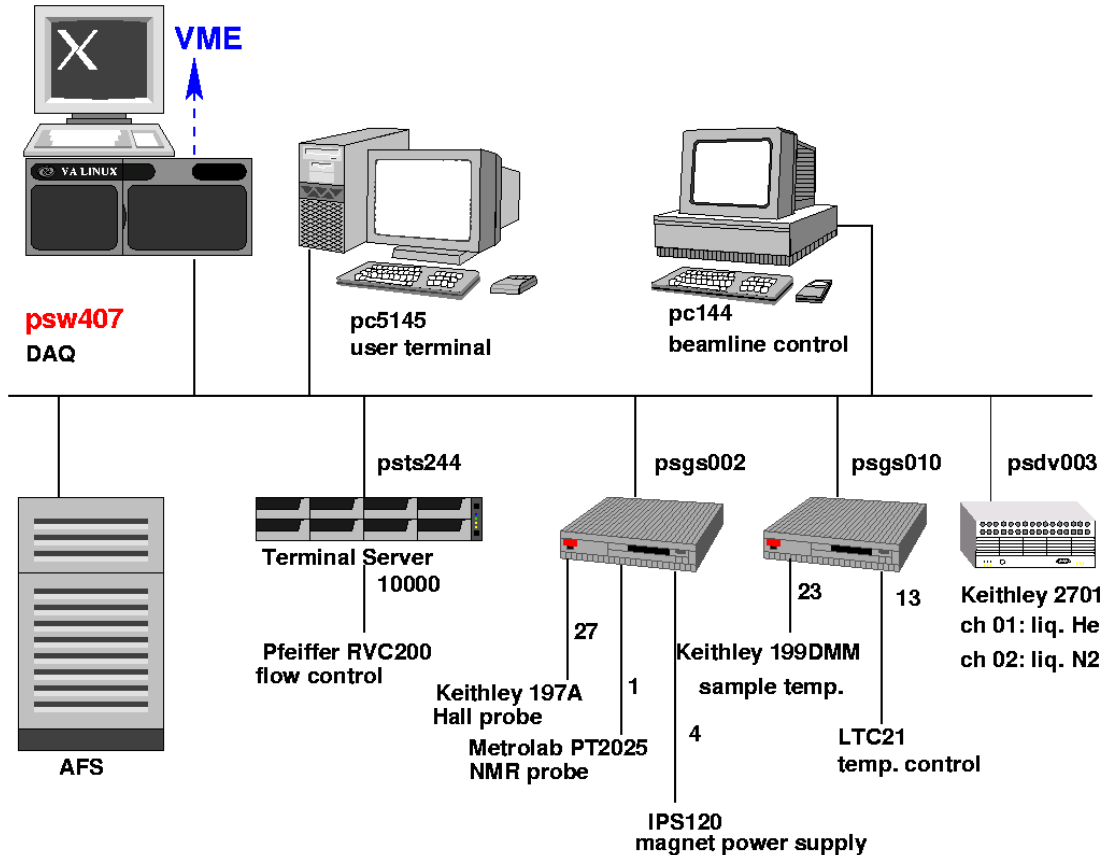


MIDAS experiment „alc“

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...)

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 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	301		
comment	test		
prescan_Field(T)	0		
lower_Field(T)	0		
upper_Field(T)	0.22		
stepSize_Field(T)	0.001		
number_of_runs	7		
autorun_active	1		
		Start	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		1.88798	1.88798
Magnet-Status		0	1
Magnet-Current		0	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		0	1.8902

