



VOXON

VX1 QUICK START GUIDE.

- P.1** – Introduction
- P.2** – Package Contents
 - Hardware Setup
- P.3** – Introducing Vertex
 - Introducing VoxieOS
- P.4** – VoxieMenu Settings
 - VoxieOS Settings
- P.5** – Media and Software Creation
 - Keystone Calibration
- P.6** – VX1 Diagram
- P.7** – Troubleshooting Guide
- P.8** – Frequently Asked Questions



Welcome to the dawn of volumetric computing. The VX1 is a display like no other. A device capable of displaying 3D images inside an 18 x 18 x 8 cm volume where objects, animations, games, or complex data are instantly brought to life. A true 3D image viewable from any angle by any number of people.

Our technology is based on a 'trio of hardware': a **computer**, **projector**, and a **reciprocating screen**. These technologies synchronise to create a 3D volume.

After reading this guide, you should be familiar with the following:

- Setting up your VX1.
- Browsing and launching volumetric applications using *Vertex*.
- Using volumetric applications and supported 3D media types.
- Adjusting the volumetric image.
- Accessing the Developers Kit.
- Troubleshooting and frequently asked questions.

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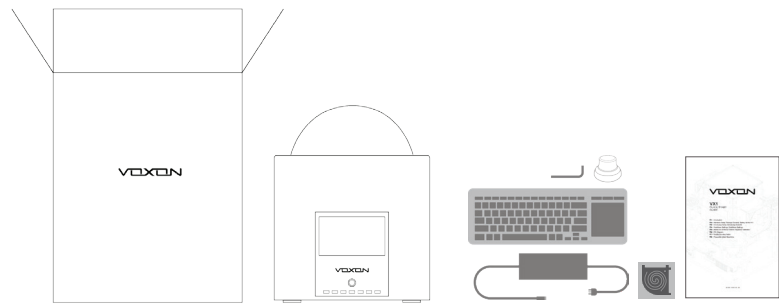


contact@voxon.co

Package Contents

Check that your VX1 comes shipped with the following items:

- 1x Voxon VX1 Volumetric Display Unit
- 1x Power supply (Some will have 2)
- 1x All-in-One Keyboard
- 1x 3Dconnexion *SpaceMouse Compact*
- 1x Replacement Spring Set
- 1x Printed Quick Start Guide (this document)



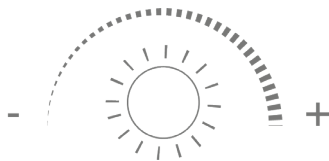
Hardware Setup

The volumetric display will achieve its best performance when:

- ✓ It is operated in low lighting conditions, especially away from natural light.
- ✓ There are no reflections on the dome from overhead lights.
- ✓ The VX1 is placed on a solid, level surface.

1 Locate a suitable environment capable of low ambient light

- Switchable or dimmable lighting is best
- Avoid sunlight and overhead lighting



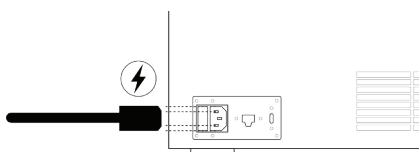
2 Place the VX1 on a solid surface

- Avoid unwanted vibrations
- Place on a level, hard surface



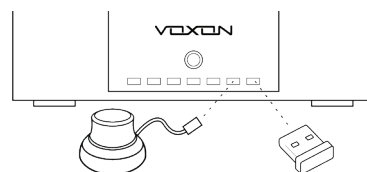
3 Connect Power Cable

- Connect power cable



4 Plug in peripherals

- Connect Keyboard and *SpaceMouse Compact*



5 Power On Device

- Turn on the enable switch at the rear of the device
- Press the front power button



6 Launch our Voxon Introduction App

- Wait for Vertex to load
- Tap the 'Launch' button to begin your volumetric journey





Introducing Vertex

Vertex is a graphical user interface for the VX1. It launches volumetric programs, downloads new content and manages volumetric settings. When the VX1 is powered on, *Vertex* will run automatically.

Vertex's user interface is divided into four main panels:

RECENT	LIBRARY	STORE	SETTINGS
Displays the five most recently launched applications.	Browse the installed applications and media packs on your system.	Explore and download applications and media packs from the online store.	Adjust volumetric settings for the display and <i>Vertex</i> .

