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Universal Multiple-Octet Coded Character Set
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1. Introduction. This document proposes the addition to the UCS of 214 new graphic characters to provide compatibility with a wide range of home computers, or “microcomputers,” manufactured approximately from the mid-1970s to the mid-1980s, and with the teletext broadcasting standard originally developed in the early 1970s.

***NOTE:** Mapping tables between legacy character sets and the allocations in this proposal are attached to the PDF version of this document.*

2. History. Box-drawing characters, solid and shaded blocks, and similar graphic characters were encoded in the UCS in 1991 (Unicode 1.0) for compatibility with established character sets, both in popular microcomputers—particularly the IBM PC—and in terminal-emulation software. The set of block characters was augmented in 1999 (Unicode 3.0) and in 2002 (Unicode 3.2) to cover additional platforms, due largely to proposals by Frank da Cruz (L2/98-353 through -355, L2/98-413, and L2/00-159), which also included C1 and EBCDIC control pictures, hex byte pictures, and some other graphic characters that were not accepted.

Over the years that followed, suggestions were occasionally made on the Unicode public mailing list to add characters from legacy platforms, but few formal proposals emerged. One that did was “Proposal to create a new block for missing Block Element characters,” by Eduardo Marín Silva (L2/17-194), which proposed five characters from the Sinclair ZX80 and ZX81 character sets.

A list discussion in April 2017 concerning the “PETSCII” character set, used in various forms by Commodore home computers ranging from the PET (1977) to the C128 (1985), led to the formation of an ad-hoc Terminals Working Group, which is responsible for this document.

Computers of this era enjoyed a great deal of popularity—the Commodore 64 is *still*, to this day, the largest-selling single computer model of all time—and spawned a large number of computer clubs and user groups devoted to these machines. Some of the original user groups are still in existence,

and new ones, often online-only, have emerged more recently. The characters proposed here are intended to benefit these users and hobbyists, by providing round-trip convertibility of character data between legacy platforms and the UCS. They may also facilitate the creation of software for these platforms, such as emulators and cross-assemblers, and have been requested by developers of present-day text-mode applications as well, to enhance pseudo-graphical displays.

3. Microcomputer platforms. The group considered the following platforms and character sets:

- Amstrad CPC (464, 664, 6128, etc.)
- Apple 8-bit computers (II, II Plus, IIe, IIc, III, and the 16-bit IIGs), including MouseText
- Atari 8-bit computers (400, 800, XL, XE) (“ATASCII”)
- Atari 16-bit computers (ST, STE, TT, Falcon), including the GEM windowing system
- Commodore 8-bit computers (PET, VIC-20, 64, 128) (“PETSCII”)
- Commodore Amiga (500, 1000, etc.)
- Mattel Aquarius
- MSX computers (Spectravideo SV-328, Yamaha YIS503II, Canon V-20, etc.)
- Oric computer series (Tangerine Computer Systems)
- RISC OS computers (Acorn, other ARM machines)
- Sinclair 8-bit computers (ZX80, ZX81, ZX Spectrum, and Timex Sinclair equivalents)
- Tandy TRS-80 computers (TRS-80 Model I, Model III, Model 4, Color Computer)
- Texas Instruments TI-99/4A

For many of these platforms, information about the character sets and text and graphics modes was available only through scanned copies of user manuals and photographs of screens showing a full or partial character dump. The combination of low-resolution images and lack of supporting information meant that some characters were difficult or impossible to identify, and consequently have not been proposed in this document.

4. Teletext and Minitel. *Teletext* was a service invented in the United Kingdom in the early 1970s for broadcasting pages of information, generally text and simple block graphics, to analog television receivers via the vertical blanking interval. Teletext found its greatest popularity in Europe, where it was commonplace until the adoption of digital television; almost all analog television sets sold in Europe since the early 1980s had built-in teletext decoders.

Several different 7-bit character sets were defined for teletext, including a complete set of 2×3 block graphics (64 in all), analogous to the block quadrants found in other platforms, as well as additional mosaic graphics. There was also a set of 27 control characters which could be used to select foreground and background color, character height (single or double), and other attributes, similar to those found in the ISO 6429 (ANSI X3.64, ECMA-48) standard which was introduced later. Figure 25 illustrates several of these display techniques used on a single page. At least one line of microcomputers (the BBC Model B Microcomputer, manufactured by Acorn) supported a teletext display mode.

A digital version of teletext, using the same character encoding model, is still in use in Romania, as shown in Figure 27.

Later versions of the teletext specification included features such as (relatively) high-resolution graphics and dynamically redefinable character sets (DRCS), which are not considered in this document.

Minitel was an interactive videotext service, used in France from the early 1980s until 2012, that utilized dedicated terminals and standard telephone service to provide two-way online functionality, similar to many modern-day uses of the Internet. Like teletext, Minitel was character-based and made extensive use of 2 × 3 block characters to provide simple graphics.

5. Graphic characters. Most of the characters proposed in this document are *semigraphics*: block-style symbols which could be combined to simulate an all-points-addressable graphic display. Many platforms used these text characters to support a so-called “graphics mode”: small blocks could be “plotted” at various coordinates, and the appropriate full-sized block character consisting of the necessary “on” and “off” blocks would be displayed in text mode (Figure 24). The set also includes numerous box-drawing and shading characters, and some miscellaneous characters such as arrows and stick figures, which were present in the target platforms.

The word “sextant” is used in this document, by analogy with “quadrant”—a term used for certain UCS characters since 1999—to refer to a semigraphics block consisting of six smaller blocks or “cells” arranged in two columns and three rows. In the teletext specification, characters in this group could be displayed either with the cells joined together, as with the existing quadrant characters, or with a narrow space between cells. A teletext emulator could interpret the control character U+001A (“separated graphics”) to display space between cells, or U+0019 (“contiguous graphics”) to revert to the default, joined appearance (Figure 28).

Four of the 64 sextant block characters were unified with existing characters: the left and right half blocks and full block were unified with the visually identical U+258C, U+2590, and U+2588, while the empty block can be mapped to an existing space character with suitable properties, such as U+00A0 NO-BREAK SPACE.

Other line-drawing and partial-block characters proposed in this document were determined not to be unifiable with existing characters. The horizontal one-eighth blocks are similar in nature to the horizontal scan line characters at U+23BA through U+23BD and U+2500, but are defined strictly in terms of an 8-row cell, just as the horizontal scan lines are defined in terms of a 9-row cell. Additionally, the proposed U+1FB95 CHECKER BOARD FILL and U+1FB96 INVERSE CHECKER BOARD FILL exist side-by-side in the same legacy character sets as U+2592 MEDIUM SHADE and the proposed U+1FB90 INVERSE MEDIUM SHADE (Figures 1 and 8), which are finer-grained. Choosing the wrong semigraphics character in contexts like images or UIs could result in mismatches or “seams” in juxtaposition with surrounding semigraphics characters. New characters proposed here are intended to fit together visually, the same way the existing ones do.

Some of the graphic characters are intended to be used together, to represent line-drawing images that would not fit within a single character block. Examples include LEFT, MIDDLE, and RIGHT THIRD WHITE RIGHT POINTING INDEX from the TRS-80 Model III and Model 4, and LEFT and RIGHT HALF RUNNING MAN from MouseText on the Apple IIc. These are analogous to U+2320 TOP HALF INTEGRAL and U+2321 BOTTOM HALF INTEGRAL, which, like the present characters, were encoded for compatibility.

Graphic characters on text-oriented legacy platforms were designed for restricted resolution, typically an 8×8 cell. Many of these characters are shown with improved resolution in the code charts beginning on page 11. For example, two characters from the Apple MouseText set, LEFTWARDS and RIGHTWARDS ARROW AND UPPER AND LOWER ONE EIGHTH BLOCK, were displayed in the Apple II series with an incomplete upper line (Figure 3), but are shown in the code charts with a complete (broken) line. The code chart glyphs are illustrative only and do not imply a change in character identity.

6. Seven-segment digits. The character set for Atari 16-bit machines (ST and successors) defined clones of the ASCII digits 0 through 9, styled as upright (i.e. not oblique) seven-segment digits, in the code space below 0x20. These styled digits were particularly popular in Atari ST applications, where they were used in separate domains from regular ASCII digits, such as game scores. Representatives of the Atari ST user community have specifically requested these characters. They are proposed here at code points U+1FBF0 through U+1FBF9.

7. Characters not proposed. Not all characters identified in the target platforms were deemed suitable for encoding. For example, the character set for Atari 16-bit machines included two characters for the left and right halves of the Atari logo, and four which could be arranged to form an image of the fictional character J.R. “Bob” Dobbs (see Wikipedia article). Both of these symbols, like the existing Apple logo, were determined to be IP-encumbered and thus are not proposed here.

Glyphs from lesser-used platforms that the group observed but could not identify are also not proposed, as described above.

Characters that could not be attested in any of the target platforms are not proposed. One code point, U+1FB93, was left unassigned in this proposal as a placeholder for the as-yet unattested *LEFT HALF BLOCK AND RIGHT HALF INVERSE MEDIUM SHADE, which would be the reverse-video equivalent of U+1FB8D RIGHT HALF MEDIUM SHADE from the Aquarius.

For some platforms, additional research yielded character-dump images that show characters not included in earlier revisions of this proposal. Many of these characters are already encoded in the Miscellaneous Technical or Control Pictures blocks of the UCS. Any additional characters present in the legacy platforms, but not proposed here, may be included in a separate, future proposal.

“Reverse video” or “inverse video” characters, which were present on nearly all microcomputers of the 1970s and 1980s and often served the same purpose that bold or italic characters serve today, have been determined to be out of scope for the UCS and are not proposed here. In a previous version of this proposal (L2/17-435), they were proposed as variation sequences. The ISO 6429 display sequences **SGR 7** (“negative image”) and **SGR 0** (“default rendition”) are suggested as a higher-level protocol to achieve this effect.

Control characters from microcomputer platforms and teletext were considered, but also determined to be out of scope for the UCS. These characters were located in what would today be considered the C0 control range (0x00–0x1F) or the C1 control range (0x7F–0x9F). Processes that need to interchange these codes should simply interchange the binary C0 or C1 value, extended to the UCS code space but without further mapping. Emulators should treat these control codes as appropriate for the targeted environment.

8. Character names. At least since the 1970s, international SDOs such as ECMA and national bodies such as ANSI and BSI have assigned names to the elements of coded character sets. By contrast, vendors of microcomputers, and even the developers of the teletext standard, tended to provide at best a code chart or image of a screen showing the character set, usually without names. We have attempted to invent names for these characters that are meaningful, unique, and conformant to WG2 and UTC guidelines.

9. Ordering and code point assignment. The proposed characters are presented roughly in groups: block sextants are together, followed by other mosaic graphics, and so forth. Although the exact order of these characters within their groups is not an overriding concern, it seems reasonable that the groups should be kept together.

All characters (with the exception of two arrows which seemed to fit logically within an existing block) are shown here with a suggested code point in a new block (1FB00..1FBFF) that is unassigned and adjacent to existing symbol blocks, according to the “Roadmap to the SMP,” revision 11.0.0. A placeholder block name, “Graphics for Legacy Computing,” is listed in the summary form. However, it is understood that final assignment of blocks, code points, and block and character names is completely at the discretion of UTC and/or WG2.

10. Implementation. To assist implementers of emulators and conversion tools with the variety of mechanisms discussed in this proposal—existing and new block graphics characters, control codes, ISO 6429 sequences for reverse video, and so forth—the group has developed an extensive set of mapping tables, providing suggested mappings from the legacy character sets to the UCS. These mapping tables are attached to the PDF version of this document. The group is also drafting a Unicode Technical Note to explain the mechanisms and recommended techniques for working with them.

