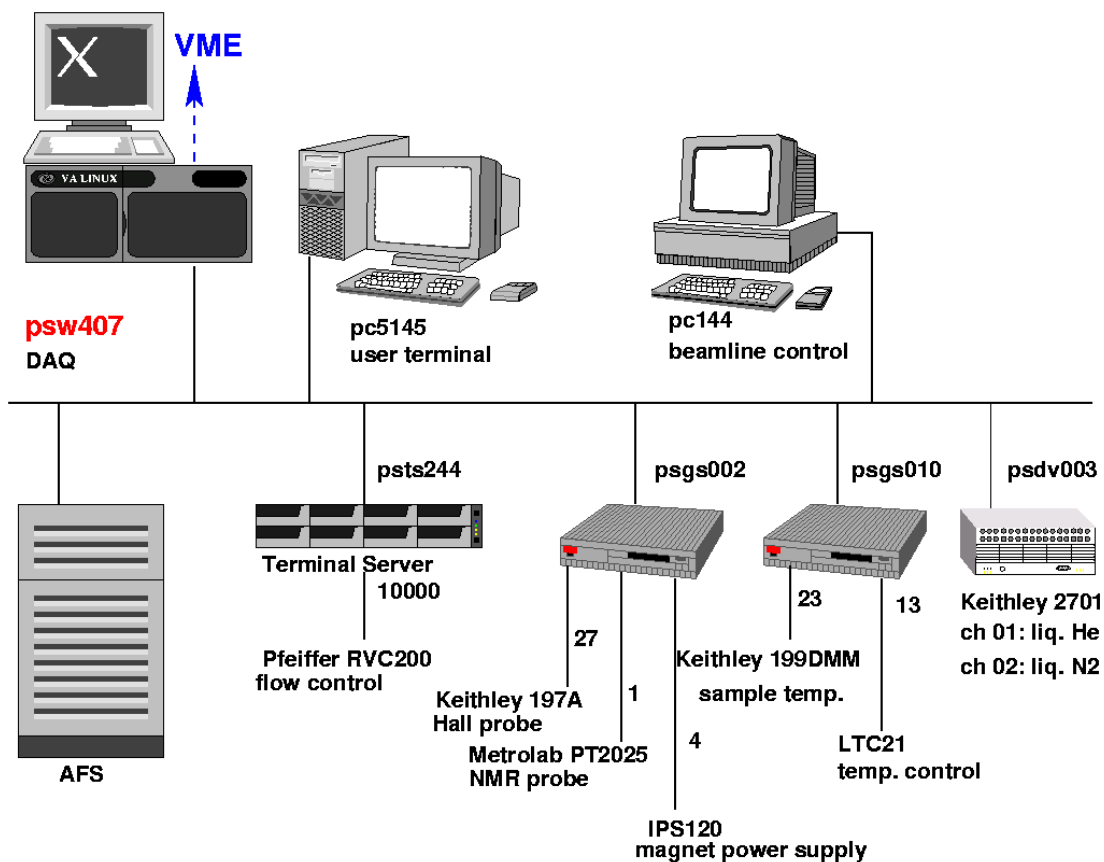


MIDAS experiment „alc“

USER MANUAL

SR35, 05.07.2006



Data acquisition is running on psw407 (DELL Power Edge 2600).

AFS users can logon to pc5145, the local user account is l_musr_alc.

Data files are stored locally on psw407 in /home/l_musr_alc/exp/alc and automatically copied to /afs/psi.ch/project/bulkmusr/data/alc/ti

start web browser: <http://psw407:8080> (PSI only!): **Status** page
 (the following screenshots are taken from pc4244...)

