There are four sections in this document:
   A: Initially loading the digitizing programs and setting parameters. Steps 1 thru 4
    B: Setting Part Z0 on the wheel which is explained in steps 5 thru 12
    C: Setting up for digitizing the wheel which is explained in steps 13 thru 30
    D: Loading digitized program, running the program to verify tool path, and cutting wheel which are explained in steps 31 thru 39

A: Initial Setup

1. The c:\cnct directory is where the digitizing program and the program that calls the digitizing program with the Aux 3 key "Digitizing" are stored. The other 2 files that are created when you run the digitizing program with the values for the current wheel you are running are also saved in the c:\cnct directory.
2. Copy the current version of the digitizing program and the file mfunc60.mac into the c:\cnct directory. Open the file mfunc60.mac and check to make sure the program being called with the G65 is the same name as the digitizing program.
3. You then need to go the parameter screen to set the parameters for the probe and for Dry Run feature. From the Main screen Pres F1-Setup -> F3-Config -> (Enter pass word 137) -> F3 – Params.
4. On page 1 set parameters: 11 - probe PLC input, 13 – probe retract distance suggested value .02(.05mm) , 14 – fast probing rate suggested value 30 (750mm), 15 – slow probing rate suggested value 2 (50mm), 16 – search distance suggested value 2 (50), 18 – probe detect input to the correct values for probing. Press the F8 – Next Table to go to the next page to set parameter 190 to 6011.0000. Pres F10 – Save. – Note: See Manual for more information to change parameters.

B: Setting Z0

5. Put the wheel in the correct size jaws on the chuck and tighten the jaws with the key. Manually rotate the chuck by hand to ensure that the wheel is running true on the diameter and the face. An indicator can be used for this or bring tool #2 in close and spin wheel manual by hand to check if wheel is running true. You can try loosing the jaws slightly and turning the wheel in the chuck to a new position to get it running truer.
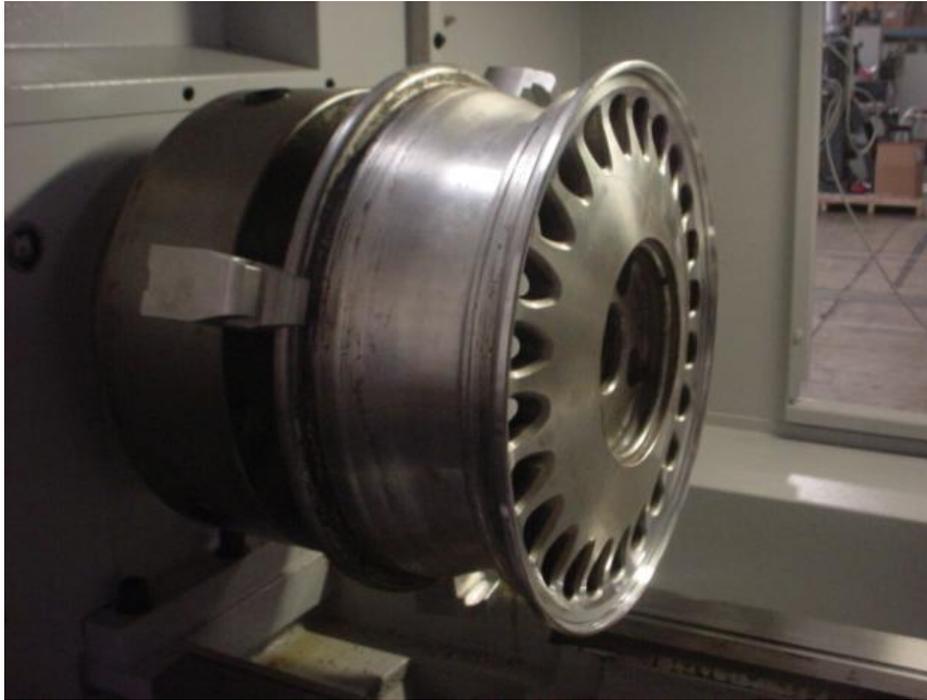
Picture 1

6. Put Tool #1, the probe, into the tool post.

WCS #1 (G54)   Current Position (Inches)   Job Name: mpu11wheelplain-V3-B.txt

X ⊖   +16.5900   Tool: T0101
                                                      Feedrate: 100% 0.0 ipm

Z   -15.4133   Spindle: -84 M
                                                             Coolant

