



ICS1531 MCLK and PNLCLK PLL Spread Spectra

This application note indicates spread-spectrum values for both MCLK and PNLCLK clocks. For both MCLK and PNLCLK, the bandwidth can be measured directly with a modulation analyzer such as the HP53310A.

Note: Within this application note, an 'X' indicates a 'don't care' value.

1 MCLK PLL Spread Spectrum

$$\text{Relative Spread Bandwidth (\%)} = \frac{\text{Bandwidth}}{\text{MCLK Frequency}} \times 100$$

In this equation, 'Bandwidth' refers to the peak-to-peak frequency deviation of the modulated MCLK signal.

The MCLK frequency is set by the ICS1531 register values given in Table 1-1 Column 1.

Table 1-1. MCLK PLL Spread-Spectrum

1. ICS1531 Reg Values for MCLK (Hex)						2. Nominal MCLK Frequency (MHz)	3. Actual MCLK Frequency (MHz)	4. Target Amplitude Reduction (dB)	5. Actual Amplitude Reduction (dB)	6. Bandwidth (MHz)	7. Relative Spread Bandwidth (%)
26	27	28	29	2A	2B						
0C	79	X	X	X	01	66	65.966	0	0.0	0.00	0.0
0C	79	25	05	0D	03			-3	-2.1	0.12	0.3
0C	79	26	05	0D	03			-6	-6.7	0.31	0.5
08	80	X	X	X	01	75	74.895	0	0.0	0.00	0.0
08	80	D9	05	0D	03			-3	-4.7	0.19	0.3
08	80	DA	05	0D	03			-6	-7.1	0.39	0.5
0F	E5	X	X	X	01	100	99.840	0	0.0	0.00	0.0
0F	E5	CE	07	11	03			-3	-3.5	0.15	0.2
0F	E5	CF	07	11	03			-6	-6.1	0.34	0.3
0C	7A	X	X	X	01	133	132.954	0	0.0	0.00	0.0
0C	7A	2F	05	0C	03			-3	-3.5	0.18	0.2
0C	7A	30	05	0C	03			-6	-8.6	0.55	0.4
08	80	X	X	X	01	150	149.789	0	0.0	0.00	0.0
08	80	D8	05	08	03			-3	-3.7	0.10	0.07
08	80	D9	05	08	03			-6	-6.9	0.43	0.3



2 PNLCLK PLL Spread Spectrum

$$\text{Relative Spread Bandwidth (\%)} = \frac{\text{Bandwidth}}{\text{PNLCLK Frequency}} \times 100$$

In this equation, 'Bandwidth' refers to the peak-to-peak frequency deviation of the modulated PNLCLK signal.

The PNLCLK frequency is set by the ICS1531 register values given in Table 2-1 Column 1. In addition to the same columns 2 through 7 that Table 1-1 lists, Table 2-1 also lists the following:

- Column 2: The video mode. As part of the video mode designation, a two-digit number refers to the vertical refresh rate, in Hertz. For example, for VGA60, the vertical retrace rate is 60 Hz.

