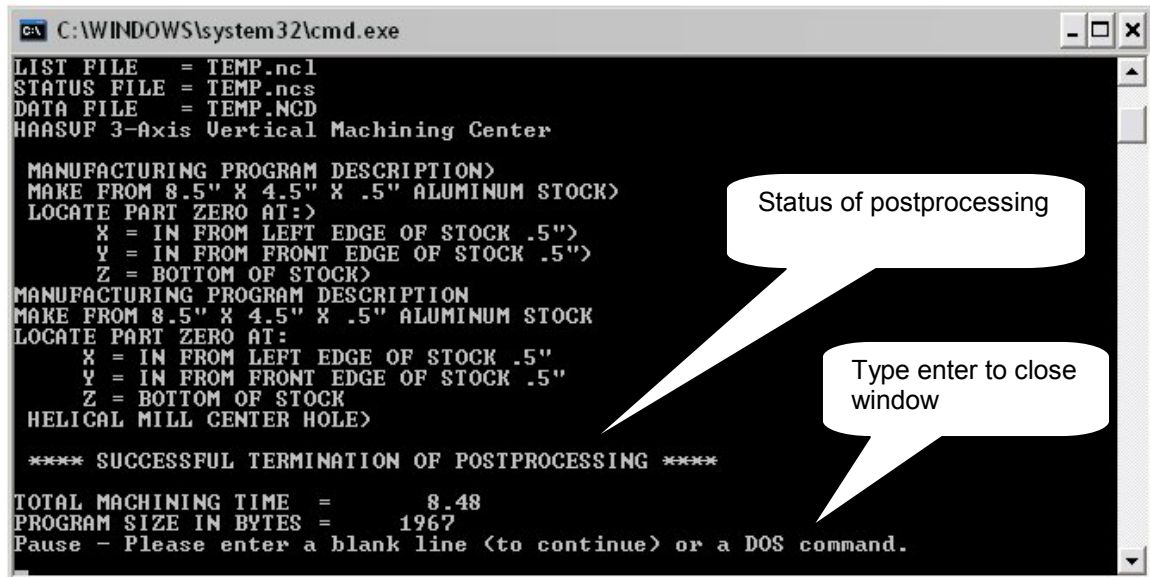
APTsource files can be postprocessed with a specified postprocessor by first selecting the APTsource file and selecting the postprocessor. The PostProcess command button is then selected as shown below in figure 7.



Postprocessing - Fig. 7

Postprocessor Progress/Status Window

The progress and status of the postprocessing is displayed in a command prompt window as shown below in figure 8.



```
C:\WINDOWS\system32\cmd.exe
LIST FILE      = TEMP.nc1
STATUS FILE    = TEMP.ncs
DATA FILE      = TEMP.NCD
HAASVF 3-Axis Vertical Machining Center

MANUFACTURING PROGRAM DESCRIPTION>
MAKE FROM 8.5" X 4.5" X .5" ALUMINUM STOCK>
LOCATE PART ZERO AT:>
  X = IN FROM LEFT EDGE OF STOCK .5">
  Y = IN FROM FRONT EDGE OF STOCK .5">
  Z = BOTTOM OF STOCK>
MANUFACTURING PROGRAM DESCRIPTION
MAKE FROM 8.5" X 4.5" X .5" ALUMINUM STOCK
LOCATE PART ZERO AT:
  X = IN FROM LEFT EDGE OF STOCK .5"
  Y = IN FROM FRONT EDGE OF STOCK .5"
  Z = BOTTOM OF STOCK
HELICAL MILL CENTER HOLE>

**** SUCCESSFUL TERMINATION OF POSTPROCESSING ****

TOTAL MACHINING TIME =      8.48
PROGRAM SIZE IN BYTES =    1967
Pause - Please enter a blank line (to continue) or a DOS command.
```

Postprocessor Progress/Status Window - Fig. 8

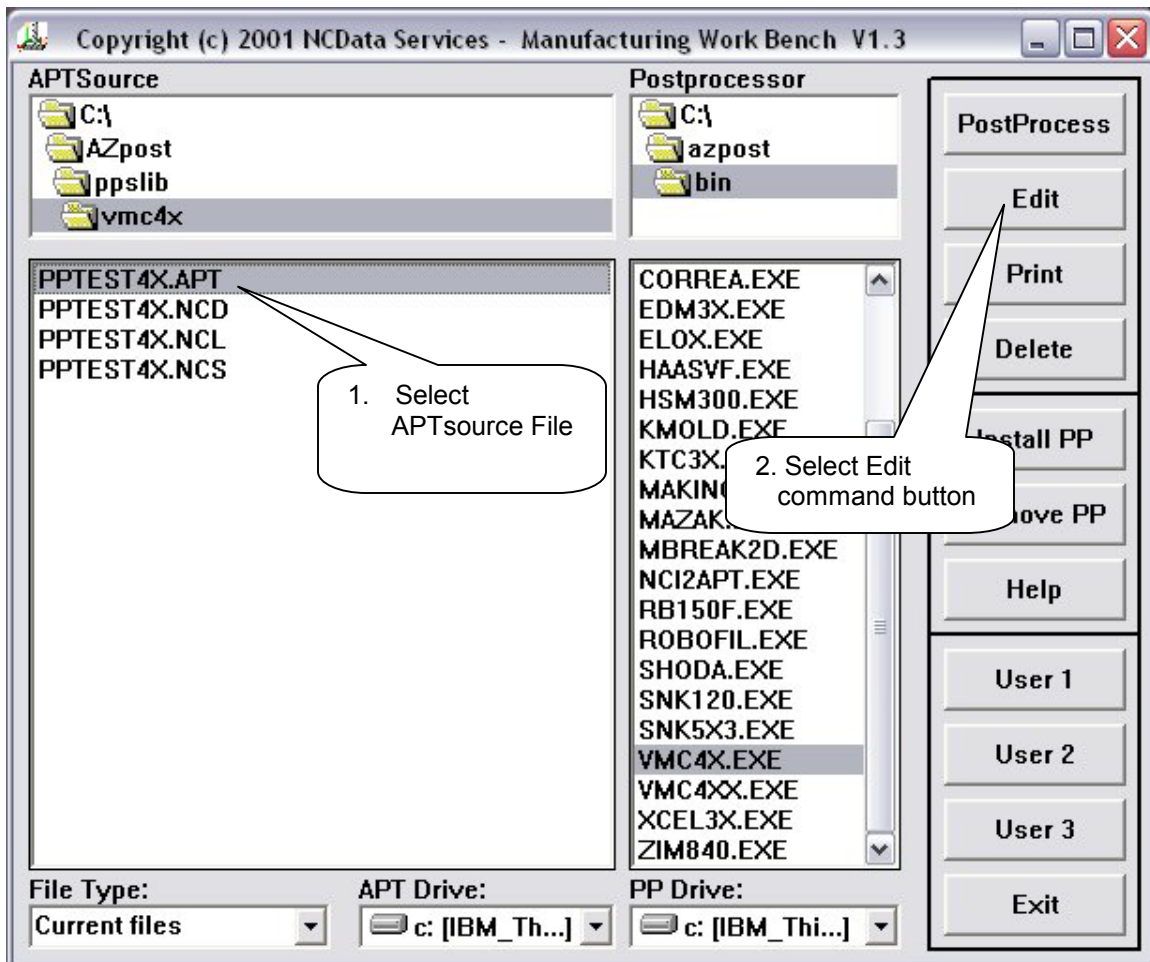
If the postprocessor selected requires a configuration file (.cfg) and no configuration file is specified in the APTsource the window will prompt the user for the configuration file name (without the extension).

If postprocessing problems are encountered, a count of postprocessing warnings and errors are displayed at the end of postprocessing. If no errors are encountered a "SUCCESSFUL TERMINATION OF POSTPROCESSING" is displayed. The Progress/Status window can be closed by typing the enter key in The window at the pause prompt.

