

# SST Beamline FDR

Beamline Controls

Johnny Kirkland

- NIST team observes final installation of components by FMB Oxford
- NIST team observes operation of
  - Motor controls
  - Slits
  - Monochromators
  - Mirrors
  - Beamline diagnostic monitors
- NIST does final end-to-end acceptance test of systems

- FMB Oxford supplies IOCs, Engineering and Operation Screens for all components
- We evaluate screens to prioritize usefulness
- We add/edit screens for day-to-day operations
- We incorporate information most relevant to data acquisition into main data acquisition package

# XDAC data acquisition software

- XDAC was in use at 13 beamlines at the NSLS
- It is specialized for spectroscopy
- It has been used for over 15 years
- It has helped experimenters take data for thousands of publications

# Advantages of an Advanced GUI

- Saves time
  - Easier to train users
  - Easier for users to remember how to use when they return

# Advantages of an Advanced GUI

- Saves money
  - Less beamline staff time used for training
  - Less beamline staff time needed for handholding
  - Less beamline staff time needed for debugging

# Advantages of an Advanced GUI

- Saves photons
  - Faster training means data collection begins sooner
  - Faster training means beamline staff can devote more time to improving experiment
  - Data acquisition more efficient, more photons collected
  - Data acquisition more fool-proof, less loss of photons due to experimenter error

# XDAC main panel

The screenshot displays the XDAC main panel software interface. At the top, a menu bar includes File, Edit, Operate, Tools, Window, and Help. A status bar on the right shows 'X-3B Demo'. Below the menu bar, a row of controls includes 'Mono Position' (0.00), 'Timer' (0.0000), 'I0' (0.0000), 'Ip' (0.0000), 'I1' (0.0000), 'I2' (0.0000), 'IRING' (0.0000), and 'Ring' (0.0). The interface is divided into several functional areas:

- Monochromator Control:** Features a vertical 'Move' column with buttons for +200, +100, +50, 0, -50, -100, and -200. It also includes a 'Move' input field (0.00 eV) and buttons for 'Move Rel. to E0', 'Move Rel. to Current', and 'Move Absolute'. A 'Diffraction Element' dropdown is set to 'Si 111', with 'Calibrate' and 'Setup' buttons below it. A 'Home' button is also present.
- Data Storage:** Includes a 'Write Notes to Log' button, a 'Filename' field (Cu\_foil.001), and a 'User Comments' field (Copper foil calibration test). A 'File Options' button is set to 'PC Format'.
- E0 and Edges:** The 'E0' field is set to 8979.0. There are 'Edges' and 'Search' buttons.
- Scan Parameters:** Includes a 'Scan Type' dropdown (Energy), an 'Element' dropdown (Copper), and an 'Edge' dropdown (K). A '2-Step Scan' button is also visible.
- Setup and Actions:** The 'Setup' section has buttons for Detectors, Defined Scans, Motors, Optics, and Beamline. The 'Actions' section has buttons for Measure Offsets, Motor Control, Optics Control, Edit/Execute Macro, and Quit.
- Scan Configuration:** A 'Save' button is next to a 'Predefined Scans' dropdown (User). Fields include 'Number of Scans' (1), 'Regions per Scan' (1), 'Scan Region Boundaries' (-30,30), 'Scan Region Step Sizes' (.3), and 'Integration Times' (3). 'Mono Settling Time' is 0.50 and 'I0 Abort Level' is 0.010.
- Estimated Total Scan Time:** 13.67 minutes. A 'Check linearity' button and a large green 'Start Energy Scan' button are also present.

At the bottom left, the text reads: L.R. Furenlid, J.P. Kirkland, and A.J. Mayer. ©2012. Version #1.4