11. Unicode character properties.

1F8B0;ARROW POINTING UPWARDS THEN NORTH WEST;So;0;ON;;;;;N;;;;;
1F8B1;ARROW POINTING RIGHTWARDS THEN CURVING SOUTH WEST;So;0;ON;;;;;N;;;;;
1FB00;BLOCK SEXTANT-1;So;0;ON;;;;;N;;;;;
1FB01;BLOCK SEXTANT-2;So;0;ON;;;;;N;;;;;
1FB02;BLOCK SEXTANT-12;So;0;ON;;;;;N;;;;;
1FB03;BLOCK SEXTANT-3;So;0;ON;;;;;N;;;;;
1FB04;BLOCK SEXTANT-13;So;0;ON;;;;;N;;;;;
1FB05;BLOCK SEXTANT-23;So;0;ON;;;;;N;;;;;
1FB06;BLOCK SEXTANT-123;So;0;ON;;;;;N;;;;;
1FB07;BLOCK SEXTANT-4;So;0;ON;;;;;N;;;;;
1FB08;BLOCK SEXTANT-14;So;0;ON;;;;;N;;;;;
1FB09;BLOCK SEXTANT-24;So;0;ON;;;;;N;;;;;
1FB0A;BLOCK SEXTANT-124;So;0;ON;;;;;N;;;;;
1FB0B;BLOCK SEXTANT-34;So;0;ON;;;;;N;;;;;
1FB0C;BLOCK SEXTANT-134;So;0;ON;;;;;N;;;;;
1FB0D;BLOCK SEXTANT-234;So;0;ON;;;;;N;;;;;
1FB0E;BLOCK SEXTANT-1234;So;0;ON;;;;;N;;;;;
1FB0F;BLOCK SEXTANT-5;So;0;ON;;;;;N;;;;;
1FB10;BLOCK SEXTANT-15;So;0;ON;;;;;N;;;;;
1FB11;BLOCK SEXTANT-25;So;0;ON;;;;;N;;;;;
1FB12;BLOCK SEXTANT-125;So;0;ON;;;;;N;;;;;
1FB13;BLOCK SEXTANT-35;So;0;ON;;;;;N;;;;;
1FB14;BLOCK SEXTANT-235;So;0;ON;;;;;N;;;;;
1FB15;BLOCK SEXTANT-1235;So;0;ON;;;;;N;;;;;
1FB16;BLOCK SEXTANT-45;So;0;ON;;;;;N;;;;;
1FB17;BLOCK SEXTANT-145;So;0;ON;;;;;N;;;;;
1FB18;BLOCK SEXTANT-245;So;0;ON;;;;;N;;;;;
1FB19;BLOCK SEXTANT-1245;So;0;ON;;;;;N;;;;;
1FB1A;BLOCK SEXTANT-345;So;0;ON;;;;;N;;;;;
1FB1B;BLOCK SEXTANT-1345;So;0;ON;;;;;N;;;;;
1FB1C;BLOCK SEXTANT-2345;So;0;ON;;;;;N;;;;;
1FB1D;BLOCK SEXTANT-12345;So;0;ON;;;;;N;;;;;
1FB1E;BLOCK SEXTANT-6;So;0;ON;;;;;N;;;;;
1FB1F;BLOCK SEXTANT-16;So;0;ON;;;;;N;;;;;
1FB20;BLOCK SEXTANT-26;So;0;ON;;;;;N;;;;;
1FB21;BLOCK SEXTANT-126;So;0;ON;;;;;N;;;;;
1FB22;BLOCK SEXTANT-36;So;0;ON;;;;;N;;;;;
1FB23;BLOCK SEXTANT-136;So;0;ON;;;;;N;;;;;
1FB24;BLOCK SEXTANT-236;So;0;ON;;;;;N;;;;;
1FB25;BLOCK SEXTANT-1236;So;0;ON;;;;;N;;;;;
1FB26;BLOCK SEXTANT-46;So;0;ON;;;;;N;;;;;
1FB27;BLOCK SEXTANT-146;So;0;ON;;;;;N;;;;;
1FB28;BLOCK SEXTANT-1246;So;0;ON;;;;;N;;;;;
1FB29;BLOCK SEXTANT-346;So;0;ON;;;;;N;;;;;
1FB2A;BLOCK SEXTANT-1346;So;0;ON;;;;;N;;;;;
1FB2B;BLOCK SEXTANT-2346;So;0;ON;;;;;N;;;;;
1FB2C;BLOCK SEXTANT-12346;So;0;ON;;;;;N;;;;;
1FB2D;BLOCK SEXTANT-56;So;0;ON;;;;;N;;;;;
1FB2E;BLOCK SEXTANT-156;So;0;ON;;;;;N;;;;;
1FB2F;BLOCK SEXTANT-256;So;0;ON;;;;;N;;;;;
1FB30;BLOCK SEXTANT-1256;So;0;ON;;;;;N;;;;;
1FB31;BLOCK SEXTANT-356;So;0;ON;;;;;N;;;;;
1FB32;BLOCK SEXTANT-1356;So;0;ON;;;;;N;;;;;
1FB33;BLOCK SEXTANT-2356;So;0;ON;;;;;N;;;;;
1FB34;BLOCK SEXTANT-12356;So;0;ON;;;;;N;;;;;
1FB35;BLOCK SEXTANT-456;So;0;ON;;;;;N;;;;;
1FB36;BLOCK SEXTANT-1456;So;0;ON;;;;;N;;;;;
1FB37;BLOCK SEXTANT-2456;So;0;ON;;;;;N;;;;;
1FB38;BLOCK SEXTANT-12456;So;0;ON;;;;;N;;;;;
1FB39;BLOCK SEXTANT-3456;So;0;ON;;;;;N;;;;;
1FB3A;BLOCK SEXTANT-13456;So;0;ON;;;;;N;;;;;
1FB3B;BLOCK SEXTANT-23456;So;0;ON;;;;;N;;;;;
1FB3C;LOWER LEFT BLOCK DIAGONAL LOWER MIDDLE LEFT TO LOWER CENTRE;So;0;ON;;;;;N;;;;;
1FB3D;LOWER LEFT BLOCK DIAGONAL LOWER MIDDLE LEFT TO LOWER RIGHT;So;0;ON;;;;;N;;;;;
1FB3E;LOWER LEFT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER CENTRE;So;0;ON;;;;;N;;;;;
1FB3F;LOWER LEFT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER RIGHT;So;0;ON;;;;;N;;;;;
1FB40;LOWER LEFT BLOCK DIAGONAL UPPER LEFT TO LOWER CENTRE;So;0;ON;;;;;N;;;;;
1FB41;LOWER RIGHT BLOCK DIAGONAL UPPER MIDDLE LEFT TO UPPER CENTRE;So;0;ON;;;;;N;;;;;
1FB42;LOWER RIGHT BLOCK DIAGONAL UPPER MIDDLE LEFT TO UPPER RIGHT;So;0;ON;;;;;N;;;;;
1FB43;LOWER RIGHT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER CENTRE;So;0;ON;;;;;N;;;;;

1FB44;LOWER RIGHT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER RIGHT;So;0;ON;;;;;N;;;;;
1FB45;LOWER RIGHT BLOCK DIAGONAL LOWER LEFT TO UPPER CENTRE;So;0;ON;;;;;N;;;;;
1FB46;LOWER RIGHT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB47;LOWER RIGHT BLOCK DIAGONAL LOWER CENTRE TO LOWER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB48;LOWER RIGHT BLOCK DIAGONAL LOWER LEFT TO LOWER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB49;LOWER RIGHT BLOCK DIAGONAL LOWER CENTRE TO UPPER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB4A;LOWER RIGHT BLOCK DIAGONAL LOWER LEFT TO UPPER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB4B;LOWER RIGHT BLOCK DIAGONAL LOWER CENTRE TO UPPER RIGHT;So;0;ON;;;;;N;;;;;
1FB4C;LOWER LEFT BLOCK DIAGONAL UPPER CENTRE TO UPPER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB4D;LOWER LEFT BLOCK DIAGONAL UPPER LEFT TO UPPER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB4E;LOWER LEFT BLOCK DIAGONAL UPPER CENTRE TO LOWER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB4F;LOWER LEFT BLOCK DIAGONAL UPPER LEFT TO LOWER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB50;LOWER LEFT BLOCK DIAGONAL UPPER CENTRE TO LOWER RIGHT;So;0;ON;;;;;N;;;;;
1FB51;LOWER LEFT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB52;UPPER RIGHT BLOCK DIAGONAL LOWER MIDDLE LEFT TO LOWER CENTRE;So;0;ON;;;;;N;;;;;
1FB53;UPPER RIGHT BLOCK DIAGONAL LOWER MIDDLE LEFT TO LOWER RIGHT;So;0;ON;;;;;N;;;;;
1FB54;UPPER RIGHT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER CENTRE;So;0;ON;;;;;N;;;;;
1FB55;UPPER RIGHT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER RIGHT;So;0;ON;;;;;N;;;;;
1FB56;UPPER RIGHT BLOCK DIAGONAL UPPER LEFT TO LOWER CENTRE;So;0;ON;;;;;N;;;;;
1FB57;UPPER LEFT BLOCK DIAGONAL UPPER MIDDLE LEFT TO UPPER CENTRE;So;0;ON;;;;;N;;;;;
1FB58;UPPER LEFT BLOCK DIAGONAL UPPER MIDDLE LEFT TO UPPER RIGHT;So;0;ON;;;;;N;;;;;
1FB59;UPPER LEFT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER CENTRE;So;0;ON;;;;;N;;;;;
1FB5A;UPPER LEFT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER RIGHT;So;0;ON;;;;;N;;;;;
1FB5B;UPPER LEFT BLOCK DIAGONAL LOWER LEFT TO UPPER CENTRE;So;0;ON;;;;;N;;;;;
1FB5C;UPPER LEFT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB5D;UPPER LEFT BLOCK DIAGONAL LOWER CENTRE TO LOWER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB5E;UPPER LEFT BLOCK DIAGONAL LOWER LEFT TO LOWER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB5F;UPPER LEFT BLOCK DIAGONAL LOWER CENTRE TO UPPER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB60;UPPER LEFT BLOCK DIAGONAL LOWER LEFT TO UPPER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB61;UPPER LEFT BLOCK DIAGONAL LOWER CENTRE TO UPPER RIGHT;So;0;ON;;;;;N;;;;;
1FB62;UPPER RIGHT BLOCK DIAGONAL UPPER CENTRE TO UPPER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB63;UPPER RIGHT BLOCK DIAGONAL UPPER LEFT TO UPPER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB64;UPPER RIGHT BLOCK DIAGONAL UPPER CENTRE TO LOWER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB65;UPPER RIGHT BLOCK DIAGONAL UPPER LEFT TO LOWER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB66;UPPER RIGHT BLOCK DIAGONAL UPPER CENTRE TO LOWER RIGHT;So;0;ON;;;;;N;;;;;
1FB67;UPPER RIGHT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER MIDDLE RIGHT;So;0;ON;;;;;N;;;;;
1FB68;UPPER AND RIGHT AND LOWER TRIANGULAR THREE QUARTERS BLOCK;So;0;ON;;;;;N;;;;;
1FB69;LEFT AND LOWER AND RIGHT TRIANGULAR THREE QUARTERS BLOCK;So;0;ON;;;;;N;;;;;
1FB6A;UPPER AND LEFT AND LOWER TRIANGULAR THREE QUARTERS BLOCK;So;0;ON;;;;;N;;;;;
1FB6B;LEFT AND UPPER AND RIGHT TRIANGULAR THREE QUARTERS BLOCK;So;0;ON;;;;;N;;;;;
1FB6C;LEFT TRIANGULAR ONE QUARTER BLOCK;So;0;ON;;;;;N;;;;;
1FB6D;UPPER TRIANGULAR ONE QUARTER BLOCK;So;0;ON;;;;;N;;;;;
1FB6E;RIGHT TRIANGULAR ONE QUARTER BLOCK;So;0;ON;;;;;N;;;;;
1FB6F;LOWER TRIANGULAR ONE QUARTER BLOCK;So;0;ON;;;;;N;;;;;
1FB70;VERTICAL ONE EIGHTH BLOCK-2;So;0;ON;;;;;N;;;;;
1FB71;VERTICAL ONE EIGHTH BLOCK-3;So;0;ON;;;;;N;;;;;
1FB72;VERTICAL ONE EIGHTH BLOCK-4;So;0;ON;;;;;N;;;;;
1FB73;VERTICAL ONE EIGHTH BLOCK-5;So;0;ON;;;;;N;;;;;
1FB74;VERTICAL ONE EIGHTH BLOCK-6;So;0;ON;;;;;N;;;;;
1FB75;VERTICAL ONE EIGHTH BLOCK-7;So;0;ON;;;;;N;;;;;
1FB76;HORIZONTAL ONE EIGHTH BLOCK-2;So;0;ON;;;;;N;;;;;
1FB77;HORIZONTAL ONE EIGHTH BLOCK-3;So;0;ON;;;;;N;;;;;
1FB78;HORIZONTAL ONE EIGHTH BLOCK-4;So;0;ON;;;;;N;;;;;
1FB79;HORIZONTAL ONE EIGHTH BLOCK-5;So;0;ON;;;;;N;;;;;
1FB7A;HORIZONTAL ONE EIGHTH BLOCK-6;So;0;ON;;;;;N;;;;;
1FB7B;HORIZONTAL ONE EIGHTH BLOCK-7;So;0;ON;;;;;N;;;;;
1FB7C;LEFT AND LOWER ONE EIGHTH BLOCK;So;0;ON;;;;;N;;;;;
1FB7D;LEFT AND UPPER ONE EIGHTH BLOCK;So;0;ON;;;;;N;;;;;
1FB7E;RIGHT AND UPPER ONE EIGHTH BLOCK;So;0;ON;;;;;N;;;;;
1FB7F;RIGHT AND LOWER ONE EIGHTH BLOCK;So;0;ON;;;;;N;;;;;
1FB80;UPPER AND LOWER ONE EIGHTH BLOCK;So;0;ON;;;;;N;;;;;
1FB81;HORIZONTAL ONE EIGHTH BLOCK-1358;So;0;ON;;;;;N;;;;;
1FB82;UPPER ONE QUARTER BLOCK;So;0;ON;;;;;N;;;;;
1FB83;UPPER THREE EIGHTHS BLOCK;So;0;ON;;;;;N;;;;;
1FB84;UPPER FIVE EIGHTHS BLOCK;So;0;ON;;;;;N;;;;;
1FB85;UPPER THREE QUARTERS BLOCK;So;0;ON;;;;;N;;;;;
1FB86;UPPER SEVEN EIGHTHS BLOCK;So;0;ON;;;;;N;;;;;
1FB87;RIGHT ONE QUARTER BLOCK;So;0;ON;;;;;N;;;;;
1FB88;RIGHT THREE EIGHTHS BLOCK;So;0;ON;;;;;N;;;;;
1FB89;RIGHT FIVE EIGHTHS BLOCK;So;0;ON;;;;;N;;;;;
1FB8A;RIGHT THREE QUARTERS BLOCK;So;0;ON;;;;;N;;;;;
1FB8B;RIGHT SEVEN EIGHTHS BLOCK;So;0;ON;;;;;N;;;;;
1FB8C;LEFT HALF MEDIUM SHADE;So;0;ON;;;;;N;;;;;

