

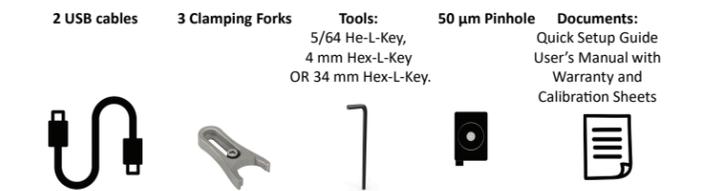
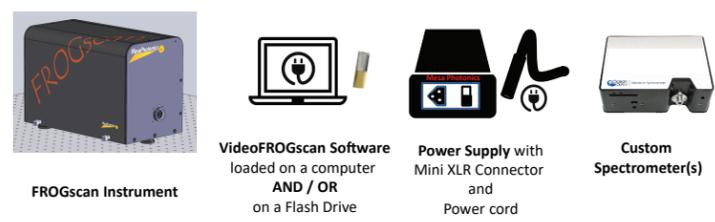
QUICK SETUP GUIDE TO



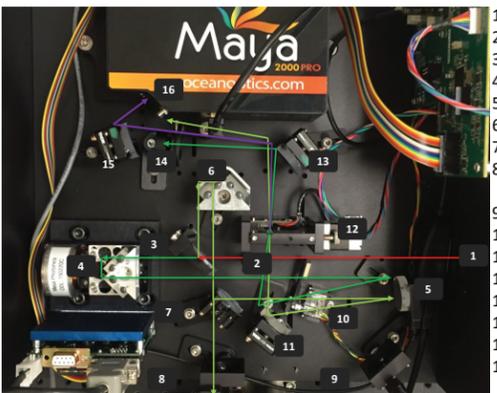
FROGscan Instruments FROGscan Standard FROGscan Ultra & VideoFROGscan Software

Read this QUICK SETUP GUIDE first and keep handy for future reference!

INCLUDED ITEMS



FROGSCAN SYSTEM REVIEW*



- 1= Entrance Iris
- 2= Center Iris
- 3= Beam Splitter
- 4= Servo Mirror
- 5= Focusing Mirror
- 6= Fixed Mirror
- 7= Overlap Mirror
- 8= Fixed Delay Beam Camera
- 9= Focusing Mirror Camera
- 10= Diverter Mirror
- 11= 1st Turning Mirror
- 12= SHG Crystal
- 13= 2nd Turning Mirror
- 14= Lens + Iris
- 15= 3rd Turning Mirror
- 16= Spectrometer

*This image depicts a FROGscan Ultra; FROGscan Standard does not contain the Lens/Iris and the 3rd Turning Mirror. Cameras are an optional feature and are not included with every instrument.

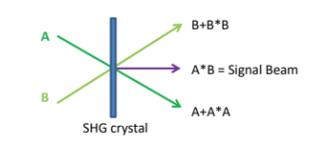
FROGSCAN SYSTEM REVIEW

The LASER beam enters through the Entrance Iris and is split into 2 parts by the Beam Splitter. The Servo Beam travels to the time delayed Servo Retroreflector and from there to the Focusing Mirror. The Fixed Beam is reflected by the Fixed Delay Mirror.

Part of the Fixed Beam travels through the Overlap Mirror and to the Exit Iris. The other part travels from the Overlap Mirror to the Focusing Mirror. The Fixed Beam and the Servo Beam meet on the 1st Turning Mirror from where they are directed through the SHG crystal and the Signal Beam is generated.

In FROGscan Ultra, the 2nd Turning Mirror directs the Signal Beam through the Lens/Iris, where the Servo Beam, the Fixed Beam and their respective harmonics are shuttered out by the Iris. The Lens focuses the Signal Beam onto the Spectrometer Turning Mirror and into the Spectrometer.

In FROGscan Standard, the beams travel from the crystal directly to the Spectrometer Turning Mirror and from there into the Spectrometer.