The screenshot shows a Microsoft Internet Explorer browser window titled "MIDAS status - Microsoft Internet Explorer". The address bar shows "http://pc4244:8080/". The page content includes a navigation menu with buttons for Stop, Pause, ODB, CNAF, Messages, ELog, Alarms, Programs, History, Config, and Help. The main status area shows "Run #277" is "Running" with "Alarms: On" and "Restart: No". The start time is "Sun May 1 09:37:00 2005" and the running time is "2h37m06s". The experiment name is "cell 112, 15% DODMAC / 50 mole% para-hydroxybenzoate, 35C". A table lists various equipment and their status, including Scaler, Magnet, Hallprobe, NMRprobe, LTC21, SampleT, RVC200, and Beamline. A summary table shows the channel "alc_05_0277.root" is active with 4349 events, 0.410 MB written, and 0.028 GB total. A log entry states "12:13:58[Analyzer] Magnet field changed to 1.880980 (demand = 1.880980)".

| Equipment | FE Node | Events | Event rate [s] | Data rate[kB/s] | Analyzed |
|-----------|------------------------|--------|----------------|-----------------|----------|
| Scaler | alc_fe@pc4244 | 3110 | 0.0 | 0.1 | 99.9% |
| Magnet | IPS120 SC@pc4244 | 155 | 0.0 | 0.0 | 0.0% |
| Hallprobe | HALL_SCfe@pc4244 | 155 | 0.0 | 0.0 | 0.0% |
| NMRprobe | NMR_SCfe@pc4244 | 155 | 0.0 | 0.0 | 0.0% |
| LTC21 | LTC21 SC@pc4244 | 314 | 0.0 | 0.2 | 0.0% |
| SampleT | SampleT_scfe@pc4244 | 155 | 0.0 | 0.0 | 0.0% |
| RVC200 | RVC200 Frontend@pc4244 | 147 | 0.0 | 0.0 | 0.0% |
| Beamline | BeamLine SC@pc4244 | 157 | 0.0 | 0.0 | 0.0% |

| Channel | Active | Events | MB written | GB total |
|------------------|--------|--------|------------|----------|
| alc_05_0277.root | Yes | 4349 | 0.410 | 0.028 |

DO NOT USE 'Konqueror' !!!! (only IE, Mozilla, or Firefox)

Start a run

| MIDAS experiment "alc" | | | Tue May 10 08:53:59 2005 Refr:60 | | | | | | |
|---|------------------------|--------------------------|----------------------------------|-------------------------------|-------------------------------------|----------|---------|--------|------|
| Start | ODB | CNAF | Messages | ELog | Alarms | Programs | History | Config | Help |
| Run #300 | Stopped | | Alarms: On | Restart: No | Data dir: /home/l_musr_alc/exp/alc/ | | | | |
| Start: Fri May 6 06:56:23 2005 | | | | Stop: Fri May 6 09:15:20 2005 | | | | | |
| test | | | | | | | | | |
| Equipment | FE Node | Events | Event rate[/s] | Data rate[kB/s] | Analyzed | | | | |
| Scaler | alc_fe@pc4244 | 108206 | 0.0 | 0.1 | 19.9% | | | | |
| Magnet | IPS120 SC@pc4244 | 0 | 0.0 | 0.0 | 0.0% | | | | |
| Hallprobe | HALL_SCfe@pc4244 | 0 | 0.0 | 0.0 | 0.0% | | | | |
| NMRprobe | NMR_SCfe@pc4244 | 0 | 0.0 | 0.0 | 0.0% | | | | |
| LTC21 | LTC21 SC@pc4244 | 0 | 0.0 | 0.0 | 0.0% | | | | |
| SampleT | SampleT_scfe@pc4244 | 0 | 0.0 | 0.0 | 0.0% | | | | |
| RVC200 | RVC200 Frontend@pc4244 | 0 | 0.0 | 0.0 | 0.0% | | | | |
| Beamline | BeamLine SC@pc4244 | 0 | 0.0 | 0.0 | 0.0% | | | | |
| Channel | Active | Events | MB written | GB total | | | | | |
| 0 test_alc_05_0035.root | Yes | 3869 | 0.380 | 0.038 | | | | | |
| 08:37:11[LTC21 SC] Nothing connected to sensor #2? :K ; | | | | | | | | | |
| ODBedit [pc4244] | | IPS120 SC [pc4244] | | alc_fe [pc4244] | | | | | |
| HALL_SCfe [pc4244] | | NMR_SCfe [pc4244] | | SampleT_scfe [pc4244] | | | | | |
| LTC21 SC [pc4244] | | BeamLine SC [pc4244] | | Logger [pc4244] | | | | | |
| mhhttpd [pc4244] | | RVC200 Frontend [pc4244] | | Analyzer [pc4244] | | | | | |

