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## TrueType fonts in PostScript

Thomas H. Barton

### 1 Introduction

Many TrueType fonts are available at no cost; for example, 328 fonts came with my copy of Windows 2000. Unfortunately, TrueType fonts cannot be directly employed with the versions of PostScript currently in use, levels 1 through 3. With Adobe's introduction of Open Type fonts, this situation may change in future versions of PostScript but at the moment TrueType remains a resource that cannot be used directly in PostScript. This problem has been addressed by various authors by programs that convert TrueType to PostScript Type 1 fonts. At the time of writing, three, *ttf2pfb*, *tfmpk*, and *ttf2pt1* are currently listed on CTAN in the directory `fonts/utilities`.

Early in the life of level 2 PostScript, which was introduced in 1994, with version 2.013, Adobe transformed the situation with regard to TrueType fonts by introducing a new PostScript font specification, Type 42. The specification is contained in Adobe Technical Note 5012, which can be obtained from: <http://partners.adobe.com/asn/developer/technotes/fonts.html>.

In its opening paragraph, the technical note states that conversion to Type 42 *yields better print quality than can be achieved by converting a TrueType font to a Type 1 or Type 3 font*.

Note 5012 indicates that the font conversion is a fairly complex process but fortunately Ghostscript has already done it via its internal procedure `.loadttfont`. Pointed to the TrueType font file in the form of a file object as its sole argument, this procedure loads on the user stack the dictionary of the font's Type 42 equivalent. This dictionary can be used directly within Ghostscript, but if the aim is to create a program to run under Adobe PostScript, information must be extracted from it.

This article describes a PostScript program which does that and outputs two PostScript files, one a PFA file containing the Type 42 font and another which will print a list of the names and appearances of all the glyphs defined by the font on any PostScript printer capable of using Type 42 fonts. The second file is useful because many TrueType fonts define far more glyphs than are usual in a Type 1 PostScript font, e.g., the TrueType font `arial.ttf` defines 1296 glyphs.

While there may well be others, I am only aware of one other program which accomplishes this task, `To42.ps` by Christof Labouisse. This program is not easy to find; for example, at the time of this writing a Google search using the keyword `to42` produces nothing. I obtained my copy via an appeal on the PostScript newsgroup by the kindness of Michael Piotrowski.

## 2 The program

The program is contained in a PostScript file called `TrueTypeToType42.ps` which is intended to be run under Ghostscript. It will not run under Ghostview. Because it uses the Ghostscript internal procedure `.loadttfont`, it will not run under a standard PostScript interpreter, whether in a printer or RIP. The program is available on CTAN in `fonts/utilities/TrueTypeToType42`.

Apart from using some Ghostscript internal procedures, it is a standard PostScript program, and so should run on any platform provided a recent version of Ghostscript is installed. I am not sure of the precise meaning of *recent* but I have run it under Ghostscript versions 6.5 and 7.0. The program is extensively commented, so much so that for regular use it would be advantageous to remove the comments.

### 2.1 The Ghostscript command line

The invocation of this program from the command line uses the `--` (double hyphen) option:

```
<Path to \GS{} executable>
-I<Path to \GS{} main folder>
-- <Path to conversion program>
```

```
<Path to \TT{} font>
```

(This is intended to be typed on a single command line, it has been folded only to fit the text width.)

I am currently using Ghostscript 7.00 on a PC under Windows 2000. The full path name of my Ghostscript Windows executable is:

```
C:\GS\GS7.00\bin\gswin32.exe
```

All my TrueType fonts are in the directory `C:\TrueTypeFonts`, and `TrueTypeToType42.ps` is in the directory `D:\Fonts\TrueType\Utilities`. So, my command line is:

```
C:\GS\GS7.00\bin\gswin32
-IC:\GS\GS7.00
-- D:\Fonts\TrueType\Utilities
    \TrueTypeToType42.ps
    C:\TrueTypeFonts\<\TT{} font file>
```

### 2.2 Output

While running, the program writes extensive commentary to the Ghostscript standard output, and creates three files in a directory of your choice. These three files are:

1. The Type 42 equivalent of the TrueType font.
2. A PostScript file which, when downloaded to a PostScript printer, will produce a hard copy of all the glyphs defined by the font together with their names in ASCII sort order.
3. A text file which is a permanent record of the comments made to standard output.

