

Abstract

Micro-Research Finland Oy (MRF) has been providing timing systems for accelerators since 1999. Timing system development started with the timing system for the SLS synchrotron at PSI, Switzerland. Other users include Diamond Light Source, UK, BEPCII, China, LCLS/SLAC, USA, SNS/ORNL, USA, SSRF, China, Elettra, Italy, among others. The Spanish Light Source ALBA has also chosen to use the MRF timing system and ALBA is the first facility to utilize bidirectional signaling.

Timing signals are distributed over a fiber optic network using gigabit rate signaling. The timing system resolution is 8 ns to 20 ns depending on the frame rate which can be derived from an external source e.g. synchrotron RF clock. An Event Generator (EVG) produces all timing signals utilizing internal counters, event sequencers and hardware inputs. Fan-out modules distribute the optical timing signal to an array of Event Receivers (EVR). Event Receivers recover the event clock from the optical signal and produce hardware outputs or software interrupts based on events. Highest precision outputs reach jitter values of less than 5 ps rms. The timing system is also capable of distributing time and timestamping events. Small data packets up to 2k bytes may be transferred over the same fiber without interfering with events. EVGs are available as VME and CompactPCI modules. EVRs are available as VME, PMC and CompactPCI modules.

The bidirectional timing system will be capable of measuring the fiber delays with a sub nanosecond precision. Results of an experiment with existing timing system components will be presented.

MRF participants for the workshop

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