

TRAK[®] LPM 4th Axis Sample Program

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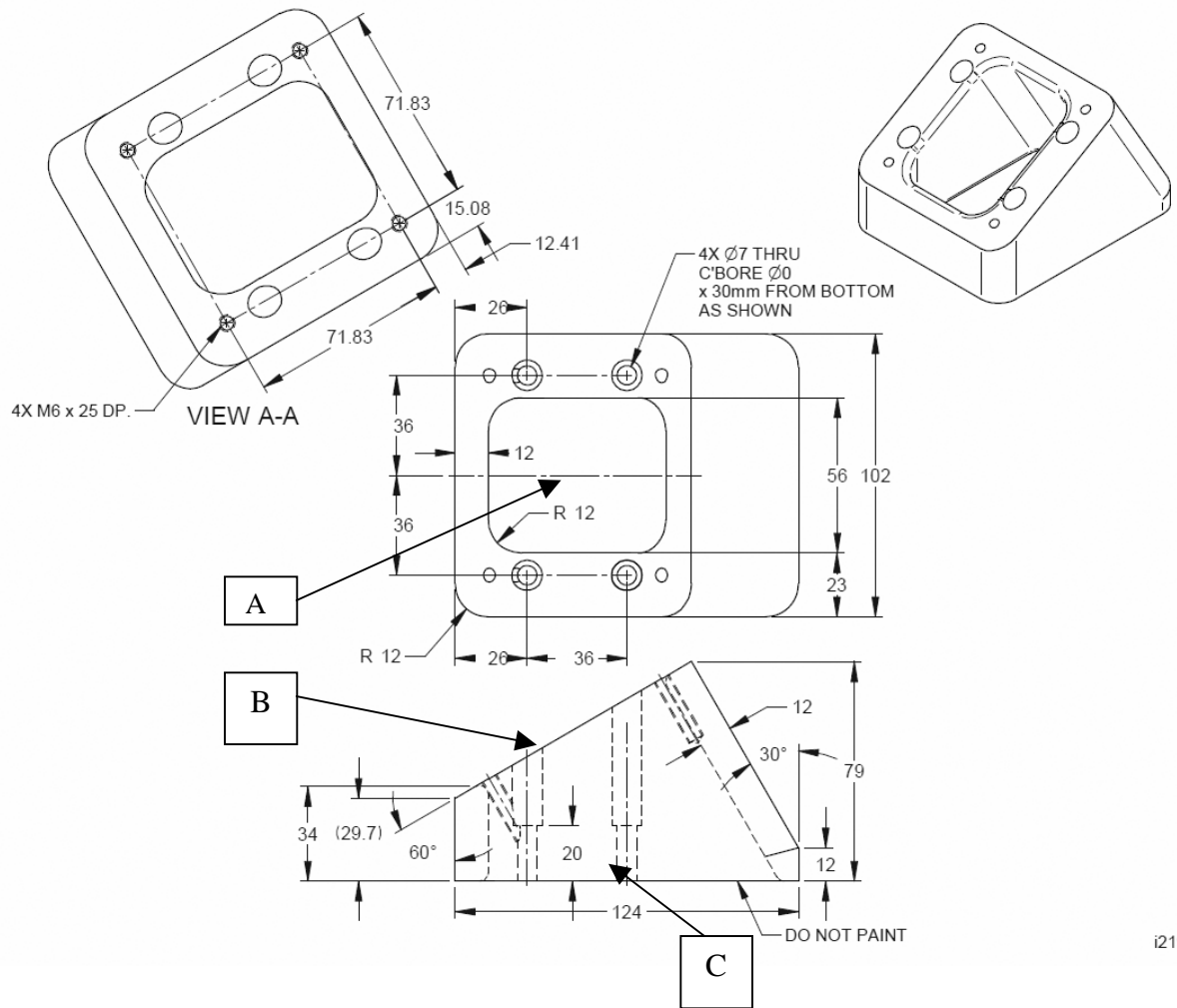
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3.0 4-Axis Mill Programming

Program Example 1:



i21985

Fig 1.

- **Operation 1:** This sample part was programmed using the center of the part (Point A) as the X and Y Absolute part Zero when the A axis is at Negative 30.000 degrees. The Z axis Absolute Zero is the top surface of the workpiece (Surface B) when it is finish machined.
- **Operation 2:** The Absolute Part Zero for the X and Y axis is at the center of the workpiece (Point C) when the A axis is at Zero degrees. The Z axis Absolute Zero is the bottom surface of the workpiece (Surface C).
 - Before running the program enter PART/FIX MGMT mode and input the necessary fixture offset data.

• **Example 1:** A Master Program using 2 programs was used. Two offset fixture locations will be displayed in the PART/FIX MGMT screen as shown below. The fixture locations for both operations are designated as 4TH. Using a MASTER PROGRAM gives us the ability to have more than one A Axis Offset in the PART/FIX MGMT screen. Multiple fixture offsets for X,Y,Z, and A can be a useful tool in simplifying set-ups resulting in reduced change-over time.

NOTE: When mounting a fixture to the rotary table, it may be difficult for the operator to secure and bolt the assembly so the workpiece is at “zero degrees” in the X-Y Plane. Any error can be corrected by inserting a value in the A Offset.

• **PART/FIXTURE MANAGEMENT SCREEN DESCRIPTION**

• **OFFSET DESCRIPTION EXAMPLE 1 (Programmed in mm)**

- The X Offset is the distance from rotary table face to part zero.
- The Y Offset is the distance from part zero to the centerline of rotation of the rotary table.
- The Z Offset is the distance from part zero to the centerline of rotation of the rotary table.
- In the following example, the A axis is being rotated with a POSITIONING EVENT and the A Offset is used to compensate for the error in how the fixture was installed.
- Two workpieces are being machined. In this example the first workpiece is located 350mm from the face of the rotary table in the X-minus direction. For the second workpiece we are using the PARTS/FIXTURE feature with the second workpiece shifted 125mm in the X-plus direction (towards the rotary table).

PT7 Offline

PROG S/U MP/N 21985C

ATC Pos 0 No Tool

Part/Fixture Management

Part	1	2
P/N	21985OP1	21985OP2
Fixture Location	4TH	4TH
Fixture Number	1	1
X Offset	-350.000	-350.000
Y Offset	11.342	0.000
Z Offset	-2.378	-56.432
A Offset	1.780	1.780
Parts/Fixture	2	2
X Shift	125.000	125.000
Y Shift	0.000	0.000
Z Shift	0.000	0.000

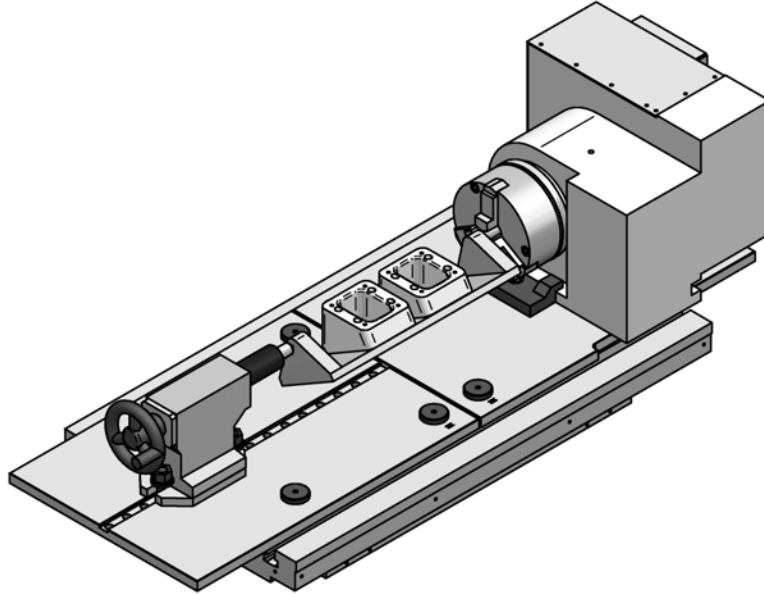
X	58.394	4TH
Y	259.638	4TH
Z	323.444	4TH
A	0.000	4TH

FIXTURE NUMBER : 1

PICTURE NOTES GO TO Z SAFETY SPIN SPEED RETURN

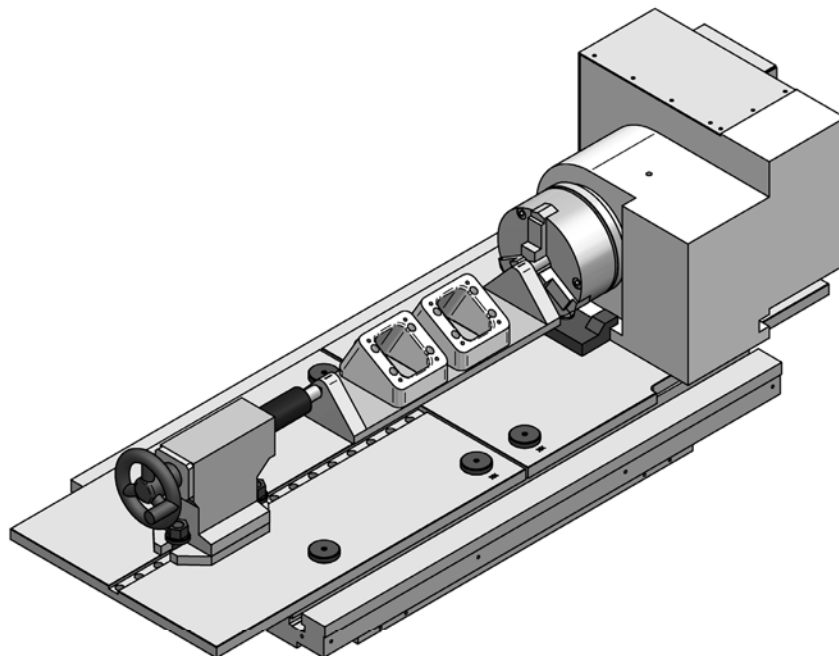
- **Programming Aspects Shown On This Part**

- OPERATION 1: Face milling, center drilling, drilling, tapping with the A-axis positioned at Negative 30 degrees Absolute. Part Zero for the Z axis is the top finish milled surface. Part zero for the X and Y axis is the center of the workpiece.



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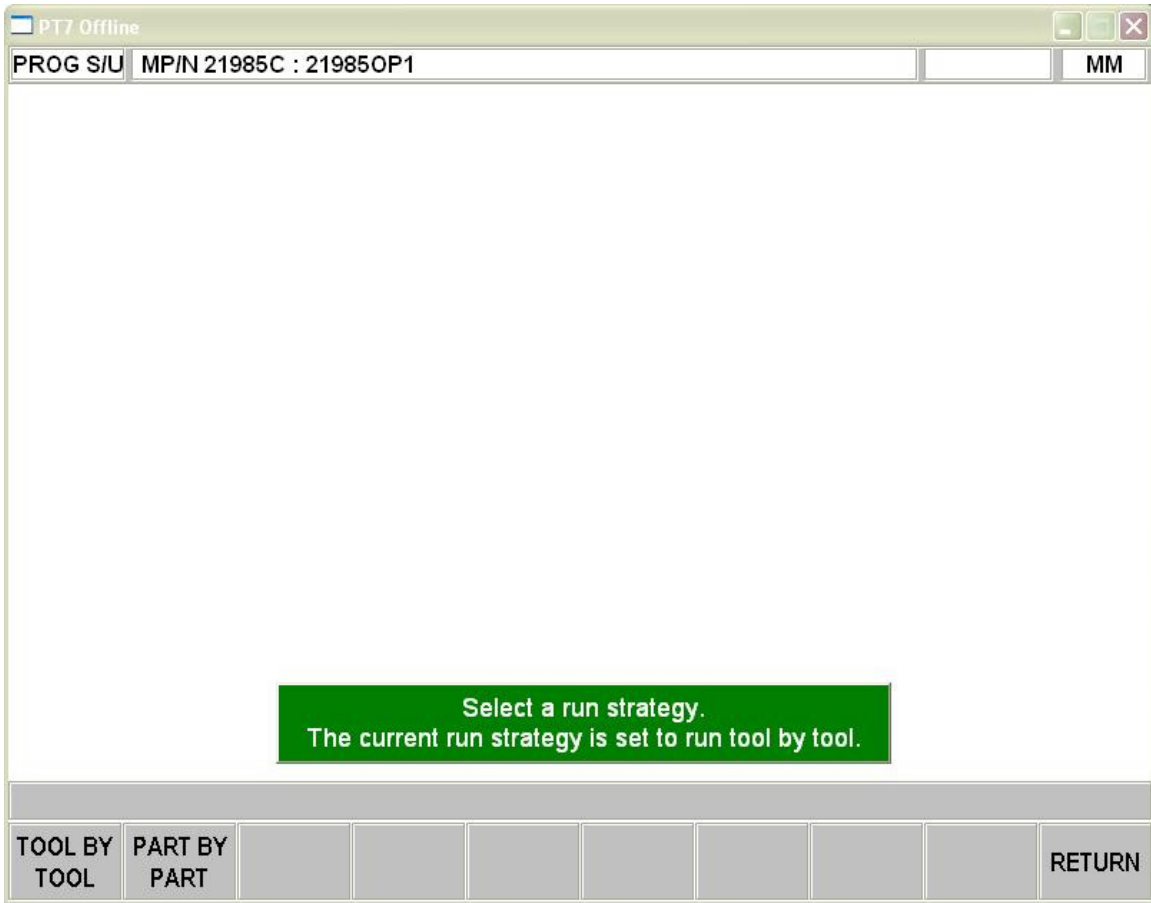
OPERATION 2: Rotate the A-axis to Zero degrees Absolute using a Positioning Event. Part Absolute Zero has been moved to the bottom surface of the workpiece for the Z axis. Part Absolute Zero for the X and Y axis remains in the center of the workpiece. Once these values are determined, they must be input into the PART/FIX MGMT screen. The 4 holes can be machined complete at a 30 degree angle relative to the top face.



Tooling Data: Enter the proper tooling data

PT7 Offline									
PROG S/U MP/N 21985C								MM	
ATC						PART PROGRAM TOOL TABLE			
Loc	Dia	Type	Z Offset	Z Mod	Dia Mod	Tool No	Dia	Type	ATC Loc
1	9.525	Ctr Drill	-28.448	0.000	0.000	1	75.000	Face Mill	4
2	0.000	None	0.000	0.000	0.000	2	10.000	Ctr Drill	5
3	7.925	Ruf EM	-54.458	0.000	0.000	4	5.000	Drill	6
4	75.000	Face Mill	12.440	0.000	0.000	5	6.000	Tap	7
5	10.000	Ctr Drill	23.300	0.000	0.000	6	11.000	Fin EM	8
6	5.000	Drill	-3.453	0.000	0.000	7	7.000	Drill	9
7	6.000	Tap	-4.112	0.000	0.000				
8	11.000	Fin EM	8.644	0.000	0.000				
9	7.000	Drill	5.556	0.000	0.000				
10	7.925	Fin EM	-56.162	0.000	0.000				
11	0.000	None	0.000	0.000	0.000				
12	0.000	None	0.000	0.000	0.000				
13	0.000	None	0.000	0.000	0.000				
14	0.000	None	0.000	0.000	0.000				
15	0.000	None	0.000	0.000	0.000				
16	0.000	None	0.000	0.000	0.000				
17	0.000	None	0.000	0.000	0.000				
18	0.000	None	0.000	0.000	0.000				
19	0.000	None	0.000	0.000	0.000				
20	0.000	None	0.000	0.000	0.000				
21	0.000	None	0.000	0.000	0.000				
ATC LOCATION : 4									
TOOL CRIB	REMOVE TOOL	NOTES	DISABLE LOC						RETURN

- **Run Strategy:** Determine the method by which the parts will be run, Tool by Tool or Part by Part. In most applications running both workpieces in Tool by Tool mode results in less tool changes which in turn reduces cycle time.



- **Shown below are the EVENTS of both programs contained in the Master Program**

- The Program name screen (EVENT 0), must the have the A axis enabled. Press **YES** for **FOURTH AXIS REQUEST**.
- NOTE: Before programming, make sure the Fourth Axis has been turned on. Enter MACHINE SETUP MODE and press THE 4TH AXIS ON soft key.