335 Emergency stop released
304 MDI...

Press ESC to cancel

Dist to Go
X ⊖   +0.0000   Please Insert Tool 1
Z   +0.0000   Close the Door
                              and press Cycle Start to Continue

Block? | T101

Rapid
Off
F9

Screen Shot 1

7. If the top right of the screen does not display Tool: T0101, then Press **F3-MDI**, type **T0101**, and Press Cycle Start. You will see Tool: T0101 on the top right of the screen as shown in Screen Shot 1.
8. Tool #1 should already be setup. If not, please follow the instructions in "Wheel Lathe Tool Set up V3 CNC11 Ver 3-12 .docx".
9. Part Z0 should be set on each wheel. This makes it easier to read the G-code file later. You can use the bead or a point on the wheel that is farthest from the chuck. For this example we will set Part Z0 at the bead.
10. Jog the probe tip over to where it is just touching the bead at the farthest point from the chuck.
11. If you are in MDI, press ESC. From the main screen press **F1-Setup** then **F1-Part**.
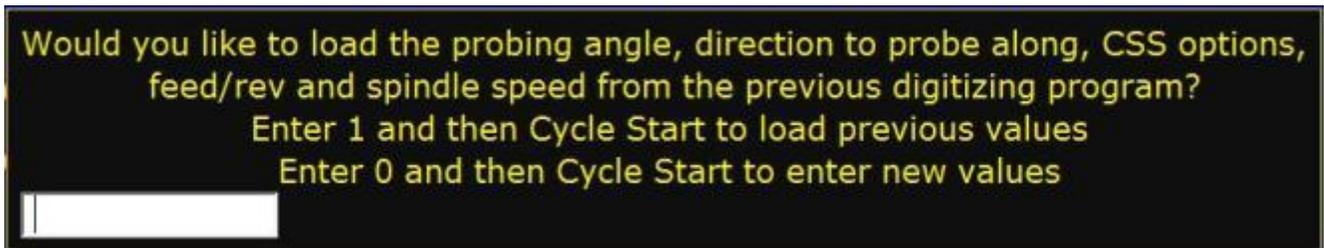
WCS #1 (G54)   Current Position (Inches)   Job Name: mpu11wheelplain-V3-B.txt

Tool: T0101

X ⬡   **+16.5900**   Feedrate: 100% 0.0 ipm

Spindle: -84 M

Z   **+0.0000**   Coolant

335 Emergency stop released
304 MDI...
307 Operator abort: job cancelled
301 Stopped

Set Z Part 0/Position

1) Jog to Touch Off on Part
2) Edit the Value if Necessary
3) Press F10 to Set Position

Axis	Part Position	Tool Number
Z	0.0000	1

WCS #1 (G54)

Prev WCS F6	Next WCS F7	Set X F8	WCS Table F9	Set F10

Screen Shot 2

12. The value of the "Z Part Position" field should be 0.000 and the "Tool Number" field should be 1 as shown in Screen Shot 2. Press **F10-Set**.

C: Setting up for digitizing the wheel

13. Press Digitizing (Aux 3) key on the jog panel.
14. With Tool #1 (probe) in the tool post Press Cycle Start to start running the digitizing program.
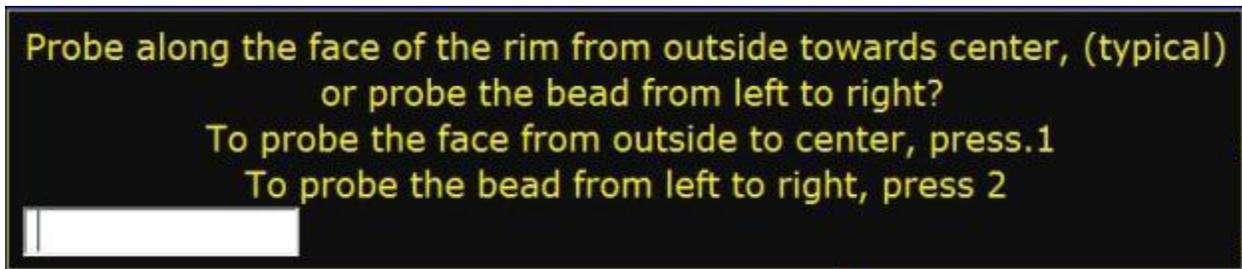
Please enter the file name that you wish cut to to save your data to:
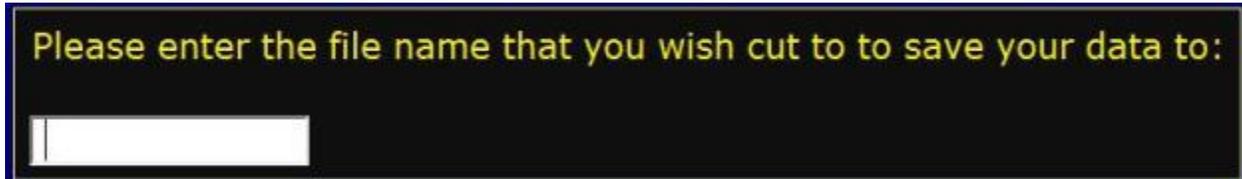
Screen Shot 3

