TOF/VETO/BTS/FTI readout

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20.10.2003

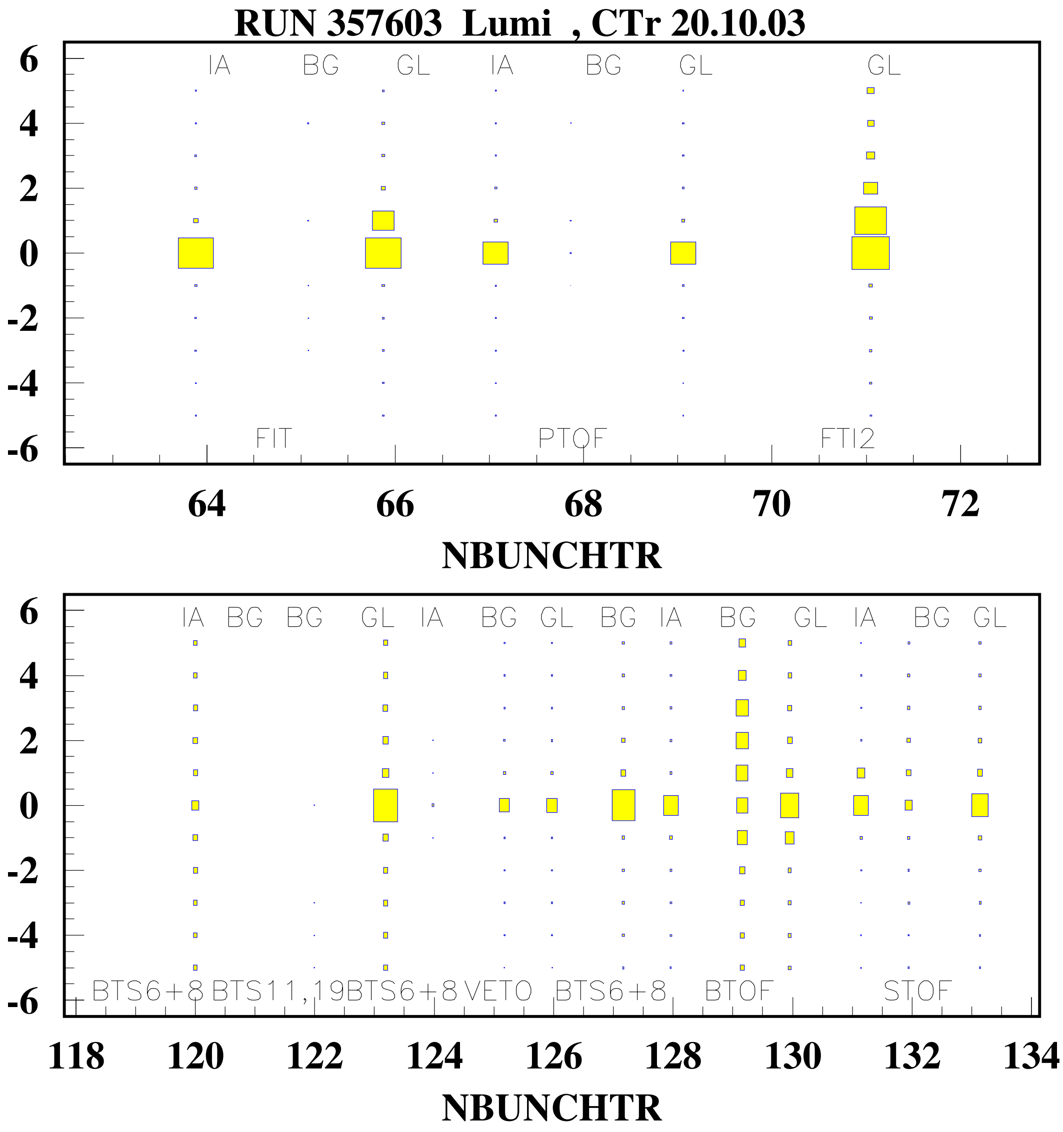
▷ Trigger
▷ "Old" TOF readout
▷ "New" TOF readout

Trigger:

21 trigger elements sent to Central Trigger:

FIT	IA, BG, GL;	
PTOF	IA, BG, GL;	
FTI2	GL;	
BTOF	IA, BG, GL;	
STOF	IA, BG, GL;	
VETO	IA, BG, GL;	
BTS-6m||8m	IA, BG, GL;	
BTS-11m	BG;	(IA and GL in VETE bank)
BTS-19m	BG;	(IA and GL in VETE bank)

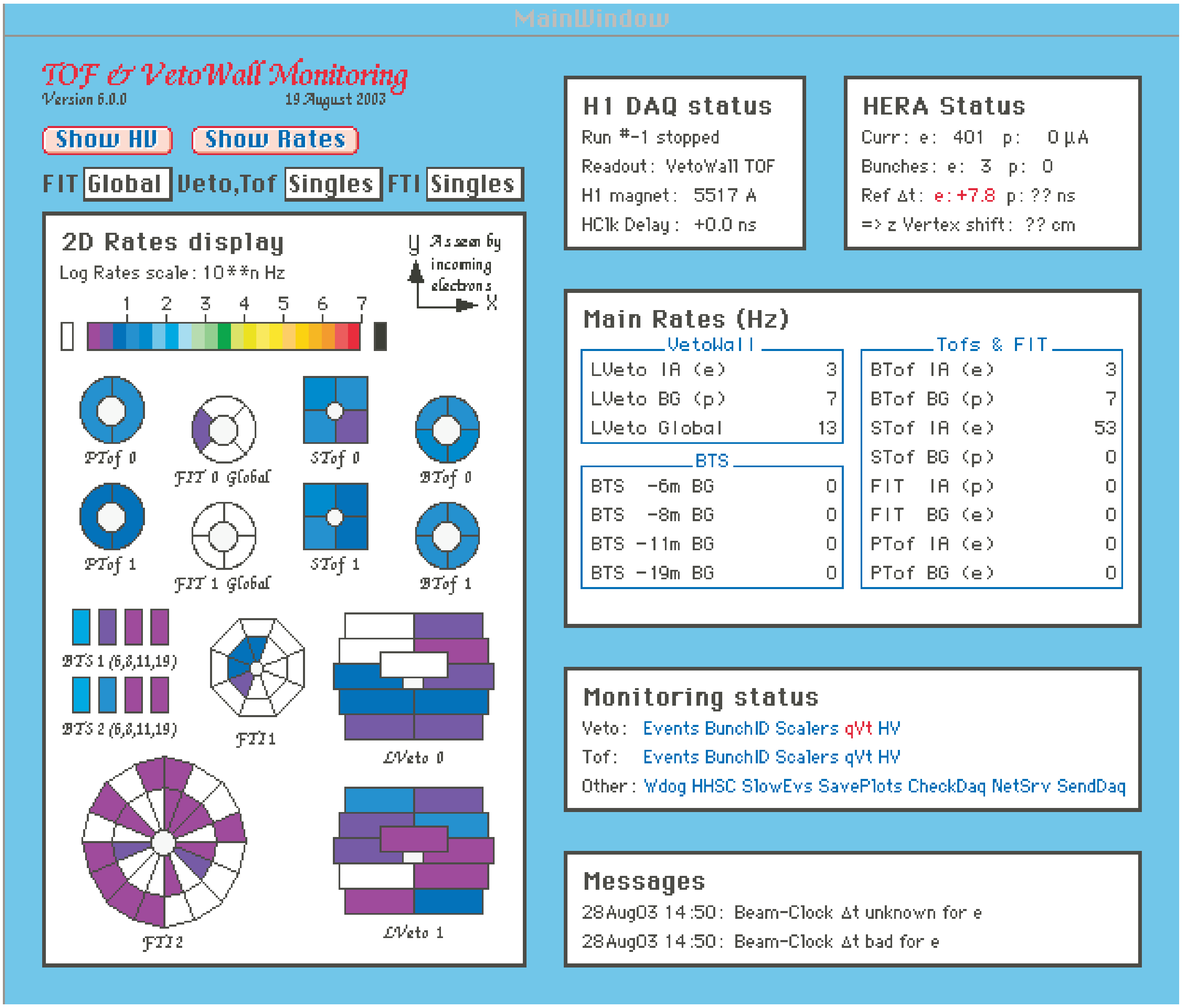
- Minor hardware modifications in trigger logic (with exception of BTS which was made new)
- All gates are adjusted using recent beam fills
- Timing with respect to Central Trigger needs little adjustment– need an independent reference trigger for which timing can be trusted


