Master Client User's Guide

Preface

The purpose of this document is to describe the PhaseSpace Master Client application that is included with the PhaseSpace Impulse X2 system. It will give an overview of the features that will allow users to calibrate the Impulse X2 system, record live data, and play back recorded takes.

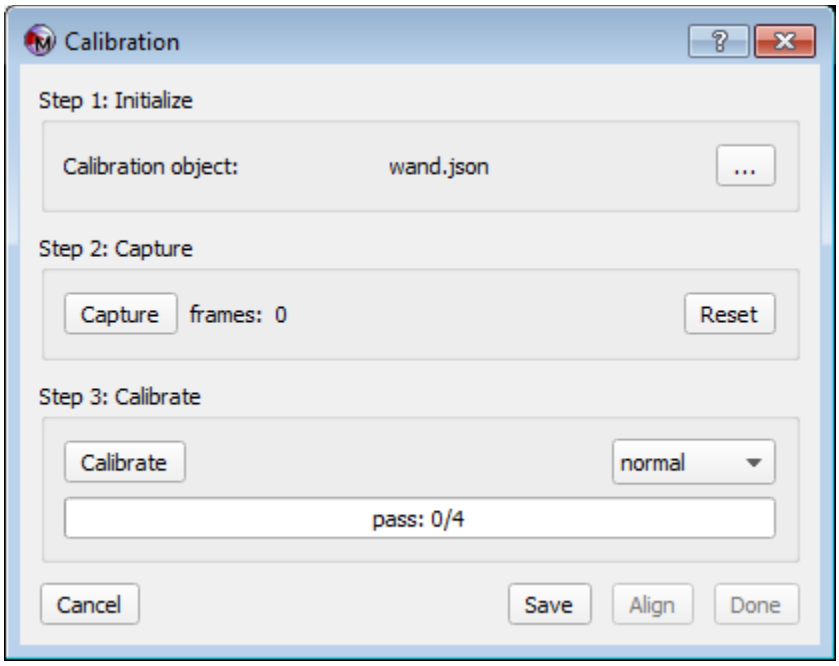
PhaseSpace Master Client is a calibration and motion capture data recording program. It allows users to stream motion capture data, record motion capture data, and conduct system calibration and alignment entirely within one application. Data from Master Client can be saved as 3D point data to be used in other software.

Calibration & Alignment

Calibration

1. In the OWL Configuration panel, set the Address to the IP address of the Impulse X2 server to be calibrated.

2. In the *Settings* menu, select *Calibration* to enter calibration mode. This will open the Calibration dialog box. (***Note:*** *If this is the first run of the Master Client, you will be asked to locate the calibration object's tracker file before the calibration dialog opens*)



3. Once the appropriate calibration object tracker file is selected, connect an encoded driver to the calibration object and turn the driver on.

4. Click the **Capture** button to start the data capture process. Use the calibration object to generate calibration data points. The camera views in the 2D view panel will fill with green as data is collected.

5. Set the calibration quality with the drop select (f*astest, fast, normal, slow, exhaustive*). Higher quality calibration will take longer to compute. Click the **Calibrate** button to start the calibration process. After four passes, calibration is complete. If the calibration fails, press the **Reset** button and repeat the capture process to create a new set of data.

6. Click the **Save** button to save the completed calibration.

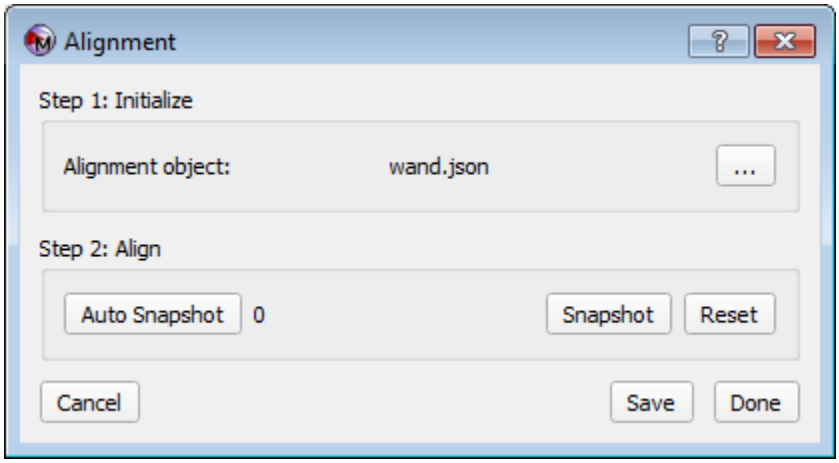
7. Click the **Align** button to begin alignment or the **Done** button to close the dialog.

