KScan3D supports up to four sensors connected to a single computer.

By using more than one sensor, you can capture scans from multiple angles at once. Multi-sensor setups can significantly shorten the amount of time spent scanning larger objects. This is especially helpful when data capture must be performed as rapidly as possible, for instance when scanning a person. For more information about capturing full body scans, see Creating A Multi-Sensor Setup For Full Body Scanning.

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### Hardware Requirements

#### Computer Requirements

The requirements for a multi-sensor setup are greater than those of a typical computer. Here are the recommended specs:
- A desktop PC running Windows 7 64-bit or Windows 8 64-bit
- A quad core 2Ghz CPU or better
- 16GB of RAM or more
- A video card with at least 1GB Video RAM and a fast GPU
- 20GB hard drive space or more
- Enough USB 2.0 ports to support the desired number of sensors plus all other USB devices concurrently (see note below)

**Sensors**

As with single-sensor scanning, KScan3D supports the following sensors:

- Microsoft Kinect for Windows
- Microsoft Kinect for Xbox 360
- ASUS Xtion PRO
- ASUS Xtion PRO LIVE

**A Note About USB Ports**

To run a multi-sensor setup, it is crucial that your computer have enough USB port **throughput** and **power** to support all connected devices simultaneously, including sensors, a keyboard, a mouse, and any other USB devices.

Most USB ports are powered and driven by USB controllers in pairs. For this reason, although your computer may appear to have an adequate number of USB ports, it still may not recognize one or more connected sensors or devices.

For example, at least five pairs of USB 2.0 (or 3.0) ports - each independently powered and controlled - are recommended when using a four-sensor setup.

The computer pictured below has one pair of USB 2.0 ports in the front, with a keyboard and wireless mouse connected:
The back of the computer has four pairs of USB 2.0 and USB 3.0 ports. Three pairs are in the port panel and one pair is on a powered PCIe card.

Note that each pair of ports has only one sensor connected.
Setting Up KScan3D to Use Multiple Sensors

KScan3D now provides improved multi-sensor scanning support. A new Eliminate Interference option allows sensors to capture overlapping scans without data corruption due to infrared pattern interference between sensors. You can also reorder the sensors so the live feeds reflect real-world sensor positions and even group sensors together to capture scans simultaneously.
1: Launch KScan3D

Launch KScan3D and ensure that all sensors are operating properly. If all live feeds are not displayed, select the magnifying glass icon on the right hand side of the screen to hide the visible feed(s), then select the button again to show all feeds. If all feeds are not showing, see the Troubleshooting section below.

2: Create a New Project

Select the New Project button in the Toolbar and create a new project.
3: Select the Devices Tab

Select the Devices tab at the top-left corner of the screen to access the Devices interface.

4. Adjust the Sensor Live Feed Order (Optional)

If desired, select and move the sensor names up and down in the list until the order of the live feeds corresponds to your actual sensor positions.
You can also group sensors together so they capture scans simultaneously. This can shorten scan times. However, keep in mind that data captured from sensors that are grouped together and aiming at the same target may result in corrupt data due to infrared interference.

Here are some examples of the results you can obtain using different Group settings:

- If all groups are set to default, the sensors will capture scans one at a time in the order they are listed.
- If Scanners 1 and 3 are set to Group 1 and Scanners 2 and 4 are set to Group 2, first sensors 1 and 3 will capture scans simultaneously, then sensors 2 and 4 will capture scans simultaneously.
- If all four Scanners are set to Group 1, all four sensors will capture scans simultaneously.

5. Select the Eliminate Interference Checkbox

Select the Eliminate Interference checkbox. Provided the Group settings are set accordingly, this option will allow the sensors to capture overlapping scans without data corruption due to infrared pattern interference.
6. Close and Relaunch KScan3D

To ensure that the sensors properly accept all settings, close and relaunch KScan3D.

Setting Up A Multi-Sensor Project

Prior to using your multi-sensor setup, you need to capture an initial set of temporary scans and use the Set Preset feature. This will calculate and save the positions and orientations of the sensors relative to one another.

1. Set the Meshing Settings

In the Meshing panel, set Generate to Meshing and Alignment to None.
2. Set the Scanning Settings

In the Scanning panel, be sure the Enable Batch Scanning option is not checked. Unless you need additional pre-scan time, set the Delay (in seconds) to 0.

