Scanning with Rapidform

The **Build >> Scanner Direct Control >> Konica Minolta VIVID** command allows you to operate your VIVID 3D scanner and accompanying rotary table directly. It offers manual, semi-automatic and fully automatic scanning, automated rotary table calibration, and a variety of control parameters to make the best use of the VIVID 3D Scanner.

Basic Steps:

1) Turn on **Vivid 700 Scanner**, then computer, then plug in turntable.
2) Launch **Rapidform**, then load **Vivid Scanner Control**
3) Check the **Rotary Turntable** tab to make sure turntable is connected. Reconnect if necessary.
4) Position object to be scanned on turntable and adjust the scanner distance and height as necessary.
5) **Calibrat**e
6) Scan (as long as you do not move anything, you do not need to recalibrate. You can scan multiple sessions.)

Loading the Vivid Scanner Control

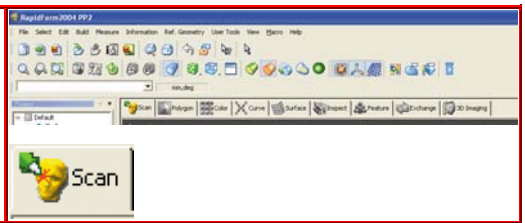
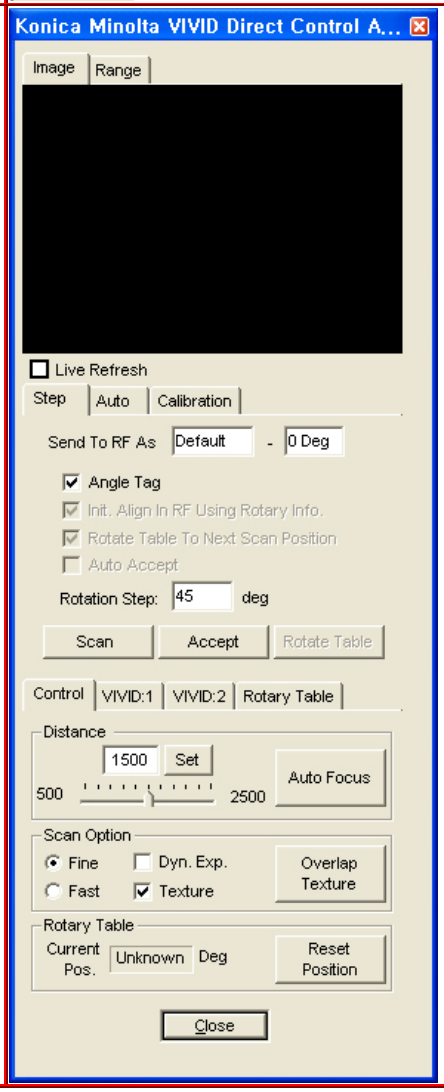
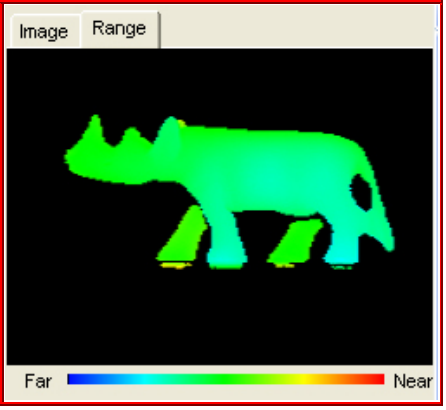
Make sure the **Scan** button is clicked, then select **Build >> Scanner Direct Control >> Konica Minolta VIVID** from the menu.	
Select **Build >> Scanner Direct Control >> Konica Minolta VIVID** from the menu. The following dialog box appears in 3~5 second while detecting and initializing the connected scanner and turntable The top 2 tabs – **Image** and **Range –** control viewing options. The middle 3 tabs – **Step, Auto**, and **Calibration** control scanning functions. The bottom 4 tabs – **Control, VIVID:1, VIVID:2**, and **Rotary Table** – control scanner and turntable options and variables.	

Image / Range Panes

The **Image** / **Range** pane allows you to preview and monitor the scanning process in real-time. The scanned texture can be shown here as well.

Under the **Image** tab, there is a picture box. If there is no VIVID 3D Scanner connected to your computer, a message is shown here: **VIVID Not Found**. If there is a VIVID 3D Scanner connected to your computer, you can monitor the model and see the scan result here. If **Live Refresh** is on, the image is refreshed in real-time while the model is being scanned.