Alignment

1. In the OWL Configuration panel, set the Address to the IP address of the Impulse X2

server to be aligned.

2. In the *Settings* menu, select *Alignment* to enter alignment mode. This will open the Alignment dialog box. (***Note:*** *If this is the first run of the Master Client, you will be asked to locate the alignment object's tracker file before the alignment dialog opens. Typically, this file is the same as the calibration object's tracker file because the calibration object is also used for alignment.*)



3. Click the **Auto Snapshot** button to have Master Client automatically place alignment points as you position the alignment object in the capture space.

4. Set the origin of the capture space (*typically the center of the space*). If Auto Snapshot is on, the 3D viewer will flash green once the alignment object is still and the point is set. To create a snapshot manually, click the **Snapshot** button when the alignment object is in place.

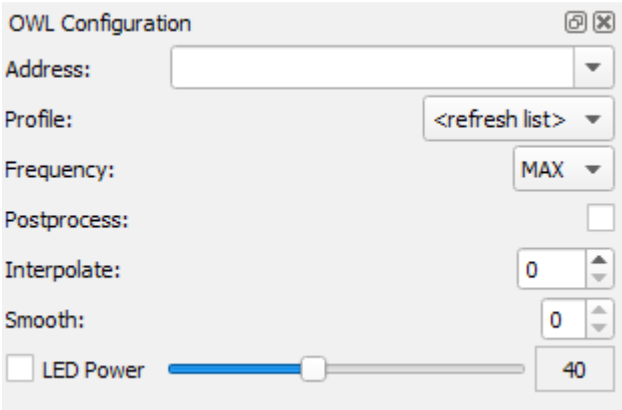
5. Set points for the X and Z axes. When all three points are set, Master Client will automatically align the capture space according to the XYZ axes produced
.
6. To change or reset alignment, click the **Reset** button and set the points again.

7. Click the **Save** button to save the completed alignment.

8. Click the **Done** button to close the alignment dialog.

Streaming Motion Capture Data

OWL Configuration



Note: *Changes to the configuration settings, except LED Power and Profile, will only take effect after restarting the stream.*

- **Address** - The IP address of the server.
- **Profile** - The tracker profile to use. Profiles are created in the Configuration Manager.
- **Frequency** - The capture frame rate.
- **Postprocess** - Apply postprocessing to marker data.
- **Interpolate** - The maximum size gap (*in frames)* to automatically interpolate over. The recommended interpolation is a value greater than the number of LED groups.
- **Smooth** - Smoothing filter for the interpolation. 0 would mean none, while a number equal to the interpolation frames would be the max.
- **LED Power** - The brightness of the LED markers (*0%-100%*). This setting can be adjusted and toggled on and off while the server is streaming.

OWL Trackers

- Point Tracking
  - To create a new point tracker, right click in the OWL Trackers table or the Markers table and select Add Point Tracker.
  - To remove a tracker or save a tracker file, right click an individual tracker in the OWL Trackers table and select the desired option.
- Rigid Body Tracking
  - To create a rigid body from markers in the live stream, select a group of at least three markers in the 3D viewer, right click in the OWL Trackers table or the Markers table, and select "Add Rigidbody Tracker" from the pop-up menu.