1FB8D;RIGHT HALF MEDIUM SHADE;So;0;ON;;;;N;;;;;
1FB8E;UPPER HALF MEDIUM SHADE;So;0;ON;;;;N;;;;;
1FB8F;LOWER HALF MEDIUM SHADE;So;0;ON;;;;N;;;;;
1FB90;INVERSE MEDIUM SHADE;So;0;ON;;;;N;;;;;
1FB91;UPPER HALF BLOCK AND LOWER HALF INVERSE MEDIUM SHADE;So;0;ON;;;;N;;;;;
1FB92;UPPER HALF INVERSE MEDIUM SHADE AND LOWER HALF BLOCK;So;0;ON;;;;N;;;;;
1FB94;LEFT HALF INVERSE MEDIUM SHADE AND RIGHT HALF BLOCK;So;0;ON;;;;N;;;;;
1FB95;CHECKER BOARD FILL;So;0;ON;;;;N;;;;;
1FB96;INVERSE CHECKER BOARD FILL;So;0;ON;;;;N;;;;;
1FB97;HEAVY HORIZONTAL FILL;So;0;ON;;;;N;;;;;
1FB98;UPPER LEFT TO LOWER RIGHT FILL;So;0;ON;;;;N;;;;;
1FB99;UPPER RIGHT TO LOWER LEFT FILL;So;0;ON;;;;N;;;;;
1FB9A;UPPER AND LOWER TRIANGULAR HALF BLOCK;So;0;ON;;;;N;;;;;
1FB9B;LEFT AND RIGHT TRIANGULAR HALF BLOCK;So;0;ON;;;;N;;;;;
1FB9C;UPPER LEFT TRIANGULAR MEDIUM SHADE;So;0;ON;;;;N;;;;;
1FB9D;UPPER RIGHT TRIANGULAR MEDIUM SHADE;So;0;ON;;;;N;;;;;
1FB9E;LOWER RIGHT TRIANGULAR MEDIUM SHADE;So;0;ON;;;;N;;;;;
1FB9F;LOWER LEFT TRIANGULAR MEDIUM SHADE;So;0;ON;;;;N;;;;;
1FBA0;BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE LEFT;So;0;ON;;;;N;;;;;
1FBA1;BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE RIGHT;So;0;ON;;;;N;;;;;
1FBA2;BOX DRAWINGS LIGHT DIAGONAL MIDDLE LEFT TO LOWER CENTRE;So;0;ON;;;;N;;;;;
1FBA3;BOX DRAWINGS LIGHT DIAGONAL MIDDLE RIGHT TO LOWER CENTRE;So;0;ON;;;;N;;;;;
1FBA4;BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE LEFT TO LOWER CENTRE;So;0;ON;;;;N;;;;;
1FBA5;BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE RIGHT TO LOWER CENTRE;So;0;ON;;;;N;;;;;
1FBA6;BOX DRAWINGS LIGHT DIAGONAL MIDDLE LEFT TO LOWER CENTRE TO MIDDLE RIGHT;So;0;ON;;;;N;;;;;
1FBA7;BOX DRAWINGS LIGHT DIAGONAL MIDDLE LEFT TO UPPER CENTRE TO MIDDLE RIGHT;So;0;ON;;;;N;;;;;
1FBA8;BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE LEFT AND MIDDLE RIGHT TO LOWER
CENTRE;So;0;ON;;;;N;;;;;
1FBA9;BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE RIGHT AND MIDDLE LEFT TO LOWER
CENTRE;So;0;ON;;;;N;;;;;
1FBAA;BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE RIGHT TO LOWER CENTRE TO MIDDLE
LEFT;So;0;ON;;;;N;;;;;
1FBAB;BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE LEFT TO LOWER CENTRE TO MIDDLE
RIGHT;So;0;ON;;;;N;;;;;
1FBAC;BOX DRAWINGS LIGHT DIAGONAL MIDDLE LEFT TO UPPER CENTRE TO MIDDLE RIGHT TO LOWER
CENTRE;So;0;ON;;;;N;;;;;
1FBAD;BOX DRAWINGS LIGHT DIAGONAL MIDDLE RIGHT TO UPPER CENTRE TO MIDDLE LEFT TO LOWER
CENTRE;So;0;ON;;;;N;;;;;
1FBAE;BOX DRAWINGS LIGHT DIAGONAL DIAMOND;So;0;ON;;;;N;;;;;
1FBAF;BOX DRAWINGS LIGHT HORIZONTAL WITH VERTICAL STROKE;So;0;ON;;;;N;;;;;
1FBB0;ARROWHEAD-SHAPED POINTER;So;0;ON;;;;N;;;;;
1FBB1;INVERSE CHECK MARK;So;0;ON;;;;N;;;;;
1FBB2;LEFT HALF RUNNING MAN;So;0;ON;;;;N;;;;;
1FBB3;RIGHT HALF RUNNING MAN;So;0;ON;;;;N;;;;;
1FBB4;INVERSE DOWNWARDS ARROW WITH TIP LEFTWARDS;So;0;ON;;;;N;;;;;
1FBB5;LEFTWARDS ARROW AND UPPER AND LOWER ONE EIGHTH BLOCK;So;0;ON;;;;N;;;;;
1FBB6;RIGHTWARDS ARROW AND UPPER AND LOWER ONE EIGHTH BLOCK;So;0;ON;;;;N;;;;;
1FBB7;DOWNWARDS ARROW AND RIGHT ONE EIGHTH BLOCK;So;0;ON;;;;N;;;;;
1FBB8;UPWARDS ARROW AND RIGHT ONE EIGHTH BLOCK;So;0;ON;;;;N;;;;;
1FBB9;LEFT HALF FOLDER;So;0;ON;;;;N;;;;;
1FBBA;RIGHT HALF FOLDER;So;0;ON;;;;N;;;;;
1FBBB;VOIDED GREEK CROSS;So;0;ON;;;;N;;;;;
1FBBC;RIGHT OPEN SQUARED DOT;So;0;ON;;;;N;;;;;
1FBBD;NEGATIVE DIAGONAL CROSS;So;0;ON;;;;N;;;;;
1FBBE;NEGATIVE DIAGONAL MIDDLE RIGHT TO LOWER CENTRE;So;0;ON;;;;N;;;;;
1FBBF;NEGATIVE DIAGONAL DIAMOND;So;0;ON;;;;N;;;;;
1FBC0;WHITE HEAVY SALTIRE WITH ROUNDED CORNERS;So;0;ON;;;;N;;;;;
1FBC1;LEFT THIRD WHITE RIGHT POINTING INDEX;So;0;ON;;;;N;;;;;
1FBC2;MIDDLE THIRD WHITE RIGHT POINTING INDEX;So;0;ON;;;;N;;;;;
1FBC3;RIGHT THIRD WHITE RIGHT POINTING INDEX;So;0;ON;;;;N;;;;;
1FBC4;NEGATIVE SQUARED QUESTION MARK;So;0;ON;;;;N;;;;;
1FBC5;STICK FIGURE;So;0;ON;;;;N;;;;;
1FBC6;STICK FIGURE WITH ARMS RAISED;So;0;ON;;;;N;;;;;
1FBC7;STICK FIGURE LEANING LEFT;So;0;ON;;;;N;;;;;
1FBC8;STICK FIGURE LEANING RIGHT;So;0;ON;;;;N;;;;;
1FBC9;STICK FIGURE WITH DRESS;So;0;ON;;;;N;;;;;
1FBCA;WHITE UP-POINTING CHEVRON;So;0;ON;;;;N;;;;;
1FBF0;SEGMENTED DIGIT ZERO;Nd;0;EN; 0030;0;0;0;N;;;;;
1FBF1;SEGMENTED DIGIT ONE;Nd;0;EN; 0031;1;1;1;N;;;;;
1FBF2;SEGMENTED DIGIT TWO;Nd;0;EN; 0032;2;2;2;N;;;;;
1FBF3;SEGMENTED DIGIT THREE;Nd;0;EN; 0033;3;3;3;N;;;;;
1FBF4;SEGMENTED DIGIT FOUR;Nd;0;EN; 0034;4;4;4;N;;;;;
1FBF5;SEGMENTED DIGIT FIVE;Nd;0;EN; 0035;5;5;5;N;;;;;

1FBF6; SEGMENTED DIGIT SIX; Nd; 0; EN; 0036; 6; 6; 6; N; ; ; ;
1FBF7; SEGMENTED DIGIT SEVEN; Nd; 0; EN; 0037; 7; 7; 7; N; ; ; ;
1FBF8; SEGMENTED DIGIT EIGHT; Nd; 0; EN; 0038; 8; 8; 8; N; ; ; ;
1FBF9; SEGMENTED DIGIT NINE; Nd; 0; EN; 0039; 9; 9; 9; N; ; ; ;