| MIDAS experiment "alc" | | Tue May 10 08:55:17 2005 | |
|--|------------------------------------|--------------------------|--|
| Start new run | | | |
| Run number | <input type="text" value="301"/> | | |
| comment | <input type="text" value="test"/> | | |
| prescan_Field(T) | <input type="text" value="0"/> | | |
| lower_Field(T) | <input type="text" value="0"/> | | |
| upper_Field(T) | <input type="text" value="0.22"/> | | |
| stepSize_Field(T) | <input type="text" value="0.001"/> | | |
| number_of_runs | <input type="text" value="7"/> | | |
| autorun_active | <input type="text" value="1"/> | | |
| <input type="button" value="Start"/> <input type="button" value="Cancel"/> | | | |

for autorun sequence: set **autorun_active = 1** (if 0: only single run)

there are no 'scans' anymore!

Stop a run

| MIDAS experiment "alc" | | | Sun May 1 12:14:06 2005 Refr:60 | | | | | |
|---|------------------------|--|---------------------------------|---------------------------------------|----------------------|------------------------|--------------------------|-------------------------|
| Stop | Pause | ODB | CNAF | Messages | ELog | Alarms | Programs | History |
| Config | Help | | | | | | | |
| Run #277 | Running | Alarms: On | Restart: No | Data dir: /home/l_musr_alc/exp/alc/ | | | | |
| Start: Sun May 1 09:37:00 2005 | | | | Running time: 2h37m06s | | | | |
| cell 112, 15% DODMAC / 50 mole% para-hydroxybenzoate, 35C | | | | | | | | |
| Equipment | FE Node | Events | Event rate [s] | Data rate[kB/s] | Analyzed | | | |
| Scaler | alc_fe@pc4244 | 3110 | 0.0 | 0.1 | 99.9% | | | |
| Magnet | IPS120 SC@pc4244 | 155 | 0.0 | 0.0 | 0.0% | | | |
| Hallprobe | HALL_SCfe@pc4244 | 155 | 0.0 | 0.0 | 0.0% | | | |
| NMRprobe | NMR_SCfe@pc4244 | 155 | 0.0 | 0.0 | 0.0% | | | |
| LTC21 | LTC21 SC@pc4244 | 314 | 0.0 | 0.2 | 0.0% | | | |
| SampleT | SampleT_scfe@pc4244 | 155 | 0.0 | 0.0 | 0.0% | | | |
| RVC200 | RVC200 Frontend@pc4244 | 147 | 0.0 | 0.0 | 0.0% | | | |
| Beamline | BeamLine SC@pc4244 | 157 | 0.0 | 0.0 | 0.0% | | | |
| Channel | | Active | Events | MB written | GB total | | | |
| 0 alc_05_0277.root | | Yes | 4349 | 0.410 | 0.028 | | | |
| 12:13:58[Analyzer] Magnet field changed to 1.880980 (demand = 1.880980) | | | | | | | | |
| ODBEdit [pc4244] | | IPS120 SC [pc4244] | | alc_fe [pc4244] | | | | |
| HALL_SCfe [pc4244] | | NMR_SCfe [pc4244] | | SampleT_scfe [pc4244] | | | | |
| LTC21 SC [pc4244] | | RVC200 Frontend [pc4244] | | BeamLine SC [pc4244] | | | | |

Do not interfere the stopping procedure – wait until the pages refreshes and shows status ‘stopped’.

