ROSS virtual solutions

UX-VS User Guide

Version 2.7

Thank You for Choosing Ross

You've made a great choice. We expect you will be very happy with your purchase of Ross Technology.

Our mission is to:

1. Provide a Superior Customer Experience
   - offer the best product quality and support
2. Make Cool Practical Technology
   - develop great products that customers love

Ross has become well known for the Ross Video Code of Ethics. It guides our interactions and empowers our employees. I hope you enjoy reading it below.

If anything at all with your Ross experience does not live up to your expectations be sure to reach out to us at *solutions@rossvideo.com*.

David Ross
CEO, Ross Video
dross@rossvideo.com

Ross Video Code of Ethics

Any company is the sum total of the people that make things happen. At Ross, our employees are a special group. Our employees truly care about doing a great job and delivering a high quality customer experience every day. This code of ethics hangs on the wall of all Ross Video locations to guide our behavior:

1. We will always act in our customers' best interest.
2. We will do our best to understand our customers' requirements.
3. We will not ship crap.
4. We will be great to work with.
5. We will do something extra for our customers, as an apology, when something big goes wrong and it's our fault.
6. We will keep our promises.
7. We will treat the competition with respect.
8. We will cooperate with and help other friendly companies.
9. We will go above and beyond in times of crisis. *If there's no one to authorize the required action in times of company or customer crisis - do what you know in your heart is right. (You may rent helicopters if necessary.)*

UX-VS · User Guide

- Release Date: November 3, 2014.
- Software Issue: **2.7**

The information contained in this Guide is subject to change without notice or obligation.

Copyright

Patents

Patent numbers US 7,034,886; US 7,508,455; US 7,602,446; US 7,802,802 B2; US 7,834,886; US 7,914,332; US 8,307,284; US 8,407,374 B2; US 8,499,019 B2; US 8,519,949 B2; US 8,743,292 B2; GB 2,419,119 B; GB 2,447,380 B; and other patents pending.

Notice

The material in this manual is furnished for informational use only. It is subject to change without notice and should not be construed as commitment by Ross Video Limited. Ross Video Limited assumes no responsibility or liability for errors or inaccuracies that may appear in this manual.

Important Regulatory and Safety Notices to Service Personnel

Before using this product and any associated equipment, read all the Important Safety Instructions listed below so as to avoid personal injury and to prevent product damage.

Products may require specific equipment, and /or installation procedures be carried out to satisfy certain regulatory compliance requirements. Notices have been included in this publication to call attention to these Specific requirements.

Symbol Meanings

Protective Earth — *This symbol identifies a Protective Earth (PE) terminal, which is provided for connection of the supply system's protective earth (green or green/yellow) conductor.*

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product. Failure to heed this information may present a risk of damage or injury to persons or equipment.

Warning — *The symbol with the word "**Warning**" within the equipment manual indicates a potentially hazardous situation, which if not avoided, could result in death or serious injury*

Caution — *The symbol with the word "**Caution**" within the equipment manual indicates a potentially hazardous situation, which if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.*

Notice — *The symbol with the word "**Notice**" within the equipment manual indicates a situation, which if not avoided, may result in major or minor equipment damage or a situation, which could place the equipment in a non-compliant operating state.*

Warning Hazardous Voltages — *The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of shock to persons.*

ESD Susceptibility — *This symbol is used to alert the user that an electrical or electronic device or assembly is susceptible to damage from an ESD event.*

Important Safety Instructions

1) Read these instructions.

2) Follow all instructions and heed all warning.

3) Refer all servicing to qualified service personnel.

4) The equipment's AC appliance inlets are the means to disconnect the product from the AC Mains and must remain readily operable for this purpose.

5) Parts of the equipment's power supplies can still present a safety hazard even when the product is in the "OFF" state. To avoid the risk of electrical shock and to completely disconnect the apparatus from the AC Mains, remove all power supply cords from the product's AC appliance inlets prior to servicing.

6) The product chassis is to be rack mounted only. To ensure safe operation and maintain long-term system reliability, proper installation requires that the front and back area of the chassis remain clear of obstructions so as not to restrict airflow.

Warning

7) Indoor Use: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

Warning

8) This apparatus when equipped with multiple power supplies can generate high leakage currents. To reduce the risk of electric shock to operator and service personnel the following requirements must be met:

a) The equipment is to be installed in a restricted access area.

A restricted access area is one where access can only be gained by SERVICE PERSONS or by USERS who have been instructed about the reasons for the restrictions applied to the location and about any precautions that shall be taken; and

access is through the use of a TOOL or lock and key, or other means of security, and is controlled by the authority responsible for the location

b) the building installation shall provide a means for connection to protective earth and;

c) the product's protective earth terminal is connect to facility's protective earth using a 1.5mm2 (14AWG) conductor and a #8 1.5mm2 ring terminal and;

d) a SERVICE PERSON shall check whether or not the socket-outlet from which the equipment is to be powered provides a connection to the building protective earth.

Caution

9) This apparatus contains a Lithium battery, which if replaced incorrectly, or with an incorrect type, may cause an explosion. Replace only with the same type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instruction by qualified service personnel.

EMC Notices

US

FCC Part 15

This equipment has been tested and found to comply with the limits for a class A Digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a Commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Notice

Changes or modifications to this equipment not expressly approved by Ross Video Ltd. could void the user’s authority to operate this equipment.

CANADA

This Class “A” digital apparatus complies with Canadian **ICES-003**.

Cet appareil numerique de la classe “A” est conforme a la norme **NMB-003** du Canada.

EUROPE

This equipment is in compliance with the essential requirements and other relevant provisions of **CE Directive 93/68/EEC**.

INTERNATIONAL

This equipment has been tested to **CISPR 22:1997** along with amendments **A1:2000** and **A2:2002** and found to comply with the limits for a Class A Digital device.

Notice This is a Class A product. In domestic environments, this product may cause radio interference, in which case the user may have to take adequate measures.

Warranty and Repair Policy

Ross Video Limited (Ross) warrants its XPression systems to be free from defects under normal use and service for the following time periods from the date of shipment:

- **XPression Server** — 12 months
- **XPression Software Upgrades** — 12 months free of charge
- **System and Media hard drives** — 12 months

If an item becomes defective within the warranty period Ross will repair or replace the defective item, as determined solely by Ross.

Warranty repairs will be conducted at Ross, with all shipping FOB Ross dock. If repairs are conducted at the customer site, reasonable out-of-pocket charges will apply. At the discretion of Ross, and on a temporary loan basis, plug in circuit boards or other replacement parts may be supplied free of charge while defective items undergo repair. Return packing, shipping, and special handling costs are the responsibility of the customer.

This warranty is void if products are subjected to misuse, neglect, accident, improper installation or application, or unauthorized modification.

In no event shall Ross Video Limited be liable for direct, indirect, special, incidental, or consequential damages (including loss of profit). Implied warranties, including that of merchantability and fitness for a particular purpose, are expressly limited to the duration of this warranty.

This warranty is TRANSFERABLE to subsequent owners, subject to Ross’ notification of change of ownership.

Extended Warranty

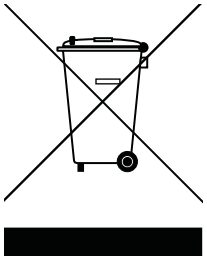
For customers that require a longer warranty period, Ross offers an extended warranty plan to extend the standard warranty period by one year increments. For more information about an extended warranty for your XPression system, contact your regional sales manager.

Environmental Information

The equipment that you purchased required the extraction and use of natural resources for its production. It may contain hazardous substances that could impact health and the environment.

To avoid the potential release of those substances into the environment and to diminish the need for the extraction of natural resources, Ross Video encourages you to use the appropriate take-back systems. These systems will reuse or recycle most of the materials from your end-of-life equipment in an environmentally friendly and health conscious manner.

The crossed-out wheeled bin symbol invites you to use these systems.



If you need more information on the collection, reuse, and recycling systems, please contact your local or regional waste administration.

You can also contact Ross Video for more information on the environmental performances of our products.

Company Address

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Contents

Introduction

Congratulations on your selection of the UX virtual control system. The UX user experience, UX Xperience™, represents the culmination of 20 years of experience in real-time 3D virtual-set technology.

UX-VS brings ease-of-use to the historically complicated world of virtual-set and augmented-reality setup and operation by means of its intelligent architecture and its intuitive, touch-screen interface.

The UX platform is highly flexible and customizable, delivering seamless integration of best-of-breed technologies, including tracking, chroma keying, robotics, gesture-recognition, and of course, real-time 3D rendering.

The UX platform consists of three main components, each of which will be discussed in detail in the following sections. These components are:

- UX Xperience™ - The UX user interface for system setup, calibration, and operational control.
- UX Layout - The configuration tool that allows you to define the graphic elements you'll be working with in your virtual environment.
- UX Driver - the component that interacts with UX Xperience™ and drives the 3D graphics engine.

  These components run on one or more computers in a production system. There are two different functions that these computers serve:

- User Interface System (UX Xperience™) - the computer with the touch-screen console that is used to interact with UX for setup, calibration, and operation.
- Rendering System - a computer with powerful graphics and SDI-interface hardware that is used to render the virtual graphics in real time.

Configurations can range from a single computer serving as both the User Interface System and Rendering System for a single-camera setup to a dedicated User Interface System and multiple Rendering Systems, one for each of several cameras, as shown below.

Welcome to the future of virtual sets and augmented reality. Welcome to UX Xperience™!

About This Guide

This guide covers the use of a Ross Video Product. The following chapters are included:

- Chapter 1, **Introduction,** summarizes the guide and provides important terms, conventions and feature descriptions.
- Chapter 2, **UX Layout**, provides instructions on how to select objects for use in Unreel Experience.
- Chapter 3, **UX Experience**, provides instructions on how to use the user interface.
- Chapter 4, **UX Driver**, provides instructions on how to configure and launch the UX Driver.

If you have questions pertaining to the operation of the Ross Video product, please contact us at the numbers listed in the section "**Contacting Technical Support**" on page 1–2. Our technical staff is always available for consultation, training, or service.

Documentation Conventions

Special text formats are used in this guide to identify parts of the user interface, text that a user must enter, or a sequence of menus and submenus that must be followed to reach a particular command.

Interface Elements

Bold text is used to identify a user interface element such as a dialog box, menu item, or button. For example:

In the **Media Manager Client**, click **Channel 1** the **Channels** section.

User Entered Text

Courier text is used to identify text that a user must enter. For example:

In the **File Name** box, enter `Channel01.property`.

