

# Self-Correcting Message System using Hamming Code

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**Abstract** – This paper presents, how to send a self-correcting message with the help of hamming code. Hamming code is an error detection and correction technique. Message bits are received in signal form and then check if there any bits get flipped due to noise and if is so then message get corrected by itself. Self-correcting message applies its 5 extended parity bits to check for each 11-bit data. If one bit get flipped, then that error bit is identified and corrected by this system, and if 2 bits get flipped then machine is able to detect that 2 errors are present. This system can be also used in Compact Disc (CD) and Digital Versatile Disc (DVD)

**Keywords** – Hamming Code, error correction, error detection, parity

## I. Description

Self-Correcting message system works for each 11 bits data which are further converted to 16 bits which includes 4 bits for redundancy for parity check and 1 bit is extended parity check. In this design, even parity is considered that is number of 1's in data bits is even. Before transmitting the data, parity bits are generated for each 11 bit of data and transmits the 16 bits of data. And after transmission some checks are performed and which can be used for correcting any errors.

## II. Circuit Details

An Op-Amp based comparator which is used for comparing Analog voltage level with another reference voltage  $V_{REF}$ . This will generate a square wave generated square wave is provided to MOD-11 Counter. It gives 11 states from 0000 to 1010. MOD-11 will reset back to 0000 once it reaches to 1010 state. The output of the MOD-11 counter is wave using RC constant circuit. The output of

given as input to 1:16 DEMUX which generated data bits. For each 11-bit data 4 parity bits along with 1 extended parity check bit is which gives 16 bits as output after parity generation. That means from each 11-bit data, 16 bits are generated and transmitted. After transmission parity checks are performed which will ensure the correctness of data.

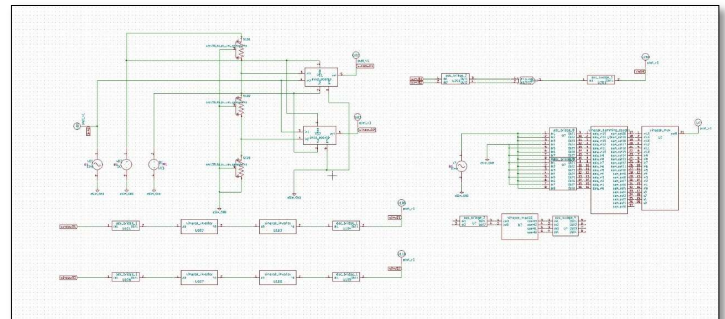


Fig 1 . Circuit Diagram

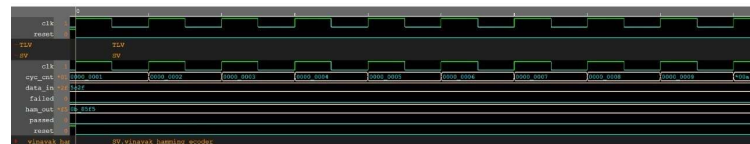


Fig 2 Hamming Code waveform

## III. References

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