

Railway file (.rly) specification

These are text files readable by any text editor or word processor, but beware of editing them directly because all strings (e.g names - for current purposes a string is anything that isn't a number) end with a NULL character (zero in ASCII), and text editors ignore NULLs. The files can be edited directly using Notepad++ (<https://notepad-plus-plus.org/>), which is a free editor that displays and can copy all special characters - see 'Changing-a-timetable-in-a-session-file-while-retaining-routes.pdf' (downloadable from the website) for details.

In this specification file contents are indicated in red.

Broad structure:

- a) General information
- b) Active track elements (elements that have tracks)
- c) Inactive track elements (other elements - parapets, concourses, platforms, level crossings and non-station named locations)
- d) Text
- e) Preferred directions
- f) User graphics

Detailed structure:

a) General information:

Version number of the railway.exe program that saved the file

Home horizontal offset (positive or negative)

Home vertical offset (positive or negative)

The whole railway is divided up into 16 x 16 pixel squares, each capable of holding a single track element, where each square is identified by its horizontal location (HLoc) and vertical location (VLoc). Position 0-0 (horizontal and vertical locations both zero) corresponds to the top left hand corner square of the screen when the railway first started to be built, and never changes for that railway thereafter. Although the railway can be any size (limited only by computer memory and operating system limitations), the displayed area is often smaller than full size. In order to retain the same 'Home' screen when a railway is saved the top left hand corner square of the home screen is saved as a horizontal offset and a vertical offset.

b) Active track elements:

Number of active elements

Identifier two forms:

****Active elements**** (if no user graphics present)

****Active elements**1** (if there are user graphics)

Individual element information

Element number 0 for first, (Number of active elements - 1) for last

SpeedTag see SpeedTag notes below

HLoc see above note under General information

VLoc as above

if a gapjump:

ConnLinkPos[0] see Link notes below

Conn[0] see Link notes below

if a signal or points:

Attribute this is a number that identifies which way points are set, or which signal aspect is showing

if a signal:

CallingOnSet 0 if a call on is not available, or 1 if it is

if any other type of element: nothing

In a .rly file the signal and point Attribute and CallingOnSet values aren't needed, but they are included because the functions that create a .rly file are also used for building a session file, where they are needed.

Length01 a track element can have two tracks (crossovers, bridges and points), or one (all other active elements). 01

Length23 corresponds to the first or single track, and 23 to the other

SpeedLimit01 as above

SpeedLimit23 as above

LocationName name not used for timetabling, only for identification purposes: platforms, non-station named locations, concourses and footcrossings have LocationNames

ActiveTrackElementName name used either in the timetable or for a continuation (continuation names are not used in timetables as trains can't stop there). Only active track elements where there are platforms or non-station named locations have ActiveTrackElementNames

End of element marker

if 4 aspect signal 4*****

if 3 aspect signal 3*****

if 2 aspect signal 2*****

if ground signal G*****

if not a signal *****

c) Inactive track elements:

Number of inactive elements

Identifier

****Inactive elements****

Individual element information

Element number 0 for first, (Number of inactive elements - 1) for last

SpeedTag see SpeedTag notes below

HLoc see above note under General information

VLoc as above

LocationName see description in Active track elements

End of element marker

d) Text: (no identifiers or end of item markers - individual items can be distinguished by text and font name)

Number of text items (includes location names)

HPos this and VPos correspond to the pixel position of the top left hand corner of the first text character

VPos

Text string

Font name

Font size the integer height of the font in points

Font colour Red/Green/Blue value as a hex (#) integer of the form #BBGGRR where each colour runs from #00 to #FF

Font charset integer value for the charset supported by the font (each font has its own associated charsets)

Font style integer value: 0=regular, 1= bold, 2=italic, 4=underline & 8=strikeout, they can be added to give combinations

e) Preferred directions:

A single preferred direction is an enhanced type of track element with additional information relating to the preferred direction. Each preferred direction element has only a single direction and a single track, so a bridge with both tracks having bidirectional preferred directions will be represented by four separate preferred direction elements.

Number of preferred direction elements

Individual element information

Element number 0 for first, (Number of preferred direction elements - 1) for last

TrackVectorPosition the element number in the sequence of all active track elements that the preferred direction relates to

ELink the entry link number- see Link notes

ELinkPos the entry link array position (in Link[0-3])

XLink the exit link number

XLinkPos the exit link array position (in Link[0-3])

EXNumber a number identifying the required graphic for display purposes

CheckCount an internal check value used when building preferred directions

IsARoute preferred directions are also used for routes, so this indicates whether it is a route (value 1) or not (value 0)

AutoSignals a marker for routes to indicate whether or not it's an automatic signal route element

ConsecSignals as above for a preferred direction signal route element

if the element is a route element and neither of the above is set then it's an unrestricted route element

End of element marker

If not last element *****

If last element *****

f) User graphics:

Number of user graphics

Individual graphic information

Graphic file name must be of type .bmp, .jpg, .png or .gif

HPos this and VPos correspond to the pixel position of the top left hand corner of the graphic

VPos

SpeedTag notes:

Windows includes a type of button called a SpeedButton, which is used for selecting particular elements when building a railway. This button has an attribute called a Tag, used to identify a particular SpeedButton in an application. In railway.exe this is called SpeedTag and is an integer. The diagram below shows all the track elements with their corresponding SpeedTag numbers.



