



TAG OPTICS Inc.
*REVOLUTIONIZING ADAPTIVE
OPTICS THROUGH ACOUSTICS*

Operating Instructions
TAG Lens 2.0 & DrvKit 2.1
V2.2 - Rev. 02.2023

TAG LENS 2.0 & TAG OPTICS DRVKIT 2.1



OPERATION MANUAL

V2.2

REV. 02-2013



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Safety Guidelines



Abiding by the directions contained in this operating instructions booklet is necessary to prevent damages. Any deviations from the guidelines can have adverse effects on the products, surrounding equipment, and cause bodily damage.

- ALWAYS WEAR APPROPRIATE PROTECTIVE EYEWEAR WHEN OPERATING THIS DEVICE WITH ANY LASER SOURCE
- Product is temperature and power sensitive and exceeding the maximum recommendations could permanently damage the product.
- Physical damage to the product can cause a non-toxic fluid to leak and cause permanent damage to the product
- The temperature of the device can increase if operated at high powers and be warm to the touch. Care should be taken to avoid contact with flammable materials.
- Product should be operated by qualified personnel only.

It is advised to read the *Operating Instructions* and *Quality Assurance Certificate* in their entirety before using the product. Each TAG Lens is supplied with its own *Quality Assurance Certificate* and TAG Optics recommends staying within the specification guidelines. TAG Optics Inc. will not be responsible for any material malfunction, bodily or equipment injuries that occur during or as a result of using the products.



GENERAL NOTE

The TAG Lens 2.0 is designed to be operated at room conditions and should not be subject to rapid changes in temperature.

Most AC signal generator can be used to drive the TAG Lens 2.0; however, multiple factors will affect its performance including impedance mismatch, quality of the sinusoidal waveform, signal amplitude and environmental conditions. For more information on using a third party signal generator to drive the TAG Lens see *Operating the Lens with Other Signal Generator, Troubleshooting*, or contact TAG Optics Inc.

The TAG Lens Driving Kit 2.1 (Drv Kit 2.1) is designed with an adaptive frequency algorithm that enables it to drive the TAG Lens at optimal conditions and is able to compensate for small changes in environmental conditions. The software that operates the Drv Kit 2.1 was written in Python and its source code is available upon request – the most recent version of the software is available for download on TAG Optics’ website.

In order to synchronize the TAG Lens with an external light source, the TAG Optics Driving Kit provides a synchronous TTL output. The width, amplitude and phase delay of this synchronous pulse can be modified to meet user needs. The phase delay is used to select the timing between the state of the TAG lens’ wavefront and the light source giving the user control over the focal length.

INSTALLING THE SOFTWARE

INSTALLING THE REQUIRED USB DRIVER

A separate Windows installer is provided to install the appropriate driver required to operate the Drv Kit 2.1

1. Make sure that you are logged in as a user with administrative privileges
2. Plug-in the supplied USB Flash Drive into the USB port of your computer and run the file titled “ZADIG.exe”
3. Once the program is open, connect the Drv Kit 2.1 to the computer via USB Cable
4. Once the device is connected, “CDC Virtual Com” should be displayed in the drop down menu and the USB ID should be 03EB 2404. If either are different, select the Option



menu and click on Manual selection, then manually select the correct device from the drop down menu.

5. In the box to the right of the green arrow, make sure that “Libusbwin32 (V1.2.6.0)” is selected.
6. Click the Install button
7. Once completed close the program and unplug the Drv Kit 2.1 from the Computer. The driver is now properly installed

INSTALLING THE DRV KIT 2.1 SOFTWARE

The software for the DRV Kit 2.1 is a self-contained program that does not require additional system files to be installed. User should run the TAG Optics Driving Kit.exe within the containing folder but shortcuts can be created.

1. Plug-in the supplied USB Flash Drive into the USB port of your computer. Find and extract the compressed folder called “TAG Optics Driving Kit ###.zip”¹ to your desired location on your PC. The executable file titled “TAG Optics Driving Kit.exe” contained within the “TAG Optics Driving Kit” folder starts the program; a shortcut can be created to call the program from a different location.
2. The software is now ready to be used.

