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Fast-switching Langmuir probe bias electronics for Alcator C-Mod[1] L. LYONS, B. LABOMBARD, MIT PSFC — In order to resolve fast-changes in edge plasma density, temperature and plasma potentials with a single Langmuir electrode, the I-V characteristic must be generated and sampled at high frequency. To this end, a custom-designed package of fast-switching electronics is being assembled for use in Alcator C-Mod, employing three principal components: (1) a master TTL waveform generator, (2) fast-switching MOSFET drive circuits ($\sim$ 30 ns rise time), and (3) current-voltage monitor circuits. Three voltage bias states are capacitively coupled to up to 6 Langmuir probes in a sequence that samples portions of the I-V characteristic: ion saturation ($\geq$ -234V), electron collection ($\leq$ +64V), and near floating ($\sim$ 0V). Up to 2 amps of peak current can be supplied to each probe with waveform durations of $\sim$ 2 seconds. Resultant I-V characteristics are digitally sampled ($\leq$ 50MHz) by cPCI transient recorders. Three additional TTL waveforms, synchronized to the data-sampling times of the different bias states, are also supplied. These may be used to report plasma conditions in real-time using a mirror Langmuir probe technique [1].
[1] B. LaBombard and L. Lyons, manuscript in preparation.

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