Under the **Range** Tab, the scanning result is shown in color contour. There is a color bar showing the distances in different colors. Anything black in color will not be seen by the scanner, as it is out of range.



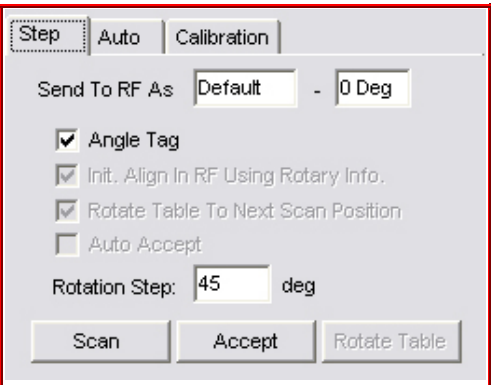
Step / Auto / Calibration Panes

The **Step** / **Auto** pane allows you to set up for a semi-automatic scanning process (step by step) or an totally automatic scanning process. The check boxes in this section are only enabled when there is a rotary table connected to your computer with proper communication settings and calibration.

Under the **Step** tab, you can set up parameters for a step by step scanning. You can input the name of the scan shell and its suffix in the **Send to RF As** boxes.

- If **Angle Tag** is checked on, the suffix number changes to xxx degree - the current angular position of rotary table.
- If **Init. Align in RF Using Rotary Info.** is checked on, a rough alignment will be applied to the scan data when **Accept** is clicked. The rotation information related to the corresponding rotary table is used in the alignment process.
- If **Rotate Table To Next Position** is checked on, the rotary table will be moved to the next pre-defined scan position when **Accept** is clicked. If it is not checked on, you have to click **Rotate Table** button to rotate the table manually before the next scan is performed.
- If **Auto Accept** is checked on, the scan data from each scan will be automatically sent to RapidForm. **Rotation Step** is the relative degree the rotary table rotates in each step.

When the model is in position, you can click **Scan** to perform a scan. To send the scan result to RapidForm, you need to click **Accept**. In case

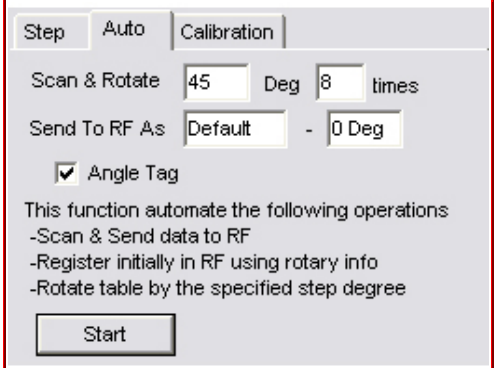


Rotate Table To Next Scan Position is not checked on, to rotate the rotary table to next scan position, you need to click **Rotate Table**.

Under the **Auto** tab, you can set up the parameters used for a fully automated scanning process.

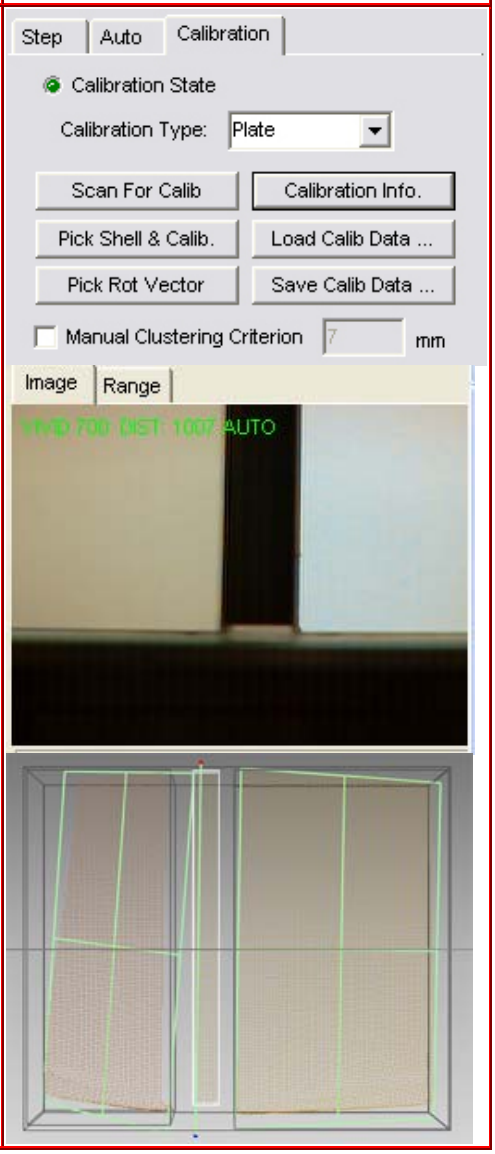
- In **Scan & Rotate** boxes, you can input a step angle (**Deg**) or the number of rotations (**times**). When one value is changed, the other will be modified to ensure a full 360 degree scan set. For example, if **Deg** is set to 60, the **times** value will be 6; while setting the **times** value to 8 will cause the **Deg** value to be set to 45.
- **Send To RF As** and **Angle Tag** options are same as those under **Step** tab.

