Roy of Superior Art Creations

TheDraw Fonts File (.TDF) Specifications[3]

by Roy/SAC[4]

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I spend quite some time on my "FONTS COLLECTION[17]" for the MS DOS ANSI/ASCII Text Editor "TheDraw[18]". The font file is in binary format and I wondered how it is structured to maybe write later some tools around it, like a Font Viewer for Windows, Converter to and from ANSI and stuff like that.

Note that this is not an official specifications document, I reverse engineered it by testing, so there might be cases I am unaware of, although I am pretty confident that I covered everything about it.

"TheDraw" Fonts Files have the extension "**.TDF**" (which is short for "*TheDraw Font*" duh :)).

One **.TDF** Fonts file is by default designed as a "collection" of multiple fonts, even if it only holds a single font (like after exporting a single font to an extra file). It can hold up to **34 fonts**. More are not possible, if used with TheDraw itself or with it's external `TDFONTS.EXE` Fonts Editor utility.

An empty fonts file without any font in it yet is always **232 bytes** in size. The actual character data are always stored after those 232 bytes and can vary in size, depending on the size, type and complexity of the font characters. Every additional font added to the collection is **212 bytes** long if without any character data.

Font Header

Offset	Length	Description	Sample Value
0	1	Character 19 (13h)	`13`
1	18	Fix String	`TheDraw FONTS file`
19	1	Character 26 (1Ah)	`1A`
20	4	Fix 4 Bytes Sequence Indicating the Start of a new Font Definition	`55 AA 00 FF`
24	1	Byte: Length of the Font Name (max. is 12 characters)	`0B`
25	12	Font Name (String). Only use the number of bytes specified in byte 24 and ignore any after (it might be 00 values or maybe garbage)	`MY NEW FONT`
37	4	unused as far I know. Typically all 0 bytes	`00 00 00 00`
41	1	Font Type (byte): 00 = Outline, 01 = Block, 02 = Color	`02`
42	1	Letter Spacing: 01h – 29h, representing the range 0-40 as decimal values	`01 ... 29`
43	2	Block Size (Word, Little Endian) Size of character data after main font definition block, including terminating 0 if followed by another font (last font in collection is not Null terminated)	`7F 04  (= 1,151)`

Offset	Length	Description	Sample Value
45	188	2 bytes (Word, Little Endian) for each character from ASC(33) ("!") to ASC(126) ("~") (94 characters total) with the offset (starting at 0) after the font header definition where the character data start (e.g. 0 would mean that character data start at byte 233 [for the first font in the file only])	`FF FF` = char not defined
233	BlockSize	Character Detail Data	