# XDAC motor setup panel

Motor Setup

File Edit Operate Tools Window Help

Motor Setup

Name	Module Type	TCP/IP Addr or PV	Motor Ini File	Camac Slot	Subadd	Max Speed	Acceleration	Unit Name	Conv-Factor	-Limit	+Limit	Backlash
HAtop	E500	0.0.0.0	null.prm	5	3	3000	20	mm	-1290.0787	-10.000	10.000	0
HAbot	Compu6K	0.0.0.0	null.prm	5	4	3000	20	mm	1290.0787	-10.000	10.000	0
HAright	ACR9000	0.0.0.0	null.prm	5	5	3000	20	mm	-1290.0784	-100.000	100.000	0
HAleft	EPICSmtr	0.0.0.0	null.prm	5	6	3000	20	mm	1290.0784	-100.000	100.000	0
HA_Box_Height	E500	0.0.0.0	null.prm	5	7	400	100	mm	645.0400	160.000	200.000	0
Rotary	Compu6K	0.0.0.0	null.prm	5	0	4000	90	Deg	160000.0000	8.500	35.000	2000
Trolley	ACR9000	0.0.0.0	null.prm	5	1	800	50	mm	2522.8899	23.400	145.000	0
Mono_Focus	EPICSmtr	0.0.0.0	null.prm	5	2	800	50	mm	7237.0000	5.000	14.500	700
MIRup	UNUSED	0.0.0.0	null.prm	6	0	1000	100	mm	8062.9922	-7.000	7.000	0
MIRdwn	UNUSED	0.0.0.0	null.prm	6	1	1000	100	mm	8062.9922	-7.000	7.000	0
MIRfoc	UNUSED	0.0.0.0	null.prm	6	2	200	50	mm	787.4016	-8.000	10.000	0
Metalomics_Slide	UNUSED	0.0.0.0	null.prm	13	1	1000	50	mm	78.7500	0.000	847.000	0
Exp_Upstr_Lift	UNUSED	0.0.0.0	null.prm	13	2	750	50	mm	1586.7070	0.000	74.000	0
Exp_Ctr_Lift	UNUSED	0.0.0.0	null.prm	13	3	750	50	mm	1586.7070	0.000	74.000	0
Exp_Dnstr_Lift	UNUSED	0.0.0.0	null.prm	13	4	750	50	mm	1586.7070	2.500	74.000	0
Exp_Horiz	UNUSED	0.0.0.0	null.prm	13	5	750	50	mm	1586.7070	-27.500	27.500	0
Exp_Skew	UNUSED	0.0.0.0	null.prm	13	6	750	50	mm	-1586.7070	-25.000	25.000	0
DET_Lift	UNUSED	0.0.0.0	null.prm	13	0	2000	10	mm	-789.4065	0.000	120.000	0
PA-Top	UNUSED	0.0.0.0	null.prm	6	3	1000	20	mm	806.2992	-8.000	8.000	0
PA-Bottom	UNUSED	0.0.0.0	null.prm	6	4	1000	20	mm	-806.2992	-8.000	8.000	0

Prev Next 0 Place

J.P. Kirkland, L.R. Furenlid, and A.J. Mayer. ©2014.

Set Privileges Print Motor Setup Cancel Save & Exit

# XDAC detector setup

Detector Setup

File Edit Operate Tools Window Help

Detector Setup

Place	Status	Name	Module Type	Device/Slot	Subaddr	PV Name	428 Addr	Gains	Offsets	V to F	Normalize
0	Enabled	Timer	EPICS scaler	11	0	0000000	0	1	0.00	1000	Off
Next	Enabled	l0	EPICS scaler	11	1	0000000	0	6	0.00	1000	On
Prev	Enabled	lp	EPICS scaler	11	4	0000000	0	6	0.00	1000	On
	Enabled	l1	EPICS scaler	11	2	0000000	0	6	0.00	1000	On
	Enabled	l2	EPICS scaler	11	5	0000000	0	7	0.00	1000	On
	Enabled	IRING	EPICS scaler	11	5	0000000	0	1	0.00	1000	On
	Disabled	XIA	EPICS dxp	11	8	0000000	0	1	0.00	1000	Off
	Disabled	Ge1	UNUSED	1	13	0000000	0	1	0.00	1000	Off
	Disabled	Ge2	UNUSED	1	14	0000000	0	1	0.00	1000	Off
	Disabled	Ge3	UNUSED	1	15	0000000	0	1	0.00	1000	Off
	Disabled	Ge4	UNUSED	1	16	0000000	0	1	0.00	1000	Off
	Disabled	Ge5	UNUSED	1	17	0000000	0	1	0.00	1000	Off
	Disabled	Ge6	UNUSED	1	18	0000000	0	1	0.00	1000	Off
	Disabled	Ge7	UNUSED	1	19	0000000	0	1	0.00	1000	Off
	Disabled	Ge8	UNUSED	1	20	0000000	0	1	0.00	1000	Off
	Disabled	Ge9	UNUSED	1	21	0000000	0	1	0.00	1000	Off

EPICS dxp Multi-Element Detector  
 dxp Status: No connection  
 No. of dxp Elements: 32  
 No. of dxp SCAs: 9  
 dxp Setup

XIA Multi-Element Detector  
 XIA Status: No connection  
 No. of Elements: 0  
 No. of SCAs: 0  
 XIA Setup

TCP/IP Interface  
 Status: Disabled  
 Name: NSLS Multielement Detector  
 IP Address: 130.199.192.68  
 Normalize: Off

GPIB Interface  
 Control  

Status	Name	Type	GPIB Address
Disabled		SI9650 T. Controller	15
Disabled		Lakeshore 330 T. Controller	12

Iring Conversion: 10000.00

Timer/Scaler Type: EPICS  
 Timer Device/Slot #: 12  
 EPICS Timer PV name:

Ideal Gas Mix Print Detector Setup

J.P. Kirkland, L.R. Furenlid, and A.J. Mayer. ©2014.