15. Enter file name and then press Cycle Start. (For this example the wheel name to digitize will be "Wheel 1")

Would you like to load the probing angle, direction to probe along, CSS options, feed/rev and spindle speed from the previous digitizing program?
Enter 1 and then Cycle Start to load previous values
Enter 0 and then Cycle Start to enter new values

Screen Shot 4

16. Type 0 and then press Cycle Start. (The first time you will enter 0. Later on you may want to use previous data.)

Probe along the face of the rim from outside towards center, (typical) or probe the bead from left to right?
To probe the face from outside to center, press.1
To probe the bead from left to right, press 2

Screen Shot 5

17. Type 1 if you wish to digitize the face of the rim from the outside of the rim towards center or 2 if you want to digitize from the bead from the left to the right. (For this example, we will do the surface of the rim so type 1 and press Cycle Start).
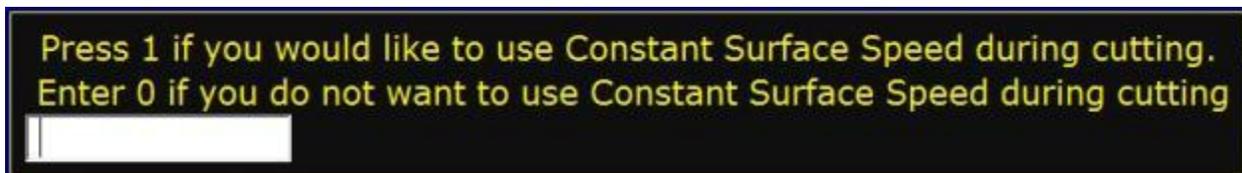
Enter Probing step-over

Screen Shot 6

18. Enter the Probing stepover value and press Cycle Start. (For this example, we will use a stepover of 0.03").

**Note:** The smaller the value the longer it will take to digitize.

Enter Feed/Rev for cutting
.01

Screen Shot 7

19. Enter the Feed/Rev for cutting and then press Cycle Start.

Press 1 if you would like to use Constant Surface Speed during cutting. Enter 0 if you do not want to use Constant Surface Speed during cutting

Screen Shot 8

20. Type 0 for RPM or 1 for CSS and press Cycle Start.

Note: Usually, you will run RPM not CSS.

Enter Spindle speed (rpm) for cutting
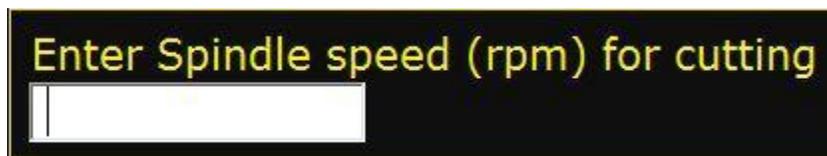
Screen Shot 9a

21. Enter the spindle speed or constant surface speed for cutting and press Cycle Start.

Note: If CSS was selected in step 20, then the message shown in Screen Shot 9b will be displayed.

Enter the Constant Surface Speed.
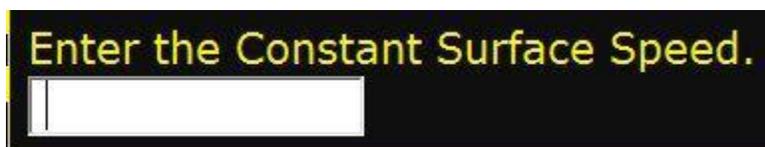
Screen Shot 9b

Would you like to load the start, end, lead-in, lead-out and retract positions from the previous digitizing program?