The Characters

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNO
PQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
```

Offset Addresses

Font 1 Header	20
Font 1 Data	233
Font 2 Header	232 + Font 1 Block Size + 1
Font 2 Data	Font 2 Header + 212 + 1
Font 3 Header	Font 2 Data + Font 2 Block Size + 1
Font 3 Data	Font 3 Header + 212 + 1
Font X …	…

Font Character

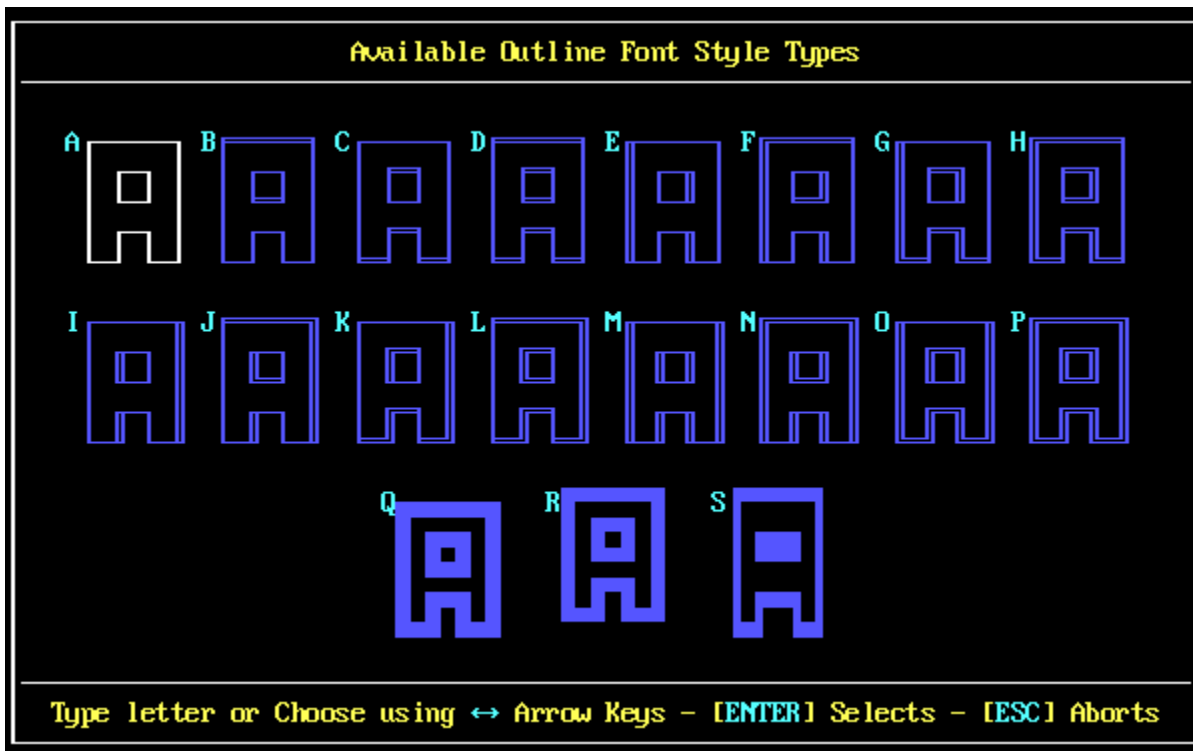| Offset	Length	Description	Sample Value
0	1	Max Width of Character (1 <= W <= 30 (1Eh))	`0A`
1	1	Max Height of Character** (1<= H <= 12 (0Ch))	`05`

** The Max Height Value is not reliable. If a line ends with a **&**, this line is not counted in the Max Height. For Example, if a character is 6 lines high and line 5 and line 4 end with a & character, the value for Max Height will be 4 and not 6. The Max Height value can only be used to determine the "Line Height" to determine where to position the cursor after a line-break. To read the full character data, always read to the Null (Chr(0)) terminator.

Byte 1 (All Font Types)

The individual characters for Fonts of type "*Block*" or "*Outline*" are single bytes only where "*Block*" using the actual ASCII character code. For Fonts of type "*Color*", each character takes up 2 bytes. The first byte is the character itself and the 2nd byte is to specify the background and foreground colors used for the character. "*Outline*" Font Types store Letters, which are used as character reference. For visualization purposes you might want to use the following mapping.
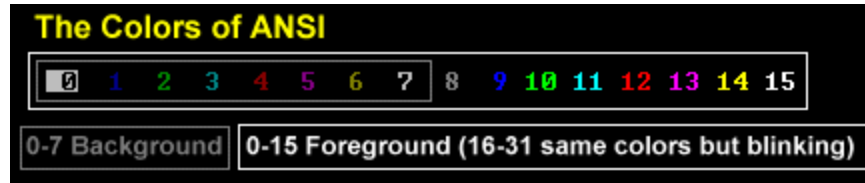
Letter		Chr Dec/Hex	Description	Out-/Inside
A	=	205 / CD		
B	—	196 / C4		
C	|	179 / B3		
D	‖	186 / BA		
E	⌐	213 / D5	Upper-left outer corner Up-to-Right outer corner	outside inside

Letter		Chr Dec/Hex	Description	Out-/Inside
F	⌐⌐	187 / BB	Upper-right outer corner Right-to-Down outer corner	outside inside
G	⊓	214 / D6	Up-to-Right inner corner Upper-left inner corner	outside inside
H	¬	191 / BF	Right-to-Down inner corner Upper-right inner corner	outside inside
I	⊾	200 / C8	Lower-left inner corner	inside
J	⌐	190 / BE	Lower-right inner corner	inside
K	∟	192 / C0	Lower-left outer corner	outside
L	⊔	189 / BD	Lower-right outer corner	outside
M	⊣	181 / B5		
N	⊩	199 / C7		
O	≈	247 / F7	Hard space for all spaces inside a character	
@	@	064 / 40	Filler for all leading spaces	
&	&	038 / 26	Descender mark	

Byte 2 ("Color" Font Type Only)

