



Verisurf LPT_{REV A2}

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Verisurf LPT Introduction

This manual was created to begin the bridge between Verisurf software and LPT software. It is a 1st draft and will be updated as the 2 softwares merge together. Any references in this manual to the LPT software functions in Administrator or Operator may be brief due to the fact that the LPT manuals on those topics can be used to reference all LPT functionality. Please refer to the LPT manuals for reference information on Administrator or Operator.

The Verisurf LPT Partnership

LPT and Verisurf Software, Inc. began a partnership in late 2005 that both companies felt would aid each other in becoming the world leader in laser projection. Prior to this partnership no company could efficiently project 3D curves onto a 3D surface. Due to this partnership LPT / Verisurf hardware and software have taken 3D projection to new heights with the ease of use and quality of projection.

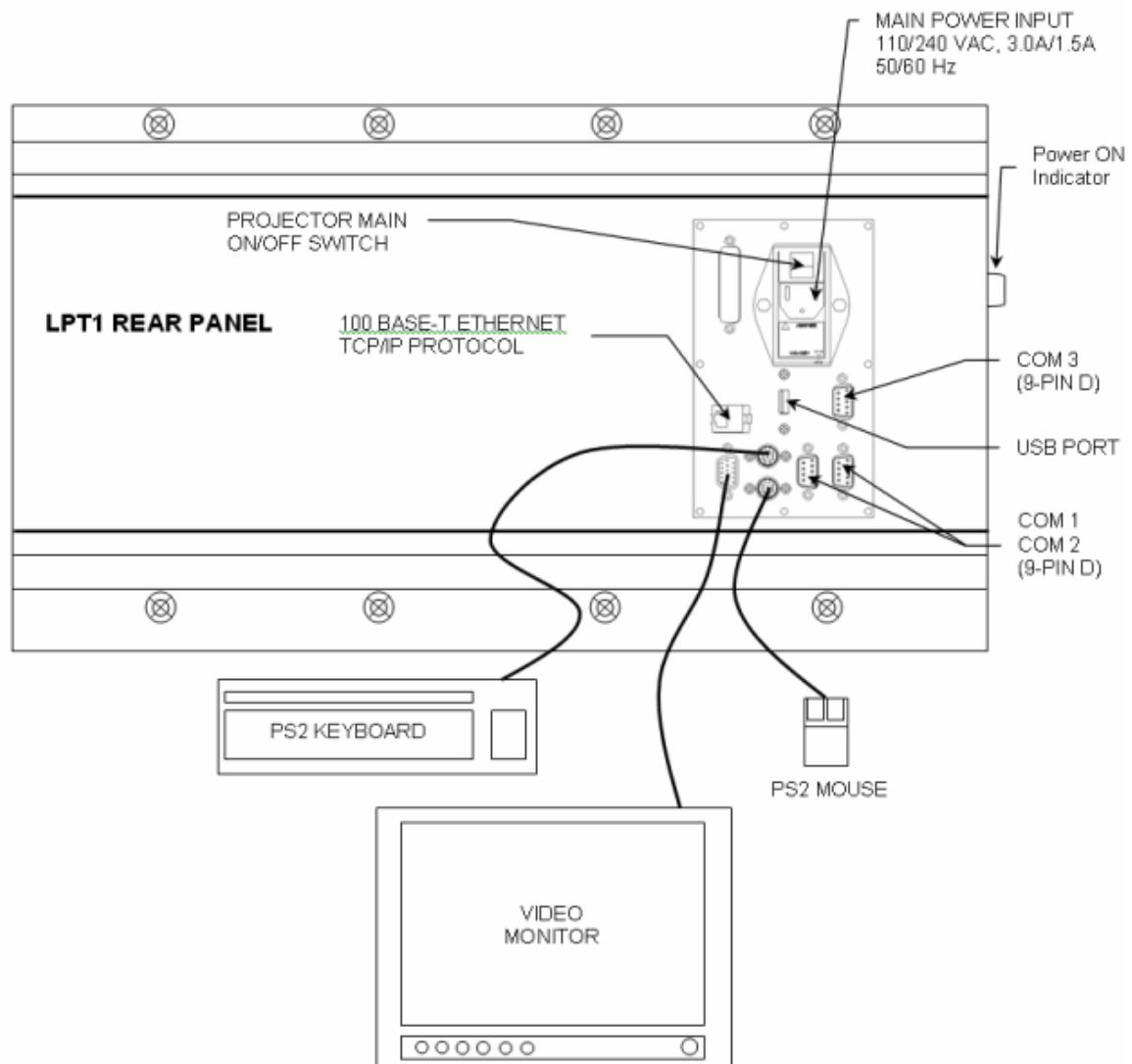
Using LPT / Verisurf hardware and software a customer can quickly project any type of curve accurately. This partnership has taken root at many companies requiring efficient and accurate projection and we are currently working with many customers to improve both the hardware and software to accommodate any customer need.

LPT / Verisurf hardware and software are committed to the success of this joint venture and look forward to assisting your company in its projection requirements.

Network Connection

ADMIN / OPERATOR on LPT computer

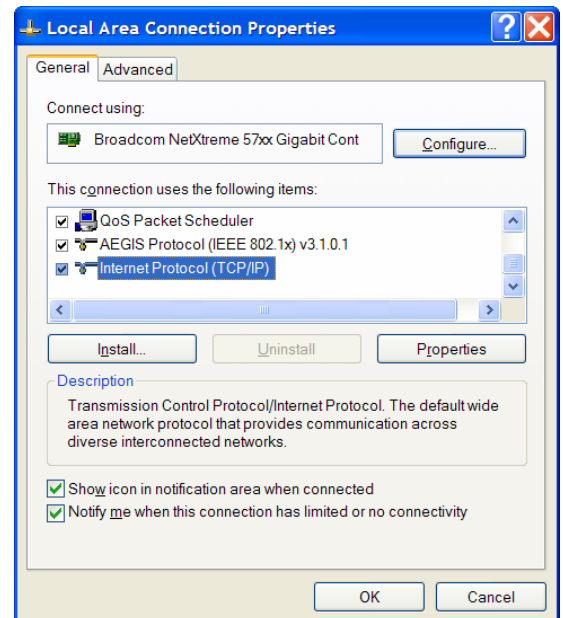
There are no special connections involved. Once the projector is mounted in position, connect all of the necessary cables to the LPT1 rear panel. This example shows the connections for an LPT1. For other LPT models please refer to the Operator Manual for your particular LPT.



ADMIN and/or OPERATOR on Laptop

To use the projector we need to adjust our network settings to be able to communicate between your computer and the projectors.

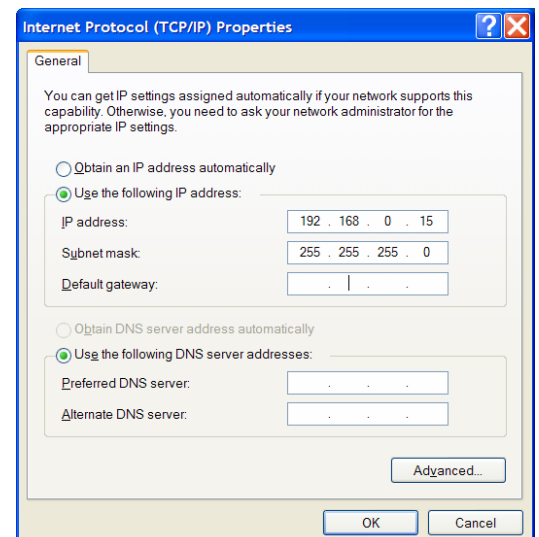
You should have a desktop icon to be able to go to My Network Places > View Network Connections > Local Area Connection. From here go to Internet Protocol and double-click.



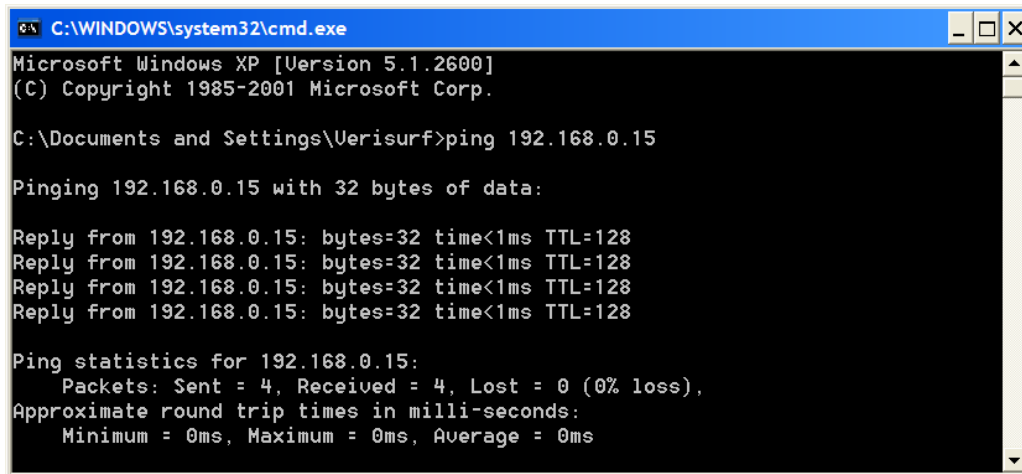
This will bring up a screen that you can input an IP address.

Input the address 192.168.0.15. Hitting tab after the IP address will automatically enter the Subnet mask 255.255.255.0.

Once this is accomplished your computer with Verisurf should be able to communicate with the projector.



On rare occasion you may not get a connection. To test this we can “PING” the connection. Use START > RUN and type CMD. This will bring up a command prompt or DOS prompt. From here type ping 192.168.0.15. A report will be given showing whether the computer is “talking” with the projector. This screenshot that the computer is talking with the projector. We see this because we are receiving a Reply.



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Verisurf>ping 192.168.0.15

Pinging 192.168.0.15 with 32 bytes of data:

Reply from 192.168.0.15: bytes=32 time<1ms TTL=128
Reply from 192.168.0.15: bytes=32 time<1ms TTL=128
Reply from 192.168.0.15: bytes=32 time<1ms TTL=128
Reply from 192.168.0.15: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.15:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

If the “PING” fails you will need to double-check a few items.

- Double-check your IP address.
- Double check your cabling.
- Do you have a firewall? This may prevent the IP address being recognized.

After checking these items you should obtain a connection and be able to log into the LPT computer.



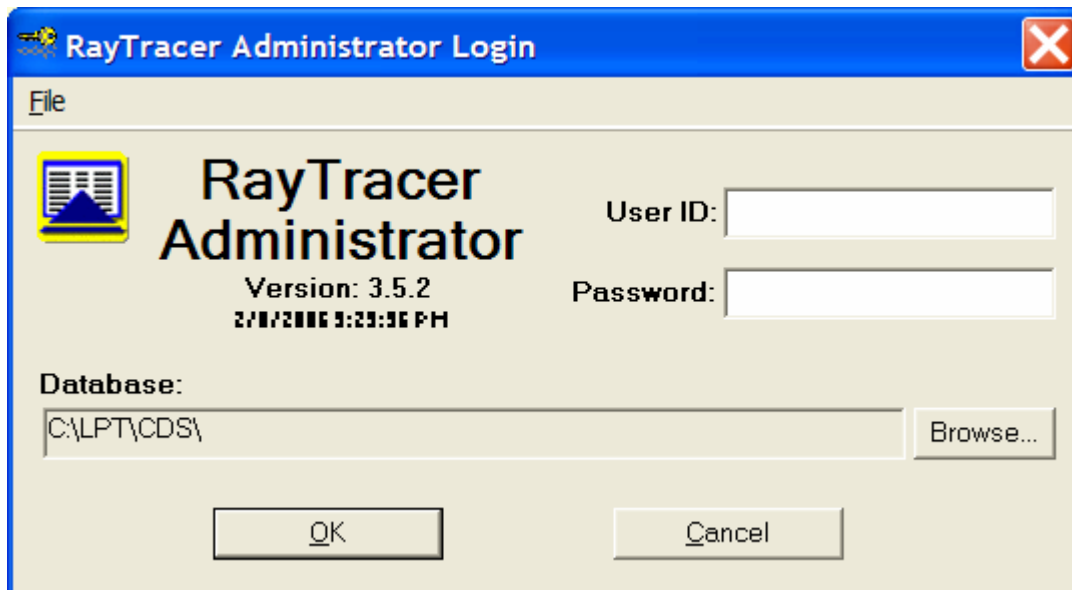
Setting up LPT

Administrator Database Setup

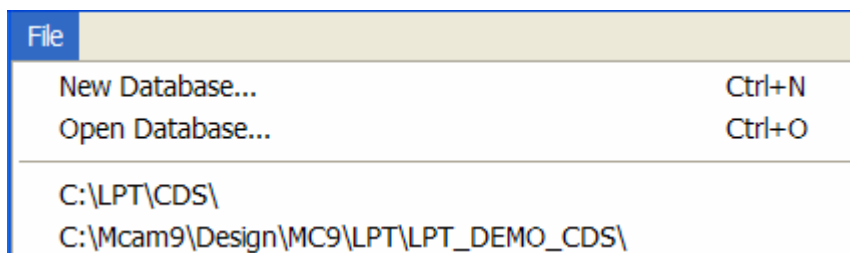
Double clicking the icon to the right will bring up the Ray Tracer Administrator Login screen shown below.



