



### Centroid TT-4 Tool Touch Off

CNC Software Version: CNC12 V4.5+  
Models: Acorn CNC, Oak, Allin1DC



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## TT-4 DESCRIPTION

The TT-4 is a tool touch off device designed to implement automatic and manual tool height offset measurements for applications where the tooling or the spindle may be non-conductive. It can also be used to determine tool breakage and wear.

The TT-4 is suitable for use with any CNC control or Digital Read Out (DRO). The output signal is an electronic switch and is normally closed but can be configured as normally open using the TT-4 Inverting Cable. An LED indicating light signals red when the touch-off occurs.

Over-travel in XYZ directions allow for great flexibility in mounting location and orientation. Mounting is through a standard magnetic base.

The user should first become familiar with the various parts and features of the TT-4 to facilitate assembly, installation and calibration. Read the "Adjustments" section (page 17) before attempting adjustments. Review the over-travel limits shown in the specifications. Exceeding the limits will damage the TT-4. Go slow and verify everything is functioning properly before running automatic measuring cycles at full speed. A simple visual operational check can prevent very expensive repairs.

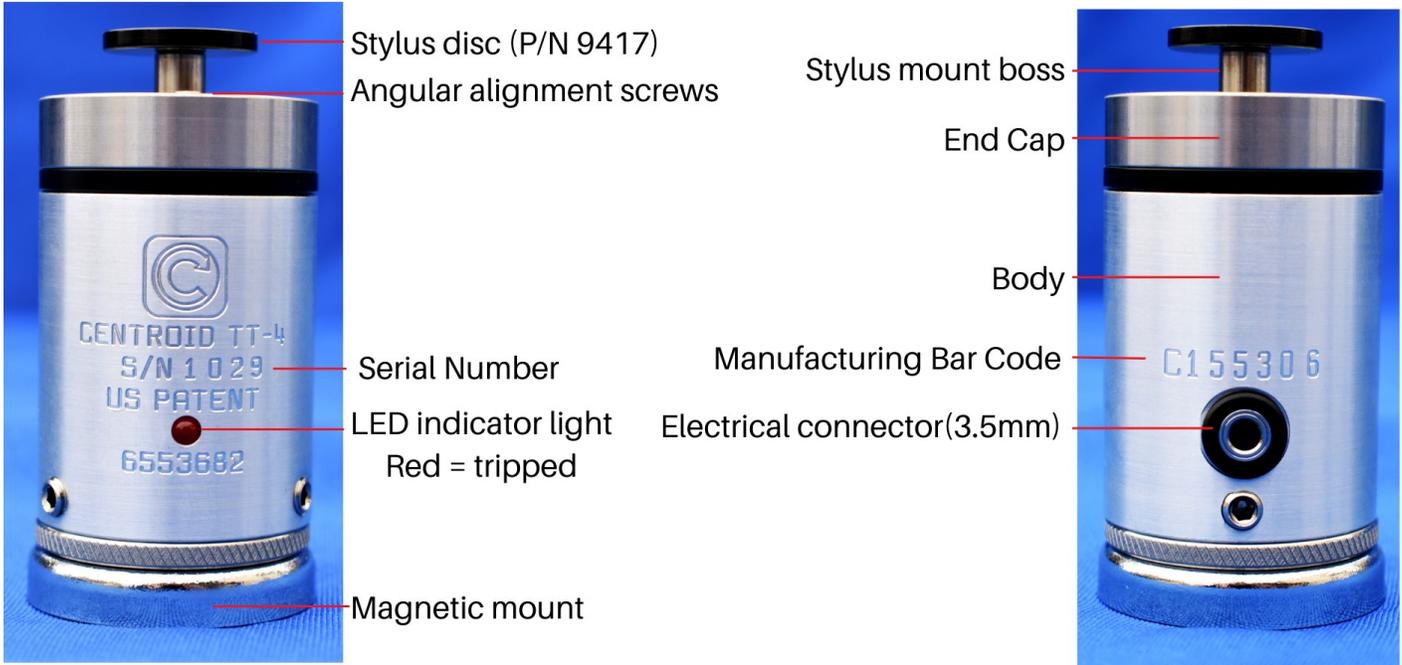
The TT-4 should be serviced by Centroid. Only the Stylus Disc (P/N 9417) can be replaced by the end user. Contact Centroid Technical Support at 1-814-353-9290 for a description of the return policy and assistance in determining if return is necessary. See the "Maintenance and Care" section (page 18) for precautions when shipping the TT-4.

## TT-4 SPECIFICATIONS

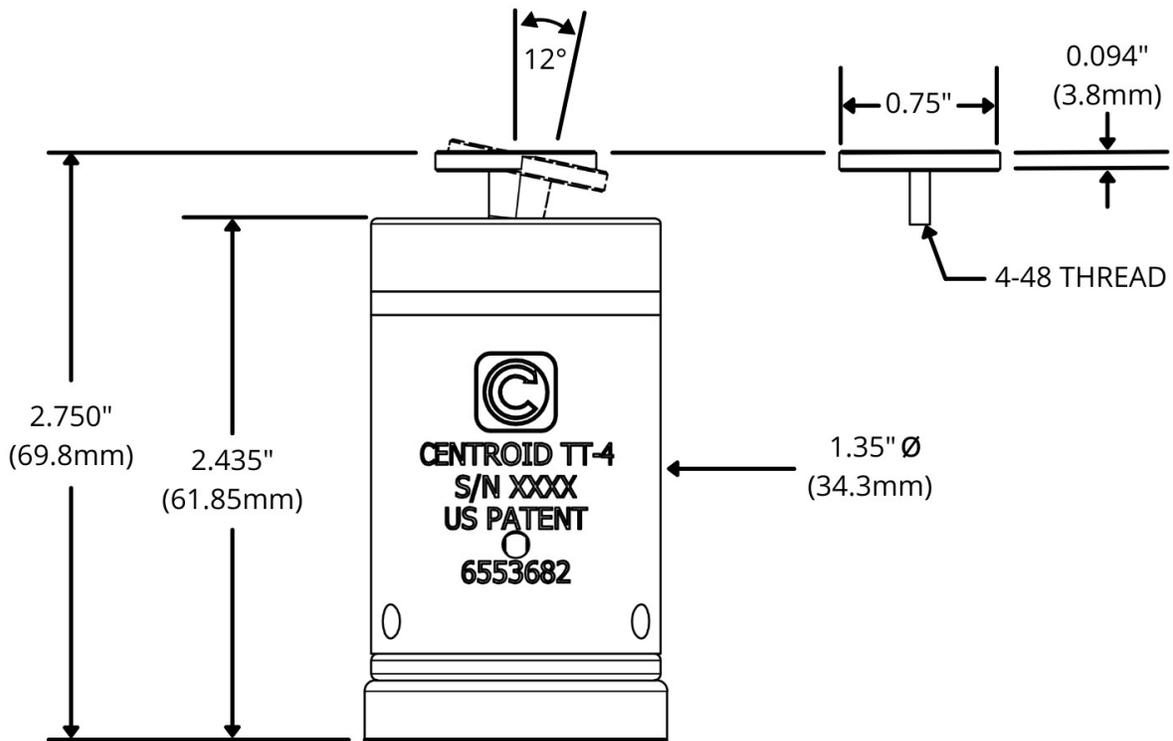
Probing directions	X+/-, Y+/-, Z-
Unidirectional repeatability	.00006" (1 uM) 2 sigma at 1 ipm
Mounting orientation	Any
Height*	2.749" (69.8mm)*
Body diameter	1.35" (34.3 mm)
Disc Diameter	0.75" (19.05mm)
Mounting Options	Magnetic (stock)
Mounting shank diameter and length	D= 0.5" (12.7mm) L= 1.50" (38.1mm)
Touch off surface mount thread	4-48
Over travel limit angle	12 degrees from vertical
Deflection Z travel limit	0.25" (6.35mm) (maximum)
Trigger force Z*	25 oz nominal center of disc*
Trigger force XY*	12 -25 oz nominal direction dependent*
LED status indicator	red = triggered
Supply voltage	5-24 VDC
Output	5-24 VDC, NC output (NO output with inverting cable)
Pre-travel Z	< 0.0003" at center of disc
Pre-travel variation XY*	0.0015" nominal, direction dependent*
Parallelism adjustment range*	0.005"*
Measuring feedrate (nominal)	1 inch per minute
Weight*	0.45 lb (204g)*
Exposure to liquids	IP64

\*Stock TT-4: magnetic mount and 0.75" diameter stylus disc installed.

