

## Install and Operate Sharp Shape USB3D Foot Scanner

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The installation procedures are described in Part II of this article. Because you only use it once for the installation, we put that part at the end of the article. Please read that part carefully before you operate the scanner. Failing to do so may result in unnecessary trouble.

### Part I: Operation Instructions

To launch the scan program, go to Start, Programs, and find the Sharp Shape USB Foot Scanner. You can also set up an icon on your Desktop and launch the program from Desktop. Once the program is launched, you should see a similar screen as shown in Figure 1. After it is launched, there will be no image.

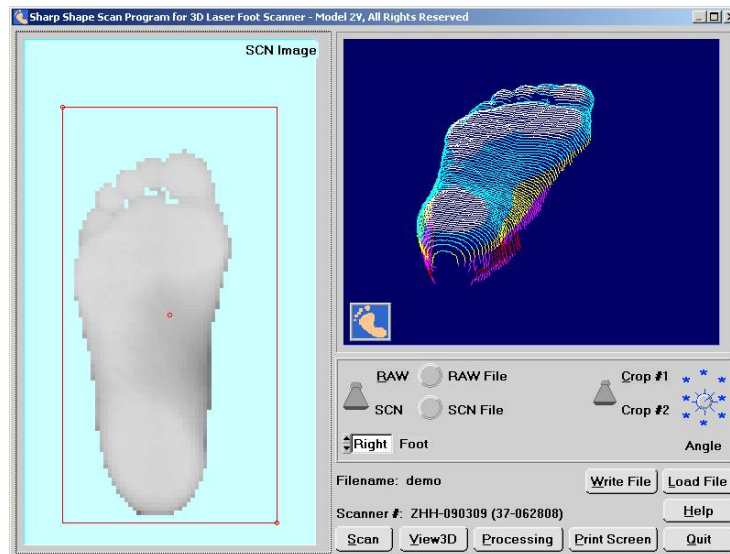


Figure 1

Once you have clicked the 'Scan' button, the following menu will appear (on the left of Figure 2). After you have typed in the name and clicked "Begin Scan", the scan program waits for data (on the right of Figure 2).

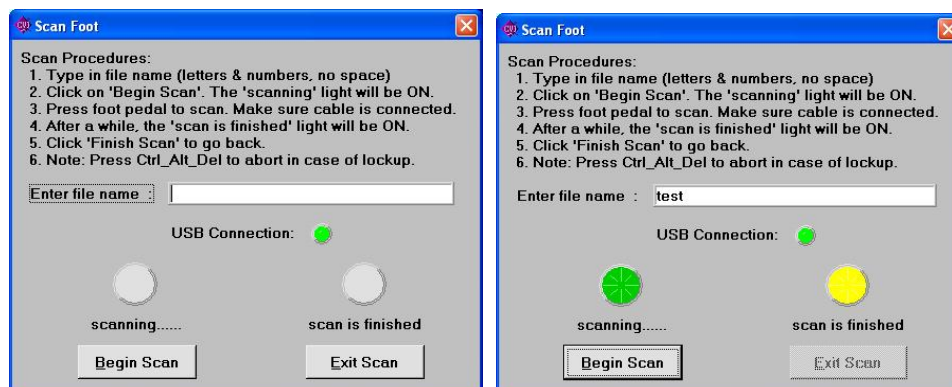


Figure 2

Now you can arrange the foot in front of the scanner glass. If you make a neutral foot position, either the 1<sup>st</sup> met. head or the 5<sup>th</sup> met. head may lift from the glass depending on the foot varus or valgus. The foot should be put as close to the glass as possible.

For the current model (USB3D), we have upgraded the imaging board of our previous model (2V) to a native USB imaging board. A USB board decreases the scan speed from 15 seconds to 4 seconds, meaning the user will not need to hold the foot as long.

The scan should be made with the scanner in the upright position as shown in Figure 3. The height of the patient chair has to be suitable. Press the foot pedal when ready. Although a dark room is not required, some experiments with different light conditions are needed for better result.



Figure 3

Once the scan is taken, you should see the screen with foot image like Figure 4. At this time, you check the integrity of the image and decide to make a re-scan or to keep this image. If you want, you can save the SCN image as SCN file. The SCN and RAW files are two different formats. The SCN format contains more curvature, so it is better for foot diagnosis and evaluation. The RAW format is for the CAD/CAM software. The CAD/CAM software is required for the milling of mold/orthotic/insole.

The foot image is shown with a red cropping box (Crop #2) or red cropping polygon (Crop #1). Cropping is used to get rid of unwanted image (scattered lights and fingers). Everything inside the cropping box will be kept and everything outside will be cropped.

