Setup for High Voltage for Ge and PM

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This document is a proposal for a suitable setup for Ge and PM High Voltage The setup procedures will use the high voltage server to realise the needed configuration.

1 Setup files

[This part is dependent on the hardware of the Lecroy boards facilities.]
At "power on", the setup of the Ge and PM tubes will be done through, setup files. These files will be read by the HV server to make a particular setup and will be modified by user's interface when some values have to be changed in the files.

The setup files will have the following values :

1|◦) SETUP FILE FOR GE

Voltage G1	Ramp G1	DC current limit G1	AC current limit G1	Voltage limit G1	Additional data G1
Voltage G2	Ramp G2	DC current limit G2	AC current limit G2	Voltage limit G2	Additional data G2
⋮			⋮		⋮
Voltage Gi	Ramp Gi	DC current limit Gi	AC current limit Gi	Voltage limit Gi	Additional data Gi
⋮			⋮		⋮
Voltage G44	Ramp G44	DC current limit G44	AC current limit G44	Voltage limit G44	Additional data G44
Voltage G45	Ramp G45	DC current limit G45	AC current limit G45	Voltage limit G45	Additional data G45

2|◦) SETUP FILE FOR PM HIGH VOLTAGE

Shield 1	Voltage BGOa	Voltage limit BGOa	additional data BGOa	...	Voltage BGOj	Voltage limit BGOj	additional data BGOj
Shield 2	Voltage BGOa	Voltage limit BGOa	additional data BGOa	...	Voltage BGOj	Voltage limit BGOj	additional data BGOj
⋮				⋮			⋮
Shield 45	Voltage BGOa	Voltage limit BGOa	additional data BGOa	...	Voltage BGOj	Voltage limit BGOj	additional data BGOj

note: The HV User interfaces must provide functions to access to any parameter in the setup files.

2 Procedures needed

The HV User interface must provide the user with the following procedures: (through appropriate interface)

1. **SetupFileCreate:** will be used to keep in a file, the HV specifications for a device (Ge or PM). This procedure will be used also to add new detector. The acces of the file must be secured by a password. Modification in the file does not modify HV as long as load command has not been used.
   The required parameters are:

   - for Ge, the detector name.(se EDOC024 for detector naming). For example SetupFileCreate(G23) will ask the user to type the values (in specific fileds in graphic) that will be saved in the setup file of G23. (Standard value: ramp, HV limit, ... must be shipped).

   - for PM, the BGO detector name. For example SetupFileCreate(S23d) will create a new (=old modified) setup file for the BGO S23d (see EDOC024 for BGO detectors naming).

   - additional detector: parameters should also be updated in the general data base (new detector type).

2. **ReadParameters:** is used to know at which values are set the parameters of a detector. Typing ReadParameters(G23) will have as effect to display the parameters (voltage, ramp, AC current limit, ...) of the Ge detector 23. This command will be used for control.

3. **ModifySetupFile:** will be when the values concerning the HV must be changed. For example, if the PM tube coupled to the BGO S23d fall down, it should be replaced by an other PM tube that may not have the same characteristics. Whe then have to update the setup file. In our example we will do that by: ModifySetupFile(S23d).
   Acces method different: no modification of the general data base but note in log book and local data base only.
   Values change either because of caracteristic changes in the detector or change detector.

4. **LoadParameters:** setup the specified detector(s) with the adequate values that will be found in the setup file of that (these) detector(s).

   LoadParameters: way of loading parameters:

   USE 1 LoadParameters(Gn) or LoadParameters(G[n-m]) (see EDOC024 for notation). The first form has as effect to set the voltage for the Ge number n with the values from it's setup file.

   The second form does the same thing as the first but, it does it for the detectors n, n+1, n+2, ..., m-1, m one after one.

USE 2 LoadParameters(Snx), LoadParameters(S[nx-ny]), LoadParameters(S[nx-ny,n'x'-n'y',...]).

USE 3 LoadParameters(GEALL) and LoadParameters(nSALL) set respectively the parameters of all the Ge and the parameters of all the BGO of Ge n.
LoadParametes(SALL) will set the parameters of all the shields.

n and n', ... are the numbers of the Ge detector; n $\in \{1, 2, ..., 45\}$
Provide extra detector type. Additional detectors naming need also some reference for HV module needed-need for other polarity for example.
x, y, x', y', ... $\in$ {a, b, ...,h, i, j} where a, b, ..., i, j identify the 10 BGO surrounding the Ge.

The first form of LoadParameters allow the user to set the voltage for the PM x (coupled to the BGO x) of the Ge n.

The second form is used when one need to set the voltage for several PM a time. These PM must belong to the same Ge.

The third form is the extension of the second by refers to differents Ge shield.

3 Different steps in the HV set ups

3.1 For Ge crystals

The voltage will be set in two phasis:

- **First phasis:** the selected voltage and ramp will be found in the setup file for the Ge. But this ramp will not be used to increase the voltage. A small step HV (100 V) will be use at the first time to test two things:

  1. **The Ge pre-amplifier:** this was done previously by controling the output from the Ge crystal. If there is no signal, that means that the pre-amplifier is not powered up. This will have as consequence to cut the voltage delivered to the Ge crystal.
     IF no power on, there is no shut down: HV does not set but there may be other reasons for that.

  2. **The Ge cooling system:** during the first phasis, if the Ge crystal is not well cooled, there will be an alarm that will cut or inhibit the voltage. So using a small ramp avoid damages of the crystal in the case it may be hot.

- **Second phasis:** If the first phasis ends successfully, the second phasis can begin. This will consist only by setting the HV at the real value (that found in the setup file) with appropriate ramp.

3.2 For PM TUBES

For the PM tubes, one will have only to verify if the detected has the same value as the predicted.

For the different procedures, the user must get on a screen messages in order to follow creation, modification,... of setup files.
For example, (that is just a general idea) by typing SetupFileCreate(G23) one could get the following messages on the screen.

SETUP FILE FOR GE 23

```
demand voltage    : default_value (volts)
ramp              : default_value  (volts/sec)
DC current limit  : default_value (nA)
AC current limt   : default_value (nA)
```

SAVE MODIFICATIONS (1) **DISCARD MODIFICATIONS (2)**

clicking in fields allows modification.

By typing SetupFileCreate(s23) one will get :

SETUP FILE FOR SHIELD 23

```
DETECTOR            VOLTAGE(volts)     RAMP(volts/sec)

S23a                default_value      default_value
S23b                default_value      default_value
S23c                default_value      default_value
S23d                default_value      default_value
S23e                default_value      default_value
S23f                default_value      default_value
S23g                default_value      default_value
S23h                default_value      default_value
S23i                default_value      default_value
S23j                default_value      default_value
```

SAVE MODIFICATIONS (1) **DISCARD MODIFICATIONS (2)**

In this example we have considered that the only values necessary for setting the HV for PM tubes are voltages and ramps.

The same ramp will be used for each detector but this ramp could be modified for a particular detector.

The defaults values are the values of a previous setup for each kind of detector.