Referenced Guides

Italic text is used to identify the titles of referenced guides, manuals, or documents. For example:

For more information, refer to the section "**GenLock Configuration**" on page 3–6 in the ***BlackStorm User Guide***.

Menu Sequences

Menu arrows are used in procedures to identify a sequence of menu items that you must follow. For example, if a step reads "**Server** > **Save As**," you would click the **Server** menu and then click **Save As**.

Getting Help

The Ross Video product Online Help system is accessed by selecting **Help Topics** from the **Help** menu in the product. Alternatively, press the **F1** key while working in a client or dialog box.

The Online Help system contains the following navigation tabs to locate information contained in the Online Help topics and ***User Guide***:

- **Contents** — table of contents
- **Index** — keyword reference
- **Search** — full text search
- **Favorites** — preferred information storage and access

Ross Video product guides are also supplied as print-ready PDF files on the Ross Video product Software Installation DVD.

Contacting Technical Support

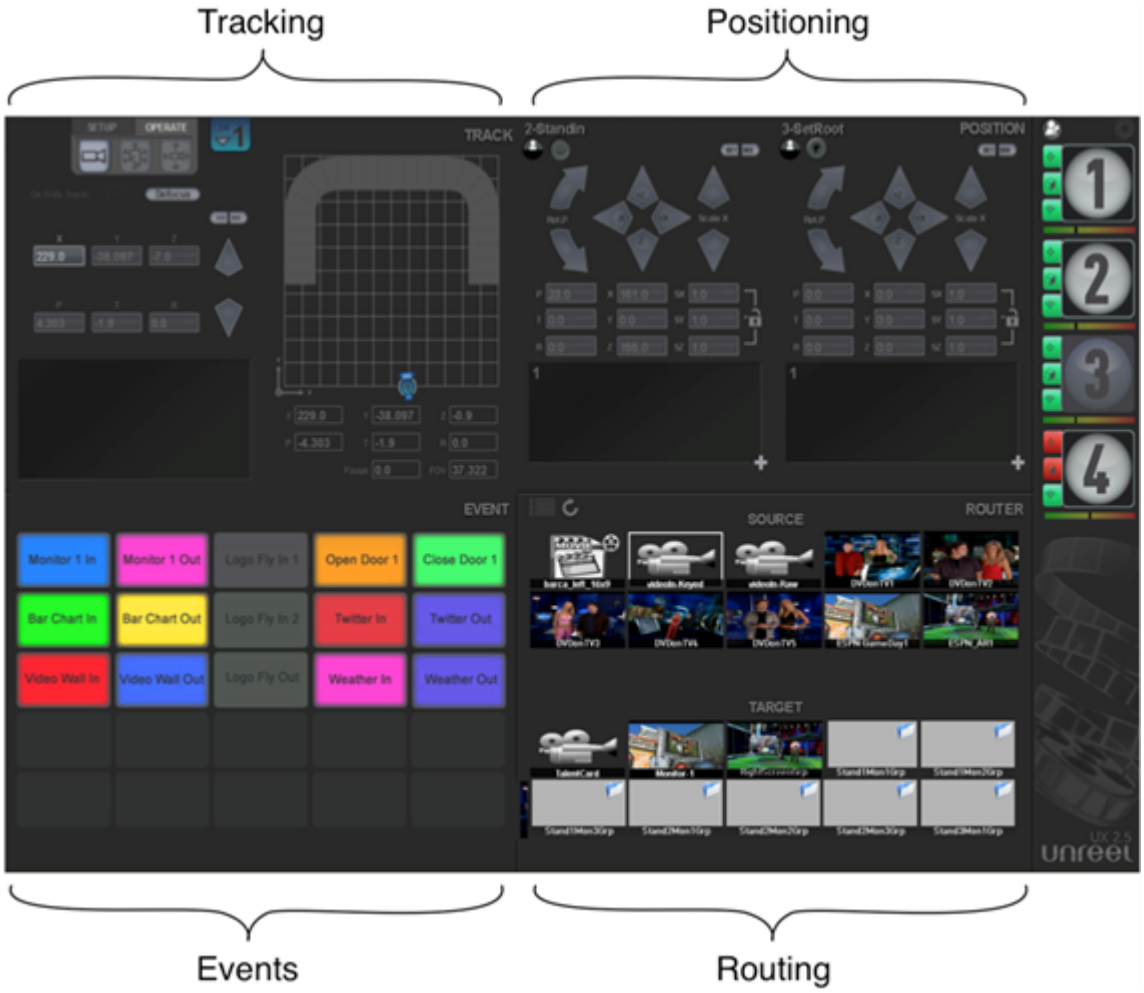
At Ross Video, we take pride in the quality of our products, but if problems occur, help is as close as the nearest telephone.

Our 24-hour Hot Line service ensures you have access to technical expertise around the clock. After-sales service and technical support is provided directly by Ross Video personnel. During business hours (Eastern Time), technical support personnel are available by telephone. After hours and on weekends, a direct emergency technical support phone line is available. If the technical support person who is on call does not answer this line immediately, a voice message can be left and the call will be returned shortly. This team of highly trained staff is available to react to any problem and to do whatever is necessary to ensure customer satisfaction.

- **Technical Support:** (+1) 613-652-4886
- **After Hours Emergency:** (+1) 613-349-0006
- **E-mail:** techsupport@rossvideo.com
- **Website:** http://www.rossvideo.com

UX Layout

The *UX Layout* application is designed to easily facilitate the key functions associated with setting up, and operating a virtual studio. The interface includes a vertical status bar along the right side, with the remainder consisting of four functional quadrants.



UX Xperience™

The UX Xperience™ interface is designed to easily facilitate the key functions associated with setting up and operating a virtual studio. The interface includes a vertical status bar along the right side, with the remainder consisting of four functional quadrants.

Status Bar

The status bar occupies the right-hand side of the main UX window. It contains the following elements, from top to bottom:

- UX Settings Button
- Camera Status Blocks
- Notification Area

Each of these is discussed in more detail below.

UX Settings Button

The **Settings** button, which looks like a small gear, is located in the extreme upper-right corner of the status bar. This button brings up the **Settings** panel, which is where you will set network-related, licensing, and other configuration information. Importantly, it is also where you will initiate the connection to remote or local driver instances. The panel contains three tabbed pages as follows: **Remote** tab, **UX** tab, and **About** tab.

Remote Tab

The **Remote** settings page is where you will enter network-related information for connecting to one or more, local or remote UX Driver instances running on XPression rendering systems.

Given that there is a great deal of information, and a variety of types of information, flowing between the computers in a UX networked system, there are a number of different IP addresses and ports that must be identified.

IP Settings

At the top of the **Remote** page is a table of information, with four columns and one row for each of the cameras your system is licensed for. If, for example, you are licensed for three cameras, you will see a four by three table of fields.

The first row of this table is populated with default values, which include the IP address of the local UX computer the UI is running on. This is convenient if you are running a standalone, single-camera system, as you needn't change any settings. However, if you are running a component system, with the UI separated from the XPression rendering systems, then you will need to change some things.

In most cases, you can leave all the port numbers at their default values. The **IP Address** fields (the first column) should be set to the IP addresses of each of the XPression rendering computers that are hosting the UX Driver instances, typically one computer per camera. For example, if you are using two of your three licensed cameras, you will put the IP address of the rendering computer associated with Camera One in the first row of the table. The address for renderer associated with Camera Two will go in the second row. You should replicate all of the same port numbers for each row of the table.

The check-boxes to the left of the **IP SETTINGS** table indicate which cameras (remote driver instances) UX will be actually communicating with. You can, for example, configure more cameras than you actually plan to use immediately by filling out the entire table, but only checking some subset of the rows.

Below the table are the **track server ports** fields. These can be left at their default values of 8856 and 8858.

Configuration Files

Below the **IP settings** are two input fields for entering the **Project configuration file** and the **Track configuration file** respectively.

The **Project configuration file** is the file produced by UX Layout (described below). After you have run UX Layout and produced this file, you simply need to tell UX Xperience where to find it by browsing to, and selecting the file.

The **Track settings configuration file** contains information about the way you've configured the tracking-related settings in the UX UI. The file is created by default in the same folder that contains the UX UI, and you do not need to change this unless you want to save different settings under different names.

Connect Button

The **Connect** button is very important, as it initiates communications between the UX Xperience UI and the UX Drivers running on the rendering systems.

When this button is pressed, you will see activity in each of the driver consoles, and you will see the UI quadrants populated with live data.

UX Tab

The UX page of the **Settings** panel provides four functions:

Units

The **Units** drop-down allows selection of units that will be used for measuring positional offsets and other linear measurements. The options are inches, centimeters, and grid. This last option allows you to use a non-standard unit that might correlate to markings on the floor (e.g., tiles, concrete seams, etc.).

User Profile

By default, the user profile is set to **Operator**. The Operator user is not password protected and is restricted to operations-oriented functions. For example, the Operator can move a virtual object to different stored locations, but cannot create new stored locations.

Clicking on the **user-profile** button toggles it between **Operator** and **Admin** user profiles. If **Admin** is selected, you must enter the administrator password. The default password is `unreel` and can be changed on the **Admin Authentication** pop-up.

Quadrant Arrangement

The on-screen arrangement of the quadrants, relative to each other, can be changed by using the four drop-down position selectors (one for each quadrant).

By default, the quadrants are arranged with the tracking quadrant, **UX Track**, in the upper left, the object-positioning quadrant, **UX Position**, in the upper right, the events quadrant, **UX Event**, in the lower left, and the virtual video router, **UX Router**, in the lower right.

Full-Screen Mode

Selecting the **Start in full-screen mode** check-box causes the UX UI to occupy the entire desktop when it is next launched. Unlike a maximized window, this will literally consume the entire screen, with no edges or title-bar.

Because the UX UI, when run in full-screen mode, contains no title bar, there is also no ability to click on the red **X** to shut it down. For this reason, there is an **Exit UX** button just below the full-screen check-box. Clicking on this button will shut down the UX Xperience UI.

About Tab

The **About** page is mostly informational. It allows users to see what version of UX is installed and what specifically is included in the license. This includes the number of instances/cameras, any extra features (e.g., gesture-recognition) that may be part of the license, and importantly, the license's expiration date.

In addition to this information, there is a large button at the bottom of the About page labeled: **Generate UNREEL Machine Information File**. Clicking this button creates a .umi file that is used by UNREEL to generate a UX software license (either a soft license or a hardware-key-based one). This should only be necessary when a new system is being licensed (or relicensed), and will typically be used only by UNREEL.