The the Ray Tracer Administrator Login screen is where we will set-up a new database or load an existing database.

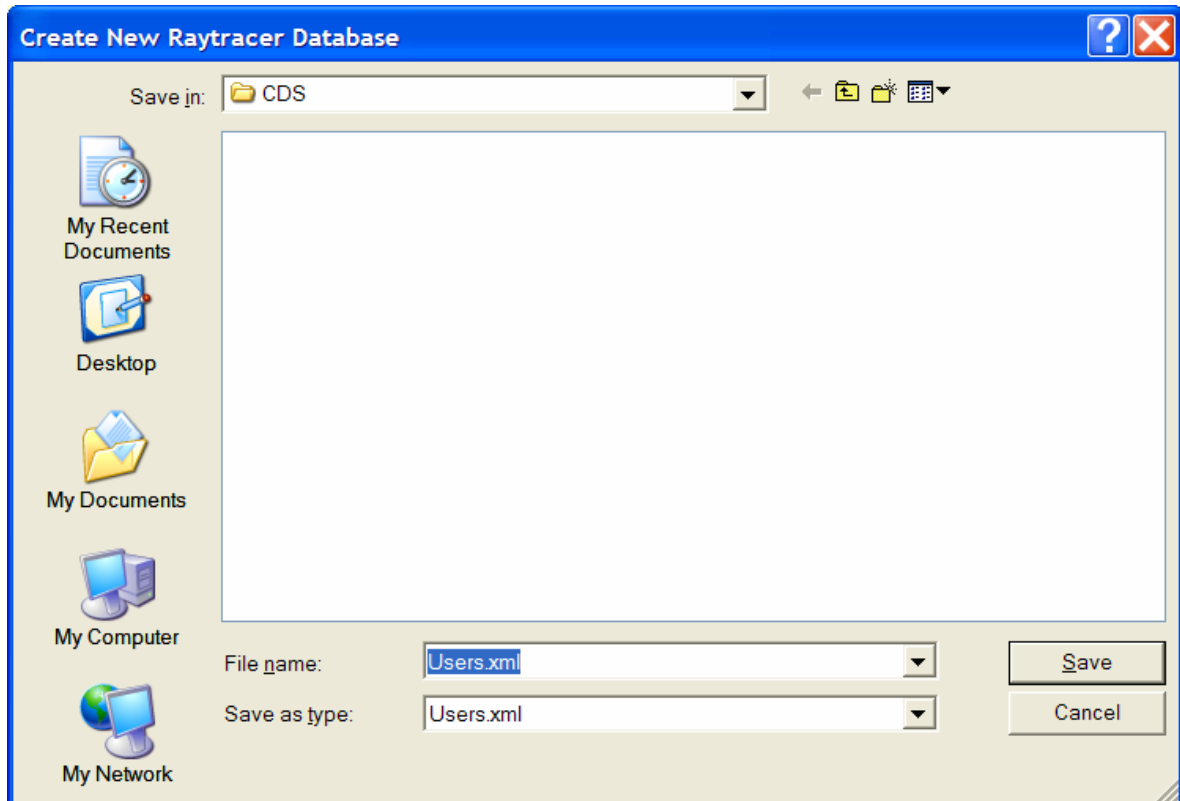


Choosing File at the top left will open this menu. Here we see we can create a new database, open an existing database or choose a prior database from history.



Choosing NEW will prompt if indeed you want to create a NEW database and then take you to this screen prompting where you want the database files to be located. Being a NEW database we will create a new folder choosing Create new folder from the icon at the upper right.

In this example a new folder named CDS has been created and then we double-clicked to enter the database. The filename is Users.xml. We save this and we now have a new database with individual files that are currently empty.

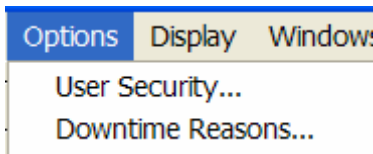


Once the Administrator Main menu is active we can see 5 pulldowns and 7 tabs.



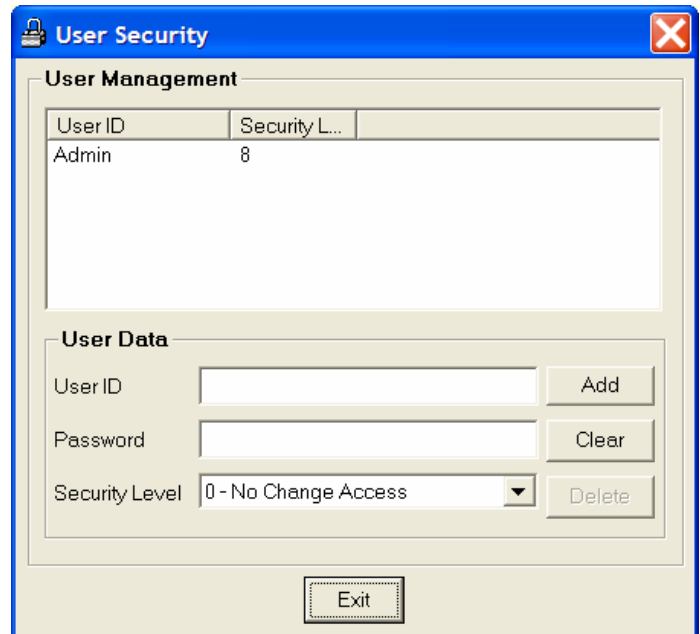
User Security

Once we have a database created through administrator it is advisable to create a new account that is easy to remember. We do this through the options pulldown > User Security.

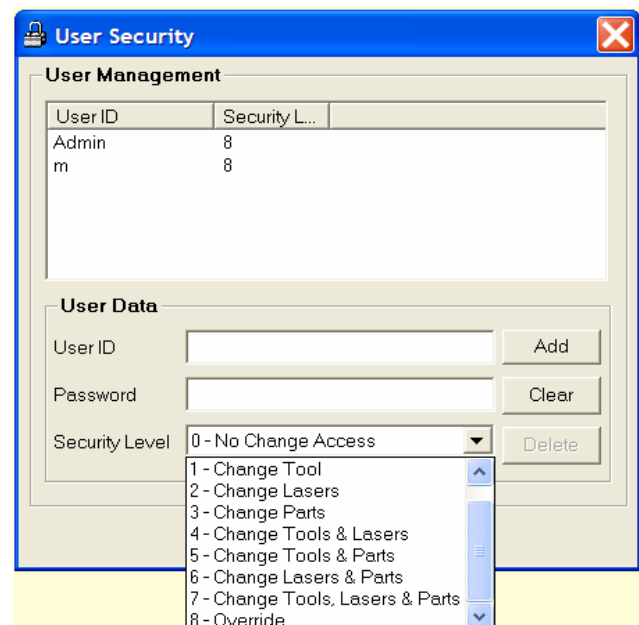


Shown here we have the initial User Security setting with only the administrator shown as a user. We will add another User ID and password with FULL access so that we can easily get in and out of this database. At Verisurf LPT we usually use User ID "m" and password "m".

Type those letters in the entry boxes and then to give this User ID full access we click the Security Level pulldown and choose 8 – override.



Shown here is the new User ID M.



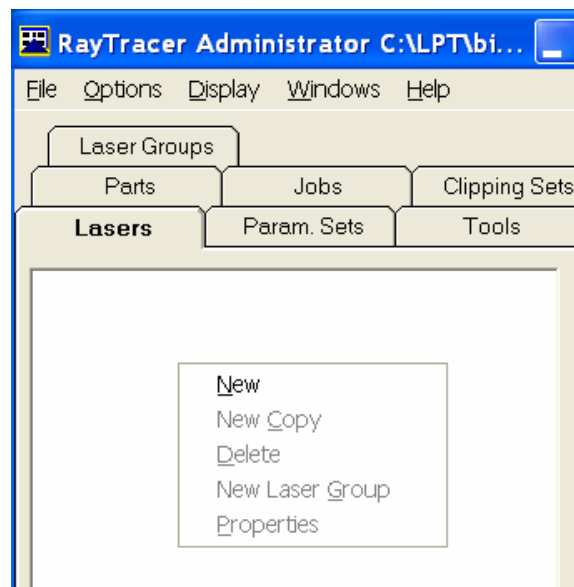
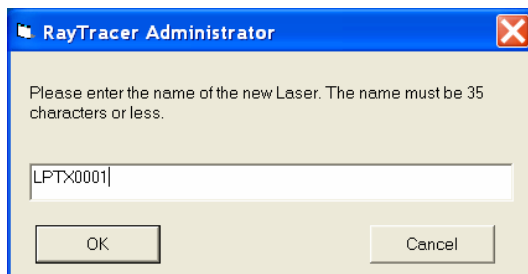
Creating a Job

As an administrator you can create a job database that can then be sent to LPT Operator to run. A job consists of 4 databases that **MUST** be in the job and perhaps a clipping set database if using more than one Laser. The 4 that must be there are Laser Group, Parameter Set, Tools and Parts. The Administrator pulldowns are used to create Laser Group and Parameter set while Verisurf will be used to create Parts and Tools.

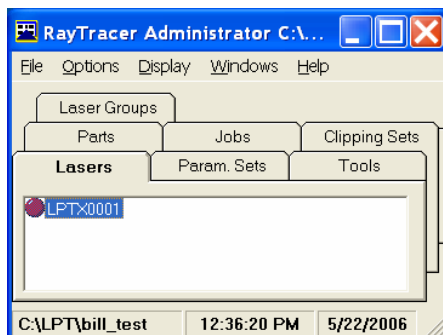
Choosing a Laser and Laser Group

The first item, Lasers / Laser Groups are created to tell the job which Laser it will connect to.

Go to Tab named Laser and right-click in the field to bring up the menu shown to the right. You can then choose New and enter the exact Laser name.



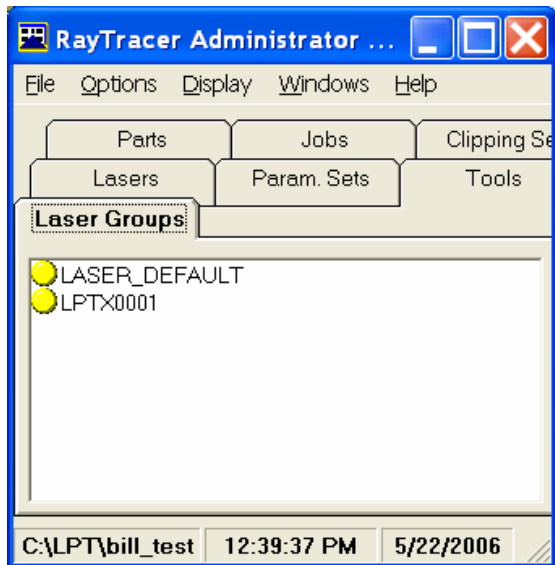
After creating the Laser name it will appear in the field.



We can now create a Laser Group by right-clicking the Laser name and choosing New Laser Group.

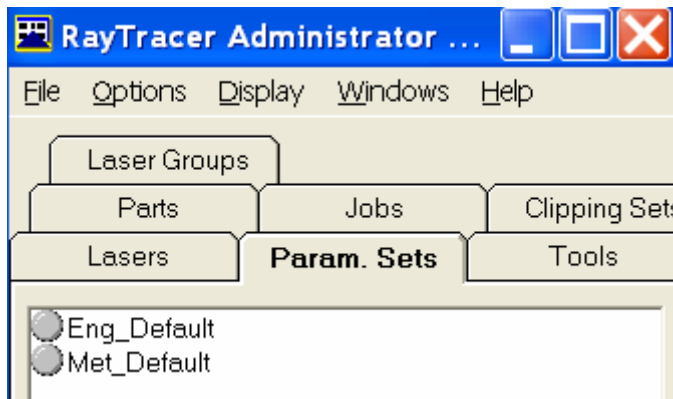


Type in a name for the group and a new Laser group will be created that you can verify by choosing the Laser Groups tab.