To begin scanning after all the parameters are set, just click **Start**. The **Control / VIVID / Rotary Table / Calibration** pane allows you to set parameters for VIVID and rotary table and do calibration. Under the **Control** tab, you can focus the scanner, set scan options and reset the rotary table.



Under the **Calibration** tab are settings to calibrate the rotary table.

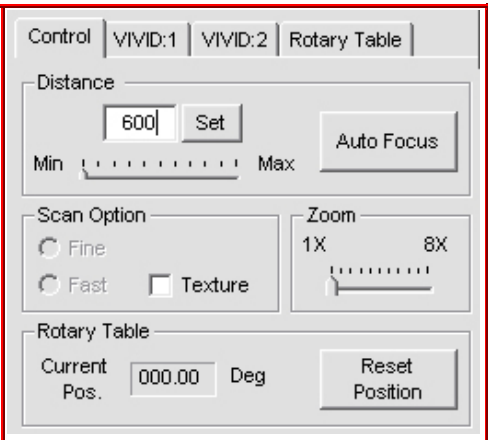
- **Calibration State** shows the calibration status or if a stored calibration is successfully loaded. If it is not lit, you need to do calibration.
- **Calibration Types** should be **Plate**.
- Place scanning jig onto the turntable so that the black line is perfectly centered. You may need to zoom in. (see pic)
- Click **Scan For Calib.** The jig used in calibration will be scanned and the scan will be sent to RapidForm. The scanned jig should look like the picture.
- The rotating vector should have the red point on top and the blue point on the bottom. If not, you must reverse the vector direction by going to **Ref. Geometry>Transform>Vector>Reverse.** Then click **Pick Rot Vector**, pick the vector and then click
- In case the scan data contains a lot of noise and the calibration failed, you may need to re-focus and re-scan. Otherwise you may need to edit the scan data and then make a reference vector in RapidForm. Then click **Pick Rot Vector**, pick the vector and then click. Or click **Pick Shell & Calib.** and pick the scan shell to calibrate.
- If **Calibration Info.** is clicked, the current calibration information will be shown.
- If **Load Calib Data...** is clicked, you can load calibration information previously stored in a file.
- If **Save Calib Data...** is clicked, you can save the current calibration information to a file.
- **Manual Clustering Criterion** is used to classify clusters within the scan shell for the calibration purpose. If it is not checked on, the **Clustering Criterion** value is automatically calculated. When it is checked on, you can input a **Clustering Criterion** value. **Clustering Criterion** is a distance value and it is used to decide which cluster a vertex belongs to.



