TRAK® LPM 4th Axis

Sample Program

Document:	P/N 27497
Version:	011111

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3.0 4-Axis Mill Programming

Program Example 1:

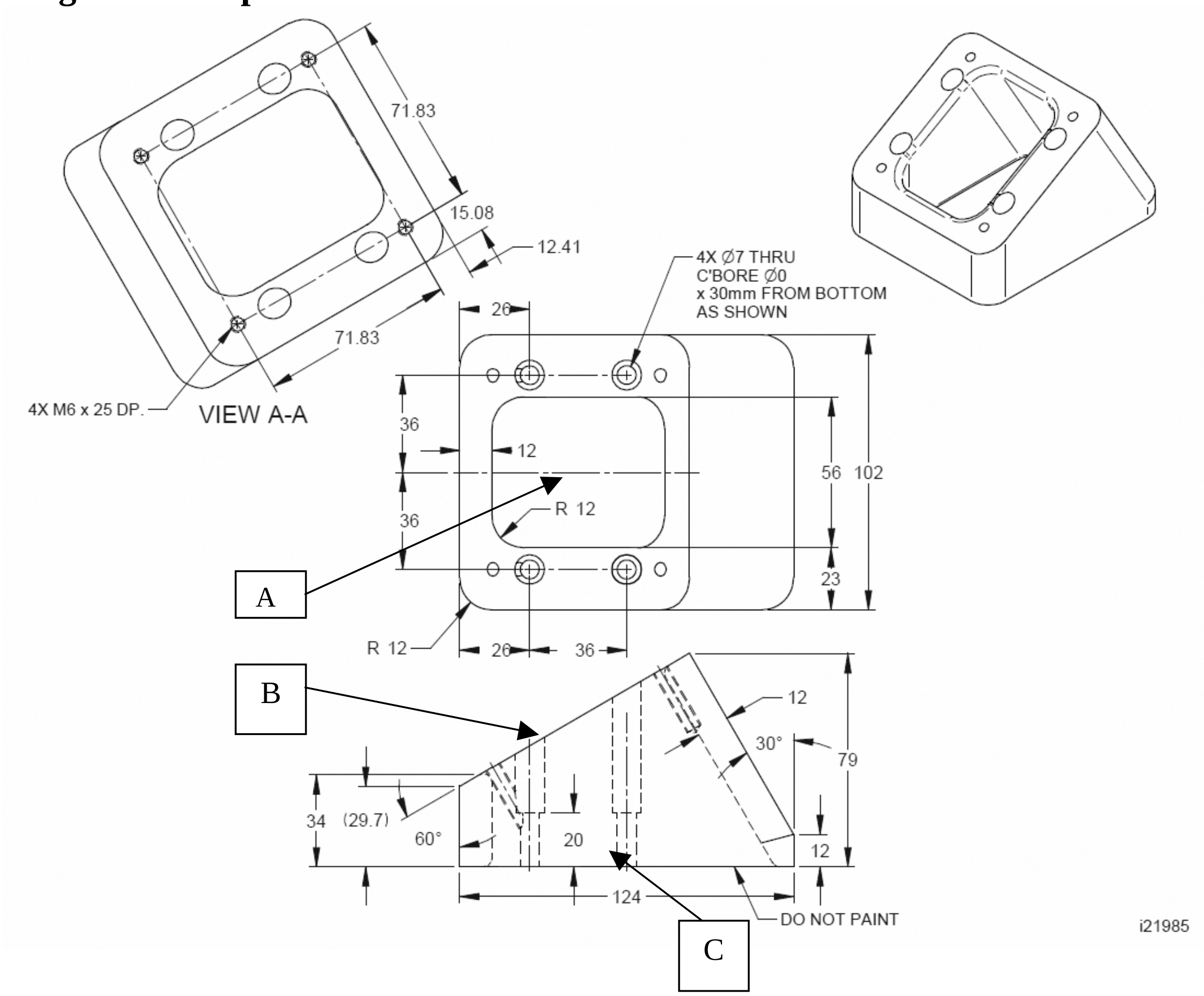


Fig 1.

- **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.

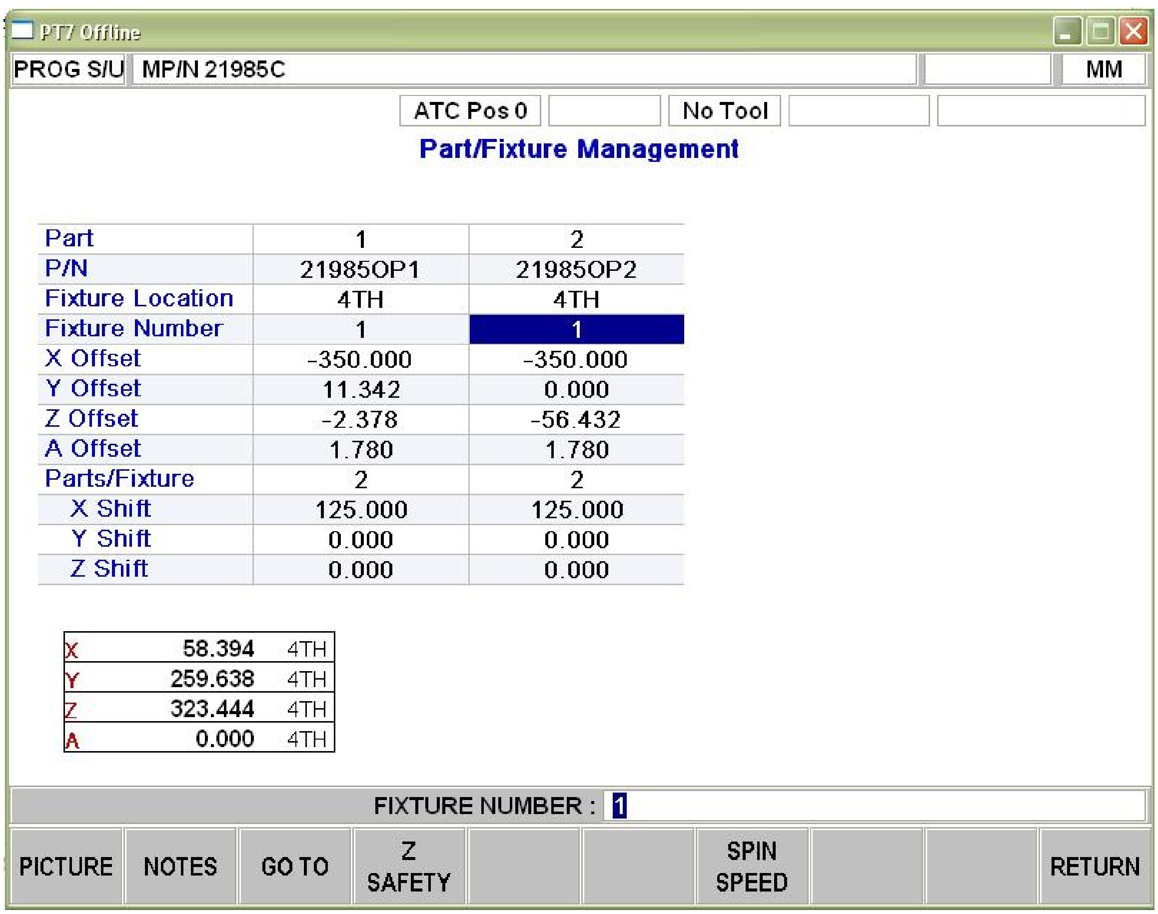
- **Example 1:** A Master Program using 2 programs was used. Two offset fixture locations will be displayed in the PART/FIX MGMT screen as shown below. The fixture locations for both operations are designated as 4[TH]. Using a MASTER PROGRAM gives us the ability to have more than one A Axis Offset in 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.

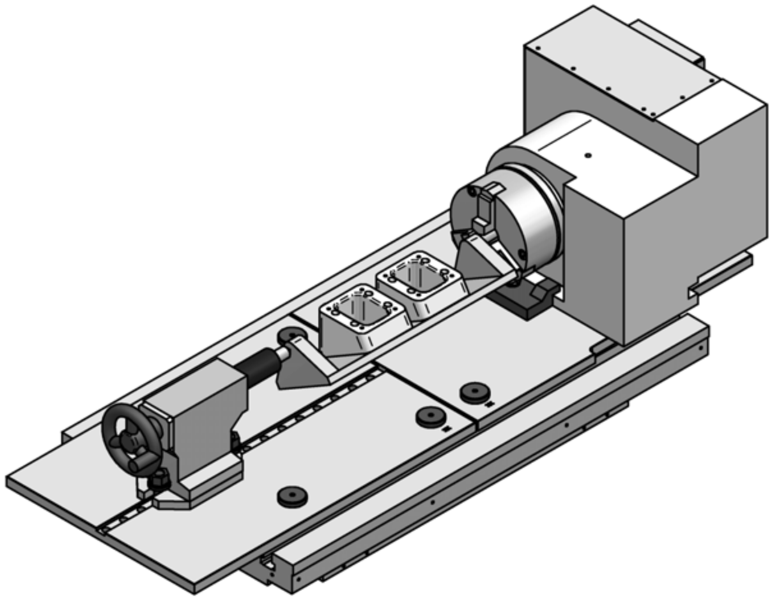
• PART/FIXTURE MANAGEMENT SCREEN DESRIPTION

• 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).

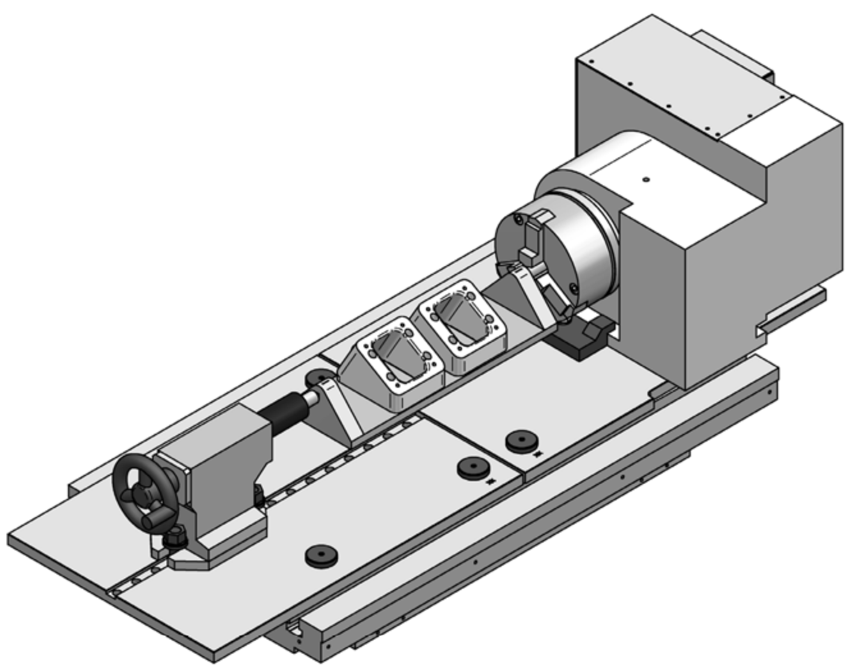


- **Programming Aspects Shown On This Part**
  - OPERATION 1: Face milling, center drilling, drilling, tapping with the A-axis positioned at Negative 30 degrees Absolute. Part Zero for the Z axis is the top finish milled surface. Part zero for the X and Y axis is the center of the workpiece.

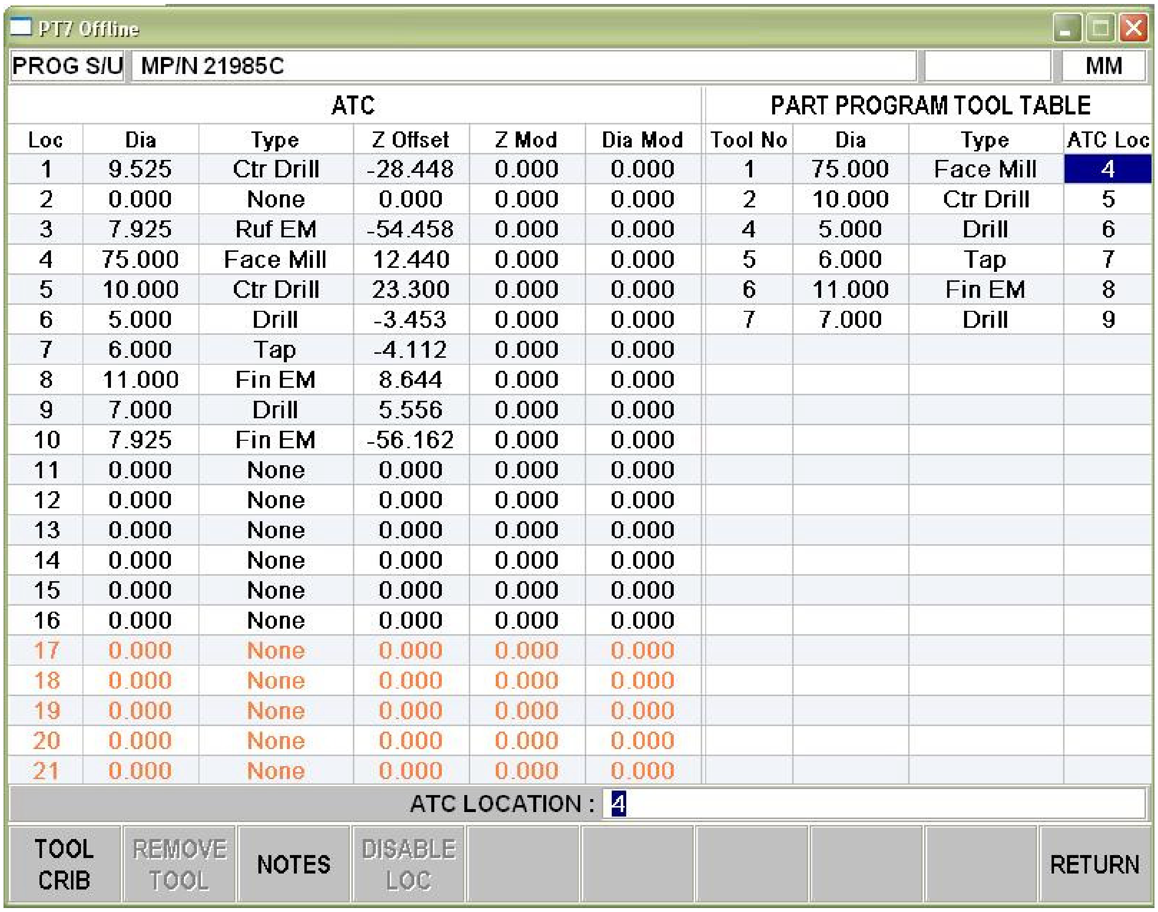


-

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

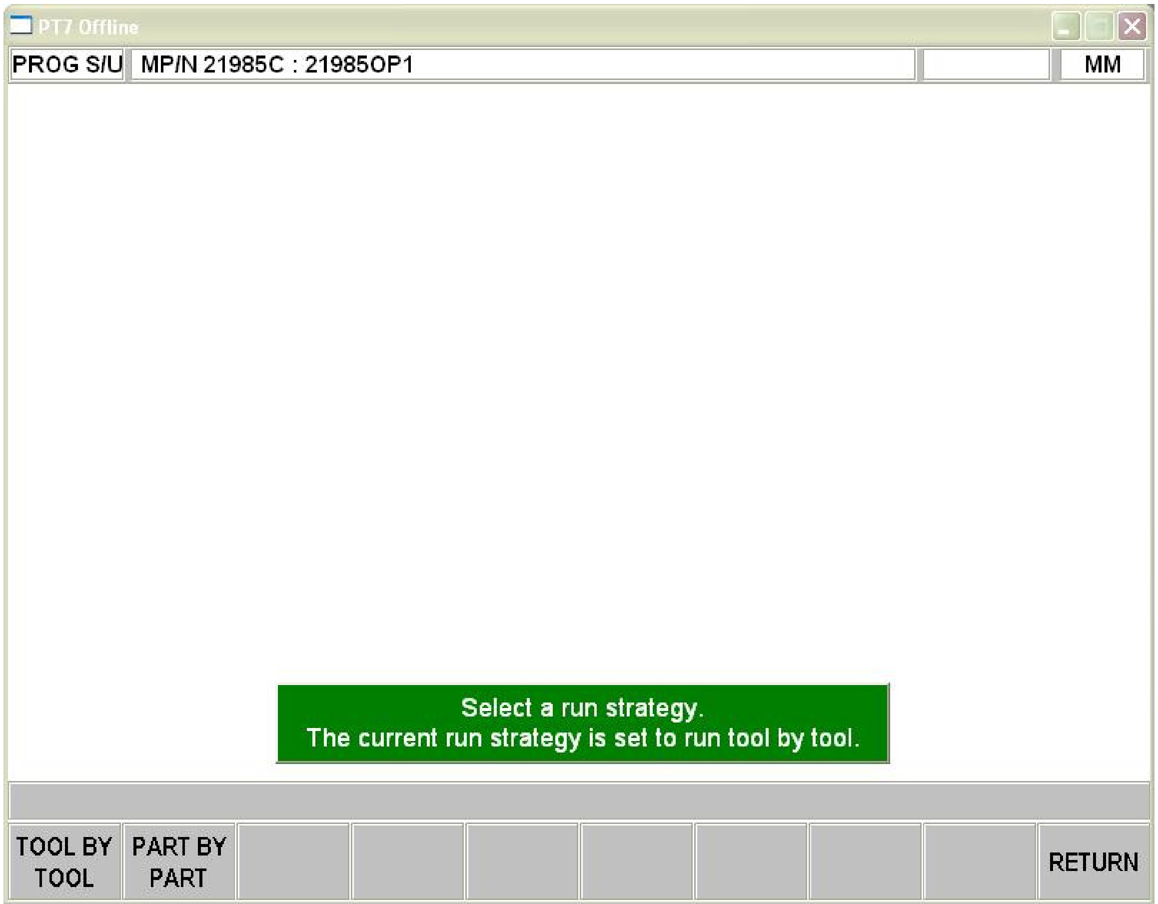
ATC					
Loc	Dia	Type	Z Offset	Z Mod	Dia Mod
1	9.525	Ctr Drill	-28.448	0.000	0.000
2	0.000	None	0.000	0.000	0.000
3	7.925	Ruf EM	-54.458	0.000	0.000
4	75.000	Face Mill	12.440	0.000	0.000
5	10.000	Ctr Drill	23.300	0.000	0.000
6	5.000	Drill	-3.453	0.000	0.000
7	6.000	Tap	-4.112	0.000	0.000
8	11.000	Fin 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

PART PROGRAM TOOL TABLE			
Tool No	Dia	Type	ATC Loc
1	75.000	Face Mill	4
2	10.000	Ctr Drill	5
4	5.000	Drill	6
5	6.000	Tap	7
6	11.000	Fin EM	8
7	7.000	Drill	9

ATC LOCATION : 4

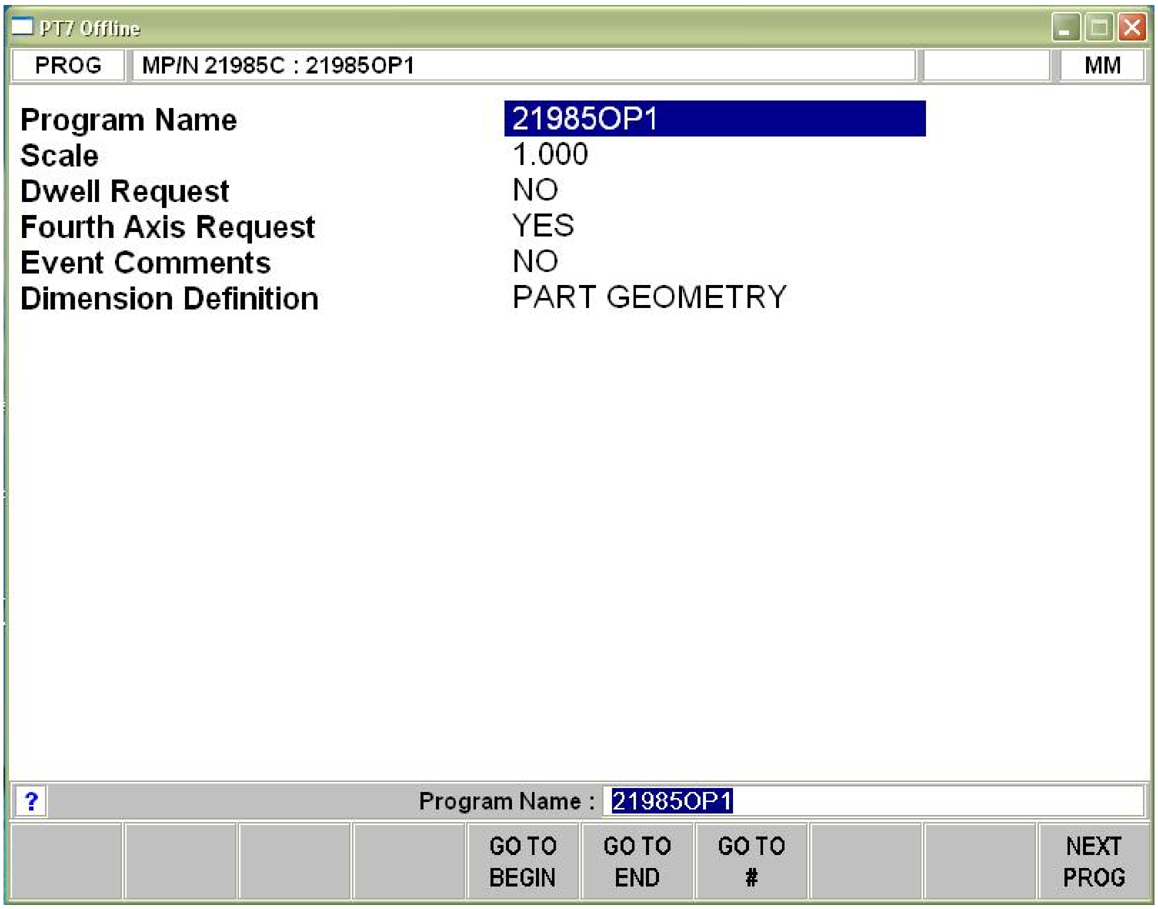
TOOL CRIB | REMOVE TOOL | NOTES | DISABLE LOC | RETURN

- **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**.**

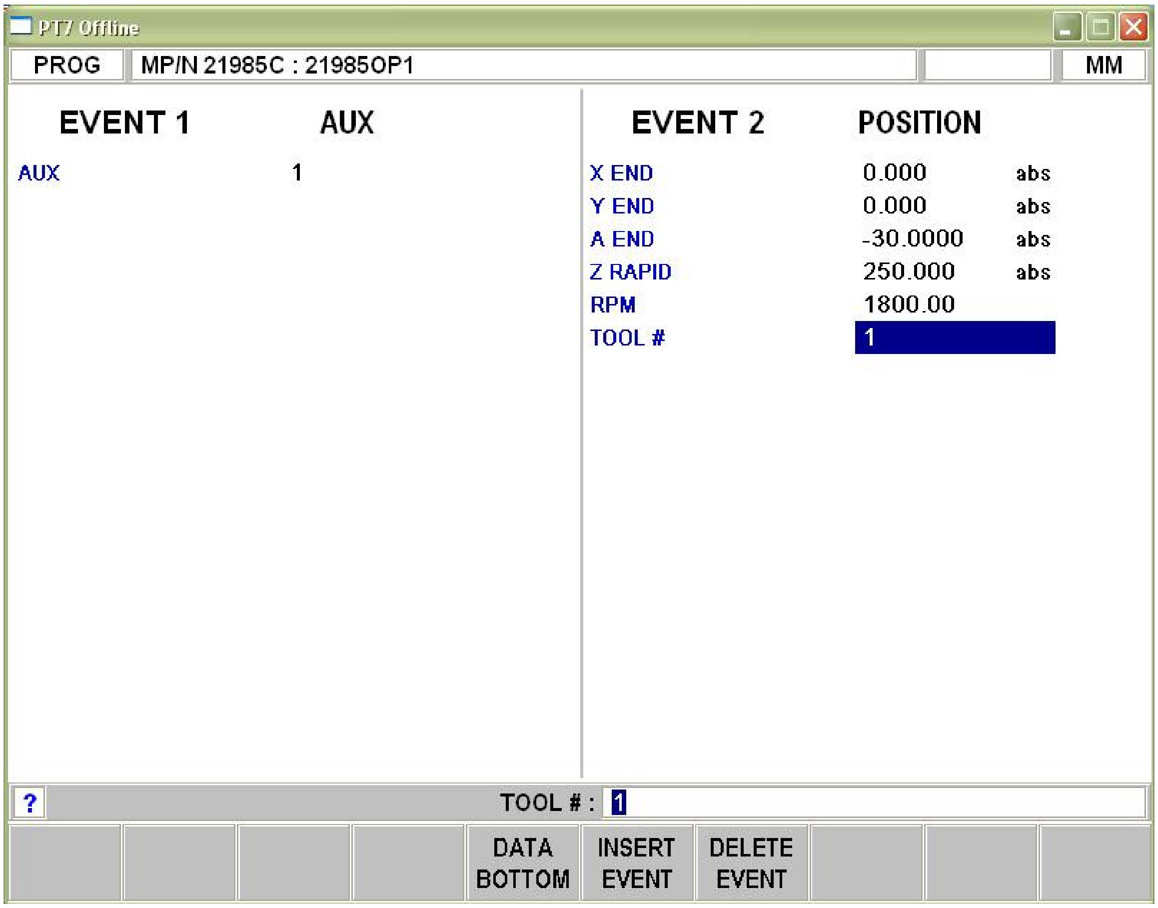


- **Shown below are the EVENTS of both programs contained in the Master Program**
  - The Program name screen (EVENT 0), must the have the A axis enabled. Press **YES** for **FOURTH AXIS REQUEST**.
  - NOTE: Before programming, make sure the Fourth Axis has been turned on. Enter MACHINE SETUP MODE and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

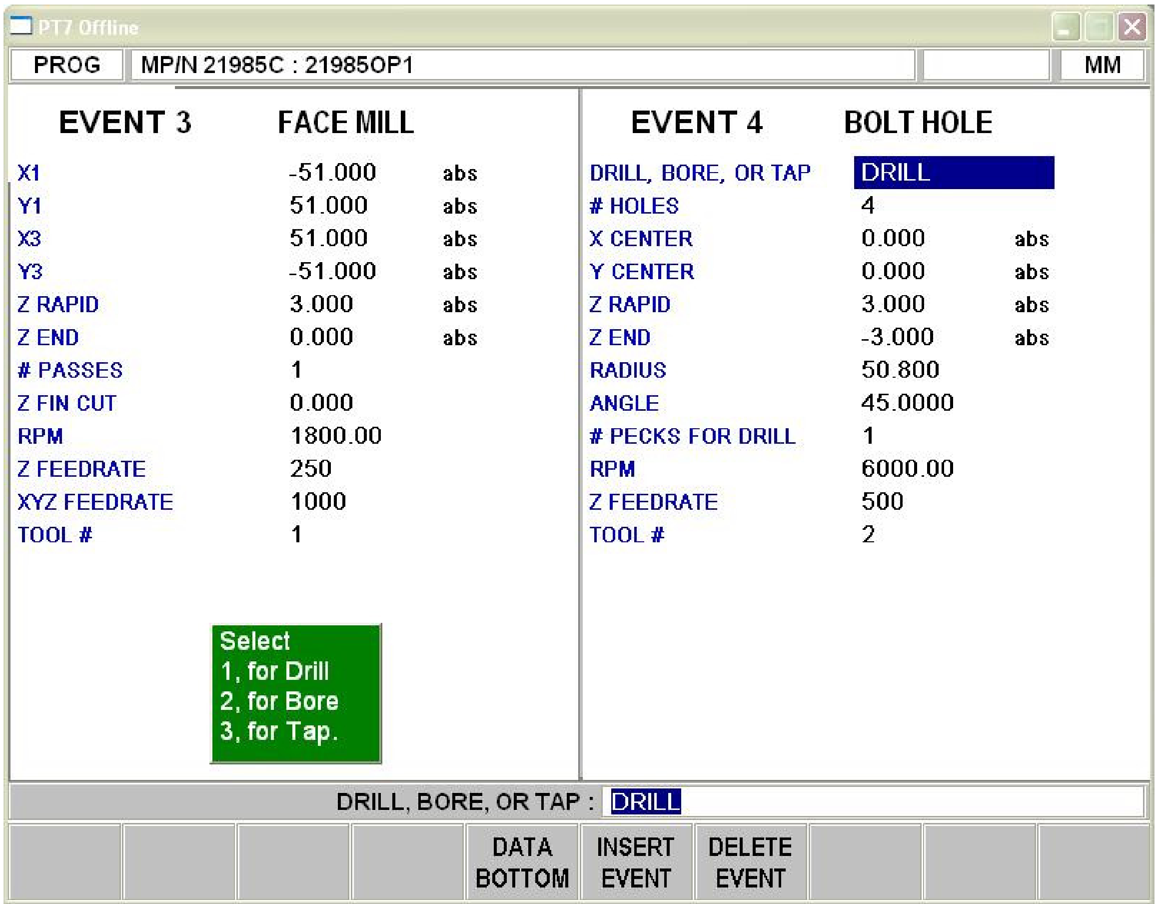
- **FIRST PROGRAM – Operation 1:**



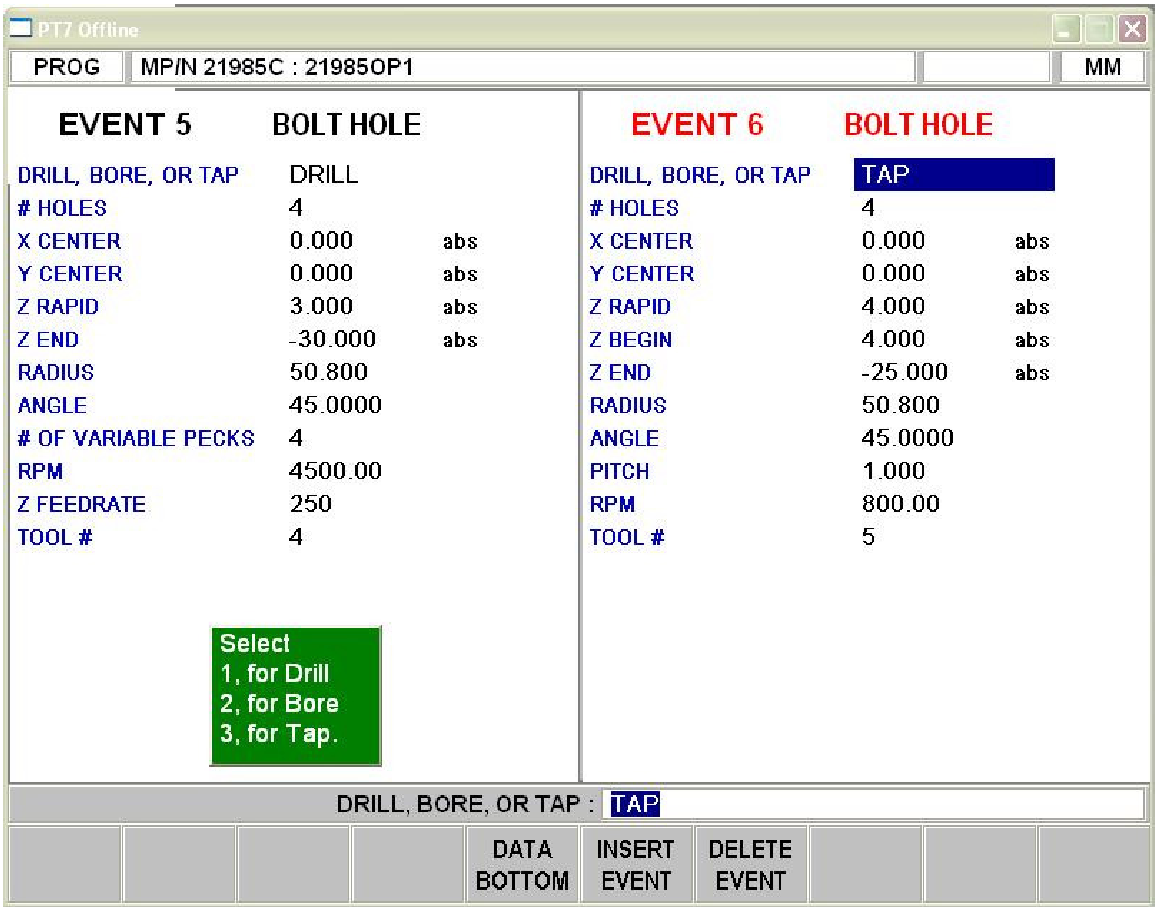
- **Event 1:** Auto Coolant **ON**
- **Event 2:** Position the A axis to negative 30.000 degrees absolute. From the operators view standing in front and to the left of the rotary table, the trunnion will rotate counterclockwise enabling us to mill the top surface.



