EVLA Memo #33

Digital Transmission System Signaling Protocol
Version 3

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Abstract:
Built on the infrastructure of the current VLA, including its twenty-seven, 25-meter diameter antennas, the EVLA project will install new electronics and fiber optics to enhance the VLA performance. The current receiver plan specifies the simultaneous reception of two pair of orthogonally polarized IF signals. The four IF signals will be digitized at the antenna and transmitted through a fiber optic system to the central control building. Each receiver-IF will provide an instantaneous bandwidth of 4 GHz per polarization, partitioned into two 2 GHz wide sub-bands by the IF system, for a total of eight sub-bands. Each sub-band is harmonically sampled at 4 GHz, and quantized to 3 bits. This produces three synchronized high-speed serial optical fiber transmission channels per polarization and a total of 12 channels per antenna. The data is formatted into 160-bit frames and transmitted at 10 Gbits/second/channel. The frame consists of a sync word, a sequence word, a time stamps, the payload, and a checksum. Modulo-2 addition with a specific pattern scrambles the frame information to provide timing information and minimizes the low frequency content. End-of-life error rates of less than 10^{-6} are required. This EVLA memo is based on a NRAO memo "Digital Transmission System Signaling Protocol", written by Robert W. Freund, 2000 September 25 for the ALMA project.

***The Abstract should be in basic text. You do not need to format the abstract page.