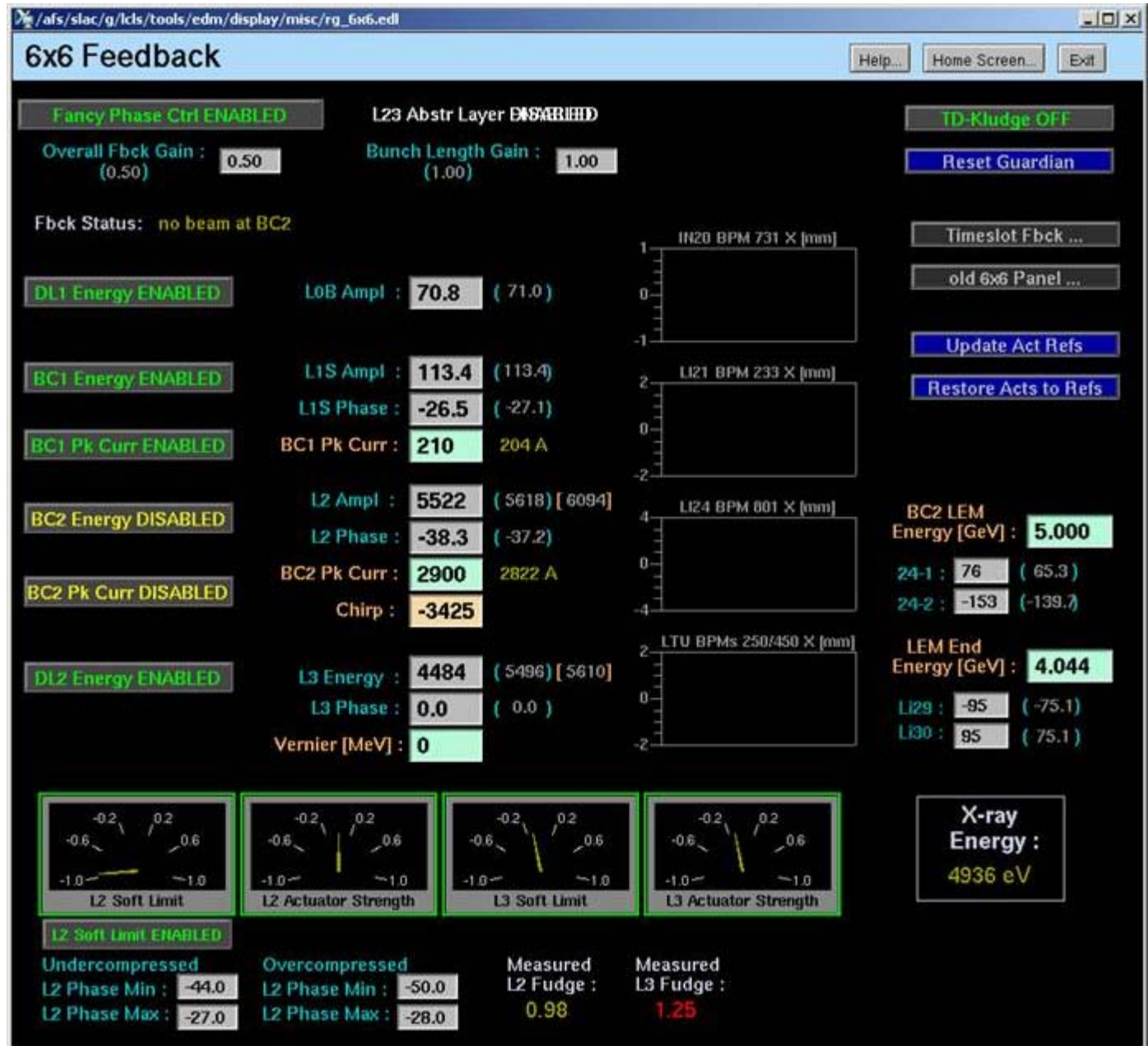


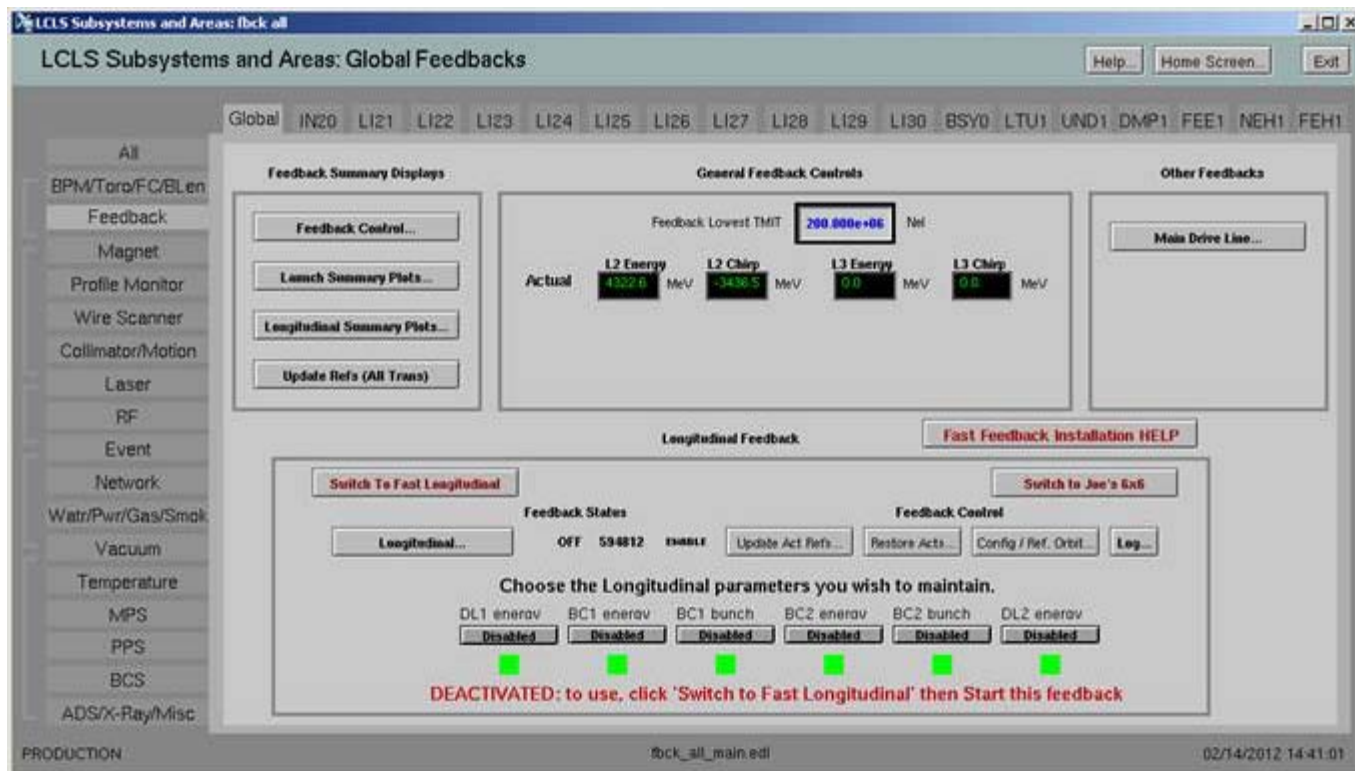
## LLRF Master IOC's Reboot Procedure

(as of 14-Feb-2012)

