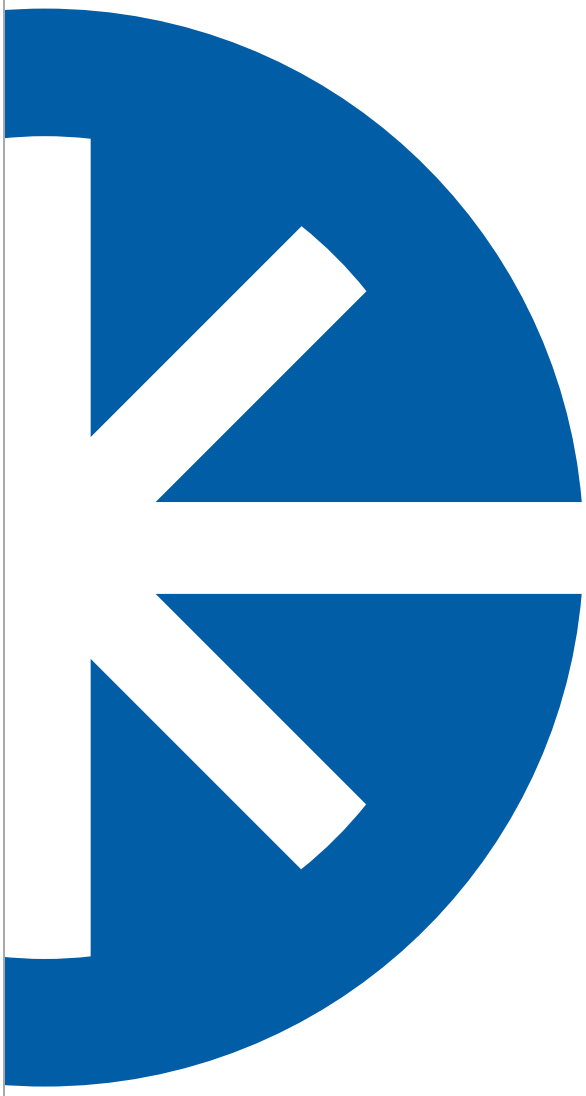

Chameleon™ Discovery GUI

User's Guide

COHERENT®
Superior Reliability & Performance

User's Guide
Chameleon™ Discovery GUI

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LIST OF ILLUSTRATIONS

Signal Words and Symbols in this Manual

This documentation may contain sections in which particular hazards are defined or special attention is drawn to particular conditions. These sections are indicated with signal words in accordance with ANSI Z-535.6 and safety symbols (pictorial hazard alerts) in accordance with ANSI Z-535.3 and ISO 7010.

Signal Words

Four signal words are used in this documentation: **DANGER**, **WARNING**, **CAUTION** and ***NOTICE***.

The signal words **DANGER**, **WARNING** and **CAUTION** designate the degree or level of hazard when there is the risk of injury:

DANGER!
Indicates a hazardous situation that, if not avoided, will result in death or serious injury. This signal word is to be limited to the most extreme situations.

WARNING!
Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

CAUTION!
Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

The signal word "***NOTICE***" is used when there is the risk of property damage:

NOTICE!
Indicates information considered important, but not hazard-related.

Messages relating to hazards that could result in both personal injury and property damage are considered safety messages and not property damage messages.

Symbols

The signal words **DANGER**, **WARNING**, and **CAUTION** are always emphasized with a safety symbol that indicates a special hazard, regardless of the hazard level:

This symbol is intended to alert the operator to the presence of important operating and maintenance instructions.

This symbol is intended to alert the operator to the danger of exposure to hazardous visible and invisible laser radiation.

This symbol is intended to alert the operator to the presence of dangerous voltages within the product enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

This symbol is intended to alert the operator to the danger of Electro-Static Discharge (ESD) susceptibility.

This symbol is intended to alert the operator to the danger of crushing injury.

This symbol is intended to alert the operator to the danger of a lifting hazard.

This symbol is intended to alert the operator to the danger of a fire hazard.

Preface

This manual contains user information for the Chameleon Discovery GUI User's Guide.

NOTICE!
All screen shots are examples only and are not intended to be used as actual data.

Export Control Laws Compliance

It is the policy of Coherent to comply strictly with U.S. export control laws.

Export and re-export of lasers manufactured by Coherent are subject to U.S. Export Administration Regulations, which are administered by the Commerce Department. In addition, shipments of certain components are regulated by the State Department under the International Traffic in Arms Regulations.

The applicable restrictions vary depending on the specific product involved and its destination. In some cases, U.S. law requires that U.S. Government approval be obtained prior to resale, export or re-export of certain articles. When there is uncertainty about the obligations imposed by U.S. law, clarification must be obtained from Coherent or an appropriate U.S. Government agency.

Products manufactured in the European Union, Singapore, Malaysia, Thailand: These commodities, technology, or software are subject to local export regulations and local laws. Diversion contrary to local law is prohibited. The use, sale, re-export, or re-transfer directly or indirectly in any prohibited activities are strictly prohibited.

Introduction

The “Chameleon Discovery” and “Chameleon Discovery TPC” laser systems can be controlled from a user-supplied external computer via the Coherent-supplied Chameleon Discovery Graphical User Interface (GUI). While the laser can be controlled via a terminal window, or via third-party-provided software, this manual describes installation and use of the Coherent provided GUI. Installers for the Coherent GUI can be found on the Coherent website, www.coherent.com.

Details of the communications protocol, how to establish communication, and the command set, are contained in the “Chameleon Discovery Operator's Manual”, PN 1313627.

Referring to Figure 1 below, the user-supplied external computer should be connected to the laser via either the “USB Laser” or “RS232 Laser” connections shown.

Note that only one channel can be connected at any given time, and the USB connector always takes precedence over the 9-pin serial connection, therefore do not attempt to connect to both.

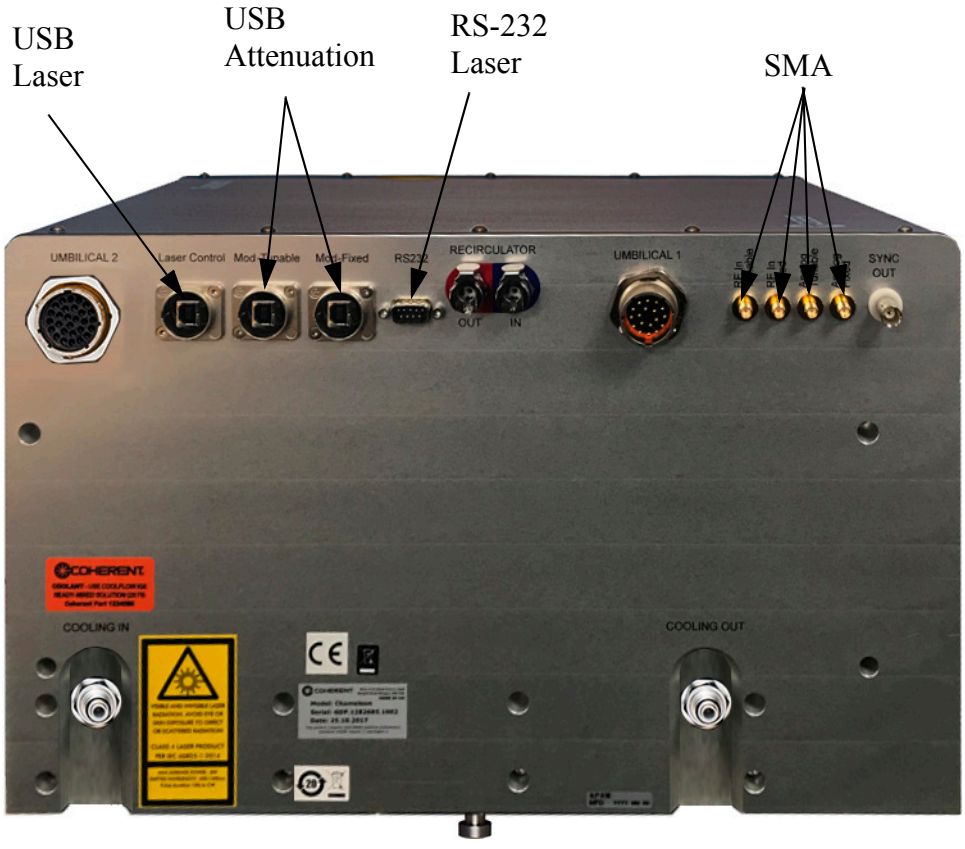


Figure 1. Interface Control Locations[a]

a. The USB Attenuation Controls and the SMA Controls are only operational on the Chameleon Discovery TPC System.