- **FIRST PROGRAM – Operation 1:**

The screenshot shows a software window titled "PT7 Offline" with a standard Windows-style title bar. Below the title bar, there is a header area with "PROG" on the left, "MP/N 21985C : 21985OP1" in the center, and "MM" on the right. The main area of the window displays a list of program parameters:

Program Name	21985OP1
Scale	1.000
Dwell Request	NO
Fourth Axis Request	YES
Event Comments	NO
Dimension Definition	PART GEOMETRY

At the bottom of the window, there is a status bar with a question mark icon on the left and the text "Program Name : 21985OP1". Below the status bar is a row of buttons: "GO TO BEGIN", "GO TO END", "GO TO #", and "NEXT PROG".

- **Event 1:** Auto Coolant **ON**
- **Event 2:** Position the A axis to negative 30.000 degrees absolute. From the operators view standing in front and to the left of the rotary table, the trunnion will rotate counterclockwise enabling us to mill the top surface.

PT7 Offline

PROG MP/N 21985C : 21985OP1 MM

EVENT 1	AUX	EVENT 2	POSITION
AUX	1	X END	0.000 abs
		Y END	0.000 abs
		A END	-30.0000 abs
		Z RAPID	250.000 abs
		RPM	1800.00
		TOOL #	1

? TOOL # : 1

DATA BOTTOM INSERT EVENT DELETE EVENT

- **Event 3:** Using FACE MILL Event to mill top of workpiece. Z zero in EVENT 3 is the finished surface.
- **Event 4:** Using BOLT HOLE Event to Center Drill

PT7 Offline

PROG MP/N 21985C : 21985OP1 MM

EVENT 3	FACE MILL		EVENT 4	BOLT HOLE	
X1	-51.000	abs	DRILL, BORE, OR TAP	DRILL	
Y1	51.000	abs	# HOLES	4	
X3	51.000	abs	X CENTER	0.000	abs
Y3	-51.000	abs	Y CENTER	0.000	abs
Z RAPID	3.000	abs	Z RAPID	3.000	abs
Z END	0.000	abs	Z END	-3.000	abs
# PASSES	1		RADIUS	50.800	
Z FIN CUT	0.000		ANGLE	45.0000	
RPM	1800.00		# PECKS FOR DRILL	1	
Z FEEDRATE	250		RPM	6000.00	
XYZ FEEDRATE	1000		Z FEEDRATE	500	
TOOL #	1		TOOL #	2	

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : **DRILL**

DATA BOTTOM INSERT EVENT DELETE EVENT

- **Event 5:** Using BOLT HOLE Event to Drill
- **Event 6:** Using BOLT HOLE Event to Tap

PT7 Offline

PROG MP/N 21985C : 21985OP1 MM

EVENT 5 BOLT HOLE			EVENT 6 BOLT HOLE		
DRILL, BORE, OR TAP	DRILL		DRILL, BORE, OR TAP	TAP	
# HOLES	4		# HOLES	4	
X CENTER	0.000	abs	X CENTER	0.000	abs
Y CENTER	0.000	abs	Y CENTER	0.000	abs
Z RAPID	3.000	abs	Z RAPID	4.000	abs
Z END	-30.000	abs	Z BEGIN	4.000	abs
RADIUS	50.800		Z END	-25.000	abs
ANGLE	45.0000		RADIUS	50.800	
# OF VARIABLE PECKS	4		ANGLE	45.0000	
RPM	4500.00		PITCH	1.000	
Z FEEDRATE	250		RPM	800.00	
TOOL #	4		TOOL #	5	

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : TAP

DATA BOTTOM INSERT EVENT DELETE EVENT

• **Second Program: Operation--2:**

PT7 Offline		MP/N 21985C : 21985OP2		MM				
Program Name	21985OP2							
Scale	1.000							
Dwell Request	NO							
Fourth Axis Request	YES							
Event Comments	NO							
Dimension Definition	PART GEOMETRY							
?		Program Name : 21985OP2						
			GO TO BEGIN	GO TO END	GO TO #			NEXT PROG

- **Event 1:** Position the A axis to Zero degrees absolute. From the operators view standing in front and to the left of the rotary table, the trunnion will rotate clockwise enabling us to machine complete the 4 counterbore holes.
- **Event 2 thru 5 :** Center Drill four holes using tool # 2 at the specified Zero degree angle as shown on the detailed print.
- **Event 6 thru 9 :** Drill four holes using tool # 7 at the specified Zero degree angle as shown on the detailed print.
- **Event 10 thru 13 :** Counterbore the 4 holes using tool # 6 to a depth that is 20.000mm above the bottom surface of the workpiece at the specified Zero degree angle as shown on the detailed print.
- **Event 14 :** Using an AUXILIARY EVENT inserting a 3 shuts off the AUTO COOLANT and inserting a 6 enables Part Change Position, bringing the table forward towards the operator for ease of loading and unloading parts.

PT7 Offline

PROG MP/N 21985C : 21985OP2 MM

EVENT 1	POSITION		EVENT 2	DRILL	
X END	0.000	abs	DRILL OR BORE	DRILL	
Y END	0.000	abs	X	-18.000	abs
A END	0.0000	abs	Y	36.000	abs
Z RAPID	250.000	abs	Z RAPID	72.000	abs
RPM	1000.00		Z END	67.000	abs
TOOL #	2		# PECKS FOR DRILL	1	
			RPM	2500.00	
			Z FEEDRATE	250	
			TOOL #	2	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : **DRILL**

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 21985C : 21985OP2 MM

EVENT 3			EVENT 4		
DRILL			DRILL		
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	-18.000	abs	X	18.000	abs
Y	-36.000	abs	Y	-36.000	abs
Z RAPID	72.000	abs	Z RAPID	45.000	abs
Z END	67.000	abs	Z END	40.000	abs
# PECKS FOR DRILL	1		# PECKS FOR DRILL	1	
RPM	2500.00		RPM	2500.00	
Z FEEDRATE	250		Z FEEDRATE	250	
TOOL #	2		TOOL #	2	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : DRILL

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 21985C : 21985OP2 MM

EVENT 5			EVENT 6		
DRILL			DRILL		
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	18.000	abs	X	-18.000	abs
Y	36.000	abs	Y	36.000	abs
Z RAPID	45.000	abs	Z RAPID	72.000	abs
Z END	40.000	abs	Z END	-5.000	abs
# PECKS FOR DRILL	1		# OF FIXED PECKS	6	
RPM	2500.00		RPM	2700.00	
Z FEEDRATE	250		Z FEEDRATE	250	
TOOL #	2		TOOL #	7	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : DRILL

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 21985C : 21985OP2 MM

EVENT 7			EVENT 8		
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	-18.000	abs	X	18.000	abs
Y	-36.000	abs	Y	-36.000	abs
Z RAPID	72.000	abs	Z RAPID	45.000	abs
Z END	-5.000	abs	Z END	-5.000	abs
# OF FIXED PECKS	6		# OF FIXED PECKS	4	
RPM	2700.00		RPM	2700.00	
Z FEEDRATE	250		Z FEEDRATE	250	
TOOL #	7		TOOL #	7	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : DRILL

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 21985C : 21985OP2 MM

EVENT 9			EVENT 10		
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	18.000	abs	X	-18.000	abs
Y	36.000	abs	Y	36.000	abs
Z RAPID	45.000	abs	Z RAPID	72.000	abs
Z END	-5.000	abs	Z END	20.000	abs
# OF FIXED PECKS	4		# OF FIXED PECKS	5	
RPM	2700.00		RPM	2000.00	
Z FEEDRATE	250		Z FEEDRATE	200	
TOOL #	7		TOOL #	6	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : DRILL

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 21985C : 21985OP2 MM

EVENT 11	DRILL	EVENT 12	DRILL
DRILL OR BORE	DRILL	DRILL OR BORE	DRILL
X	-18.000 abs	X	18.000 abs
Y	-36.000 abs	Y	-36.000 abs
Z RAPID	72.000 abs	Z RAPID	45.000 abs
Z END	20.000 abs	Z END	20.000 abs
# OF FIXED PECKS	5	# OF FIXED PECKS	3
RPM	2000.00	RPM	2000.00
Z FEEDRATE	200	Z FEEDRATE	200
TOOL #	6	TOOL #	6

Select
1, for Drill
2, for Bore.

DRILL OR BORE : **DRILL**

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 21985C : 21985OP2 MM

EVENT 13	DRILL	EVENT 14	AUX
DRILL OR BORE	DRILL	AUX	36
X	18.000 abs		
Y	36.000 abs		
Z RAPID	45.000 abs		
Z END	20.000 abs		
# OF FIXED PECKS	3		
RPM	2000.00		
Z FEEDRATE	200		
TOOL #	6		

0 - NONE
1 - Coolant ON
2 - Air ON
3 - Coolant OFF
4 - Air OFF
5 - Pulse Indexer
6 - Part Change Position
7 - 4th Axis Auto-Clamp OFF
8 - 4th Axis Auto-Clamp ON

AUX : **36**

DATA BOTTOM INSERT EVENT DELETE EVENT

Program Example 2:

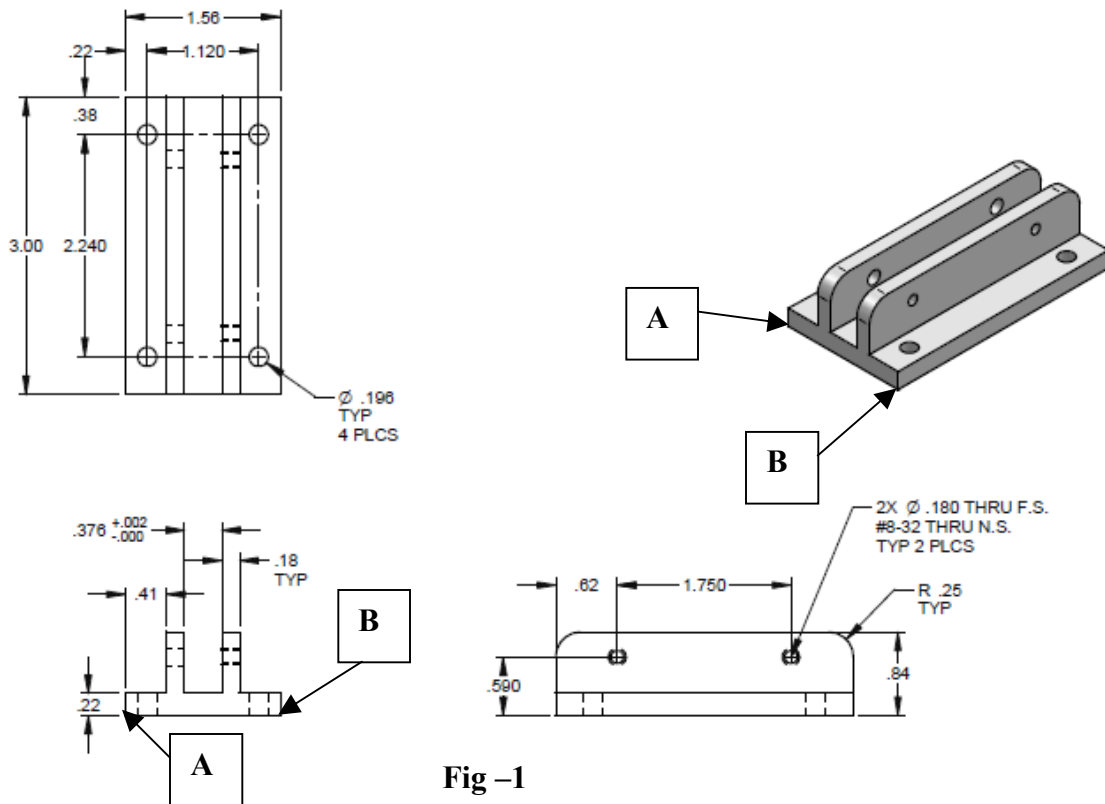


Fig -1

- **Operation 1:** This sample part was programmed using Point **A**, as shown above, as the X, Y and Z Absolute Part Zero when the A axis is at a Positive 90.000 degrees.
- **Operation 2:** Point **B**, as shown above, is the X, Y and Z Absolute Part Zero when the A axis is at a Positive 270.000 degrees.
- **Operation 3:** Point **A**, as shown above, is the X, Y and Z Absolute Part Zero when the A axis is at a Zero (0.000) degrees.

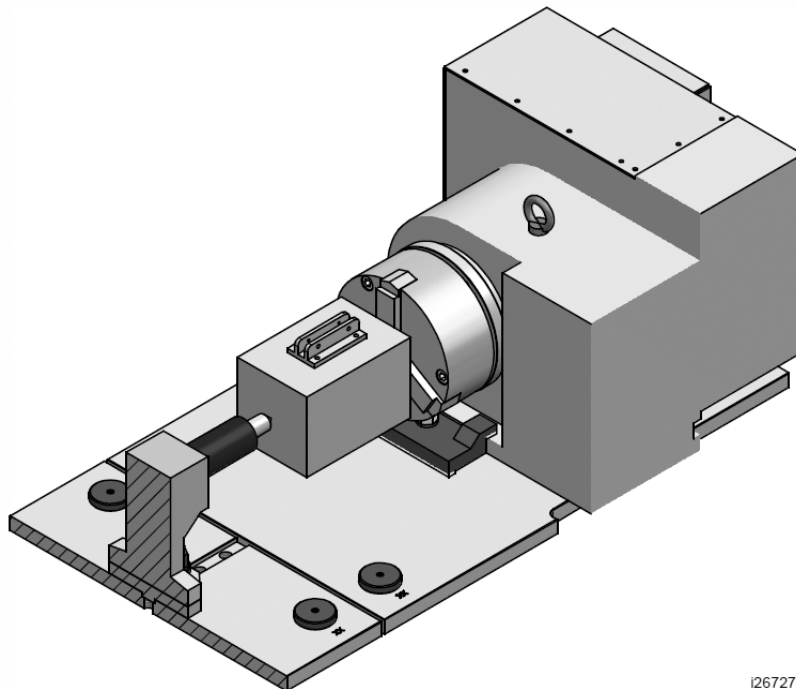


Fig. 2

• **Example 2:** A Master Program using 3 programs was used. Three offset fixture locations will be displayed in the PART/FIX MGMT screen as shown below. The fixture locations for all three operations are designated as 4TH. In this example, angular rotation of the rotary table is accomplished by using an **A Offset** value for each operation.

1: No POSITIONING EVENTS are used in this program to orient the A axis as in the previous example. As each individual program runs, the A Offset in the PART/FIX MGMT SCREEN commands the rotary table to orient to the specified value that has been input for that particular operation.

2 : This part was made from solid stock ; 3.25”L x 1.75”W x 1.00H

The screenshot shows the 'Part/Fixture Management' screen in PT7 Offline. At the top, it displays 'PROG S/U' as 'MP/N 265341' and 'INCH' units. Below this, there are fields for 'ATC Pos 0' and 'No Tool'. The main area contains a table with the following data:

Part	1	2	3
P/N	265341OP1A	265431OP2A	265340P3A
Fixture Location	4TH	4TH	4TH
Fixture Number	1	1	1
X Offset	-8.2500	-8.2500	-8.2500
Y Offset	-2.0000	2.0000	0.7800
Z Offset	0.7800	0.7800	2.0000
A Offset	90.0000	270.0000	0.0000
Parts/Fixture	1	1	1
X Shift	0.0000	0.0000	0.0000
Y Shift	0.0000	0.0000	0.0000
Z Shift	0.0000	0.0000	0.0000

Below the main table is a smaller table with the following data:

X	2.2990	4TH
Y	10.2220	4TH
Z	12.7340	4TH
A	0.000	4TH

At the bottom of the screen, there is a field for 'A OFFSET : 0.0000' and a row of buttons: PICTURE, NOTES, GO TO, Z SAFETY, SPIN SPEED, and RETURN.