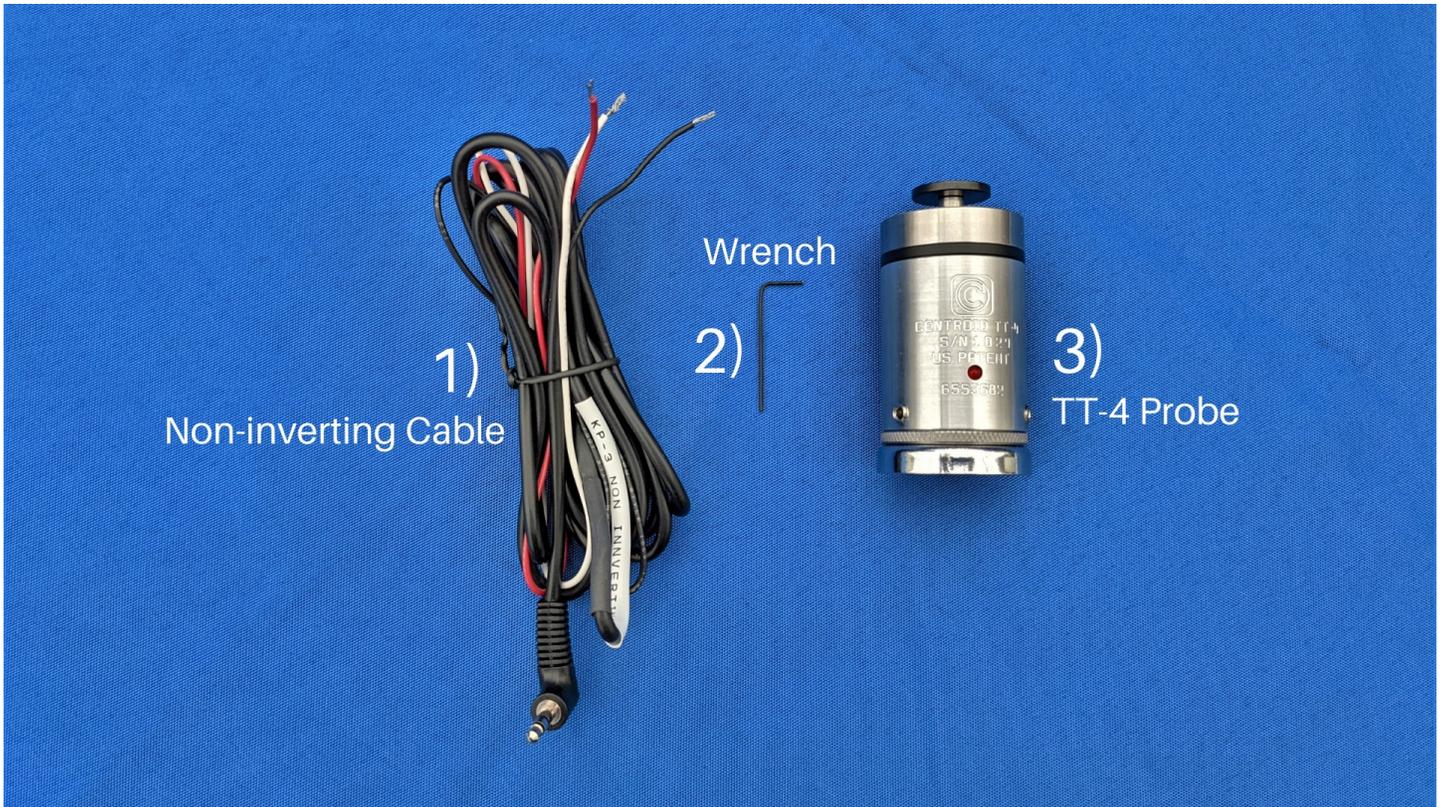
# TT-4 DIAGRAM



# DIMENSIONS AND OVER TRAVEL LIMITS



## TT-4 FOR ACORN KIT CONTENTS (P/N #15135)



### Contents Description:

- 1) TT-4 / KP-3 Non-inverting Cable P/N 14947
- 2) 0.035" Hex Allen Wrench P/N 9497
- 3) TT-4 Probe P/N 15133

## TT-4 FOR OAK/Allin1DC KIT CONTENTS (P/N #15134)



### Contents Description:

- 1) TT-4 Inverting Cable P/N 15128
- 2) TT-4 Probe P/N 15133
- 3) 0.035" Hex Allen Wrench P/N 9497
- 4) Oak/Allin1DC Probe Cable P/N 11211

## TT-4 CABLE CONNECTOR

Connect the 3.5mm mini jack connector into the TT-4 body and fully seat the plug!



Correct! TT-4 Cable connector is fully seated



Incorrect, TT-4 cable connector is not fully seated

## TT-4 ACORN WIZARD CONFIGURATION

**Note:** The Oak/Allin1DC do not have a Wizard. Please follow the **TT-4 SETUP PROCEDURE WITH Oak/Allin1DC** (page 14-16) and **Centroid CNC12 TT-4 configuration for Oak/Allin1DC** (page 22) to configure the TT-4.

### 1) Navigate to the "Input Definitions"

menu under "Primary System: 2) Select the "Probe" for "Input Type" from the drop down box

Primary System

- Axis Drive Type
- Input Definitions**
- Output Definitions

Axis

- Configuration
- Homing and Travel
- Axes Pairing
- Advanced

Spindle

- Setup
- Rigid Tapping
- PWM Setup

Touch Devices

- Probe
- Tool Touch Off

Control Peripheral

- Input Devices
- Wireless MPG

DB25 Connector

- Mapping

Preferences

Input Type: Probe

- SecondAxisHomeLimitOk
- SecondAxisHomeOk
- SecondAxisMinusLimitOk
- SecondAxisPlusLimitOk
- SlavedHomeInput
- SpindleHighRange
- SpindlesOriented
- SpindleLowRange
- SpindleMedRange
- SpindleOk
- SpindleTempAlarmMessage
- SpindleTempAlarmStop
- ThirdAxisHomeLimitOk
- ThirdAxisHomeOk
- ThirdAxisMinusLimitOk
- ThirdAxisPlusLimitOk
- ToolCheck2
- ToolsUnclamped
- ToolTouchOffDetect
- ToolTouchOffTriggered
- ToolUnclampButton
- VFDUpToSpeed

Acorn Integrated Inputs 1-8

NC	NO	Definition
1		IN1
2		IN2
3		IN3
4		IN4
5		IN5
6		IN6
7		IN7
8		IN8

Ether1616 Ex

Auto detection did expansion boards c Ethernet switch.

For more informati Acorn input/output [here](#).

Click and Drag an Input function definition from list to the Input number Definition box to assign a function to an input.

Click the Input number circle to toggle the input state from NC to NO. Note: Probe Input states are determined in the Probe setup menus.

3) Click and drag "ToolTouchOffDetect" and "ToolTouchOffTriggered" to inputs 6 and 7 respectively

Primary System

- Axis Drive Type
- Input Definitions**
- Output Definitions

Axis

- Configuration
- Homing and Travel
- Axes Pairing
- Advanced

Spindle

- Setup
- Rigid Tapping
- PWM Setup

Touch Devices

Input Type: Probe

- SafetyDoorLockConfirmed
- SafetyDoorSwitchClosed
- SecondAxisHomeLimitOk
- SecondAxisHomeOk
- SecondAxisMinusLimitOk
- SecondAxisPlusLimitOk
- SlavedHomeInput
- SpindleHighRange
- SpindlesOriented
- SpindleLowRange
- SpindleMedRange
- SpindleOk
- SpindleTempAlarmMessage
- SpindleTempAlarmStop
- ThirdAxisHomeLimitOk
- ThirdAxisHomeOk

Acorn Integrated Inputs 1-8

NC	NO	Definition
1		IN1
2		IN2
3		IN3
4		IN4
5		IN5
6		IN6
7		IN7
8		IN8

Ether1616 I

Auto detection di expansion boards Ethernet switch.

For more informa Acorn input/out

Click and Drag an Input function definition from list

Wizard Config. cont'd on next page→

## TT-4 ACORN WIZARD CONFIGURATION CONT'D

**Note:** The Oak/Allin1DC do not have a Wizard. Please follow the **TT-4 SETUP PROCEDURE WITH Oak/Allin1DC** (page 14-16) and **Centroid CNC12 TT-4 configuration for Oak/Allin1DC** (page 22) to configure the TT-4.

- 1) Select the “Tool Touch Off” menu under “Touch Devices.”
  - 2) Choose the “TT-4” in the “Tool Touch Off type” drop down menu.
  - 3) Select “Yes” for the “Inhibit Spindle when Detect is on”.
- Note: If the TT-4 will remain wired into the Acorn while machining, the “Inhibit Spindle when Detect is on” will need to be turned off while machining.
- 4) Press “Write Setting to CNC Control Configuration.”

The screenshot displays the "Mill CNC Control Configuration Wizard" window. The left sidebar shows a tree view with categories: Primary System, Axis, Spindle, Touch Devices, Control Peripheral, DB25 Connector, and Preferences. Under "Touch Devices", "Tool Touch Off" is selected and highlighted with a red box and the number "1)".