For a Chameleon Discovery TPC model, additional connections "USB Attenuation" and "SMA" are required, in various configurations. Their use, as they relate to the Coherent Discovery GUI, will be described later in this manual. Location for the "USB Attenuation" and "SMA" connections are shown in Figure 1.

Chameleon Discovery GUI Installation

Download the required installation file from www.Coherent.com.

The Chameleon Discovery GUI is installed after the components from Microsoft have been installed. If the required components are already installed on the computer, then the Chameleon Discovery GUI setup program will start at the "GUI Setup Wizard" menu form, as shown in Figure 2.

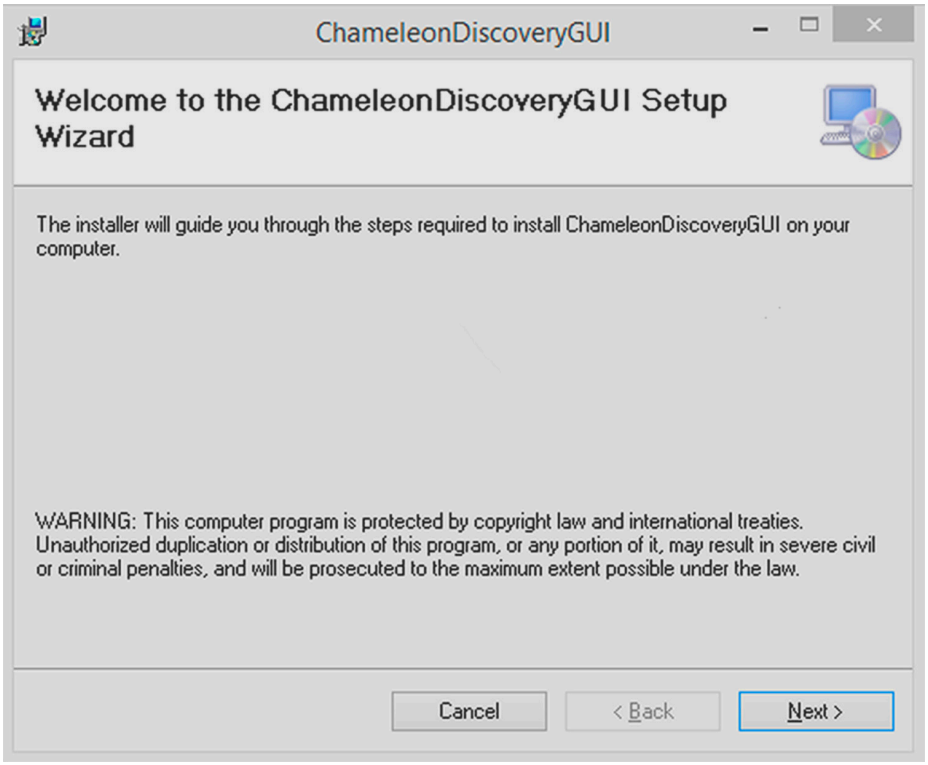
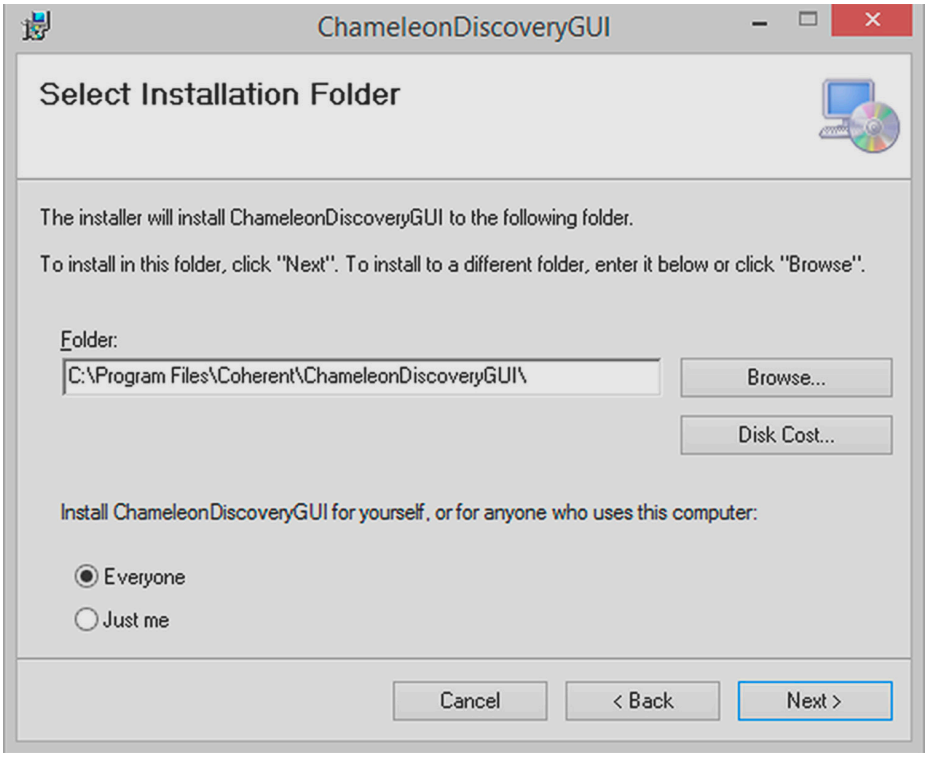


Figure 2. GUI Setup Installation



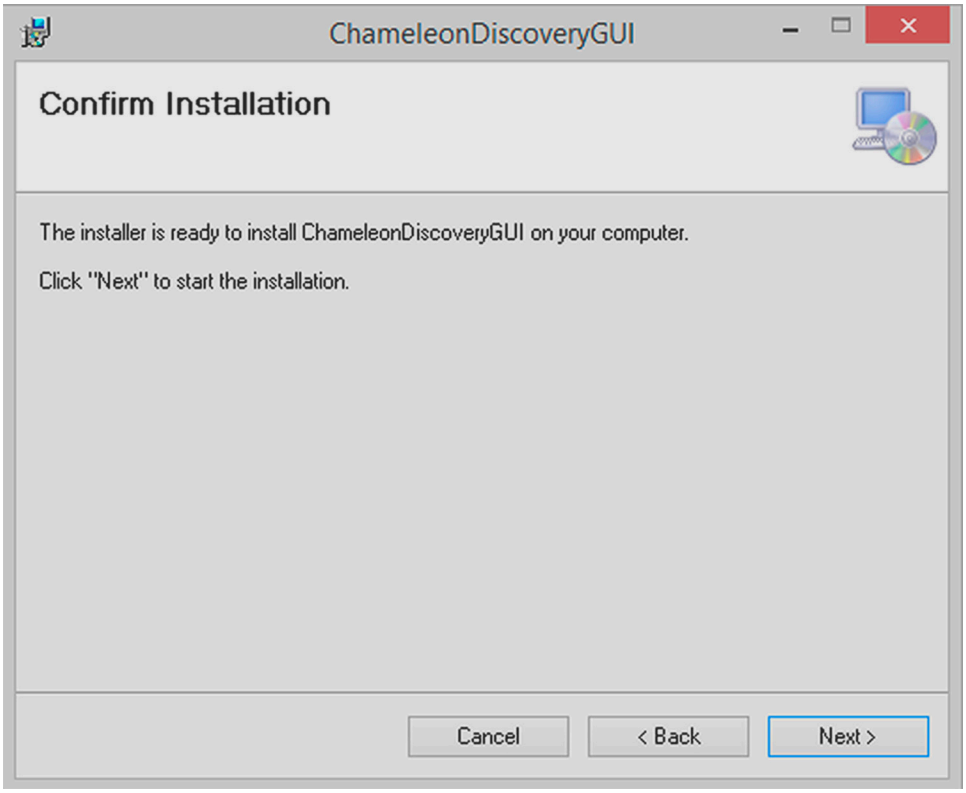


Figure 2. GUI Setup Installation (Continued)

