



ARFX Launcher User Manual for HTC Vive Tracking
Hardware
Version 1

October 2022

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Section 1: Introduction

ARwall creates augmented reality technology that captures live, in-camera VFX composites. Geared toward film productions, **ARwall** provides a viable alternative to the green screen process and continually works to advance virtual production technologies for all creators.

This product guide details the **ARwall ARFX Launcher** product and describes how to use it.

For more information on **ARwall**, visit: <https://arwall.co>

To contact **ARwall**, send an email to: support@arwall.co

Section 2: General Computer Set Up

This section describes how to set up your computer for use with the **ARwall ARFX Launcher**.

Section 2.1 Computer and Hardware Requirements

Before you get started, ensure that you have the hardware components listed in Table 1 below for the most optimal performance for the **ARFX Launcher**.

Table 1: Main Components and Accessories

| Main Component | Accessories |
|---|--|
| Windows PC machine with recommended Nvidia GeForce RTX 2080 graphics card or better (minimum GTX 1080) | <ul style="list-style-type: none">• 1 x Keyboard• 1 x Mouse• Optional: 1 x USB Hub• Optional: 1 x Xbox Controller and USB Dongle |
| HTC Vive Tracking Hardware (<i>see section 3, Motion Tracking Hardware for further information</i>) | <ul style="list-style-type: none">• Minimum: 2 x 2.0 Base Stations• 2 x AC power supplies for Base Stations• 1-2 x 2.0 or 3.0 Vive Tracker(s)• 2 x USB cable for each tracker• 2 x USB Wireless Dongle for each tracker (label each dongle to coincide with corresponding tracker) |

| | |
|----------------------|---|
| Optional Peripherals | <ul style="list-style-type: none"> • 2 x ¼ inch ball mount adapter and stand (1 per Base Station or use an equivalent ¼ inch clamp or peripheral for mounting base stations) • 2 x USB extension cable (1 for each tracker) |
| License | <ul style="list-style-type: none"> • Activation Code (provided by ARwall) • Steam (click link to create free account) |

Section 2.2 Boot Up Computer

If you are using your own computer

To boot up the computer, do the following:

1. Plug in all accessories, including:
 - a. Mouse
 - b. Keyboard
 - c. Monitor/Screen/Projector/LED wall
 - d. USB Hub
 - e. Any additional cables
2. Turn on the computer

Section 2.3 Password Protection

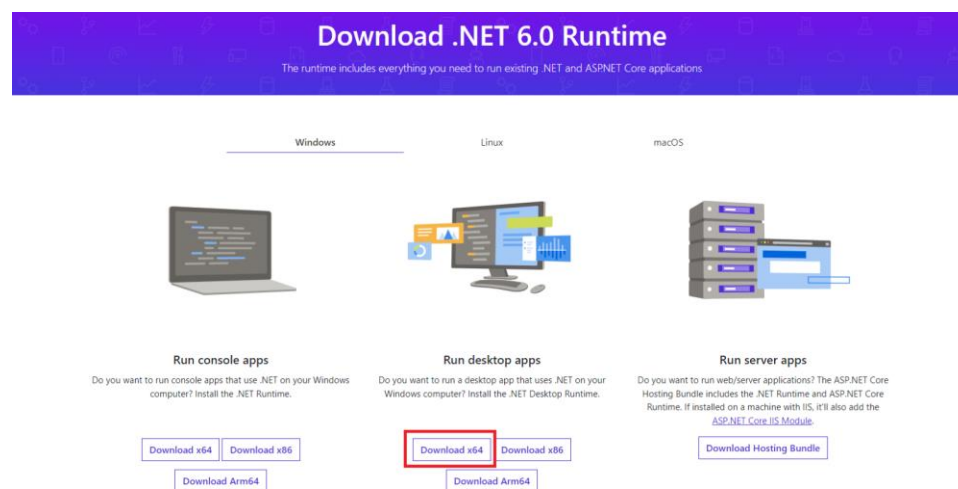
ARwall should have provided you with an **Activation Code** to access the **ARFX Launcher**. We will discuss where to enter this activation code in section [Section 4.2: Setting up the ARFX Launcher](#). This product is for a **SINGLE** seat license on a single machine. If you would like to purchase additional seats, move to another machine, or misplace your activation code, please contact your **ARwall** representative or email support@arwall.co and we will provide it to you.

NOTE: According to the Terms of Sale, it is the responsibility of the purchaser to secure all ARwall IP to the best of their ability. This includes, but is not limited to, keeping your passwords secure, system password protection, and physical security locks when appropriate.

Section 2.4 Prerequisite Software Installation

Be sure to install the following to make sure your **ARFX Launcher** runs seamlessly:

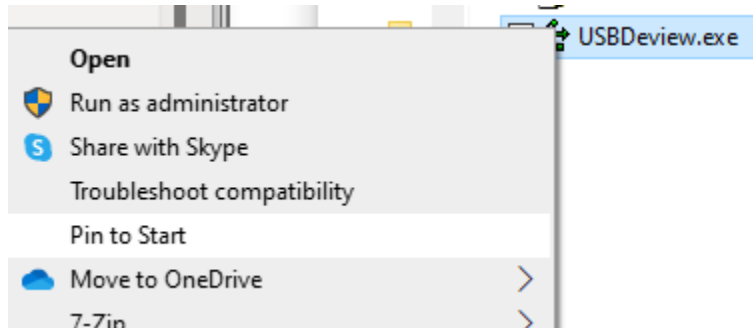
- Steam
 - SteamVR
 - .NET6 Runtime
 - USB Deview
1. Install SteamVR which will require a free Steam Account
 - a. Install Steam:
 - i. Instructions here:
https://support.steampowered.com/kb_article.php?ref=3046-ECVN-3712
 - ii. Be sure to create your own free account and have that login password available.
 - b. Install SteamVR:
 - i. Within Steam, search for SteamVR and install (or use this external link:
<https://store.steampowered.com/app/250820/SteamVR/>)
 - ii. This will assist you by showing you which HTC Vive devices are connected or not. Great for troubleshooting!
 2. Install USB Deview:
 - a. Install USB Deview:
 - i. Download file: <https://www.nirsoft.net/utils/usbdeview-x64.zip>
 - ii. Unzip the file in your desired location & install the software.
 - iii. This will assist you in finding your HTC Vive Serial numbers in case the Launcher has any issues recognizing them.
 3. Install .NET6 Runtime:
 - a. Download .NET6 Runtime: <https://dotnet.microsoft.com/en-us/download/dotnet/6.0/runtime>



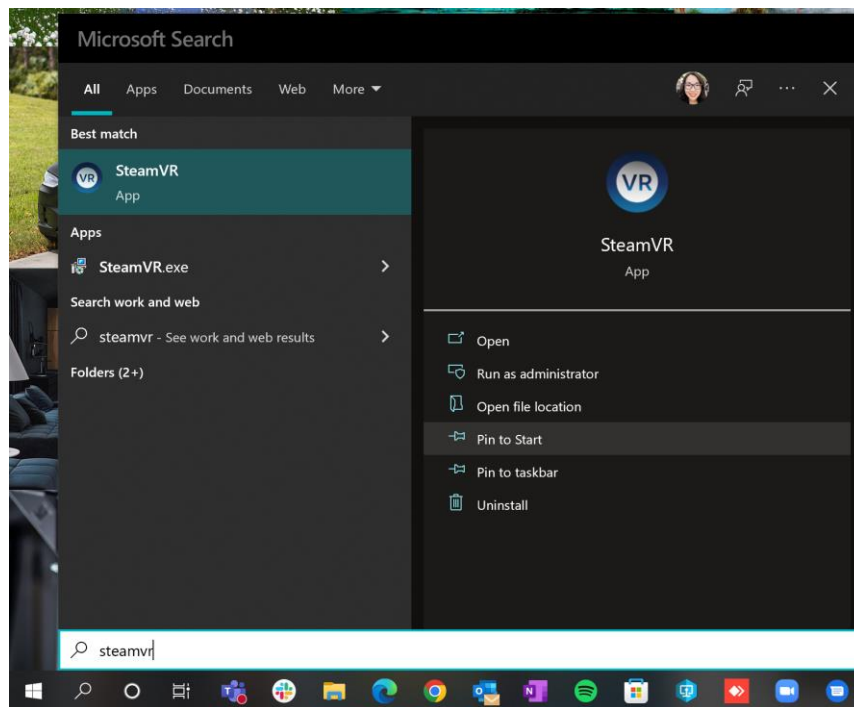
- b. Choose Run Desktop apps > Download x64 and install

- i. This installation is necessary for our login system to work correctly.

BEST PRACTICE: It is recommended to pin SteamVR and USB Deview to the Windows Start Menu for ease of opening the software when needed later. To do so, right click on the EXE file and select “Pin to Start.”



Alternatively, SteamVR can be added by clicking Windows button, searching for “SteamVR” using Microsoft Search and selecting “Pin to Start”







Section 3: HTC Vive Motion Tracking Hardware Set Up

This section describes how to connect your *Base Station* and *Vive Tracker* equipment.

Section 3.1 HTC Vive Motion Tracking Hardware

In Table 2 below, you will find a list of the *Motion Tracking Hardware* components.

Table 2: Motion Tracking Hardware Components

| Name | Information | Quantity | Image |
|--------------------------------|---|----------|---|
| <i>2.0 Base Station</i> | Rectangular boxes with motion-sensing capabilities | 2 |  |
| <i>AC Power Cable</i> | Base Station power supply | 2 |  |
| <i>2.0 or 3.0 Vive Tracker</i> | Puck-shaped device used to calibrate and track motion within the range of the motion-sensing Base Stations | 2 |  |
| <i>Vive Tracker Dongle</i> | Provides a wireless connection for <i>Vive Trackers</i> , but it is recommended to connect trackers with cables and dongle for best tracking results. (Each Vive Tracker comes with a Vive Dongle, please label the dongle and trackers that belong to each other for ease of use.) | 2 |  |

Section 3.2 Connect Base Station

Two (2) *Base Stations* are the minimum requirement to work with the **ARFX Launcher**, but up to 16 *Base Stations* can be used at a time. It is recommended to use around 4-6 *Base Stations* around the intended play area where the physical camera will be tracked for optimal tracking. To turn on a *Base Station*, connect an AC power supply to each *Base Station* and plug into the correct power outlet. Initially the *Base Station* will display a blinking blue light.



It will then turn into a white or green light to indicate that the Base Station is active.

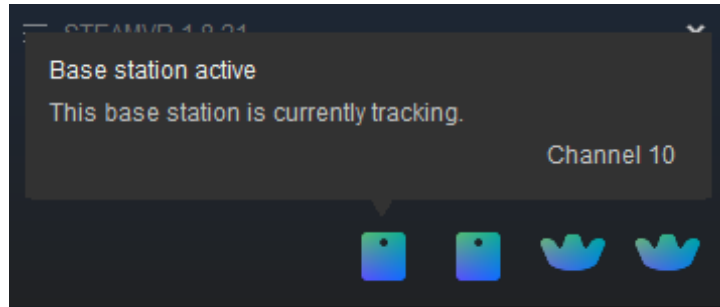


NOTE: *There is minimal power draw per Base Station which makes it easy to share power with on set film lights as needed.*

BEST PRACTICE: *Turn off /unplug the Base Stations when not in use to prevent overheating and preserve the operating lifetime of the device. Each Base Station has a little running motor inside that will eventually wear down the device over time. Having a few backup Base Stations are recommended when preparing for a film production shoot in case an older Base Station stops working on set.*

Section 3.3 Connect Multiple Base Stations

To connect more than two *Base Stations*, you will need to make sure each *Base Station* has its own unique channel number and *SteamVR* is tracking the correct *Base Stations*.



