

## 1 Introduction

This document contains the instructions to set up a computer for Virtual Reality and use the new Virtual Reality mode on eDrawings. These instructions are for a PC desktop with Solidworks 2019 and eDrawings Pro 2019 SP01 already installed.

## 2 Virtual Reality and eDrawings

Virtual Reality (VR) is a computer-generated experience that creates simulated and immersive environments. There are currently a number of different headsets on the market that allow you to do a variety of things in the virtual world. In 2019, Solidworks came out with a new feature that allows users to import their CAD files onto eDrawings and view them through a VR headset. This feature allows users to better visualize their product before they produce a physical copy. Since this is a new development and the feature has only been available for a few months, eDrawings Virtual Reality can only be used with the HTC Vive or HTC Vive Pro VR headsets. Additionally, the feature only appears on the eDrawings Pro 2019 SP01 Full release version. eDrawings and Solidworks have announced that they plan to make this feature accessible to more headsets in the future.

## 3 eDrawings Virtual Reality Technology Requirements

Using the Vive VR headset requires a computer with a higher-end graphics card and the most up-to-date software to ensure your headset and computer are compatible. Here are the specific requirements to run the eDrawings Direct VR feature obtained from the Solidworks forum:

System Requirements:

- Processor: Intel i5 or i7 running Windows 10
- RAM: Minimum 32 GB
- Graphics card: nVidia Quadro P3000 and up. This feature is heavily dependent on GPU so you will appreciate a high end nVidia graphics card. They do not support AMD yet.
- VR Headset: HTC Vive running on Steam
- Software: eDrawings Pro 2019 SP01 Full (not Early Visibility)

## 4 Setting Up Your PC or Laptop

To ensure that your PC is “Virtual Reality ready” there are programs you can install and run on your PC to determine whether your computer is compatible. Each VR company has its own requirements but to install the HTC Vive VR headset, you can visit [Vive Ready](#) and download the file for the Vive.

	VIVE	VIVE Pro
<b>Processor</b>	Intel™ Core™ i5-4590 or AMD FX™ 8350, equivalent or better	Intel® Core™ i5-4590 or AMD FX™ 8350, equivalent or better
<b>Graphics</b>	NVIDIA GeForce™ GTX 1060 or AMD Radeon™ RX 480, equivalent or better. For additional graphics card options, <a href="#">view the complete list</a> .	NVIDIA® GeForce® GTX 1060 or AMD Radeon™ RX 480, equivalent or better. For additional graphics card options, <a href="#">view the complete list</a> .
<b>Memory</b>	4 GB RAM or more	4 GB RAM or more
<b>Video output</b>	1x HDMI 1.4 port, or DisplayPort 1.2 or newer	DisplayPort 1.2 or newer
<b>USB</b>	1x USB 2.0 port or newer	1x USB 3.0 port or newer
<b>Operating system</b>	Windows™ 7 SP1, Windows™ 8.1 or later or Windows™ 10	Windows® 8.1 or later, Windows® 10 Upgrade to Windows® 10 for the best results with the dual front facing cameras *Driver is required to download and install before using VIVE Pro under Windows® 7.
		Recommended Graphics for the best experience is NVIDIA® GeForce® GTX 1070/Quadro P5000 or above, or AMD Radeon™ Vega 56 or above.

[Test My PC](#)                      [Test My PC](#)

Once you download and open the file, the program will run a test and create a report of any requirements your computer does not meet. Once you have met all requirements, you are ready to set up the VR headset.