There are two ways of cropping the image. The default is a cropping box (Crop #2) and it is a simpler way. There are only three moveable dots when Crop #2 is selected. If the image needs a better cropping, click the Crop #1 / Crop #2 switch and select Crop #1. There are multiple moveable dots for you to drag and you can do a better cropping with these dots.

To utilize the cropping box, use the mouse to drag the red dots to where you want. After the red dots are in desired places, click the RAW/SCN switch. The SCN image is transferred to the RAW image. The image is cropped at the transition. The adjusted cropping polygon is shown in the Figure 4. Crop #1 is used in this case. The result of the cropped image is demonstrated in Figure 5.

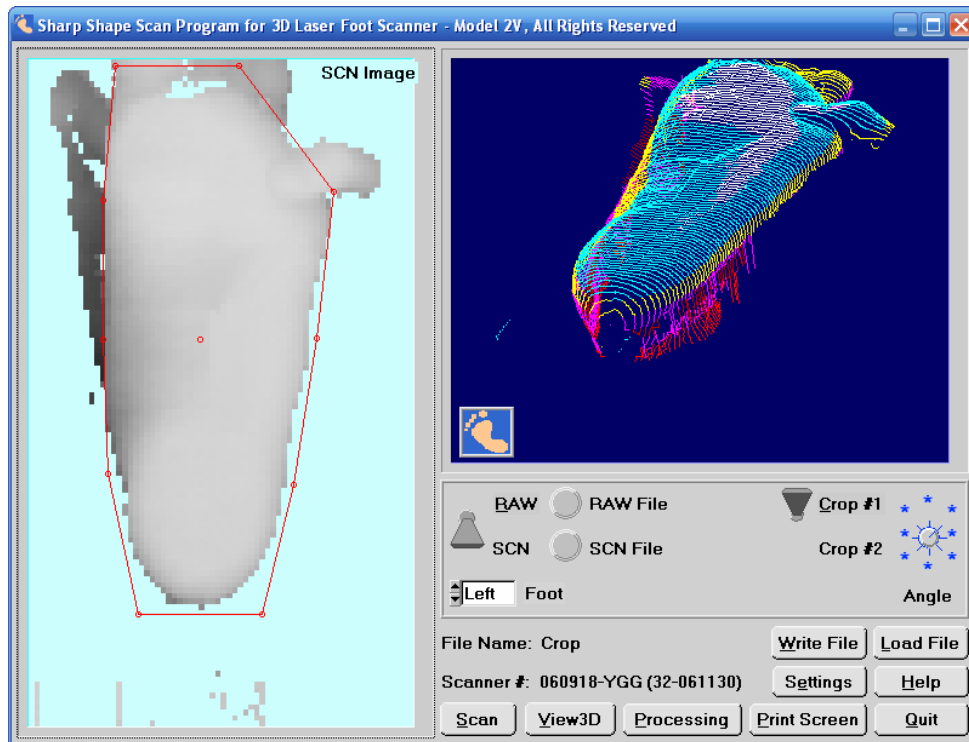


Figure 4

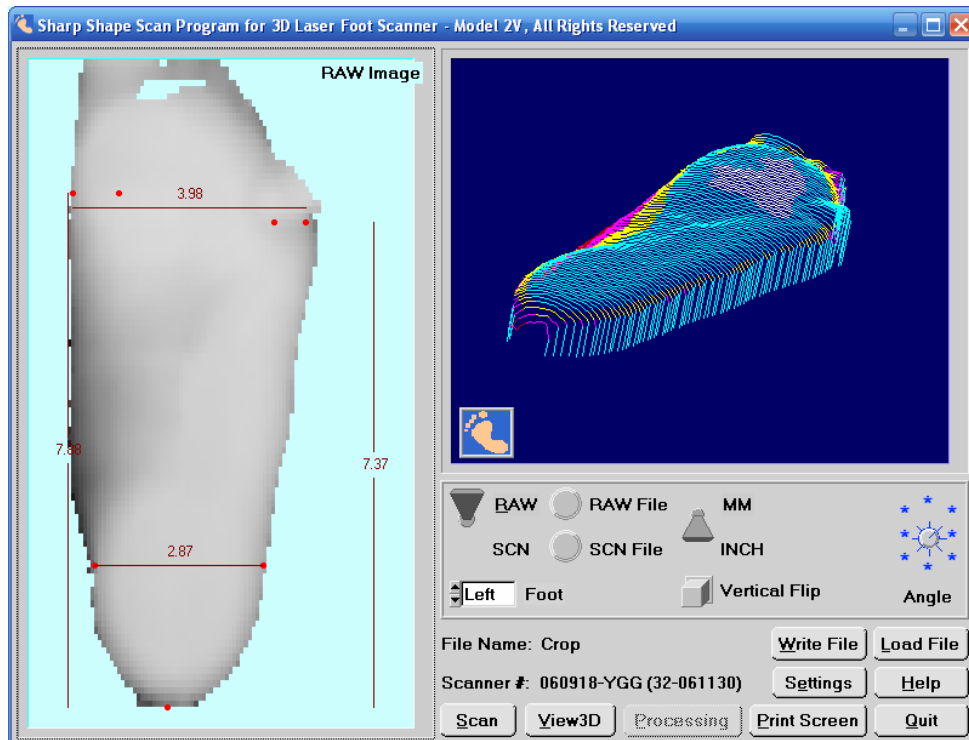


Figure 5

After cropping, the red dots on the foot will provide references for the cast correction software for the width, length of the device. Click on the red dots and drag them to the suitable places. The outer two dots on the forefoot define the width of the forefoot and the inner two dots on the forefoot define the locations of the 1<sup>st</sup> and 5<sup>th</sup> met. heads. Use common sense to locate them. Also locate the three dots on the heel to suitable locations. The measurements are shown on the screen. After you are done, click on 'Write File' to write the RAW file.

The locations of the RAW files and SCN files are as following:

C:\SCANFEET\RAWFILE

C:\SCANFEET\SCNFILE

SCANFEET is the folder where you installed your programs. You can access the files in these locations, if you want to copy or email them to somewhere else.

Print Screen and View3D are two useful utilities that are not mandatory to the scan process. You can experiment with them.

### Image Processing

When using 'Processing', leave the RAW/SCN switch on the SCN position. You still need to adjust the cropping box or polygon with the methods mentioned above. The Processing only affects with the image inside the cropping box, so adjusted box is better than the non-adjusted. If you don't take care of the cropping box, noise may get into the 'Processing' menus and make the work hard for you. Therefore, it is important to use the cropping methods introduced above.