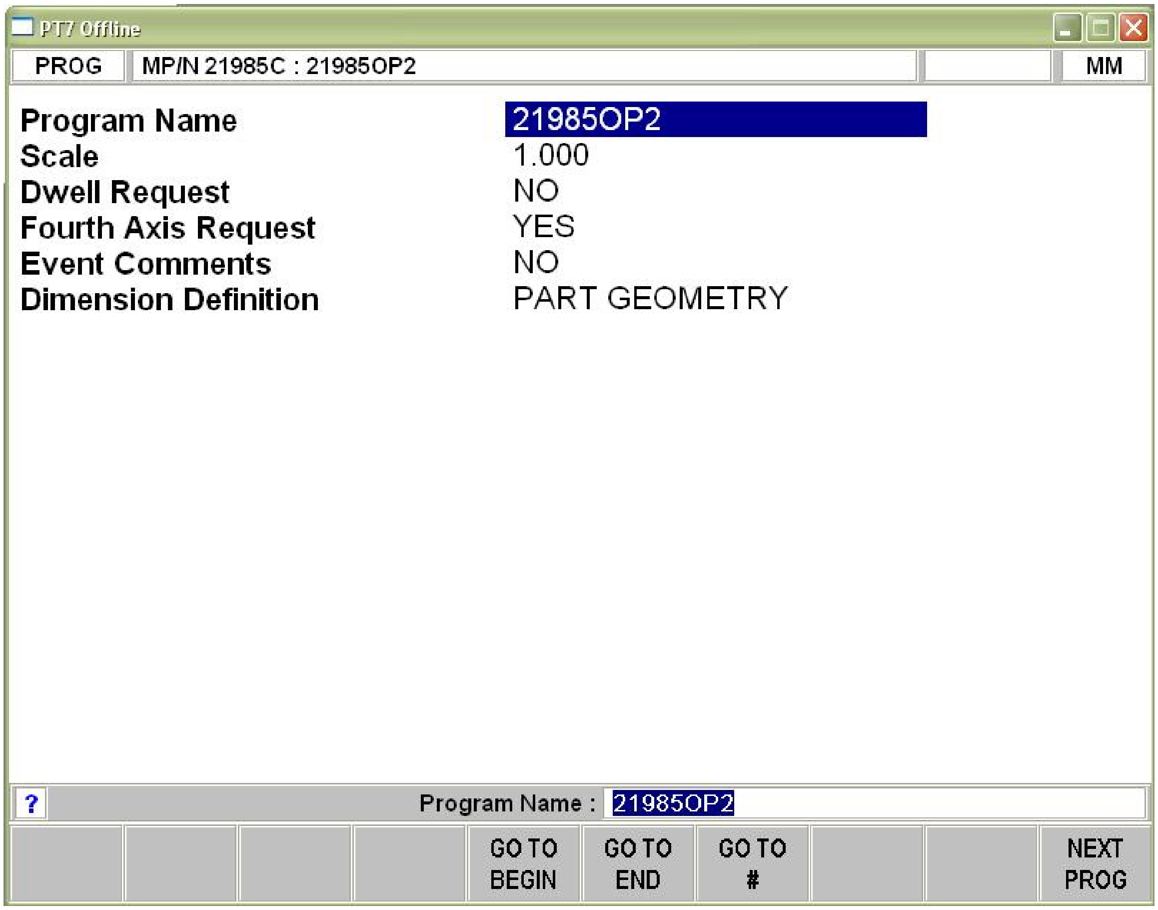
- **Event 3:** Using FACE MILL Event to mill top of workpiece. Z zero in EVENT 3 is the finished surface.
- **Event 4:** Using BOLT HOLE Event to Center Drill



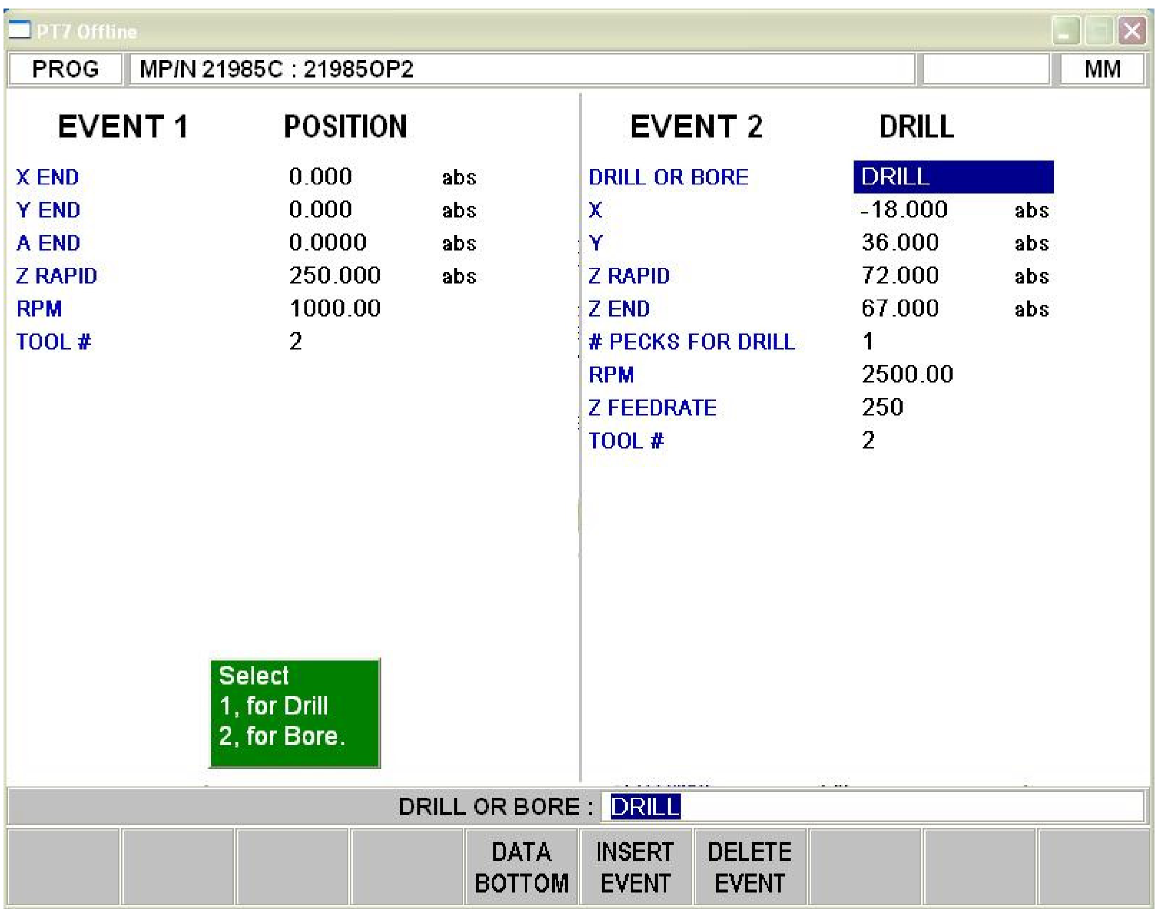
- **Event 5:** Using BOLT HOLE Event to Drill
- **Event 6:** Using BOLT HOLE Event to Tap

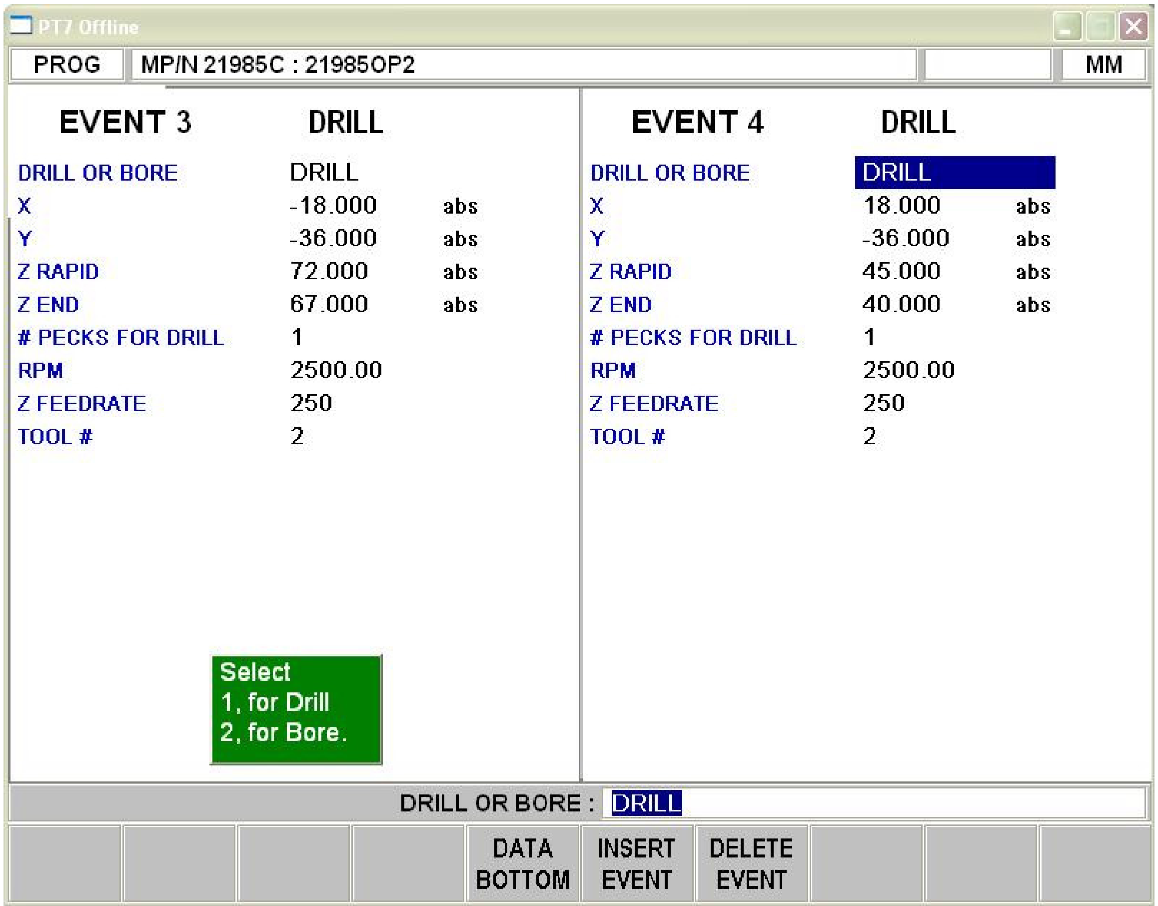


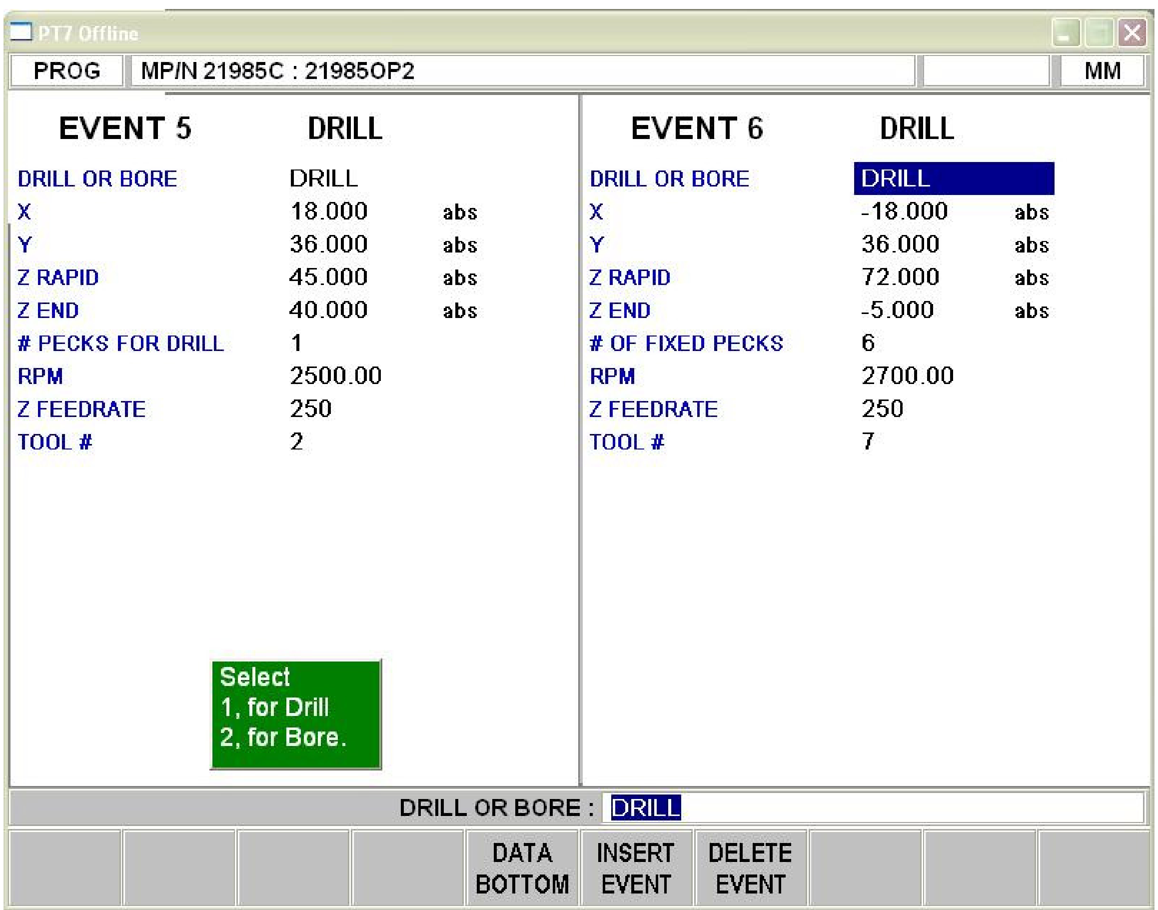
• **Second Program: Operation--2:**

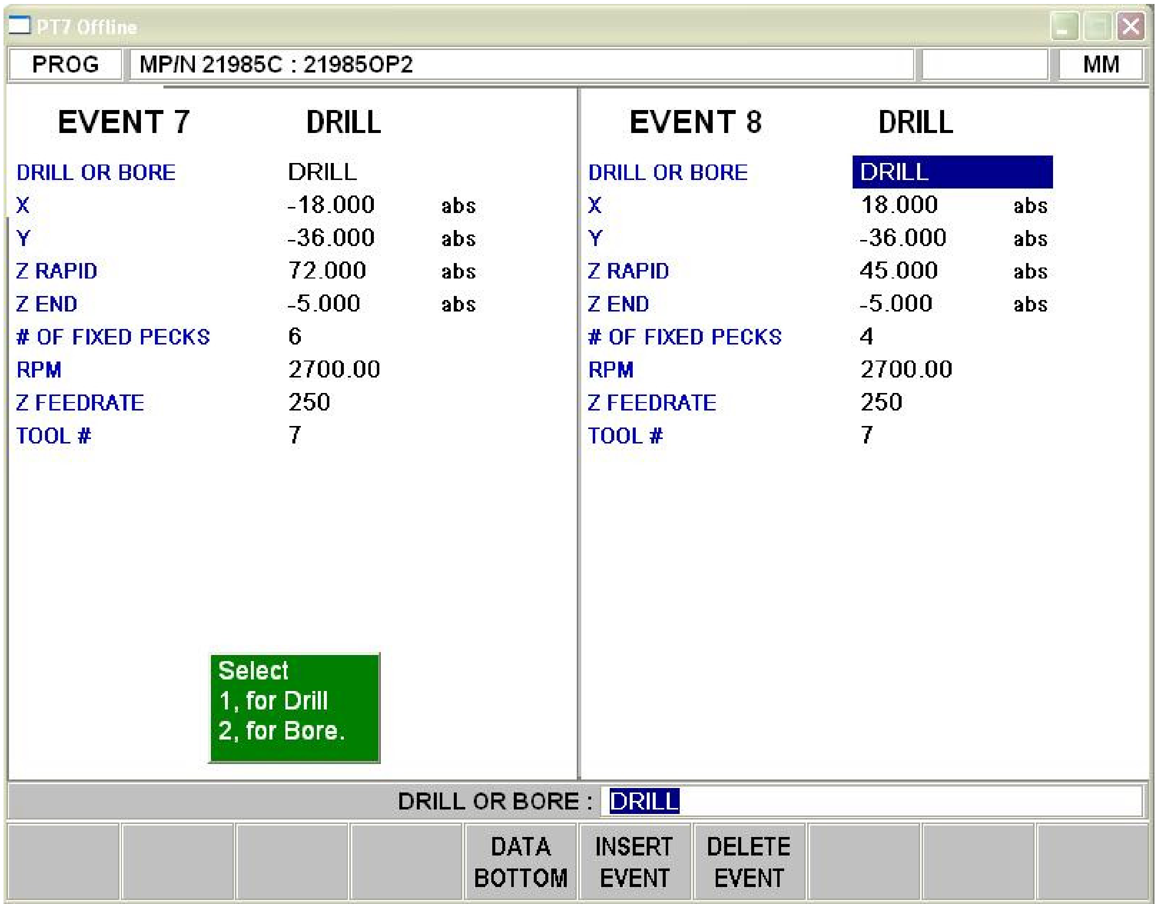


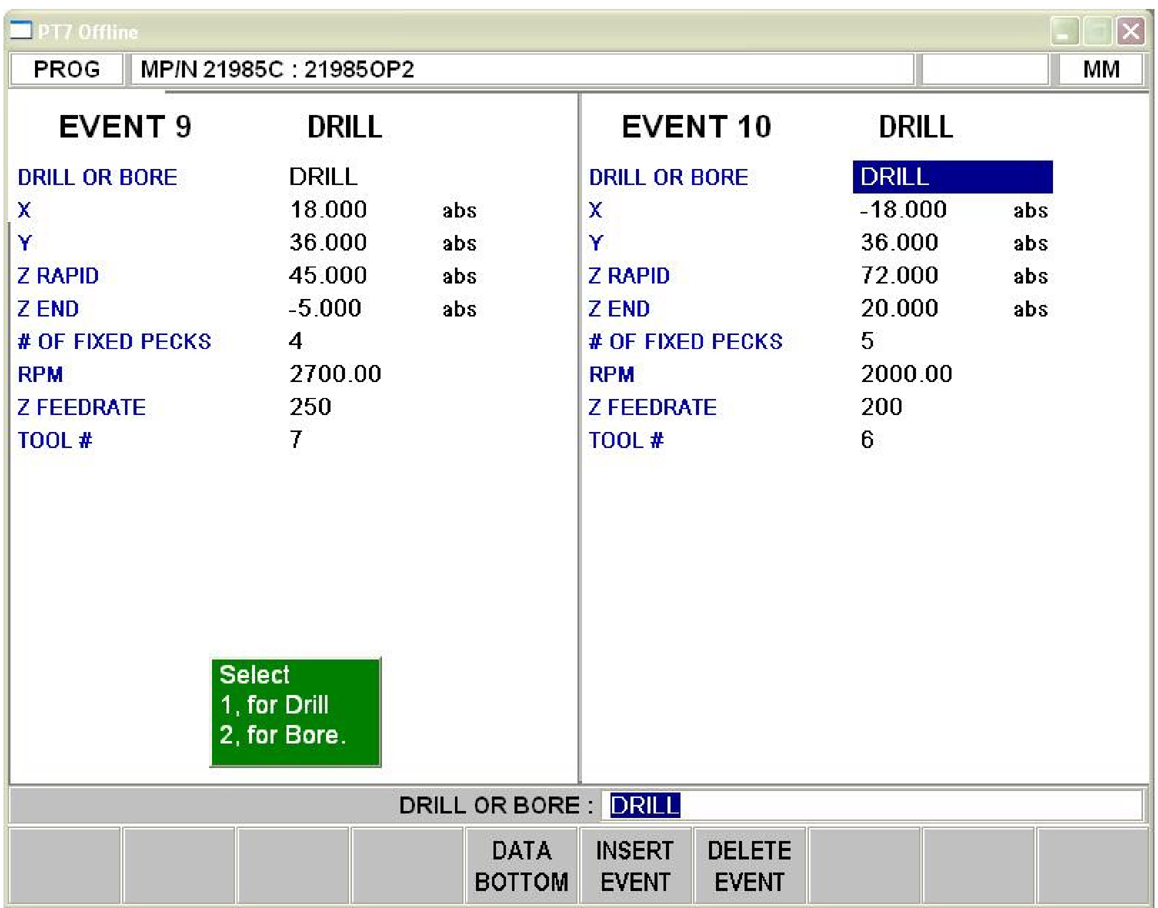
- **Event 1:** Position the A axis to Zero degrees absolute. From the operators view standing in front and to the left of the rotary table, the trunnion will rotate clockwise enabling us to machine complete the 4 counterbore holes**.**
- **Event 2 thru 5 :** Center Drill four holes using tool # 2 at 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**.**

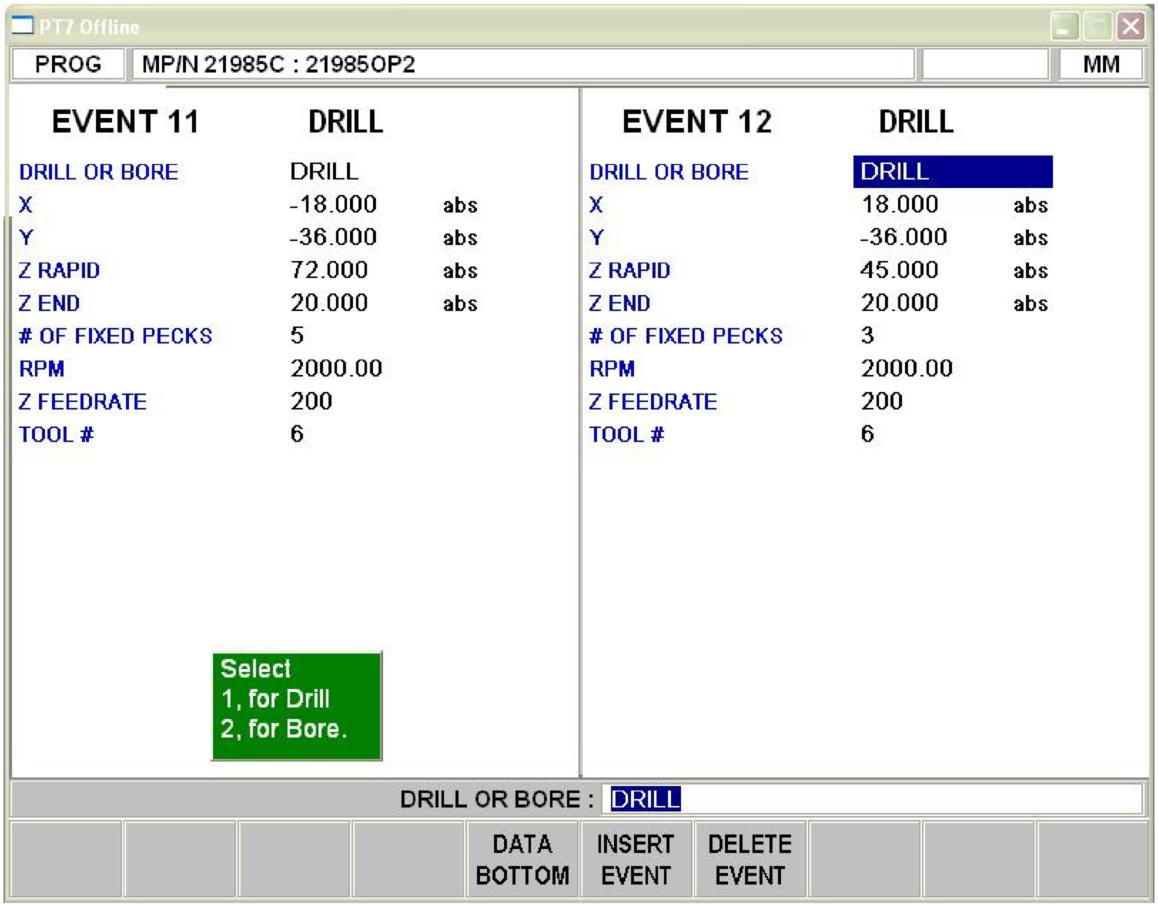


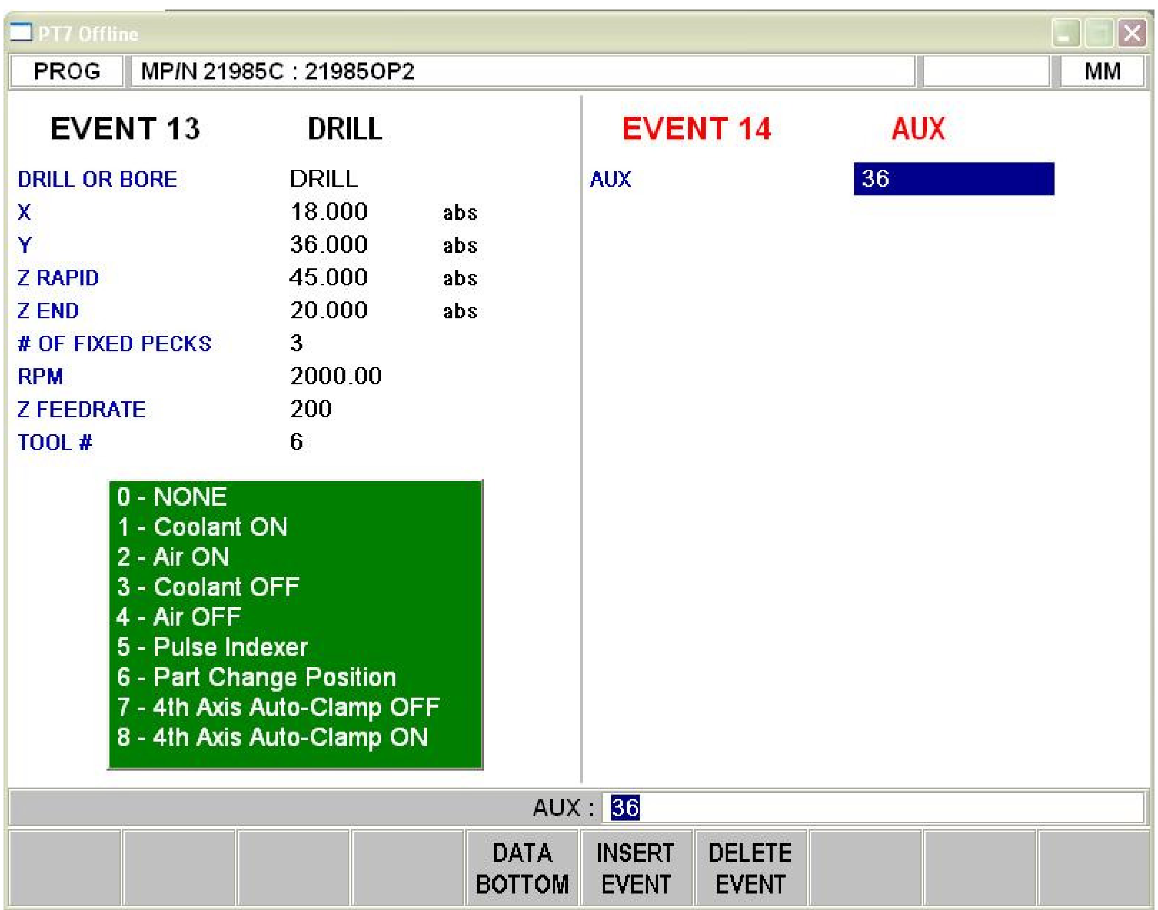

PT7 Offline
PROG
MP/N 21985C : 21985OP2
MM
EVENT 3 DRILL
DRILL OR BORE DRILL
X -18.000 abs
Y -36.000 abs
Z RAPID 72.000 abs
Z END 67.000 abs
PECKS FOR DRILL 1
RPM 2500.00
Z FEEDRATE 250
TOOL # 2
EVENT 4 DRILL
DRILL OR BORE DRILL
X 18.000 abs
Y -36.000 abs
Z RAPID 45.000 abs
Z END 40.000 abs
PECKS FOR 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 5 DRILL
DRILL OR BORE DRILL
X 18.000 abs
Y 36.000 abs
Z RAPID 45.000 abs
Z END 40.000 abs
PECKS FOR DRILL 1
RPM 2500.00
Z FEEDRATE 250
TOOL # 2
EVENT 6 DRILL
DRILL OR BORE DRILL
X -18.000 abs
Y 36.000 abs
Z RAPID 72.000 abs
Z END -5.000 abs
OF FIXED PECKS 6
RPM 2700.00
Z FEEDRATE 250
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 7 DRILL
DRILL OR BORE DRILL
X -18.000 abs
Y -36.000 abs
Z RAPID 72.000 abs
Z END -5.000 abs
OF FIXED PECKS 6
RPM 2700.00
Z FEEDRATE 250
TOOL # 7
EVENT 8 DRILL
DRILL OR BORE DRILL
X 18.000 abs
Y -36.000 abs
Z RAPID 45.000 abs
Z END -5.000 abs
OF FIXED PECKS 4
RPM 2700.00
Z FEEDRATE 250
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 DRILL
DRILL OR BORE DRILL
X 18.000 abs
Y 36.000 abs
Z RAPID 45.000 abs
Z END -5.000 abs
OF FIXED PECKS 4
RPM 2700.00
Z FEEDRATE 250
TOOL # 7
EVENT 10 DRILL
DRILL OR BORE DRILL
X -18.000 abs
Y 36.000 abs
Z RAPID 72.000 abs
Z END 20.000 abs
OF FIXED PECKS 5
RPM 2000.00
Z FEEDRATE 200
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
DRILL OR BORE DRILL
X -18.000 abs
Y -36.000 abs
Z RAPID 72.000 abs
Z END 20.000 abs
OF FIXED PECKS 5
RPM 2000.00
Z FEEDRATE 200
TOOL # 6
Select
1, for Drill
2, for Bore.
EVENT 12
DRILL
DRILL OR BORE DRILL
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
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 21985C : 21985OP2
MM
EVENT 13
DRILL
DRILL OR BORE DRILL
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
EVENT 14
AUX
AUX 36
AUX : 36
DATA BOTTOM
INSERT EVENT
DELETE EVENT

Program Example 2:

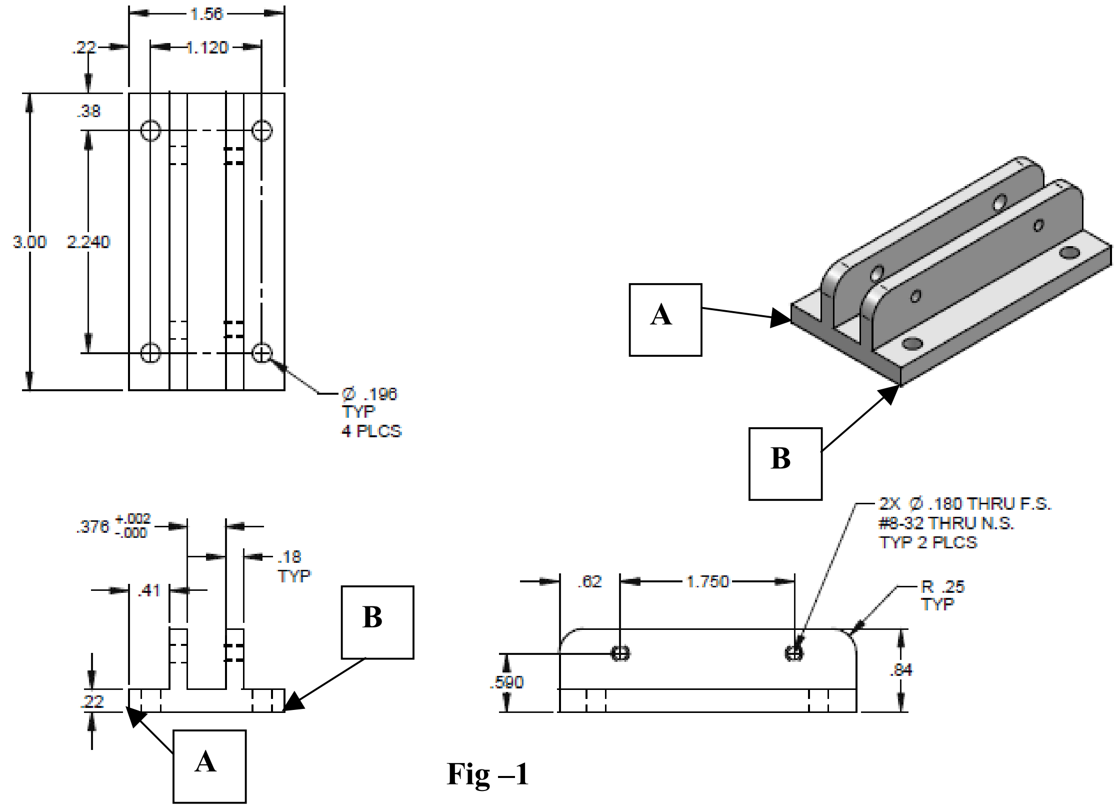


Fig –1

- **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.