read NMR probe

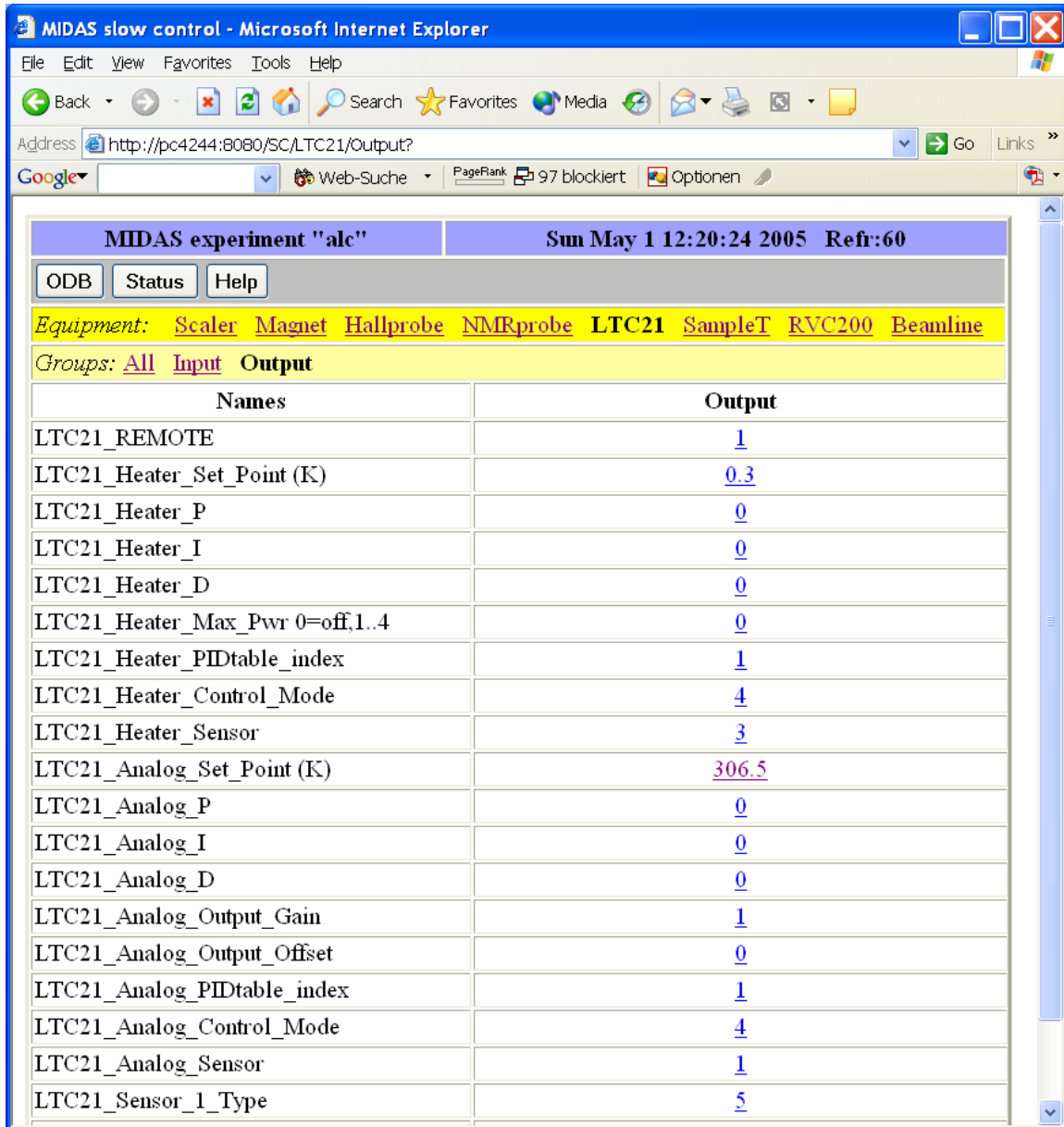
MIDAS experiment "alc"		Sun May 1 12:18:25 2005 Refr:60	
ODB Status Help			
Equipment: Scaler Magnet Hallprobe NMRprobe LTC21 SampleT RVC200 Beamline			
Groups: All			
Names		Demand	Measured
METROLAB PT2025		0	1.88959

```
- 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

ODB Status Help

Equipment: [Scaler](#) [Magnet](#) [Hallprobe](#) [NMRprobe](#) **LTC21** [SampleT](#) [RVC200](#) [Beamline](#)

Groups: [All](#) [Input](#) [Output](#)

Names	Output
LTC21_REMOTE	1
LTC21_Heater_Set_Point (K)	0.3
LTC21_Heater_P	0
LTC21_Heater_I	0
LTC21_Heater_D	0
LTC21_Heater_Max_Pwr 0=off,1..4	0
LTC21_Heater_PIDtable_index	1
LTC21_Heater_Control_Mode	4
LTC21_Heater_Sensor	3