Processing is the recent improvement in the scan program. It has many advantages. As you know, a good image is very critical for making good cast corrections. Sometimes, it is very hard to make good scans. For example, it is hard to manipulate the foot for a good position and orientation. It is sometimes hard to control the lighting condition.

You can solve some of the problems with our old DOS processing program. However, the old processing program only processes RAW files. RAW file is a secondary file comparing with the SCN file. The processing functions in the new scan program are based on the SCN file. SCN file is a direct scan file. Although data loss occurs in both processing programs due to math calculation round-offs, the processing in the new scan program (or the Convert program) is much better than the old DOS program.

We added a new button named 'Processing'. The button is shown in Figure 6. After you click on it, it opens up a whole new world.



Figure 6

After clicking the 'Processing' button, a small menu shows up. The menu is shown in the following. You have three choices, i.e. Yaw, Pitch and Roll. Let's go through them one by one in the following.



Figure 7

The Yaw menu is shown in the Figure 8. The original foot is shown on the left-hand side. There is a red line that works as reference. There is a blue line which is adjustable. On the blue line, there are two dots that are moveable.

To use the Yaw menu, check the integrity of the image first. If the image requires adjustment on the long axis, use the left mouse button to click and drag the lower dot to the center of the foot. Then use the left mouse button to click and drag the upper dot to make the blue line lines up with the long axis of the foot. Then click 'View' button. The rotated image will be shown on the right-hand side. Refer to Figure 8.

If you want to save the change, click 'Back (save)'. If you don't want to save the change, click 'Back (no save)'. After you get back to the first page, remember to click 'Write File' if you want to save the change to the SCN file.

Please note that a small math calculation error will occur during processing, so we do not recommend large angle rotation and we do not recommend rotating the foot for multiple times (meaning rotate/write the file, then re-load the file and rotate/write again). The large angle problem should be corrected at the first place (during scan). Again, doing the rotation here is much better than doing it in the old DOS program.

