

# Shift Instructions for the COMPASS Trigger

## 1 How the vetos and triggers are set up

Vetos:

$$\text{Veto}' = \text{Veto}_{\text{beamline}} \text{ OR } \text{Veto}_{\text{outer}}$$

$$\text{Veto}_{\text{tot}} = \text{Veto}' \text{ OR } \text{Veto}_{\text{inner1}} \text{ OR } \text{Veto}_{\text{inner2}} \text{ OR } \text{Veto}_1$$

Triggers:

IT	inner trigger	$\text{h4inner AND h5inner AND calorimeter}$
MT	middle trigger	$\text{h4middle AND h5middle AND calorimeter AND } \overline{\text{Veto}_{\text{tot}}}$
MTinc	middle trigger incl.	$\text{h4middle AND h5middle AND } \overline{\text{Veto}_{\text{tot}}}$
LT	ladder trigger	$\text{h4ladder AND h5ladder AND calorimeter AND } \overline{\text{Veto}'}$
OT	outer trigger	$\text{h3outer AND h4outer AND } \overline{\text{Veto}_{\text{tot}}}$
CT	calorimeter trigger	$\text{calorimeter (high threshold) AND } \overline{\text{Veto}_{\text{tot}}}$
VI	veto inner	$\text{Veto}_{\text{inner1}} \text{ AND } \text{Veto}_{\text{inner2}}$
Halo	halo trigger	$\text{h4outer AND } \text{Veto}_1$
BT	beam trigger	$\text{Scifi1 AND Scifi2}$

## 2 Trouble Shooting

If

- Trigger rates increase or decrease by a factor of 10% or 20%:  
Check the beamline if there are elements missing.
- Single channels in the trigger or veto hodoscopes show 0 counts (or few) compared to the reference plots:  
Check the high voltage of this specific channel (see section: High Voltage).
- One or more hodoscopes are missing (i. e. empty histograms): Check the high voltage. Maybe one HV crate went off. Also one or more trigger rates should have dropped.
- Much more Calo Triggers than before: Maybe thresholds have to be reloaded. Call the trigger expert.

## 3 High Voltage

### 3.1 LeCroy High Voltage

The HVs of some middle and ladder hodoscopes are sitting on the blue LeCroy Box located in the trigger barrack. It is not operated by the slow control.

Go to **pctri07** and check if there is **HV Control for LeCroy Box** running. All channels should be green.

The HV control consists of two parts, a daemon which talks to the LeCroy Box, and a User Interface.

If you want to (re-)start them (after checking with the trigger expert), log in to **pctri07** and cd to `/online/detector/trigger/online/hv`.

If the daemon was exited abnormally you may first have to remove the file `hv1440daemon.pid`. Then type:

```
./hv1440daemon to start the daemon, and/or  
./hv1440control ttyS0& to start the user interface.
```

### 3.2 CAEN High Voltage

All other HVs are operated via slow control and are coming from one of the three trigger CAEN HV crates.

In the past (2004) from time to time CAEN HV Crate lost communication with the slow control (PVSS reports something like “HOD\_CCRx might be switched OFF”). If this happens it is necessary to reboot the HV crate. Please check the standard online histograms if also the high voltage is off and/or there is a significant change in the trigger rates. If not, there is no need for rush action. Wait for the end of the current run (or even for the next field rotation) to do the following:

- Go to the trigger barrack and find the corresponding CAEN HV crate (it is a red one).
- Switch it off, wait 30 seconds and switch it on again. The HV of this CAEN crate will now be off.
- Go back to the slow control computer and switch on all hodoscope HV channels. It may take some time until all channels are up again.

## 4 Discriminator boards

To reload the discriminator boards of the hodoscopes do the following:

Log in to pccofe02 or pccofe12,  
cd to `/online/detector/trigger/online/discriminator`  
and then issue the command

```
./load_discr
```

It will load the Xilinx FPGAs on all the boards, check each board and finally load the threshold, delay and enable values.

If you want to load all discriminator boards it is important that you do this procedure twice, once at pccofe02 and once at pccofe12.

## 5 Matrix boards

To reload all the matrix patterns and delays login to **pccofe01**,  
cd to `/online/detector/trigger/online/matrix`,  
and issue the command:

```
./load_matr
```

This helps if you suspect that the matrix boards have lost their patterns and timings.

A lot of messages are printed on the screen, some looking like error messages because they end with a BAD! printed in red, but they indicate no severe problem. As long as not all messages end in BAD!, but some end with a GOOD!, printed in green, you can assume that loading the matrices worked just fine.

In case of a power cut or a switched off crate, use the command:

```
./load_matr_reset
```

This resets also the VME bus and reloads the Xilinx chip which is responsible for the communication via the VME bus. Since the Freiburg coincidence moduls reside in the same crate, you have to reload them as well, and also the Prescaler (`LOAD -A 1024`. Eq.# 1024 may have changed, please check first)

## 6 Freiburg coincidence moduls

The Freiburg coincidence moduls add the calo trigger and the veto to the triggers (if applicable).

To reload it you have to login to **pccofo01**,  
cd to `/online/detector/trigger/online/coincidence`,  
and issue the commands:

```
./load_coinc  
./loadPattern.py
```

## 7 Calorimeter

The trigger electronics for HCAL1 and HCAL2 needs thresholds to be loaded.

On **pctri07** (though it should work from any pc in the compass domain),  
cd to `/online/detector/trigger/online/calorimeter` and type:

```
./load_thresholds.
```

It loads the thresholds for both calorimeters simultaneously.