L2/25-037

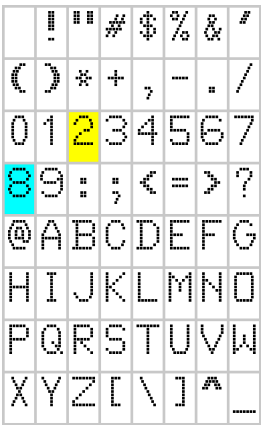
Piotr Grochowski 2024-11-25

Addressing false unifications of legacy computing box drawing characters

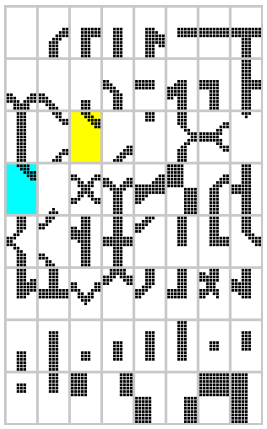
1. Evidence of usage

HP 264x has the Large Character set mode, which includes box drawing characters that can be joined in both dimensions on the character grid to form large visual characters. In L2/21-235, the characters have been proposed to Unicode and incorporated in Unicode 16.0. However, the characters mapped to 0x12 and 0x18 ('2' 🮂 and '8' 🮃) are falsely unified to U+1CE2B. In the HP2645 version of the set, the character at 0x12 is symmetric to 0x09 🮄, 0x13 🮅, and 0x24 🮆 (U+1CE22, U+1CE2C, and U+1CE3B respectively), whereas 0x18 has one extra foreground pixel, and is therefore visually distinct.

The two falsely unified characters have been highlighted:



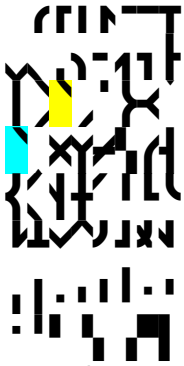
Roman Uppercase mapping [1]



Large Character set mapping in HP2645 [1]

00A0	1CE1A	1CE1B	1CE1C	1CE1D	1CE1E	1CE1F	1CE20
1CE21	1CE22	1CE23	1CE24	1CE25	1CE26	1CE27	1CE28
1CE29	1CE2A	1CE2B	1CE2C	1CE2D	1CE2E	1CE2F	1CE30
1CE2B	1CE31	1CE32	1CE33	1CE34	259A	1CE35	1CE36
1CE37	1CE38	1CE39	1CE3A	1CE3B	1CE3C	1CE3D	1CE3E
1CE3F	1CE40	1CE41	1CE42	1CE43	1CE44	1CE45	1CE46
1CE47	1CE48	1CE49	1CE4A	1CE4B	1CE4C	1CE4D	1CE4E
1CE4F	1CE50	2598	259D	2596	2597	2580	258C

