



EUDET pixel telescope data taking manual

Ph. Roloff*

October 30, 2007

Abstract

This manual is intended to enable an unexperienced user to take data using the EUDET pixel telescope at the DESY testbeam area 24 or elsewhere.

*Deutsches Elektronen Synchrotron DESY, Notkestr. 85, 22607 Hamburg, Germany

1 Introduction

The aim of this document is to allow an unexperienced user to take data with the EU-DET pixel telescope. It is intended to provide the necessary information to take data and to provide help in case of trivial problems. Thus no technical details are explained here.

In **section 2** it is explained how the hardware of the telescope is switched on. **Section 3** describes the DAQ software while the topic of **section 4** is the TLU control utility.

Here the status of the telescope in September 2007 is described. Since the development of the hardware and the DAQ software is still in progress, changes to the presented information are possible. Please report comments to *philipp.roloff@desy.de*.

2 Switching on the hardware

Before the data taking can be started, the hardware of the pixel telescope needs to be switched on. In the following subsections it is described how this is done for the different devices used.

2.1 VME-Carte

The power switch of the VME-Crate is located at the front side of the device (see figure 1).

2.2 Cooling

A **Huber ministat 240-3** cooling device is used for the pixel telescope. These steps need to be followed to switch it on:

- Switch on the power of the cooling device.
- Press the button **Set**.
- Adjust the temperature using the wheel.
- Press the button **Set** again.
- To start the pump press the rightmost of the three blue buttons.

The cooling device uses water as cooling liquid. A typical operating temperature is 8° C. At room temperature it takes about 30 minutes until the telescope is cooled after the cooling system was switched on.

Condensation water dropping from the metal pipes can not destroy the sensors.

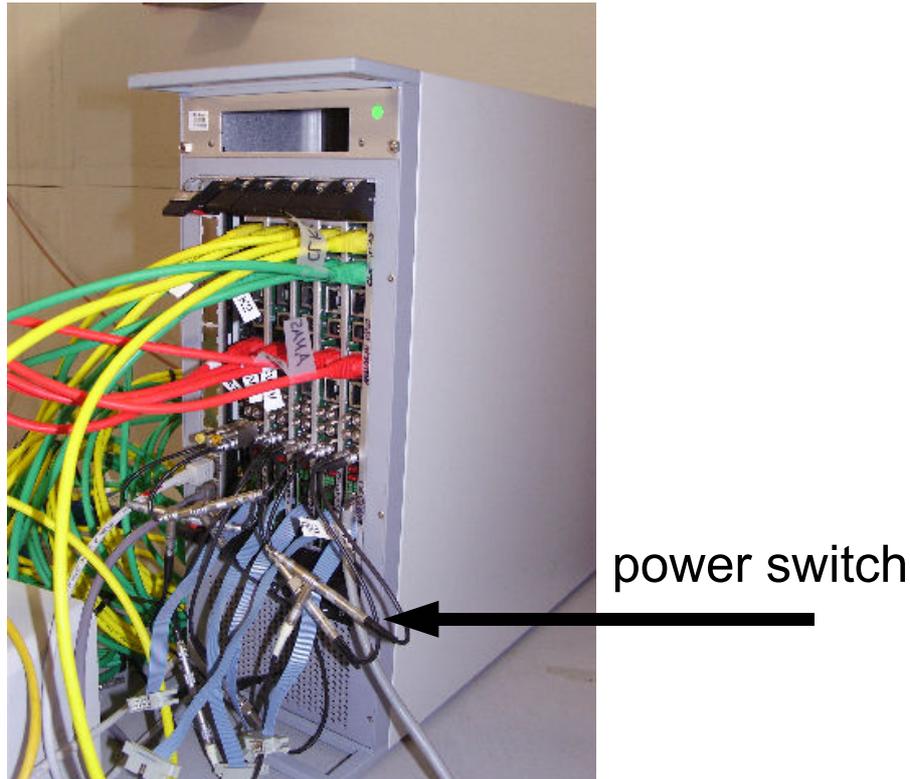


Figure 1: Front side of the VME-Crate. The location of the power switch is shown.

2.3 Power supplies for sensors

The power for the telescope sensors is provided by two AGILENT E3644A power supplies. Each power supply provides an electric potential of 8 V. The “+” connector of the upper power supply is connected to the red cables from the sensors and the “-” connector of the lower power supply is connected to the blue cables from the sensors.

