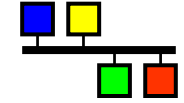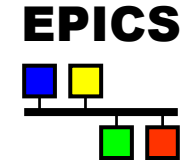# Transient Recorder Support
# EPICS Meeting at BESSY

May 2002

Marty Kraimer

# *GenericTransient Recorder GTR*

◆ GTR discussed at ICALEPCS 2001 EPICS Meeting

  ◆ Support for Joerger VTR1012, VTR10010

  ◆ Wanted support for VTR10012 and SIS3300

  ◆ Initial Goal: Be able to test all four recorders

  ◆ GTR: Is this a good idea?

◆ Results now

  ◆ Joerger VTR1012, VTR10010, VTR10012, VRTR10012_8

  ◆ Struck SIS3300, SIS3301

  ◆ GTR seems like a good idea.

  ◆ BUT VTR10012 and SIS330x provide additional features that GTR does not support.

# *Generic Transient Recorder*
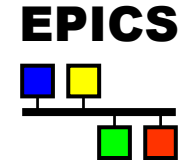
Generic Transient Recorder – Definition

◆ One or more ADCS with common gate, clock, trigger

◆ Memory to record samples

◆ Provides following methods for data collection.

  ◆ postTrigger – Data sampling starts when trigger occurs.

  ◆ prePostTrigger (optional) – Data samped continuously into circular buffer. When trigger occurs acquire additional set of samples and stop.

◆ Device specific clock and trigger options.

◆ Supports multiple events (optional)

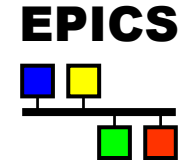# *GTR Support*
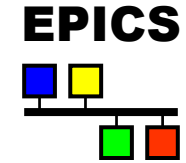
- ◆ GTR Support
  - ◆ Generic adl file for controlling a TR.
  - ◆ Generic set of records to control and collect waveforms from TR.
  - ◆ Generic device support.
  - ◆ Generic driver interface for communicating with specific TRs.
  - ◆ Generic driver which calls TR specific drivers.
  - ◆ TR specific drivers for Joerger and Struck TRs.
- ◆ Other Features?
  - ◆ VTR10012 and SIS330x provide many additional features
  - ◆ Define other interfaces?
  - ◆ Extend GTR – Only if generic!!

# GTR Options

◆ Most options provided by TR specific driver

◆ clock – Rates, etc.

◆ trigger – Source, etc.

◆ multiEvent – If TR supports.