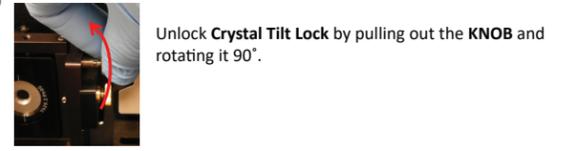


The Servo Beam (A) and the Fixed Beam (B) each generate a second harmonic (A*A and B*B) through interaction with the non linear SHG crystal.

The Signal Beam (A*B) is produced only when the Servo Beam (A) and the Fixed Beam (B) overlap temporally and spatially in the crystal.

1. PREPARATION

- 1.1 Remove antistatic covering from FROGscan.
- 1.2 Remove antistatic covering from Power Supply.
- 1.3 Place the instrument in the desired location on an optical table.
- 1.4 Loosely secure Clamps.
- 1.5 Unscrew the Thumb Screws at the bottom of the FROGscan Cover and lift the cover until it is in an upright position.
- 1.6 Remove the foam cushion from the Beam Block.
- 1.7 Remove Servo Clip by removing the tape/label along with the clip. Gently move servo manually to ensure it moves freely.
- 1.8



2. INSTALL VIDEO FROGSCAN SOFTWARE (VFS)

(skip this step if your order included a computer with pre-installed VFS)

Do not connect either of the USB cables to the computer until Video FROGscan has been installed!

- 2.1 insert the supplied USB Flash Drive into your computer.
- 2.2 Right click on VideoFROGscan. Run as Administrator
- 2.3 Follow the prompts.
- 2.4 Follow camera driver installation prompts if your instrument order includes cameras.
- 2.5 Follow the prompts to install LabVIEW 2012
- 2.6 If your FROGscan came with alignment cameras, remove the Dongle from the external interface of FROGscan.

3. RUN FROGscan

- 3.1 Remove Warning Label from exterior Power Input Connector.
- 3.2 Connect Power Supply to the FROG instrument and switch to ON.
- 3.3 If the USB cables were connected as part of the VideoFROGscan application, disconnect and then reconnect the USB cables before running VideoFROGscan for the first time.
- 3.4 Click on the VFS application to start.
- 3.5 Allow VideoFROGscan to complete initialization (slightly more than one minute).

4. ALIGN LASER BEAM INTO FROGSCAN

When working in the optical path of FROGscan, wear appropriate laser safety glasses and clothing to protect yourself from any hazards the LASER system may present.

- 4.1 Raise the cover of FROGscan and position the instrument on the optical table so the laser beam enters through the entrance and internal irises.
- 4.2 Secure FROGscan to the optical table using the 3 supplied clamps.
- 4.3 Use 2 external mirrors to adjust the beam so that it passes through the Entrance and Center irises.



The internal iris may now be removed by unscrewing the iris from the rod.

We recommend using the factory wavelength for first use.

5. ALIGN LASER BEAM INTO FROGscan USING ALIGNMENT CAMERAS

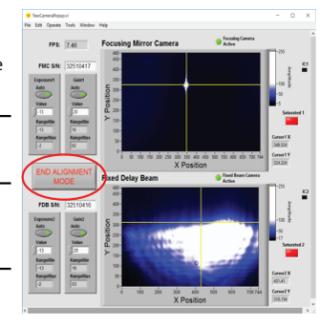
Systems with alignment cameras simplify aligning the beams

- 5.1 Go to the Setup and Alignment in VHS.
- 5.2 Click Alignment mode to ON.
- 5.3 Wait for approx. 5 seconds for the operating system to load the camera drivers.
- 5.4



- 5.5 Position FROGscan on the optical table so that the beams appear overlapped in the Focusing Mirror Camera window and the Fixed Delay Beam (an inverted image of the top half of the split beam) appears as a centered semicircle on the bottom half of the screen.
- 5.6 Use two external mirrors to more precisely align the beams.
- 5.7 Set the Diverter Mirror Position to ON in the Setup and Alignment tab to observe a change in the image.
- 5.8 When the beams are positioned correctly, select END ALIGNMENT MODE.