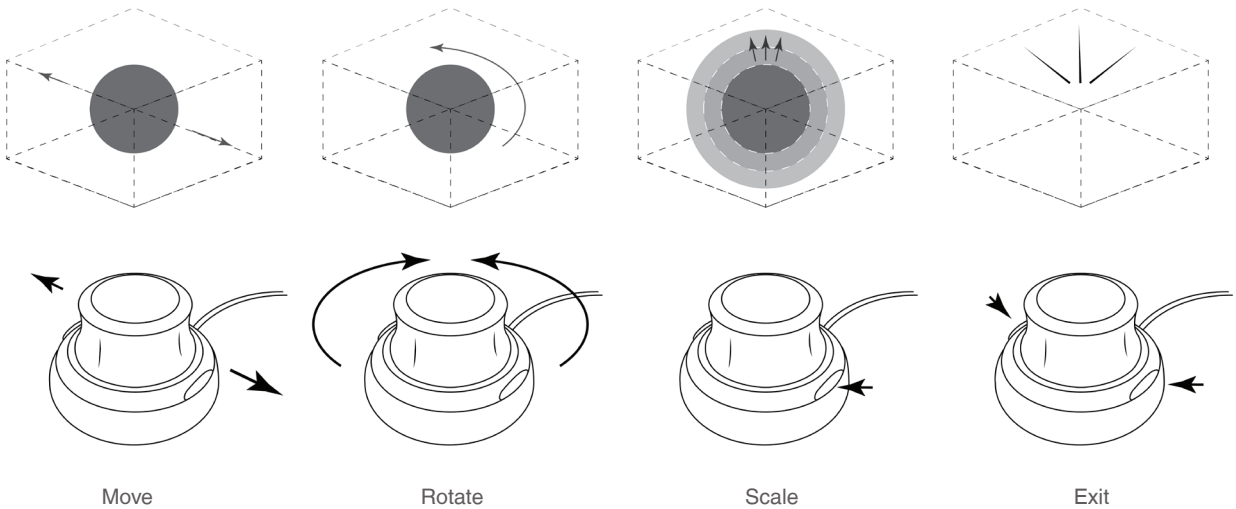
Vertex's user guide can be found on our website, www.voxon.co



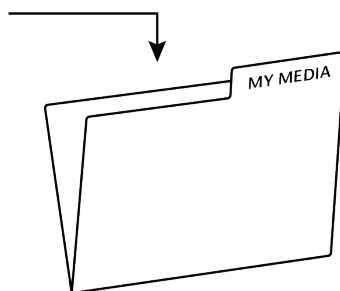
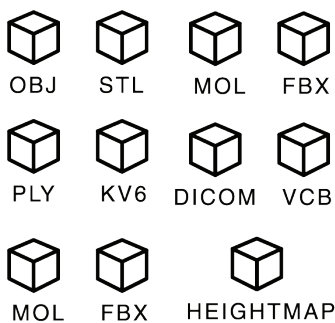
Introducing VoxieOS

VoxieOS is a volumetric file browser for viewing 3D media. Numerous 3D data types are supported including **.OBJ**, **.STL**, **.PLY**, **.KV6**, **.MOL**, **.FBX**, **DICOM**, **heightmap**, as well as animations and volumetric videos (**.VCB**). Sample packs are included with the VX1 to demonstrate the types of media that can be viewed.

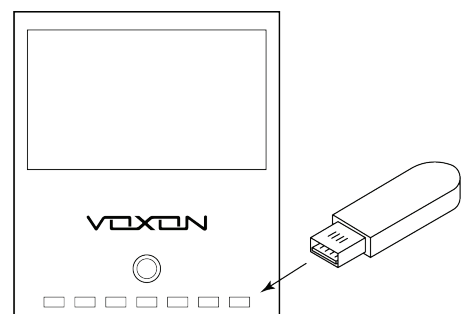
When viewing 3D content use the *SpaceMouse* to move, scale and rotate.



Place your own media files in the 'C:\Voxon\Media\MyMedia' folder.



If you insert a USB drive while *VoxieOS* is running, it will automatically navigate to that drive.



Voxiemenu Settings

While a Voxon application is running, tapping the touchscreen (or pressing the '\ key) will open the *VoxieMenu* interface providing access to system and application settings. Note : The *VoxieMenu's* rightmost tab(s) are application specific.

Here are a few noteworthy settings:

File

Load Settings: Loads the last saved user settings

Save Settings: Saves the current user settings.

Shutdown: Exits the current Voxon application.

Render

Mono Color: Changes between the seven monochrome modes (highest vertical resolution).

Two Color: Interlaces two colours for multicolour effect (medium vertical resolution).