Enter 1 and then Cycle Start to load previous values
Enter 0 and then Cycle Start to enter new values

Screen Shot 10

22. Type 0 and then press Cycle Start to enter new values.

Please jog the probe to the lead-in position
Press Cycle Start to continue

Screen Shot 11

23. To set the lead-in position, jog the probe near the outside edge of the rim and press Cycle Start as shown in Picture 2. Jog the probe to about 0.25" away from the edge of rim on X and Z axes.

Picture 2 (Lead-in Position)

Please jog in the X- direction to the position to begin probing
Note: You must be within .125" of the part and the probe cleared.
Press Cycle Start to continue

Screen Shot 12

24. Jog X- to the position to begin probing as shown in Picture 3. The position for the Z axis is about 0.125" away and the X axis should be right at the edge of the rim. Press Cycle Start to save the starting position.
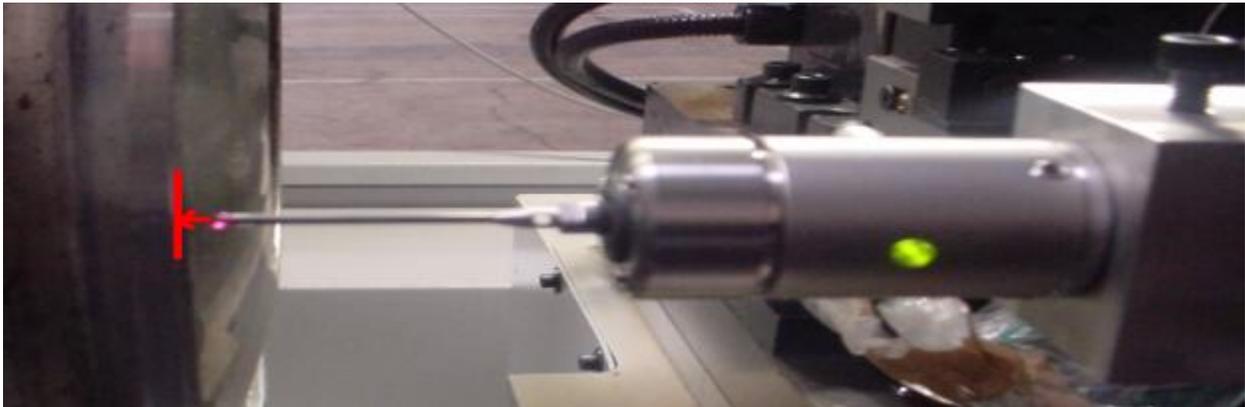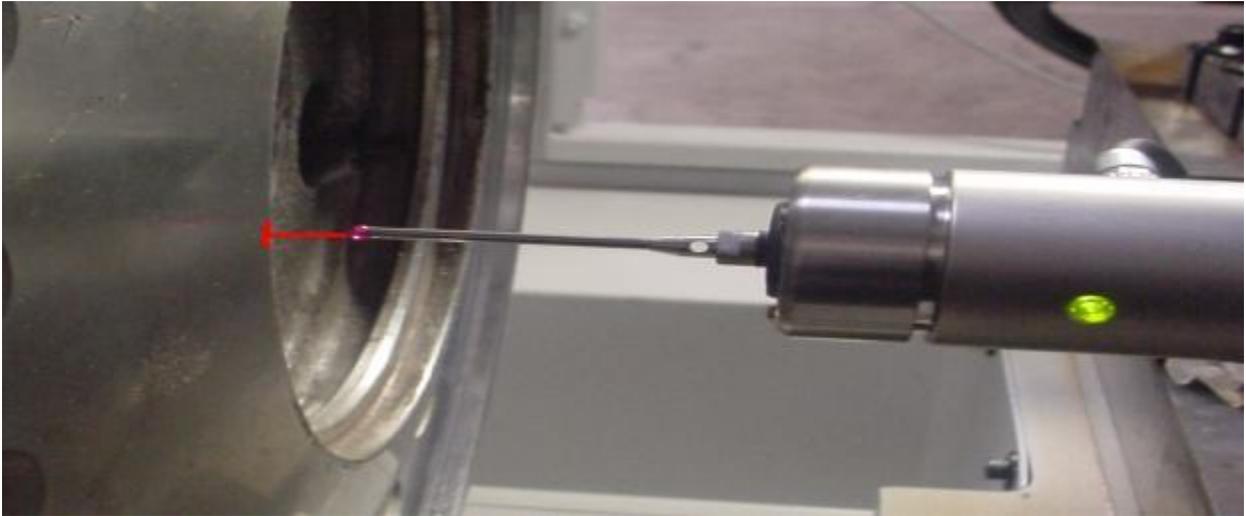