12. References.

- 3d@galax.xyz. 2014. "Teletext Character Set."
<http://www.galax.xyz/TELETEXT/CHARSET.HTM>
- 3QD Developments Ltd. 2015. "RISC OS 3.7 User Guide."
http://www.riscos.com/support/users/userguide3/book2ab/e_7.html
- Bettencourt, Rebecca. 2008. "The Ultimate Apple II Font."
<http://www.kreativekorp.com/software/fonts/apple2.shtml>
- Bettencourt, Rebecca. 2012. "The Ultimate Commodore Font."
<http://www.kreativekorp.com/software/fonts/c64.shtml>
- Bettencourt, Rebecca. 2014. "The Ultimate TRS-80 Font."
<http://www.kreativekorp.com/software/fonts/trs80.shtml>
- British Broadcasting Corporation. 1984. "BBC Microcomputer System User Guide."
- CBM Archives. <http://www.zimmers.net/anonftp/pub/cbm/firmware/characters/>
- Covington, Michael A. Compute! issue 42. 1983. "All About The TI Character Set."
http://www.atarimagazines.com/compute/issue42/082_1_ALL_ABOUT_THE_TI_CHARACTER_SET.php
- CPCWiki. 2012. "Keyboard Versions." http://www.cpcwiki.eu/index.php/Keyboard_Versions
- da Cruz, Frank. 2000. "Supplemental Terminal Graphics for Unicode."
<ftp://ftp.kermit.columbia.edu/kermit/ucsterminal/ucsterminal.txt>
- European Broadcasting Union. 1997. "Enhanced Teletext specification."
http://www.etsi.org/deliver/etsi_i_ets/300700_300799/300706/01_60/ets_300706e01p.pdf
- Independent Broadcasting Authority. 1977. "IBA Technical Review #2: Technical Reference Book," 3rd Edition. http://www.ntlpa.org.uk/wp-content/uploads/2013/06/IBA_TechnicalReviews1-24_PDF/IBA_TechnicalReview2_TechnicalReferenceBook2750.pdf
- Little, Gary B. 1985. "Inside the Apple IIe." Bowie, MD: Brady Communications Company, Ltd.
- Marín Silva, Eduardo, 2017. "Proposal to create a new block for missing Block Element characters." UTC document L2/L17-194. <http://www.unicode.org/L2/L2017/17194-block-elements.pdf>
- Microcomputer & Related Culture Foundation. 2016. "MSX font."
https://www.msx.org/wiki/MSX_font
- Niwatori, Shiroi. 2017. "Typvs Litterarvm Nisiciae." <http://hwm3.gyao.ne.jp/shiroi-niwatori/nishiki-teki.htm>
- Oy, Aivosto. 2014. "Commodore PETSCII character sets."
<http://www.aivosto.com/vbtips/petscii.pdf>
- Phillips, George. 2014. "TRS-80 Fonts and Unicode." <http://48k.ca/fonts.html>
- Teletext Art Research Lab. 2017. <http://teletextart.co.uk/>
- Texas Instruments Incorporated. 1981. "TI Extended BASIC for the TI-99/4 home computer."
<http://www.digitpress.com/library/manuals/ti994a/ti%20extended%20basic.pdf>
- Texas Instruments Incorporated. 1979. "User's Reference Guide."
http://www.99er.net/files/docs/TI994_User_Guide.pdf

Texas Instruments Incorporated. 1981. "User's Reference Guide."

<http://www.99er.net/files/userrefguide.pdf>

Uiterweer, Bert Post. 2002. "CPC464/664/6128 ASCII Table." [http://cpctech.cpc-](http://cpctech.cpc-live.com/docs/cpckybd.pdf)

[live.com/docs/cpckybd.pdf](http://cpctech.cpc-live.com/docs/cpckybd.pdf)

Wikipedia. 2017. "Atari ST character set." https://en.wikipedia.org/wiki/Atari_ST_character_set

Wikipedia. 2017. "ATASCII." <https://en.wikipedia.org/wiki/ATASCII>

Wikipedia. 2017. "PETSCII." <https://en.wikipedia.org/wiki/PETSCII>

Wikipedia. 2017. "Semigraphics." <https://en.wikipedia.org/wiki/Semigraphics>

Wikipedia. 2017. "World System Teletext." https://en.wikipedia.org/wiki/World_System_Teletext

Wikipedia. 2017. "ZX Spectrum character set."

https://en.wikipedia.org/wiki/ZX_Spectrum_character_set

Wikipedia. 2017. "ZX80 character set." https://en.wikipedia.org/wiki/ZX80_character_set

Wikipedia. 2017. "ZX81 character set." https://en.wikipedia.org/wiki/ZX81_character_set

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	1F80	1F81	1F82	1F83	1F84	1F85	1F86	1F87	1F88	1F89	1F8A	1F8B	1F8C	1F8D	1F8E	1F8F	
0												↖ 1F8B0					
1												↗ 1F8B1					
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
A																	
B																	
C																	
D																	
E																	
F																	

Arrows for legacy computing

- 1F8B0 ↶ ARROW POINTING UPWARDS THEN NORTH
WEST
- 1F8B1 ↷ ARROW POINTING RIGHTWARDS THEN
CURVING SOUTH WEST

	1FB0	1FB1	1FB2	1FB3	1FB4	1FB5	1FB6	1FB7	1FB8	1FB9	1FBA	1FBB	1FBC	1FBD	1FBE	1FBF
0																
1																
2																
3																
4																
5																
6																
7																
8																
9																
A																
B																
C																
D																
E																
F																

Block mosaic terminal graphic characters

1FB00	█	BLOCK SEXTANT-1
1FB01	█	BLOCK SEXTANT-2
1FB02	█	BLOCK SEXTANT-12
		= upper one third block
1FB03	█	BLOCK SEXTANT-3
1FB04	█	BLOCK SEXTANT-13
1FB05	█	BLOCK SEXTANT-23
1FB06	█	BLOCK SEXTANT-123
1FB07	█	BLOCK SEXTANT-4
1FB08	█	BLOCK SEXTANT-14
1FB09	█	BLOCK SEXTANT-24
1FB0A	█	BLOCK SEXTANT-124
1FB0B	█	BLOCK SEXTANT-34
		= middle one third block
1FB0C	█	BLOCK SEXTANT-134
1FB0D	█	BLOCK SEXTANT-234
1FB0E	█	BLOCK SEXTANT-1234
		= upper two thirds block
1FB0F	█	BLOCK SEXTANT-5
1FB10	█	BLOCK SEXTANT-15
1FB11	█	BLOCK SEXTANT-25
1FB12	█	BLOCK SEXTANT-125
1FB13	█	BLOCK SEXTANT-35
1FB14	█	BLOCK SEXTANT-235
1FB15	█	BLOCK SEXTANT-1235
1FB16	█	BLOCK SEXTANT-45
1FB17	█	BLOCK SEXTANT-145
1FB18	█	BLOCK SEXTANT-245
1FB19	█	BLOCK SEXTANT-1245
1FB1A	█	BLOCK SEXTANT-345
1FB1B	█	BLOCK SEXTANT-1345
1FB1C	█	BLOCK SEXTANT-2345
1FB1D	█	BLOCK SEXTANT-12345
1FB1E	█	BLOCK SEXTANT-6
1FB1F	█	BLOCK SEXTANT-16
1FB20	█	BLOCK SEXTANT-26
1FB21	█	BLOCK SEXTANT-126
1FB22	█	BLOCK SEXTANT-36
1FB23	█	BLOCK SEXTANT-136
1FB24	█	BLOCK SEXTANT-236
1FB25	█	BLOCK SEXTANT-1236
1FB26	█	BLOCK SEXTANT-46
1FB27	█	BLOCK SEXTANT-146
1FB28	█	BLOCK SEXTANT-1246
1FB29	█	BLOCK SEXTANT-346
1FB2A	█	BLOCK SEXTANT-1346
1FB2B	█	BLOCK SEXTANT-2346
1FB2C	█	BLOCK SEXTANT-12346
1FB2D	█	BLOCK SEXTANT-56
		= lower one third block
1FB2E	█	BLOCK SEXTANT-156
1FB2F	█	BLOCK SEXTANT-256
1FB30	█	BLOCK SEXTANT-1256
		= upper and lower one third block
1FB31	█	BLOCK SEXTANT-356
1FB32	█	BLOCK SEXTANT-1356
1FB33	█	BLOCK SEXTANT-2356
1FB34	█	BLOCK SEXTANT-12356
1FB35	█	BLOCK SEXTANT-456
1FB36	█	BLOCK SEXTANT-1456
1FB37	█	BLOCK SEXTANT-2456
1FB38	█	BLOCK SEXTANT-12456
1FB39	█	BLOCK SEXTANT-3456
		= lower two thirds block
1FB3A	█	BLOCK SEXTANT-13456

1FB3B █ BLOCK SEXTANT-23456

Smooth mosaic terminal graphic characters

1FB3C	▴	LOWER LEFT BLOCK DIAGONAL LOWER MIDDLE LEFT TO LOWER CENTRE
1FB3D	▾	LOWER LEFT BLOCK DIAGONAL LOWER MIDDLE LEFT TO LOWER RIGHT
1FB3E	▵	LOWER LEFT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER CENTRE
1FB3F	▾	LOWER LEFT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER RIGHT
1FB40	▴	LOWER LEFT BLOCK DIAGONAL UPPER LEFT TO LOWER CENTRE
1FB41	▾	LOWER RIGHT BLOCK DIAGONAL UPPER MIDDLE LEFT TO UPPER CENTRE
1FB42	▵	LOWER RIGHT BLOCK DIAGONAL UPPER MIDDLE LEFT TO UPPER RIGHT
1FB43	▾	LOWER RIGHT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER CENTRE
1FB44	▴	LOWER RIGHT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER RIGHT
1FB45	▾	LOWER RIGHT BLOCK DIAGONAL LOWER LEFT TO UPPER CENTRE
1FB46	▵	LOWER RIGHT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER MIDDLE RIGHT
1FB47	▾	LOWER RIGHT BLOCK DIAGONAL LOWER CENTRE TO LOWER MIDDLE RIGHT
1FB48	▴	LOWER RIGHT BLOCK DIAGONAL LOWER LEFT TO LOWER MIDDLE RIGHT
1FB49	▾	LOWER RIGHT BLOCK DIAGONAL LOWER CENTRE TO UPPER MIDDLE RIGHT
1FB4A	▵	LOWER RIGHT BLOCK DIAGONAL LOWER LEFT TO UPPER MIDDLE RIGHT
1FB4B	▾	LOWER RIGHT BLOCK DIAGONAL LOWER CENTRE TO UPPER RIGHT
1FB4C	▴	LOWER LEFT BLOCK DIAGONAL UPPER CENTRE TO UPPER MIDDLE RIGHT
1FB4D	▾	LOWER LEFT BLOCK DIAGONAL UPPER LEFT TO UPPER MIDDLE RIGHT
1FB4E	▵	LOWER LEFT BLOCK DIAGONAL UPPER CENTRE TO LOWER MIDDLE RIGHT
1FB4F	▾	LOWER LEFT BLOCK DIAGONAL UPPER LEFT TO LOWER MIDDLE RIGHT
1FB50	▴	LOWER LEFT BLOCK DIAGONAL UPPER CENTRE TO LOWER RIGHT
1FB51	▾	LOWER LEFT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER MIDDLE RIGHT
1FB52	▵	UPPER RIGHT BLOCK DIAGONAL LOWER MIDDLE LEFT TO LOWER CENTRE
1FB53	▾	UPPER RIGHT BLOCK DIAGONAL LOWER MIDDLE LEFT TO LOWER RIGHT
1FB54	▴	UPPER RIGHT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER CENTRE
1FB55	▾	UPPER RIGHT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER RIGHT
1FB56	▵	UPPER RIGHT BLOCK DIAGONAL UPPER LEFT TO LOWER CENTRE
1FB57	▾	UPPER LEFT BLOCK DIAGONAL UPPER MIDDLE LEFT TO UPPER CENTRE
1FB58	▴	UPPER LEFT BLOCK DIAGONAL UPPER MIDDLE LEFT TO UPPER RIGHT
1FB59	▾	UPPER LEFT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER CENTRE
1FB5A	▴	UPPER LEFT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER RIGHT
1FB5B	▾	UPPER LEFT BLOCK DIAGONAL LOWER LEFT TO UPPER CENTRE
1FB5C	▴	UPPER LEFT BLOCK DIAGONAL LOWER MIDDLE LEFT TO UPPER MIDDLE RIGHT
1FB5D	▾	UPPER LEFT BLOCK DIAGONAL LOWER CENTRE TO LOWER MIDDLE RIGHT
1FB5E	▴	UPPER LEFT BLOCK DIAGONAL LOWER LEFT TO LOWER MIDDLE RIGHT