`00 - FF` , the first part (or Floor(Value / 16)) holds the **background color** (`0,1,2,3 .. max. 7`) and the second part (or Value mod 16) holds the **foreground color** (`0,1,2,3 .. max. F`). See the Color Table below for the available colors.
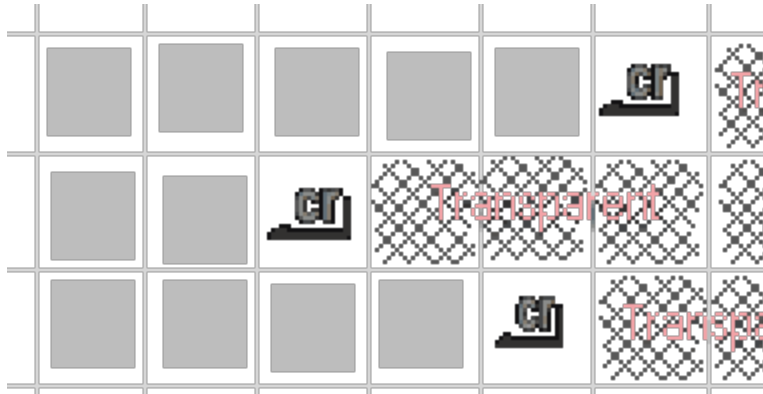

The end of each line in the character is terminated by the *Carriage Return* character (`ASC(13)` or `0Dh`)

A character value = 0 (Null) indicates the end of the current character (Note: that a color value of "00" for fonts of type "Color" is perfectly legal and should not be interpreted as Null termination).
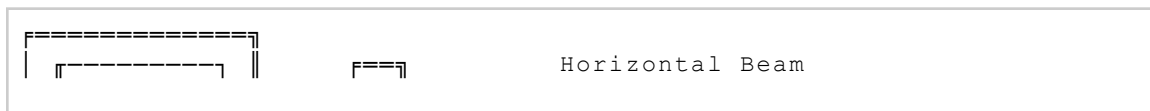
General Notes

- If the current line is being terminated before the specified "Max. Width" is reached, everything after the break will be treated as non-existent or transparent space. I tried to illustrate this behavior in the following drawing.
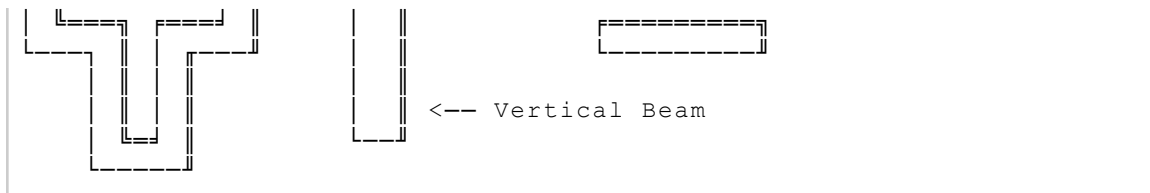

- If the characters of your "Color" font are too large, TheDraw might run into a problem because the space needed exceed the maximum possible offset value in the font base definition. Keep in mind that only 2 bytes are reserved, providing a max. offset of 65534 (=FEh, remember that FFh = no character defined). Taking a color font using 2 bytes per char and maximum dimensions per character of 30×12 + up-to 11 line-breaks and 1 null termination for a total of 94 characters, you are running out of address space much earlier than the end of character 93.
- Remember that the "Outline" font type has restrictions regarding the use of characters. Those rules are enforced by the font-editor tool though and not by the font file format, so be careful, if you are going to *create* new .TDF font files yourself.
- If a character is created using the "Copy" character feature by the TDFonts.exe font editor, the target character will point to the same offset position for the character data as the source character. Only if the target character is changed afterwards will the character data be stored at a different offset location. This reduces space and can be solution for the address space issue mentioned at the first bullet point.

From the TheDraw Documentation

Outline Fonts

Pay special attention to how the top/right of the outside border, and the bottom/left of the inside border were done. Of particular importance are the corners. The following characters must be used in the described locations.

