Vinten μVRC
Robotic Control System

User Guide

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www.vinten.com
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Important Safety Information

Important information on the safe installation and operation of this product. Read this information before operating the product. For your personal safety, read these instructions. Do not operate the product if you do not understand how to use it safely. Save these instructions for future reference.

Warning Symbols Used in these Instructions

Safety cautions are included in these instructions. These safety instructions must be followed to avoid possible personal injury and avoid possible damage to the product.

**WARNING!**
Where there is a risk of personal injury or injury to others, comments appear supported by the warning triangle symbol.
Where there is a risk of damage to the product, associated equipment, process or surroundings, comments appear supported by the word ' **CAUTION**'.

**ELECTRIC SHOCK**
Where there is a risk of electric shock, comments appear supported by the hazardous voltage warning triangle.

Intended Use

The μVRC robotic control system is designed to control compatible robotic camera equipment and accessories. Camera operators can remotely control movements of axes and other functions.

The μVRC is designed for use in TV studios and other applications including houses of worship, conference facilities and auditoriums.

Electrical Connection

**WARNING! Risk of electric shock.** Always disconnect and isolate the product from the power supply before attempting any servicing or removing the covers. Always check cables for signs of damage. Damaged cables can cause personal injury and/or damage the equipment. It is the responsibility of the local organisation to ensure that the product is periodically checked for electrical safety in accordance with local regulations.

**CAUTION!** This product must be connected to a power supply of the same voltage (V) and current (A) as indicated on the product. Refer to the technical specifications for the product. Using alternative power sources will invalidate the system EMC liability. All connections to other devices must be made using shielded cables.

Operating Environment

**WARNING!** Slots and openings are intended for ventilation purposes to ensure reliable operation of the product and protect it from overheating. Do not block or cover any slots and openings. Protect the product from water, moisture and dust. The presence of electricity near water can be dangerous.
Mounting and Installation

**WARNING!** Always ensure that all power and auxiliary communications cables are routed so that they do not present any danger to personnel. Take care when routing cables in areas where robotic equipment is in use.

Cleaning

**WARNING! Risk of electric shock.** Always disconnect and isolate the product from the power supply before cleaning. Do not use solvent or oil-based cleaners, abrasives or wire brushes. Clean with a dry lint free cloth.

Maintenance

**WARNING!** The fitting of non-approved parts or accessories, or the carrying out of non-approved alterations or servicing can be dangerous and could affect the safety of the product. It may also invalidate the terms and conditions of the product warranty.

Safety when Working with Robotic Equipment

In normal operation remote-controlled equipment can move suddenly and without warning. Since audible warnings are not suitable for use within the studio environment, it is recommended that only trained personnel be allowed to work in the active areas where remote controlled robotic equipment is located.

The safe operating zone is a minimum of 1 m (3 ft).

Safety Notes for Operators

Operators must familiarise themselves with the working footprint of the robotic equipment, including all installed payload items (lens, zoom and focus controls, viewfinder, prompter, etc.) to prevent inadvertent collisions or injury to personnel.

If personnel are too close to robotic equipment that is about to move, the operator should prevent the motion from starting or stop the motion if it has started.

We strongly recommend that the operator verifies visually that the active area is clear of hazards and personnel, both before and during remote operation.

About this User Guide

This user guide covers the installation, configuration and operation of the μVRC robotic control system.

In this user guide, the following symbols are used to indicate useful or important information:

- **NOTE:** Gives additional important information about the product.
- **TIP:** Gives extra advice and ways to perform a particular step or procedure.
## Getting Started

### Box Contents

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>μVRC computer</td>
</tr>
<tr>
<td>2</td>
<td>Joystick panel</td>
</tr>
<tr>
<td>3</td>
<td>μVRC power supply</td>
</tr>
<tr>
<td></td>
<td>USB connecting cable</td>
</tr>
<tr>
<td></td>
<td>Power cable (x3)</td>
</tr>
<tr>
<td></td>
<td>User guide</td>
</tr>
<tr>
<td></td>
<td>NI - Not Illustrated</td>
</tr>
</tbody>
</table>
μVRC Computer Components and Connections

1. Touch-screen interface
2. Adjustable stand
3. Power button
4. Power socket
5. Network port
6. USB3 ports
7. VESA mounting holes (X4)*
8. USB 2 ports

* For more information on the VESA mount, see Technical Specifications on page 44.
Joystick Panel Controls and Connections

1. Main joystick control
2. Shot control keys
3. Focus controls
4. Keys not currently used
5. Hand rest pad
6. Camera selection keys
7. USB port
# Upgrade Options

The standard μVRC has built-in functions to set up and run a basic robotic camera system, consisting of up to four Vantage heads and cameras.

Upgrade licenses are available for purchase to expand the system or functions. If additional licenses are purchased to upgrade the μVRC, a license key is issued. The license key must be applied in the License Management window to activate the new features. For more information, see [About Screen and License Management](#) on page 34.

<table>
<thead>
<tr>
<th>Upgrade Option</th>
<th>License Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>μVRC Plus Four</td>
<td>V4063-8001</td>
<td>✔️ Up to eight Vantage heads can be controlled.</td>
</tr>
<tr>
<td>μVRC Total Control</td>
<td>V4063-8002</td>
<td>✔️ Any number of Vantage heads can be controlled.</td>
</tr>
<tr>
<td>PTZ Control</td>
<td>V4063-8003</td>
<td>✔️ Control a single PTZ camera (Sony or Panasonic).</td>
</tr>
<tr>
<td>ICE/Fusion</td>
<td>V4063-8004</td>
<td>✔️ Adds control of Vinten ICE and Fusion robotics.</td>
</tr>
<tr>
<td>Hexagon</td>
<td>V4063-8005</td>
<td>✔️ Adds control of Vinten Hexagon robotics.</td>
</tr>
<tr>
<td>CCU Control (broadcast cameras)</td>
<td>V4063-8006</td>
<td>✔️ Add paint/shading control for a single broadcast camera (Sony).</td>
</tr>
<tr>
<td>Automation Interface</td>
<td>V4063-8007</td>
<td>✔️ Allows a third party control system to integrate with the μVRC.</td>
</tr>
<tr>
<td>Distributed network control, database replication and backup</td>
<td>V4063-8008</td>
<td>✔️ Allows multiple μVRC to share control. Also allows interaction with HD-VRCs.</td>
</tr>
<tr>
<td>Shot Thumbnails</td>
<td>V4063-8009</td>
<td>✔️ Adds support for an external video capture interface to allow shots to display thumbnails from live video.</td>
</tr>
</tbody>
</table>
Connecting the μVRC

System and Power Connections

The μVRC system is easily connected together. Robotic cameras are connected using standard Ethernet connections. Use a powered Ethernet switch to expand the number of connections available to suit your system requirements. The control panel is connected and powered with the supplied USB lead.