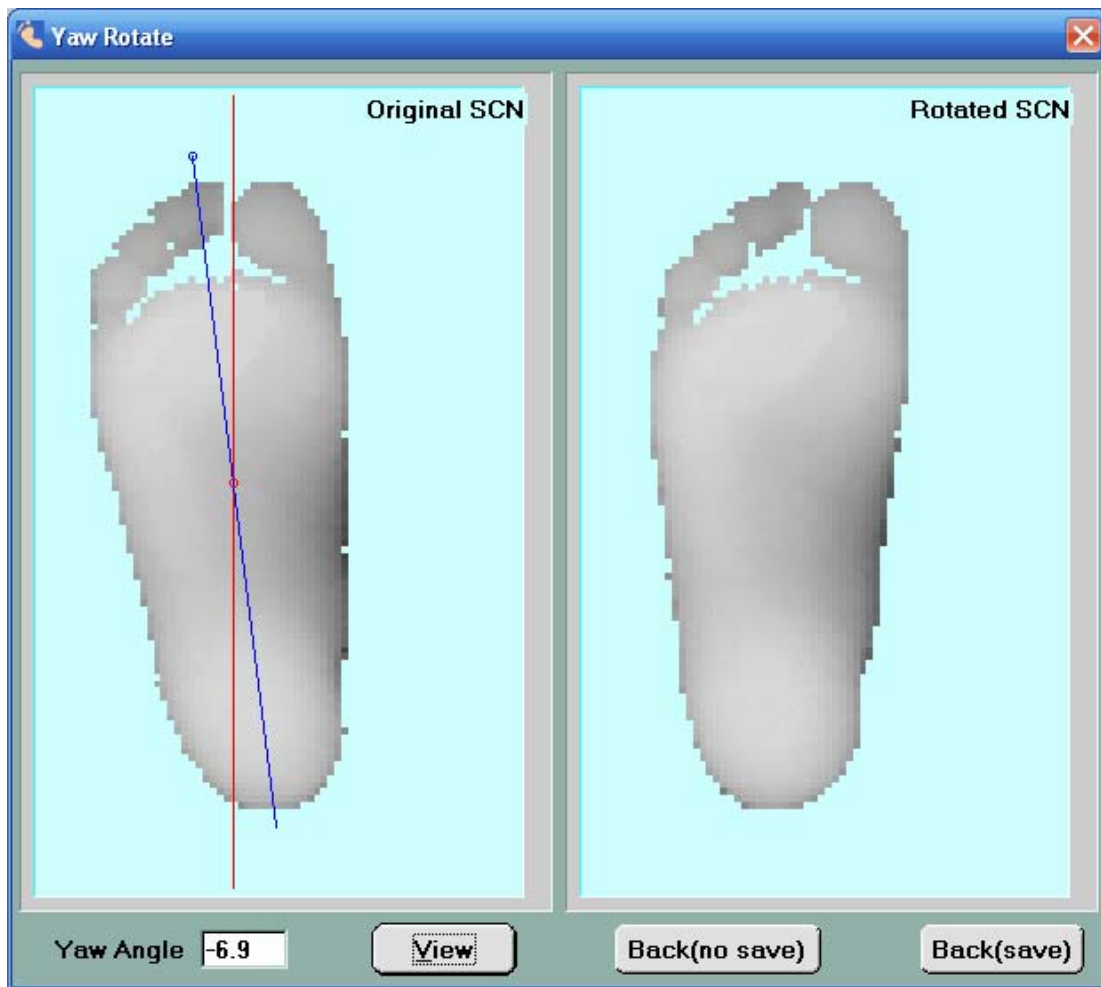


Figure 8

The Pitch menu is shown in Figure 9. The original foot is shown on the upper window. There is a red line that works as reference. There is a blue line which is adjustable. On the blue line, there are two dots that are moveable.

To use the Pitch menu, check the integrity of the image first. If the foot image requires adjustment on the pitch angle, use the left mouse button to click and drag the left dot to a proper location on the left side of the foot. Then use the left mouse button to click and drag the right dot to make the blue line lines up with the bottom of the foot. Then click 'View' button. The rotated image will be shown on the lower window. Refer to the following figure.

If you want to save the change, click 'Back (save)'. If you don't want to save the change, click 'Back (no save)'. After you get back to the first page, remember to click 'Write File' if you want to save the change to the SCN file.

Please note that a small math calculation error will occur during processing, so we do not recommend large angle rotation and we do not recommend rotating the foot for multiple times (meaning rotate/write the file, then re-load the file and rotate/write again). The large angle problem should be corrected at the first place (during scan). Again, doing the rotation here is much better than doing it in the old DOS program.

