TDASHVcontrol User's Guide

Version 2.0

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Contents

1 Changes to the last version

Using the HVcontrol program package, you should consider the following changes to the last version:

- A currently started run is now suspended automatically during execution of the HV commands get, get...& tape, set or shutdown.
- an `#include` feature is added to the configuration file. See chapter 5.1 for details.
- the `change_slot` utility is no more available because of the more powerful `#include` feature.
- tdasmenu, especially the HVcontrol submenu now supports an EDITOR environment variable.

2 Introduction

This chapter gives an introduction to the HVcontrol program package. The first part is a short overview of HVcontrol features, the second explains some used terms, and the third looks at the file organisation.

2.1 Overview

TDASHVcontrol provides an user interface to C.A.E.N. SY 127 High Voltage Systems, connected via model C 139 CAMAC interface. See [lec90] for information on CAMAC. The high voltage system is controlled by a submenu of tdasmenu (if you are not familiar with the concept of TDAS, refer to [sch92]). This submenu allows you to

- configure the high voltage system using configuration files. This means to adjust all the parameters of the HV channels, e.g. desired voltage, maximum current, on/off etc. See [caea91, caeb91] for a technical description of the HV electronics.
- read HV parameters into readout files, i.e. investigate the current setting of the HV.
- save the HV configuration onto the mass storage medium, i.e. usually a tape (only with TDAS started).

Furthermore you can use the hvstatus program to watch the status of the HV independently.

2.2 Used terms

Now, a short explanation of some used terms is given.

HV: HV is an abbreviation for high voltage system.

text file: A text file is a file which contains only simple text. Every file created by an editor is a text file.

configuration file: A configuration file is a text file containing the information needed to configure the HV electronics, e.g. used channels, desired voltage, on/off etc. See section 5.1 for detailed information.

readout file: A readout file is a text file created by the TDASHVcontrol program, containing the current status of the selected channels. See section 5.2 for details.

channel select file: In fact, it is the same as a configuration file, but only the channel numbers are used to select the channels that are to be read out.

2.3 Organisation

Normally, TDASHVcontrol is set up automatically in a TDAS environment, and you need not worry about the file organisation.
If you want to run HVcontrol, you need the following files at least:

tdasmenu: located at TDASroot/MENU, contains the HVcontrol submenu

tdassymbols: located at TDASroot/MENU, used to start tdasmenu

TDAShvcontrol: the command processor, located at TDASroot/CMDS

hvdefault.hvc, hvkill.hvc: located at TDASroot/CNF, default HV configuration files

Useful are (all located at TDASroot/CMDS):

hvstatus: shows the HV status periodically

hv_cleanup: emergency cleanup

hv_ev_del: used by hv_cleanup, do not run explicitly.

Now you are ready to run HVcontrol.

3 The HVcontrol menu

In fact, the HVcontrol menu is a submenu of the TDAS main menu, and it is used in the same way as the other TDAS submenus. Select it by typing 'h' in the main menu. Now, a description of every menu item follows.

Note: If one of the commands get, get...& tape, set or shutdown is invoked within a run, this run will be temporary suspended automatically because the HV cannot be driven while the data acquisition is running.

3.1 G: get...

This item is used to get the current HV data from the electronics and write it to a readout file on harddisk. Once selected, you will first be prompted for a channel select file:

```
channel select file: hvdefault
```

You can edit the given default file name, or just get it typing `<return>`. Don't type the extension `.hvc` printed by the directory menu item. Everytime when a file name is required, a default is given. Then, you will be prompted for a readout file name:

```
read channels into: hvvalues
```

All HV data from the electronics will be stored into the named file. View it by the 'edit' menu item.

CAUTION: If the readout file already exists, it will be overwritten!

3.2 T: get... & tape

This command is like the previous one, but the HV data is also stored on the TDAS mass storage medium, usually the EXAbyte 8500 tape device, for further inspection during offline analysis. To be succesful, TDAS must be running, and the mass storage device has to be mounted via the TDASarchive submenu.

It is possible to run this command automatically at every `begin run` command. This feature is controlled by the environment variable `procs_control` defined in `tdassymbols`. If `procs_control` contains a token `TDAShvcontrol`, automatic saving on tape is turned on, otherwise it is turned off.

This command also suspends the run if necessary.

3.3 S: set...

HV configuration is performed by that menu item. Selecting it, you will be asked for a configuration file name:

```
configuration file name: hvdefault
```

Enter a new file name, or edit the default one, omitting the `.hvc` extension. The selected configuration will now be set in the HV electronics.

This command also suspends the run if necessary.