Camera Status Blocks

Below the **UX Settings** button on the status bar are one or more camera status blocks. These status blocks, one for each camera, show general information about the status of the rendering computer and UX Driver associated with each camera. There are three sections of each status block:

1. **Camera Identifier**

   The camera identifier is a large circle with a number inside. The number represents the camera number and is either lighter white, indicating that the camera is activated in the UX settings, or a dimmer gray, indicating that the camera is licensed, but is not selected for use in the settings.

2. **Status Tabs**

   Depending on which version of UX is being used, there are either two or three icon tabs along the left edge of each status block representing:

   - Tracking status

     Indicates whether or not tracking data is flowing from the camera tracking head or device through the UX Driver and into the UX Xperience UI.

   - Render status

     Indicates whether or not the renderer-control communication channels are open.

   - Network status

     Indicates whether the data network itself is available and functioning.

   These tabs change color to indicate the status of their respective communication channel. Green indicates that the channel is open and operational, whereas red indicates that there is a problem.

3. **Renderer Performance Meter**

   Along the bottom edge of each status block is a strip of color that is a gradient from green on the left to red on the right, with a black marker somewhere in between. This strip is a performance meter that shows how hard the renderer is working. If the indicator is anywhere in the left-most two thirds of the meter, then all is well. If, on the other hand, it is approaching (or in) the red, this means that the renderer is struggling to keep up (i.e., it's barely able to render the scene for each image frame.)

   If the renderer performance meter suggests trouble, it is advisable to investigate any potential problems on the rendering system in question.

Notification Area

The notification area is at the very bottom of the status bar. This is where important messages relating to licensing or other system-level issues will be displayed. If there are no active messages, then the UX version number and UNREEL logo are all that is visible.

Quadrants

The UX Experience interface is broken into four main functional areas, which are represented as quadrants on the interface:

- **TRACK**: Camera tracking
- **POSITION**: Positioning of virtual elements
- **EVENT**: Events definition and triggering
- **ROUTER**: Routing images/movies/live video

Each of these quadrants is discussed in detail in the sections below.

Track Quadrant: Camera Tracking

The UX **Track** quadrant has two different modes, **Operate** mode and **Setup** mode, which are selectable using the tab bar at the top of the quadrant.

✶ The blue drop-down selector just to the right of the tab bar allows you to select the camera you wish to control. Any camera-specific configuration parameters or commands will be applied to the camera selected.

Each mode in the tab bar includes three separate sections of settings and/or information, which are selectable via the three buttons underneath the **Operate** and **Setup** tabs.

Specifically, under the **Setup** tab, the three buttons are:

- **Camera Mount Offsets**
- **Track Settings**
- **Studio Settings**

Whereas under the **Operate** tab, the buttons are:

- **Camera Positions**
- **Garbage Mattes**
- **Operational Offsets**

Each of these, when selected, will load the UX Track quadrant with a different page of information. Under the **Operate** tab, all of the information pages are divided into two columns with the right-hand column (showing a top-down view of the tracked space) and real-time feedback (showing the tracking data coming from the camera) consistent across all of them.

Each of the different information pages is discussed in detail below.

Setup: Camera Mount Offsets

This section varies depending on the camera mount selected (under **Camera Tracking Settings**). At a minimum, it contains the three offset values of the camera relative to the three axes of rotation. In each case, the offset is from the center of the camera's lens at the point where the lens meets the camera body to the rotational axis.

So, for example, the **Up/Down** offset is the vertical distance from the center of the lens to the horizontal axis upon which the camera tilts. Similarly, the **Right/Left** offset is the horizontal distance from the center of the lens to the vertical axis around which the camera pans. Finally, the **Front/Back** offset is the horizontal distance forward or back from the point at which the pan and tilt axes intersect.

In addition to these three basic offsets, there may be additional offsets required depending on the mount type (see description below). If, for example, the mount type is a jib, you will need to enter:

- the height of the main pivot
- the jib arm length
- the nose up-down offset (relative to the arm)
- the nose length
- the tilt from pan-axis offset

The page shows a graphic depiction of a jib to indicate where these measurements are taken.

Setup: Track Settings

The track settings page captures information about the camera's setup. The page is arranged in two columns, the left column focused on tracking parameters and the right column focused on lens information. Starting in the upper left corner, the page includes the following elements:

- **Active**

  If this box is checked (default), the tracking for the selected camera is enabled. Unchecking this box will cause the driver for the selected camera to stop accepting tracking data from the camera.

- **Live Feedback**

  If this box is checked (default), the tracking data received by the driver for the selected camera will be continually sent to the UI for the operator to see. If this box is unchecked, the driver will continue receiving and processing tracking data, but will not send updates to the UI.

- **Tracking type**

  This drop-down allows you to select whether the camera head on which the selected camera is mounted is a manually controlled head, or if it is robotically controlled.

- **Camera mount type**

  This drop-down allows you to select what type of head and mount the selected camera is using. This is very important, as it may enable or disable certain axes, change tracking data scale values, etc.

- **Tracking protocol**

  This drop-down allows you to specify which protocol is being used for tracking telemetry data. Different heads or mounts may use different protocols, and some heads (e.g., Furio) can use more than one protocol. You should make sure the protocol selected here matches what is being produced by the selected head and mount.

- **Transport type**

  This drop-down allows the selection of the tracking data transport type. Select **UDP** (default) for IP-network-based transport or **Serial** for RS-232/422-based transport.

- **Reset Buffers**

  This button causes the driver associated with the selected camera to reset its tracking data buffers to their default values (six fields/three frames).

- **Global Scales & Offsets**

  The two buttons below the **Reset Buffers** button allow you to set global scales and offsets respectively. These global values are established as part of the calibration process (thus their inclusion here under the **Setup** tab).

  You use these global values to establish the relationship between the real world of the physical studio and the 3D volume within which each of your cameras are being tracked. This is necessary, for example, to align disparate tracking technologies that may have different tracking-system-dictated origins. It could also be necessary to align multiple tracked cameras using the same tracking technology, but which are bound to different locations (e.g., a curved-track Furio system and a straight-track Furio system).

- **Set Scales**

  This button brings up a pop-up window that facilitates entry of scale values for a number of calculated values. This is where, for example, the scale value is applied to translate from a Furio track system's encoder values to

real-world units (e.g., inches or centimeters). The **Scale** pop-up can also be useful if you need to reverse direction of a given parameter. For example, to make tilt reverse its direction, enter -1.0 in the **Tilt Scale** field. The fields in the pop-up are as follows:

› **Dolly**

Movement along a dolly track, if one is in use.

✶ Functionality has not yet been implemented.

› **Swing**, **Elevate**

For jib mounts, these refer to the jib-arm swing (Y-axis rotation) and elevate (a.k.a. "boom" = X-Axis rotation).

› **Extend**

If a telescopic jib is in use, this refers to the extension of the telescopic jib arm.

› **Pan**, **Tilt**, **Roll**

These are the standard rotation movements (rotational Y, X, and Z respectively).

› **X Position**, **Y Position**, **Z Position**

These are the standard location coordinates in 3D space.

› **Zoom**, **Focus**

These refer to changes in lens zoom and focus.

- **Set Offsets**

This button brings up a pop-up window that facilitates entry of offset values for the tracked 3D space relative to the global, or real world 3D space. This is particularly useful if you're using a track system that is not aligned along an axis in the physical space. If, for example, you had a Furio track that was at a 15-degree angle relative to the physical space, you could apply a 15-degree offset to the Y Rotation so that the track, in tracked space, is properly aligned along the X-axis. The fields in the pop-up are as follows:

› **X Position**, **Y Position**, **Z Position**

These are the standard location coordinates in 3D space.

› **X Rotation**, **Y Rotation**, **Z Rotation**

These are the standard rotation movements (Tilt, Pan, and Roll respectively).

- **Value-Change Control**

The **Value-Change Control** (large arrow up and arrow down buttons with smaller scale buttons on top) is a standard UX control used in many places throughout the UI. It is simply a touch-screen-friendly way to change the value in the currently selected field. To use it, you simply select the input field whose value you wish to change, select the desired scale value (i.e., how much change should occur for each click of an arrow button - ranges from 0.001 to 100), and then click on the up or down arrows to affect the change.

- **Lens**

This scroll-selector allows the selection of the specific lens being used on the selected camera. An extensive matrix of data for each lens in the list has been compiled and stored in the UX database. Selecting the right lens will ensure that tracking data remains accurate through the full range of zoom, focus, and even models lens distortions.

- **Lens Distortion**

This check-box enables or disables (default) the lens-distortion modeling feature. While using this feature can be critical for certain types of lenses and/or settings, in many cases, it is not necessary and disabling it frees up more graphics processor bandwidth for other uses.

- **CCD Centering**

Each individual physical lens has a certain amount of offset from center based on its manufacture and how it is attached to the camera body. For tracking purposes, it comes down to how far it is offset in the X and Y directions from center on the charge-coupled device (CCD sensor) inside the camera.

The CCD-offset X and Y values are determined using the CCD-Centering process described in the *UX Calibration Guide*. Once these values are determined, they are entered in their respective fields here.

- **Crosshairs**

  This check-box enables (turns on) or disables (turns off) visual crosshairs on the rendering system associated with the selected camera. These crosshairs are used in the CCD-Centering process described in the *UX Calibration Guide.*

- **Zoom Encoder Min-Max Values**

  These two fields are used to enter the minimum and maximum encoder values produced by the encoded lens on the selected camera. The default values are 0 and 60,000 respectively, but these values should be replaced with actual values observed from the lens when it is at the extremes of its zoom range.

- **Focus Encoder Min-Max Values**

  These two fields, as with the zoom encoder min-max values, are used to enter the minimum and maximum encoder values produced by the encoded lens on the selected camera. The default values are 0 and 60,000 respectively, but these values should be replaced with actual values observed from the lens when it is at the extremes of its focus range.

Setup: Studio Settings

The **Studio Settings** page captures information about the physical studio space. This page, like the **Track Settings** page, is arranged in two columns. In this case, the left column focuses on the size and shape of the space, whereas the right column is focused on the top-down view of the studio and its position within the walls of the room containing it. Starting in the upper left corner, the page includes the following elements:

- **Units**

  This drop-down allows you to select which primary unit of measure you wish to use for the project: centimeters or inches.