The root name of the Type 42 file is the PostScript name of the font and its extension is `.pfa`. For example, if you are creating the Type 42 equivalent of `times.ttf`, whose PostScript name is `TimesNewRomanPSMT`, the file's name will be `TimesNewRomanPSMT.pfa`. The translation from the binary TrueType file to the ASCII pfa file results in an approximate doubling of file length.

All the usual pfa operations can be carried out with the Type 42 file, e.g.,

- included in the prologue of a PostScript program;
- stored on a printer hard disk;
- re-encoded by changing the encoding vector;
- renamed by changing the `/FontName` key.

The glyph file is called `ShowAllGlyphs.ps`. It is self-contained, having a copy of the Type 42 file in its prologue, and will produce hard copy when downloaded to a printer containing an Adobe PostScript interpreter version 2.013 or later. It can also be viewed in recent versions of Ghostview. The output is a list of all the glyphs defined by the font together with their names in ASCII sort order.

This is useful since many TrueType fonts define very large numbers of glyphs; e.g., my copy of `times.ttf` defines 1296 glyphs, and my copy of `garamond.ttf` defines 663 glyphs.

The text file is called `TrueTypeToType42.txt` and provides a permanent record of the progress of the program as signalled on the Ghostscript standard output. This file is useful if things go wrong.

### 2.3 Program defaults

The program needs to know where to put its output files. The file names are as just described and the path for them is defined in the program as the value of the key `/Path`. In the program, this is set to the string `(D:\\Temp\\)`. This must be reset to whatever you wish to use. In your editor, search for `'\Path'` and change the contents of the string to whatever suits your needs. `'/Path'` will be found in the *setup* section of the program. Note that Ghostscript requires that the backslash in Windows paths must be replaced by double backslashes. Note also that the terminating path separator must be included.

The program is set up for simplex printing from paper tray 3. If you wish to change this, open the program in your editor, search for `'setpagedevice'` and change the values of `/Duplex` and `/Media Position` to suit your needs. The value of `/Duplex` is the boolean `true` or `false`. The value of `/Media Position` is an integer, the number of the printer tray from which paper will be taken.

### 2.4 Running under Windows

I run the program on a PC under Windows 2000. It can be run from the Windows command prompt with the command line given above but I prefer to work in Windows Explorer. I have a Windows batch file called `TTF2T42WE.bat`, which is included with the program on CTAN. Place a copy of this file in your `SendTo` folder. Mine is in:

```
C:\Documents and Settings\Thomas H. Barton
    \SendTo
```

(Again, this is folded over two lines only because of the text width.)

To use this batch file:

- Start Windows Explorer.
- Move to the folder containing the TrueType file.
- Right click on the TrueType file. This displays a list of activities.
- On this list, click on *SendTo* to display another list of activities, one of which is `TTF2T42WE`.
- Left click on `TTF2T42WE`. This invokes the conversion program. The three output files are

placed in the folder specified by the `/Path` key in program `TrueTypeToType42.ps`.

The TrueType fonts which came with my copy of Windows 2000 are automatically stored in the folder:

```
C:\Winnt\Fonts
```

This folder has special properties for working with the Windows font software which make it unsuitable for conversion. I therefore copied the font files to the folder `C:\TrueTypeFonts` and convert them from there.

### 2.5 Obtaining the files

The CTAN directory

```
/fonts/utilities/TrueTypeToType42
```

contains four files:

- 1) the program itself;
- 2) `TrueTypeToType42.ps`;
- 3) the Windows batch file, `TTF2T42WE.bat`;
- 4) and `ReadMe` files in text and HTML format.

◇ Thomas H. Barton  
Emeritus Professor of Electrical  
Engineering  
University of Calgary  
Canada  
`thbarton@shaw.ca`