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Janome Embroidery Format JEF

The JEF and JEF+ files consists of a number of sections. Multi-byte numbers appear to be stored little endian. For the JEF (and not JEF+) files, there is no simple signature, except to see if the Stitch-offset is after the Thread-type-list. The JEF pattern can easily be extracted from JEF+ files; by using the Stitch-offset to the Stitch-list, to skip over the JEF+ header; and then to ignore the JEF+ details, after the Stitch-list, at the end of the file.

File = File-header Thread-colour-list Thread-type-list [Plus-header] Stitch-list {Plus-detail}

Thread-colour-list = {Thread-colour}

Thread-type-list = {Thread-type}

Stitch-list = {Stitch}

Stitch = Escaped-command | Displacement

File-header

Offset	Length	Type	Description
0	4	Offset	Stitch-offset location of first stitch
4	4	Flags	unknown = 1, 10 or 20
8	8	ASCII	Date YYYYMMDD
16	8	ASCII	Time HHMMSSxx
24	4	Count	Thread-count number of thread changes
28	4	Count	Stitch-count
32	4	Code	Hoop-code = 0 to 4
36	4	Measure	Extent-1-left stitch extent left of centre in 0.1 mm units
40	4	Measure	Extent-1-top
44	4	Measure	Extent-1-right
48	4	Measure	Extent-1-bottom
52	4	Measure	Extent-2-left; -1 implies not used
56	4	Measure	Extent-2-top
60	4	Measure	Extent-2-right
64	4	Measure	Extent-2-bottom
68	4	Measure	Extent-3-left; -1 implies not used
72	4	Measure	Extent-3-top
76	4	Measure	Extent-3-right
80	4	Measure	Extent-3-bottom
84	4	Measure	Extent-4-left; -1 implies not used
88	4	Measure	Extent-4-top
92	4	Measure	Extent-4-right
96	4	Measure	Extent-4-bottom
100	4	Measure	Extent-5-left; -1 implies not used
104	4	Measure	Extent-5-top
108	4	Measure	Extent-5-right
112	4	Measure	Extent-5-bottom

Hoop-code

Hoop-code	Hoop-name	Hoop-size
0	A Standard	126 x 110 mm
1	C Free Arm	50 x 50 mm
2	B Large	140 x 200 mm
3	F Spring Loaded	126 x 110 mm
4	D Giga	230 x 200 mm

Thread-colour

Offset	Length	Type	Description
0	4	Code	Thread-code = 1 to 78

Thread-code	Colour-RGB	Colour-number	Colour-name
1	"#000000"	002	"Black"
2	"#F0F0F0"	001	"White"
3	"#FFCC00"	239	"Sunflower"
4	"#E6651E"	254	"Hazel"
5	"#C4E39D"	264	"Green Dust"
6	"#237336"	226	"Green"
7	"#071650"	232	"Navy Blue"
8	"#4CB58F"	250	"Emerald Green"
9	"#F669A0"	201	"Pink"
10	"#FF4720"	202	"Vermilion"
11	"#E2A188"	236	"Cinnamon"
12	"#595B61"	252	"Dark Gray"
13	"#E4C35D"	003	"Gold"
14	"#6231BD"	261	"Violet Blue"
15	"#2F5933"	219	"Olive Green"
16	"#FAB381"	212	"Peach"
17	"#F999B7"	211	"Pale Pink"
18	"#F09C96"	256	"Salmon"
19	"#A39166"	268	"Olive Drab"
20	"#970533"	215	"Wine Red"
21	"#AC9CC7"	209	"Pale Violet"
22	"#65C2C8"	217	"Sky"
23	"#E5E5E5"	220	"Silver Gray"
24	"#A0B8CC"	216	"Pale Sky"
25	"#98D6BD"	227	"Pale Aqua"
26	"#0B2F84"	207	"Blue"
27	"#98F3FE"	229	"Powder Blue"
28	"#B2E1E3"	228	"Baby Blue"
29	"#FF0927"	244	"Cardinal Red"
30	"#14329C"	262	"Blue Ink"
31	"#A80043"	242	"Burgundy"
32	"#FF6600"	203	"Orange"
33	"#FF6048"	234	"Coral"
34	"#B59474"	237	"Umber"