The main configuration area is titled "Tool Touch Off Configuration". It contains the following settings:

- Touch Off Tool PLC input: Input 7
- Tool Touch Off type: TT-4 (highlighted with a red box and the number "2)")
- Input state when triggered: Open\*
- Subtract height of Tool Touch Off device: No
- Tool Touch Off/Surface Plate: Height for setting part zero: 0
- Use Tool Touch Off device to set Z Reference: No
- Inhibit Spindle when Detect is on (Green): Yes (highlighted with a red box and the number "3)")

At the bottom of the window, a green button labeled "Write Settings to CNC Control Configuration" is highlighted with a red box and the number "4)". The status bar at the bottom left indicates "Connected to CNC12".

## USING THE CNC12 I/O DIAGNOSTIC SCREEN

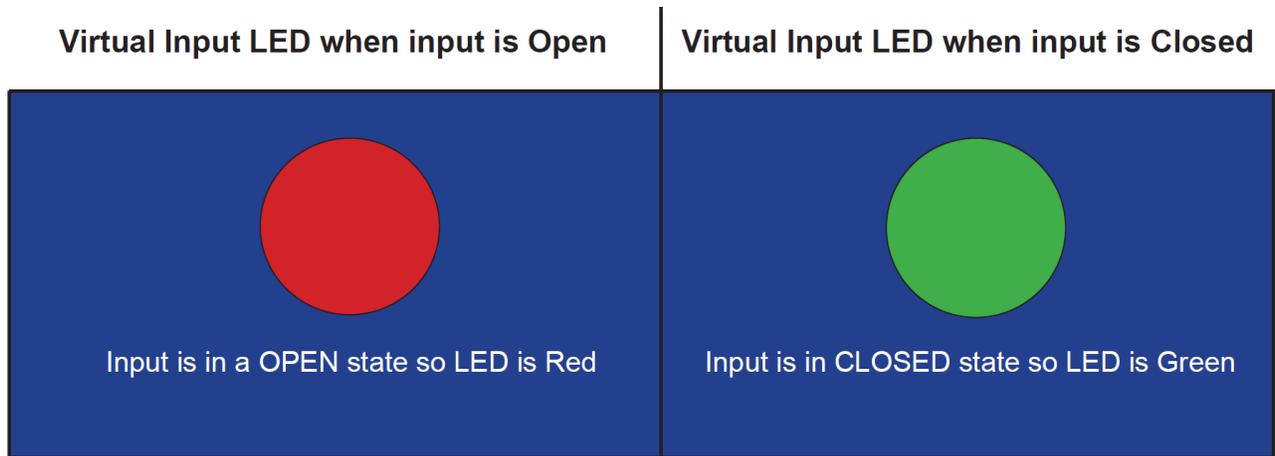
From the main screen of CNC12 bring up the PLC diagnostic screen (aka Input and Output screen), by pressing the keys <ALT> and <i> at the same time. To exit from the Input and Output screen, press the keys <ALT> and <i> again at the same time.

The CNC12 PLC diagnostic screen can be used to observe the state of any input or output.

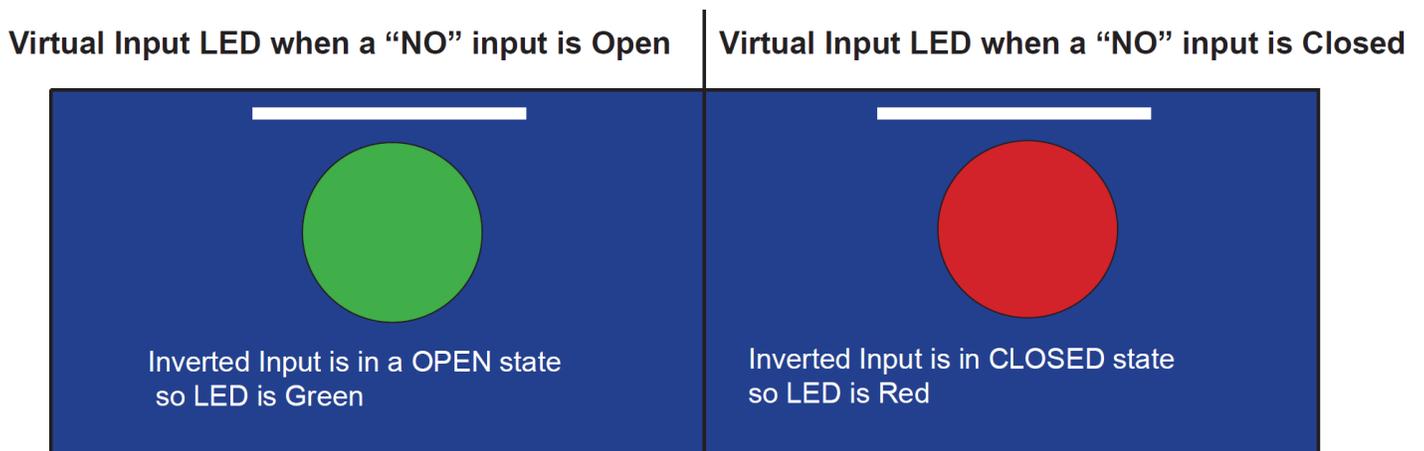
A **red** Virtual LED for an input indicates that input is “open.”

A **green** Virtual LED for an input indicates that input is “closed.”

If an input in the Wizard is set to NC the PLC diagnostic LEDs appear as below.



If an input in the Wizard is set to NO the PLC diagnostic LEDs appear as below. A white line above the Virtual LED indicates that the input has been Inverted.



## TT-4 SETUP PROCEDURE WITH ACORN

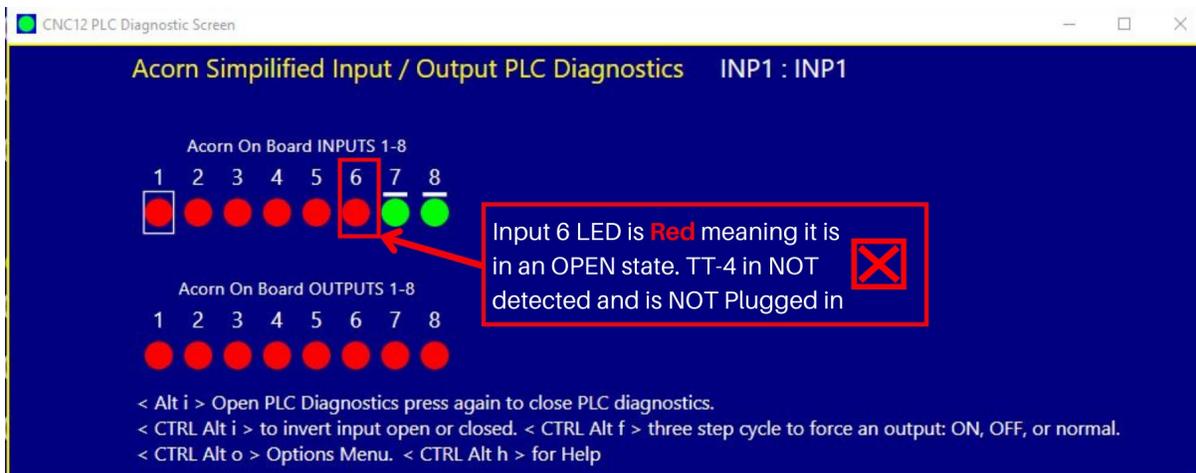
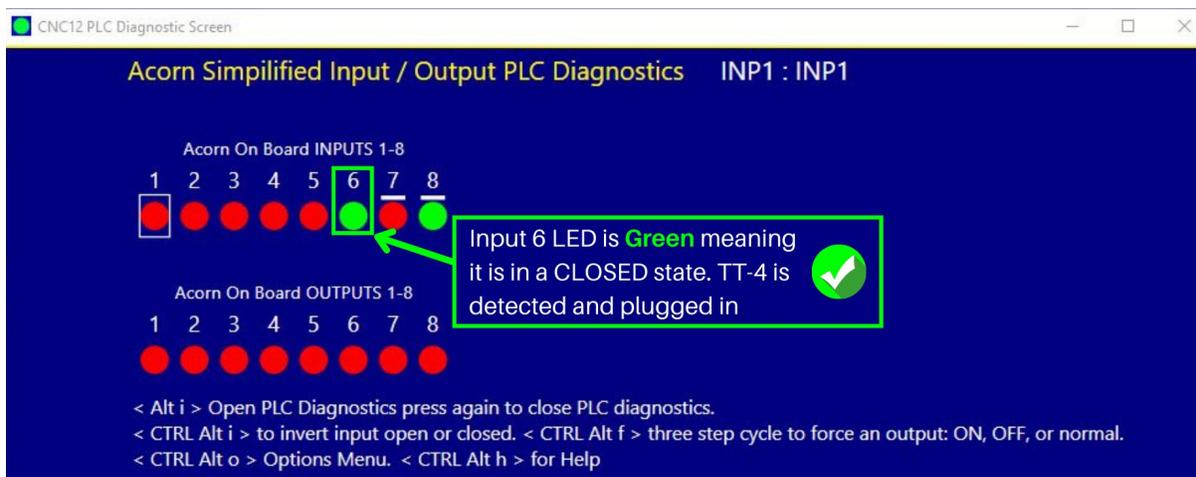
**STEP 1:** Connect the non-inverting cable P/N 14947 following the **ACORN TT-4 Wiring Schematic** (#S15087). In order to have the TT-4 and KP-3 connected at the same time follow the **ACORN TT-4 and KP-3 Wiring Schematic** (#S15122). Follow the wire colors to match-up the TT-4 outputs with the correct control inputs. Double check that supply power is not being applied to the TT-4 output.

