11.6 a) Blockdiagram. A CSDC number C can be written as subtraction between two binary numbers $(C_+)_2$ and $(C_-)_2$, where $(C_+)_2$ is the positive part of the CSDC number (replace the negative ones with zeros) and $(C_-)_2$ is the negative part of the CSDC number (replace the positive ones with zeros and the the negative ones with ones)

$$(C)_{CSDC} = (C_+)_2 - (C_-)_2 .$$

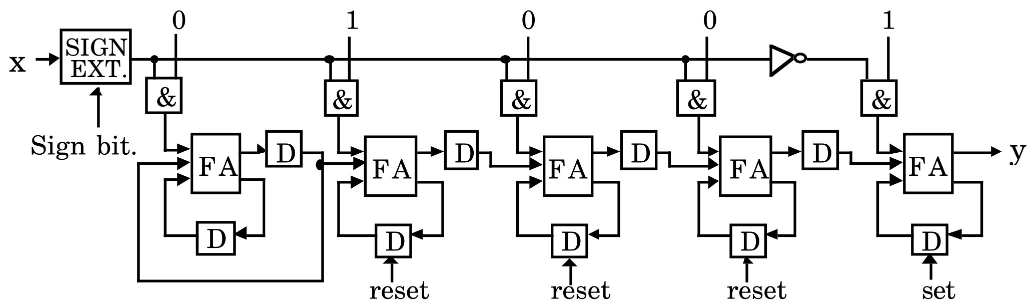
If the LSB in the binary number x has value of 2^{-n} and the coefficient C is a CSDC number, the product y can be expressed as follows

$$y = Cx = (C_+ - C_-)x = C_+x + C_-(-x) = C_+x + C_-(x' + 2^{-n}) = C_+x + C_-x' + C_-2^{-n}$$

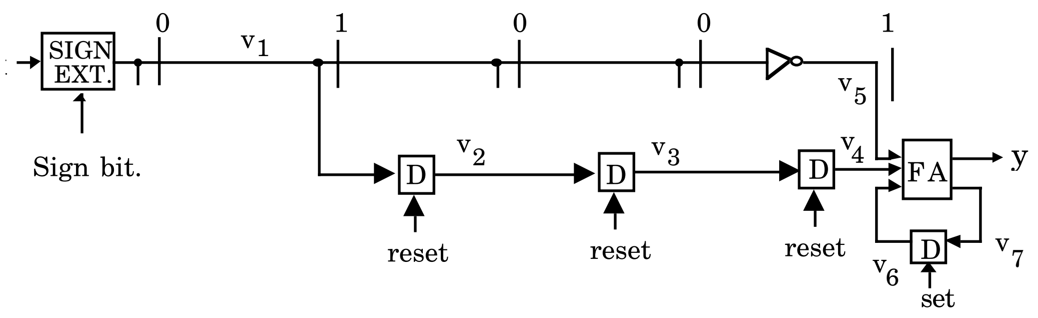
where x' is the bit-wise inversion of x.

In this ease, $\alpha = (0.100\bar{1})_{CSDC}$ and LSB has a value of 2^{-7}. The product can be computed as $y = C_+x + C_-x' + C_-2^{-n} = (0.1000)_2x + (0.0001)_2x' + (0.0001)_2 2^{-7}$.

The multiplications with $(0.1000)_2$ and $(0.0001)_2$ are only shift operations. Moreover, the shift operation is embedded in the serial/parallel multipliers. The block diagram is shown below.



Obviously this block diagram can be simplified and the simplified block diagram is shown below.



b) Verification with $x = (0.110)_2$.

x	v1	v2	v3	v4	v5	v6	v7	y	
0	0	0	0	0	1	1	1	0	(LSB)
1	1	0	0	0	0	1	0	1	
1	1	1	0	0	0	0	0	0	

0	0	1	1	0	1	0	0	1	
-	0	0	1	1	1	0	1	0	
-	0	0	0	1	1	1	1	1	
-	0	0	0	0	1	1	1	0	
-	0	0	0	0	1	1	1	0	(MSB)

$x \cdot \alpha = 0.75 \cdot 0.4375 = 0.328125 = (0.0101010)2 = y$