Picture 3 (Start Position)

Please jog in the X- direction to the position to stop probing
Press Cycle Start to continue

Screen Shot 13

25. Jog the Z axis away to ensure that you will not crash the probe into the wheel when you move in the X- direction. Jog X- to the position to stop probing as shown in Picture 4. When you are in position, press Cycle Start to save the stopping position.

Picture 4 (Stop Position)

> Please jog in the X- direction to the lead-out position
> Press Cycle Start to continue

Screen Shot 14

26. This is how much further X will need to cut after the last probing position to do a clean cut. If the last probing position is to a shoulder protruding out, this will be the same position. If there is a recess like in Picture 4 then the additional X- position is to make sure there isn't a tool radius left on the wheel. Jog X- to a position past the probe stopping position and press Cycle Start to save the lead-out position.
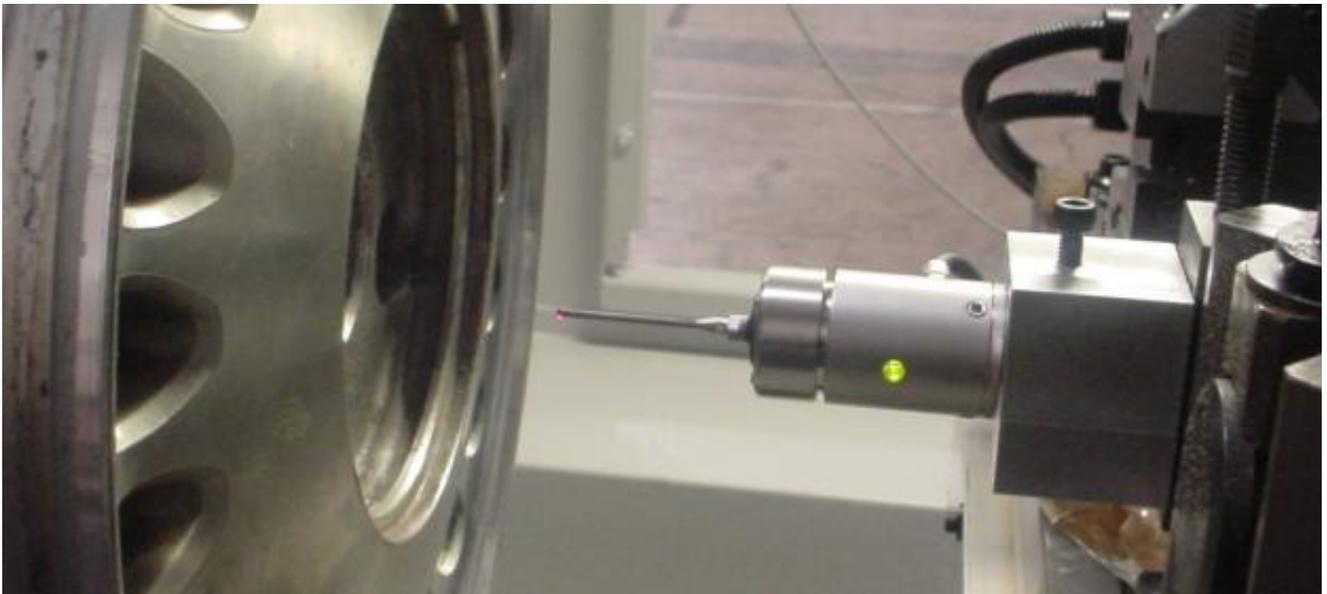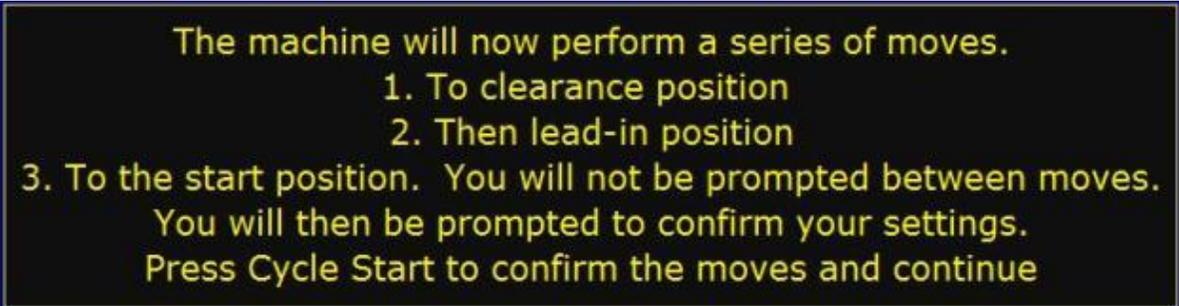