The μVRC computer connections are located on the rear of the product. See the section μVRC Computer Components and Connections on page 5.

For more information on connecting up robotic cameras and components, refer to the documentation supplied with the products.

* To connect PTZ heads, an additional license is required. For more information see Upgrade Options on page 7.
Starting the μVRC

Powering Up
When all connections in the μVRC system have been made, the μVRC computer can be powered up.

To power up, depress the power button recessed on the rear edge of the case.

Starting the μVRC Application

When the μVRC computer has booted up, double tap on the Fusion Client icon.

If only one user-name is set up on the system with no password set, the μVRC automatically logs in.

If multiple user-names have already been set up, select the appropriate name in the User Selection window. Enter the password, if one has been set.
Adding Robotic Camera Units to the System

Configuration Management Tool

The Configuration Management Tool allows you to add any connected hardware to the μVRC system. You can build each individual robotic camera unit by adding the hardware components (robotic head, camera, lens, etc) fitted.

The Configuration Management Tool has built-in intelligence to identify compatible and incompatible hardware components being added to a robotic camera unit.

From the main μVRC workspace tap the **Menu > Configuration Management** buttons to open the Configuration Management Tool window.

- **Profiles List** - Available robotic heads, cameras and other components
- **Camera Storage Grid** - Cells for storing robotic camera units
- **Camera Properties** - Configuration section for robotic cameras and hardware
Adding a Robotic Head and Camera or PTZ Camera

1. Select the appropriate robotic head or PTZ camera (example shown is a Vantage Head) from the Profiles List*.  
2. Drag the selected device into an empty cell on the Camera Storage Grid.  
3. In the Camera Properties section, enter a name for the new camera (example shown is Vantage 1) and its network IP address to connect it to the μVRC system.  
4. If a Vantage head is selected, drag the camera type fitted from the Profiles List into the same cell as the robotic head.  
5. When all the cameras and components have been added to the Camera Storage Grid, tap the Apply Changes button.  
6. Tap the OK button to allow the software to restart.

If the 🔄 icon is still displayed on a camera or component, something has not yet been configured (such as a missing protocol, missing IP address, etc.). Configuration must be completed for the camera and components to fully function.

When the μVRC restarts, added cameras are available for selection from the Camera selection and Status Bar.

Cameras and components can be removed from the μVRC system by returning to the Configuration Management Tool and tapping the red cross on a camera or component. All shots stored for the camera will also be deleted.

*Products available for selection appear in white text. Products in black text require an additional license to be purchased and applied. For more information see Upgrade Options on page 7.
The μVRC user interface consists of a joystick panel and a PC workstation with integral touch-screen display, through which all functions and operations can be utilised.

Using the Joystick Panel

The joystick panel enables you to select and control connected robotic cameras. Additional keys are available to select cameras and other useful functions.

Joystick Camera Controls

The joystick panel provides the best way to smoothly control camera movement and adjustments.

<table>
<thead>
<tr>
<th>Control function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pan axis control</td>
</tr>
<tr>
<td>Tilt axis control</td>
</tr>
<tr>
<td>Zoom control</td>
</tr>
<tr>
<td>Course focus control</td>
</tr>
<tr>
<td>Fine focus control</td>
</tr>
</tbody>
</table>

Control functions can be reversed in the μVRC configuration.
**Joystick Panel Keys**

The joystick panel has a selection of useful short cut keys which duplicate features and functions available on the touch-screen display. The keys provide quick access to functions when the operator is using the joystick to control cameras.

1. Camera shot control keys (fade/stop/cut)
2. Function keys (not currently used)
3. Numeric keypad (not currently used)
4. Camera selection keys*
5. X4 key (zoom proportional)
6. Camera selection shift key* (provides access to cameras 9 to 16)

*The number of cameras available for selection is dependent on the system license.
Using the Touch-Screen Display Interface

The μVRC touch-screen display is the primary interface with the system, enabling you to select cameras and setup, store, manage and select shots for shows.

The main μVRC workspace window provides instant access to functions required to operate the remote camera control system.

The window comprises:

1 **Stored Shot Grid** - This grid of cells is used to display the shots that have been created and stored for each camera in the current show, or the shots stored for the currently selected camera depending on the setting of the Per Camera configuration option.

2 **Camera selection and Status Bar** - The robotic cameras can be selected from this workspace bar or the control panel.

3 Toolbar containing function and menu buttons

**Stored Shot Grid**

The grid size (number of shots that are visible on a single page can be selected using the Grid Size option on the Configuration Screen – see **Grid Display Options** on page 26. Depending on the number of shots stored in the current show and the grid size selected, the shots may span several pages.
Shot Status Colour codes

The background of the shots stored in the grid are colour coded to indicate the shot status.

<table>
<thead>
<tr>
<th>Shot Colour</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Red</td>
<td>Indicates that the camera is moving (via Cut or Fade) to the shot.</td>
</tr>
<tr>
<td>B Green</td>
<td>Indicates that the shot is cued and the camera will move to this shot when Cut or Fade is selected.</td>
</tr>
<tr>
<td>C Dark Blue</td>
<td>Indicates that the camera is exactly on shot as stored in the show file.</td>
</tr>
<tr>
<td>D Light Blue</td>
<td>Indicates that the camera has been trimmed off the shot stored in the show file.</td>
</tr>
<tr>
<td>F Grey</td>
<td>Indicates shots that are available for selection.</td>
</tr>
</tbody>
</table>

Camera Selection Status Bar

Available robotic cameras can be selected from this bar. The colour of the camera button indicates the current status of the camera.

