# **Displays**

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#### MS/PRL main screen

Location: Iclshome (SC) --> RF/Global --> Phase Reference Line

Master Source & PRL	(on Icls-srv01)	+ _ = ×
LCLS-II Master Source & Phase Reference Line		Home Screen EXIT
RF Reference         MO freq. selpt         162500000 00 Hz         MO DAC Volt         1.55673981 Volt           MO freq. error         0.0040 Hz         MO freq. counter RBV         162499999996 Hz         162499999996 Hz	Sector 0 (CID)	L2CID-04 Beckhoff PDU
Freq. locker enable/disable Enable WARNING: Disabling the feedback loop will affect the entire LCLSZ system PRL Loops	Sector 2           L0-L1 Ret. Amp           OK         33.43 W           L2 Ret. Amp           OK         26.14 W           L0-L1 & L2 LO Amp           OK         11.18 W	L2KG02-24 Water Temp 31.79 C L2KG02-24 Beckhoff PDU L2KG02-25 Water Temp 29.13 C
L0-L1 PRL Loop	Sector 4         OK         17.08 W           L2 VCO Amp         OK         18.96 W           L3 Amp         OK         18.47 W	L2KG04-20 Beckhoff

# RF Reference (MO Locker)

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Location: Iclshome (SC) --> RF/Global --> Phase Reference Line

Description: Frequency counter and MO locker matlab script

- Freq locker Enable/Disable button should be set to "Enable"
- MO freq setpoint should be 162.5 MHz
- MO freq error should be < ~1 Hz
- Matlab script LED should be green
- All PVs should be in NO\_ALARM state
- For help, refer to Troubleshooting page

	Master Source & PRL (on Icls-
LCLS-II Master Source & Phase Reference Line	
RF Reference	Sec
MO freq. setpt 162500000.00 Hz MO DAC Vo	It 1.55586243 Volt
MO freq. error -0.0027 Hz	L
MO freq. counter RBV 162499999.997 Hz	
Freq. locker enable/disable Matlab script utils	
Enable Disable Watchdog counter	2908
WARNING: Disabling the feedback loop will affect the entire LCLS2 system	
- PRL Loops	
LO-L1 PRI Loon L2 PRI Loon	

## PRL Loops

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Location: Iclshome (SC) --> RF/Global --> Phase Reference Line --> L0-L1 PRL Loop...(etc.)

Description: Phase Reference Line feedback loops

- ADC Ampl = ON, Error = OFF, Lock = ON
  LED PV should read "101: Locked"
  Tx/Rx frame rates should be ~5000'
  Loop Lock Disable should be "Enabled"

- All PVs should be in NO\_ALARM state
- For help, refer to Troubleshooting page

	L0-L1 P	RL Loop / VCO Contro	l (on Icls-srv01)			( + = = ×
PRL for L0-L1 PRL Loop	/ VCO Control					
	Readback	Readback (Raw Value)	Control (Raw Value)			EXIT
Firmware Version	20	0×14				
Additional Phase Shift (in degree)	0.0000000	0×0	0×0	0.000		
Loop Filter Reset	Normal	0×0	0×0	Normal		
LED	101: Locked	0×5	0×5			
Phase Err (before phase shift, degre	0.01647949	0×9				
Phase Err (after phase shift, degree)	0.00961304	0×3fffd				
Lock Logic Status	1	0×1			_	
Input MUX	Chn2-Chn1	0×1	0×1	Chn2-Chn1		
w0 scale	1.00000000	0x20	0×20	Ĭ1.00		
w1 (radian)	150.00000000	0x12c0	0×12c0	<u>)</u> ́150.00		
Ramp Slop for Phase Shift (in degre	0	0×0	0×0	Ĭ0		
ADC0 Amplitude (in volt)	1.41177063	0×1915e				
ADC1 Amplitude (in volt)	0.93125610	0×108f8				
Loop Lock Disable	Enabled	0×0	0×0	Enable		
Reset Lock Logic State Machine	Normal	0×0	0×0	Normal	Ĩ.	
ADC Ampl. Error ON OFF TxFrameRate (Master) 5000 Hz RxFrameRate (Slave) 5000 Hz RxErrDrop Count (Slave) 4	Lock Unloo ON z	Ck Count 1023 Fault Buffer Control OnDemand Buffer 0 Control OnDemand Buffer 1 Control	Reset N LED st waveform/ F LED st waveform/ P ADC[0:3] waveforms	lormal Phase Error waveform hase Error waveform	a	