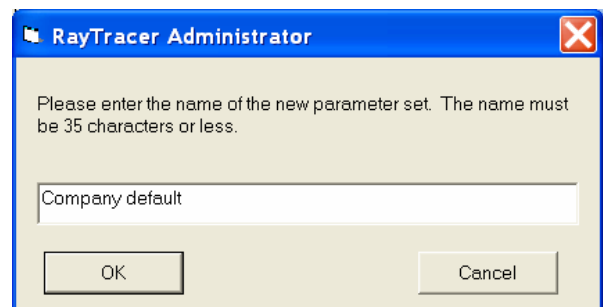
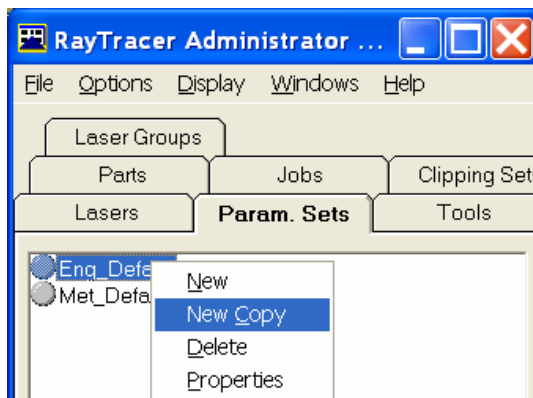
We now have 1 of 4 components needed to create a job.

Choosing a Parameter Set

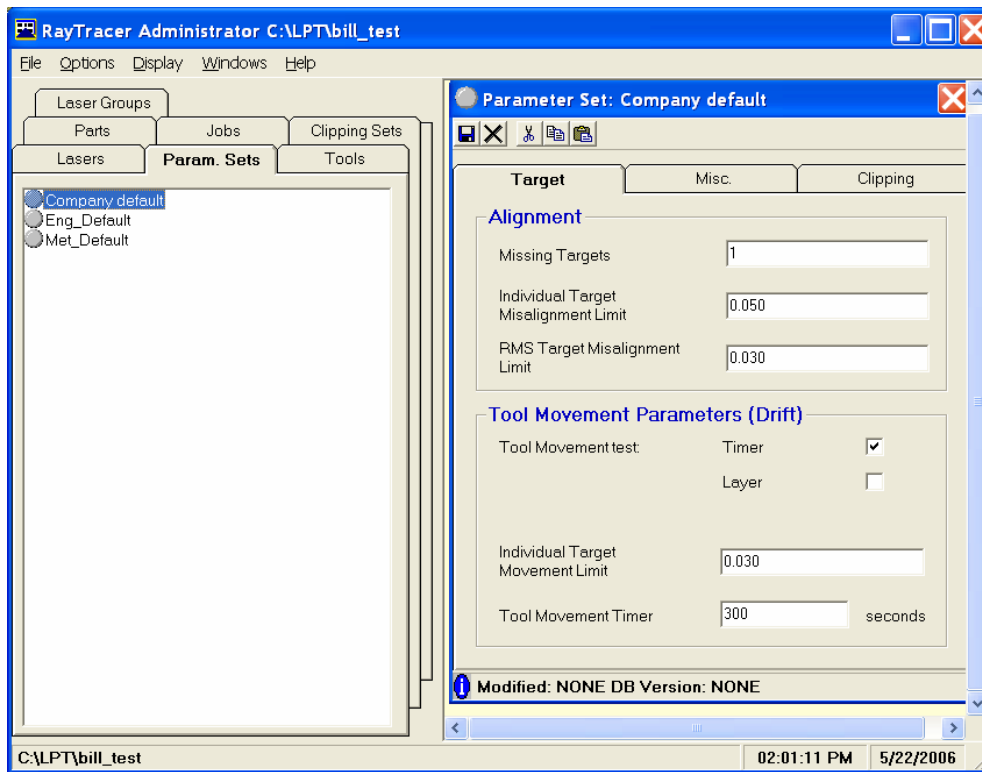


LPT comes with 2 parameter sets as defaults. They are English and Metric Default sets. These can be used as a basis to create your own customized parameter set for your application.

Determine whether you will be working in English or Metric and create a copy that will be renamed. Right-click and choose New Copy and give it a new name.



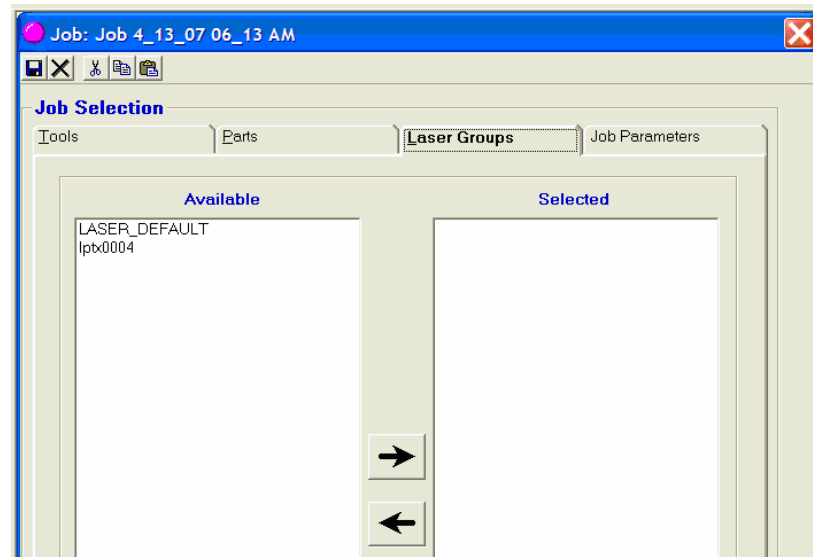
Once your Parameter set is created, we can modify it to suit your needs.



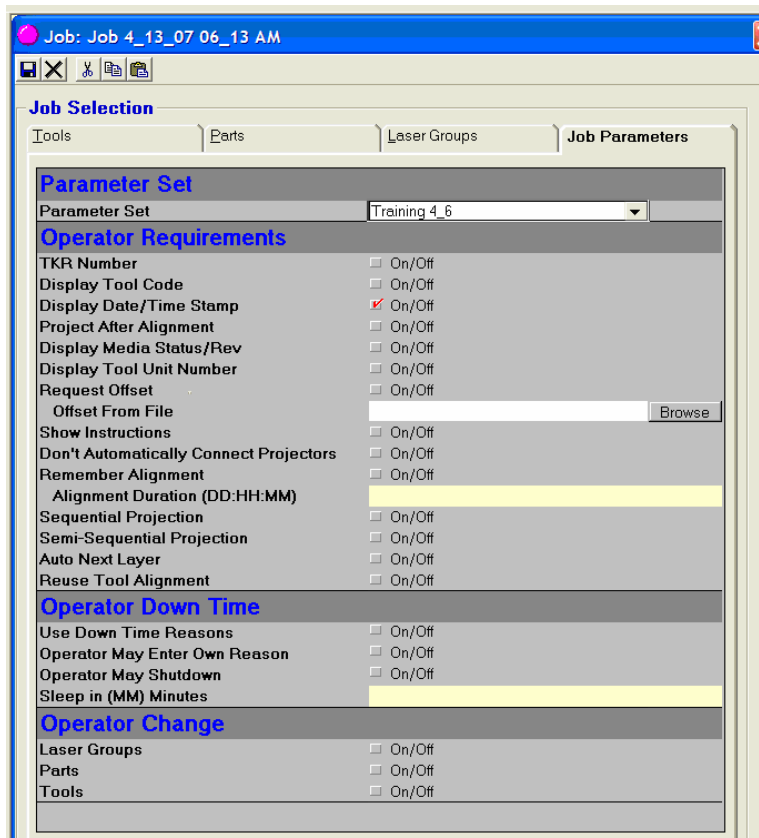
Page 27 of the LPT Administrator Manual contains all the variations we can use. Your instructor will go over the basics of the 3 pull-down tabs with you to set up an initial Parameter set.

Adding to the Jobs Tab

Now you can add the Laser Group and Parameter Set to your job. Click on the Jobs tab. Right-click and choose New, name the job and click OK. The Job Selection box will appear. Using the arrows in the middle, transfer the Laser over to the Laser Groups.

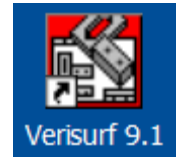


In the Job Parameters, select the new set from the dropdown menu. Display Date/Time Stamp should be the only item checked. Click on the Save icon. Close the window and minimize Administrator.

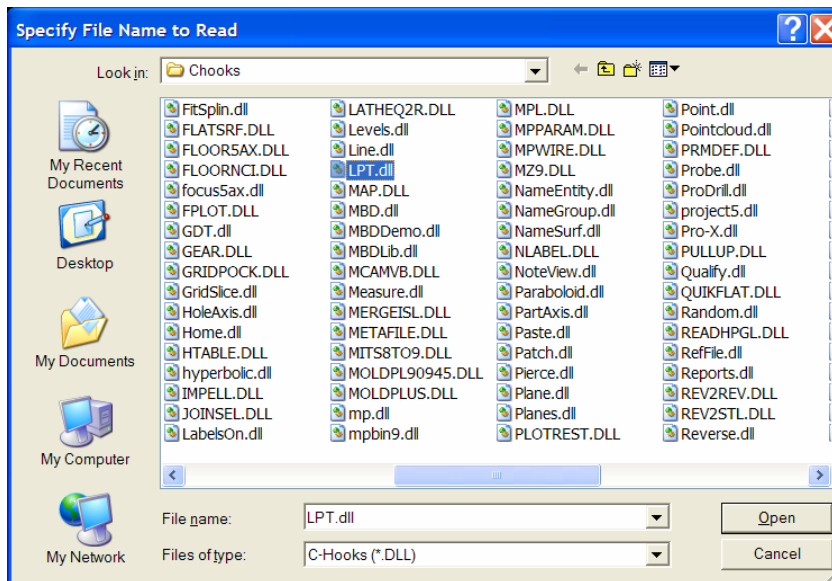
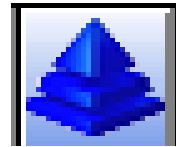


Verisurf to obtain Tool and Part Info

Double clicking the icon to the right will bring up the Verisurf that you can use to gather your tooling points and part geometry. Go to File>Open and get the .MC9 file you wish to work on.



Once the job is opened in Verisurf, we will start the LPT functionality by clicking the icon to the right. This icon may or may not be on your icon toolbar. If it is not access it by hitting ALT-C and choosing LPT.dll as shown below.



Choosing LPT.dll or the icon will bring up LPT. From this menu we then start the LPT linker by choosing Start LPT Linker.

The screenshot shows a software dialog box titled "Laser Projection" with a standard Windows-style title bar (blue background, white text, and a red close button). Below the title bar is a tab labeled "Start LPT Linker". The dialog is divided into two main sections: "Naming" and "Operation".

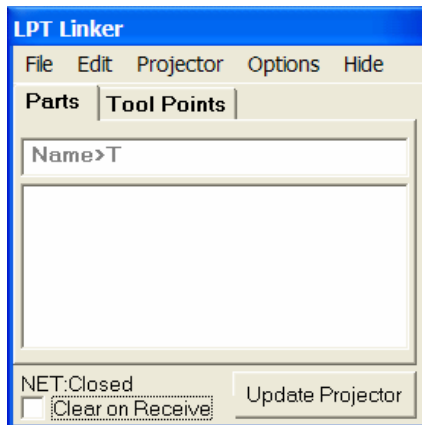
In the "Naming" section, there is a "Part Name" text field containing the letter "T". Below it is a "Group" label followed by a text field containing the word "Chains".

In the "Operation" section, there are four radio button options arranged in two rows. The first row has "Tooling Points" and "Measure". The second row has "Chain Curves" (which is selected, indicated by a filled circle) and "Cross Hairs".

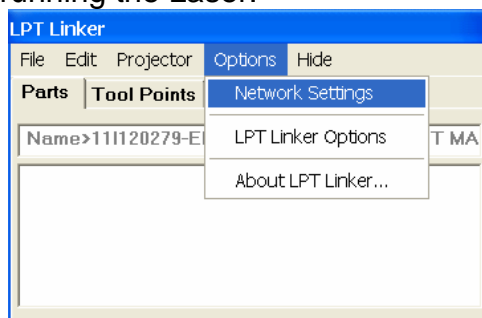
At the bottom of the dialog, there are three buttons: "Done", ">> More" (which is highlighted with a dashed border), and "New".