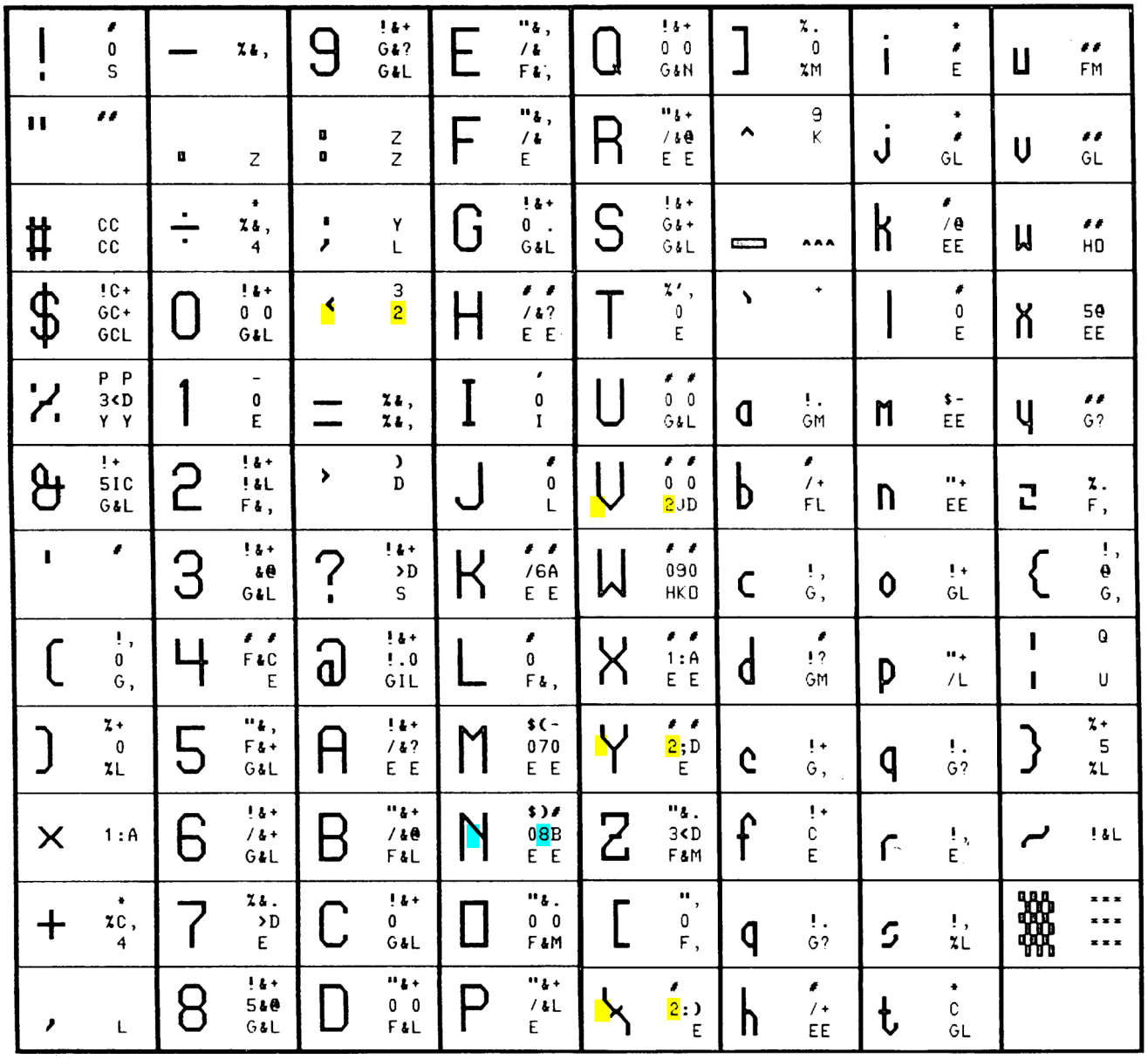
The mapping table for the Large Character set proposed in L2/21-235R, including the falsely unified U+1CE2B [2]



Large Character Set in Unicode mapping

The 0x12 '2' 🮂 character has been highlighted in yellow, and it is observed to connect below vertical lines (0x10 '0' 🮇 and 0x03 '#' 🮈) or symmetrically below a perpendicular diagonal (0x13 '3' 🮅). It may connect to the left of characters that continue the diagonal to form a corner or an intersection (0x2A 'J' 🮉, 0x1B ';' 🮊, 0x1A ':' 🮋), which in turn continue into a symmetric diagonal on the right side (0x24 'D' 🮆 or 0x09 ')' 🮄). In particular, the character always switches direction at its upper edge, and therefore is not necessarily designed to smoothly connect to a lower left diagonal.

The 0x18 '8' 🮃 character has been highlighted in cyan, and it is observed to connect below a diagonal of same direction (0x09 ')' 🮄), and to the left of the character that joins the diagonal into a vertical stem (0x42 'B' 🮌, which '2' 🮂 is not observed to connect to). In particular, the character is designed to smoothly connect to the lower left diagonal.



Example usage of Large Character set with mappings to the Roman Uppercase [3]

The distinct types of connections formed by the two characters, the different encoding in the source platform for round trip compatibility, as well as their different visual appearance, warrant a disunification. Fonts may or may not use the same visual glyph for the two characters.

The 0x12 '2' 𜹑 character should keep its existing encoding as U+1CE2B LARGE TYPE PIECE DIAGONAL UPPER RIGHT.

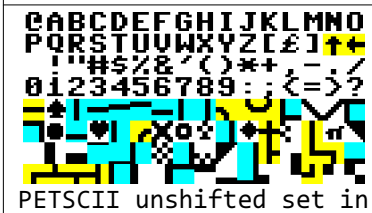
The 0x18 '8' 𜹑 character should be disunified and named as LARGE TYPE PIECE DIAGONAL UPPER RIGHT EXTENDED FROM LOWER LEFT.

[1] http://www.bitsavers.org/pdf/hp/terminal/264x/HP2645_Font_ROMs.zip
[2] https://www.unicode.org/L2/L2021/21235r-terminals-supplement.pdf (terminals-supplement-mappings.zip/HP264XLG.TXT)
[3] http://www.bitsavers.org/pdf/hp/terminal/264x/2645A/02645-90005_2641A_2645A_2645S_N_Display_Station_Reference_Manual_Nov1978.pdf (page B-19/B-20; page 182 of 204 in pdf)

PETSCII includes various box drawing characters, which includes not only the basic 11 light box drawings, 4 rounded corner box drawings, and 2 box drawing arrows (─│┌┐└┘├┤┬┴┼╭╮╰╯↑←) but also horizontals and verticals at all 8 rows and columns (including the bounding box edges), as well as combinations of two perpendicular bounding box edges. However, the extra characters as implemented in L2/19-025 are falsely unified with 1÷8 blocks and therefore do not result in a coherent set of Unicode box drawings.