Cancel Save&Exit



# XDAC motor control

Motor Control

File Edit Operate Tools Window Help

Motor Control

Timer: 0.000 I0: 0.000 Ip: 0.000 I1: 0.000 I2: 0.000 IRING: 0.000 Iring: 0.0 Refresh Rate (Hz): 4.00

Motor Select: HAtop -0.000 mm

Destination: 0.000 Speed: 3000

Moving: [Stop]

Fast Speed: 3000 Slow Speed: 600

Call This Position: 0.0000 Calibrate

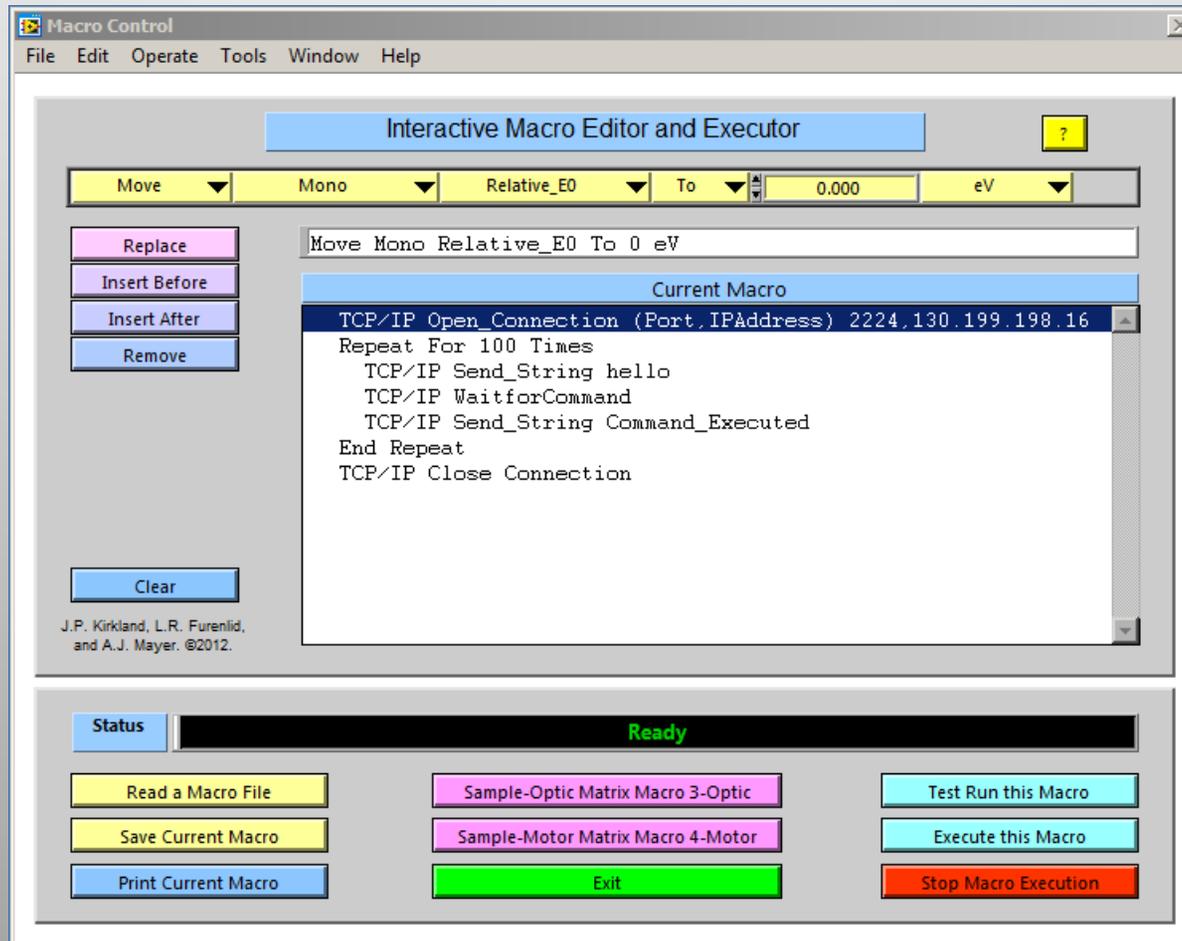
Min: -10.00 Max: 10.00

HAtop	HAbot	HAright	HAleft	HA_Box_Height	Rotary	Trolley	Mono_Focus
-0.000	0.000	-0.000	0.000	0.000	0.000	0.000	0.000
mm	mm	mm	mm	mm	Deg	mm	mm
limit ok	limit ok	limit ok	limit ok				
limit ok	limit ok	limit ok	limit ok				