LPT Linker

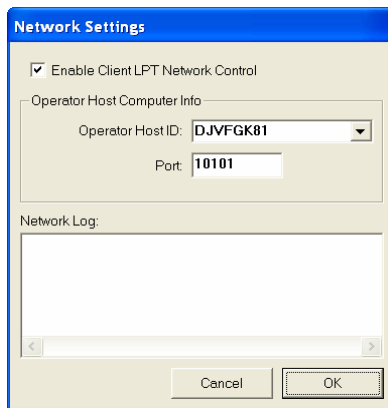
The LPT Linker is used to gather the Parts and Tool Points as you can see by the two tabs shown below.



If running Operator from the Laptop we need to tell Linker which computer is running the Laser.



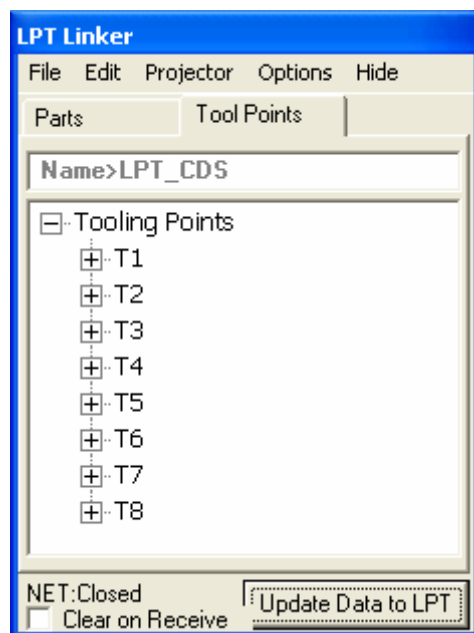
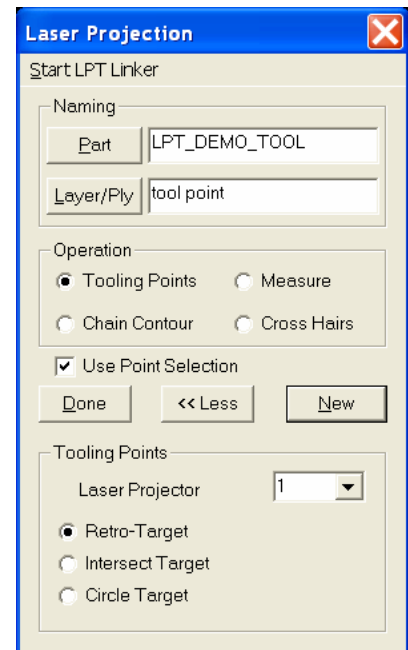
Go to Network settings and change the Operator Host ID to your computer name. Check the enable Client LPT Network Control. This will enable your laptop to control the projector.



Gathering Tool Points

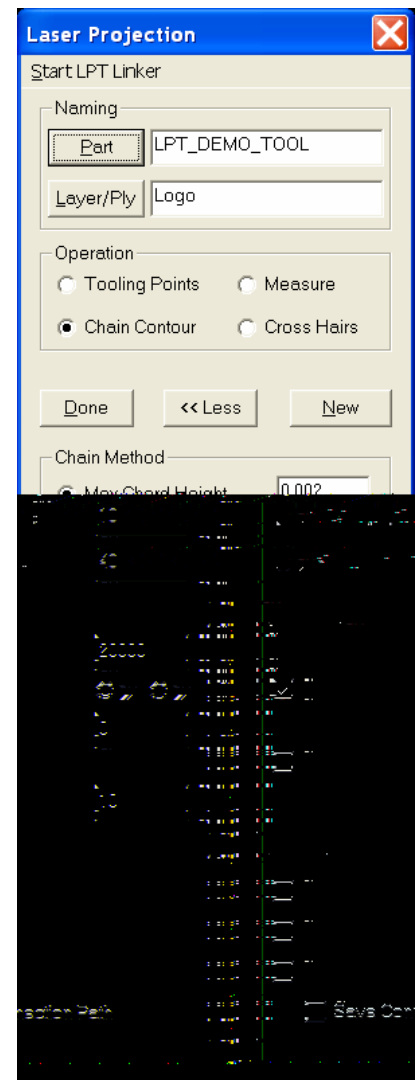
Using the CAD tools available in Verisurf it becomes a simple process to gather tooling points. You need a minimum of 4 points to align to. Ensure that the points cover as much area of the part as possible. Choosing new with “Use Point Selection” on will put you into the point selection menu to individually choose points, intersects, endpoints, etc. With “Use Point Selection” off you can window around a group of points to be used for creating tooling points.

Using this tool we can easily load tooling points into the database that LPT operator can use.



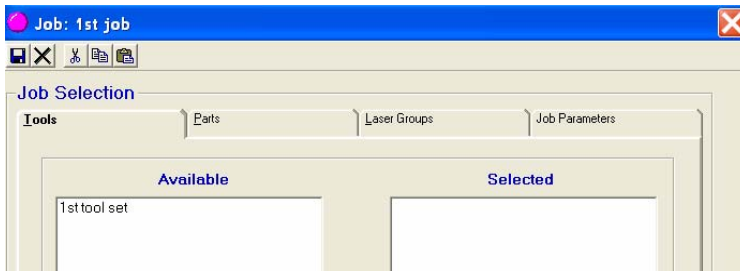
Gathering Curves

Using the Cad entities that are in the Verisurf Cad model we see that it becomes a relatively easy process to pick entities to project once there is an alignment. Clicking the Operation box toggle to Chain curves we get this menu *(may need a new screenshot here due to updates in software programming)* Once toggled we can choose various curves and load those curves into the database.

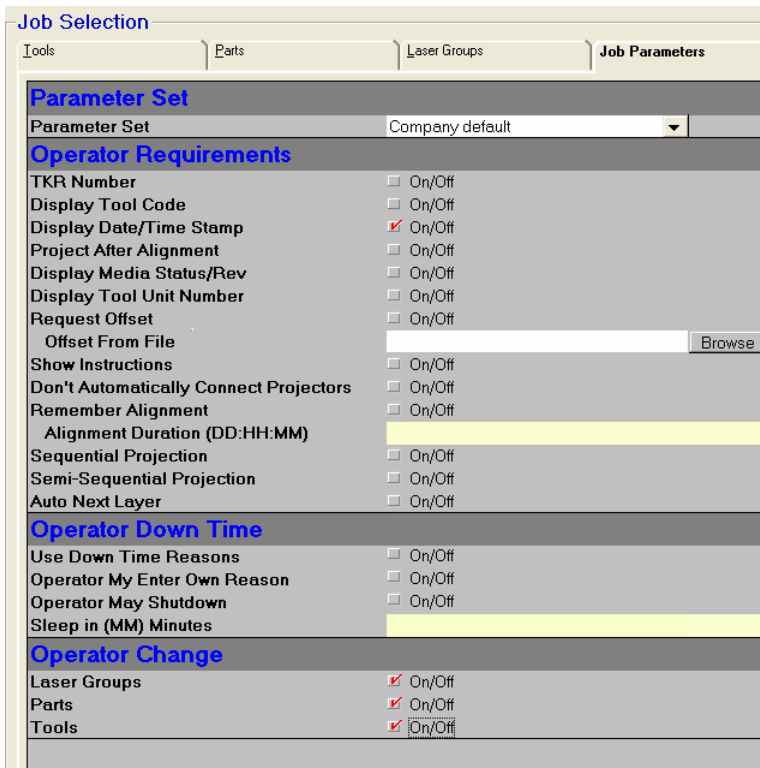


Create the Job

Go to the Job tab of Administrator and right-click in the field to create a new job. Choose a name and the Job Selection menu will appear. Here we see the drop downs contain the 4 components we discussed. Tools, Parts, Laser Groups and Job Parameters should now have a database in the Available column that can be entered into the Selected column.



Go through the first 3 tabs and place the databases you created from Available to Selected. The 4th tab, Job Parameters, has a new table that has a number of options. Set them as shown below choosing your Parameter set from the pulldown. These options are reviewed in the Administrator Manual.

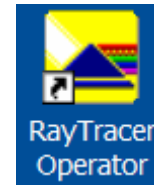


Choose SAVE on this menu and then SAVE the job. Congratulations! You have created your 1st Verisurf / LPT job.

Operator Socket Connection Setup

We are now ready to begin filling the PART and TOOL database folders with data. We do this through the Verisurf interface but we first need a connection between Verisurf and Operator. We accomplish this by turning on a socket connection in RayTracer Operator.

Double clicking the icon to the right will bring up the Ray Tracer Operator Login screen shown below.

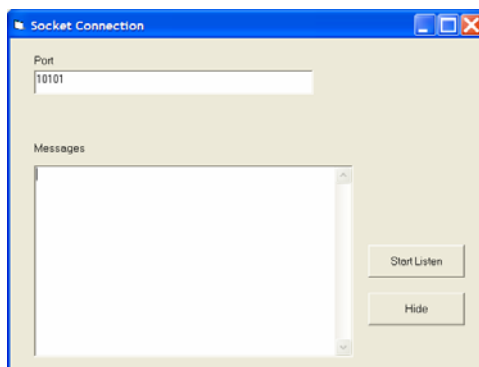


The Ray Tracer Operator Login screen is where we will log into an existing database. Use the browse button to locate the database created in Administrator.



Once the Operator interface is opened we pull down Options > Socket Connection.

We click on Start Listen and we should obtain a message that socket is open.



Verisurf/LPt Interface Examined

Tooling Points

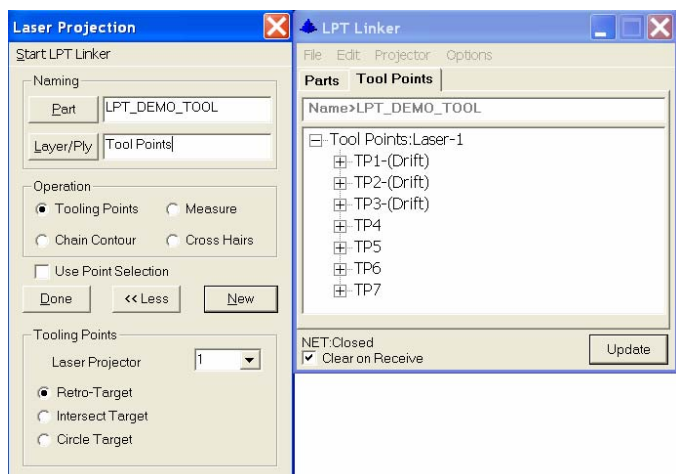
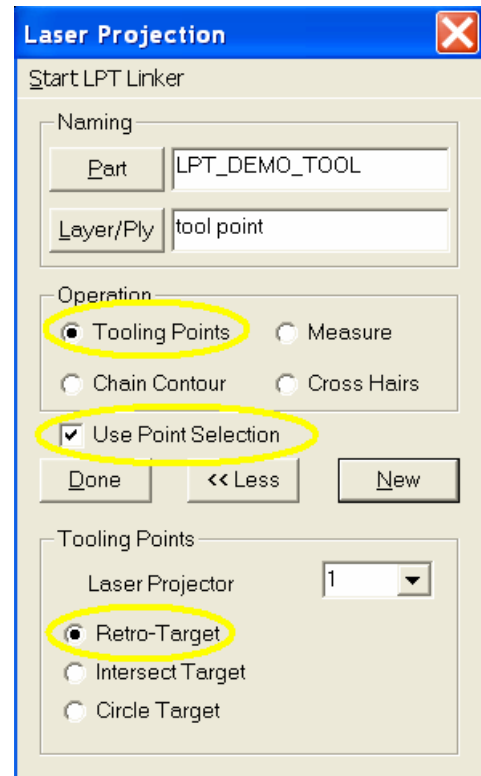
Tooling points, or retro-targets as they are known in most parts of the industry, are known value points in the model that the projector uses to align itself to the part. When these points are picked up by the projector the system uses the known locations to best-fit itself to the model. After this is accomplished we can then project any line, spline or arc in the model onto the part.

Unlike most systems which only use reflective targets LPT projectors can also pick up either a edge intersection or a hole in the part and use these items for alignment. However, this can only be accomplished with the LPT 10 or the new LPT 100. For this discussion we will limit ourselves to retro-targets. Intersect and circle targets will be discussed if the user has purchased a LPT10 or LPT100.