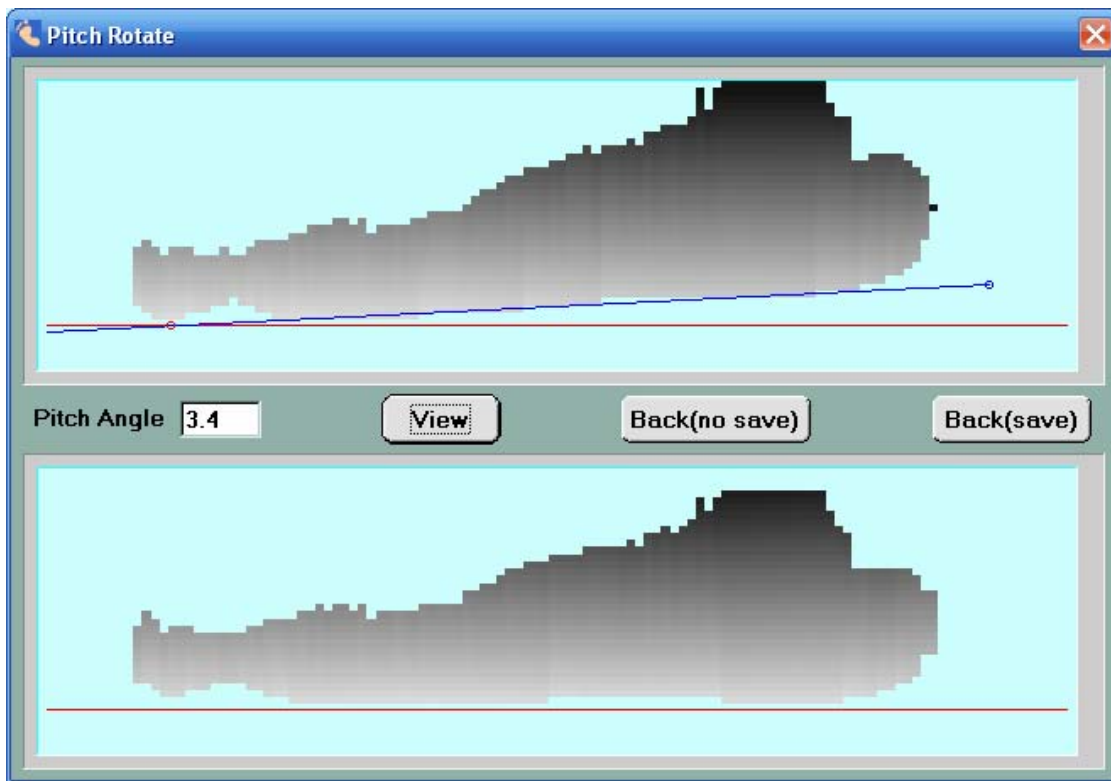


Figure 9

The Roll menu is shown in the following. The original foot is shown on the top two windows and the rolled foot (if any roll has been applied) is shown on the bottom two windows. For clarity purpose, the forefoot is shown on the left-side two windows and the forefoot with rearfoot is shown on the right-side two windows.

There are two purposes with the Roll menu. First, use it to rotate the foot so the bisector of the heel is vertical and then save the change. This change can be later read by the correction software. More accurate forefoot varus or valgus will be shown in the correction software. Second, use it to find the forefoot varus and valgus.

At the upper-right window, there is a purple 'T' which works as reference. There is a red line which is adjustable. On the red line, there are two dots that are moveable.

To use the Roll menu to serve the first purpose (roll foot and write file), check the integrity of the image (whether the heel bisector is vertical or not) first. The following picture shows a perfect vertical line so there is no change needs to be made.

If it requires adjustment on the heel angle, use the left mouse button to click and drag the upper dot to a proper location (usually on top the heel). Then use the left mouse button to click and drag the lower dot to make the red line lines up with the bisector of the heel. Then click 'View' button. The rotated image will be shown on the lower windows (refer to the following figure on next page). The way to save changes or to ignore changes is the same as mentioned in the above Yaw and Pitch operations.

