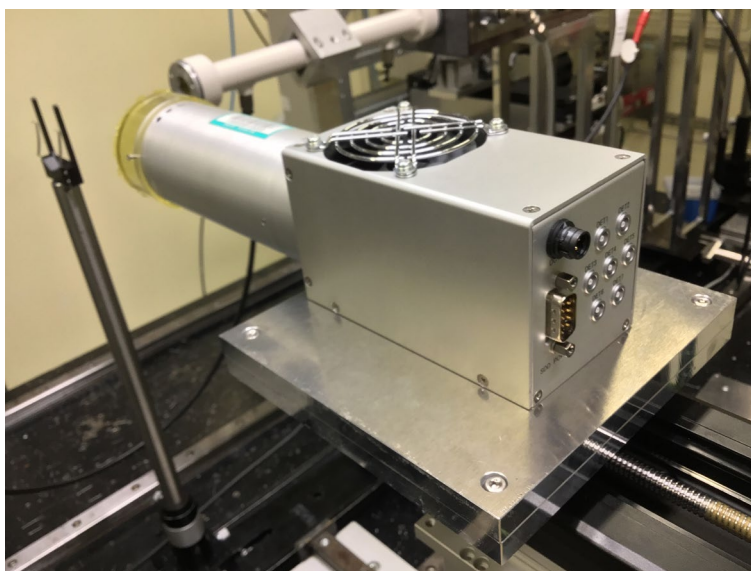


User manual of 7-element SDD by SPEC (BL14B2)

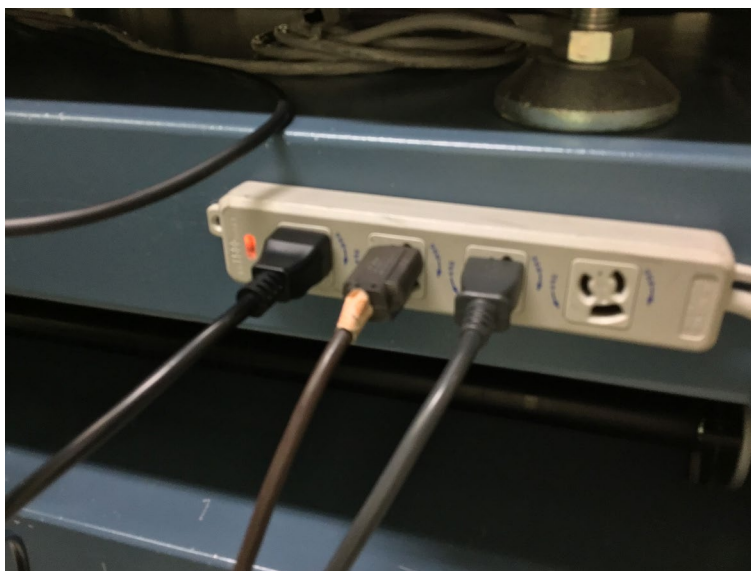
9.27.2023 Hironori Ofuchi

1. Preparation before using 7-element SDD

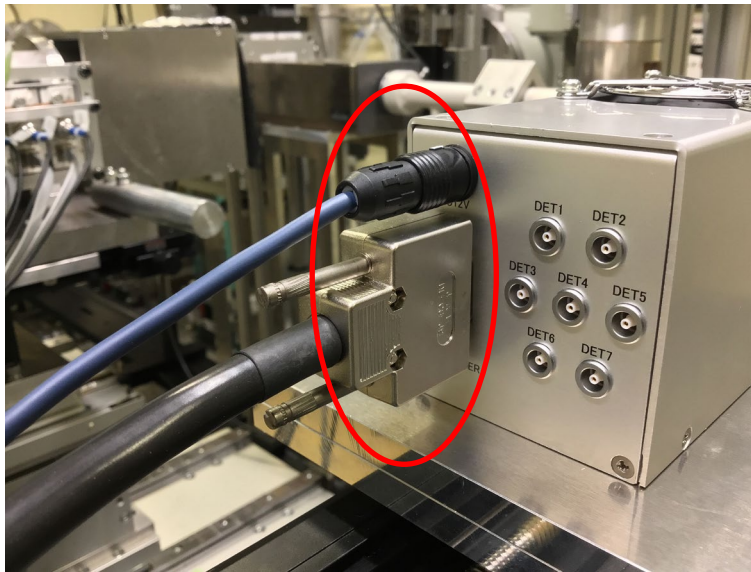
(1) Set the 7-element SDD on the X-Z stage.