1FB5F	▀	UPPER LEFT BLOCK DIAGONAL LOWER CENTRE TO UPPER MIDDLE RIGHT
1FB60	▁	UPPER LEFT BLOCK DIAGONAL LOWER LEFT TO UPPER MIDDLE RIGHT
1FB61	▂	UPPER LEFT BLOCK DIAGONAL LOWER CENTRE TO UPPER RIGHT
1FB62	▃	UPPER RIGHT BLOCK DIAGONAL UPPER CENTRE TO UPPER MIDDLE RIGHT
1FB63	▄	UPPER RIGHT BLOCK DIAGONAL UPPER LEFT TO UPPER MIDDLE RIGHT
1FB64	▅	UPPER RIGHT BLOCK DIAGONAL UPPER CENTRE TO LOWER MIDDLE RIGHT
1FB65	▆	UPPER RIGHT BLOCK DIAGONAL UPPER LEFT TO LOWER MIDDLE RIGHT
1FB66	▇	UPPER RIGHT BLOCK DIAGONAL UPPER CENTRE TO LOWER RIGHT
1FB67	█	UPPER RIGHT BLOCK DIAGONAL UPPER MIDDLE LEFT TO LOWER MIDDLE RIGHT
1FB68	▉	UPPER AND RIGHT AND LOWER TRIANGULAR THREE QUARTERS BLOCK
1FB69	▊	LEFT AND LOWER AND RIGHT TRIANGULAR THREE QUARTERS BLOCK
1FB6A	▋	UPPER AND LEFT AND LOWER TRIANGULAR THREE QUARTERS BLOCK
1FB6B	▌	LEFT AND UPPER AND RIGHT TRIANGULAR THREE QUARTERS BLOCK
1FB6C	▍	LEFT TRIANGULAR ONE QUARTER BLOCK
1FB6D	▎	UPPER TRIANGULAR ONE QUARTER BLOCK
1FB6E	▏	RIGHT TRIANGULAR ONE QUARTER BLOCK
1FB6F	▐	LOWER TRIANGULAR ONE QUARTER BLOCK

Block elements

1FB70		VERTICAL ONE EIGHTH BLOCK-2 → 258F left one eighth block
1FB71		VERTICAL ONE EIGHTH BLOCK-3
1FB72		VERTICAL ONE EIGHTH BLOCK-4
1FB73		VERTICAL ONE EIGHTH BLOCK-5
1FB74		VERTICAL ONE EIGHTH BLOCK-6
1FB75		VERTICAL ONE EIGHTH BLOCK-7 → 2595 right one eighth block
1FB76	—	HORIZONTAL ONE EIGHTH BLOCK-2 → 2594 — upper one eighth block
1FB77	—	HORIZONTAL ONE EIGHTH BLOCK-3
1FB78	—	HORIZONTAL ONE EIGHTH BLOCK-4
1FB79	—	HORIZONTAL ONE EIGHTH BLOCK-5
1FB7A	—	HORIZONTAL ONE EIGHTH BLOCK-6
1FB7B	—	HORIZONTAL ONE EIGHTH BLOCK-7 → 2581 _ lower one eighth block
1FB7C	┌	LEFT AND LOWER ONE EIGHTH BLOCK
1FB7D	┐	LEFT AND UPPER ONE EIGHTH BLOCK
1FB7E	└	RIGHT AND UPPER ONE EIGHTH BLOCK
1FB7F	┘	RIGHT AND LOWER ONE EIGHTH BLOCK
1FB80	▬	UPPER AND LOWER ONE EIGHTH BLOCK
1FB81	▬	HORIZONTAL ONE EIGHTH BLOCK-1358
1FB82	▬	UPPER ONE QUARTER BLOCK → 2582 ▬ lower one quarter block
1FB83	▬	UPPER THREE EIGHTHS BLOCK → 2583 ▬ lower three eighths block
1FB84	▬	UPPER FIVE EIGHTHS BLOCK → 2585 ▬ lower five eighths block
1FB85	▬	UPPER THREE QUARTERS BLOCK → 2586 ▬ lower three quarters block
1FB86	▬	UPPER SEVEN EIGHTHS BLOCK → 2587 ▬ lower seven eighths block
1FB87	▬	RIGHT ONE QUARTER BLOCK → 258E left one quarter block
1FB88	▬	RIGHT THREE EIGHTHS BLOCK → 258D left three eighths block

1FB89	▬	RIGHT FIVE EIGHTHS BLOCK → 258B ▬ left five eighths block
1FB8A	▬	RIGHT THREE QUARTERS BLOCK → 258A ▬ left three quarters block
1FB8B	▬	RIGHT SEVEN EIGHTHS BLOCK → 2589 ▬ left seven eighths block

Shade characters

1FB8C	▬	LEFT HALF MEDIUM SHADE
1FB8D	▬	RIGHT HALF MEDIUM SHADE
1FB8E	▬	UPPER HALF MEDIUM SHADE
1FB8F	▬	LOWER HALF MEDIUM SHADE
1FB90	▬	INVERSE MEDIUM SHADE → 2592 ▬ medium shade
1FB91	▬	UPPER HALF BLOCK AND LOWER HALF INVERSE MEDIUM SHADE
1FB92	▬	UPPER HALF INVERSE MEDIUM SHADE AND LOWER HALF BLOCK
1FB93	▬	<reserved> = left half block and right half inverse medium shade
1FB94	▬	LEFT HALF INVERSE MEDIUM SHADE AND RIGHT HALF BLOCK

Fill characters

1FB95	▬	CHECKER BOARD FILL → 259A ▬ quadrant upper left and lower right → 1F67F ·· reverse checker board
1FB96	▬	INVERSE CHECKER BOARD FILL → 259E ▬ quadrant upper right and lower left → 1F67E ·· checker board
1FB97	▬	HEAVY HORIZONTAL FILL = upper middle and lower one quarter block → 3013 ▬ geta mark
1FB98	▬	UPPER LEFT TO LOWER RIGHT FILL → 25A7 ▬ square with upper left to lower right fill
1FB99	▬	UPPER RIGHT TO LOWER LEFT FILL → 25A8 ▬ square with upper right to lower left fill

Smooth mosaic terminal graphic characters

1FB9A	▬	UPPER AND LOWER TRIANGULAR HALF BLOCK → 29D7 ▬ black hourglass
1FB9B	▬	LEFT AND RIGHT TRIANGULAR HALF BLOCK → 29D3 ▬ black bowtie

Shade characters

1FB9C	▬	UPPER LEFT TRIANGULAR MEDIUM SHADE → 25E4 ▬ black upper left triangle
1FB9D	▬	UPPER RIGHT TRIANGULAR MEDIUM SHADE → 25E5 ▬ black upper right triangle
1FB9E	▬	LOWER RIGHT TRIANGULAR MEDIUM SHADE → 25E2 ▬ black lower right triangle
1FB9F	▬	LOWER LEFT TRIANGULAR MEDIUM SHADE → 25E3 ▬ black lower left triangle

Character cell diagonals

1FBA0	↙	BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE LEFT
1FBA1	↘	BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE RIGHT
1FBA2	↙	BOX DRAWINGS LIGHT DIAGONAL MIDDLE LEFT TO LOWER CENTRE
1FBA3	↘	BOX DRAWINGS LIGHT DIAGONAL MIDDLE RIGHT TO LOWER CENTRE
1FBA4	↙	BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE LEFT TO LOWER CENTRE
1FBA5	↘	BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE RIGHT TO LOWER CENTRE
1FBA6	↙	BOX DRAWINGS LIGHT DIAGONAL MIDDLE LEFT TO LOWER CENTRE TO MIDDLE RIGHT
1FBA7	↘	BOX DRAWINGS LIGHT DIAGONAL MIDDLE LEFT TO UPPER CENTRE TO MIDDLE RIGHT
1FBA8	↙	BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE LEFT AND MIDDLE RIGHT TO LOWER CENTRE
1FBA9	↘	BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE RIGHT AND MIDDLE LEFT TO LOWER CENTRE
1FBAA	↙	BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE RIGHT TO LOWER CENTRE TO MIDDLE LEFT
1FBAB	↘	BOX DRAWINGS LIGHT DIAGONAL UPPER CENTRE TO MIDDLE LEFT TO LOWER CENTRE TO MIDDLE RIGHT
1FBAC	↙	BOX DRAWINGS LIGHT DIAGONAL MIDDLE LEFT TO UPPER CENTRE TO MIDDLE RIGHT TO LOWER CENTRE
1FBAD	↘	BOX DRAWINGS LIGHT DIAGONAL MIDDLE RIGHT TO UPPER CENTRE TO MIDDLE LEFT TO LOWER CENTRE
1FBAE	◊	BOX DRAWINGS LIGHT DIAGONAL DIAMOND

Light solid line with stroke

1FBAF	+	BOX DRAWINGS LIGHT HORIZONTAL WITH VERTICAL STROKE
-------	---	--

Terminal graphic characters

1FBB0	▶	ARROWHEAD-SHAPED POINTER
1FBB1	☑	INVERSE CHECK MARK → 2713 ✓ check mark
1FBB2	♏	LEFT HALF RUNNING MAN • faces right whereas 1F3C3 • ♀ faces left • Running Man is the name for these characters in documentation for the Apple II → 1F3C3 • 🏃 runner
1FBB3	♎	RIGHT HALF RUNNING MAN

Arrows

1FBB4	↩	INVERSE DOWNWARDS ARROW WITH TIP LEFTWARDS → 21B2 ↓ downwards arrow with tip leftwards
1FBB5	↩	LEFTWARDS ARROW AND UPPER AND LOWER ONE EIGHTH BLOCK
1FBB6	↪	RIGHTWARDS ARROW AND UPPER AND LOWER ONE EIGHTH BLOCK
1FBB7	↘	DOWNWARDS ARROW AND RIGHT ONE EIGHTH BLOCK
1FBB8	↗	UPWARDS ARROW AND RIGHT ONE EIGHTH BLOCK

Terminal graphic characters

1FBB9	◡	LEFT HALF FOLDER → 1F4C1 ◡◡ file folder → 1F5C0 ◡◡ folder
1FBBA	◢	RIGHT HALF FOLDER
1FBBB	⊕	VOIDED GREEK CROSS → 0023 # number sign → 256C ⊕ box drawings double vertical and horizontal → 2719 ⊕ outlined greek cross → 271A ⊕ heavy greek cross → 1F7A3 • medium greek cross
1FBBC	◻	RIGHT OPEN SQUARED DOT → 2ACE ◻ square right open box operator
1FBBD	⊗	NEGATIVE DIAGONAL CROSS • glyph does not necessarily extend to the edges of the character cell • diagonals extend past the corners of the box unlike in 274E ⊗ → 2573 ⊗ box drawings light diagonal cross → 274E ⊗ negative squared cross mark
1FBBE	⊗	NEGATIVE DIAGONAL MIDDLE RIGHT TO LOWER CENTRE • glyph does not necessarily extend to the edges of the character cell
1FBBF	⊗	NEGATIVE DIAGONAL DIAMOND • glyph does not necessarily extend to the edges of the character cell
1FBC0	⊗	WHITE HEAVY SALTIRE WITH ROUNDED CORNERS → 274C ⊗ cross mark → 1F5D9 •• cancellation x → 1F7AC •• heavy saltire
1FBC1	☞	LEFT THIRD WHITE RIGHT POINTING INDEX → 261E ☞ white right pointing index
1FBC2	☞	MIDDLE THIRD WHITE RIGHT POINTING INDEX
1FBC3	☞	RIGHT THIRD WHITE RIGHT POINTING INDEX
1FBC4	⊗	NEGATIVE SQUARED QUESTION MARK • glyph does not necessarily extend to the edges of the character cell → 003F ? question mark → 2BD1 ⊗ uncertainty sign → FFFD ⊗ replacement character
1FBC5	♏	STICK FIGURE → 1F6B9 • ♀ mens symbol
1FBC6	♏	STICK FIGURE WITH ARMS RAISED
1FBC7	♏	STICK FIGURE LEANING LEFT
1FBC8	♏	STICK FIGURE LEANING RIGHT
1FBC9	♏	STICK FIGURE WITH DRESS → 1F6BA • ♀ womens symbol
1FBCA	▴	WHITE UP-POINTING CHEVRON → 2302 ▴ house → 1F530 • ♀ japanese symbol for beginner