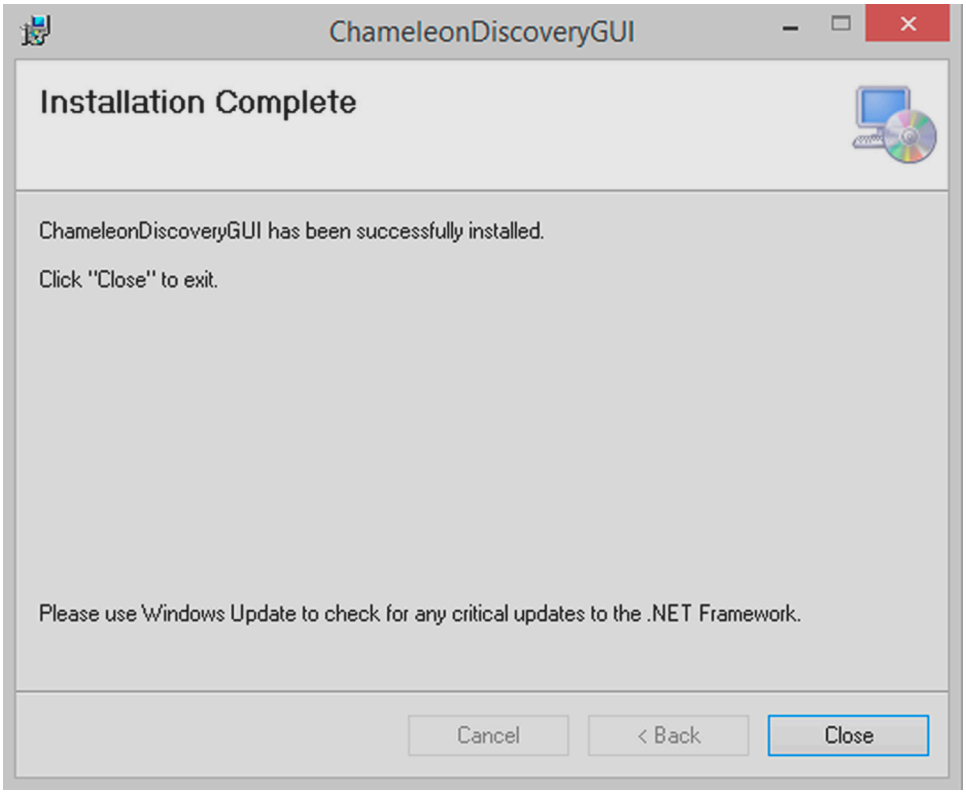
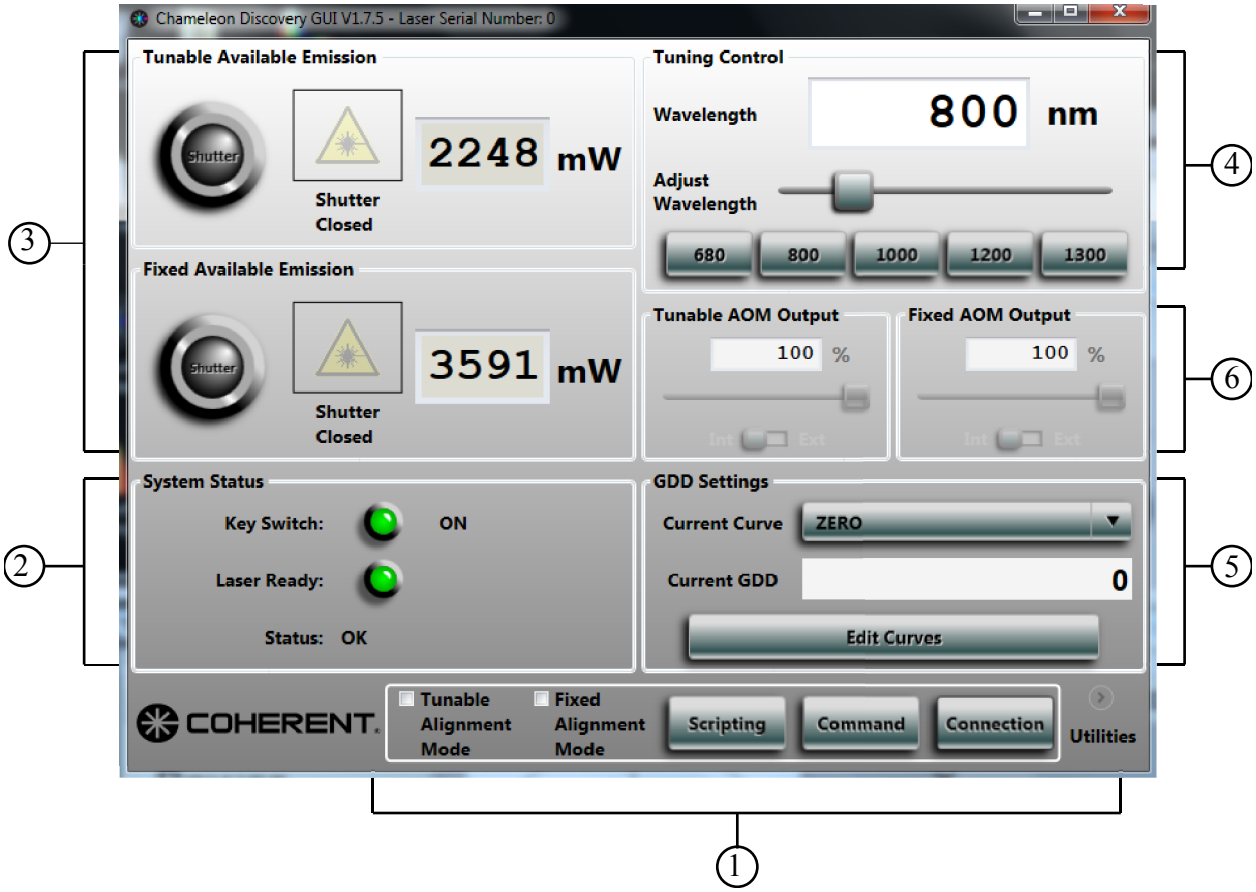


Figure 2. GUI Setup Installation (Continued)

Main GUI Screen

Below the figure is a description of the basic functionality of the GUI screen. Refer to the following pages for more details.



1. **Utilities** - Contains the Connections, Command Scripting buttons. Also contains the variable and fixed alignment modes.

2. **System Status LEDs** - Indicates when the Key Switch is ON/OFF and if the laser is ready. It also indicates whether the Status is Tuned or Faulted.

3. **Shutter Control** - Provides shutter control.

4. **Tuning Control** - Displays the wavelength and allows the user to adjust wavelength.

5. **GDD Settings** - Gives access to program and select predefined GDD curves.

6. **Attenuation Control**[a] - Discovery TPC only

Figure 3. Main GUI Screen

a. For a standard Chameleon Discovery System, attenuation control is not available, therefore these controls are shown grayed out in this view.
Attenuation Control is only operational on a Chameleon Discovery TPC System. Description of these controls follow later in this manual.

Utilities Menu

The utilities menu consists of the Connections, Command Prompt, Scripting buttons and check boxes for fixed and tunable alignment modes.