<table>
<thead>
<tr>
<th>Frame Colour</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Green</td>
<td>Camera is currently selected and controlled by the control panel.</td>
</tr>
<tr>
<td>B White</td>
<td>Camera is available for immediate selection and control.</td>
</tr>
<tr>
<td>C Black</td>
<td>Camera is offline and unavailable.</td>
</tr>
<tr>
<td>E Grey</td>
<td>Camera needs to be enabled. Tap the Opt button and select Enable from the Device Control field.</td>
</tr>
</tbody>
</table>

When selected, any camera can be controlled from the joystick control panel, or using the virtual joystick and controls on the touch screen.
## Function and Menu Buttons

The toolbar containing the function and menu buttons is displayed at the bottom of the workspace. The buttons and menus enable you to create and manage shots and shows, and configure the µVRC system.

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Menu" /></td>
<td>Menu</td>
<td>Displays the toolbar menu enabling you to: manage shows, configure the system and preferences.</td>
</tr>
<tr>
<td><img src="image" alt="Edit" /></td>
<td>Edit</td>
<td>Displays the edit menu enabling you to: rename a shot, delete a shot, edit the shot time, replace a stored shot with a new one and move shots to different positions in the grid.</td>
</tr>
<tr>
<td><img src="image" alt="Stop" /></td>
<td>Stop</td>
<td>Stops all camera movement during a cut or fade operation.</td>
</tr>
<tr>
<td><img src="image" alt="Cut" /></td>
<td>Cut</td>
<td>Cuts from the current shot(s) to the selected shot(s) as fast as possible. This function can be latched to immediately cut to a shot when it is selected. Cut is not suitable for on-air moves.</td>
</tr>
<tr>
<td><img src="image" alt="Fade" /></td>
<td>Fade</td>
<td>Fades from the current shot to the selected shot in the time duration stored in the shot. This function can be latched to immediately fade to a shot when it is selected.</td>
</tr>
<tr>
<td><img src="image" alt="Store" /></td>
<td>Store</td>
<td>Stores the shot on the currently selected camera unit into the selected cell in the grid. A show must be opened to store shots.</td>
</tr>
<tr>
<td><img src="image" alt="Focus" /></td>
<td>Focus</td>
<td>Zooms the lens of the current on-shot camera unit (thumbnail coloured dark blue) all the way in tight and displays the Focus menu.</td>
</tr>
<tr>
<td><img src="image" alt="Sequence" /></td>
<td>Sequence</td>
<td>Available for Vinten Hexagon track only, when the Hexagon license upgrade has been purchased and applied.</td>
</tr>
<tr>
<td><img src="image" alt="Virtual Stick" /></td>
<td>Virtual Stick</td>
<td>Displays the Virtual Joystick window, providing a method of controlling cameras from the touch screen when the control panel is not available.</td>
</tr>
<tr>
<td><img src="image" alt="Page Up/Down" /></td>
<td>Page Up/Down</td>
<td>Enables you to scroll up and down through pages of multiple stored shots.</td>
</tr>
<tr>
<td><img src="image" alt="Options" /></td>
<td>Options</td>
<td>Displays the Options menu which enables you to: Enable cameras; turn X4 mode on/off; select CCU menus for compatible cameras and device configuration. Options are for the currently selected device and not visible if no camera is selected.</td>
</tr>
</tbody>
</table>
Toolbar Menu

Tap Menu to display the toolbar menu.

<table>
<thead>
<tr>
<th>Menu Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Show Management</td>
<td>Displays the Show Management functions, enabling you to create, load, list and delete shows - see Show management on page 20.</td>
</tr>
<tr>
<td>Configuration Management</td>
<td>Displays the Configuration Management screen, enabling you to configure the system, manage users and licenses - see Configuration Management on page 31.</td>
</tr>
<tr>
<td>User Preferences</td>
<td>Displays the User Preferences screen, enabling you to configure: editing grid display options, joystick settings, etc. See User Preferences on page 26.</td>
</tr>
<tr>
<td>Sort Cameras</td>
<td>Displays the Sort Cameras screen, where the order cameras appear on the Camera Selection and Status bar can be changed. See Sort Cameras on page 33.</td>
</tr>
<tr>
<td>About</td>
<td>Displays the About screen with software and license information. Licenses are also updated and applied here. See About Screen and License Management on page 34.</td>
</tr>
<tr>
<td>Exit</td>
<td>Exits the µVRC application.</td>
</tr>
<tr>
<td>Return</td>
<td>Closes the menu.</td>
</tr>
</tbody>
</table>

Edit menu

Tap Edit to display the Edit menu. This has options that let you rename shots, modify the fade time, delete shots, re-save a shot or swap shot positions on the grid. Tap Return to exit from the Edit menu. For more information – see Managing Shots on page 22.

Stop Button

The stop button is used to halt the movement of a camera during a fade or cut to a stored shot.

There are two stopping options selectable in the User Preferences screen:

- The standard stop option provides a ‘gentle’ synchronised stop which halts robotic camera movement in approximately two seconds - recommended for on-air use.
- The other stop option provides a ‘fast’ abrupt stop that is not synchronised and may produce a small amount of instability on the camera, and therefore should not be used on air. See - Camera Control on page 28.

After using Stop to halt a robotic transition, you can:

- Complete that move by selecting the shot again and tapping Fade or Cut.
- Make another move, by selecting the required shot and tapping Fade or Cut.
**Cut and Fade Buttons**

After a shot is selected on the touch-screen, the Cut and Fade buttons become available to move the camera from the current shot to the selected shot.

**Latching**

If latched Cut or Fade is selected (tap **Cut** or **Fade** before selecting a shot), the camera will automatically move to a new shot as soon as it is selected on the touch screen, with no need to tap the buttons.

**Store Button**

Tapping the Store button will save the current position of the selected camera as a shot in the current show for future use. You can select where the shot is stored in the stored shot grid.

---

A show must be created and opened to store shots. For more information see **Show management** on page 20.

**Focus Button**

When you are on shot (stored shot coloured dark blue), tapping the Focus button will zoom the lens all the way in tight. You can then:

1. Use pan and tilt, if necessary, to frame the person or object that you want to set focus on.
2. Adjust the focus.
3. Select one of the Focus Menu options described below.

