



EPICS IOCs Embedded in LXI Instrumentation for Remote Waveform Monitoring & Analysis

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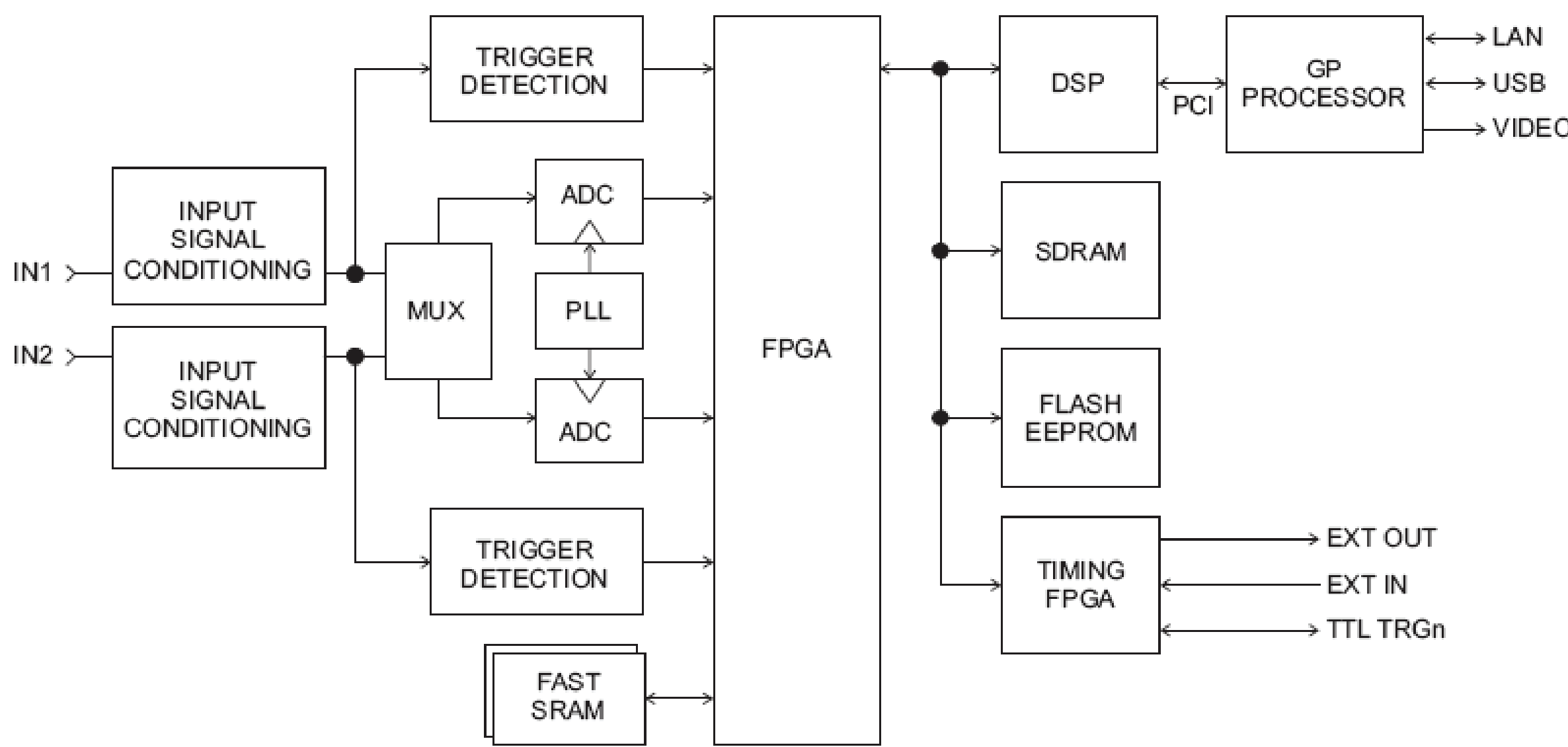


Introduction

- Instruments based on the LAN eXtensions for Instrumentation (LXI) standard are well suited to many of the remote monitoring and control applications at particle accelerators
- ZTEC Instruments' LXI oscilloscopes/digitizers with embedded EPICS IOCs are specifically designed to replace benchtop oscilloscopes and digitizer cards for remote waveform monitoring and waveform analysis applications

