
# Status of the JRA1 Trigger Logic Unit (TLU)

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# Outline

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# Introduction

- The TLU ( Trigger Logic Unit ) is the small piece of hardware “glue” that links the beam trigger, DUT and DAQ.
- Design aim is to place as few burdens as possible on DUT.

# Firmware – Basic Functionality

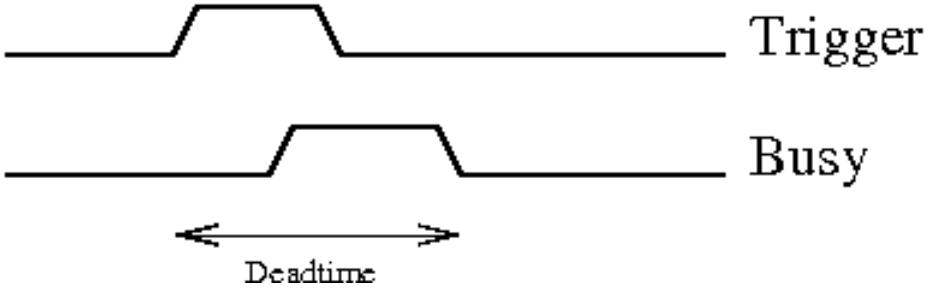
- Firmware for basic functionality complete and tested
  - Accepts PM trigger and distributes to active devices under test.
  - Inhibits further triggers until DUT busy lowered
  - Stores time of each trigger (48MHz counter)
  - Can readout TLU status (trigger counter, internal timer, status of veto etc.)

# Firmware – Trigger Number

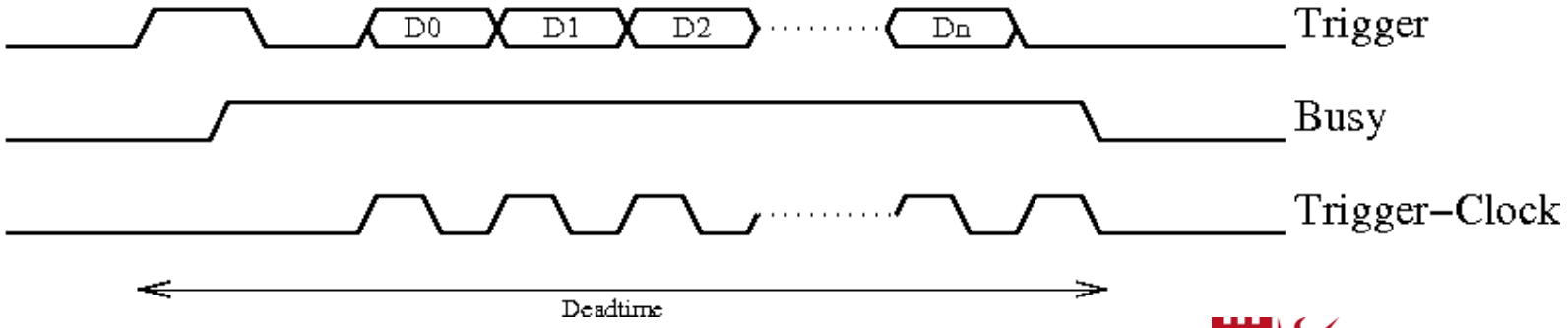
- Firmware to distribute trigger number written (but not tested)
  - Scheme follows suggestion by Claus Gilles
  - Data clocked out by DUT
  - Will be implemented by beam-telescope (where the data **has to be reliable)**
  - **Optional** for DUT (after all, it is their data )

# Firmware – TLU/DUT Handshake

- **Two modes:**
  - **Simple ( Trigger/Busy )**




  - **Trigger-data (Trigger/Busy/Trigger-clock)**



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# Tests of TLU

- One unit taken to University of Geneva.
- Trigger pulses fed into discriminator inputs, trigger outputs monitored.
  - Time-stamp capture verified.
  - TLU/DUT “simple handshake” verified.
- ... after we had shaken out the bugs it worked.



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# Hardware Status

- **Two units built and functioning. ( Bristol, Geneva)**
- **Three additional units complete and tested except for front panel and discriminator units.**
  - **Existing TLUs use a discriminator unit from Strasburg. Only two available.**
  - **Hans Kruger (Bonn) has taken on design and production of discriminators for new TLUs.**
    - **Available mid/end November**
    - **Simplified and better tuned to TLU.**

# Future

- **Existing TLU will fulfil requirements of demonstrator in '07.**
- **Keep existing interface the same, but on a second RJ45 to each DUT provide:**
  - **Master clock (for use with timestamp and for trigger information)**
  - **Faster trigger information (clocked by TLU into FIFO on DUT). Lower dead-time, more information.**
  - **“spill-on” flag.**
  - **(Can be implemented in firmware – no h/ware change).**
  - **Decrease timestamp granularity from 20ns to 5ns**

# Future

- **TLU will probably evolve...**
  - **into a “Tagging Logic Unit” storing lists of triggers in each “spill” for operation in “trigger-less” mode.**
- **Try to “sell” the idea of a TLU to other groups of EUDET to make it easer to interface with them?**