- To create a rigid body from a file, right click in the OWL Trackers table and select "Load Tracker File" from the pop-up menu. Once the tracker file is selected, Master Client will generate the rigid body based on the points specified in the tracker file. (***Note:*** *The marker IDs and marker configuration must match the marker IDs and marker configuration specified in the tracker file.*)

Recording

1. Set the working directory of the capture session. Recorded takes will be saved in the working directory. The working directory is displayed in the top toolbar.
2. Set up the server configuration with the OWL Configuration panel.
3. Press the **Connect** button to start the live stream.
4. Set the name of the take to be recorded.
5. When ready, press the **Record** button to start recording. A timer in red text will appear over the viewer indicating the time elapsed in the recording.
6. Press the **Record** button again to end the recording.

RPD Playback

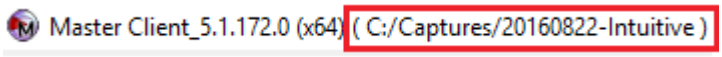
1. Set the working directory to the folder containing the desired RPDs.
2. In the OWL Configuration panel, set Address to the IP address of an Impulse X2 server that is not currently streaming.
3. Open the RPD Playlist panel. The list will automatically display the RPDs in the working directory.
4. Double-click on an RPD to start playing the take.

To stop an in progress RPD playback click the **Connect** button.

Interface

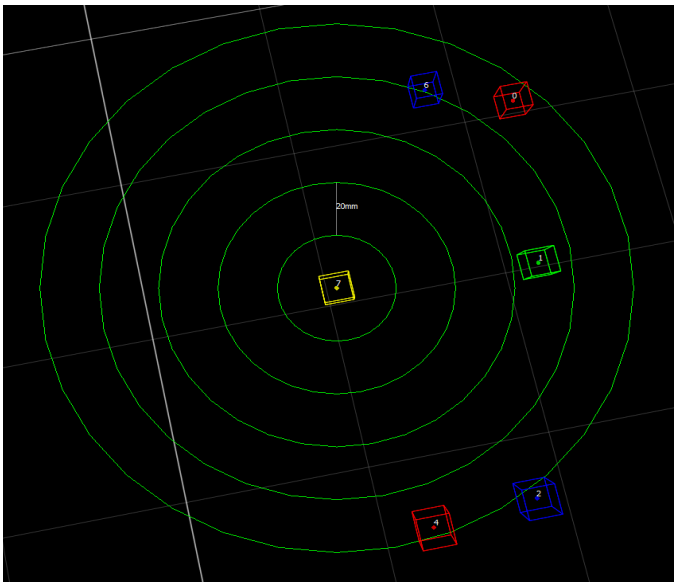
Menus

- File
  - **Working Directory** - Set the directory in which new recordings will be saved and existing recordings can be accessed. The working directory is displayed at the top of the client.

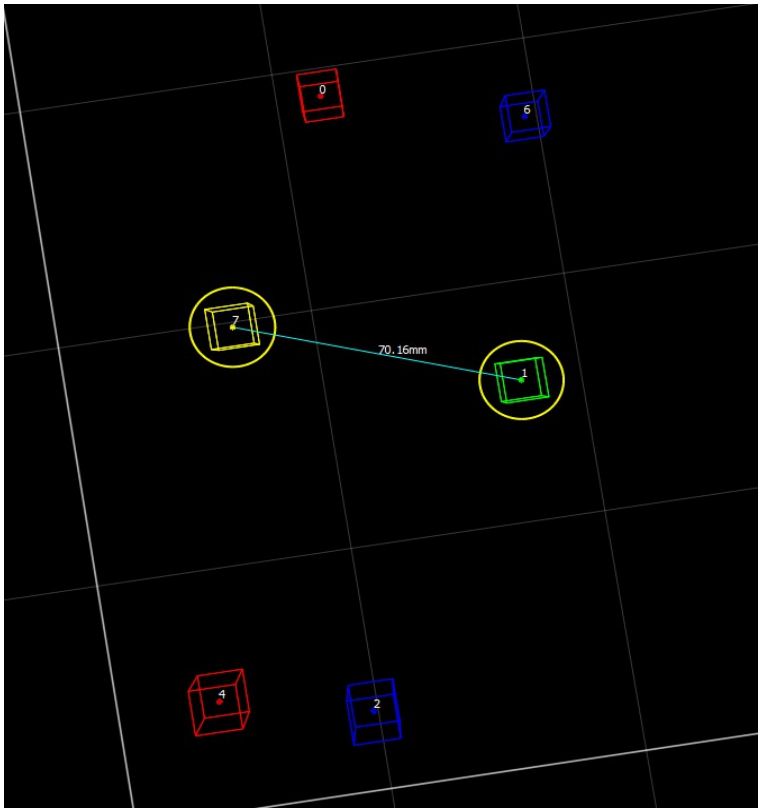


- **Quit (Ctrl + Q)** - Exit the application.