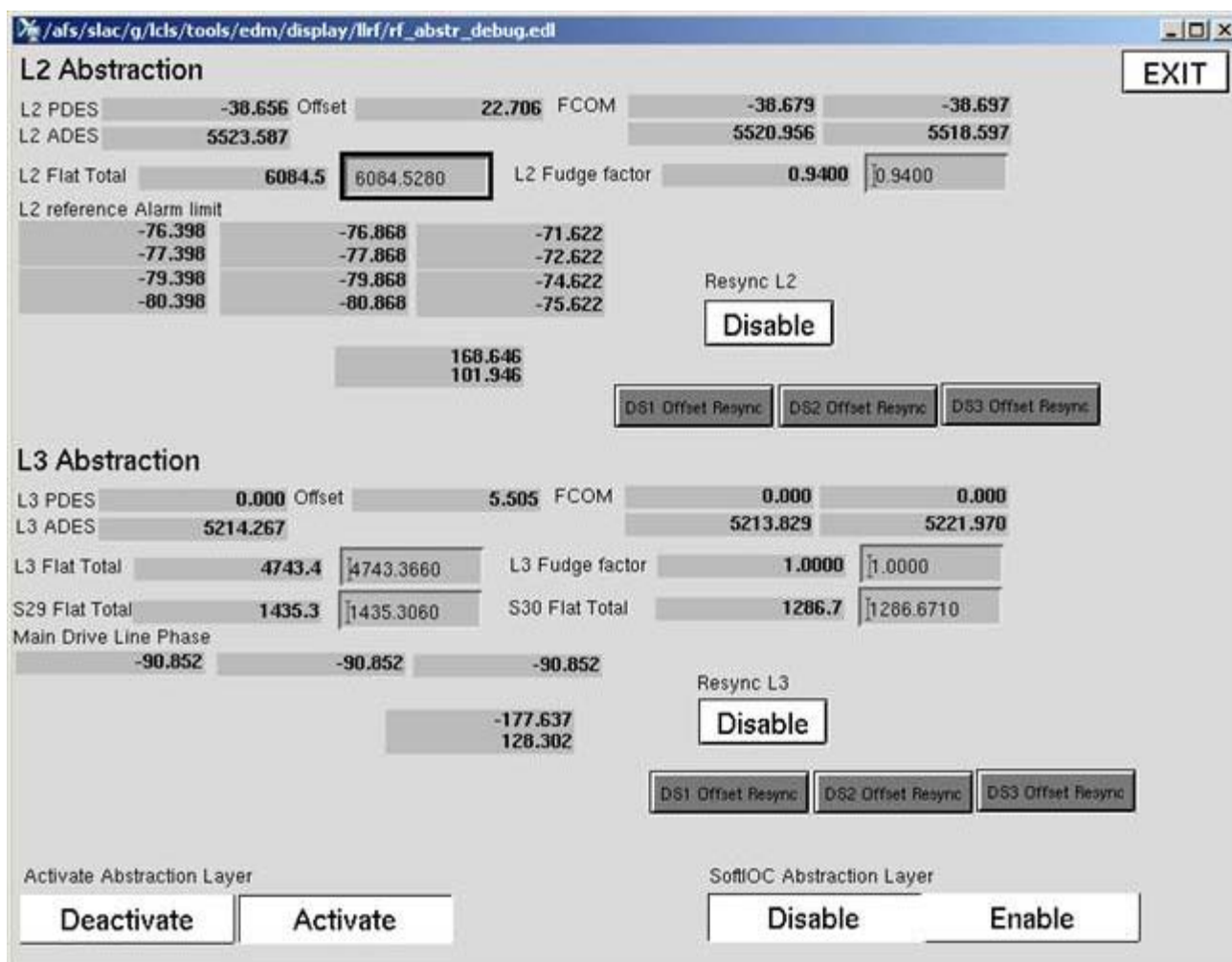
1. Have Ops turn off beam
2. Have Ops turn off MATLAB Feedback (or fast feedback)
  - If 6X6 is running:
    - L23 Abstraction Layer must be disabled. But this alone is insufficient.
    - Ensure individual 6X6 feedbacks are all disabled (DL1 Energy, BC1 Energy, BC1 Pk Current, BC2 Energy, BC2 Pk Current, DL2 Energy)



If Fast Feedback is running:



3. Deactivate the L2/L3 Abstraction Layer in the RF/Global -> L2 -> Abstraction Debugging screen



4. Stop the RF ChannelWatcher





VME GN1

LCLS LLRF Station: RF GUN  
GUN:IN20:1:GN1

Klystron 20-6 Diagnostics    More klystron parameters...    Home Screen...    Exit

