

QPSK modulator baseband pulse shaping using XC95xxx and AD9856

Signion announces the availability of a base-band pulse shaping design based on XILINX's CPLD - XC95108. The design can directly be used with Analog Devices' Quadrature Digital Upconverter AD9856 to realize a QPSK modulator at an IF up to 80 MHz (Fig 1). The design meets the spectral mask requirements of IESS-308 (Fig 2). As the design is available in the form of Viewlogic schematics, it is easily adapted to other CPLDs. The output drive circuitry contained in the schematics may be modified the section may be suitably modified to meet timing requirements of other commercially available digital upconverters.

In addition to base-band pulse shaping, the CPLD implements V.35 scrambler and binary/quarternary differential encoder which can be enabled optionally through pin straps (or by an external micro-controller which implements user interface functions).

A reference PCB design is also available from Signion that illustrates an all-digital modulator at an IF of 70MHz.

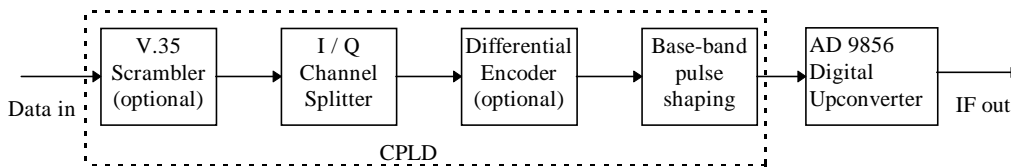


Figure 1. Two chip Direct IF Modulator with spectrum control.

Bit Sequence	2-sample waveform	3-sample waveform
000	-1.0000, -1.0000	-c, -c, -c
001	-1.0000, -0.79395	-c, -b, -a
010	0.79395, 0.79395	a, c, a
011	0.79395, 1.0000	a=0.50037, b=1.06881, c=1.00000
100	-0.79395, -1.0000	-a, -b, -c
101	-0.79395, -0.79395	-a, -c, -a
110	1.0000, 0.79395	c, b, a
111	1.0000, 1.0000	c, c, c

Table 1. Switched IJF waveforms with inverse sinc correction

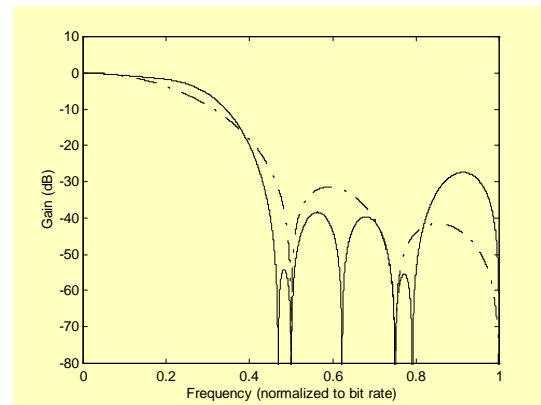


Figure 2. Magnitude response of Feher's QPSK-1 (dashed line) and with IJF/ inverse sinc correction (solid line)

This base-band pulse shaping design, that may be used as a component in implementing the IESS-308 standard, is available in the form of XILINX CPLD project including schematics, XNF files and JEDEC file (for XC95108) for USD 195. The reference design, that includes one evaluation board, schematics, BOM, layout and gerber files, is available for USD 495. To order, please contact bbps@signion.com. See also <http://www.signion.com/pulse.pdf> for design details.