Full Colour: Interlaces three colours (RGB) for 'full-colour effect' (lowest vertical resolution).

Dot Size: Adjusts the size of the voxels (volumetric pixel).

Motor

Height: Adjusts the height of the volume. Factory default is 75 (about ~6 cm height with enclosure on).

Aspect

Aspect X,Y, Z: Adjust the aspect ratio of the volume along X, Y or Z dimensions.

Misc.

Touch Controls: Toggles a touchscreen version of a keyboard.

Normal Global Shading: Creates a 'shadow' effect based on the vertex normals from the 3D model based on user defined light source.

For a full description of all *VoxieMenu* settings please visit this link.



VoxieOS Settings

When using *VoxieOS* to view a model, extra settings become available in the *VoxieMenu*.

Saving Pos & Ori

Saves the current render settings and model's transform (position, rotation and scale).

Load Pos & Ori

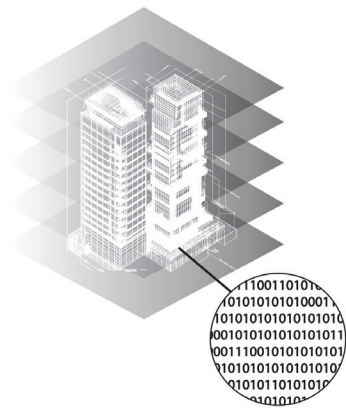
Loads the previously saved render settings and model's transform (position, rotation and scale).

Draw Wireframe

Toggles between drawing the model in wireframe or shaded modes.

Rotate Axis

Automatically rotates the model by the selected speed and axis.



Media and Software Creation

The Developers Kit is a collection of software, examples, and guides for users to create their own 3D media and software. The included software API allows new Voxon applications to be developed.

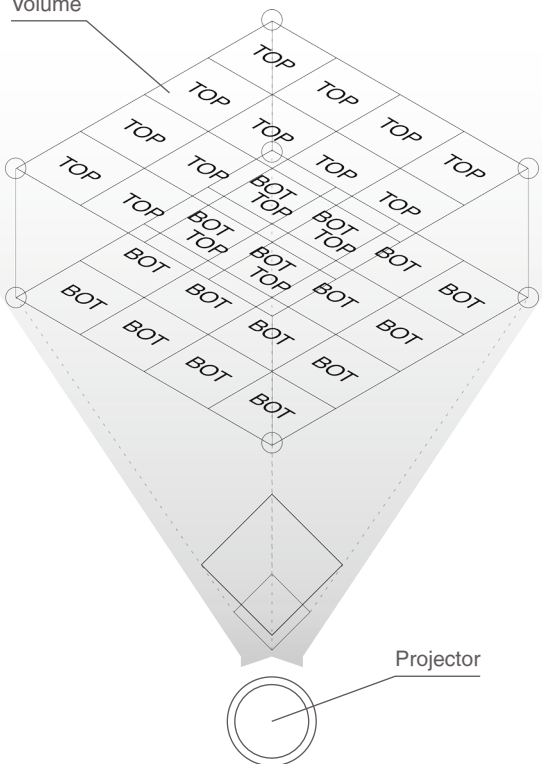
The Voxon Runtime and main API are written in C/C++. Other programming languages such as C# and Python, or frameworks such as *Unity* and *Blender* are accessible through plugins.

The Developers Kit includes a software simulator which allows you to test Voxon applications. This can be used for off-hardware visualisation, software development or as a convenient portable demonstration.

The Developers Kit is available from our website <https://voxon.co/developersKit>



VX1
Screen
Volume



Keystone Calibration

The VX1 achieves its 3D imagery by projecting a stack of 2D images onto a reciprocating screen. Warping of the image occurs as the screen physically moves further away from the projected image. This problem is solved via a keystone calibration setting which scales the images within the volume appropriately.

The keystone can be adjusted by selecting 'Keystone Calibration' located under the 'Aspect' page in Vertex's settings panel.