---

Current Acquisition

	Cell 1A	Cell 1B	Cell 2A	Cell 2B	Total Weight any value > 0 ok
Actual Phase + offset (deg 2856 MHz)	48.56	162.50	-30.00	-108.69	
Phase Weighting	0.50	0.00	0.50	0.50	1.50
Actual Amplitude * scale factor (MV)	0.000	0.001	0.001	0.001	
Amplitude Weighting	0.50	0.00	0.50	0.50	1.50
Actual Power * scale factor (MW)	0.00	0.00	0.00	0.00	

---

Phase (deg 2856 MHz)

Limit Correction to: Min Cor 0.0001, Desired 0.00, Wt average 0.0000, Max Cor 5.0000, Delta Phase 0.0000, Local Phas FB ON

New set point: -90.76

Smoothing: 0.20

Previous Set Point: -90.76

Limit Set Point to: -360 < Set Point < 360

If Local Phas FB is off OR Ampl below minimum threshold, Previous Set Point is sent every time PAD is triggered

---

Amplitude (MV), > 0

Limit Correction to: Min Cor 0.0000, Desired 6.00, Wt average 0.0000, Max Cor 10.0000, Ratio - 1.0, Local Ampl FB ON

New Set Point: 5790

Smoothing: 0.2000

Previous Set Point: 5790

Limit Set Point to: 3000 < Set Point < 6700

Minimum Ampl reqd for BOTH Phas and Ampl FBs: 4.000

If Ampl Phas FB is off OR Ampl below minimum threshold, Previous Set Point is sent every time PAD is triggered

---

Expert panels

RF GUN 1 PAD (source)

Adjust scale factors & offsets

Max for POE

Min for ADES

PatternAware

I adjust = Aset x cos Pset x Scale

= 5790 x cos -90.76 x 1.000

= -76

Q adjust = Aset x sin Pset x Scale

= 5790 x sin -90.76 x 1.000

= -5789

Sending I and Q adjust to PAC

Enabled

Expert panels

RF GUN PAC (destination)

RF GUN PAC Calibration

## 8. Special additional check for the L2 and L3 SPACs:

When the L2 button is clicked, additionally check that the Klystron Kly 24-X PAC's actual I/Q values match with the I & Q set points in the screen below:

Example:

VME L2
LCLS LLRF Station: L2
ACCL124...
Help
Home Screen...
Exit

Phase & Amplitude

	Klystron 24-1	Klystron 24-2	Klystron 24-3	Klystron 24-4	Klystron 24-5	Klystron 24-6	L2 Reference	S24 Reference	L2 Abstraction
Desired Phase (deg 2856 MHz)	117.326	-168.265	0.000				122.876	0.000	-25.604
Phase Offset Correction (deg 2856 MHz)	158.768	92.068	74.490				161.504		
Phase Setpoint (desired + offset) (deg 2856 MHz)	276.4	-76.1	74.5				284.4		
Phase Setpoint (desired + offset) (deg 476 MHz)							47.4		

Expert only. Although these amplitudes are modifiable, they are not expected to change!

Desired Amplitude (IQ Mag)	9000	6000	10000				10000	10000	5091
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I&Q Setpoints for SPACs

