Low Power DSP Architecture For OFDM

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Abstract

The design of Single Error Correction –Double Adjacent Error Detection- Trio and Tetra Adjacent Error Detection (SEC-DAED-TAED-Tetra AED) codes through bit placement algorithm(BPA) is discussed by means of a smaller amount number of parity bits. In existing method, with the help of hamming code SEC- DAED are designed. There is the need of adding one parity bit to identify the Trio adjacent error in SEC-TAED, which occupies high time. To avoid this difficulties in this paper proposed the SEC-DAED-TAED- Tetra AED. In proposed TAED, to identify the errors there is no necessitate of using parity bits. Compare to the existing method the proposed method provides high efficiency by utilizing BPA which is used in the space communication application to transfer the data. The proposed method is implemented in XILINX ISE tool.

Keywords: Error correction, Error detection, OFDM, Xilinx ISE.

1. Introduction

Very Large Scale Integration System (VLSI) System design is the best approach to design and implements the wireless transmission techniques such as OFDM and Software Defined Radio (SDR) [1]. VLSI System design supports reconfigurability and adaptability efficiently [2]. Also reducing the hardware slices, Look-up Tables (LUTs), power consumption, combinational and sequential delay consumptions are the main concerns of VLSI System design environment [3]-[4]. Hence, the main goal of VLSI System design based 3G & 4G LTE wireless communication system is to improve the data rate speed of data transmission.

3. Dipole and Monopole Antenna

In OFDM transmission scheme, overlapping of sub-channels is allowed. Hence the spectrum can be used more efficiently. The orthogonality of OFDM signal can be explained in the frequency domain [5]. The schematic OFDM modulation is shown in Figure 1.8. To partition a single input with higher data stream into multiple lower rate data stream, Serial to Parallel (S/P) converter is used in OFDM modulation.

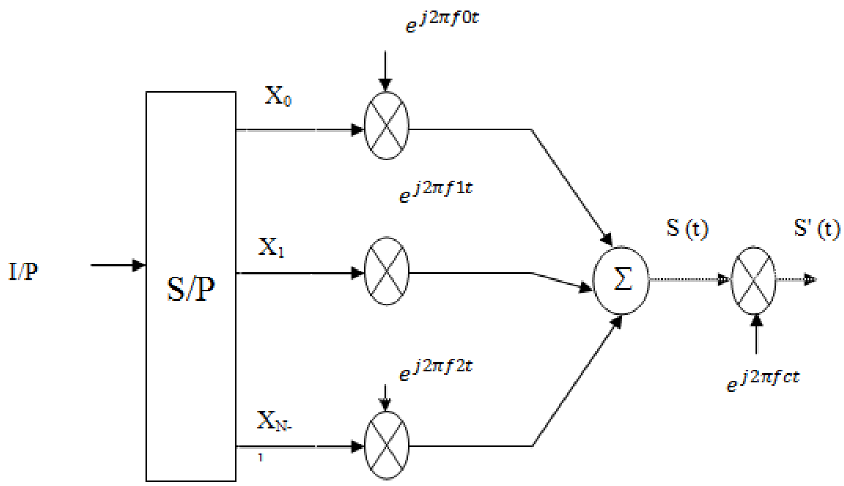

Figure.1 Schematic of OFDM Modulation

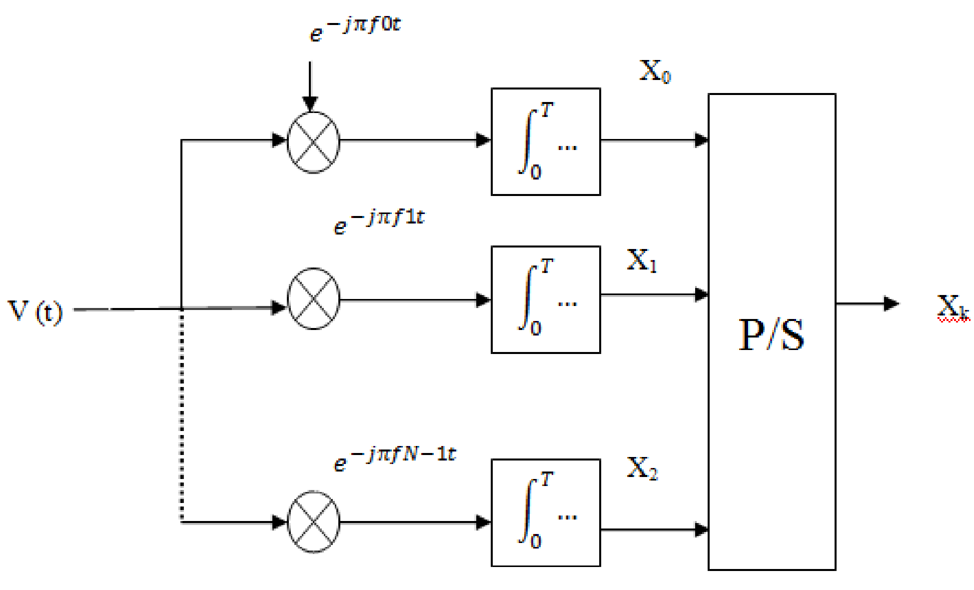

Figure.2 Schematic of OFDM demodulation

For designing the SEC-DAED-TAED-Tetra AED Hamming codes, Selective Bit Replacement algorithm is used. Only 12 bits of Hamming codes are used for performing all the needful. In proposed code Six grouping of TAE and five grouping of DAED-TAED is identified effectively. The highest combination number in 13 bit is 12 DAE grouping and 10 TAE grouping.

