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Jefferson Lab's 20A Bipolar Trim power supply for Very Low Inductance Load

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An Injector upgrade at Jefferson Lab presented new requirements for the Wien filter magnets power supplies. In addition to raising the output amperage requirements from 10Amps to 20Amps, the new power supplies are required to drive loads with very low inductance, capacitive effects and stringent ripple limitations. Existing power supply solutions required loads with a minimum of 25mH to achieve the ripple requirements. A plan to develop a 100 parts per million (ppm) 20Amp DC power supply to drive specified loads was formulated. The specification and design choices for this power supply will be presented. A modulator approach to the design functions led to embedded controller and power amplifier implemented on two different printed circuit boards. This modular design allows for future flexibility to meet higher power requirements or obsolescence. The controller design uses modern technologies such as Field Programmable Gate Array (FPGA) for embedded controls, diagnostics and communications.

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Footnotes

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Yes

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