

# RPC Trigger in CRuZeT 4

Tomasz Früboes



CMS Warsaw Group

August 26, 2008

# Stability of the linksystem

- The linksystem was stable during whole period of CRuZeT 4 (no problems due to CCU instabilities).
- Issue: changing main CMS clock source (TTC; clock source LHC↔internal) destabilises TTCrx and QPLL chips, which don't recover properly (affects also other systems, not only RPC). Power cycling needed to reset, current recovery time up to 4h (most of it due to firmware reloading after power cycle). We anticipate to shorten the procedure to ~30 minutes in the future

# Stability of the linksystem

- Issue: reboot of GT crate (CTC source) kills optic links synchronisation (problem in TTC-RPC crate?). Possible solution waits to be tested (in configuration of TTCci change BGO, orbit and L1 source from CTC to LTC for period of reboot). **We would like to be notified in advance whenever this happens**

## TTCci Main Configuration (*TTCci 0*)

State Machine: **Enabled**

Input Sources (0x28088) & QPLL

<b>Clock Source:</b> <input type="text" value="TTC"/> (trc)	<b>Orbit Source</b> <input type="text" value="CTC"/> (crc)
QPLLCTRL Bit 5 (if external clock): <input type="radio"/> Reset (0) <input checked="" type="radio"/> <b>No Reset (1)</b>	<b>Trigger Source (Enabled)</b> <input checked="" type="radio"/> <b>CTC</b>
QPLLCTRL Bit 4 (if external clock): AutoRestart: <input checked="" type="radio"/> <b>ON (1)</b> <input type="radio"/> OFF (0)	<input type="radio"/> LTC
QPLL Freq. bits: 0x0 (6 bits for INTERNAL clock, 4 otherwise)	<input type="radio"/> other / choose from: <input type="checkbox"/> SCOM <input type="checkbox"/> BCHANNEL <input type="checkbox"/> CYCLIC <input type="checkbox"/> FRONTPANELO <input type="checkbox"/> FRONTPANEL1 <input type="checkbox"/> INTERNAL Freq.: <input type="text" value="10000"/> Hz <input type="checkbox"/> Random (if Trigger Source = INTERNAL)
<b>BGO Source</b> <input checked="" type="radio"/> <b>CTC</b> <input type="radio"/> LTC <input type="radio"/> other / choose from: <input type="checkbox"/> VME <input type="checkbox"/> CYCLIC	

# Trigger rate peaks

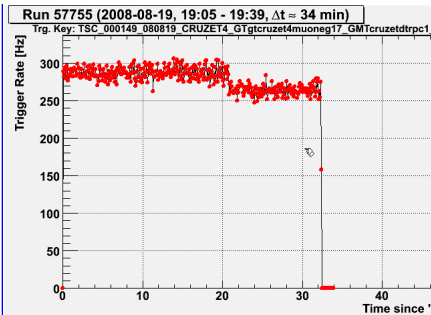
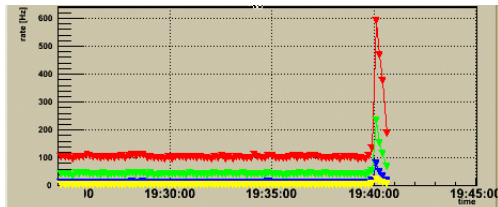
During runs several rate peaks were observed.

Possibly due to:

- Destroy/create of trigger configuration (doesn't affect runs)
- High voltage instabilities
- Masking of noisy channels done too early after HV switch on

Still under investigation with RPC chamber group

# Trigger rate peaks - destroy/create of trigger configuration



## From trigger ELOG:

run 57755 started

... in LS 13 the muon trigger rate dropped by about 20 Hz to 340 Hz,  
most probably due to a DT problem in some chambers

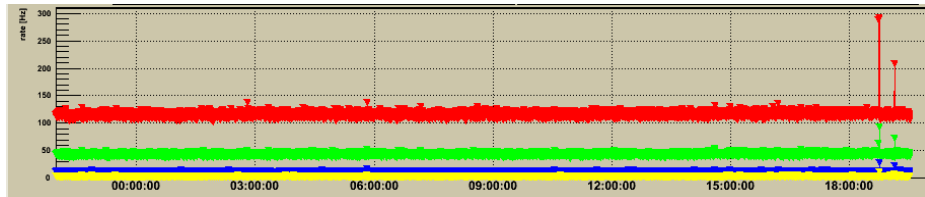
Run Control stops run

(pause+stop causes problem in trigger, but destroy clears it up)

543583 triggers sent

## Another TTC-RPC crate problem?

# Trigger rate peaks - high voltage instabilities



Rate peaked from  $\sim 100$  Hz to  $\sim 300$  Hz. From RPC ELOG:

Subject: W-2 S4\_Rb3- trip  
At 18.50 the chamber tripped with no clear reason.  
We tried to ramp again but it doesn't reach 8000 V.  
It is now off.

HV in this chamber was back before 8PM (second rate peak)

## Trigger rate peaks - masking of noisy strips done to early after HV turned on

At Saturday (23 VIII) 8AM there was a gas problem in RPC, fixed around 12PM. Masking of noisy strips was done 5 to 10 minutes after HV was switched on (as requested by chamber group). During the rest of day we observed several rate peaks which weren't identified as coming from HV problems or caused by GT trigger configuration destroy.

Around 10PM masking of noisy channels was done again. For the rest of CRUZET4 the only rate peaks were due to GT destroy or HV instability (mentioned earlier)

⇒ need to better understand chambers stability with time after HV switch on

# Summary

- Overall stable operation of the linksystem and RPC trigger during whole period of Cruzet4
- Stable rate of  $\approx 100$  Hz. Most of the time running with 8 trigger crates in readout, 7 in trigger
- Better understanding of rate peaks problems