Connections Menu

Clicking on the Connections button opens the Laser Connection window.

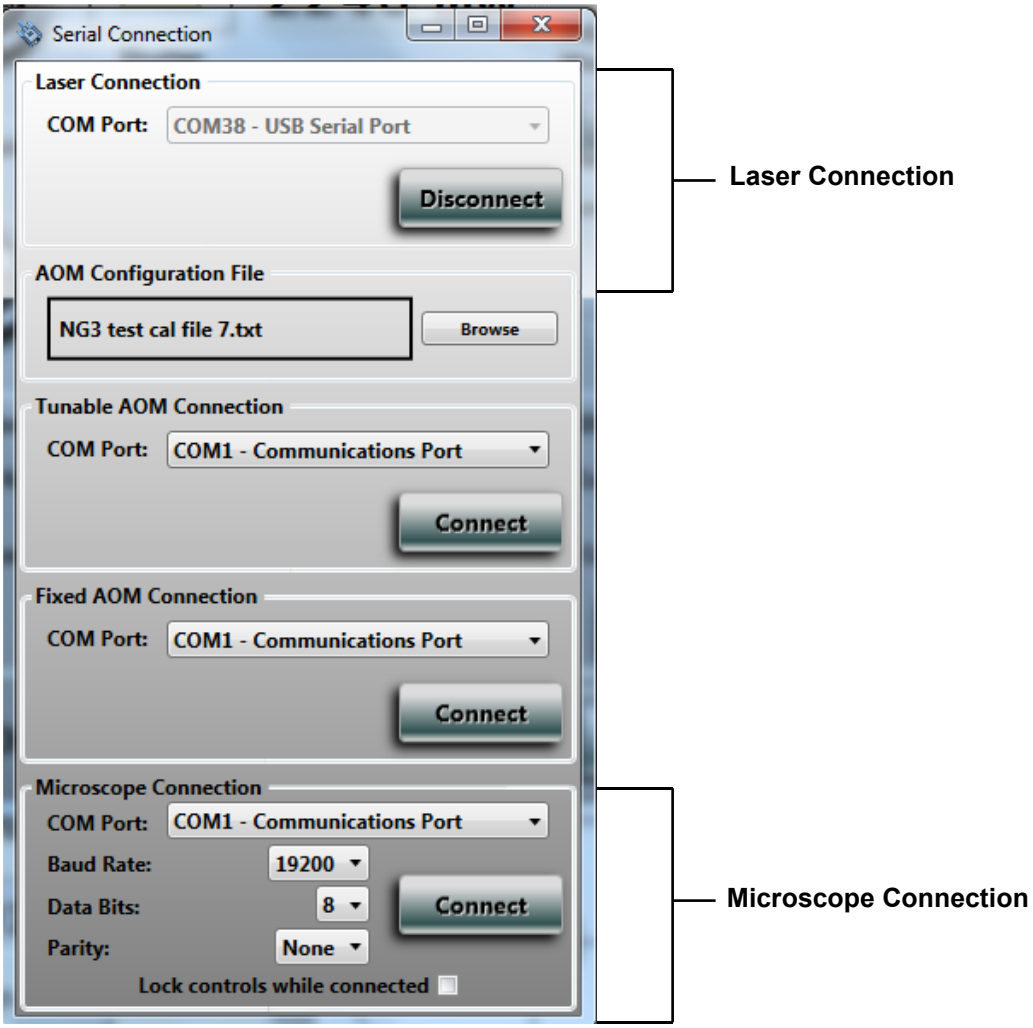


Figure 4. Connections Menu

Use the Laser Connection section to select the correct COM port for from the user-supplied PC to the laser.

The Microscope Connection section gives the possibility to select the correct COM port where a third-party application is controlling the laser, with commands/queries simply being passed through the Coherent GUI. When selected, the "Lock Controls While Connected" function locks out the GUI, in order to avoid conflicts. Contact your local Coherent service group for further information on the set-up.

AOM connections apply only to Chameleon Discovery TPC systems and will be described later in this manual.

Command Prompt

The command prompt accessed via the Command button on the Utilities menu gives the user a terminal window (Figure 5) to send commands and receive status feedback from the laser. The command set is described in the “Chameleon Discovery Operator's Manual”, PN 1313627.

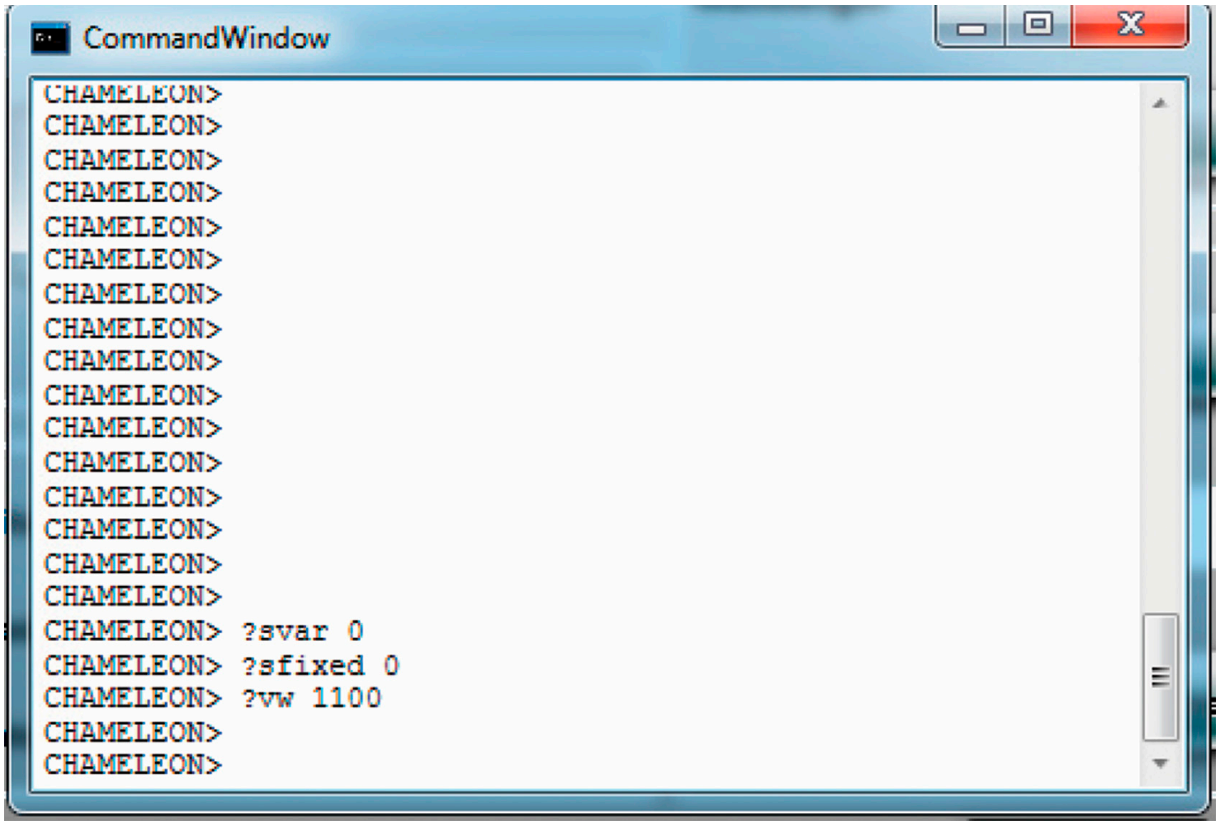


Figure 5. Command Prompt

Scripting Tool

The Scripting tool allows the user to generate a list of pre-programmed commands (Figure 6) for the laser to perform. As mentioned previously, the command set is described in the "Chameleon Discovery Operator's Manual", PN 1313627..