The light box drawings that have stable Unicode mappings are highlighted in yellow (arrows may or may not be box drawing depending on the typeface, but in PETSCII-compatible fonts they should be box drawing), whereas the characters that have defective mappings to 1÷8 or 1÷4 blocks are highlighted in cyan.

PETSCII unshifted set in PET/VIC-20

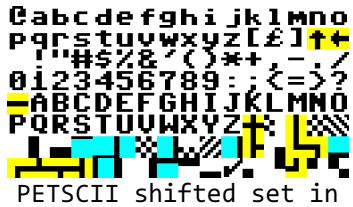


PETSCII unshifted set in C64

0040	0041	0042	0043	0044	0045	0046	0047	0048	0049	004A	004B	004C	004D	004E	004F
0050	0051	0052	0053	0054	0055	0056	0057	0058	0059	005A	005B	00A3	005D	2191	2190
0020	0021	0022	0023	0024	0025	0026	0027	0028	0029	002A	002B	002C	002D	002E	002F
0030	0031	0032	0033	0034	0035	0036	0037	0038	0039	003A	003B	003C	003D	003E	003F
2500	2660	1FB72	1FB78	1FB77	1FB76	1FB7A	1FB71	1FB74	256E	2570	256F	1FB7C	2572	2571	1FB7D
1FB7E	2022	1FB7B	2665	1FB70	256D	2573	25CB	2663	1FB75	2666	253C	1FB8C	2502	03C0	25E5
00A0	258C	2584	2594	2581	258F	2592	2595	1FB8F	25E4	1FB87	251C	2597	2514	2510	2582
250C	2534	252C	2524	258E	258D	1FB88	1FB82	1FB83	2583	1FB7F	2596	259D	2518	2598	259A

The mapping table for PETSCII unshifted proposed in L2/19-025, including defective mappings to 1÷8 and 1÷4 blocks

PETSCII shifted set in PET/VIC-20



PETSCII shifted set in C64

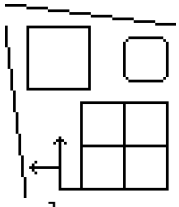
0040	0061	0062	0063	0064	0065	0066	0067	0068	0069	006A	006B	006C	006D	006E	006F
0070	0071	0072	0073	0074	0075	0076	0077	0078	0079	007A	005B	00A3	005D	2191	2190
0020	0021	0022	0023	0024	0025	0026	0027	0028	0029	002A	002B	002C	002D	002E	002F
0030	0031	0032	0033	0034	0035	0036	0037	0038	0039	003A	003B	003C	003D	003E	003F
2500	0041	0042	0043	0044	0045	0046	0047	0048	0049	004A	004B	004C	004D	004E	004F
0050	0051	0052	0053	0054	0055	0056	0057	0058	0059	005A	253C	1FB8C	2502	1FB96	1FB98
00A0	258C	2584	2594	2581	258F	2592	2595	1FB8F	1FB99	1FB87	251C	2597	2514	2510	2582
250C	2534	252C	2524	258E	258D	1FB88	1FB82	1FB83	2583	2713	2596	259D	2518	2598	259A

The mapping table for PETSCII shifted proposed in L2/19-025, including defective mappings to 1÷8 and 1÷4 blocks

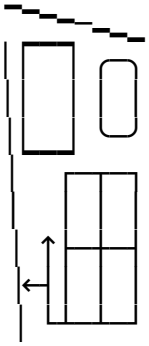
To make the issue more apparent, here are the glyphs arranged in such a way so as to form consistent unshifted example usage:

63	45	44	43	40	46	52	64
65	4F	63	50	20	55	40	49
54	65	20	67	20	5D	20	5D
47	4C	64	7A	20	4A	40	4B
42	20	20	70	40	72	40	6E
5D	20	20	5D	20	5D	20	5D
48	20	1E	6B	40	5B	40	73
59	1F	73	5D	20	5D	20	5D
67	20	6D	71	40	71	40	7D