**STEP 2:** Connect the TT-4 to the 3.5mm electrical connector using the non-inverting cable P/N 14947. Touch the stylus disc and the LED should turn red.

**STEP 3:** Open the Wizard and follow the **TT-4 Acorn Wizard Configuration** on page 7-8. Check the operation manual for the specific control for compatible parameter settings.

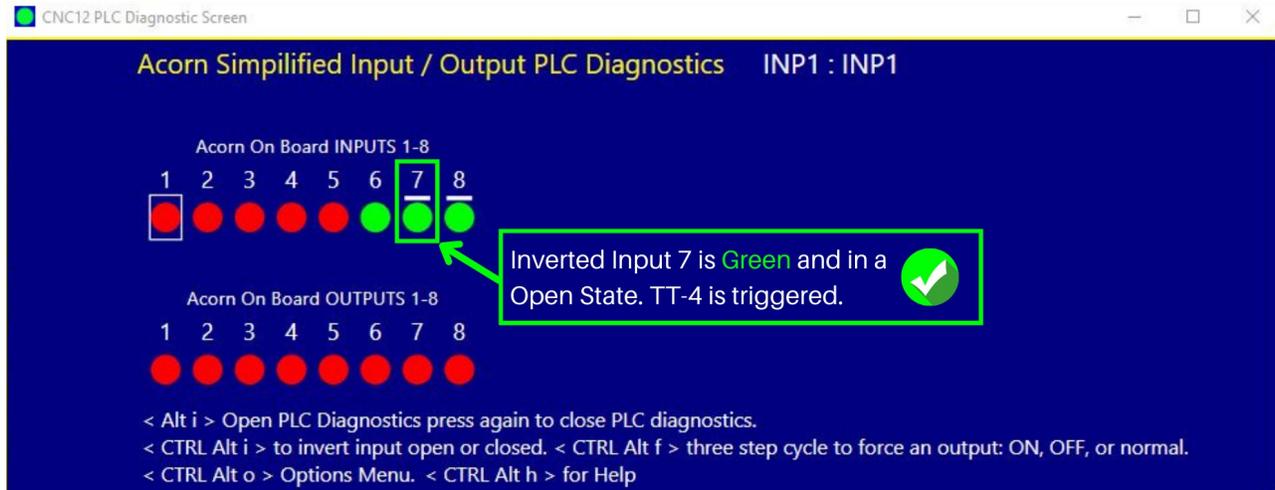
**STEP 4:** From the CNC12 home screen, bring up the PLC diagnostic screen (aka Input and Output screen), by pressing the keys <ALT> and <i> at the same time. If unfamiliar with the PLC diagnostic screen please refer to the **USING THE CNC12 I/O DIAGNOSTIC SCREEN** on page 9.

**STEP 5:** Locate the inputs that were selected in the Wizard input definition menu in Step 3. “ToolTouchOffDetect” is suggested to be Input 6 and “ToolTouchOffTriggered” is suggested to be Input 7. Verify that that “ToolTouchOffDetect” (suggested Input 6) is open(green) when plugged in.



Steps cont'd on next page→

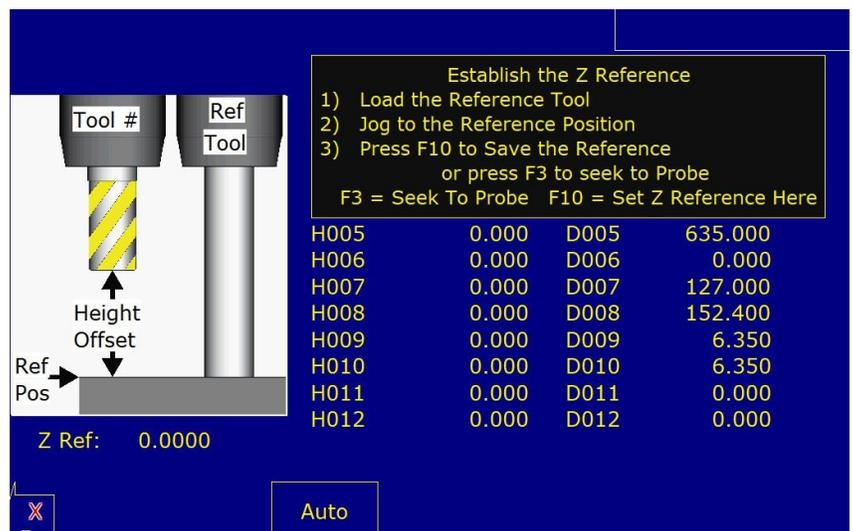
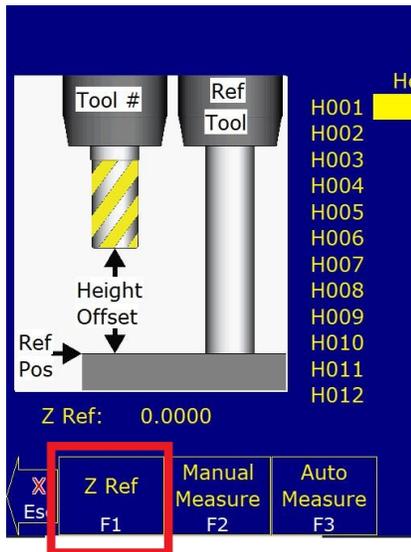
**STEP 6:** Verify that “ToolTouchOffTriggered” (suggested Input 7) changes to red to green when the TT-4 is plugged in and triggered.



**STEP 7:** Confirm that the machine will respond correctly before attempting an actual automated touch off. Perform a slow dry run without a tool in the spindle by completing the following steps.

**STEP 8:** From the CNC12 home screen, press RESET to CLEAR, and CYCLE START to home the machine

**STEP 9: Mill:** Navigate to the Reference Menu by selecting F1 (Setup), F2 (Tool), F1 (Offset Lib.), F1 (Z Ref). Follow the on-screen directions to Establish the Z Reference.



Steps cont'd on next page→

**Lathe:** Navigate to the Tool Offset Menu by selecting F1 Setup, F2 Tool Offset. Select the number for Z Offset and then press F1 Z Ref. Follow the on-screen directions to Establish the Z Reference.

Off. #	Tool Loc	Tool Orient	Tool Type	Approach	X Offset	Z Offset
01	T01	FFace	Bore	Front	0.0000	0.0000
02	T02	OD	Turn	Front	0.0000	0.0000
03	T03	OD	Cutoff	Front	0.0000	0.0000
04	T04	FFace	Groove	Front	0.0000	0.0000
05	T05	OD	Thread	Front	0.0000	0.0000
06	T06	FFace	Drill	Front	0.0000	0.0000
07	T07	FFace	Drill	Front	0.0000	0.0000
08	T08	FFace	Tap	Front	0.0000	0.0000
09	T09	OD	Groove	Front	0.0000	0.0000
10	T10	FFace	Drill	Front	0.0000	0.0000

X Diam: -3.2595  
Z Ref: -1.5994

Entry mode:

Z Ref	Measure Tool	Abs Inc	+ .001
F1	F2	F4	F5

**Z Reference**

F1 = Auto F10 = Manual

**Establish the Z Reference**

1) Load the Reference Tool  
2) Jog to the Reference Position  
3) Press F10 to Save the Reference

OR

1) Type the reference location below  
2) Press F10 to Save the Reference

-->

**STEP 10:** Confirm the control is detecting the TT-4 connection by unplugging the TT-4 and while unplugged trying an automated touch off.

**Mill:** Select F3 Auto Measure and then Cycle Start. No motion should occur and a "Tool Touch off not found" error message should appear on the control screen.

Tool Touch Off not found  
Press any key to exit

**Lathe:** Select F2 Measure Tool, F5 Measure offset X, and then Cycle Start. No motion should occur and a "Tool Touch off not found" error message should appear on the control screen.

Tool Touch was not found!  
Probing Cycle canceled. Please check Tool Touch.  
Press any key to continue

**STEP 11:** To manually test the Tool Touch off trigger, first plug in the TT-4. Make sure the Plug is FULLY seated! See page 6 to see how to fully seat the TT-4 Cable connector.

**STEP 12:** On a Mill select F3 Auto Measure or on a Lathe select F2 Measure Tool > F6 Measure offset Z and press CYCLE START

Steps cont'd on next page→

**STEP 13:** Gently trigger the TT-4 by pressing your finger on the stylus disc twice. If the TT-4 is configured and wired properly the “Tool Touch Off Cleared” statement will appear which indicates that the TT-4 has been triggered. The Offset will be recorded.