The “-” connector of the upper power supply has to be connected to the “+” connector of the lower power supply. These connectors also have to be connected to the black cables from the sensors. The cabling is shown schematically in figure 2.

To switch on the power supplies follow this procedure:

- Press the **Power** button.
- Press the button **Recall** two times.
- Press the **Set Limits** button.
- Adjust the desired current limit: Typical values for the currents are 450 - 700 mA per sensor for the upper power supply and 150 mA per sensor for the lower power

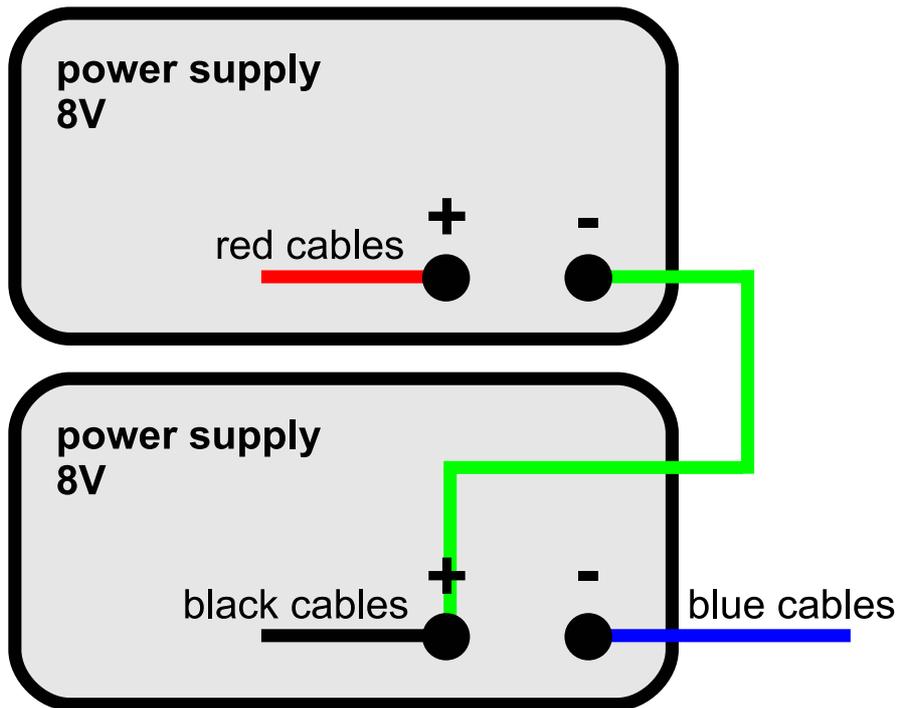


Figure 2: Power supplies for the sensors. The cabling is also described in the text.

supply.

- Press the **Set Limits** button again.
- Enable the output using the **Output On/Off** button. This should be done for both power supplies at the same time.

3 Running the DAQ software

The DAQ software is running on the MAC in the control room. In the first subsection a short tutorial is given how to take a run. The further subsections list the available configurations and provide help in case of problems.

3.1 Tutorial

- If necessary login as user **eudet**.
- Open a shell and enter the directory `~/Desktop/eudaq`. The software can be started by the command `./STARTRUN`.

- Several windows open. The data taking is controlled in the window **eudaq Run Control** which is shown in figure 3.