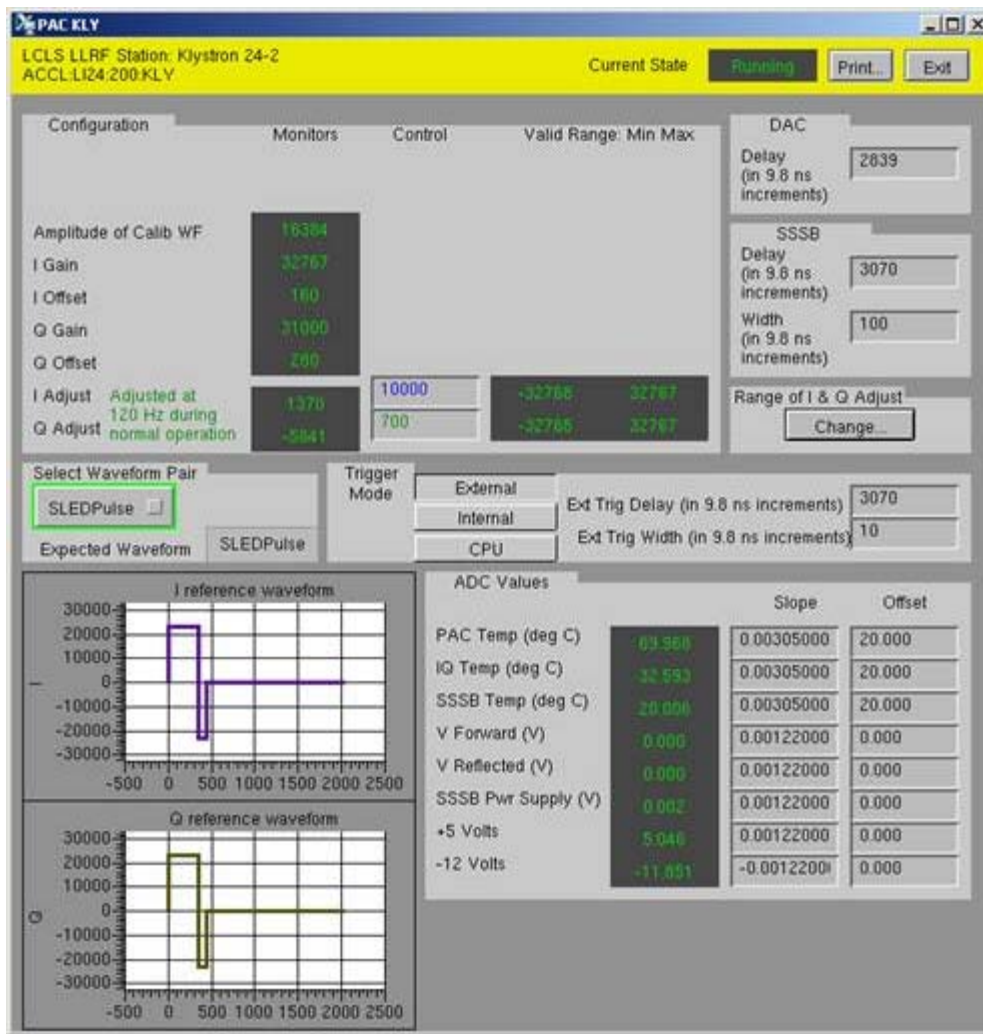
I Scale	1.000	1.000	1.000				1.000	1.000
I Set = A Des x cos(P Set) x I Scale	995.0	1377.0	2674.0				6789.0	10000.0
Q Scale	1.000	1.000	1.000				1.000	1.000
Q Set = A Des x sin(P Set) x Q Scale	-6944.0	-5839.0	9635.0				7380.0	0.0
Sending I and Q adjust to SPAC	Enabled	Enabled	Enabled				Enabled	Enabled

Expert panels

Destination PAC Operations	Kly 24-1	Kly 24-2	Kly 24-3	Kly 24-4	Kly 24-5	Kly 24-6	L2 Ref	S24 Ref
Destination PAC Calibration	Kly 24-1	Kly 24-2	Kly 24-3	Kly 24-4	Kly 24-5	Kly 24-6	L2 Ref	S24 Ref
	Max for PDES	Max for PDES	Max for PDES				Max for PDES	Max for PDES
	Max for ADES	Max for ADES	Max for ADES				Max for ADES	Max for ADES
Klystron Selector for L2 Ampl/phase feedback	24-1/24-2							
	24-2/24-3							
	24-1/24-3							

Warning !!!  
Klystron Selector does not work with the new Abstraction Layer!  
Please, wait to use it until completion of implementation.

Abstraction Debugging



9. The Beam Phase Cavity 3 Minimum amplitude shows purple box (PINI has to be set correctly).

Until the fix is in, accept 10.0

Similarly check to see if there are PVs that come up with purple boxes around them after reboot.

Check Archiver plus Channel Watcher values to see if the new values are same as what was prior to reboot.  
If yes, accept the new values by hitting enter in those fields.