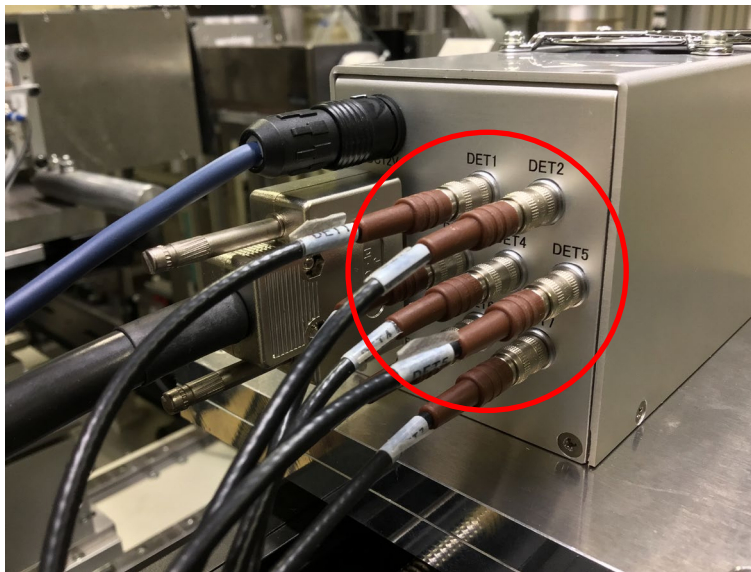
(2) Connect the power cable (SPEC PC, DSPs, and hub) to power tap.



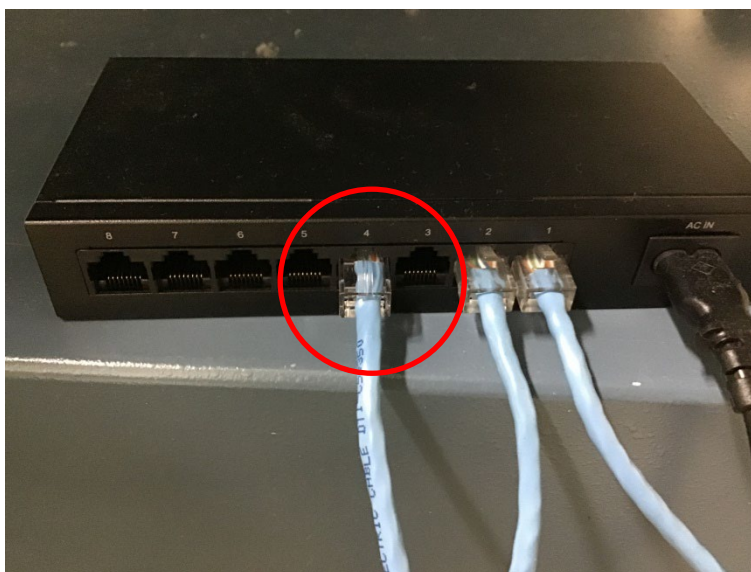
(3) Connect the DSP and fan cable to the 7-element SDD.



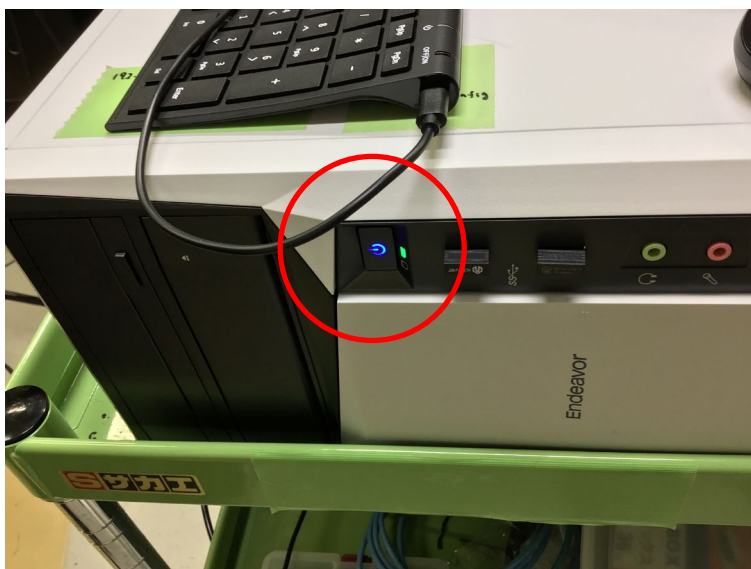
(4) Connect the signal cables to the 7-element SDD. Each connector number (DET1-7) is labeled on each signal cable.



