A Multi-Moded RF Delay Line Distribution System for the Next Linear Collider (NLC)*,

C. ADOLPHSEN, G. BOWDEN, Z.D. FARKAS, J. IRWIN, K. KO, N. KROLL, T. LAVINE, Z. LI, R. LOEWEN, R. MILLER, C. NANTISTA, R.D. RUTH, J. RIFIKIN, S.G. TANTAWI, A.E. VLIEKS, P.B. WILSON, J. WANG, SLAC - The Delay Line Distribution System (DLDS) [1] is an alternative to conventional pulse compression which enhances the peak power of an rf source while matching the long pulse of that source to the shorter filling time of the accelerator structure. We present a variation on that scheme that combines the parallel delay lines of the system into one single line. The power of several sources is combined into a single waveguide delay line using a multi-mode launcher. The output mode of the launcher is determined by the phase coding of the input signals. The combined power is extracted using several mode extractors, each of which extracts only one single mode. Hence, the phase coding of the sources controls the output port of the combined power. The power is, then, fed to the local accelerator structures. We present a detailed design of such a system, including several implementation methods for the launchers, extractors, and ancillary high power rf components. The system is designed so that it can handle the 600 MW peak power required for the second stage of the NLC design, while maintaining high efficiency.

* Supported by Department of Energy Contract DE-AC03-76SF00515

[1] H. Mizuno, Y. Otake, A New Rf Power Distribution System For X Band Linac Equivalent To An Rf Pulse Compression Scheme Of Factor 2**N,î 17th International Linac Conference (LINAC94), Tsukuba, Japan, Aug 21 - 26, 1994.