NOTE: *Newly purchased Base Stations will have default channels that might be the same as existing Base Stations' channels, usually channel 1. Make sure to test and set Base Stations' channels before mounting them.*

BEST PRACTICE: *If only two Base Stations are being used in your system, there is no need to change the Base Stations' channels. The system should work fine without changing the channels from 1. However, if issues arise or more Base Stations are added, be sure to change each Base Station to be on its own unique channel.*

To set each *Base Station* with its own unique channel, do the following:

1. Locate the *SteamVR App* on the Computer and open it.
2. Connect a *Vive Tracker* to your machine via USB cables.
3. Plug in one *Base Station*.
4. Place the *Vive Tracker* in view of the *Base Station*. Each *Base Station* has a 120-degree field of view. This step can sometimes take several seconds before the *SteamVR* recognizes the *Base Station* but moving the tracker in front of the *Base Station* can help the system recognize it faster.
5. Hover over the (newly turned on) *Base Station* icon tracked on *SteamVR* to record which channel is taken.
6. Plug in another *Base Station* and repeat step 4 and 5.
7. If any *Base Station* is set to the same channel as the other *Base Station(s)*, use a paperclip or thumbtack and press the Channel button at the back of the *Base Station* to set a different channel. There is a total of 16 channels to pick from.



8. Make sure the new *Base Station*'s channel does not overlap with existing *Base Stations*' channels.
9. Repeat steps 4-7 until all *Base Stations* have their own channels and are tracked by *SteamVR*.

BEST PRACTICE: *It is recommended to label the back of a Base Station with the channel that is assigned to that Base Station for ease of use and troubleshooting on set.*

NOTE: *For convention or XR heavy settings, there could be neighbors that are also using Base Stations that could interfere with ARFX's tracking. It is best to talk to them about their Base Station setup and adjust channels and Base Station field of views accordingly.*

Section 3.4 Base Station Placement

Optimal *Base Station* considerations:

1. The goal is to make sure the *Trackers* will always be seen by at least one *Base Station* regardless of where it is in the intended tracking/play area.
2. Each *Base Station* should be placed at a height of around 2 meters/6.5 feet tall (light stands with proper adapters are recommended, but *Base Stations* can be attached directly to higher walls, ceilings, or set pieces if needed – just make sure that whatever the *base stations* are attached to is not easily disturbed, moved, or shaken during filming).
3. Each *Base Station* field of view should be tilted slightly down towards the intended tracking/play area.

4. Each *Base Station* field of view should slightly overlap other *Base Station* field of views and all *Base Stations* together should cover the tracking area that you expect the *Trackers* to be active in. Keep in mind that each *Base Station* has a 120-degree field of view, but with creative daisy-chaining, a few *Base Stations* can create a sizeable play area for the tracked camera.
5. Be sure that at least one *Base Station* can see the screen that you are using (mainly the center of the screen, where you will be calibrating with a *tracker*).
6. Make sure that *Base Stations* and tracking/play areas are away from sun light or other reflective surfaces such as mirrors or glass if possible. These factors can affect tracking and should be minimized as much as possible on set.
7. Some on set lights can cause IR radiation to interfere with tracking stability with *Base Stations*. It is recommended to turn one light on at a time while testing tracking to test if lights are causing tracking issues. Most common lights that cause issues are older.

HTC Vive offers best practices for *Base Station*/*Base Station* placement here:
<https://www.vive.com/eu/support/vive/category/howto/tips-for-setting-up-the-base-stations.html>

Sample ARFX with HTC Vive Tracking Hardware Setup (Base Stations are identified as “Lighthouses” in the below image)



Section 3.5 Connect Vive Tracker

To connect the *Vive Tracker*, do the following:

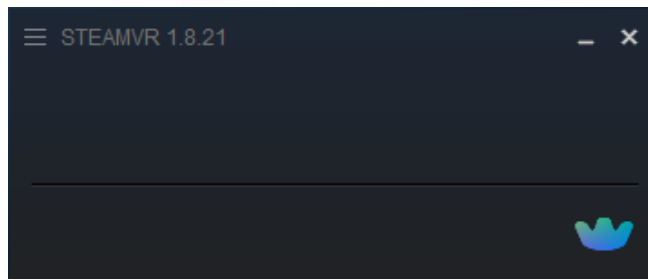
1. Refer to [Section 4: ARwall ARFX Launcher](#) on installing and opening the ARFX Launcher. Open the **ARFX Launcher** and click on the “Patch SteamVR” button to unlock SteamVR to no longer require an HMD device.

BEST PRACTICE: *If SteamVR updates or asks for an HMD to be connected, be sure to click the “Patch SteamVR” button on the ARFX Launcher to turn this requirement on SteamVR off. Restarting SteamVR after this button has been clicked should remove the HMD requirement.*

2. Locate the *SteamVR App* on the Computer and open it.
3. Plug in a *Vive Tracker* to the machine with USB cables and place it within view of at least one *Base Station* that is powered on. If the *Vive Tracker* is plugged in, you should be able to see the tracker on the *SteamVR app*.

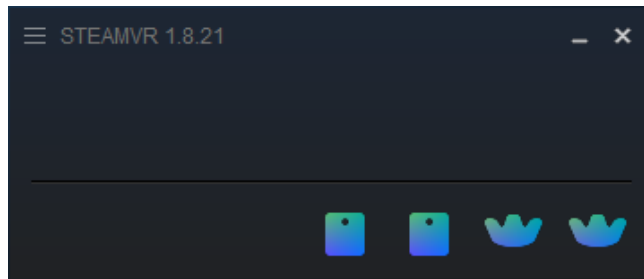
NOTE: *Ensure that the Vive Tracker is inside the play area and within the 120-degree field of view of at least one Base Station.*

4. To pair the *Vive Tracker*, press the middle button on the *Vive Tracker*.

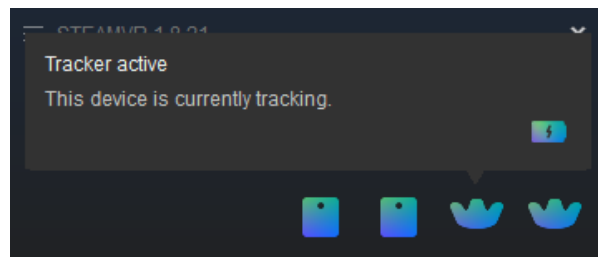


5. The light on the *Vive Tracker* should turn green or amber once it is paired.

NOTE: *A green or amber light should show once the middle button is pressed. Do not hold the middle button.*



Check the *SteamVR* app after the pairing is complete. The tracker and any *Base Stations* that can see the tracker(s) should appear. Hover over the tracker icon; if “Tracker Active” displays, the pairing was successful.



If the tracker pairing was not successful, restart the *SteamVR* app, check cable connections, and redo step 3.

NOTE: If the Base Stations are not reading, contact support@arwall.co.

BEST PRACTICE: Always charge the tracker when you are finished using it. To display the battery life, hover over the tracker icon in the *SteamVR* app. It is recommended to keep the trackers plugged in to the machine to keep the trackers always charged.

BEST PRACTICE While trackers can be used wirelessly (if the specified tracker’s dongle is plugged into the computer or USB dongle), it is also recommended to keep the trackers plugged in for optimal tracking, especially if there are potential interference such as neighboring AR/VR experiences or lots of cell phones in the tracking/play area.

The blinking light will change colors to indicate different statuses, as described in Table 3 below.

Table 3: Light Indicator

| Color | Description |
|-------------------------------|-----------------------------|
| Blinking Red | Low Battery |
| Amber while plugged in | Charging, but paired/active |
| White while plugged in | Fully Charged, |

| | |
|-------|--------------------------|
| | but not paired/active |
| Green | Paired/active |

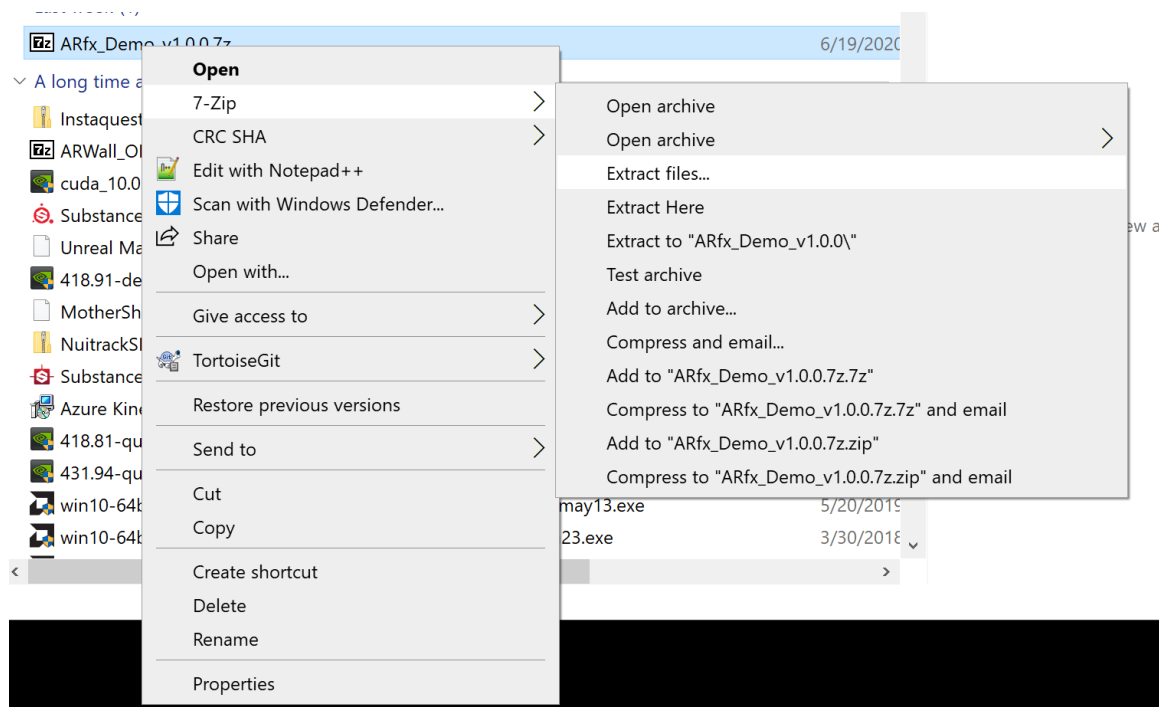
Section 4: ARwall ARFX Launcher

This section describes how to install, set up, and run the **ARwall ARFX Launcher**. These instructions assume that the computer and tracking hardware have already been set up from [Section 2: General Computer Set Up](#) and [Section 3: HTC Vive Motion Tracking Hardware Set Up](#).

Section 4.1: Installing the Launcher Software

To install **ARwall ARFX Launcher**, do the following:

1. Extract the Launcher file (ie. **ARfx_Demo_v1.0.0.7z** or **StarterPack_08-14-2022.7z**) using 7-Zip by right clicking the file and selecting 7-Zip > Extract Files....