Segmented digits

1FBF0	◻	SEGMENTED DIGIT ZERO → 0030 0 digit zero
-------	---	---

1FBF1 𐄀 SEGMENTED DIGIT ONE
→ 0031 1 digit one
1FBF2 𐄁 SEGMENTED DIGIT TWO
→ 0032 2 digit two
1FBF3 𐄂 SEGMENTED DIGIT THREE
→ 0033 3 digit three
1FBF4 𐄃 SEGMENTED DIGIT FOUR
→ 0034 4 digit four
1FBF5 𐄄 SEGMENTED DIGIT FIVE
→ 0035 5 digit five
1FBF6 𐄅 SEGMENTED DIGIT SIX
→ 0036 6 digit six
1FBF7 𐄆 SEGMENTED DIGIT SEVEN
→ 0037 7 digit seven
1FBF8 𐄇 SEGMENTED DIGIT EIGHT
→ 0038 8 digit eight
1FBF9 𐄈 SEGMENTED DIGIT NINE
→ 0039 9 digit nine

Figures.

Figures showing legacy character charts or “dumps” are presented first, followed by examples of usage and other illustrations.



Figure 1. A character chart of the Amstrad CPC English character set, with U+1FB95 CHECKER BOARD FILL and U+2592 MEDIUM SHADE highlighted in red. (CPCWiki)



Figure 2. Character dump of the Apple II set, showing normal mode (with MouseText) and inverse video.

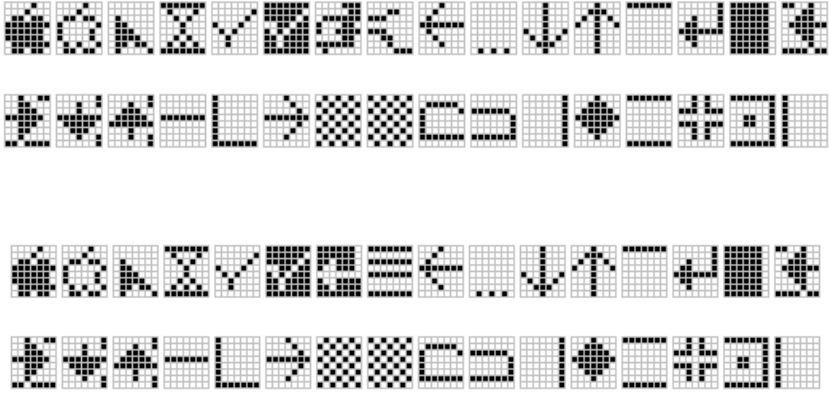


Figure 3. MouseText as implemented on the Apple IIc (above, with RUNNING MAN) and IIGS (below, with replacement characters). (Wikipedia)

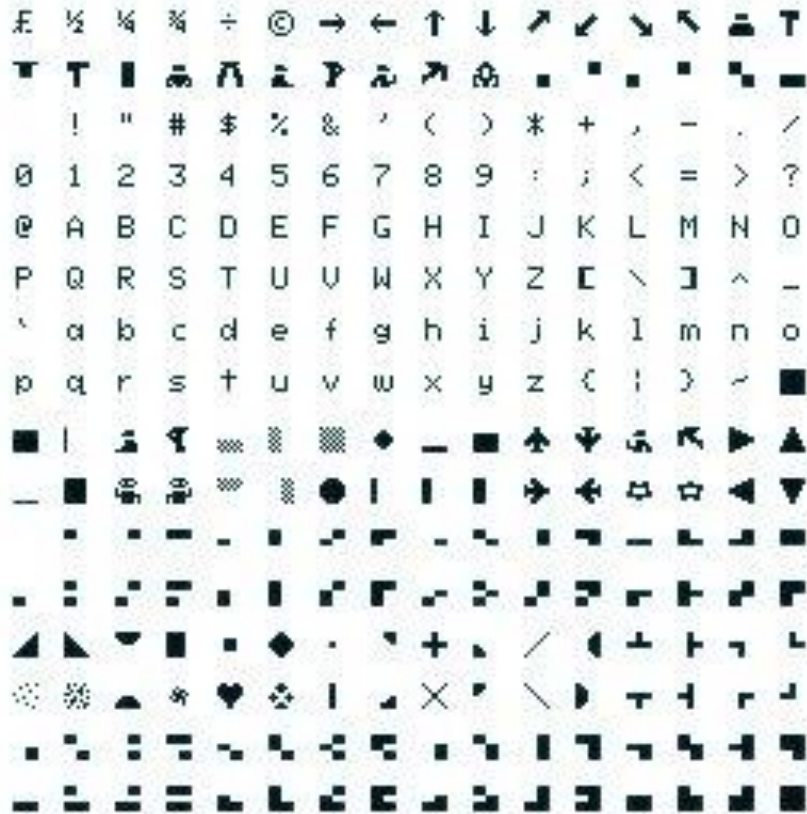


Figure 4. Mattel Aquarius character set. Several of the glyphs in this collection were not identified in earlier revisions of this proposal, and hence are not proposed here. They may be included in a subsequent proposal document. See Section 8 for more information on non-proposed characters.



Figure 5. Character dump of ATASCII for the Atari 8-bit family (400, 800, XL, XE), showing both inverse and normal video.



Figure 6. Another character dump of ATASCII glyphs. Note the use of inverse video for headings, as character styling such as bold would be used today.

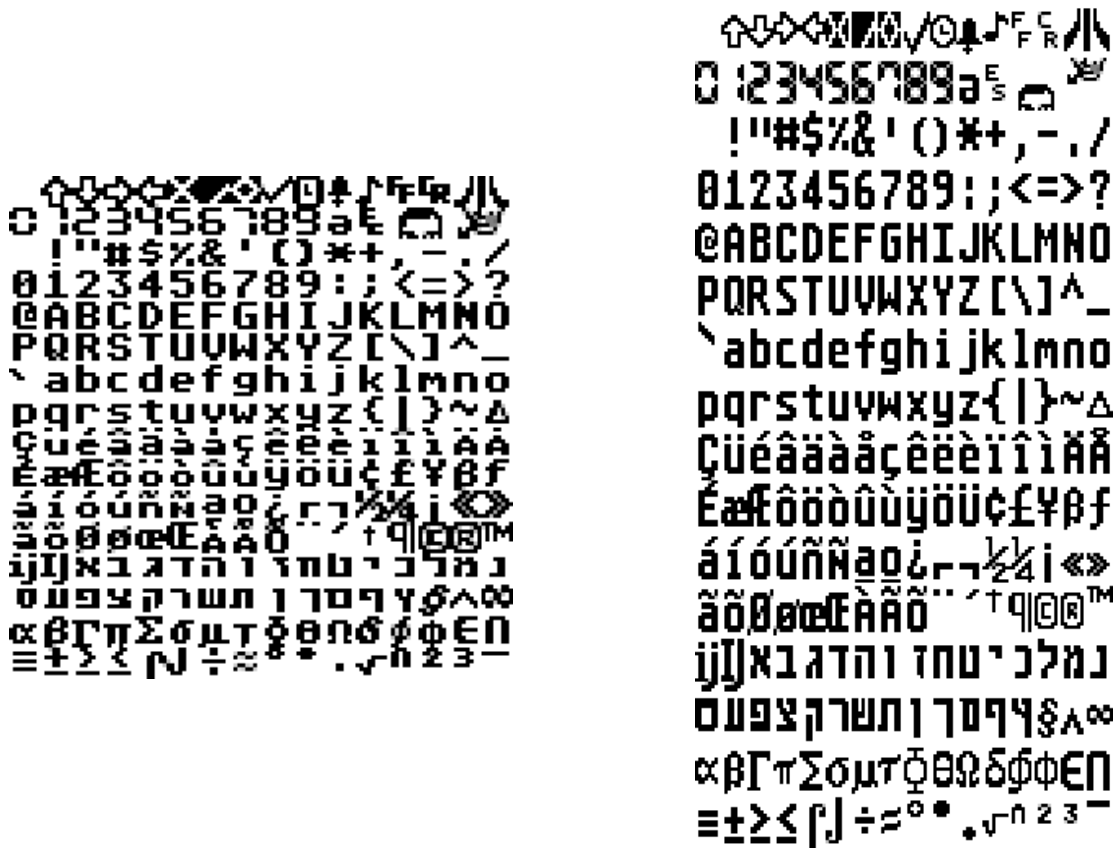


Figure 7. Atari ST glyphs, 8 pixels high (left) and 16 pixels high (right). Note 7-segment styled digits at 0x10 through 0x19 (proposed), and Atari logo at 0x0E–0x0F and J.R. “Bob” Dobbs image at 0x1C–0x1F (not proposed; see Section 8). (Wikipedia, CCO 1.0)



Figure 8. Image of the Commodore PET and VIC-20 character set, generated from a ROM dump, with U+1FB95 CHECKER BOARD FILL and U+2592 MEDIUM SHADE highlighted in red. (CBM Archive)



Figure 9. The Commodore 64 and 128 “PETSCII” character set, shown in several modes, including normal and inverse video.