Naming

The Naming section of the LPT interface contains two boxes labeled Part and Layer / Ply. The default Part Name will be the name of the *.MC9 file your model is contained in. This corresponds to the name in the Linker that will be the program name.

The Layer / Ply Name corresponds to the name in the Linker that will be the first branch of the tree. Under this branch are the actual points that will be used for alignment.



Use Point Selection



With Use Point Selection toggled on Verisurf will give you the ability to individually choose points in the order you desire. It responds just like the normal Point Selection option available in many MasterCam functions. As your cursor hovers over a point it will lock onto that point and it can be selected. Continue selecting all points required to align and when finished choose the Back button or Escape. The points will load into the linker and the LPT Administrator.

Having Use Point Selection toggled off Verisurf will give you the ability to either Window around all the points, choose All Points or selected a MasterCam Group of points. The benefit of this method comes into play if your model has been set up with some forethought. If your target points have notes associated with target names it is quite easy to choose Window and then window around all available targets and choose done. The points will load into the linker and the LPT Administrator. Caution: If other points are present in the model they will be included in the target set sent to the Linker.

If all your target points are on one level you can choose ALL > Level and specify Level number. Choose Done and the points will load into the linker and the LPT Administrator.

Tooling Points

The Tooling Points we are working with are Retro-targets so that is the option selected. Also note that the Laser selected is set to NUMBER 1. This is the selection for one laser. If multiple projectors are being used use the pull-down and set this to which projector the tooling points apply to. The number corresponds to the order you have the projectors in your Laser Group that was set in Administrator.

Point Entry:

Origin
Center
Endpoint
Intersec
Midpoint
Point
Last
Relative
Quadrant
Sketch

Select Tooling Points

Unselect

Window

All

Group

Result

Done

Chain Contour

Chain Contour is where the real power of Verisurf / LPT is displayed. By choosing any single or group of lines, splines or arcs Verisurf will compute the laser path with your settings and send this path data to LPT to project real-time. The screen to the right shows the various settings you can adjust to send the path to the laser.

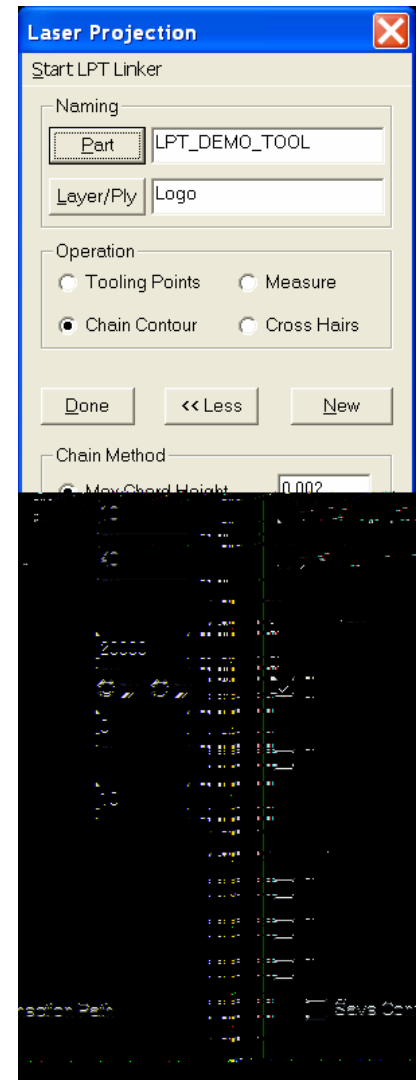
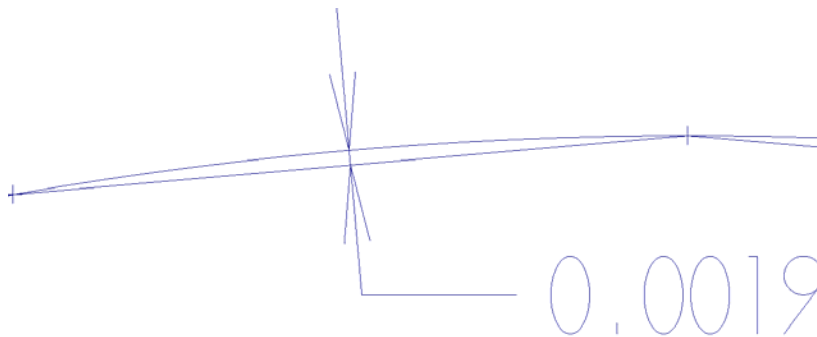
Chain Method and **Controls** handles how the path will be sent while **Saves** enable an Administrator to visually analyze in the Cad what the path will look like.

Chain Method

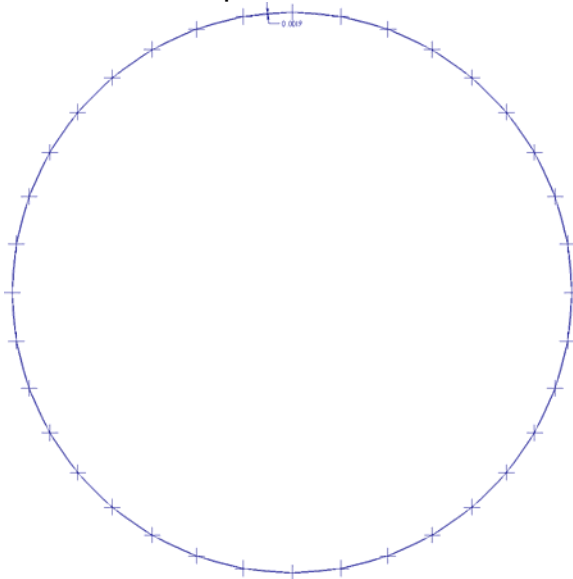
There are 3 settings you can choose from that will determine the visual definition of the projection.

Max Chord Height

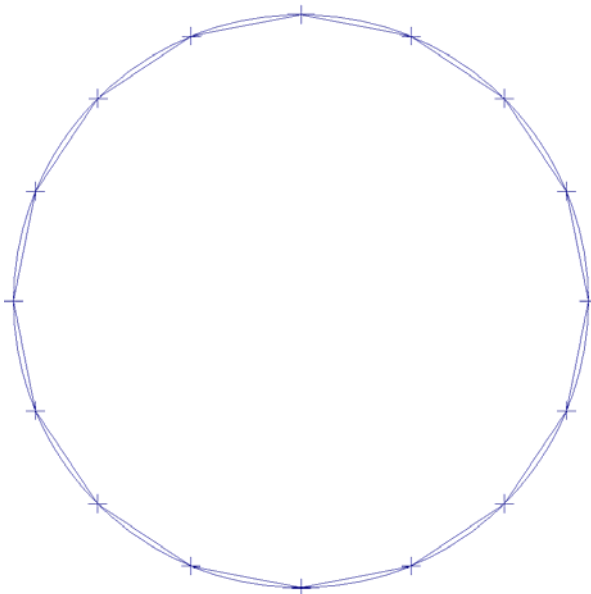
This setting allows you to set how tight the projection will be to the curve. It uses the chord length of any curve to determine where the projection points will be. With a tight setting of .002 (as shown) a point will be placed whenever the path along the curve finds a chord height of .002. Below is a 1.00 DIA circle projected at .002 Chord Height zoomed in to show the projection path. The straight line is the path zoomed in showing a chord length of .0019. This is under the max of .002.



The next picture shows the entire circle at .002 chord length.
37 lines for the path and 36 lines for the projection points.



Now lets look at a larger chord length of .010.
It will have fewer points and lines and be less defined. 17 points and 16 lines.

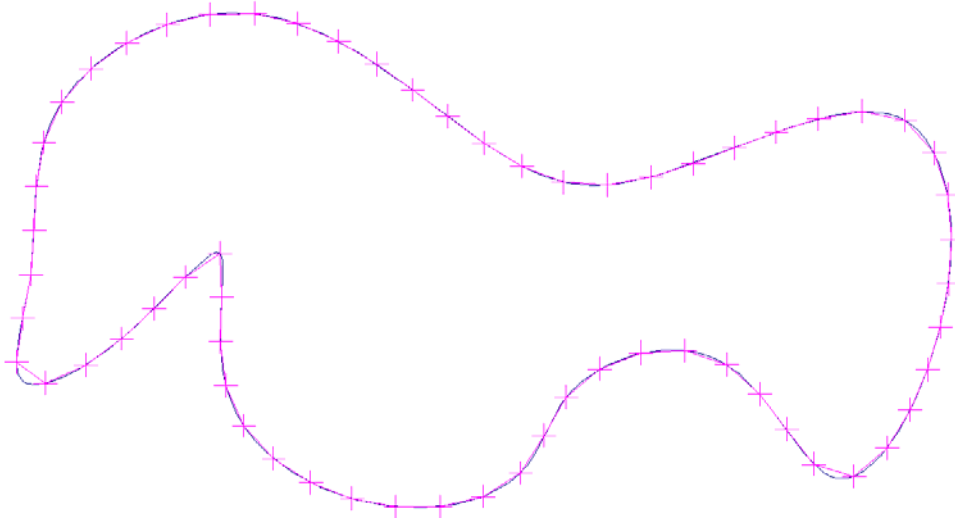


As we can see the definition is far better at a tight setting on chord length. You may ask, "why not always use a tight chord length?" Answer: This is only a 1.00 DIA circle and it would be fine. What if we had many curves to project in one ply? A tight setting would return hundreds, if not thousands, of points and lines that would need to be projected on one ply or level. This in turn will cause the projection to flicker. Breaking up the curves into separate entities may be required to get a projection at tight settings.

Distance Along

This setting is pretty much self explanatory. Points and the distance between them will be spaced at what your setting is. These points are now at even increments of 0.1. We can see that it looks fine where the curve is a gradual radius but where the curve is sharp it misses part of the turn. Look at the lower-left corner for example.

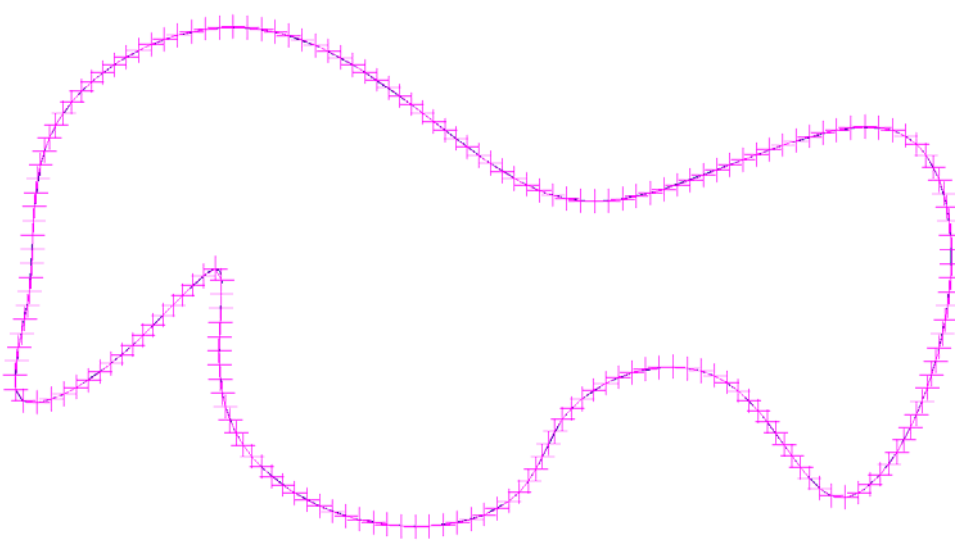
| | |
|---|------|
| Chain Method | |
| <input type="radio"/> Max Chord Height | 0.01 |
| <input checked="" type="radio"/> Distance Along | 0.1 |
| <input type="radio"/> Num of Points | 40 |



Num of Points

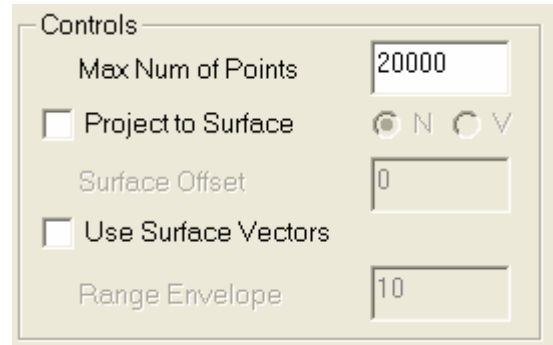
This setting is pretty much self explanatory. This will limit the amount of points used to create the projection. With this setting only 200 points will be used and they will be evenly distributed.

| | |
|--|------|
| Chain Method | |
| <input type="radio"/> Max Chord Height | 0.01 |
| <input type="radio"/> Distance Along | 0.1 |
| <input checked="" type="radio"/> Num of Points | 200 |



Controls

These settings control a number of projection settings that may have to be used depending on your model integrity. There may be a case where what you want to project is not on the surface. Perhaps the lines you want to project need to be offset an inch to locate a mating piece.