- View
  - Click dashed line to seperate into own window.
  - **Show IDs** - Toggle display of marker ID numbers.
  - **Show Rays** - Toggle display of camera sight lines.
  - **Show Trails** - Toggle display of marker trails.
  - **Show Target Circles** - Toggle display of circles for scale when zoomed in.



  - **Focus on Selected (F)** - Center view on selected item.
  - **Follow Selected (Shift + F)** - View will follow selected item.
  - **Markers**
    - **Visible** - Toggle display of markers.
    - **Size** - Select display size of markers.
    - **Distance**
      - **Show Current** - Toggles display of distance between two selected markers.



- **Mark (M)** - Marks distance between two selected markers.
- **Clear (Shift + M)** - Clear all marked distances.

◦ **Rigids**

- **Visible** - Toggle display of rigid bodies.
- **Size** - Select display size of rigid bodies.

◦ **Cameras**

- **Visible** - Toggle display of cameras.
- **Cones** - Toggle display of camera view cones.
- **Stands** - Toggle display of camera position indicators on floor.
- **Chains** - Toggle display of connections between chained cameras.

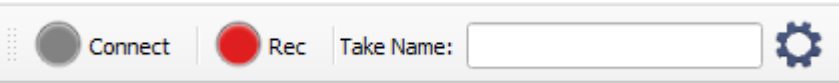
◦ **2D Layout** - Arrange camera views by:

- **Auto** - Master Client will automatically select a layout type.
- **Grid** - Arrange camera views in a grid.
- **Staggered** - Arrange camera views in a more compact staggered grid.

◦ **Toggle selected view** - Toggle between selected camera views only and all camera views.

- Tools
  - **Rigid Bodies**
    - **Create (Ctrl + B)** - Create a rigid body from at least three selected markers.
    - **Show Editor** - Open rigid body editor.
  - **Alignment** - Enter alignment mode.
  - **Calibration** - Enter calibration mode.
- Settings
  - **Configure** - Open Options dialog box
- Window
  - Click dashed line to separate into own window.
  - **Show Dock Titlebar(s)** - Toggle display of the titlebars at the top of each panel.
  - **OWL Configuration** - Toggle display of the OWL Configuration panel.
  - **OWL Trackers** - Toggle display of the OWL Trackers panel.
  - **RPD Playlist** - Toggle display of the RPD Playlist panel.
  - **Cameras** - Toggle display of the Cameras panel.
  - **OWL Tools** - Toggle display of the toolbar above the panels and viewer.

OWL Tools



- **Connect** button - Connect to the Impulse X2 server with the settings specified in the OWL Configuration panel.
- **Record** button - When streaming, start recording the marker data in the capture space.
- **Take Name** - The name with which the current take will be saved.
- **Gear** button - Opens the Options dialog box. Also accessible via Configuration in the Settings menu.
- Position within the application can be adjusted by clicking and dragging the double dotted lines.

Panels

Further details for each panel are covered in relevant sections. Panels can be pulled out of

the sidebar with the 'minimize window' button and hidden with the 'X' button.