Any errors should be analyzed by closing this window and opening the ".NCL" file using the Edit command button. Errors can then be found by finding the %%% character string in the file.

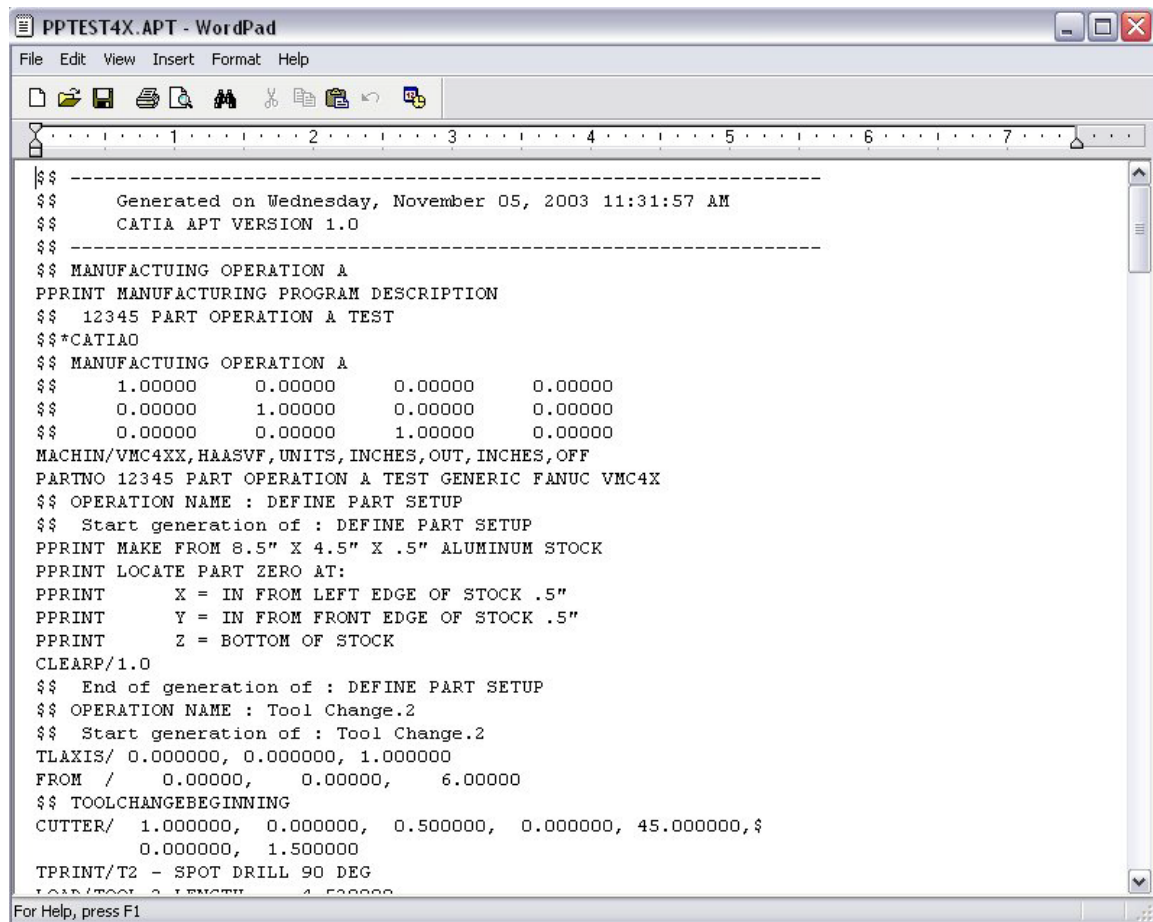
Edit command button

Files in the APTsource folder can be opened and edited if required by selecting the file and selecting the Edit command button as shown below in figure 9.



Edit command button - Fig. 9

Edit file window



```
PPTEST4X.APT - WordPad
File Edit View Insert Format Help

$$$
Generated on Wednesday, November 05, 2003 11:31:57 AM
CATIA APT VERSION 1.0
$$$
$$$ MANUFACTURING OPERATION A
PPRINT MANUFACTURING PROGRAM DESCRIPTION
$$$ 12345 PART OPERATION A TEST
$$$*CATIAO
$$$ MANUFACTURING OPERATION A
$$$ 1.00000 0.00000 0.00000 0.00000
$$$ 0.00000 1.00000 0.00000 0.00000
$$$ 0.00000 0.00000 1.00000 0.00000
MACHIN/VMC4XX,HAASVF,UNITS,INCHES,OUT,INCHES,OFF
PARTNO 12345 PART OPERATION A TEST GENERIC FANUC VMC4X
$$$ OPERATION NAME : DEFINE PART SETUP
$$$ Start generation of : DEFINE PART SETUP
PPRINT MAKE FROM 8.5" X 4.5" X .5" ALUMINUM STOCK
PPRINT LOCATE PART ZERO AT:
PPRINT X = IN FROM LEFT EDGE OF STOCK .5"
PPRINT Y = IN FROM FRONT EDGE OF STOCK .5"
PPRINT Z = BOTTOM OF STOCK
CLEARP/1.0
$$$ End of generation of : DEFINE PART SETUP
$$$ OPERATION NAME : Tool Change.2
$$$ Start generation of : Tool Change.2
TLAXIS/ 0.000000, 0.000000, 1.000000
FROM / 0.00000, 0.00000, 6.00000
$$$ TOOLCHANGEBEGINNING
CUTTER/ 1.000000, 0.000000, 0.500000, 0.000000, 45.000000,$
0.000000, 1.500000
TPRINT/T2 - SPOT DRILL 90 DEG
LOAD/TOOL 2 LENGTH 4.500000
$$$
```

File Edit/Open - Fig. 10

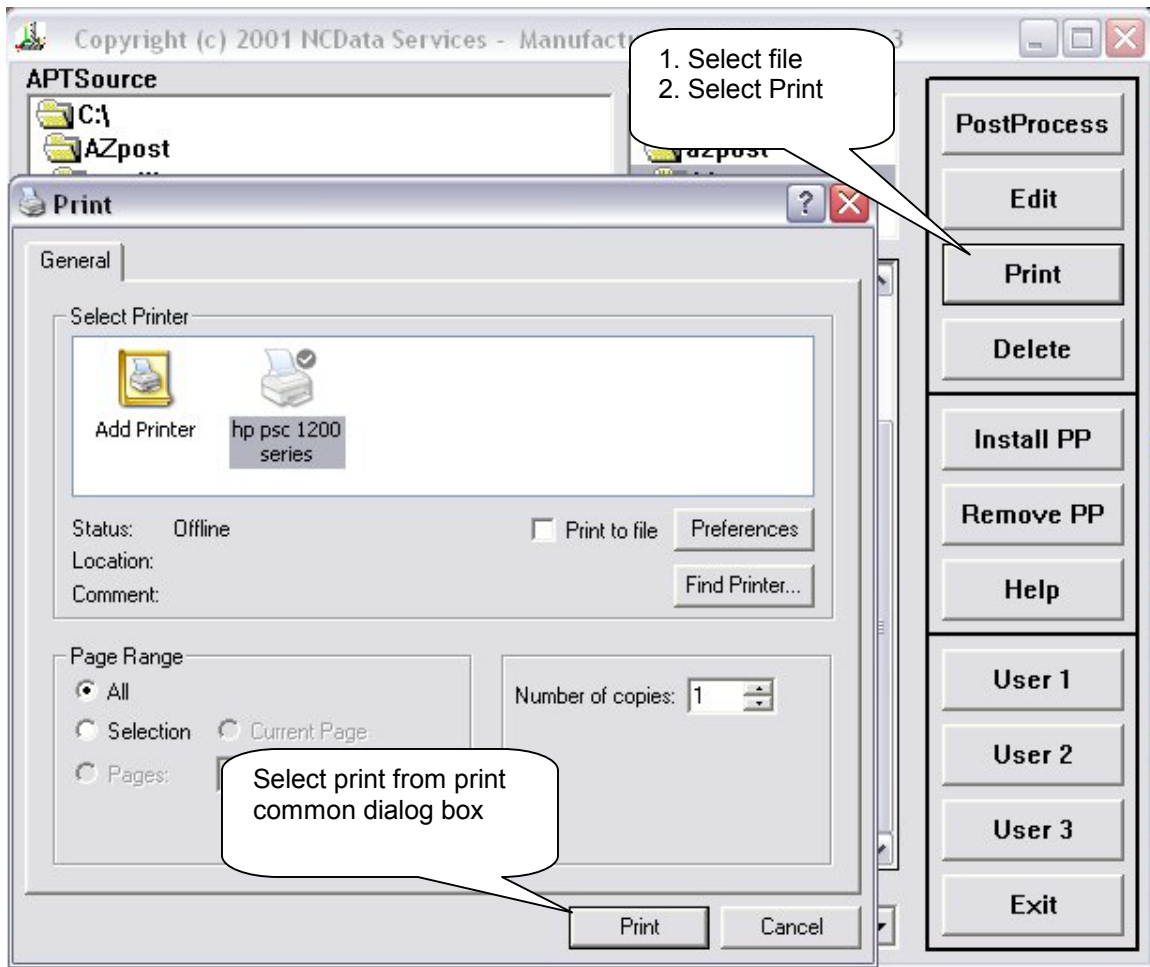
The program used to edit the file can be changed by customization of MfgWB (see customizing MfgWB). The Default and recommended product is Microsoft WordPad.