<table>
<thead>
<tr>
<th>Focus Menu Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keep Camera</td>
<td>After the focus has been adjusted, tap <strong>Keep Camera</strong> to return the camera to the shot’s original pan, tilt and zoom settings and keep the adjusted focus setting. The shot stored in the show database is not updated, so the next time you recall the shot it will have the original focus, not the adjusted focus.</td>
</tr>
<tr>
<td>Keep Shot</td>
<td>After the focus has been adjusted, tap <strong>Keep Shot</strong> to return the camera to the shot’s original pan, tilt and zoom settings, keep the adjusted focus setting and store the adjusted focus in the show database. The next time you recall the shot it will have the adjusted focus.</td>
</tr>
<tr>
<td>Cancel</td>
<td>Tap <strong>Cancel</strong> to abandon the adjusted focus setting and return the camera to the shot’s original pan, tilt, zoom and focus settings.</td>
</tr>
<tr>
<td>Return</td>
<td>Tap <strong>Return</strong> to return to the workspace leaving the lens zoomed in tight and with pan, tilt and focus as you left them.</td>
</tr>
</tbody>
</table>
Virtual Joystick Button

The Virtual Joystick Window provides a convenient method of manually controlling robotic cameras from the touch screen when a control panel is not available. Tap *Virtual Stick* to open.

Dragging your finger across or along any of the controls on the touch screen will operate that control in a similar way to the control panel.

- The direction you drag your finger controls the direction of movement
- The distance you drag your finger controls the speed of movement
- Removing your finger from the touch screen stops the movement

Tap *Virtual Stick* again to close.

Options Menu

The Options Menu contains operation and configuration options for the currently selected camera, allowing you to:

- Enable robotic cameras
- Turn X4 mode on and off
- Enter the CCU control screens
- Enter the Device Configuration screen

X4

The default zoom mode (zoom proportional) ensures that the speed of the pan and tilt movements are proportional to the zoom angle of the camera lens. This means that pan and tilt move slowly when you are zoomed in and quickly when you are zoomed out.

If X4 mode is switched on (zoom proportional mode is off), the pan and tilt movements are more sensitive when zoomed in.

CCU

Tapping the CCU button opens up the camera functions and CCU control screens, where functions and settings on a compatible connected camera can be used and adjusted. For more information see - [CCU Interfaces](#) on page 38.

Device Configuration

Tapping the button opens the Device Configuration screen. Settings such as axis limits can be adjusted on the currently selected camera. For more information see - [Device Configuration](#) on page 35.

Tap *Return* in the Options menu to close the menu and return to the main screen.
Working with Shots and Shows

Shows are created by storing collections of camera position shots from one or more cameras. The term 'shows' is historic, and stems from camera control systems originally being used purely for the creation of TV shows. The term has been retained for consistence with existing users.

Show management

A show is a collection of stored shots from one or more cameras saved in a file. To store shots in the grid display, either a new show must be created or an existing show must be loaded.

Tap **Menu > Show Management** to display the show management buttons.

<table>
<thead>
<tr>
<th>Buttons</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Load</td>
<td>Load a show from the grid.</td>
</tr>
<tr>
<td>New</td>
<td>Create a new show.</td>
</tr>
<tr>
<td>Delete</td>
<td>Delete an existing show.</td>
</tr>
<tr>
<td>Import</td>
<td>Import a show from a file.</td>
</tr>
<tr>
<td>Export</td>
<td>Export a show to a file.</td>
</tr>
<tr>
<td>Unload</td>
<td>Remove a show from the shot grid.</td>
</tr>
<tr>
<td>Rename</td>
<td>Rename a show.</td>
</tr>
</tbody>
</table>

Only Admin users can permanently change shows – normal user’s changes only last until the show is reloaded, or the software restarted.

Loading a New Show

1. Tap to select the desired show from the grid.
2. Tap the **Load** button.
3. The workspace is displayed with the selected show.

Creating a new show

1. Tap the **New** button.
2. Use the touch-screen keyboard to enter a name for the new show.
3. Tap **Enter** to return to the workspace, which is now ready to store shots in this new show. The new show name is displayed in the title bar of the workspace.
Deleting a Show

There is NO undo option to recover a deleted show, unless it has been backed up.

1. Select the desired show for deletion from the grid.
2. Tap the Delete button.
3. Tap YES to delete the show or NO to return without deleting.

Importing a show
1. Tap the Import button.
2. Tap Yes to continue with the import.
3. Use the file browser to locate the desired show. Tap Open to complete the import.

Exporting a show
1. Tap to select the desired show from the grid to export.
2. Tap the Export button.
3. Use the file browser to place the show in the desired location. Tap Save to complete the export.

Unloading a show
1. Tap the Unload button.
2. The current show and its stored shots is removed from the grid.

Renaming a show
1. Tap the Rename button.
2. Use the touch screen keyboard to enter a new name for the show.
3. Tap Enter to return to the workspace. The new show name is displayed in the title bar of the workspace.

A show must be loaded to enable shots to be stored.
Adding Shots to a Show

Make sure that the required show is loaded.

1. Select the required camera on the touchscreen or the control panel.

2. Use the joystick and controls to move the camera into position for the shot, and then frame and focus the shot.

3. Tap Store on the touch screen and touch a position on the grid to store the shot.

4. Type a name for the shot into the Shot name* field and tap Enter. The shot will be saved with the default fade time** and its thumbnail displayed on the grid.

5. Repeat steps 2–5 for each required shot.

* A shot name cannot be entered if Require Shot Name is turned off in the User Preferences screen. A number will be assigned to the shot instead.

** A specific fade time for the shot can be entered if Require Shot Time is turned on in the User Preferences screen.

For more information, see Shot Options on page 28.

Managing Shots

The Edit menu provides options that let you:

- Rename or delete shots
- Modify the shot fade time
- Swap shot positions on the grid

From the workspace tap to select Edit to reveal the edit menu.

Only the latched delete, latched time and return buttons are available from the edit menu until you select a shot on the grid.
Latched Delete
Use the latched delete function when you want to delete multiple shots. The normal delete mode deletes a single shot and then returns you to the workspace. Latched delete keeps you in the edit menu after each deletion.

