ALock. Phase Locking Electronics Unit

- Input frequency signal up to 2.8 GHz
- PID bandwidth up to 2 MHz
- Up to 50 W high-voltage amplifier for PZT
- PZT modulation bandwidth up to 200 kHz
- Auto-lock/relock functions
- Optical beat detector unit (optional)
- Industrial interfaces (optional)

Product overview

The ALock series is a multipurpose re-configurable PLL-based platform that is suitable for various phase locking applications in the optical and radio frequency domains (up to 2.8 GHz).

- Modular architecture ensures configuration flexibility of the phase locking system
- Implementation of all-analogue locking module provides precision tuning with exceptional ratio of tuning bandwidth vs. dynamic range
- Digital control enables automatic phase locking procedure and preset storage functions for fast and easy switching between different configurations of the system
- Two independent control signal conditioning channels ensure locking restoration after significant phase fluctuations by quickly switching to a reserve channel with a large permitted phase angle deviation
- Input modules accept a wide range of input frequencies and amplitude levels
- Broad choice of locking driver modules enables various adjustment techniques, from precise digital temperature control to fast modulation via electro-optic modulators
- The implemented high-voltage driver is compatible with high-capacitance piezo actuators having broad modulation bandwidth of up to 200 kHz
### Technical specifications and possible configuration options

#### Input options
- Bandpass filter with AGC for input signal conditioning
- Analogue phase detector with input range of \(-\pi/2 .. \pi/2, 0…600\) MHz
- High-frequency phase frequency detector: \(-8\pi .. 8\pi, 0…2.8\) GHz
- Digital phase frequency detector: \(-90\pi .. 90\pi, 0…300\) MHz
- Frequency multiplier

#### PID controller
- 2 independently configurable PID channels with up to 2 MHz feedback bandwidth
- Adjustable preamplifier: 0.001-1000
- P-channel: amplification 1-1000
- I-channel: amplification 1-1000, 8 integral time constants
- D-channel: amplification 1-1000, 4 derivative time constants
- Phase lock detector

#### Output options
- High-voltage amplifier for PZT actuator: >150 V, 50 W, up to 200 kHz modulation BW
- Buffer amplifier for operation of laser diodes and EOM
- Piezoelectric motor driver for linear translation stages
- Step motor driver for linear translation stages
- Temperature controller for long-term layout temperature correction: 12 V, 10 A

#### Dimensions
19" rack, 2U height, depth 320 mm

#### Utility requirements and power consumption
100-240 V, 50/60 Hz, single-phase; <100 W
OEM power supply on demand

#### Control and monitoring
Stand-alone LCD screen with a control wheel
Available remote-control interfaces: USB/RS485/Ethernet/CAN
(exact interface combination depends on final configuration and customer’s requirements)

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**Applications:**
- Stabilization of optical frequency comb generators
- Synchronization of optical sources to an RF clock
- Stabilization of laser output frequency via Pound-Drever-Hall (PDH) technique
- Carrier-envelope phase stabilization (CEP-stabilization)
- Fiber-link stabilization
- ASOPS (asynchronous optical sampling) pump-probe techniques, THz-ASOPS

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**ALock signal flow chart**

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**AVESTA**

LASERS AND OPTICAL SYSTEMS

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