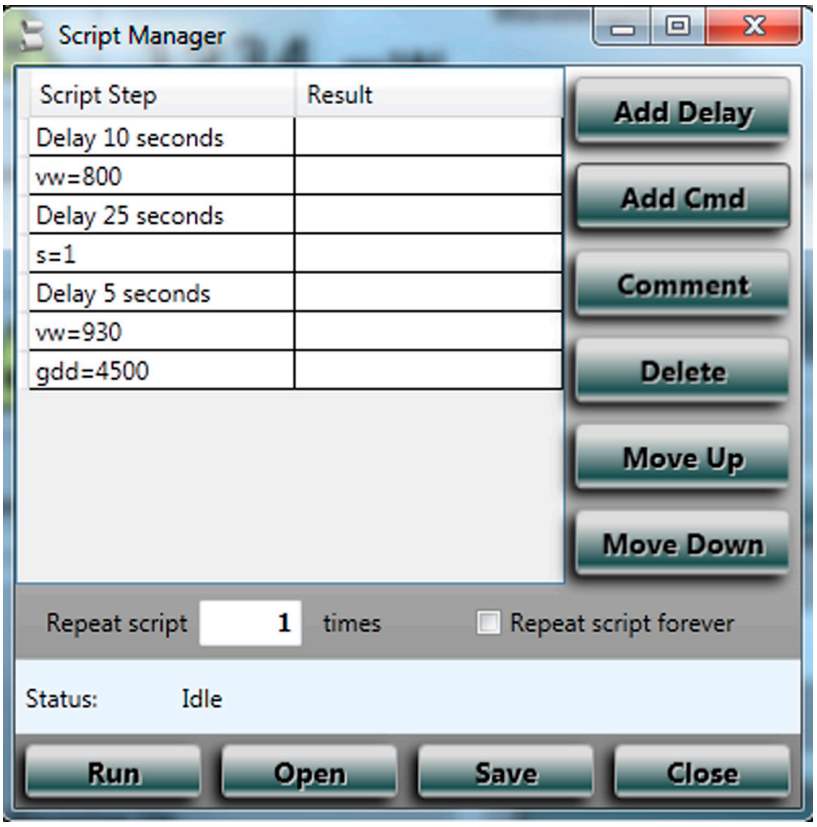


Figure 6. Scripting Tool

Alignment Mode

Checking the appropriate boxes shown in Figure 7 activates the Tunable and Fixed Alignment Mode functions. These options set the tunable or fixed outputs into a reduced power output mode for external optical alignment, e.g. mirror alignment. For Tunable Alignment Mode, the laser tunes to 730 nm at reduced power. While the Fixed Alignment Mode remains at 1040 nm but at reduced power.

Figure 7. Alignment Mode

System Status

The System Status gives an overview of system operational status.

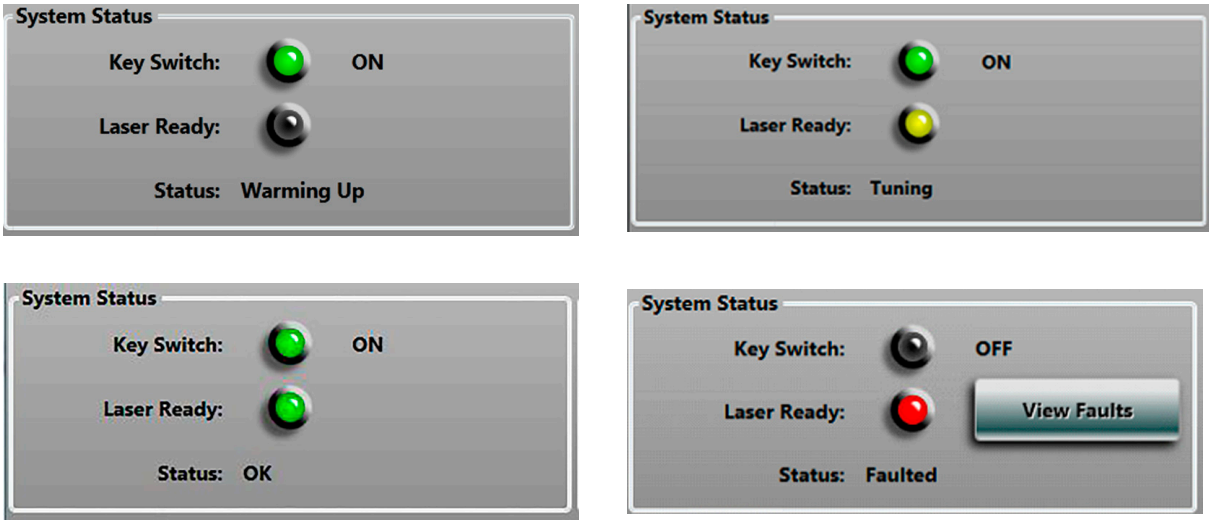


Figure 8. System Status - Examples

Key Switch

Indicates that the keyswitch on the laser PSU is in the Standby or Enable state.

Laser Ready

Green - Laser is running with no faults.

Yellow - Laser is warming up or tuning.

Red - Indicates a fault.

Status

Warming Up - System is powered on but not ready to be keyed on.

Tuning - Laser is in the process of tuning the wavelength.

OK - Laser is running.

Faulted - Indicates that a system fault has occurred. Press "View Faults" for details.

Shutter Control

The Shutter buttons provide shutter control via mouse-click with shutter status as shown in Figure 9.

Press and hold to Open, single click to Close.

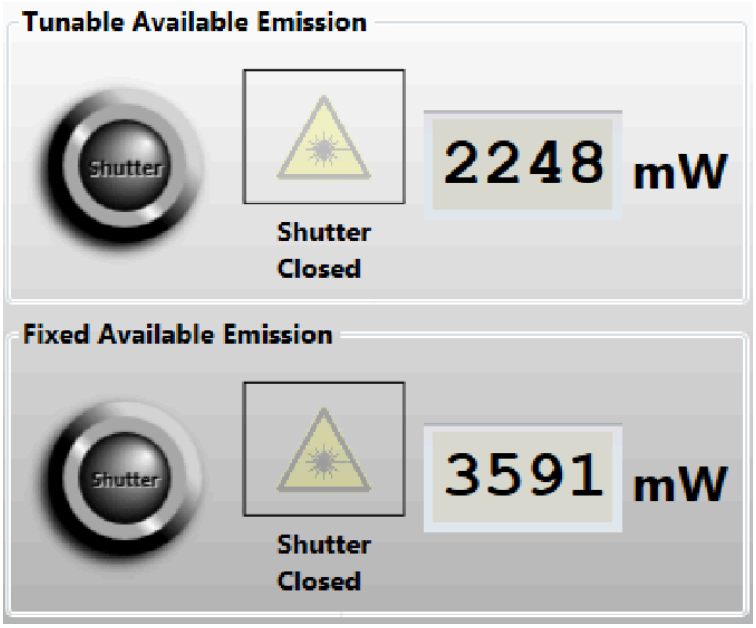


Figure 9. Shutter Buttons

Wavelength Adjust

Adjust wavelength by directly entering the desired value into the Wavelength screen, by moving the Adjust Wavelength sliding-scale or by selecting any of the user-defined presets. Presets are programmed using the mouse double-click function to edit. See Figure 10.

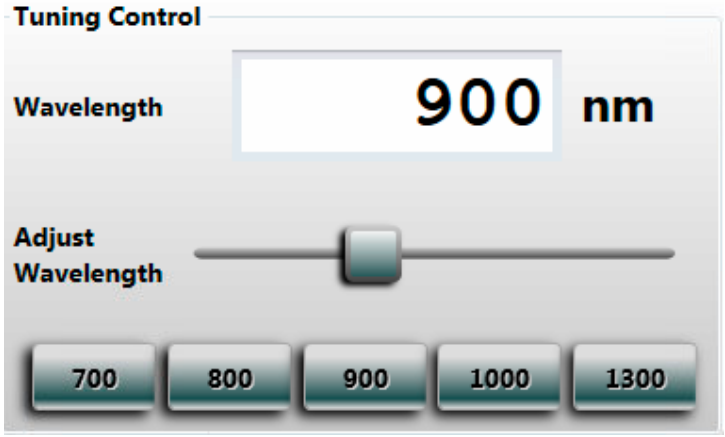


Figure 10. Wavelength Screen

The wavelength screen will change to red (Figure 11) in color as the laser is tuning to the new selected value and return to black once tuned.