LTC21_Analog_Set_Point (K)	306.5
LTC21_Analog_P	0
LTC21_Analog_I	0
LTC21_Analog_D	0
LTC21_Analog_Output_Gain	1
LTC21_Analog_Output_Offset	0
LTC21_Analog_PIDtable_index	1
LTC21_Analog_Control_Mode	4
LTC21_Analog_Sensor	1
LTC21_Sensor_1_Type	5

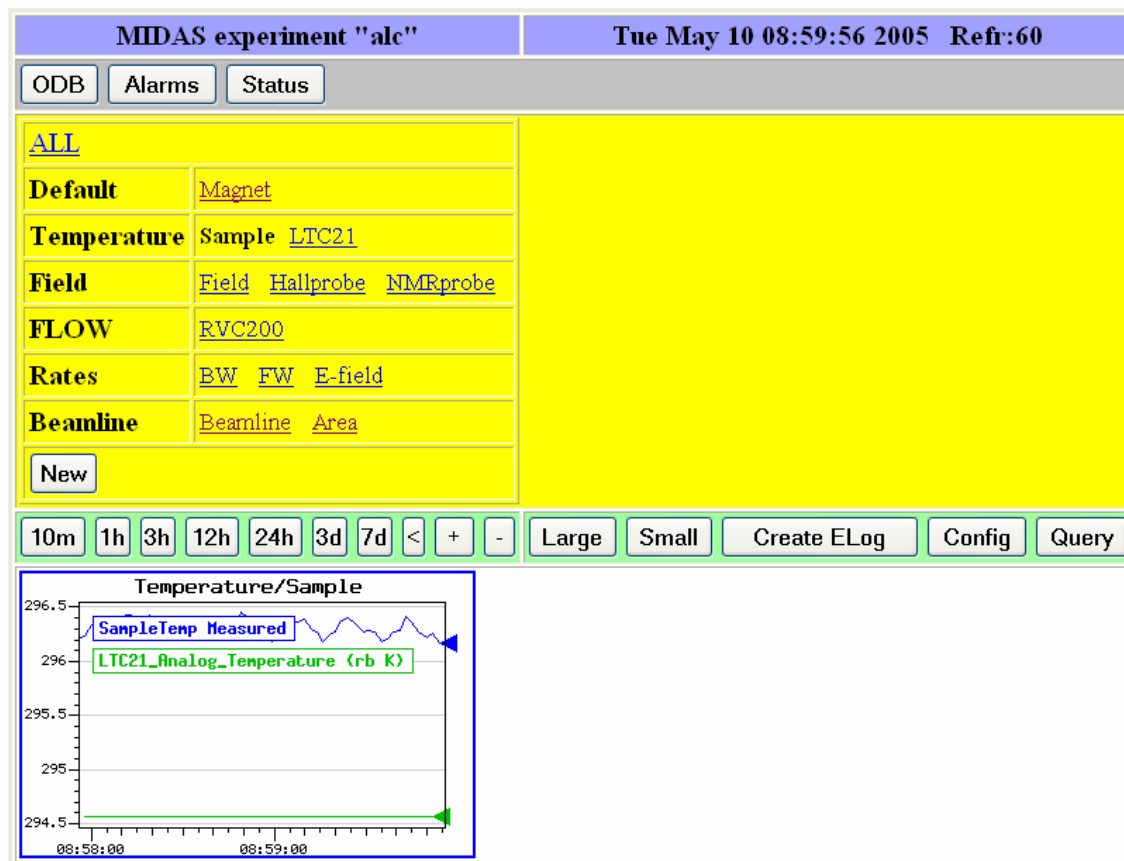
Set Flow

MIDAS experiment "alc"		Sun May 1 12:23:21 2005 Refr:60	
ODB	Status	Help	
Equipment: Scaler Magnet Hallprobe NMRprobe LTC21 SampleT RVC200 Beamline			
Groups: All			
Names		Demand	Measured
Pfeiffer RVC200 FLO		3000	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			



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

Start frontends from terminal by running the command
alc_start_midas

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:**