- **Studio Dimensions**

  This section of input fields includes size (in X, Y, and Z dimensions) of the physical studio, the unit size to be used for the grid (i.e., the number of base units per grid unit), and the size of the grid (X, Y, Z) in these grid units.

- **Cyc Shape**

  This drop-down allows you to select the shape of your blue- or green-screen cyclorama. Doing so will cause the top-view of the tracked space to reflect the selected shape.

- **Cyc Size**

  These 3 fields allow you to specify the size (X, Y, Z) of the cyclorama.

- **Top-down View**

  The **Top-Down View** shows you a representation of the tracked space with the cyclorama positioned and shaped as specified. It also shows the real-time position within the space of the selected camera (shown as a blue icon).

- **Studio Offset**

  These two fields allow you to specify where the studio's origin (X and Z on the floor) is positioned relative to the physical room.

- **Cyc Position**

  These two fields allow you to specify where the cyclorama's origin (X and Z on the floor) is positioned relative to the tracked studio space.

Operate: Camera Positions

The **Camera Positions** button under the **Operate** tab allows an operator to define and recall stored positions for the virtual camera within the virtual studio. As mentioned above, all of the **Operate** tab's pages are divided into two columns with the right-hand column showing the top-down view of the tracked space along with read-only data fields that provide the following real-time feedback:

- X, Y, Z: The selected virtual camera's calculated position in the tracked 3D space
- P, T, R: The selected virtual camera's calculated rotation (Pan, Tilt, Roll) in the tracked 3D space
- Focus, FOV: The lens' focus value and calculated FOV

The left-hand column of the Camera Positions page allows you to specify, store, and recall camera positions. The following elements are available:

- **On Dolly Track**

  This check-box specifies whether or not the selected camera is on a dolly system. If the box is unchecked, the normal position input fields are displayed (as described below). If the box is checked, the position input fields below change to show track-related positions, specified as an offset along a track with defined endpoints:

  › **Center Column Offset**

  The distance from the start of the track (endpoint one) to the center of the dolly column, upon which the camera is mounted.

  › **Track endpoint one: X, Y, Z**

  This is the XYZ position of the beginning of the dolly track.

  › **Track endpoint two: X, Y, Z**

  This is the XYZ position of the end of the dolly track.

- **Defocus**

  This button brings up the **Defocus** (a.k.a. “depth-of-field”) pop-up. By default, it also tells the UX Driver for the selected camera to begin outputting depth-of-field detail. The **Defocus** pop-up window includes the following elements:

  › **Enable**

  This check-box indicates whether or not the defocus effect is activated. By default, it is enabled when the defocus button is first pressed.

  › **Show DOF Marks**

  When checked, this check-box tells the renderer associated with the selected camera that it should visually display depth-of-field indicators in the scene. Exactly how these visual marks appear is renderer-specific, but in general, they allow the user to see how much of the defocus effect is being applied to different parts of the rendered scene.

  › **Manual**

  This check-box, allows you to manually change the lens-related defocus parameters (i.e., Focus Distance). If unchecked, these values will be calculated automatically based on the lens-curve data for the lens in use by the selected camera.

  › **Circle of Conf.**

  This field allows you to specify the **Circle of Confusion** value to be used by the defocus algorithm. In general, the higher this number, the more defocus is applied.

  › **Focus Near/Far**

  These read-only fields show you the calculated focus range. The **Near** value indicates the point closest to the camera where objects come into focus, whereas the **Far** value indicates the furthest point where objects are in focus. Any objects closer than the **Near** value or farther away than the **Far** value will be blurred based on the defocus algorithm.

  › **FNum**

  This input field allows you to specify the **F-Stop** number to use for the focus calculations.

› **Distance Offset**

This input field allows you to specify an offset to be applied to the entire focus range. If, for example, you entered 5.0, both the near and far values would be offset by 5 feet. A positive value will move the focus range away from the camera, negative will move it closer.

› **Focus Distance**

If the **Manual** checkbox is checked, this slider allows you to explicitly set the distance to the focus point. If the **Manual** checkbox is not checked, this slider will be greyed out (unusable), as the focus distance will be automatically calculated.

› **Zero Offset**

This button is just for convenience. Clicking it resets the **Distance Offset** slider to zero (0.0) so no offset is applied.

- **X**, **Y**, **Z**

  These position input fields allow you to specify a position for the virtual camera. These values represent offsets from the camera's normal position, as indicated by the tracking data.

- **P**, **T**, **R**

  These rotation input fields (Pan, Tilt, Roll) allow you to specify a rotation for the virtual camera. Again, these values represent offsets from the camera's normal rotation (as indicated by the tracking data).

- **Value-Change Control**

  The **Value-Change Control** (large arrow up and arrow down buttons with smaller scale buttons on top) is a standard UX control used in many places throughout the UI. It is simply a touch-screen-friendly way to change the value in the currently selected field. To use it, you simply select the input field whose value you wish to change, select the desired scale value (i.e., how much change should occur for each click of an arrow button - ranges from 0.001 to 100), and then click on the up or down arrows to affect the change.

- **Positions** (scrolling list)

  This scrolling list allows you to capture and select, any number of different virtual-camera positions within the virtual scene.

  Capturing/adding a camera-offset position

✶ Capturing/adding a new camera position can only be done with UX Administrator privileges (See User Profile under UX Settings button above).

To capture the virtual camera's current position as a new stored position, click on the + sign in the lower-right corner of the stored-positions scroll list. Note that if the + is not there, you are not logged in as the UX administrator.

A pop-up window will appear, allowing you to enter the following:

› **Name**

This input field contains a default name of *X* (where *X* is a number that represents the count of the item in the list). You can replace this default name with a name of your choosing.

› **Save Defocus Parameters**

This check-box indicates whether or not the stored position should also capture the parameters that control the defocus effect.

You then press **OK** to save the named stored-position. You will then see the name you selected appear in the scrolling list of positions.

Recalling a camera-offset position

To recall a stored position, first select the position from the scrolling list by clicking on the name of the position. You will see a > symbol appear at the far right of the list next to the item you have selected. To move the virtual camera to the stored position, simply click on the > symbol.

Operate: Garbage Mattes

The purpose of the **Garbage Mattes** page is to define and arrange garbage mattes. Garbage mattes are typically used to extend the virtual set beyond the limits of the physical green or blue-screen. A garbage matte is typically a transparent rectangular plane that, when turned on, is put in the foreground (with respect to the chromakeyer), thus obscuring any physical objects that might be seen by the camera (the garbage) and ensuring that, over the dimensions of the rectangular plane, the computer-generated scene behind the matte is visible (through the transparent matte).

There are a total of five possible garbage mattes: Left, Right, Top, Floor, and Back. The mattes are represented visually in the top-down view (in the right-most half of the Garbage Mattes page) as long-thin trapezoids with a circled letter in the center indicating which matte it is ("L" for Left, etc.).

Along the left edge of the **Garbage Mattes** page, there are 5 status blocks, one for each garbage matte. Each status block consists of three visual components: One gray/white circular indicator with two smaller red or green indicators underneath.

- **The Focus Indicator**

  The **Focus Indicator** is a gray/white circular icon with a single letter in it (e.g., "L" for Left). It lets you know which garbage matte you are seeing data for in the data fields and which one you are affecting with the controls in the UI. The selected matte will show with a bright outline in the top-down view.

  To select a garbage matte to work on, simply click on its **Focus Indicator**. The selected indicator will change from gray to white to indicate that it has focus.

- **The Status Indicator**

  The **Status Indicator** is the left-most smaller indicator beneath the Focus Indicator. It is a toggle that will either be green showing the word **ON** or red with the word **OFF**.

  If this indicator shows **ON**, it means that the selected garbage matte is activated in the scene. If it is **OFF**, it will not be in the foreground and, as long as it is transparent, will have no impact on the rendered scene.

- **The visibility indicator**

  The **Visibility Indicator** is the right-most smaller indicator beneath the Focus Indicator. Similar to the **Status Indicator**, it is a toggle that will either be green showing a closed-eye icon, or red showing an open-eye icon.

  If this indicator is green (closed eye), it means that the garbage matte is transparent, and therefore suitable for use on-air. In this case, the matte will not be shown in the top-down view. If this indicator is red (open eye), it means that the garbage matte has been made visible (both in the UI's top-down view and in the rendered scene), which would not be desirable for on-air production.

✶ As a reminder, UX always uses red to indicate something that should not go on-air, and green to indicate that things are OK for on-air presentation.

Garbage mattes can be made visible to assist in positioning them within the scene. After you have the mattes properly positioned for a given production, you would then turn off visibility so they can operate as desired.

Each matte will show in a unique solid color when made visible. These colors are as follows:

- Left: Red
- Right: Green
- Top: Blue
- Floor: Purple
- Back: Yellow

The rest of the left-hand column of the **Garbage Mattes** page consists of the following components:

- **Lock All Cameras**

  This check-box (checked by default) indicates that a single set of five garbage mattes should be used for all cameras/renderers in the UX production. If, for example, the Left garbage matte is placed three feet to the left of the anchor's desk in 3D space, then each renderer will have the Left matte in that same position. This is the most common way to run a virtual production.

If, however, it is desirable for these mattes to be in different positions for different cameras, unchecking this box will cause UX to create *N* sets of five garbage mattes, where *N* is the number of cameras. In this case, selecting a different active camera (from the blue drop-down in UX), will load the garbage mattes for the selected camera, complete with their own separate position and rotation data.

- **Garbage Matte Control Block**

  Below the **Lock All Cameras** check-box is a standard set of UX position/rotation controls. The **Garbage Matte Control Block** includes:

  › **Two curved arrows for affecting rotation values**

  These curved arrows allow control of garbage matte rotation. They will affect the visual representation of the currently selected garbage matte, and will change values in the selected rotation field (Pan, Tilt, or Roll), with Pan being the default.

  › **Four arrows in a star formation for affecting position values**

  By default, the left and right arrows within this star control movement along the X-axis. Accordingly, clicking these arrows affects the value shown in the **X Position** field.

  Similarly, the up and down arrows in the star move the garbage matte along the Y-axis (vertically relative to the floor) by default, affecting values in the **Y Position** field.

  You can change the default to the Z-axis (forward and back along the floor) by first highlighting the **Z Position** field and then using the up and down arrows.

  › **A standard UX Value-Change Control set**

  The **UX Value-Change Control** (two arrows with scale buttons) is to the right of the four-arrow star pattern and is used to change the remaining garbage-matte parameters (i.e., length, height, and feather). The up and down arrows will affect whichever of these values is selected.

