File format of the `*.rcd` data files

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1 File header

Each data file starts with a file header indicating it is a RCD file. The format is as follows

Offset	Length	Contents description
0	4	Magic string 'RCDF'
4	4	Value '1', version number of the data file format.
8	Total length	

2 Data blocks

After the file header come the various data blocks. The goal of data blocks is to provide blobs of information that are somewhat independent. The data blocks are referenced by game blocks by their ID. The first data block gets number 1, the second block number 2, etc.

A reference to data block 0 means 'not present'.

2.1 Sprite Pixels

A data block containing the actual image of a sprite (in 8bpp).

Offset	Length	Contents description
0	4	Magic string '8PXL'
4	4	Version number of the block '1'.
8	4	Length of the block excluding magic string, version, and length.
12	2	Width of the image.
14	2	h, height of the image.
16	$4 * h$	Jump table to pixel data of each line. Offset is relative to the first entry of the jump table. Value 0 means there is no data for that line.
?	?	Pixels of each line.
?	Variable length	

Line data is a sequence of pixels with an offset. Its format is

Offset	Length	Contents description
0	1	Relative offset (0-127), bit 7 means 'last entry of the line'.
1	1	n, number of pixels that follow this count (0-255).
2	n	Pixels, 1 byte per pixel (as it is 8bpp).
?	Variable length	

The offset byte is relative to the end of the previous pixels, thus an offset of 0 means no gap between the pixels. A count of 0 is useful if the gap at a line is longer than 127 pixels.

Note: Some simple form of compressing may be useful in the pixels as it decreases the amount of memory transfers.

2.2 Sprite block

Data of a single sprite.

Offset	Length	Contents description
0	4	Magic string 'SPRT'
4	4	Version number of the block '2'.
8	4	Length of the block excluding magic string, version, and length.
12	2	(signed) X-offset.
14	2	(signed) Y-offset.
16	4	Sprite image data.
20	0	(removed in version 2) Palette data.
20	Total length	

3 Game blocks

A game block is a piece of data useful for the game. Normally it refers to one or more data blocks.

3.1 Tile surface sprite sub-block

In several game blocks you can find a set of sprite for the ground. Below is the layout of such a sub-block. Note that the sprites should look to the north (thus, the sprite at 4 has its back corner up).

Offset	Length	Contents description
0	4	Flat surface tile.
4	4	North corner up.
8	4	East corner up.
12	4	North, east corners up.
16	4	South corner up.
20	4	North, south corners up.
24	4	East, south corners up.
28	4	North, east, south corners up.
32	4	West, north corners up.
36	4	West, east corners up.
40	4	West, north, east corners up.
44	4	West, south corners up.
48	4	West, north, south corners up.
52	4	West, east, south corners up.
56	4	Steep north slope.
60	4	Steep east slope.
64	4	Steep south slope.
68	4	Steep west slope.
72	Total length of the sub-block	

3.2 Ground tiles block

A set of ground tiles that form a smooth surface.

Offset	Length	Contents description
0	4	Magic string 'SURF'
4	4	Version number of the block '3'.
8	4	Length of the block excluding magic string, version, and length.
12	2	(added in version 2) Type of ground.
14	2	Width of a tile of the surface.
16	2	Change in Z height (in pixels) when going up or down a tile level.
18	72	Tile surface sprite sub-block for north viewing direction.
90	0	(removed in version 3) Tile surface sprite sub-block for east viewing direction.
90	0	(removed in version 3) Tile surface sprite sub-block for south viewing direction.
90	0	(removed in version 3) Tile surface sprite sub-block for west viewing direction.
90	Total length	

Known types of ground:

- Empty (0) Reserved, do not use in the RCD file.
- Grass (16-19) Green grass ground, with increasing length grass on it.
- Sand (32) Desert 'ground'.

3.3 Tile selection

A tile selection cursor. It is very similar to ground tiles, except there is no type.

Offset	Length	Contents description
0	4	Magic string 'TSEL'
4	4	Version number of the block '1'.
8	4	Length of the block excluding magic string, version, and length.
12	2	Width of a tile of the surface.
14	2	Change in Z height (in pixels) when going up or down a tile level.
16	72	Tile surface sprite sub-block.
88	Total length	

3.4 Tile area selection

Offset	Length	Contents description
0	4	Magic string 'TARE'
4	4	Version number of the block '1'.
8	4	Length of the block excluding magic string, version, and length.
12	2	Width of a tile of the surface.
14	2	Change in Z height (in pixels) when going up or down a tile level.
16	72	Tile surface sprite sub-block.
88	Total length	

3.5 Patrol area selection

Offset	Length	Contents description
0	4	Magic string 'PARE'
4	4	Version number of the block '1'.
8	4	Length of the block excluding magic string, version, and length.
12	2	Width of a tile of the surface.
14	2	Change in Z height (in pixels) when going up or down a tile level.
16	72	Tile surface sprite sub-block.
88	Total length	

3.6 Tile corner selection block

Offset	Length	Contents description
0	4	Magic string 'TCOR'
4	4	Version number of the block '1'.
8	4	Length of the block excluding magic string, version, and length.
12	2	Width of a tile of the surface.
14	2	Change in Z height (in pixels) when going up or down a tile level.
16	72	Tile surface sprite sub-block for selected corner pointing north.
88	72	Tile surface sprite sub-block for selected corner pointing east.
160	72	Tile surface sprite sub-block for selected corner pointing south.
232	72	Tile surface sprite sub-block for selected corner pointing west.
304	Total length	

3.7 Shops/stalls

One tile objects.

