



## ARF/XRF Agile RF Synthesizer + AOM Driver



The MOGLabs ARF/XRF agile RF synthesizer provides two channels of agile RF frequency synthesis with high-power output drivers. Each channel spans a frequency range of 20 to 400 MHz with output power up to +36dBm (4 W). The two channels can be controlled via front panel knobs to adjust frequency and power, or via computer interface. Two external analogue inputs are provided for each channel, to allow FM/AM/PM at up to 10 MHz bandwidth, and PID servo feedback is built-in for laser noise-eating or frequency locking.

The computer interface (10/100 Ethernet and USB) allows full control of all parameters, advanced table sequence control, and monitoring. Ultrafast digital outputs can be individually controlled in synchronisation with the table sequences.

### Features

- Two RF channels, independent or synchronised
- High output power: up to +36dBm per channel
- Wide frequency range: 20-400MHz
- High modulation bandwidth up to 10 MHz (AM, FM,  $\phi$ )
- RF power output monitoring and protection
- External digital inputs for fast on/off, trigger
- 16 high-speed digital IO (table sequence control)
- Autonomous execution of complicated frequency/power/phase sequences
- External sync clock input
- Three analogue outputs
- Robust open- and short-circuit protection
- Ethernet and USB interfaces

### Applications

- AOM driver
- Noise eater or laser frequency lock
- Diamond NV quantum control
- Laser cooling, trapping, spectroscopy
- Bose-Einstein condensation
- Quantum optics: squeezed light
- Electromagnetic transparency, slow light
- Time and frequency standards

# Agile Frequency Synthesizer/AOM Driver

## Specifications ARF/XRF

RF characteristics	
RF output power	ARF421, XRF421: 0 to +36 dBm      14-bit resolution ARF021, XRF021: 0 to +16 dBm
Frequency	20 to 400 MHz, 32-bit resolution
Frequency stability	±1 ppm (0 to 50°C)
Phase	0 to 360°, 16-bit resolution
Absolute phase noise	- 115dBc/Hz @ 10kHz, - 113dBc/Hz @ 1kHz, - 105dBc/Hz @ 100Hz
Signal to noise	> 90dBc SFDR @ 10dBm
Intermodulation and spurious	< - 80dBc
Crosstalk between channels	< - 70dBc
RF 'off' level	< - 70dBm
External clock	5 MHz to 1 GHz
Analogue input/output	
Number	2 inputs and 2 outputs per RF channel
Function	FM, AM, $\phi$ or analogue sampling for DSP applications
Sensitivity	± 1V, 7 <sup>th</sup> order anti-alias filter 12-bit resolution, 65MHz sampling rate
Modulation bandwidth	10 MHz first parameter, 1 MHz second parameter
DAC	3 channels, ± 2.5 V, 14-bit, 1MHz bandwidth
Digital input/output	
RF on/off	Software control, front-panel buttons, hardwired TTL
Trigger input	Per channel, start/retrigger by edge or level
Shutter output	Per channel TTL output
High speed digital IO	16 TTL input/output, user-controllable and via table mode (advanced)
Computer interface	
Ethernet	10/100 TP, RJ45
USB	USB2, plug type USB-A
Table mode	Up to 8k programming points per channel
Table timing resolution	ARF: 1 $\mu$ s, XRF: 16 ns
Dimensions and power	
Dimensions	250x79 x292mm (WxHxD), 2kg
Power	95 – 264 Vac, 47 to 63Hz, 1A