When editing APTsource, PPTable, and Configuration files formatting must not be used. Formatting will cause processing by the postprocessor or CATIA to fail.

Note that printing of the file may be done by the editor product.

Print command button

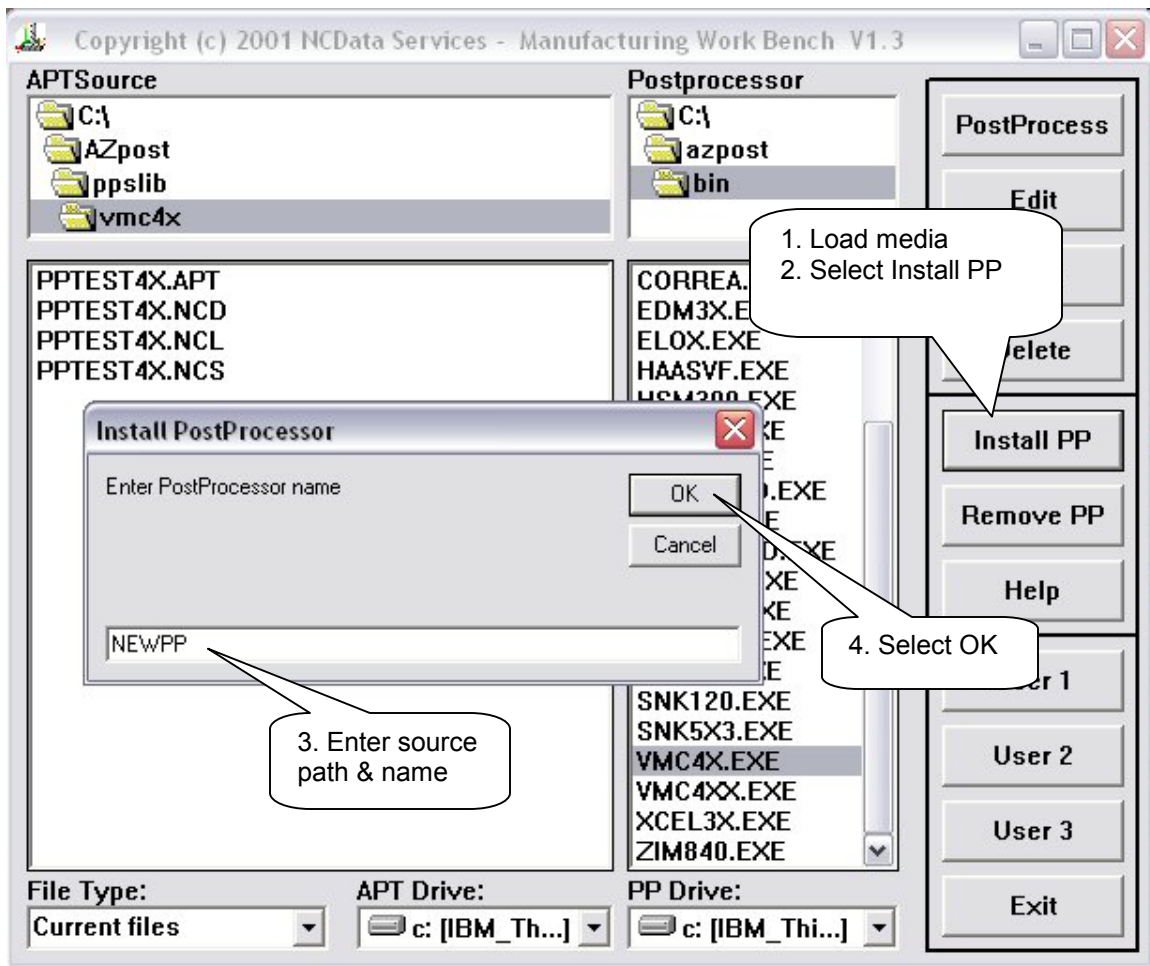
Files in the APTsource folder can be printed by selecting the file and selecting the print command button as shown below in figure 11.



File Print - Fig. 11

Install PostProcessor command button

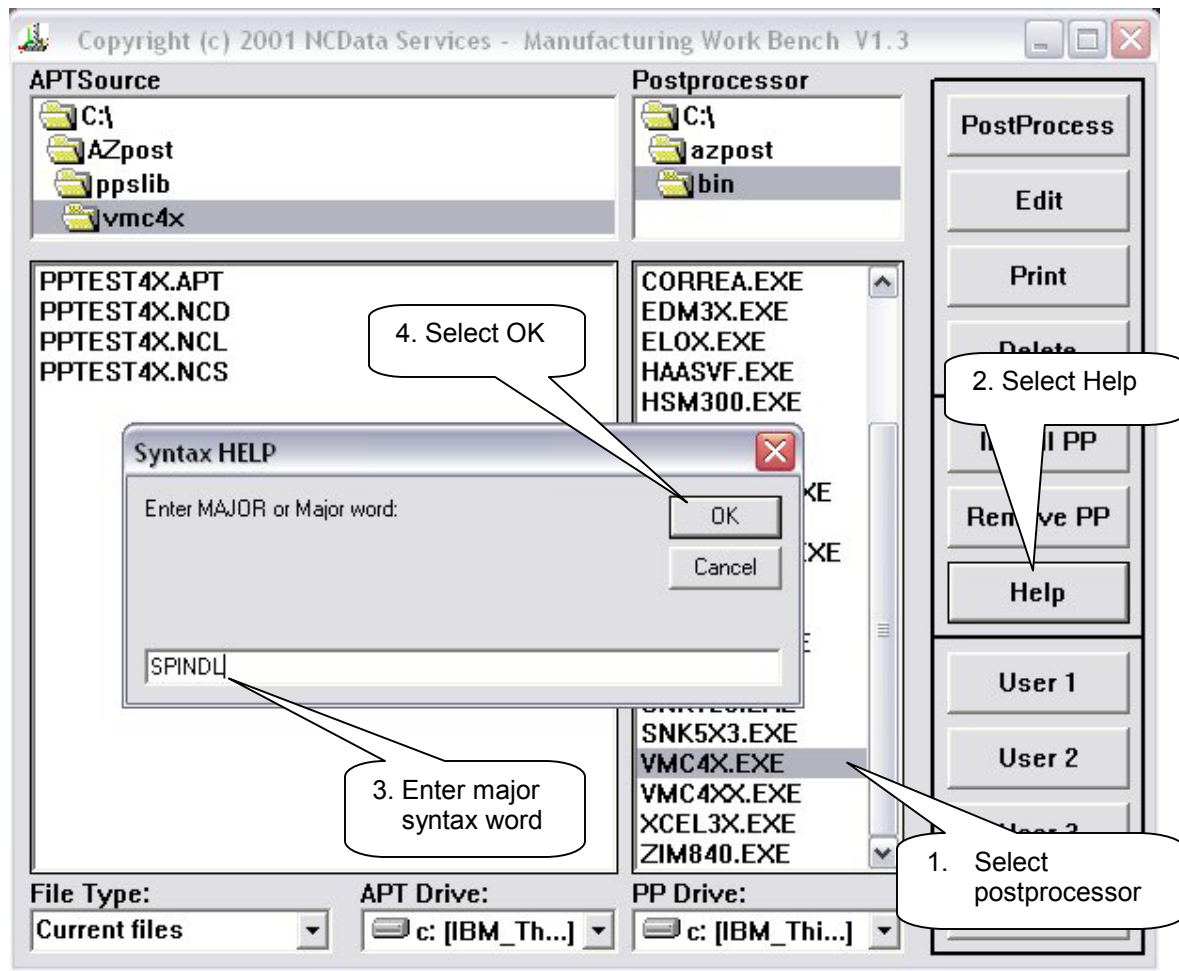
The Install PP command button can be used to install new postprocessors into the \AZpost\bin folder. The full path and name of the source media/folder can be specified in the pop-up window as shown below in figure 12.



