

Advanced LIGO PSL RF Electronic Components Overview LIGO-T0900589-v1

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1 Subsystems

RF electronic components required in the subsystems of the PSL.

1.0.1 PMC and Injection Locking

- 1x RF Source 35.5 MHz. Oscillator for Pound-Drever-Hall locking technique.
- 1x RF Distribution. RF source distribution to broadband EOM (between NPRO and 35 W amplifier), PMC PDH demodulation, Injection locking PDH demodulation.
- 1x Dual Delay Line. Phase shifter for PMC and injection locking.
- (1x EOM Driver. Amplifier for driving the broadband EOM.)
- 2x Photodiode. Two photodiodes for PDH error signals for PMC and injection locking.
- 2x Servo. Two servo boards including RF mixer.

1.0.2 Frequency Stabilization

- 1x RF Source 21.5 MHz. Oscillator for Pound-Drever-Hall locking technique.
- 1x RF Distribution. RF source distribution to resonant EOM (no additional driver required) in frequency stabilization path and TTFSS demodulation.
- 1x Single Delay Line. Phase shifter for PDH technique.
- 1x TTFSS. Servo with RF mixer.
- 1x Photodiode. RF Photodiode for reference cavity error signals. Recycle iLIGO ones.

Either reusing the iLIGO VCO or using a new low noise VCO (baseline) requiring the following components:

- 1x RF Source 71 MHz. Reference oscillator for low noise VCO.
- 1x Low Noise VCO. RF Source for frequency shifting AOM in the frequency stabilization path.
- 1x AOM Driver. Amplifier for driving the AOM.

1.0.3 Power Stabilization

1. 1x RF Source 80 MHz. Oscillator for power modulation AOM. Could be replaced by a RF Distribution in case the 71 MHz source is reused for the AOM.
2. 1x Power modulation AOM Driver. Driver for AOM with high-bandwidth (>100 kHz) amplitude modulation input.

2 Total

Counts are per PSL.

RF electronic component designs available via LSC (see <http://ilog.ligo-wa.caltech.edu:7285/advligo/RfDesign>):

Module	Count
RF oscillator source	4
RF distribution amplifier	2
Delay line phase shifter	2
AOM/EOM driver	1
Low noise VCO	1
Table-top frequency stabilization servo	1
Total	

RF electronic components from AEI:

Module	Count	DCC
Photodiodes	2	
PMC/ILJ Servos	2	T0900578, T0900577

RF electronic components reused from iLIGO:

Module	Count
FSS Photodiode	1

RF electronic components without a design:

Module	Count
Power modulation AOM Driver	1
Power supplies	?