International Journal of Applied Engineering Research
ISSN 0973-4562 Volume 10, Number 6 (2015) pp. 13887-13892

http://www.ripublication.com

Transition Inversion Technique Based Extended Frequency Directed Run-Length Encoding

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Abstract

Data compression involves many methods; Run Length Encoding is one of them. Run Length Encoding (RLE) is a simple form of data compression technique, which runs the data are stored as a single valued data, rather than the original run. Transition Inversion (TI) increases the bit transition. This TIC is able to increase the 0's transitions by 50% when compared to the existing method. The optimization of the transition inversion encoder and decoder, compression ratio is proposed for run length encoding method. Integration of the transition inversion technique in the extended frequency directed run-length encoding is to increase the compression ratio of the test vectors.

Keywords: Transition inversion, run-length encoding, extended frequency directed coding.

Introduction

Compression is done with the help of input compression and output compaction. Data compression involves lossless and lossy compression methods. The data compression technique is used to store or to send a smaller number of bits. Lossless compression is the RLE method. In the run length encoding, five different approaches are there for the filling of "don't care" bit. The method used to increase the prevalence of runs of 0s is the Simple run length code. In this method the careful ordering of test cubes increases the number of 0s, which helps to enhance the run-length coding efficiently. The next method is the Golomb code which helps to overcome the disadvantages of the simple run-length coding method. In this the code words are divided into groups, and each group has a separate prefix and tail at the end. The use of this approach is for the longer runs. To control the problems in this approach, the frequency directed run-length encoding is generated. From this method, the encoding is based on the runs of

0's.The frequency directed run-length code consist of the prefix and tail with equal sized code words. In this method, predicts only the runs of 0's so called as an extended frequency directed run-length Is used and this helps in both runs of 1's followed by 0's and 0's followed by 1's. The main disadvantage in this method is we cannot generate the random numbers so we use transition inversion technique to integrate with the extended frequency directed run-length coding.

Run-Length Encoding

Run-length encoding is one method used to compress data and this method is very efficient when the data's are represented as 1's and 0's.This method is used to replace the consecutive repeating occurrences of symbol. When it uses only two symbols it will be more effective. For example if the value be "BBBB" it can be written as 4B.this method is known as the run-length encoding. Run-length encoding consists of different approaches for "don't care" bit filling. For various ISCAS circuits-filling done with the help of runs of 0's and 1's.This also involves the runs of 0's followed by 1's and 1's as 0's as well.

Transition Inversion

Transition inversion is a technique used to invert the data that is present on the tester. This involves odd inversion, even inversion, no inversion, full inversion is done based on the 1's and 0's.If the number of 1's is greater than 0's then full inversion takes place. If the number of 1 is equal to 0's,then half inversion occurs depending upon the positions of 1's.If the number of 0 is greater than 1,then will be no inversion. Transition inversion helps to increase the compression ratio and helps in increasing the runs of 0's.

Extended Frequency Directed Run-Length Coding

Extended frequency directed run-length coding is used in an efficient way that is this involves both the runs of 0's as well as the runs of 1's.This approach is an extension of the frequency directed run-length coding. This helps to obtain more number of 0's since this involves both the number of 0's as well as 1's.This is more efficient when compared with all the approaches used in the run-length encoding. This is integrated along with the transition inversion technique to overcome all the drawbacks that are present in these approaches.

Existing System

In the existing system the run-length encoding is used to compress the data. There are different types of run-length used to compress data; one among them is that frequency directed run-length encoding. In this frequency directed run-length encoding helps to compress data depending on the frequency of runs of 0s.The codeword is given for

both prefix and suffix. They are splitted into groups depending upon the size of the test data. The extension to the FDR is that extended frequency directed run-length encoding. In this it further compress the test data present on the tester since it works on both the runs of 0s as well as the runs of 1s.Compared to all the methods in the run-length Extended Frequency directed Run-length coding is more efficient.