RUN 357603 Lumi , CTr 20.10.03
IA BG GL IA BG GL GL
FIT PTOF FTI2
NBUNCHTR
IA BG BG GL IA BG GL BG IA BG GL IA BG GL
BTS6+8 BTS11,19BTS6+8 VETO BTS6+8 BTOF STOF
NBUNCHTR

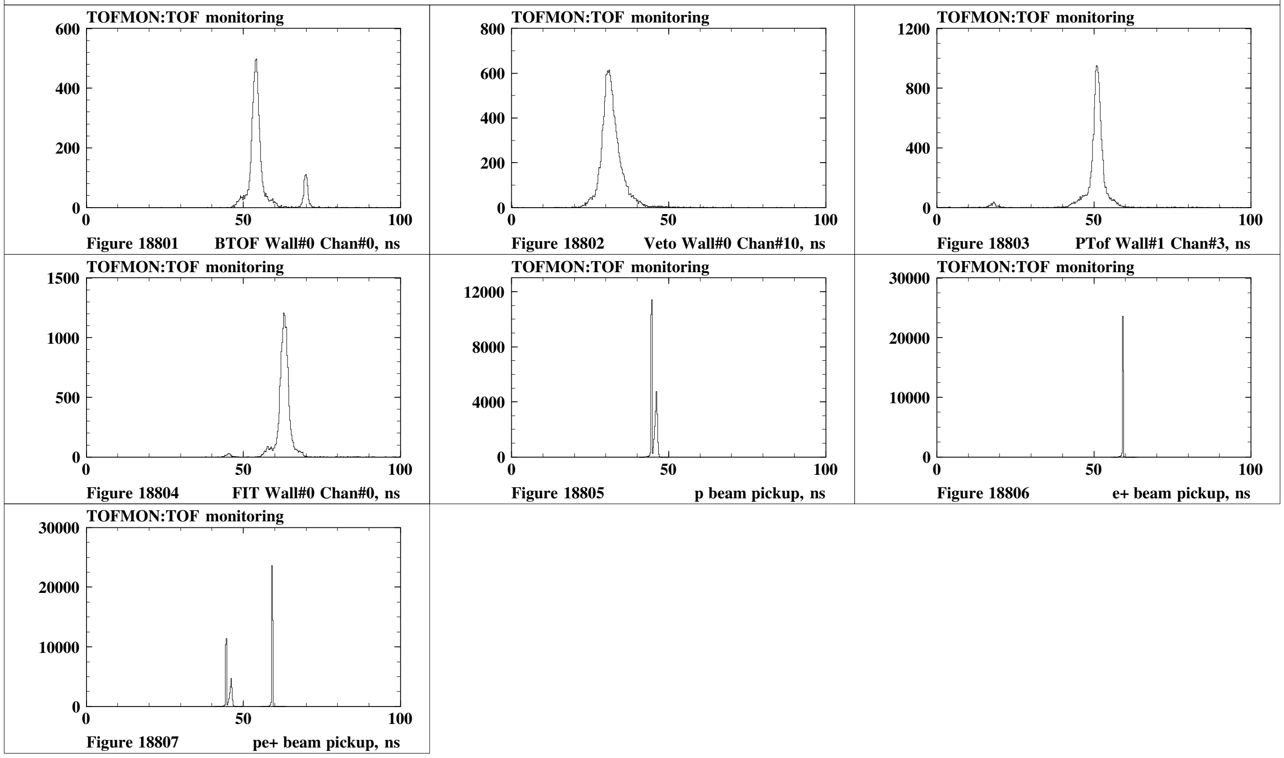
“Old” TOF readout:

Data from TOF/VETO go to following data streams:
- Flash TDC for offline data analysis (CJC branch, CRPE bank)
- COP branch (BRTE bank) and Lumi branch (VETE bank) for filling the gated output hit paterns
- CAMAC TDCs and scalers for online monitoring (ToF-Mac)

