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S E M I N A R

Room 223B ZEC

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A 3-GB/S VERTICAL RECORDING PREAMPLIFIER FOR HARD DISK DRIVES

by

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Abstract: Higher data rate hard disk drives (HDD) and improved read channel electronics are demanding preamplifier performance be extended well beyond 1 Gb/s. In order to continue to increase drive capacities, new read-write head technologies (vertical recording and TGMR heads) are demanding innovative preamplifier circuit solutions. Today's production preamplifiers possess a wide band response of 2.5 MHz-600 MHz, however, next generation preamplifiers will require response greater than 250 KHz-1GHz. Low corner frequencies below 250 KHz present read recovery (sleep-to-read, write-to-read, etc.) challenges which can limit drive capacity.

This project targets a > 2 Gb/s TGMR (tunneling giant magneto-resistive) read path for vertical recording HDDs. A high performance BiCMOS process (IBM's 0.5μm 5HP process) is essential due to the large transconductances, low noise and high speed requirements of the read paths first stage.

System frequency limitations at the input are a result of the large TGMR read sensor and preamplifier input capacitance. Due to read head and preamplifier manufacturing variations, resistive feedback around the first stage is used to set a controlled input impedance targeted to match the interconnect transmission line.

Murthy R. Mellachervu. Born in 1979, grew up in Ranchi, India. Received his Bachelor of Technology from Indian Institute of Technology, Madras, in May 2001. Currently working towards MS degree with graduation in May 2004. Spent the Fall 2002, and Spring 2003 with Texas Instruments, Inc., Dallas, Texas, Preamplifier Group Storage Products, where the Master's project was developed. Will be working with Silicon Labs, Austin, after graduation.