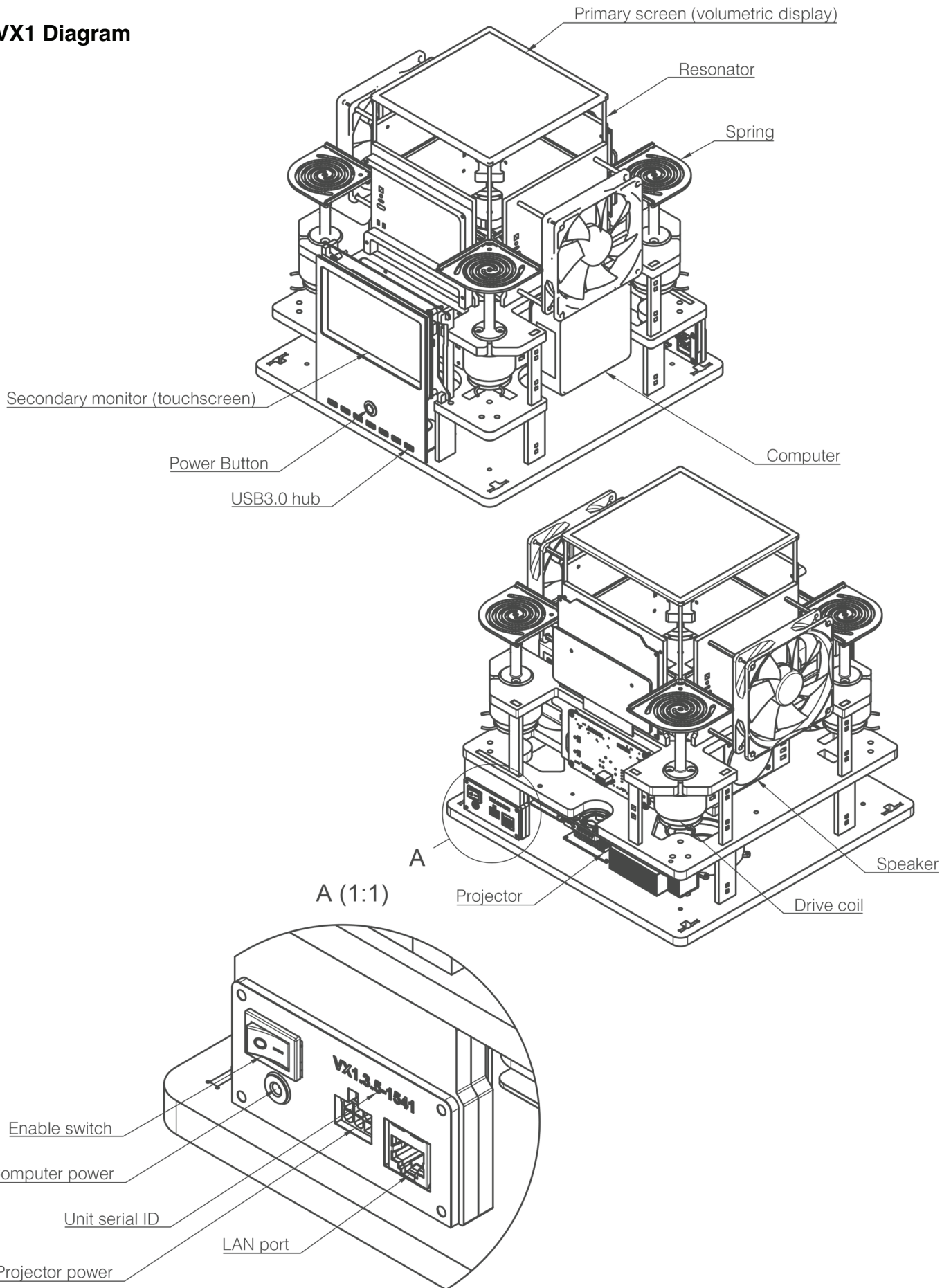
To use the *Keystone Calibration* application, move the cursor around and click and drag each corner of the virtual keystone until aligned with the physical volumetric display. Ensure all corners and edges are visible within the volumetric display.

Once completed, save the keystone by going to 'Save settings' in the 'File' tab on the *VoxieMenu*.

A video demonstration can be accessed here.