• **Fixture Offset 1:** The trunnion as pictured below is 4.0 inches square. The part is located in the **center of the trunnion**. With the bottom of the workpiece being Part Zero, the values for the Y Offset is negative 2.0000 inches. This is due to the fact that the trunnion face is 2.0000 inches from the center of rotation of the A axis in the negative Y direction. The Z Offset is positive 0.7800 inches, **half the width of the workpiece** (Point A in figure 1)

• **Fixture Offset 2:** Here, with the bottom of the workpiece being Part Zero, the values for the Y Offset is positive 2.0000 inches. This is due to the fact that the trunnion face is 2.0000 inches from the center of rotation of the A axis in the positive Y direction. The Z Offset is again positive 0.7800 inches, **half the width of the workpiece** (Point B in figure 1).

• **Fixture Offset 3:** Here, with the bottom of the workpiece being Part Zero, the values for the Z Offset is positive 2.0000 inches. This is due to the fact that the trunnion face is 2.0000 inches from the center of rotation of the A axis in the positive Z direction.

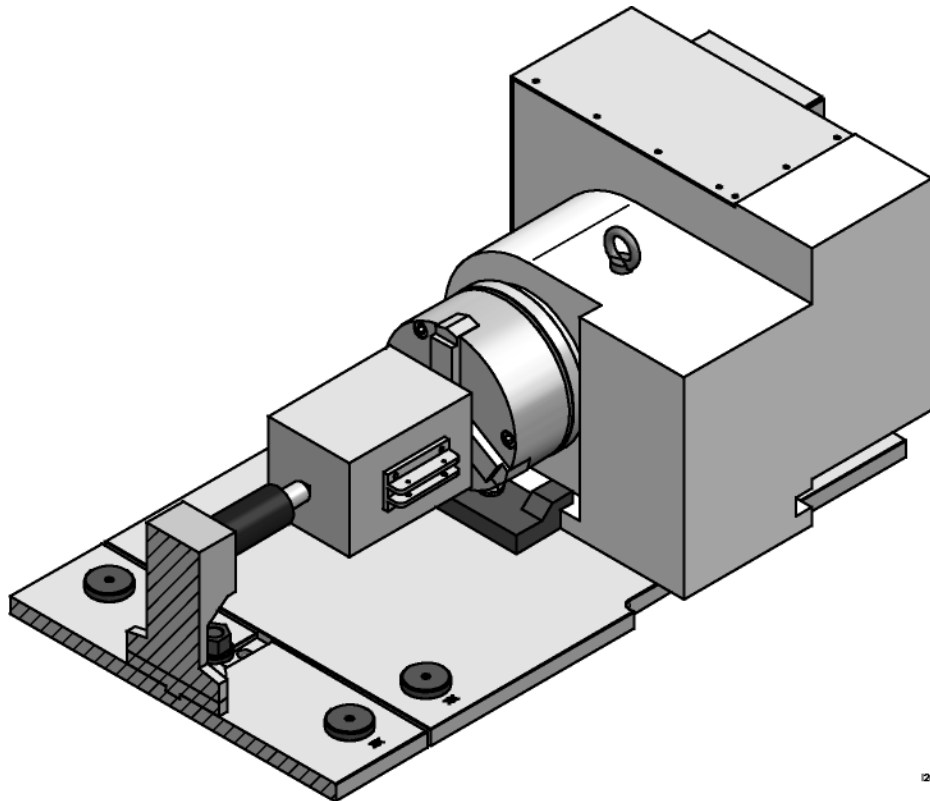
The Y Offset is a positive .7800 inches, **half the width of the workpiece** (Point A in figure 1). In the Y axis, Point A is on the positive side of the center of rotation.

Tooling Data: Enter the proper tooling data

PT7 Offline										
PROG S/U								MP/N 265341		INCH
ATC						PART PROGRAM TOOL TABLE				
Loc	Dia	Type	Z Offset	Z Mod	Dia Mod	Tool No	Dia	Type	ATC Loc	
1	0.3750	Ctr Drill	-1.1200	0.0000	0.0000	1	0.7500	Fin EM	2	
2	0.7500	Fin EM	2.1340	0.0000	0.0000	2	0.7500	Ruf EM	3	
3	0.7500	Ruf EM	2.1980	0.0000	0.0000	3	0.1360	Drill	4	
4	0.1360	Drill	1.0030	0.0000	0.0000	4	0.1500	Tap	12	
5	0.3120	Ruf EM	0.9870	0.0000	0.0000	7	0.3750	Ctr Drill	1	
6	0.3120	Fin EM	0.7690	0.0000	0.0000	9	0.1800	Drill	13	
7	0.1870	Fin EM	-0.1790	0.0000	0.0000	11	0.0600	Other	14	
8	0.0930	Fin EM	-0.2450	0.0000	0.0000	12	0.3120	Ruf EM	5	
9	0.0890	Drill	0.8960	0.0000	0.0000	13	0.3120	Fin EM	6	
10	0.1120	Tap	2.3670	0.0000	0.0000	14	0.2500	Ctr Drill	15	
11	0.2500	Other	0.7840	0.0000	0.0000	15	0.1960	Drill	16	
12	0.1500	Tap	2.6570	0.0000	0.0000					
13	0.1800	Drill	2.4560	0.0000	0.0000					
14	0.0600	Other	1.9870	0.0000	0.0000					
15	0.2500	Ctr Drill	0.3450	0.0000	0.0000					
16	0.1960	Drill	0.5870	0.0000	0.0000					
17	0.0000	None	0.0000	0.0000	0.0000					
18	0.0000	None	0.0000	0.0000	0.0000					
19	0.0000	None	0.0000	0.0000	0.0000					
20	0.0000	None	0.0000	0.0000	0.0000					
21	0.0000	None	0.0000	0.0000	0.0000					
ATC LOCATION : 2										
TOOL CRIB	REMOVE TOOL	NOTES	DISABLE LOC						RETURN	

- **Programming Aspects Shown On This Part**

- **OPERATION 1:**
- **EVENT 1:** Turn on Auto Coolant
- **EVENT 2 thru 8:** Using .75" roughing end mill to rough mill the top step
- (refer to fig. 1 - .41" and .22" dim's)
- **EVENT 9 thru 13:** Using .75" finish end mill to finish mill the rough form milled in events 2 thru 8. (refer to fig. 1 - .41" and .22" dim's)
- **EVENT 14 and 15:** Center drilling for two .180" dia. holes using a .375" center drill.
- **EVENT 16 and 17:** Drill 2 holes using a .180" dia. drill
- **EVENT 18 thru 21:** Using a 90 degree deburring tool to deburr the outer form. (refer to fig. 1 - .64" dim. With .25" radius)



26726-3

Fig 3
Trunnion at 90.000 degrees

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 0	EVENT 1	AUX
PROGRAM NAME 265341OP1A	AUX	1
SCALE 1.000		
DWELL REQUEST NO		
FOURTH AXIS REQUEST YES		
EVENT COMMENTS NO		
DIMENSION DEFINITION PART GEO		

0 - NONE
 1 - Coolant ON
 2 - Air ON
 3 - Coolant OFF
 4 - Air OFF
 6 - Part Change Position
 7 - 4th Axis Auto Clamp OFF
 8 - 4th Axis Auto-Clamp ON

AUX : 1

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 2	MILL	EVENT 3	MILL
X BEGIN 3.5000 abs		X BEGIN 3.5000 abs	
Y BEGIN -0.6300 abs		Y BEGIN -0.4300 abs	
Z RAPID 0.2000 abs		Z RAPID 0.2000 abs	
Z BEGIN -0.4000 abs		Z BEGIN -0.4000 abs	
X END -0.5000 abs		X END -0.5000 abs	
Y END 0.0000 inc		Y END 0.0000 inc	
Z END 0.0000 inc		Z END 0.0000 inc	
CONRAD 0.0000		CONRAD 0.0000	
TOOL OFFSET LEFT		TOOL OFFSET LEFT	
RPM 800.00		RPM 800.00	
Z FEEDRATE 30.0		Z FEEDRATE 30.0	
XYZ FEEDRATE 10.0		XYZ FEEDRATE 10.0	
TOOL # 2		TOOL # 2	

X BEGIN : 3.5000 abs

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 4	MILL		EVENT 5	IRR PROFILE	
X BEGIN	3.5000	abs	X BEGIN	3.0100	abs
Y BEGIN	-0.2300	abs	Y BEGIN	0.5000	abs
Z RAPID	0.2000	abs	Z RAPID	0.1000	abs
Z BEGIN	-0.4000	abs	Z END	-0.8000	abs
X END	-0.5000	abs	TOOL OFFSET	LEFT	
Y END	0.0000	inc	# PASSES	1	
Z END	0.0000	inc	FIN CUT	0.0000	
CONRAD	0.0000		RPM	800.00	
TOOL OFFSET	LEFT		Z FEEDRATE	30.0	
RPM	800.00		XYZ FEEDRATE	20.0	
Z FEEDRATE	30.0		TOOL #	2	
XYZ FEEDRATE	10.0				
TOOL #	2				

X BEGIN : 3.0100 abs

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 6	A.G.E. MILL	OK	EVENT 7	A.G.E. MILL	OK
TANGENT			TANGENT	YES	
X BEGIN	3.0100	abs	X END	-0.0100	abs
Y BEGIN	0.5000	abs	Y END	0.0000	inc
X END	0.0000	inc	CONRAD	0.2500	
Y END	-0.8500	abs	ANGLE END		
CONRAD	0.2500		LENGTH		
ANGLE END			LINE ANGLE		
LENGTH	1.3500				
LINE ANGLE	270.0000				

Select
1, for YES
2, for NO.

TANGENT : YES

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 8		A.G.E. MILL	OK	EVENT 9		IRR PROFILE
TANGENT		YES		X BEGIN	3.0000	abs
X BEGIN	-0.0100	abs		Y BEGIN	0.5000	abs
Y BEGIN	-0.8500	abs		Z RAPID	0.1000	abs
X END	0.0000	inc		Z END	-0.8000	abs
Y END	0.5000	abs		TOOL OFFSET	LEFT	
CONRAD				# PASSES	1	
ANGLE END				FIN CUT	0.0000	
LENGTH	1.3500			RPM	1200.00	
LINE ANGLE	90.0000			Z FEEDRATE	30.0	
				XYZ FEEDRATE	10.0	
				TOOL #	1	

X BEGIN : 3.0000 abs

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 10		A.G.E. MILL	OK	EVENT 11		A.G.E. MILL	OK
TANGENT				TANGENT	YES		
X BEGIN	3.0000	abs		X END	0.0000	abs	
Y BEGIN	0.5000	abs		Y END	0.0000	inc	
X END	0.0000	inc		CONRAD	0.2500		
Y END	-0.8400	abs		ANGLE END			
CONRAD	0.2500			LENGTH			
ANGLE END				LINE ANGLE			
LENGTH	1.3400						
LINE ANGLE	270.0000						

Select
1, for YES
2, for NO.

TANGENT : YES

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 12	A.G.E. MILL	OK	EVENT 13	MILL	
TANGENT	YES		X BEGIN	3.5000	abs
X BEGIN	0.0000	abs	Y BEGIN	-0.2200	abs
Y BEGIN	-0.8400	abs	Z RAPID	0.1000	abs
X END	0.0000	inc	Z BEGIN	-0.4100	abs
Y END	0.5000	abs	X END	-0.5000	abs
CONRAD			Y END	0.0000	inc
ANGLE END			Z END	0.0000	inc
LENGTH	1.3400		CONRAD	0.0000	
LINE ANGLE	90.0000		TOOL OFFSET	LEFT	
			RPM	1200.00	
			Z FEEDRATE	30.0	
			XYZ FEEDRATE	12.0	
			TOOL #	1	

X BEGIN : 3.5000 abs

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 14	DRILL		EVENT 15	DRILL	
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	0.6200	abs	X	2.3700	abs
Y	-0.5900	abs	Y	-0.5900	abs
Z RAPID	-0.3000	abs	Z RAPID	-0.3000	abs
Z END	-0.4950	abs	Z END	-0.4950	abs
# PECKS FOR DRILL	1		# PECKS FOR DRILL	1	
RPM	1000.00		RPM	1000.00	
Z FEEDRATE	6.0		Z FEEDRATE	6.0	
TOOL #	7		TOOL #	7	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : DRILL

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 16			EVENT 17		
DRILL			DRILL		
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	0.6200	abs	X	2.3700	abs
Y	-0.5900	abs	Y	-0.5900	abs
Z RAPID	-0.3000	abs	Z RAPID	-0.3000	abs
Z END	-0.8500	abs	Z END	-0.8500	abs
# OF FIXED PECKS	4		# OF FIXED PECKS	4	
RPM	1800.00		RPM	1800.00	
Z FEEDRATE	6.0		Z FEEDRATE	6.0	
TOOL #	9		TOOL #	9	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : DRILL

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 18			EVENT 19		
IRR PROFILE			A.G.E. MILL		
X BEGIN	3.0000	abs	TANGENT		
Y BEGIN	-0.3650	abs	X END	0.0000	inc
Z RAPID	0.1000	abs	Y END	-0.8400	abs
Z END	-0.4500	abs	CONRAD	0.2500	
TOOL OFFSET	LEFT		ANGLE END		
# PASSES	1		LENGTH		
FIN CUT	0.0000		LINE ANGLE		
RPM	4000.00				
Z FEEDRATE	30.0				
XYZ FEEDRATE	16.0				
TOOL #	11				

Select
1, for YES
2, for NO.

TANGENT :

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 265341OP1A INCH

EVENT 20	A.G.E. MILL	OK	EVENT 21	A.G.E. MILL	OK
TANGENT	YES		TANGENT	YES	
X BEGIN	3.0000	abs	X END	0.0000	inc
Y BEGIN	-0.8400	abs	Y END	-0.3650	abs
X END	0.0000	abs	CONRAD		
Y END	0.0000	inc	ANGLE END		
CONRAD	0.2500		LENGTH		
ANGLE END			LINE ANGLE		
LENGTH	3.0000				
LINE ANGLE	180.0000				

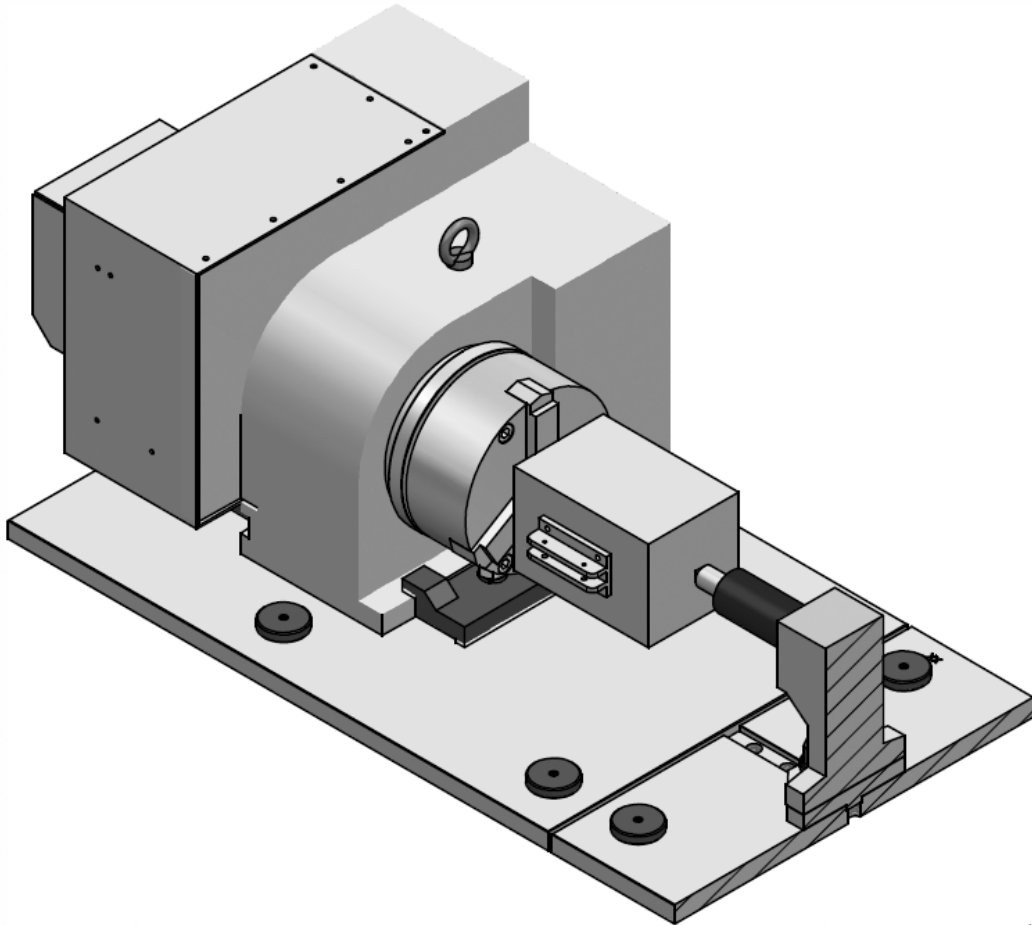
Select
1, for YES
2, for NO.