Control / VIVID:1 / VIVID:2 / Rotary Table Panes

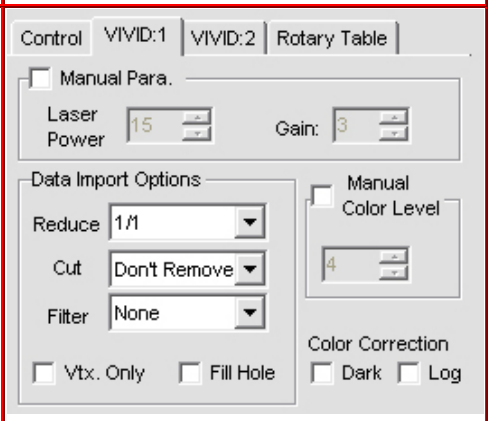
Under the **Control Tab**,

- If **Auto Focus** is clicked, the VIVID scanner will execute an automatic focusing that is just like pressing the **AF** button on the VIVID panel. Also it is possible to focus by sliding the **Distance** slide bar. When Auto Focus is in progress, this slide bar is disabled.
- Under the **Scan Option** section, you can set the scan mode to **Fine** or **Fast**. **Fine** is the default option. It allows a better quality scanning, but a longer scanning time is needed. While **Fast** mode shortens the scanning, the quality may be sacrificed. **Dyn. Exp.** determines the on or off of **Dynamic Expansion Mode**. It is only valid for VIVID 910. The **Scan Num** is a kind of extended concept of **Dynamic Expansion Mode**. From 1 to 4 it can be controlled. The **Texture** options toggles whether to scan the texture information or not. **Overlap Texture** decides whether to take only the texture of the current model and overlap it on a previously scanned data. Using this function, you may take a non-textured model and overlap a texture in a different illumination condition.
- The **Zoom** allows you to zoom in/out an object like pressing the Zoom (W/T) button on the VIVID panel. It is only valid for VIVID 700.
- Under the **Rotary Table** section, you can see the current position (**Current Pos.**) of the rotary table in degrees (**Deg**). If it is near the limit, you need to click **Reset Position** in order to move the rotary table to its initial position.



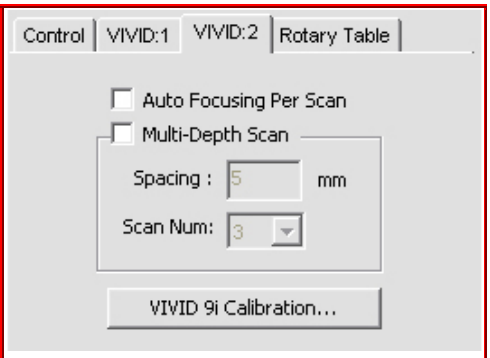
Under the **VIVID:1** tab, you can set parameters related to the scanner.

- If **Manual Para.** is checked on, you can adjust the **Laser Power** and **Gain**. **Laser Power** should have a value between 1 and 255. **Gain** decides the sensitivity of the laser sensor. If **Manual Para.** is not checked on, the parameters will be automatically found and the manual parameters will be ignored.
- If **Manual Color Level** is checked on, you can adjust the scanning color level by typing a value in the box below.
- Under **Data Import Options**, **Reduce** decides the sampling ratio used to import the scan data. The default value is 1/1 and the options include 1/1, 1/4, 1/9, 1/16. **Cut** decides the method to remove unnecessary parts while importing the scan data. If **Don't Remove** is selected, no removal is carried out. If **Bound** is selected, the boundary points will be removed. If **Bound & xx Degree** is selected, the boundary points, along with the polygons within the corresponding angular range (5 Degree, 10 Degree, 15 Degree or 20 Degree) to the view vector will be removed. **Filter** decides the filtering method. If **None** is selected, the scan data won't be filtered. If **Noise Filter** is selected, the noisy vertices will be filtered. If **High Quality** is selected, the unreliable data will be filtered. This is only effective for importing scan data obtained using Vivid910. If **Noise Filter & High Quality** is selected, both the 2 filtering methods mentioned above will be applied. It is also only effective for importing scan data obtained using Vivid910. If **Vtx Only** (Vertex Only) is checked on, only the point data without connectivity information is loaded. If you want to fill holes, you need to check on **Fill Hole**. The **Color Correction** controls the brightness of texture. **Dark** makes texture darkly. **Log** makes texture brightly.



Under the **VIVID:2** tab, you can do a special job related to the scanner.

- If **Auto Focusing Per Scan** is clicked, the VIVID scanner will execute an automatic focusing whenever you press the **Scan** button.
- If **Multi-Depth Scan** is clicked, the scanner will execute a multiple scanning while changing the distance. For example, if you set Spacing to 20 and Scan Num to 3 when the distance is 600, the scanning is performed at the position of 580, 600, and 620, and three shells are created in RapidForm working window. The shell names are Default - 000deg: 01, Default - 000deg: 02 and Default - 000deg: 03.
- **VIVID 9i Calibration** does not apply with this scanner model



Under **Rotary Table** tab, you can make the connection with a rotary table.

- **Rotary Table Connection** shows if there is a rotary table connected to the computer. If it is not lit, no rotary table is connected.
- In the **Model** box, you can select the current used table's name. This should be **ZETA6104(Fast)**
- In the **COM** box, you can set the COM Port. This should be **COM1**. When you attempt to re-connect the rotary table or after the parameter are changed, you need to click **Connect** button. If **Disconnect** is clicked, the current connection is reset and you can change the table or COM Port.
- If **Auto connection on startup** is checked on, the application tries to communicate with a rotary table when the command is run.
- If you put a value in the **Rotate To ... Deg** box and click **Move**, the rotary table will be rotated by corresponding degree.