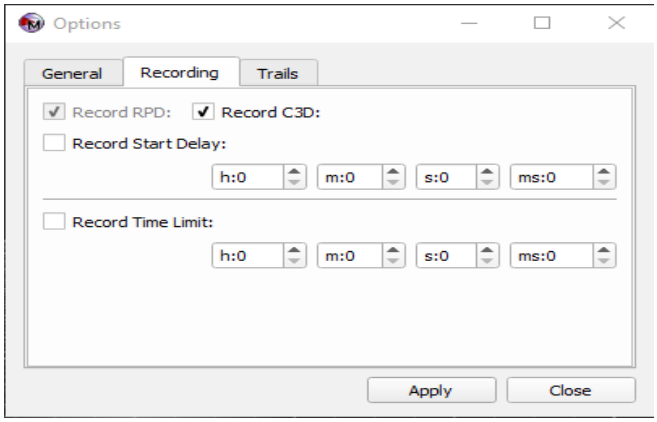
- **OWL Configuration** - Set up connection to Impulse X2 server.
- **OWL Trackers** - View markers being tracked by the current mode configuration.
- **RPD Playlist** - Listing of recorded data files in the current working directory.
- **Cameras** - View cameras used by the current Impulse X2 server.
    - Cameras can be selected individually or as a group by clicking and dragging. To add cameras to the current group select with Ctrl + Left click.
- **2D** - Show individual 2D views of cameras.
- **3D** - Show 3D capture space (available only when system is calibrated).
    - Mouse commands:
        - **Left click** - Select. Click and drag to select multiples.
        - **Right click** - Click and drag to rotate viewpoint.
        - **Mouse scroll-wheel OR Left click + Right click OR Ctrl + Middle click** - Zoom in and out.
        - **Middle click OR Ctrl + Right click** - Click drag to move camera along xz plane.
        - **Shift + Middle click** - Click and drag to move camera along y-axis.
    - Hotkeys:
        - **Shift + R** - Reset camera position.
        - **X** - Set camera view along x-axis. **Shift + X** for negative direction.
        - **Y** - Set camera view along y-axis. **Shift + Y** for negative direction.
        - **Z** - Set camera view along z-axis. **Shift + Z** for negative direction.
        - **Q** - Rotate around y-axis clockwise.
        - **E** - Rotate around y-axis counterclockwise.
        - **O** - Toggle orthogonal and perspective view.
        - **G** - Display target circles while zoomed in. **Shift + G** to remove circles.

All panels except the 2D and 3D viewers can be toggled by right-clicking the menu bar or toolbar and selecting from the pop-up menu. Alternatively they can be toggled from the 'Window' menu. The panels can also be rearranged by clicking and dragging, so that multiple panels are visible in the sidebar.

Options

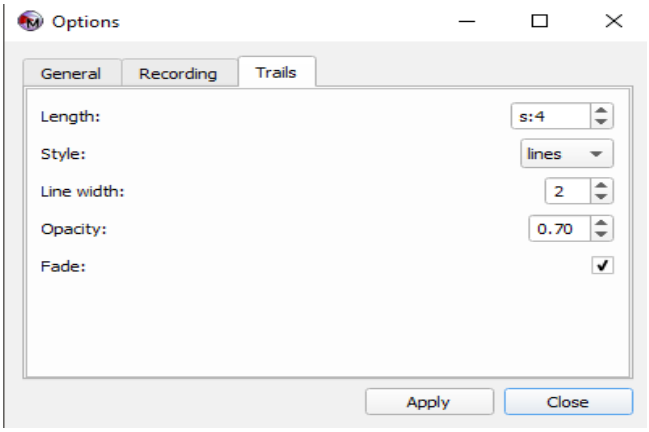
- General

- **Interpolation Type** - The type of interpolation to apply to the data, when interpolation is enabled. Interpolation can be either linear or cubic.



- Recording
  - **Record C3D** - Record to a C3D file in addition to a RPD file.
  - **Record Start Delay** - If enabled, recording will begin after the specified amount of time has passed since the record button was pressed.
  - **Record Time Limit** - If enabled, recording will automatically end after the specified amount of time.

