Design of a 95 GHz, Multi-Megawatt Gyroklystron Amplifier for Advanced Accelerators*, M.R. ARJONA, W. LAWSON, University of Maryland - At the University of Maryland, we have been designing and testing the suitability of X-, Ku, and K-Band Gyroklystrons as drivers for linear colliders and other advanced accelerator applications [1]. In this paper we present a design of a system at 95 GHz which is based on the characteristics of our second harmonic, two-cavity circular tube, which produced over 30 MW of peak power at 19.7 GHz with an efficiency near 30%. We present the design of the magnetron injection gun (MIG), the magnetic field coils, and the microwave circuit. The MIG produces a 500 kV, 45 A small-orbit annular beam with an average perpendicular-to-parallel velocity ratio of 1.5 and a parallel velocity spread below 6%. The microwave circuit has a first-harmonic TE011 input cavity which is driven at 47.5 GHz, and second-harmonic TE021 buncher and output cavities which are resonant at 95 Ghz. Peak powers between 6-9 MW are expected with gains and efficiencies comparable to the low-frequency results. A complete description of the system will be reported along with a summary of the predicted optimal results and a parametric study.

* Work supported by the U.S. Department of Energy.

[1] V.L. Granatstein and W. Lawson, "Gyro-Ampifiers as Candidate RF Drivers for TeV Linear Colliders" IEEE Trans. on Plasma Science, vol. 24, pp. 648-665 (1996).