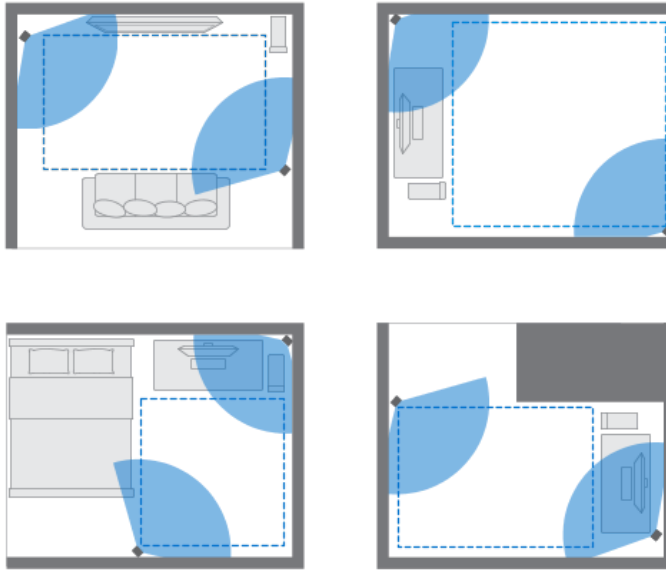
## 5 Setting Up the HTC Vive

There are instructions for all Vive headsets on [Vive Setup](#). However, I will outline the steps that I used from [HTC Vive setup guide](#) because these instructions are much simpler and there are some steps that you can skip.

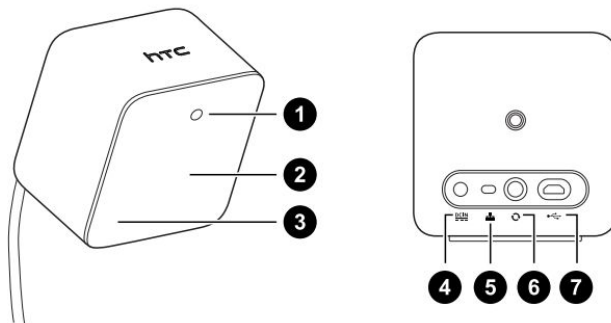
### 5.1 Setting Up the Base Stations

1. Pick a room. If you are going to setup using a seated or standing experience, there is no minimum space requirement. If you are using a room-scale experience, the minimum space requirement is 6.5 x 5 ft. The maximum diagonal length between base stations is 16 ft. 4 in. Make sure there are no low hanging fans, windows, or any other objects that could be potential hazards in the designated space. Note: eDrawings does not require a specific setup.
2. Installing the base stations. The base stations can be mounted onto walls, placed on top of bookshelves, or tripods. Just make sure that the base stations face each other and there is nothing blocking their line of sight. The base stations should be diagonal from

each other. Here are examples of room setups:



### 3. Connecting the Base Stations.



1	Status light
2	LED lens
3	Channel indicator
4	Power port
5	Channel button
6	Sync cable port
7	Micro USB port

- a. First plug the base station power cord provided into the power port and connect the other end to a power source.
- b. Press the Channel/Mode button until one base station reads “B” in the Channel indicator and the other base station reads “C” in the same area.

- c. After this, the Status light should be either green or white. If a different color appears, here are some common solutions:
  - i. **No LED:** Make sure the base station(s) are getting power.
  - ii. **Blinking white LED (standby mode):** Unplug and then re-plug the base station(s).
  - iii. **Blue LED that never changes (waiting to stabilize):** Make sure the base stations are secure. Vibrations prevent connection stabilization.
  - iv. **Purple LED blinks or remains solid (connection issue):** Make sure nothing is blocking communication between the two stations.

## 5.2 Setting Up the Link Box

There are two sides to the Link Box. An orange side and a non-orange side.

Using the non-orange side first:



1. Plug in the Power cord into the Power port on the Link Box and connect the other end to a power outlet.
2. Plug in the USB cord into the USB-A port on the Link Box and connect the other end to any USB-A port (2.0 or newer) on your PC.
3. Plug in the HDMI cable into the HDMI port on the Link Box and connect the other end to an HDMI port on your PC. (Make sure the HDMI port on your PC is not grouped with the USB ports and audio ports because those are linked to the integrated graphics which will not support the Vive.)

Note: You may need a Mini DisplayPort to HDMI adapter if you do not have the proper HDMI ports for your PC.