Install PostProcessor - Fig. 12

Help command button

Help with postprocessor syntax can be provided by selecting the postprocessor, selecting the Help command button and entering the desired major word as shown below in figure 13.

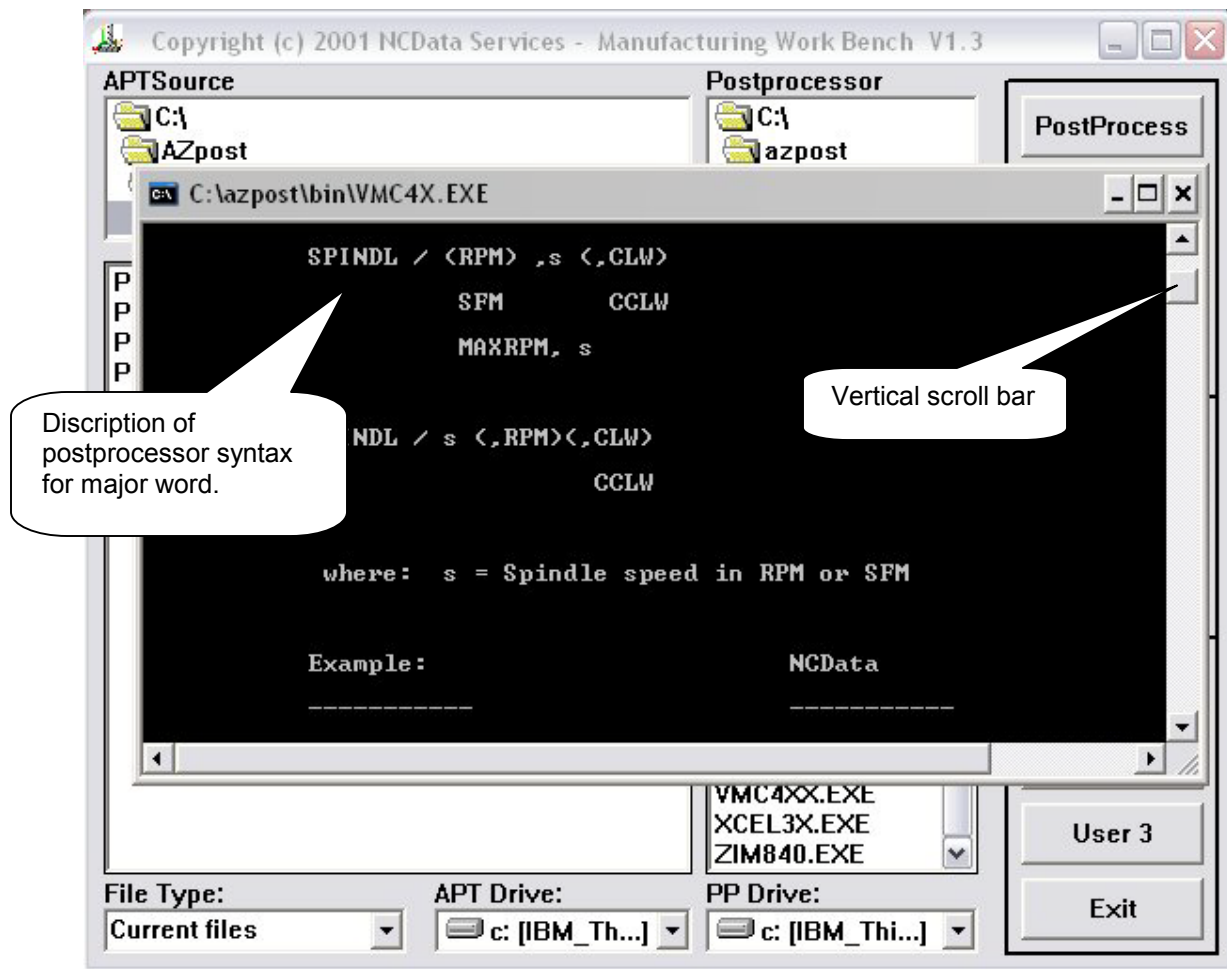


PostProcessor Syntax Help - Fig. 13

Note that this feature only works with postprocessors developed by NCDData Services or AZPost postprocessors.

Postprocessor syntax Window

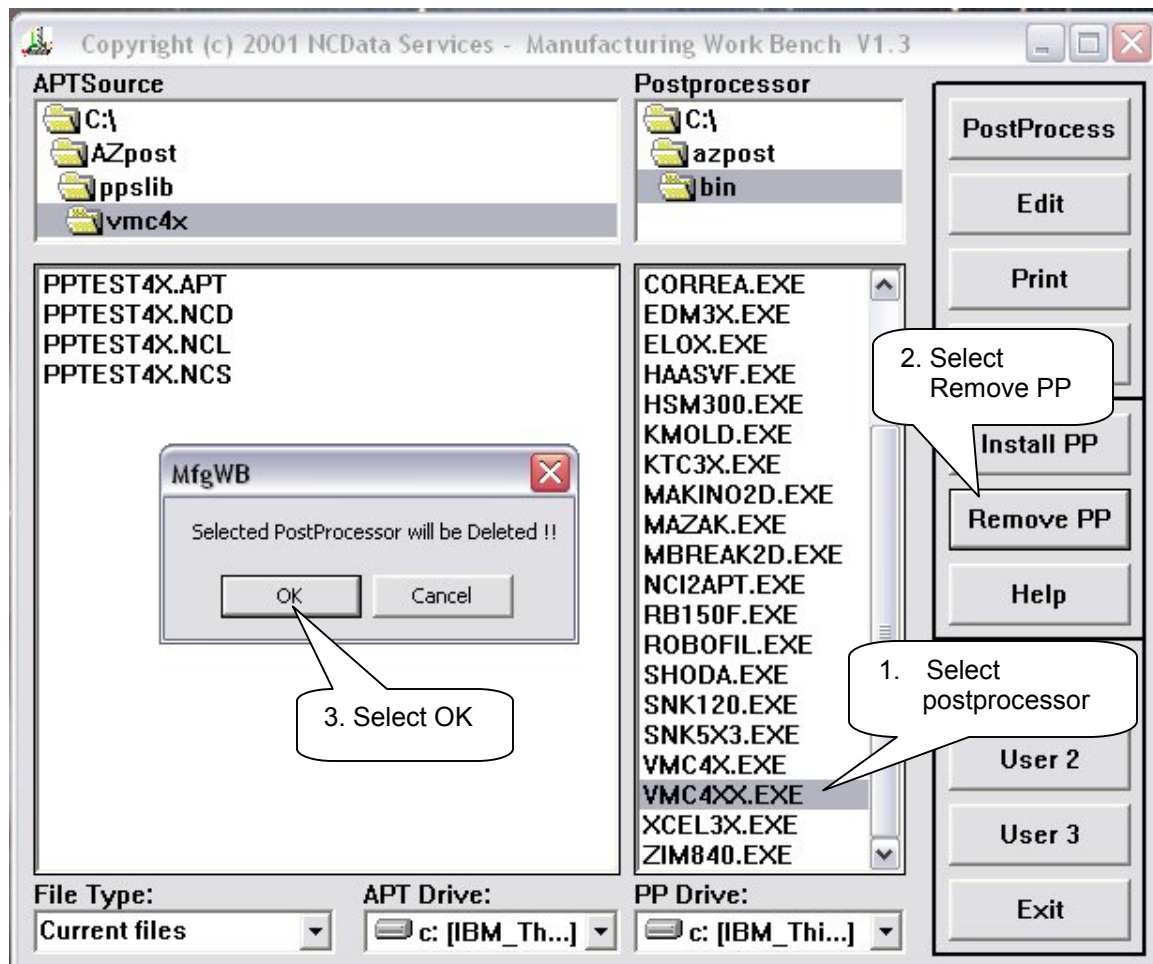
The postprocessor syntax will be displayed in a command prompt window that can be scrolled to view the text. The window can be closed by typing “enter” in the window.



