

B & O Font version 2

By Ken Van Mechelen

After I got a copy of the B & O font at the April 23th archives session, I began to use it to create decals, using Word 97. I found that the font didn't have all the characters I needed so I added some characters, creating version 2. I also changed the spacing between characters and the overall width of the number characters to make them more uniform. This allows numbers to line up in columns.

Original font:

ABCDEFGHIJKLMNOPSUVWXYZ 0123456789 - , .! &
BALTIMORE & OHIO

Version 2

ABCDEFGHIJKLMNOPSUVWXYZ 0123456789 - , . * &
BALTIMORE & OHIO

Added characters (discussed later):

= + `¶€_! : : < >

The reasons I changed the font are:

- 1. The overall width of the numbers was not uniform, as examples:

Version 1	Version 2
11111111	!!!!!!!
22222222	22222222
33333333	33333333
44444444	44444444
55555555	55555555
66666666	66666666
77777777	77777777
88888888	88888888
99999999	99999999
00000000	00000000

Overall number width needs to be uniform so the car weight and capacity numbers line up:

Version 1		Version 2	
CAPY	100000	CAPY	100000
LD LMT	130400	LD LMT	130400
LT WT	38600	LT WT	><38600

- 2. The spacing between alphabetic characters was not uniform, and a little cramped. I made the white space on either side of the printed image of each character the same.
- 3. The letters were not of uniform height. For example: the top of the O and the F are somewhat higher than the I. The difference is small – about 2.5%. However, Windows has to calculate the height of printed and displayed characters, then round to the nearest pixel for display or printing. Some combinations of character sizes and printer or display resolutions will result in an extra dot in the height of some characters, especially noticeable in small character sizes. I enlarged or compressed characters as required to get more even heights (within about 0.1%).

4. I added a number of characters in order to add a Capitol Dome, to make lines, to facilitate Word 97 functions and for fine spacing. The keyboard locations for the special characters (including the 13 Great States symbol from the original font) are:

Symbol	*	#	=	+	undefined char	¶	€	_	!	@	(space 1/16 #)	(space _ #)	;	:
Keyboard	*	#	=	+	undefined char	Word	Word	Word	!	@	<	>	;	:

The first symbol (*) is directly from the version 1 font, just moved from the ! key to the asterisk key.

The second symbol (#) is a Capitol Dome that I scanned in. After seeing the *, I'm not happy with the # -- it isn't nearly as good a character as the *, although in HO scale it's hard to tell.

The 3rd and 4th characters (= and +) are used to make lines as in:

Baltimore & ohio
123456

The letters and numbers above are printed at 8.5 pt., corresponding to 7" letters in HO scale, and the + and = are printed at 1.5 pt., approximately 1" lines.

The 5th character is printed or displayed for any character that is not defined in this font. For example, if you type x\$x in version 2, it will display as x\$x. In version 1 it will display as X\$x. This character shows you where you typed a wrong character, rather than displaying an apparently empty space.

The 7th, 8th and 9th characters facilitate Word 97 operations. When you set Word to show paragraph marks, it uses the ¶ symbol. The € is displayed at the end of a table entry. When you set Word to display spaces, it uses the _ symbol. These guides are handy when I use tables in Word 97 to lay out decals.

The 10th character is another number 1 character. It is spaced wider than the regular number 1, to match the width of the other numbers. Checking prototype photographs, I found that sometimes the 1 is spaced to match other numbers and sometimes it's more closely spaced. The B&O Color Guide to Freight and Passenger Equipment by C T Bossler shows examples of closely spaced 1's on pages 31,36,45,63,73 and 95. It shows widely spaced 1's on pages 41,58, 59, 65, 66, 70, 73, 78 and 81. The real prize is on page 48, where the CAPY number has a closely spaced 1 and the LT WT number has a widely spaced 1. In the two tables illustrating number spacing above, I actually entered the ! version of the 1 in the first table. Since prototype car numbers were painted on using stencils hung on the car rather than some fixed, uniform, spacing, I expect that there are other variations, but the 1 is the most obvious. The regular number 1 is 9/16 the width of the other numbers.

The 11th character is a simple bullet, entered by typing the keyboard's @ character. It was added to allow generation of the circular symbol found on some cars. This was used to indicate something about the car's wheels. I have forgotten what.

The 12th and 13th characters facilitate spacing for decal layout. The < character doesn't print or display anything. It generates a space equal to 1/16th of a number. The > character is similar, but generates a space equal to _ of a number. I used < and > in the table above to make the LT WT numbers line up with the LD LMT and CAPY numbers. Since the LD LMT and LT WT numbers started with a closely spaced 1 (9/16 size), I actually typed in <> to get the correct space, making the two 3's line up. If the LD LMT had started with a 2, I would had typed >> to get an equivalent space. Incidentally, the regular space is actually 5/8 of the size of a number. This corresponds to about 60% of the size of the average character, in line with other fonts.