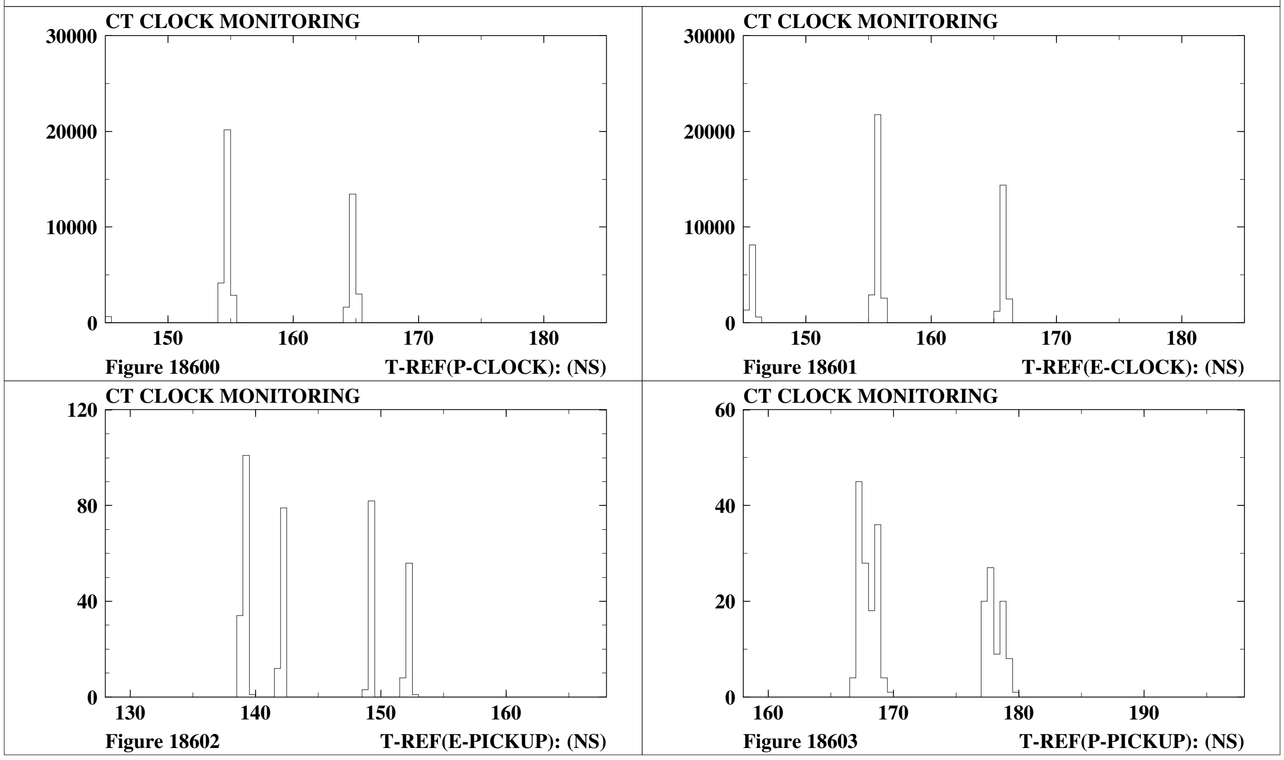
- outputs of all BTS and new BTOF channels are added to these data streams, otherwise minor hardware modifications
- The TOF-Mac monitoring program is modified by M.Landon (HV and rate monitor, TDC and rate histograms, scaler rates)
- Time reconstruction from FTDC data: is OK in 1-st approximation, needs adjustment of constants
- Time reconstruction efficiency, DQ checking– to be done


MainWindow
TOF & VetoWall Monitoring
Version 6.0.0
19 August 2003
Show HV
Show Rates
FIT Global Veto,Tof Singles FTI Singles
2D Rates display
Log Rates scale: 10**n Hz
1 2 3 4 5 6 7
Y As seen by incoming electrons X
PTof 0
FIT 0 Global
STof 0
BTof 0
PTof 1
FIT 1 Global
STof 1
BTof 1
BTS 1 (6,8,11,19)
BTS 2 (6,8,11,19)
FTI 1
LVeto 0
FTI 2
LVeto 1
H1 DAQ status
Run #-1 stopped
Readout: VetoWall TOF
H1 magnet: 5517 A
HClk Delay: +0.0 ns
HERA Status
Curr: e: 401 p: 0 µA
Bunches: e: 3 p: 0
Ref Δt: e: +7.8 p: ?? ns
=> z Vertex shift: ?? cm
Main Rates (Hz)
VetoWall
LVeto IA (e) 3
LVeto BG (p) 7
LVeto Global 13
BTS
BTS -6m BG 0
BTS -8m BG 0
BTS -11m BG 0
BTS -19m BG 0
Tofs & FIT
BTof IA (e) 3
BTof BG (p) 7
STof IA (e) 53
STof BG (p) 0
FIT IA (p) 0
FIT BG (e) 0
PTof IA (e) 0
PTof BG (e) 0
Monitoring status
Veto: Events BunchID Scalers qVt HV
Tof: Events BunchID Scalers qVt HV
Other: Wdog HHSC SlowEvs SavePlots CheckDaq NetSrv SendDaq
Messages
28Aug03 14:50: Beam-Clock Δt unknown for e
28Aug03 14:50: Beam-Clock Δt bad for e