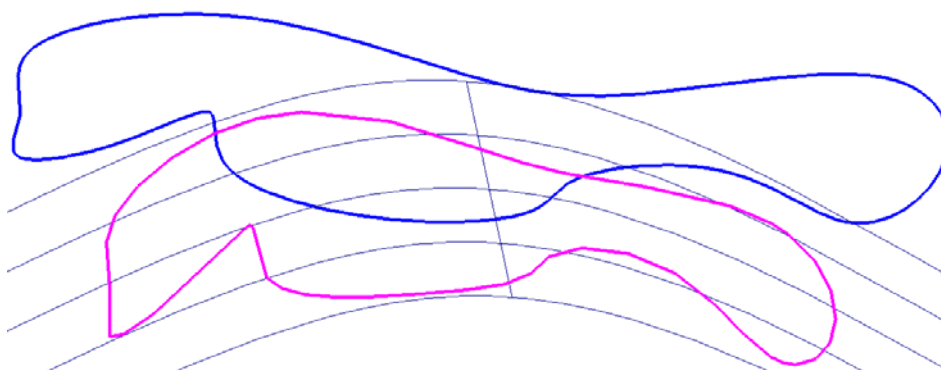


Max Num of Points

This control is used to set a maximum number of points to project. With experience on your projector you will get a feel for how many points can be projected to limit the amount of flicker from your projector. The default is 20000 points.

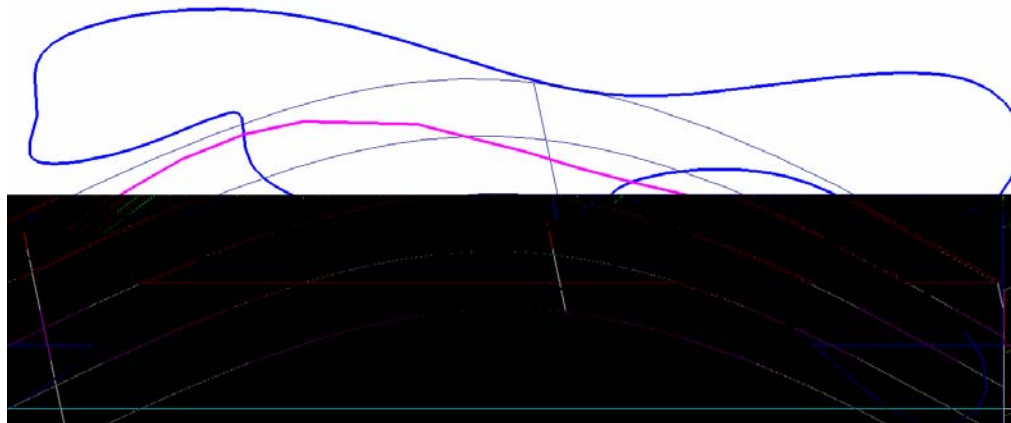
Project to Surface (Set to N – Normal)

This control should be used if your splines to be projected DO NOT lie on the surface. The splines will then be projected **NORMAL** to the surface. Let's have a look at an example. The picture below shows the spine curve we used on the prior page. Note how the curve projects NORMAL to the surface or "wraps".



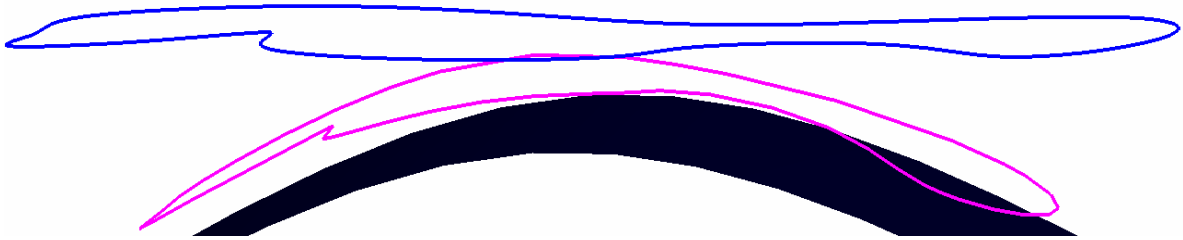
Project to Surface (Set to V – View)

The splines will then be projected **NORMAL** to the active **CPLANE**. This was projected in CPLANE TOP.



Surface Offset

This setting can be used to offset the curves FROM the surface



Range Envelope

This setting is used for the operator to input the distance Verisurf will search for a surface to project to. If any part of the surface is further from the curve than the Envelope no path will be created in that area.

Saves

These settings were included in Verisurf aid the Administrator in creating the projection paths prior to actually having the part to project on. Any of the choices can be selected to save, in the Cad model, points, vectors, paths and connection paths. Be careful that you save these entities to a different level as not corrupt your model.

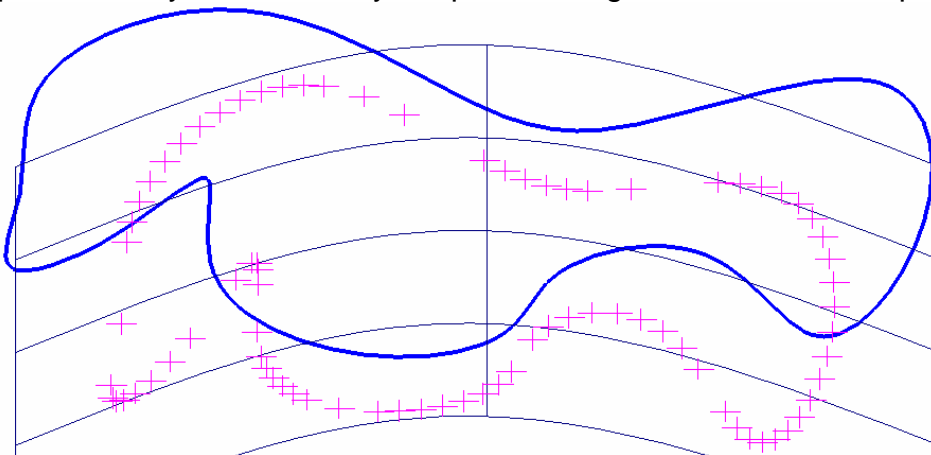
| Saves | |
|-------------------------------------|-----------------------------|
| <input checked="" type="checkbox"/> | Save Points in Verisurf |
| <input type="checkbox"/> | Save Vectors in Verisurf |
| <input type="checkbox"/> | Save Laser Path in Verisurf |
| <input checked="" type="checkbox"/> | Save Connection Path |

to

to

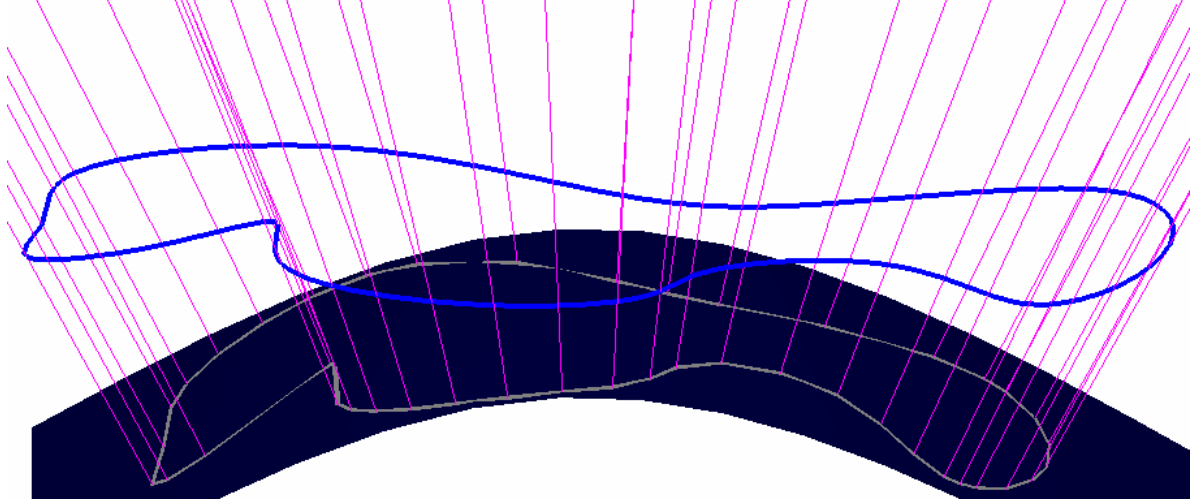
Save Points in Verisurf

Selecting this option will save the actual X,Y,Z laser point that the projector will be shooting to. These points will match what is written through the linker to the LPT part directory. Below is only the points being saved with normal projection.



Save Vectors in Verisurf

Saving the vector lines from the points can enable the Administrator to visually check if the angle of the surface is too oblique to the projector. He can also verify that the vector direction is correct to assure that clipping will be used properly. Shown below are vector lines. Note: Vector lines are hard-coded to be 1.00 inches.

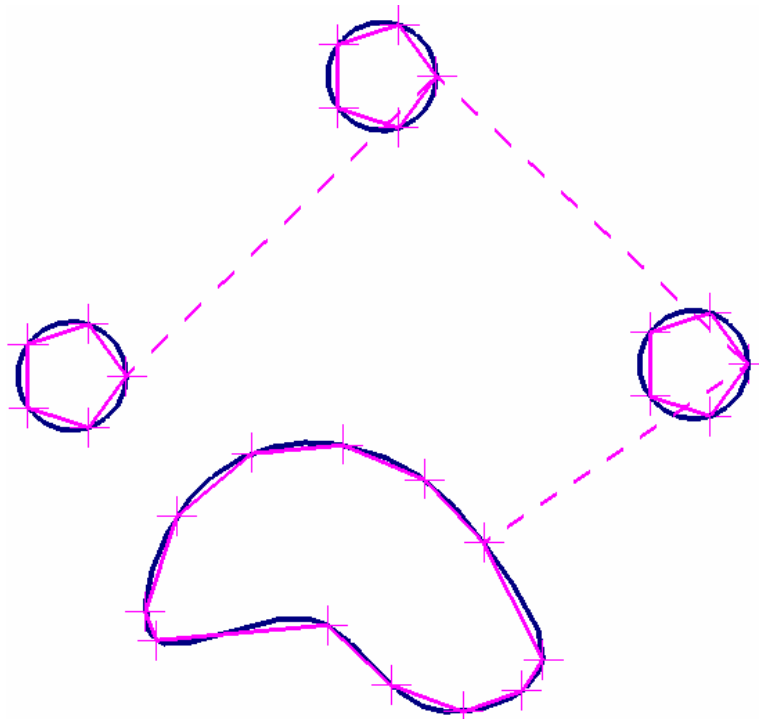


Save Laser Path in Verisurf

This control can be used so that the actual path that will be projected is displayed. The examples above show many saved laser paths.

Save Connection Path

This control can be utilized only if you are saving the laser path. It can then be checked to display a dashed line connection path between separate projections. This is useful to verify the laser path takes the shortest route between curves to minimize flicker.



Cross Hairs

Cross Hairs are used to project locations of specific points. This is useful if you want to project rivet locations, tooling holes or any other location your application may require. The cross hairs can be projected in a combination of ways.

Type of Cross Hair

You have the choice of a single point, a cross hair with vertical and horizontal lines, a circle or square or a mixture cross hair and circle/square.