OPERATING THE LENS WITH THE DRV KIT 2.1

Step 1 – Connecting the Drv Kit 2.1 to the computer and to the AC/DC adapter

First connect the Drv Kit 2.1 to the computer using a USB cable. Second connect external power of the Drv Kit 2.1 by connected the 12V DC power adapter. Note: In order for the PC to properly recognize the Drv Kit 2.1, the USB cable should always be connected before the 12V DC power adapter.

Step 2 – Connecting the TAG Lens

Using the supplied BNC to SMA cable connect the TAG Lens to the driving Kit

¹ As of 2013/3/01 the current version of the TAG Optics Driving Kit software is 1.0.5



Step 3 – General Operation of the TAG Lens

1. Click on the “TAG Optics Driving Kit.exe” icon to start the program
2. Click “Power On” button to start the communication between the Drv Kit 2.1 and the computer. If everything is connected properly, you should hear the fan turn on.
3. To start operating the TAG Lens, select either the “Large Aperture” or “Small Aperture” button. Once you have made a selection, the system will automatically initialize and will be fully operational.

nb. Selecting Large aperture will operate the TAG Lens between 140-145 KHz yielding an effective aperture in the 5-7 mm range. Selecting small aperture will operate the TAG Lens between 455-460 KHz yielding an effective aperture in the 1.7-2 mm range.
4. Adjust the amplitude to achieve the desired tuning range.

General note:

If running the TAG Lens at other than standard room temperature or at very high amplitude it is advisable to run the TAG Lens for 5-10 minutes and then re-initiating the device before starting operation.

Step 4 – Synchronizing the TAG Lens Using the SYNC OUT Port

1. Connect a BNC cable from the user’s external system to the “SYNC” port on the Drv Kit 2.1
2. In the software control panel select the desired amplitude of either 3 or 5 Volt
3. Adjust the width and pulse phase delay as needed

MANUAL CONTROL

The automated control described above will operate the TAG Lens at the selected fix resonance frequency. However, in some cases, users might want to select other resonance frequencies for the device as listed in the QA certificate. In this case, the software has the ability for manual control of the frequency.

1. Press “Power Off” followed by “Power On” button to restart the TAG Lens
2. Press the “Manual Control” button



3. Press on “Unlock” to ensure that the software is not currently maintaining resonance
4. Adjust frequencies using either the slider, or preset frequency buttons. Additionally, the user can manually input the frequency in the “Set to” box and then pressing the “Set” button.
5. To scan a range of frequencies, input the desired starting and ending frequencies in the box next to the slider adjustment and press the “Scan” button. The software will then proceed to scan through the set frequencies and will display a plot of the current/voltage phase difference.

Note: Once the scan is finished, the software will automatically go to the best possible frequency. Additionally, the user is provided with the option to have the software “Lock” to the current resonance frequency if possible.

OPERATING THE LENS WITH OTHER SIGNAL GENERATOR

The TAG lens can be operated with any standard bench-top signal generator. In general, it is advised to use a generator with a 50 Ohm or lower output impedance to drive the TAG Lens. The function generator should be set for sinusoidal output (not square or triangle waves). For additional assistance please contact TAG Optics for support.

TROUBLESHOOTING

The “Auto Start” does not maintain resonance:

- 1) Make sure that all cables are properly inserted
- 2) Make sure that the light source is properly connected. Note: if your light source is not synchronized with the TAG Lens you should expect to see a long-line focus; if the light source is synchronized with the TAG Lens you should expect to see the light focused at a fixed position
- 3) Make sure that TAG Lens temperature is within the desired operating range
- 4) Check synchronization of light source with the TAG Lens
- 5) If the above three do not fix your problem switch to manual and perform a scan over the range of interest and manually select the optimal frequency. The resonance frequencies at room temperature for the device as listed in the QA certificate
- 6) Contact TAG Optics if the above does not fix the problem



I can't synchronize the TAG lens with my Laser

- 1) Check operating specifications of the Laser system to make sure it is given the proper triggering signal
- 2) Check the "SYNC OUT" connector on the driving kit with an oscilloscope to make sure the synchronizing signal is being sent. If there is no signal or other problem, please contact TAG Optics

CONTACT US

For more information on operating the TAG Lens please contact your TAG Optics Inc. representing agent or contact:

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