10. Now, with all the PACs' local regulation loops activated and the local feedbacks on, we are ready to Activate the L2/L3 Abstraction layer.

Choose the 'Activate' button:

/afs/slac/g/lcls/tools/edm/display/llrf/rf\_abstr\_debug.edl
EXIT

### L2 Abstraction

L2 PDES	-28.380	Offset	19.532	FCOM	-28.386	-28.413
L2 ADES	5259.626				5258.630	5258.375
L2 Flat Total	5823.8	5823.8170	L2 Fudge factor	0.9400	0.9400	

L2 reference Alarm limit

-83.356	-76.868	-99.998
-84.356	-77.868	-100.998
-86.356	-79.868	-102.998
-87.356	-80.868	-103.998

Resync L2

Disable

161.548  
94.848

DS1 Offset Resync DS2 Offset Resync DS3 Offset Resync

### L3 Abstraction

L3 PDES	0.000	Offset	5.505	FCOM	0.000	0.000
L3 ADES	5421.128				5425.074	5434.484
L3 Flat Total	4743.4	4743.3660	L3 Fudge factor	1.0000	1.0000	

S29 Flat Total 1435.3 1435.3060 S30 Flat Total 1286.7 1286.6710

Main Drive Line Phase

-90.852	-90.852	-90.852
	-177.637	128.302

Resync L3

Disable

DS1 Offset Resync DS2 Offset Resync DS3 Offset Resync

Activate Abstraction Layer

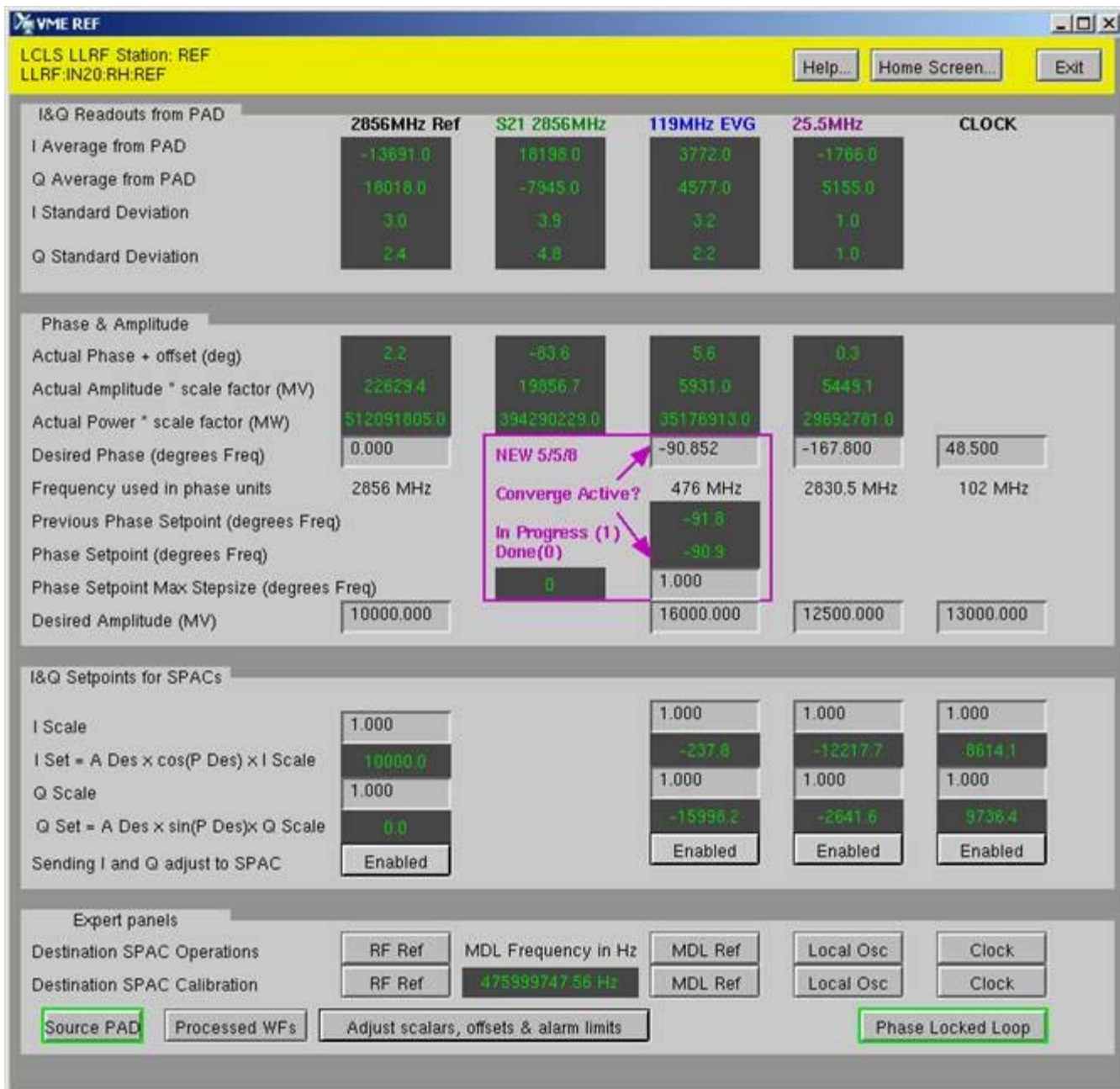
Deactivate Activate

SoftIOC Abstraction Layer

Disable Enable

11. Check in the Reference VME IOC to see if the desired Phase and Amplitude shows the value saved by CW (snapshot) prior to reboot:





12. Repeat 5-11 for ioc-li24-rf01

Reboot ioc, enable corresponding PAC regulation loops and turn on local feedbacks.

Order of rebooting ioc-in20-rf01 and ioc-li24-rf01 does not matter.

13. Have Ops activate MATLAB 6X6 or Fast Feedback.

Once again ensure that L23 Abstraction Layer is enabled as well as the individual feedbacks.

13. Start Channel Watcher

```
ssh laci@lcls-daemon2
/etc/init.d/st.cwRF start
```

14. Note of caution:

In the VME L2 screen, all the Desired Phase, offset and Amplitude fields show as editable (write).



However, these values take effect only when the L2/L3 Abstraction layer is deactivated.

When the Abstraction Layer is activated, the values in these fields are over-written by the AL software.

This is true for the VME L3 screen as well the Reference VME REF screens.

DO NOT EDIT these fields while ABSTRACTION LAYER IS ACTIVATED.

15. Have Ops turn the beam ON.

16. Verify that in the L2/L3 Abstraction layer screen, the L2 and L3 PDES and ADES are changing by little amounts.

The screenshot displays the 'L2 Abstraction' and 'L3 Abstraction' sections of a software interface. The title bar shows the path: /afs/slac/g/lcls/tools/edm/display/llrf/abstr\_debug.edl. An 'EXIT' button is in the top right corner.

**L2 Abstraction**

L2 PDES	-24.566	Offset	19.532	FCOM	-24.566	-24.592
L2 ADES	5291.829				5291.829	5294.464
L2 Flat Total	5823.8		5823.8170	L2 Fudge factor	0.9400	0.9400

L2 reference Alarm limit

-87.111	-76.868	-115.272
-88.111	-77.868	-116.272
-90.111	-79.868	-118.272
-91.111	-80.868	-119.272

Resync L2

Disable

157.730  
91.030

DS1 Offset Resync DS2 Offset Resync DS3 Offset Resync

**L3 Abstraction**

L3 PDES	0.000	Offset	5.505	FCOM	0.000	0.000
L3 ADES	5225.564				5225.564	5235.616
L3 Flat Total	4743.4		4743.3660	L3 Fudge factor	1.0000	1.0000
S29 Flat Total	1435.3		1435.3060	S30 Flat Total	1286.7	1286.6710

Main Drive Line Phase

-90.852	-90.852	-90.852
---------	---------	---------

Resync L3

Disable

-177.637  
128.302

DS1 Offset Resync DS2 Offset Resync DS3 Offset Resync

Activate Abstraction Layer

Deactivate Activate

SoftIOC Abstraction Layer

Disable Enable