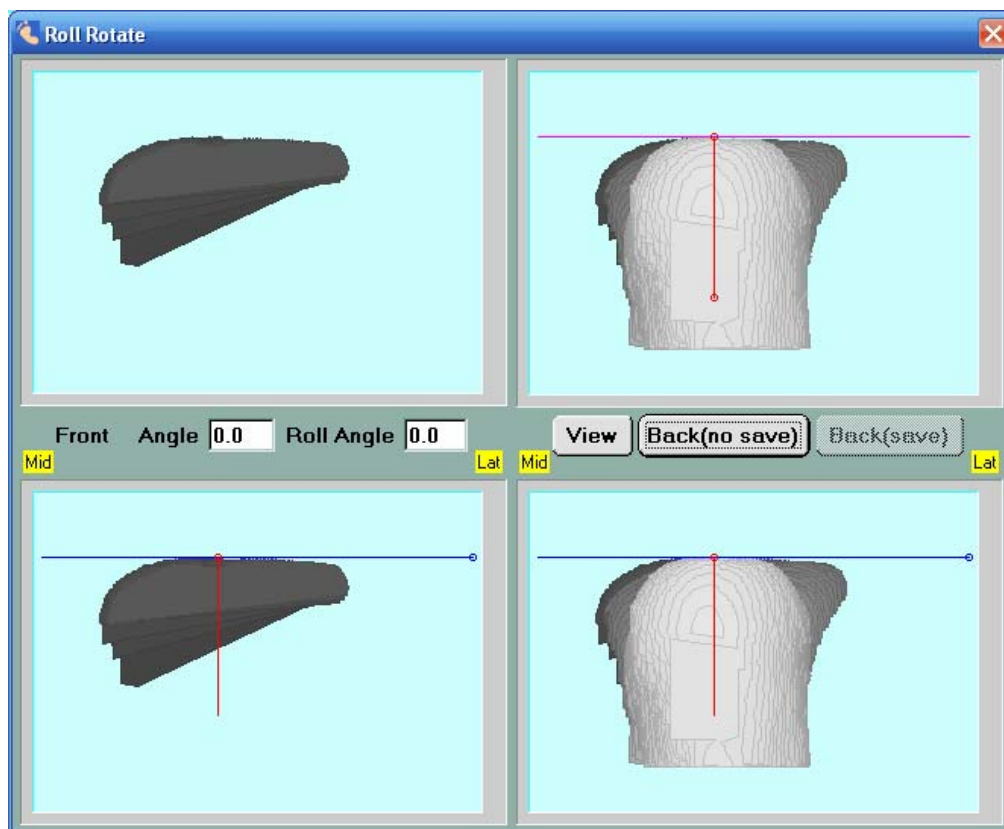


Figure 10

To use the Roll menu to serve the second purpose (finding forefoot varus or valgus), check the integrity of the image (whether the heel bisector is vertical or not) first. If the image needs adjustment, do the same as shown on the previous page. Note that if the foot is scanned with heel vertical to the scanner glass, there will be no change to make on the upper-right windows.

At the lower-right corner, there is a red 'T' which works as reference. There is a blue line which is adjustable. On the blue line, there are two dots that are moveable. Use the left mouse button to click and drag the left dot to a proper location on the foot (usually on top of the heel). Then use the left mouse button to click and drag the right dot to make the blue line lineup with the forefoot platform. The angle of forefoot varus or valgus will be shown on screen. Please refer to the following figure.

Sometimes, it is hard to see the forefoot angle because the heel blocks the view. You can do the same thing (finding forefoot varus or valgus) on the lower-left window. The way of operating the blue line is the same as above.

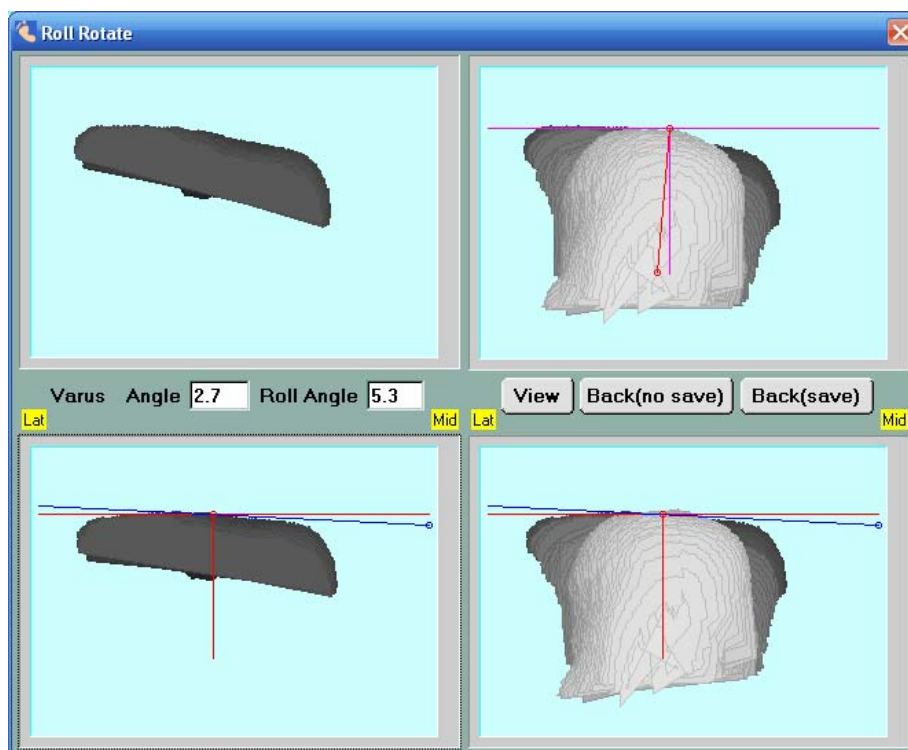


Figure 11

The Roll menu is added to serve for an important purpose. In the past, we assume that the scan is made when the heel bisector is vertical to the scanner glass. This assumption is not always true. Sometimes, it is hard to align the bisector of the heel with the foot scanner. This menu allows the user to re-align the bisector of the heel, and then re-evaluate the forefoot varus and valgus. It is going to be much more accurate now.

By the way, the same principle applies to the View3D button. Only the image inside the cropping box will be shown in the View3D menu. Therefore, if you want to see a better 3D view, go through the cropping before you click View3D.



## Part II: Installation Procedures

We assume that the foot scanner has been assembled. For assemble instructions, please refer to the document “Assemble the Sharp Shape USB3D Foot Scanner”.