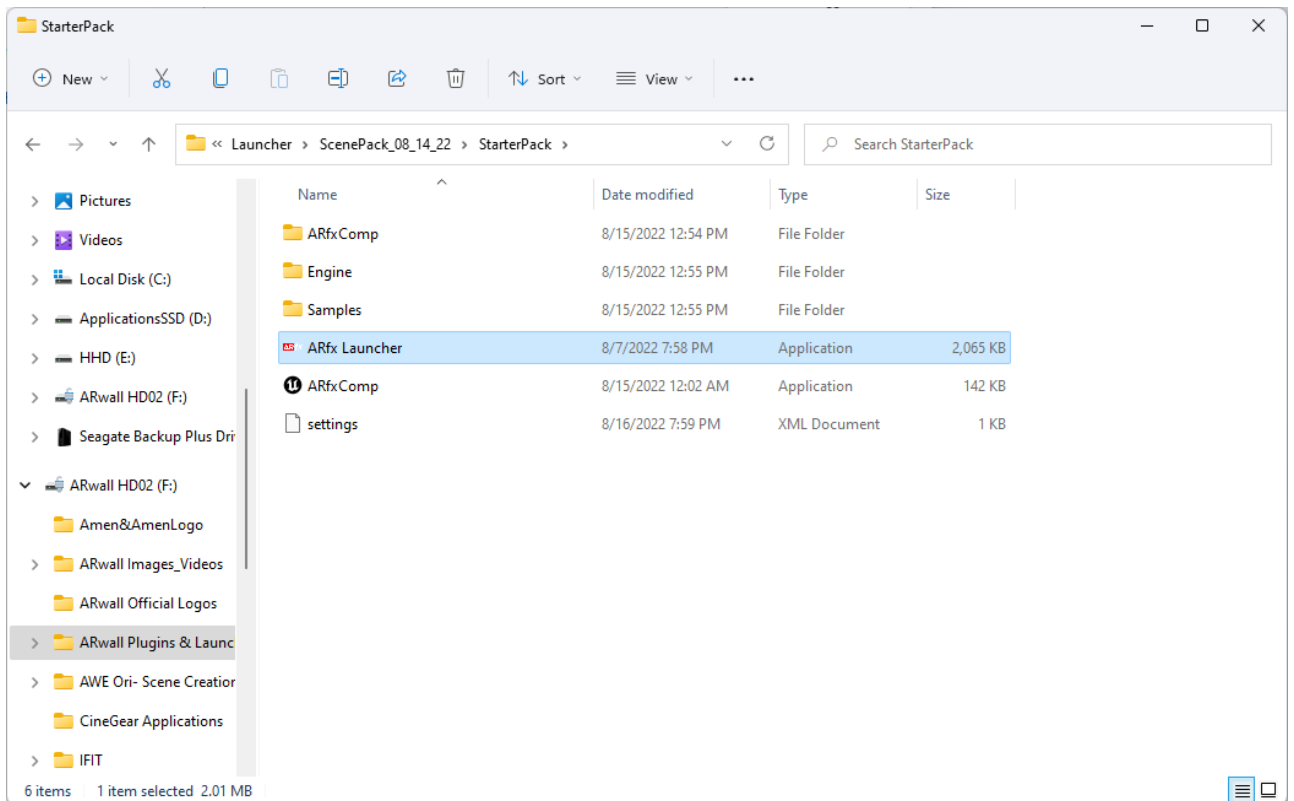


NOTE: If your machine does not have 7-Zip, please download and install it from here: <https://www.7-zip.org/>

2. Choose where you want to extract to, then Click "OK"

3. Once extracted, locate your **StarterPack** folder, open it, and locate **ARfx_Launcher.exe**. This will be the file to open the launcher.

NOTE: Please allow enough time for the file to completely extract, as it can be large.



Section 4.2: Setting up the ARFX Launcher

To set up **ARwall ARFX Launcher**, do the following:

1. Locate **ARfx_Launcher.exe** and double click it to run the launcher.

ARFX Launcher User Interface



2. The Launcher screen will open, select and input the appropriate information for your system:
 - a. **Resolution:** Resolutions supported by your monitor as reported by Windows.
 - i. Choose the intended resolution you would like to run ARFX on (usually highest resolution available is recommended)
 - b. **Display:** List all monitors connected to this machine. Each is given by Windows.
 - i. Select the display you want to run ARFX on
 - ii. If the launcher does not load on display you selected, please refer to [Section 7.5: ARFX Launcher loading on wrong display](#) for troubleshooting.
 - c. **Screen Dimensions:**

- i. **Width:** Physically measured width of the screen. Please be sure to measure it!
 - ii. **Height:** Physically measured height of the screen. Please be sure to measure it!
 - iii. **cm or inch:** Units in which your screen measurements were made in. Highly important, please double check this!
 - iv. Measure the width and height of the screen (within the bevel) you will be running ARFX on (can be in centimeters or inches) and input in the relevant boxes
- d. **Tracker Puck Serial Numbers:** This should automatically detect the serial numbers of the HTC Vive Trackers that are currently connected to the computer.
 - i. **Camera Tracker:** USB ID of the Vive Puck used for the hero camera.
 - ii. **Calibration Tracker:** USB ID of the Vive Puck used for calibration.
 - iii. **AUTO:** This will try to automatically obtain any Vive Pucks connected (or once connected) to the system and assign them to the Camera and Calibration IDs. Please ensure your devices are connected and on before pressing this.
 - iv. **CHECK:** This will check if the devices with the provided IDs are connected.
 - 1. Click **AUTO** or **CHECK** to populate or confirm that two Tracker serial numbers are recognized.
 - 2. If the tracker is paired and seen by SteamVR, the serial number should show up.
 - 3. If the tracker is paired and physically wired, the box next to that tracker should also show as a green checkmark.

NOTE: If there is only one tracker available, please make sure the same serial number shows up for both Camera Tracker and Calibration Tracker boxes to use the same tracker for both tracking and calibrating.

NOTE: If the calibration and hero trackers are swapped when ARFX is launched, the serial numbers can be swapped within the menu system while in play mode or on the Launcher screen or the physical trackers can be physically swapped.

- e. **Velocity Thresholds:**
 - i. **Positional:** Velocity threshold before updating position (in cm/sec).
 - ii. **Angular:** Velocity threshold before updating angle (in degrees/sec).
 - iii. It is recommended to set both Positional and Angular to 0.01.

BEST PRACTICE: If tracking is jerky for a slow-moving hero camera shot, lower the Positional and Angular values down by 0.01 or 0.001 increments at a time until the tracking is smooth. If the hero tracker is sitting still but there is perceived jitter on the ARFX background, increase the Positional and Angular values up by 0.01 or 0.001 increments until the jitter no longer shows.

f. **Software Key:**

- i. **ENTER KEY:** Enter your key/Activation Code to access the software.

1. Click **ENTER KEY** and this screen will open.

| COMMAND | HOTKEY | USE CTRL | USE ALT | USE SHIFT |
|------------|--------|--------------------------|--------------------------|--------------------------|
| Load Map 1 | 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Load Map 2 | 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Load Map 3 | 3 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Load Map 4 | 4 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Load Map 5 | 5 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. Copy and paste your *Activation Code* and click OK.

- ii. **CLEAR CACHE:** Forcefully clears your login cache.

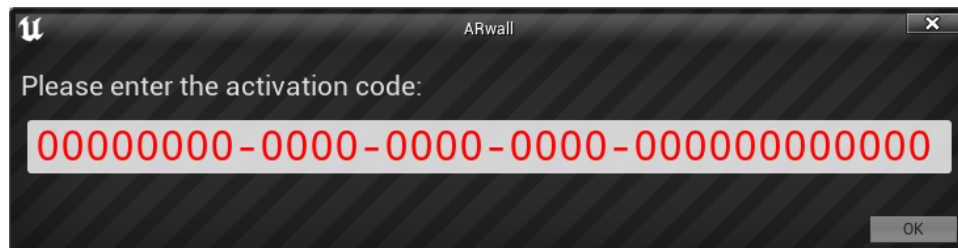
1. If you accidentally put in the wrong *Activation Code*, click **CLEAR CACHE** and try again.

NOTE: Please reach out to your ARwall representative or email support@arwall.co to acquire an activation code if you don't already have one.

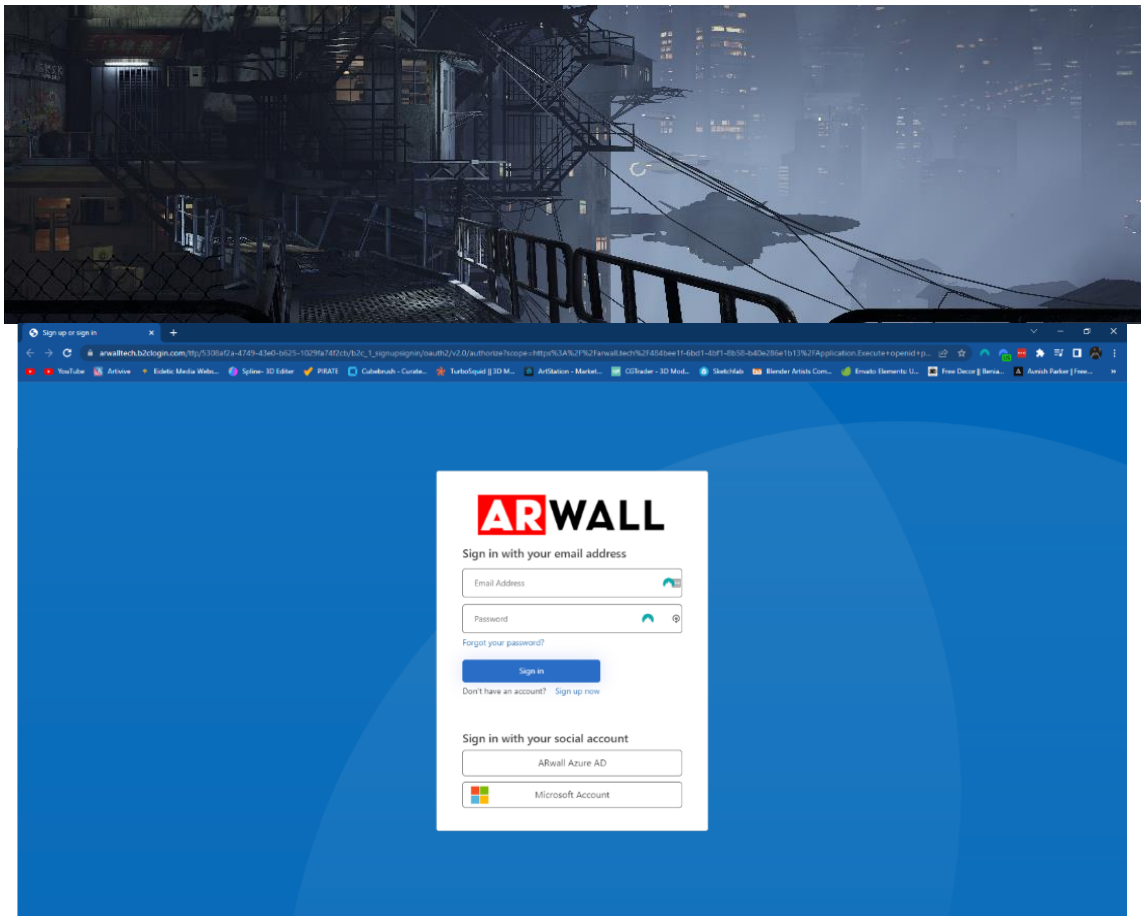
- g. **Hotkeys:** Take note of existing hotkeys and change any if needed. Clicking the **USE CTRL**, **USE ALT**, and **USE SHIFT** for a hotkey option means that the designated button will need to be held down when pressing the hotkey to activate the command.