Set Magnet

change **Demand** value

| MIDAS experiment "alc" | | Sun May 1 12:16:52 2005 Refr:60 |
|---|----------------|---------------------------------|
| ODB Status Help | | |
| Equipment: Scaler Magnet Hallprobe NMRprobe LTC21 SampleT RVC200 Beamline | | |
| Groups: All | | |
| Names | Demand | Measured |
| Magnet-Field | <u>1.88798</u> | 1.88798 |
| Magnet-Status | <u>0</u> | 1 |
| Magnet-Current | <u>0</u> | 27.7643 |

read Hall probe

| MIDAS experiment "alc" | | Sun May 1 12:19:17 2005 Refr:60 |
|---|----------|---------------------------------|
| ODB Status Help | | |
| Equipment: Scaler Magnet Hallprobe NMRprobe LTC21 SampleT RVC200 Beamline | | |
| Groups: All | | |
| Names | Demand | Measured |
| Hallprobe | <u>0</u> | 1.8902 |

read NMR probe

| MIDAS experiment "alc" | | Sun May 1 12:18:25 2005 Refr:60 |
|---|----------|---------------------------------|
| ODB Status Help | | |
| Equipment: Scaler Magnet Hallprobe NMRprobe LTC21 SampleT RVC200 Beamline | | |
| Groups: All | | |
| Names | Demand | Measured |
| METROLAB PT2025 | <u>0</u> | 1.88959 |

```
- field >= 0.0
* - probe is locked
* - readout unit is Tesla
* - sum of returned errors (returned value < 0.0)
*                               status  unit
*   -1.0 BUS DRIVER I/O TIMEOUT  I
*   -2.0 BUS DRIVER ERROR        B
*   -4.0 not in state LOCKED      !L
*   -8.0 state NOT LOCKED        N
*   -16.0 state WRONG            W
*   -32.0 state NMR signal        S
*   -64.0 unit not Tesla          !T
*   -128.0 invalid channel number C
*
* status = I|B|L|N|W|S|C|E
* unit   = T|F|U
```

Set Temperature

LTC21: Input: read values

Output: set value **LTC21_Analog_Set_Point (K)**

| MIDAS experiment "alc" | | Sun May 1 12:20:24 2005 Refr:60 | |
|--|--|---------------------------------|--------------|
| <input type="button" value="ODB"/> <input type="button" value="Status"/> <input type="button" value="Help"/> | | | |
| <i>Equipment:</i> Scaler Magnet Hallprobe NMRprobe LTC21 SampleT RVC200 Beamline | | | |
| <i>Groups:</i> All Input Output | | | |
| Names | | Output | |
| LTC21_REMOTE | | | <u>1</u> |
| LTC21_Heater_Set_Point (K) | | | <u>0.3</u> |
| LTC21_Heater_P | | | <u>0</u> |
| LTC21_Heater_I | | | <u>0</u> |
| LTC21_Heater_D | | | <u>0</u> |
| LTC21_Heater_Max_Pwr 0=off,1..4 | | | <u>0</u> |
| LTC21_Heater_PIDtable_index | | | <u>1</u> |
| LTC21_Heater_Control_Mode | | | <u>4</u> |
| LTC21_Heater_Sensor | | | <u>3</u> |
| LTC21_Analog_Set_Point (K) | | | <u>306.5</u> |
| LTC21_Analog_P | | | <u>0</u> |
| LTC21_Analog_I | | | <u>0</u> |
| LTC21_Analog_D | | | <u>0</u> |
| LTC21_Analog_Output_Gain | | | <u>1</u> |
| LTC21_Analog_Output_Offset | | | <u>0</u> |
| LTC21_Analog_PIDtable_index | | | <u>1</u> |
| LTC21_Analog_Control_Mode | | | <u>4</u> |
| LTC21_Analog_Sensor | | | <u>1</u> |
| LTC21_Sensor_1_Type | | | <u>5</u> |

Set Flow

| MIDAS experiment "alc" | | Sun May 1 12:23:21 2005 Refr:60 | |
|---|---------------------------------------|-------------------------------------|----------|
| <input type="button" value="ODB"/> | <input type="button" value="Status"/> | <input type="button" value="Help"/> | |
| <i>Equipment:</i> Scaler Magnet Hallprobe NMRprobe LTC21 SampleT RVC200 Beamline | | | |
| <i>Groups:</i> All | | | |
| Names | | Demand | Measured |
| Pfeiffer RVC200 FLO | | <u>3000</u> | 3000 |

Demand = 3000 for $T = 0 - 100$ °C,
set Demand = 10000 for cooling down,
base temp. ???