35	"#FDF5B5"	210	"Pale Yellow"
36	"#F5DB8B"	238	"Blond"
37	"#C79732"	272	"Old Gold"
38	"#889B9B"	221	"Gray"
39	"#AB5A96"	208	"Purple"
40	"#FFBDE3"	240	"Orchid Pink"
41	"#C3007E"	241	"Peony Purple"
42	"#FF0000"	225	"Red"
43	"#EE71AF"	266	"Floral Pink"
44	"#608541"	246	"Moss Green"
45	"#609418"	247	"Meadow Green"
46	"#C6EECB"	245	"Opal Green"
47	"#5BD2B5"	249	"Aquamarine"
48	"#FFFF17"	204	"Yellow"
49	"#04917B"	251	"Peacock Green"
50	"#5C2625"	260	"Dark Sepia"
51	"#FFFFDC"	253	"Ivory White"
52	"#FF5A27"	235	"Burnt Orange"
53	"#A76C3D"	257	"Cocoa Brown"
54	"#9C6445"	214	"Brown"
55	"#B45A30"	258	"Sienna"
56	"#481A05"	205	"Dark Brown"
57	"#0C8918"	269	"Meadow"
58	"#70A9E2"	230	"Bright Blue"
59	"#1D5478"	231	"Slate Blue"
60	"#165FA7"	263	"Solar Blue"
61	"#7FC21C"	218	"Yellow Green"
62	"#06480D"	248	"Dark Green"
63	"#843154"	267	"Wine"
64	"#FD33A3"	265	"Crimson"
65	"#FFBBBB"	233	"Salmon Pink"
66	"#F7F297"	270	"Mustard"
67	"#00B552"	206	"Bright Green"
68	"#FCF121"	275	"Canary Yellow"
69	"#E6965A"	255	"Toast"

70	"#D7BDA4"	213	"Beige"
71	"#FF9D00"	273	"Honey Dew"
72	"#FFBA5E"	274	"Tangerine"
73	"#0257B5"	222	"Ocean Blue"
74	"#6E3937"	259	"Sepia"
75	"#540571"	243	"Royal Purple"
76	"#CC9900"	271	"Yellow Ocher"
77	"#D0BAB0"	223	"Beige Gray"
78	"#E3BE81"	224	"Bamboo"

Thread-type

Offset	Length	Type	Description
0	4	int	unknown = 13

Plus-header

Only in JEF+ files.

Offset	Length	Type	Description
0	4	int	Signature-1 = 0
4	4	int	Signature-2 = 0
8	8	ASCII	Signature-3 = "JANOME\0\0"
16	4	Count	Plus-detail-count = 1
20	4	Offset	Plus-detail-offset from file-start to JEF+ extra details

Escaped-command

Offset	Length	Type	Description
0	1	Byte	Escape = -128 or 0x80
1	1	Byte	Command-code = 1, 2 or 16

Command-code	Description
1	Change to next thread in list
2	Move followed by 8 bit displacement-X and 8 bit displacement-Y
16	Last-stitch

Displacement

Offset	Length	Type	Description
0	1	Byte	Displacement-X -127 to 127 in 0.1 mm
1	1	Byte	Displacement-Y -127 to 127 in 0.1 mm

Plus-detail

Unknown, many 32 bit numbers, then many 16 bit numbers.

SEW Format

This appears to be an earlier format, it is fairly simple (from the examples seen), it includes bitmap previews, but sometimes they do not match the pattern described in stitches. The format seems to use the same thread colour codes and the same stitch-list as JEF.

Format appears to be little endian, except for the bitmaps.

SEW-file = SEW-header {Bitmap} {stitch}

SEW-header

Only SEW files

Offset	Length	Type	Description
0	2	Count	Colour count; maximum of 12 colours
2	12x2	Table	Colour index table padded with 0; JEF colour code
0x1A	12x2	Table	Colour unknown; all entries appear to have the same value: 8 or 0 or 255
0x32	12x2	Table	Stitches per colour (minus a few)
0x4A			

Bitmap

The bitmaps and sets of bitmaps appear to start at several fixed file offsets:

0x004A 1 x 48 pixel by 32 lines monochrome

0x010C 1 to 12 x 24 by 16, one for each colour

0x043C 1 x 64 by 48 monochrome

0x05BE 1 to 12 x 64 by 48, one for each colour
0x17D6 1 x w x h, variously sized monochrome outline and centre mark.
There are about 1440 bytes before the stitch-list.

This last bitmap may give an indication of the size in millimetres, the width will be a multiple of 8 mm.
The available bits (for pixels or mm) $1440 \times 8 = 11,520$ gives a maximum size around 120 mm x 96 mm, so may be not.

Offset	Length	Type	Description
0	1	Count	Width of bitmap in (8 bit) bytes
1	1	Count	Height of bitmap in lines/rows
2	Width x Height	Byte	Bits from top to bottom, left to right, MSB to LSB
2 + Width x Height			

The bitmap is similar to PBM P4 format, a PBM file can be created by writing:

```
"P4\n"  
"%d %d\n", Width * 8, Height
```

then copy Width x Height chars

Stitch

The SEW stitches appear to start at the fixed file offset 0x1D78, and use the same Escaped-command and (8 bit, 8 bit) Displacement as JEF above.

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