Frequency Modulation

Application note: FM input

The PPCL300 and PPCL550 Pure Photonics tunable laser (and some custom partnumbers) can be optionally configured with a frequency modulation input. This input can be used to finetune the frequency at a high update rate to lock the laser to a resonance.

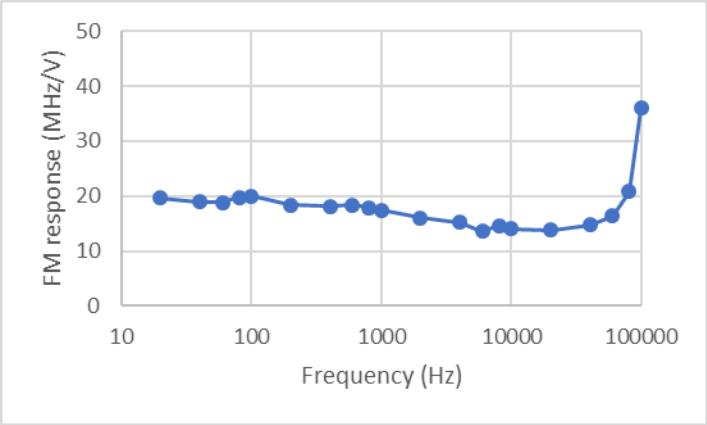
This application note describes the frequency modulation feature.

1. Configuration

The FM input is an analog input into the PZT driver circuit. On PPCL300 it is pin 20 of the 20 pin connector. On the PPCL550 it is the first or second (if amplitude modulation input is included) SMA connector from the edge.

The FM input is a high resistance input (1MOhm) without noticeable current draw. The useful input range is 0-6V. The PZT driver circuit applies up to 28V onto the PZT through a chain of 2 Op Amps. When the input voltage goes below 0V or exceeds 6V, the signal is clipped.

A typical frequency modulation response is shown in the below graph. This may vary from device to device, but not by too much. Once the modulation frequency exceeds 100kH, the resonance of the PZT (at 150kHz) is excited. Going beyond that will have a very low transfer constant.



Dither / telecom mode

In dither/telecom mode the laser itself applies a 24V pk-pk signal at 888Hz onto the PZT. This signal is used to determine the alignment of the laser cavity with the filters. In the dither mode the laser needs this signal to align and if this signal is not strong enough, the laser will start to increase the laser temperature until it can detect the signal.

When applying a modulation signal that is moderately strong and/or close to 888Hz, the laser will lose lock and go in thermal run-away.

When no signal is connected the full dither signal is present. When an input signal is connected the magnitude of the dither will be reduced and it will be offset. **In case the modulation signal results in clipping of the dither signal, the laser may lose lock and go in thermal run-away.**

Whisper mode

In whisper mode, the laser has disabled the dither and the laser is not dependent on the locking signal. As such, the user can apply any signal on the FM input without impacting the locking behavior of the laser.