- Trails

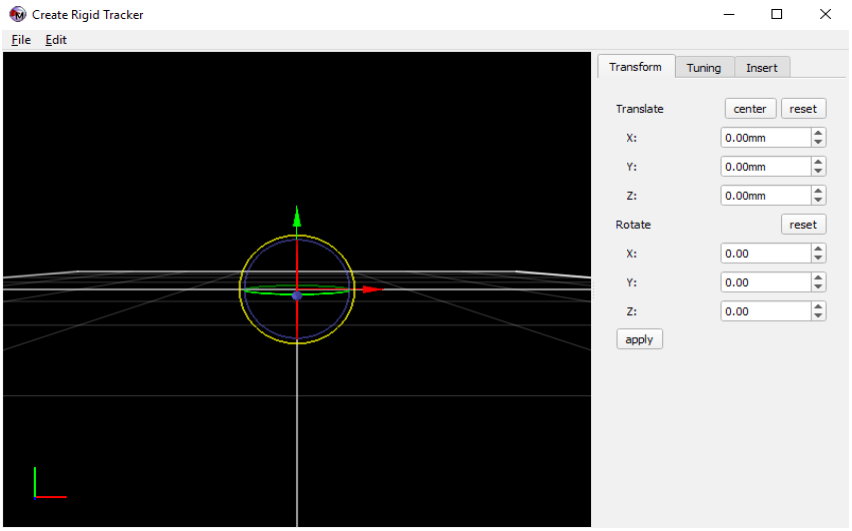


  - **Length** - Set trail lengths.
  - **Style** - Set trail style to lines, points, or both.
  - **Line width** - Set trail width.
  - **Opacity** - Set trail opacity.
  - **Fade** - Toggle if trails should fade out.

- Display
  - **3D View Text Size (pt)** - Adjust text size.

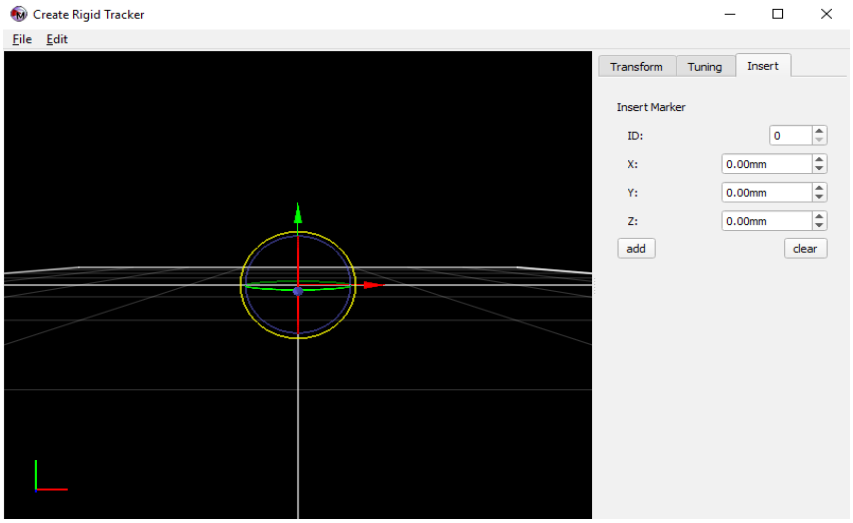
- Apply button to save all settings, Close button to close the dialog box.

Rigid Body Editor



- Transform
  - **Translate**
    - **Center** - Put selected marker on the center.
    - **Reset** - Change all translate fields to 0.00.
    - **X** - Move rigid body along the x-axis.
    - **Y** - Move rigid body along the y-axis.
    - **Z** - Move rigid body along the z-axis.
  - **Rotate**
    - **Reset** - Change all rotation fields to 0.00.
    - **X** - Rotate rigid body along the x-axis.
    - **Y** - Rotate rigid body along the y-axis.
    - **Z** - Rotate rigid body along the z-axis.
  - **Apply** - Apply changes.

- Tuning
  - Only make changes to the Tuning tab if you are experienced with Kalman filters, otherwise leave the Enable box unchecked.



- Insert - Add markers individually to rigid body.
  - **ID** - Marker ID.
  - **X** - Marker position on x-axis.
  - **Y** - Marker position on y-axis.
  - **Z** - Marker position on z-axis.
  - **Add** - Add marker to rigid body.
  - **Clear** - Clear all markers from rigid body.