3.4 K: shutdown... (kill)

Shutdown (kill) performs an emergency shutdown of the HV. No further input is required. The action done by shutdown is defined in the `hvkill` configuration file. `hvkill` should only contain a large ramp down value and the switch `off`.

This command also suspends the run if necessary.

Note: Shutdown isn't supported by the CAMAC interface of the HV, so it is slow. Current speed is about 6 channels per second.

3.5 C: clear...

If the HV detects an error condition (e.g. overcurrent), the alarm bit is set. This bit may be watched with the `hvstatus` program which may — once started — run independent of TDAS and other HVcontrol functions. If the error condition doesn't persist, the alarm bit can be cleared by this menu item.

3.6 E: edit...

Use this menu item to edit all the text files needed or generated by the other commands. If you are prompted for the file name:

```
edit file: hvdefault
```

just enter the name of the desired file (default given).

Note: The help key of the `SEDT` editor is the PF2 key.

3.7 D: show directory...

This command shows which HVcontrol text files exist. File names are displayed *with* the `.hvc` extension, but you needn't type the extension in the HVcontrol submenu, wherever a filename is expected.

3.8 Q: terminate...(quit)

This terminates the TDAShvcontrol command executing process. Only use it if you want to shutdown TDAS and HVcontrol for a longer time.

3.9 P: restart...

This is a kind of undo of the terminate command. It restarts the TDASHVcontrol command executing process. Normally, it is unused, because `TDAShvcontrol` is started automatically by entering `tdasmenu`.

3.10 R: return...

Returns to the TDAS main menu. `TDAShvcontrol` keeps running, even when you leave the main menu.

4 Utilities

This section tells you something about the `hvstatus` program, which displays the status of the HV electronics periodically, and the `hv_cleanup` program performing a major cleanup of the HVcontrol system.

4.1 Hvstatus

Hvstatus displays the status word of the HV about every 30 sec. See [caeb91] for more information on the status word. The meaning of the items is:

PowOn: Power turned on (should be 1)

Passw: access requires password (should be 0)

Keyb: key pad enable; 1 = enabled

Alarm: alarm bit. A warning is written if true.

Vx: V0/V1 selector (should be 0)

Ix: I0/I1 selector (should be 0)

HV_ON: HV enable switch (1 = enabled)

A good way to run `hvstatus` is to start it within a small xterm window on the UNIX host.

4.2 Hv_cleanup

In very few cases, e.g. if `TDASHVcontrol` is aborted abnormally, the HVcontrol status may be undefined. In this case, do the following:

1. ensure that no process is accessing the HV (e.g. think of `hvstatus` running in the background).
2. goto shell level (i.e. leave TDAS main menu).
3. execute `hv_cleanup`. Ignore displayed error messages.
4. reenter tdasmenu (via `tm`).
5. try again.

Now, HVcontrol is completely reinitialised.

5 Text file formats

There are two different, at present uncompatible kinds of text files: HV configuration files (e.g. used by Set) and HV readout files (e.g. created by Get). The format of both file types is described below.

5.1 Configuration files

HV configuration files are used to configure the HV electronics or to select the channels to be read. They consist of comments and markers '`>>`' followed by the data. Any text containing no markers is considered a comment and is ignored. A marker with its subsequent data words (lets say, a data block) mustn't be interrupted by a comment. Data words must be delimited by any number of spaces, newlines or '|'.

The first marker has to be followed by the CAMAC crate number, the second marker by the slot number containing the HV controller. Now any number of further data blocks follow, each defining the setting of one HV channel. The marker is followed by the HV crate number, the HV channel number, V0, I0, V1, I1, ramp up, ramp down, trip and `on` or `off`. Reference [caea91] for detailed information on V0...trip. Furthermore, a configuration file is processed first by the C preprocessor. Don't worry about C preprocessors, but this allows you to include other text files via

```
#include "filename"
```

This works exactly as if the contents of the file `"filename"` is inserted at the position of the `#include` directive. A common use of includes is to separate the header from the configuraton files. If, for example, the slot of the HV controller changes, you need only to change the separated header file, and all configuration files including that header file will work properly.

The easiest way to get familiar with the configuration file format is to view an existing file with the directory and edit HVcontrol submenu items. See chapter 6 for a sample session.

5.2 Readout files

Readout files are text files created by the get commands of the HVcontrol submenu. They contain the actual setting of the HV channels. Abbreviations are:

CR: HV crate number

CH: HV channel number

VMON: monitored voltage

IMON: monitored current

Vx: set voltages

Ix: set currents

RUP: ramp up speed

RDW: ramp down speed

TRIP: trip time

OF: channel turned off

TR: channel triped

ON: channel turned on

OV: overvoltage occurred

UV: undervoltage occurred

OC: overcurrent occurred

RU: channel ramping up

RD: channel ramping down

The units of the displayed values depend on the used HV modules. See [caea91] for detailed information on channel characteristics.