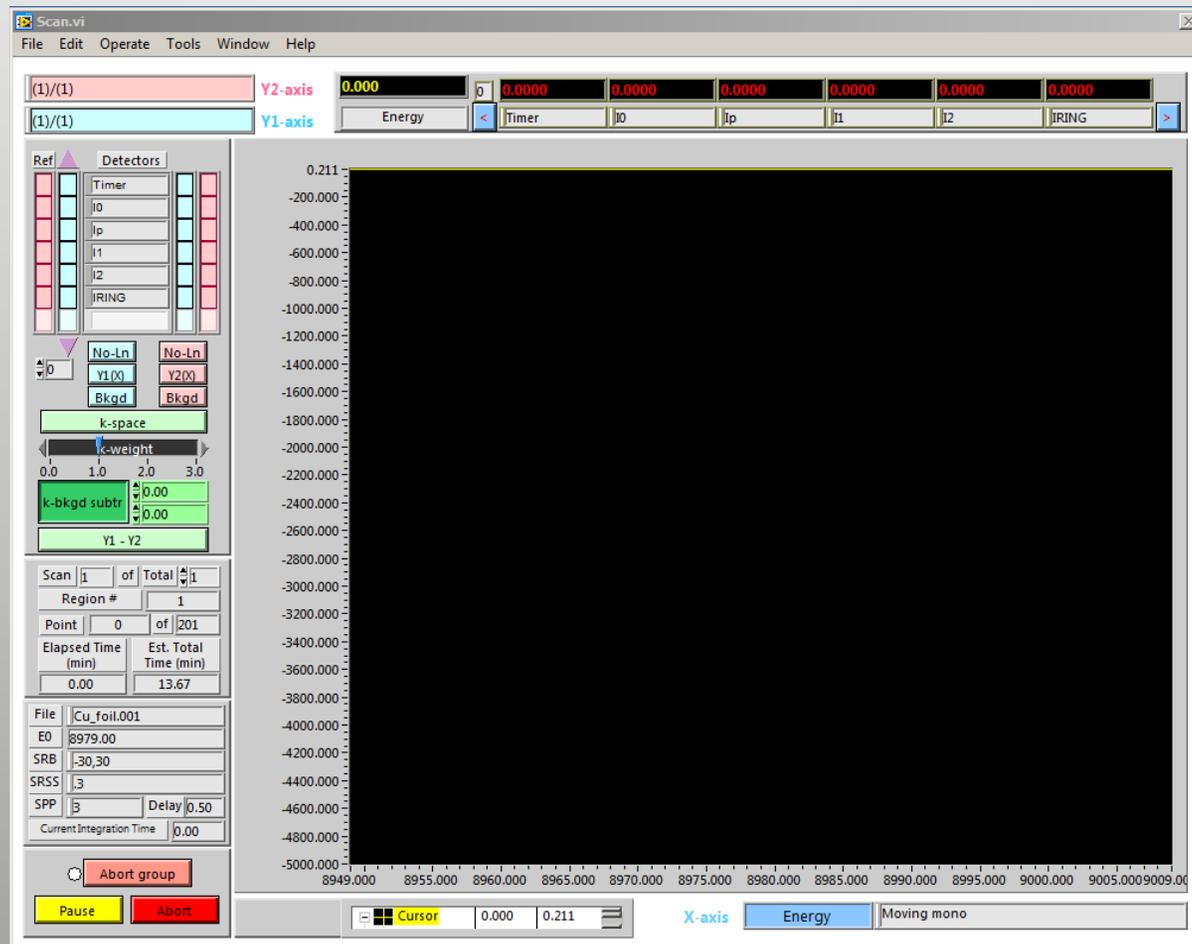
Home Motor(s) Exit Print Motor Positions

J.P. Kirkland, L.R. Furenlid, and A.J. Mayer. ©2011.

# XDAC macro tool



# XDAC scan



# IDA main panel