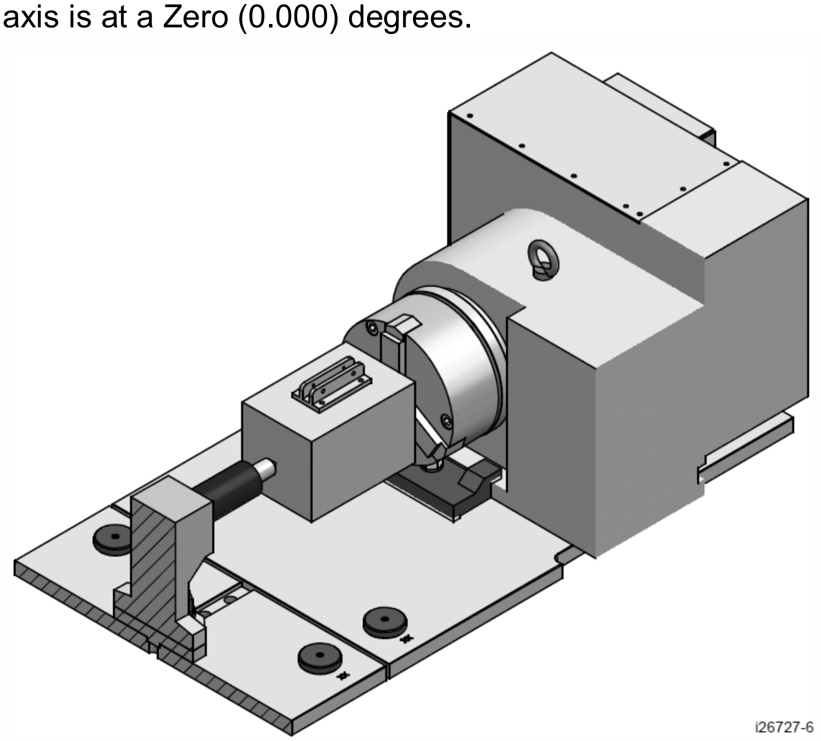
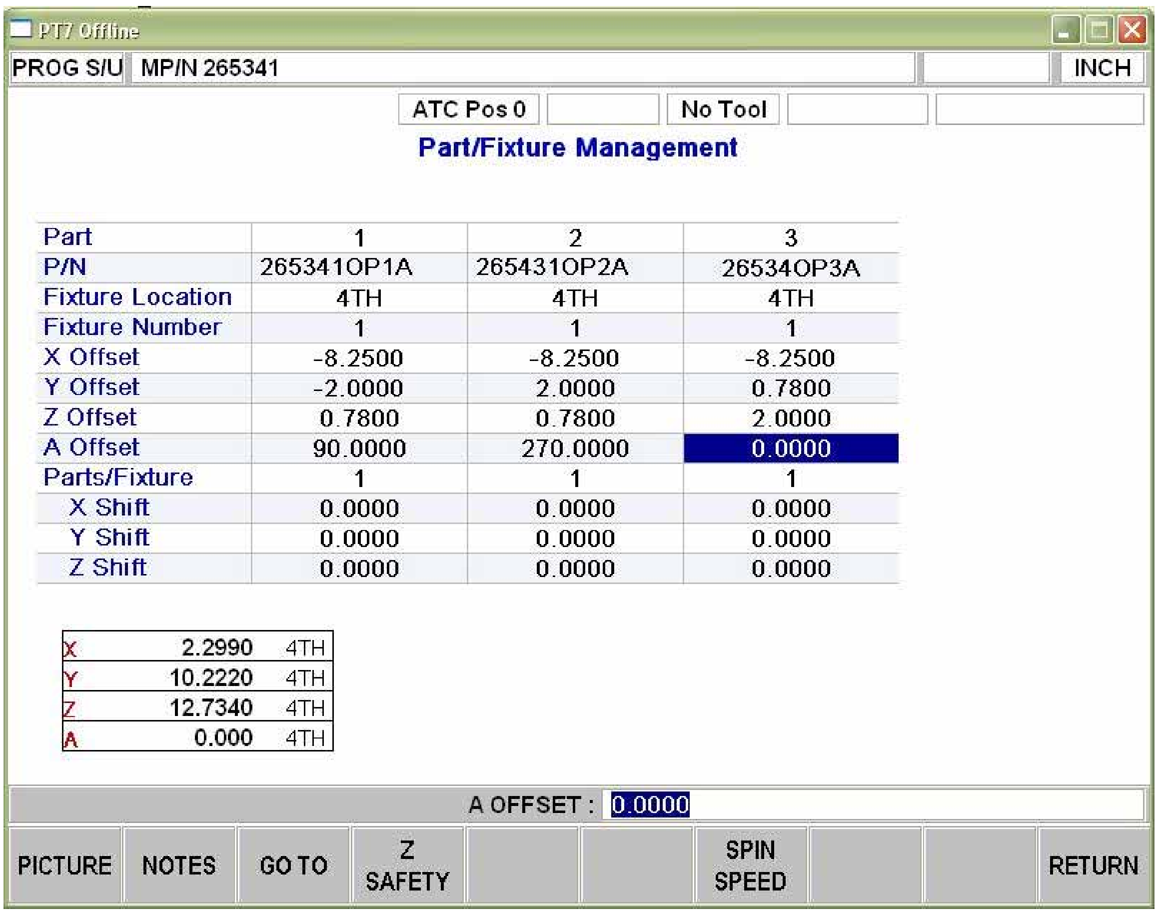


Fig. 2

• **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 4^{TH}. 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



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

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

• **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)

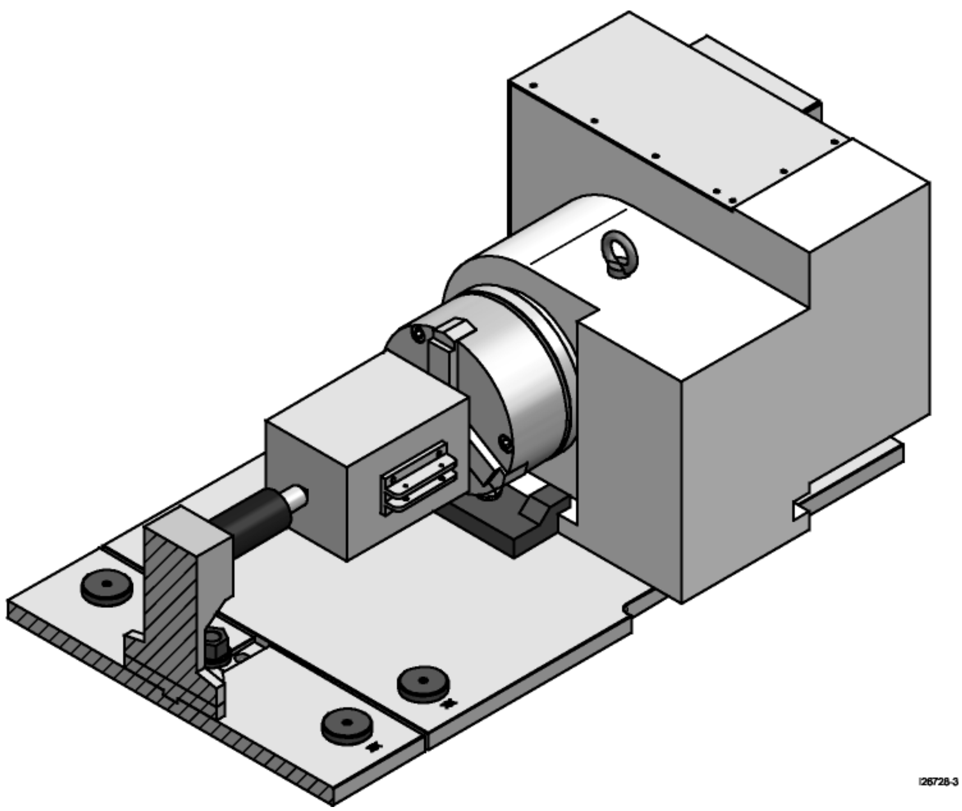
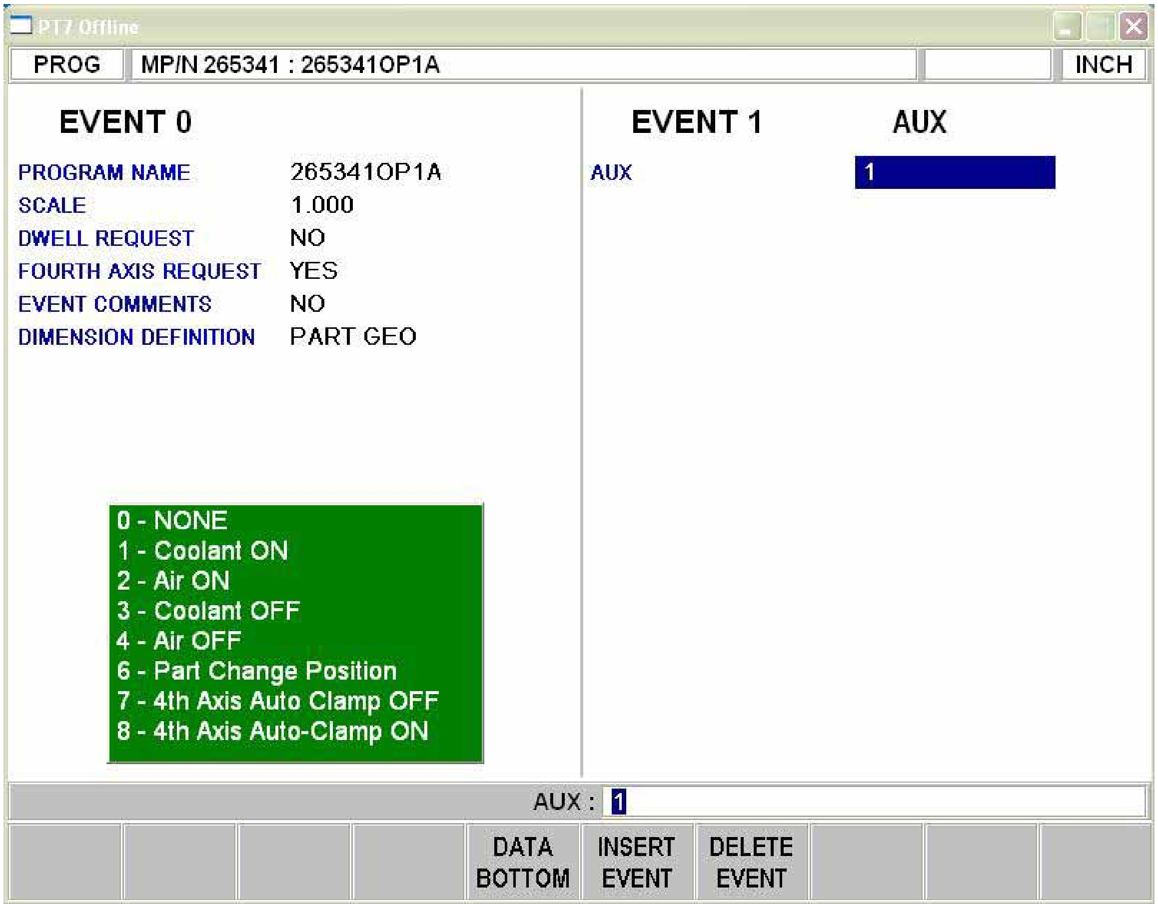
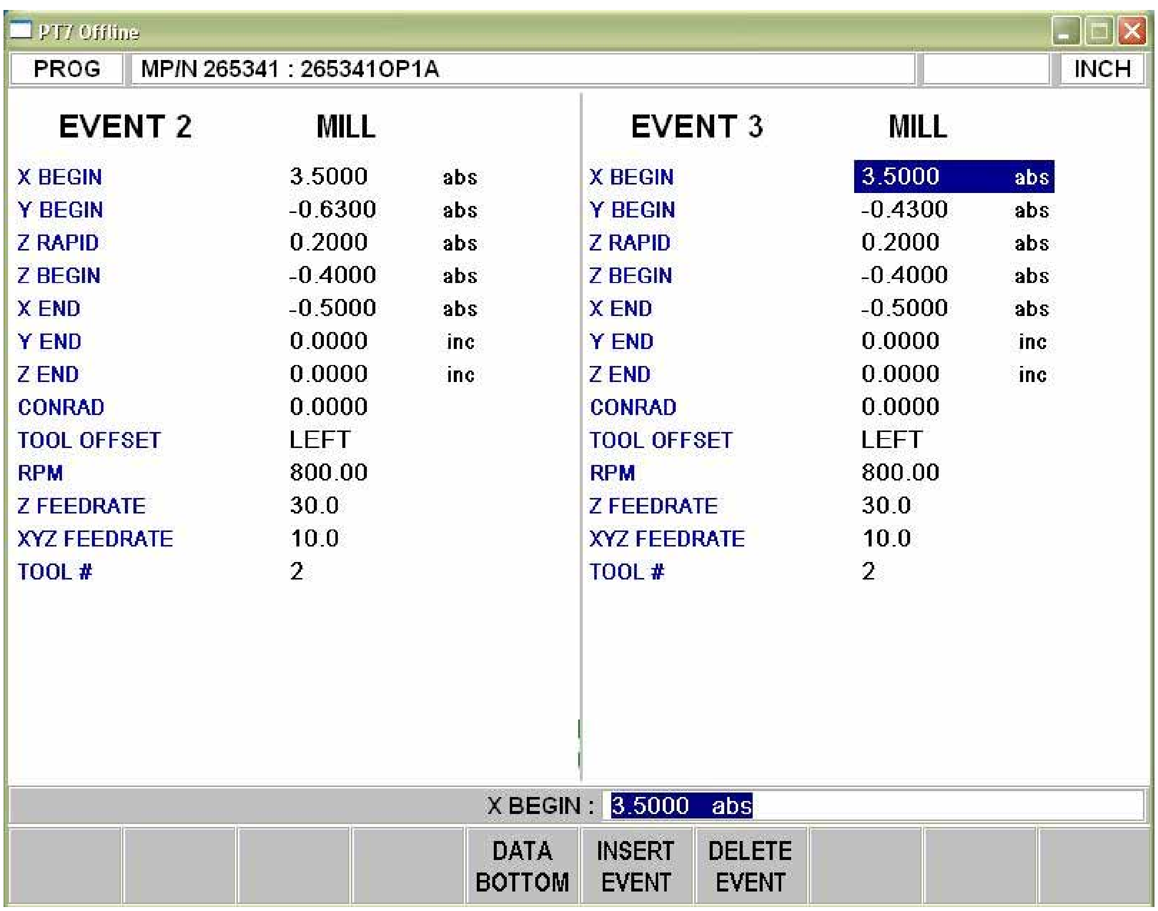
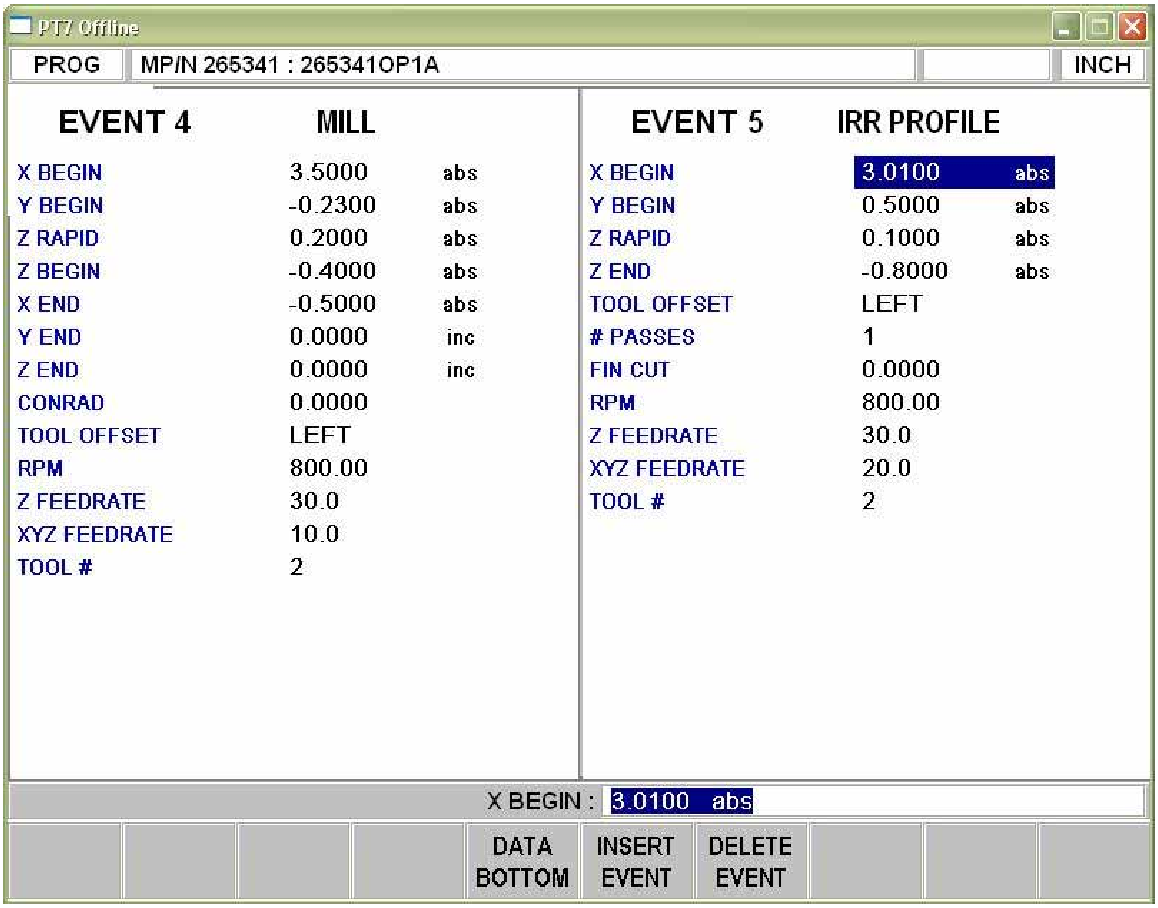
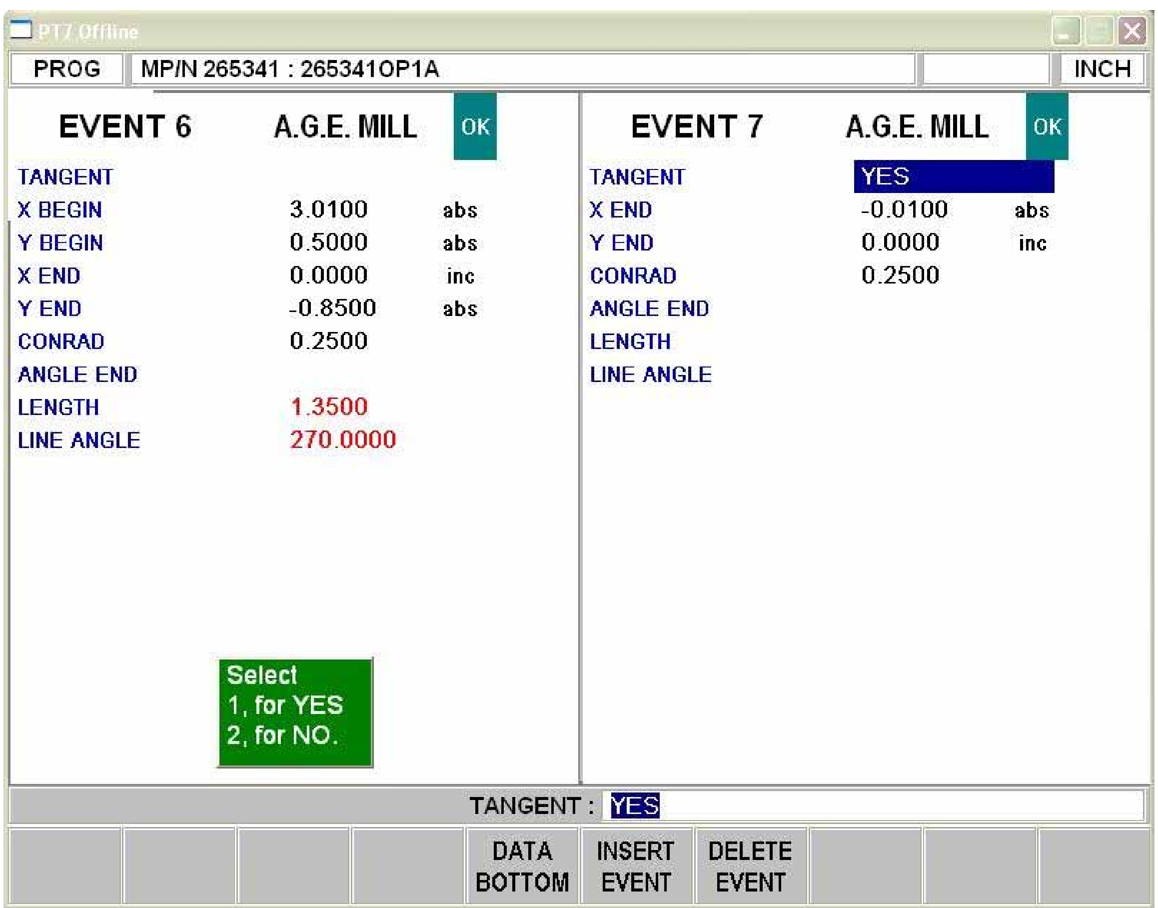


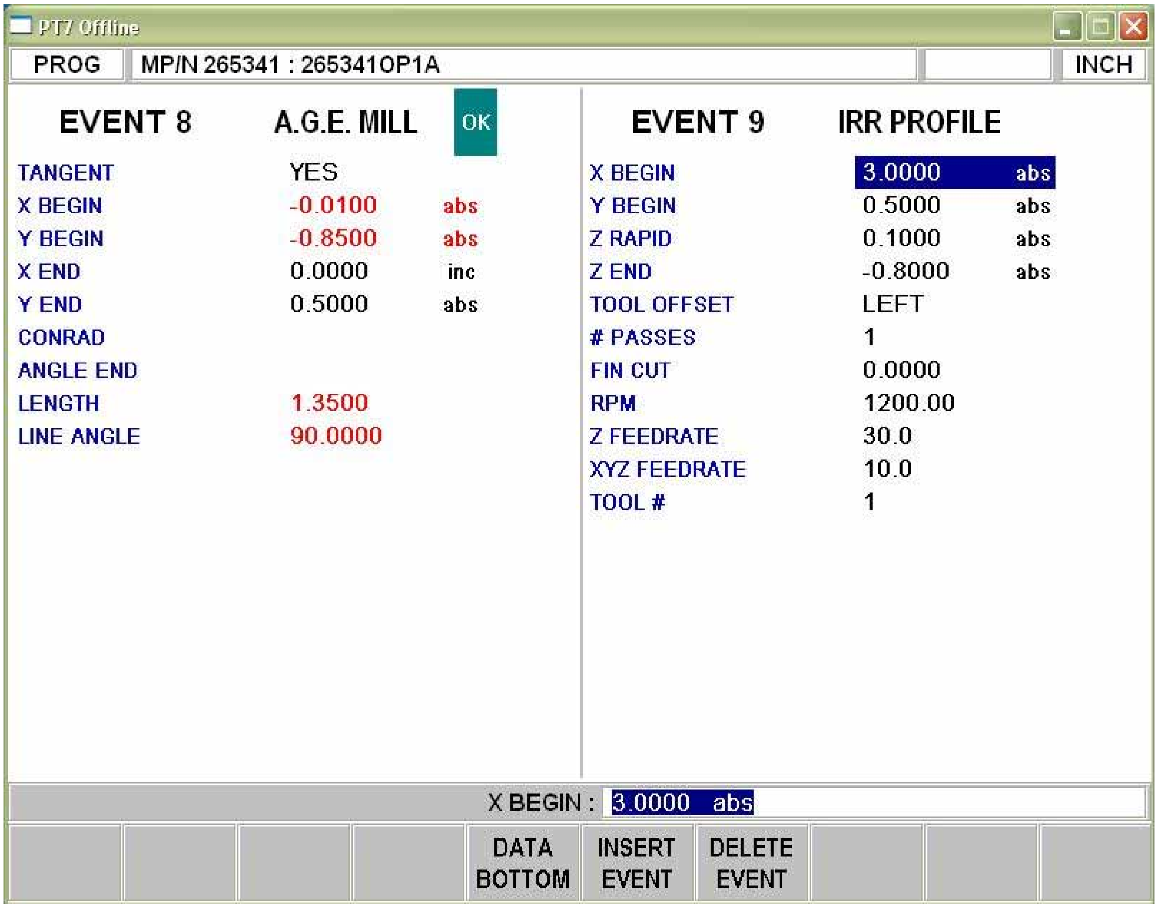
Fig 3
Trunnion at 90.000 degrees

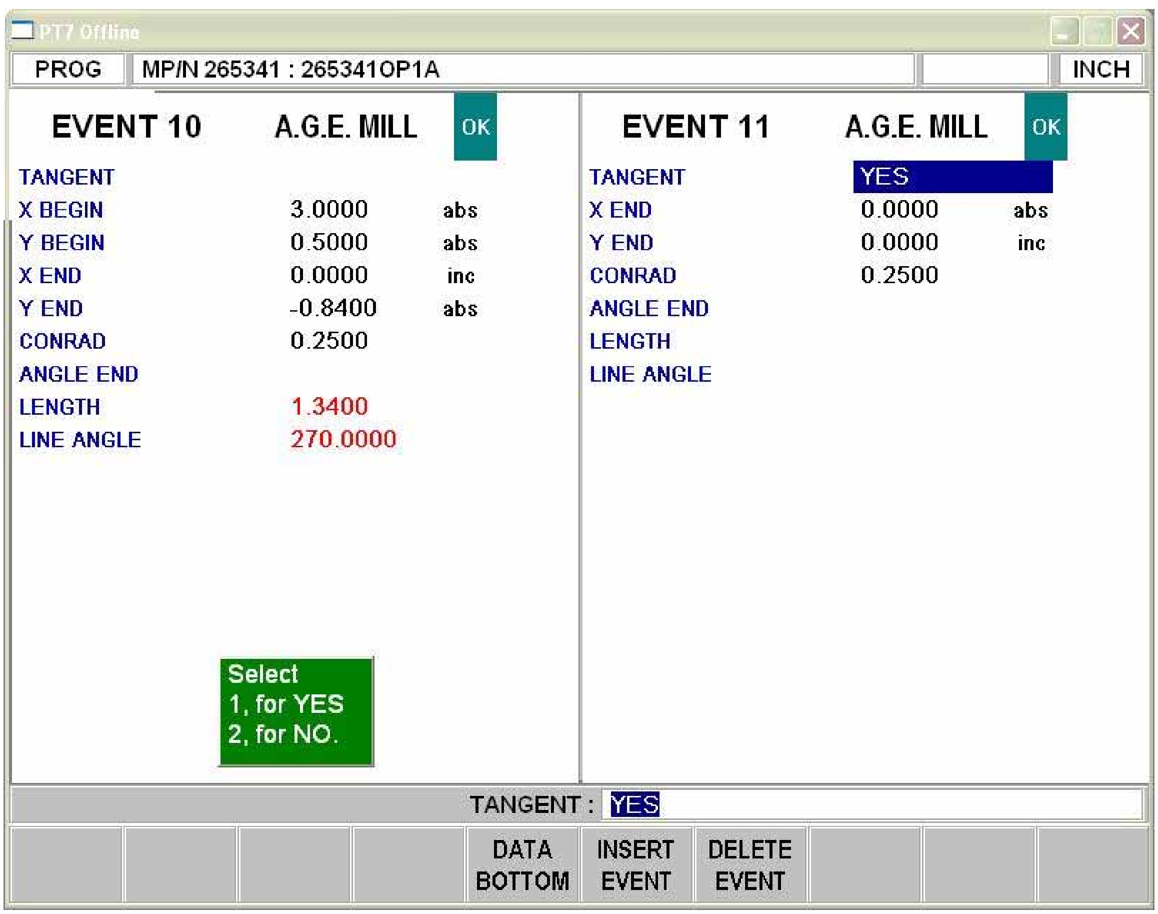

PT7 Offline
PROG
MP/N 265341 : 265341OP1A
INCH
EVENT 0
PROGRAM NAME 265341OP1A
SCALE 1.000
DWELL REQUEST NO
FOURTH AXIS REQUEST YES
EVENT COMMENTS NO
DIMENSION DEFINITION PART GEO
0 - NONE
1 - Coolant ON
2 - Air ON
3 - Coolant OFF
4 - Air OFF
6 - Part Change Position
7 - 4th Axis Auto Clamp OFF
8 - 4th Axis Auto-Clamp ON
EVENT 1 AUX
AUX 1
AUX : 1
DATA BOTTOM
INSERT EVENT
DELETE EVENT

