

## EPICS at NLCTA

Processing of NLC structures is key to achieving ultimate performance

Goal is to limit the number of 'breakdown' events of several types

Do not understand underlying mechanisms

Do not understand how to best proceed

2001 plans are to remove gas sources and process structures as carefully as practical

Will install new structures in March that should be processed using EPICs

## EPICS controls at NLCTA

- Primary control of RF during structure processing
- Connection of Allen-Bradley PLC's to SCP (soon)
- Use of VME-based waveform acquisition for data collection
  
- RF Processing:
  - Similar to feedback:
    - Actuator (digital and analog)
    - Response
    - Exceptions
    - Calibration
  - Dissimilar to feedback
    - Full logging and recording of events
    - even when in 'monitor' mode

## Hardware

- Processing requires at minimum (present Labview system is a minimum installation)
  - Control and monitoring of RF power
  - Sensing of fault condition
  - Automatic reset; depending on state
- Existing system also includes vacuum monitoring
- EPICS/VME based system must include
  - Control of RF energy through attenuator and pulse length
  - Transfer function: attenuator to power (requires several other analogs to compute) so that engineering setpoints can be used
  - Fault condition response depending on recent history and other analog signals; e.g. vacuum

## Hardware

- Must also include:
  - Recording of typical and fault pulse data
    - Fault n-1, n-2... are interesting
  - Pulse counting and labelling (to be used in identifying event sequences)
  - Fast pulse acquisition for characterizing breakdown (and typical) events
- Summary
  - Digital I/O
  - Analog I/O
  - Fast pulse amplitude
  - Fast pulse timing
  - Serial I/O(?)
- Some signals are in the database already – these should be integrated

## Software

- Software does not (does?) have the primary responsibility for protecting structure/klystron system
- Does something(?) at 120Hz (max)
- Controls power – either ramp up/down or stabilize
- Allows configuration of reset response:
  - time duration to wait
  - External conditions to wait
  - Reduction in power/pulse length combination
  - Differences depending on fault sequence
- Provides configuration control
- Interfaces with CRR, HSTB
- Uses engineering units exclusively

## Problems

- Interface with existing VXI 'Veetest' based system
  - Parameters can change – parallel control
  - Eventually this will go away and become integrated
- Calibration
- Schedule