17-BM XAS Endstation Controls Status
2 August 2018
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Attached are summaries of the motor plan for the XAS endstation at 17-BM, as well as a status snapshot as of Thursday, 2 August 2018. In brief, essential components for first light at the XAS endstation are ready, with additional capabilities being brought on-line as resources permit.

A summary of status by component, as of 2 August 2018:

- ***Pre-mono slits:*** all individual motion axes are functional. Coordinated slit gap and translation motions are being developed (Controls trac ticket #2077).
- ***Monochromator components:*** theta motion is operational with motor shaft encoder feedback, as are both picomotor driven motions for the crystal assembly. These will be aligned and calibrated during commissioning activities. A Heidenhain angle encoder is available, with an interpolator for readback on order (scheduled delivery in October 2018).
- ***Pink beam absorber diagnostic***: this device has been bench tested on the Delta Tau level and is undergoing EPICS integration.
- ***Monochromatic ADC slits:*** an ADC blue slits assembly is installed. This device is not critical for first light commissioning, but will be needed for beam characterization later in the commissioning program. At this time, the individual vertical slits are fully active, while troubleshooting is ongoing for the horizontal slits (device was fully functional on bench). Coordinated slit gap and translation motions are being developed (Controls trac ticket #2077).
- ***XAS endstation Table:*** 3 individual Y lift motors are functional. These are being tied together in a coordinated Y lift motion (Controls trac ticket #2077). This functionality is not critical for first light, but will be required for final alignment of components.
- ***XAS endstation motion stages:*** individual stepper motor stages for alignment of the sample (X, Y, Z) and detector (Y) are available and functional. Future developments include an X-axis stage for detector alignment.

Additional instrumentation has been integrated into EPICS for commissioning, including:

- XIA filter box assembly with 4 independent Al filters
- Weiner MPOD Micro crate with 8-channel HVPS for ionization chambers
- Weiner VME crate with MVME3100 CPU card and SIS3820 scaler

Additional capabilities will be brought online as the commissioning program proceeds.

Comp.	*Motor*	*Motor Cable No.*	*Encoder Cable No.*	*Ctrl:Ax*	*Rack*	*Encoder*	*Status/Notes*
XAS@XFP	FREE	17BM-100087-RG:A1-AHBA-B	17BM-100119-RG:A1-AHBA-B	MC5:4	A1		to ES:3
XAS@XFP	FREE	17BM-100088-RG:A1-AHBA-B	17BM-100120-RG:A1-AHBA-B	MC5:5	A1		to ES:3
XAS@XFP	Table3:Y1	17BM-100089-RG:A1-AHBA-B	17BM-100121-RG:A1-AHBA-B	MC5:6	A1	N	component of virt mtr Table3:Y
XAS@XFP	Table3:Y2	17BM-100090-RG:A1-AHBA-B	17BM-100122-RG:A1-AHBA-B	MC5:7	A1	N	component of virt mtr Table3:Y
XAS@XFP	Table3:Y3	17BM-100091-RG:A1-AHBA-B	17BM-100123-RG:A1-AHBA-B	MC5:8	A1	N	component of virt mtr Table3:Y
XAS@XFP	premono-slit-top	17BM-100145-RG:A2-AHTA3-B	17BM-100161-RG:A2-AHTB3-B	MC6:1	A2	N	component of virt mtr premono_Y
XAS@XFP	premono-slit-bot	17BM-100146-RG:A2-AHTA3-B	17BM-100162-RG:A2-AHTB3-B	MC6:2	A2	N	component of virt mtr premono_Y
XAS@XFP	premono-slit-inb	17BM-100147-RG:A2-AHTA3-B	17BM-100163-RG:A2-AHTB3-B	MC6:3	A2	N	component of virt mtr premono_X
XAS@XFP	premono-slit-outb	17BM-100148-RG:A2-AHTA3-B	17BM-100164-RG:A2-AHTB3-B	MC6:4	A2	N	component of virt mtr premono_X
XAS@XFP	ADC-slit-top	17BM-100149-RG:A2-AHTA3-B	17BM-100165-RG:A2-AHTB3-B	MC6:5	A2	N	component of virt mtr ADC_X
XAS@XFP	ADC-slit-bot	17BM-100150-RG:A2-AHTA3-B	17BM-100166-RG:A2-AHTB3-B	MC6:6	A2	N	component of virt mtr ADC_X
XAS@XFP	ADC-slit-inb	17BM-100151-RG:A2-AHTA3-B	17BM-100167-RG:A2-AHTB3-B	MC6:7	A2	N	component of virt mtr ADC_Y
XAS@XFP	ADC-slit-outb	17BM-100152-RG:A2-AHTA3-B	17BM-100168-RG:A2-AHTB3-B	MC6:8	A2	N	component of virt mtr ADC_Y
XAS@XFP	mono_theta	17BM-100153-RG:A2-AHTA3-B	17BM-100169-RG:A2-AHTB3-B	MC7:1	A2	Y	Oct 2018: Heidenhain angle encoder readback
XAS@XFP	PB-diag-Y	17BM-100154-RG:A2-AHTA3-B	17BM-100170-RG:A2-AHTB3-B	MC7:2	A2	N	no limits
XAS@XFP	FREE	17BM-100155-RG:A2-AHTA3-B	17BM-100171-RG:A2-AHTB3-B	MC7:3	A2		
XAS@XFP	Det_Y	17BM-100156-RG:A2-AHTA3-B	17BM-100172-RG:A2-AHTB3-B	MC7:4	A2	Y	
XAS@XFP	Det_X	17BM-100157-RG:A2-AHTA3-B	17BM-100173-RG:A2-AHTB3-B	MC7:5	A2	Y	**to be implemented**
XAS@XFP	Cryo_Y	17BM-100158-RG:A2-AHTA3-B	17BM-100174-RG:A2-AHTB3-B	MC7:6	A2	Y	
XAS@XFP	Cryo_X	17BM-100159-RG:A2-AHTA3-B	17BM-100175-RG:A2-AHTB3-B	MC7:7	A2	Y	
XAS@XFP	Cryo_Z	17BM-100160-RG:A2-AHTA3-B	17BM-100176-RG:A2-AHTB3-B	MC7:8	A2	N	
XAS@XFP	mono_chi	-	-	MC8:1	-	-	NewFocus 8742 picomotor driver
XAS@XFP	mono_bender	-	-	MC8:2	-	-	NewFocus 8742 picomotor driver
XAS@XFP	FREE	-	-	MC8:3	-	-	NewFocus 8742 picomotor driver
XAS@XFP	FREE	-	-	MC8:4	-	-	NewFocus 8742 picomotor driver