VX1 Diagram



Troubleshooting

Scenario	Potential Cause	Solution
<p><i>Vertex</i> not loading or has been removed.</p> <p>Error message “can’t load voxiebox.dll” when a Voxon application is launched.</p>	<p>Software Issue : <i>Vertex</i> or Voxon Runtime have been removed or become corrupt.</p>	<p>Uninstall <i>Vertex</i> (From <i>Windows</i>’ ‘add or remove programs’ feature)</p> <p>Reinstall <i>Vertex</i> by going to our website and downloading the ‘Voxon Installer’. Running this will install <i>Vertex</i> and the Voxon Runtime on your device.</p> <p>If still not working try removing the ‘user_settings.json’ file found in %appdata%/vertex directory and running <i>Vertex</i> again.</p>
<p>Volumetric screen is blank.</p>	<p>Settings Issue : The keystone has been corrupted, missing or incorrect values.</p> <p>Hardware Issue : Projector hardware issue or IR sensor error.</p>	<p>Run the <i>Keystone Calibration</i> app and choose the ‘reset to safe values’ button. Hit this button multiple times to cycle through safe defaults.</p> <p>If the image is reversed or off frame. Try pressing the mirror buttons in the <i>VoxieMenu</i>.</p> <p>Try changing rendering color modes.</p> <p>Try restarting the device.</p> <p>If the problem persists contact Voxon support.</p>
<p>The reciprocating screen is not moving evenly and is operating louder than usual.</p> <p>The screen stops moving after a short period.</p>	<p>Hardware Issue : Broken spring. Damaged coil drive.</p>	<p>Replace the set of springs. A spring replacement guide and video is available on our website.</p> <p>A replacement springs set is included with your VX1. New springs can be obtained by contacting Voxon.</p>
<p>When launching Voxon application the error message is shown: “Warning: hidusb_init() fail. hidusb couldn’t find HID device want 1 projectors(s)...”</p>	<p>Hardware Issue : Loose cable. The USB connection from the computer to the projector is not found.</p> <p>The computer or projector’s USB port could be damaged.</p> <p>The projector might not be operating.</p>	<p>This fix requires the VX1’s enclosure to be opened and the hardware to be inspected.</p> <p>Contact Voxon for support.</p>
<p>When launching Voxon application the error message is shown: “ERROR: Projector mismatch. LED brightness settings disabled! HDMI-EDID...”</p>	<p>Hardware Issue : Loose cable. The HDMI connection from the projector to the computer has failed.</p> <p>The computer’s HDMI port has failed.</p> <p>The projector is not operating.</p>	<p>This fix requires the VX1’s enclosure to be opened and the hardware to be inspected.</p> <p>Contact Voxon for support.</p>

More trouble shooting scenarios can be found on our website. <https://www.voxon.co/vxsupport>



Frequently Asked Questions

How does a VX1 volumetric display work?

The VX1 is a swept surface volumetric display. It achieves its visualisation through a mixture of engineering and persistence of vision. As the reciprocating surface sweeps through the volume, it positions each slice in its own space and time. The VX1's 3D volume consists of 192 2D slices stacked on top of each other. The human eye blends these slices together resulting in a physical 3D image viewable from any perspective.

Can the dome be removed?

Yes, **but at your own risk**. Removing the protective dome exposes the VX1 to potential damage and touching the reciprocating screen could cause personal injury. **Voxon does not recommend users to remove the protective dome.**

How can I video the VX1?

The VX1 has a minimum refresh rate of 15 volumes per second (the volumetric equivalent of 15 frames per second). This frequency does not sync with standard filming practices and results in the 3D image being half-formed or 'flickery'. To capture the VX1 as a solid image, the recording's frame rate needs to be set to 15 fps. Not all cameras can shoot at this speed (*The Panasonic Lumix GH5* is a professional camera that can achieve this). *Filmic Pro* is a phone app that can film at 15 fps and is available on both *iPhone* and *Android*.

To achieve the best results, we recommend the following:

- Having some ambient light in the room
- Experiment with angles
- Having some objects which are recognisable in the background or foreground helps with scale and context.
- People in the shot using the technology add excitement to the image.

A video example can be found here.



Why does the device flicker?

While the VX1 operates at 30 hz, due to the cyclic nature of the screen, data located at the outer limits of the volume is closer to 15 hz which is below the flicker threshold of the human eye. To minimise flicker in your own media, try to use the centre of the volume where the refresh rate is closest to 30 hz. Experiment with the 'Dim Caps' setting under the 'Render' tab on the *VoxieMenu* to darken the edges of the display.

How can I get the brightest image?

The VX1 uses a projector to display its volume. Projectors are sensitive to external sources of light. To get the brightest image, render in monochrome white, experiment with the 'Dot Size' settings, operate the VX1 in low ambient light environments and avoid overhead lights.

Can the VX1 run through a network?

Yes. *VoxieNetwork* is a Voxon application that can link two VX1s together (in either hardware or simulated instances). The second instance will mimic the first 'host' device. We also have our own UDP based protocol *BigPak* for sending volumetric commands through a network. *BigPak* which can be found within our Developers Kit.

More Frequently Asked Questions can be found on our website.

