

CERTIFICATE

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Date:

Certified that the thesis work entitled ‘**A New Realization of Linear Phase Detector**’ is a bonafide work carried out by **Rajeev Ranjan** (University Roll No. 2K11/VLS/20) in partial fulfillment for the award of degree of Master of Technology in VLSI Design & Embedded System of Delhi Technological University during the session 2011-13. The project has been approved as it satisfied the academic requirements in respect of thesis work prescribed for the Master of Technology degree.

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ABSTRACT

Clock and data recovery (CDR) circuits have been extensively used in digital communication systems for extracting timing information. Phase detectors (PD) play an essential role in CDR circuits. A Phase Detector detects and amplifies the phase/frequency difference between the input signal and the output of the local oscillator (LO) employed in the CDR circuit to recover clock and data. The performance of CDR circuits critically depends on the characteristics of the phase detector. A lot of work has been done on realization of Phase Detectors using non-linear circuits but realization of Phase Detectors using analog building blocks (ABB) is quite unexplored. The low power consumption and small chip area are possible by realizing PD's using analog building blocks (ABB) instead of non-linear circuits . As a consequence, the realization of Phase Detectors using analog building blocks (ABB) is a new and challenging domain. This report describes the realization of a new Linear Phase Detectors using OTRA; a current mode analog building blocks (ABB).

The operational transresistance amplifier (OTRA) is an amplifier which provides an output voltage with inputs as two differential currents. Thus, it is a current controlled voltage source. The transresistance required is very high so as to realize open loop circuits such as comparator and closed loop circuits such as filters.

In this work SPICE simulation of Linear Phase Detector using OTRA and OTRA as the basic building block have been done and their characteristics have been verified. The workability of the Linear Phase Detector using OTRA has been confirmed by SPICE Simulation and the results are compared with theoretical analysis.