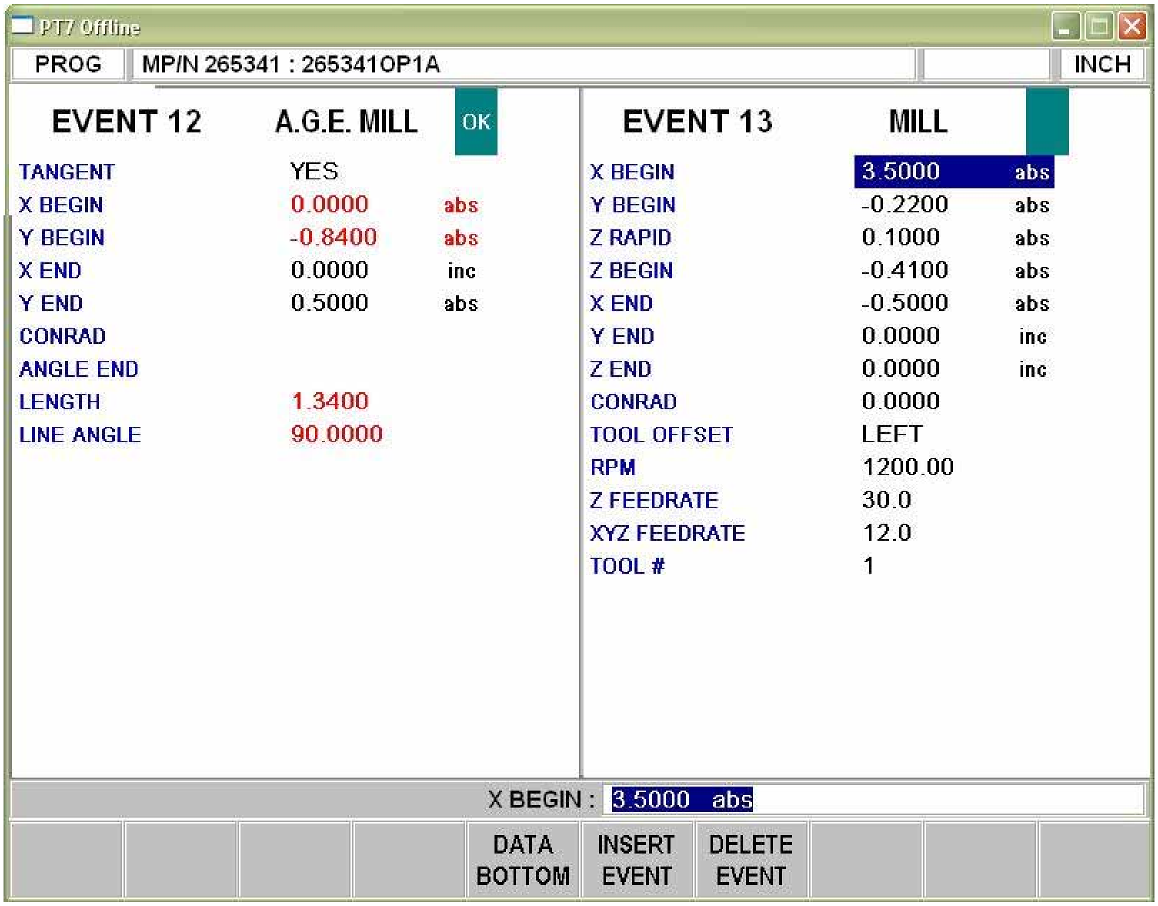

PT7 Offline
PROG
MP/N 265341 : 265341OP1A
INCH
EVENT 2 MILL
X BEGIN 3.5000 abs
Y BEGIN -0.6300 abs
Z RAPID 0.2000 abs
Z BEGIN -0.4000 abs
X END -0.5000 abs
Y END 0.0000 inc
Z END 0.0000 inc
CONRAD 0.0000
TOOL OFFSET LEFT
RPM 800.00
Z FEEDRATE 30.0
XYZ FEEDRATE 10.0
TOOL # 2
EVENT 3 MILL
X BEGIN 3.5000 abs
Y BEGIN -0.4300 abs
Z RAPID 0.2000 abs
Z BEGIN -0.4000 abs
X END -0.5000 abs
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

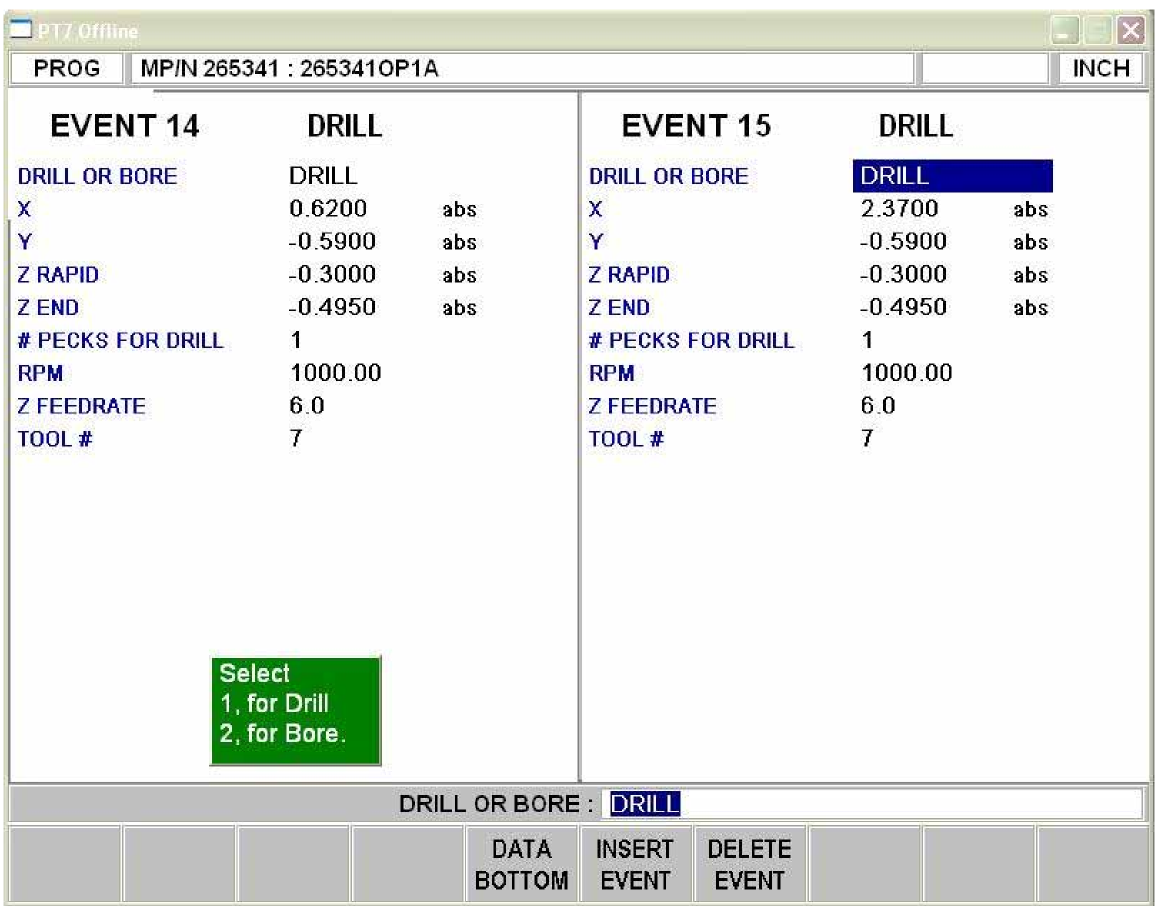

PT7 Offline
PROG
MP/N 265341 : 265341OP1A
INCH
EVENT 4 MILL
X BEGIN 3.5000 abs
Y BEGIN -0.2300 abs
Z RAPID 0.2000 abs
Z BEGIN -0.4000 abs
X END -0.5000 abs
Y END 0.0000 inc
Z END 0.0000 inc
CONRAD 0.0000
TOOL OFFSET LEFT
RPM 800.00
Z FEEDRATE 30.0
XYZ FEEDRATE 10.0
TOOL # 2
EVENT 5 IRR PROFILE
X BEGIN 3.0100 abs
Y BEGIN 0.5000 abs
Z RAPID 0.1000 abs
Z END -0.8000 abs
TOOL OFFSET LEFT
PASSES 1
FIN CUT 0.0000
RPM 800.00
Z FEEDRATE 30.0
XYZ FEEDRATE 20.0
TOOL # 2
X BEGIN : 3.0100 abs
DATA BOTTOM
INSERT EVENT
DELETE EVENT

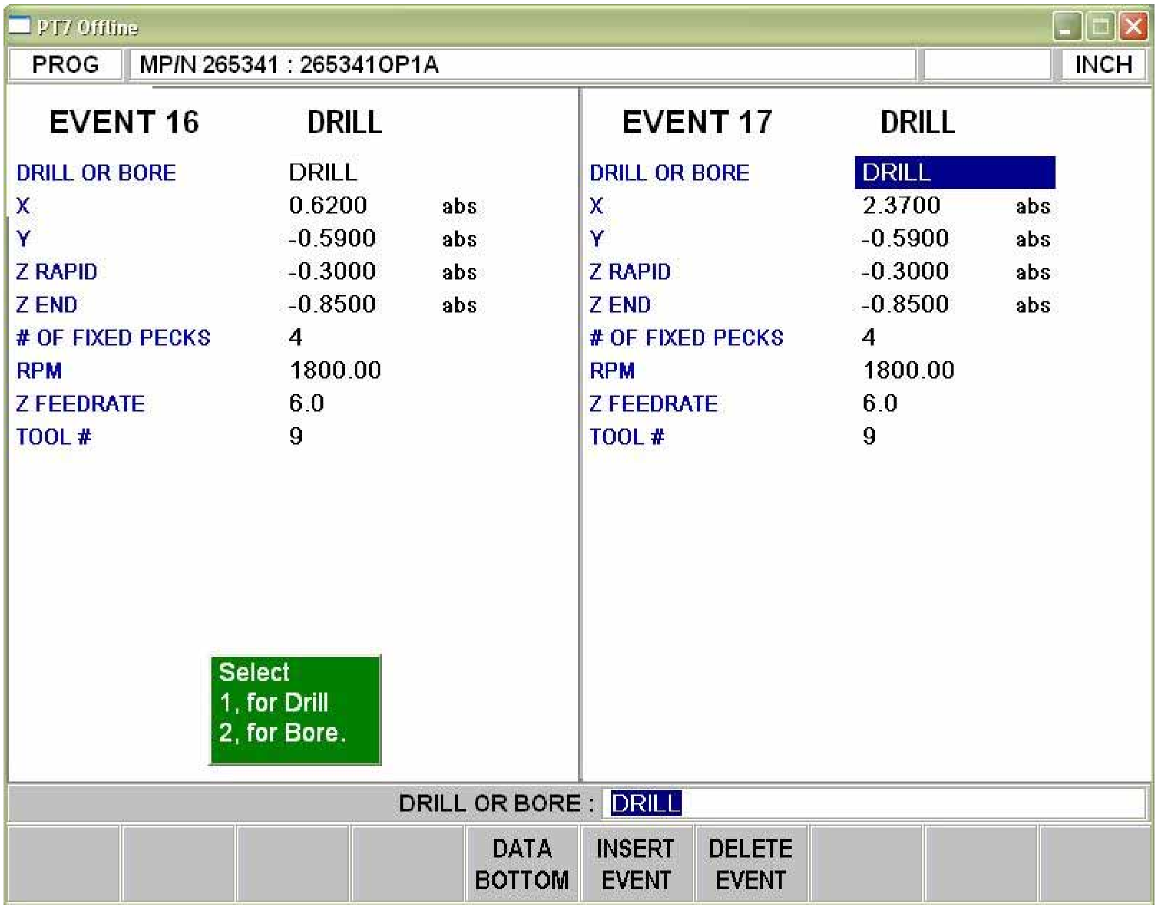

PT7 Offline
PROG
MP/N 265341 : 265341OP1A
INCH
EVENT 6 A.G.E. MILL
OK
TANGENT
X BEGIN 3.0100 abs
Y BEGIN 0.5000 abs
X END 0.0000 inc
Y END -0.8500 abs
CONRAD 0.2500
ANGLE END
LENGTH 1.3500
LINE ANGLE 270.0000
Select
1, for YES
2, for NO.
EVENT 7 A.G.E. MILL
OK
TANGENT YES
X END -0.0100 abs
Y END 0.0000 inc
CONRAD 0.2500
ANGLE END
LENGTH
LINE ANGLE
TANGENT : YES
DATA BOTTOM
INSERT EVENT
DELETE EVENT

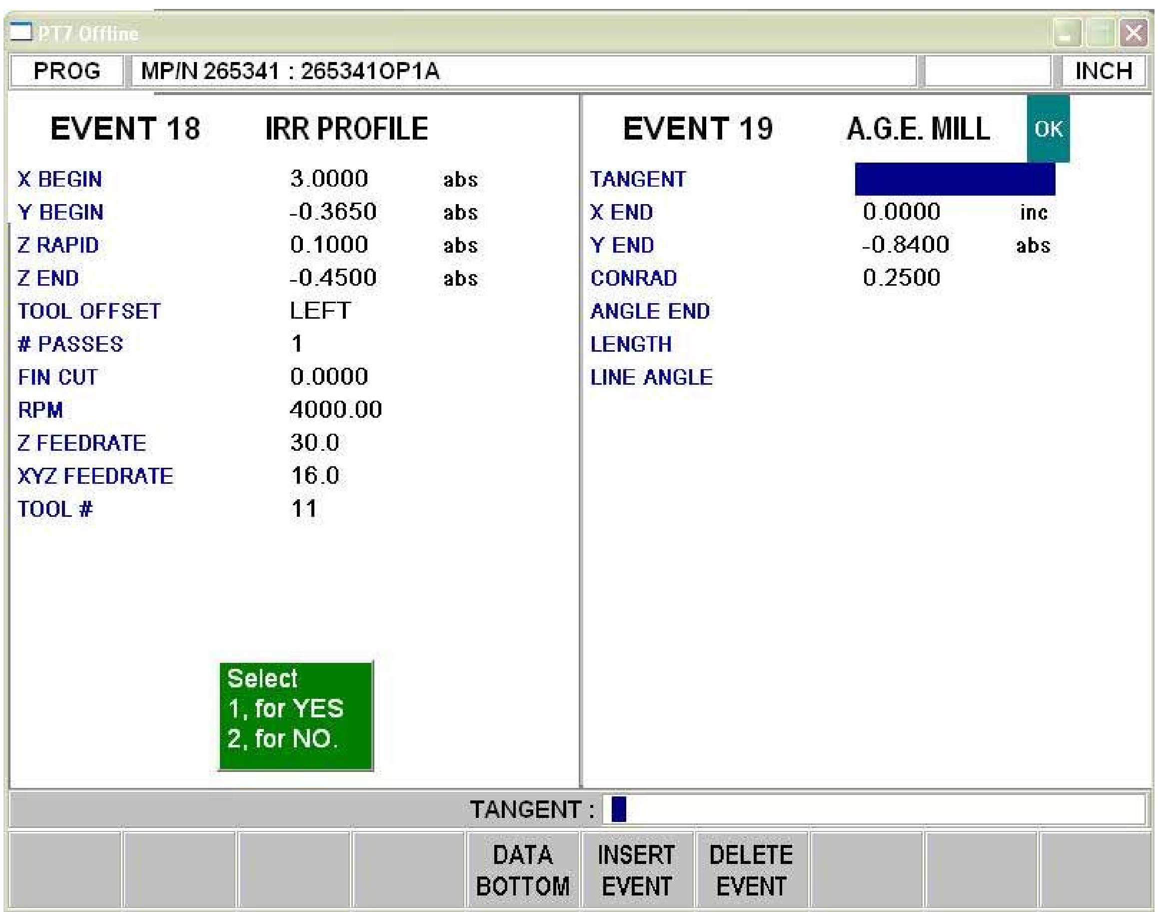

PT7 Offline
PROG
MP/N 265341 : 265341OP1A
INCH
EVENT 8
A.G.E. MILL
OK
TANGENT YES
X BEGIN -0.0100 abs
Y BEGIN -0.8500 abs
X END 0.0000 inc
Y END 0.5000 abs
CONRAD
ANGLE END
LENGTH 1.3500
LINE ANGLE 90.0000
EVENT 9
IRR PROFILE
X BEGIN 3.0000 abs
Y BEGIN 0.5000 abs
Z RAPID 0.1000 abs
Z END -0.8000 abs
TOOL OFFSET LEFT
PASSES 1
FIN CUT 0.0000
RPM 1200.00
Z FEEDRATE 30.0
XYZ FEEDRATE 10.0
TOOL # 1
X BEGIN : 3.0000 abs
DATA BOTTOM
INSERT EVENT
DELETE EVENT

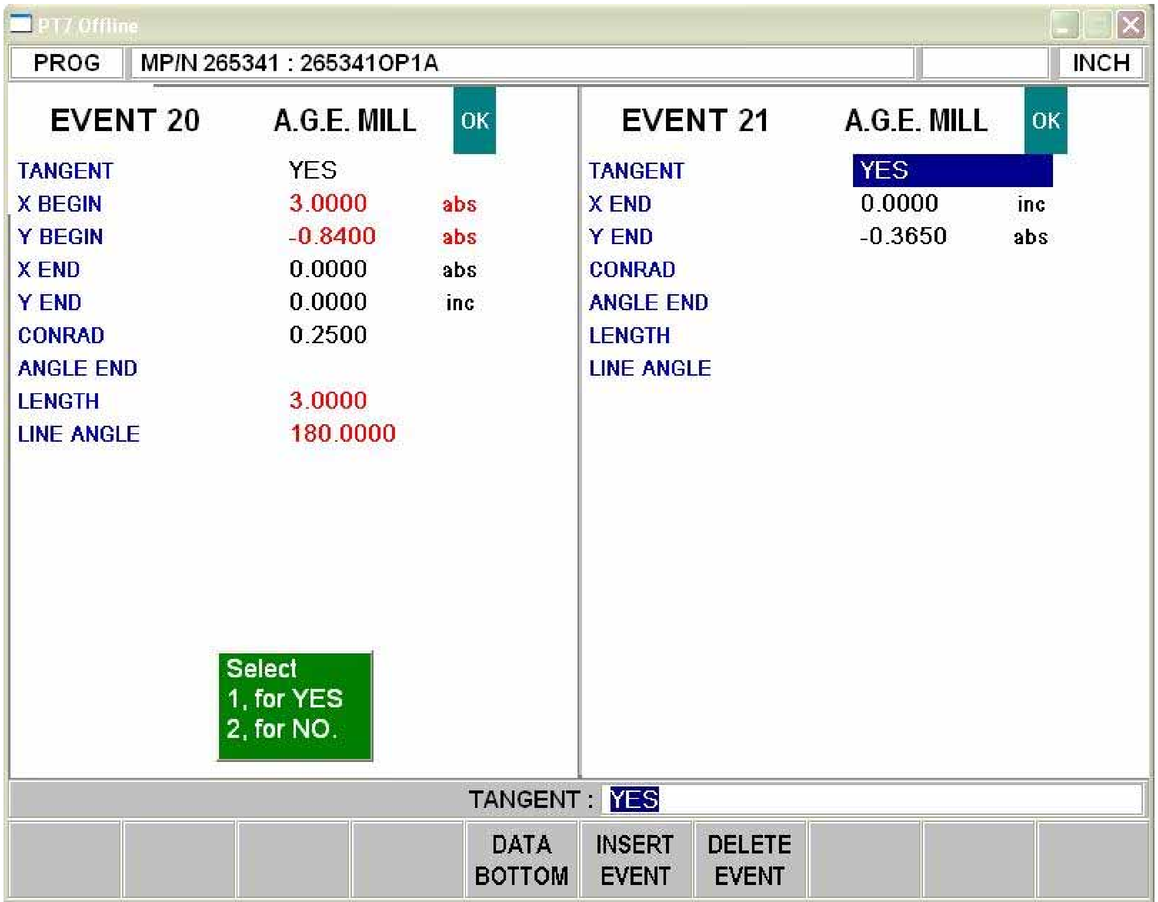

PT7 Offline
PROG
MP/N 265341 : 265341OP1A
INCH
EVENT 10
A.G.E. MILL
OK
TANGENT
X BEGIN 3.0000 abs
Y BEGIN 0.5000 abs
X END 0.0000 inc
Y END -0.8400 abs
CONRAD 0.2500
ANGLE END
LENGTH 1.3400
LINE ANGLE 270.0000
Select
1, for YES
2, for NO.
EVENT 11
A.G.E. MILL
OK
TANGENT YES
X END 0.0000 abs
Y END 0.0000 inc
CONRAD 0.2500
ANGLE END
LENGTH
LINE ANGLE
TANGENT : YES
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 265341OP1A
INCH
EVENT 12
A.G.E. MILL
OK
TANGENT YES
X BEGIN 0.0000 abs
Y BEGIN -0.8400 abs
X END 0.0000 inc
Y END 0.5000 abs
CONRAD
ANGLE END
LENGTH 1.3400
LINE ANGLE 90.0000
EVENT 13
MILL
X BEGIN 3.5000 abs
Y BEGIN -0.2200 abs
Z RAPID 0.1000 abs
Z BEGIN -0.4100 abs
X END -0.5000 abs
Y END 0.0000 inc
Z END 0.0000 inc
CONRAD 0.0000
TOOL OFFSET LEFT
RPM 1200.00
Z FEEDRATE 30.0
XYZ FEEDRATE 12.0
TOOL # 1
X BEGIN : 3.5000 abs
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 265341OP1A
INCH
EVENT 14
DRILL
DRILL OR BORE DRILL
X 0.6200 abs
Y -0.5900 abs
Z RAPID -0.3000 abs
Z END -0.4950 abs
PECKS FOR DRILL 1
RPM 1000.00
Z FEEDRATE 6.0
TOOL # 7
Select
1, for Drill
2, for Bore.
EVENT 15
DRILL
DRILL OR BORE DRILL
X 2.3700 abs
Y -0.5900 abs
Z RAPID -0.3000 abs
Z END -0.4950 abs
PECKS FOR DRILL 1
RPM 1000.00
Z FEEDRATE 6.0
TOOL # 7
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 265341OP1A
INCH
EVENT 16
DRILL
DRILL OR BORE DRILL
X 0.6200 abs
Y -0.5900 abs
Z RAPID -0.3000 abs
Z END -0.8500 abs
OF FIXED PECKS 4
RPM 1800.00
Z FEEDRATE 6.0
TOOL # 9
Select
1, for Drill
2, for Bore.
EVENT 17
DRILL
DRILL OR BORE DRILL
X 2.3700 abs
Y -0.5900 abs
Z RAPID -0.3000 abs
Z END -0.8500 abs
OF FIXED PECKS 4
RPM 1800.00
Z FEEDRATE 6.0
TOOL # 9
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 265341OP1A
INCH
EVENT 18
IRR PROFILE
X BEGIN 3.0000 abs
Y BEGIN -0.3650 abs
Z RAPID 0.1000 abs
Z END -0.4500 abs
TOOL OFFSET LEFT
PASSES 1
FIN CUT 0.0000
RPM 4000.00
Z FEEDRATE 30.0
XYZ FEEDRATE 16.0
TOOL # 11
Select
1, for YES
2, for NO.
EVENT 19
A.G.E. MILL
OK
TANGENT
X END 0.0000 inc
Y END -0.8400 abs
CONRAD 0.2500
ANGLE END
LENGTH
LINE ANGLE
TANGENT :
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)

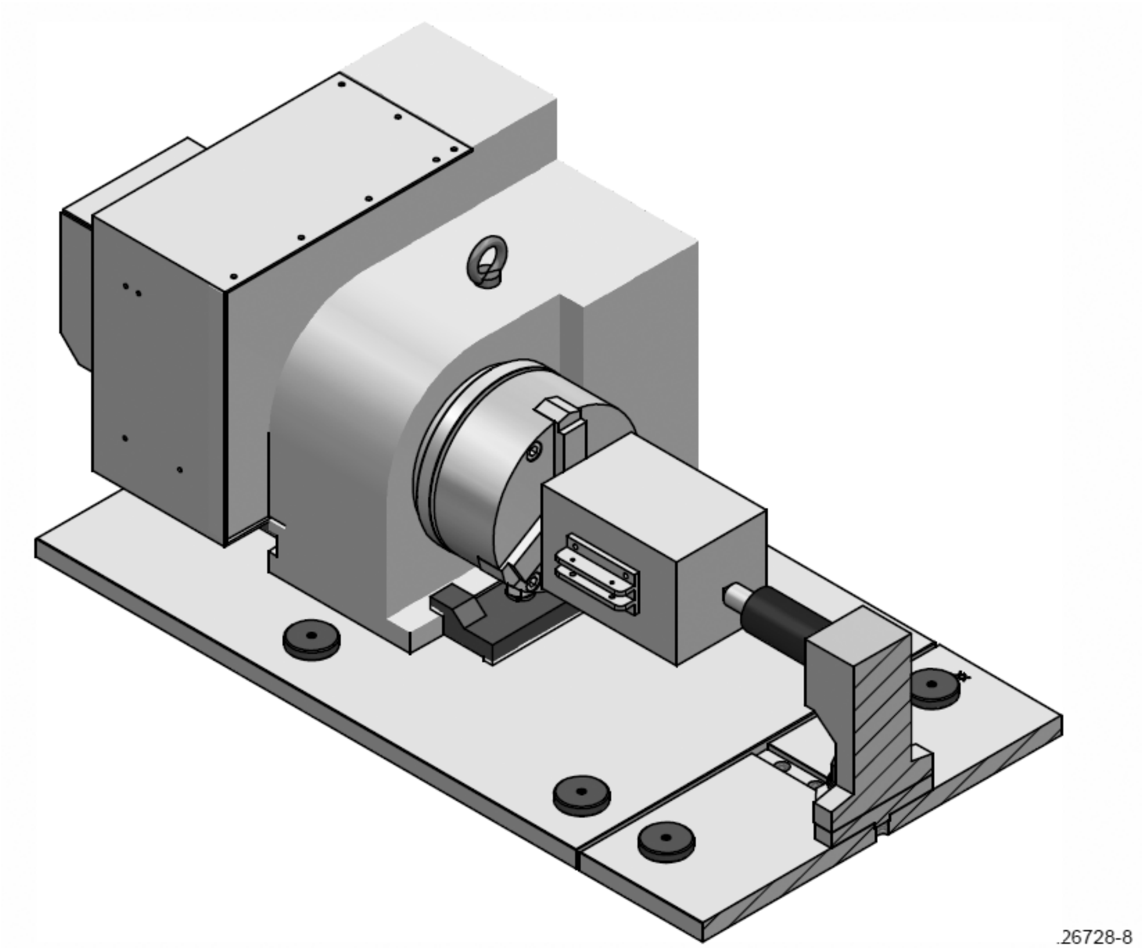


Fig 4
Trunnion at 270.000 degrees
(Rear View)

PT7 Offline

PROG	MP/N 265341 : 265431OP2A		INCH

EVENT 0

PROGRAM NAME	265431OP2A
SCALE	1.000
DWELL REQUEST	NO
FOURTH AXIS REQUEST	YES
EVENT COMMENTS	NO
DIMENSION DEFINITION	PART GEO

EVENT 1 MILL

X BEGIN	3.5000	abs
Y BEGIN	0.6300	abs
Z RAPID	0.2000	abs
Z BEGIN	-0.4000	abs
X END	-0.5000	abs
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 MILL

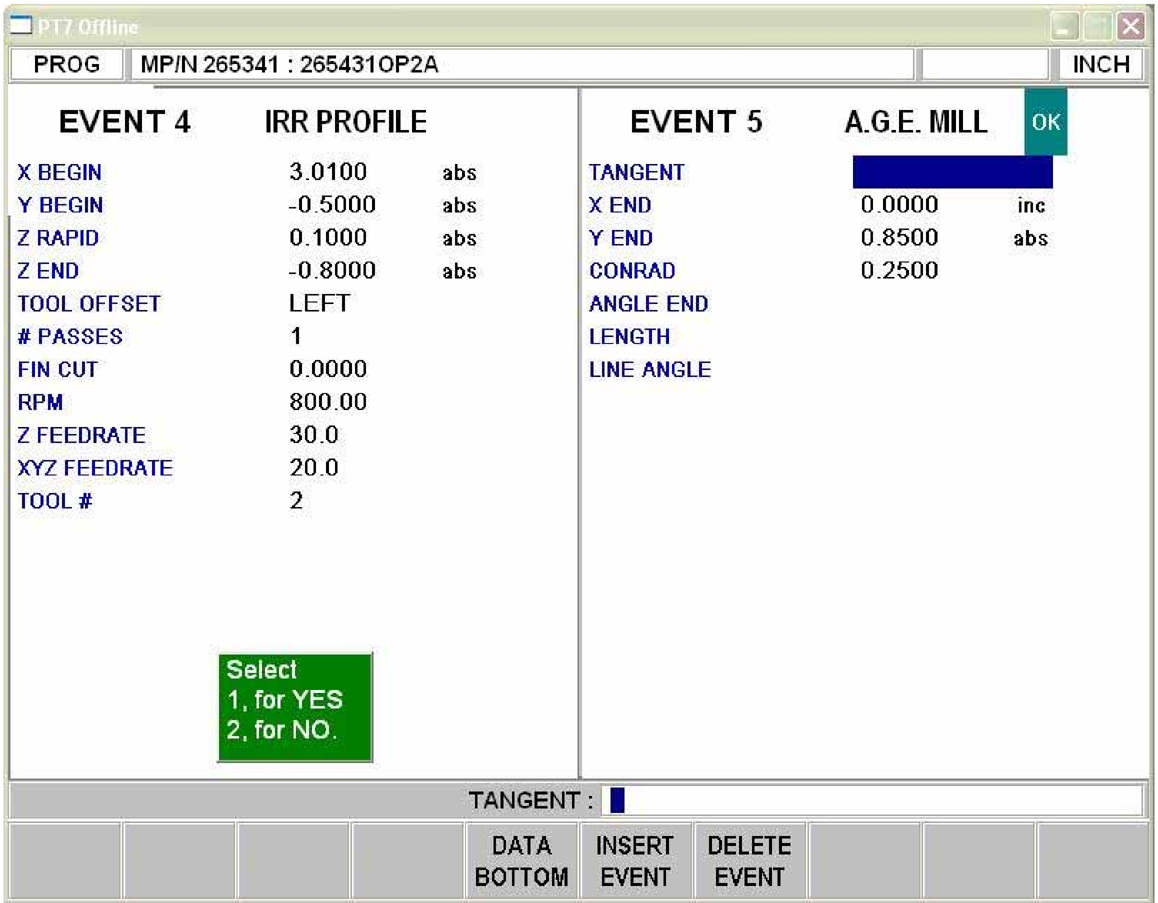
X BEGIN	3.5000	abs
Y BEGIN	0.4300	abs
Z RAPID	0.2000	abs
Z BEGIN	-0.4000	abs
X END	-0.5000	abs
Y END	0.0000	inc
Z END	0.0000	inc
CONRAD	0.0000	
TOOL OFFSET	LEFT	
RPM	800.00	
Z FEEDRATE	30.0	
XYZ FEEDRATE	10.0	
TOOL #	2	