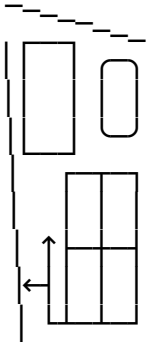
Bytes of example usage



Example usage in PET/VIC-20



Example usage in L2/19-025 mapping

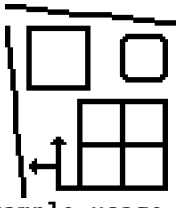


Example usage with proposed characters

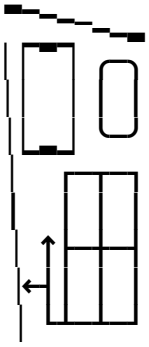
In the C64 version of PETSCII, the embedded font is bold, and therefore light box drawing characters inherit the bold weight, except for 0x63 and 0x64, which remain thin so that 0x77 and 0x6F (quarter blocks) become the consistent light box drawings.

77	45	44	43	40	46	52	6F
65	4F	77	50	20	55	40	49
54	65	20	67	20	5D	20	5D
47	4C	6F	7A	20	4A	40	4B
42	20	20	70	40	72	40	6E
5D	20	20	5D	20	5D	20	5D
48	20	1E	6B	40	5B	40	73
59	1F	73	5D	20	5D	20	5D
67	20	6D	71	40	71	40	7D

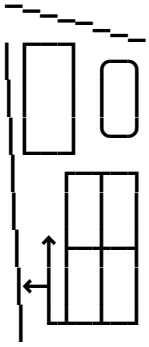
Bytes of example usage



Example usage in C64



Example usage in L2/19-025 mapping



Example usage with proposed characters

In the L2/19-025 mapping, the light box drawing characters of PETSCII may have inconsistent thickness, because some of them are mapped to established light box drawings, and some are mapped to 1÷8 or 1÷4 blocks.

In PET/VIC-20, the box drawing horizontal and vertical line glyphs, consistent with the basic 11 light box drawings, the box drawing arrows, and the rounded corners, are rounded right and down, corresponding to the fifth row and column. There are separate glyphs for the lines rounded up and left, corresponding to the fourth row and column. Fonts intended for optimal PETSCII PET/VIC-20 usage should move the basic box drawings slightly right and down, so that they are symmetric to the rounded up and left counterparts, and all 8 positions for rows and columns are usable.

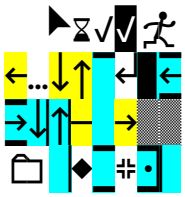
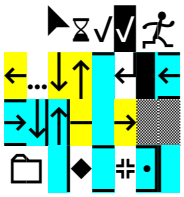
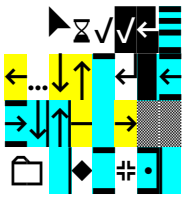
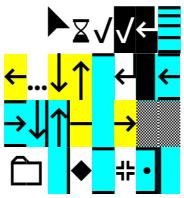
In C64, the versions of the horizontal and vertical lines rounded up and left have the same visual appearance as their rounded right and down

counterparts. Therefore, fonts intended for optimal PETSCII C64 usage should have the rounded up and left glyphs the same as the basic horizontal and vertical glyphs.

The 18 following characters are proposed for PETSCII:

‾ BOX DRAWINGS LIGHT TOP EDGE
‾ BOX DRAWINGS LIGHT VERY HIGH HORIZONTAL
‾ BOX DRAWINGS LIGHT HIGH HORIZONTAL
‾ BOX DRAWINGS LIGHT ROUNDED UP HORIZONTAL
_ BOX DRAWINGS LIGHT LOW HORIZONTAL
_ BOX DRAWINGS LIGHT VERY LOW HORIZONTAL
_ BOX DRAWINGS LIGHT BOTTOM EDGE
⎡ BOX DRAWINGS LIGHT LEFT EDGE
⎢ BOX DRAWINGS LIGHT VERY LEFT VERTICAL
⎢ BOX DRAWINGS LIGHT LEFT VERTICAL
⎢ BOX DRAWINGS LIGHT ROUNDED LEFT VERTICAL
⎥ BOX DRAWINGS LIGHT RIGHT VERTICAL
⎥ BOX DRAWINGS LIGHT VERY RIGHT VERTICAL
⎥ BOX DRAWINGS LIGHT RIGHT EDGE
⎡ BOX DRAWINGS LIGHT TOP AND LEFT EDGES
⎤ BOX DRAWINGS LIGHT TOP AND RIGHT EDGES
⎣ BOX DRAWINGS LIGHT BOTTOM AND LEFT EDGES
⎦ BOX DRAWINGS LIGHT BOTTOM AND RIGHT EDGES

Apple II in some iterations has the MouseText characters, which similarly to PETSCII, includes not only the horizontal and arrows (‾←↑→↓) but also light box drawing characters on the edges. Once again, the extra characters as implemented in L2/19-025 are falsely unified with 1÷8 blocks and therefore do not result in a coherent set of Unicode box drawings.