Picture 5 (Clearance Position)
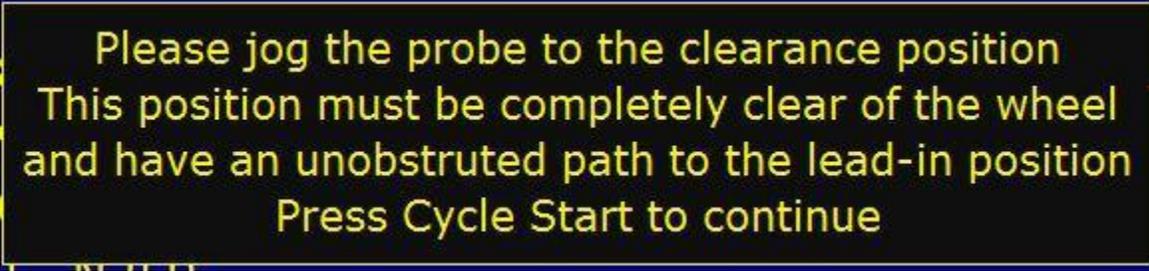
Please jog the probe to the clearance position
This position must be completely clear of the wheel
and have an unobstruted path to the lead-in position
Press Cycle Start to continue

Screen Shot 15

27. Jog the Z axis away from the rim until you are sure that the probe will not crash into the rim. Press Cycle Start to save the clearance position.

28. Follow the screen instructions to complete the actions.

The machine will now perform a series of moves.
1. To clearance position
2. Then lead-in position
3. To the start position. You will not be prompted between moves.
You will then be prompted to confirm your settings.
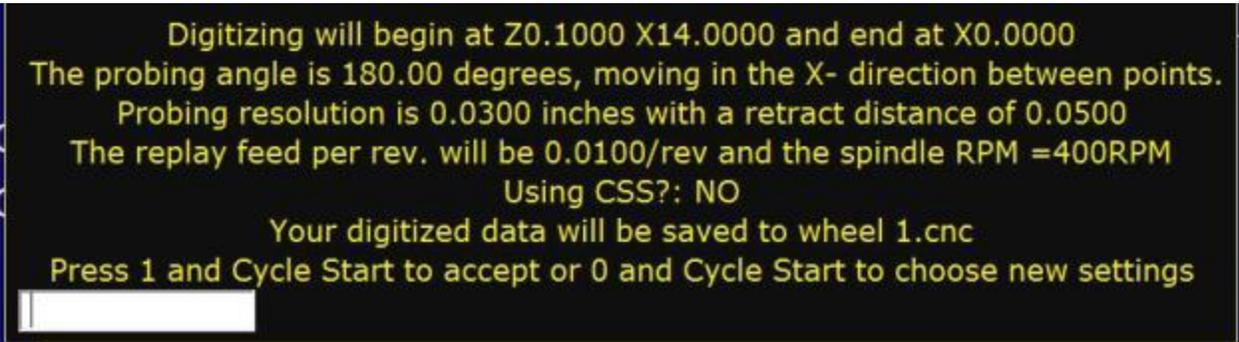Press Cycle Start to confirm the moves and continue

Screen Shot 16

Your digitizing program is ready to run using the following settings:

Screen Shot 17

29. After all of the positions have been confirmed, the message shown in Screen Shot 17 will appear for several seconds and then the message shown in Screen Shot 22 will be displayed.

