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1520**AN FFT SPECTROMETER WITH
PULSAR DEDISPERSION CAPABILITIES**Richard J. Lacasse and J. Richard Fisher
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NRAO is constructing a signal processor which incorporates some novel approaches to both pulsar radiometry and spectroscopy. Using a pipelined FFT, the processor operates on individual output points of each transform to calculate, in real time, functions that have traditionally been done with analog electronics or after data have been averaged in a computer. The signal processor consists of two parallel pipelines, only one of which is described below.

The heart of the spectrometer is a pipelined 10-stage FFT engine that can process real data at up to 80Ms/s, producing 1024 point complex, 40 MHz spectra every 25 μ sec. Ahead of the FFT engine are 8 IF-to-video converters and 6-bit analog-to-digital converters. A high speed memory acquires, sorts, and orders the data from the converters for 1, 2, 4, or 8 input processing. User selectable windows are applied to the data before transformation. Modules following the FFT pipeline include a self-or cross-power calculator, a stokes parameter calculator, a faraday rotation corrector, and an accumulator/dedisperser. Dedispersion is accomplished by a high speed, complex memory addressing scheme which can accommodate the anticipated ranges of observation bandwidths and dispersion measures. In addition, spectra can be accumulated independently in as many as 8 recurring time periods of programmable width and spacing.