Syntax Window - Fig. 14

Remove postprocessor command button

A postprocessor can be removed from the \AZpost\bin folder by selecting the postprocessor and selecting the Remove PP command button as shown below in figure 15.



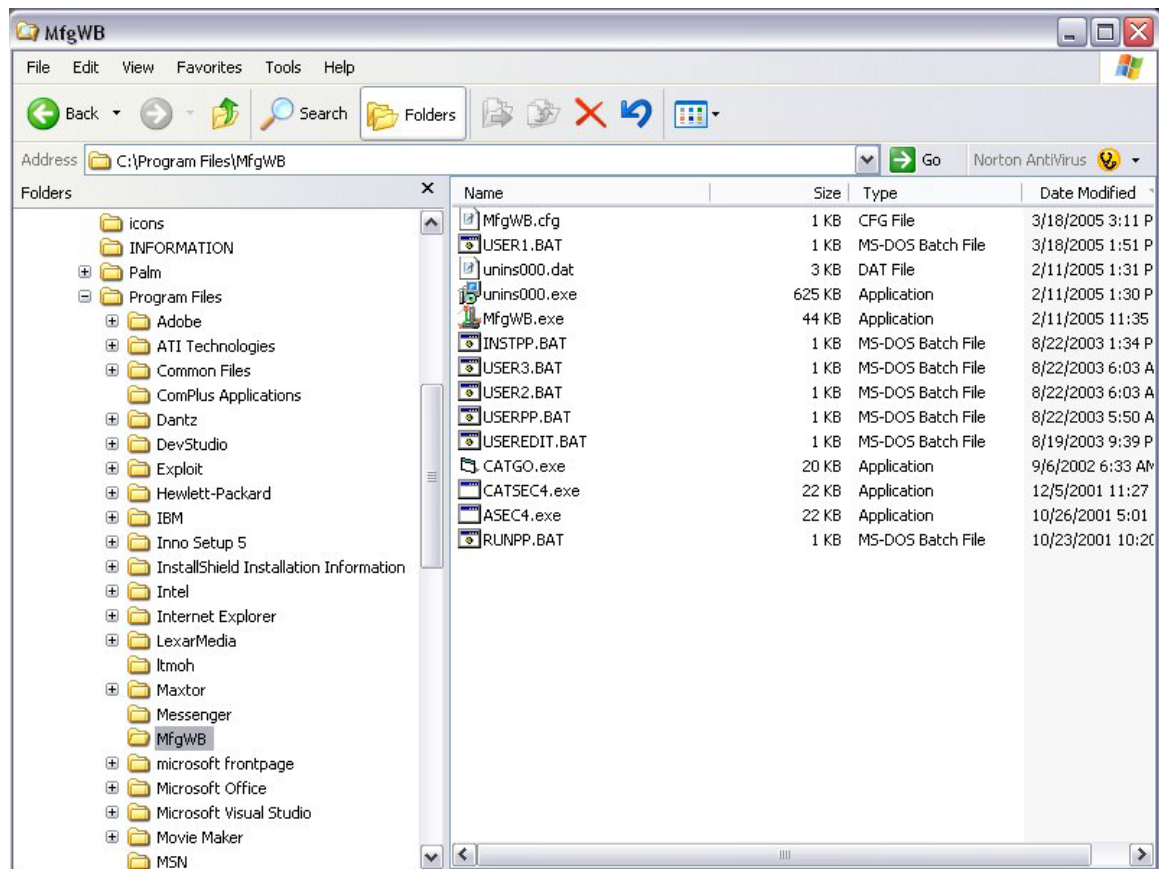
Remove PostProcessor - Fig. 15

Note that postprocessors should be removed before re-installing them.

MfgWB Customization

The customization files

The customization files for MfgWB are in the \Program Files\ MfgWB folder as shown below in figure 16.



MfgWB folder - Fig. 16

The customizable files in MfgWB are as follows:

1. **MfgWB.cfg** - data configuration file for MfgWB default values.
2. **UserEdit.bat** - Windows batch file used to open desired file editor.
3. **UserPP.bat** - Windows batch file used to execute desired postprocessor.
4. **InstPP.bat** - Windows batch file used to install postprocessor.

- 5. **RunPP.bat** - Alternate windows batch file used to execute Postprocessor.
- 6. **User1.bat** - Windows batch file used to define user function.
- 7. **User2.bat** - Windows batch file used to define user function.
- 8. **User2.bat** - Windows batch file used to define user function.

MfgWB.cfg

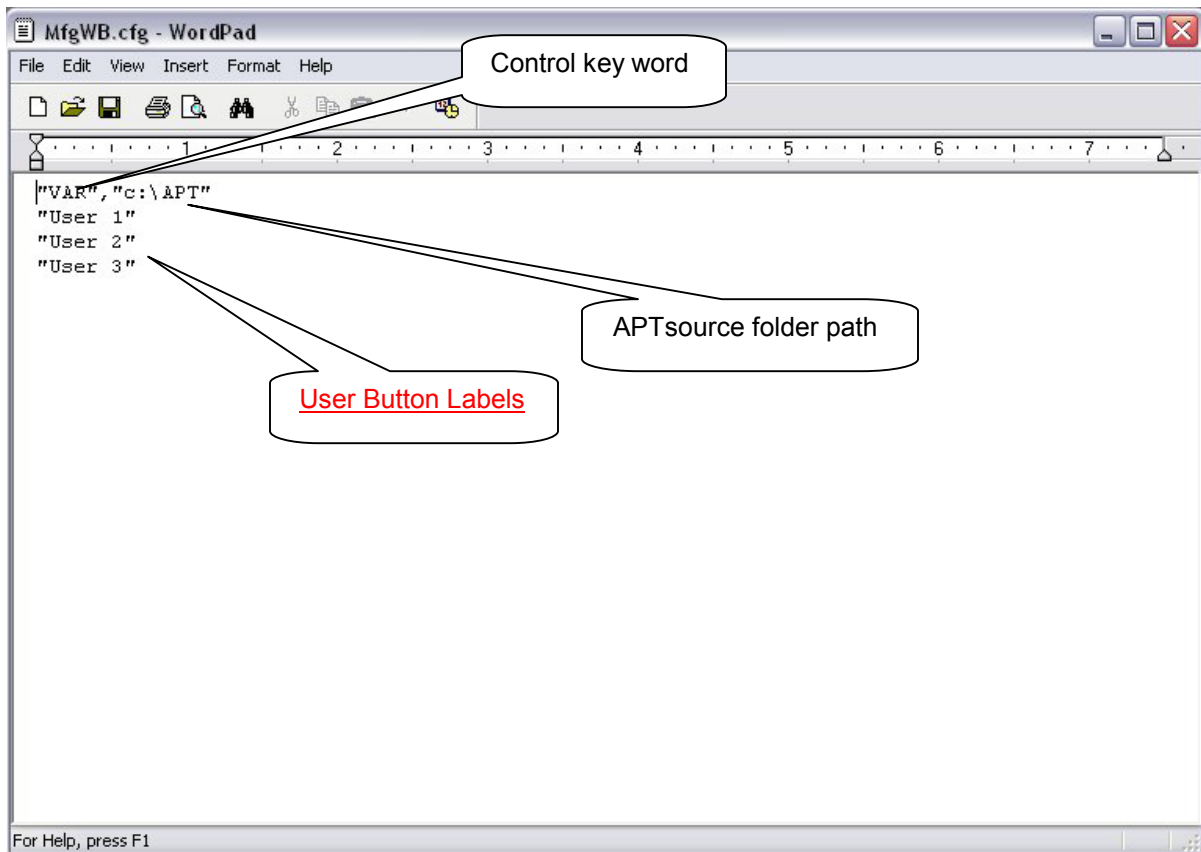
The MfgWB.cfg file is a data file that controls the default APTsource folder path and user function buttons labeling.