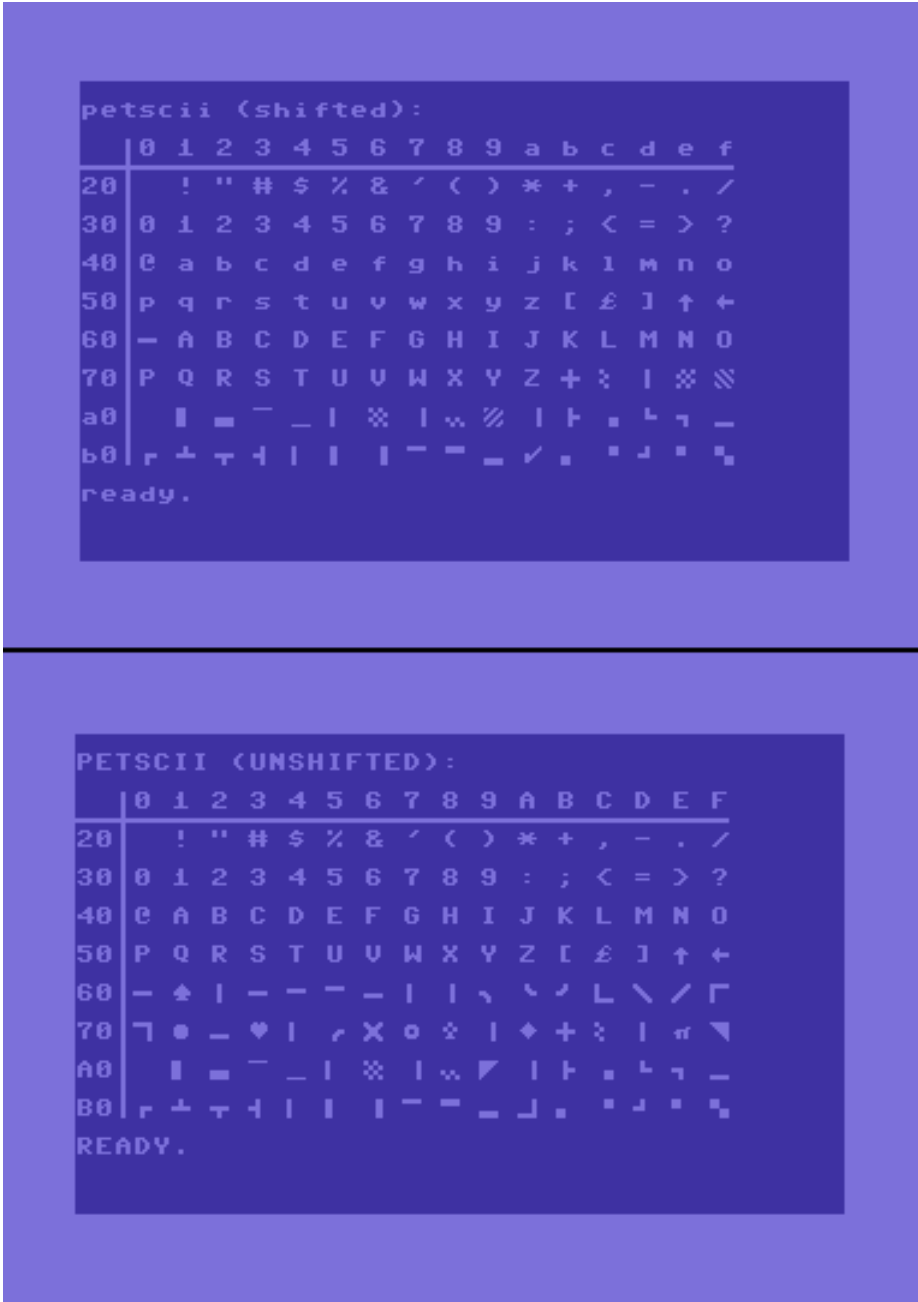


Figure 10. PETSCII as displayed on the Commodore 64. Other Commodore models used slightly different versions of this set. (Wikipedia)

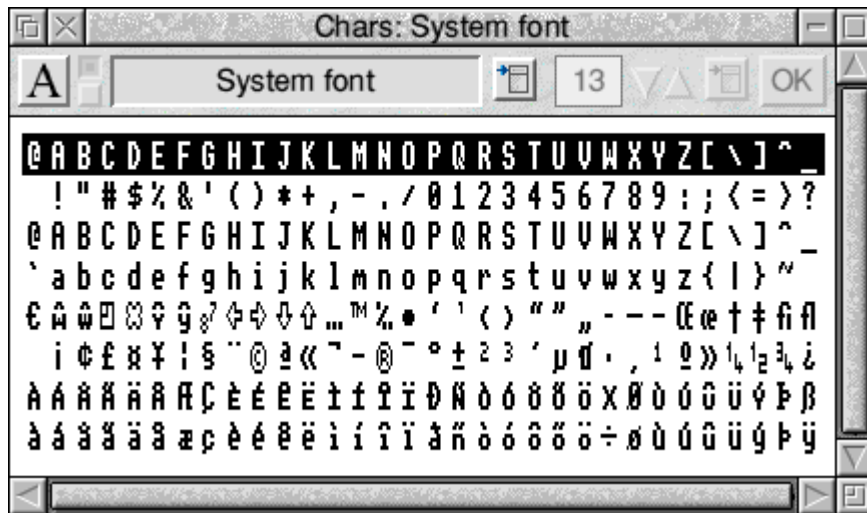


Figure 13. The RISC OS character set. This set is based on ISO 8859-1, but contains ASCII glyphs in the 00–1F range and several differences in the 80–9F range.

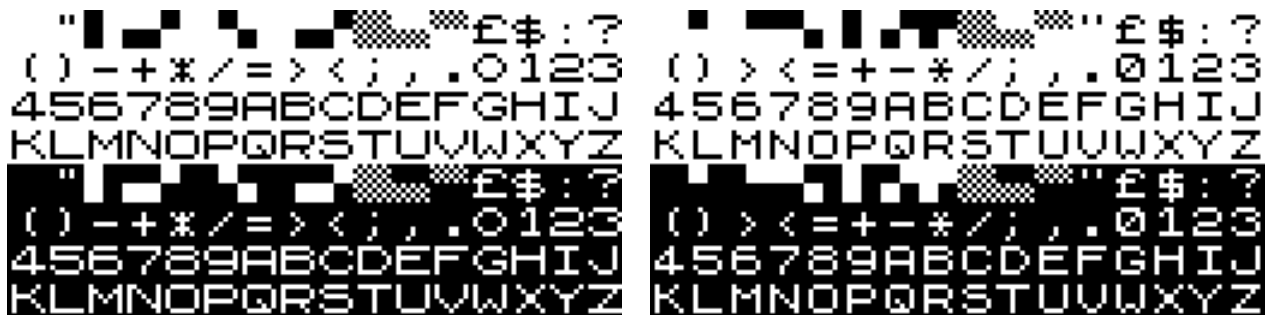


Figure 14. Sinclair ZX80 (left) and ZX81 (right) character dumps. (Wikipedia, CCO 1.0)

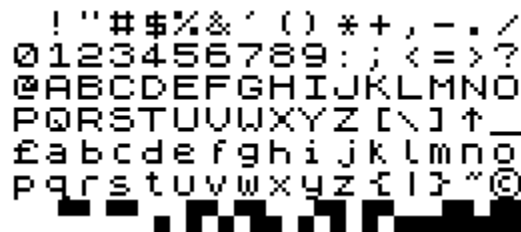


Figure 15. The Sinclair ZX Spectrum character set, including 2×2 block graphics.

	2	3	4	5	6	7
0	[Pattern]	[Pattern]	[Pattern]	(1)	[Pattern]	[Pattern]
1	[Pattern]	[Pattern]	(1)	(1)	[Pattern]	[Pattern]
2	[Pattern]	[Pattern]	(1)	(1)	[Pattern]	[Pattern]
3	[Pattern]	[Pattern]	(1)	(1)	[Pattern]	[Pattern]
4	[Pattern]	[Pattern]	(1)	(1)	[Pattern]	[Pattern]
5	[Pattern]	[Pattern]	(1)	(1)	[Pattern]	[Pattern]
6	[Pattern]	[Pattern]	(1)	(1)	[Pattern]	[Pattern]
7	[Pattern]	[Pattern]	(1)	(1)	[Pattern]	[Pattern]
8	[Pattern]	[Pattern]	(1)	(1)	[Pattern]	[Pattern]
9	[Pattern]	[Pattern]	(1)	(1)	[Pattern]	[Pattern]
A	[Pattern]	[Pattern]	(1)	(1)	[Pattern]	[Pattern]
B	[Pattern]	[Pattern]	(1)	[Pattern]	[Pattern]	[Pattern]
C	[Pattern]	[Pattern]	(1)	[Pattern]	[Pattern]	[Pattern]
D	[Pattern]	[Pattern]	(1)	[Pattern]	[Pattern]	[Pattern]
E	[Pattern]	[Pattern]	(1)	[Pattern]	[Pattern]	[Pattern]
F	[Pattern]	[Pattern]	(1)	[Pattern]	[Pattern]	[Pattern]

	2	3	4	5	6	7
0	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
1	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
2	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
3	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
4	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
5	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
6	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
7	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
8	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
9	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
A	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
B	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
C	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
D	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]	[Pattern]
E	[Pattern]	[Pattern]	[Pattern]	[Pattern]	(2)	(2)
F	[Pattern]	[Pattern]	[Pattern]	(1)	(2)	(2)

Figure 16. Charts showing the block mosaic characters (2 × 3 sextants, left) and smooth mosaic and line-drawing characters (right) used in the teletext standard.

```

>LIST
10 REM SCREEN COLOR YELLOW
20 CALL SCREEN(12)
30 REM TEXT BKGND GREEN
40 REM FRGND BLACK
50 FOR X=1 TO 16
60 CALL COLOR(X,2,4)
70 NEXT X
80 REM PRINT CHARACTERS
90 FOR X=30 TO 126
100 PRINT CHR$(X);
110 NEXT X
120 PRINT
130 INPUT A$
>RUN
! "#$%&'()*+,-./0123456789
:;<=>?@ABCDEFGHIJKLMNPOQRSTUVWXYZ
VWXYZ[\]^_`abcde fghijklmnopq
rstuvwxyz{|}~
?

```

Figure 17. TI-99/4A character dump, generated by Rebecca Bettencourt using a JavaScript-based emulator.



Figure 18. Character dumps for the TRS-80 Model I (top left), Model III (top right), and Model 4 (bottom), shown with generating BASIC programs on Macintosh-based emulators.



Figure 19. The TRS-80 Color Computer character set.

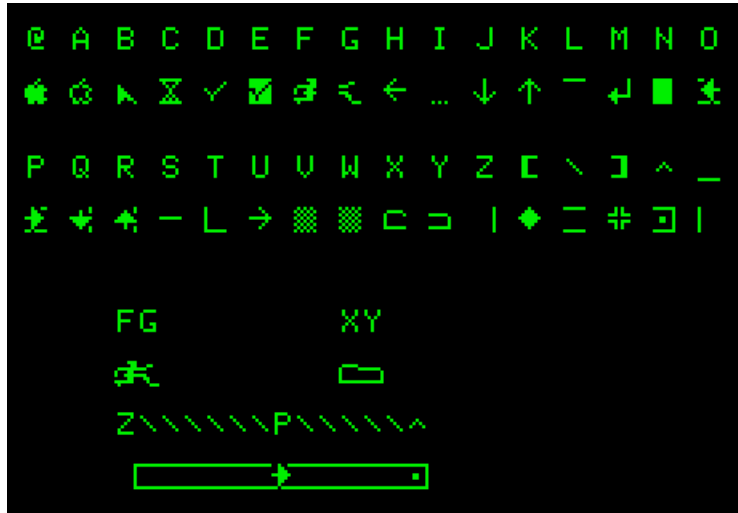


Figure 20. The Apple IIc MouseText set with corresponding ASCII characters (64 code positions higher), showing RIGHTWARDS ARROW AND UPPER AND LOWER ONE EIGHTH BLOCK in the context of a scroll bar.



Figure 21. A text-mode message box constructed with Apple MouseText characters.

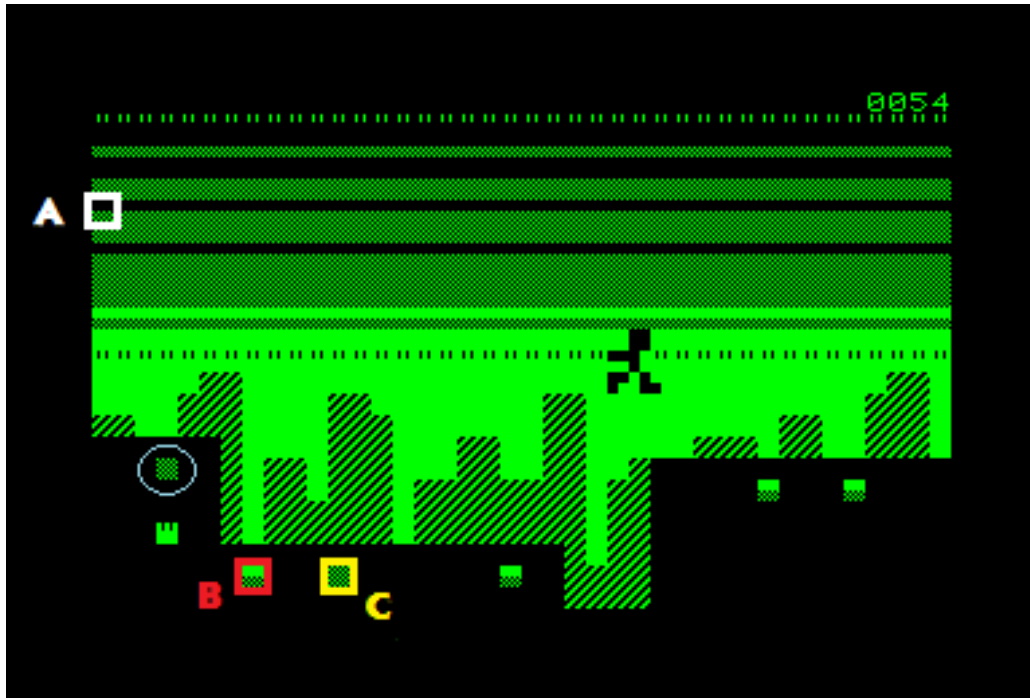


Figure 22. Image created on the Commodore PET using semigraphics. Examples of proposed characters are highlighted: (A) U+1FB8F LOWER HALF MEDIUM SHADE, (B) U+1FB91 UPPER HALF BLOCK AND LOWER HALF INVERSE MEDIUM SHADE, (C) U+1FB90 INVERSE MEDIUM SHADE (compare with U+2592 MEDIUM SHADE, circled).