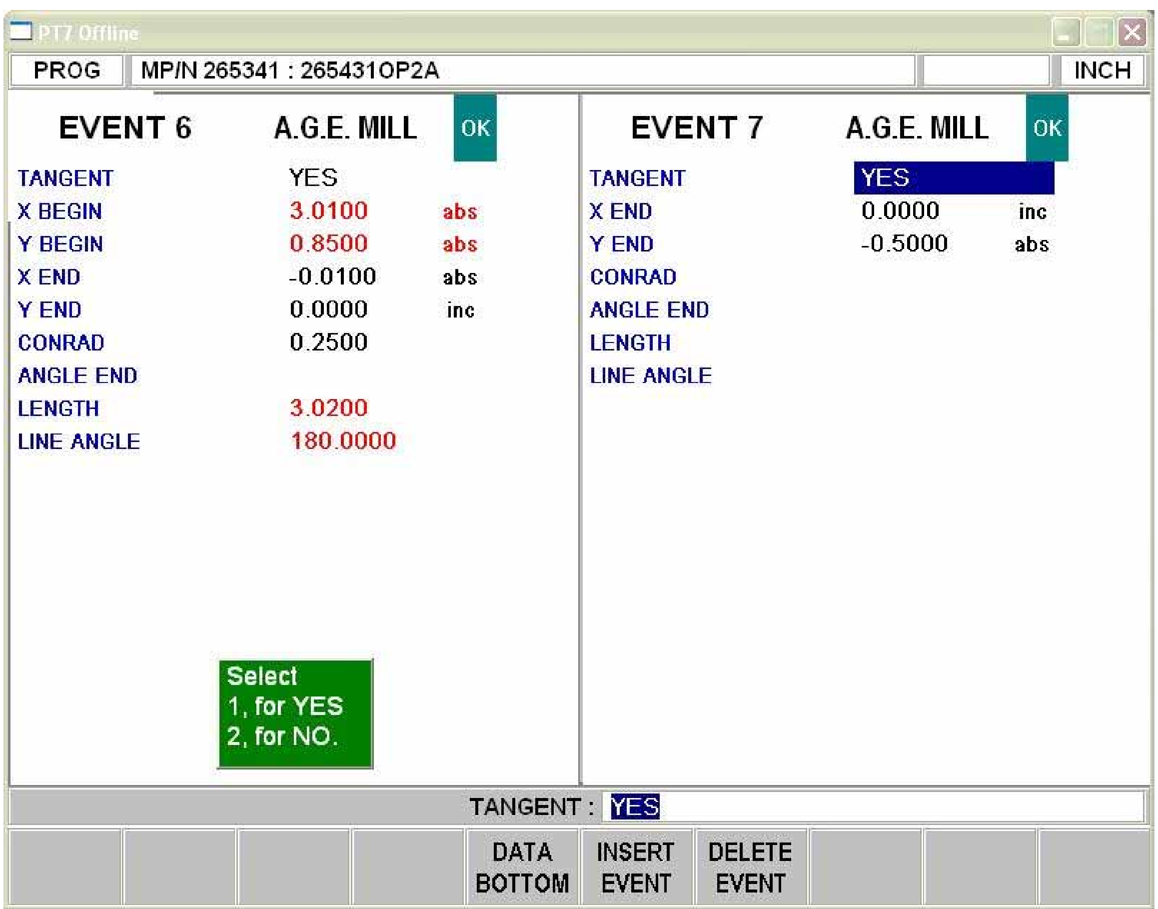
EVENT 3 MILL

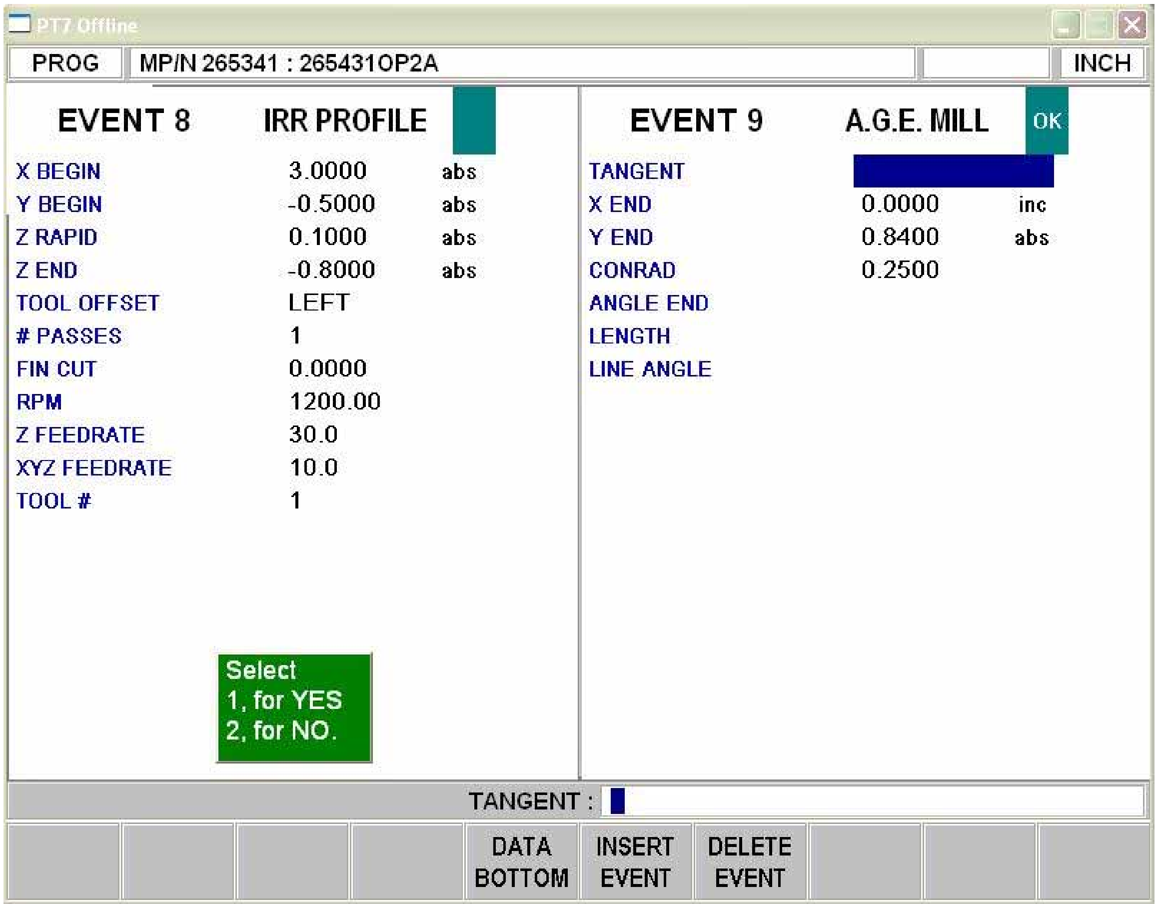
X BEGIN	3.5000	abs
Y BEGIN	0.2300	abs
Z RAPID	0.2000	abs
Z BEGIN	-0.4000	abs
X END	-0.5000	abs
Y END	0.0000	inc
Z END	0.0000	inc
CONRAD	0.0000	
TOOL OFFSET	LEFT	
RPM	800.00	
Z FEEDRATE	30.0	
XYZ FEEDRATE	10.0	
TOOL #	2	

X BEGIN : 3.5000 abs

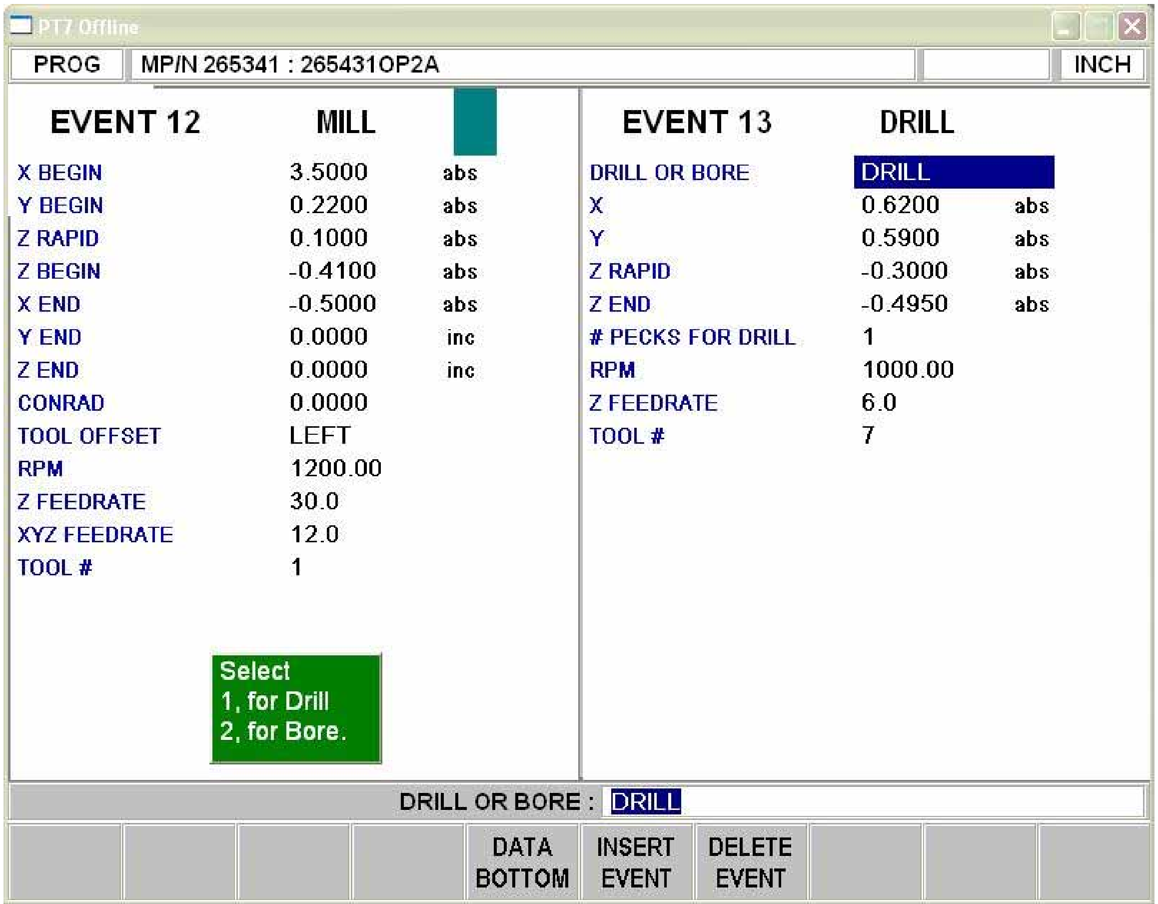
DATA BOTTOM | INSERT EVENT | DELETE EVENT

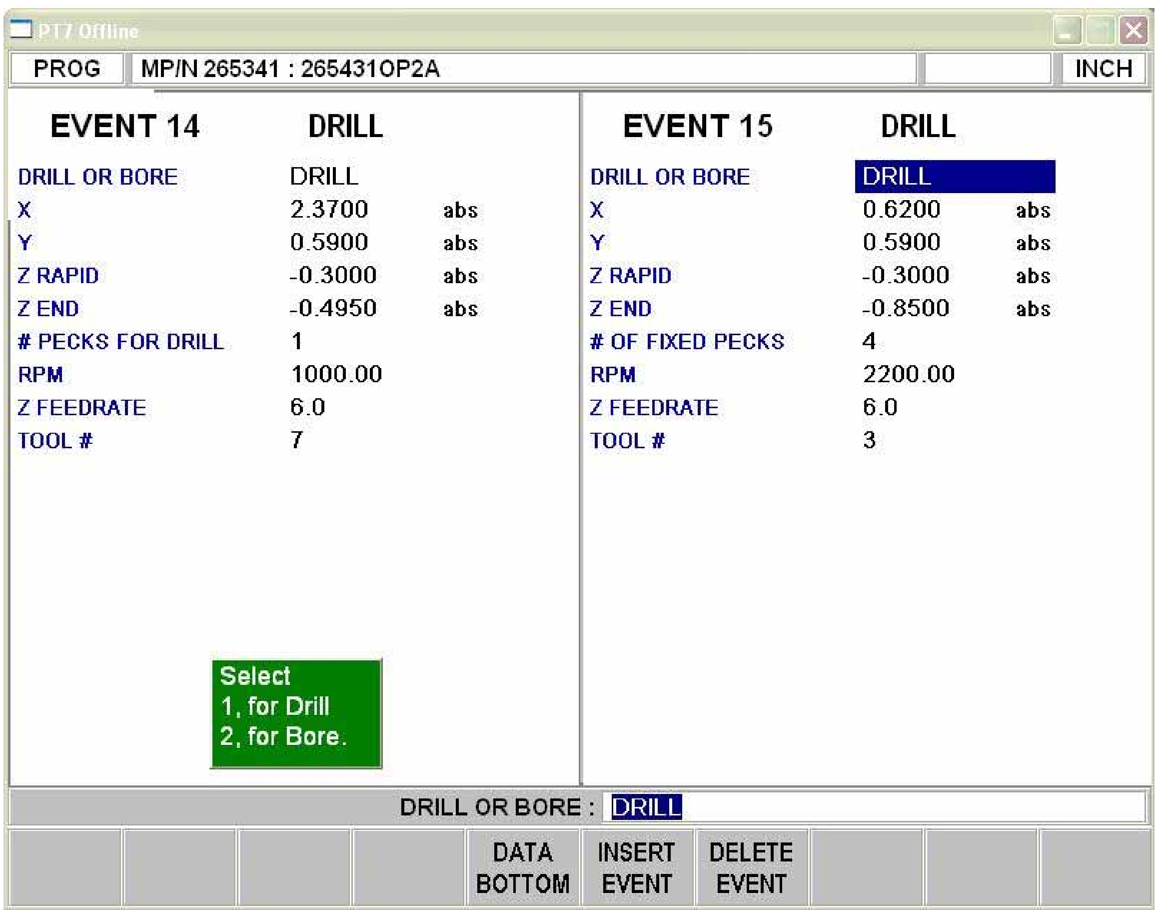

PT7 Offline
PROG
MP/N 265341 : 265431OP2A
INCH
EVENT 4
IRR PROFILE
X BEGIN 3.0100 abs
Y BEGIN -0.5000 abs
Z RAPID 0.1000 abs
Z END -0.8000 abs
TOOL OFFSET LEFT
PASSES 1
FIN CUT 0.0000
RPM 800.00
Z FEEDRATE 30.0
XYZ FEEDRATE 20.0
TOOL # 2
Select
1, for YES
2, for NO.
EVENT 5
A.G.E. MILL
OK
TANGENT
X END 0.0000 inc
Y END 0.8500 abs
CONRAD 0.2500
ANGLE END
LENGTH
LINE ANGLE
TANGENT :
DATA BOTTOM
INSERT EVENT
DELETE EVENT

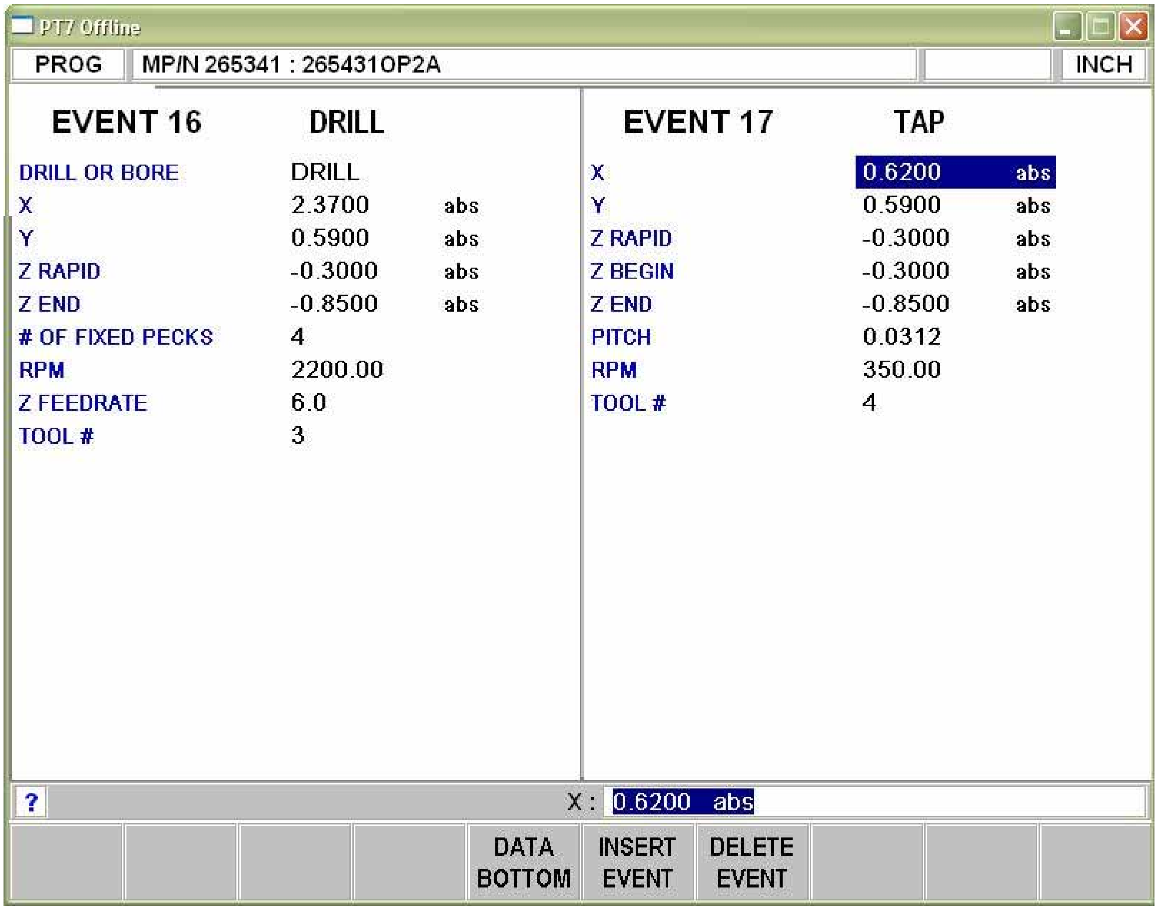

PT7 Offline
PROG
MP/N 265341 : 265431OP2A
INCH
EVENT 6
A.G.E. MILL
OK
TANGENT YES
X BEGIN 3.0100 abs
Y BEGIN 0.8500 abs
X END -0.0100 abs
Y END 0.0000 inc
CONRAD 0.2500
ANGLE END
LENGTH 3.0200
LINE ANGLE 180.0000
Select
1, for YES
2, for NO.
EVENT 7
A.G.E. MILL
OK
TANGENT YES
X END 0.0000 inc
Y END -0.5000 abs
CONRAD
ANGLE END
LENGTH
LINE ANGLE
TANGENT : YES
DATA BOTTOM
INSERT EVENT
DELETE EVENT

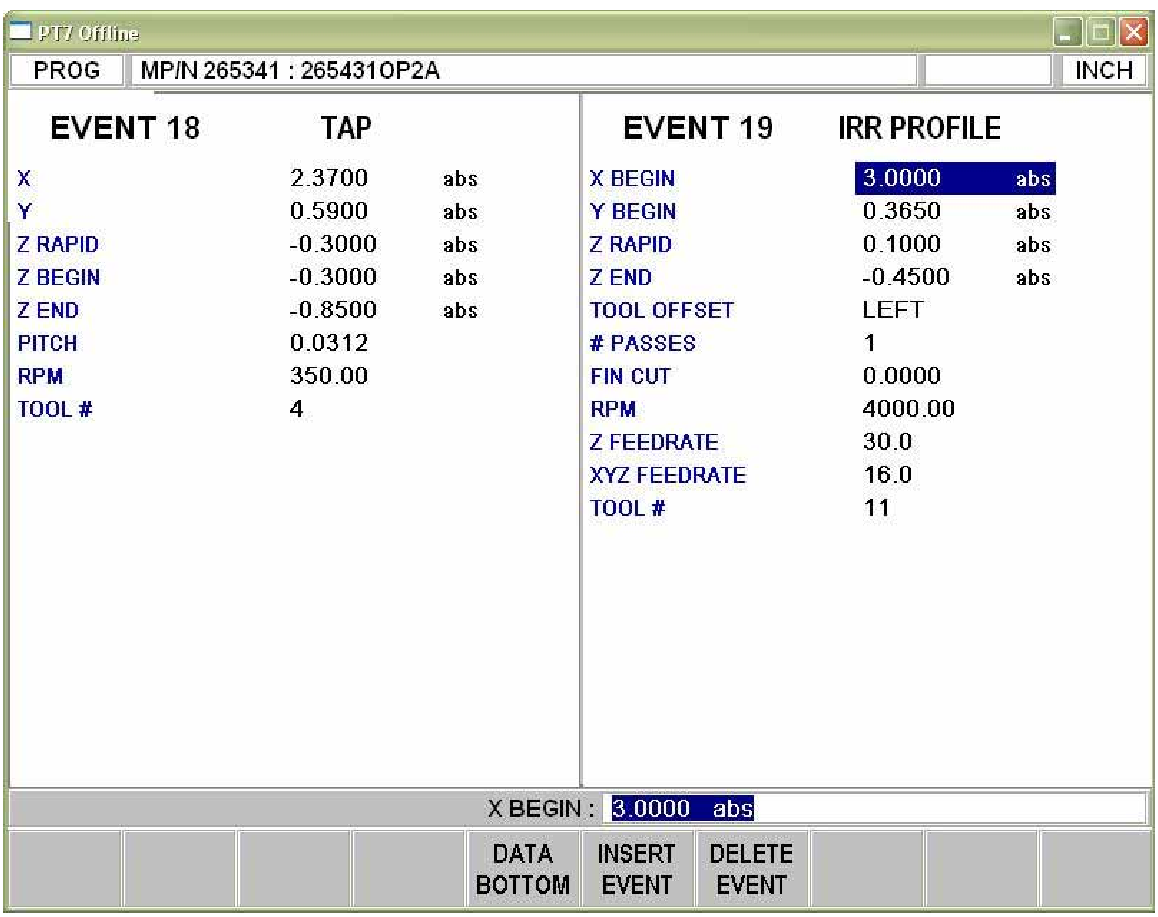

PT7 Offline
PROG
MP/N 265341 : 265431OP2A
INCH
EVENT 8
IRR PROFILE
X BEGIN 3.0000 abs
Y BEGIN -0.5000 abs
Z RAPID 0.1000 abs
Z END -0.8000 abs
TOOL OFFSET LEFT
PASSES 1
FIN CUT 0.0000
RPM 1200.00
Z FEEDRATE 30.0
XYZ FEEDRATE 10.0
TOOL # 1
Select
1, for YES
2, for NO.
EVENT 9
A.G.E. MILL
OK
TANGENT
X END 0.0000 inc
Y END 0.8400 abs
CONRAD 0.2500
ANGLE END
LENGTH
LINE ANGLE
TANGENT :
DATA BOTTOM
INSERT EVENT
DELETE EVENT

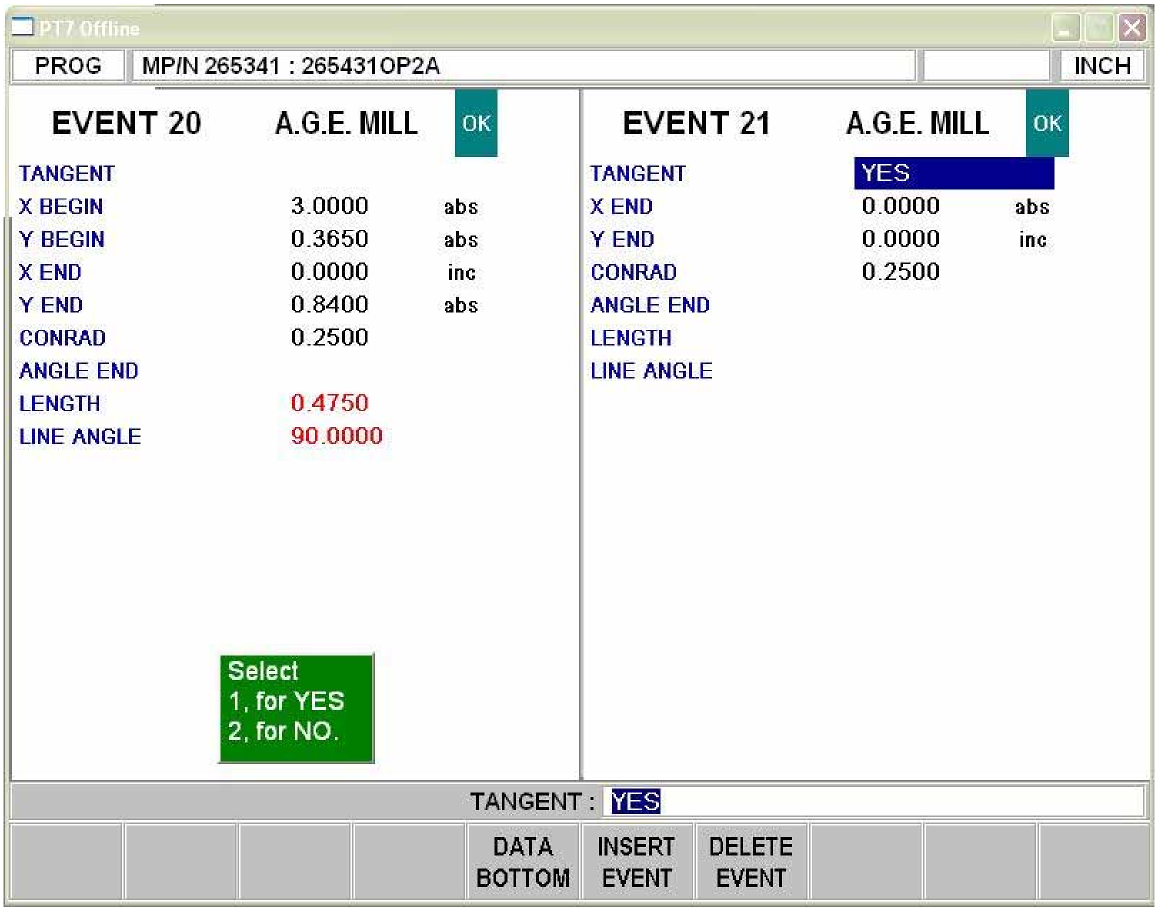

PT7 Offline
PROG
MP/N 265341 : 265431OP2A
INCH
EVENT 10
A.G.E. MILL
OK
TANGENT YES
X BEGIN 3.0000 abs
Y BEGIN 0.8400 abs
X END 0.0000 abs
Y END 0.0000 inc
CONRAD 0.2500
ANGLE END
LENGTH 3.0000
LINE ANGLE 180.0000
Select
1, for YES
2, for NO.
EVENT 11
A.G.E. MILL
OK
TANGENT YES
X END 0.0000 inc
Y END -0.5000 abs
CONRAD
ANGLE END
LENGTH
LINE ANGLE
TANGENT : YES
DATA BOTTOM
INSERT EVENT
DELETE EVENT

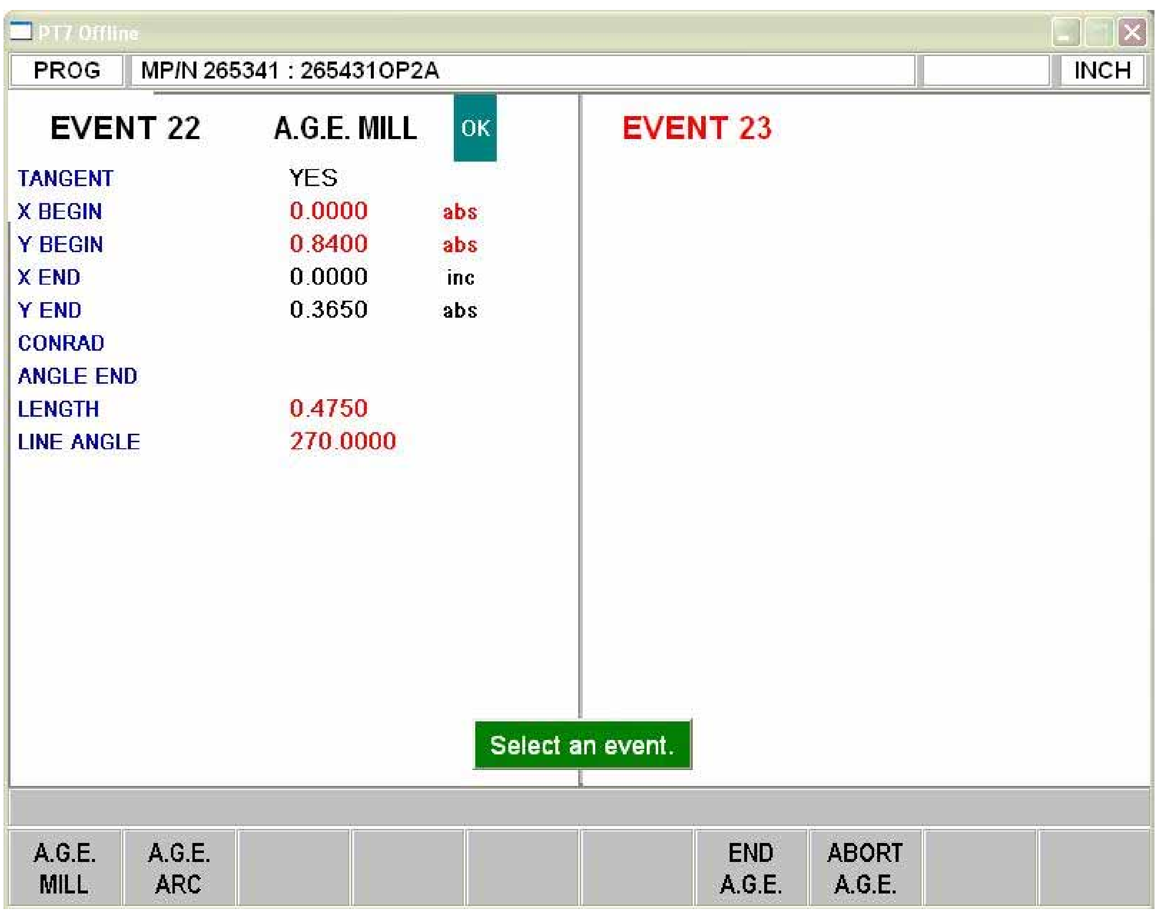

PT7 Offline
PROG
MP/N 265341 : 265431OP2A
INCH
EVENT 12 MILL
X BEGIN 3.5000 abs
Y BEGIN 0.2200 abs
Z RAPID 0.1000 abs
Z BEGIN -0.4100 abs
X END -0.5000 abs
Y END 0.0000 inc
Z END 0.0000 inc
CONRAD 0.0000
TOOL OFFSET LEFT
RPM 1200.00
Z FEEDRATE 30.0
XYZ FEEDRATE 12.0
TOOL # 1
Select
1, for Drill
2, for Bore.
EVENT 13 DRILL
DRILL OR BORE DRILL
X 0.6200 abs
Y 0.5900 abs
Z RAPID -0.3000 abs
Z END -0.4950 abs
PECKS FOR DRILL 1
RPM 1000.00
Z FEEDRATE 6.0
TOOL # 7
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 265431OP2A
INCH
EVENT 14 DRILL
DRILL OR BORE DRILL
X 2.3700 abs
Y 0.5900 abs
Z RAPID -0.3000 abs
Z END -0.4950 abs
PECKS FOR DRILL 1
RPM 1000.00
Z FEEDRATE 6.0
TOOL # 7
Select
1, for Drill
2, for Bore.
EVENT 15 DRILL
DRILL OR BORE DRILL
X 0.6200 abs
Y 0.5900 abs
Z RAPID -0.3000 abs
Z END -0.8500 abs
OF FIXED PECKS 4
RPM 2200.00
Z FEEDRATE 6.0
TOOL # 3
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 265431OP2A
INCH
EVENT 16
DRILL
DRILL OR BORE DRILL
X 2.3700 abs
Y 0.5900 abs
Z RAPID -0.3000 abs
Z END -0.8500 abs
OF FIXED PECKS 4
RPM 2200.00
Z FEEDRATE 6.0
TOOL # 3
EVENT 17
TAP
X 0.6200 abs
Y 0.5900 abs
Z RAPID -0.3000 abs
Z BEGIN -0.3000 abs
Z END -0.8500 abs
PITCH 0.0312
RPM 350.00
TOOL # 4
?
X : 0.6200 abs
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 265431OP2A
INCH
EVENT 18
TAP
X 2.3700 abs
Y 0.5900 abs
Z RAPID -0.3000 abs
Z BEGIN -0.3000 abs
Z END -0.8500 abs
PITCH 0.0312
RPM 350.00
TOOL # 4
EVENT 19
IRR PROFILE
X BEGIN 3.0000 abs
Y BEGIN 0.3650 abs
Z RAPID 0.1000 abs
Z END -0.4500 abs
TOOL OFFSET LEFT
PASSES 1
FIN CUT 0.0000
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
TANGENT
X BEGIN 3.0000 abs
Y BEGIN 0.3650 abs
X END 0.0000 inc
Y END 0.8400 abs
CONRAD 0.2500
ANGLE END
LENGTH 0.4750
LINE ANGLE 90.0000
EVENT 21
A.G.E. MILL
OK
TANGENT YES
X END 0.0000 abs
Y END 0.0000 inc
CONRAD 0.2500
ANGLE END
LENGTH
LINE ANGLE
Select
1, for YES
2, for NO.
TANGENT : YES
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 265431OP2A
INCH
EVENT 22
A.G.E. MILL
OK
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
EVENT 23
Select an event.
A.G.E. MILL
A.G.E. ARC
END A.G.E.
ABORT A.G.E.

