# *Low-Frequency Sine-Wave Source*

## FEATURES

Low-frequency *Sine-Wave Generator*

- Amplitude: 0 – 80 V peak to peak (0 – 28 V RMS)
- Frequency range: 0 – 20 kHz
- DC offset: ±5 V
- Amplitude and frequency sweeps
- Built-in sequencer, up to 20 steps
- USB-programmable, Python interface
- Ready for scripts, notebooks and AI assistants
- USB +5 V powered, low consumption
- Internal rechargeable battery (8 h autonomy)
- Dimensions 94 mm × 32 mm × 20 mm
- Weight 80 g

## DESCRIPTION

The HOA-20K is a low-frequency sine-wave generator specifically designed to drive devices with a capacitive impedance (e.g. liquid-crystal cells, piezoelectric devices).

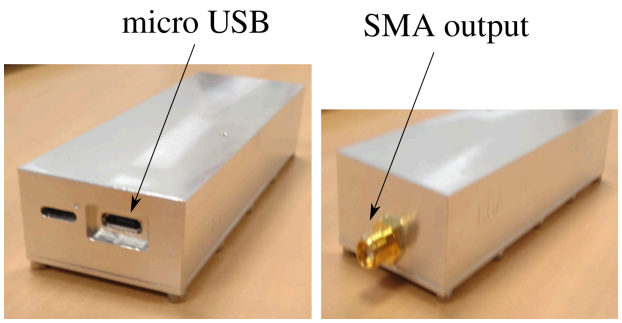
The frequency range goes from DC to 20 kHz and the maximum amplitude is 80 V peak to peak. All parameters are easily set from a graphical interface.

All electronic components are low noise. For increased stability, an internal rechargeable battery allows operation without mains power. The battery autonomy is 8 hours with the output on.

## APPLICATIONS

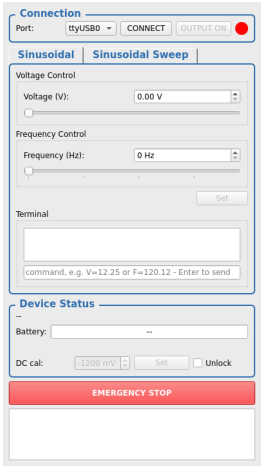
- Electrical driver for liquid-crystal cells
- OASLM electrical driver
- Electrical driver for piezoelectric components
- Automated measurements driven from Python

## VIEWS




## CONTROL SOFTWARE

Connect the SMA cable to the driven device and the USB cable to the computer. The supplied software (Linux, Windows, macOS) sets the voltage and the frequency, runs amplitude and frequency sweeps, shows the battery level and the temperature, and has an emergency stop.




**Python client included:** a script drives the generator in a few lines, and the window follows every action.

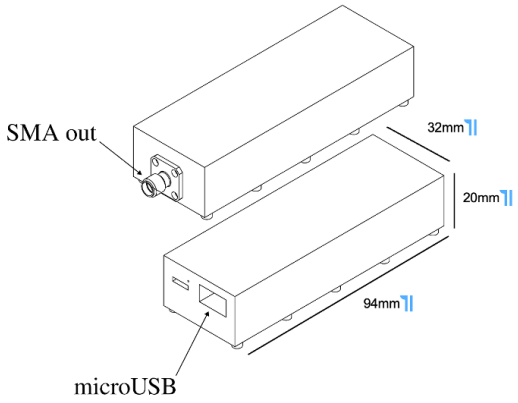
```
from hoa20k import HOA20K
with HOA20K() as gen:
    gen.connect()
    gen.set(voltage=5, frequency=1000)
    print(gen.state())
```

**Ready for automation and AI.** The client is a single file using only the standard Python library: the HOA-20K plugs into scripts, Jupyter notebooks, acquisition programs and AI assistants, which can operate it on request. The 0 – 28 V limit, the local-only connection and the emergency stop stay in force whoever drives it.

The HOA-20K can also be programmed directly from any language through its USB serial port (commands on page 2).

# *Low-Frequency Sine-Wave Source*

## MECHANICAL DRAWING




## CHARACTERISTICS

| Item | HOA-20K |
|---|---|
| Waveform | Sine |
| Frequency range | 0 – 20 kHz |
| Voltage range | 0 – 80 V peak to peak<br>(0 – 28 V RMS) |
| Voltage resolution | 0.01 V RMS |
| Voltage offset | −5000 – +5000 mV |
| Output connector | SMA |
| Interface / power | micro-USB, +5 V<br>(serial over USB) |
| Battery autonomy | 8 h, output on |
| Dimensions | 94 mm × 32 mm × 20 mm |
| Weight | 80 g |

## Programming the HOA-20K

Plug in the micro-USB port to communicate with the HOA-20K (serial over USB, 115200 baud, 8N1, commands terminated by CR LF). A set of predefined commands, written in capital letters, controls the sine waveform generated by the HOA-20K.

## LIST OF COMMANDS

| Syntax | Parameter range | Description |
|---|---|---|
| `B=?` | | Return the battery voltage (above 4 V the battery is more than 90 % charged) |
| `T=?` | | Return the maximum internal temperature in degrees Celsius |
| `F=?` | | Return the frequency of the output voltage in hertz |
| `F=X` | 0 ≤ X ≤ 20E3 | Set the frequency of the output sine wave to X hertz |
| `V=?` | | Return the RMS voltage of the output sine wave in volts |
| `V=X` | 0 ≤ X ≤ 28 | Set the RMS voltage of the output sine wave to X volts |
| `CAL=X` | −5E3 ≤ X ≤ 5E3 | Add a DC offset of X millivolts (saved in the device) |
| `CAL?` | | Return the DC offset in millivolts |
| `ON / OFF` | | Turn the output on / off |
| `SET(F,V,T)` | 0 ≤ F ≤ 20E3<br>0 ≤ V ≤ 28<br>1 ≤ T ≤ 200<br>(integer values) | Add a step to the sequence (up to 20 steps): a sine wave of<br>• frequency F in hertz<br>• amplitude V in volts RMS<br>• duration T in seconds |
| `START` | | Start playing the sequence |
| `STOP` | | Stop the sequence |
| `RESET` | | Clear the sequence |
| `SAVE` | | Save the sequence in the device (occasional use) |