The 1st record in the file contains two text fields separated by a comma. The first field is a keyword specifying either “VAR” or “FIX”.

“VAR” specifies that the folder path specified as default in the second field is variable and can be overwritten to the currently selected path when MfgWB is exited. This saves the current APTsource folder path from the interactive MfgWB session.

“FIX” specifies that the folder path specified as default in the second field is fixed and will not get overwritten by MfgWB. This path will always be the default when MfgWB is started.

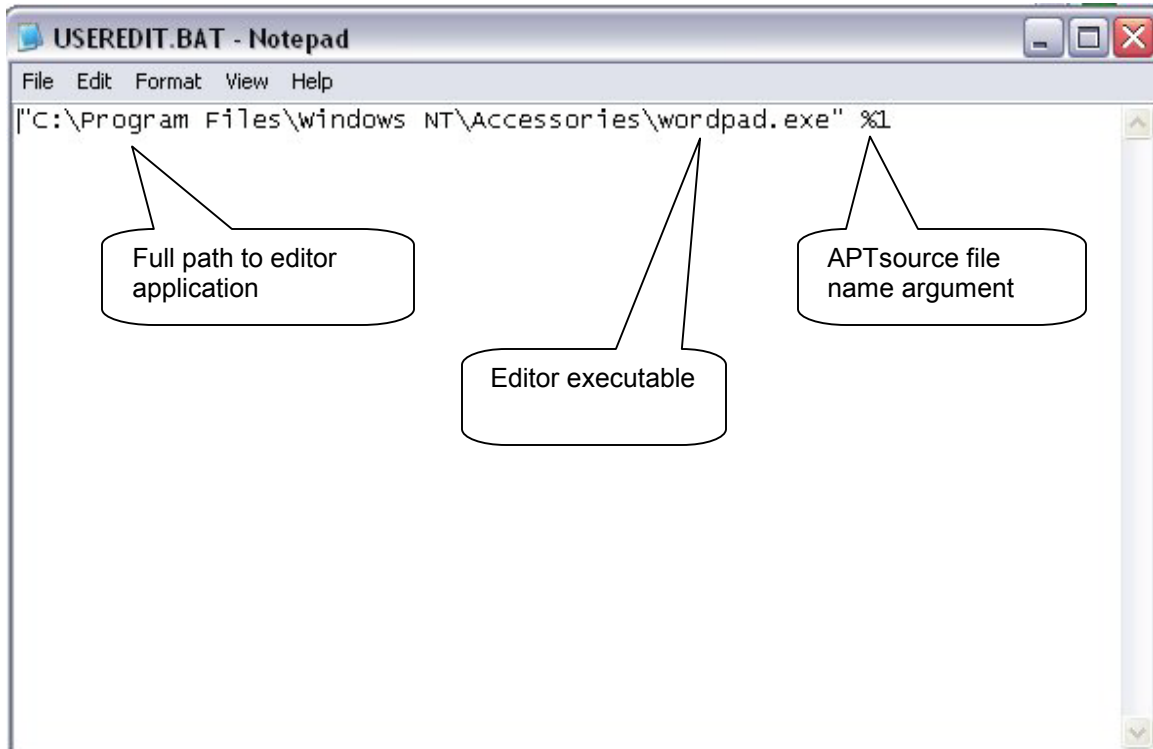
The 2nd, 3rd and 4th records contain the labels used for the respective user command function buttons. See the default below in figure 17.



MfgWB Configuration - Fig. 17

USEREDIT.BAT

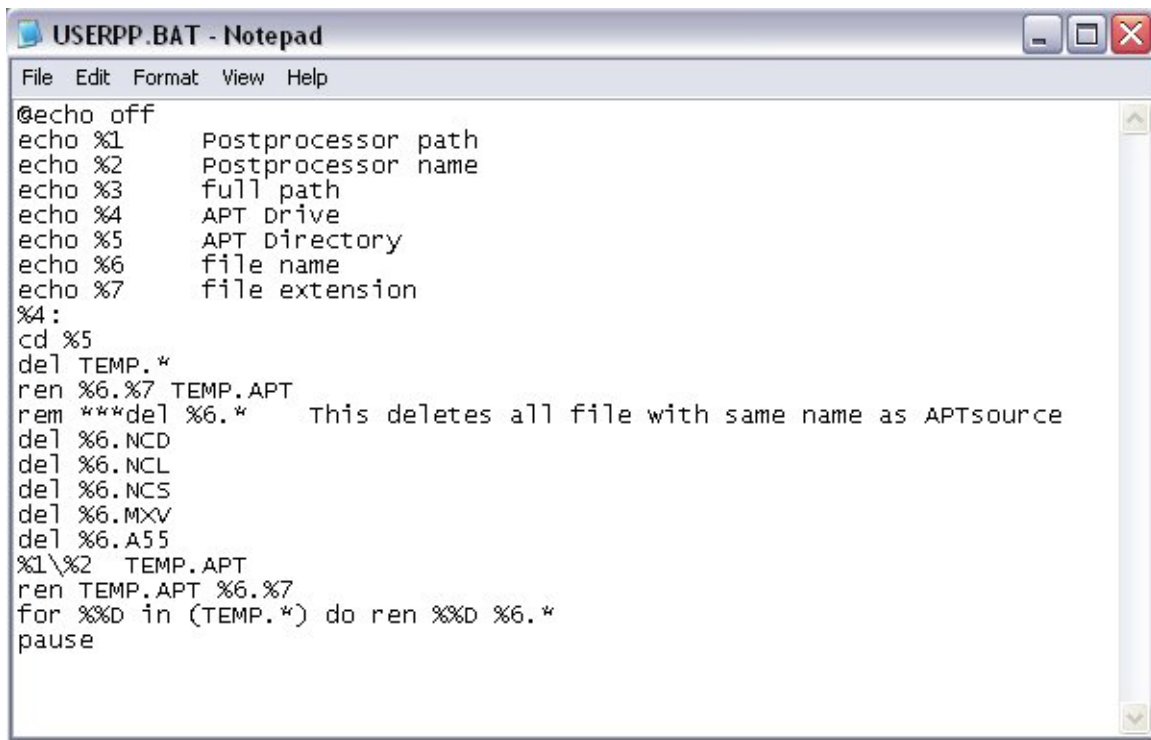
This is a windows command batch file that is executed when the Edit command is selected. The %1 variable contains the APTsource file that is currently selected in the APTsource folder. The default code executes the windows wordpad editor with the variable %1 as the argument as shown below in figure 18.