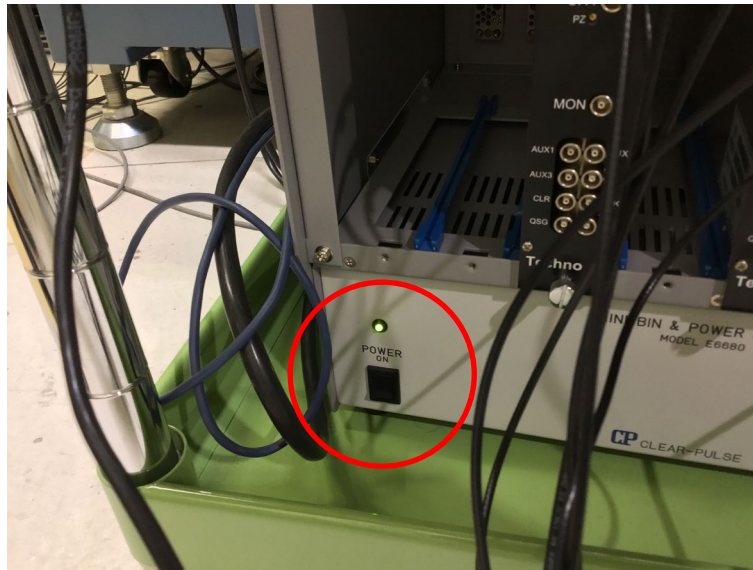
(4) Connect LAN cable to the hub.



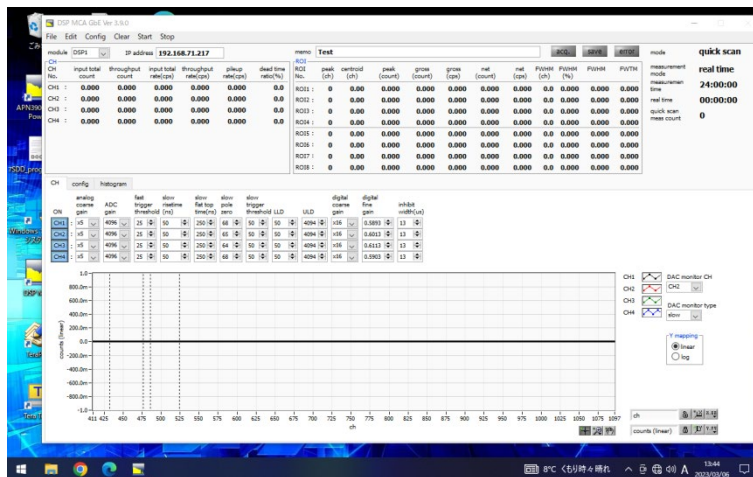
(5) Turn on the 7-element SDD PC.



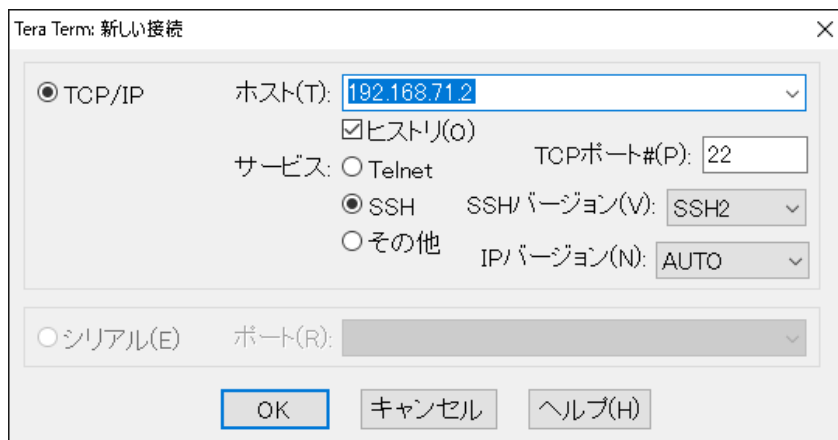
(6) Turn on the power supply of DSPs.



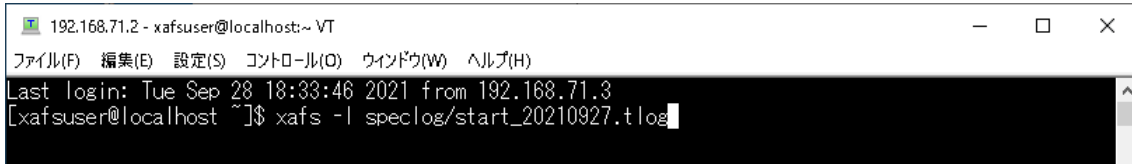
(7) Log in the 7-element SDD PC and run “DSP MCA” program on desktop (by staff). Exit the program after confirming that the program has started.



