Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

A General-Purpose Microwave Sequencer for Controlling Josephson Phase Qubits MARKUS ANSMANN, R. MCDERMOTT, K.B. COOPER, M. STEFFEN, J.M. MARTINIS, UC Santa Barbara, K. OSBORN, K. CICAK, S. OH, D.P PAPPAS, R.W. SIMMONDS, NIST, Boulder — The short coherence times and the sensitivity to noise of quantum states in superconducting Josephson phase qubits call for measurement and control equipment that is both fast and low-noise. At the same time, because these qubits are still in the development phase, this equipment should be maximally flexible to easily allow for new and unexpected experiments. Here, we present a solution based on a custom computer-controlled 64-bit 200MHz FPGA sequencer card that can deliver clean, precisely timed ($\sim$0.6ns) microwave pulses with an amplitude and phase shift that can be adjusted in 5ns intervals. It also provides a buffered readout system to allow for a high measurement repetition rate yielding good statistics quickly. A modular design of the hardware and software allows the entire measurement process to be readily reconfigured.

John Martinis
UC Santa Barbara

Date submitted: 30 Nov 2004 Electronic form version 1.4