<table>
<tr>
<td> 
Apple II MouseText characters</td>
<td>
<table>
<tr><td></td><td></td><td>1FBB0</td><td>231B</td><td>2713</td><td>1FBB1</td><td>1FBB2</td><td>1FBB3</td></tr>
<tr><td>2190</td><td>2026</td><td>2193</td><td>2191</td><td>2594</td><td>21B2</td><td>2589</td><td>1FBB5</td></tr>
<tr><td>1FBB6</td><td>1FBB7</td><td>1FBB8</td><td>2500</td><td>1FB7C</td><td>2192</td><td>2592</td><td>1FB90</td></tr>
<tr><td>1FBB9</td><td>1FBBA</td><td>2595</td><td>25C6</td><td>1FB80</td><td>1FBBB</td><td>1FBBC</td><td>258F</td></tr>
</table>
The mapping table for Apple II MouseText proposed in L2/19-025, including defective mappings to 1÷8 blocks
</td>
<td> 
Apple II MouseText characters in L2/19-025 mapping</td>
<td> 
Apple II MouseText with proposed characters</td>
</tr>
<tr>
<td> 
Apple IIGS MouseText characters</td>
<td>
<table>
<tr><td></td><td></td><td>1FBB0</td><td>231B</td><td>2713</td><td>1FBB1</td><td>1FBB4</td><td>1FB81</td></tr>
<tr><td>2190</td><td>2026</td><td>2193</td><td>2191</td><td>2594</td><td>21B2</td><td>2589</td><td>1FBB5</td></tr>
<tr><td>1FBB6</td><td>1FBB7</td><td>1FBB8</td><td>2500</td><td>1FB7C</td><td>2192</td><td>2592</td><td>1FB90</td></tr>
<tr><td>1FBB9</td><td>1FBBA</td><td>2595</td><td>25C6</td><td>1FB80</td><td>1FBBB</td><td>1FBBC</td><td>258F</td></tr>
</table>
The mapping table for Apple IIGS MouseText proposed in L2/19-025, including defective mappings to 1÷8 blocks
</td>
<td> 
Apple IIGS MouseText characters in L2/19-025 mapping</td>
<td> 
Apple IIGS MouseText with proposed characters</td>
</tr>
</table>

The character 🭁 (U+1FB81 HORIZONTAL ONE EIGHTH BLOCK-1358), also known as the 'title bar' of the Apple IIGS MouseText character set, in Unicode 13.0–15.1 was defined to be first, third, fifth and eighth slice of eighths vertically, but in Unicode 16.0, the third and fifth slices do not necessarily form a strict geometrical construction. However, that's still suboptimal for general Apple II compatibility, as the first and eighth slices are still defined to be 1÷8 blocks. Changing U+1FB81 to be made entirely of light box drawings would break compatibility with tiling with existing 1÷8 blocks, so it is proposed to be disunified as well.

The 12 following characters are proposed for Apple II (*4 of them are also proposed for PETSCII):

¯ BOX DRAWINGS LIGHT TOP EDGE*
▉ INVERSE BOX DRAWINGS LIGHT RIGHT EDGE
↞ BOX DRAWINGS LIGHT TOP AND BOTTOM EDGES WITH LEFTWARDS ARROW
↠ BOX DRAWINGS LIGHT TOP AND BOTTOM EDGES WITH RIGHTWARDS ARROW
↡ BOX DRAWINGS LIGHT RIGHT EDGE WITH DOWNWARDS ARROW
↟ BOX DRAWINGS LIGHT RIGHT EDGE WITH UPWARDS ARROW
└ BOX DRAWINGS LIGHT BOTTOM AND LEFT EDGES*
┘ BOX DRAWINGS LIGHT RIGHT EDGE*
─ BOX DRAWINGS LIGHT TOP AND BOTTOM EDGES
┘ BOX DRAWINGS LIGHT TOP BOTTOM AND RIGHT EDGES WITH MIDDLE DOT
└ BOX DRAWINGS LIGHT LEFT EDGE*
☰ BOX DRAWINGS LIGHT TOP AND BOTTOM EDGES AND MULTIPLE HORIZONTAL

2. Existing proposals for legacy computing

As of Unicode 16.0, the proposals L2/19-025, L2/21-234, and L2/21-235 have been already incorporated into Unicode. This resulted in adding Symbols for Legacy Computing and Symbols for Legacy Computing Supplement blocks, as well as extending Supplemental Arrows-C, Miscellaneous Mathematical and Technical Symbols, and Control Pictures blocks. This is intended to provide compatibility for various legacy platforms, such as Teletext, PETSCII, Apple II, Amstrad CPC, ZX80/ZX81, TRS-80, MSX, Minitel, Atari ST, RISC OS, Sharp MZ, Ohio Scientific, Robotron Z9001, Kaypro, Mattel Aquarius, and HP 264x.