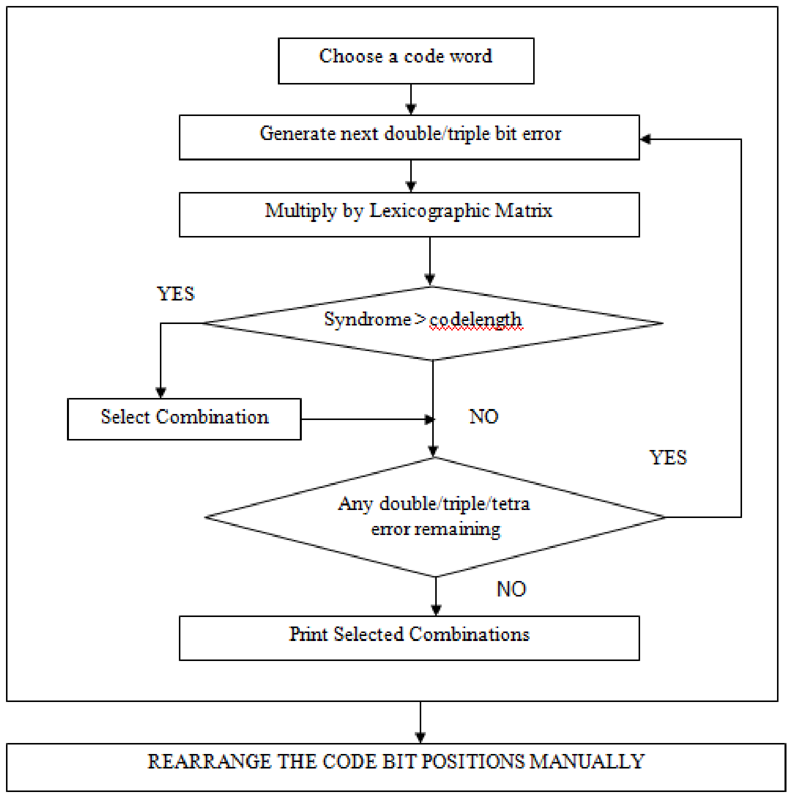

Figure.3 Flowchart Bit placement Strategy

To obtain the proposed objective are discussed as follows a) To realize all Trio and double and tetra error grouping using a software program. b) To reorganize the expression by hand to enlarge the number of ABE .c) To realize all the probable grouping of DEB-TEB-Trio and tetra error bits, the program executing step.iv) Hamming code is chosen. v)The entire 3-error, 2-error and 4-error grouping code produced.vi)The error words create multiply with the lexicographic check matrix.vii) Those bit error groupings generating the condition, and chose the larger bit position code. viii)Positions are noted.

5. Result and discussion

In this paper the proposed method is simulated using Xilinx ISE tool. Figure 4 shows SEC-DAED-TAED-TETRA AED hamming codes – "SEC" the Simulation result. Figure 5 shows the SEC-DAED-TAED-TETRA AED hamming codes – "DAED" Simulation result.