NOTE: *If the "HOME" key is difficult to access on the keyboard, it's recommended to change the "Calibrate Screen" option to the letter "C" or any other key that's not being used by another hotkey option.*

- h. **RESET HOTKEYS:** Click this button if you would like to reset hotkeys to their default settings
 - i. **PATCH STEAMVR:** Click this button once when you first launch the launcher or when you notice SteamVR has an error message saying it cannot find the headset/HMD. This should bypass SteamVR's requirement to have a headset attached to the system to run SteamVR.
 - j. **SAVE:** Click this button to save any settings you changed in the launcher screen
 - k. **LAUNCH:** Click this button when all settings have been finalized to launch the ARFX Scene
3. If this is the first time running the **ARFX Launcher** on your machine, make sure to click **PATCH STEAMVR** button at least once so that SteamVR is set up properly to run with ARFX
 4. Once all settings have been finalized, click **SAVE** to save settings and then click **LAUNCH** to start the ARFX Demo/Scene
 5. If this is the first time running the **ARFX Launcher** or the cache was cleared for the software key, this screen may open:



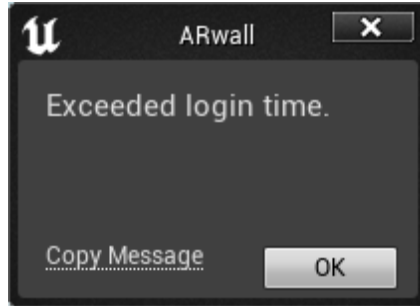
- a. Copy and paste your Activation Code and click OK.
6. You should see the ARFX Screen open along with a browser window with a login prompt.



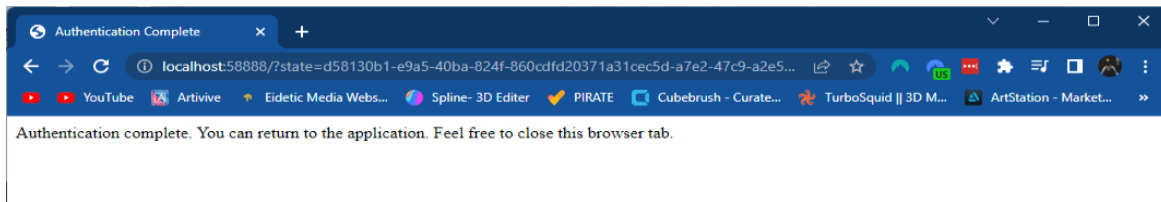
BEST PRACTICE: If the ARFX Screen opens above the browser window and you can't see the browser window, please use ALT-TAB on the keyboard to select the browser window to display on top.

7. On the Microsoft Login Screen, log in using your chosen email/password account.
 - a. If this is the first time using an ARwall product, please create a new account by clicking **Sign up now** or if you have an existing Microsoft account, please use the **Microsoft Account** button to login.
 - i. After your first successful login, be sure to use the same email login and password for all future logins.

NOTE: You will have 90 seconds to login before the pop-up below appears and the Launcher closes. If the ARFX screen loads on top of the browser login window, please use ALT+TAB buttons to choose the browser window and complete login before using the ARFX screen before the 90 second window closes.



8. After login has been approved you will see this window.



9. Click back to your ARFX Screen, proceed with calibration as defined in [Section 5.1: XR Sync Calibration](#).



Section 5: Calibration and Camera Control

This section describes how to calibrate **ARwall ARFX** using the patented XR Sync system and describes how to use the **ARwall** camera controls once **ARFX** is up and running.

Section 5.1: XR Sync Calibration

This section describes how to calibrate **ARwall ARFX** using the patented XR Sync system. This process is the same whether running ARFX through the **ARFX Launcher** or through *Unreal Engine 4*.

Once the **ARwall ARFX Launcher** scene is up and running, calibrate the scene so that the proportions and parallax looks correct to the tracked physical camera. To perform calibration in **ARwall ARFX**, do the following:

1. Press the **TAB** key on a keyboard or **X** button on an Xbox controller, the calibration screen will open. Locate the center of the screen marked by the red crosshairs.

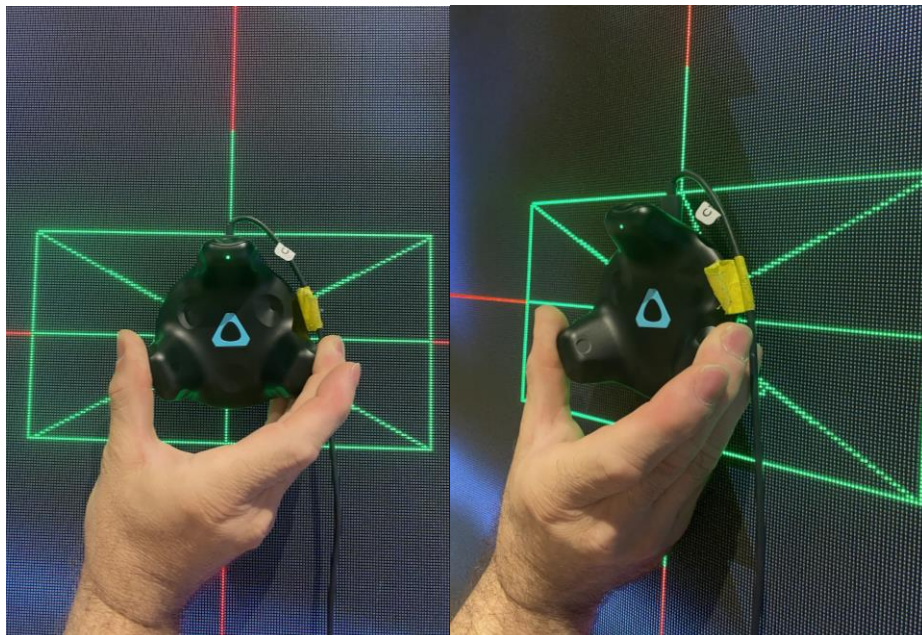


2. The green triangle/square that appears represents the calibration tracker. The current position is always relative to the last calibration point but should always move in relationship to wherever you move the calibration puck.

NOTE: The green triangle/square should move when moving one of the trackers connected to the system. This is the tracker previously set as the calibration tracker. If this is not the intended tracker for calibration, either swap the trackers physical positions (on the camera vs next to the screen) or swap the serial numbers as mentioned under [Section 4.2: Setting up the ARFX Launcher](#))



3. Place the calibration puck flat against the screen and centered on the crosshairs with the green light on the tracker facing up (for 2.0 Trackers) and with the green light on the tracker facing down (for 3.0 Trackers). Both 2.0 and 3.0 Trackers will have the cable pointed up for correct calibration. Press the Calibration button (that was set previously under Hotkeys, by default it should be the **C** key on keyboard and **B** button on Xbox controller) while the calibration puck is on the crosshairs, then press **TAB** (or whichever button was previously set under Hotkeys) to exit the calibration screen.



BEST PRACTICE: *Feel free to press the Calibration button again if it does not look like it calibrated correctly the first time. Make sure the calibration tracker is positioned in place on the red crosshairs, until it looks like the ARFX Screen looks correctly positioned and does not jump around a lot between calibration button presses. This ensures that you have the most optimal calibration.*

NOTE: *It is good practice to recalibrate anytime a lighthouse is moved or bumped, even if very minute. This could cause jitter/jumping of the virtual camera if not recalibrated.*

Section 5.2: Camera Control

This section describes how to use the **ARwall** camera controls for both keyboard and Xbox controller once the **ARFX Launcher** is launched and calibrated.

1. Launch ARFX Launcher and calibrate. Refer to [Section 4: ARwall ARFX Launcher](#) and [Section 5.1: XR Sync Calibration](#) for further details.
2. Move the Hero Tracker (tracker on the physical camera) within the designated play area as dictated by the base stations. The scene should show the correct parallax.

BEST PRACTICE: *It is recommended to look at the parallax through a physical camera or phone. It should be like looking through a window. Move the physical camera left, you should see more of the right side of the virtual scene environment. Move the physical camera right, you should see more of the left side of the virtual scene environment. Move the physical camera up, you should see more of the bottom of the virtual scene environment. Move the physical camera down, you should see more of the top of the virtual scene environment. Move the physical camera closer to the screen, you should see more of the virtual scene environment. Move further from the screen, you should see less of the environment.*


If this is not what you're seeing, try to calibrate again and make sure that the base stations can clearly see each other and the trackers. Refer to [Section 3.4 Base Station Placement](#) for further details.

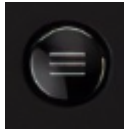
The default virtual camera controls are described in Table 4 below.

Table 4: Camera Controls

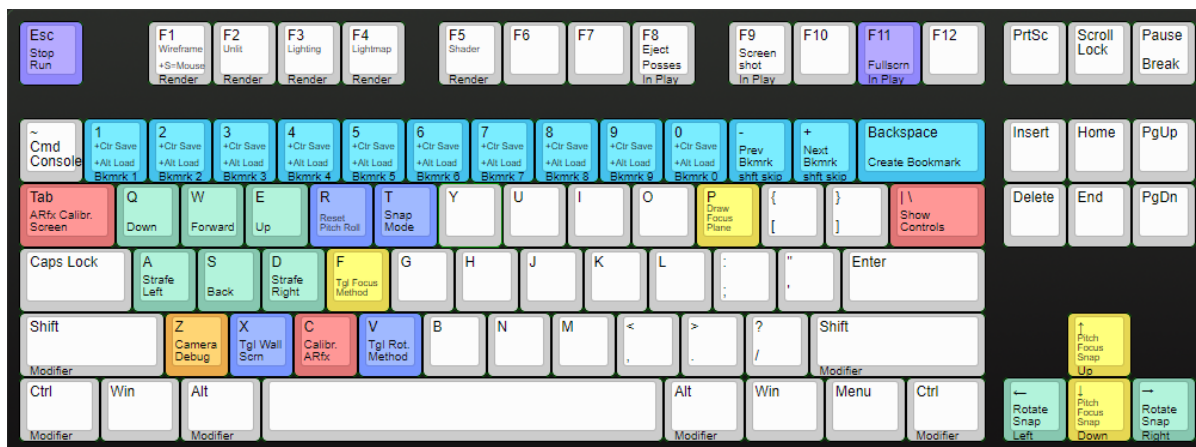
| Action | Keyboard | Xbox Controller |
|---------------------------------------|---|---|
| To move the virtual camera | Use the WASD navigation controls: <ul style="list-style-type: none">• W = Forward• S = Backwards• A = Left• D = Right | Left Stick is the Forward, Backwards, Left, and Right control. |
| To move the virtual camera up or down | Use the following controls: <ul style="list-style-type: none">• Q = Down• E = Up | Left Trigger is to move vertically down Right Trigger is to move vertically up |

| | | |
|--|---|--|
| To rotate/pan the virtual camera left or right | <p>Use the following controls:</p> <ul style="list-style-type: none"> • Use the left arrow (←) to pan the camera left. • Use the right arrow (→) to pan the camera right. | <p>Right Stick pans the camera</p> <p>LB (Left shoulder button) rotates 90 degrees left</p> <p>RB (Right shoulder button) rotates 90 degrees right</p> |
| To toggle the calibration menu | <p>Use the Tab key:</p> <ul style="list-style-type: none"> • Press Tab to toggle on/off | X button to toggle on/off |
| To calibrate the screen (while holding up the calibration puck to the center of the screen crosshairs, so the parallax and camera tracking look correct) | <p>Use the C key:</p> <ul style="list-style-type: none"> • Press C while calibration puck is held in the center of the screen | B button while calibration puck is held in the center of the screen |
| To toggle focus method | <p>Use the F key:</p> <ul style="list-style-type: none"> • Press F to toggle on/off the focus method | A button or press down the Right Stick button to toggle on/off the focus method |
| To toggle focal distance input (also adds focal plane) | <p>Use the P key:</p> <ul style="list-style-type: none"> • Press P to toggle on/off the Draw Focus Plane, should look like a transparent purple wall on screen indicating your focus plane • Use the up arrow (↑) and the down arrow (↓) to change the focal distance | <p>Y button or while in normal mode: hold D-PAD Down arrow to toggle between focus enabled mode and normal mode.</p> <p>While in focus enabled mode:</p> <ul style="list-style-type: none"> • Press D-PAD Right arrow to increase Focal Distance (+) • Press D-PAD Left arrow to decrease Focal Distance (-) |