Using the Orange side:

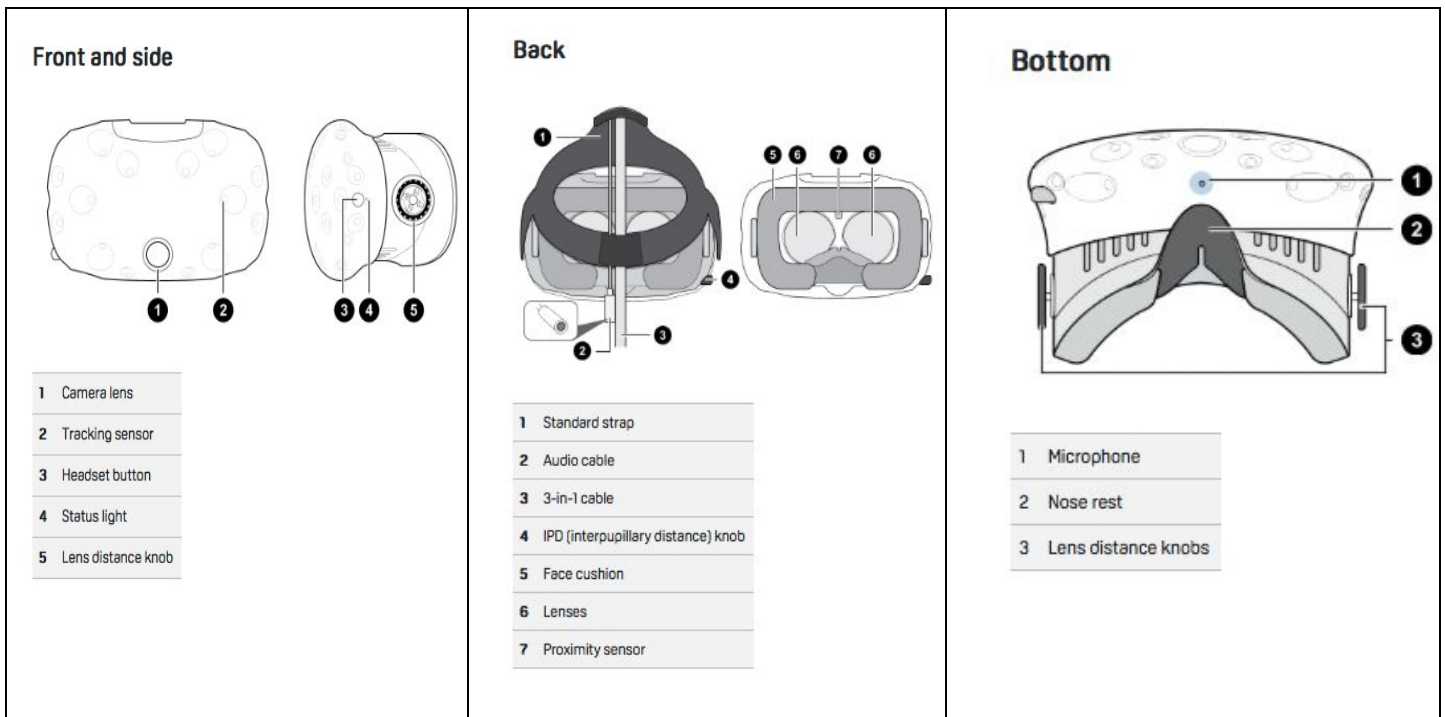


The Vive Headset comes with a 3-in-1 cable that connects to the Link Box.

1. Plug in the headset's HDMI connector into the HDMI port on the Link Box.
2. Plug in the USB-A connector into the USB-A port on the Link Box.
3. Plug in the power connector into the Power port on the Link Box.

### 5.3 Adjusting the Headset

Here is a diagram of the headset:



Try on the headset and adjust the standard straps so the headset is secure on your head. If you need to adjust the lens distance for any reason:

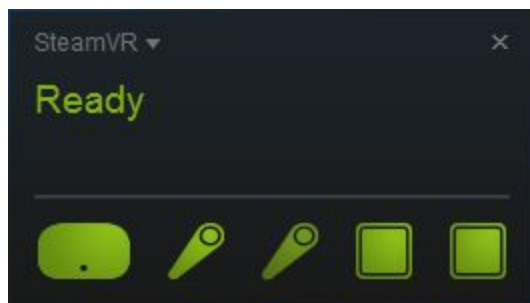
1. Referring to the bottom view picture of the headset, the gray rubber rings located at the end of the side straps are the lens distance knobs. Grab them and pull them out about an eighth of an inch.
2. Still pulling them out, turn the gray rings. You will begin to notice that the piece that touches your face extends out from the lens portion of the headset.
3. You will feel the knob “click” up to six times as it moves away from the lens/sensor section.
4. After you have adjusted the headset, push the gray rubber ring back down into place to lock down the new adjustment.