Digitizing will begin at Z0.1000 X14.0000 and end at X0.0000
The probing angle is 180.00 degrees, moving in the X- direction between points.
Probing resolution is 0.0300 inches with a retract distance of 0.0500
The replay feed per rev. will be 0.0100/rev and the spindle RPM =400RPM
Using CSS?: NO
Your digitized data will be saved to wheel 1.cnc
Press 1 and Cycle Start to accept or 0 and Cycle Start to choose new settings
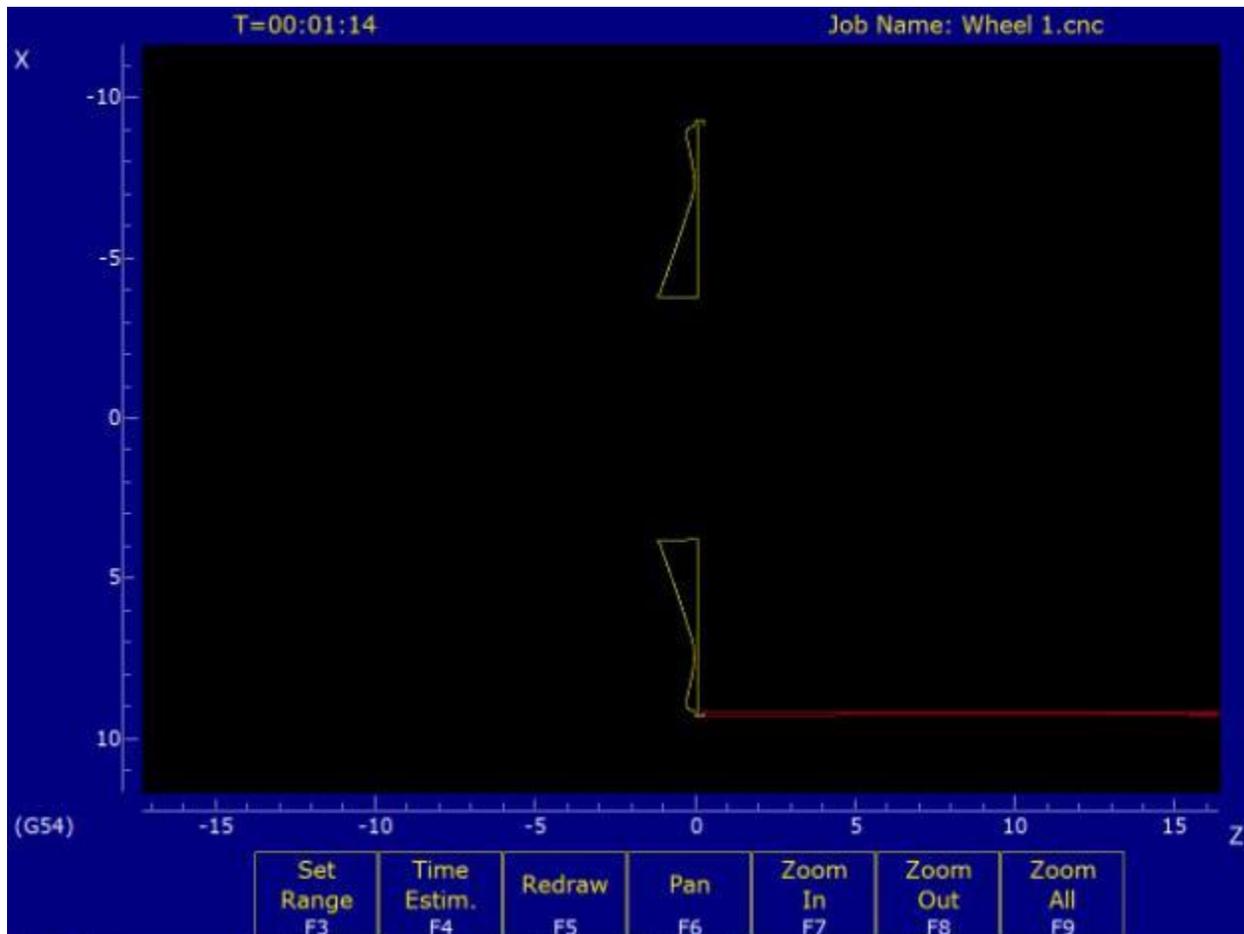
Screen Shot 18

30. Type 1 and press Cycle Start to start digitizing. The machine will start digitizing automatically to collect the data.

Note: If you need to stop the digitizing program to turn the wheel, press Feed Hold. The probe will move away from the wheel. After you have rotated the wheel, press Cycle Start to complete the digitizing program.