TANGENT : YES

DATA BOTTOM INSERT EVENT DELETE EVENT

● **OPERATION 2:**

- **EVENT 1 thru 7:** Using .75" roughing end mill to rough mill the top step (refer to fig. 1 - .84 dim. With .25" radius on the outer form)
- **EVENT 8 thru 11:** Using .75" finish end mill to finish mill the rough form milled in events 1 thru 7. (refer to fig. 1 - .84" dim with .25" radius on the outer form)
- **EVENT 12:** Using .75" finish end mill to finish mill the top step (refer to fig. 1 - .22" and .41" dim's)
- **EVENT 13 and 14:** Center drilling for two .180" dia. holes using a .375" center drill.
- **EVENT 15 and 16:** Drill 2 holes using a .180" dia. drill
- **EVENT 17 and 18:** Tap the 6-32 dia. holes
- **EVENT 19 thru 22:** Using a 90 degree deburring tool to deburr the outer form. (refer to fig. 1 - .64" dim. With .25" radius)



.26728-8

Fig 4
Trunnion at 270.000 degrees
(Rear View)

PT7 Offline

PROG MP/N 265341 : 265431OP2A INCH

EVENT 0		EVENT 1		MILL	
PROGRAM NAME	265431OP2A	X BEGIN	3.5000	abs	
SCALE	1.000	Y BEGIN	0.6300	abs	
DWELL REQUEST	NO	Z RAPID	0.2000	abs	
FOURTH AXIS REQUEST	YES	Z BEGIN	-0.4000	abs	
EVENT COMMENTS	NO	X END	-0.5000	abs	
DIMENSION DEFINITION	PART GEO	Y END	0.0000	inc	
		Z END	0.0000	inc	
		CONRAD	0.0000		
		TOOL OFFSET	LEFT		
		RPM	800.00		
		Z FEEDRATE	30.0		
		XYZ FEEDRATE	10.0		
		TOOL #	2		

X BEGIN : 3.5000 abs

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 265431OP2A INCH

EVENT 2		EVENT 3		MILL	
X BEGIN	3.5000 abs	X BEGIN	3.5000 abs		
Y BEGIN	0.4300 abs	Y BEGIN	0.2300 abs		
Z RAPID	0.2000 abs	Z RAPID	0.2000 abs		
Z BEGIN	-0.4000 abs	Z BEGIN	-0.4000 abs		
X END	-0.5000 abs	X END	-0.5000 abs		
Y END	0.0000 inc	Y END	0.0000 inc		
Z END	0.0000 inc	Z END	0.0000 inc		
CONRAD	0.0000	CONRAD	0.0000		
TOOL OFFSET	LEFT	TOOL OFFSET	LEFT		
RPM	800.00	RPM	800.00		
Z FEEDRATE	30.0	Z FEEDRATE	30.0		
XYZ FEEDRATE	10.0	XYZ FEEDRATE	10.0		
TOOL #	2	TOOL #	2		

X BEGIN : 3.5000 abs

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 265431OP2A INCH

EVENT 4			IRR PROFILE			EVENT 5			A.G.E. MILL		
X BEGIN	3.0100	abs	TANGENT			X END	0.0000	inc			
Y BEGIN	-0.5000	abs	X END			Y END	0.8500	abs			
Z RAPID	0.1000	abs	CONRAD			CONRAD	0.2500				
Z END	-0.8000	abs	ANGLE END			ANGLE END					
TOOL OFFSET	LEFT		LENGTH			LENGTH					
# PASSES	1		LINE ANGLE			LINE ANGLE					
FIN CUT	0.0000										
RPM	800.00										
Z FEEDRATE	30.0										
XYZ FEEDRATE	20.0										
TOOL #	2										

Select
1, for YES
2, for NO.

TANGENT : █

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265341 : 265431OP2A INCH

EVENT 6			A.G.E. MILL			EVENT 7			A.G.E. MILL		
TANGENT	YES		TANGENT	YES		X END	0.0000	inc			
X BEGIN	3.0100	abs	X END			Y END	-0.5000	abs			
Y BEGIN	0.8500	abs	CONRAD			CONRAD					
X END	-0.0100	abs	ANGLE END			ANGLE END					
Y END	0.0000	inc	LENGTH			LENGTH					
CONRAD	0.2500		LINE ANGLE			LINE ANGLE					
ANGLE END											
LENGTH	3.0200										
LINE ANGLE	180.0000										

Select
1, for YES
2, for NO.

TANGENT : YES

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265341 : 265431OP2A INCH

EVENT 8	IRR PROFILE		EVENT 9	A.G.E. MILL	OK
X BEGIN	3.0000	abs	TANGENT		
Y BEGIN	-0.5000	abs	X END	0.0000	inc
Z RAPID	0.1000	abs	Y END	0.8400	abs
Z END	-0.8000	abs	CONRAD	0.2500	
TOOL OFFSET	LEFT		ANGLE END		
# PASSES	1		LENGTH		
FIN CUT	0.0000		LINE ANGLE		
RPM	1200.00				
Z FEEDRATE	30.0				
XYZ FEEDRATE	10.0				
TOOL #	1				

Select
1, for YES
2, for NO.

TANGENT :

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265341 : 265431OP2A INCH

EVENT 10	A.G.E. MILL	OK	EVENT 11	A.G.E. MILL	OK
TANGENT	YES		TANGENT	YES	
X BEGIN	3.0000	abs	X END	0.0000	inc
Y BEGIN	0.8400	abs	Y END	-0.5000	abs
X END	0.0000	abs	CONRAD		
Y END	0.0000	inc	ANGLE END		
CONRAD	0.2500		LENGTH		
ANGLE END			LINE ANGLE		
LENGTH	3.0000				
LINE ANGLE	180.0000				

Select
1, for YES
2, for NO.

TANGENT : YES

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265341 : 265431OP2A INCH

EVENT 12			EVENT 13		
MILL			DRILL		
X BEGIN	3.5000	abs	DRILL OR BORE	DRILL	
Y BEGIN	0.2200	abs	X	0.6200	abs
Z RAPID	0.1000	abs	Y	0.5900	abs
Z BEGIN	-0.4100	abs	Z RAPID	-0.3000	abs
X END	-0.5000	abs	Z END	-0.4950	abs
Y END	0.0000	inc	# PECKS FOR DRILL	1	
Z END	0.0000	inc	RPM	1000.00	
CONRAD	0.0000		Z FEEDRATE	6.0	
TOOL OFFSET	LEFT		TOOL #	7	
RPM	1200.00				
Z FEEDRATE	30.0				
XYZ FEEDRATE	12.0				
TOOL #	1				

Select
1, for Drill
2, for Bore.

DRILL OR BORE : **DRILL**

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265341 : 265431OP2A INCH

EVENT 14			EVENT 15		
DRILL			DRILL		
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	2.3700	abs	X	0.6200	abs
Y	0.5900	abs	Y	0.5900	abs
Z RAPID	-0.3000	abs	Z RAPID	-0.3000	abs
Z END	-0.4950	abs	Z END	-0.8500	abs
# PECKS FOR DRILL	1		# OF FIXED PECKS	4	
RPM	1000.00		RPM	2200.00	
Z FEEDRATE	6.0		Z FEEDRATE	6.0	
TOOL #	7		TOOL #	3	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : **DRILL**

DATA INSERT DELETE
BOTTOM EVENT EVENT

EVENT 16			EVENT 17		
DRILL			TAP		
DRILL OR BORE	DRILL		X	0.6200	abs
X	2.3700	abs	Y	0.5900	abs
Y	0.5900	abs	Z RAPID	-0.3000	abs
Z RAPID	-0.3000	abs	Z BEGIN	-0.3000	abs
Z END	-0.8500	abs	Z END	-0.8500	abs
# OF FIXED PECKS	4		PITCH	0.0312	
RPM	2200.00		RPM	350.00	
Z FEEDRATE	6.0		TOOL #	4	
TOOL #	3				
			X : 0.6200 abs		
		DATA BOTTOM	INSERT EVENT	DELETE EVENT	

EVENT 18			EVENT 19		
TAP			IRR PROFILE		
X	2.3700	abs	X BEGIN	3.0000	abs
Y	0.5900	abs	Y BEGIN	0.3650	abs
Z RAPID	-0.3000	abs	Z RAPID	0.1000	abs
Z BEGIN	-0.3000	abs	Z END	-0.4500	abs
Z END	-0.8500	abs	TOOL OFFSET	LEFT	
PITCH	0.0312		# PASSES	1	
RPM	350.00		FIN CUT	0.0000	
TOOL #	4		RPM	4000.00	
			Z FEEDRATE	30.0	
			XYZ FEEDRATE	16.0	
			TOOL #	11	
			X BEGIN : 3.0000 abs		
		DATA BOTTOM	INSERT EVENT	DELETE EVENT	

PT7 Offline

PROG MP/N 265341 : 265431OP2A INCH

EVENT 20	A.G.E. MILL	OK	EVENT 21	A.G.E. MILL	OK
TANGENT			TANGENT	YES	
X BEGIN	3.0000	abs	X END	0.0000	abs
Y BEGIN	0.3650	abs	Y END	0.0000	inc
X END	0.0000	inc	CONRAD	0.2500	
Y END	0.8400	abs	ANGLE END		
CONRAD	0.2500		LENGTH		
ANGLE END			LINE ANGLE		
LENGTH	0.4750				
LINE ANGLE	90.0000				

Select
1, for YES
2, for NO.

TANGENT : YES

DATA INSERT DELETE
BOTTOM EVENT EVENT

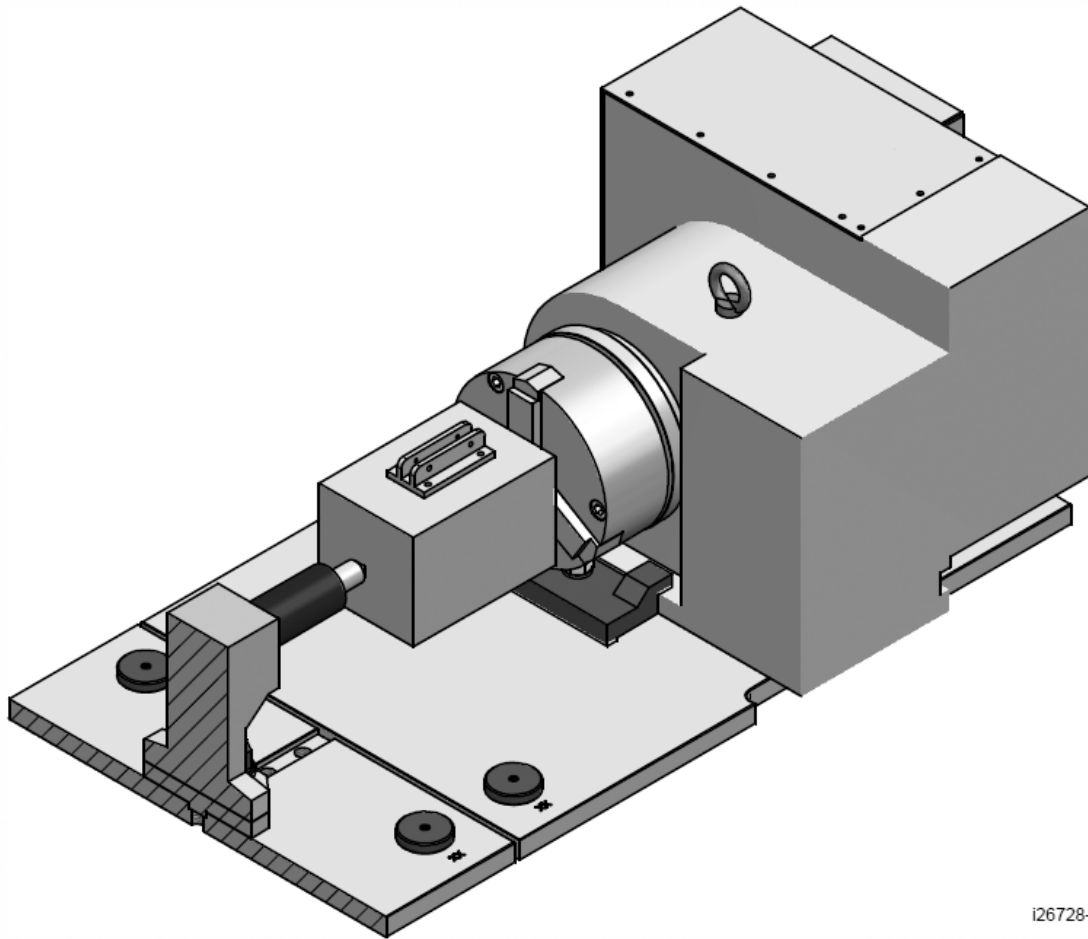
PT7 Offline

PROG MP/N 265341 : 265431OP2A INCH

EVENT 22	A.G.E. MILL	OK	EVENT 23
TANGENT	YES		
X BEGIN	0.0000	abs	
Y BEGIN	0.8400	abs	
X END	0.0000	inc	
Y END	0.3650	abs	
CONRAD			
ANGLE END			
LENGTH	0.4750		
LINE ANGLE	270.0000		

Select an event.

A.G.E. A.G.E. END ABORT
MILL ARC A.G.E. A.G.E.



i26728-3

Fig 5
Trunnion at 0.000 degrees

• **OPERATION 3:**

- **EVENT 1:** Using a .312" dia. roughing end mill to rough mill the center slot
- **EVENT 2:** Using a .312" dia. finish end mill to finish mill the center slot
- **EVENT 3 thru 6:** Using a .25" dia. center drill to center drill 4 holes
- **EVENT 7 thru 10:** Using a .196" dia drill to drill 4 holes
- **EVENT 11:** Turn off AUTO COOLANT and move table to part change position

PT7 Offline

PROG MP/N 265341 : 26534OP3A INCH

EVENT 2			RECT PKCT	EVENT 3			DRILL
X1	-0.5000	abs		DRILL OR BORE	DRILL		
Y1	-0.5900	abs		X	0.3800	abs	
X3	3.5000	abs		Y	-0.2200	abs	
Y3	-0.9670	abs		Z RAPID	-0.5200	abs	
Z RAPID	0.1000	abs		Z END	-0.7200	abs	
Z END	-0.6200	abs		# PECKS FOR DRILL	1		
CONRAD	0.0000			RPM	2500.00		
DIRECTION	CCW			Z FEEDRATE	8.0		
# PASSES	5			TOOL #	14		
ENTRY MODE	PLUNGE						
FIN CUT	0.0000						
RPM	5500.00						
Z FEEDRATE	30.0						
XYZ FEEDRATE	27.0						
TOOL #	13						

Select
1, for Drill
2, for Bore.

DRILL OR BORE : **DRILL**

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 26534OP3A INCH

EVENT 4			DRILL	EVENT 5			DRILL
DRILL OR BORE	DRILL			DRILL OR BORE	DRILL		
X	2.6200	abs		X	0.3800	abs	
Y	-0.2200	abs		Y	-1.3400	abs	
Z RAPID	-0.5200	abs		Z RAPID	-0.5200	abs	
Z END	-0.7200	abs		Z END	-0.7200	abs	
# PECKS FOR DRILL	1			# PECKS FOR DRILL	1		
RPM	2500.00			RPM	2500.00		
Z FEEDRATE	8.0			Z FEEDRATE	8.0		
TOOL #	14			TOOL #	14		

Select
1, for Drill
2, for Bore.