1	2	125	126	127	128	18	19	140	142	141	143	3	4	5	6	20	21	22	23
88	89	90	91	92	93	94	95	80	81	82	83	84	85	86	87	26	27	24	25
60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	129	130	145	146

(top row speedtag numbers)

(second row speedtags)

(bottom row speedtags)



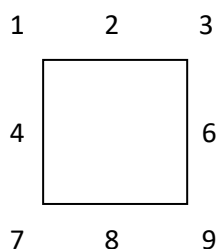
7	8	9	10	11	12	13	14	133	135	139	15	16	48	49	51	50
28	29	30	31	32	33	34	35	137	136	138	44	45	52	53	55	54
36	37	38	39	40	41	42	43	132	134		47	46	57	56	58	59



131	96	97	98	99	100	101	111	112	113	114	115	144
76	77	102	103	104	105	106	116	117	118	119	120	
78	79	107	108	109	110		121	122	123	124		

Link notes:


Each track element has a 4-integer array of links, corresponding to the positions where the track links to other elements. These are numbered as follows:-



Some elements have no links (platforms, concourses, parapets etc) but others have a maximum of four links (crossovers, bridges and points (although points only have 3 they are treated as having 4 where the leading link is listed for both tracks - it makes other program functions simpler). The simpler elements have just 2 links. For example a diagonal crossover would have numbers 1, 9, 3, and 7 in positions Link[0], Link[1], Link[2] and Link[3]. Number 5 is omitted for better symmetry - all opposites add to 10, all diagonals are odd, all horizontals and verticals are even. Points with straight track 4 to 6 and diverging track 4 to 9 would have numbers 4, 6, 4, and 9 in the four array positions as above. Unused links take the value -1 to indicate that they are not set.

The order of the links is vitally important as the position of a link is often used to find specific information. For example all continuations, buffers and gaps use Link[0] for the continuation/buffer/gap end and Link[1] for the other end; all points use Link[0] & Link[2] for the leading end, Link[1] for the straight or left-hand trailing link and Link[3] for the diverging or right-hand trailing link; and all bridges use Link[0] & Link[1] for the top track and Link[2] and Link[3] for the bottom track and similarly for others. Link information is not provided in .rly files because it can be found from the SpeedTag number.



Each element needs to know which other elements it connects to so that preferred directions and routes can be set and train movements properly controlled. To allow this each element contains two more 4-integer arrays Conn[0-3] and ConnLinkPos[0-3]. Conn[0-3] indicates the connecting element (i.e. its number in the sequence of all active track elements) in the same order as the order of Link[0-3]. ConnLinkPos[0-3] indicates the connecting element link array position again in the same order as the order of Link[0-3]. All values for Conn[0-3] and ConnLinkPos[0-3] are set when

the user clicks the  'Link all track together' button, and if any can't be set then an error message is given and the offending element highlighted.

Sample start of LU Metropolitan Line (JKWok).rly: (copied from Notepad++)

NUL = NULL character

CR LF = carriage return & line feed = new line

.v2.5.0NULCR LF	Saved by program version v2.5.0
-46CR LF	Home horizontal offset -46
-12CR LF	Home vertical offset -12
2034CR LF	2034 active track elements
Active.elements1NULCR LF	Identifier with '1' at end indicating that there are user graphics first element (no. 0)
0CR LF	SpeedTag = 20 = 
20CR LF	HLoc
-46CR LF	VLoc
0CR LF	Length01 (100m)
100CR LF	Length23 not set (= -1) since it's a simple single track element
-1CR LF	SpeedLimit01 (48km/h)
48CR LF	SpeedLimit23 not set
-1CR LF	No LocationName
NULCR LF	No ActiveTrackElementName
NULCR LF	End of element marker - not a signal so *****
*****NULCR LF	2nd element (no. 1)
1CR LF	SpeedTag = 69 and it's a ground signal - see below - so it displays as 
69CR LF	HLoc
-45CR LF	VLoc
0CR LF	It's a signal so this is its Attribute = 0 = red (all signals red for a .rly file)
0CR LF	Again a signal so the is CallingOnSet = 0 = not available (all same for .rly)
0CR LF	Length01 = 100m
100CR LF	Length23 not set
-1CR LF	SpeedLimit01 = 48km/h
48CR LF	SpeedLimit23 = not set
-1CR LF	No Location Name
NULCR LF	No ActiveTrackElementName
NULCR LF	End of element marker - it is a ground signal so prefixed by 'G'
G*****NULCR LF	

The above includes lines 1 to 29 of the file. It continues until line 57,864 - which is quite big.
The biggest so far is Xeon's Shanghai Metro with 1,266,667 lines - beat that!!