free axis

Module	Pre-Mono Slits				Monochromator			Pink Beam Diag.	Monochromatic ADC Slits		
Component	Slt:PrM-Ax:T	Slt:PrM-Ax:B	Slt:PrM-Ax:I	Slt:PrM-Ax:O	Mono:1-Ax:Theta	Mono:1-Ax-th2f	Mono:1-Ax-ch2f	WBS:1-Ax:Y	Slt:ADC-Ax:T	Slt:ADC-Ax:B	Slt:ADC-Ax:I
Axis	Premono Y Top	Premono Y Bot	Premono X Inb	Premono X Out	Mono Theta	Pico th2f - bender	Pico ch2f - chi	PB Diagnostic Y	ADC Slt Y Top	ADC Slt Y Bot	ADC Slt X Inb
Controller	xf17bma-mc06	xf17bma-mc06	xf17bma-mc06	xf17bma-mc06	xf17bma-mc07	xf17bma-mc08	xf17bma-mc08	xf17bma-mc07	xf17bma-mc06	xf17bma-mc06	xf17bma-mc06
Axis number	1	2	3	4	1	1	2	2	5	6	7
Motor type	1.8° stepper	1.8° stepper	1.8° stepper	1.8° stepper	0.9° stepper	picomotor	picomotor	1.8° stepper	1.8° stepper	1.8° stepper	1.8° stepper
Encoder type	none	none	none	none	incr. rotary, Heidenhain angle	N/A	N/A	none	none	none	none
EU	mm	mm	mm	mm	deg	micron	micron	mm	mm	mm	mm
+ limit	11.100	11.700	6.500	6.350	N/A	N/A	N/A	N/A	N/A	N/A	N/A
- limit	-10.900	-11.700	-6.500	-6.250	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Range	22.000	23.400	13.000	12.600	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Resolution (steps/EU)	25850.01	25850.01	51699.76	51699.76	2110885	-	-	59254	14285.7	14285.7	14285.7
Resolution (EU/step)	3.86847E-05	3.86847E-05	1.93425E-05	1.93425E-05	4.737350E-07	2.10E-02	2.10E-02	1.68765E-05	7.0000E-05	7.0000E-05	7.0000E-05
Speed (EU/s)	0.5	0.5	0.25	0.25	0.01	20	20		0.25	0.25	0.25
Max. Speed (EU/s)	0.5	0.5	0.25	0.25	0.02	N/A	N/A		0.25	0.25	0.25
Ixx77 setting	1000	1000	1000	1000	2000	N/A	N/A	500	1000	1000	1000
+ limit checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
- limit checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Motion direction checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-07-31	EF/MS 2018-07-13	EF/MS 2018-07-13	in progress	EF 2018-08-02	EF 2018-08-02	EF 2018-08-02
Velocity Set/Checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-07-31	EF/MS 2018-07-13	EF/MS 2018-07-13	in progress	EF 2018-08-02	EF 2018-08-02	EF 2018-08-02
Full range motion checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	N.A.	N.A.	N.A.	in progress	EF 2018-08-02	EF 2018-08-02	In Progress (EF) 2018-08-02
EPICS interface checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-07-31	EF 2018-07-13	EF 2018-07-13	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01
EPICS calibration checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-07-31	N.A.	N.A.	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01
Overtravel limits checked	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	EF 2018-08-01	N.A.	N.A.	N.A.	EF 2018-08-02	EF 2018-08-02	EF 2018-08-02
Overall status	Ready	Ready	Ready	Ready	Ready	Ready	Ready	In Progress	Ready	Ready	In Progress
Notes	Virtual motor integration ongoing (8/2/18)	Virtual motor integration ongoing (8/2/18)	Virtual motor integration ongoing (8/2/18)	Virtual motor integration ongoing (8/2/18)	fully validate in commissioning. Heidenhain encoder readback integration planned Oct 2018	UHV motor function validated, complete setup in commissioning	axis functional on bench, motion to be tested during commissioning	Bench tested, integration ongoing at time of checkout	Limits to be set in commissioning. Virtual motor integration ongoing (8/2/18)	Limits to be set in commissioning. Virtual motor integration ongoing (8/2/18)	Functioned on bench, issue with reliable movement found in checkout. *Not required for first light.*