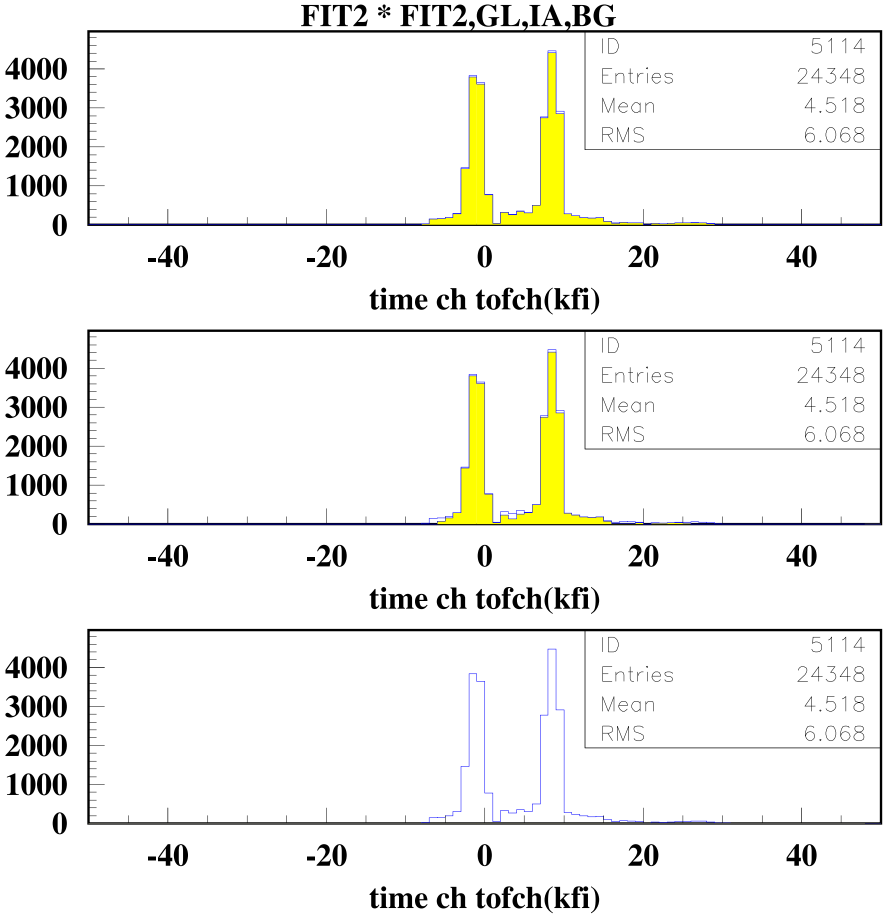
Look - Run 357603 **Date 20/10/2003**



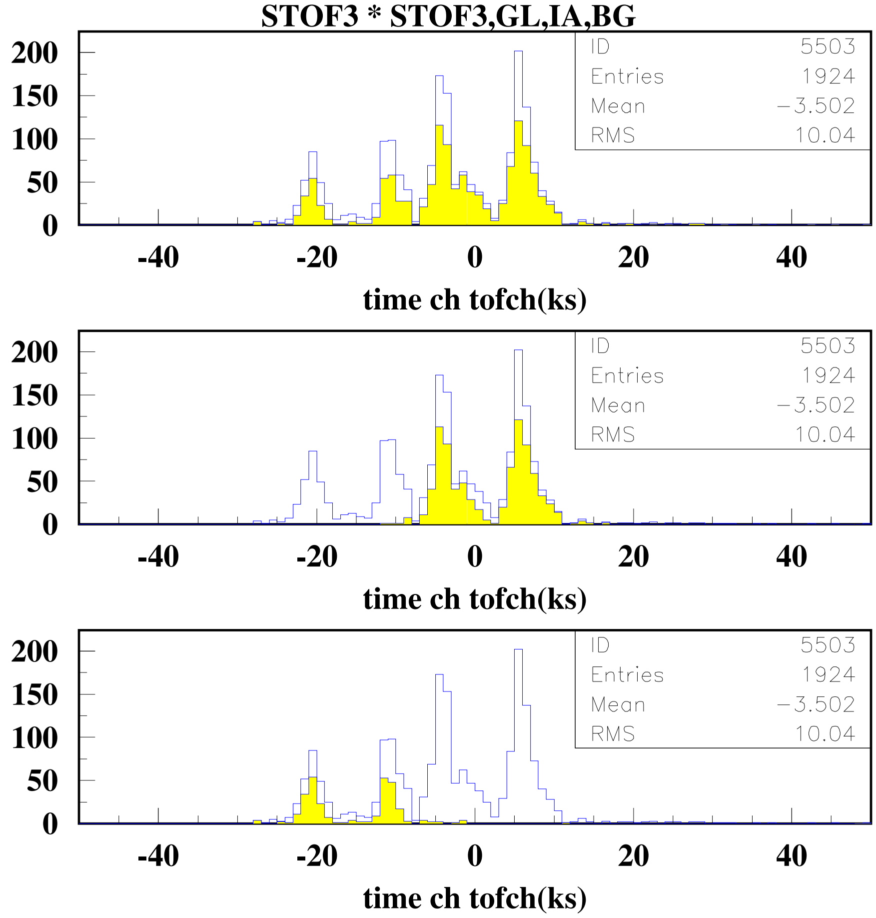
Look - Run 357603 **Date 20/10/2003**

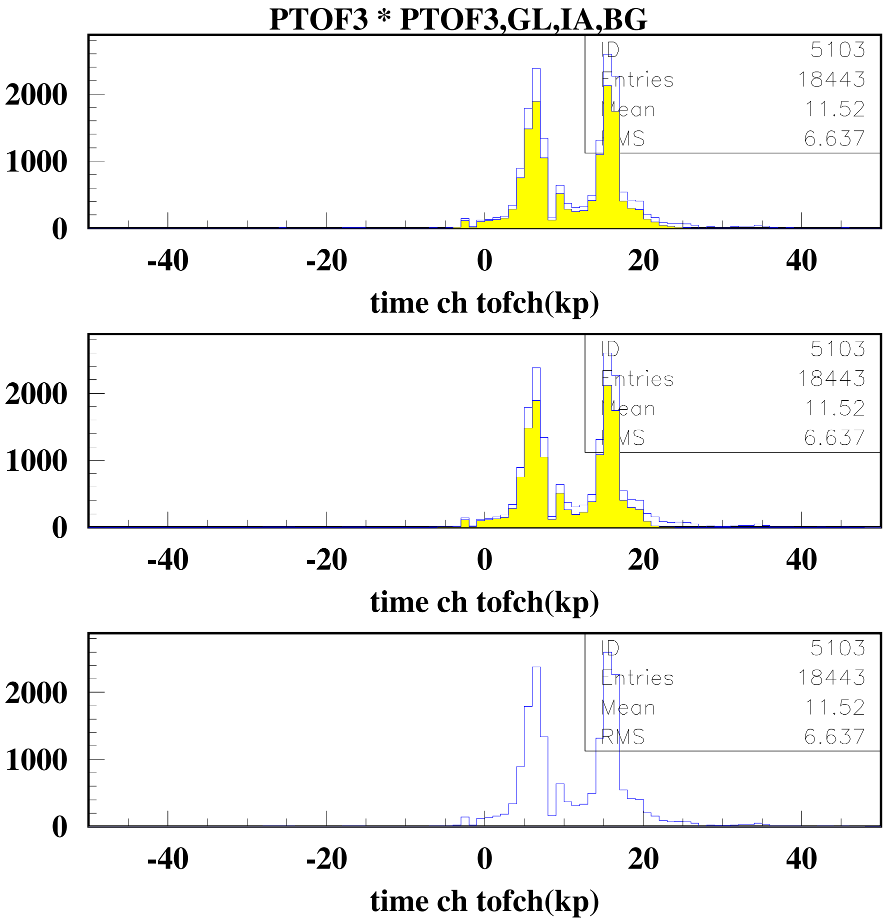


FIT2 * FIT2,GL,IA,BG



STOF3 * STOF3,GL,IA,BG




PTOF3 * PTOF3,GL,IA,BG
ID 5103
Entries 18443
Mean 11.52
RMS 6.637
2000
1000
0
-40
-20
0
20
40
time ch tofch(kp)
ID 5103
Entries 18443
Mean 11.52
RMS 6.637
2000
1000
0
-40
-20
0
20
40
time ch tofch(kp)
ID 5103
Entries 18443
Mean 11.52
RMS 6.637
2000
1000
0
-40
-20
0
20
40
time ch tofch(kp)

“New” TOF readout:

▷new TOF readout has to provide the possibly complete timing and rate information both for online monitoring and offline analysis:

- the TDC and rate information for all individual channels;
- the hit patterns and corresponding rates for coincidences between pairs of counters;
- monitor the stability of gates, electron and proton pickups, electron and proton HERA clocks.

-Collect all TOF/VETO timing and hit patterns in room 101.

-Timing from all single channels are digitized by TDC (128 ch. CAEN V767);