1. Tap **Latched Delete**.
2. Tap a shot and confirm the deletion.
3. Tap another shot and confirm the deletion.
4. Repeat until all of the desired shots have been deleted.
5. Tap **Latched Delete** again to exit this mode.

Latched Time
Use the latched time function when you want to modify the time of multiple shots. The normal time mode modifies a single shot and then returns you to the workspace. Latched time keeps you in the edit menu after each shot is modified.

1. Tap **Latched Time**.
2. Tap the required shot and modify its time using the touch-screen keypad.
3. Tap another shot and modify its time.
4. Repeat until all of the desired shots have been modified.
5. Tap **Latched Time** again to exit this mode.

Other Edit Options

<table>
<thead>
<tr>
<th>Edit Menu Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Tap on the shot in the grid you wish to edit the name of. Tap <strong>Name</strong> and type in the desired shot name and tap <strong>Enter</strong> to return to the workspace. The shot name can be a maximum of 16 characters long.</td>
</tr>
<tr>
<td>Time</td>
<td>Tap on the shot in the grid you wish to edit the time of. Tap <strong>Time</strong> and type in the desired shot time and tap <strong>Enter</strong> to return to the workspace.</td>
</tr>
<tr>
<td>Delete</td>
<td>To delete a single shot, tap the shot you want to delete from the grid display. Tap <strong>Delete</strong> and <strong>Yes</strong> to delete the shot and return to the workspace.</td>
</tr>
<tr>
<td>Swap</td>
<td>Allows you to rearrange the position of the shots in the grid by exchanging pairs of shots or exchanging a shot with an unused position. Tap the shot on the grid display that you want to move. Tap <strong>Swap</strong>. Tap a second shot or an unused location to swap the shots on the grid and return to the workspace.</td>
</tr>
<tr>
<td>Return</td>
<td>Tap <strong>Return</strong> to go back to the workspace.</td>
</tr>
</tbody>
</table>
Running a Show with the μVRC

Cueing, Trimming and Tracking Shots

While a typical show is being aired, the μVRC operator will be occupied with three primary tasks – cueing, trimming and tracking shots.

Cueing shots

Cueing is the process of positioning the camera framing before it is used on air. It is important that the μVRC operator stays ahead of the shows run-down by cueing shots as early as possible. As time permits, the operator can have two or three shots cued ahead of the run-down. The Cut, Fade and Stop function buttons on the touch screen (and control panel) are used to start and stop the movements of the robotic camera when cueing shots.

Shot Status Colour Codes

The current shot for each camera is shown on the touch screen in a Blue box. Dark Blue if the shot is exactly as stored or light Blue if the shot has been trimmed. The μVRC operator should familiarise themselves with all the colour codes associated with a shot. See - Shot Status Colour codes on page 15.

Adjusting Shot Fade Times

The stored fade time can always be modified on air (in real-time) using the time slider on the virtual joystick.

The maximum fade time is 120 seconds.

Latched Cut or Fade Function

The cut or fade function can be latched to speed up system operation. Latching immediately moves between the current and selected shots as soon as the new shot is selected. You do not need to explicitly touch cut or fade to start the transition.

The fade function is not available when latched cut is enabled.

The cut function is not available when latched fade is enabled.

1. Ensure that no shots are currently cued (no shot thumbnails have a green background).

2. Tap the desired function for latching (Cut or Fade) on the touch screen – the button turns red to denote latched mode.

3. Check that the operating area around the cameras is clear.

4. Select a shot on the touch screen. The thumbnail immediately turns red and the camera moves to the selected shot.

5. Select other shots as required. In each case the thumbnail immediately turns red and the camera moves to the selected shot.

6. Tap Cut or Fade again on the touch-screen to return to the normal control mode (Cut and Fade available).
Fading or Cutting multiple shots
The number of shots that can be selected at one time is controlled by the Single Selection mode in the User Preferences screen. See - Shot Preferences on page 29.

- If Single Selection mode is ON (button is blue), you can only select one shot on one camera at a time. If you select another shot, the previously selected shot is automatically deselected.
- If Single Selection mode is OFF, you can select a shot on more than one camera. When you then select fade or cut, all of the cameras will start moving at the same time.

Trimming shots
After a camera arrives “on shot” and before it is on air, the μVRC operator will want to take control at the joystick panel and check the framing and focus of the shot and trim the shot as needed. This lets the operator correct for things like the subject not being exactly in position.

The focus function, available from the touch-screen can be used for this purpose. See - Focus Button on page 18.

After trimming a shot the stored shot cell will turn light Blue. The operator can replace the existing shot with the trimmed shot by storing it (tap store and then touch the shot), ensuring the shot is correctly framed for the rest of the current show. The stored shot cell will then turn dark blue.

Real Time Tracking
You can use the joystick panel to follow live movement.

Select the required camera at the control panel and track the shot as needed.
The μVRC can be set up and configured to suit the preferences of the user. Parameters relating to the user interface and control of attached cameras can be easily adjusted.

User Preferences

The user preferences screen provides many options for changing parameters and preferences relating to the user interface, camera controls and shot management.

To access the screen, tap **Menu > User Preferences**.

Buttons with a blue background indicate that a toggled parameter or mode is ON. After making the required changes on this screen tap **Return** to go back to the workspace. The screen is divided into configuration groups:

- Grid Display Options
- Panel Options
- Shot Options
- Camera Control
- Shot Preferences
- Group Display Preferences
- CCU Recall Preferences

**Grid Display Options**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grid Size</td>
<td>Tap to change the size of the shot storage grid. Tap <strong>OK</strong> to confirm any changes. The minimum grid size is 2 x 3 per page. The maximum grid size is 10 x 12 per page.</td>
</tr>
<tr>
<td>Display Headers</td>
<td>Turns the column and row headers (ABC/123) on or off. The headers are particularly useful when a show extends over multiple pages.</td>
</tr>
<tr>
<td>Per Camera Display</td>
<td>When this option is enabled and a camera is selected, the editing grid will only show thumbnails for shots stored for that camera. All other shots in the grid will be shown as grey boxes.</td>
</tr>
</tbody>
</table>
Panel Options

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Full Panel</td>
<td>Expands the size of the Camera Selection and Status panel.</td>
</tr>
<tr>
<td>Stick Preferences</td>
<td>Enters the Stick Preferences screen, where you can change the parameters of the camera controls.</td>
</tr>
</tbody>
</table>