WCS #1 (G54) Current Position (Inches) Job Name: systest.cnc  
 X  $+0.0000$  Tool: T0100 Part Cnt: 0  
 Feedrate: 100% 0.0 ipm Spindle: 0 A Part #: 0  
 Z  $+0.0000$  Rapid Rate: 100% 0:00:49

Tool Library

Off. #	Tool #	Tool Orient	Type	Approach	X Offset	Z Offset	Nose Radius	Nose Vector	Spin Dir	Max Spin	Coolant	Description
01	T01	FFace	Bore	Front	0.0000	-1.5765	0.0150	3	CW	0	Off	55 Degree turning
02	T02	OD	Turn	Front	0.0000	0.0000	0.0312	3	CW	0	Off	80 Degree turning
03	T03	OD	Cutoff	Front	0.0000	0.0000	0.0000	8	CW	0	Off	.125 wide cutoff
04	T04	FFace	Groove	Front	0.0000	0.0000	0.0000	7	CW	0	Off	.0625 wide OD Grve
05	T05	OD	Thread	Front	0.0000	0.0000	0.0312	3	CW	0	Off	OD Threading Tool
06	T06	FFace	Drill	Front	0.0000	0.0000	0.0000	7	CW	0	Off	#3 Center Drill
07	T07	FFace	Drill	Front	0.0000	0.0000	0.0000	7	CW	0	Off	Drill
08	T08	FFace	Tap	Front	0.0000	0.0000	0.0156	7	CW	0	Off	Tap
09	T09	OD	Groove	Front	0.0000	0.0000	0.0000	8	CW	0	Off	.125 wide OD Grve
10	T10	FFace	Drill	Front	0.0000	0.0000	0.0000	7	CW	0	Off	9/16 drill

X Diam: -3.2595  
 Z Ref: -1.5994

Entry mode: absolute

Buttons: X Z Ref, Abs Inc, Measure offset X, Measure offset Z, Measure Z and X, Tool Wear, Save

WCS #1 (G54) Current Position (Inches) Job Name: cncm.hom  
 X  $+0.0000$  Tool: T----H--- Part Cnt: 20000  
 Feedrate: 100% 0.0 ipm Spindle: 0 A Part #: 0  
 Y  $+0.0000$  Rapid Rate: 100% 0:00:06  
 Z  $+0.0000$

8075 WARNING: TOOL TOUCH OFF TRIPPED  
 302 Moving...  
 4077 Tool Touch Off Cleared  
 306 Job finished

Tool Geometry Offset Library

Tool #	Reference Tool	Height Offset	Diameter
H001		-0.1187	D001 0.0500
H002		0.0000	D002 0.1875
H003		0.0000	D003 0.5000
H004		0.0000	D004 0.5000
H005		0.0000	D005 25.0000
H006		0.0000	D006 0.0000
H007		0.0000	D007 5.0000
H008		0.0000	D008 6.0000
H009		0.0000	D009 0.2500
H010		0.0000	D010 0.2500
H011		0.0000	D011 0.0000
H012		0.0000	D012 0.0000

Z Ref: 0.0000

Buttons: X Z Ref, Manual Measure, Auto Measure, +.001, -.001, Save

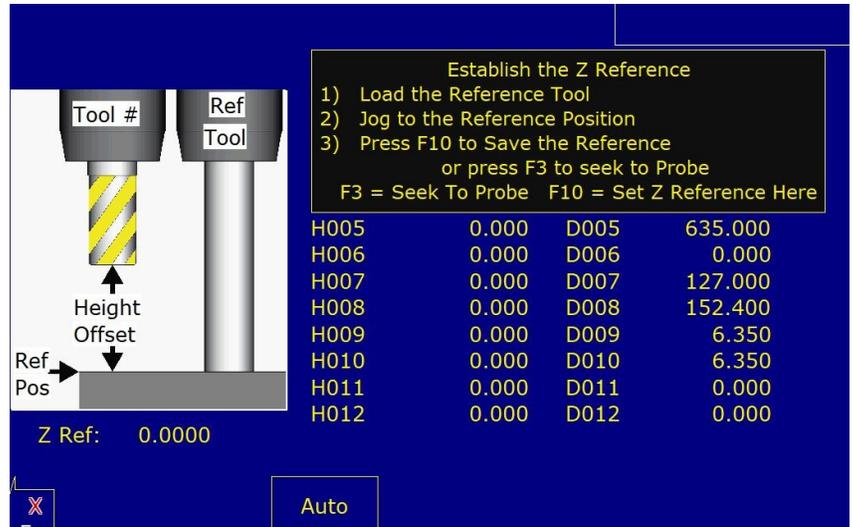
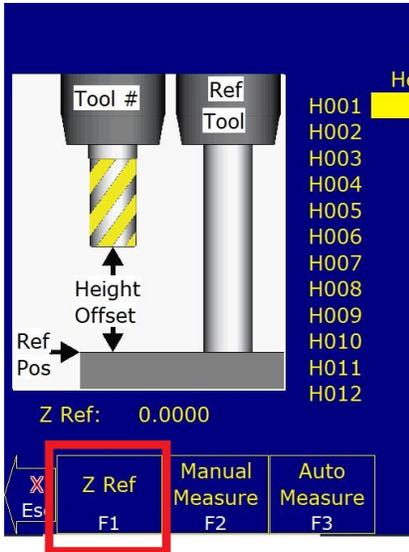
**STEP 14:** Thoroughly clean the area where the TT-4 will be mounted. Mount the TT-4 in the desired location and confirm the magnetic mount is firmly attached to the mounting surface and no wobble, deflection or rocking is possible.

**STEP 15:** Review the TT-4 over travel limits in the specifications. Perform an automatic tool measurement cycle test with the feedrate override reduced to 20% to verify everything is functioning correctly. Be prepared to manually stop the machine to prevent over travel damage.

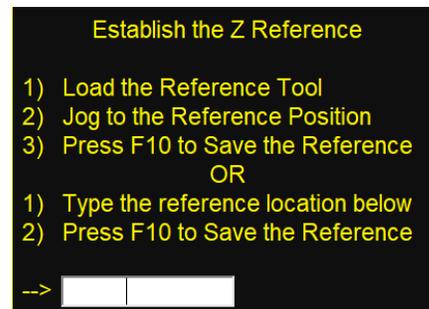
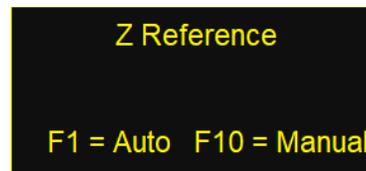
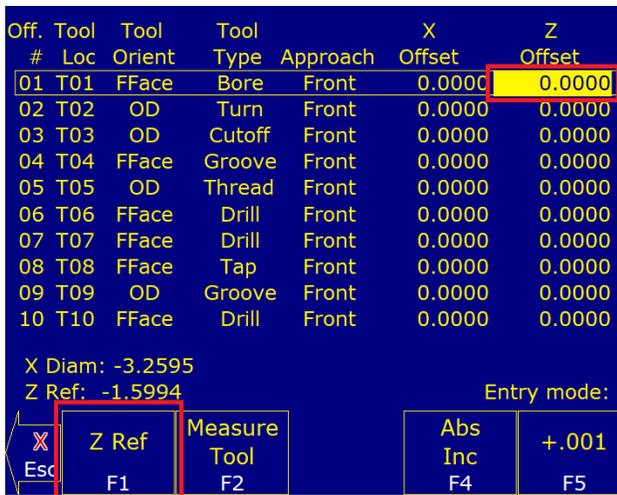
**STEP 16:** Perform a tool measurement cycle near the edge of the disc at three equidistant points around the edge of the disc. If the three measurements are not within the operator's expected tolerance, adjust the angular adjustment set screws to confirm that the disc surface is parallel to the measurement plane. See the “ADJUSTMENTS” section (page 17) if necessary.



**STEP 7: Mill:** Navigate to the Reference Menu by selecting F1 Setup, F2 Tool, F1 Offset Lib., F1 Z Ref. Follow the on-screen directions to Establish the Z Reference



**Lathe:** Navigate to the Tool Offset Menu by selecting F1 Setup, F2 Tool Offset, Select the number for Z Offset and then press F1 Z Ref. Follow the on-screen directions to Establish the Z Reference.



**STEP 8:** Confirm the control is detecting the TT-4 connection by unplugging the TT-4 and while unplugged trying an automated touch off.

**Mill:** Select F3 Auto Measure and then Cycle Start. No motion should occur and a "Tool Touch off not found" error message should appear on the control screen.

Tool Touch Off not found  
 Press any key to exit

**Lathe:** Select F2 Measure Tool, F5 Measure offset X, and then Cycle Start. No motion should occur and a "Tool Touch off not found" error message should appear on the control screen.

Tool Touch was not found!  
 Probing Cycle canceled. Please check Tool Touch.  
 Press any key to continue

**STEP 9:** To manually test the Tool Touch off trigger, first plug in the TT-4. Make sure the Plug is FULLY seated! See page 6 to see how to fully seat the TT-4 Cable connector.