Additionally, you may need to adjust the interpupillary distance (physical distance between pupils). Referring to the back view picture of the headset, the IPD knob is located on the bottom right side of the headset. It is best to adjust this setting when in VR. Turn the knob until the IPD fits your preference.

## 6 Installing SteamVR

There are two systems that allow you to connect your HTC Vive to the “Virtual World”: Steam VR and Viveport. eDrawings runs through SteamVR, so Viveport is unnecessary to purchase and install. You can download SteamVR by visiting [SteamVR](#). Once you have created an account on Steam, locate the VR button on the top right corner of the Steam window. Clicking this button will open a small window that tells you when your headset, base stations, and controllers are connected. Your base stations and headset should already be connected and appear green in this window.

Connectivity window:



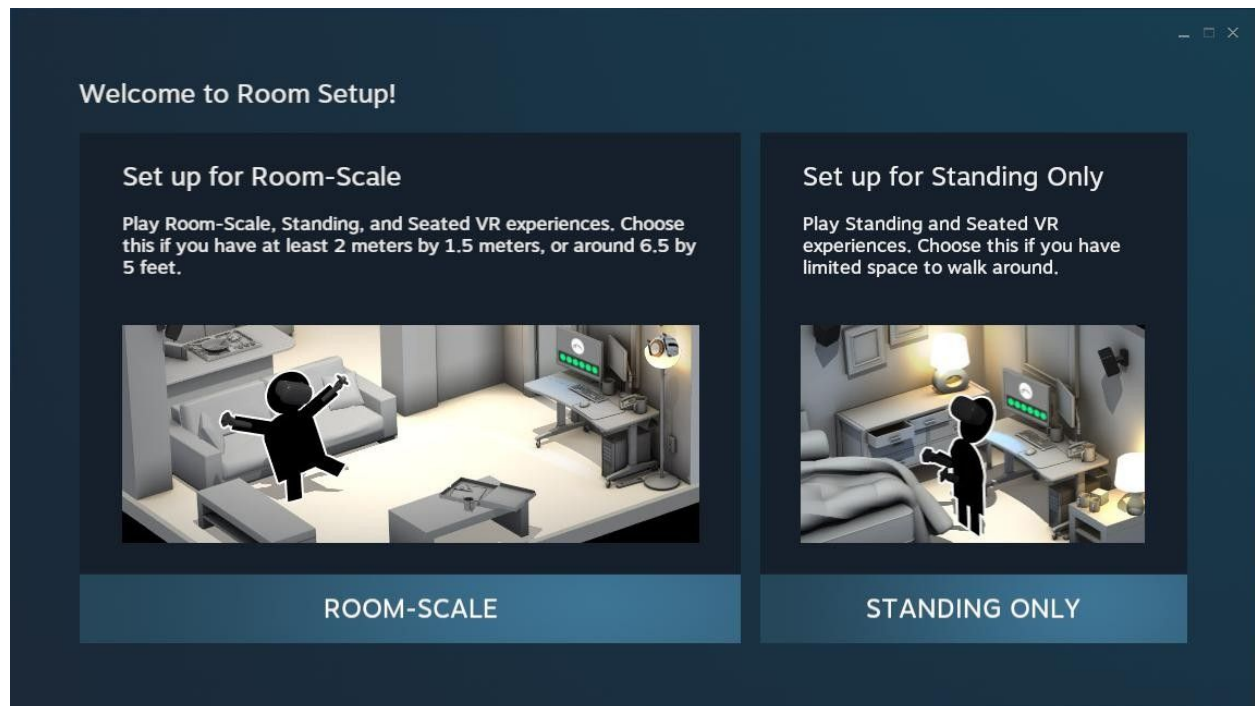
### 6.1 Activating Controllers

Your controllers were charged prior to being shipped but it is a good idea to charge them before you begin to use any VR programs. (There are two Micro USB chargers, one for each controller.) To activate your controllers, press and hold down on the bottom-most button (Steam

menu button) until you hear a chime and the controller icon turns green on the connectivity window. Make sure your controllers are in the line of sight of the base stations, otherwise the base stations will not detect the controllers.