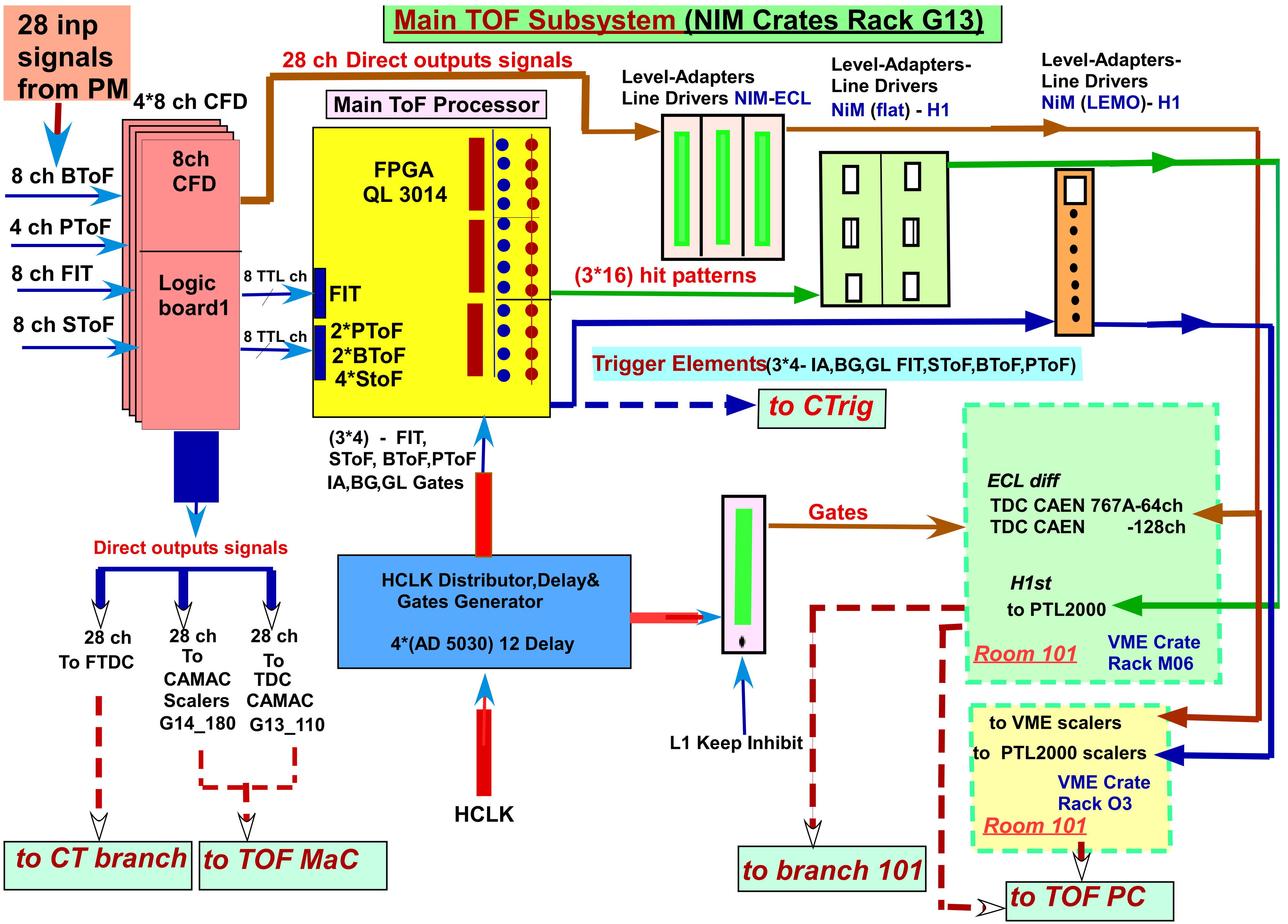
-All gates, pick-up and HERA clock signals are digitized by TDC (64 ch. CAEN V767).

-"Hit patterns", e.g. gated coincidences are collected by PTL2000 pipeline. Also their rates will be available from PTL2000.

-All single channel rates (except FTI2) are counted by scalers SIS3801.

-All trigger rates are counted by PTL2000 scaler.

	PM	Time meas's	single rates	Trigger elements	Gates	Hits
PTOF	4	4	4	3	3	2*3
FIT	8	8	8	3	3	8*3
FTI2	32	32		6	3	2*3
FTI1	16	-		-	-	-
BTOF	8	8	8	3	3	2*3
STOF	8	8	8	3	3	4*3
pickup					2	
H.clock					2	
VETO	22	22	22	3	3	11*3
BTS	8	4	8	12	12	4*3
All		86	58	33	34	33*3
		TDC	*Scalers*	*TDC PTL2000*	*TDC*	*PTL2000*


Main TOF Subsystem (NIM Crates Rack G13)
28 inp signals from PM
4*8 ch CFD
8 ch BToF
4 ch PToF
8 ch FIT
8 ch SToF
8ch CFD
Logic board1
28 ch Direct outputs signals
Main ToF Processor
FPGA QL 3014
8 TTL ch
8 TTL ch
FIT
2*PToF
2*BToF
4*StoF
Level-Adapters Line Drivers NIM-ECL
Level-Adapters- Line Drivers NiM (flat) - H1
Level-Adapters- Line Drivers NiM (LEMO)- H1
(3*16) hit patterns
Trigger Elements(3*4- IA,BG,GL FIT,SToF,BToF,PToF)
to CTrig
(3*4) - FIT, SToF, BToF,PToF IA,BG,GL Gates
Direct outputs signals
28 ch To FTDC
28 ch To CAMAC Scalers G14_180
28 ch To TDC CAMAC G13_110
HCLK Distributor,Delay& Gates Generator
4*(AD 5030) 12 Delay
HCLK
Gates
L1 Keep Inhibit
ECL diff
TDC CAEN 767A-64ch
TDC CAEN -128ch
H1st
to PTL2000
Room 101
VME Crate Rack M06
to VME scalers
to PTL2000 scalers
VME Crate Rack O3
Room 101
to CT branch
to TOF MaC
to branch 101
to TOF PC

All hardware works are basically completed: assembling of large number of electronic modules, cabling,... (The readout logic was significantly extended with respect to what was originally planned).

New TOF readout consists of two independent subsystems:

1) asynchronous to H1 readout- Rates (single channels and triggers)