6 A sample session

Note: Printed messages may have changed slightly. This will be corrected in following releases. Also, the used editor now depends on the `EDITOR` environment variable.

To start the sample session, enter the TDAS main menu. Select the HVcontrol submenu by typing 'h'. At first, let's take a look what's there. Type 'd' to view the directory. A list of all configuration and readout files is displayed, looking like the following sample:

```
hvconfig.hvc    hvdefault.hvc   hvkill.hvc      hvoff.hvc       hvreset.hvc
hvsample.hvc    hvvalues.hvc

press any key
```

We are interested in `hvsample.hvc` now. Press any key to return to the menu, and select '`E: edit text file`'. Asked for an '`edit file`', type '`hvsample <return>`'. Now, hvsample is loaded into the editor. Note that PF2 is the help key of the used SEDT editor. At first, change to replace mode by pressing F14; this makes editing of tables much easier. Adjusting text with the arrow up/down keys, your screen should show the hvsample configuration file:

```
 File: /h0/usr/diehl/TDAS/CNF/hvsample.hvc       replace; Line=4  ; Buf=0
L       T       T       T       T       T       T       T       T       T


                     *****  HV configuration  *****

#include "slot.h"


    Cr.   Ch.     V0      I0      V1      I1    RUP    RDW    TRIP   ON/OFF
----------------------------------------------------------------------------
>>    0 |    0 |  1000 |   220 |      - |      - |   80 |  100 |      0 |  off
>>    0 |    1 |  0900 |   230 |      - |      - |   55 |  100 |      0 |  off
>>    0 |   14 |  1200 |   240 |      - |      - |  100 |  100 |      0 |  off

the only channel turned on:
>>    0 |   15 |  1300 |   250 |      - |      - |   10 |  100 |      0 |   on
```

The file `slot.h` looks like this:

```
CAMAC crate no.          >> 15
HV controller slot no.   >>  7
```

The CAMAC crate number and the HV controller slot number are defined in the `slot.h` file. Overwrite them with the new values if necessary. In `hvsample.hvc`, 4 HV channels are defined. The desired parameters are just typed into the table. A minus sign '`-`' keeps this value unchanged. You may now edit the parameters as you like. If you are satisfied, save the file and exit by pressing `PF1 f`.

Now, the *file* is changed, but the current setting of the electronics isn't! To do this, select '`set HV from text file`' in the HVcontrol menu. Enter `hvsample` as configuration file name. A few seconds later, it should look like this:

```
configuration file name: hvsample
4 channels done.
command completed successfully

press any key
```

Now, the parameters given in the file are transferred into the HV electronics. Let's try to read it back using the `get` menu item: The channel select file is `hvsample` again because we want to read our four chanels only. The prompt '`read channels into: hvvalues`' requires any readout file name you like, hvvalues is the default. Both names entered, you should see something like that:

```
channel select file: hvsample
read channels into: hvvalues
4 channels done.
command completed successfully

press any key
```

The actual setting of the electronics is now read into the given file. Surely you want to view it, so do it with the edit menu item. The readout file name is given as default edit file, just get it pressing `<return>`. Dependent on your changes above, you will see a readout file of the following kind:

```
CAMAC crate no. >> 15  HV controller slot no. >> 7

   CR CH VMON IMON   V0   I0  V1   I1   RUP  RDW TRIP  OF TR ON OV UV OC RU RD
>>  0  0    0    0 1000  220   0 2000   80  100    0   1  0  0  0  0  0  0  0
>>  0  1    0    1  900  230   0 2000   55  100    0   1  0  0  0  0  0  0  0
>>  0 14    0    0 1200  240   0 2000  100  100    0   1  0  0  0  0  0  0  0
>>  0 15 1299    0 1300  250   0 2000   10  100    0   0  0  1  0  0  0  0  0
```

That's it. You can leave the editor without saving with PF1 q. Running the configuration file `hvoff` turns all channels off. Good luck!

References

[caea91] C.A.E.N.: Model SY 127 High Voltage System, Technical Information Manual, C.A.E.N. 1991

[caeb91] C.A.E.N.: Model SY 127 High Voltage System CAMAC Controller, Technical Information Manual, C.A.E.N. 1991

[lec90] LeCroy Corporation: 1990 Research Instrumentation Catalog, LeCroy Corporation 1990

[sch92] Florian Schwandt: TDAS OS-9 ISKP Programmer's Guide, F. Schwandt 1992