The Focusing Mirror Camera shows the overlap of the beams as they would appear in the crystal.

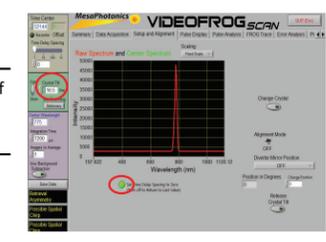


The Fixed Delay Beam Camera shows the Fixed Delay Beam as it would appear on the Overlap Mirror.

6. MAXIMIZE THE FROGSCAN SIGNAL BEAM

FROGscan is factory aligned and the signal beam should be visible, but it can be maximized.

- 6.1 Go to the Setup and Alignment in VFS to maximize the raw intensity of the signal.
- 6.2 Click the "LED" button at the bottom of the spectrogram to set the time delay spacing to "0."
- 6.3 Determine the maximum intensity as a function of the crystal tilt: Tilt the crystal cartridge manually, or via the Crystal Tilt function for FROGscan instruments with automated crystal tilt function.
- 6.4 Determine the maximum intensity as a function of spatial overlap of the beams in the crystal by adjusting the Overlap Mirror.



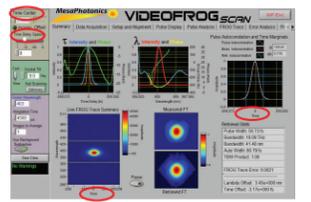
PROTECT YOURSELF AND OTHERS AGAINST REFLECTIONS FROM THE SHG CRYSTAL WHEN TILTING THE CRYSTAL!

6.5

Go to the Summary Tab in VFS and adjust the Overlap Mirror until the Live FROG trace is centered and symmetrical around 0.

Optimize the entry of the signal beam into the spectrometer slits by adjusting the 2nd Turning Mirror.

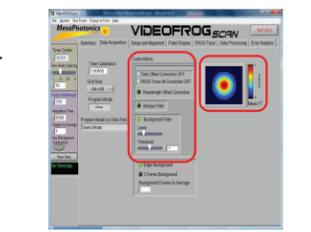
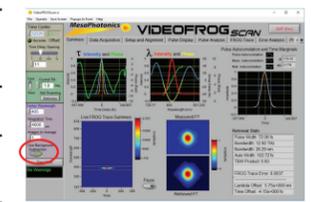
Go to the Summary Tab in VFS. Adjust the Time Center numbers in steps of 5 until the 3 auto-correlation spectra on the top right overlap.



DO NOT ATTEMPT TO MOVE OR ADJUST ANY OPTICAL COMPONENTS OTHER THAN THE OVERLAP MIRROR AND THE LAST TURNING MIRROR

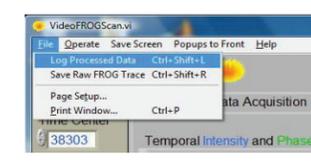
7. OPTIMIZE THE FROGSCAN TRACE

- 7.1 Go to the Summary tab and adjust the overlap mirror until the FROG trace is symmetrical.
- 7.2 Select Use Background Subtraction.
- 7.3 Select Background Filter and adjust the Level to remove background speckle.
- 7.4 Lower the Threshold if too much of the wings are being removed.
- 7.5 Remove potential tilt by selecting FROG Trace Tilt Correction ON.



8. SAVE FROGSCAN DATA

- 8.1 Select the Data Processing tab and click in the Data Directory field.
- 8.2 A new window will open. Navigate to select the preferred location for saving the data.
- 8.3 Go to File in the Main Menu.
- 8.4 Select Log Processed Data to save 10 files of FROG data in rapid succession. Select Save Raw FROG Trace to save the retrieved pulses, the gate and the measured FROG trace. Select Page Setup to set the printer output for printing hard copies of the screen. Select Print Window to print the window to a printer.
- 8.5 Exit VFS by clicking on the Quit button



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