The next step is to remove the two parking screws from the back of the scanner. The parking screws are used for the scanner safety during shipping. They prevent the cart from moving and hitting parts inside the scanner during transportation.



Figure 12

Figure 12 illustrates the locations of the two screws. These two screws must be removed before powering the scanner. You may want to save these two screws for future use. **If you ever need to tighten these screws for shipping, make sure they are only fingertip tight.** Over-tightening them may cause damage of the cart.

The next step is to install the scan program and software driver on your computer. You need a IBM or compatible PC. **Please do not plug the USB cable to the computer until you have installed the scan program.** We will send four files, i.e., SETUP.EXE, NEWSCAN.001, NEWSCAN.002, and NEWSCAN.003 as a ZIP file to you. The scan program and software driver are contained in these four files. We usually use email to deliver the ZIP file. In case email fails, we use the Internet to delivery it. Please contact us for details. To install the scan program, please unzip the ZIP file to a folder and launch the SETUP program.

During the software installation, Windows will ask you some questions regarding security. When asked, you will need to give “green lights” to these questions in order to allow the installation to continue; otherwise, you will not be able to install the program. The program is installed under C:\ScanFeet folder by default. We recommend that you use the default folder.

After installation, you may connect the scanner with the computer via USB cable. The USB port is at the back of the scanner towards the bottom (refer to Figure 13 below). Then turn on the scanner. The computer should recognize a USB device has come in (shown in Device Manager).



Figure 13. USB port location

After installing the scan program, the files (including driver files) are installed under C:\ScanFeet. The file and folder structure is shown in Figure 14 (on left).

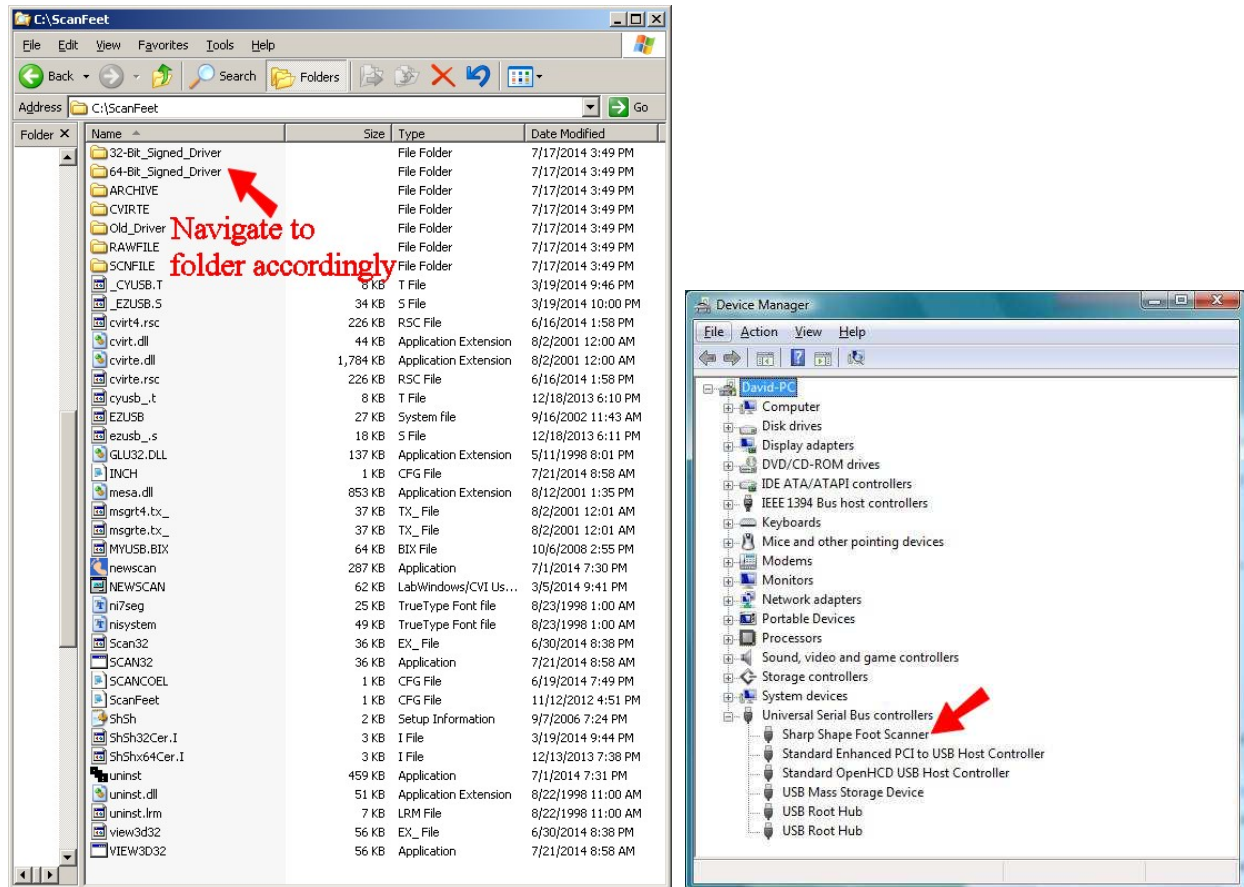


Figure 14. File/Folder structure (left) and Device Manager contents (right)