### **PRL** Amps/Attenuators

Location: Iclshome (SC) --> RF/Global --> Phase Reference Line --> L0-L1 VCO Amp...(etc.)

Description: Phase Reference Line power amplifiers and digital attenuators

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- Fault status and status message should be "OK"
  Amp alarms should read "OK"
  Setpt. RBV should read "At target"
  Amp Reset should be in "Standby"
  For help, refer to Troubleshooting page

	PRL Amp: PRL:	SYS0:02:L0 (on Icls-srv01)	+ - • ×
PRL Amplifier (PR L0-L1 VCO	L:SYS0:02:L0)		EXIT
Amp		Attenuator	
Fault Status	ок	Attenuation Setpt + 7.00 dB	Max 31.75 dB
Status Message	ОК	Setpt. RBV 7.00 dB At target	Min 0.00 dB
Fwd Power Ref Power	38.17 W 45.82 dBm 1.78 W 32.51 dBm	<< Decrease power       Increase power>>         Increase 1 step (0.25 dB)       Decrease 1 step (0.25 dB)	Expert
Fwd Pwr Alarm	ОК		
PS Alarm	ОК	Go to max attenuation	
Temp Alarm	ОК	Ramp to target setpoint Abort Step Count	: 0 / 17
Amp Reset	Reset Standby		

#### Amp/Attenuator Expert Screen

Location: lclshome (SC) --> RF/Global --> Phase Reference Line --> L0-L1 VCO Amp...(etc.) --> Expert...

Description: Power amplifier and digital attenuator expert controls

PRL Amp Expert: PRL:SYS0:	02:L0 (on lcls-srv01)	
PRL Amplifier Expert Settings (PRL:SYS0:02:L0) L0-L1 VCO		
***** EXPERTS ONLY *****		
Fwd Power         45.81 dBm         38.14           Ref Power         32.51 dBm         1.78 ft	Conversion	
Attenuator	Ramping	
Setpt. 7.00 dB	Target setpt 7.00 7.00 dB	
Max attn limit 31.75 31.75 dB	Ramp initial 17.00 17.00 dB	
Min atta limit 0.00 0.00 dB	Ramp increment -0.62 dB	
0.00 ub	Ramp # steps 17 17	
	Ramp step delay 3 3 s	
	Ramp Check Disabled Enabled Enabled	
Setpt. bits 4 RBV bits 4 3 3 2 2	Fwd Pwr trip check	
LSB 1 LSB 1	Val (0 = trip)	
	Fwd pwr current 45.81346	
Latch bit Off	Fwd pwr previous 45.81685	
	Lower threshold 25.00000 25.00000	
	Upper threshold 38.00000 38.00000	
	Enable/Disable Disabled Enabled Enabled	

# Water/Temp/Misc

Location: Iclshome (SC) --> RF/Global --> Phase Reference Line

Description: Beckhoff low-level displays, rack water & temperature, PDUs for amp AC power etc.

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Occassionally PDU alarm PVs will be INVALID (purple) because of a hardware problem. This should not affect PRL functionality.
All other PVs should be in NO\_ALARM state

L2CID-04 Beckhoff	PDU
L2CID-04 Water Flow	6.4 LPM
L2KG02-24 Water Temp	31.76 C
L2KG02-24 Beckhoff	PDU
L2KG02-25 Water Temp	29.16 C
L2KG04-20 Beckhoff	PDU