An ongoing proposal for legacy computing is L2/23-252, which proposes disunification of some of the legacy computing characters from emoji. The characters in that proposal theoretically should not conflict with what is being proposed in this proposal, since the two proposals involve entirely different characters. However, due to limited remaining space in Symbols for Legacy Computing and Symbols for Legacy Computing Supplement blocks, using other encoding blocks may be necessary in order to incorporate multiple ongoing proposals.

3. Example encoding

This example allocation assumes that L2/23-252 will be rejected; that is, placed in the "Archive of Notices of Non-Approval". However, depending on the decisions that Unicode makes regarding this and other proposals, the glyphs may be allocated differently.

Symbols for Legacy Computing Supplement, Supplemental Arrows-C:

	1CCF	1CE1	1CE2	1CE3	1CE4	1CE5	1CE6	1CE7	1CE8	1CE9	1CEA	1CEB	1F8B
0	1CCF0	1CE10	1CE20	1CE30	1CE40	1CE50	1CE60	1CE70	1CE80	1CE90	1CEA0	1CEB0	1F8B0
1	1CCF1	1CE11	1CE21	1CE31	1CE41	1CE51	1CE61	1CE71	1CE81	1CE91	1CEA1	1CEB1	1F8B1
2	1CCF2	1CE12	1CE22	1CE32	1CE42	1CE52	1CE62	1CE72	1CE82	1CE92	1CEA2	1CEB2	1F8B2
3	1CCF3	1CE13	1CE23	1CE33	1CE43	1CE53	1CE63	1CE73	1CE83	1CE93	1CEA3	1CEB3	1F8B3
4	1CCF4	1CE14	1CE24	1CE34	1CE44	1CE54	1CE64	1CE74	1CE84	1CE94	1CEA4	1CEB4	1F8B4
5	1CCF5	1CE15	1CE25	1CE35	1CE45	1CE55	1CE65	1CE75	1CE85	1CE95	1CEA5	1CEB5	1F8B5
6	1CCF6	1CE16	1CE26	1CE36	1CE46	1CE56	1CE66	1CE76	1CE86	1CE96	1CEA6	1CEB6	1F8B6
7	1CCF7	1CE17	1CE27	1CE37	1CE47	1CE57	1CE67	1CE77	1CE87	1CE97	1CEA7	1CEB7	1F8B7
8	1CCF8	1CE18	1CE28	1CE38	1CE48	1CE58	1CE68	1CE78	1CE88	1CE98	1CEA8	1CEB8	1F8B8
9	1CCF9	1CE19	1CE29	1CE39	1CE49	1CE59	1CE69	1CE79	1CE89	1CE99	1CEA9	1CEB9	1F8B9
A	1CCFA	1CE1A	1CE2A	1CE3A	1CE4A	1CE5A	1CE6A	1CE7A	1CE8A	1CE9A	1CEAA	1CEBA	1F8BA
B	1CCFB	1CE1B	1CE2B	1CE3B	1CE4B	1CE5B	1CE6B	1CE7B	1CE8B	1CE9B	1CEAB	1CEBB	1F8BB
C	1CCFC	1CE1C	1CE2C	1CE3C	1CE4C	1CE5C	1CE6C	1CE7C	1CE8C	1CE9C	1CEAC	1CEBC	1F8BC
D	1CCFD	1CE1D	1CE2D	1CE3D	1CE4D	1CE5D	1CE6D	1CE7D	1CE8D	1CE9D	1CEAD	1CEBD	1F8BD
E	1CCFE	1CE1E	1CE2E	1CE3E	1CE4E	1CE5E	1CE6E	1CE7E	1CE8E	1CE9E	1CEAE	1CEBE	1F8BE
F	1CCFF	1CE1F	1CE2F	1CE3F	1CE4F	1CE5F	1CE6F	1CE7F	1CE8F	1CE9F	1CEAF		1F8BF

Symbols for Legacy Computing:

	1FB0	1FB1	1FB2	1FB3	1FB4	1FB5	1FB6	1FB7	1FB8	1FB9	1FBA	1FBB	1FBC	1FBD	1FBE	1FBF
0	1FB00	1FB10	1FB20	1FB30	1FB40	1FB50	1FB60	1FB70	1FB80	1FB90	1FBA0	1FBB0	1FBC0	1FBD0	1FBE0	1FBF0
1	1FB01	1FB11	1FB21	1FB31	1FB41	1FB51	1FB61	1FB71	1FB81	1FB91	1FBA1	1FBB1	1FBC1	1FBD1	1FBE1	1FBF1
2	1FB02	1FB12	1FB22	1FB32	1FB42	1FB52	1FB62	1FB72	1FB82	1FB92	1FBA2	1FBB2	1FBC2	1FBD2	1FBE2	1FBF2
3	1FB03	1FB13	1FB23	1FB33	1FB43	1FB53	1FB63	1FB73	1FB83		1FBA3	1FBB3	1FBC3	1FBD3	1FBE3	1FBF3
4	1FB04	1FB14	1FB24	1FB34	1FB44	1FB54	1FB64	1FB74	1FB84	1FB94	1FBA4	1FBB4	1FBC4	1FBD4	1FBE4	1FBF4
5	1FB05	1FB15	1FB25	1FB35	1FB45	1FB55	1FB65	1FB75	1FB85	1FB95	1FBA5	1FBB5	1FBC5	1FBD5	1FBE5	1FBF5
6	1FB06	1FB16	1FB26	1FB36	1FB46	1FB56	1FB66	1FB76	1FB86	1FB96	1FBA6	1FBB6	1FBC6	1FBD6	1FBE6	1FBF6
7	1FB07	1FB17	1FB27	1FB37	1FB47	1FB57	1FB67	1FB77	1FB87	1FB97	1FBA7	1FBB7	1FBC7	1FBD7	1FBE7	1FBF7
8	1FB08	1FB18	1FB28	1FB38	1FB48	1FB58	1FB68	1FB78	1FB88	1FB98	1FBA8	1FBB8	1FBC8	1FBD8	1FBE8	1FBF8
9	1FB09	1FB19	1FB29	1FB39	1FB49	1FB59	1FB69	1FB79	1FB89	1FB99	1FBA9	1FBB9	1FBC9	1FBD9	1FBE9	1FBF9
A	1FB0A	1FB1A	1FB2A	1FB3A	1FB4A	1FB5A	1FB6A	1FB7A	1FB8A	1FB9A	1FBAA	1FBBA	1FBCA	1FBDA	1FBEA	1FBFA
B	1FB0B	1FB1B	1FB2B	1FB3B	1FB4B	1FB5B	1FB6B	1FB7B	1FB8B	1FB9B	1FBAB	1FBBB	1FBCB	1FBDB	1FBEB	1FBFB
C	1FB0C	1FB1C	1FB2C	1FB3C	1FB4C	1FB5C	1FB6C	1FB7C	1FB8C	1FB9C	1FBAC	1FBBC	1FBCC	1FBDC	1FBEC	1FBFC
D	1FB0D	1FB1D	1FB2D	1FB3D	1FB4D	1FB5D	1FB6D	1FB7D	1FB8D	1FB9D	1FBAD	1FBBD	1FBCD	1FBDD	1FBED	1FBFD
E	1FB0E	1FB1E	1FB2E	1FB3E	1FB4E	1FB5E	1FB6E	1FB7E	1FB8E	1FB9E	1FBAE	1FBBE	1FBCE	1FBDE	1FBEE	1FBFE
F	1FB0F	1FB1F	1FB2F	1FB3F	1FB4F	1FB5F	1FB6F	1FB7F	1FB8F	1FB9F	1FBAF	1FBBF	1FBCF	1FBDF	1FBEF	1FBFF

1CCFA ⌜ BOX DRAWINGS LIGHT TOP AND LEFT EDGES
→ 1FB7D ⌜ left and upper one eighth block
1CCFB ⌝ BOX DRAWINGS LIGHT TOP AND RIGHT EDGES
→ 1FB7E ⌝ right and upper one eighth block
1CCFC ⌞ BOX DRAWINGS LIGHT BOTTOM AND LEFT EDGES
→ 1FB7C ⌞ left and lower one eighth block
1CCFD ⌟ BOX DRAWINGS LIGHT BOTTOM AND RIGHT EDGES
→ 1FB7F ⌟ right and lower one eighth block