DRILL OR BORE : **DRILL**

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265341 : 26534OP3A INCH

EVENT 6			EVENT 7		
DRILL			DRILL		
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	2.6200	abs	X	0.3800	abs
Y	-1.3400	abs	Y	-0.2200	abs
Z RAPID	-0.5200	abs	Z RAPID	-0.5200	abs
Z END	-0.7200	abs	Z END	-0.9000	abs
# PECKS FOR DRILL	1		# PECKS FOR DRILL	1	
RPM	2500.00		RPM	3000.00	
Z FEEDRATE	8.0		Z FEEDRATE	8.0	
TOOL #	14		TOOL #	15	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : DRILL

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265341 : 26534OP3A INCH

EVENT 8			EVENT 9		
DRILL			DRILL		
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	2.6200	abs	X	0.3800	abs
Y	-0.2200	abs	Y	-1.3400	abs
Z RAPID	-0.5200	abs	Z RAPID	-0.5200	abs
Z END	-0.9000	abs	Z END	-0.9000	abs
# PECKS FOR DRILL	1		# PECKS FOR DRILL	1	
RPM	3000.00		RPM	3000.00	
Z FEEDRATE	8.0		Z FEEDRATE	8.0	
TOOL #	15		TOOL #	15	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : DRILL

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265341 : 26534OP3A INCH

EVENT 10	DRILL	EVENT 11	AUX
DRILL OR BORE	DRILL	AUX	36
X	2.6200 abs		
Y	-1.3400 abs		
Z RAPID	-0.5200 abs		
Z END	-0.9000 abs		
# PECKS FOR DRILL	1		
RPM	3000.00		
Z FEEDRATE	8.0		
TOOL #	15		

0 - NONE
 1 - Coolant ON
 2 - Air ON
 3 - Coolant OFF
 4 - Air OFF
 6 - Part Change Position
 7 - 4th Axis Auto Clamp OFF
 8 - 4th Axis Auto-Clamp ON

AUX : 36

			DATA BOTTOM	INSERT EVENT	DELETE EVENT		
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Program Example 3:

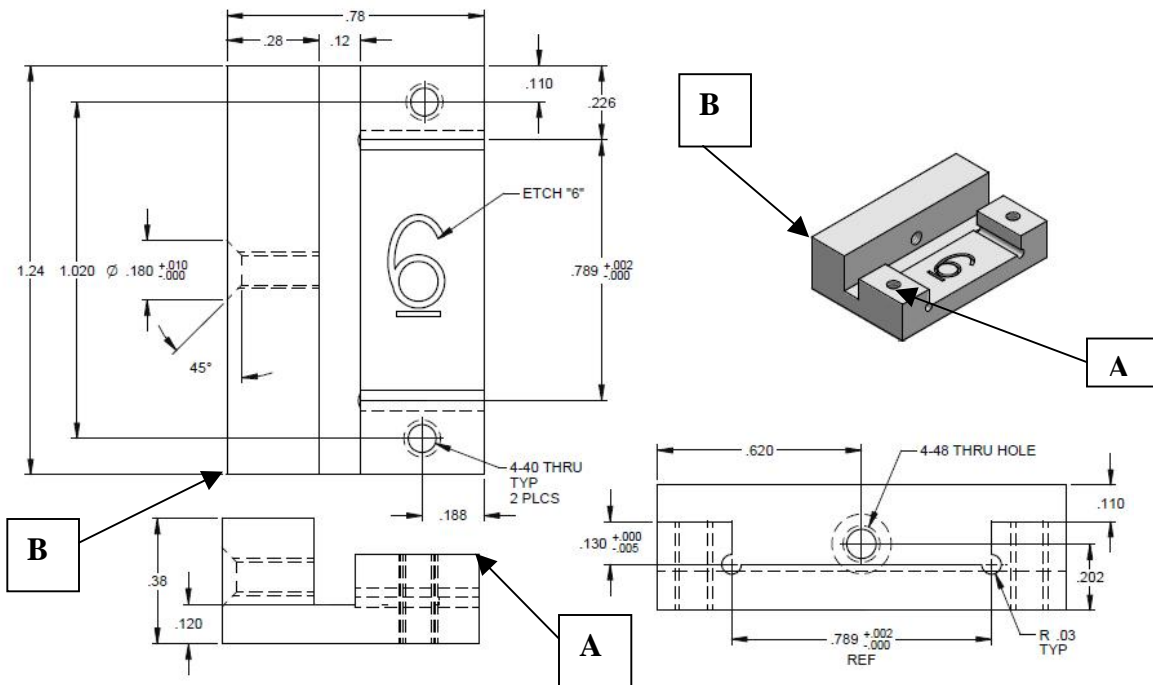


Fig -1

- **Operation 1:** This sample part was programmed using Point **A**, as shown above, as the X, Y and Z Absolute Part Zero when the A axis is at a Positive 270.000 degrees. Point A is shown in "space" in the isometric view because the material has been removed from the blank or raw stock.
- **Operation 2:** Point **B**, as shown above, is the X, Y and Z Absolute Part Zero when the A axis is at a Positive 90.000 degrees.
- **Operation 3:** Point **B**, as shown above, is the X, Y and Z Absolute Part Zero when the A axis is at a Zero (0.000) degrees.

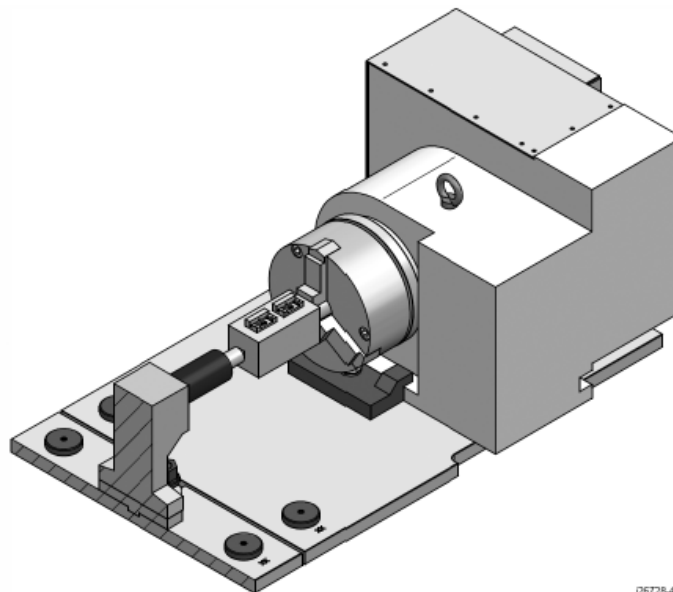


Fig 2

- **Example 3:** A Master Program using 3 programs was used. Three offset fixture locations will be displayed in the PART/FIX MGMT screen as shown below. The fixture locations for all three operations are designated as 4TH. In this example, angular rotation of the rotary table is accomplished by using an **A Offset** value for each operation. Two parts are located on the face of the trunnion. **Parts/Fixture** was used with an **X axis shift** of 2.0000 inches.

NOTES

1 : **No POSITIONING EVENTS** are used in this program to orient the A axis as in the previous example. As each individual program runs, the A Offset in the PART/FIX MGMT SCREEN commands the rotary table to orient to the specified value that has been input for that particular operation.

2 : This part was made from solid stock ; 1.30"L x 1.00"W x .50"H

PT7 Offline

PROG S/U MP/N 265346op2 INCH

ATC Pos 0 No Tool

Part/Fixture Management

Part	1	2	3
P/N	265346OP2	265346OP3	265346OP4
Fixture Location	4TH	4TH	4TH
Fixture Number	1	1	1
X Offset	-5.7500	-5.7500	-5.7500
Y Offset	2.0000	-2.0000	-0.3900
Z Offset	0.3900	0.3900	2.0000
A Offset	270.0000	90.0000	0.0000
Parts/Fixture	2	2	2
X Shift	2.0000	2.0000	2.0000
Y Shift	0.0000	0.0000	0.0000
Z Shift	0.0000	0.0000	0.0000

X	2.2990	4TH
Y	10.2220	4TH
Z	12.7340	4TH
A	0.000	4TH

X SHIFT : 2.0000

PICTURE	NOTES	GO TO	Z SAFETY		SPIN SPEED		RETURN
---------	-------	-------	----------	--	------------	--	--------

- **Fixture Offset 1:** The trunnion as pictured below is 4.0 inches square. The part is located in the **center of the trunnion**. With the bottom of the workpiece being Part Zero, the values for the Y Offset is positive 2.0000 inches. This is due to the fact that the trunnion face is 2.0000 inches from the center of rotation of the A axis in the positive Y direction. The Z Offset is positive 0.3900 inches, **half the width of the workpiece** (Point A in figure 1)
- **Fixture Offset 2:** Here, with the bottom of the workpiece being Part Zero, the values for the Y Offset is negative 2.0000 inches. This is due to the fact that the

trunnion face is 2.0000 inches from the center of rotation of the A axis in the negative Y direction. The Z Offset is again positive 0.3900 inches, **half the width of the workpiece** (Point B in figure 1).

• **Fixture Offset 3:** Here, with the bottom of the workpiece being Part Zero, the values for the Z Offset is positive 2.0000 inches. This is due to the fact that the trunnion face is 2.0000 inches from the center of rotation of the A axis in the positive Z direction.

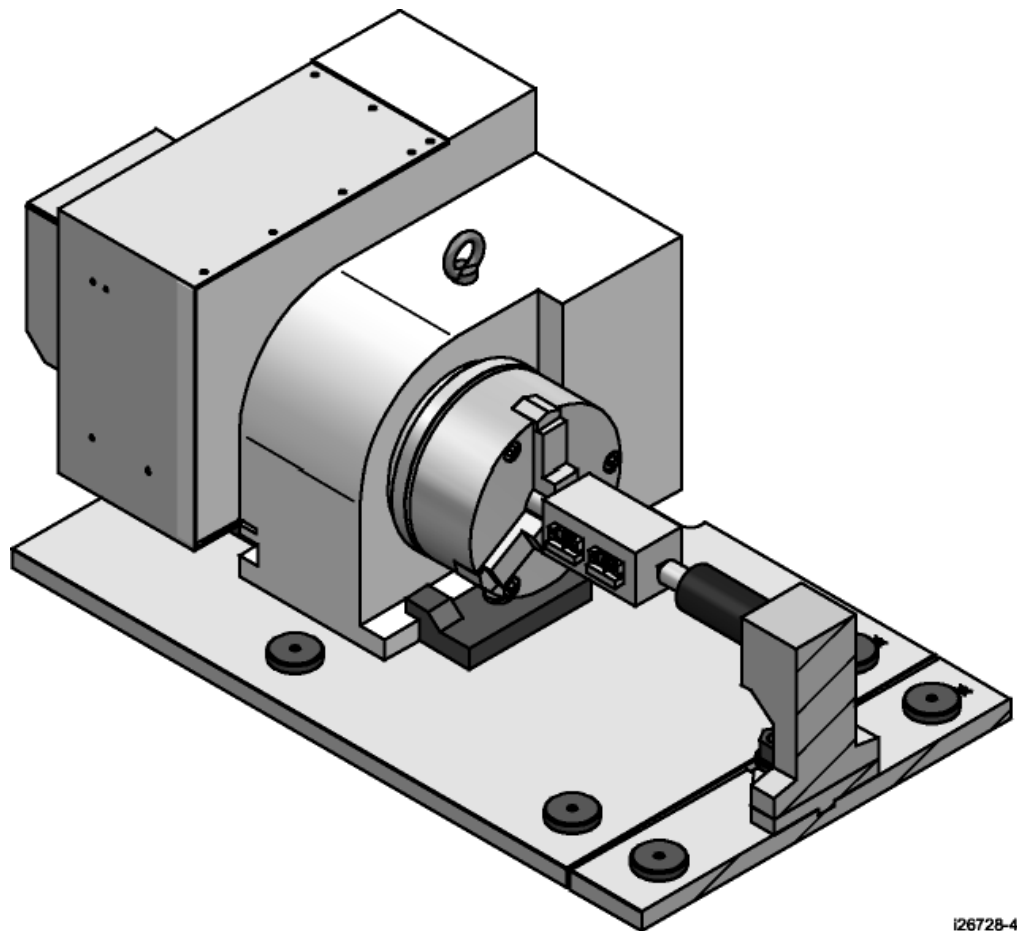
The Y Offset is a negative .3900 inches, **half the width of the workpiece** (Point A in figure 1). Point A with the A axis at zero degrees is on the negative side of the center of rotation in the Y axis direction.

Tooling Data: Enter the proper tooling data

PT7 Offline										
PROG S/U								MP/N 265346op2		INCH
ATC						PART PROGRAM TOOL TABLE				
Loc	Dia	Type	Z Offset	Z Mod	Dia Mod	Tool No	Dia	Type	ATC Loc	
1	0.3750	Ctr Drill	-1.1200	0.0000	0.0000	1	0.3750	Ctr Drill	1	
2	0.0620	Drill	0.9870	0.0000	0.0000	2	0.0620	Drill	2	
3	0.3750	Fin EM	1.4530	0.0000	0.0000	3	0.3750	Fin EM	3	
4	0.0930	Drill	1.8950	0.0000	0.0000	4	0.0930	Drill	4	
5	0.1120	Tap	2.4110	0.0000	0.0000	5	0.1120	Tap	5	
6	0.5000	Fin EM	0.3260	0.0000	0.0000	7	0.5000	Fin EM	6	
7	0.1870	Fin EM	-0.1790	0.0000	0.0000	8	0.1870	Fin EM	7	
8	0.0930	Fin EM	-0.2450	0.0000	0.0000	9	0.0930	Fin EM	8	
9	0.0890	Drill	0.8960	0.0000	0.0000	10	0.0890	Drill	9	
10	0.1120	Tap	2.3670	0.0000	0.0000	11	0.1120	Tap	10	
11	0.2500	Other	0.7840	0.0000	0.0000	12	0.2500	Other	11	
12	0.1500	Tap	2.6570	0.0000	0.0000					
13	0.1800	Drill	2.4560	0.0000	0.0000					
14	0.0600	Other	1.9870	0.0000	0.0000					
15	0.2500	Ctr Drill	0.3450	0.0000	0.0000					
16	0.1960	Drill	0.5870	0.0000	0.0000					
17	0.0000	None	0.0000	0.0000	0.0000					
18	0.0000	None	0.0000	0.0000	0.0000					
19	0.0000	None	0.0000	0.0000	0.0000					
20	0.0000	None	0.0000	0.0000	0.0000					
21	0.0000	None	0.0000	0.0000	0.0000					
ATC LOCATION : 1										
TOOL CRIB	REMOVE TOOL	NOTES	DISABLE LOC						RETURN	

- **Programming Aspects Shown On This Part**

- **OPERATION 1:**
- **A axis at 270.000 degrees**
- **EVENT 1:** Turn on Auto Coolant
- **EVENT 2:** Using a finish end mill to mill the side of workpiece (refer to fig. 1 – for the width of the workpiece - .7800" dim.)
- **EVENT 3 and 4:** Center drill the 2 side holes
- **EVENT 5 and 6:** Using a .06" dia drill, drill the 2 side holes (holes for clearance in the milled section - .03" rad. callout)
- **EVENT 7 and 8:** Using a .375" dia. end mill, mill the profile (refer to fig. 1 for the .110" and .130" dim's.)



i26728-4

Fig 3
Trunnion at 270.000 degrees

PT7 Offline

PROG MP/N 265346op2 : 265346OP2 INCH

EVENT 0	EVENT 1	AUX
PROGRAM NAME 265346OP2	AUX	1
SCALE 1.000		
DWELL REQUEST NO		
FOURTH AXIS REQUEST YES		
EVENT COMMENTS NO		
DIMENSION DEFINITION PART GEO		

0 - NONE
 1 - Coolant ON
 2 - Air ON
 3 - Coolant OFF
 4 - Air OFF
 6 - Part Change Position
 7 - 4th Axis Auto Clamp OFF
 8 - 4th Axis Auto-Clamp ON

AUX : 1

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265346op2 : 265346OP2 INCH

EVENT 2	FACE MILL	EVENT 3	DRILL
X1 0.0000 abs		DRILL OR BORE	DRILL
Y1 0.3800 abs		X 0.2260 abs	
X3 1.2400 abs		Y 0.2400 abs	
Y3 0.0000 abs		Z RAPID 0.1000 abs	
Z RAPID 0.1100 abs		Z END -0.0300 abs	
Z END 0.0000 abs		# PECKS FOR DRILL 1	
# PASSES 2		RPM 1800.00	
Z FIN CUT 0.0000		Z FEEDRATE 6.0	
RPM 2800.00		TOOL # 1	
Z FEEDRATE 10.0			
XYZ FEEDRATE 30.0			
TOOL # 3			

Select
 1, for Drill
 2, for Bore.