**STEP 10:** On a Mill select F3 Auto Measure or on a Lathe select F2 Measure Tool > F6 Measure offset Z and press CYCLE START

Steps cont'd on next page→

**STEP 11:** Gently trigger the TT-4 by pressing your finger on the stylus disc twice. If the TT-4 is configured and wired properly the “Tool Touch Off Cleared” statement will appear which indicates that the TT-4 has been triggered. The Offset will be recorded.



WCS #1 (G54) Current Position (Inches) Job Name: systest.cnc  
 X +0.0000 Tool: T0100 Part Cnt: 0  
 Z +0.0000 Feedrate: 100% 0.0 ipm Spindle: 0 A  
 Rapid Rate: 100% 0:00:49

Tool Library

Off. #	Tool Loc	Type	Approach	X Offset	Z Offset	Nose Radius	Nose Vector	Spin Dir	Max Spin	Coolant	Description	
01	T01	FFace	Bore	Front	0.0000	-3.5765	0.0150	3	CW	0	Off	55 Degree turning
02	T02	OD	Turn	Front	0.0000	0.0000	0.0312	3	CW	0	Off	80 Degree turning
03	T03	OD	Cutoff	Front	0.0000	0.0000	0.0000	8	CW	0	Off	.125 wide cutoff
04	T04	FFace	Groove	Front	0.0000	0.0000	0.0000	7	CW	0	Off	.0625 wide OD Grve
05	T05	OD	Thread	Front	0.0000	0.0000	0.0312	3	CW	0	Off	OD Threading Tool
06	T06	FFace	Drill	Front	0.0000	0.0000	0.0000	7	CW	0	Off	#3 Center Drill
07	T07	FFace	Drill	Front	0.0000	0.0000	0.0000	7	CW	0	Off	Drill
08	T08	FFace	Tap	Front	0.0000	0.0000	0.0156	7	CW	0	Off	Tap
09	T09	OD	Groove	Front	0.0000	0.0000	0.0000	8	CW	0	Off	.125 wide OD Grve
10	T10	FFace	Drill	Front	0.0000	0.0000	0.0000	7	CW	0	Off	9/16 drill

X Diam: -3.2595  
 Z Ref: -1.5994  
 Entry mode: absolute

Buttons: Z Ref (F1), Abs Inc (F4), Measure offset X (F5), Measure offset Z (F6), Measure Z and X (F7), Tool Wear (F9), Save (F10)

WCS #1 (G54) Current Position (Inches) Job Name: cncm.hom  
 X +0.0000 Tool: T----H--- Part Cnt: 20000  
 Y +0.0000 Feedrate: 100% 0.0 ipm Spindle: 0 A Part #: 0  
 Z +0.0000 Rapid Rate: 100% 0:00:06

8075 WARNING: TOOL TOUCH OFF TRIPPED  
 302 Moving...  
 4077 Tool Touch Off Cleared  
 306 Job finished

Tool Geometry Offset Library

Tool #	Reference Tool	Height Offset	Diameter
H001		-0.1187	D001 0.0500
H002		0.0000	D002 0.1875
H003		0.0000	D003 0.5000
H004		0.0000	D004 0.5000
H005		0.0000	D005 25.0000
H006		0.0000	D006 0.0000
H007		0.0000	D007 5.0000
H008		0.0000	D008 6.0000
H009		0.0000	D009 0.2500
H010		0.0000	D010 0.2500
H011		0.0000	D011 0.0000
H012		0.0000	D012 0.0000

Z Ref: 0.0000

Buttons: Z Ref (F1), Manual Measure (F2), Auto Measure (F3), +.001 (F5), -.001 (F6), Save (F10)

**STEP 12:** Thoroughly clean the area where the TT-4 will be mounted. Mount the TT-4 in the desired location and confirm the magnetic mount is firmly attached to the mounting surface and no wobble, deflection or rocking is possible.

**STEP 13:** Review the TT-4 over travel limits in the specifications. Perform an automatic tool measurement cycle test with the feedrate override reduced to 20% to verify everything is functioning correctly. Be prepared to manually stop the machine to prevent over travel damage.

**STEP 14:** Perform a tool measurement cycle near the edge of the disc at three equidistant points around the edge of the disc. If the three measurements are not within the operator's expected tolerance, adjust the angular adjustment set screws to confirm that the disc surface is parallel to the measurement plane. See the “ADJUSTMENTS” section (page 17) if necessary.

## ADJUSTMENTS

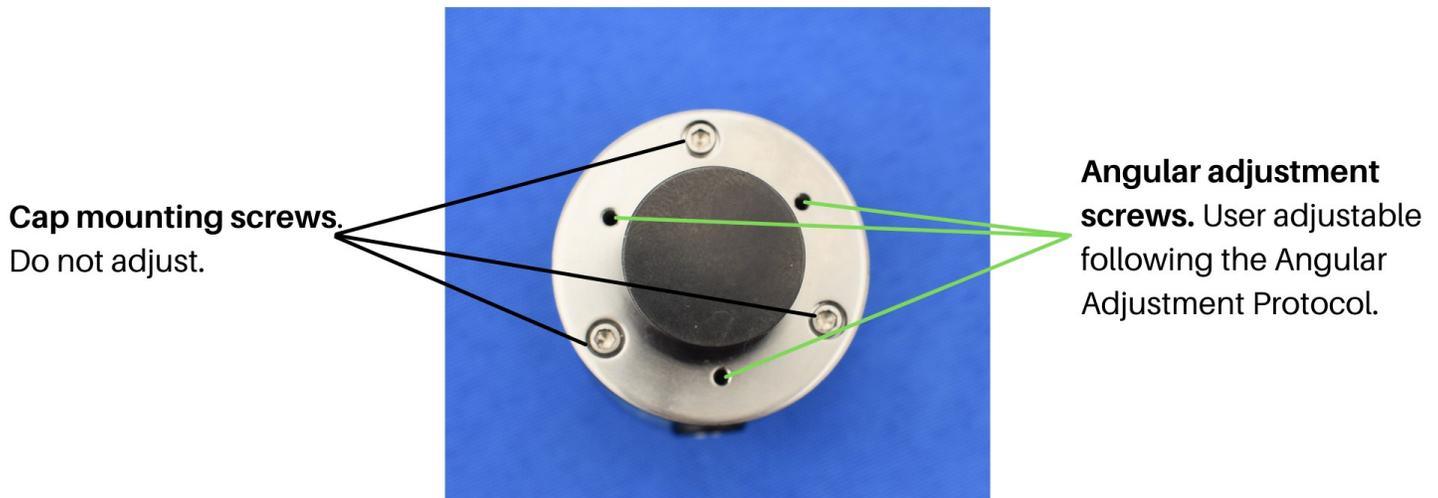
**Caution:** Over-tightening screws can cause permanent internal damage to the TT-4. Tighten with small adjustments and use caution. Max torque when tightening is 3in/lb.

### WHEN TO CHECK ADJUSTMENTS

Any time the TT-4 is removed from its mounting location, the stylus disc is changed, or the TT-4 is used in a different machine, the alignment procedure should be repeated to ensure accuracy. The user should also repeat the alignment procedure if the unit is dropped or receives any sudden external shock. It is good practice to periodically check alignment for quality control and to establish a base-line maintenance schedule.

### ANGULAR ADJUSTMENT PROTOCOL

TT-4 Top View



The TT-4 is factory aligned with the stylus disc surface parallel to the mounting surface using the standard magnetic mount. The angular adjustment feature provides a means to make fine adjustments to the stylus disc surface to make it parallel to the plane in which measurements are taken. The angular adjustment screws are adjusted with a 0.035" Hex Allen Wrench (P/N 9497). The TT-4 should be mounted on a surface parallel to the machine table. The TT-4 should be adjusted when a different mounting surface is used. In most cases the TT-4 is placed on the bed of a mill to measure tool heights. The disc surface must be perpendicular to the tool center axis to return accurate measurements at any point on the disc surface.



The range of adjustment across the diameter of the disc is 0.005". An assessment of the alignment can be made by performing an automatic cycle on the top of the disc near the edge at each set screw in the end cap. All the measurements should be within the operators expected tolerance. If they are not, then begin adjustment with the angular alignment screw that returned the shortest tool length (disc edge highest above bed). Turning the set screw clockwise tilts the disc surface downward toward the angular alignment screw being adjusted, lowering that portion of the disc height and tightening the internal sensing assembly. Turning counterclockwise has the reverse effect. Start with the angular alignment screw that needs to be turned clockwise. Make a small adjustment (approx. 1/8th of a turn) and do not exceed 4 small adjustments (i.e., 1/2 of a total turn) or a torque of 3in/lb. After making two small adjustments on one set screw, make the opposite adjustment on the other two angular alignment screws. Repeat this process until all the measurements are the same. If a screw becomes too tight loosen all three by a half turn and start over. Moderate tension must be maintained on these screws to maintain good repeatability.

