



SAS021 Super Agile RF Synthesizer



The MOGLabs SAS021 provides two channels of highly agile RF frequency synthesis using AD9914 DDS cores, a high-speed FPGA, and separate microcontroller for communications and control.

Each channel spans a frequency range of 20 MHz – 1 GHz. The basic functions can be controlled via front-panel adjustments, with FM and AM modulation at up to 10 MHz bandwidth.

The computer interface (10/100 ethernet, USB, and memory stick) allows full control of all parameters, including loading of FM and AM control data for triggered or looped playback. Fast frequency chirps or complex waveforms can be defined with resolution up to 190 pHz in frequency, 12-bit in power and 0.4 mrad (0.02°) phase, on 8 ns intervals.

Features

- Complete package: run from 100-250 Vac, 50/60 Hz
- Wide frequency range: 20 MHz – 1 GHz
- High modulation bandwidth: 10 MHz
- Fully digital operation with analog usability
- Complex frequency/power/phase sequences
- External and internal synchronisation options
- Full hardware monitoring of all vital parameters
- Robust open- and short-circuit protection
- FPGA architecture for extreme flexibility
- Labview and DLL drivers

Applications

- Diamond NV quantum control
- Laser cooling and trapping
- Bose-Einstein condensation
- Quantum optics: squeezed light
- Electromagnetic transparency and slow light
- Time and frequency standards
- Laser spectroscopy
- Physics teaching labs

Super Agile Frequency Synthesizer

Specifications SAS021

RF characteristics

RF output power	0 to 100 mW (+20 dBm) with 12-bit resolution (0.024 mW steps)
Frequency	20 MHz to 1 GHz, resolution up to 190 pHz (32-bit)
Frequency stability	±1 ppm (0 to 50°C)
Phase	16 bit
Phase noise	– 120dBc/Hz
Signal to noise	> 80dBc SFDR
Intermodulation and spurious	< – 45dB
DDS core	2 x Analog Devices AD9914

Inputs

Frequency modulation	± 1V, 10 MHz bandwidth, SMA, 50Ω
Amplitude modulation	± 1V, 10 MHz bandwidth, SMA, 50Ω
External clock	3.2 MHz to 1 GHz, SMA, 50Ω

Outputs

RF	2 channels, each 0 to 100 mW (+20Bm) in 0.024 mW steps
Monitor	+0dBm monitor for each channel, SMA, 50Ω
Digital	16 independent, individually controlled, optional synchronise with DDS
Protection	RF outputs open/short circuit protected
DAC	± 1.000 V, 14-bit, SMA, 50Ω

Computer interface

Ethernet	10/100 TP, RJ45
USB	USB2, plug type USB-B
Memory	USB2 memory stick
Table mode	256k points frequency, power and phase each with repeat 1 – 32x
Table timing resolution	Full frequency resolution 8 ns

Digital inputs/outputs

RF on/off	TTL for each channel, level and slope, 5 ns
Trigger	TTL for each channel, software-controllable sync between channels
Pulse blaster	Synchronised 16 high-speed TTL outputs (8 ns)

Dimensions and power

Dimensions	250x89 x210 mm (WxHxD), 2 kg
Power	100 – 250 Vac, 50 to 60 Hz, 1A