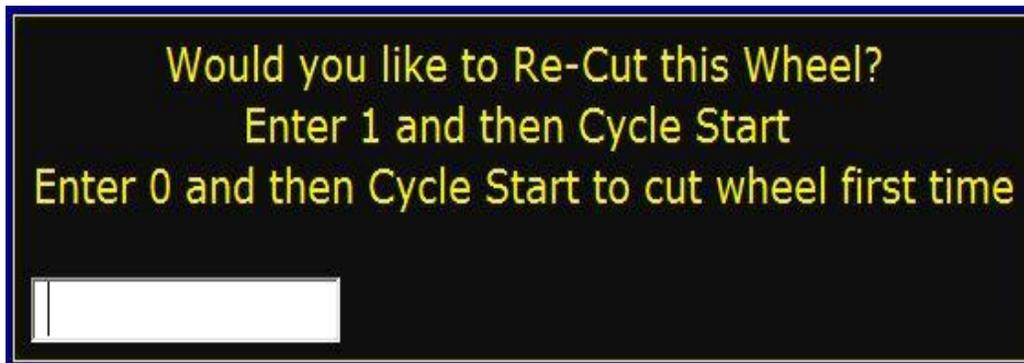**D: Loading digitized program and running the program to prove tool path and cutting wheel.**

31. After the surface of the rim has been completely digitized, load the program for the wheel that you want to cut. In this example "Wheel 1" was used to create the digitize file. From the main screen press **F2-Load** then look at the top of the screen to see what the current directory is. If it shows Current Directory: c:\cnct*.* then you will need to highlight [ncfiles] and press ENTER to get into the directory where the digitized files are stored. If it shows Current Directory: c:\cnct\ncfiles*.* then you are in the correct directory. Highlight the file name and press **F10-Accept**.

32. Press **F8-Graph** to see what the tool path will look like.

Screen Shot 19

33. Press ESC once to get back to the main screen. Remove Tool #1 and install Tool #2. Press **F3-MDI**, type **T0202**, and press Cycle Start. You will see Tool: T0202 on the top right of the screen. Press ESC to go back to the main screen.

34. Press Cycle Start to run the program that you have loaded. If Dry Run (AUX1) LED is lit then you are in Dry Run mode. This is the default mode The program will run but the spindle will not be spinning in this mode and it will be offset 0.05" (2mm) away from the rim so that you can verify the tool path.

Would you like to Re-Cut this Wheel?
Enter 1 and then Cycle Start
Enter 0 and then Cycle Start to cut wheel first time

Screen Shot 20

35. Type 0 and press Cycle Start.

During probing, the first contact point for this rim was detected at X14.000 Z0.0000
Jog your tool tip to that location and press Cycle Start to set your position

Screen Shot 21

36. Jog the tip of the tool to the location defined in the displayed message as shown in Screen Shot21.

Please Insert Tool 2
Close the Door
and press Cycle Start to Continue
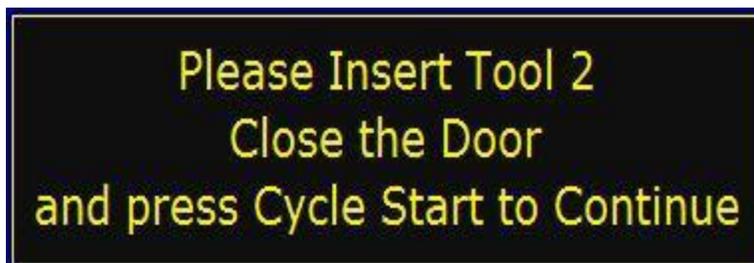
Screen Shot 22

37. Make sure Tool #2 is loaded.
38. **Dry Run mode:** Checks the tool path without the spindle being on. (You can put 0.125" in the Tool Wear table to prevent the tip of the tool from touching the wheel.) At this time the AUX1 LED will

be lit to designate that it is in Dry Run mode (Default mode). Make any adjustments in the Tool Wear (F9) as necessary for X and Z so Tool #2 is the same distance away all the way through the cutting path.

39. **Cutting mode:** After you have visually seen that the tool path in Dry Run mode is correct after any adjustments in X or Z axes, you are ready to cut the wheel. Press Cycle Start. When the message comes up in screen shot 20 Press the AUX1 key to turn off Dry Run mode, then Enter 1, then Press Cycle Start to start cutting. Follow the instructions displayed on screen shot 22.