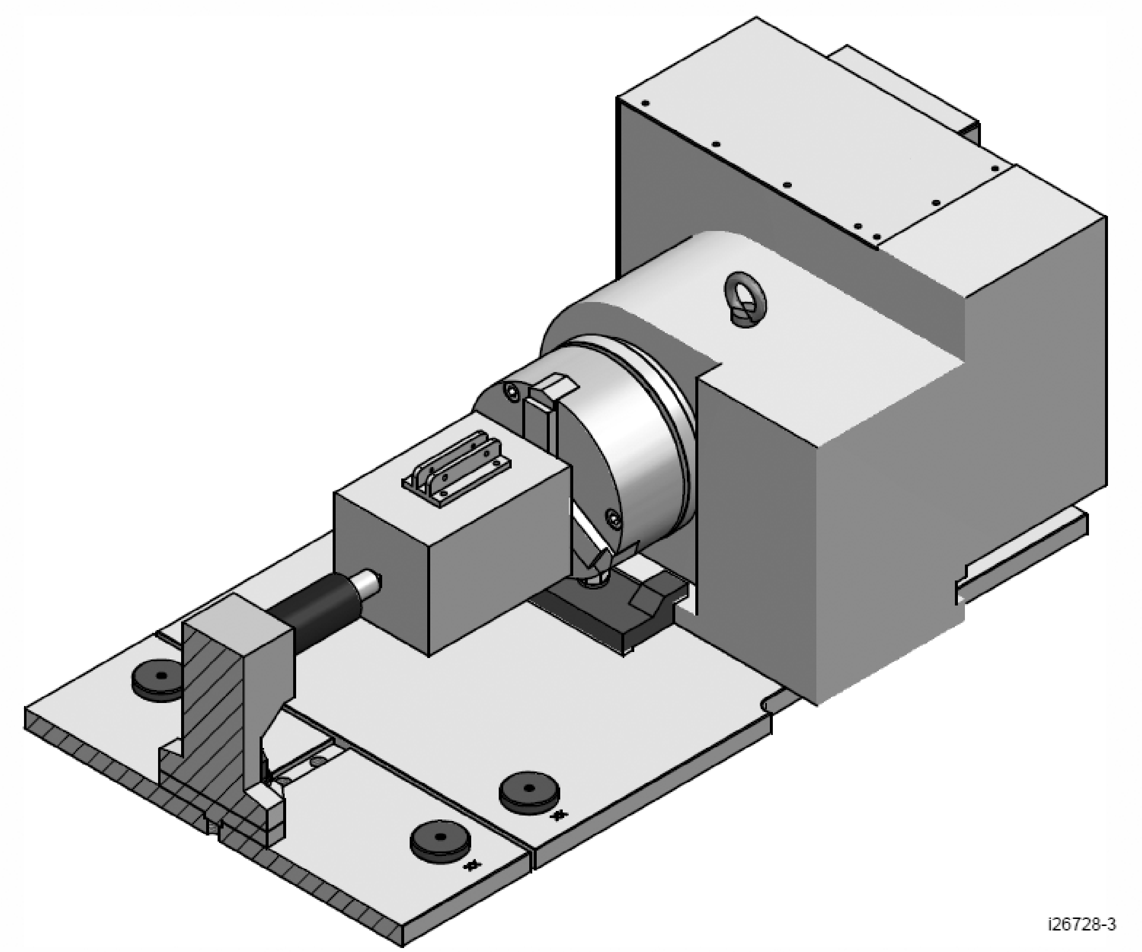
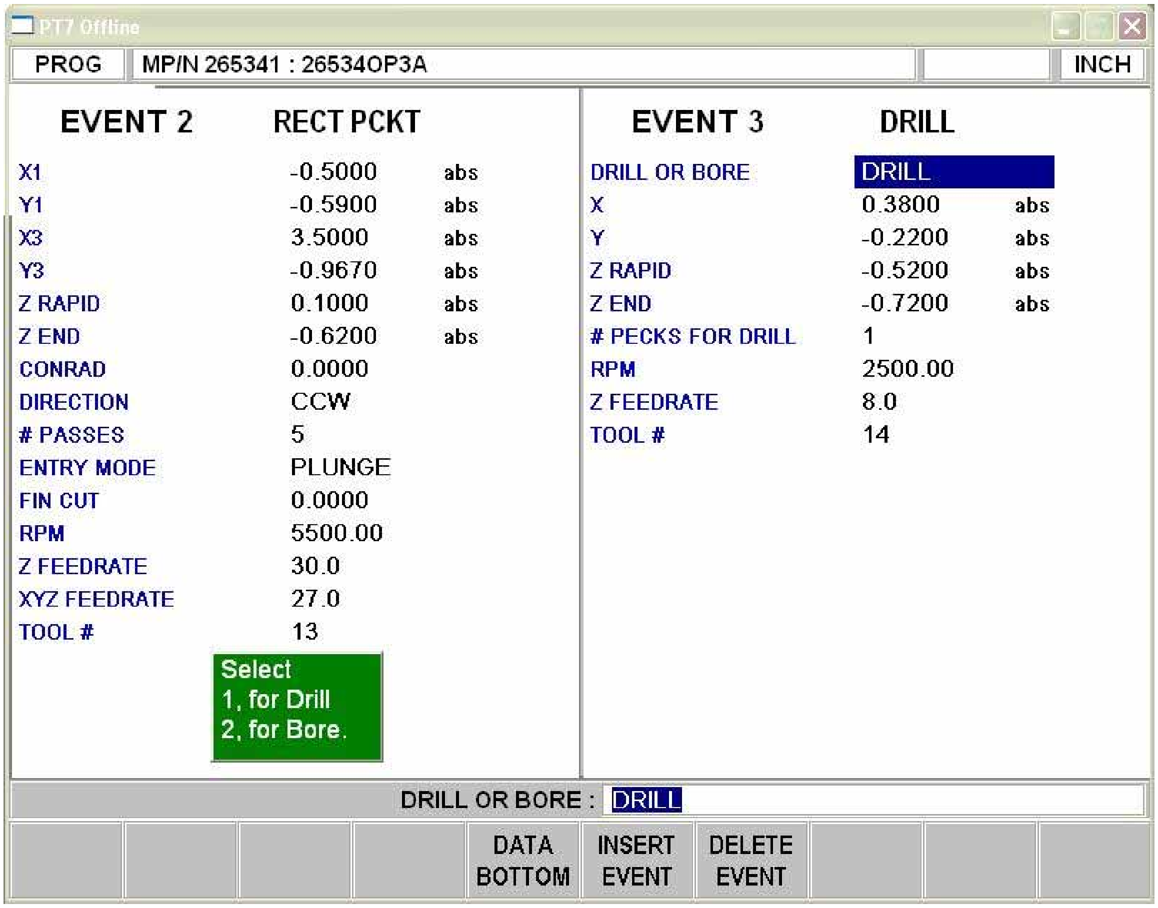
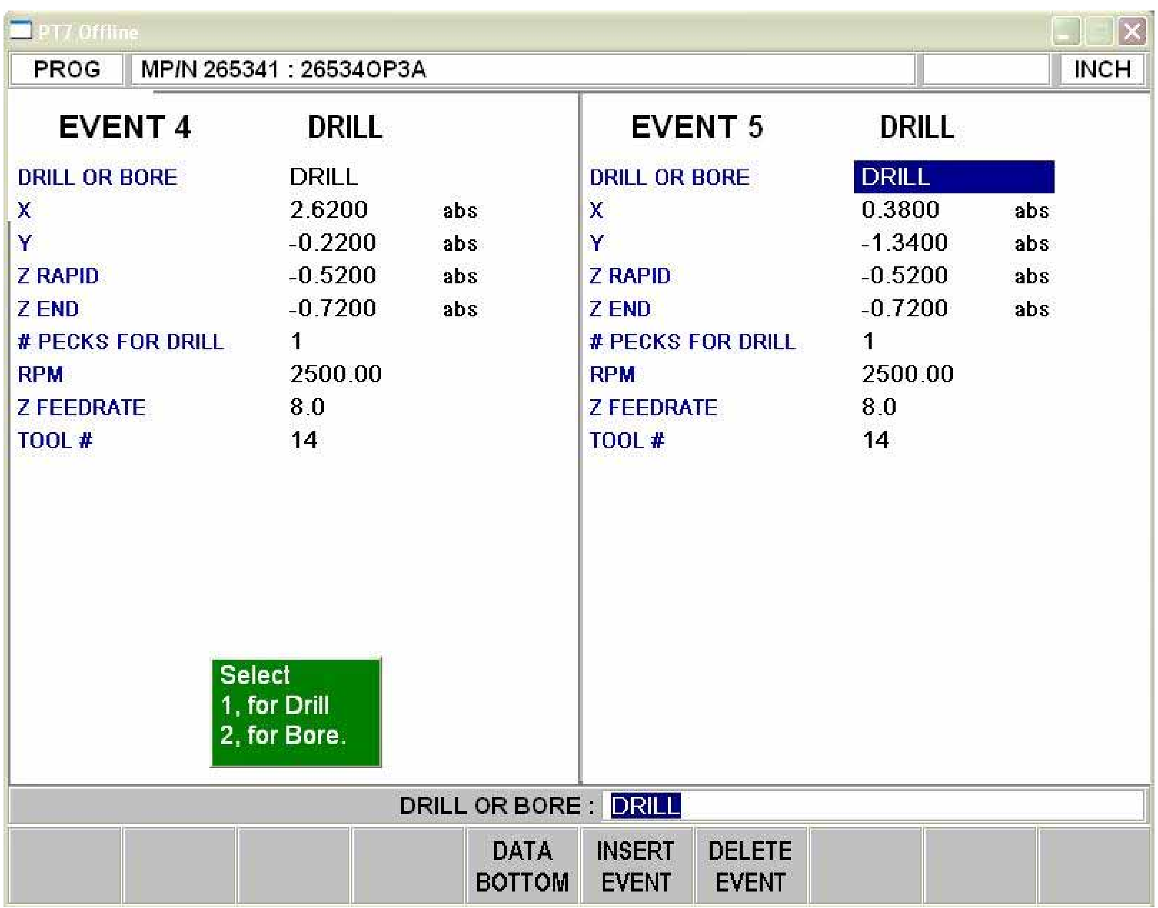
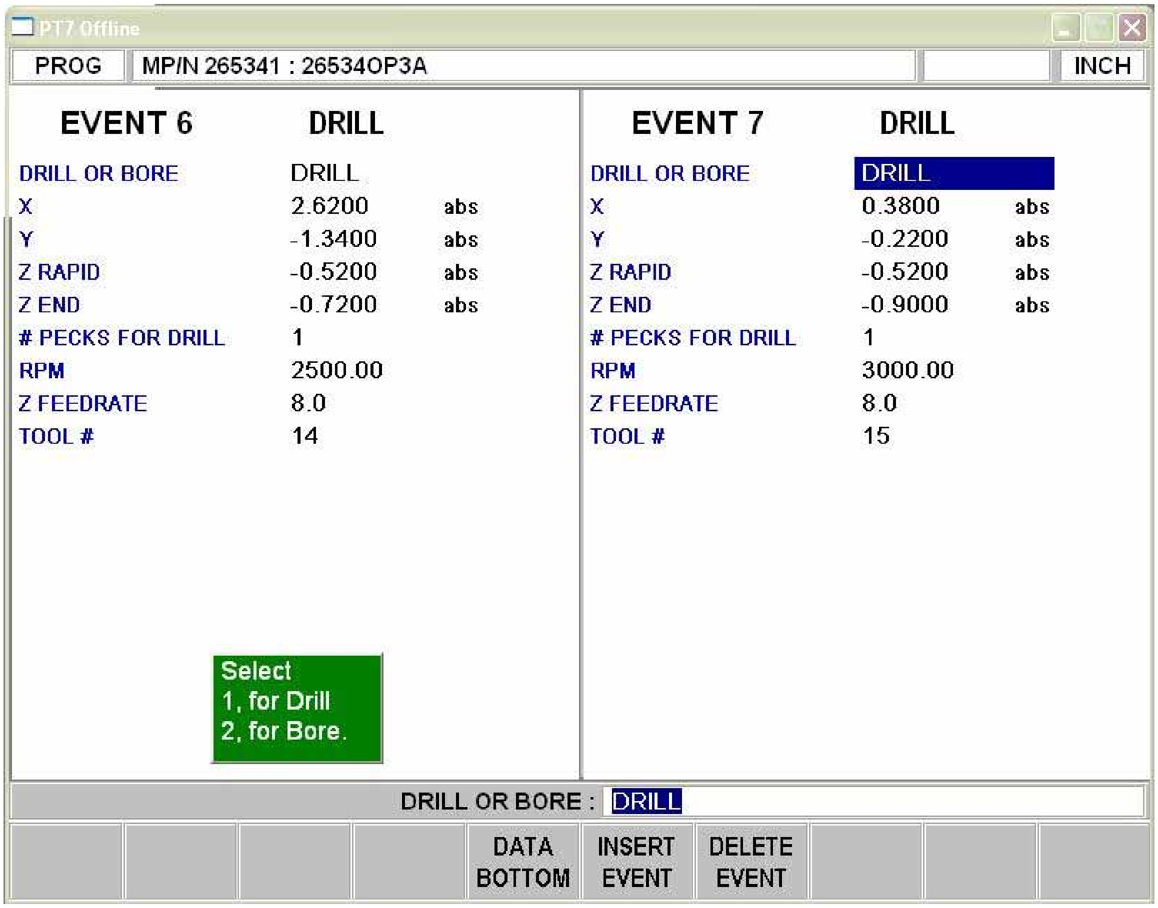


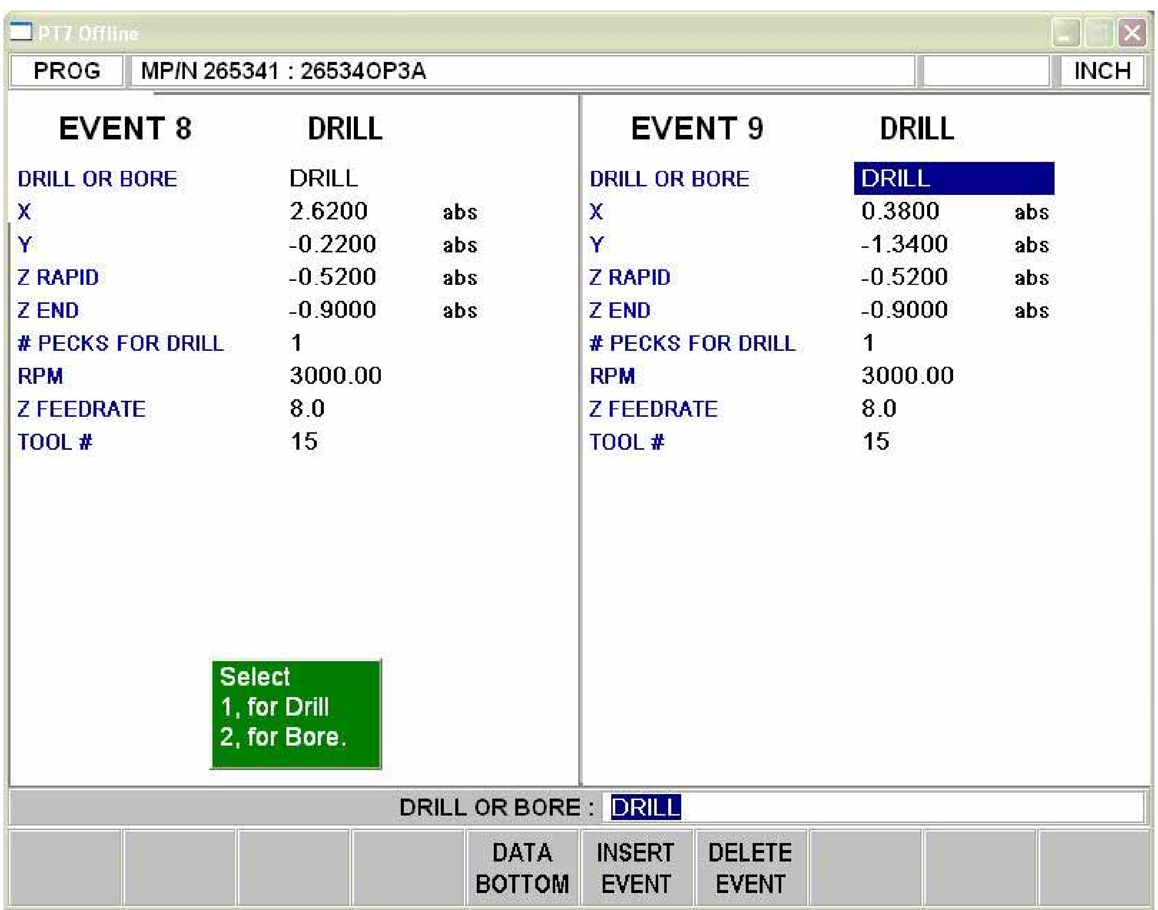
Fig 5
Trunnion at 0.000 degrees

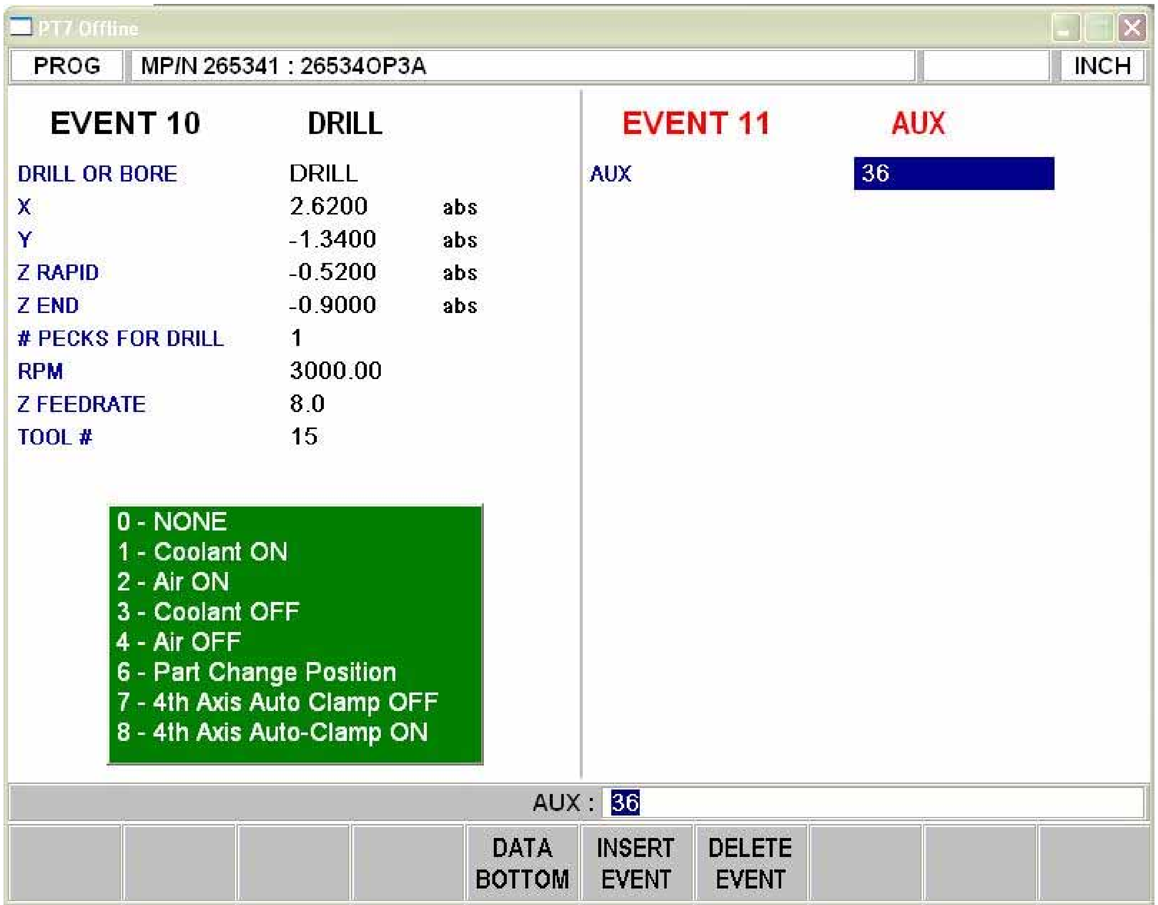
- **OPERATION 3:**
    - **EVENT 1:** Using a .312” dia. roughing end mill to rough mill the center slot
    - **EVENT 2:** Using a .312” dia. finish end mill to finish mill the center slot
    - **EVENT 3 thru 6:** Using a .25” dia. center drill to center drill 4 holes
    - **EVENT 7 thru 10:** Using 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 PCKT
X1 -0.5000 abs
Y1 -0.5900 abs
X3 3.5000 abs
Y3 -0.9670 abs
Z RAPID 0.1000 abs
Z END -0.6200 abs
CONRAD 0.0000
DIRECTION CCW
PASSES 5
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.
EVENT 3
DRILL
DRILL OR BORE DRILL
X 0.3800 abs
Y -0.2200 abs
Z RAPID -0.5200 abs
Z END -0.7200 abs
PECKS FOR DRILL 1
RPM 2500.00
Z FEEDRATE 8.0
TOOL # 14
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 26534OP3A
INCH
EVENT 4
DRILL
DRILL OR BORE DRILL
X 2.6200 abs
Y -0.2200 abs
Z RAPID -0.5200 abs
Z END -0.7200 abs
PECKS FOR DRILL 1
RPM 2500.00
Z FEEDRATE 8.0
TOOL # 14
Select
1, for Drill
2, for Bore.
EVENT 5
DRILL
DRILL OR BORE DRILL
X 0.3800 abs
Y -1.3400 abs
Z RAPID -0.5200 abs
Z END -0.7200 abs
PECKS FOR DRILL 1
RPM 2500.00
Z FEEDRATE 8.0
TOOL # 14
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 26534OP3A
INCH
EVENT 6 DRILL
DRILL OR BORE DRILL
X 2.6200 abs
Y -1.3400 abs
Z RAPID -0.5200 abs
Z END -0.7200 abs
PECKS FOR DRILL 1
RPM 2500.00
Z FEEDRATE 8.0
TOOL # 14
Select
1, for Drill
2, for Bore.
EVENT 7 DRILL
DRILL OR BORE DRILL
X 0.3800 abs
Y -0.2200 abs
Z RAPID -0.5200 abs
Z END -0.9000 abs
PECKS FOR DRILL 1
RPM 3000.00
Z FEEDRATE 8.0
TOOL # 15
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 26534OP3A
INCH
EVENT 8 DRILL
DRILL OR BORE DRILL
X 2.6200 abs
Y -0.2200 abs
Z RAPID -0.5200 abs
Z END -0.9000 abs
PECKS FOR DRILL 1
RPM 3000.00
Z FEEDRATE 8.0
TOOL # 15
Select
1, for Drill
2, for Bore.
EVENT 9 DRILL
DRILL OR BORE DRILL
X 0.3800 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
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265341 : 26534OP3A
INCH
EVENT 10 DRILL
DRILL OR BORE DRILL
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
EVENT 11 AUX
AUX 36
AUX : 36
DATA BOTTOM
INSERT EVENT
DELETE EVENT

Program Example 3:

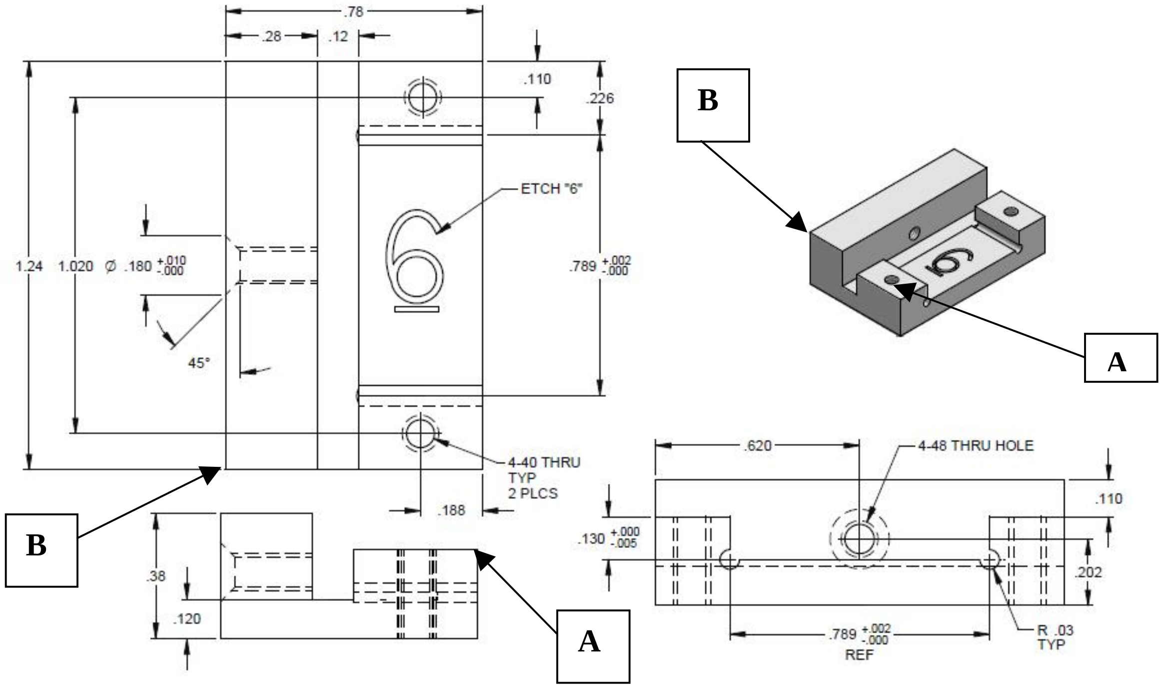


Fig -1

- **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.

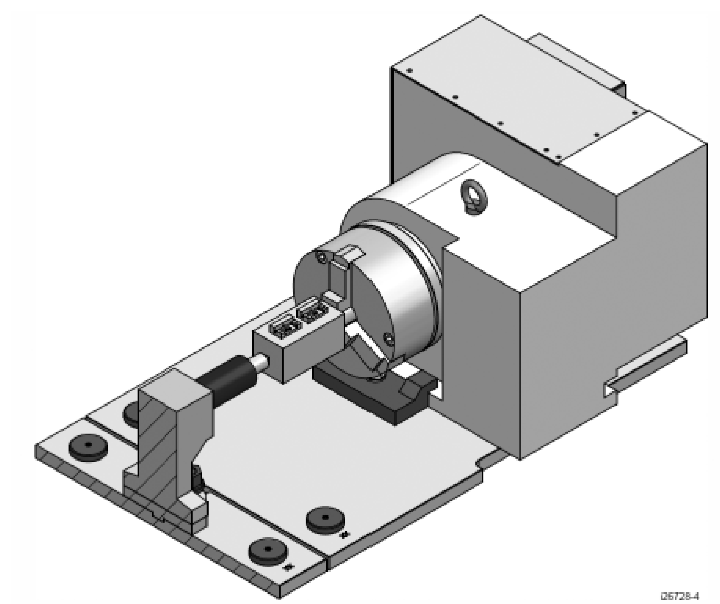


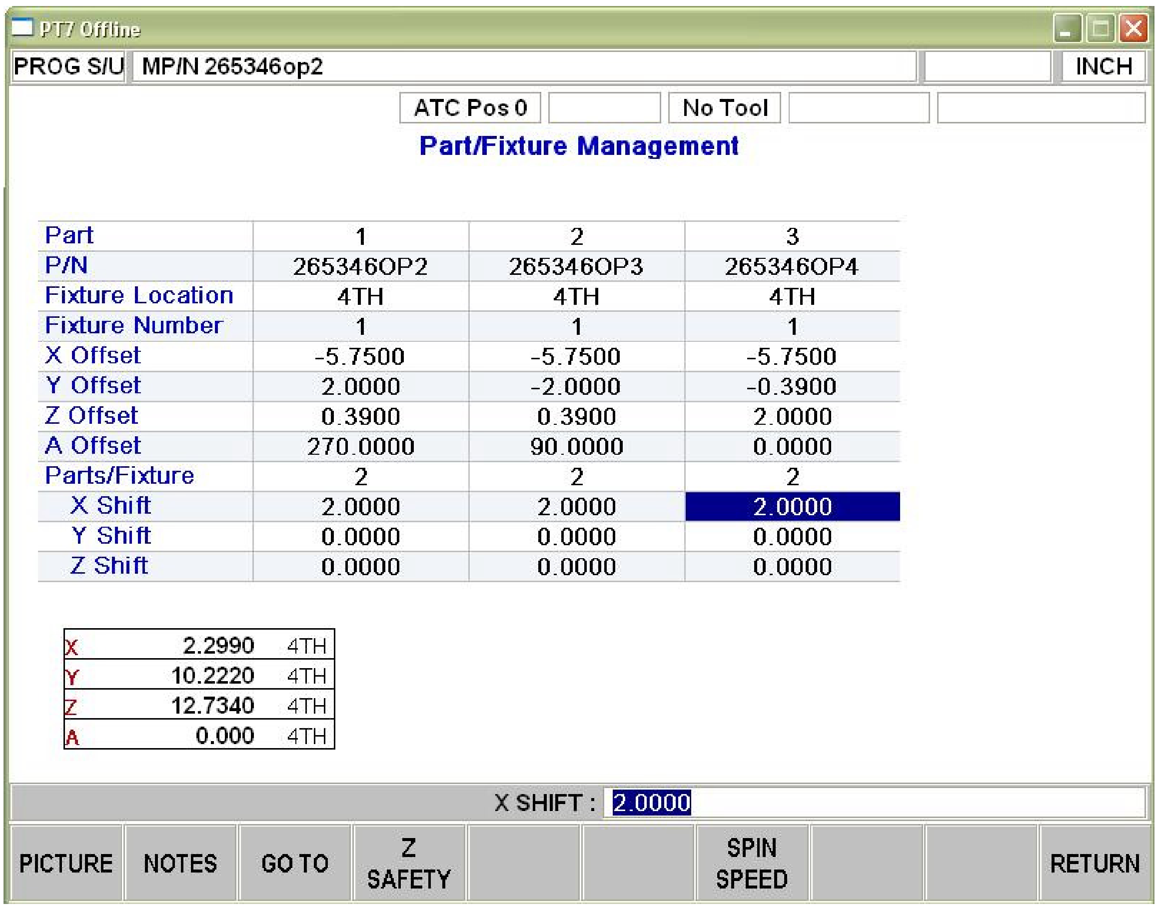
Fig 2

• **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.)