	Table3			Detector Motion	Sample/Cryo Motion		
Slt:ADC-Ax:O	Tbl:3-Ax:YUI	Tbl:3-Ax:YO	Tbl:3-Ax:YDI	Stg:8-Ax:Y	Stg:9-Ax:Y	Stg:9-Ax:X	Stg:9-Ax:Z
ADC Slt X Out	Table3 Y Upstream	Table3 Y Center	Table 3 Y Downstream	Detector Y	XAS Cryo Y	XAS Cryo X	XAS Cryo Z
xf17bma-mc06	xf17bma-mc05	xf17bma-mc05	xf17bma-mc05	xf17bma-mc07	xf17bma-mc07	xf17bma-mc07	xf17bma-mc07
8	6	7	8	4	6	7	8
1.8° stepper	1.8° stepper	1.8° stepper	1.8° stepper	0.9° stepper	0.9° stepper	0.9° stepper	0.9° stepper
none	none	none	none	incr. rotary	incr. rotary	incr. rotary	not implemented
mm	mm	mm	mm	mm	mm	mm	mm
N/A	N/A	N/A	N/A	96.000	96.500	75.000	404.500
N/A	N/A	N/A	N/A	-96.000	-96.500	-75.000	0.000
N/A	N/A	N/A	N/A	192.000	193.000	150.000	404.500
14285.7	62500	62500	62500	6280.02	6280.02	2534.85	2520.16
7.0000E-05	1.6000E-05	1.6000E-05	1.6000E-05	1.59235E-04	1.59235E-04	3.94501E-04	3.96800E-04
0.25	0.25	0.25	0.25	1.00	0.75	1.50	5.00
0.25	0.25	0.25	0.25	0.75	0.50	2.00	5.00
1000	1000	1000	1000	1000	1000	1000	2000
N.A.	N.A.	N.A.	N.A.	EF	EF	EF	EF
				2018-07-31	2018-07-31	2018-07-31	2018-07-31
N.A.	N.A.	N.A.	N.A.	EF	EF	EF	EF
				2018-07-31	2018-07-31	2018-07-31	2018-07-31
EF	EF	EF	EF	EF	EF	EF	EF
2018-08-02	2018-08-01	2018-08-01	2018-08-01	2018-07-31	2018-07-31	2018-07-31	2018-07-31
EF	EF	EF	EF	EF	EF	EF	EF
2018-08-02	2018-08-01	2018-08-01	2018-08-01	2018-07-31	2018-07-31	2018-07-31	2018-07-31
In Progress (EF)	N.A.	N.A.	N.A.	EF	EF	EF	EF
2018-08-02				2018-07-31	2018-07-31	2018-07-31	2018-07-31
EF	EF	EF	EF	EF	EF	EF	EF
2018-08-01	2018-08-01	2018-08-01	2018-08-01	2018-07-31	2018-07-31	2018-07-31	2018-07-31
EF	EF	EF	EF	EF	EF	EF	EF
2018-08-01	2018-08-01	2018-08-01	2018-08-01	2018-07-31	2018-07-31	2018-07-31	2018-07-31
EF	N.A.	N.A.	N.A.	EF	EF	EF	EF
2018-08-02				2018-07-31	2018-07-31	2018-07-31	2018-07-31
In Progress	Ready	Ready	Ready	Ready	Ready	Ready	Ready
Functioned on bench, issue with reliable movement found in checkout. *Not required for first light.*	Limits to be set in commissioning. Virtual motor integration ongoing (8/2/18)	Limits to be set in commissioning. Virtual motor integration ongoing (8/2/18)	Limits to be set in commissioning. Virtual motor integration ongoing (8/2/18)	Functional. Travel range to be refined during commissioning.	Functional. Travel range to be refined during commissioning.	Fully functional.	incr. rotary encoder avail., not implemented on this axis