Offset	Length	Contents description
0	4	Magic string 'SHOP'
4	4	Version number of the block '1'.
8	4	Length of the block excluding magic string, version, and length.
12	2	Width of a tile of the surface.
14	2	Height of the shop in voxels.
16	4	View to the north where the entrance is at the NE edge.
20	4	View to the north where the entrance is at the SE edge.
24	4	View to the north where the entrance is at the SW edge.
28	4	View to the north where the entrance is at the NW edge.
32	Total length	

3.8 Build direction arrows

Offset	Length	Contents description
0	4	Magic string 'BDIR'
4	4	Version number of the block '1'.
8	4	Length of the block excluding magic string, version, and length.
12	2	Width of a tile of the surface.
14	4	Arrow pointing to NE edge.
18	4	Arrow pointing to SE edge.
22	4	Arrow pointing to SW edge.
26	4	Arrow pointing to NW edge.
30	Total length	

3.9 Foundations block

Vertical foundations to close gaps in the smooth surface.

Offset	Length	Contents description
0	4	Magic string 'FUND'
4	4	Version number of the block '1'.
8	4	Length of the block excluding magic string, version, and length.
12	2	Type of foundation.
14	2	Width of a tile.
16	2	Change in Z height of the tiles.
18	4	Vertical south-east foundation, east up, south down.
22	4	Vertical south-east foundation, east down, south up.
26	4	Vertical south-east foundation, east up, south up.
30	4	Vertical south-west foundation, south up, west down.
34	4	Vertical south-west foundation, south down, west up.
38	4	Vertical south-west foundation, south up, west up.
42	Total length	

Known types of foundation:

- Empty (0) Reserved, do not use in the RCD file.
- Ground (16)
- Wood (32)
- Brick (48)

The tile width and z-height are used to ensure the foundations match with the surface tiles.

3.10 Path block

Path coverage is a set of at most 47 images. Paths can connect to neighbouring tiles through four edges, optionally also covering the corner between two connecting edges.

Starting at offset 14 are the sprite block numbers of each sprite. As normal, use 0 to denote absence of a sprite. Two letter words in the description denote an edge connects, one letter words denote the corner is covered.

Known types of path surface:

- Empty (0) Reserved, do not use in the RCD file.
- Concrete (16)

Offset	Length	Contents description
0	4	Magic string 'PATH'
4	4	Version number of the block '1'.
8	4	Length of the block excluding magic string, version, and length.
12	2	Type of path surface.
14	4	- (empty)
18	4	NE
22	4	SE
26	4	NE, SE
30	4	NE, SE, E
34	4	SW
38	4	NE, SW
42	4	SE, SW
46	4	SE, SW, S
50	4	NE, SE, SW
54	4	NE, SE, SW, E
58	4	NE, SE, SW, S
62	4	NE, SE, SW, E, S
66	4	NW
70	4	NE, NW
74	4	NE, NW, N
78	4	NW, SE
82	4	NE, NW, SE
86	4	NE, NW, SE, N
90	4	NE, NW, SE, E
94	4	NE, NW, SE, N, E
98	4	NW, SW
102	4	NW, SW, W
106	4	NE, NW, SW
110	4	NE, NW, SW, N
114	4	NE, NW, SW, W
118	4	NE, NW, SW, N, W
122	4	NW, SE, SW
126	4	NW, SE, SW, S
130	4	NW, SE, SW, W
134	4	NW, SE, SW, S, W
138	4	NE, NW, SE, SW
142	4	NE, NW, SE, SW, N
146	4	NE, NW, SE, SW, E
150	4	NE, NW, SE, SW, N, E
154	4	NE, NW, SE, SW, S
158	4	NE, NW, SE, SW, N, S
162	4	NE, NW, SE, SW, E, S
166	4	NE, NW, SE, SW, N, E, S
170	4	NE, NW, SE, SW, W

Table continued at next page

Path sprites continued		
Offset	**Length**	**Contents description**
174	4	NE, NW, SE, SW, N, W
178	4	NE, NW, SE, SW, E, W
182	4	NE, NW, SE, SW, N, E, W
186	4	NE, NW, SE, SW, S, W
190	4	NE, NW, SE, SW, N, S, W
194	4	NE, NW, SE, SW, E, S, W
198	4	NE, NW, SE, SW, N, E, S, W
202	Length of one view direction.	

3.11 Platforms

Offset	Length	Contents description
0	4	Magic string 'PLAT'
4	4	Version number of the block '1'.
8	4	Length of the block excluding magic string, version, and length.
12	2	Width of a tile of the surface.
14	2	Change in Z height (in pixels) when going up or down a tile level.
16	2	Platform type.
18	4	Flat platform for north and south view.
22	4	Flat platform for east and west view.
26	4	Platform is raised at the NE edge.
30	4	Platform is raised at the SE edge.
34	4	Platform is raised at the SW edge.
38	4	Platform is raised at the NW edge.
42	Total length	

Platform type:

- Empty 0, do not use.
- Wood 16.

3.12 Platform supports

-rotation? -steep slopes?

4 Future

To consider:

- Place for the license
- Author and other information?
- Readme document?
- . . . ?

To do:

- (nothing, at the moment)