```

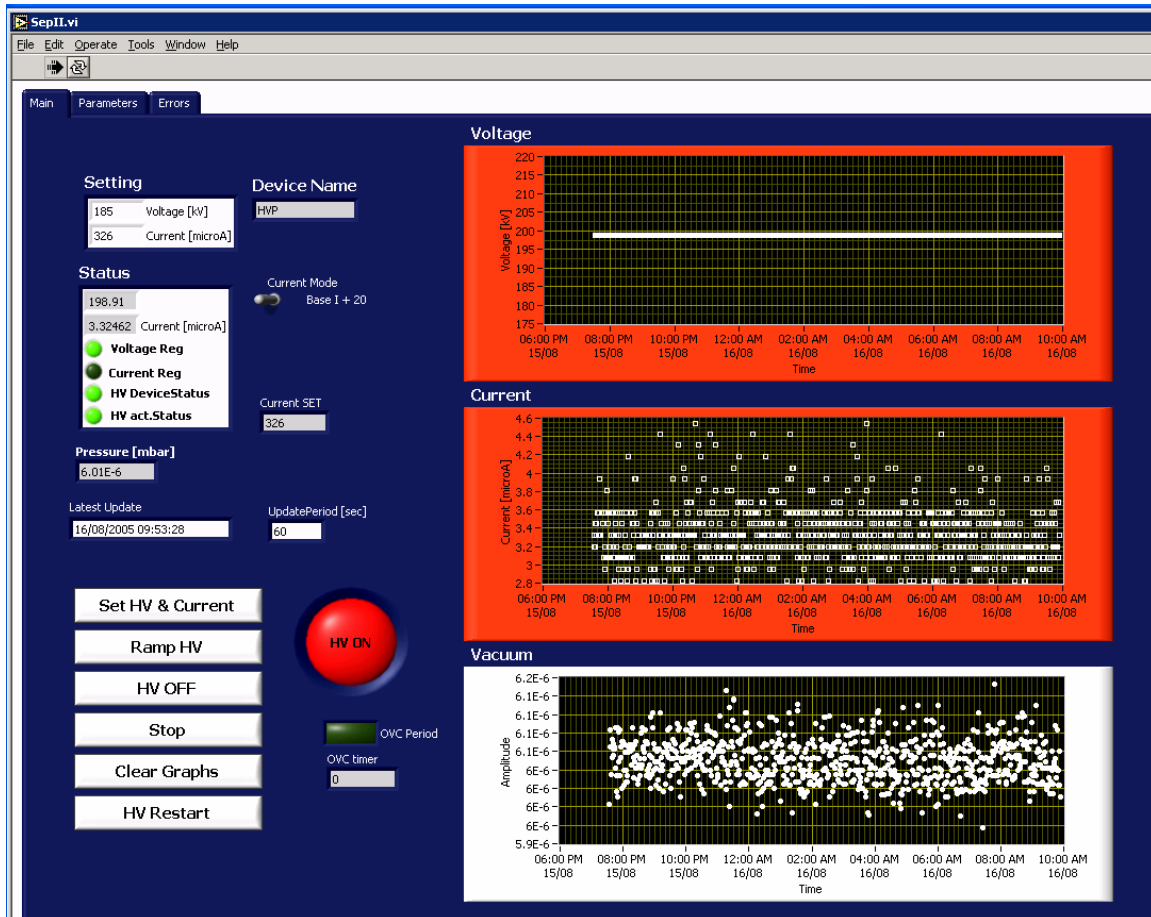
[l_musr_alc@pc4244]$ mhttpd -p 8080 -D
[l_musr_alc@pc4244]$ alc_fe -D
[l_musr_alc@pc4244]$ ips120_scfe -D
[l_musr_alc@pc4244]$ ltc21_scfe -D
[l_musr_alc@pc4244]$ samplet_scfe -D
[l_musr_alc@pc4244]$ hall_scfe -D
[l_musr_alc@pc4244]$ nmr_scfe -D
[l_musr_alc@pc4244]$ rvc200_scfe -D
[l_musr_alc@pc4244]$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

```

Separator: **vncviewer 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
0      0      0      0      0      0      9042    1601696    0      915025    829539    925851
756272    827958    883336    764988    0      0      0      0      0      0      862837    751539    743396
512164    508840    602534    716321    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
0      0      0      0      0      0      9149    1620915    0      927877    842968    938642
767071    839195    895571    777035    0      0      0      0      0      0      872329    758847    754103
518703    514314    612899    725841    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 beam blocker 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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