History

MIDAS experiment "alc" Tue May 10 08:59:06 2005 Refr:60

ODB Alarms Status

Please select panel:

| | |
|-------------|---|
| ALL | |
| Default | Magnet |
| Temperature | Sample LTC21 |
| Field | Field Hallprobe NMRprobe |
| FLOW | RVC200 |
| Rates | BW FW E-field |
| Beamline | Beamline Area |

New

MIDAS experiment "alc" Tue May 10 08:59:56 2005 Refr:60

ODB Alarms Status

ALL

| | |
|-------------|---|
| Default | Magnet |
| Temperature | Sample LTC21 |
| Field | Field Hallprobe NMRprobe |
| FLOW | RVC200 |
| Rates | BW FW E-field |
| Beamline | Beamline Area |

New

10m 1h 3h 12h 24h 3d 7d < + - Large Small Create ELog Config Query

Temperature/Sample

| Time | SampleTemp Measured (K) | LTC21_Analog_Temperature (rb K) |
|----------|-------------------------|---------------------------------|
| 08:58:00 | ~296.0 | ~294.5 |
| 08:59:00 | ~296.0 | ~294.5 |

ODB: **DO NOT TOUCH!** – discuss with Instrument Scientist first

Start frontends from terminal by running the command
alc_start_midass

Shutdown all frontends:

alc_mcleanup

```
[l_musr_alc@pc4244 alc]$ alc_mcleanup
Midas cleanup procedure for experiment ALC...
Stopping MIDAS clients...
09:48:00 [ODBEdit] Program ODBEdit on host pc4244 stopped
09:48:00 [IPS120 SC] Program IPS120 SC on host pc4244 stopped
09:48:00 [alc_fe] Program alc_fe on host pc4244 stopped
09:48:00 [HALL_SCfe] Program HALL_SCfe on host pc4244 stopped
09:48:00 [ODBEdit1] Cannot shutdown client "NMR_SCfe", please kill manually and do an ODB cleanup
09:48:00 [SampleT_scfe] Program SampleT_scfe on host pc4244 stopped
09:48:00 [LTC21 SC] Program LTC21 SC on host pc4244 stopped
09:48:00 [BeamLine SC] Program BeamLine SC on host pc4244 stopped
09:48:00 [Logger] Program Logger on host pc4244 stopped
09:48:00 [mhttpd] Program mhttpd on host pc4244 stopped
09:48:00 [RVC200 Frontend] Program RVC200 Frontend on host pc4244 stopped
09:48:00 [Analyzer] Program Analyzer on host pc4244 stopped
odbedit exit status 0
Now I do an ODB cleanup...
Killing processes in case that odbedit failed to stop them ...
Process with pid \003256\ (mhttpd) ...killednecho -n Process with pid \003278\ (nmr_scfe) ...
killedn
killproc exit status 0
killing mozilla...
mozilla-bin: no process killed
killing opera...
opera: no process killed
Cleaning up shared memory segments for user l_musr_alc ...
Shared memory segment id 65537 ...
resource(s) deleted
Shared memory segment id 98306 ...
resource(s) deleted
Shared memory segment id 131075 ...
resource(s) deleted
Cleaning up semaphores for user l_musr_alc ...

----- Shared Memory Segments -----
key          shmid      owner      perms      bytes      nattch     status
0x00000000  0          root       777        49152      1

----- Semaphore Arrays -----
key          semid      owner      perms      nsems
0x4d05c027  0          l_musr_al 666        1
0x4d05c028  32769     l_musr_al 666        1
0x4d05c029  65538     l_musr_al 666        1
0x4d05c080  98307     l_musr_al 666        1
0x4d05c1c0  131076    l_musr_al 666        1

----- Message Queues -----
key          msqid      owner      perms      used-bytes  messages
[l_musr_alc@pc4244 alc]$
```