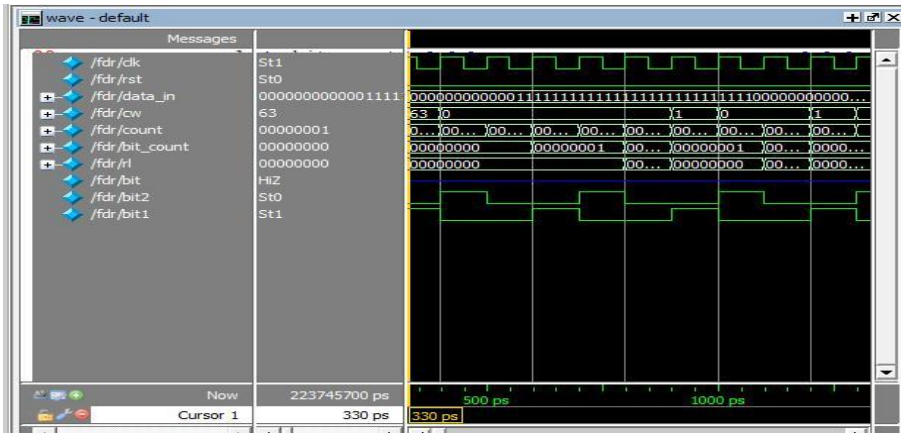

Figure 1: Simulation Result for Existing FDR

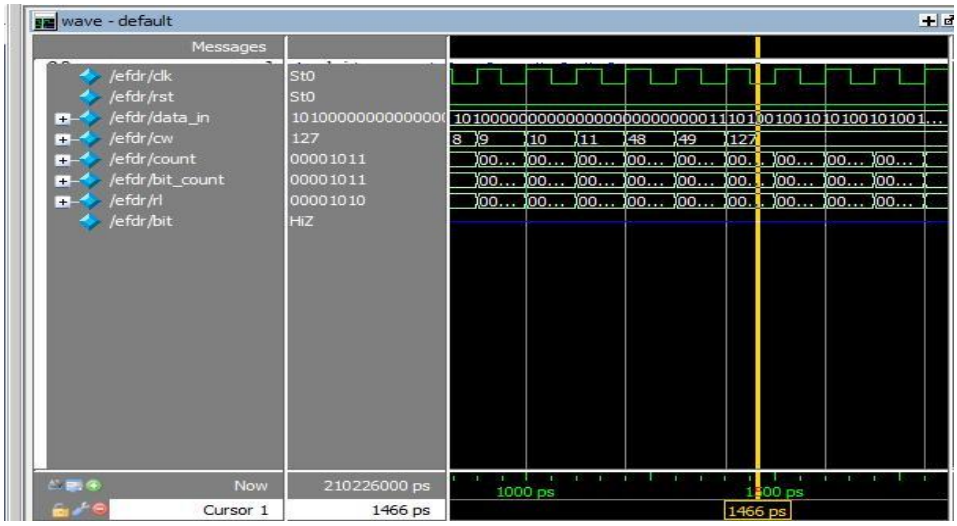

Figure 2: Simulation Result for Existing EFDR

Proposed Method

In this proposed work, we use a technique known as the transition inversion. This helps in reduction of power and very efficient in reducing the number of 0s while inverting the data. The test patterns are generated using the automatic test equipment then the don't care bits are filled by 1s and 0s.Then the number of 1s and 0s are calculated for inversion, the inversion occurs depending upon the values of 1s and

0s.After inverting the number of 0s is reduced; this helps in further compression of the data. When the codes on given on the inverted data the values will be obtained. The value obtained will be more efficient than the existing work.