(8) Start software “Teraterm” to login SPEC server (192.168.71.2). Login SPEC server (by staff).



(9) Run “xafs -l speclog/xafs_*****.tlog” (*****: date).



```
192.168.71.2 - xafsuser@localhost:~ VT
ファイル(F) 編集(E) 設定(S) コントロール(O) ウィンドウ(W) ヘルプ(H)
Last login: Tue Sep 28 18:33:46 2021 from 192.168.71.3
[xafsuser@localhost ~]$ xafs -l speclog/start_20210927.tlog
```

2. Setting of 7-elements SDD

(1) Run “**HV_on_sdd**” macro.

```
0000.XAFS> HV_on_sdd
```

(2) Run “**sdd_on**” macro.

```
0000.XAFS> sdd_on
```

(3) Run “**setdir_7sdd**” macro to set data storage directory.

```
setdir_7sdd dir
```

```
0000.XAFS> setdir_7sdd 20220101
```

(4) Set standard sample in sample holder.

(5) Run “**set_all_db_roi**” macro to read ROI parameters from the database.

```
setdir_7sdd element-edge
```

```
0000.XAFS> set_all_db_roi Cu-K
```

If the ROI parameters are not registered in the database, the message “指定したフォルダは存在しない” will be displayed.

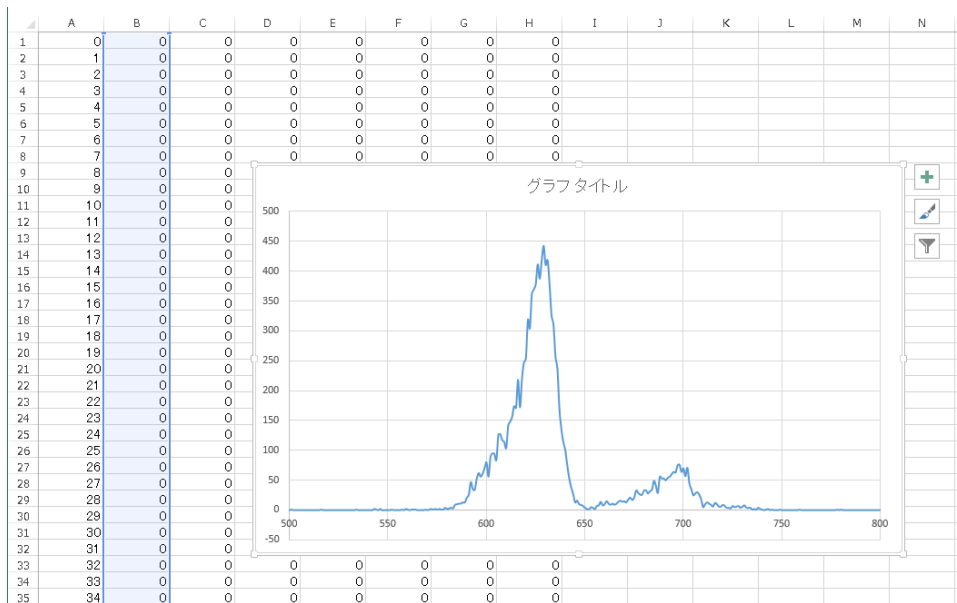
(5) Open DSS. Run “**ct ; get_all_count**” macro to count intensity of SDD.

```
0000.XAFS> ct ; get_all_count
```

(6) Run “**sdd_mca_out**” macro to save mca data file. The Mca data file is saved in /xafsuser/xas/mca directory at SPEC server.

```
0000.XAFS> sdd_mca_out CuO_mca
```

(7) Open mca data by Excel, and check ROI.



(6) Run “put_roi_all” macro to set ROI parameter.

`put_roi_all min max`

```
0000.XAFS> put_roi_all 350 520
```

(8) Run “put_roi” macro when you want to change ROI parameter for specific channel.

`put_roi min max channel_number`

```
0000.XAFS> put_roi 300 450 5
```

3. Measuring deadtime correction data (if needed)

(1) Set the attenuator downstream of the second mirror.

(2) Adjust value of `ssdx` so that ICR counts of SDD become 250,000 – 300,000 cps at maximum.

(3) Run “kazoe_sdd” macro.

`kazoe_sdd att dewll_time filename`

```
0000.XAFS> kazoe_sdd att 10 downtime_10s_Cu_K_A_mode_20220101
```

4. Measuring XAFS spectrum

(1) Set sample in the sample holder.

