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Improved timing sequence generator on the DIII-D tokamak[1] R.A. COLIO, CSU-San Marcos, D.F. FINKENTHAL, Palomar College, T.M. DETERLY, General Atomics — The DIII-D tokamak uses a central clock source and trigger system to synchronize plant operations and diagnostics. The system uses a bi-phase encoding technique to send both clock and trigger signals to remote receivers, and supports both pre-programmed sequences of triggers as well as event-driven triggers. A 1 MHz timebase is used and triggers are encoded as eight-bit hexadecimal words. Currently, the system relies on a cascaded series of CAMAC-based delay generators to produce the trigger sequence. We present a modern and more versatile implementation based on a single FPGA (field programmable gate array) capable of providing clock rates upward of 100 MHz while maintaining compatibility with existing equipment. A proposal for system clock synchronization with GPS for improved precision is also presented.

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