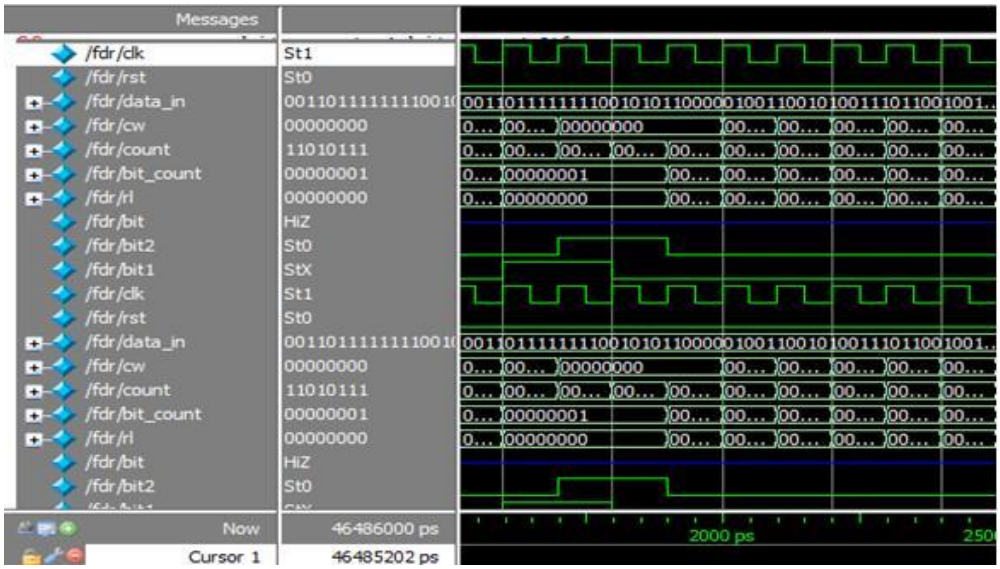

Figure 3: Simulation Result for FDR

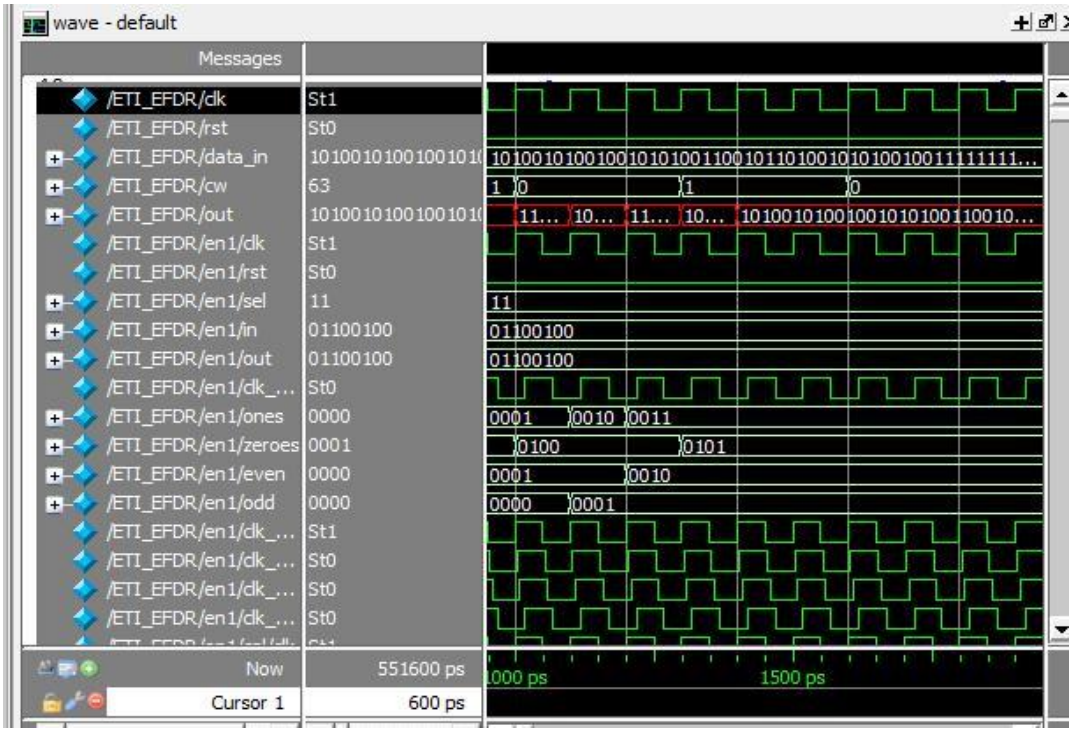

Figure 4: Simulation Result for EFDR

Table 1: Comparison Table for Compression Ratio

Run-Length Encoding Types	Existing Compression Ratio	Proposed Compression Ratio
Frequency Directed Run-Length	47%	55%
Extended Frequency Directed Run-Length	58%	63%

Conclusion

In this paper, we have proposed an algorithm to compress data further when compared with the previous work. The proposed technique is based on the compression of data depending on runs of 0s and 1s and that of minimising the number of 1s with the help of technique known as the transition inversion. Based on experimental results it has been known that the proposed work resulting in the high test data compression.

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