MfgWB Edit Command - Fig. 18

USERPP.BAT (for long APTsource file names)

This is a windows command batch file that is executed when the Postprocess command is selected. Arguments %1 through %7 are echoed to the window for tracing and debugging purposes. The APT folder drive is selected and the APT folder is made the current directory. TEMP.* is erased and the APTsource file is renamed as TEMP.APT All existing output files are deleted for the APTsource. The selected postprocessor is executed with the TEMP.APT file as its' command line argument. The TEMP.APT is renamed back to the original selected file and all the TEMP output files are renamed to the original file name with existing extensions. See Figure 19 below.



```
@echo off
echo %1      Postprocessor path
echo %2      Postprocessor name
echo %3      full path
echo %4      APT Drive
echo %5      APT Directory
echo %6      file name
echo %7      file extension
%4:
cd %5
del TEMP.*
ren %6.%7 TEMP.APT
rem ***del %6.*      This deletes all file with same name as APTsource
del %6.NCD
del %6.NCL
del %6.NCS
del %6.MXV
del %6.A55
%1\%2 TEMP.APT
ren TEMP.APT %6.%7
for %%D in (TEMP.*) do ren %%D %6.*
pause
```

MfgWB PostProcesses Command - Fig. 19

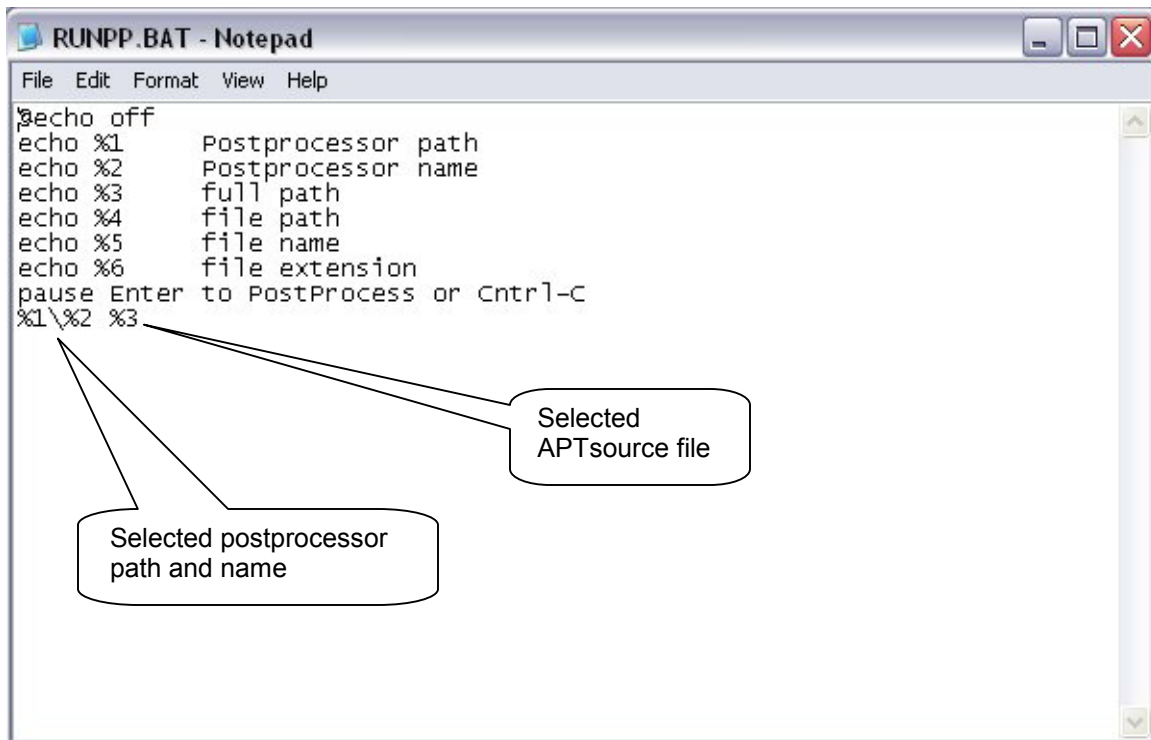
Note that the postprocessor is designed to be executed by specifying the fully qualified file name of the APTsource file as its command line argument.

The AZpost postprocessors do not support long file names (greater than 12 characters). This why the files are renamed to TEMP.APT for postprocessing and then renamed back.

Example: **VMC4X C:\APT\PART4X.APT**

RUNPP.BAT (Option for APTsource files with short names)

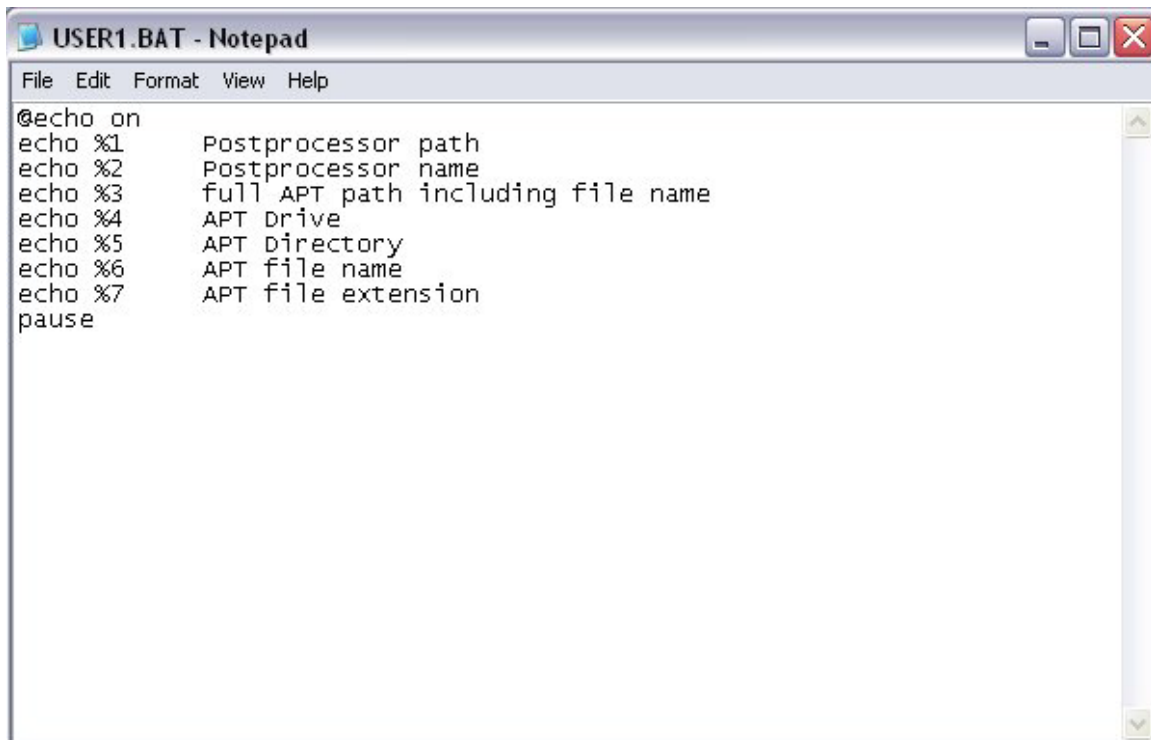
This is a windows command batch file that is executed when the Postprocess command is selected. Arguments %1 through %7 are echoed to the window for tracing and debugging purposes. This simplified version does rename the files, but does not support selected APTsource files with long names. The USERPP.BAT is the default. If this option is desired it must be renamed to USERPP.BAT



MfgWB PostProcess Command (alternative) - Fig. 20

USER1.BAT

This is a windows command batch file that is executed when the USER1 command is selected. Arguments %1 through %7 are echoed to the window for tracing and debugging purposes. The user can develop any batch code using the arguments provided to the selected files and postprocessors. For information on developing batch code see the chapter on Working with Batch Programs in a Microsoft DOS “User’s Guide and Reference”.



