Summary of SPECTRA Display Modes

Revision 1 (23 January 2013)

Mode Options					Mode Number	Colour Resolution (w x h)	Attribute Size (h x w)	Attribute Foreground Colours	Attribute Background Colours	Attribute Cell Bright	Attribute Foreground Bright	Attribute Background Bright	Attribute Cell Flash	Attribute Foreground Flash	Attribute Background Flash	Border Colours	Border Bright	Border Flash
Full cell	Standard border	Single attribute byte	Basic colours	Row	0	32 x 24	8 x 8	8	8	Yes	-	-	Yes	-	-	8	-	-
				Quad	1	32 x 48	8 x 4	8	8	Yes	-	-	Yes	-	-	8	-	-
				Dual	2	32 x 96	8 x 2	8	8	Yes	-	-	Yes	-	-	8	-	-
				Line	3	32 x 192	8 x 1	8	8	Yes	-	-	Yes	-	-	8	-	-
			Extra colours	Row	4	32 x 24	8 x 8	64	2	-	-	-	Yes	-	-	8	-	-
				Quad	5	32 x 48	8 x 4	64	2	-	-	-	Yes	-	-	8	-	-
				Dual	6	32 x 96	8 x 2	64	2	-	-	-	Yes	-	-	8	-	-
				Line	7	32 x 192	8 x 1	64	2	-	-	-	Yes	-	-	8	-	-
		Double attribute byte	Basic colours	Row	8	32 x 24	8 x 8	8	8	-	Yes	Yes	-	Yes	Yes	8	-	-
				Quad	9	32 x 48	8 x 4	8	8	-	Yes	Yes	-	Yes	Yes	8	-	-
				Dual	10	32 x 96	8 x 2	8	8	-	Yes	Yes	-	Yes	Yes	8	-	-
				Line	11	32 x 128 / 32 x 32	8 x 1 / 8 x 2	8	8	-	Yes	Yes	-	Yes	Yes	8	-	-
			Extra colours	Row	12	32 x 24	8 x 8	64	64	-	-	-	-	Yes	Yes	8	-	-
				Quad	13	32 x 48	8 x 4	64	64	-	-	-	-	Yes	Yes	8	-	-
				Dual	14	32 x 96	8 x 2	64	64	-	-	-	-	Yes	Yes	8	-	-
				Line	15	32 x 128 / 32 x 32	8 x 1 / 8 x 2	64	64	-	-	-	-	Yes	Yes	8	-	-
	Enhanced border	Single attribute byte	Basic colours	Row	16	32 x 24	8 x 8	8	8	Yes	-	-	Yes	-	-	8	Yes	Yes
				Quad	17	32 x 48	8 x 4	8	8	Yes	-	-	Yes	-	-	8	Yes	Yes
				Dual	18	32 x 96	8 x 2	8	8	Yes	-	-	Yes	-	-	8	Yes	Yes
				Line	19	32 x 192	8 x 1	8	8	Yes	-	-	Yes	-	-	8	Yes	Yes
			Extra colours	Row	20	32 x 24	8 x 8	64	2	-	-	-	Yes	-	-	64	-	-
				Quad	21	32 x 48	8 x 4	64	2	-	-	-	Yes	-	-	64	-	-
				Dual	22	32 x 96	8 x 2	64	2	-	-	-	Yes	-	-	64	-	-
				Line	23	32 x 192	8 x 1	64	2	-	-	-	Yes	-	-	64	-	-
		Double attribute byte	Basic colours	Row	24	32 x 24	8 x 8	8	8	-	Yes	Yes	-	Yes	Yes	8	Yes	Yes
				Quad	25	32 x 48	8 x 4	8	8	-	Yes	Yes	-	Yes	Yes	8	Yes	Yes
				Dual	26	32 x 96	8 x 2	8	8	-	Yes	Yes	-	Yes	Yes	8	Yes	Yes
				Line	27	32 x 128 / 32 x 32	8 x 1 / 8 x 2	8	8	-	Yes	Yes	-	Yes	Yes	8	Yes	Yes
			Extra colours	Row	28	32 x 24	8 x 8	64	64	-	-	-	-	Yes	Yes	64	-	-
				Quad	29	32 x 48	8 x 4	64	64	-	-	-	-	Yes	Yes	64	-	-
				Dual	30	32 x 96	8 x 2	64	64	-	-	-	-	Yes	Yes	64	-	-
				Line	31	32 x 128 / 32 x 32	8 x 1 / 8 x 2	64	64	-	-	-	-	Yes	Yes	64	-	-
Half cell	Standard border	Single attribute byte	Basic colours	Row	128	64 x 24	4 x 8	8	1	Yes	-	-	Yes	-	-	8	-	-
				Quad	129	64 x 48	4 x 4	8	1	Yes	-	-	Yes	-	-	8	-	-
				Dual	130	64 x 96	4 x 2	8	1	Yes	-	-	Yes	-	-	8	-	-
				Line	131	64 x 192	4 x 1	8	1	Yes	-	-	Yes	-	-	8	-	-
			Extra colours	Row	132	64 x 24	4 x 8	2 / 64	1	-	-	-	Yes	-	-	8	-	-
				Quad	133	64 x 48	4 x 4	2 / 64	1	-	-	-	Yes	-	-	8	-	-
				Dual	134	64 x 96	4 x 2	2 / 64	1	-	-	-	Yes	-	-	8	-	-