![Scanning Settings Panel]

3. Capture a Single Scan

Press the SCAN button to capture scans from all sensors.
4. Manually Align The Scans

Manually align and lock the scans:
1. Deselect and uncheck all scan thumbnails.

2. Select and check the first scan thumbnail.
3. Press the Lock button to lock this scan.
4. Select and check the second scan thumbnail.
5. Move and rotate this mesh roughly into alignment with the first scan.
6. Press the Align button to align and lock this mesh.
7. Repeat this process for the third and fourth meshes, if applicable.

All meshes should now be aligned and locked.
For more information about manually aligning scans, see the Manual Mesh Alignment section here: [Aligning Data](#).

5. Select and Save All Scans
Be sure all of the scans in the Thumbnail panel are checked and selected, then press the Save All button to save all the scans.

6. Set the Preset
Again, be sure all of the scans in the Thumbnail panel are checked and selected, then press the Set Preset button.

All subsequent scans in all projects will now rely upon this preset to determine how generated meshes will be positioned and oriented.

Note that if any of the sensors are ever moved, steps 1 through 6 will need to be repeated.

7. Delete the Scans

Delete the scans, as they aren't needed for the actual capture process.

Capturing and Processing Scans

KScan3D should now be ready to properly capture scans will all connected sensors.

With a multi-sensor setup, you can capture and process scans in a number of ways. These are listed on the Scanning an Object page in this manual.

The Rapid Point Cloud Capture With Postponed Processing method is particularly well-suited for multi-sensor scanning, especially when your target object is resting on a motorized turntable. For a complete step-by-step process using this method, see Creating A Multi-Sensor Setup For Full Body Scanning.

Multi-Computer / Multi-Sensor Setups

If scanning speed is crucial, multiple computers configured with multiple sensors and multiple copies of KScan3D can be used to capture data much more quickly. Scan data can then be copied to a single computer for finalization and export. To trigger each scan capture, you can press each SCAN button manually or write a program that uses the KScan3D API to trigger scans across a network.
Troubleshooting

Sensor Issues

If Windows does not recognize all of the connected sensors in a multi-sensor setup, the problem is likely caused by one or both of the following:

- One or more of the USB ports is sharing a USB controller, and there is a conflict with other connected USB devices that are also sharing the controller.

- One or more of the USB ports is insufficiently powered to handle the connected sensor(s) and/or device(s).

If you are using a desktop PC and you have a PCI card slot available, you can usually install a USB card to provide your computer with additional USB ports and controllers as needed.

Laptops that are capable of supporting more than two sensors are rare. Note that plugging a multi-port USB hub into an existing USB port will not be sufficient, as doing so simply shares the port's available throughput and USB controller with the added hub ports.

Alignment Issues

If there is not enough overlapping data from one scan to the next, KScan3D won't be able to properly align a mesh to a previous mesh.

Be sure your computer has the minimum required specs listed above. Also, remember that the Rapid Point Cloud Capture With Postponed Processing scanning method is the best way to capture scans as quickly as possible.

If you are using a motorized turntable, be sure the rotation speed is slow enough for your computer to capture sufficient overlapping data.

If your scanning object has surface qualities that are too dark, reflective, and/or transparent/translucent, there may be too many holes in the mesh for the alignment process to work properly. You may wish to prepare your object as recommended here: Scanning Basics.

If you are scanning a person and s/he moves a body part during the scanning process (for instance, his or her arm moves or head tilts), either the automatic alignment process may be affected or you'll get inaccurate mesh results. If body part movement is an issue, you can use additional stabilization structures to help the person remain as still as possible. Remember, these objects can be deleted from the scans prior to finalizing the mesh.

Keep in mind, just because a mesh won't automatically align doesn't mean the mesh is unusable.
If a mesh has enough overlapping data compared to other scans, it can often be aligned manually. For more information, see the Manual Mesh Alignment section here: Aligning Data.

Also, it is important to remember that meshes can be combined in groups. The separate groups can then be combined together to form a single combined group prior to finalization.

NEXT: Creating A Multi-Sensor Setup For Full Body Scanning