(eventually run twice or more... until no midas daemons left)
then it looks like:

```
[l_musr_alc@pc4244 alc]$ alc_mcleanup
Midas cleanup procedure for experiment ALC...
Stopping MIDAS clients...
No clients found
odbedit exit status 0
Now I do an ODB cleanup...
Killing processes in case that odbedit failed to stop them ...
killproc exit status 0
killing mozilla...
```

```
mozilla-bin: no process killed
killing opera...
opera: no process killed
Cleaning up shared memory segments for user l_musr_alc ...
Cleaning up semaphores for user l_musr_alc ...
```

```
----- Shared Memory Segments -----
key      shmid      owner      perms      bytes      nattch     status
0x00000000 0          root       777        49152      1

----- Semaphore Arrays -----
key      semid      owner      perms      nsems
0x4d05c027 0          l_musr_al 666        1

----- Message Queues -----
key      msqid      owner      perms      used-bytes  messages

[l_musr_alc@pc4244 alc]$
```

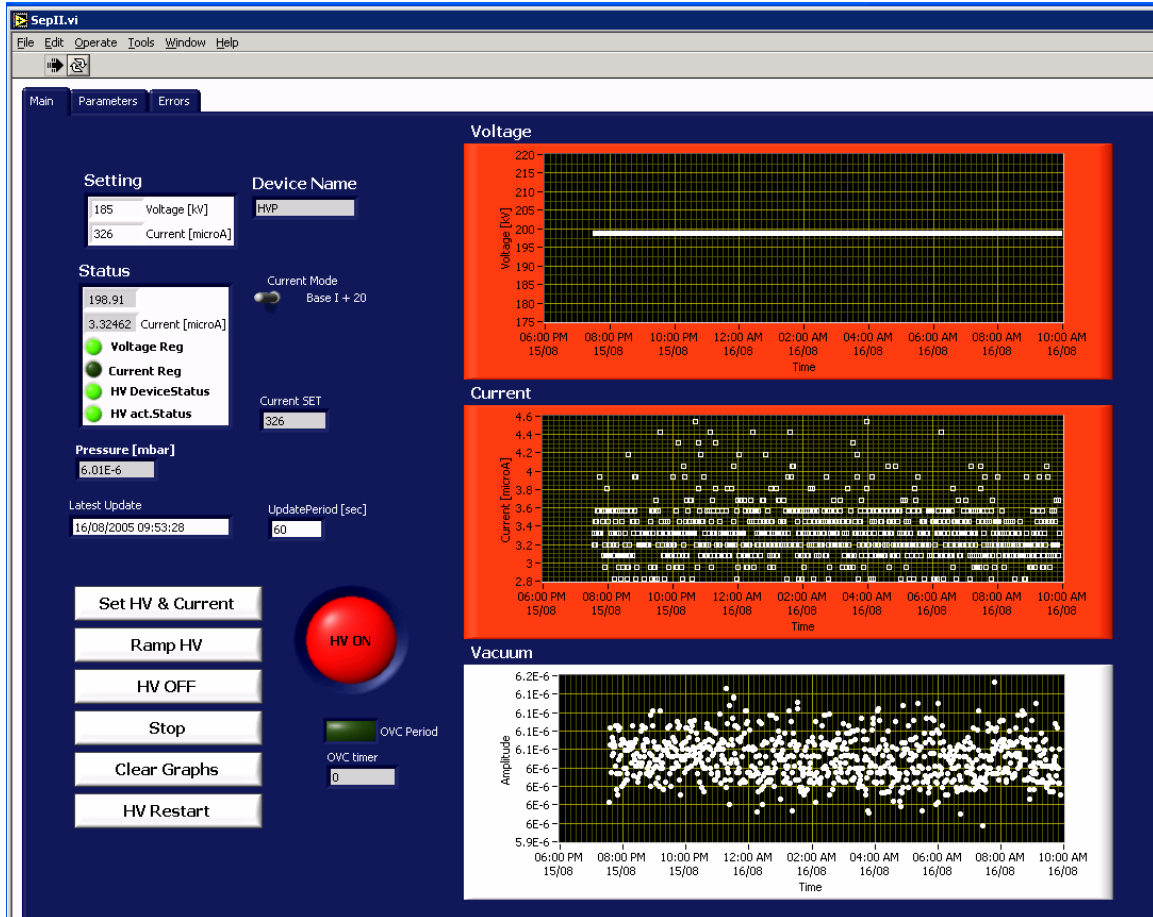
alternatively: start midas daemons one by one without X-server:

```
[l_musr_alc@pc4244]$ mhttpd -p 8080 -D
[l_musr_alc@pc4244]$ alc_fe -D
[l_musr_alc@pc4244]$ ips120_scfe -D
[l_musr_alc@pc4244]$ ltc21_scfe -D
[l_musr_alc@pc4244]$ samplet_scfe -D
[l_musr_alc@pc4244]$ hall_scfe -D
[l_musr_alc@pc4244]$ nmr_scfe -D
[l_musr_alc@pc4244]$ rvc200_scfe -D
[l_musr_alc@pc4244]$ bl_scfe -D
[l_musr_alc@pc4244]$ analyzer -D
[l_musr_alc@pc4244]$ mlogger -D
```