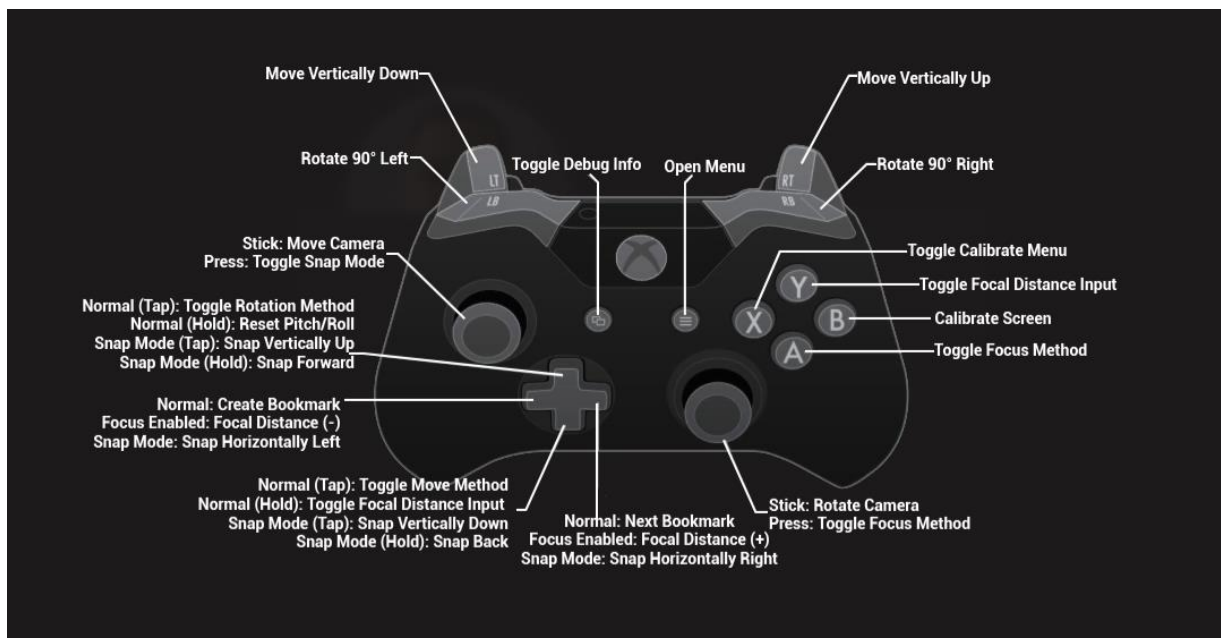
| | | |
|--|--|---|
| <p>To toggle camera debug info</p> | <p>Use the Z key:</p> <ul style="list-style-type: none"> • Press Z to toggle on the camera debugging, positional data, rotation data, and FPS • Press the Z key again to remove positional and rotational data, but keeping FPS • Press the Z key again to toggle off camera debugging | <p>Press the View button (looks like 2 rectangles) to toggle on/off camera debug info</p>  |
| <p>To change bookmark or preset camera angle</p> | <p>Use the minus (-) or equal (=) keys:</p> <ul style="list-style-type: none"> • Press the + key to fly to the next bookmark • Press the - key to fly to the previous bookmark | <p>While in normal mode:</p> <ul style="list-style-type: none"> • Press D-PAD Right arrow to fly to the next bookmark |
| <p>To toggle snap mode of the virtual camera</p> <p>(This forces the virtual camera to snap towards a direction on the virtual environment.)</p> | <p>Use the T key:</p> <ul style="list-style-type: none"> • Press T to toggle between snap mode and normal mode. <p>While in snap mode:</p> <ul style="list-style-type: none"> • Press the Up arrow (↑) once to snap vertically up • Hold the Up arrow (↑) to snap forward • Press the Right arrow (→) to snap horizontally right • Press the Down arrow (↓) to snap vertically down • Hold the Down arrow (↓) to snap backward • Press the Left arrow (←) to snap horizontally left | <p>Press down Left Stick button to toggle between snap mode and normal mode.</p> <p>While in snap mode:</p> <ul style="list-style-type: none"> • Tap the D-PAD Up arrow (↑) once to snap vertically up • Hold the D-PAD Up arrow (↑) to snap forward • Press the D-PAD Right arrow (→) to snap horizontally right • Tap the D-PAD Down arrow (↓) to snap vertically down • Hold the D-PAD Down arrow (↓) to snap backward • Press the D-PAD Left arrow (←) to snap horizontally left |

| | | |
|---|--|--|
| To toggle rotation method | <p>Press the V key to toggle between:</p> <ul style="list-style-type: none"> Rotating at camera locked to the Y axis (left and right only) Rotating at screen (free pitch up and down) <p>To Rotate:</p> <ul style="list-style-type: none"> Use the left arrow (←) to rotate the camera left. Use the right arrow (→) to rotate the camera right. | <p>While in normal mode: press the D-PAD Up arrow to toggle between:</p> <ul style="list-style-type: none"> Rotating at camera locked to the Y axis (left and right only) Rotating at screen (free pitch up and down) <p>To Rotate:</p> <ul style="list-style-type: none"> Use Right Stick to rotate the camera |
| To reset pitch & roll (move method) of the virtual camera | <p>Press the R key to:</p> <ul style="list-style-type: none"> Reset the <i>side-to-side or Y axis</i> and the <i>front-to-back of the X axis</i> | <p>While in normal mode: hold the D-PAD Up arrow to:</p> <ul style="list-style-type: none"> Reset the <i>side-to-side or Y axis</i> and the <i>front-to-back of the X axis</i> |
| To toggle move method | N/A | <p>While in normal mode: Tap the D-PAD Down arrow to toggle on/off moving only in the XY plane (cannot go up/down)</p> |
| <p>To bring up the menu system</p> <p>(Refer to Section 6: Menu System for further details)</p> | <p>Press the ESC key or Backslash (\) to:</p> <ul style="list-style-type: none"> Open up the menu system, where you can control ARFX settings, Post Process, Hotkeys/controls, audio, etc. | <p>Press the Menu button (looks like a hamburger menu) to</p> <ul style="list-style-type: none"> Open up the menu system, where you can control ARFX settings, Post Process, Hotkeys/controls, audio, etc.  |

| | | |
|--|--|-----|
| To enter Fullscreen in Play mode (if the ARFX screen pops up as a window, use this to set it to full screen) | Select the ARFX Screen and press the F11 key: <ul style="list-style-type: none"> This will toggle on/off fullscreen mode | N/A |
|--|--|-----|



Refer to [end of manual](#) for larger version of keyboard hotkeys or refer to it online here: <http://www.keyboard-layout-editor.com/#/gists/98cd82217ffe1eb61fc7a6ae19d97862>



3. Change scenes by pressing the appropriate **Hotkey** numbers (1, 2, 3, etc.), switch previously saved bookmark angles (default button is =), and some scenes have hotkey actions to change the time of day or lighting iteration (default buttons are **B, N, M, and [,]**). Refer to table below for further details.

ARFX 10 Scenes Demo Launcher Specific Scenes and Features:

| Map | Map Hotkey | Lighting Hotkeys |
|-------------|------------|------------------|
| City Block | 1 | B, N, M |
| Club | 2 | N, M, <comma> |
| Desert | 3 | B, N, M |
| Forest | 4 | B, N, M |
| Future City | 5 | B, N, M |
| Home | 6 | B, N, M |
| News Studio | 7 | N, M, <comma> |
| Office | 8 | B, N, M |
| School | 9 | B, N, M |
| Space | 0 | B, N, M |

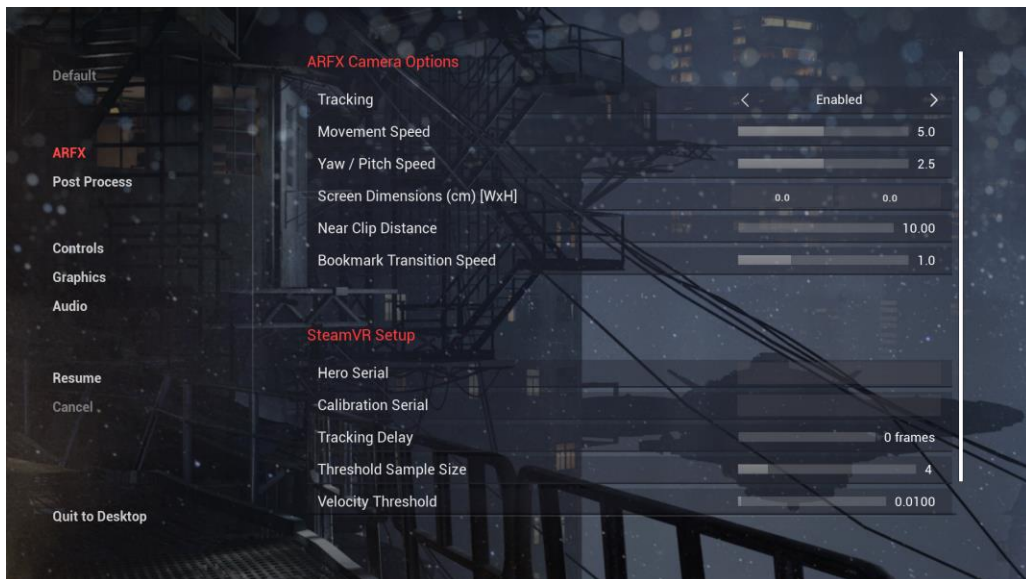
Section 6: Menu System

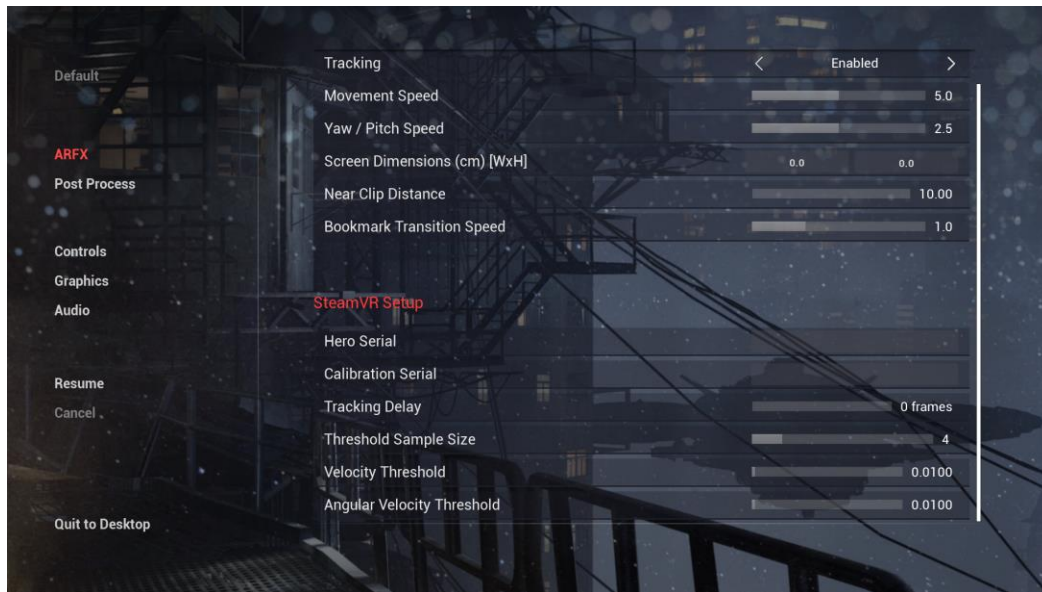
This section describes our easy-to-use menu system. Make and save changes, all while still in your launched session of **ARFX Launcher**.