✶ The scale established with the scale buttons affects all arrows in the Position/Rotation Control Block.

- **Garbage Matte Data Fields**

  Below the **Garbage Matte Control Block** is an array of data fields arranged in three vertical columns for rotation, position, and size/effect respectively:

  › **Pan**, **Tilt**, **Roll**

  These fields contain values that control the rotation of the selected garbage matte.

  › **X Position**, **Y Position**, **Z Position**

  These fields contain values that control the position in 3D space of the selected garbage matte.

  › **Length**, **Height**

  These fields contain values that control the size of the selected garbage matte. As garbage mattes are flat planes, they only have two dimensions.

  › **Feather**

  This field controls the amount of feather effect applied to the edges of the selected garbage matte. Feathering the edges of garbage mattes can smooth the transition from the virtual set, which is a composite of foreground and computer-generated background, to the garbage matte, which is pure computer-generated graphics.

Operate: Operational Offsets

The **Operational Offsets** page allows you to adjust the various position and/or rotational offsets. These values do not replace their respective global offsets. Rather, they are added to them.

For example, if you have a 30-degree pan offset established in your global offsets, but during a production the camera was bumped and rotated 2 degrees, the operational offsets allow you to quickly make this 2-degree tweak (by simply entering 2.0 in the **Pan** field) while leaving the calibrated 30-degree offset intact.

The following fields are available on the **Operational Offsets** page:

- **Dolly**

✶ Functionality has not yet been implemented.

This is an offset along the dolly track.

- **Swing**, **Elevate**

  For jib mounts, these values allow offsetting the jib-arm swing (Y-axis rotation) and jib-arm elevate (X-axis rotation).

- **Extend**

  For telescopic jib mounts, this allows you to offset the jib-arm extension.

- **Pan**, **Tilt**, **Roll**

  These fields facilitate offsetting the three degrees of rotation (Y rotation, X rotation, and Z rotation respectively).

- **X Position**, **Y Position**, **Z Position**

  These fields facilitate offsetting the camera location in 3D space.

- **FOV**, **Zoom**, **Focus**

  These fields facilitate offsetting lens-related parameters. Note that when offsetting the Zoom value, you are offsetting the raw encoder count coming from the lens, before any FOV calculation is performed. Offsetting the field of view (FOV), on the other hand, offsets the calculated FOV.

- **Value-Change Control**

  To the right of all the data fields is a **Value-Change Control**. The value-change control (large arrow up and arrow down buttons with smaller scale buttons on top) is a standard UX control used in many places throughout the UI. It is simply a touch-screen-friendly way to change the value in the currently selected field. To use it, you simply select the input field whose value you wish to change, select the desired scale value (i.e., how much change should occur for each click of an arrow button - ranges from 0.001 to 100), and then click on the up or down arrows to affect the change.

- **Pivots**

  This button is located beneath the **Value-Change Control**, and clicking it brings up the Pivots pop-up window. The fields in this window provide additional detail regarding the camera-tracking data. The fields in this window are:

  › **Swing**, **Boom**

  For jib-mounts, these fields show the raw encoder values coming in for jib-arm "swing" (Y-axis rotation) and "boom" (X-axis rotation) respectively.

  › **Pan**, **Tilt**

  These fields show the raw values for **Pan** and **Tilt** respectively. These raw values show the data before any scaling or offsetting that is set up in UX.

  › **Tilt Pivot X**, **Y**, **Z**

  The **Tilt Pivot**, as defined here, represents the point of intersection between the pan pivot and the tilt pivot. These fields therefore effectively show the camera X, Y, and Z values before any camera offsets or any lens-curve positional shifts are applied.

  › **Arm S Pivot X**, **Y**, **Z**

  For jib mounts, this is the jib arm swing pivot - and, as used here, really represents the intersection of this swing pivot with the jib-arm boom pivot. The X, Y, and Z location of this intersection is typically directly above the jib's floor position - and allows you to confirm that the jib arm's starting height is correct.

  › **Raw Lens Encoders Zoom**, **Focus**

  As the names suggest, these fields show the lens zoom and focus raw encoder values as they come from the lens, before any scaling or offsetting is applied.

Position Quadrant: Virtual Objects and Cameras

The **POSITION** quadrant enables the manipulation of moveable objects and/or virtual cameras. Moveable objects are 3D objects in the selected project that have been identified in UX Layout as objects of interest for manipulation during production operation (see UX Layout section for more detail).

The quadrant is essentially a window into a list of objects and cameras. The quadrant shows controls for two objects/cameras at a time. You scroll through pairs of objects by using the page indicator dots at the bottom of the window. These dots reflect how many pages of two objects exist in the entire list, and which page is currently selected.

There are two types of objects that can be manipulated in the **POSITION** quadrant: moveable objects and virtual cameras. Many of the same controls and data fields exist for both object types.

Moveable Objects

- **Object Name**

  The top-most thing in each object's control panel is the name of the object. The **Object Name** is shown in the top-left corner of each panel.

- **Foreground/Background**

  Below the object's name are two round buttons. The first of these controls whether the moveable object appear in front of the physical objects seen by the camera (foreground), or behind them (background). The icon on the button toggles to represent the current state, showing either a full figure of a person (foreground) or a partially obscured figure (background).

  Using this button during a live production, you can enhance the realism of virtual elements in the scene by, for example, having the talent walk out from behind an object (with the object in the foreground), and then turn and walk in front of the object (with the object set to background).

- **Visibility**

  The second button underneath the object name is the **Visibility** button. This controls whether the moveable object is visible at all or not. The icon on the button shows either an open eye (visible) or a closed eye (not visible).

- **Position Control Block**

  Below the two round buttons is a standard set of UX position/rotation controls. The **Position Control Block** includes:

  › Two curved arrows for affecting rotation values

  These curved arrows allow control of object rotation. They will change values in the selected rotation field (Pan, Tilt, or Roll), with **Pan** being the default. Note that the selected rotation will also show as a label between the two curved arrows. If, for example, you select the **T** field (for Tilt), the label between the arrows changes to **R** to **T**.

  › Four arrows in a star formation for affecting position values

  By default, the left and right arrows within this star control movement along the X-axis. Accordingly, clicking these arrows moves the object along this axis and affects the value shown in the **X** field.

  Similarly, the up and down arrows in the star move the object along the Z-axis (forward and back along the floor) by default, affecting values in the **Z** field. The labels within the arrows, which show **-Z** and **+Z**, further confirm this behavior.

  You can change the up-down arrows to control Z-axis movement (vertically relative to the floor) by first highlighting the **Z** field and then using the up and down arrows. Note that their labels should now show **-Z** and **+Z** respectively.

  › A standard UX Value-Change Control set

  The **UX Value-Change Control** (a pair of up/down arrows with scale buttons) is to the right of the four-arrow star pattern and is used to change the remaining object parameters. For moveable objects, these remaining fields control the scale (size) of the object in the X, Y, and Z dimensions. They are labeled **SX**, **SY**, and **SZ** respectively. The up and down arrows will affect whichever of these data fields is selected.

✶ The scale value established with the scale buttons (ranging from .001 to 100) affects how much change is applied for each click of the arrows. This value affects all arrows in the Position/Rotation Control Block.

- **Position Data Fields**

  Below the **Garbage Matte Control Block** is an array of data fields arranged in three vertical columns for rotation, position, and size/effect respectively:

  › **P**, **T**, **R** (Pan, Tilt, Roll)

  These fields contain values that reflect the rotation of the object

  › **X**, **Y**, **Z**

  These fields contain values that reflect the object's position in 3D space.

  › **SX**, **SY**, **SZ**

  These fields contain values that reflect the scale applied to the object. If, for example, the object was designed to be two feet tall in the scene project, changing the **SY** value to 2.0 will make the object appear four feet tall.

  › **Scale Lock Control**

  To the right of the scale values is an icon of a padlock. The lock can appear either open (unlocked) or closed (locked). This control can be used to protect the scale values against accidental change during a production. If the padlock is shown as locked, then no changes can be made to object-scale values.

- **Object Stored-Positions List**

  Below the data fields is a scrolling list that can contain stored object positions. This list allows you to capture and then recall, any number of different object positions within the virtual scene.

  Capturing/Adding an Object Position

✶ Capturing/adding a new camera position can only be done with UX Administrator privileges (See User Profile under UX Settings Button, above).

To capture the object's current position as a new stored position, click on the + sign in the lower-right corner of the stored-positions scroll list. Note that if the + is not there, you are not logged in as the UX Administrator.

A pop-up window will appear, allowing you to enter the following:

› **Name**

This input field contains a default name of **X** (where **X** is a number that represents the count of the item in the list). You should replace this default name with a name of your choosing.

› **Duration** (seconds)

This data field allows you to specify the duration for an animated move from the object's current position to this new position. If, for example, you enter 2.0 in this field, then whenever this position is recalled, the object will take two seconds to get to this position from wherever it is.

› **Delay** (seconds)

This data field allows you to specify a delay to be applied before the object moves from its current position to this new position. If, for example, you enter 3.0 in this field, then whenever this position is recalled, the object will remain in its current position for three seconds before beginning its move to this position.

› **Ease In/Out**

This drop-down list allows you to select an easing algorithm to be used when an object is animated from its current position to this new one.

Without any easing applied, the object will move at a consistent speed from point A to point B. This can result in animations that look somewhat abrupt at the start and end of the movement. If, you apply easing, then the object will gradually accelerate from a standstill at the start, and decelerate to a stop at the end of the animated movement.

You can experiment with different easing algorithms to find the desired animation effect.

You then press **OK** to save the named stored-position or **CANCEL** to cancel. After saving a new position, you will see the name you selected appear in the scrolling list of positions.

Recalling an Object Position

To recall a stored position, first select the position from the scrolling list by clicking on the name of the position. You will see a > symbol appear at the far right of the list next to the item you have selected. To move the object to the stored position (with animation, if defined in the position), simply click on the > symbol.The default for the up and down arrows is Z-axis for these controls,

Virtual Cameras

Virtual cameras are used primarily in trackless configurations. In a trackless configuration, the physical camera remains still and the virtual camera moves. As mentioned above, the controls available for virtual cameras are very similar to those for moveable objects. Any fields or behaviors that are different are listed below. Any fields or controls not listed below behave exactly the same as for moveable objects, and are described above.

- **Activate Camera**

  In place of the two circular buttons under the names of moveable objects, virtual cameras have a single button for activating (selecting) the virtual camera. Clicking the button tells the trackless system to associate the live camera's video with this virtual camera.