DRILL OR BORE : DRILL

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265346op2 : 265346OP2 INCH

EVENT 4			EVENT 5		
DRILL			DRILL		
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	1.0140	abs	X	0.2260	abs
Y	0.2400	abs	Y	0.2400	abs
Z RAPID	0.1000	abs	Z RAPID	0.1000	abs
Z END	-0.0300	abs	Z END	-0.4300	abs
# PECKS FOR DRILL	1		# OF FIXED PECKS	7	
RPM	1800.00		RPM	4000.00	
Z FEEDRATE	6.0		Z FEEDRATE	6.0	
TOOL #	1		TOOL #	2	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : DRILL

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265346op2 : 265346OP2 INCH

EVENT 6			EVENT 7		
DRILL			RECT PROFILE		
DRILL OR BORE	DRILL		X1	-0.2000	abs
X	1.0140	abs	Y1	0.1050	abs
Y	0.2400	abs	X3	1.4400	abs
Z RAPID	0.1000	abs	Y3	-0.3000	abs
Z END	-0.4300	abs	Z RAPID	0.1000	abs
# OF VARIABLE PECKS	7		Z END	-0.3900	abs
RPM	4000.00		CONRAD	0.0000	
Z FEEDRATE	6.0		DIRECTION	CCW	
TOOL #	2		TOOL OFFSET	LEFT	
			# PASSES	4	
			FIN CUT	0.0000	
			RPM	4000.00	
			Z FEEDRATE	8.0	
			XYZ FEEDRATE	30.0	
			TOOL #	3	

X1 : -0.2000 abs

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG MP/N 265346op2 : 265346OP2 INCH

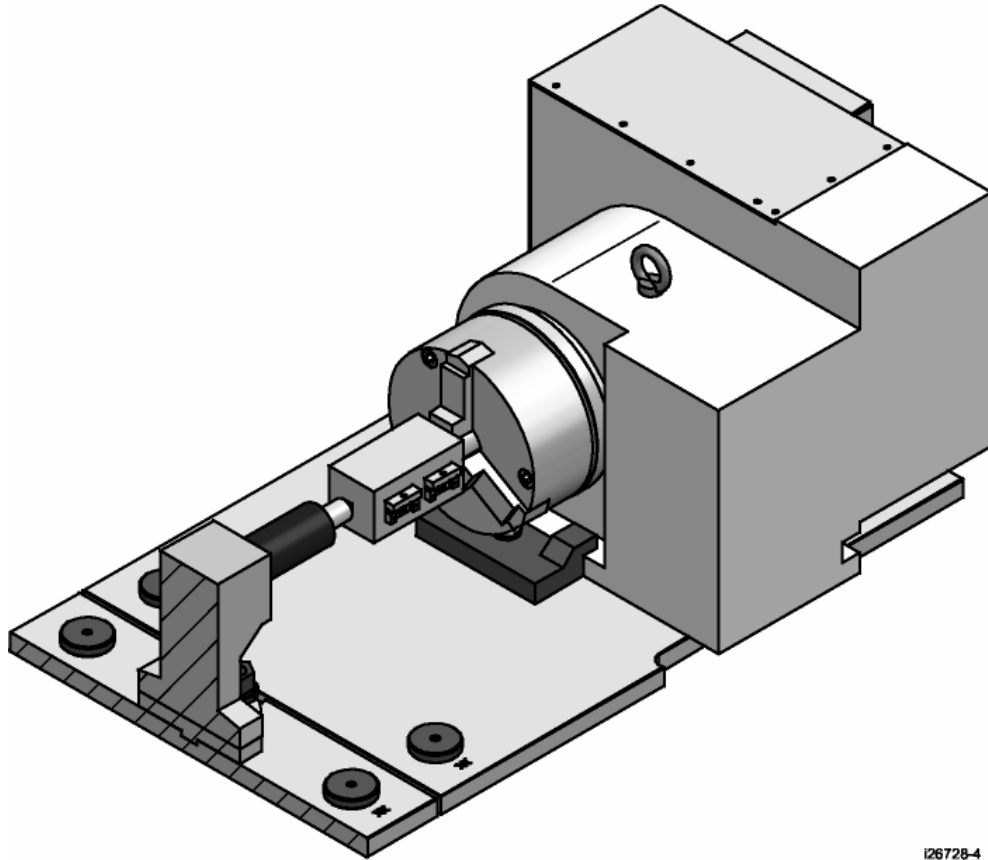
EVENT 8	RECT PROFILE		EVENT 9
X1	0.2300	abs	
Y1	0.2300	abs	
X3	1.0100	abs	
Y3	-0.2000	abs	
Z RAPID	0.1000	abs	
Z END	-0.3900	abs	
CONRAD	0.0000		
DIRECTION	CCW		
TOOL OFFSET	LEFT		
# PASSES	7		
FIN CUT	0.0000		
RPM	4000.00		
Z FEEDRATE	8.0		
XYZ FEEDRATE	30.0		
TOOL #	3		

Select an event.

POSN DRILL BOLT HOLE MILL ARC POCKET PROFILE HELIX SUB MORE

OPERATION 2:

- **A axis at 90.000 degrees**
- **EVENT 1:** Using a finish end mill to mill the side of workpiece (refer to fig. 1 – for the width of the workpiece - .7800" dim.)
- **EVENT 2:** Center drill for the tapped hole (refer to fig. 1 for 4-48 tapped hole)
- **EVENT 3:** Drill
- **EVENT 4:** Tap 4-48 hole



126728-4

Fig 4
Trunnion at 90.000 degrees

PT7 Offline

PROG MP/N 265346op2 : 265346OP3 INCH

EVENT 0		EVENT 1		FACE MILL	
PROGRAM NAME	265346OP3	X1	0.0000	abs	
SCALE	1.000	Y1	0.3800	abs	
DWELL REQUEST	NO	X3	1.2400	abs	
FOURTH AXIS REQUEST	YES	Y3	0.0000	abs	
EVENT COMMENTS	NO	Z RAPID	0.0000	abs	
DIMENSION DEFINITION	PART GEO	Z END	-0.1100	abs	
		# PASSES	2		
		Z FIN CUT	0.0000		
		RPM	2800.00		
		Z FEEDRATE	10.0		
		XYZ FEEDRATE	30.0		
		TOOL #	3		

? X1 : 0.0000 abs

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

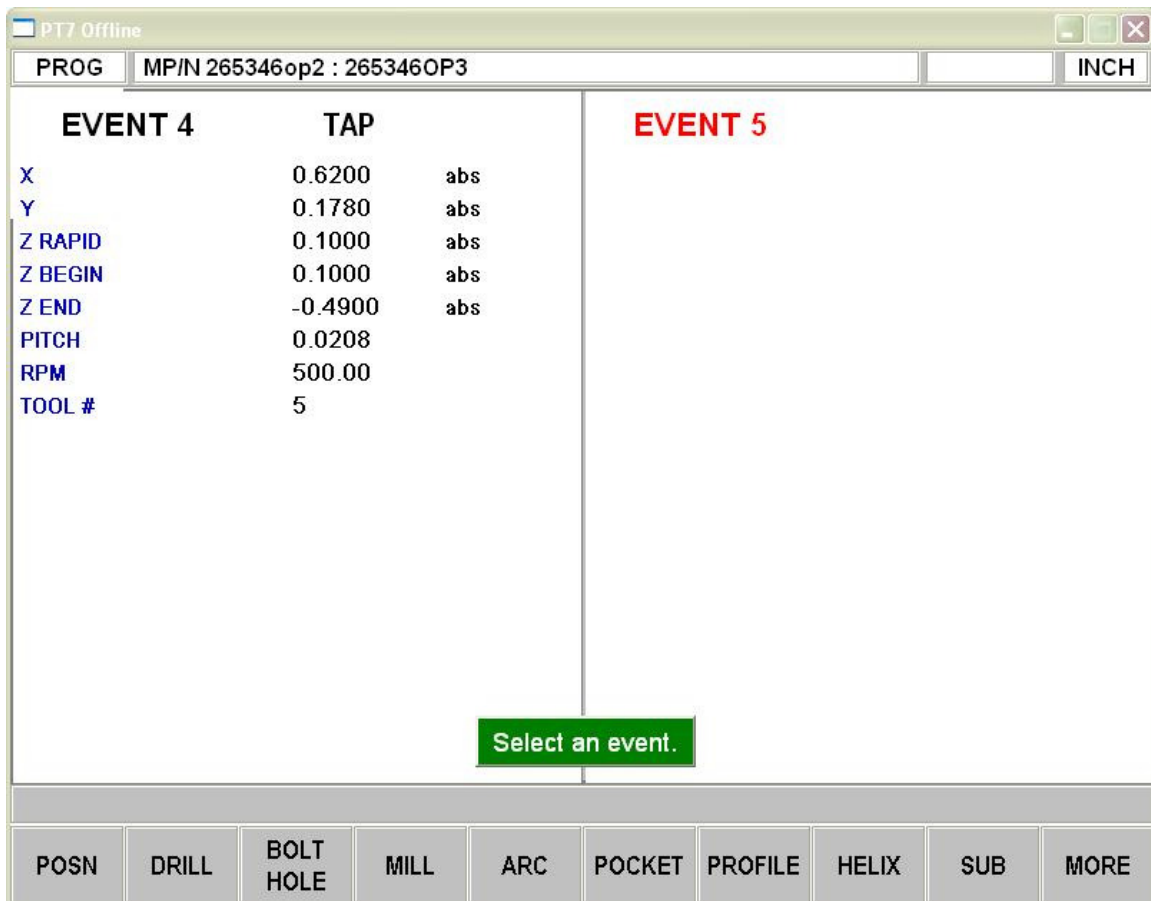
PROG MP/N 265346op2 : 265346OP3 INCH

EVENT 2		DRILL		EVENT 3		DRILL	
DRILL OR BORE	DRILL			DRILL OR BORE	DRILL		
X	0.6200	abs		X	0.6200	abs	
Y	0.1780	abs		Y	0.1780	abs	
Z RAPID	0.0000	abs		Z RAPID	0.0000	abs	
Z END	-0.1900	abs		Z END	-0.5000	abs	
# PECKS FOR DRILL	1			# OF FIXED PECKS	3		
RPM	1800.00			RPM	4000.00		
Z FEEDRATE	8.0			Z FEEDRATE	10.0		
TOOL #	1			TOOL #	4		

Select
1, for Drill
2, for Bore.

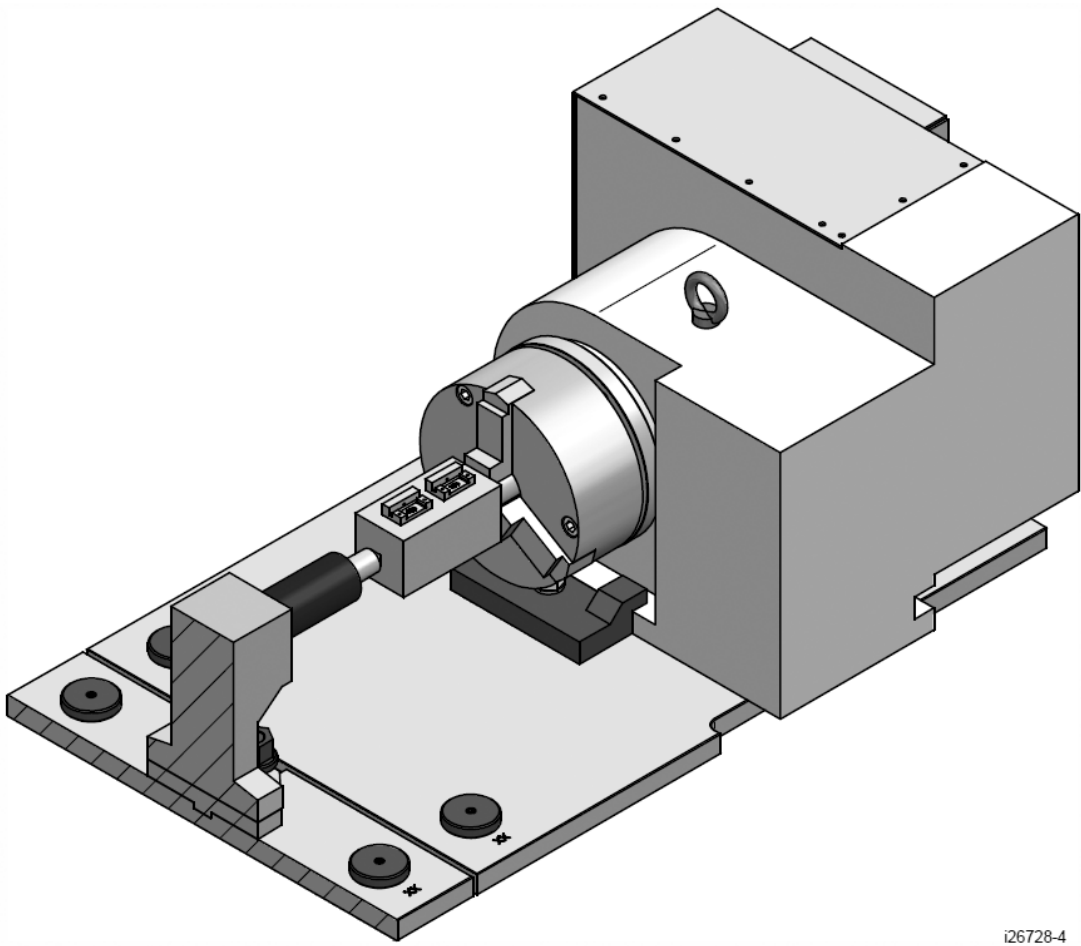
DRILL OR BORE : DRILL

DATA INSERT DELETE
BOTTOM EVENT EVENT



• OPERATION 3:

- **A axis at Zero degrees**
- **EVENT 1:** Using MILL EVENT to rough mill the face (Refer to the .110" dim. and .28" dim. leaving .005" for finish)
- **EVENT 2:** Using RECT PCKT to finish mill EVENT 1
- **EVENT 3:** Using RECT PCKT to finish mill the lower step, intersecting the .03" rad. (Refer to fig. 1 for .130" dim.)
- **EVENT 4:** Using RECT PCKT to finish mill the .120" wide slot
- **EVENT 5 and 6:** Center Drill 2 places for the 4-40 tapped holes
- **EVENT 7 and 8:** Drill 2 places for the 4-40 tapped holes
- **EVENT 9 and 10:** Tap 4-40, 2 places
- **EVENT 11:** Engrave the number 6
- **EVENT 12:** Mill straight line under the number 6
- **EVENT 13:** Turn off AUTO COOLANT and move table to part change position



i26728-4

Fig 5
Trunnion at 0.000 degrees

EVENT 2			RECT PCKT			EVENT 3			RECT PCKT		
X1	-0.1200	abs	X1	0.2260	abs						
Y1	-0.2850	abs	Y1	-0.3000	abs						
X3	1.3600	abs	X3	1.0150	abs						
Y3	-0.9000	abs	Y3	-0.9000	abs						
Z RAPID	0.0000	abs	Z RAPID	-0.0500	abs						
Z END	-0.1100	abs	Z END	-0.2380	abs						
CONRAD	0.0000		CONRAD	0.0000							
DIRECTION	CCW		DIRECTION	CCW							
# PASSES	1		# PASSES	2							
ENTRY MODE	PLUNGE		ENTRY MODE	PLUNGE							
FIN CUT	0.0000		FIN CUT	0.0000							
RPM	4000.00		RPM	4000.00							
Z FEEDRATE	10.0		Z FEEDRATE	10.0							
XYZ FEEDRATE	24.0		XYZ FEEDRATE	24.0							
TOOL #	8		TOOL #	8							

X1 : 0.2260 abs

EVENT 4			RECT PCKT			EVENT 5			DRILL		
X1	-0.1000	abs	X1	DRILL OR BORE	DRILL						
Y1	-0.2800	abs	X	0.1100	abs						
X3	1.3400	abs	Y	-0.5920	abs						
Y3	-0.4000	abs	Z RAPID	0.0000	abs						
Z RAPID	0.0500	abs	Z END	-0.1500	abs						
Z END	-0.2600	abs	# PECKS FOR DRILL	1							
CONRAD	0.0000		RPM	2000.00							
DIRECTION	CCW		Z FEEDRATE	6.0							
# PASSES	6		TOOL #	1							
ENTRY MODE	RAMP										
FIN CUT	0.0000										
RPM	5000.00										
Z FEEDRATE	6.0										
XYZ FEEDRATE	15.0										
TOOL #	9										

Select
 1, for Drill
 2, for Bore.