Section 6.1: Menu System Sub Menus

To access our menu system simply press the **ESC** or **Backslash (\)** key.

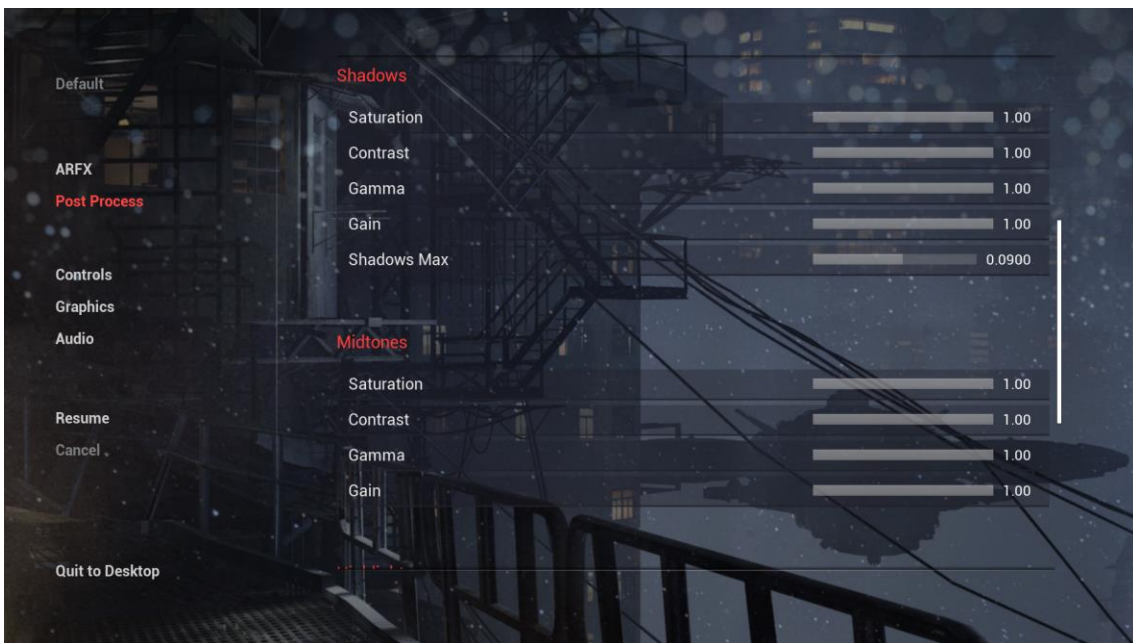
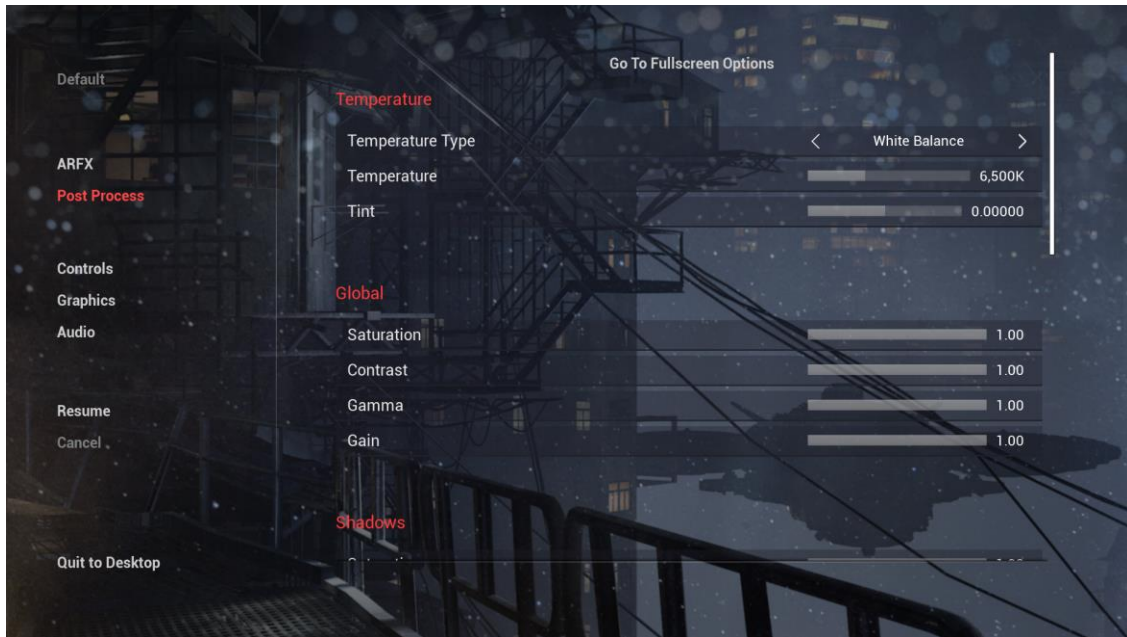
1. ARFX has integrated all the necessary features to allow you to quickly access all your favorite tools in one location, all accessible while still in play mode.

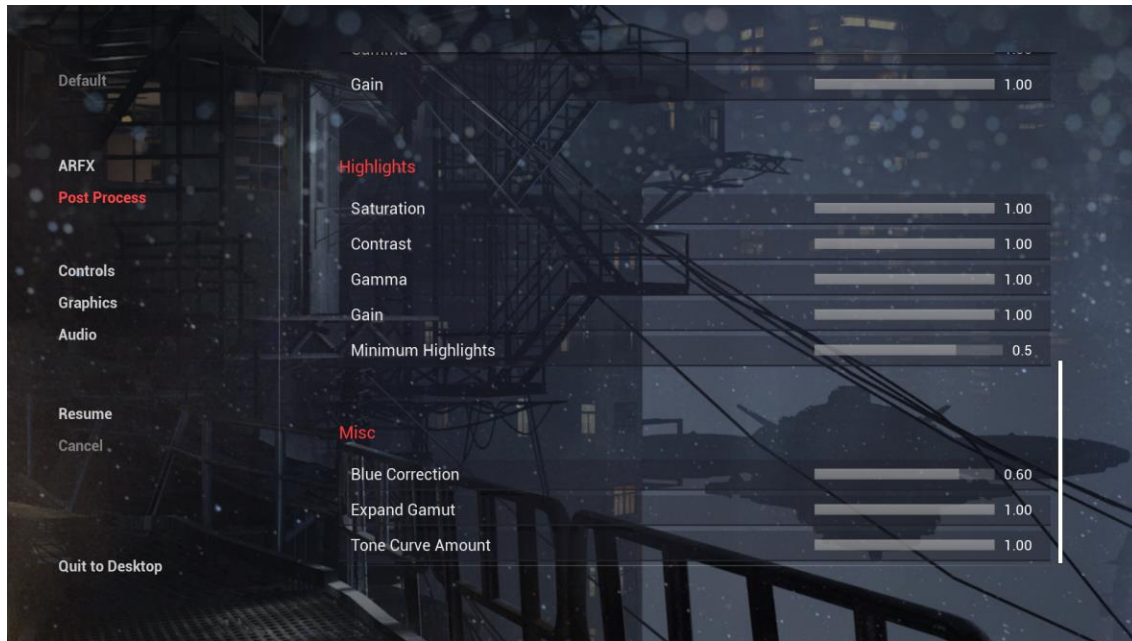




a. **ARFX:**

- i. **ARFX Camera Options:** Allow you to have further control over the ARwall Camera Actor within the scene
 1. **Tracking:** Toggles tracking on/off.
 2. **Movement Speed:** Input speed of the camera as it moves around.
 3. **Yaw/Pitch Speed:** Movement speed of camera pan and tilt.
 4. **Screen Dimensions (cm) [WxH]:** Physical Dimension of the screen in centimeters.
 5. **Near Clip Distance:** Distance at which the camera will clip objects too close to the screen/wall.
 6. **Bookmark Transition Speed:** Speed at which the camera will transition between bookmarks.
- ii. **SteamVR Setup:** Ability to fix Tracker Serial numbers and fine tune SteamVR settings
 1. **Hero Serial:** Serial number can be found via USBDevice.exe.
 2. **Calibration Serial:** Serial Number can be found via USBDevice.exe.
 3. **Tracking Delay:** Delays the tracking by this number of frames.
 4. **Threshold Sample Size:** Number of samples we take to determine velocity and angular velocity.
 5. **Velocity Threshold:** Threshold at which we start tracking.
 6. **Angular Velocity Threshold:** Threshold at which we start tracking.





b. **Post Process:** This section allows you to take further control over all your post process needs including:

i. **Temperature:**

1. **Temperature Type:** Selects the type of temperature calculation.
2. **Temperature:** Temperature in Kelvin
3. **Tint**