Stick Preferences

The stick preference screen gives you the option to change the behaviour of the main camera axis controls. Each axis can be adjusted as follows:

- **Normal/Reverse**: These parameters select the behaviour of each axis control to suit your preferences. For example, pushing the joystick away from you can cause the head/camera to tilt up or down. Tap to select Normal (button is blue) or Reverse (button is black).
- **Compound/Linear/Exponential**: This adapts the profile of each axis control to suit your preferences. Compound (a combination of linear for small movements and compound for larger movements) is the most common choice.
- **Gain/Deadband**: The Gain is used to set the velocity of the movement of the robotic camera or lens, with the gain setting of 100 being the fastest speed of movement. The Deadband setting is used to adjust the amount of play that is felt in the joystick before the camera or lens starts to move. Before changing the Gain or Deadband settings for the joysticks, you should select the desired profile (Compound, Linear or Exponential). Use the up/down arrows to adjust the gain and deadband settings.

Separate profile, gain and deadband adjustments for the tilt joystick are not provided, because the pan and tilt settings are synchronised. Any change to the pan gain or deadband will be replicated in the tilt joystick.

| Defaults | Restores the factory default settings for all the stick preferences. |
| Save     | Stores the current settings of stick preferences in the profile of the currently logged in user. |
| Cancel   | Returns to the User Preferences screen without making any changes. |

ALWAYS turn off X4 on the control panel before adjusting the zoom profile.
### Shot Options

<table>
<thead>
<tr>
<th>Options</th>
<th>ON (Blue)</th>
<th>OFF (Black)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display Shot Name</td>
<td>The name of each shot is superimposed in the stored shot cells.</td>
<td>The shot name is not displayed.</td>
</tr>
<tr>
<td>Require Shot Name</td>
<td>You will be prompted to type in a name when you store a new shot. This is the most common mode of operation.</td>
<td>The system will automatically assign a number to each saved shot. This can save time but the shot names are no longer descriptive.</td>
</tr>
<tr>
<td>Display Shot Time</td>
<td>The time of each shot is superimposed in the stored shot cells.</td>
<td>The time is not displayed.</td>
</tr>
<tr>
<td>Require Shot Time</td>
<td>You will be prompted to enter a time when you store a shot.</td>
<td>The default shot time is used for each stored shot. This is the most common mode of operation because it is faster than entering times each time you store a new shot.</td>
</tr>
</tbody>
</table>

### Camera Control

<table>
<thead>
<tr>
<th>Options</th>
<th>ON (Blue)</th>
<th>OFF (Black)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deselect</td>
<td>A camera that has been selected can be deselected by tapping it on the screen.</td>
<td>A camera can only be deselected by selecting a different camera.</td>
</tr>
<tr>
<td>Always Take Rudely</td>
<td>Selecting a camera at one controller immediately takes control away from a second controller that may have been using the camera.</td>
<td>A message appears requesting you to confirm that you want to take control of the camera from the other controller.</td>
</tr>
<tr>
<td>Always Stop Fast</td>
<td>For a robotic camera that is in motion during a cut or fade, selecting STOP on the touch-screen or on the control panel will immediately stop movement. This abrupt change of motion is not desirable for a camera that is on air, but does ensure an immediate stop to avoid a collision.</td>
<td>For a robotic camera that is in motion during a cut or fade, selecting STOP on the touch-screen or on the control panel will cause the camera to decelerate and coast to a stop. This smooth change of motion is desirable if the camera is on air.</td>
</tr>
</tbody>
</table>
### Shot Preferences

<table>
<thead>
<tr>
<th>Options</th>
<th>ON (Blue)</th>
<th>OFF (Black)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Take Camera</strong></td>
<td>When you select a shot on the touch-screen, the camera preview selection on the joystick control panel automatically follows and the joysticks will control the camera for the selected shot.</td>
<td>The shot selection on the touch-screen and the camera preview selection are decoupled. So, let's say that one camera1 is on air and being trimmed with the joysticks. You can select the next shot on camera3 and fade or cut to it while continuing to trim camera1 with the joysticks.</td>
</tr>
<tr>
<td><strong>Single Selection</strong></td>
<td>Allows you to select a shot on one camera at a time and then cut or fade to that shot. Selecting a second shot on a different camera automatically deselects the first shot.</td>
<td>Allows you to select shots on multiple cameras and then cut or fade to all of the shots at the same time.</td>
</tr>
<tr>
<td><strong>Delete Warning</strong></td>
<td>Every time you delete or replace a shot a warning message appears and requires you to confirm the deletion or replacement.</td>
<td>Shots will be deleted or replaced immediately. This mode should be used with caution, because there is no undo feature to restore a deleted shot.</td>
</tr>
<tr>
<td><strong>Default Time</strong></td>
<td>Allows you to enter a default time that will be used when you store shots (if the Require Shot Time function is off).</td>
<td></td>
</tr>
<tr>
<td><strong>Allow Deselect</strong></td>
<td>When you select a shot on the touch-screen, you can deselect that shot by tapping it a second time.</td>
<td>When you select a shot on the touch-screen, you can only deselect that shot by selecting a different shot on the same camera. Touching a selected shot a second time has no effect.</td>
</tr>
<tr>
<td>Options</td>
<td>ON (Blue)</td>
<td>OFF (Black)</td>
</tr>
<tr>
<td>----------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Show Main Panel Groups</td>
<td>Displays the Primary Panel Groups bar showing the camera mapping groups. The height of each row of stored shot cells in the editing pane is reduced slightly.</td>
<td>The Primary Panel Groups bar is not displayed and cameras are assigned to their default buttons.</td>
</tr>
<tr>
<td>Show Preview Panel Groups</td>
<td>Displays the Preview Panel Groups bar showing the camera mapping groups, below the Primary Panel Groups bar. The height of each row of stored shot cells in the editing pane is reduced slightly.</td>
<td>The Preview Panel Groups bar is not displayed.</td>
</tr>
<tr>
<td>Dock On Top</td>
<td>Displays the Primary Panel Groups and Preview Panel Groups bars, if enabled, above the Stored Shot Editing grid.</td>
<td>Displays the Primary and Preview Panel Groups bars between the Stored Shot Editing grid and the Camera Selection and Status bar.</td>
</tr>
</tbody>
</table>