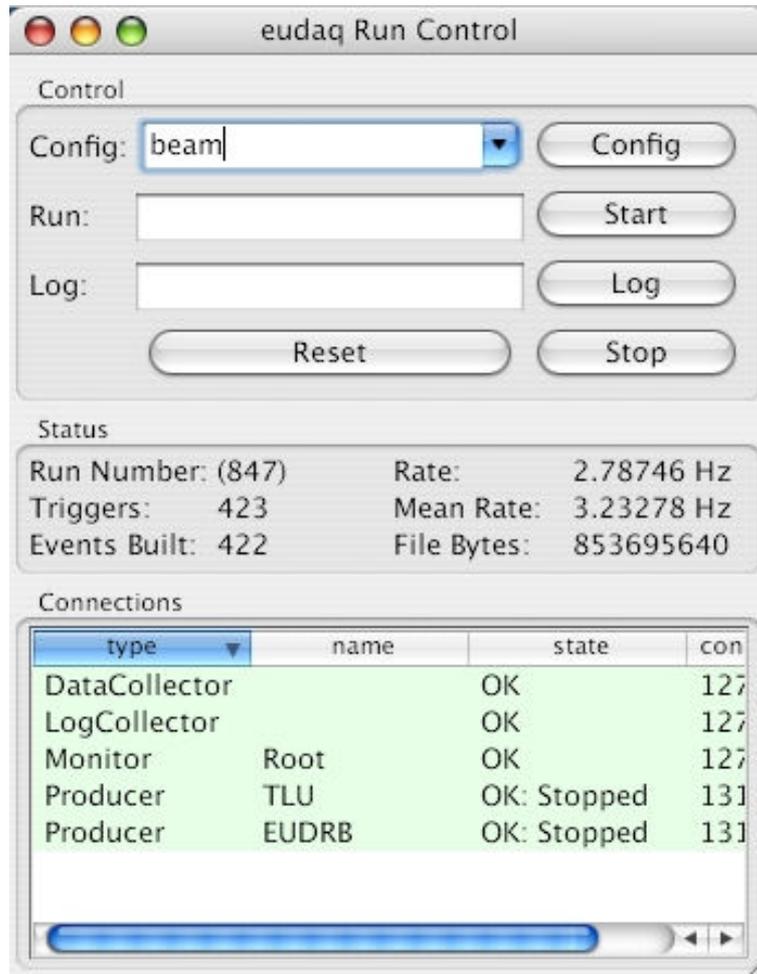


Figure 3: The run control window.

- Choose a configuration and click on the button **Config**. Wait until the state of the TLU and EUDRB producers is “Configured”. This is necessary after any changes of the setup. Some configurations are listed in subsection 3.2.
- Runs can be started by hitting the button **Start** and are stopped using the button **Stop**.
- In the run control window status information like the run number and the event rate are shown.
- Log messages are displayed in the window **EUDAQ Log Collector**. The user can add log messages by typing some text in the run control window after **Log:** and then press the **Log** button.

- The data quality can be monitored in the window **EUDAQ Root Monitor**. Plots are shown for the whole telescope and for the individual boards. Some plots need a certain number of events to be filled. Hence they typically appear after a few minutes. If the window was closed and needs to be restarted, please read 3.3.1.
- Before the size of the output files reaches the limit of 2 GB, the output file is changed automatically and the data taking continues with a new run number.

3.2 Available configurations

Data can be taken using different configurations. Here some configurations relevant for the normal user are summarised:

- **beam:** Data is taken in RAW mode.
- **beamzs:** Data is taken using zero suppression.
- **ped:** A pedestal run is taken.
- **sc[x]:** Only the scintillator number x is used for the trigger.
- **sc[xy]:** Only the scintillators x and y are used in AND mode for the trigger.
- **sc[xyz]:** Only the scintillators x, y and z are used in AND mode for the trigger.

3.3 Troubleshooting

In the following subsections instructions are given how to solve simple problems during data taking.

3.3.1 Restart Root Monitor

In case the Root Monitor window was closed, it can be restarted from the command line. Therefore go to the directory `~/Desktop/eudq/root/`. To restart the Root Monitor type **RootMonitor.exe -f [run number]**. During data taking the run number can be found in the **eudaq Run Control** window. It is also possible to connect the Root Monitor to the run control. Therefore type **RootMonitor.exe -r eudet.local** at the command line.

3.3.2 Crash of DAQ software

Just restart the software by typing `./STARTRUN` again. This kills all previous processes.

3.3.3 Check if sensors are programmed

Watch the currents at the displays of the power supplies. The currents reduce at the moment the sensors are programmed.

4 The TLU Control Utility

The program TLUcontrol.exe allows to control the trigger logic unit. This can be useful for test purposes.

In the following, it is described how to start this utility.

- First, the TLU producer must be switched off.
- Open a shell on the MAC in the control room and type **ssh root@zenpixell2.desy.de**. No password is necessary.
- Enter the directory **/home/eudet/eudaq/tlu**.
- Help is available typing the command **./TLUcontrol.exe -h**.
- The control utility can be started by the command **./TLUcontrol.exe -d [x] -a [y]**. Here x is the mask for enabling DUT connections and y is the mask for coincidence of external triggers.

To calculate the masks add the following numbers: 1 for PMT1, 2 for PMT2, 4 for PMT3 and 8 for PMT4.

- The program can be stopped by **Ctrl-c**.

Acknowledgement

This work is supported by the Commission of the European Communities under the 6th Framework Programme "Structuring the European Research Area", contract number RII3-026126.