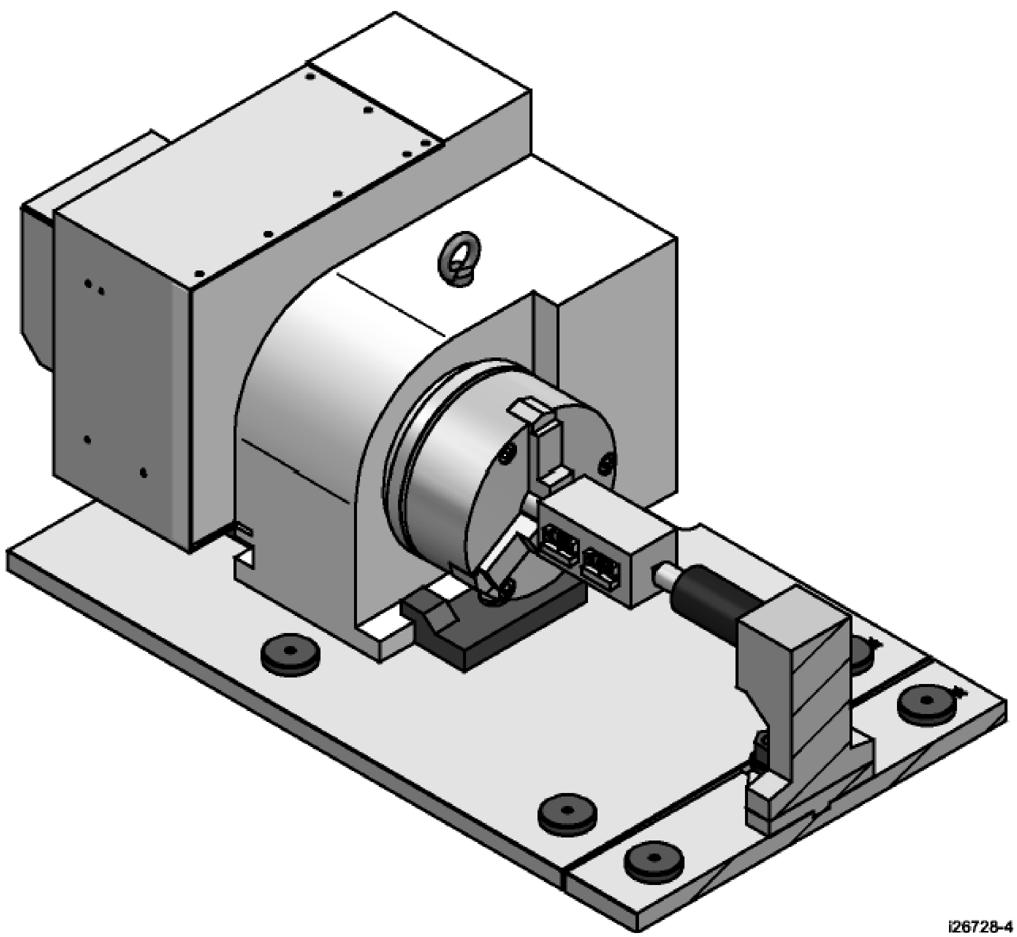
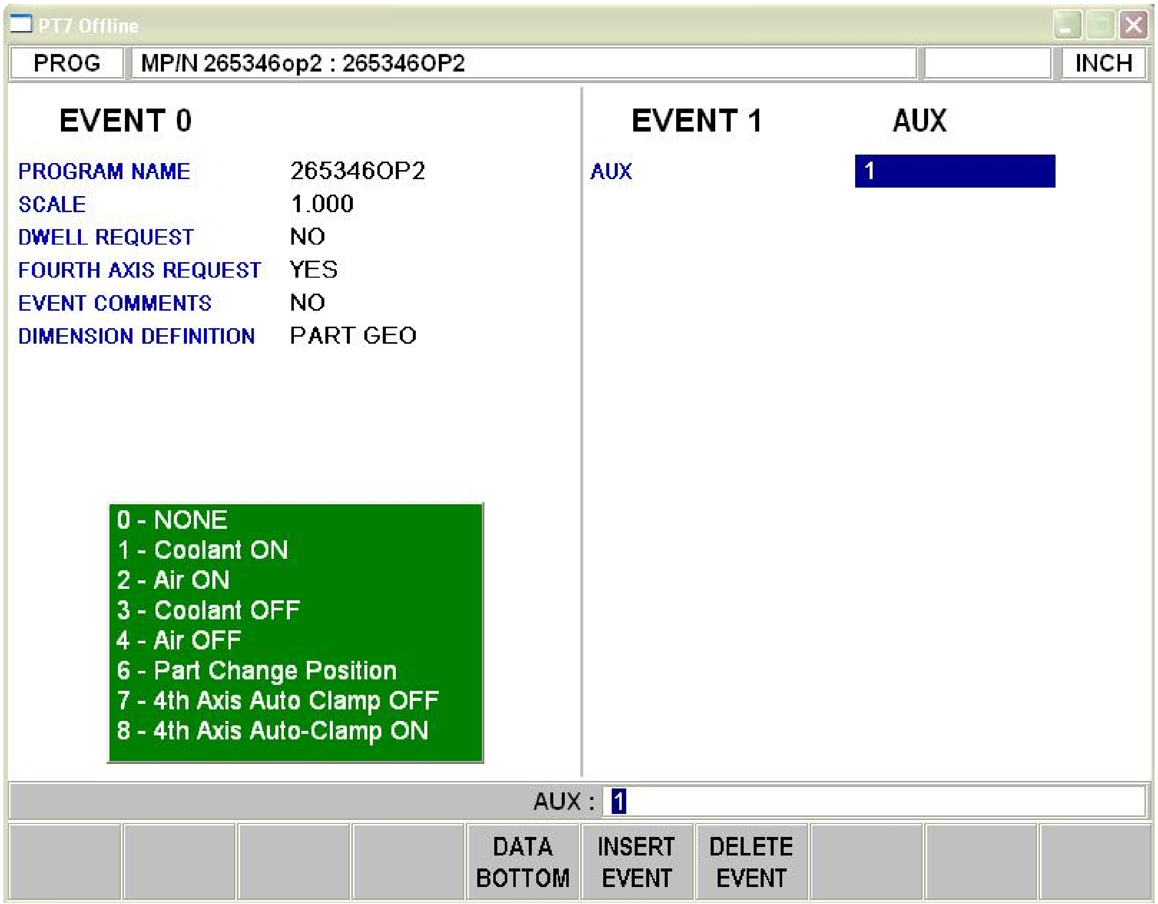
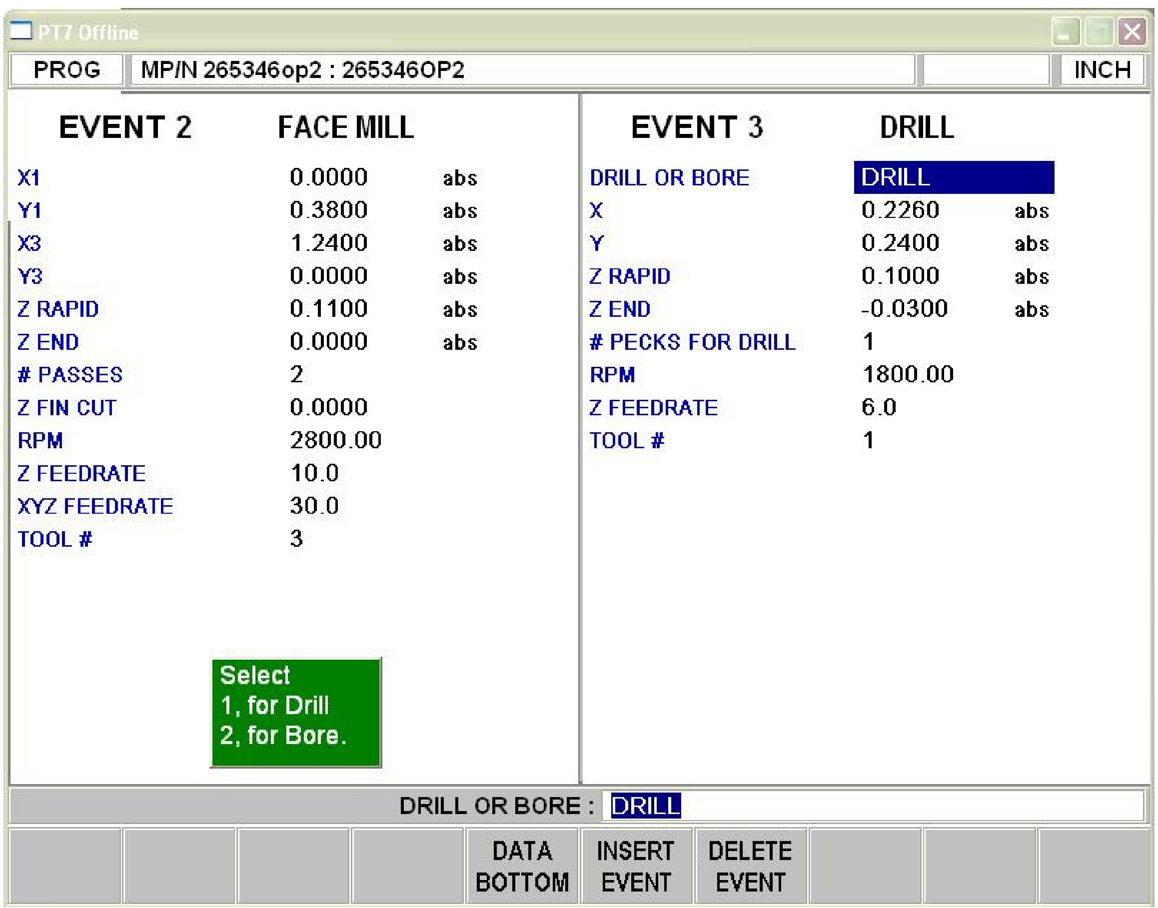
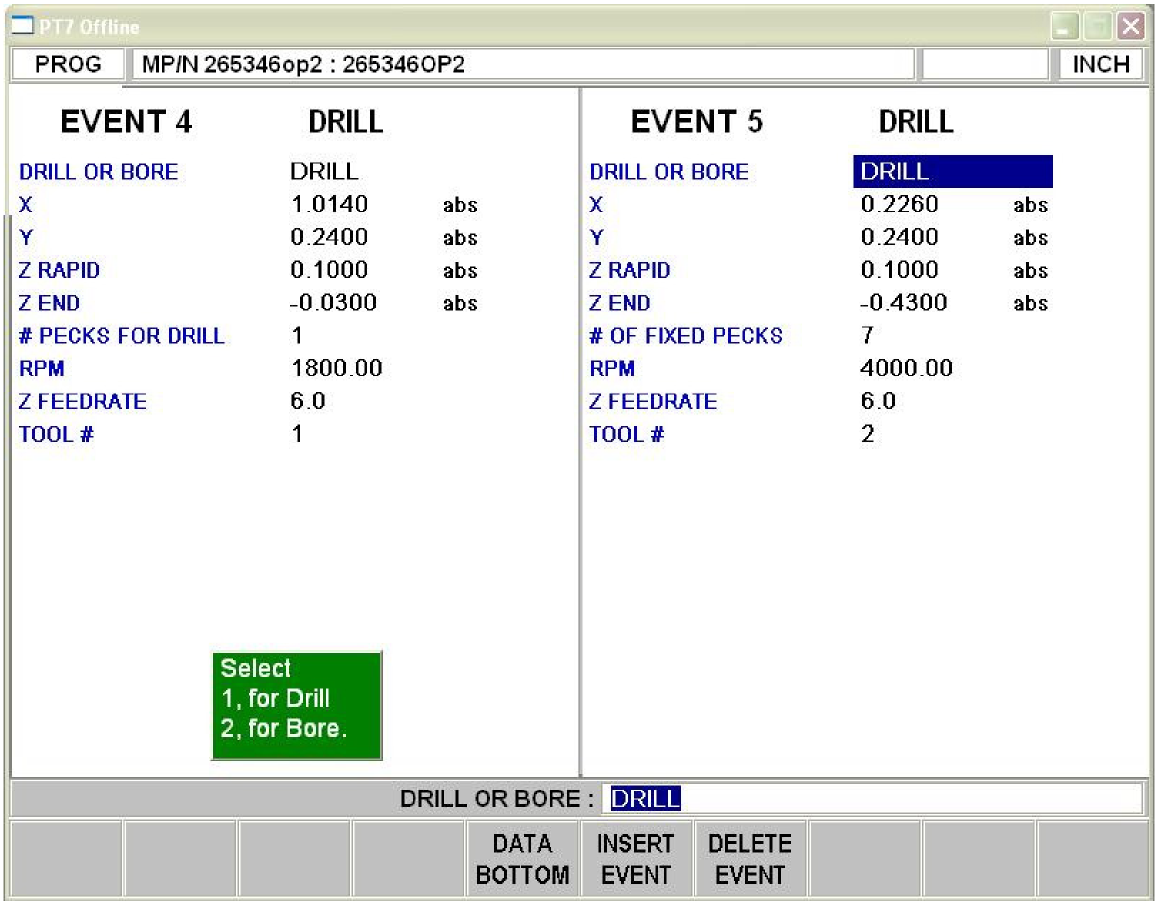
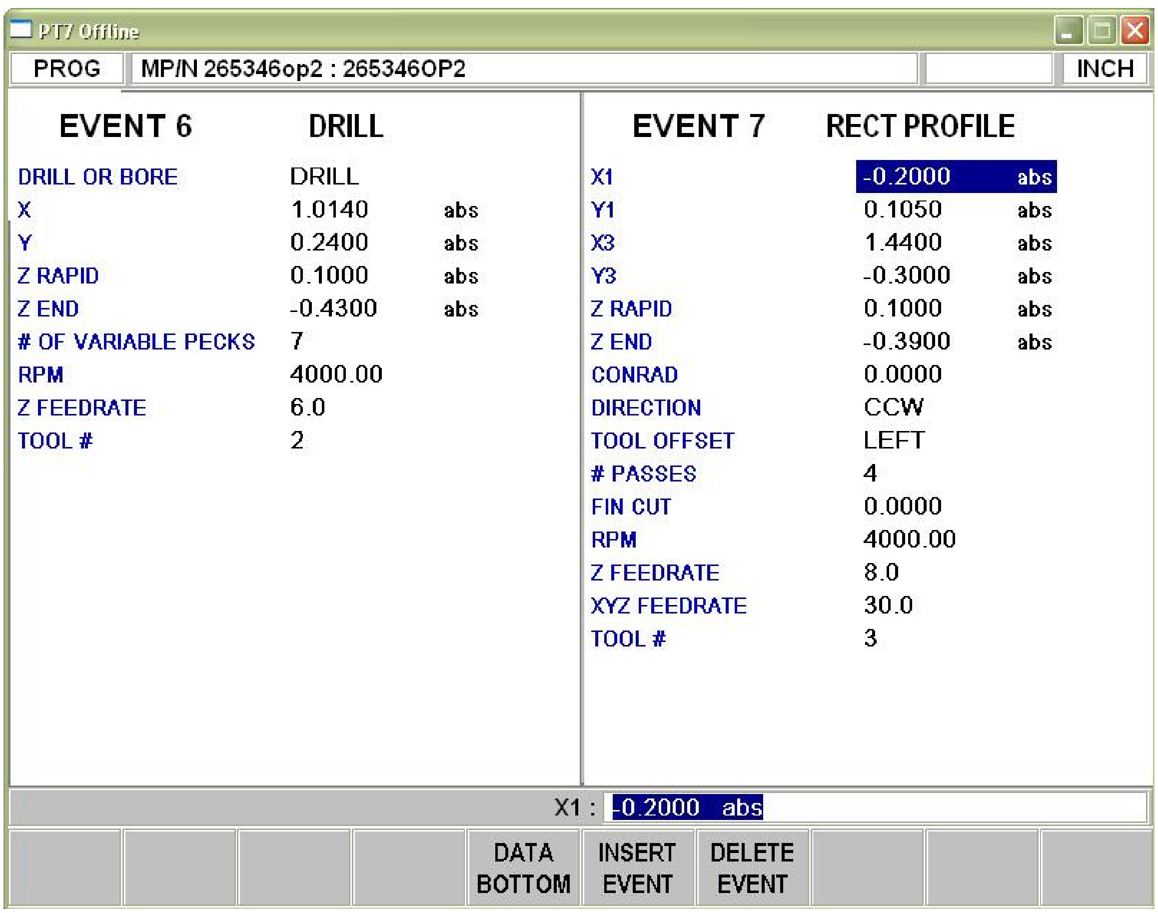


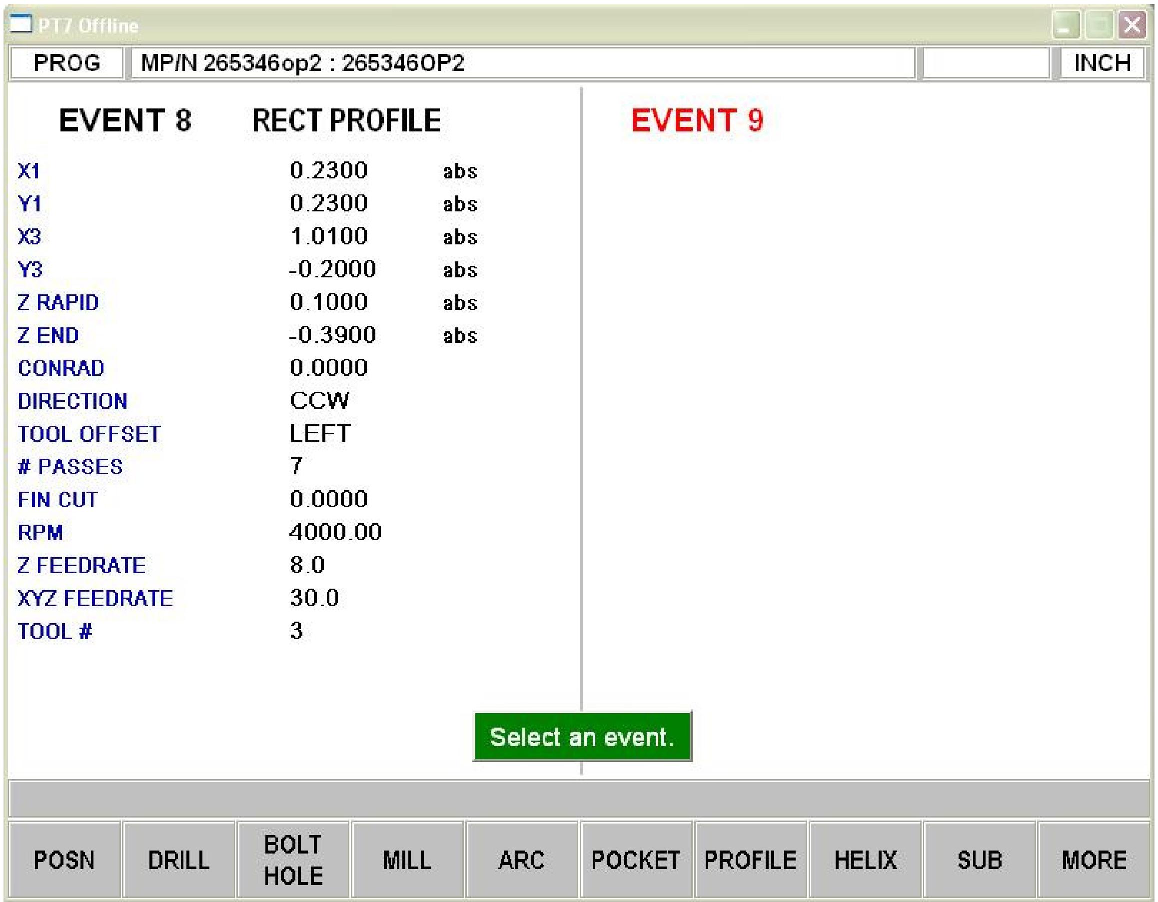
Fig 3
Trunnion at 270.000 degrees


PT7 Offline
PROG
MP/N 265346op2 : 265346OP2
INCH
EVENT 0
PROGRAM NAME 265346OP2
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
EVENT 1 AUX
AUX 1
AUX : 1
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265346op2 : 265346OP2
INCH
EVENT 2 FACE MILL
X1 0.0000 abs
Y1 0.3800 abs
X3 1.2400 abs
Y3 0.0000 abs
Z RAPID 0.1100 abs
Z END 0.0000 abs
PASSES 2
Z FIN CUT 0.0000
RPM 2800.00
Z FEEDRATE 10.0
XYZ FEEDRATE 30.0
TOOL # 3
Select
1, for Drill
2, for Bore.
EVENT 3 DRILL
DRILL OR BORE DRILL
X 0.2260 abs
Y 0.2400 abs
Z RAPID 0.1000 abs
Z END -0.0300 abs
PECKS FOR DRILL 1
RPM 1800.00
Z FEEDRATE 6.0
TOOL # 1
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265346op2 : 265346OP2
INCH
EVENT 4 DRILL
DRILL OR BORE DRILL
X 1.0140 abs
Y 0.2400 abs
Z RAPID 0.1000 abs
Z END -0.0300 abs
PECKS FOR DRILL 1
RPM 1800.00
Z FEEDRATE 6.0
TOOL # 1
EVENT 5 DRILL
DRILL OR BORE DRILL
X 0.2260 abs
Y 0.2400 abs
Z RAPID 0.1000 abs
Z END -0.4300 abs
OF FIXED PECKS 7
RPM 4000.00
Z FEEDRATE 6.0
TOOL # 2
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 6 DRILL
DRILL OR BORE DRILL
X 1.0140 abs
Y 0.2400 abs
Z RAPID 0.1000 abs
Z END -0.4300 abs
OF VARIABLE PECKS 7
RPM 4000.00
Z FEEDRATE 6.0
TOOL # 2
EVENT 7 RECT PROFILE
X1 -0.2000 abs
Y1 0.1050 abs
X3 1.4400 abs
Y3 -0.3000 abs
Z RAPID 0.1000 abs
Z END -0.3900 abs
CONRAD 0.0000
DIRECTION CCW
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 BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265346op2 : 265346OP2
INCH
EVENT 8
RECT PROFILE
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
EVENT 9
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

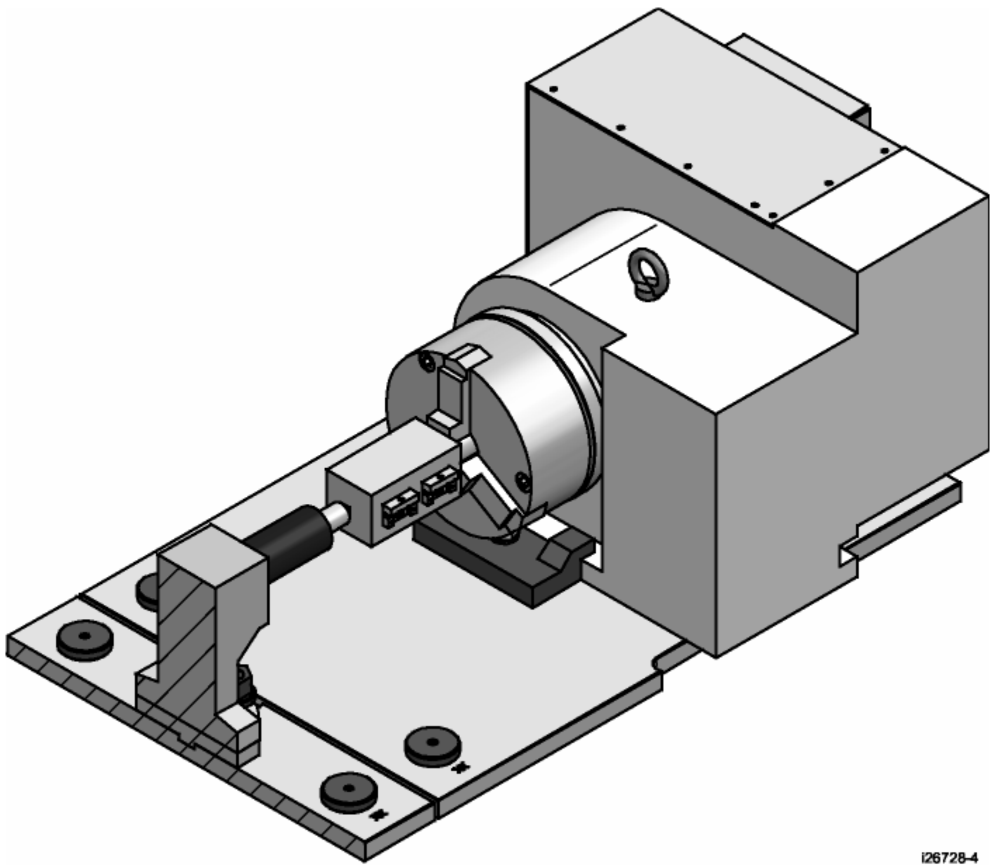
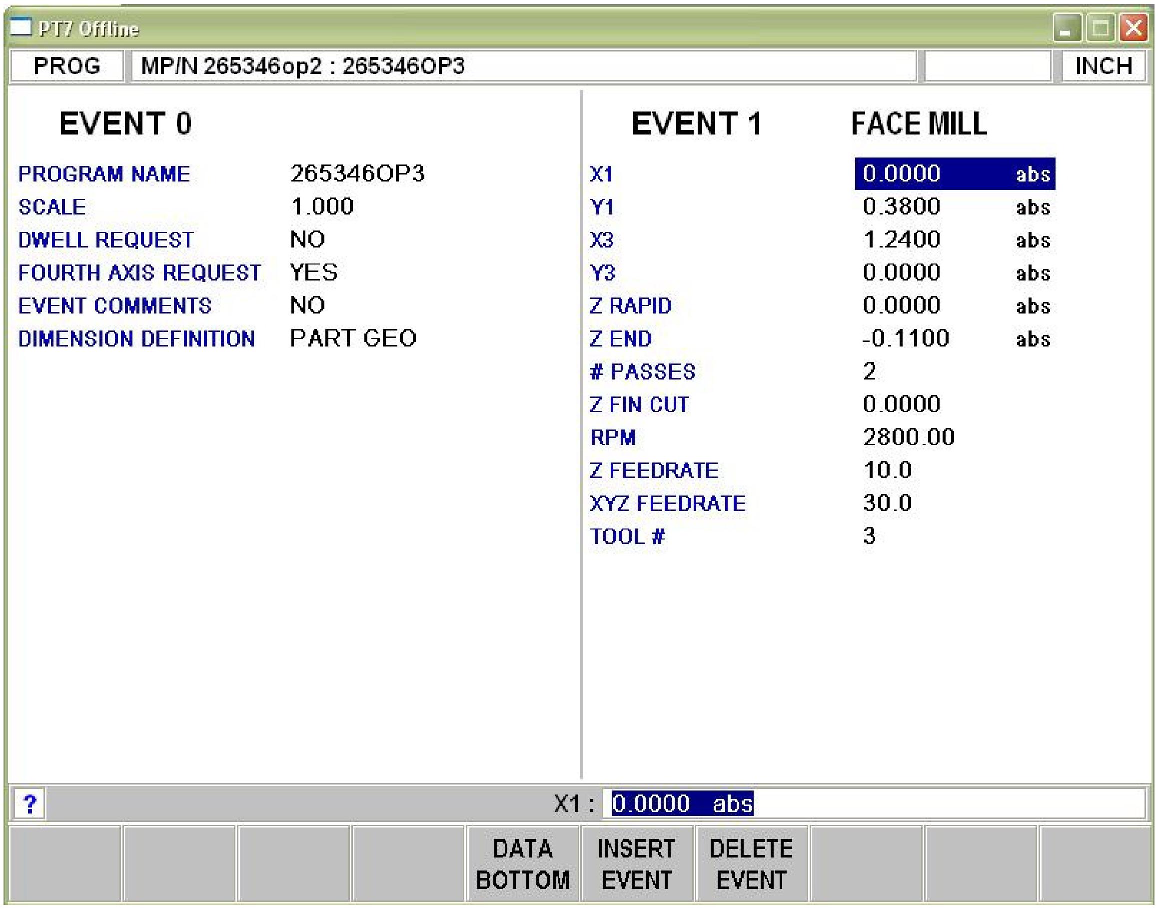
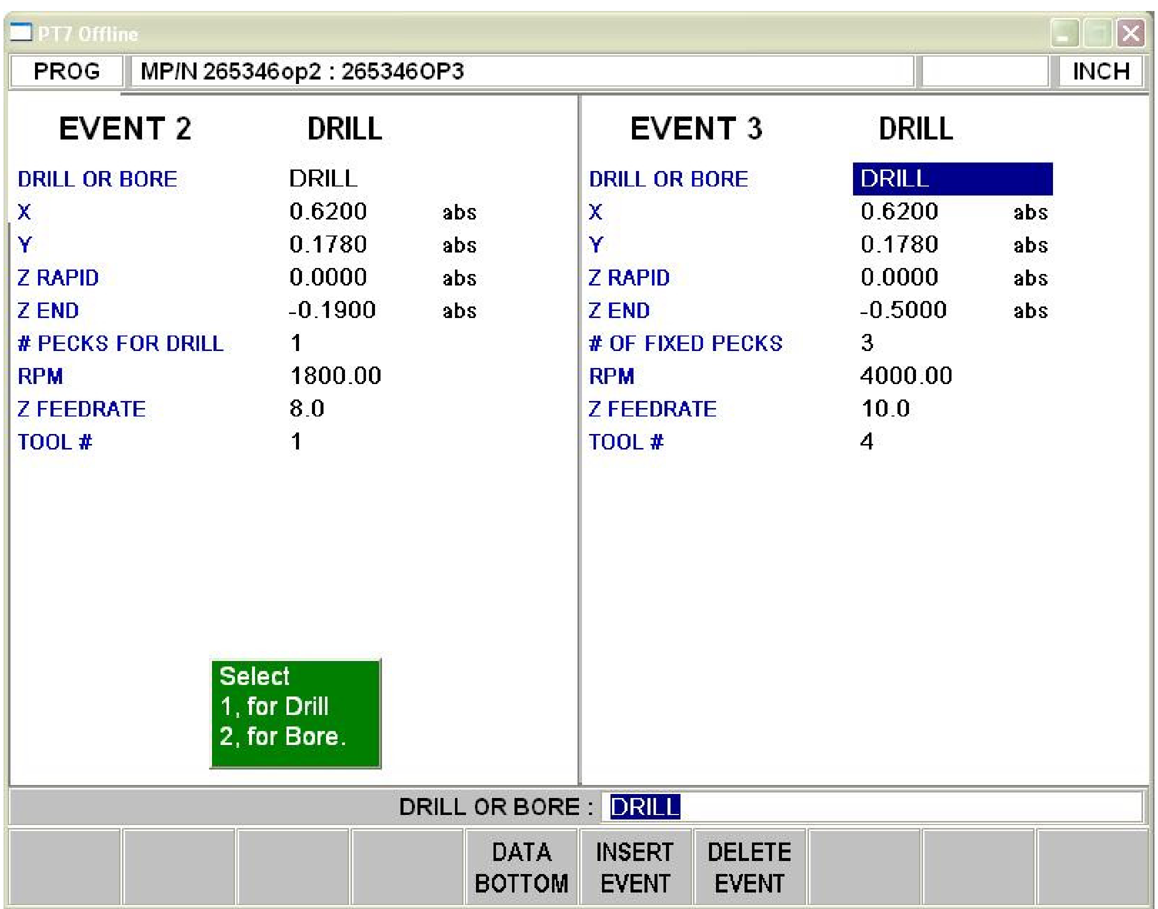
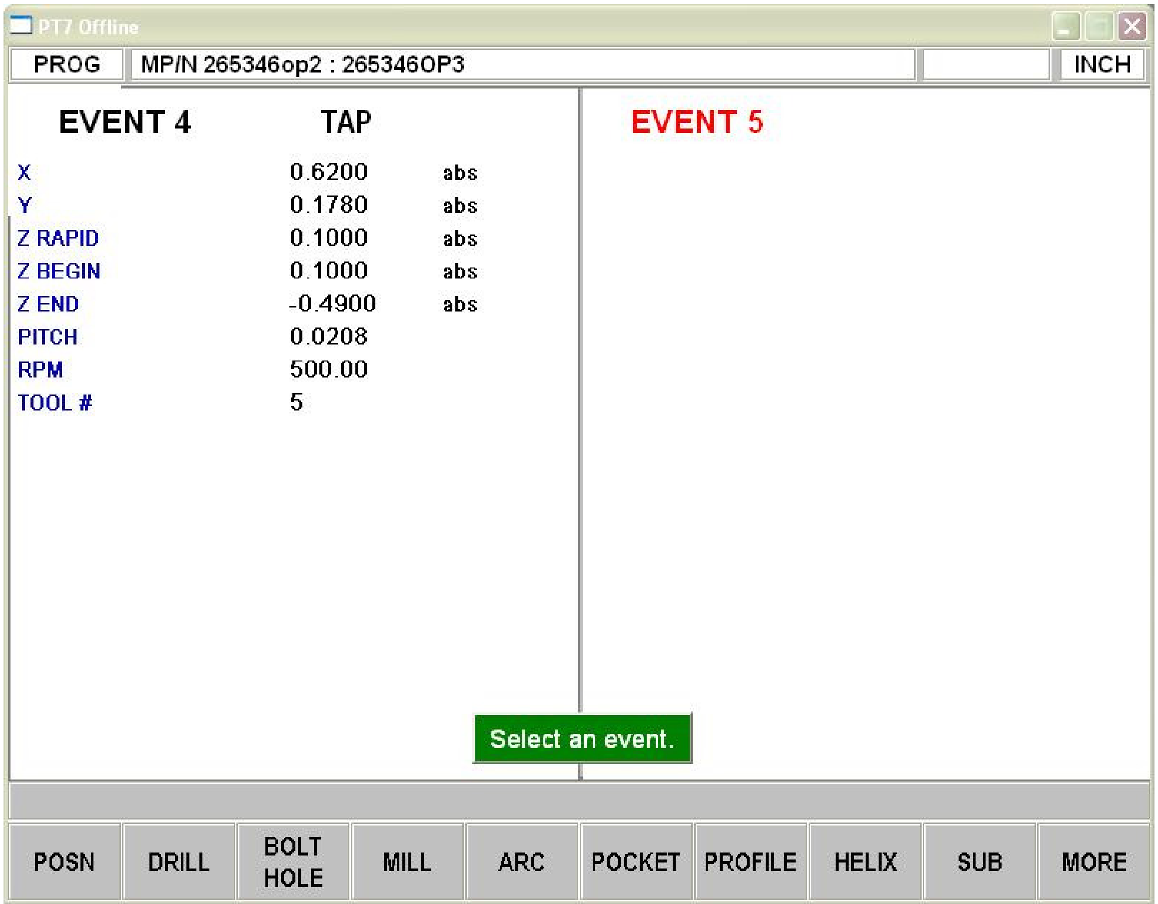