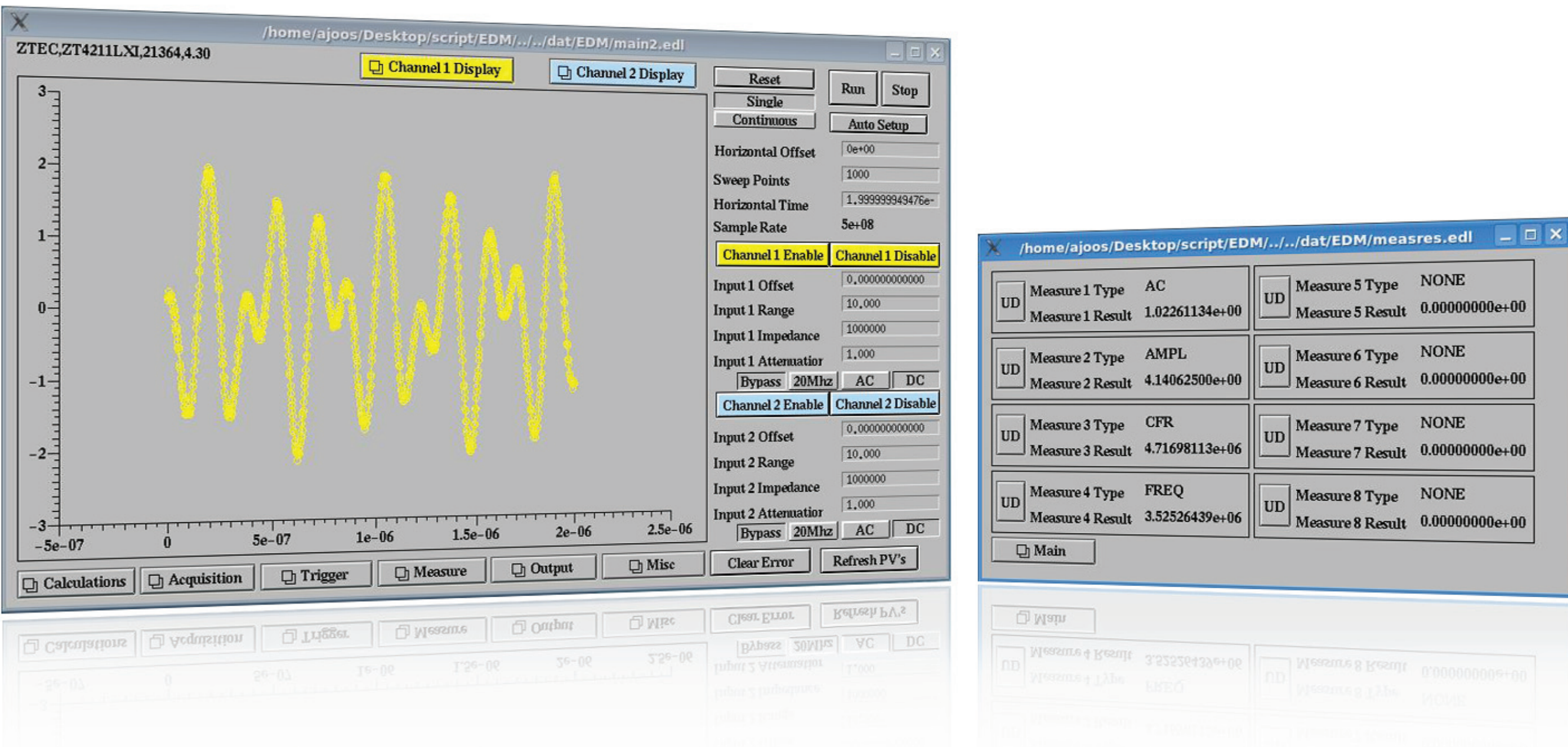
Performance LXI Oscilloscopes/Digitizers for Remote Waveform Monitoring

- Fast sampling and high bandwidth for accurate capture of transient events
 - Simultaneous sampling up to 4 GS/s on all channels
 - Analog bandwidth up to 1 GHz
- Up to 14-bit vertical resolution for high accuracy, high dynamic range signal capture
- Long, flexible acquisition memory for long recording and multi-waveform capture
 - Up to 256 Msamples
 - Segment memory captures up to 32,768 waveforms
- Onboard DSP performs real time waveform math and analysis
- LAN/Ethernet interface enables responsive remote control and monitoring from anywhere