The last two characters (; and :) solve a problem created by the < and > characters. Sometimes it is useful to see the spaces that you have used in a decal layout. In Word 97, you can turn on the display of spaces (as _), but nothing will display the spaces generated by the < and >. So I added the ; and : characters, which are entered by using the keyboard's ; and :. They are exactly the same width as the spaces generated by the < and >, respectively. Whenever I get totally confused on the spacing I have used, I simply replace all < with ; and > with : so the spacing shows up.

(Just don't forget to reverse the replacement before printing decals!) While the two symbols aren't easy to distinguish here, when displayed at 500x, they are easy to see.

I expect that other word processing programs (especially other versions of Word) work the same way, so the additions will be useful for other programs.

Railroad lettering is measured as the height of the characters in inches, while printers measure character height in points (1/72 of an inch), but the measurement includes the white space between lines. You might expect that 72 pt. type would give you characters 1 inch high, but the characters would actually be about 7/10 of an inch high, leaving 3/10 for white space between lines. Since the B&O version 2 font characters are actually 7/10 of the line spacing high, you could figure out the theoretical height of a character when printed at some point size. Printing at 720 point size should yield characters which are 7" high. However, I've found that my computer and printer don't seem to follow the rules, so I measured the character height to figure out which point size to use for various lettering sizes. For this and other fonts (e.g., Benn Coifman's fonts - www.RailFonts.com), the easiest thing to do is print some characters very large (500 or 700 point) and measure the height. Then divide to get the correct point size for your scale.

I extracted the following car lettering size information from the Railway Prototype Cyclopedia, volume 4, article by Pat Wider on Box Car Lettering Practices:

Side lettering

- White line -- 1 inch (requirement removed in 1952)
- Reporting Marks -- 7 or 9 inch
- space -- 8 1/2 inches (This doesn't seem to be followed, at least not on some B&O cars)
- Car number -- 7 inch
- White line -- 1 inch (requirement removed in 1952)
- CAPY, LD LMT, LT WT -- 3 inches
- "NEW" or station symbol plus date-- 3 inches (reweigh data) (I have seen prototype pictures where this data is smaller)
- Note: "New" limited to 30 mos, Station limited to 48 mos (30 mos before 1949)
- Dimensional data, Date Built, Cubic Feet Capacity, Couplers, Draft Gear, Markings on Trucks -- 2 inches
- Trust and Patent Marks, Journal Repack Data, Private Marks -- 1 inch

End Lettering

- Reporting Marks, car number -- 4 inches

After measuring the characters, I found the following sizes (HO scale) are the closest Word 97 can get:

- 9" letters – 11 pt. -- BALTIMORE & OHIO 1234567890
- 7" letters – 8.5 pt -- BALTIMORE & OHIO 1234567890
- 4" letters – 5 pt. -- BALTIMORE & OHIO 1234567890
- 3" letters – 3.5 pt -- BALTIMORE & OHIO 1234567890
- 2" letters -- 2.5 pt -- BALTIMORE & OHIO 1234567890
- 1" letters -- 1.5 pt -- BALTIMORE & OHIO 1234567890



13 Great States (use *) 24" – 29 pt, 36" – 43 pt *

1" lines -- 1.5 pt. = or + character ____

10 '+'s
10 '=' s



Capitol dome (use #) 24" – 29 pt, 36" – 32 pt

As I said, I got these numbers after measurement from my printer's output. For exactly correct decals, you should calculate the proper point sizes from measurements from your printer. However, it probably doesn't really make much difference, unless your local rivet counters have extremely good eyesight and microscopic measurement instruments.

><>>! baltimore & ohio -
>2 baltimore & ohio -
>>3 baltimore & ohio -
>>4 baltimore & ohio -
>>5 baltimore & ohio -
>>6 baltimore & ohio -
>>7 baltimore & ohio -
>>8 baltimore & ohio -
>>9 baltimore & ohio -
!0 baltimore & ohio -
!! baltimore & ohio -
!2 baltimore & ohio -
!3 baltimore & ohio -
!4 baltimore & ohio -
!5 baltimore & ohio -
!6 baltimore & ohio -
!7 baltimore & ohio -
!8 baltimore & ohio -
!9 baltimore & ohio -
20 baltimore & ohio -
2! baltimore & ohio -
22 baltimore & ohio -
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27 baltimore & ohio -
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3! baltimore & ohio -
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