Table 2-1. PNLCLK PLL Spread-Spectrum

1. ICS1531 Reg Values (Hex)						2. Video Mode	3. Nominal PNLCLK Frequency (MHz)	4. Actual PNLCLK Frequency (MHz)	5. Target Amplitude Reduction (dB)	6. Actual Amplitude Reduction (dB)	7. Bandwidth (MHz)	8. Relative Spread Bandwidth (%)
20	21	22	23	24	25							
0E	D9	X	X	X	01	VGA60, IBM70	25.175	25.169	0	0.0	0.00	0.0
0E	D9	E2	07	13	03				-3	-4.5	0.21	0.8
0E	D9	E4	07	13	03				-6	-6.5	0.31	1.2
07	47	X	X	X	01	VGA72, VGA75	31.5	31.420	0	0.0	0.00	0.0
07	47	E7	04	0A	03				-3	-3.6	0.14	0.4
07	47	E8	04	0A	03				-6	-6.4	0.29	0.9
08	5C	X	X	X	01	VGA85, SVGA56	36	35.795	0	0.0	0.00	0.0
08	5C	97	05	0A	03				-3	-2.3	0.10	0.3
08	5C	98	05	0A	03				-6	-6.4	0.32	0.9
0C	94	X	X	X	01	SVGA60	40	39.886	0	0.0	0.00	0.0
0C	94	3C	06	0E	03				-3	-4.5	0.21	0.5
0C	94	3D	06	0E	03				-6	-7.2	0.32	0.8
07	75	X	X	X	01	SVGA72	50	49.716	0	0.0	0.00	0.0
07	75	C7	07	0E	03				-3	-4.8	0.17	0.3
07	75	C9	07	0E	03				-6	-6.8	0.42	0.8
0F	E3	X	X	X	01	SVGA75	49.5	49.482	0	0.0	0.00	0.0
0F	E3	BE	07	12	03				-3	-4.7	0.21	0.4
0F	E3	BF	07	12	03				-6	-6.8	0.32	0.6
0E	F3	X	X	X	01	SVGA85	56.25	56.154	0	0.0	0.00	0.0
0E	F3	CA	08	0E	03				-3	-4.6	0.20	0.4
0E	F3	CB	08	0E	03				-6	-6.5	0.30	0.5
0E	F8	X	X	X	01	MAC74	57.284	57.272	0	0.0	0.00	0.0
0E	F8	F7	08	12	03				-3	-4.7	0.21	0.4
0E	F8	F8	08	12	03				-6	-5.7	0.26	0.5
0C	77	X	X	X	01	XGA60	65	64.943	0	0.0	0.00	0
0C	77	11	05	0D	03				-3	-5.7	0.24	0.4
0C	77	13	05	0D	03				-6	-9.7	0.65	1.0


Table 2-1. PNLCLK PLL Spread-Spectrum (Continued)

1. ICS1531 Reg Values (Hex)						2. Video Mode	3. Nominal PNLCLK Frequency (MHz)	4. Actual PNLCLK Frequency (MHz)	5. Target Amplitude Reduction (dB)	6. Actual Amplitude Reduction (dB)	7. Bandwidth (MHz)	8. Relative Spread Bandwidth (%)
20	21	22	23	24	25							
0F	B2	X	X	X	01	XGA75	78.75	78.328	0	0.0	0.00	0.0
0F	B2	1E	06	11	03				-3	-4.4	0.15	0.2
0F	B2	1F	06	11	03				-6	-6.8	0.32	0.4
0E	CB	X	X	X	01	XGA85	94.5	94.410	0	0.0	0.00	0.0
0E	CB	62	07	11	03				-3	-5.9	0.26	0.3
0E	CB	63	07	11	03				-6	-7.1	0.40	0.4
10	E1	X	X	X	01	SUN65	92.978	92.670	0	0.0	0.00	0.0
10	E1	3F	07	11	03				-3	-4.7	0.21	0.2
10	E1	40	07	11	03				-6	-8.4	0.52	0.6
0C	CB	X	X	X	01	SXGA60	108	107.897	0	0.0	0.00	0.0
0C	CB	71	08	11	03				-3	-4.8	0.20	0.2
0C	CB	72	08	11	03				-6	-7.0	0.38	0.4
0A	69	X	X	X	01	SXGA75	135	134.829	0	0.0	0.00	0.0
0A	69	42	05	08	03				-3	-2.2	0.13	0.1
0A	69	43	05	08	03				-6	-9.5	0.82	0.6
16	FF	X	X	X	01	SXGA85	157.5	156.903	0	0.0	0.00	0.0
16	FF	1F	06	08	03				-3	-2.7	0.12	0.1
16	FF	20	06	14	03				-6	-5.5	0.15	0.1
08	69	X	X	X	01	UXGA60	162	161.795	0	0.0	0.00	0.0
08	69	51	06	08	03				-3	-2.5	0.10	0.1
08	69	52	06	08	03				-6	-7.5	0.47	0.3