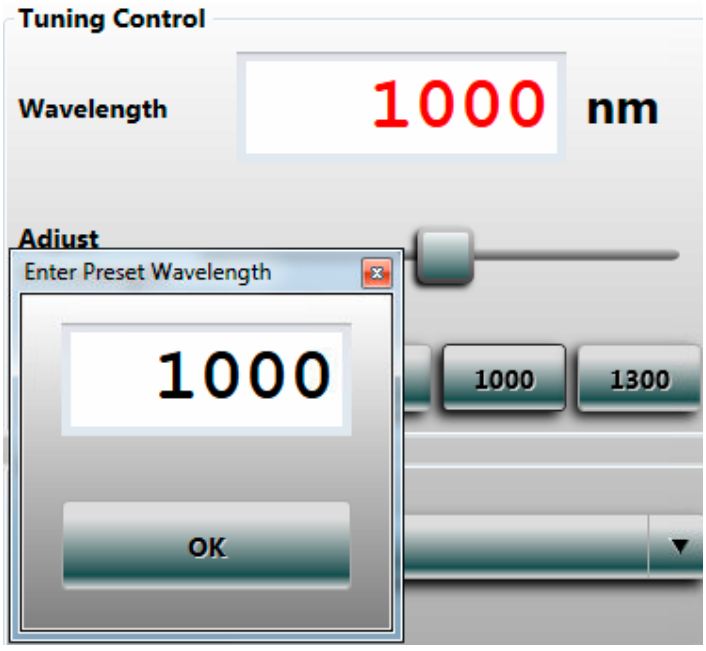


Figure 11. Wavelength Screen - Red

GDD Settings

The GDD Settings menu gives the user access to program and select pre-defined GDD curves for control of the dispersion pre-compensation section of the laser.

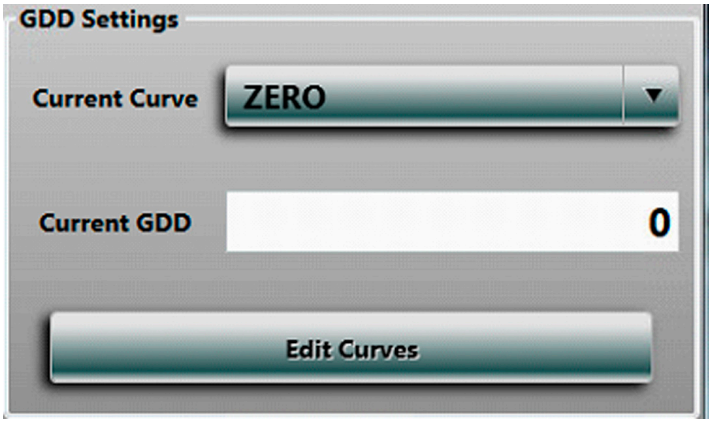


Figure 12. GDD Settings Menu

Current Curve

The Current Curve drop down allows the selection of different pre-compensation curves.

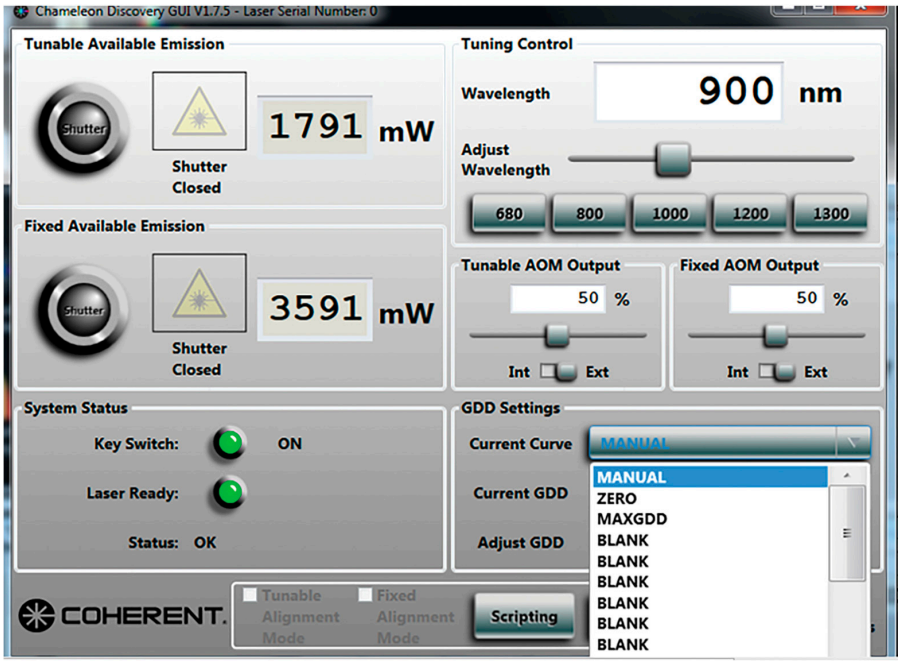


Figure 13. Current Curve - Dropdown

Edit Curves

The Edit Curves button opens a new dialog box which enables editing of existing curves and creation of new curves.

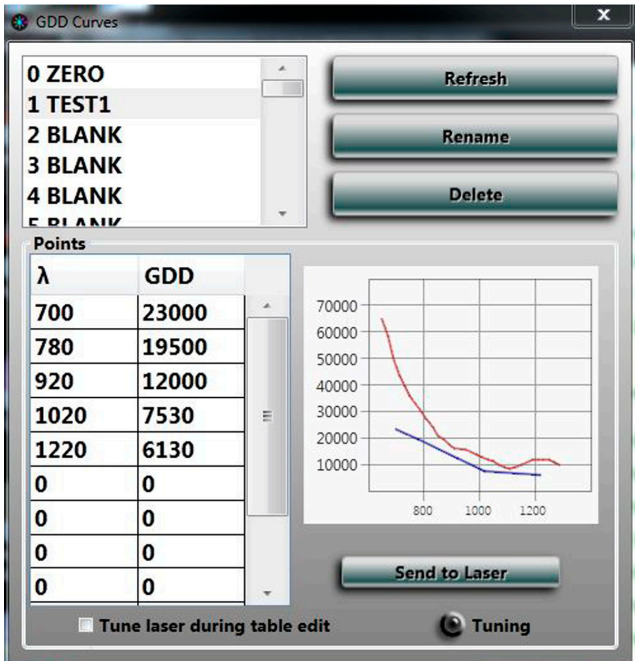


Figure 14. Edit Curves

Rename GDD Curve

To create a new curve, click on one of the BLANK curves and input a new name.