Separator: **vviewer sepii:0**, pw: exhalle

- if only black screen appears use **rdesktop sepii**, user: halle, pw: exhalle

under winXP: Remote Desktop Connection (All Programs – Accessories – Communications)



for **HV = 150 kV: SEP = 746**

The beamline setting is named **ALC2005_1st_period.set**.

Data written as **ASCII file: alc_05_NNNN.dat**
(run number NNNN)

format:

19 header lines followed by data, lines containing **48 columns** each

```
!File: /home/l_musr_alc/exp/alc/alc_05_0270.dat
!Run : 270
!Start/Stop time: 01:25:32 (30-04-2005) / 06:55:08 (30-04-2005)
!Comment: cell 107, 15% DHTAC / 50 mole% ortho-chlorobenzoate, 35C
!Field [T]: prescan = 1.5000; from = 1.5500; to = 2.3000; step = 0.0005
!Temperature (cold finger) : T1 = 346.503 K; dt1 = 0.029 K
!Temperature (sample plate): T2 = 350.154 K; dt2 = 0.063 K
!Preset Count: 1500000
!Group of preset detectors: 0x00000004
!Group of forward detectors: 0x007f0000
!Group of backward detectors: 0x000007f0
!
!
!
!
!-----
!   B_IPS   asym   a_err   I_IPS   B_NMR   B_Hall   T1   T2   reserve[0..7]   scaler[0..31]
!-----
0   1.5500   0.11370   0.00031   22.79400   1.5481   1.5480   346.629   350.034   0   0   0
756272   827958   883336   764988   0   0   0   0   915025   829539   925851
512164   508840   602534   716321   0   0   0   0   0   862837   751539   743396
0   0   0   0   0   0   0   0   0   0   0
0   1.5505   0.11459   0.00030   22.80140   1.5485   1.5480   346.660   350.027   0   0   0
767071   839195   895571   777035   0   0   0   0   927877   842968   938642
518703   514314   612899   725841   0   0   0   0   0   872329   758847   754103
0   0   0   0   0   0   0   0   0   0   0
```

scaler[28] – [31] contains the sums of all detector counts in fw and bw generated by an FC103 ‘OR’ unit. This avoids counting of double hits.

```
sb_pos = scaler[28];
sb_neg = scaler[29];
sf_pos = scaler[30];
sf_neg = scaler[31];
```

The resulting asymmetry and error are written in reserve[0] – [3] for pos. and neg. electric field applied (asy_pos, errasy_pos, asy_neg, errasy_neg). (Only negative polarity if no electric field clock signal present!).