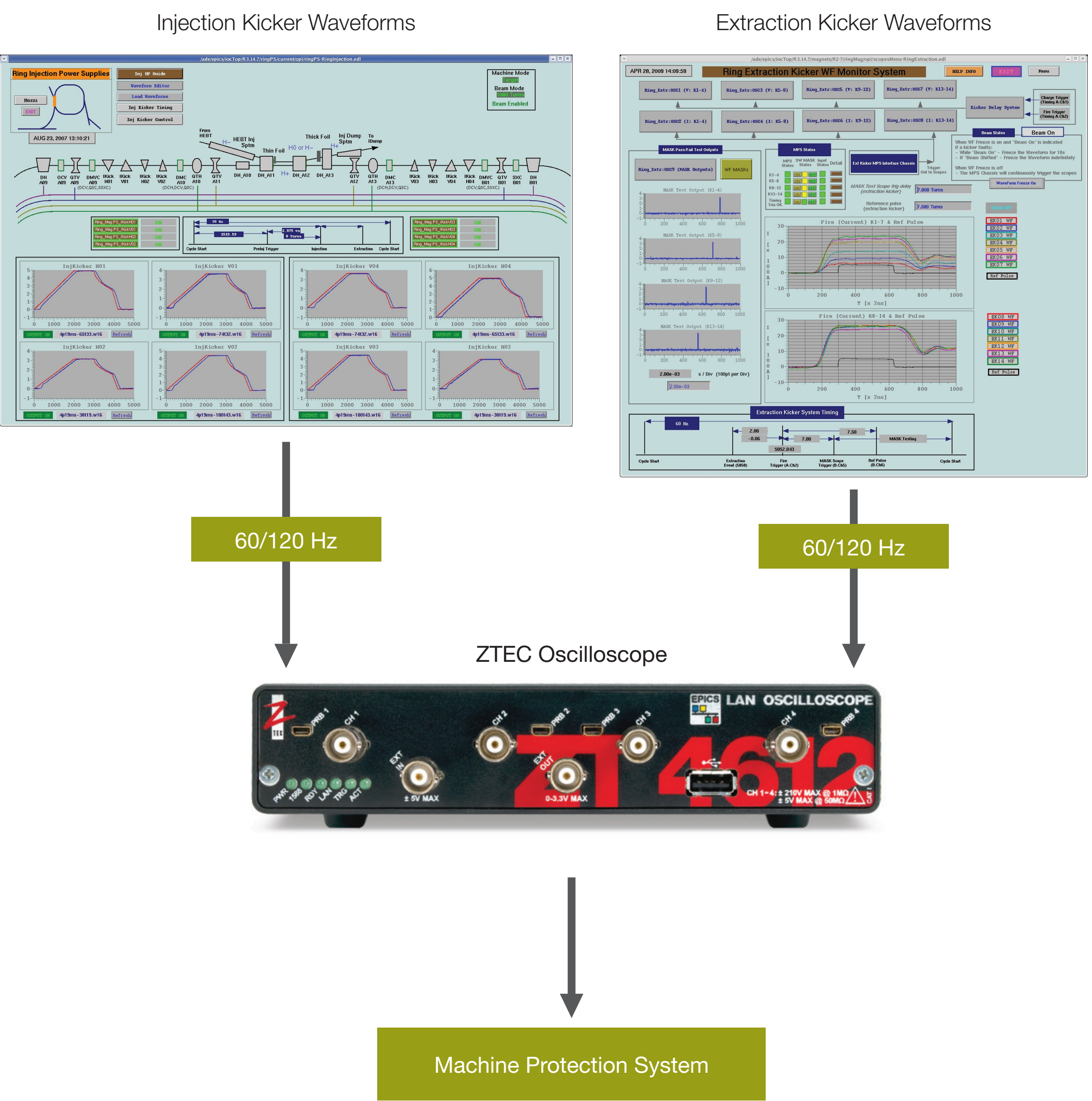
EPICS Integration

- Embedded EPICS IOC
 - On-board XScale processor runs Linux with EPICS 3.14 and Channel Access Client version 4.11
 - EPICS process variables (PVs) stored in onboard memory
- Complete instrument control via EPICS
 - PV prefixes can be modified to meet local naming conventions
 - Forward links (FLNKs) and fanout PVs are supported for improved automation and functionality
- EDM and MEDM panels provided for control and monitoring



Oak Ridge SNS Example

Proposed solution to provide real-time waveform monitoring for SNS Injection and Extraction Kicker Systems



- Supports 60 Hz injection and extraction kicker pulses with no missed pulses during continuous operation
- Segmented acquisition memory saves failed and pre-failure waveforms for later review
- Mask testing – compare captured waveform to pre-defined upper and lower allowed limits
- Optimizes interaction with the SNS Machine Protection System circuitry using a user-defined output pulse width
- After power cycling, unit boots into a predefined state for hands-off remote deployment
- Reduced rack space compared to benchtop oscilloscopes (1U height, half rack width)
- Easily integrates using existing EDM panels