

1 CPAL — Color Palette Table

2 The palette table is a set of one or more palettes, each containing a predefined number
3 of color records. It may also contain 'name' table IDs describing the palettes and their
4 entries.

5 Palettes are defined by a set of color records. Each color record specifies a color in the
6 sRGB color space using 8-bit BGRA (blue, green, red, alpha) representation. The sRGB
7 color space is specified in [IEC 61966-2-1:1999 Multimedia systems and equipment -
8 Colour measurement and management - Part 2-1: Colour management - Default RGB
9 colour space - sRGB](#).

10 All palettes have the same number of color records, specified by numColorRecords. All
11 color records for all palettes are arranged in a single array, and the color records for any
12 given palette are a contiguous sequence of color records within that array. The first
13 color record of each palette is provided in the colorRecordIndices array.

14 Multiple colorRecordIndices may refer to the same color record, in which case multiple
15 palettes would use the same color records; hence the number of functionally distinct
16 palettes may be fewer than the numPalettes entry. Also, the sequence of color records
17 for different palettes may overlap, with certain color records shared between multiple
18 palettes. Thus, the total number of color records in the CPAL table may be less than the
19 number of palette entries multiplied by the number of palettes.

20 The first palette, palette index 0, is the default palette. A minimum of one palette must
21 be provided in the CPAL table if the table is present. Palettes must have a minimum of
22 one color record. An empty CPAL table, with no palettes and no color records is not
23 permitted.

24 Colors within a palette are referenced by base-zero index. The number of colors in each
25 palette is given by numPaletteEntries. The number of color records in the color records
26 array (numColorRecords) must be greater than or equal to $\max(\text{colorRecordIndices}) +$
27 numPaletteEntries.

28 Palette Table Header

29 The CPAL table begins with a header that starts with a version number. Currently, only
30 versions 0 and 1 are defined.

31 CPAL version 0

32 The CPAL header version 0 is organized as follows:

Type	Name	Description
uint16	version	Table version number (=0).
uint16	numPaletteEntries	Number of palette entries in each palette.
uint16	numPalettes	Number of palettes in the table.
uint16	numColorRecords	Total number of color records, combined for all palettes.
Offset32	colorRecordsArrayOffset	Offset from the beginning of CPAL table to the first ColorRecord.
uint16	colorRecordIndices[numPalettes]	Index of each palette's first color record in the combined color record array.

33 CPAL version 1

34 The CPAL header version 1 adds three additional fields to the end of the table header
 35 and is organized as follows:

Type	Name	Description
uint16	version	Table version number (=1).
uint16	numPaletteEntries	Number of palette entries in each palette.
uint16	numPalettes	Number of palettes in the table.
uint16	numColorRecords	Total number of color records, combined for all palettes.
Offset32	colorRecordsArrayOffset	Offset from the beginning of CPAL table to the first ColorRecord.
uint16	colorRecordIndices[numPalettes]	Index of each palette's first color record in the combined color record array.
Offset32	paletteTypesArrayOffset	Offset from the beginning of CPAL table to the Palette Types Array. Set to 0 if no array is provided.
Offset32	paletteLabelsArrayOffset	Offset from the beginning of CPAL table to the Palette Labels Array. Set to 0 if no array is provided.

Offset32	offsetPaletteEntryLabelArray	Offset from the beginning of CPAL table to the Palette Entry Labels Array. Set to 0 if no array is provided.
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36 Palette Entries and Color Records

37 Colors defined in the CPAL table are referenced by a palette index plus a palette-entry
 38 index. Indices are base zero. For a given palette index and palette-entry index, an entry
 39 within the color records array is derived: $colorRecordIndex =$
 40 $colorRecordIndices[paletteIndex] + paletteEntryIndex$.

41 The color records array is comprised of color records:

Type	Name	Description
ColorRecord	colorRecords[numColorRecords]	Color records for all palettes

42 Each color record has BGRA values. The color space for these values is sRGB.

Type	Name	Description
uint8	blue	Blue value (B0).
uint8	green	Green value (B1).
uint8	red	Red value (B2).
uint8	alpha	Alpha value (B3).

43 The colors in the Color Record should not be pre-multiplied, and the alpha value should
 44 be explicitly set for each palette entry.

45 An alpha value of zero means no opacity (fully transparent); 255 means opaque (no
 46 transparency). Note that the alpha value in the color record can be combined with and
 47 does not supersede alpha or opacity attributes set in higher-level contexts.

48 When placing and registering overlapping elements, there is the possibility of
 49 "seaming", where the edge rendering of one element interferes with the other element.
 50 This may be more or less visible depending on the contrast of the colors used.

51 Palette Type Array

Type	Name	Description
uint32	paletteTypes[numPalettes]	Array of 32-bit flag fields that describe properties of each palette. See below for details.

52 The following flags are defined:

Mask	Name	Description
0x0001	USABLE_WITH_LIGHT_BACKGROUND	Bit 0: palette is appropriate to use when displaying the font on a light background such as white.
0x0002	USABLE_WITH_DARK_BACKGROUND	Bit 1: palette is appropriate to use when displaying the font on a dark background such as black.
0xFFFC	Reserved	Reserved for future use — set to 0.

53 Note that the `USABLE_WITH_LIGHT_BACKGROUND` and
54 `USABLE_WITH_DARK_BACKGROUND` flags are not mutually exclusive: they may both be
55 set.

56 Palette Labels Array

Type	Name	Description
uint16	paletteLabels[numPalettes]	Array of 'name' table IDs (typically in the font-specific name ID range) that specify user interface strings associated with each palette. Use 0xFFFF if no name ID is provided for a palette.

57 Palette Entry Label Array

Type	Name	Description
uint16	paletteEntryLabels[numPaletteEntries]	Array of 'name' table IDs (typically in the font-specific name ID range) that specify user interface strings associated with each palette entry, e.g. "Outline", "Fill". This set of palette entry labels applies to all palettes in the font. Use 0xFFFF if no name ID is provided for a palette entry.

58 Relationship to COLR and SVG Tables

59 Both the [COLR](#) and [SVG](#) tables can use CPAL to define their palettes.

60 COLR and CPAL

61 In fonts that have a [COLR](#) table, the CPAL table is required, and contains all the font-
62 specified colors used by multicolored glyphs.

63 As noted in the [COLR](#) table description, the palette entry index of 0xFFFF if specified in
64 the [COLR](#) table represents the foreground color used in the system. This special value
65 does not change across multiple palettes. The maximum palette entry index is 65535 - 1,
66 as the 65536th position is used in the COLR table to indicate the foreground font color.

67 SVG and CPAL

68 In fonts that have an [SVG](#) table, the CPAL table can be used to contain the values of any
69 color variables used by SVG glyph descriptions in the SVG table. SVG glyph descriptions
70 can also include color specifications directly, however. Thus, the CPAL table is optional
71 for fonts with an SVG table.

72 Foreground color is expressed by the "currentColor" keyword in the SVG glyph
73 descriptions.

74 When used with an [SVG](#) table, the default palette's colors must be set to the same
75 values as the default values for the color variables in the SVG glyph descriptions; this is
76 for text engines that support the SVG table but not color palettes. The SVG glyph
77 descriptions can express their own explicit or "hard-coded" colors as well. These are not
78 related to color variables and thus do not vary by palette selection. See the SVG table
79 specification for more details.