DRILL OR BORE : DRILL

PT7 Offline

PROG MP/N 265346aop2 : 265346OP4 INCH

EVENT 6			EVENT 7		
DRILL			DRILL		
DRILL OR BORE	DRILL		DRILL OR BORE	DRILL	
X	1.1300	abs	X	0.1100	abs
Y	-0.5920	abs	Y	-0.5920	abs
Z RAPID	0.0000	abs	Z RAPID	-0.0500	abs
Z END	-0.1500	abs	Z END	-0.4300	abs
# PECKS FOR DRILL	1		# OF VARIABLE PECKS	4	
RPM	2000.00		RPM	3300.00	
Z FEEDRATE	6.0		Z FEEDRATE	6.0	
TOOL #	1		TOOL #	10	

Select
1, for Drill
2, for Bore.

DRILL OR BORE : DRILL

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265346aop2 : 265346OP4 INCH

EVENT 8			EVENT 9		
DRILL			TAP		
DRILL OR BORE	DRILL		X	0.1100	abs
X	1.1300	abs	Y	-0.5920	abs
Y	-0.5920	abs	Z RAPID	0.1000	abs
Z RAPID	-0.0500	abs	Z BEGIN	0.1000	abs
Z END	-0.4300	abs	Z END	-0.5200	abs
# OF VARIABLE PECKS	4		PITCH	0.0250	
RPM	3300.00		RPM	500.00	
Z FEEDRATE	6.0		TOOL #	11	
TOOL #	10				

? X : 0.1100 abs

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265346aop2 : 265346OP4 INCH

EVENT 10			EVENT 11		
TAP			ENGRAVE		
X	1.1300	abs	X BEGIN	0.5200	abs
Y	-0.5920	abs	Y BEGIN	-0.7500	abs
Z RAPID	0.1000	abs	Z RAPID	0.1000	abs
Z BEGIN	0.1000	abs	Z END	-0.2500	abs
Z END	-0.5200	abs	HEIGHT	0.2500	
PITCH	0.0250		TEXT	6	
RPM	500.00		RPM	3000.00	
TOOL #	11		Z FEEDRATE	6.0	
			XYZ FEEDRATE	6.0	
			TOOL #	12	

X BEGIN : 0.5200 abs

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG MP/N 265346aop2 : 265346OP4 INCH

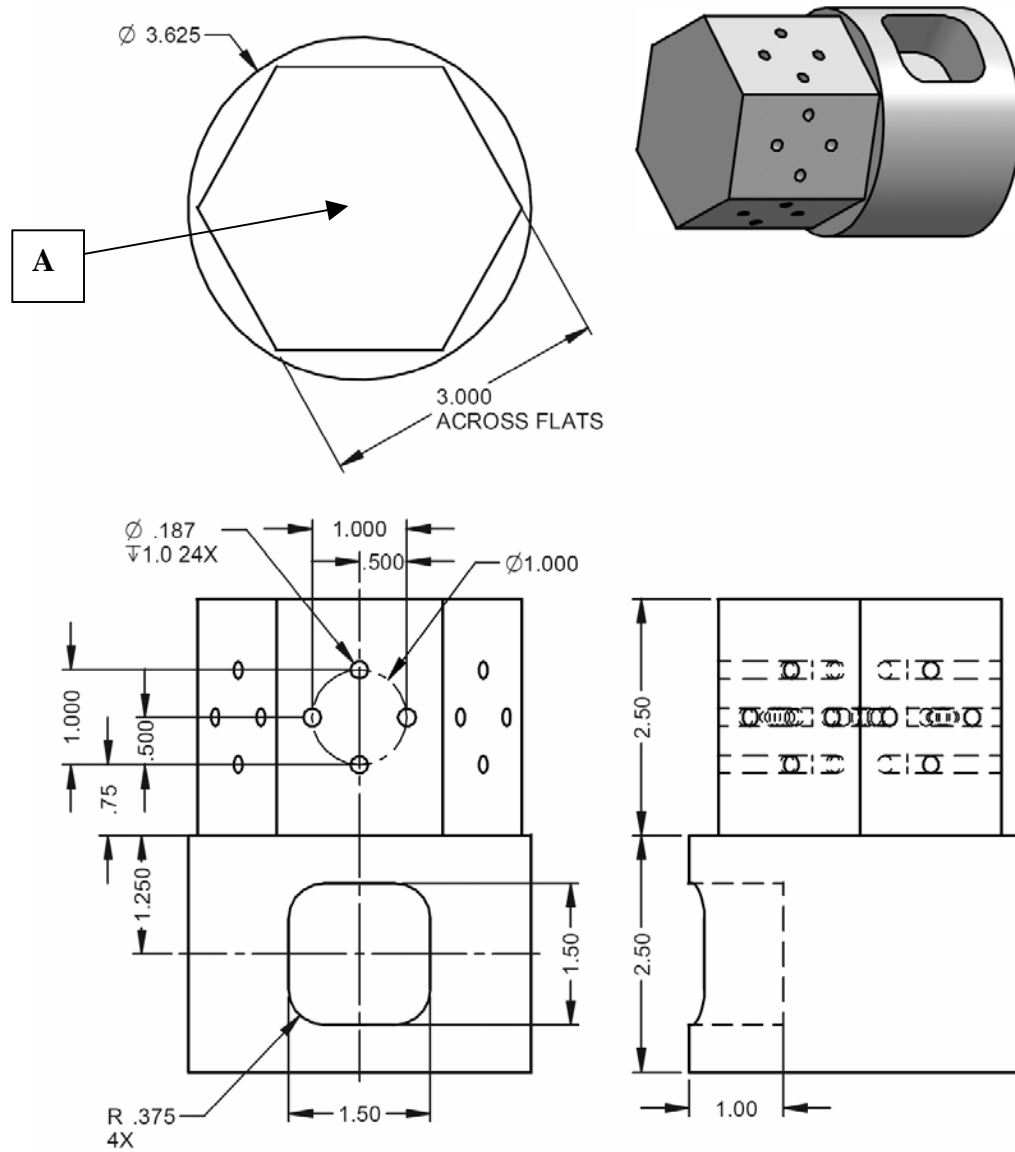
EVENT 12			EVENT 13	
MILL			AUX	
X BEGIN	0.5300	abs	AUX	36
Y BEGIN	-0.7700	abs		
Z RAPID	0.1000	abs		
Z BEGIN	-0.2500	abs		
X END	0.1500	inc		
Y END	0.0000	inc		
Z END	0.0000	inc		
CONRAD	0.0000			
TOOL OFFSET	CENTER			
RPM	3000.00			
Z FEEDRATE	8.0			
XYZ FEE				
TOOL #				

AUX : 36

0 - NONE
 1 - Coolant ON
 2 - Air ON
 3 - Coolant OFF
 4 - Air OFF
 6 - Part Change Position
 7 - 4th Axis Auto Clamp OFF
 8 - 4th Axis Auto-Clamp ON

DATA BOTTOM INSERT EVENT DELETE EVENT

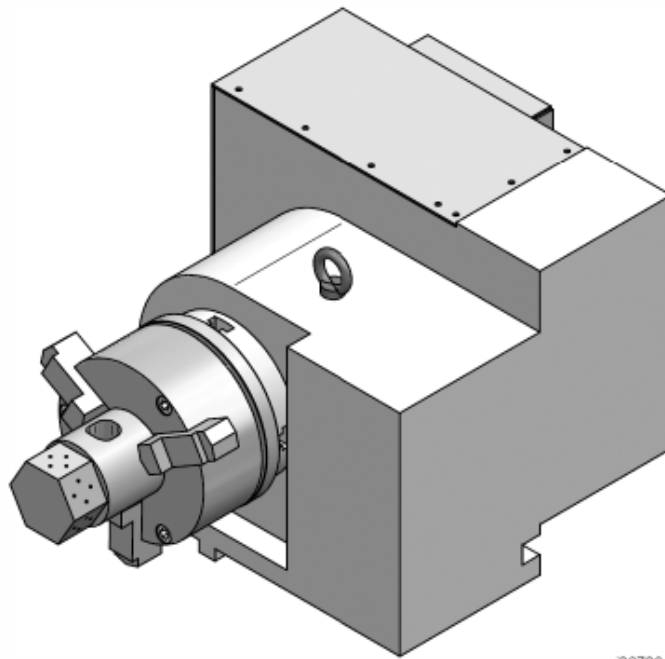
Program Example 4:



i26827-6

Fig 1

- **Operation 1:** The fixturing used in this sample part is being held in a 3 jaw chuck. The workpiece is centered on the rotary axis (A axis) centerline of rotation. Typically, this type of part uses the center of the workpiece which coincides with the center of rotation as the **Y and Z Part Absolute Zero**. The Part Absolute Zero for the X axis can be at any place along the length of the workpiece. In this example the **X Part Absolute Zero** is the front face of the hex, Point **A**, as shown above.



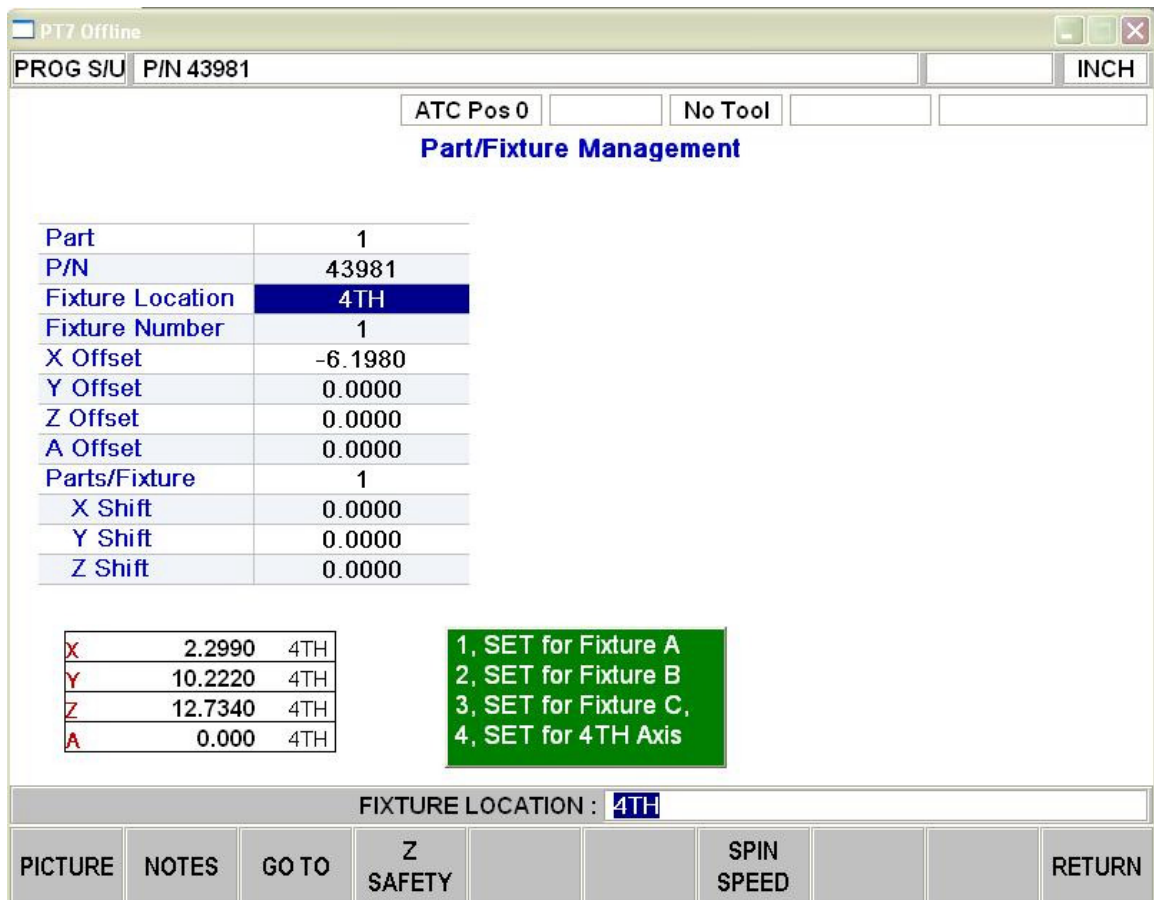
Q6728-5

Fig 2

• **Example 4:** A single program is used to program all of the machining operations. One offset fixture location will be displayed in the PART/FIX MGMT screen as shown below. The fixture location is designated as 4TH. In this example, angular rotation of the rotary table is accomplished by using POSITIONING EVENTS in the program. There are no values in the Y and Z fixture offsets. Remember, the centerline of rotation of the rotary axis coincides with the centerline of the workpiece. The only time we require values for the Y and Z axis is if Part Absolute Zero is **NOT** at the centerline of rotation.

NOTES

- 1 :** **POSITIONING EVENTS** are used in this program to orient the A axis.
- 2 :** Values can be inserted in the Y and Z offsets as an aid, helping the operator adjust workpiece dimensions that may be out due to part deflection, tooling deflection etc.
- 3:** This part was made from solid stock ; 5.0"L x 3.625" dia.
- 4:** There are two approaches that can be taken in how we machine this workpiece. Each face could have been machined complete before continuing to the next face of the workpiece. Certain applications may require this due to type of material, workpiece deflection etc. This must be considered prior to programming. Each tool would have to be called for each individual face on the hex, resulting in additional tool changes and an increase in cycle time. In this example, each tool that is called machines all six faces of the workpiece before calling up the next tool. This results in less tool changes and a shorter cycle time.



- Fixture Offset 1:** The workpiece as pictured in fig. 2 is 3.625” round stock by 5.0 inches in length. The part is located in the **center of the 3 jaw chuck**. With the centerline of the workpiece being Part Zero, the values for the Y and Z Offset is zero (0.0000”). The LPM ProtoTrak knows where the centerline of the rotary axis is and where the face of the rotary table is. This is set at the factory and remains constant. The X Offset is negative 6.198 inches (Point A in figure 1), the distance from the face of the rotary table to the face of the workpiece.

Tooling Data: Enter the proper tooling data

PT7 Offline									
PROG SIU P/N 43981								INCH	
ATC						PART PROGRAM TOOL TABLE			
Loc	Dia	Type	Z Offset	Z Mod	Dia Mod	Tool No	Dia	Type	ATC Loc
1	0.3750	Ctr Drill	2.3650	0.0000	0.0000	1	2.0000	Face Mill	2
2	2.0000	Face Mill	2.1450	0.0000	0.0000	2	0.3750	Ctr Drill	1
3	0.1870	Drill	1.8470	0.0000	0.0000	3	0.1870	Drill	3
4	0.4370	Fin EM	2.4120	0.0000	0.0000	4	0.4370	Fin EM	4
5	0.5000	Fin EM	0.1320	0.0000	0.0000				
6	0.3120	Fin EM	0.7690	0.0000	0.0000				
7	0.0000	None	0.0000	0.0000	0.0000				
8	0.0930	Fin EM	-0.2450	0.0000	0.0000				
9	0.0890	Drill	0.8960	0.0000	0.0000				
10	0.1120	Tap	2.3670	0.0000	0.0000				
11	0.2500	Other	0.7840	0.0000	0.0000				
12	0.1500	Tap	2.6570	0.0000	0.0000				
13	0.1800	Drill	2.4560	0.0000	0.0000				
14	0.0600	Other	1.9870	0.0000	0.0000				
15	0.2500	Ctr Drill	0.3450	0.0000	0.0000				
16	0.1960	Drill	0.5870	0.0000	0.0000				
17	0.0000	None	0.0000	0.0000	0.0000				
18	0.0000	None	0.0000	0.0000	0.0000				
19	0.0000	None	0.0000	0.0000	0.0000				
20	0.0000	None	0.0000	0.0000	0.0000				
21	0.0000	None	0.0000	0.0000	0.0000				
ATC LOCATION : 2									
TOOL CRIB	REMOVE TOOL	NOTES	DISABLE LOC						RETURN

- **Programming Aspects Shown On This Part**

- **OPERATION 1, TOOL 1:**
- **A axis starting at 0.000 degrees**
- **EVENT 1:** Turn on Auto Coolant
- **EVENT 2 thru 13:** Using 2.000" facemill to mill all six sides of workpiece .
Finish size of the "hex" is 3.000" x 2.500" in length.