ii. **Global:**

1. **Saturation**
2. **Contrast**
3. **Gamma**
4. **Gain**

iii. **Shadows:**

1. **Saturation**
2. **Contrast**
3. **Gamma**
4. **Gain**
5. **Shadows Max**

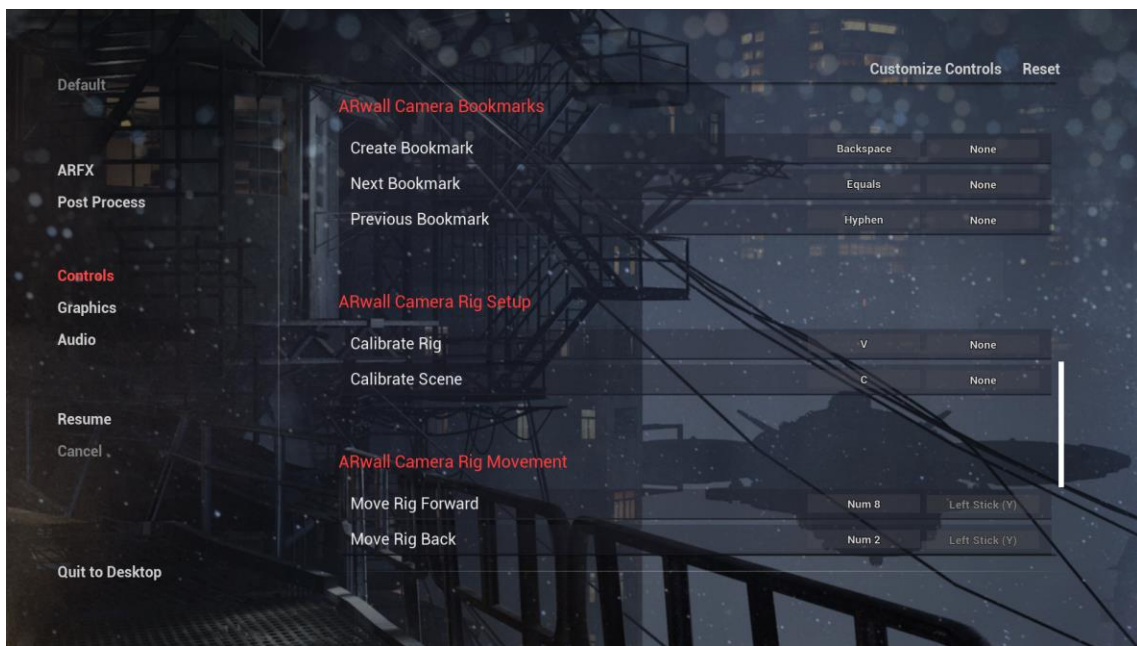
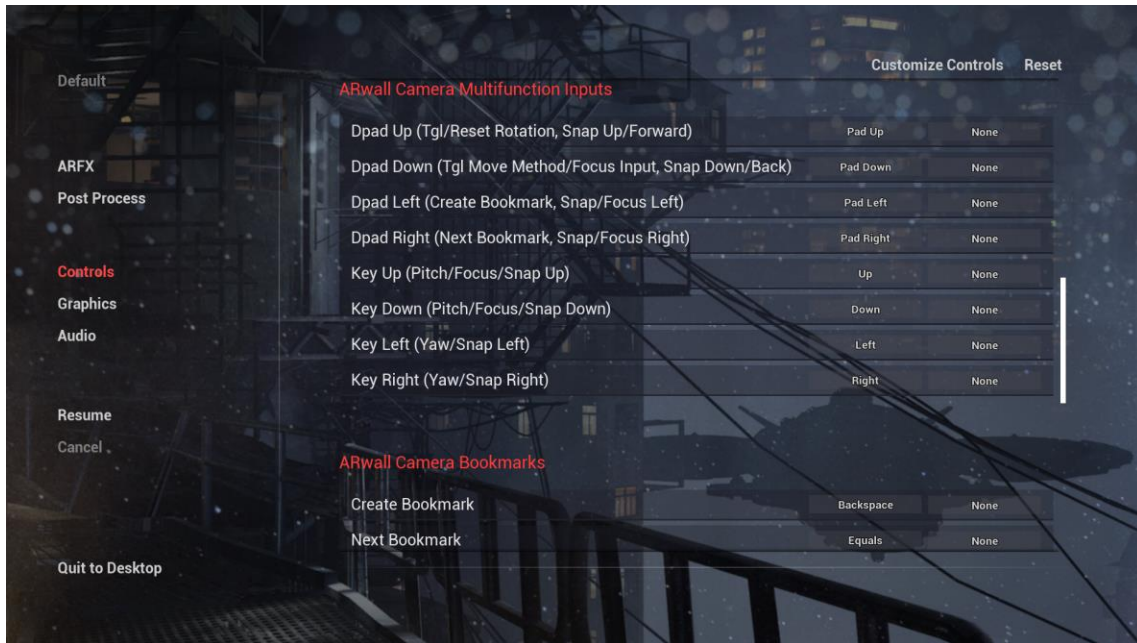
iv. **Midtones:**

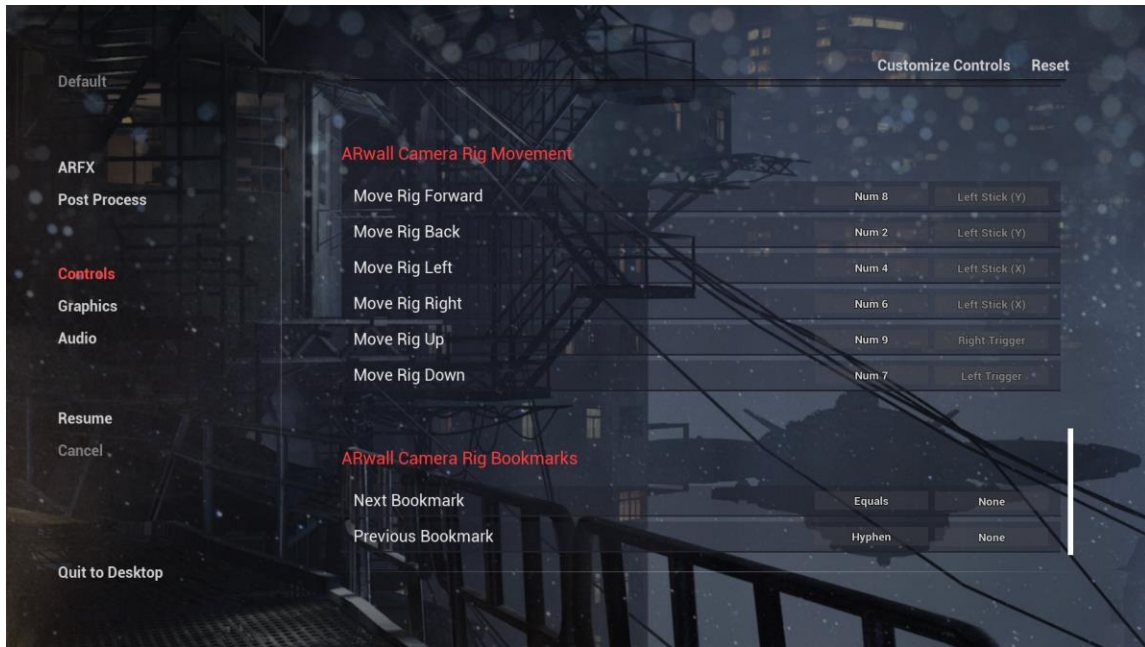
1. **Saturation**
2. **Contrast**
3. **Gamma**
4. **Gain**

v. **Highlights:**

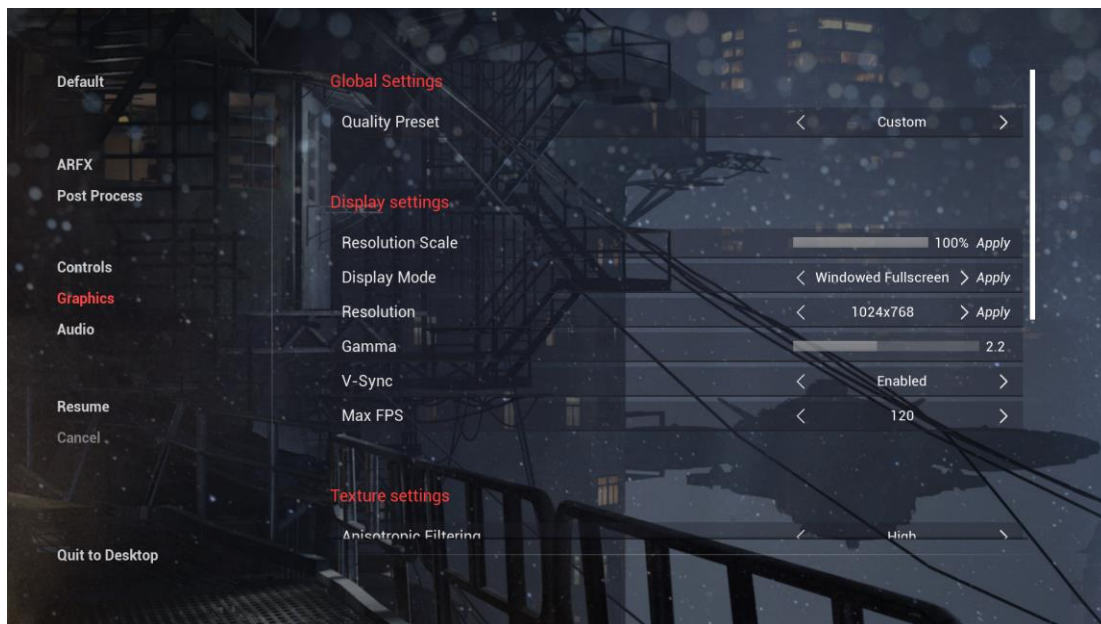
1. **Saturation**
2. **Contrast**
3. **Gamma**
4. **Gain**