(2) Run “DSS_op” macro to open DSS shutter.

```
0000.XAFS> DSS_op
```

(3) Run “ct; get_all_count” macro to count intensity of SDD.

```
ct ; get_all_count
```

```
0000.XAFS> ct; get_all_count
```

```
ICR_CH1 = 11931 count ,   SCA_CH1 = 9855 count,   ICT_CH1 = 12154 count  
ICR_CH2 = 11824 count ,   SCA_CH2 = 9729 count,   ICT_CH2 = 11965 count  
ICR_CH3 = 11988 count ,   SCA_CH3 = 9858 count,   ICT_CH3 = 12166 count  
ICR_CH4 = 11924 count ,   SCA_CH4 = 9899 count,   ICT_CH4 = 12047 count  
ICR_CH5 = 11553 count ,   SCA_CH5 = 9490 count,   ICT_CH5 = 11660 count  
ICR_CH6 = 11949 count ,   SCA_CH6 = 9907 count,   ICT_CH6 = 12076 count  
ICR_CH7 = 11696 count ,   SCA_CH7 = 9663 count,   ICT_CH7 = 11775 count
```

(4) Adjust value of ssdx so that ICR counts of SDD become 250,000 cps at maximum.

```
0000.XAFS> mv ssdx 50
```

(5) Run “getparam” macro to set parameter of step-scan XAFS.

```
getparam dir/filename
```

```
0000.XAFS> getparam /home/xafsuser/xas/par/Cu-K_111_k16_1s.par
```

```
d value = 3.135510
```

```
number of sections = 8
```

```
index / number of steps / Angle / step /seconds
```

```
0 / 28 / 13.015100 / -0.009010 /1
```

```
1 / 251 / 12.762350 / -0.000520 /1
```

```
2 / 40 / 12.631810 / -0.002680 /1
```

```
3 / 40 / 12.524520 / -0.003680 /1
```

```
4 / 40 / 12.377350 / -0.004600 /1
```

```
5 / 40 / 12.193180 / -0.005440 /1
```

```
6 / 40 / 11.975460 / -0.006190 /1
```

```
7 / 41 / 11.728030 / -0.006820 /1
```

```
 / / 11.455030 / /
```

```
TOTAL NUMBER of points = 520
```

(6) Run “xas_scan” macro to start measuring step-scan XAFS.

xas_scan filename SDD repetition number

```
0000.XAFS> xas_scan CuO SDD 1
```

5. Suspending measurement

(1) Push “Ctrl-C” key to stop measurement.

(2) Run “recover_mono_all” macro to recover Y1 axis of monochromator.

```
0000.XAFS> recover_mono_all
```

(3) Run “close_opned_files” macro.

```
0000.XAFS> close_opned_files
```

6. After measurement

(1) Run “sdd_off” macro.

```
0000.XAFS> sdd_off
```

(2) Run “HV_off_sdd” macro to stop HV of SDD.

```
0000.XAFS> HV_off_sdd
```

(3) Turn off power supply of DSPs.

(4) Turn of the SDD PC.

(5) Disconnect LAN cable to hub.

(6) Disconnect signal cables to SDD.

(7) Disconnect DSP and fan cable to SDD.

(8) Disconnect powder cable (SPEC PC, DSPs, and hub) to power tap.

(9) Remove 7-element SDD on X-Z stage.

Appendix

I. SPEC macro

<Opening DSS>

DSS_op

<Closing DSS>

DSS_cl

<Checking position of stage>

wa

(ex.)

```
0000.XAFS> wa
Current Positions (user, dial)
      xafsz      mr2z      mr2th  DetectX  DetectZ  CryoX  CryoZ  generalX
generalZ      sub1z      X_arm  Y_arm1  Y_arm2  Z_arm  Phi    Z_cas
Atten      SDDx      SDDz
      xafsz      mr2z      mr2th      decx      decz      cryox      cryoz      genex
genez      sub1z      xarm      yarm1      yarm2      zarm      phi      zcas
att      sddx      sddz
-63.6061 -62.7442 -5.0046  0.0000  5.0000 -9.0000  1.3000  0.0000
0.0000  65.0000 -9.6000 -55.7000 -55.7000  0.0000 -90.0000 -11.5040  0.0000
5.0000  0.1458
      63.6061 -62.7442 -5.0046  0.0000 -5.0000 -9.0000 -1.3000  0.0000
0.0000 -65.0000  9.6000 -55.7000 -55.7000  0.0000 -90.0000 -11.5040 141.0800
195.0000  0.1458
```

<moving position of stage>

mvr *stage_name length*

(ex.)

```
0000.XAFS> mvr sddx 10
```

Revision history

Revision date	Reviser
9.27.2023	Hironori Ofuchi