## MAINTENANCE AND CARE

**Do not submerge** the TT-4. Avoid direct flow of coolant. Wipe off excess liquids to prevent degradation of the rubber seal and LED indicator lens. Do not use compressed air to clean the TT-4 as this may force contaminants into the electrical connector and inside the body. The TT-4 body is aluminum and the end cap is stainless steel and should only be wiped clean with compatible cleaners. The TT-4 is rated at IP64.

**Storage.** Store or ship the TT-4 with the stylus mount boss protected. Pressure to the stylus mount disc will damage the internals.

**User repairs.** The TT-4 has no internal user serviceable parts or adjustments and should only be serviced by Centroid. Only the Stylus Disc (P/N 9417) can be replaced by the end user.

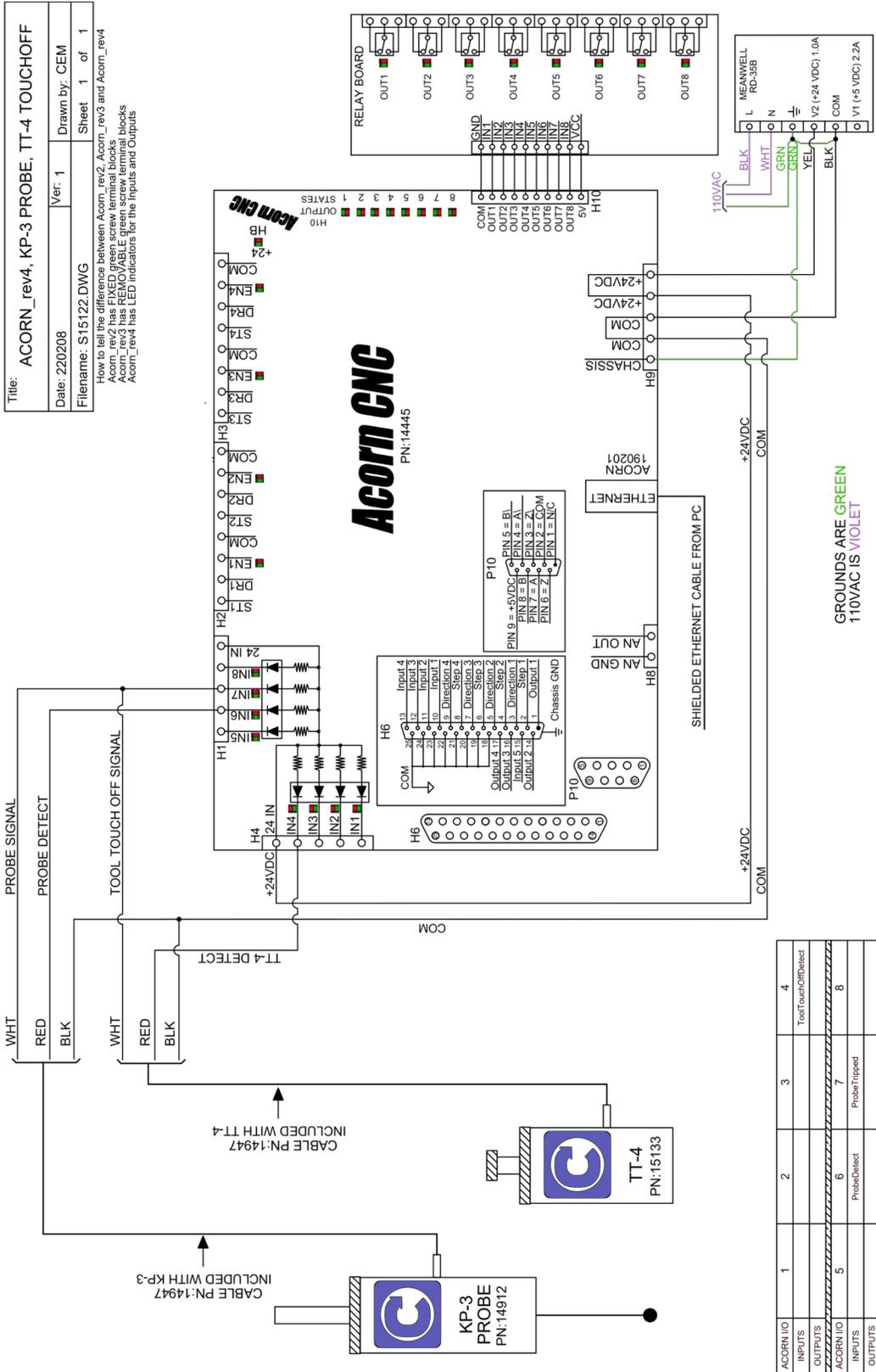
**Alignment adjustments.** Regularly check alignment. Any time the TT-4 disc is changed, the TT-4 is used in a different machine, or on a different surface the alignment procedure should be repeated to ensure accuracy. The user should also repeat the alignment procedure if the unit is dropped or receives any sudden external shock. It is good practice to periodically check alignment for quality control and to establish a base line maintenance schedule. See "ADJUSTMENT" section. If the TT-4 cannot be adjusted properly then it should be sent in for evaluation and repair.

## SHIPPING INSTRUCTIONS

Contact Centroid Technical Support at 1-814-353-9290 for a description of the return policy and assistance in determining if return is necessary. If the TT-4 must be shipped use the original plastic shipping tube and insert the TT-4 in the tube with the stylus disc end located inside the foam ring in the tube. The foam should prevent the stylus or stylus mount boss from touching the end of the plastic tube if jarred during shipping. Do not ship or store the TT-4 with the stylus mount boss pushed into the probe body as this will negatively affect internal lubrication and damage the TT-4 if jarred on that end.

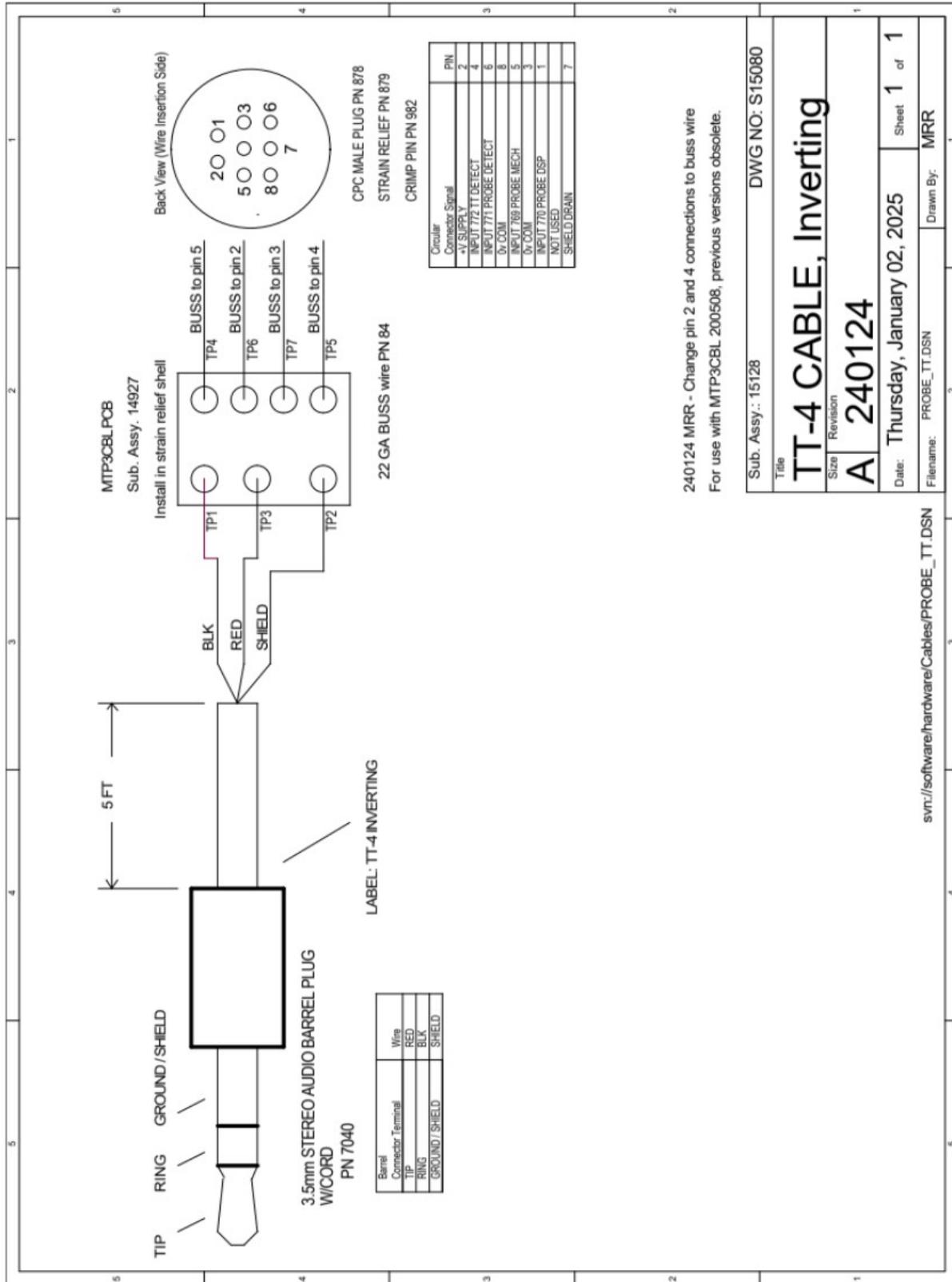


# ACORN TT-4 AND KP-3 WIRING SCHEMATIC



Schematic S15122 - [https://www.centroidcnc.com/centroid\\_diy/schematics/pbrowse.php?term=S15122](https://www.centroidcnc.com/centroid_diy/schematics/pbrowse.php?term=S15122)

# Oak/Allin1DC TT-4 Inverting Cable Schematic



## CENTROID CNC12 TT-4 CONFIGURATION FOR OAK/ALLIN1DC

CNC12 V4.16+ requires a Pro or Ultimate License for TT-4 functionality.