				Line	135	64 x 192	4 x 1	2 / 64	1	-	-	-	Yes	-	-	8	-	-
		Double attribute byte	Basic colours	Row	136	64 x 24	4 x 8	8	8	-	Yes	Yes	-	Yes	Yes	8	-	-
				Quad	137	64 x 48	4 x 4	8	8	-	Yes	Yes	-	Yes	Yes	8	-	-
				Dual	138	64 x 96	4 x 2	8	8	-	Yes	Yes	-	Yes	Yes	8	-	-
				Line	139	64 x 128 / 64 x 32	4 x 1 / 4 x 2	8	8	-	Yes	Yes	-	Yes	Yes	8	-	-
			Extra colours	Row	140	64 x 24	4 x 8	64	1*	-	-	-	-	Yes	Yes	8	-	-
				Quad	141	64 x 48	4 x 4	64	1*	-	-	-	-	Yes	Yes	8	-	-
				Dual	142	64 x 96	4 x 2	64	1*	-	-	-	-	Yes	Yes	8	-	-
				Line	143	64 x 128 / 64 x 32	4 x 1 / 4 x 2	64	1*	-	-	-	-	Yes	Yes	8	-	-
	Enhanced border	Single attribute byte	Basic colours	Row	144	64 x 24	4 x 8	8	1	Yes	-	-	Yes	-	-	8	Yes	Yes
				Quad	145	64 x 48	4 x 4	8	1	Yes	-	-	Yes	-	-	8	Yes	Yes
				Dual	146	64 x 96	4 x 2	8	1	Yes	-	-	Yes	-	-	8	Yes	Yes
				Line	147	64 x 192	4 x 1	8	1	Yes	-	-	Yes	-	-	8	Yes	Yes
			Extra colours	Row	148	64 x 24	4 x 8	2 / 64	1	-	-	-	Yes	-	-	64	-	-
				Quad	149	64 x 48	4 x 4	2 / 64	1	-	-	-	Yes	-	-	64	-	-
				Dual	150	64 x 96	4 x 2	2 / 64	1	-	-	-	Yes	-	-	64	-	-
				Line	151	64 x 192	4 x 1	2 / 64	1	-	-	-	Yes	-	-	64	-	-
		Double attribute byte	Basic colours	Row	152	64 x 24	4 x 8	8	8	-	Yes	Yes	-	Yes	Yes	8	Yes	Yes
				Quad	153	64 x 48	4 x 4	8	8	-	Yes	Yes	-	Yes	Yes	8	Yes	Yes
				Dual	154	64 x 96	4 x 2	8	8	-	Yes	Yes	-	Yes	Yes	8	Yes	Yes
				Line	155	64 x 128 / 64 x 32	4 x 1 / 4 x 2	8	8	-	Yes	Yes	-	Yes	Yes	8	Yes	Yes
			Extra colours	Row	156	64 x 24	4 x 8	64	1*	-	-	-	-	Yes	Yes	64	-	-
				Quad	157	64 x 48	4 x 4	64	1*	-	-	-	-	Yes	Yes	64	-	-
				Dual	158	64 x 96	4 x 2	64	1*	-	-	-	-	Yes	Yes	64	-	-
				Line	159	64 x 128 / 64 x 32	4 x 1 / 4 x 2	64	1*	-	-	-	-	Yes	Yes	64	-	-

The pixel resolution in each display mode is 256 x 192.
Attribute = Size of the smallest pixel block covered by a single colour value.
Cell = Attribute file byte, which can contain 1 attribute (8 pixels wide) or 2 attributes (each 4 pixels wide).
Where 8 colours are stated, these are the standard range of Spectrum colours.
An attribute or border which supports a Bright option can display 15 unique colours.
* = The SPECTRA specifrication states that this option should be 2 but the actual SPECTRA interface does not have sufficient resources available to implement it.
2 / 64 = Number of colours for odd numbered attributes / Number of colours for even numbered attributes.
32 x 128 / 32 x 32 = 128 single pixel lines (each attribute 8 x 1 pixels) followed by 32 two pixel lines (each attribute 8 x 2 pixels).
64 x 128 / 64 x 32 = 128 single pixel lines (each attribute 4 x 1 pixels) followed by 32 two pixel lines (each attribute 4 x 2 pixels).
All modes can be double buffered, i.e. all drawing occurs to one display / attribute file while another is being shown. This allows the process of drawing to the screen to be invisible to the user and hence no flicker seen.