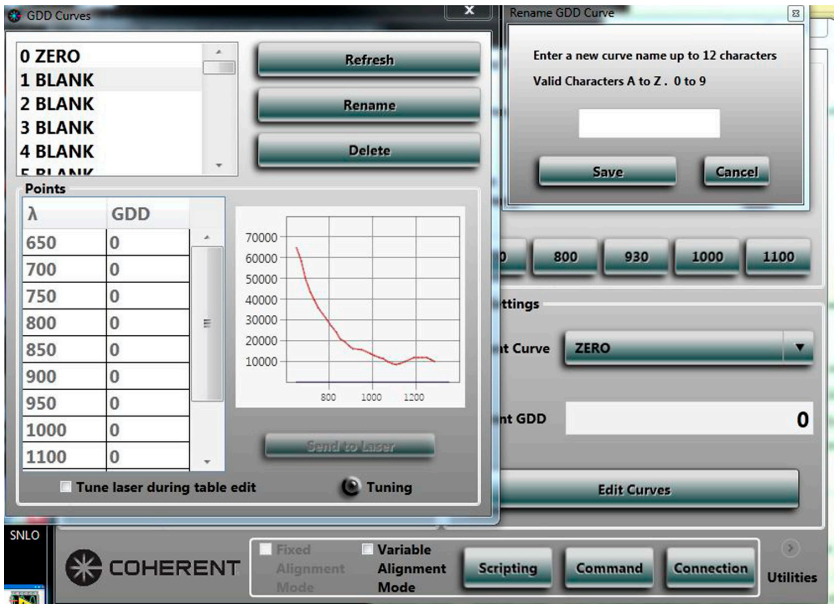


Figure 15. Rename GDD Curve

Curve Points

Step through inputting wavelength and GDD as desired. The new curve is displayed in blue. The maximum GDD per wavelength is shown in red.

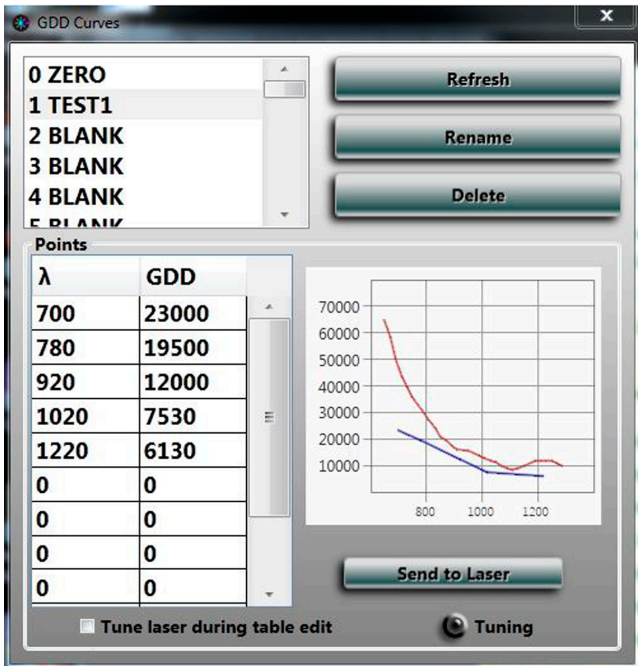


Figure 16. Curve Points

AOM Attenuation Control Connections

If the laser system is a Chameleon Discovery TPC (Total Power Control), the AOM attenuation menu allows for control of the laser output power in three basic modes which are described briefly in the following sections.

This guide only describes use of the Coherent Discovery GUI. Precise descriptions of the AOM specifications and interfaces are beyond the scope of this manual, which is restricted to describing how to connect and interact with the AOMs via the Coherent GUI.

Detailed information on the AOMs can be found in the main Chameleon Discovery User Manual.

NOTICE

The power readings displayed by the Coherent GUI in the Tunable/Fixed Emission windows are the maximum available power. Changing the AOM settings changes the actual output power but the displayed GUI readings will remain constant. The AOM percentage values are based on a curve fit and are indicative only.

The actual laser power after the AOMs at the laser output, can be measured using a suitable thermopile sensor and power meter. Go to www.coherent.com for your metrology needs.

To interface with a Chameleon Discovery TPC system from the Coherent GUI, refer back to Figure 1 of this manual.

1. Connect 2 x USB A-B style cables from the user-supplied PC to the connections on the rear panel of the laser head shown as "USB Attenuation".
   While connecting the cables it may be helpful to observe the Hardware Manager of the PC to see the port number designation.

2. Return to the "Connections" dialog first introduced in Figure 4. See Figure 17 below for connection details with the TPC.
   The connection to the laser system should already be made using the "Laser Connection" section described on pg. 6.

3. Browse to and select the system-specific calibration file in the "AOM Configuration File" section. This is a factory-set lookup table for RF power and frequency and will be supplied in text format by your Coherent representative. Example shown in Figure 17.

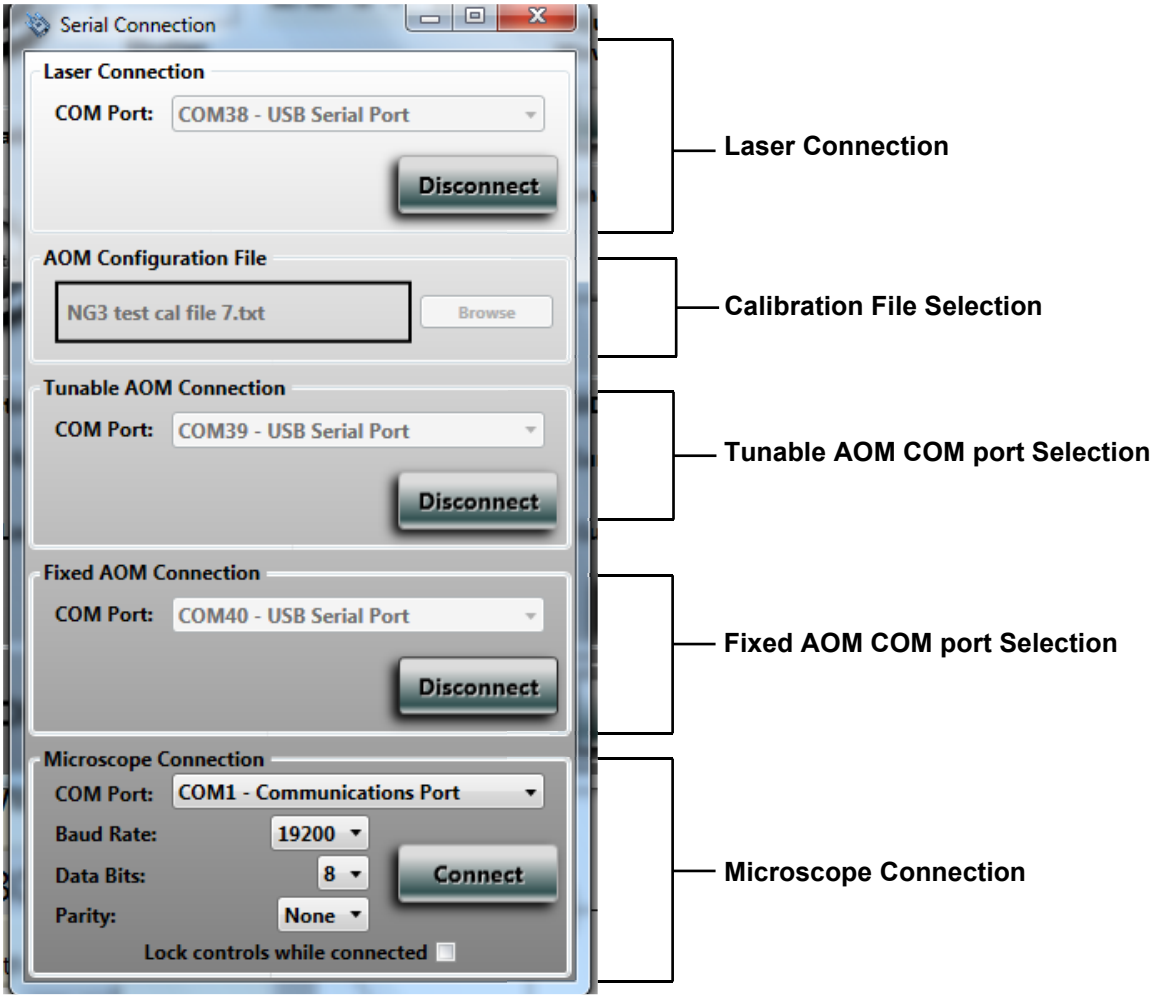


Figure 17. Connections Dialog (TPC)

4. The COM ports to the AOMs will now become available. Select the correct COM port for the Tunable and Fixed AOMs. Example shown in Figure 17.

