Command line tool GBS_MCA_Cmd

GBS_MCA_Cmd is a simple command line tool to communicate with an MCA-527 or MCA-166. The program uses the FTD2XX library which is based on an unmodified version of libusb. It is intended for Linux systems.

The program GBS_MCA_Cmd needs two libraries:

libGBS_MCA_Comm.so	- functions to communicate with an MCA
libGBS_MCA_Data.so	- data structures and functions to read and write spe files

Run the program

When the ftdi_sio module is controlling an FTDI device it is not available to libftd2xx and the program can not connect to the MCA. You can check if that is the case:

```
sudo lsmod | grep ftdi_sio
```

and unload the module if necessary:

```
sudo rmmod ftdi_sio
sudo rmmod usbserial
```

The program must be run with super-user privileges. You can use “sudo” or, if sudo is not available on your system “su”.

Now you can call the program with optional parameters:

```
sudo GBS_MCA_Cmd [timeout] [attempts] [baud rate] [no_dialog]
```

timeout: read timeout in ms, default: 1000 ms

attempts: number of attempts, if communication fails, default: 8

baud rate: baud rate for communication with MCA
possible values:	0 (default): the highest possible baud rate is used
3000000, 307200, 115200, 38400

dialog: “dialog” | “no_dialog”
“dialog”: a prompt “>” is written to standard output, if the program is ready to receive a command from standard input
“no_dialog”: the prompt is suppressed, some responses are shorter. This option is intended for batch processing (if stdin comes from a file).
default: dialog

If one parameter is left out, all parameters on the right must be omitted, too.
If baud rate is specified, connection to the MCA can be faster, because it is not necessary to try several baud rates.

The program responses on standard output:

```
Connecting to MCA...
```

And if the connection was successful (for example):

```
Connected with MCA 1675, baud rate: 3000000
```

The number after “MCA” is the serial number of the device.

Available commands

If the program is ready and waiting for commands, a prompt “>” is written to standard output. Then you can type in one of the following commands to operate the MCA:

help
All available commands are listed at standard output.

quit
The program terminates.

reset
Resets all MCA parameters to their initial state, all spectra are cleared and the measurement is aborted.

start
An acquisition is started.

stop
The acquisition is stopped.

query_state
Show state information on the MCA

save *[filename] [comment]*
State information and spectra are transferred from the MCA and written to *filename*. If no filename is specified, the default is mca_spectrum.spe. If a second parameter is entered, this text is written to the block *$SPEC_REM:*. You can use quotation marks to create remarks with spaces. Please see the MCA manual for the MCA data spectral format.

set_hv *hv [inhibit]*
Set detector high voltage to *hv* and controls the HV inhibit signal. If *inhibit* is not specified, 0 (inhibit off) is set. *Hv* must be specified without sign.

set_preset (none **|** real **|** live) *[time]*
Set automatic stop condition
none: *time* is ignored and can be omitted
real / live: *time* must be specified in seconds

set_adc *channels [lld uld]*
Set the ADC resolution, the low level discriminator and the high level discriminator.
If the discriminators are omitted, lld is set to 0 and uld is set to the maximum possible

value.

set_threshold *threshold*
Set analog threshold to *threshold* (in %). For an MCA 527 this value can be specified with a precision of 0.1% (e.g. 3.5). For an MCA 166 the value is rounded to an integer.

set_gain *coarse_gain fine_gain*
Set the amplifier coarse gain and fine gain.

set_amp_polarity (+ **|** -)
Set the ADC input to shaping (amplifier) and the amplifier polarity.

set_pzc *pzc_value*
Set the PZC (Pole Zero Cancellation) control voltage to value.
After successful execution the PZC offset is written to standard output. Note that this command needs about one second to return, because a measurement is run.

set_pzc auto
The PZC (Pole Zero Cancellation) value is evaluated automatically by offset minimization. For all iteration steps, PZC value and offset are written to standard output. Note that there is no reasonable result, if no pulses are measured (e.g. if HV is off or no detector is connected).

set_shaping_time *shaping_time*
Set the specified shaping time (in µs). For an MCA 166 this must be one of the two preset values (ordinarily 1 and 2µs).

set_trigger_filter *trigger_filter_index*
Set the specified trigger filter (index 0...5). For an MCA 166 this command is ignored.

Index 0: -1; +1
Index 1: -1; 0; +1
Index 2: +1; -2; +1
Index 3: +1; 0; -2; 0; +1
Index 4: 4* -1; 12* 0; 4* +1
Index 5: 4* +1; 4* 0; 4* -2; 4* 0; 4* +1

set_flattop_time *time*
Set the flattop time. The requested value must be specified in µs.

The commands are case sensitive.

Please see the description of the communication DLL and the firmware commands in the MCA manual for detailed information about parameters.

Run the program in a batch

The following example shows how the command line tool can be used in a batch:

```
sudo ./GBS_MCA_Cmd 700 4 0 no_dialog << EOD > TestOutput.txt
reset
```

```
set_hv 500
set_adc 1024
start
quit
EOD
sleep 120
sudo ./GBS_MCA_Cmd 700 4 0 no_dialog << EOD >> TestOutput.txt
stop
save
set_hv 0
quit
EOD
echo "Batch finished"
```