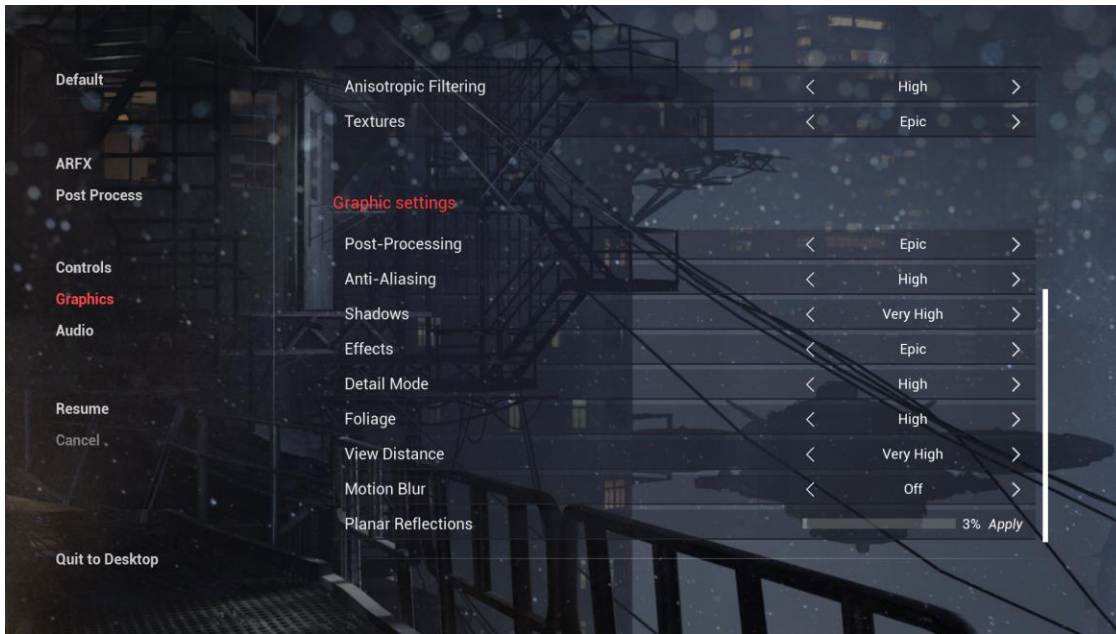






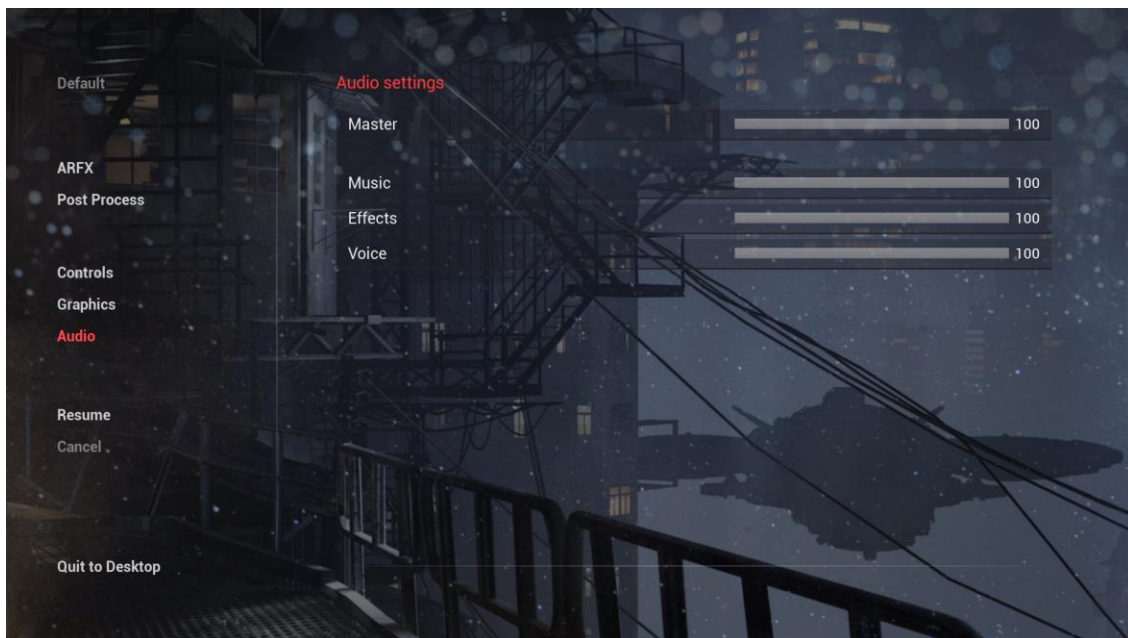
- c. **Controls:** (Hotkeys Customization for both Keyboard & Controller)
- You will first be greeted by a keyboard with all the controls. You can change the UI to view the controller settings instead by clicking 'Show Default Gamepad Controls' at the bottom of the screen.
 - In the top right corner, you can select 'Customize Controls' where you can customize every single hotkey on both keyboard and controller. You can also 'Reset' all hotkeys to the default inputs.





- d. **Graphics:** This section gives you greater control of the overall quality settings of the scene including:
- i. **Global Settings:**
 1. **Quality Preset:** Adjust the quality of all graphics and textures settings.
 - ii. **Display Settings:**
 1. **Resolution Scale:** Adjust the sharpness of the game graphics. When it's too low, the items can show a blurry image.
 2. **Display Mode:** Select the display mode.
 3. **Resolution:** Select the display resolution.
 4. **Gamma:** Adjust the gamma Calibration.
 5. **V-Sync:** Vertical synchronisation to prevent screen tearing.
 6. **Max FPS:** Select the max FPS.
 - iii. **Texture Settings:**
 1. **Anisotropic Filtering:** Reducing blur and preserving detail at extreme viewing angles.
 2. **Textures:** Adjust the quality of the textures.
 - iv. **Graphic Settings:**
 1. **Post-Processing:** Adjust the quality of post processing effects.
 2. **Anti-Aliasing:** Adjust quality of AA, smooths the object's graphics. It is recommended to turn this on.
 3. **Shadows:** Adjust the quality of the shadows for character and objects.

4. **Effects:** Adjust the quality of various effects like reflections and the material fidelity. (Can take a moment)
5. **Detail Mode:** Adjust the minimum detail level for an actor to render.
6. **Foliage:** Adjust the quality of Foliage.
7. **View Distance:** Adjust the visible distance, objects will be hidden based on their distance to the player.
8. **Motion Blur:** Adjust the blur quality on fast moving objects.
9. **Planar Reflections:** Sets any and all planar reflections in the scene to render at a % of the screen's resolution. Recommended at 50% or lower.



- e. **Audio:** Provides you with greater control of your audio settings if applicable.
 - i. **Audio Settings:**
 1. **Master:** Adjust all Volume.
 2. **Music:** Adjust the Music Volume.
 3. **Effects:** Adjust the Effects Volume.
 4. **Voice:** Adjust the Voice Volume.
- f. **Resume**
 - i. If you have made changes to any of the above settings it will ask you if you want to save before resuming.
- g. **Cancel**
 - i. This will cancel any changes made to the above settings and resume play.
- h. **Quit to Desktop**

- i. This will exit the application.

Section 7: Troubleshooting

This section describes how to correct common issues that may occur.

Section 7.1: Vive Trackers Not Recognized or Tracking

This section describes how to correct the *Vive Trackers* if they are not working,

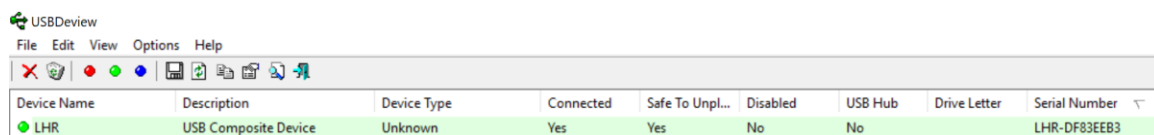
USBDevview

If the *Vive Trackers* are not tracking or if the **ARFX Launcher** is not able to automatically pull in the tracker serial numbers, double check the serial numbers.. Use the following procedure:

1. Connect the *USB-A to Micro USB* (for Tracker 2.0) or *USB-A to USB-C* (for Tracker 3.0) cable from the computer to the *Vive Tracker*.
2. Open the *USBDevview* on your desktop.



3. In the *USBDevview*, under the Serial Number column, look for something that starts with *LHR*. It will be listed with a serial number. If it displays as green, this means it is active and connected to the machine.



A two-*Vive Tracker* system is generally recommended, with a *Calibration Vive Tracker* and a *Hero Vive Tracker*, but if only one tracker is available, please be sure to use the same Serial Number of your one *Vive Tracker* for both *Calibration Tracker* and *Hero Tracker* fields.

SteamVR

If the *Vive Trackers* serial numbers are input correctly but are still not tracking, use *SteamVR* to help troubleshoot.

1. If the **ARFX Launcher** is still open, close it by pressing **ESC** or **Backslash (\)** and choosing **Quit to Desktop** on the bottom left.
2. Navigate to the *SteamVR* window or launch it if it is not on.
3. If *SteamVR* asks for a head-mounted display (HMD), launch the **ARFX Launcher** and click on **Patch SteamVR** button and relaunch *SteamVR*. This should remove the requirement for the HMD and show you any connected *Vive Trackers* and *Base Stations*.
4. If there are any missing *Vive Trackers* and/or *Base Stations*:
 - a. Double check USB cables and USB extension cables for *Vive Trackers* are fully connected into the *Trackers* and the computer.
 - i. If there is a lot of wireless/mobile interference in a space, it's best to keep *Vive Trackers* wired instead of relying purely on the wireless dongle.
 - ii. Asking nearby cast/crew members to turn off their mobile devices may also help improve tracking in general.
 - b. Make sure to position the *trackers* and *base stations* so they can see each other. Give it a few moments as it usually takes a few seconds before *SteamVR* will recognize a previously unconnected device.
 - c. Double check that the trackers have a green (active) or amber (active and charging) light showing on their LED light.
 - i. If a tracker LED light is showing blue or white instead, be sure to press the *Vive Tracker* button. This should turn it green or amber.
 - d. If using more than two *Base Stations*, make sure that all *base stations* are on their own unique channels.
5. If none of the above work, restart the computer and start up *SteamVR* and **ARFX Launcher** again.

Section 7.2: Tracking and Jittering Issues

If you are having jitters with the tracking,

1. Make sure there isn't any IR being reflected towards the puck
 - a. This can cause the puck to jitter and lose tracking, but the tracking will come back.
 - b. If you are losing tracking, make sure the puck isn't being blocked, and it is being seen by the Base Stations.
 - c. It is possible someone may have accidentally bumped one of the Base Stations while setting up. In this case you will just need to recalibrate.
2. If these solutions haven't worked out, you can hardwire the puck using a *USB-A to Micro-USB* or *USB-A to USB-C* cable. This will stop the jitteriness.

BEST PRACTICE: If tracking is jerky for a slow-moving hero camera shot, lower the Positional and Angular values down by 0.01 or 0.001 increments at a time until the tracking is smooth. If the hero tracker is sitting still but there is perceived jitter on

the ARFX background, increase the Positional and Angular values up by 0.01 or 0.001 increments until the jitter no longer shows.

Section 7.3: Recommended Wires

All wires used with **ARwall** should be the most up-to-date versions for best performance:

- *HDMI* should be minimum of 2.0.
- *DisplayPort* should be minimum 1.4.
- If converters are used, be sure to match the minimum versions listed above.
- USB-A Extension Cables should be a minimum of 2.0 or 3.0. If this cable needs to extend longer than 50 feet, fiber optic USB extension cables are recommended.

Section 7.4: Project File Issues

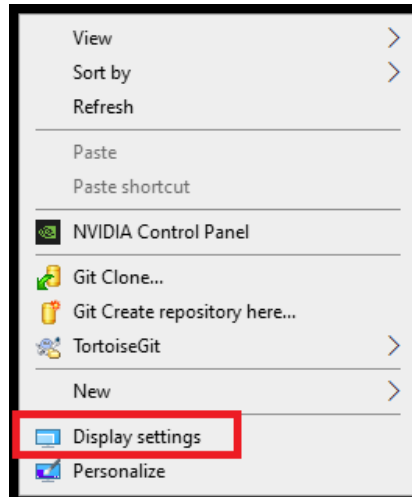
If **ARFX Launcher** keeps closing/crashing after hitting launch, or not opening the login window, try the following:

1. If the login window does not appear, make sure to download and install .NET6 Runtime.
 - a. This is required for the login window to communicate with our software. You can download your appropriate .NET6 Runtime here: <https://dotnet.microsoft.com/en-us/download/dotnet/6.0/runtime>
2. If you entered an incorrect Activation Code with your login and password, follow these steps:
 - a. Open the Launcher and locate the 'Software Key' section
 - b. Click **CLEAR CACHE**, click **ENTER KEY** and enter your Activation Code once more.



Section 7.5: ARFX Launcher Loading on Wrong Display

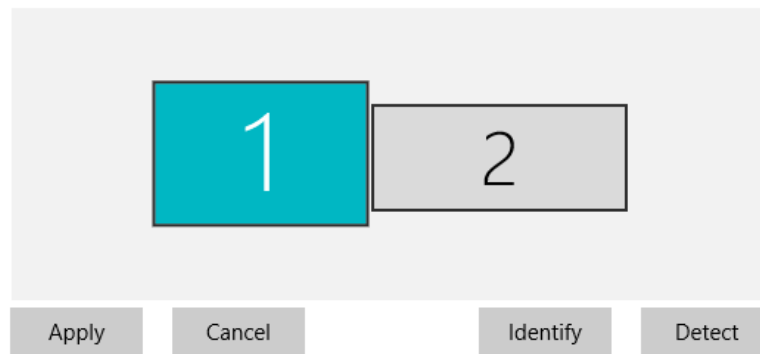
1. If the **ARFX Launcher** does not load on the display you selected, please set the selected display as your "main display." To do so, right click on the desktop and select "Display Settings."



2. Select the display that you want to load the **ARFX Launcher** on under the “Rearrange your displays” section. (Screen 1 is selected below)

Rearrange your displays

Select a display below to change the settings for it. Press and hold (or select) a display, then drag to rearrange it.



3. Scroll down to “Multiple displays” section and click on “Make this my main display”

Multiple displays

Multiple displays

Extend these displays

☐ Make this my main display

4. Close out Display Settings and launch **ARFX Launcher**. It should now load on your intended display.

Keyboard Hotkey Layout

