

Reading Out FIR Coefficients From the HSP43220

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There are two methods of reading out the FIR coefficients. With method 1, a single coefficient is output with every DATA_RDY. With method 2, a coefficient is output every rising edge of FIR_CK.

Method 1

The premise is to configure the 43220 to look like a FIR filter, input an impulse, and observe the coefficients at the output.

First, the FIR Section of the chip is programmed for no decimation ($F_{dec} = 1$). This may require changing H_DRATE from the original setup (see BYPASSING THE HDF). The F_REG is written for the original value of F_TAPS, F_BYP = 0, F_OAD = 0, F_ESYM = 1, F_DRATE = 0, and F_CLA = 0 (H_REG1). The FC_REG is loaded normally. The FIR data ram must be sufficiently filled with zeros before the impulse. The minimum number of zeros to clock into the 43220 is ($H_{dec} * taps$). The pin OUTSELH should be set to a zero. An impulse, value 0800H, is input and the coefficients will be output in the order, outer coeff through center coeff and back to outer coeff. The 20-bit coefficients are output on the 24 DATA_OUT pins with the format shown below.

Method 2

This method allows for reading out the FIR coefficients in less time than method 1 but requires the system to have the ability to capture the value on the DATA_OUT pins every FIR_CK. DATA_RDY has no meaning in this mode. The HDF Section must be configured as described in the BYPASSING the HDF portion of this memo. For an NTAP filter, the value for F_TAPS is either NTAPS or NTAPS-1, whichever is odd. For example, for either a 67 or 68 tap filter, F_TAPS = 67. Set other FIR parameters as follows: F_BYP = 0, F_OAD = 1, F_ESYM = 1, F_DRATE = 0, and F_CLA = 1.

Instead of an impulse, the DATA_IN pins are held at the value 0800H. After $(taps/2)(H_{dec}+10)$ CK_IN cycles, all the coefficients will be output on consecutive FIR_CKs in the order in which they were written.

Bypassing the HDF

Use the following equation to determine the H_{dec} required with $F_{dec} = 1$ (if F_{dec} was equal to 1 in the original filter then the correct H_{dec} is already known).

$$H_{DEC} = \frac{CK_IN[(taps/2) + 5]}{FIR_CK}$$

Round the resultant value for H_{dec} up to the next integer value.

For $H_{dec} = 1$, set H_BYP = 1, in this case an impulse is defined as the DATA_IN pins having the value 0800H for one rising edge of CK_IN.

For $H_{dec} = N$, $N > 1$, set HBYP = 0, H_DRATE = N-1, H_GROWTH = 50, H_STAGES = 0. In this case an impulse is defined as the DATA_IN pins having the value 0800H for N rising edges of CK_IN (see Figure 1).

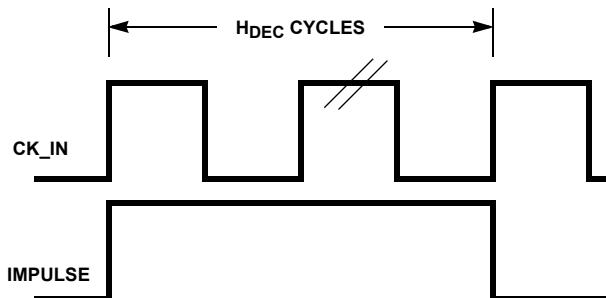


FIGURE 1.

OUTPUT FORMAT

DATA_OUT	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	c7	c6	c5	c4	c3	c2	c1	c0	SE	SE	SE	SE	c19	c18	c17	c16	c15	c14	c13	c12	c11	c10	c9	c8

SE - SIGN EXTENSION

FIGURE 2.

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