Cross Hair

Max Chord Height: 0.002

☒ Cross Len / Width: 1

☐ Cross ☒ Diameter: 0.333 ☐ Square

or

Laser Projection

Start LPT Linker

Naming

Part: LPT_DEMO_TOOL

Layer/Ply:

Operation

☐ Tooling Points ☐ Measure

☐ Chain Contour ☒ Cross Hairs

☒ Use Point Selection

Done << Less New

Cross Hair

Max Chord Height: 0.002

☒ Cross Len / Width: 1

☐ Cross ☒ Diameter: 0.333 ☐ Square

Controls

Max Num of Points: 20000

☒ Project to Surface ☒ N ☐ V

Surface Offset: 0

☐ Use Surface Vectors

Range Envelope: 10

Saves

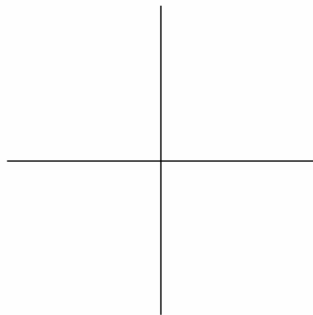
☐ Save Points in Verisurf

☐ Save Vectors in Verisurf

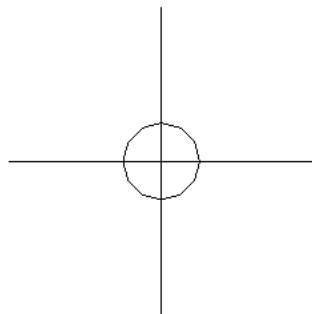
☐ Save Laser Path in Verisurf

☐ Save Connection Path

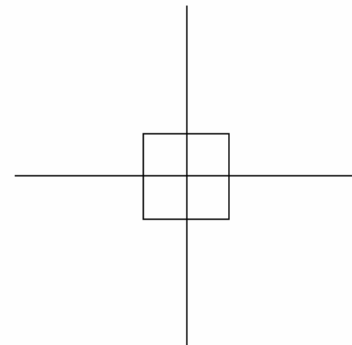
CROSS HAIR




CROSS HAIR WITH CIRCLE



CROSS HAIR WITH SQUARE



Measure

Laser Projection 

Start LPT Linker

Naming

Part

Layer/Ply

Operation

☐ Tooling Points ☒ Measure

☐ Chain Contour ☐ Cross Hairs

Measure

Laser Projector

☒ Retro-Target

☐ Intersect Target

☐ Circle Target

☐ Edge Target

☐ Contour Target

☐ Aim Target

Controls

☐ Target Offset

☐ Min Time (seconds)

☐ Min Distance

Using Verisurf Automate with LPT10

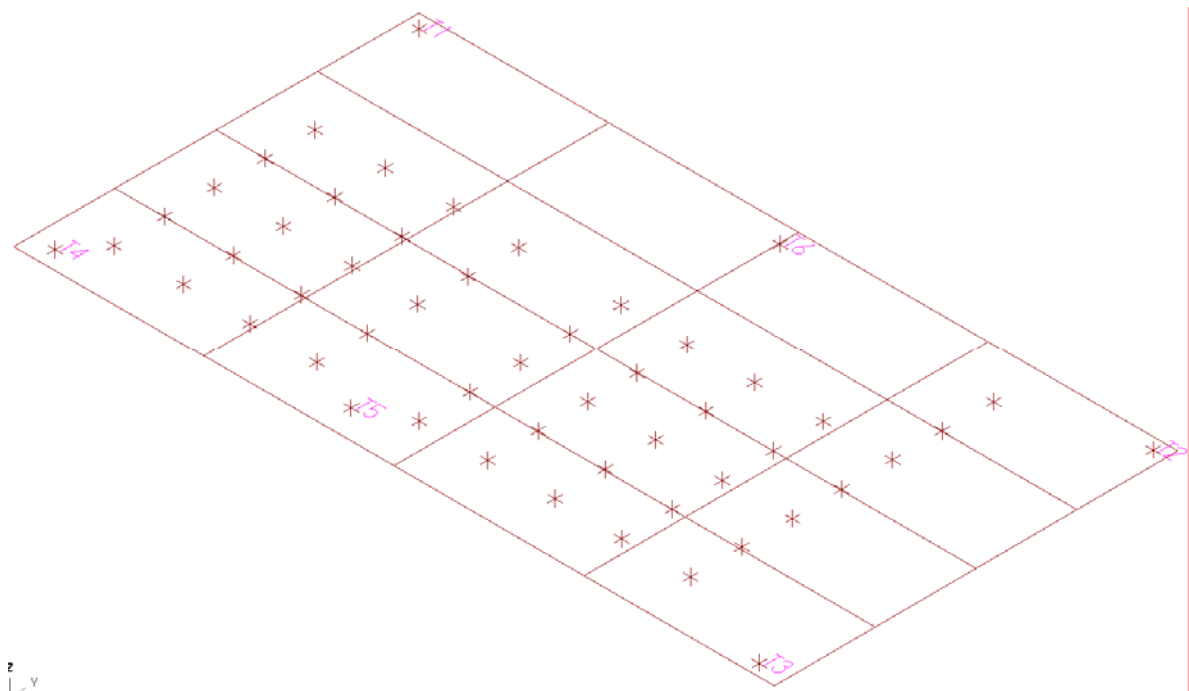
To use Verisurf Automate with LPT10 you will have to be licensed with Verisurf for the following modules:

- LPT
- Veriprobe

Using the feature recognition tools of the LPT10 we can utilize Verisurf to create a program for measuring holes, edges and the dimensions between the holes and edges. A program can be written prior to the part being manufactured. When ready to inspect the new part you will need to align the LPT to the part and then run the pre-written program.

For our example program we will use the part file shown below. The location of this file is LPT10_PROGRAMMING1.MC9.

It contains on separate levels, a surface, a series of points that represent holes, 4 edge lines and a group of LPT targets with names.



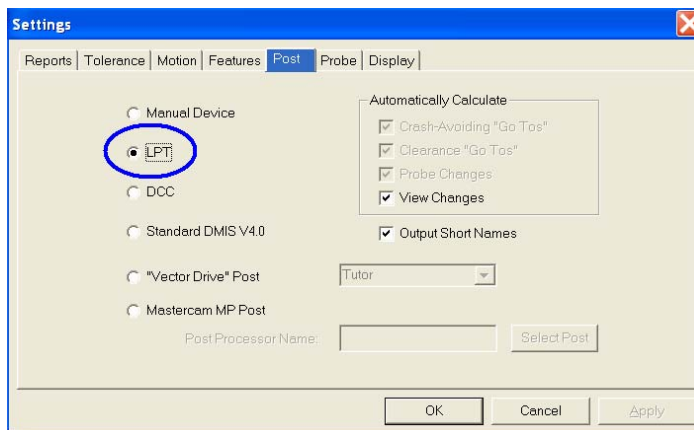
Automate Interface - Features

The LPT Automate interface is identical to the normal Verisurf Automate interface except that there are subtle changes in the menus. To access the LPT automate we need to activate the LPT post processor. This is done through VERISURF > AUTOMATE > SETUP.

Automate Measurements

New
Setup
Auto Align
Features
Constructs
Insert
Insert CHook
Operations
Utilities

On the tabs choose Post. Change the device to LPT.



Now we are ready to program in Automate.

There are 2 things that will be scanned. Holes and Edges. In holes we can choose either Single Hole to choose individually or Holes which will bring up the selection menu shown to the right.

Automate Feature

Point
Surface Pts
Contour
Rectangle
Single Hole
Holes
Edge

Select the feature(s) to measure

Unselect
Chain
Window
Area
Only
All
Group
Result
Done

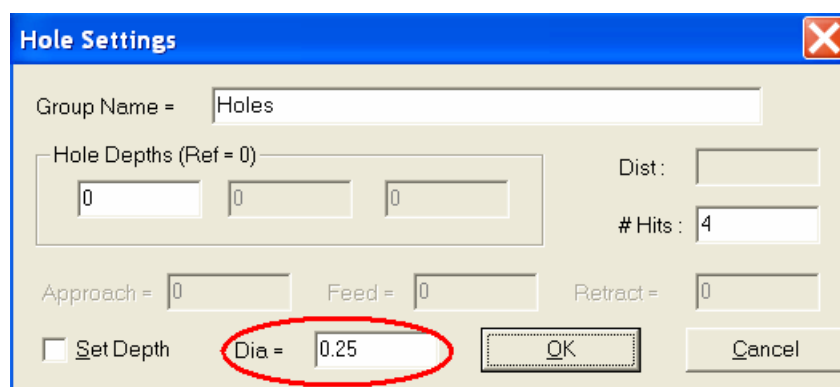
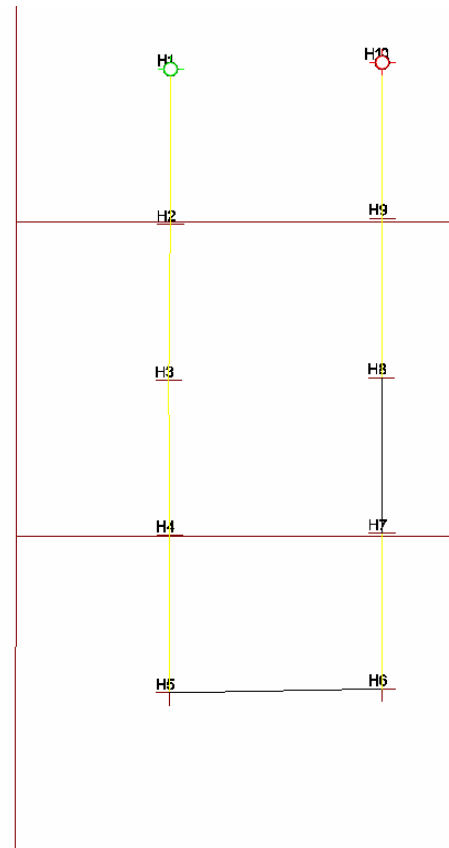
Verisurf has provided two ways of collecting holes. Many customers use points placed on the surface to represent hole locations. Verisurf has allowed the user to select either holes (arcs) or points. When selecting them you can choose the points individually by using the Single Hole menu option or groups of holes by using the Holes menu option.

Scanning Holes – Single Hole

Let's pick a few holes using both of these options. Open LPT10_PROGRAMMING1.MC9. We will pick H1 to H5 using Single Hole.

1. Choose VERISURF > AUTOMATE > FEATURES > SINGLE HOLE.
2. Using your cursor pick Hole 1.
3. We see that Hole 2 is located right next to the representation of the surface. To choose it you can either choose below the point to assure that you are picking the point. You can ZOOM into the point to aid in picking it. You can also ALT-E > All POINTS to isolate the points.
4. Continue picking Hole 3 through Hole 5.
5. When you are finished picking the points choose ESC or BACKUP to end the selection.

You will be shown this screen where you can input the Diameter to set your scanbox size.



6. Change this to .25 and select OK. If you choose cancel your selections will be removed.

Scanning Holes – Holes

To pick a group of holes of the same diameter the HOLES option is available.

Choosing this option will bring up the selection menu shown below.

The full selection menu is available, if you know it.
Your primary selection will be a window around points of similar diameter.

Place a window around the points / arcs to be measured and choose done after your selection.

Select the feature(s) to measure

Unselect

Chain

Window

Area

Only

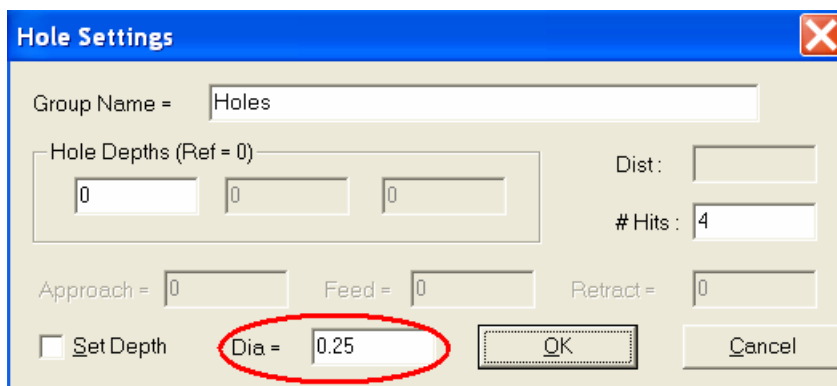
All

Group

Result

Done

AGAIN you will get the Hole Settings menu :



The Hole Settings dialog box is shown with a blue title bar and a close button. It contains the following fields and controls:

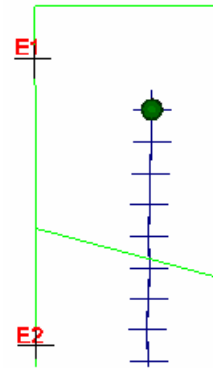
- Group Name = Holes
- Hole Depths (Ref = 0): Three input fields, each containing 0.
- Dist: Input field.
- # Hits: 4
- Approach = 0
- Feed = 0
- Retract = 0
- ☐ Set Depth
- Dia = 0.25 (circled in red)
- OK button
- Cancel button

Choose a diameter of your choice.

Scanning Edges – Splines, Lines Arcs

Verisurf has provided two ways of collecting edges. We can manually “Sketch” on any line spline or arc. Verisurf will also allow you to pick any point and then Verisurf will find the closest edge. This closest edge is also perpendicular to the hole.

This is an example of picking the edge points by sketching on the spline.