Figure 23. Additional examples of art created on the Commodore 64, using semigraphics from the PETSCII repertoire.

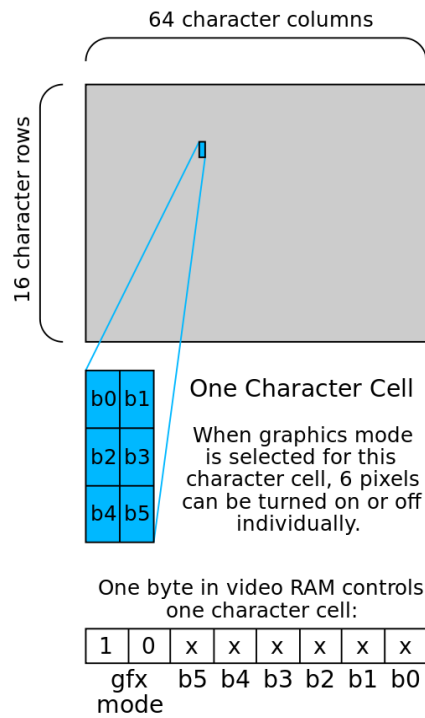


Figure 24. Illustration of the use of semigraphics to plot “pixels” on the TRS-80 by displaying the appropriate 2×3 block graphic. (Wikipedia)

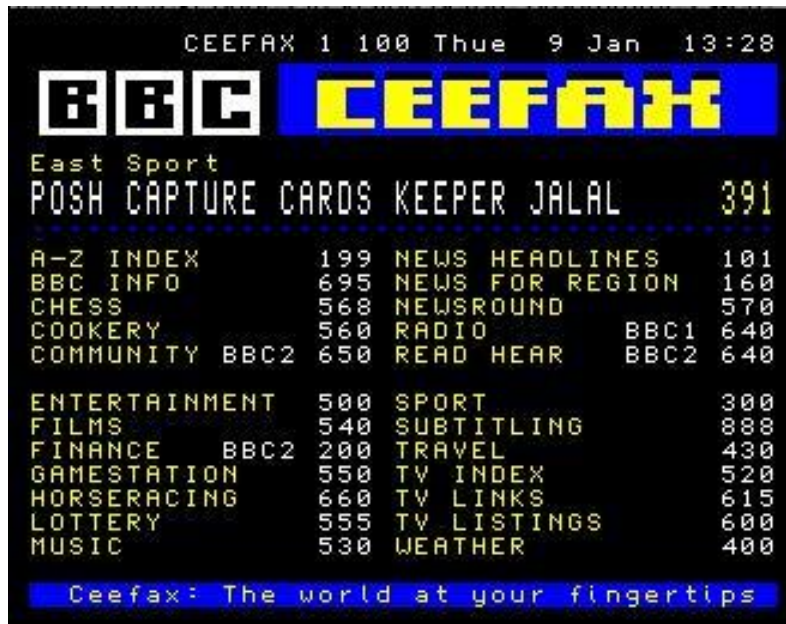


Figure 25. Screen shot from CeeFAX, the world’s first teletext information service. Note the use of foreground and background colors, double-height text, and semigraphics.

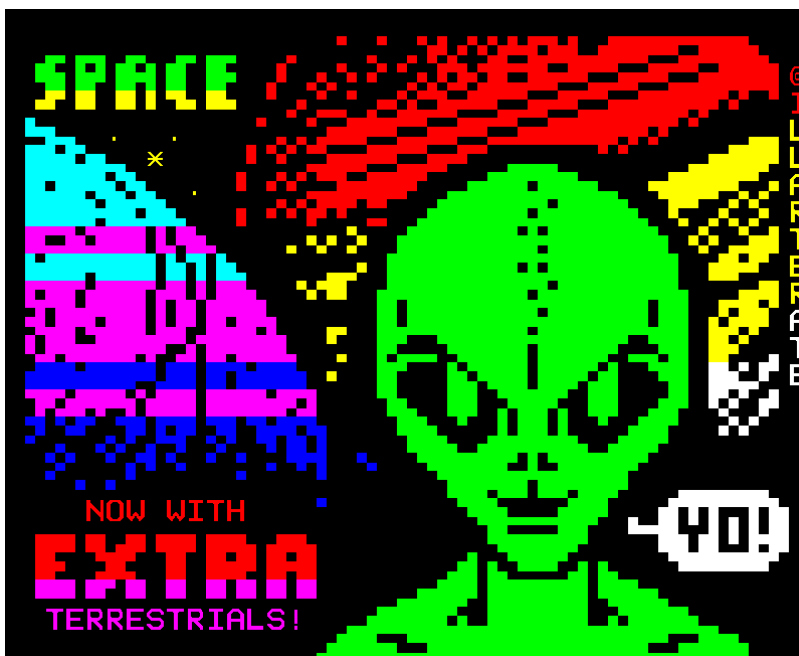


Figure 26. A different example of the color and semigraphics capabilities of teletext. This image is composed using a wide variety of block sextant characters. (Teletext Art Research Lab)



Figure 27. A present-day example of digital teletext in Romania, using block semigraphics from the teletext character set. (Ricardo Bánffy)

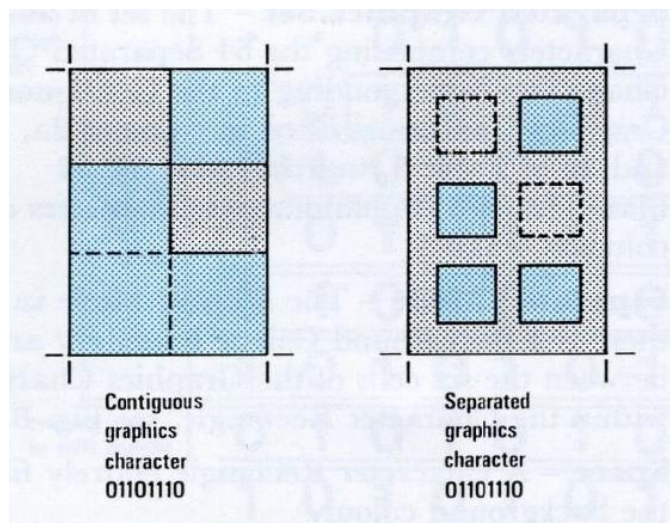


Figure 28. Illustration of “contiguous mode” versus “separated mode” 2 × 3 block graphics in teletext. (IBA Technical Review #2)

A. Administrative

1. Title

Proposal to add characters from legacy computers and teletext to the UCS

2. Requester's name

Terminals Working Group (Doug Ewell et al.)

3. Requester type (Member body/Liaison/Individual contribution)

Individual contribution.

4. Submission date

2019-01-04

5. Requester's reference (if applicable)

6. Choose one of the following:

6a. This is a complete proposal

Yes.

6b. More information will be provided later

No.

B. Technical – General

1. Choose one of the following:

1a. This proposal is for a new script (set of characters)

Yes.

1b. Proposed name of script

Graphics for Legacy Computing.

1c. The proposal is for addition of character(s) to an existing block

No.

1d. Name of the existing block

2. Number of characters in proposal

214.

3. Proposed category (A-Contemporary; B.1-Specialized (small collection); B.2-Specialized (large collection); C-Major extinct; D-Attested extinct; E-Minor extinct; F-Archaic Hieroglyphic or Ideographic; G-Obscure or questionable usage symbols)

Category B.1.

4a. Is a repertoire including character names provided?

Yes.

4b. If YES, are the names in accordance with the "character naming guidelines" in Annex L of P&P document?

Yes.

4c. Are the character shapes attached in a legible form suitable for review?

Yes.

5a. Who will provide the appropriate computerized font (ordered preference: True Type, or PostScript format) for publishing the standard?

Rebecca Bettencourt

5b. If available now, identify source(s) for the font (include address, e-mail, ftp-site, etc.) and indicate the tools used:

Rebecca Bettencourt, FontForge.

6a. Are references (to other character sets, dictionaries, descriptive texts etc.) provided?

Yes.

6b. Are published examples of use (such as samples from newspapers, magazines, or other sources) of proposed characters attached?

Yes.

7. Does the proposal address other aspects of character data processing (if applicable) such as input, presentation, sorting, searching, indexing, transliteration etc. (if yes please enclose information)?

Yes.

8. Submitters are invited to provide any additional information about Properties of the proposed Character(s) or Script that will assist in correct understanding of and correct linguistic processing of the proposed character(s) or script.

See above.

C. Technical – Justification

1. Has this proposal for addition of character(s) been submitted before? If YES, explain.

Yes, in L2/17-435 (2017-12-11), L2/17-435R (2018-04-23), and L2/18-235 (2018-07-20). Five of the characters were proposed by Eduardo Marin Silva in L2/17-194 (2017-06-16).

2a. Has contact been made to members of the user community (for example: National Body, user groups of the script or characters, other experts, etc.)?

Yes.

2b. If YES, with whom?

comp.sys.apple2 (Apple II newsgroup); Atari ST user community; TRS-80 user community (George Phillips).

2c. If YES, available relevant documents

3. Information on the user community for the proposed characters (for example: size, demographics, information technology use, or publishing use) is included?

Contemporary use by specialists and hobbyists.

4a. The context of use for the proposed characters (type of use; common or rare)

Rare.

4b. Reference

5a. Are the proposed characters in current use by the user community?

Yes.

5b. If YES, where?

Worldwide, but particularly in North America and Europe.

6a. After giving due considerations to the principles in the P&P document must the proposed characters be entirely in the BMP?

No.

6b. If YES, is a rationale provided?

6c. If YES, reference

7. Should the proposed characters be kept together in a contiguous range (rather than being scattered)?

Mostly yes, but this is not required.

8a. Can any of the proposed characters be considered a presentation form of an existing character or character sequence?

Yes, the “7-segment” styled digits can be considered presentation forms of U+0030 through U+0039.

8b. If YES, is a rationale for its inclusion provided?

Yes.

8c. If YES, reference

Included in proposal.

9a. Can any of the proposed characters be encoded using a composed character sequence of either existing characters or other proposed characters?

No.

9b. If YES, is a rationale for its inclusion provided?

9c. If YES, reference

10a. Can any of the proposed character(s) be considered to be similar (in appearance or function) to an existing character?

Yes.

10b. If YES, is a rationale for its inclusion provided?

Yes.

10c. If YES, reference

The proposal document describes new semigraphics, some of which are superficially similar to existing characters.

11a. Does the proposal include use of combining characters and/or use of composite sequences (see clauses 4.12 and 4.14 in ISO/IEC 10646-1: 2000)?

No.

11b. If YES, is a rationale for such use provided?

11c. If YES, reference

11d. Is a list of composite sequences and their corresponding glyph images (graphic symbols) provided?

11e. If YES, reference

12a. Does the proposal contain characters with any special properties such as control function or similar semantics?

No.

12b. If YES, describe in detail (include attachment if necessary)

13a. Does the proposal contain any Ideographic compatibility character(s)?

No.

13b. If YES, is the equivalent corresponding unified ideographic character(s) identified?