  For example, you might have several virtual cameras defined within your scene/project, each of which has a different position, rotation, and FOV setting. For example, if you have three virtual cameras named **Cam_1**, **Cam_2**, and **Cam_3** and the physical camera's video output is currently associated with **Cam_1**; then, if you go to the **Cam_2** virtual camera and click on its round **Activate Camera** button, the system will immediately associate the real camera with the **Cam_2** virtual camera.

✶ The same effect can be achieved in a more flexible way (i.e., with animations) by simply defining multiple stored positions for a single virtual camera.

- **FOV**

  In place of the three scale-related data fields for moveable objects, virtual cameras have a single **FOV** (field of view) data field. As you might guess, this is because virtual cameras do not have a scale, but they do have fields of view.

  Accordingly, the **UX Value-Change Control Set** for virtual cameras controls the FOV value rather than scale values.

- **Virtual Camera Stored-Positions List**

  The stored positions for virtual cameras work exactly the same as they do for moveable objects. However, it is worth noting that, since these positions are for the virtual camera itself (which represents the perspective from which the entire virtual scene is viewed), animated moves from one camera position to another can be quite dramatic.

  If, for example, the camera is on the left side of the scene low down toward the floor, and you execute a five-second animated move to high on the right side of the scene, you will see a dramatic sweep of the scene from the camera's perspective.

Event Quadrant: UX Events

The **EVENT** quadrant enables production execution of events of all kinds. The simplest form of events are those contained in the 3D scene/project, which are exposed using UX Layout and can be any of three possible types:

- Animation Controller
- SmartGPI Trigger
- Scene Director

✶ These event types are described in more detail in the UX Layout section.

These events are automatically assigned to event buttons in UX using the names they have in the project by default.These events can be triggered in UX by simply clicking on the appropriate named event button in the **EVENT** quadrant.

There is, however, a great deal more that can be done with UX events. This additional functionality is accessed via the **Event Editor**.

Event Editor

The UX **Event Editor** is accessed directly from the Event buttons within the **EVENT** quadrant. You can edit existing events or create new ones using the editor. The **Event Editor** is invoked by right-clicking (or simply touch-and-holding, if using a touch-screen interface) any event button.

When invoked, the **Event Editor** pop-up will appear. This window contains three tabs as follows:

General Tab

The **General** tab facilitates changing the event button's appearance and specifying an external trigger for event. It contains the following elements:

- **Name:** This input field allows you to give the event a name of your choosing. This name will appear on the event button, so it's best to choose concise names.
- **Color:** This field allows you to select a custom color for the event button. In a production environment, it can be very helpful to color-code the event buttons so they can be found and identified at a glance. You could, for example, show animation controller events in blue and robotic control events in green.
- **Delete:** This button allows you to delete an event. Once an event is deleted, its button will revert to the standard inactive look, and will be completely deactivated.
- **Triggered By:** UX Events are typically triggered manually when the UX operator presses the appropriate event button. In this case, the **Triggered By** drop-down should be left at its default selection of *Nothing*.
- However, in automated settings (i.e., when using an automation system like Ross OverDrive), it is desirable to have UX operate under the control of the automation system. To accomplish this, UX Events can be triggered by RossTalk messages (coming from OverDrive).
- To configure an event for external triggering, select **RossTalk** from the **Triggered By** drop-down. Then press the **Setup** button described below.
- **Setup:** The **Setup** button is used to define the RossTalk message that will trigger the UX Event. Clicking on this button brings up a small pop-up window with the following elements:
  - **GPI:** RossTalk messages are essentially SmartGPI messages with a specific GPI number. Using the **GPI** data field, you can specify which GPI number will be used to trigger this event.

✶ This number must match the number defined in, and used by OverDrive for this event.

  - **Global RossTalk Server Port:** This data field contains the IP port number associated with the global RossTalk Server. The default is port 7788, but it should be set to whatever port is being used by OverDrive.

✶ If the Event is defined to be triggered by a RossTalk SmartGPI trigger, the event button will reflect this by showing yellow text in the upper right corner of the button: RTX, where RT is for RossTalk and X is the GPI number selected.

Actions Tab

Sometimes it is desirable to have a number of things happen with the press of a single event button. The **Actions** tab facilitates this and provides the flexibility to control how each activity within the event is performed. The **Actions** tab includes the following elements:

- **Extra Actions**: This scrolling list contains the actions to be performed by this event, above and beyond any base action assigned to the event. Note that, if you are creating a new event (as opposed to one that was exposed via *UX Layout* and created automatically), there is no base action.

  The scrolling list works like other scrolling lists in UX, and new list items are added in the same way: By clicking on the **+** sign in the lower-right corner of the list. Doing so brings up the **Action Definition** pop-up, which contains the following elements:

  - **Type**

This drop-down allows you to select which type of action you are adding to the list. The available action types are:

- **Event**
- **Router**
- **Position**
- **Pause**
- **GPI**

Some of these event types (Event, Router, Position) mimic the capabilities in the **EVENT, ROUTER**, and **POSITION** quadrants respectively.

Depending on the action type selected, the remaining elements change accordingly. Each type is discussed below, along its corresponding interface elements.

- **Event**

  If the Event option is selected, the following elements are presented:

  › **Event to Run**

  This selection list is populated with the UX Events that are currently defined. You can simply select an event and hit **OK** to add it to the actions list. In this way, you can have a number of individual UX Events associated with individual event buttons, but also have a single event that executes one or more of the other defined events.

- **Router**

  If the Router action-type option is selected, the following elements are presented:

  › **Router Action**

  This drop-down allows you to select which type of router action you intend to add: Movie control or assigning a router source to a router target. Depending on which option is selected, the remaining elements change yet again.

  Movie Ctrl – If the Movie Ctrl router action is selected, the following elements are shown:

  Movie List: This list shows the movies known to UX for this project. You simply select which movie you're interested in controlling.

  Control Action: This drop-down allows you to select which action you want to perform on the selected movie: Play or Stop.

  Assign – If the Assign router action is selected, the following elements are shown:

  Source List: This list shows the Sources (stills and movies) known to UX for this project. You select from this list which source you are interested in assigning to a new target.

  Target List: This list shows the target objects known to UX for this project. You select which target object you want to assign the selected source to.

- **Position**

  If the Position action-type option is selected, the following elements are presented:

  › **Item**

  This scrolling list allows you to select a defined moveable object to be repositioned.

  › **Alpha**

  This drop-down allows you to select the finishing Alpha value (**Front** = foreground, **Back** = background). The value selected will be the final value when the move is complete.

  › **Visibility**

  This drop-down allows you to select the finishing object Visibility (**Show** = visible, **Hide** = invisible). The value selected will be the final value when the move is complete.

› **Available Positions**

This scrolling list shows any pre-defined object positions for the selected object. These positions would have to have been created in the **POSITION** quadrant within UX. The object will start at its current position and will end at the position selected.

✶ UX will apply any defined delay or animation effects defined in the selected move when executing the move.

- **Pause**

  The **Pause** action does just that, it waits for a specified period of time. This can be used between other types of actions to create a pause between actions. If the **Pause** action-type option is selected, the following elements are presented:

  › **Pause time** (seconds)

  This data field allows you to specify the amount of time (in seconds) that the action should pause.

- **GPI**

  As discussed above, UX Events can be triggered by RossTalk SmartGPI signals. Using this action type, UX Events can also issue GPI triggers to other external devices. If the GPI action-type option is selected, the following elements are presented:

  › **IP Address**

  This scrolling list allows you to select from known IP addresses, or add a new one. To add a new address, you use the + symbol in the lower right of the list, as with other similar lists in UX.

  › **Port**

  This scrolling list allows you to select from known IP ports, or add a new one. To add a new port, you use the + symbol in the lower right of the list.

  › **GPI**

  This data field allows you to enter the desired GPI trigger number. The number entered here will be used in the outbound GPI trigger.

› **Run**

This drop-down, just below the Extra Actions list on the **Actions** tab allows you to select a mode of execution for the actions in the Extra Actions list. The available run modes are:

- **All actions**
- **As playlist**
- **Auto rundown**

Each of these, along with their unique UI elements, are described below.

- **All actions**

  This run mode causes UX to execute all Extra Actions immediately - i.e., at the same time.

- **As playlist**

  This run mode causes the actions to be executed one at a time, for each button press. This allows the UX Operator to essentially control a defined playlist all within a single UX Event.

  When this run mode is selected, the following additional elements are presented:

  › **Loop**

  This check-box allows you to specify whether the playlist should loop back to the top when the bottom of the Extra Actions list is reached.

  › **Reset**

  This button allows you to reset the playlist - i.e., to make the first item in the Extra Actions list the next action.

- **Auto rundown**

  This run mode is similar to the All Actions mode, except that the actions are executed from top to bottom and any **Pause** actions recognized and executed.

Robotics Tab

Router Quadrant: Virtual Router

The Router Quadrant allows users to manage sources and targets. It contains thumbnails of all image and video sources as well as available targets. Video source thumbnails also contain a play-bar, that allows the operator to control how the video will be played back.

The mapping of sources and targets is carried out in Layout. On the XPression computer, open an XPression project and select the objects from the scenes to be applied to the target. Save the objects (images and videos) to folders, indicating the mapping in the upper right portion of the screen.

UX Driver

The UX Driver is the UX component that communicates with the UX Xperience™ UI and directly controls the rendering of the virtual environment. It handles two broad functional categories:

- **Tracking**

  UX Driver receives and processes tracking data from encoded camera lenses and heads (and/or from other tracking devices/systems). It uses the tracking data, together with calibration and other data provided by the UI, to determine the precise location and rotation of the camera's nodal point and adjust the virtual scene to match. This is done for each and every field/frame so that the computer-generated scene tracks perfectly with the physical camera - and there are no skips or jumps that belie the illusion of the blended virtual and real worlds.

- **Operational Control**

  UX Driver is also responsible for responding to the full range of operational control commands that might be executed by the UX Operator. Each time the user moves a virtual object in the **POSITION** quadrant or assigns a new source to a target surface in the Router quadrant, for example, a command is sent from the UX Xperience™ UI to the driver(s), which, in turn, adjust the virtual scene accordingly.

  In a networked UX system, there is typically a single UX UI controlling one or more camera/renderer systems. For each camera, there is a dedicated XPression rendering system, which hosts both the XPression real-time 3D graphics software and the UX Driver.