**CCU Recall Preferences**

<table>
<thead>
<tr>
<th>Options</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iris</td>
<td>Tap Iris to recall only the Iris setting with the shot. Iris recall can be selected with or without Master Black recall. If All is selected, the setting of Iris is ignored.</td>
</tr>
<tr>
<td>Master Black</td>
<td>Tap Master Black to recall only the Master Black setting with the shot. Master Black recall can be selected with or without Iris Recall. If All is selected, the setting of Master Black is ignored.</td>
</tr>
<tr>
<td>All</td>
<td>Tap All to recall all stored camera functions and CCU parameters with the shot. This will override the Iris and Master Black selections.</td>
</tr>
</tbody>
</table>
Configuration Management

The Configuration Management Screen provides an interface for:

• Adding and changing camera components
• User Management

For more information on adding and changing camera components, see Setting up a Basic μVRC System on page 10.

To access the screen, tap Menu > Configuration Management.

User Management

In the System field, tap the Users button. The User Management window opens. By default, the user Admin has been created as a Superuser. A Superuser has the right to add and delete other users.

At least one Superuser must be present on the system to allow access to User Management. The last remaining Superuser cannot be removed.

Adding a User

1. Tap the Add button. A new user named Unknown appears in the list.
2. Name the user in the User field.
3. Provide a password in the Password field (leave blank for no password).
4. Select the Role of the user (Operator or Superuser).
5. Tap the Update button.

Deleting a User

To delete a user, select the user from the list and tap the Delete button (6).

When all the required changes have been made, tap the Return button to exit the User Management window.
Switcher Configuration

If a video switcher is connected into the μVRC system, it can be setup in the Switcher Configuration window.

In the System field, tap the Switchers button. The Switcher Configuration window opens.

1. Select the protocol* of the switcher from the Protocol drop down list.
2. Select the transport type* of the switcher from the Transport drop down list.
3. Change the number offset* for the switcher by using the arrows in the Output field. This is the video output number the preview monitor is connected to on the switcher.
4. Change the switcher number level* using the arrows in the Level field.

* Refer to the documentation supplied with the video switcher.

Configurable Switcher Settings

If the Configurable option is selected from the Protocol drop-down menu, settings can be applied for a specific switcher configuration.

Source offset: This is the input on the switcher that the first camera is connected to. Subsequent cameras must be connected contiguously (some switchers number from 0 and others from 1).

The example shown is for a Blackmagic video hub.

For further help and advice for configurable switcher settings, please contact Vinten.
Sort Cameras

If a multiple number of cameras are present on the μVRC system, the order they appear on the Camera Selection and Status bar can be changed. This is useful to identify and select frequently used cameras quickly during operation.

1. To access the screen, tap **Menu > Sort Cameras**.

2. Tap and drag a camera to a new location (example shows camera named PTZ4 being moved to the first position).

3. Continue to reposition cameras in the list as desired. When complete, tap the **Apply** button to save the changes.

When camera positions are changed, the physical connections on the switcher must also be changed to match the new order.
About Screen and License Management

The About screen displays software and license information. The License management window is also accessed from the screen.

To access the screen, tap **Menu > About**. The current software version and licenses are displayed.

Tap **Return** to exit.

License Management

If additional features and functions are purchased to upgrade the μVRC, a license key is issued. This license key must be applied to activate the new features. When you buy a software license, you will be issued with a license serial number. To obtain your license key, you must go to the Vinten website and use the online license request form. You will need:

- The system ID
- Your name (individual or organisation)
- The license serial number

In the About screen, tap the **Update License** button. The License Management window opens.

1. The System ID is a unique code for your installation of the μVRC. The System ID must be quoted when purchasing additional licenses.

There are two ways to apply a license key:

2. Copy and paste the new license key into the **Key** field. Tap the **Apply** button to activate the new license.

3. If you have a license file, tap the **Padlock** icon. When the Windows browser opens, navigate to the appropriate license file (*.lic file) and tap **Open**. Tap the **Apply** button to activate the new license.
Device Configuration

**WARNING!** Changes to the configuration settings of robotic products can cause a risk of personal injury or product damage. Ensure the motion of the product is monitored when changes to settings are being carried out.

Connected robotic cameras, such as Vantage heads, can be configured to adjust settings for the range and characteristics of movement.

1. Select the appropriate camera head.

2. Tap **Opts > Device Configuration**.

3. The Device Configuration screens open, with two tabs available for selection - Axis Gains and Axis Limits.

### Changing the Camera Axis Gain Settings

Robotic cameras can be configured to adjust the axis gain settings, changing the motion response of the head to joystick control. Each axis can also be inverted to reverse joystick control. Axis gain settings can be easily set, changed or cleared.

1. Adjust the gain settings for Pan or Tilt tapping the up/down arrows.

2. Tapping the **Default** button for Pan or Tilt restores factory defaults for gain settings.

3. Tapping the **Invert** button for Pan or Tilt reverses the movement direction of the axis when controlled by the joystick.

*The Invert setting is for when the robotic device is ceiling mounted, or the cradle is inverted. Using the invert setting ensures that joystick control (camera movement) is in consistent for all devices.*

### Changing the Camera Axis Limits

Robotic cameras can be configured to limit the range of movement in axes of motion. This is useful to prevent collision with a wall or ceiling, or the tilt axis colliding with the head itself. Axis limits can be easily set, changed or cleared.

Each axis displayed in a separate panel (example shown is the pan axis).
Resetting the Axis Centre Point
The centre points of the camera control axes can be set at any position required.

1. Drive the camera to the desired position on the axis.
2. Tap the Zero button in the appropriate axis panel.
3. The current position marker (blue triangle) returns to the centre point and is reset to 0.00°.

Setting Axis Limit Points
The range of the camera control axes can be restricted by setting limit points. The procedure described below is identical for all axes and positive and negative limits.

1. Drive the camera to the desired limit position on the axis.
2. Tap the Set button for the appropriate axis limit end (positive or negative).
3. The axis end limit marker (red rectangle) moves to the new limit point and the limit position value is displayed in degrees.
Clearing Axis Limit Points
Camera control axes limit points can be easily cleared and changed at any time. The procedure described below is identical for all axes and positive and negative limits.