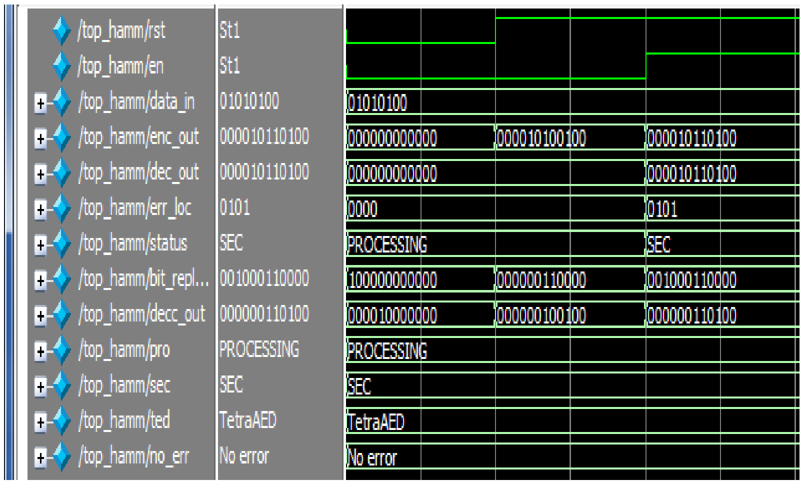

Figure. 4 SEC-DAED-TAED-TETRA AED hamming codes – "SEC" Simulation result

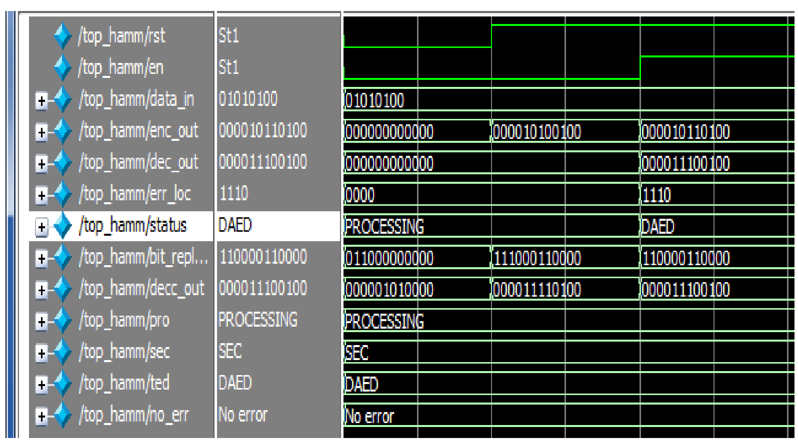

Figure. 5 SEC-DAED-TAED-TETRA AED hamming codes – "DAED" Simulation result

Figure 6 shows the Simulation result of SEC-DAED-TAED-TETRA AED hamming codes –"TAED". Figure 7 shows the Simulation result of SEC-DAED-TAED-TETRA AED hamming codes – "TETRA AED" .

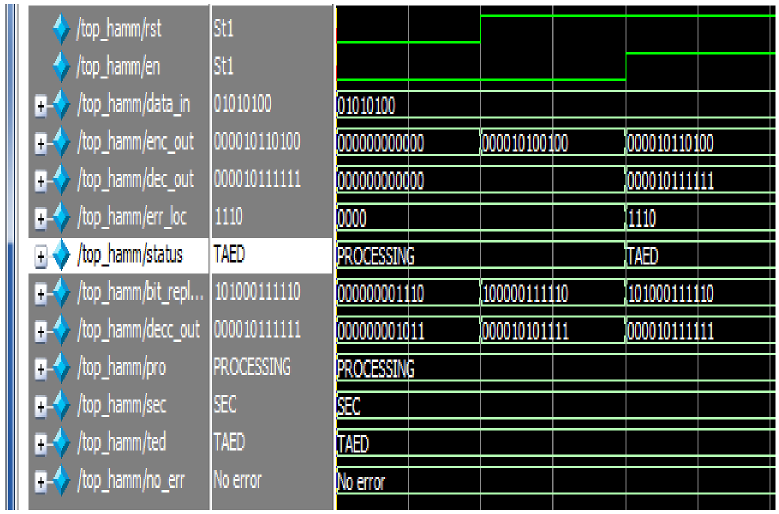

Figure.6 SEC-DAED-TAED-TETRA AED hamming codes – "TAED" Simulation result

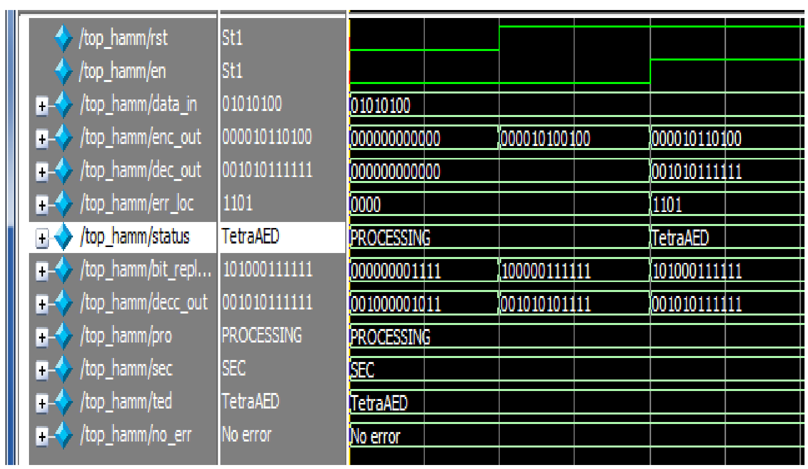

Figure.7 SEC-DAED-TAED-TETRA AED hamming codes –"TETRA AED" Simulation result

6. Conclusion

The proposed SEC-DAED-TAED-Tetra AED Hamming codes is utilized to overcome the incorrect data through communication in space. When transmitting the message data on the basis of bit flipping. Developed Extended SEC-DAED-TAED –Tetra AED Hamming code has been distinguished 25.1% of DAED and 15% of TAED and 58% of Tetra AED. Compare to the existing method the proposed method provides the fast transmission.

References

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