  The rendering systems are responsible for the real-time rendering of the virtual scene from the perspective of their associated physical cameras. Each instance of the UX Driver receives its own unique tracking data from its camera, but all cameras in a system simultaneously receive the same control commands. In this way, if a virtual object is moved, for example, the move is seen by all of the cameras, each of which may be viewing it from a different angle.

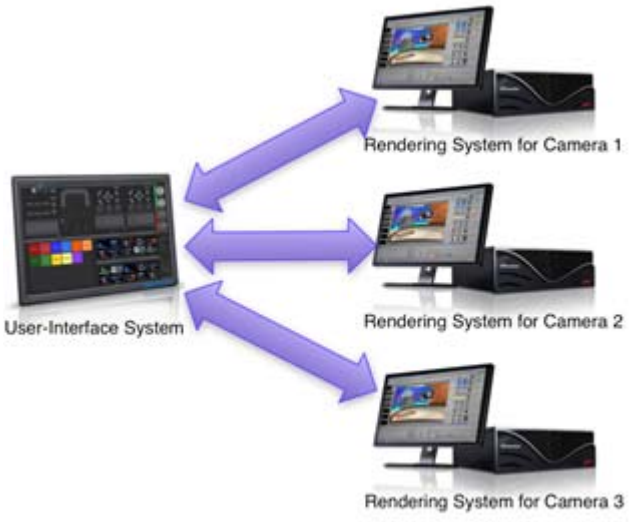


Figure 4.1 *Typical UX Networked Configuration*

Driver Control

When UX Driver is launched, at least two things happen: A command window is opened (if it's not already open) and an icon appears in the Windows tool tray. The tool-tray icon is used to perform some basic operational controls on the Driver. If XPression is configured to use a virtual output, then the output window will also appear. Right clicking on the tool-tray icon reveals a menu that includes the following options:

Renderer UI

Selecting this option will cause the renderer's (XPression) UI to appear while the Driver continues to run. This can be very useful for exploring the objects in the scene hierarchy while the system is running.

You will notice that, if the renderer UI is visible, this option will show a check mark to indicate that it is active. Selecting this option again will cause the renderer UI and the check mark will disappear.

Reset Tracking Buffer

The tracking module within UX Driver maintains a buffer of tracking data packets in order to ensure that tracking packets are acquired and available even if the 3D renderer is unusually taxed for a brief period of time.

Sometimes, typically if something is not yet configured correctly (e.g., gen-lock is not synchronized between the camera head and the renderer), this buffer can grow. When this happens, the delay between when the physical camera is moved and when the virtual set responds becomes unacceptably long.

By selecting the **Reset Tracking Buffer**, you can reset an outsized tracking data buffer to its original size and restore performance to the system.

Settings

Selecting the **Settings** option causes the UX Driver Settings panel to appear, facilitating the configuration of the Driver. This panel, and its available fields and controls, is described below under Driver Settings.

Exit

The **Exit** option shuts down the UX Driver and, as a result, the tool-tray icon itself disappears. The driver can also be shut down via a keyboard control (see *Driver Tips & Tricks* below), but this approach is preferred, as it will work even when accessing the driver via remote desktop, whereas key sequences sometimes do not work.

- By default, new Windows tool-tray icons are hidden, meaning that you must click on the little **Show Hidden Icons** arrow to see the UX Driver icon. You can change this so that the icon is always visible by clicking on this arrow and selecting **Customize…**. Then find the **UX_Driver** icon and set its behavior to **Show Icon and Notifications**.

Driver Settings

UX Xperience™ and UX Driver both need to know about each other. As discussed in previously in the UX Xperience section, you must enter the IP address in the UI's **Settings** panel for each camera's Driver/Renderer computer. Similarly, the driver must be configured to know where the UI resides on the network (among other things).

The UX Driver operates, for the most part, without any graphical UI in order to minimize any potential performance impact on the GPU's ability to render the designated virtual scene. The exception to this is the Driver's **Settings** panel.

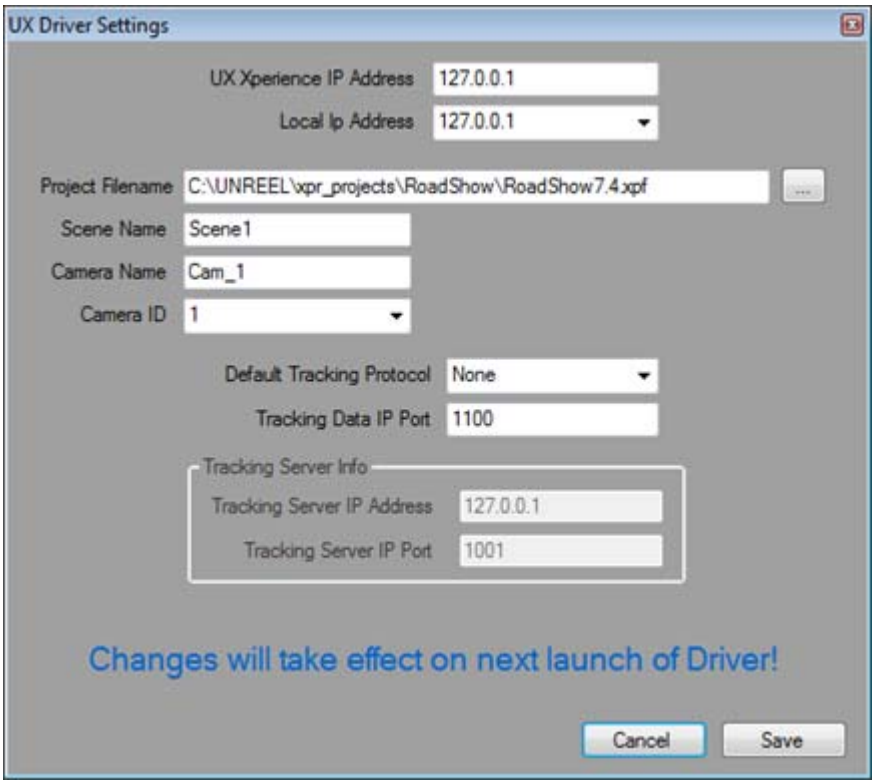


Figure 4.2 *UX Driver Settings Panel*

The UX Driver **Settings** panel captures configuration information used by the driver for controlling the XPression 3D real-time graphics renderer and receiving and processing tracking data from an associated tracked camera.

The settings panel is accessed in one of two ways:

1. Via the Driver's tool-tray menu (discussed above under *Driver Control*)
2. By using the `-s` command-line argument (discussed below under the Command-Line Options)

The following are descriptions of the various settings available in the Driver Settings Panel:

- **Project Filename**

  This is the name of the default XPression project that will be used for the virtual set and/or augmented-reality graphics.

- **Scene Name**

  This is the name of the default scene to be used within the aforementioned XPression project for the virtual set and/or augmented-reality graphics.

- **Camera Name**

  This is the name of the virtual camera within the XPression project that will be associated with the attached tracked physical camera. As the physical camera moves, the values for position, rotation, zoom, and focus are applied to the named virtual camera within XPression.

- **Camera ID**

  This is the ID number used by the UX UI to refer to this camera. If, for example, the IP address of this Driver's computer is entered in the UX UI as the first camera, then this value should be **1**.

- **Default Tracking Protocol**

  The protocol to be used for a given camera is specified within the UX UI. However, certain protocols require special initialization when the Driver starts up. Specifying the default protocol here allows that initialization to occur.

- **Tracking Data IP Port**

  The Tracking Data IP Port is the IP port number that the driver should listen to for incoming UDP-based tracking data. Note that, whatever port is specified here must also be set at the tracking device itself. For Furio heads, this is done via the web-based configuration tool.

- **Project Filename**

  This is the name of the default XPression project that will be used for the virtual set and/or augmented-reality graphics.

- **Tracking Server Info**

  The fields in this box will only be activated if the selected protocol is Motion Analysis. For Motion Analysis tracking, the incoming tracking data comes from a special tracking-server computer rather than directly from an encoded camera head or other tracked device.

- **Tracking Server IP Address**

  This is the IP address of the Motion Analysis tracking server.

- **Tracking Server IP Port**

  This is the IP port on which the driver will communicate with the Motion Analysis tracking server.

Command-Line Options

The UX Driver is typically run from the desktop icon created at installation. By default, it is run without any command-line arguments. However, in certain circumstances, it may be necessary or desirable to use one of the Driver's available command-line arguments. If you open a Windows command prompt and navigate to the Driver's install directory (C:\UNREEL\UX\Driver by default), you can execute the driver on the command-line. Executing the Driver with the *-h* command-line argument (for help), as shown in the example below, shows all of the available command-line options.

```
C:\UNREEL\UX\Driver>ux_driver -h


Usage: ux_driver [-<option>]


Options:
    -framerate      - run driver at frame rate (30fps vs field rate of 60fps)
    -globalcam      - use global camera for MOS workflows
    -h              - help (this info)
    -id <id>        - sets driver's camera ID
    -pf <projFile>  - sets XPression project file name
    -ps <projScene> - sets scene name
    -pc <projCam>   - sets virtual camera name
    -q              - run driver in 'quiet' mode (fewer console messages)
    -s              - edit default settings
    -tpr <protocol> - specify tracking protocol
    -tpo <port>     - specify tracking IP port
    -trackless      - run driver in trackless mode
    -ua <addr>      - specify IP address of UI
```

Each of these command-line options are discussed below.

`-framerate`

By default, the Driver operates at field rate, meaning that the renderer is updated 60 times per second. However, there are times when you may want this updating to occur at frame rate (30 updates per second) instead. For example, the XPression renderer defaults to using frame rate when it is only driving a virtual output, which is commonly done when remotely testing/diagnosing issues. If using the virtual output in this way, it is helpful to be able to have the UX Driver operate in the same mode, so you can operate the system and view the expected rendering on the virtual output.

`-globalcam`

By default, the Driver uses scene-based cameras in XPression. However, in some cases, it is desirable to maintain tracking on a camera while different XPression projects and/or scenes are loaded and unloaded. This is particularly important when using automation systems such as OverDrive™ to control UX. In these instances, using this command-line option will cause UX to use XPression's global camera, which was designed specifically for this purpose.

`-h`

As shown above, this command-line option will cause the driver to display all available command-line options.

`-id <id>`

This option allows you to override the UX camera ID for this Driver's camera. Invoking ux_driver -id 2, for example, will set this camera's UX ID to 2.

`-pf <projFile>`

This command-line option allows you to override the default XPression project identified in the Driver Settings. This can be used in batch files or other scripting to dynamically determine which project should be launched when the Driver is started. It is also used to define multiple desktop icons for the driver, each of which will launch a different project.