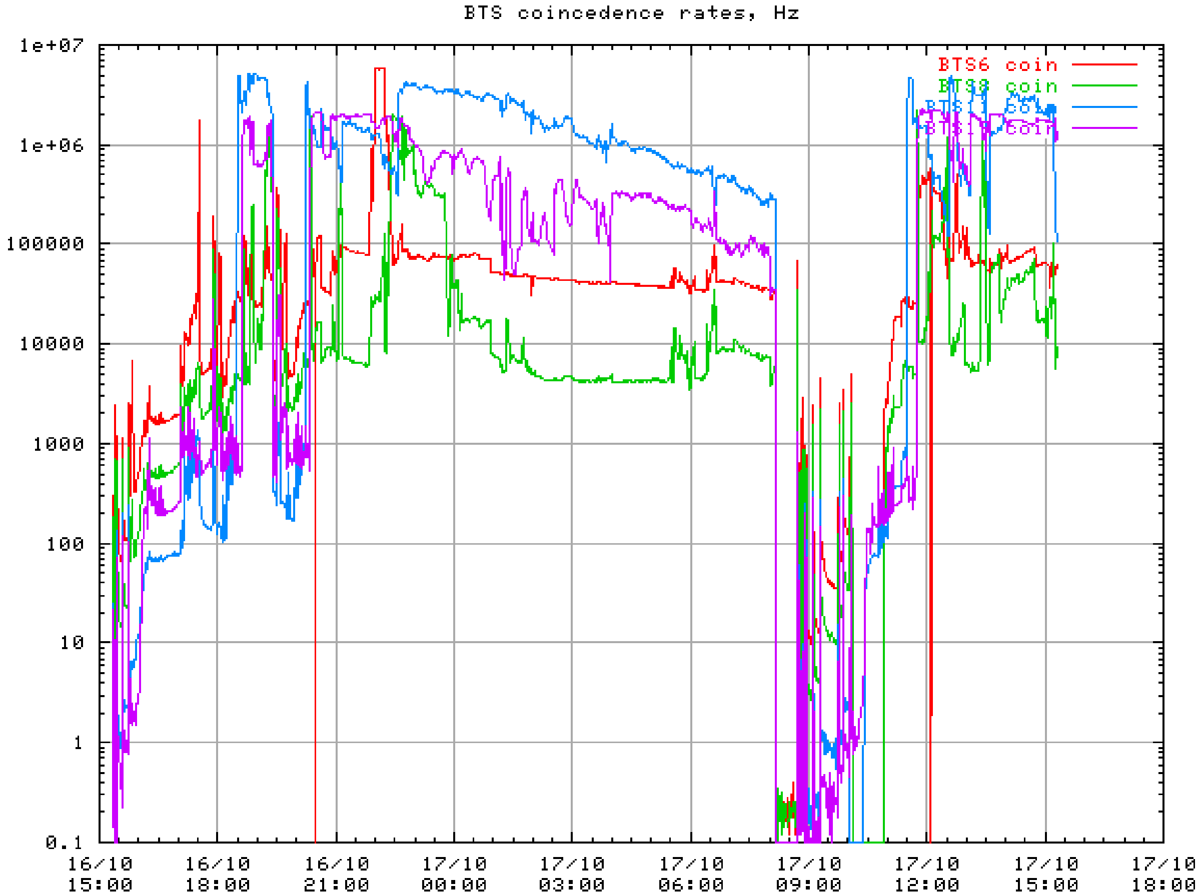
This part is basically ready and works rather stable since a couple of months (thanks to Vitaly Dodonov !).
Rates are sent at 1 Hz rate to the TOF Slow Control PC.
Rate histories are stored (averaged in 10sec) on the local disk of $masis$ **computer (**$\sim$ **8 MByte/day) and can be seen from the** $http://masis.desy.de:8080/tofrate$
(would be better idea to have a dedicated PC for this purpose ?)

Also an online monitoring (ROOT analog of ToF-MAC program) is avaliable (H.Zohrabyan) and can be tested.

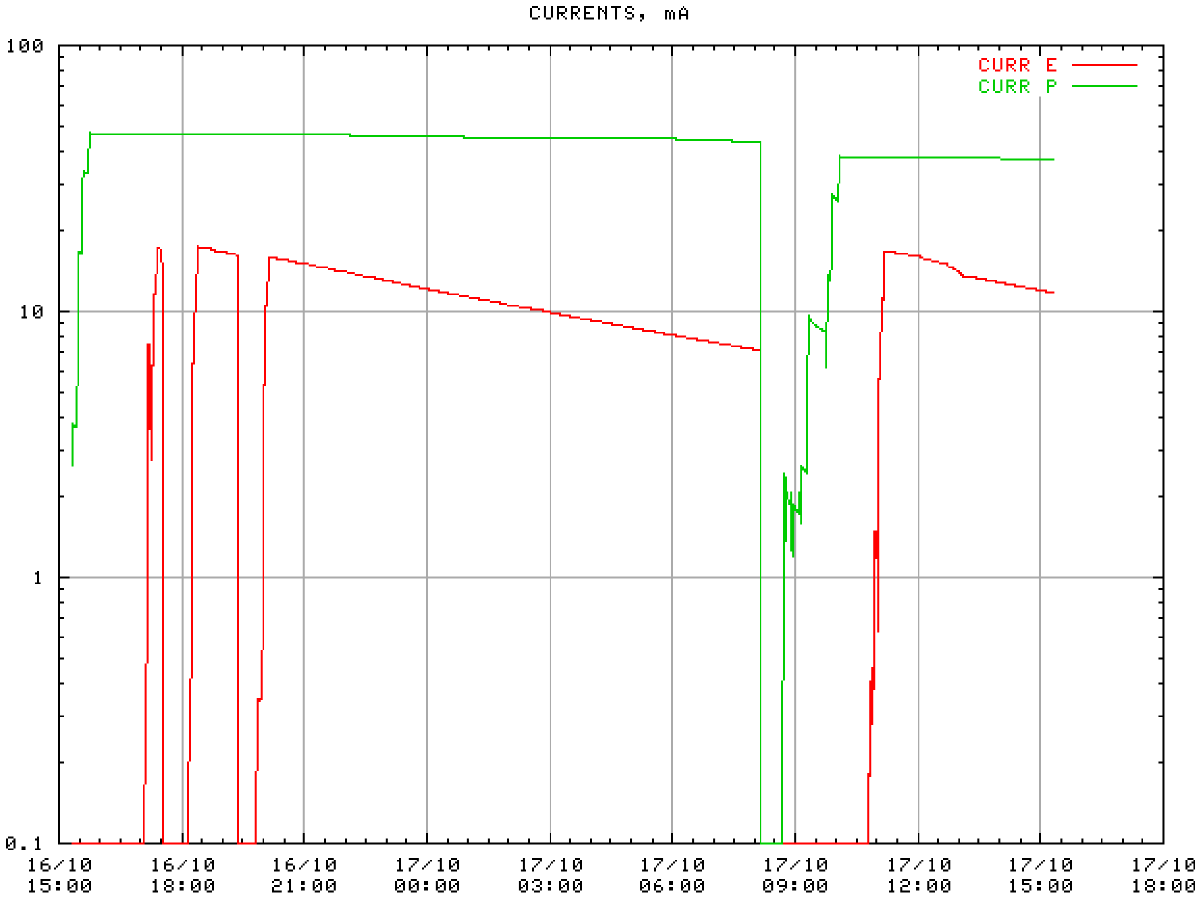
2) synchronous to H1 readout- TDC, PTL2000-hit patterns

TOF readout will put data into multievent buffer located in DPM. Subsystem 101 processor will read TOF data via VSB link and transmit data to the Branch 10 VME-taxi. The data will be also sent to TOF Slow Control PC.
$\longrightarrow$**no TDC timing measurements if CDAQ/CTrigger are not working**