1. Tap the Clear button for the appropriate axis limit point (positive or negative) to remove the current limit point position.

2. A new limit can be applied by driving to a new position and tapping Set.
CCU Interfaces

The instructions in this chapter must be used in conjunction with the documentation supplied with your camera.

CCU (Camera Control Unit), is a TV studio term where a separate, external box was often used to control camera functions, such as colour matching. It is now used generically to describe adjusting camera options.

If cameras installed in the μVRC system have a compatible remote control interface, you can control camera functions from the user interface. All of the CCU parameters are saved with each shot. When a shot is recalled, the CCU parameters can be recalled if required.

Displaying the CCU Control Screen

To display the functions and CCU control screens for a camera:

1. Tap **Opts > CCU** to display the Functions and CCU control screens for the selected camera.

Each camera has a tabbed menu screen for camera functions and CCU controls. Buttons with a green background are functions that are ON. Buttons with a black background on the screen are OFF.

2. Tap **Return** to close the CCU screen and return to the workspace.

CCU parameters changed using the camera’s menu system (either on the camera, or using the μVRC remote menu control) are NOT stored with shots. Only parameters that are directly modified from the μVRC CCU control buttons are stored.

If the CCU button is red, or turns red at any time, communication with the camera has been lost.

Typical Camera Functions and CCU Controls

The camera functions and CCU controls available vary widely depending on the manufacturer and model of the connected camera and the protocol used. To demonstrate how the interface works, a typical camera has been chosen to provide an example. For a full list of functions and controls for each camera protocol, see **CCU Database** on page 41.

Camera Functions Tab

The first tab on the CCU screen displays the camera functions for the connected camera. Buttons with a green background indicate that a function is selected or ON. Buttons with a grey background indicated that a function is not available.
Many function buttons are a simple ON/OFF toggle such as Auto Focus or Color Bars. Functions being controlled or changed are seen on the camera’s built in screen or video output.

Other function buttons open a sub menu, providing multiple selection settings such as WB Mode.

Tap a setting button to make a change and return to the main screen.

On many cameras, it is possible to access and control the built-in menu system. Changes can be made and stored remotely.

It is important that the user can see the on-screen display of the camera via a video monitor screen when navigating camera menus and making changes.

Tap the **Menu** button. Use the navigation buttons (right hand side of the screen) to scroll through the menus. Tap the **Confirm** button to enter a sub-menu or save a change. Use the **Cancel** button to discard a change.

Tap the **Menu** button again to exit the camera’s menu system.
CCU Controls Tab
The second tab on the CCU screen displays the CCU control functions for the connected camera.

Tap the **Up/Down** arrows to adjust individual settings as required. Red arrows indicate that the setting is available for adjustment. Observe changes on the camera’s on-screen display or video output. Some functions have an indicator bar and display the setting value for precise adjustments.

Grey Up/Down arrows indicate a setting cannot currently be adjusted. This could be because the function is currently set to “auto”. Most functions can be changed to “manual” control in the Camera Functions Tab.

Many camera models have physical switches that prevent manual remote control. Refer to the documentation supplied with your camera for more information.
CCU Database

The tables in this section list cameras/camera protocols compatible with the μVRC system. The camera functions and CCU controls available vary between the various camera models and protocols. The specific features are listed for each camera.

Although these features vary between cameras, they are operated in the same way as demonstrated in the section Typical Camera Functions and CCU Controls on page 38.

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<th>Features</th>
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<td>Green Gain</td>
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<tr>
<td>Nd Filter</td>
<td>Blue Gain</td>
</tr>
<tr>
<td>Cc Filter</td>
<td>Red Pedestal</td>
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<tr>
<td>Black Stretch</td>
<td>Green Pedestal</td>
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<tr>
<td>Auto White Balance</td>
<td>Blue Pedestal</td>
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<td>Bars</td>
<td>Master Black</td>
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<tr>
<td>Red Gain</td>
<td>Iris Level</td>
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<table>
<thead>
<tr>
<th>Sony BRC</th>
<th>Features</th>
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</thead>
<tbody>
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<td>Auto Focus</td>
<td>Menu (Menu off)</td>
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<tr>
<td>Auto White Balance</td>
<td>Blue Gain</td>
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<tr>
<td>AWC Mode</td>
<td>Red Gain</td>
</tr>
<tr>
<td>Color Bars</td>
<td>Iris</td>
</tr>
<tr>
<td>Exposure Mode</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sony Lanc</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto Focus</td>
<td>Menu</td>
</tr>
<tr>
<td>Auto Iris</td>
<td>Iris</td>
</tr>
<tr>
<td>Hitachi Broadcast Cameras</td>
<td>Features</td>
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<tr>
<td></td>
<td>Color Bars</td>
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<td></td>
<td>Iris Closed</td>
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<td>AWB</td>
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<td></td>
<td>ABB</td>
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<td>Red Gain</td>
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<td>Red Ped</td>
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<tr>
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<td></td>
</tr>
<tr>
<td>Panasonic PTZ</td>
<td>Features</td>
</tr>
<tr>
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Technical Specifications

μVRC PC Controller

**Physical Data**
- **Height**: 369 mm (14.5 in.)
- **Length**: 539 mm (21.2 in.)
- **Width**: 83 mm (3.3 in.)

**Electrical Data**
- **Power Supply**: 19V 135W AC Power Adapter

**VESA Mount**
- **Mounting Hole Spacings**: 100 x 100 mm (3.9 x 3.9 in.)

**Touch-screen Display Panel**
- **Specification**: 21.5inch TFT-LCD, LED Backlight, 16:9, 1920 x 1080 (FHD)
- **Illumination**: 250nits, Viewing Angle: 170° (Horizontal), 160° (Vertical)

**Joystick Panel**

**Physical Data**
- **Height**: 111 mm (4.4 in.)
- **Length**: 279 mm (11 in.)
- **Width**: 228 mm (9 in.)

**Electrical Data**
- **Power**: Via USB interface (5V DC) consumption 1A
- **USB Interface**: Type A male cable length: 2m (6ft. 6.8in.)

Technical specifications are subject to change without notice.