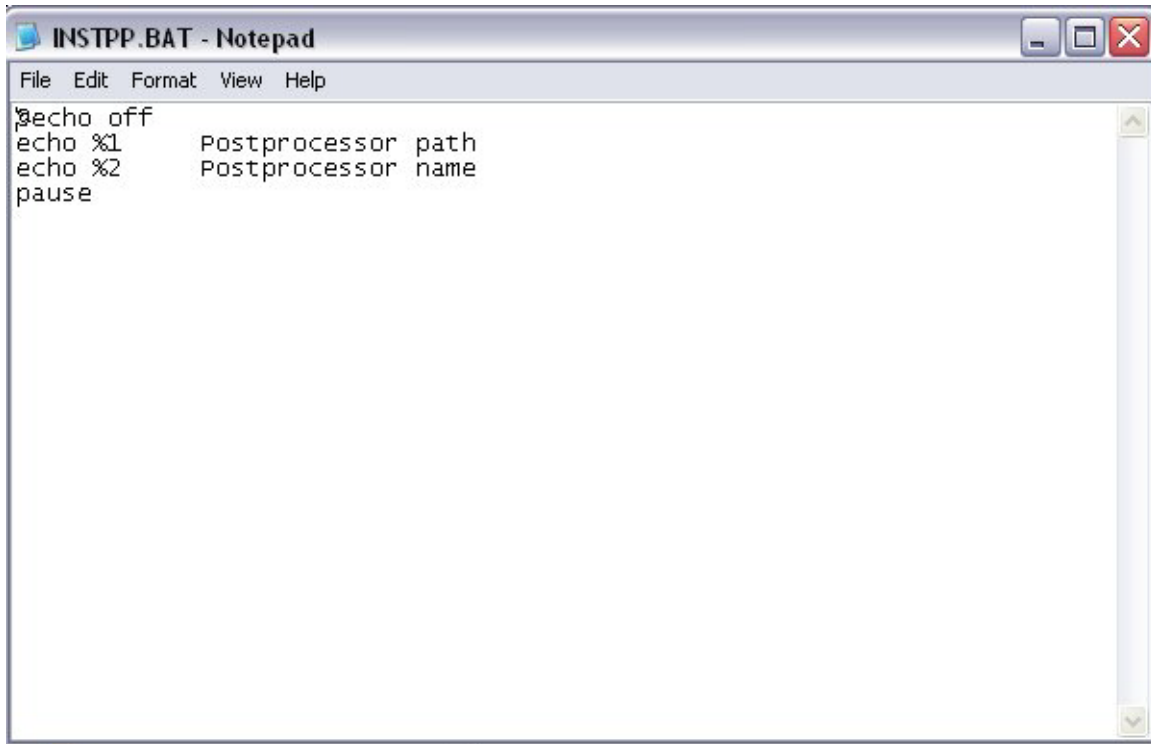
```
@echo on
echo %1      Postprocessor path
echo %2      Postprocessor name
echo %3      full APT path including file name
echo %4      APT Drive
echo %5      APT Directory
echo %6      APT file name
echo %7      APT file extension
pause
```

MfgWB User Command - Fig. 21

Note that USER2.BAT and USER3.BAT contain the same batch code and can be developed for different functions by the user.

INSTPP.BAT

This is a windows command batch file that is executed when the Postprocess command is selected. Arguments %1 through %2 are echoed to the window for tracing and debugging purposes. This batch file can be customized by the user to copy postprocessor files from input media to the \AZpost\bin folder.



```
File Edit Format View Help
%echo off
echo %1      Postprocessor path
echo %2      Postprocessor name
pause
```

MfgWB Install PostProcessor Command - Fig. 22

MfgBatchCmd.bat

This is a windows command batch file that replaces the one shipped with CATIA and is executed by CATIA when the Manufacturing Batch menu tool is selected.

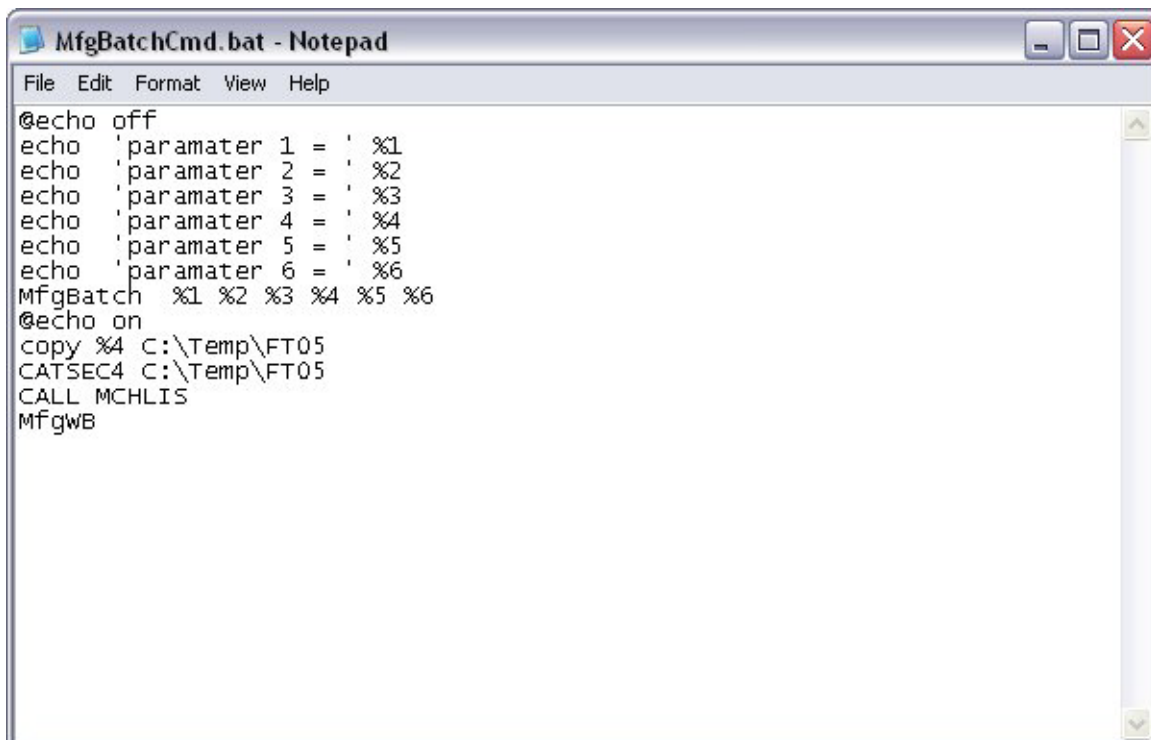
Arguments %1 through %6 are echoed to the window for tracing and debugging purposes. The CATIA MfgBatch program processes arguments %1 through %6 and creates the APTsource file. The %4 argument contains the CATIA parameter file name that contains the name of the APTsource file.

The parameter file is then copied to a temporary file named FT05.

The CATSEC4 program opens the CATIA FT05 parameter file and finds the name of the APTsource file. CATSEC4 then opens the APTsource file and creates a command batch file named MCHLIS.BAT that contains an executable record for each MACHIN record found in the APTsource file.

The MCHLIS.BAT file is then executed by a batch CALL command. Each MACHIN record in the MCHLIS file executes the specified postprocessor using the APTsource file as input.

The MfgWB is then opened displaying the results of postprocessor execution.



```
@echo off
echo 'paramater 1 = ' %1
echo 'paramater 2 = ' %2
echo 'paramater 3 = ' %3
echo 'paramater 4 = ' %4
echo 'paramater 5 = ' %5
echo 'paramater 6 = ' %6
MfgBatch %1 %2 %3 %4 %5 %6
@echo on
copy %4 C:\Temp\FT05
CATSEC4 C:\Temp\FT05
CALL MCHLIS
Mfgwb
```

CATIA Manufacturing Batch Command (replacement) - Fig. 23