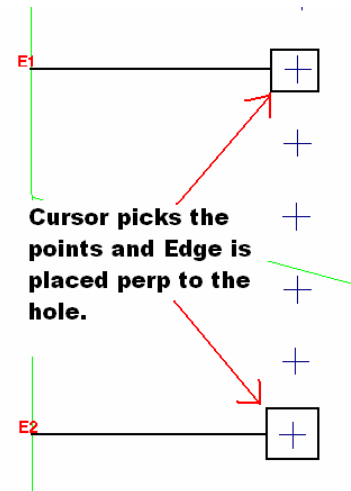


At the time of the manual be created there are still some issues to be resolved when picking on a trimmed spline or picking while in different Cplanes. These problems will be resolved shortly. I have the best results by being in CPlane Top

Scanning Edges – Perpendicular to Hole

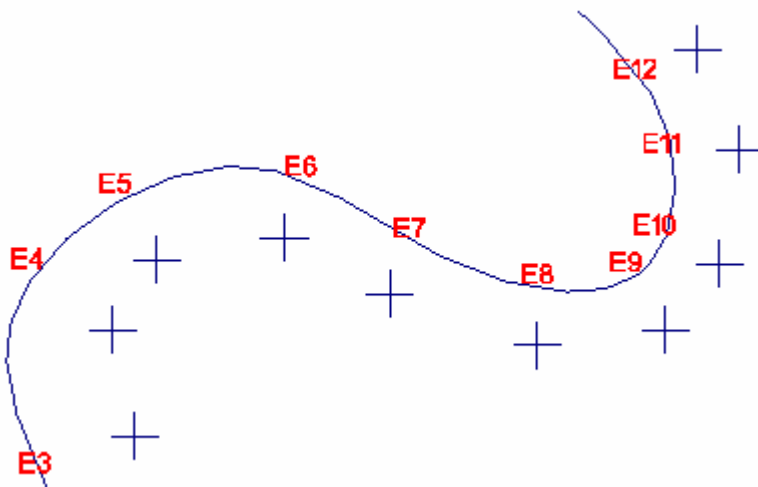
Picking any point that represents a hole while in Edge will generate an edge scan at the closest line, spline or arc that it finds to the hole.

This is an example of picking the edge points by picking the points and letting Verisurf determine the point perpendicular to the spline.



You may run into occasions where the spline you want it to project perpendicular to is not the closest spline. You can SCREEN > BLANK the unwanted spline. Pick the point that will then project an edge to the correct spline. After this is done SCREEN > BLANK > UNBLANK the spline to bring it back.

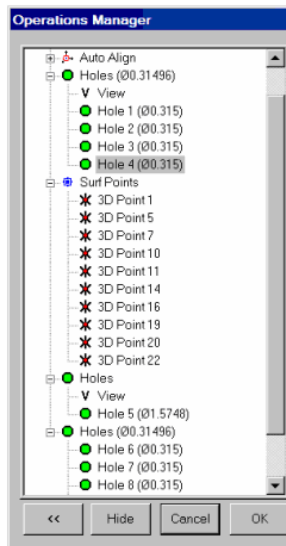
This perpendicular to hole option is really nice if you have a curved edge. Your edge scans will then be perpendicular



Automate Interface – Operations MGR

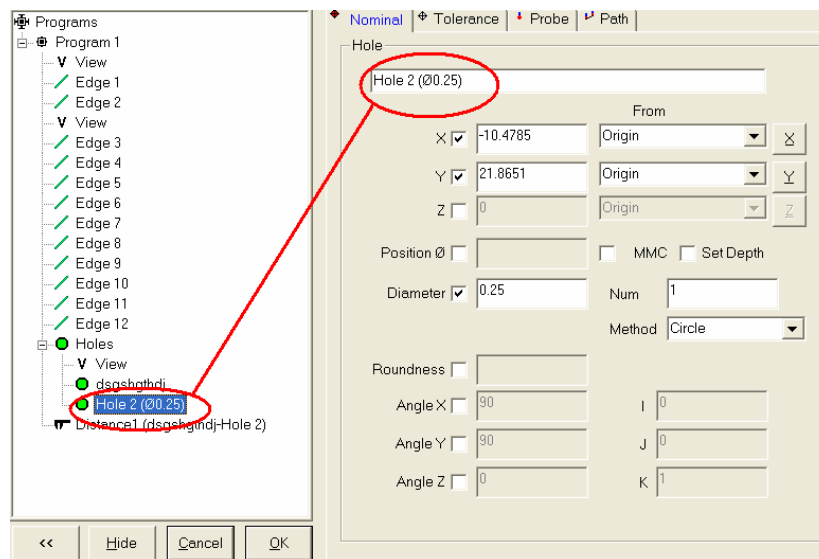
The Feature Tree

- The feature tree lists all the functions and features added by the operator during the course of creating the Automate Plan. Selecting a feature or function on the tree will cause the right side to expand as shown here.



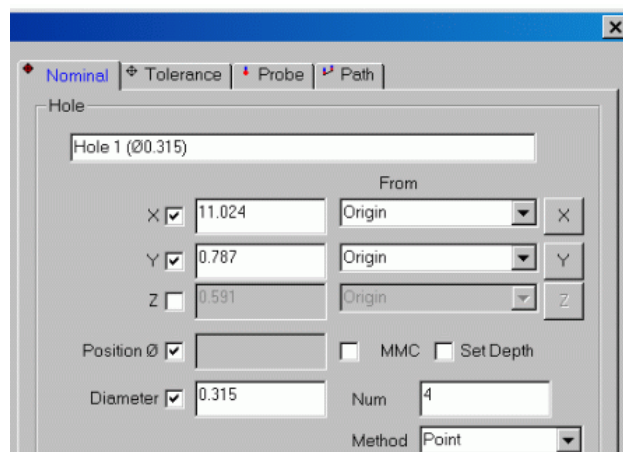
- Objects on the feature tree may be 'Drag and Dropped' as needed. For example if a feature needs to be added higher in the tree simply add the feature to the bottom of the tree and drag it up to the desired location. Select OK.
- Features may also be moved down or deleted at any time. Select OK when edits

Features in the tree can also be renamed in the ID entry area shown below.



Nominals Tab

- The Nominals Tab is completed automatically by the program as the modeled data is normally the product definition.

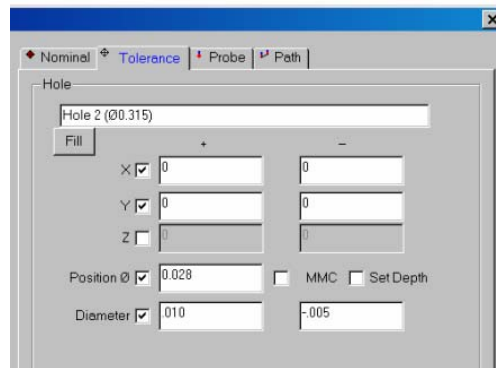


- The report output can be adjusted by checking or un-checking the appropriate boxes here. The feature description, target origin and method of toleranceing may also be adjusted.
- Checking the Position \checkmark causes the output as True Position Dia., checking the MMC box will apply the Maximum Material Condition principle.
- By using the dropdown boxes under 'FROM' the operator can specify from what feature the item is to be compared such as from Origin or from hole # 5 etc...

- The X, Y and Z buttons to right of the 'From' column allow the operator a method to select features directly from the model as measure 'From' features.
- Set Depth, Checking this option causes the playback to prompt for a point in the appropriate Axis to set the depth of projection.

Tolerance Tab

- The Tolerance is completed by the operator based on blueprint or MBD tolerancing.

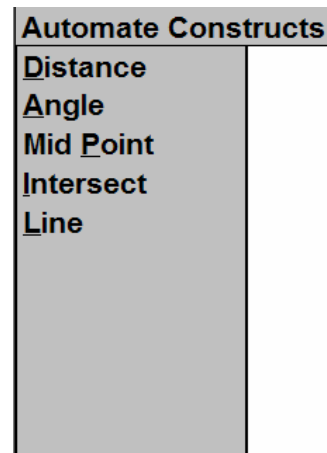
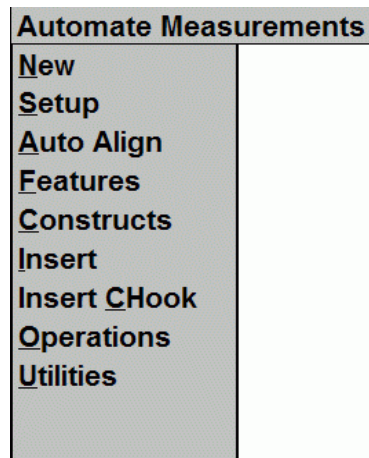


- The applied tolerance can be adjusted here by checking or un-checking the appropriate boxes and modifying the parameters.
- Checking the Position \checkmark causes the output as True Position Dia., checking the MMC box will apply the Maximum Material Condition principle.
- In this example True Position is the desired output so the tolerancing for the X and Y have been zeroed out. With these settings the report output will contain the actual as well as the positional results.

| | Measured | Nominal | +Tol | -Tol | Dev | Over | OOT |
|----------------------------|----------|---------|--------|------|--------|------|-----|
| Hole 2 (Ø0.315) (4) | | | | | | | |
| X | 0.7773 | 0.7874 | | | | | |
| Y | 0.7787 | 0.7874 | | | | | |
| Position Ø | 0.0267 | 0 | 0.0280 | RFS | 0.0267 | 95% | |

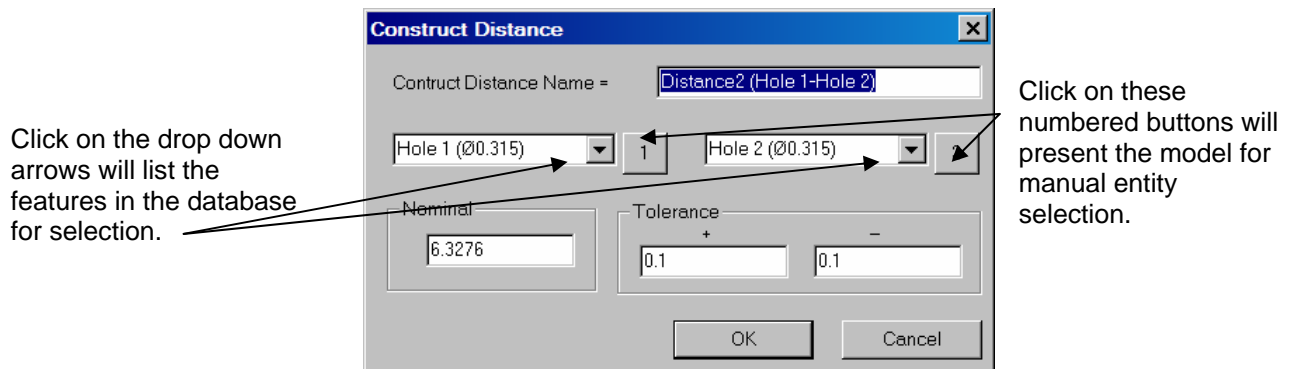
- The X, Y and Z buttons to right of the 'From' column allow the operator a method to select features directly from the model as measure 'From' features.
- Set Depth, Checking this option causes the playback to prompt for a point in the appropriate Axis to set the depth of projection.

Automate Interface – Construct



Constructs

- **Distance, Angle, Mid Point, Intersect and Line** allows the operator to pick two features to construct the 2D result between them. Each option presents this dialog box for the operator to pick the features to perform the function.



- When executing the construct commands the program defaults to pick an entity from the model. By clicking on an entity or on the open field will cause this menu to open. Here the operator can select items from the feature tree or return to the model for selection. Note the features selected must be previously measured and on the tree for calculations to be performed.

VERISURF > INSPECT

Preparation prior to running program

LPT OPERATOR ALIGN

A job database with a valid tool.xml file must be used to align the part to be programmed and subsequently measured. This can be accomplished as outlined on Page 20, Tooling Points. Start OPERATOR and run the alignment tool file.

LPT LINKER

After the LPT10 is aligned to the tooling points we need to verify that LPT Linker in Verisurf is connected to LPT OPERATOR.

Once the Operator interface is opened we pull down Options > Socket Connection. We click on Start Listen and we should obtain a message that socket is open.

The LPT Linker is used to gather the Parts and Tool Points as you can see by the two tabs shown below.

If running Operator from the Laptop we need to tell Linker which computer is running the Laser.

Go to Network settings and change the Operator Host ID to your computer name.

Check the enable Client LPT Network Control. This will enable your laptop to control the projector.