`-ps <projScene>`

Similar to the -pf option, this option enables you to override, and dynamically set, the XPression scene you want to be opened by default.

`-pc <projCam>`

Similar to the -pf and -ps options, this option enables you to override, and dynamically set, the XPression scene-based virtual camera you want to be associated with this instance of the Driver.

`-q`

This causes the driver to restrict console messages to only those that are most important. Other, informational messages will be suppressed.

`-s`

This option causes the Driver to launch the **Settings** panel. This is equivalent to selecting **Settings** from the Driver's tool-tray menu.

`-tpr <protocol>`

This option enables you to override, and dynamically set, the default tracking protocol to use for receiving tracking data.

`-tpo <port>`

Often used in conjunction with the -tpr option, this option enables you to override, and dynamically set, the IP port used for receiving tracking data.

`-trackless`

This option is used together with the UX Lite UI to facilitate trackless virtual environments. If this option is set, the Driver will not look for any tracking data, but will still accommodate all operational control requests.

`-ua <addr>`

This option enables you to override, and dynamically set, the IP address of the UX UI system. Using this option, you could reassign a driver from one UI control system to another, without having to go through the **Settings** panel each time you want to make a change.

Hot-Key Options

Once the UX Driver is up and running, it is designed to minimize use of any graphics resources in order to minimize any potential impact on the production performance. For this reason, live interactions with the Driver are done via hot keys rather than more typical UI interactions.

The UX Driver supports a number of hot-key options, each of which is described below.

`alt-F`

This hot-key causes the driver to display the currently active features. Features include the following:

- **Defocus/Depth-of-Field**

  This feature is enabled via the UX UI and tells the Driver to simulate physical-lens depth-of-field effects when rendering the scene. With this feature on, objects in front of or behind the focus depth will be blurred. The further from the focus depth, the more blur is applied - mimicking the behavior of a real lens.

- **Lens Distortion**

  This feature is also enabled via the UX UI and tells the driver to simulate physical lens distortion effects when rendering the scene. With this feature on, parts of the virtual scene that approach the edges of the field of view will distort in the same way real objects do for the specified lens. This feature is typically used for large, arena-style setups where the lens distortion becomes a discernible factor.

✶ This feature requires lens-distortion curves, which have only been created for a small number of lenses.

- **Console Logging Detail**

  Console logging detail is either *Verbose* (default) or *Quiet*. The mode can be changed either by using the `-q` command-line option described above under *Command-Line Options* or by using the `<alt> V` hot-key option described below.

`alt-H`

This hot-key causes the driver to display an information panel listing all the available hot-key options as shown here:

```
HOT-KEY FUNCTIONS:
    alt-F = show active renderer features
    alt-H  = show hot-key help
    alt-Q = reset tracking queue
    alt-R  = turn on/off renderer's UI
    alt-S = shutdown
   alt-T = turn on/off tracking
   alt-U = turn on/off UI updating
   alt-V = toggle verbosity
   alt-X = requery database
   alt-ARROW-UP = increment tracking queue depth
   alt-ARROW-DN = decrement tracking queue depth
```

`alt-Q`

This hot-key causes the driver to reset the tracking data queue to its original size (6 fields by default). This is very helpful if something has occurred that caused the buffer to grow and the system to become unresponsive.

`alt-R`

This hot-key causes the driver to turn on or off the renderer's (XPression's) user interface. It is equivalent to selecting **Renderer UI** from the tool-tray menu.

`alt-S`

This hot-key causes the driver to cleanly shut itself down. This is the equivalent to selecting **Exit** from the tool-tray menu. When shut down using one of these two approaches, the Driver will also shutdown the associated XPression instance.

- If the Driver is somehow otherwise killed, the XPression instance will remain in memory and will have to be manually killed using the Windows Task Manager.

`alt-T`

This hot-key causes the driver to start or stop ignoring incoming tracking data.

`alt-U`

This hot-key causes the driver to start or stop sending tracking data to the UX UI.

`alt-V`

This hot-key causes to toggle between *Quiet* and *Verbose* output modes. By default, the system starts in verbose mode (which can be confirmed using the alt-F hot-key described above).

`alt-X`

This hot-key causes the driver to re-query the UX database for information about the scene and other various settings. This query normally occurs only when the driver first connects to the UI, but it can be helpful to be able to change things and re-query to retrieve the changes without ever shutting down the Driver.

`alt-ARROW-UP`

This hot-key causes the driver to increment (increase by one field) the depth of the tracking data buffer. This can be useful to give the renderer more time to render complex geometry for each frame.

`alt-ARROW-DOWN`

This hot-key causes the driver to decrement (decrease by one field) the depth of the tracking data buffer. A relatively shallow data buffer increases system responsiveness and may be achievable without impacting renderer performance if the scene is simple and does not use a lot of texture memory.

`Driver Output`

The UX Driver is meant to be a set-and-forget type of process. It runs in a standard OS command window and shows activity using standard text output. The amount of text output shown (used typically for diagnostic purposes) can be controlled as described below. Also, the format of the output messages indicates which functional module within the driver is responsible for the message. Messages that begin with `-T->` are coming from the tracking module, whereas messages that begin with `-O->` are coming from the Operational Control module:

```
[INFO]: -T-> Starting tracking

[INFO]: -O-> Starting operator
```

Driver Tips & Tricks

UX Xperience™ and UX Driver both need to know about each other. As discussed in previously in the *UX Xperience* section, you must enter the IP address in the UI's settings panel for each camera's Driver/renderer computer. Similarly, the driver must be configured to know where the UI resides on the network via the **Settings** panel.

When accessing/controlling a UX system remotely using a tool such as TeamViewer™, the Driver's hot-keys may or may not be recognized. In this case, use the tool-tray menu to accomplish the same objectives.

Glossary of Terms

A

Augmented Reality — real set with foreground graphics. No green or blue screen required.

C

Camera Identifier — Circle displayed on a camera status box, displaying that camera's number.

CCD — Charge Coupled Device. Internal camera sensor.

Character Generator — Creates titles or credits for superimposing on edited video footage; using a keyboard for input. May provide recognized font styles, multiple screen storage and background colors for video display.

Chroma Key — An effect in which video from one source replaces video of a specific hue in a second video source. The blue and green hues are most commonly used for chroma keying.

Command Line — Text entry used to prompt the UX Driver to open to a specific setting.

Crosshairs — Option to place two perpendicularly intersecting lines in the center of the camera's point of view. Used to adjust camera's focus.

D

Defocus — Tells the driver at which point of perspective to begin recording the camera's view details.

Delay — Optional pause applied at the beginning of a camera move.

Distance Offset — User-entered values that set the camera focus ranges.

Dolly — Base containing wheels for a Ross Video Furio robotic camera system.

Duration — Time span over which an animated move occurs between the first and last position.

E

Easing — Option to vary camera acceleration and deceleration speeds during a move.

Encoder Min-Max Values — Minimum and maximum encoder values produced by the camera lens for zoom and focus.

F

Feathering — Transition effect applied to garbage matte edges to help them blend with the virtual set.

Field Rate — Driver is sending 60 updates per second to the renderer.

Focus Indicator — Circle displayed on garbage matte status blocks which indicates which matte is in use.

F.O.V. — Field of View.

Frame Rate - Driver is sending 30 updates per second to the renderer.

Furio — Robotic camera system manufactured by Ross Video.

G

Garbage Mattes - virtual transparent object used to extend blue and green screens by masking any real set objects..

I

IP Address — The numeric Internet Protocol address assigned by the Network Information Center (NIC) that uniquely identifies each computer on the network that uses TCP/IP. The IP address is a 32-bit identifier made up of four groups of numbers, each separated by a period, such as 192.168.0.1.

J

Jib — Crane-like camera mount.

K

Key — An effect produced by “cutting a hole” in background video, then filling the hole with video or matte from another source. Key source video cuts the hole, key fill video fills the hole. The video signal used for cut and fill can come from the same or separate sources.

L

Lock All Cameras — Applies the same set of garbage matte positions to all cameras.

M

Moveable Objects — 3D objects to be employed in a virtual set.

N

Notification Area — Open area at the bottom of the status bar, which displays messages for system related issues.

O

Offset — User setting to set the camera’s limits for moves, focus, pan, tilt and zoom.

P

Pan — A movement where the camera pivots horizontally left or right from a fixed point.

Project Configuration File — User-created file containing all elements to be executed in Unreel Experience.

Q

Quadrant — The Unreel Experience interface screen is divided into for sections, grouped by elements to be manipulated (Position, Track, Events and Router).

R

Remote Settings — Network configuration settings between the UX Driver and the renderer.

Renderer — Alternate name for a character generator.

Render Performance Meter — Colored status bar, ranging from green to red, which indicates how hard the renderer is working.

RT — RossTalk software that interfaces XPression with UX.

S

Status Bar — Vertical bar on the right side of the UX interface screen which contains the Settings button, camera status blocks and Notification Area.

Status Indicator — Red or green toggle circle on garbage matte status block, which indicates whether that specific matte is in use.

T

TCP (Transmission Control Protocol) — A communication-oriented Internet protocol which transmits data packets, providing guaranteed data delivery.

Tilt — A vertical pan where the camera pivots up or down from a fixed point.

Track — Data transmitted to operator concerning the camera's moves and locations.

Track Settings Configuration File —File containing the track setting configurations.

U

UDP (User Datagram Protocol) — A connectionless Internet protocol which transmits data packets without guaranteeing error free data delivery.

UI — User interface.

UX — Unreel virtual set software.

UX Driver — Connects the renderer to UX Experience and controls the output of graphics within the virtual set.

UX Experience — Unreel software user interface. Allows users to configure and operate a virtual set.

UX Layout — Contains all of the elements to be executed within UX Experience.

V

Value-Change Control — Touch screen arrow that allow users to increase or decrease value fields.

Virtual Camera — Computer generated camera used to record virtual elements.

Virtual Set — Set consisting of foreground and background graphics. Requires a green or blue screen.

Visibility Indicator — Eye icon on a garbage matte status box. Indicates to the operator if matte is transparent or visible.

X

X-Axis — Virtual axis running parallel to rails.

Y

Y-Axis — Virtual axis between the rails and the camera head.

Z

Z-Axis — Virtual axis running perpendicular to the rails and bisecting the virtual set.

Zero Offsets — Resets Distance Offset to zero.

Zoom — Expanding or reducing an image within a frame by bringing the subject closer or farther away.