1CCFE ▉ INVERSE BOX DRAWINGS LIGHT RIGHT EDGE
  • in Apple IIGS MouseText it connects above 1FBB4 ⇜
  → 1FBB4 ⇜ inverse downwards arrow with tip leftwards
  → 2589 ▉ left seven eighths block
1CCFF ⍰ BOX DRAWINGS LIGHT TOP BOTTOM AND RIGHT EDGES WITH MIDDLE DOT
  → 1FBBC ⍰ right open squared dot
1CEB4 🬔 LARGE TYPE PIECE DIAGONAL UPPER RIGHT EXTENDED FROM LOWER LEFT
  • connects below 1CE22 🬗 and to the left of 1CE39 🬹
  → 1CE2B 🬔 large type piece diagonal upper right
  → 1CE22 🬗 large type piece diagonal lower left
  → 1CE39 🬹 large type piece stem with left joint
1CEB5 ▔ BOX DRAWINGS LIGHT VERY HIGH HORIZONTAL
  → 1FB76 🭶 horizontal one eighth block-2
1CEB6 ▔ BOX DRAWINGS LIGHT HIGH HORIZONTAL
  → 1FB77 🭷 horizontal one eighth block-3
1CEB7 ─ BOX DRAWINGS LIGHT ROUNDED UP HORIZONTAL
  • in PET/VIC-20 vertically symmetric to the rounded down 2500 ─
  • in C64 visually identical to 2500 ─
  → 2500 ─ box drawings light horizontal
  → 1FB78 🭸 horizontal one eighth block-4
1CEB8 ▁ BOX DRAWINGS LIGHT LOW HORIZONTAL
  → 1FB7A 🭺 horizontal one eighth block-6
1CEB9 ▁ BOX DRAWINGS LIGHT VERY LOW HORIZONTAL
  → 1FB7B 🭻 horizontal one eighth block-7
1CEBA ▏ BOX DRAWINGS LIGHT VERY LEFT VERTICAL
  → 1FB70 ▏ vertical one eighth block-2
1CEBB ▏ BOX DRAWINGS LIGHT LEFT VERTICAL
  → 1FB71 ▏ vertical one eighth block-3
1CEBC ▏ BOX DRAWINGS LIGHT ROUNDED LEFT VERTICAL
  • in PET/VIC-20 horizontally symmetric to the rounded right 2502 ▏
  • in C64 visually identical to 2502 ▏
  → 2502 ▏ box drawings light vertical
  → 1FB72 ▏ vertical one eighth block-4
1CEBD ▏ BOX DRAWINGS LIGHT RIGHT VERTICAL
  → 1FB74 ▏ vertical one eighth block-6
1CEBE ▏ BOX DRAWINGS LIGHT VERY RIGHT VERTICAL
  → 1FB75 ▏ vertical one eighth block-7
1F8BC 🮼 BOX DRAWINGS LIGHT TOP AND BOTTOM EDGES WITH LEFTWARDS ARROW
  → 1FBB5 🮵 leftwards arrow and upper and lower one eighth block
1F8BD 🮽 BOX DRAWINGS LIGHT TOP AND BOTTOM EDGES WITH RIGHTWARDS ARROW
  → 1FBB6 🮶 rightwards arrow and upper and lower one eighth block
1F8BE 🮾 BOX DRAWINGS LIGHT RIGHT EDGE WITH DOWNWARDS ARROW
  • arrow does not necessarily extend to the top edge
  → 1FBB7 🮷 downwards arrow and right one eighth block
1F8BF 🮿 BOX DRAWINGS LIGHT RIGHT EDGE WITH UPWARDS ARROW
  • arrow does not necessarily extend to the bottom edge
  → 1FBB8 🮸 upwards arrow and right one eighth block
1FBFA ▔ BOX DRAWINGS LIGHT TOP EDGE
  → 2594 ▔ upper one eighth block
1FBFB _ BOX DRAWINGS LIGHT BOTTOM EDGE
  → 2581 ▁ lower one eighth block
1FBFC ▏ BOX DRAWINGS LIGHT LEFT EDGE
  → 258F ▏ left one eighth block
1FBFD ▕ BOX DRAWINGS LIGHT RIGHT EDGE
  • in Apple II/IIGS MouseText it connects above 21B2 ↲
  → 21B2 ↲ downwards arrow with tip leftwards
  → 2595 ▕ right one eighth block
1FBFE _ BOX DRAWINGS LIGHT TOP AND BOTTOM EDGES

→ 1FB80 🮀 upper and lower one eighth block
1FBFF 🮿 BOX DRAWINGS LIGHT TOP AND BOTTOM EDGES AND MULTIPLE HORIZONTAL
→ 1FB81 🮁 horizontal one eighth block-1358

4. Proposal summary

Add 1 character in HP 264x, 18 characters in PETSCII, and 12 characters in Apple II, including 4 in both PETSCII and Apple II, for a total of **27 characters**, by disunifying a slope character in HP 264x from a similar slope, as well as light box-drawing characters in PETSCII/Apple II from the 1÷8 blocks and 1÷4 blocks.