## 6.2 Room Setup

To setup your area of play, click the menu icon on the top left corner of the connectivity window. The first option is “Room Setup.” Choose which type of setup you will be using: room-scale or standing only. Follow the instructions.



## 6.3 Tutorial

Steam provides a tutorial on how to use the controllers and the Steam platform. The tutorial can be found by clicking the menu icon on the connectivity window. Click the “Tutorial” option, plug in your headphones, and put on your headset to begin.

## 7 Setting Up eDrawings

After setting up the headset, you can open eDrawings Pro 2019 SP01 Full. Notice that the option to “Open in VR (beta)” under the File menu is not available or does not appear? This is because a new environment needs to be created to enable the feature. To create the new environment:

1. Search “environment” on the PC’s search bar on the left corner of the screen and then press “enter”.
2. A new window will open called “System Properties” and in the bottom right corner of the window, click the “Environment Variables” button.
3. Click “New” under the User Variables to add a new environment
4. The variable name is: ED\_RS\_ENABLE\_VR
5. The variable value is: true
6. Make sure both of these are typed with the correct capitalization and punctuation otherwise the new environment will not be correct.
7. Lastly, go back to eDrawings and open the File menu and confirm that you can now see the “Open in VR (Beta)” option.

Now you can open models in eDrawings. However, you still need to download the resources like the textures, floors, skies, controller models, etc. that allow you to view models with your VR headset.

1. Download the file provided through this link:  
<http://www.solidworks.com/plugins/edrawings/download.cfm?Release=LATEST&Type=MAT> . (You can save this file anywhere on your hard drive.)
2. Then go back into eDrawings and go to “Tools”, then “Options”, then to the “Import” tab, and locate the “Solidworks Materials Folder” and add this location:  
C:\swdist\SWMaterials\_2019
3. Click “OK” and restart eDrawings to make sure the path is registered and all changes were saved.

## 8 Opening Files in eDrawings

Open a Solidworks Assembly or Part file on eDrawings through the “Open in VR (Beta)” option under the File menu. When the file opens, your starting point is the origin of the Solidworks sketch. To view the file through the VR headset, click “Play” on the lower left hand corner of the eDrawings window and make sure your controllers are connected.