Once the scanner cable is plugged in and the power is on, an installation wizard may show up in Windows. You need to lead the wizard to install the software driver. On some versions of Windows, the wizard does not show up automatically. In that case, go to Device Manager and find the 'Unknown Device' to update the driver. In either case, **you need to navigate to the driver-folder that fits your system. You do not want Windows to automatically load or search driver.** If your computer is 32-Bit, navigate to the '32-Bit\_Signed\_Driver' folder as shown above. If your computer is 64-Bit, navigate to the '64-Bit\_Signed\_Driver' folder as shown above.

For driver installation details, please find the PDF file named "Sharp Shape Signed Driver Installation Walkthrough" on our website [www.sharpsshape.com](http://www.sharpsshape.com), click the 'Downloads' button, and scroll down to the 'Signed Driver' section.

After that, the driver will be listed in the Device Manager as 'Sharp Shape USB Scanner' (refer to Figure 14 - right). Windows will not ask for a driver again the next time you plug in the scanner to the same computer.

To check the integrity of the scanner, go to Device Manager when the scanner is plugged in. You should find the "Sharp Shape Foot Scanner" as shown above in Figure 14 - left. If it is not properly installed, you need to uninstall it and re-install the driver as instructed above.

Before loading the scan program, if you accidentally plugged in the USB cable and Windows assigned a wrong driver for the scanner, go to the Device Manager to uninstall it. Then follow the above steps.

Since we introduced the digitally signed driver (32-Bit and 64-Bit), the drive installation is a lot easier. The drivers work for Windows XP, Windows 7 and Windows 8.

## Troubleshooting:

If you find something wrong with the scanner or image, please check the following:

1. Restart everything and try again. This includes restart the scan program and computer.
2. The cable needs to be well seated on both ends. Not all USB cables work the same. We will test and ship a USB cable with the scanner. If you need to find a different cable, you need to test it.
3. After the scanner is plugged in and powered on, check Device Manager to see whether you have Sharp Shape USB Scanner in there (see Figure 14 - right). Treat problem if it is not alright.
4. Start a scan and watch the LEDs inside the scanner as seen at the lower-right hand corner of the scanner (refer to Figure 15). The 2<sup>nd</sup> LED should blink for at least 4 seconds, and the 3<sup>rd</sup> LED should blink for at least 4 seconds after the foot pedal is pressed. If it doesn't blink, something is wrong with the hardware inside. Contact us for further actions.
5. The scan program and the scanner have to be synchronized. The correct scan procedure is to turn on the scanner, and then launch the scan program. Do not turn off the scanner or unplug the USB cable while the program is running. If you turn off or unplug the scanner while the scan program is running, the scan program will lose synchronization. You will not get an image after that. You have to restart everything.
6. For installing Sharp Shape USB scanners on XP, it should be easy. However, under certain circumstances, it may present difficulties. One incidence found was that when Tekscan device driver was pre-loaded, Sharp Shape scanner cannot be recognized. Please check to see whether you have such or similar device drivers loaded. Let us know if you found any one.
7. The driver included in the scan program is good for 32-Bit computer, such as XP. If you want to install the scanner with a 64-Bit computer (some Vista and most Windows 7), you need a difference driver. Please contact us for that.
8. If you cannot figure out what is the cause of the problem, please contact us before you disassemble the scanner, or before you send it back to us.



Figure 15. LED lights inside the small opening at the lower-right hand side at the scanner front

If you see a bad image (snowy, distorted or noisy), after a scan is made, please check the following:

1. You need to wait for the finish of a scan before you take another scan (press the foot pedal).
2. Shield unwanted light, especially the direct light rays from a window, to reduce noise.

To improve the image, you can do the following:

1. Before scan, you want to leave the foot out of socks for a while, so the foot can get dry a little bit. That will help to reduce the smudges on the scanner glass. **Do not use any chemical, such as Thinner, to clean the Plexiglas.** Use dry/wet cloth with soap only.
2. Some had tried using a one-time lady's sock (nylon, light color) for the scan. Although the arch may change a bit, it is a good idea to improve the image.

**Note:** The laser diodes used in the scanner are class II. They are the same as the ones used in stores. Do not stare into them for longer time than they pass through your eyes.

If you have any questions, please contact us at [sharpshape@comcast.net](mailto:sharpshape@comcast.net). *End of file*