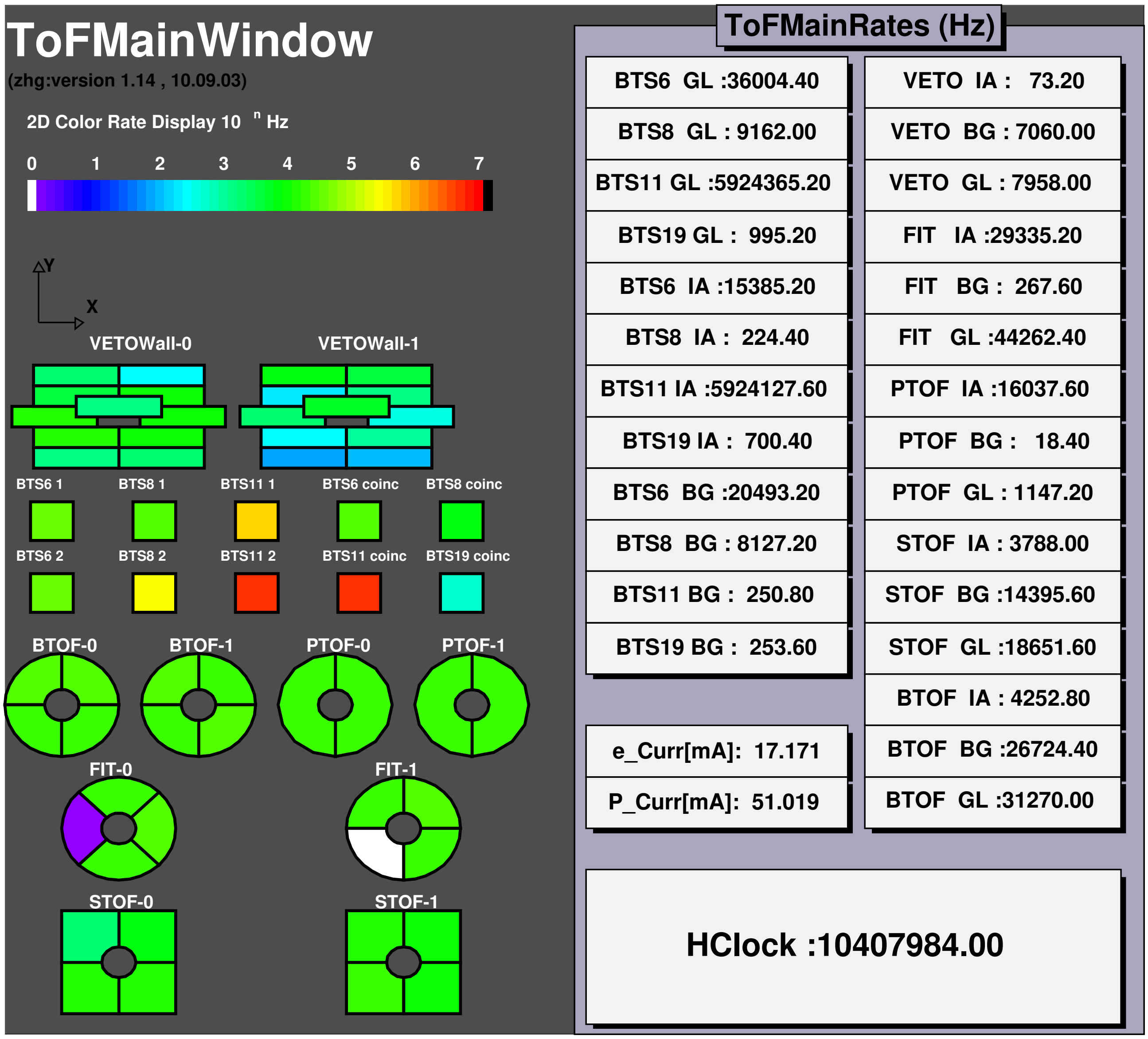
The operation of digitizer modules (PTL2000 and CAEN TDC V767) is tested on real data and in test setup (V.Dodonov):
- the PTL2000 has shown no big problem,
- the new ordered CAEN TDC was defect - sent back to CAEN



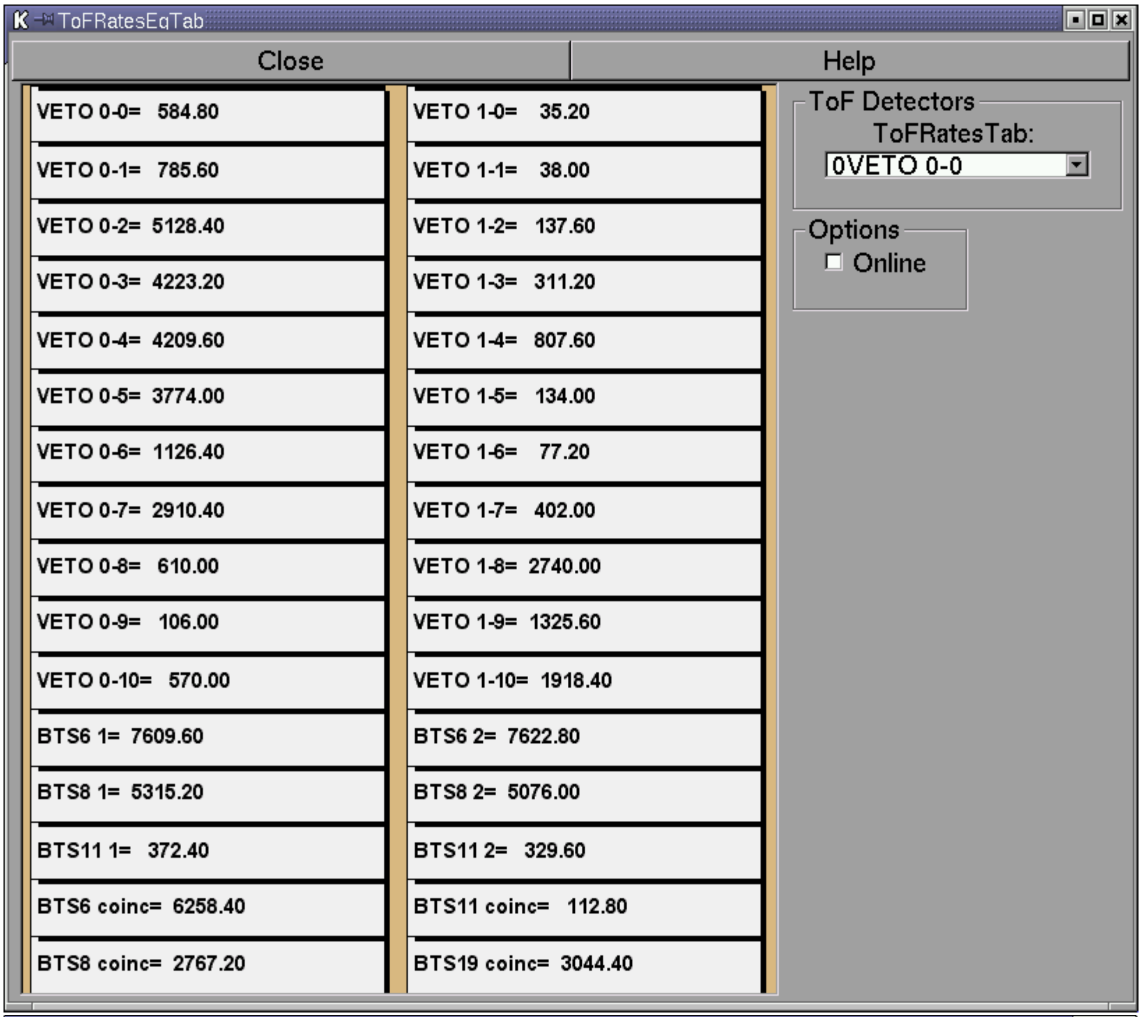
BTS coincedence rates, Hz
BTS6 coin
BTS8 coin
1e+07
1e+06
100000
10000
1000
100
10
1
0.1
16/10 15:00
16/10 18:00
16/10 21:00
17/10 00:00
17/10 03:00
17/10 06:00
17/10 09:00
17/10 12:00
17/10 15:00
17/10 18:00