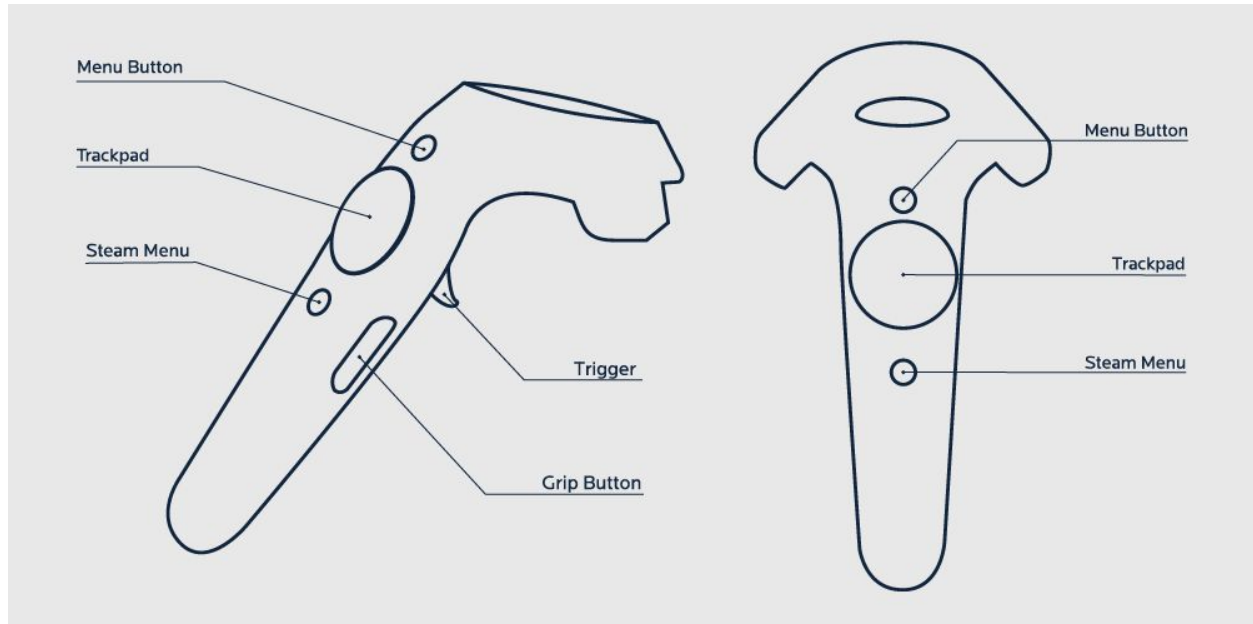
## 9 eDrawings Capabilities

In the meantime, eDrawings VR allows you to: teleport around your model, take apart your model to examine specific parts, and explode the assembly to see how everything fits together.

Due to the fact that eDrawings VR is so new, the program’s capabilities are limited. However, Solidworks has announced that it does intend to not only expand compatibility to other types of headsets (i.e. different companies in addition to HTC Vive) but also add more features like “measuring, dynamic section views, improved graphics, and more.” These features will slowly become available in future releases according to a newsletter posted by Solidworks.



## 10 Controller Assignments



eDrawings uses both Vive controllers, however the right controller is the main controller as it provides movement and manipulation of objects in the model.

### 10.1 Right Controller

Trigger: Lift and Release Part

Trigger + Trackpad Click Left/Right: Rotate Lifted Part

Trigger + Trackpad Click Up/Down: Scale Lifted Part

Menu Button: Reset View and Model

Trackpad Click Forward: Teleport or Jump to Pointer

Trackpad Click Center + Trigger: Move Part

### 10.2 Left Controller

Menu Button: Explode Assembly

To reset assembly click the Menu Button again.

## 11 Logging Off of VR

Before you store your headset, it is important that you log off of any VR programs.

1. Turn off your controllers by holding down the Steam menu button until you hear a chime and they no longer appear green on the connectivity window.
2. Exit out of any sketches open on eDrawings
3. Exit out of the SteamVR windows. (SteamVR will alert you that closing out of their windows will turn off your headset.)

## **12 Storing the VR Headset**

Once you have quit all SteamVR windows you can store the headset. Make sure to store the headset away from any light source because excess light can damage the lenses. The base stations do not need to be unplugged but can be if you are taking down the setup or need the power outlet for other things. For the most part, you can unplug any cables from the headset or base stations without disturbing your setup.

## **13 Proper Use of Headset**

It is important to take frequent breaks when using a VR headset for long periods of time. You should not be in VR for more than 15 minutes without taking a break. It is recommended to start with the seated/standing experience to get used to VR. This will reduce the chances of dizziness and slowly introduce you to VR. Once you feel comfortable with the seated experience, you can try the walking experience. With regards to the eDrawings VR program, you can access all capabilities with the seated experience and therefore the walking experience is not necessary.

## **14 Conclusion**

As of now, the eDrawings feature can only be used to view assemblies and parts of a model. This add-on was developed to help businesses reduce the cost of physical prototyping and be able to interact with their model before a physical copy is produced. This feature was also developed to help companies survey consumers and allow them to experience a product without having to create several physical prototypes. It is a great tool for this purpose however, one cannot edit a model while in VR. There are some programs that allow you to interact with your model and edit it in real time while in VR but these programs are third party extensions that require extra steps to change the Solidworks files into .obj or other file types.