Oak/Allin1DC control system parameters below are the recommended basic settings SAE Inch and Millimeters in (mm). These are the suggested starting values. Some of these parameters are typically adjusted by the integrator/user to suit the tool touch-off application. Please see control manual for additional information.

To access the Parameter menu from the main screen, select F1 setup, F3 config, type in password (137), F3 parameters.

### CNC12 Mill systems (recommended basic inch):

Parameter	Setting	Description
3	0	Modal Tool and Height Offset Control
13	0.020	Clearance amount nominal
14	30	Fast Probing Rate
15	3	Slow Probing Rate
16	1	Maximum Search Distance
17	0	Detector location return point
43	0	Automatic tool measurement options
44	50769	TT PLC input number
71	0	Part setup detector height
257	50772	TT connection detection PLC input
367	1	TT Deceleration Multiplier
407	0	TT State when tripped

### CNC12 Mill systems (recommended basic METRIC mm):

Parameter	Setting	Description
3	0	Modal Tool and Height Offset Control
13	0.508	Clearance amount nominal
14	762	Fast Probing Rate
15	76.2	Slow Probing Rate
16	127	Maximum Search Distance
17	0	Detector location return point
43	0	Automatic tool measurement options
44	50769	TT PLC input number
71	0	Part setup detector height
257	50772	TT connection detection PLC input
367	1	TT Deceleration Multiplier
407	0	TT State when tripped

**CNC12 Lathe systems (recommended basic inch):**

<b>Parameter</b>	<b>Setting</b>	<b>Description</b>
3	0	Modal Tool and Height Offset Control
13	0.020	Clearance amount nominal
14	30	Fast Probing Rate
15	3	Slow Probing Rate
16	1	Maximum Search Distance
17	0	Detector location return point
244	50769	TT PLC input number
257	50772	TT connection detection PLC input
281	0.75	TT X stylus size
282	0.094	TT Z stylus size
283	0.2	TT Safety clearance
367	1	TT Deceleration Multiplier
407	0	TT State when tripped

**CNC12 Lathe systems (recommended basic METRIC mm):**

<b>Parameter</b>	<b>Setting</b>	<b>Description</b>
3	0	Modal Tool and Height Offset Control
13	0.508	Clearance amount nominal
14	762	Fast Probing Rate
15	76.2	Slow Probing Rate
16	127	Maximum Search Distance
17	0	Detector location return point
244	50769	TT PLC input number
257	50772	TT connection detection PLC input
281	19.05	TT X stylus size
282	3.8	TT Z stylus size
283	0.2	TT Safety clearance
367	1	TT Deceleration Multiplier
407	0	TT State when tripped

## TT-4 WIRING AND USE WITH OTHER CNC CONTROLS

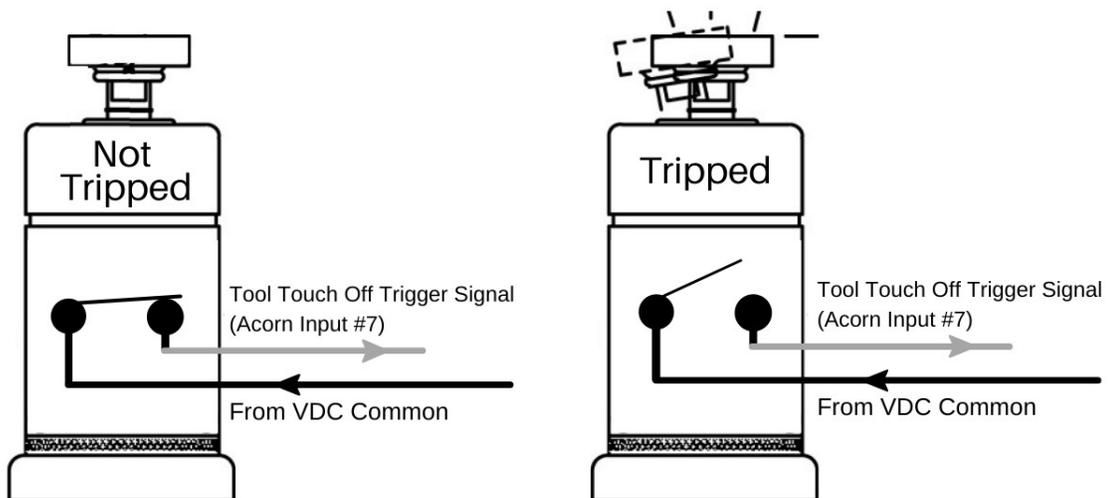
The TT-4 is compatible with most any CNC control with an input for a Tool Touch Off.

The Touch Off itself is a kinematic probe which simply breaks continuity through the precision kinematic seat (a super accurate switch) when tripped. So, said another way when the probe is not tripped there is continuity through the switch, and when the probe is tripped the switch opens breaking the continuity.

### OUTPUT LOGIC

- The TT-4 output logic is normally closed.
- When the TT-4 is triggered, the switch opens.
- For the Oak/Allin1DC, an inverting cable (P/N 15128) is used so that the TT-4 output turns into a normally open signal.
- For the Acorn, a straight through cable (P/N 14947) is used and the TT-4 output remains normally closed.

### The Normally Closed TT-4 OPENS when tripped



The operating voltage of the TT-4 is 5 to 24 VDC.

If you cut into the 3.5 mm barrel plug cord, there are three wires as shown below.



Red = Tool Touch Off Detect Signal  
(Detects if the TT4 is plugged in)

White = Tool Touch Off Trigger Signal  
(A signal is sent when a touch-off occurs)

Black = VDC Common

## TT-4 RELATED RESOURCES

Acorn Wizard Probe and Tool Touch Off setup: <https://youtu.be/iv94-oaNTMI>

FREE TECH SUPPORT SIGN UP AT [WWW.CENTROIDCNCFORUM.COM](http://WWW.CENTROIDCNCFORUM.COM)

**CENTROID™** Centroid Community CNC Support Forum

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### Centroid Acorn CNC Controller

Moderator: **cnckeith**

**FORUM**

- Acorn CNC Knowledge Base Videos  
Moderator: **cnckeith**
- Acorn CNC Tech Tips Knowledge Base, Look Here! before posting  
Moderator: **cnckeith**

**New Topic**

**ANNOUNCEMENTS**

- Acorn Mill, Lathe, Router and Plasma Public Beta Software Now Available for Testing.  
by **cnckeith** » Wed Mar 02, 2022 3:57 pm
- Acorn CNC 12 Mill, Router, and Lathe v4.64 has been released!  
by **cnckeith** » Wed Jan 27, 2021 5:15 pm
- ALL Acorn Documentation** ← **All Acorn Documentation is here** ✓  
by **cnckeith** » Wed Aug 14, 2019 1:11 pm

**TOPICS**

- Show me your Custom VCP's!  
by **cnckeith** » Mon Dec 07, 2020 2:18 pm
- What is a "Build Thread"?  
by **cnckeith** » Thu Feb 24, 2022 3:47 pm
- Cheap CNCPC that meets requirements: Lenovo Think Center M92P for Acorn <updated model M93P>  
by Roadstercycle » Sat Jun 30, 2018 2:12 pm
- New Build: SYIL X4 CNC Mill, Clearpath SDSK, C86ACCP & Centroid Acorn  
by **martyscncgarage** » Wed Feb 10, 2021 6:58 pm
- ProbeApp V3: Test and Improve Touch Probe Accuracy  
by swissi » Mon Aug 16, 2021 5:40 pm
- New Centroid Teknic Clearpath officially supported configurations. Updated 1-24-22  
by **cnckeith** » Fri Mar 05, 2021 2:43 pm
- How to Register for an Account on this Forum: Video Tutorial.** ← **Free Tech Support Sign Up** ✓  
by **cnckeith** » Mon Jul 29, 2019 8:35 pm
- help us help you  
by **martyscncgarage** » Sat Sep 28, 2019 9:34 am