AFS data path:

/afs/psi.ch/project/bulkmusr/data/alc/ti/
defined as DATAPATH on pc5145: **cd \$DATAPATH**

visualize, e.g., gnuplot: `plot "alc_05_0123.dat" u 1:2:3 w e`

use **Root** on pc5145:

```
cd /home/l_musr_alc/ALC
root -l DoALC.C
[] load();
[] plot();
[] combine();
[] save();
```

Appendix: Some ODB entries

| MIDAS experiment "alc" Sat May 14 16:06:03 2005 | | | | | | |
|---|-------------------------|--------|--------|----------|--------|------|
| Find | Create | Delete | Alarms | Programs | Status | Help |
| Create Elog from this page | | | | | | |
| / Experiment / Run Parameters / | | | | | | |
| Key | Value | | | | | |
| Cryostat | LN2 | | | | | |
| Ip_min | 1.2 | | | | | |
| rate_min | 22000 | | | | | |
| TestRun | n | | | | | |
| comment | test | | | | | |
| prescan-Field | 0 | | | | | |
| from-Field | 0 | | | | | |
| to-Field | 0.22 | | | | | |
| stepsize-field | 0.001 | | | | | |
| number_of_runs | 7 (0x7) | | | | | |
| autorun_active | 1 (0x1) | | | | | |

Ip_min is the minimum required beam current on Target E in mA. Measurement is paused when the current is lower.

rate_min is the minimum required positron rate in the sum of the backward counters (this makes sure that the run is automatically paused when the beamblocker is closed).

TestRun = 'n' writes datafile 'alc_05_NNNN.dat'
TestRun= 'y' writes 'test_alc_05_NNNN.dat'

| MIDAS experiment "alc" | | Sat May 14 16:12:15 2005 | |
|---|--------------------|--------------------------|--------|
| Find | Create | Delete | Alarms |
| Programs | Status | Help | |
| Create Elog from this page | | | |
| / Analyzer / Parameters / scaler_analysis / | | | |
| Key | Value | | |
| Ip_channel | 2 (0x2) | | |
| preset_channels | 4 (0x4) | | |
| preset_value | 1500000 (0x16E360) | | |
| Forward_Detectors | 8323072 (0x7F0000) | | |
| Backward_Detectors | 2032 (0x7F0) | | |

Ip_channel is the channel number (starting at 0, in the above example this is the third channel) of the proton beam current signal, 100 kHz correspond to 1 mA.

preset channels is the bitmask for the scaler channels used for the preset counting register in hex form. In the above example this is the proton current (equivalent to counting for a certain number of incoming muons). 3rd channel has bitmask 0100, represented by 0x4 in hex code.

preset_value is the number of counts per field points in the preset_channel. 1'500'000 counts in the proton beam channel correspond to 10 seconds measurement time at an average beam of 1.5 mA. Keep in mind that the scaler is read only every 3 seconds...

Forward_Detectors, Backward_Detectors is the bitmask for the detectors in hex code.
 FW: 0x7F0000 == 0111 1111 0000 0000 0000 0000 == channels 17 – 23 out of 32,
 BW: 0x7F0 == 0000 0000 0000 0111 1111 0000 == channels 5 – 11 out of 32.

| MIDAS experiment "alc" | | Sat May 14 16:51:28 2005 | |
|---|--------------|--------------------------|--------|
| Find | Create | Delete | Alarms |
| Programs | Status | Help | |
| Create Elog from this page | | | |
| / Analyzer / Parameters / ScalerRateSum / | | | |
| Key | Value | | |
| Channel_norm_time | 1 (0x1) | | |
| Rate_norm_time | 1000 (0x3E8) | | |

Channel_norm_time scaler[n] (#n) is number of the channel used for the clock signal (starting at channel 0, here in the second channel (scaler[1])) and **Rate_norm_time** is the clock frequency (1 kHz).

Contacts:

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alexey.stoykov@psi.ch

phone: 3465
 phone: 3200
 πE3 mobile phone: 5883
 ALC counting room: 3025

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