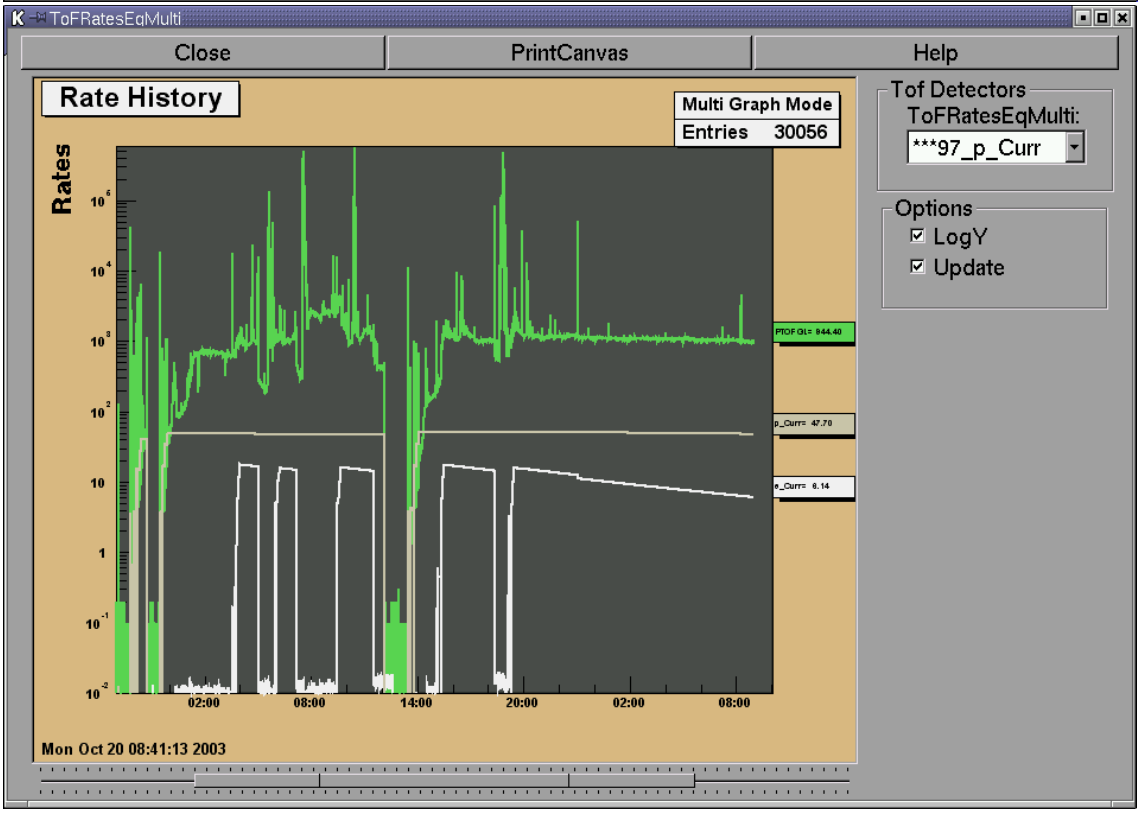


CURRENTS, mA
CURR E
CURR P
100
10
1
0.1
16/10 15:00
16/10 18:00
16/10 21:00
17/10 00:00
17/10 03:00
17/10 06:00
17/10 09:00
17/10 12:00
17/10 15:00
17/10 18:00



ToFMainWindow
(zhg:version 1.14 , 10.09.03)
2D Color Rate Display 10 n Hz
0 1 2 3 4 5 6 7
Y
X
VETOWall-0
VETOWall-1
BTS6 1
BTS8 1
BTS11 1
BTS6 coinc
BTS8 coinc
BTS6 2
BTS8 2
BTS11 2
BTS11 coinc
BTS19 coinc
BTOF-0
BTOF-1
PTOF-0
PTOF-1
FIT-0
FIT-1
STOF-0
STOF-1
ToFMainRates (Hz)
BTS6 GL :36004.40
BTS8 GL : 9162.00
BTS11 GL :5924365.20
BTS19 GL : 995.20
BTS6 IA :15385.20
BTS8 IA : 224.40
BTS11 IA :5924127.60
BTS19 IA : 700.40
BTS6 BG :20493.20
BTS8 BG : 8127.20
BTS11 BG : 250.80
BTS19 BG : 253.60
e_Curr[mA]: 17.171
P_Curr[mA]: 51.019
VETO IA : 73.20
VETO BG : 7060.00
VETO GL : 7958.00
FIT IA :29335.20
FIT BG : 267.60
FIT GL :44262.40
PTOF IA :16037.60
PTOF BG : 18.40
PTOF GL : 1147.20
STOF IA : 3788.00
STOF BG :14395.60
STOF GL :18651.60
BTOF IA : 4252.80
BTOF BG :26724.40
BTOF GL :31270.00
HClock :10407984.00


ToFRatesEqTab
Close
Help
VETO 0-0= 584.80
VETO 1-0= 35.20
VETO 0-1= 785.60
VETO 1-1= 38.00
VETO 0-2= 5128.40
VETO 1-2= 137.60
VETO 0-3= 4223.20
VETO 1-3= 311.20
VETO 0-4= 4209.60
VETO 1-4= 807.60
VETO 0-5= 3774.00
VETO 1-5= 134.00
VETO 0-6= 1126.40
VETO 1-6= 77.20
VETO 0-7= 2910.40
VETO 1-7= 402.00
VETO 0-8= 610.00
VETO 1-8= 2740.00
VETO 0-9= 106.00
VETO 1-9= 1325.60
VETO 0-10= 570.00
VETO 1-10= 1918.40
BTS6 1= 7609.60
BTS6 2= 7622.80
BTS8 1= 5315.20
BTS8 2= 5076.00
BTS11 1= 372.40
BTS11 2= 329.60
BTS6 coinc= 6258.40
BTS11 coinc= 112.80
BTS8 coinc= 2767.20
BTS19 coinc= 3044.40
ToF Detectors
ToFRatesTab:
0VETO 0-0
Options
Online


ToFRatesEqMulti
Close
PrintCanvas
Help
Rate History
Multi Graph Mode
Entries 30056
Rates
02:00
08:00
14:00
20:00
02:00
08:00
Mon Oct 20 08:41:13 2003
Tof Detectors
ToFRatesEqMulti:
***97_p_Curr
Options
LogY
Update

To Do:

- **Adjust trigger timing**
- **Calibration of FTDC data. Does it work properly ?**
- **Complete New TOF readout**