CESR-c Superconducting Wigglers and Superconducting Solenoids
Power and Control Electronics
Part Numbers and Approximate Cost

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1. Power supplies are Kepco, 3.3 volt, 375 ampere with remote voltage programming, model RKW 3.3-375K ($1800). The power supply voltage is controlled by the current regulator board which gets a current signal from a transductor (see item 2). The power supplies use 110 VAC input and are specified to be 73% efficient with a power factor of 0.99.

2. The transductor for the main winding current regulation is a GMW Ultrastab model 867, 400 ampere ($500). We feed the output into a trans-resistance amplifier with a 50 ohm trans-resistance. This resistance consists of 8, 200 ohm 0.01% resistors in series-parallel to lower the power dissipation. We get 5 volts for 200 ampere transductor primary current, 100 milliampere secondary current.

3. Trim power supply is a 5 volt 10 ampere Kepco mounted on a custom-made VME board, also voltage-contolled by the current regulator board.

4. The cryogenic controller is a Siemens-Moore model 353 with optional I/O board and ethernet interface ($2500). The optional I/O board makes it capable of regulating the three loops (three inputs, three valve outputs) and ethernet communication is essential for remote operation. I will be creating EPICS compliant software for this device for ERL.

5. The quench switch is a 1200 volt, 700 ampere IGBT from IXYS, P/N MID 550-12 A4 ($500).

6. The quench resistor is a Kanthal Globar 1 ohm disk, 120 kilojoule ($280).

7. LHe and LN2 level meters are from American Magnetics Corporation.

8. Cryogenic valves are custom-made by LEPP.

9. The VME crate is from a kit with modifications. The upper backplane is a standard commercial VME backplane ($500). The lower backplane is custom-made by LEPP.

10. All VME circuit boards are custom-made by LEPP. There is no microprocessor. Slot zero contains a VME bus master that communicates via LEPP control system serial link. This board could be directly replaced by a microprocessor board with an ethernet connection.

11. The CESR-c wigglers have 14 cryogenic temperature monitors which consist of calibrated Rhenium Oxide resistors. The resistance goes from 55k to 104k from room to LHe temperature, so a two-wire measurement is sufficient. A custom 16 channel readout

board delivers a precision current to the sensors and is self-calibrating using onboard 100k and 50 k resistors.