◆ numberPTS – Number of post trigger samples

◆ numberPPS – Number of prePost samples = total samples

◆ numberPTE – Number post trigger events

◆ arm – Provided by TR specific driver. Typical options are

    ◆ disarm

    ◆ postTrigger
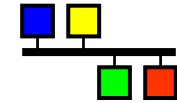
    ◆ prePostTrigger

◆ autorestart

# *postTrigger*
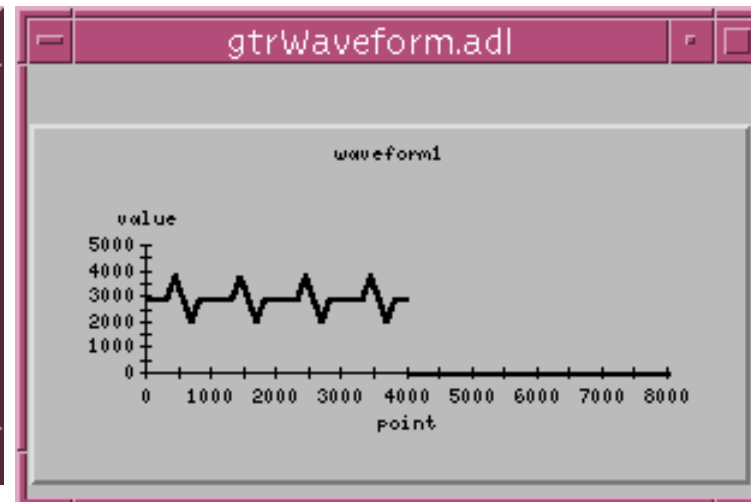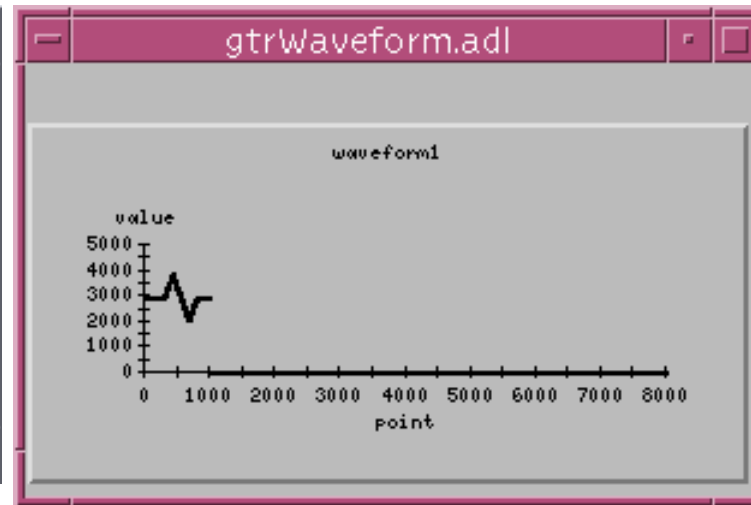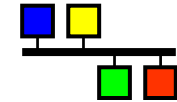
# *prePostTrigger*
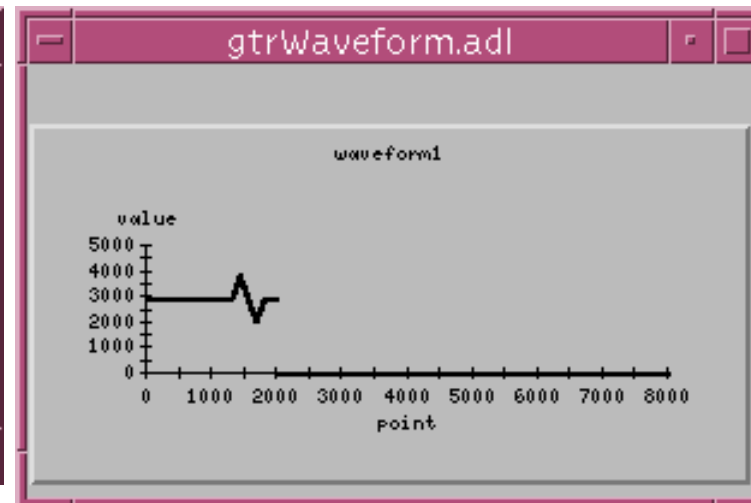
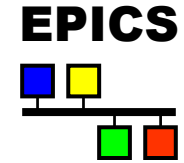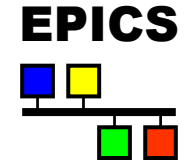# *Performance*

◆ Testing showed that limit was 1 megaSample/sec.
Same limit with 68040 and with powerPC.
Limit was VME transfers from recorder memory.

◆ Why? This is only 2 megaBytes/sec
With a VME bus analyzer we determined that

- ◆ VTR1012 responded in 190 nanoseconds.
- ◆ Rest of the overhead was VME interfaces.

◆ Andrew Johnson provided generic DMA interface

- ◆ Needed for VTR10012_8
- ◆ Implemented for MV167 and for MV2700 and MV2100.
- ◆ Did not time difference between DMA and non DMA

# *Maximum Throughput*

◆ Guess at why 1 megaSample/sec limit (2 megaBytes/sec)

    ◆ VME max rate is 40 megaBytes/sec.

    ◆ No Block Transfer => 20 megaByte limit.

    ◆ 16 rather than 32 bit transfers => 10 megaByte limit.

    ◆ VME bus interfaces cause additional factor of 5 performance hit.

◆ Solution

    ◆ VTR10012 and SIS3300 both read with 32 bit transfers.

    ◆ Perhaps DMA can provide 3 to 5 performance gain

        ◆ Have not measured performance.

    ◆ At this point other limits may happen. For sure on mv167.

◆ Limit with VME32 will still be 20 megaSample/sec.