PT7 Offline

PROG P/N 43981 INCH

EVENT 0	EVENT 1	AUX
PROGRAM NAME 43981	AUX	1
SCALE 1.000		
DWELL REQUEST NO		
FOURTH AXIS REQUEST YES		
EVENT COMMENTS NO		
DIMENSION DEFINITION PART GEO		

0 - NONE
1 - Coolant ON
2 - Air ON
3 - Coolant OFF
4 - Air OFF
6 - Part Change Position
7 - 4th Axis Auto Clamp OFF
8 - 4th Axis Auto-Clamp ON

AUX : 1

DATA BOTTOM INSERT EVENT DELETE EVENT

EVENT 2			POSITION	EVENT 3			FACE MILL
X END	1.2500	abs		X1	0.2000	abs	
Y END	0.0000	abs		Y1	1.2000	abs	
A END	0.0000	abs		X3	2.5000	abs	
Z RAPID	5.0000	abs		Y3	-1.2000	abs	
RPM	2400.00			Z RAPID	1.9000	abs	
TOOL #	1			Z END	1.5000	abs	
				# PASSES	2		
				Z FIN CUT	0.0050		
				RPM	2000.00		
				FIN RPM	2500.00		
				Z FEEDRATE	20.0		
				XYZ FEEDRATE	40.0		
				FIN FEEDRATE	30.0		
				TOOL #	1		

DATA BOTTOM INSERT EVENT DELETE EVENT

EVENT 4			POSITION	EVENT 5			FACE MILL
X END	1.2500	abs		X1	0.2000	abs	
Y END	0.0000	abs		Y1	1.2000	abs	
A END	60.0000	abs		X3	2.5000	abs	
Z RAPID	5.0000	abs		Y3	-1.2000	abs	
RPM	2400.00			Z RAPID	1.9000	abs	
TOOL #	1			Z END	1.5000	abs	
				# PASSES	2		
				Z FIN CUT	0.0050		
				RPM	2000.00		
				FIN RPM	2500.00		
				Z FEEDRATE	20.0		
				XYZ FEEDRATE	40.0		
				FIN FEEDRATE	30.0		
				TOOL #	1		

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 6	POSITION		EVENT 7	FACE MILL	
X END	1.2500	abs	X1	0.2000	abs
Y END	0.0000	abs	Y1	1.2000	abs
A END	120.0000	abs	X3	2.5000	abs
Z RAPID	5.0000	abs	Y3	-1.2000	abs
RPM	2400.00		Z RAPID	1.9000	abs
TOOL #	1		Z END	1.5000	abs
			# PASSES	2	
			Z FIN CUT	0.0050	
			RPM	2000.00	
			FIN RPM	2500.00	
			Z FEEDRATE	20.0	
			XYZ FEEDRATE	40.0	
			FIN FEEDRATE	30.0	
			TOOL #	1	

? X1 : 0.2000 abs

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 8	POSITION		EVENT 9	FACE MILL	
X END	1.2500	abs	X1	0.2000	abs
Y END	0.0000	abs	Y1	1.2000	abs
A END	180.0000	abs	X3	2.5000	abs
Z RAPID	5.0000	abs	Y3	-1.2000	abs
RPM	2400.00		Z RAPID	1.9000	abs
TOOL #	1		Z END	1.5000	abs
			# PASSES	2	
			Z FIN CUT	0.0050	
			RPM	2000.00	
			FIN RPM	2500.00	
			Z FEEDRATE	20.0	
			XYZ FEEDRATE	40.0	
			FIN FEEDRATE	30.0	
			TOOL #	1	

? X1 : 0.2000 abs

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 10	POSITION		EVENT 11	FACE MILL	
X END	1.2500	abs	X1	0.2000	abs
Y END	0.0000	abs	Y1	1.2000	abs
A END	240.0000	abs	X3	2.5000	abs
Z RAPID	5.0000	abs	Y3	-1.2000	abs
RPM	2400.00		Z RAPID	1.9000	abs
TOOL #	1		Z END	1.5000	abs
			# PASSES	2	
			Z FIN CUT	0.0050	
			RPM	2000.00	
			FIN RPM	2500.00	
			Z FEEDRATE	20.0	
			XYZ FEEDRATE	40.0	
			FIN FEEDRATE	30.0	
			TOOL #	1	

? X1 : 0.2000 abs

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 12	POSITION		EVENT 13	FACE MILL	
X END	1.2500	abs	X1	0.2000	abs
Y END	0.0000	abs	Y1	1.2000	abs
A END	300.0000	abs	X3	2.5000	abs
Z RAPID	5.0000	abs	Y3	-1.2000	abs
RPM	2400.00		Z RAPID	1.9000	abs
TOOL #	1		Z END	1.5000	abs
			# PASSES	2	
			Z FIN CUT	0.0050	
			RPM	2000.00	
			FIN RPM	2500.00	
			Z FEEDRATE	20.0	
			XYZ FEEDRATE	40.0	
			FIN FEEDRATE	30.0	
			TOOL #	1	

? X1 : 0.2000 abs

DATA INSERT DELETE
BOTTOM EVENT EVENT

- **OPERATION 1, TOOL 2:**
- **A axis starting at 0.000 degrees**
- **EVENT 14 thru 25:** Using a .375" dia center drill, a 4 hole BOLT HOLE pattern was center drilled on all six sides of the workpiece

PT7 Offline

PROG P/N 43981 INCH

EVENT 14	POSITION		EVENT 15	BOLT HOLE
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL
Y END	0.0000	abs	# HOLES	4
A END	0.0000	abs	X CENTER	1.2500 abs
Z RAPID	5.0000	abs	Y CENTER	0.0000 abs
RPM	2500.00		Z RAPID	1.6000 abs
TOOL #	2		Z END	1.3800 abs
			RADIUS	0.5000
			ANGLE	0.0000
			# PECKS FOR DRILL	1
			RPM	2500.00
			Z FEEDRATE	18.0
			TOOL #	2

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : **DRILL**

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 16	POSITION		EVENT 17	BOLT HOLE
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL
Y END	0.0000	abs	# HOLES	4
A END	60.0000	abs	X CENTER	1.2500 abs
Z RAPID	5.0000	abs	Y CENTER	0.0000 abs
RPM	2500.00		Z RAPID	1.6000 abs
TOOL #	2		Z END	1.3800 abs
			RADIUS	0.5000
			ANGLE	0.0000
			# PECKS FOR DRILL	1
			RPM	2500.00
			Z FEEDRATE	18.0
			TOOL #	2

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : **DRILL**

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 18	POSITION		EVENT 19	BOLT HOLE
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL
Y END	0.0000	abs	# HOLES	4
A END	120.0000	abs	X CENTER	1.2500 abs
Z RAPID	5.0000	abs	Y CENTER	0.0000 abs
RPM	2500.00		Z RAPID	1.6000 abs
TOOL #	2		Z END	1.3800 abs
			RADIUS	0.5000
			ANGLE	0.0000
			# PECKS FOR DRILL	1
			RPM	2500.00
			Z FEEDRATE	18.0
			TOOL #	2

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : **DRILL**

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 20	POSITION		EVENT 21	BOLT HOLE
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL
Y END	0.0000	abs	# HOLES	4
A END	180.0000	abs	X CENTER	1.2500 abs
Z RAPID	5.0000	abs	Y CENTER	0.0000 abs
RPM	2500.00		Z RAPID	1.6000 abs
TOOL #	2		Z END	1.3800 abs
			RADIUS	0.5000
			ANGLE	0.0000
			# PECKS FOR DRILL	1
			RPM	2500.00
			Z FEEDRATE	18.0
			TOOL #	2

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : **DRILL**

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 22	POSITION		EVENT 23	BOLT HOLE
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL
Y END	0.0000	abs	# HOLES	4
A END	240.0000	abs	X CENTER	1.2500 abs
Z RAPID	5.0000	abs	Y CENTER	0.0000 abs
RPM	2500.00		Z RAPID	1.6000 abs
TOOL #	2		Z END	1.3800 abs
			RADIUS	0.5000
			ANGLE	0.0000
			# PECKS FOR DRILL	1
			RPM	2500.00
			Z FEEDRATE	18.0
			TOOL #	2

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : **DRILL**

DATA INSERT DELETE
BOTTOM EVENT EVENT

EVENT 24			EVENT 25		
POSITION			BOLT HOLE		
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL	
Y END	0.0000	abs	# HOLES	4	
A END	300.0000	abs	X CENTER	1.2500	abs
Z RAPID	5.0000	abs	Y CENTER	0.0000	abs
RPM	2500.00		Z RAPID	1.6000	abs
TOOL #	2		Z END	1.3800	abs
			RADIUS	0.5000	
			ANGLE	0.0000	
			# PECKS FOR DRILL	1	
			RPM	2500.00	
			Z FEEDRATE	18.0	
			TOOL #	2	

Select
 1, for Drill
 2, for Bore
 3, for Tap.

DRILL, BORE, OR TAP : DRILL		
	DATA BOTTOM	INSERT EVENT
	DELETE EVENT	

- **OPERATION 1, TOOL 3:**
- **A axis starting at 0.000 degrees**
- **EVENT 26 thru 37:** Using a .187" dia drill, a 4 hole BOLT HOLE pattern was drilled to a 1.0000" depth on all six sides of the workpiece

PT7 Offline

PROG P/N 43981 INCH

EVENT 26	POSITION		EVENT 27	BOLT HOLE	
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL	
Y END	0.0000	abs	# HOLES	4	
A END	0.0000	abs	X CENTER	1.2500	abs
Z RAPID	5.0000	abs	Y CENTER	0.0000	abs
RPM	2800.00		Z RAPID	1.6000	abs
TOOL #	3		Z END	0.0000	abs
			RADIUS	0.5000	
			ANGLE	0.0000	
			# OF VARIABLE PECKS	4	
			RPM	2800.00	
			Z FEEDRATE	14.0	
			TOOL #	3	

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : DRILL

DATA BOTTOM INSERT EVENT DELETE EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 28	POSITION		EVENT 29	BOLT HOLE
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL
Y END	0.0000	abs	# HOLES	4
A END	60.0000	abs	X CENTER	1.2500 abs
Z RAPID	5.0000	abs	Y CENTER	0.0000 abs
RPM	2800.00		Z RAPID	1.6000 abs
TOOL #	3		Z END	0.0000 abs
			RADIUS	0.5000
			ANGLE	0.0000
			# OF VARIABLE PECKS	4
			RPM	2800.00
			Z FEEDRATE	14.0
			TOOL #	3

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : **DRILL**

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 30	POSITION		EVENT 31	BOLT HOLE
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL
Y END	0.0000	abs	# HOLES	4
A END	120.0000	abs	X CENTER	1.2500 abs
Z RAPID	5.0000	abs	Y CENTER	0.0000 abs
RPM	2800.00		Z RAPID	1.6000 abs
TOOL #	3		Z END	0.0000 abs
			RADIUS	0.5000
			ANGLE	0.0000
			# OF VARIABLE PECKS	4
			RPM	2800.00
			Z FEEDRATE	14.0
			TOOL #	3

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : **DRILL**

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 32	POSITION		EVENT 33	BOLT HOLE
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL
Y END	0.0000	abs	# HOLES	4
A END	180.0000	abs	X CENTER	1.2500 abs
Z RAPID	5.0000	abs	Y CENTER	0.0000 abs
RPM	2800.00		Z RAPID	1.6000 abs
TOOL #	3		Z END	0.0000 abs
			RADIUS	0.5000
			ANGLE	0.0000
			# OF VARIABLE PECKS	4
			RPM	2800.00
			Z FEEDRATE	14.0
			TOOL #	3

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : **DRILL**

DATA INSERT DELETE
BOTTOM EVENT EVENT

PT7 Offline

PROG P/N 43981 INCH

EVENT 34	POSITION		EVENT 35	BOLT HOLE
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL
Y END	0.0000	abs	# HOLES	4
A END	240.0000	abs	X CENTER	1.2500 abs
Z RAPID	5.0000	abs	Y CENTER	0.0000 abs
RPM	2800.00		Z RAPID	1.6000 abs
TOOL #	3		Z END	0.0000 abs
			RADIUS	0.5000
			ANGLE	0.0000
			# OF VARIABLE PECKS	4
			RPM	2800.00
			Z FEEDRATE	14.0
			TOOL #	3

Select
1, for Drill
2, for Bore
3, for Tap.

DRILL, BORE, OR TAP : **DRILL**

DATA INSERT DELETE
BOTTOM EVENT EVENT

EVENT 36			EVENT 37		
POSITION			BOLT HOLE		
X END	1.2500	abs	DRILL, BORE, OR TAP	DRILL	
Y END	0.0000	abs	# HOLES	4	
A END	300.0000	abs	X CENTER	1.2500	abs
Z RAPID	5.0000	abs	Y CENTER	0.0000	abs
RPM	2800.00		Z RAPID	1.6000	abs
TOOL #	3		Z END	0.0000	abs
			RADIUS	0.5000	
			ANGLE	0.0000	
			# OF VARIABLE PECKS	4	
			RPM	2800.00	
			Z FEEDRATE	14.0	
			TOOL #	3	

Select
 1, for Drill
 2, for Bore
 3, for Tap.

DRILL, BORE, OR TAP : DRILL			
	DATA BOTTOM	INSERT EVENT	DELETE EVENT

- **OPERATION 1, TOOL 4:**
- **A axis starting at 0.000 degrees**
- **EVENT 38:** Position the A axis at 0.000 degrees
- **EVENT 39:** Using a .437 dia end mill, a 1.500" square pocket is milled 1.0000 " deep with a .2500" Conrad. The pocket is milled with the A axis at 0.000 degrees.
- **EVENT 40:** Turns off the AUTO COOLANT and positions the machine at PART CHANGE POSITION.

EVENT 38		POSITION	EVENT 39		RECT PCKT
X END	3.7500	abs	X1	3.0000	abs
Y END	0.0000	abs	Y1	0.7500	abs
A END	0.0000	abs	X3	4.5000	abs
Z RAPID	5.0000	abs	Y3	-0.7500	abs
RPM	3500.00		Z RAPID	1.9000	abs
TOOL #	4		Z END	1.0000	abs
			CONRAD	0.2500	
			DIRECTION	CCW	
			# PASSES	5	
			ENTRY MODE	RAMP	
			FIN CUT	0.0050	
			RPM	3500.00	
			FIN RPM	4000.00	
			Z FEEDRATE	10.0	
			XYZ FEEDRATE	24.0	
			FIN FEEDRATE	18.0	
			TOOL #	4	

X1 :				3.0000	abs
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				DATA	INSERT	DELETE			
				BOTTOM	EVENT	EVENT			

PT7 Offline

PROG P/N 43981 INCH

EVENT 40 **AUX**

AUX 36

EVENT 41

Select an event.

POSN	DRILL	BOLT HOLE	MILL	ARC	POCKET	PROFILE	HELIX	SUB	MORE
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The image shows a software window titled "PT7 Offline". At the top, there are fields for "PROG" (containing "P/N 43981") and "INCH". The main area is split into two columns. The left column contains "EVENT 40" and "AUX" in bold, with "AUX" and "36" below it. The right column contains "EVENT 41" in bold. A green box with the text "Select an event." is positioned at the bottom center of the main area. At the bottom of the window is a row of ten buttons: "POSN", "DRILL", "BOLT HOLE", "MILL", "ARC", "POCKET", "PROFILE", "HELIX", "SUB", and "MORE".