```
For outside borders:
 ╔      Upper-left outer corner
 ╗      Upper-right outer corner
 ╚      Lower-left outer corner
 ╝      Lower-right outer corner
 ╠      Up-to-Right inner corner
 ╗      Right-to-Down inner corner

For inside borders:
 ╔      Upper-left inner corner
 ╗      Upper-right inner corner
 ╚      Lower-left inner corner
 ╝      Lower-right inner corner
 ╔      Up-to-Right outer corner
 ╗      Right-to-Down outer corner
```
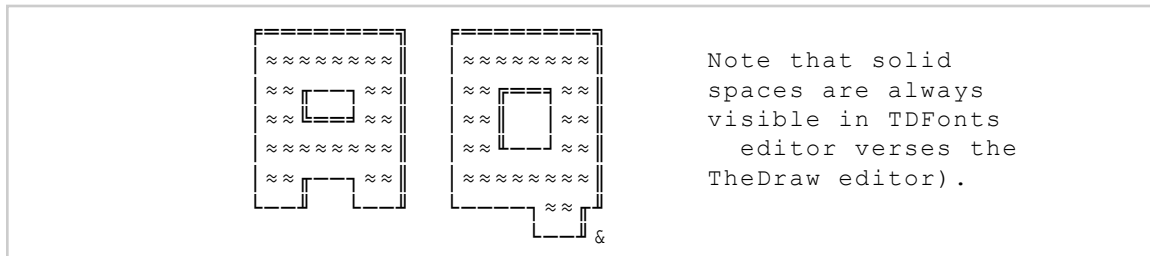
In general the drawing rules are:

- Double lines are always the rightmost side of a column.
- Double lines are always the topmost side of a beam.

RESERVED CHARACTERS

The reserved characters are for solid spaces and descender line markers. Typically solid spaces are used to fill the inside of columns and beams. These are drawn with "≈" characters. ie:

Note that solid spaces are always visible in TDFonts editor verses the TheDraw editor).

TheDraw specially tracks descenders so to align symbols and handle carriage returns properly. A carriage return should move the same number of lines for either A's or Q's for instance. If decenders were not marked, following kind of alignment error occurs:

Symbols demanding descenders should be marked as shown in the above "Q" symbol. Lines marked with ampersands are not counted when TheDraw aligns the symbols. Font symbols typically needing the descender marks are:

```
        $ , ; _ Q g j p q y
```

Others symbols may require them also, depending on how your font is designed or implemented.

Wrapping Up

That's all actually, there is nothing more to it I believe. I am pretty sure that you will hear more of this from me in the future, probably some kind of tools, which I already mentioned briefly at the beginning of this post.

I hope that you find this information useful. Let me know, if you decide to do something yourself with this information and write some tool of your own etc. Just contact me [19] :).

Cheers!

Carsten aka Roy/SAC[20]

No Comments

1. *quoted on .TDF TheDraw Fonts File Tool « Roy of Superior Art Creations[21]* April 29, 2014 at 21:40[22]

   [...] « TheDraw Fonts File (.TDF) Specifications [...]

2. *quoted on New TheDraw .TDF ANSI Fonts Update 07-08, 2014 « Roy of Superior Art Creations[23]* August 30, 2014 at 09:42[25]

   [...] TheDraw Fonts File (.TDF) Specifications [...]

3. *quoted on TheDraw Fonts Update 09-2014 « Roy of Superior Art Creations[27]* September 11, 2014 at 10:51[28]

   [...] TheDraw Fonts File (.TDF) Specifications [...]

4. *quoted on TheDraw (TDF) Fonts Tool Version 1.2 Release « Roy of Superior Art Creations[30]* September 27, 2014 at 06:34[31]

   [...] are limited in Size. It only supports font sizes up to 30 characters wide and 12 characters high (See TDF File format specifications). Figlet does not have this limitation. During the import, fonts that are too large, are simply [...]

5. *quoted on TheDraw Fonts Update 10-2014 « Roy of Superior Art Creations[33]* October 6, 2014 at 06:54[34]

   [...] TheDraw Fonts File (.TDF) Specifications [...]

6. *quoted on TheDraw ANSI Fonts Update for November 2014 « Roy of Superior Art Creations[36]* November 1, 2014 at 08[37]

   [...] TheDraw Fonts File (.TDF) Specifications [...]

7. *quoted on TheDraw ANSI Fonts Collection Roll-Up « Roy of Superior Art Creations[39]* November 15, 2014 at 07:06[40]

   [...] TheDraw Fonts File (.TDF) Specifications [...]

8. *quoted on TheDraw ANSI Fonts Update for December 2014 « Roy of Superior Art Creations[42]* December 1, 2014 at 58[43]

   [...] TheDraw Fonts File (.TDF) Specifications [...]

9. *quoted on TheDraw ANSI Fonts Update for December 2014 Part 2 « Roy of Superior Art Creations[45]* January 24, 2015 at 22:03[46]

   [...] TheDraw Fonts File (.TDF) Specifications [...]

10. *quoted on TheDraw ANSI Fonts Update for January 2015 « Roy of Superior Art Creations[48]* January 24, 2015 at 23:35[49]

    [...] TheDraw Fonts File (.TDF) Specifications [...]

11. *quoted on TheDraw ANSI Fonts Update for May 2015 « Roy of Superior Art Creations[51]* May 21, 2015 at 07:04[52]

    [...] TheDraw Fonts File (.TDF) Specifications [...]

Page Links Reference

[3] http://www.roysac.com/blog/2014/04/thedraw-fonts-file-tdf-specifications/
[4] http://www.roysac.com/blog/author/roy/
[5] http://www.roysac.com/blog/category/ansi/
[6] http://www.roysac.com/blog/category/education/
[7] http://www.roysac.com/blog/category/programming/
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[31] http://www.roysac.com/blog/2014/04/thedraw-fonts-file-tdf-specifications/#comment-19141
[33] http://www.roysac.com/blog/2014/10/thedraw-fonts-update-10-2014/
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[37] http://www.roysac.com/blog/2014/04/thedraw-fonts-file-tdf-specifications/#comment-22313
[39] http://www.roysac.com/blog/2014/11/thedraw-ansi-fonts-collection-roll-up/
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[42] http://www.roysac.com/blog/2014/12/thedraw-ansi-fonts-update-for-december-2014/
[43] http://www.roysac.com/blog/2014/04/thedraw-fonts-file-tdf-specifications/#comment-27137
[45] http://www.roysac.com/blog/2014/12/thedraw-ansi-fonts-update-for-december-2014-part-2/
[46] http://www.roysac.com/blog/2014/04/thedraw-fonts-file-tdf-specifications/#comment-31258
[48] http://www.roysac.com/blog/2015/01/thedraw-ansi-fonts-update-for-january-2015/
[49] http://www.roysac.com/blog/2014/04/thedraw-fonts-file-tdf-specifications/#comment-31268
[51] http://www.roysac.com/blog/2015/05/thedraw-ansi-fonts-update-for-may-2015/
[52] http://www.roysac.com/blog/2014/04/thedraw-fonts-file-tdf-specifications/#comment-40715