Having connected the GUI to the laser system, and to both AOMs using the Connections dialog described above, control of the AOM devices is now available.

It should be noted the "Alignment Mode" check-boxes described earlier in this manual (Figure 7) are grayed out for Chameleon Discovery TPC systems once the AOM USB connections are made. The AOMs can be easily manipulated in Internal mode (see subsequent section) to set a low output power, therefore "Alignment Mode" is not required for the Discovery TPC.

AOM Attenuation Control - Internal Mode

The first case is described as Internal Mode, the toggle switches are set to "INT"' as shown in Figure 18.

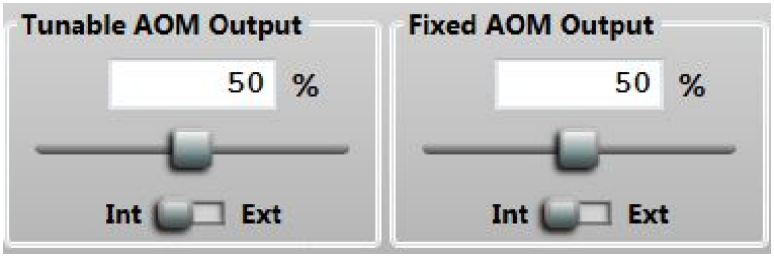


Figure 18. Internal Mode

Internal mode enables coarse manual control of the laser output power via the sliders shown in Figure 18. Click, drag, and release the slider, or click up/down on the slider bar, to set a new AOM transmission setting.

Internal mode is most likely used for:

- Coherent field engineers during installation and troubleshooting
- First-time users during initial setup of their experimental layout as a convenient method to drive the laser output power up/down as required.

As previously noted, the "Alignment Mode" check-boxes described earlier in this manual (Figure 7) are grayed out for Chameleon Discovery TPC systems when the AOM USB connections are made. Therefore, Internal mode should be used as a substitute for Alignment Mode, with the AOM sliders used to adjust the laser output power to a suitable (low) value.

Attention is drawn once again to the notice at the start of this section, that the power displayed in the Coherent GUI (Figure 9) is the maximum available power, and does not factor in the AOM transmission setting. The output power of the laser (post-AOM) can be measured externally.

AOM Attenuation Control - External Mode

The second case is described as External Mode, the toggle switches are set to “EXT” as shown in Figure 19.

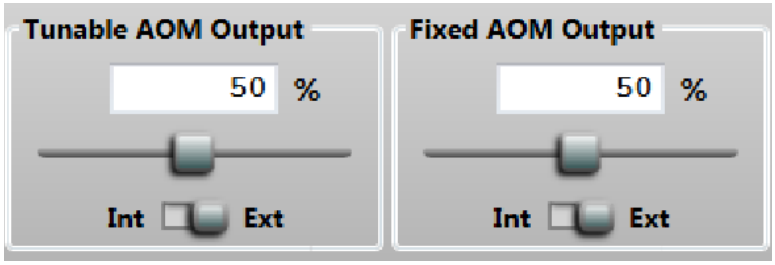


Figure 19. External Mode

This case is slightly more complicated but provides additional capabilities, with the possibility to implement fast switching of the laser power which can be synchronized with other devices such as scanning mirrors.

External mode is most likely to be used for users whose experimental setup is already configured and ready to use. It still relies on the factory-supplied calibration files and requires use of the Coherent GUI.

The mode requires additional SMA connections to the rear of the laser head (Figure 1). For external mode, the user must supply a 0-10 Vdc signal, from a signal generator or DAQ card for example, to the SMA connectors labeled “Analog Tunable” and “Analog Fixed”. See Figure 20 below.

Figure 20. Analog Signal In

The externally applied voltage works in tandem with the GUI settings:

- the percentage slider is still available and sets the maximum power available in External mode.
- the user-supplied 0-10 V signal will modulate the laser from zero output power to maximum output power, where the maximum power is set by the GUI controls.

Example 1

If the slider is set to 100 % and then 0-10 V is applied to the Analog Input, the laser will deliver 0-100 % of the maximum available laser power.

Example 2

If the slider is set to 65 % and then 0-10 V is applied to the Analog Input, the laser will deliver 0 % - 65 % of the maximum available laser power.

NOTICE
Switching from EXT mode back to INT mode in the GUI will prompt a dialog box similar to that shown in Figure 21. This alerts the user that due to the different modes of operation, a sudden increase in output power is possible when switching back to internal mode, depending on where the slider is set. The user should be aware of and prepare for this by setting the slider to 0 % before switching modes, by blocking the output beam or by closing the laser shutter.

Attention is drawn once again to the notice at the start of this section, that the power displayed in the Coherent GUI (Figure 9) is the maximum available power, and does not factor in the AOM transmission setting. The output power after the AOMs can be measured externally.

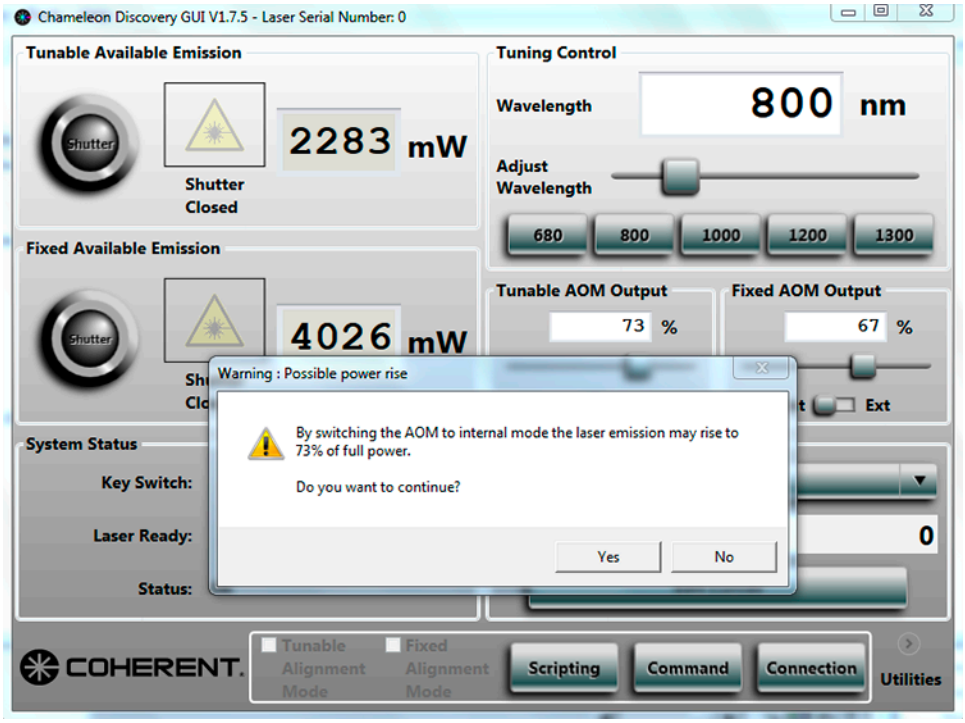


Figure 21. Switching from External to Internal Mode

AOM Attenuation Control - Direct RF In

The third possibility to control the AOMs in the Discovery TPC laser head is to send the RF drive signal direct to the AO devices, bypassing the internal drivers, via the SMA connections "RF In Tunable" and "RF In Fixed".

This case does not rely on the Coherent-supplied GUI and is beyond the scope of this manual.

This mode of operation is typically utilized by advanced users who wish to use their own drivers. The Coherent calibration files are supplied for use in this case, although final implementation is in the hands of the user or their OEM equipment vendor.

Please refer to the "Chameleon Discovery Operator's Manual", PN 1313627 for further information on the Direct RF In connection.

NOTICE

Connections should not be made to the "RF In" connectors without authorization from the OEM equipment vendor.

Chameleon Discovery GUI User's Guide

Part No. 1298356 Rev. AC

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Part No. 1298356 Rev. AC