Fig 4
Trunnion at 90.000 degrees


PT7 Offline
PROG
MP/N 265346op2 : 265346OP3
INCH
EVENT 0
PROGRAM NAME 265346OP3
SCALE 1.000
DWELL REQUEST NO
FOURTH AXIS REQUEST YES
EVENT COMMENTS NO
DIMENSION DEFINITION PART GEO
EVENT 1 FACE MILL
X1 0.0000 abs
Y1 0.3800 abs
X3 1.2400 abs
Y3 0.0000 abs
Z RAPID 0.0000 abs
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 BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265346op2 : 265346OP3
INCH
EVENT 2 DRILL
DRILL OR BORE DRILL
X 0.6200 abs
Y 0.1780 abs
Z RAPID 0.0000 abs
Z END -0.1900 abs
PECKS FOR DRILL 1
RPM 1800.00
Z FEEDRATE 8.0
TOOL # 1
EVENT 3 DRILL
DRILL OR BORE DRILL
X 0.6200 abs
Y 0.1780 abs
Z RAPID 0.0000 abs
Z END -0.5000 abs
OF FIXED PECKS 3
RPM 4000.00
Z FEEDRATE 10.0
TOOL # 4
Select
1, for Drill
2, for Bore.
DRILL OR BORE : DRILL
DATA BOTTOM
INSERT EVENT
DELETE 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

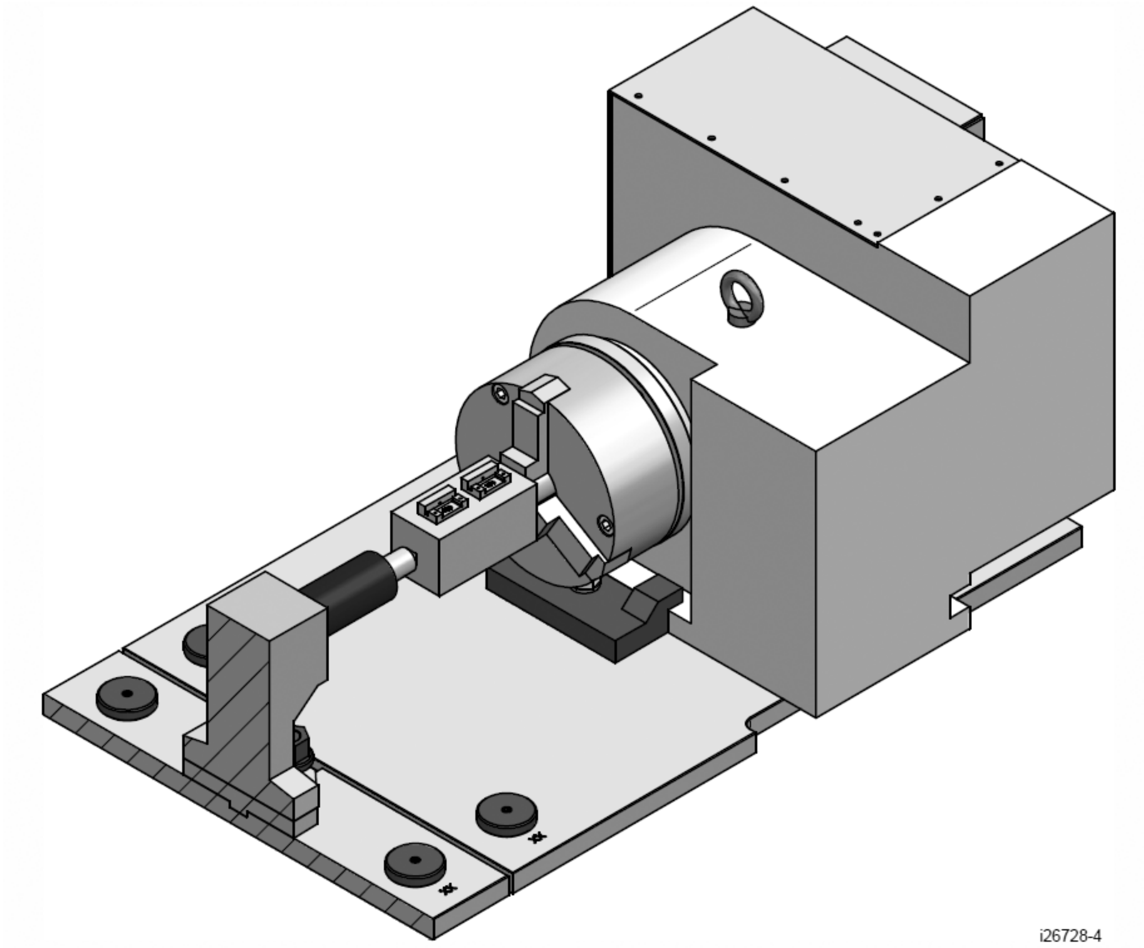


Fig 5
Trunnion at 0.000 degrees

PT7 Offline

PROG	MP/N 265346aop2 : 265346OP4		INCH

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

DATA BOTTOM | INSERT EVENT | DELETE EVENT

PT7 Offline

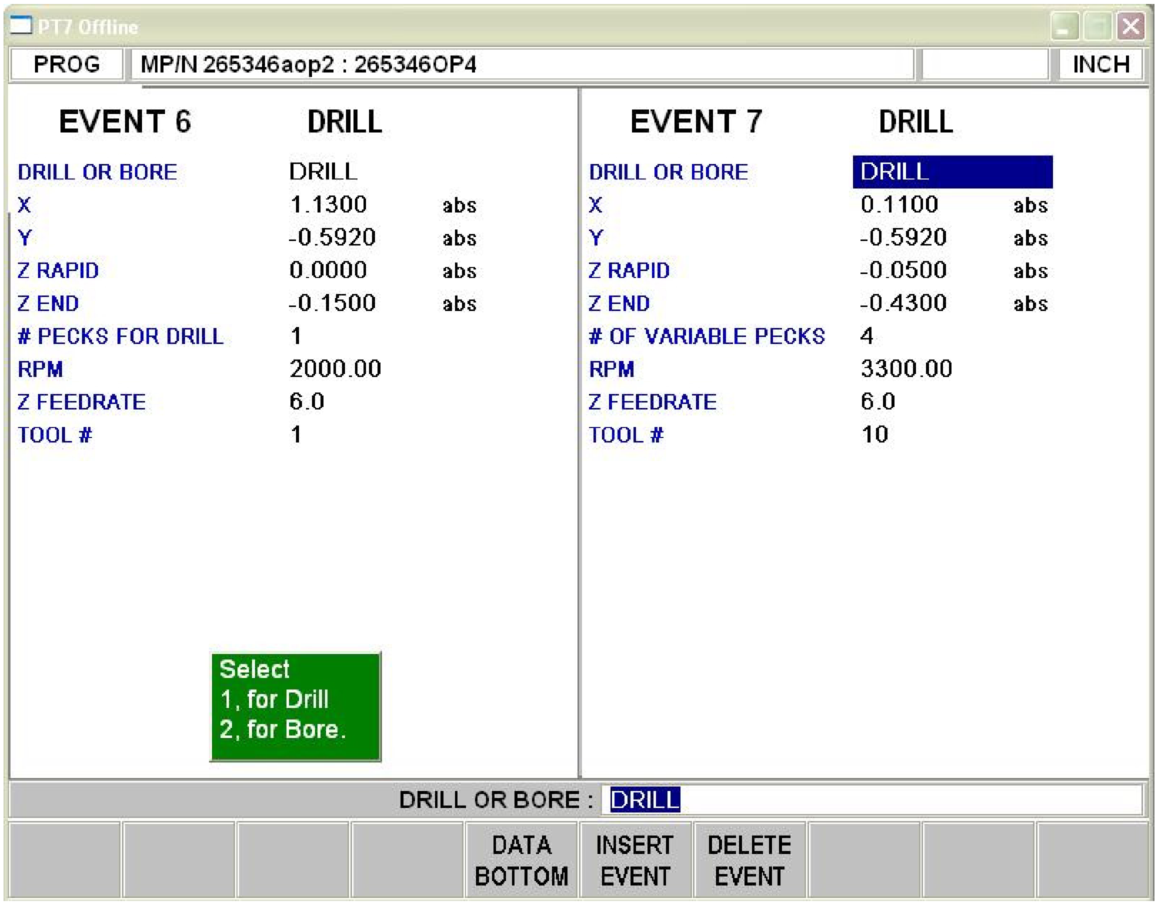
PROG	MP/N 265346aop2 : 265346OP4		INCH

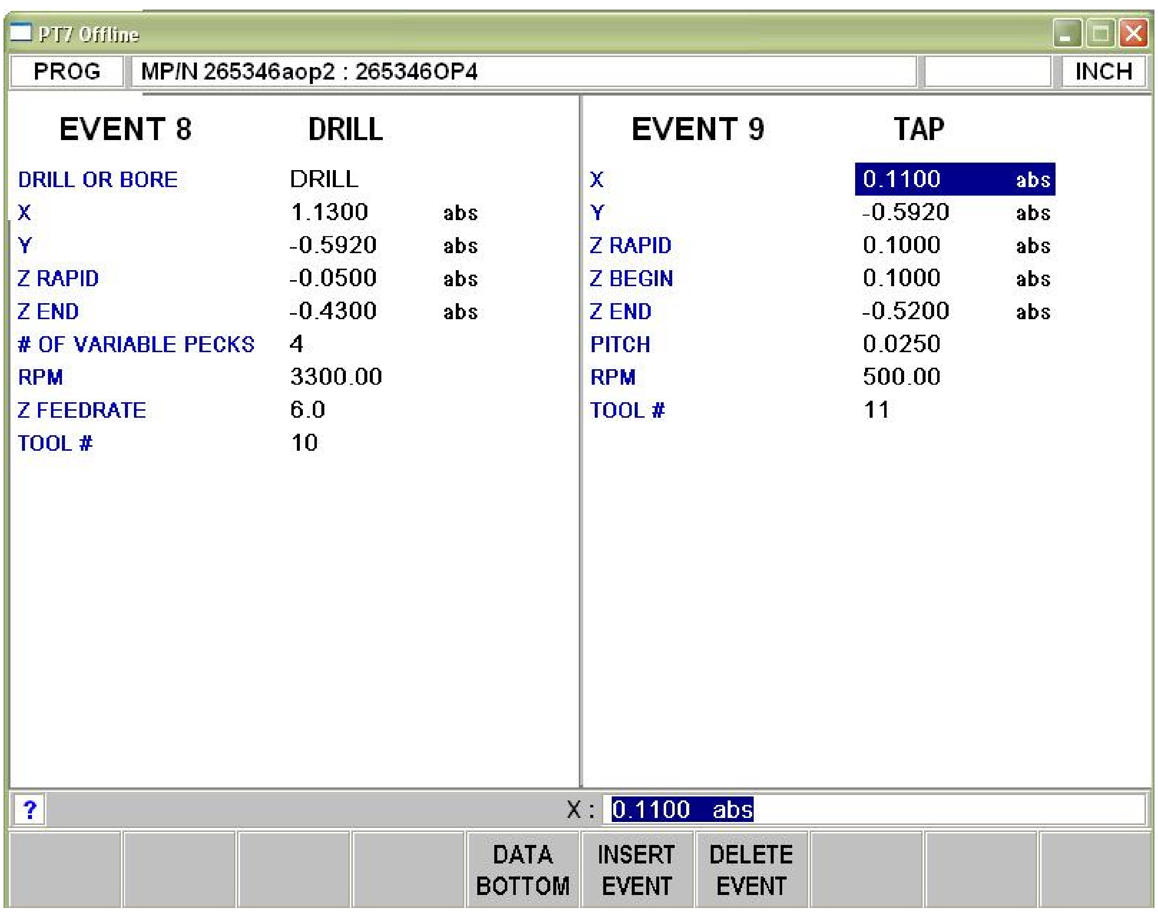
EVENT 4	RECT PCKT		EVENT 5	DRILL	
X1	-0.1000	abs	DRILL OR BORE	DRILL	
Y1	-0.2800	abs	X	0.1100	abs
X3	1.3400	abs	Y	-0.5920	abs
Y3	-0.4000	abs	Z RAPID	0.0000	abs
Z RAPID	0.0500	abs	Z END	-0.1500	abs
Z END	-0.2600	abs	# PECKS FOR DRILL	1	
CONRAD	0.0000		RPM	2000.00	
DIRECTION	CCW		Z FEEDRATE	6.0	
# PASSES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

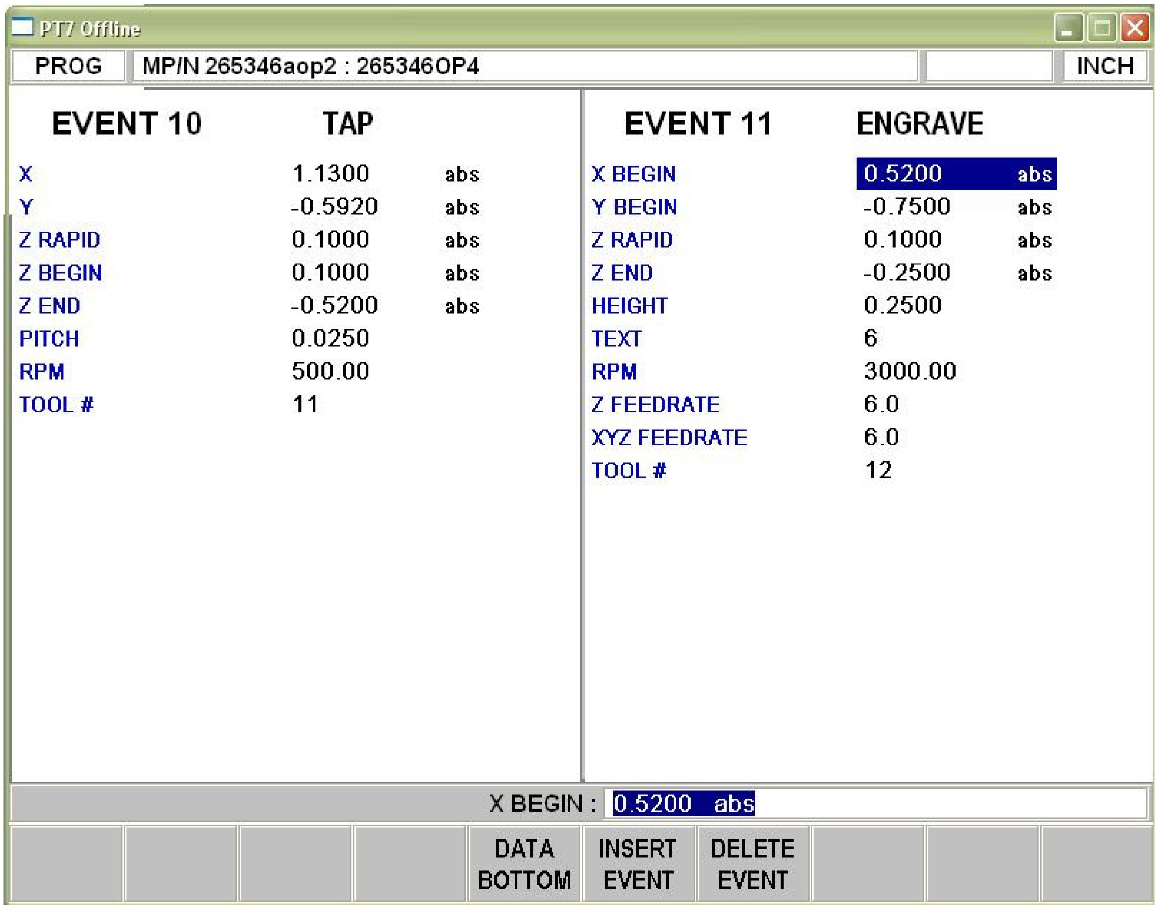
Select
1, for Drill
2, for Bore.

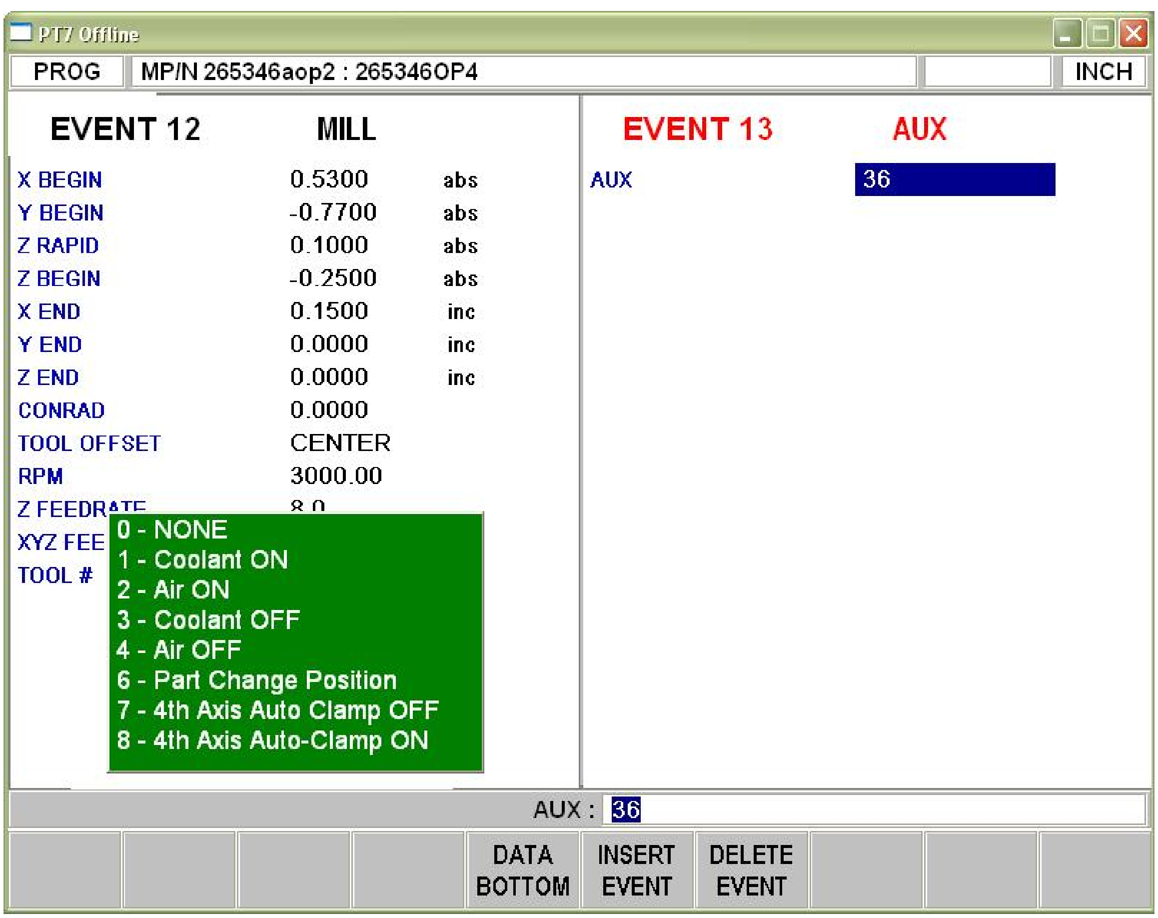
DRILL OR BORE : DRILL

DATA BOTTOM | INSERT EVENT | DELETE EVENT


PT7 Offline
PROG
MP/N 265346aop2 : 265346OP4
INCH
EVENT 6 DRILL
DRILL OR BORE DRILL
X 1.1300 abs
Y -0.5920 abs
Z RAPID 0.0000 abs
Z END -0.1500 abs
PECKS FOR DRILL 1
RPM 2000.00
Z FEEDRATE 6.0
TOOL # 1
EVENT 7 DRILL
DRILL OR BORE DRILL
X 0.1100 abs
Y -0.5920 abs
Z RAPID -0.0500 abs
Z END -0.4300 abs
OF VARIABLE PECKS 4
RPM 3300.00
Z FEEDRATE 6.0
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 DRILL
DRILL OR BORE DRILL
X 1.1300 abs
Y -0.5920 abs
Z RAPID -0.0500 abs
Z END -0.4300 abs
OF VARIABLE PECKS 4
RPM 3300.00
Z FEEDRATE 6.0
TOOL # 10
EVENT 9 TAP
X 0.1100 abs
Y -0.5920 abs
Z RAPID 0.1000 abs
Z BEGIN 0.1000 abs
Z END -0.5200 abs
PITCH 0.0250
RPM 500.00
TOOL # 11
?
X : 0.1100 abs
DATA BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
MP/N 265346aop2 : 265346OP4
INCH
EVENT 10
TAP
X 1.1300 abs
Y -0.5920 abs
Z RAPID 0.1000 abs
Z BEGIN 0.1000 abs
Z END -0.5200 abs
PITCH 0.0250
RPM 500.00
TOOL # 11
EVENT 11
ENGRAVE
X BEGIN 0.5200 abs
Y BEGIN -0.7500 abs
Z RAPID 0.1000 abs
Z END -0.2500 abs
HEIGHT 0.2500
TEXT 6
RPM 3000.00
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
MILL
X BEGIN 0.5300 abs
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
XYZ FEE
TOOL #
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
EVENT 13
AUX
AUX 36
AUX : 36
DATA BOTTOM
INSERT EVENT
DELETE EVENT

Program Example 4:

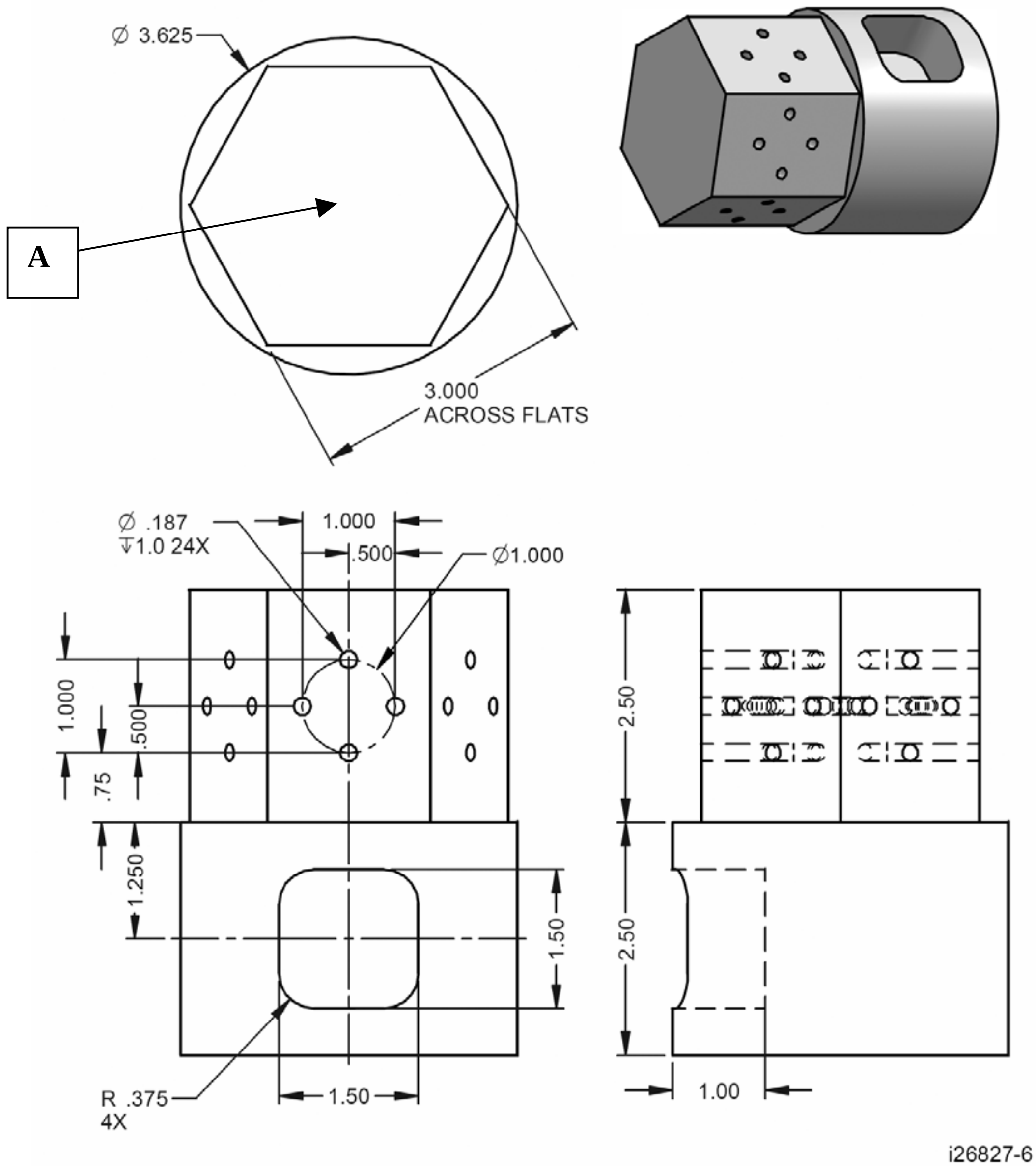


Fig 1

- **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 Abspolute 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.

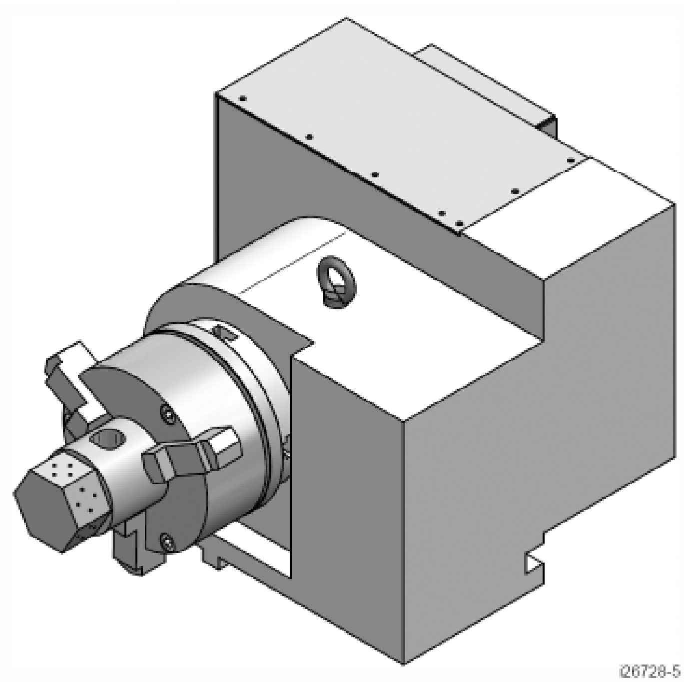


Fig 2

• **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 4**TH**. 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.

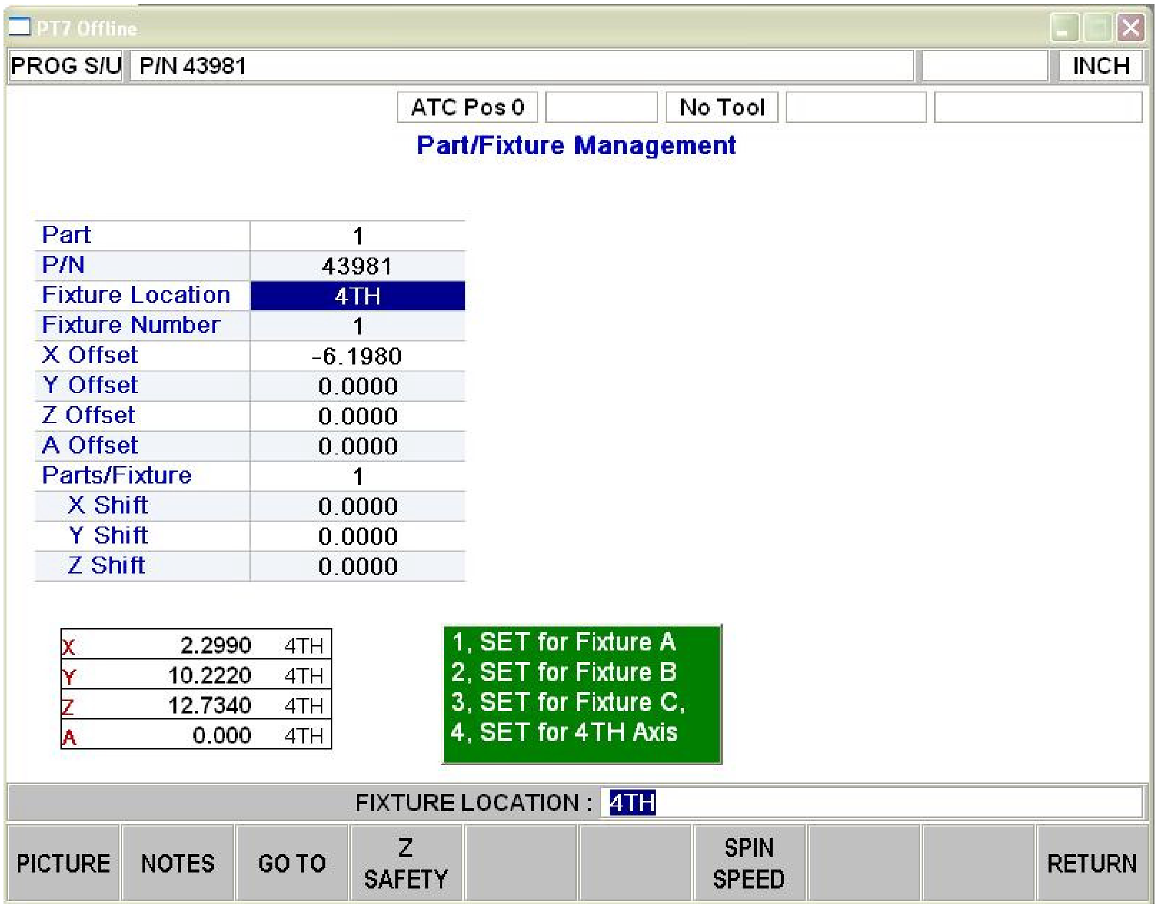
NOTES

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 S/U	P/N 43981		INCH

ATC

Loc	Dia	Type	Z Offset	Z Mod	Dia Mod
1	0.3750	Ctr Drill	2.3650	0.0000	0.0000
2	2.0000	Face Mill	2.1450	0.0000	0.0000
3	0.1870	Drill	1.8470	0.0000	0.0000
4	0.4370	Fin EM	2.4120	0.0000	0.0000
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

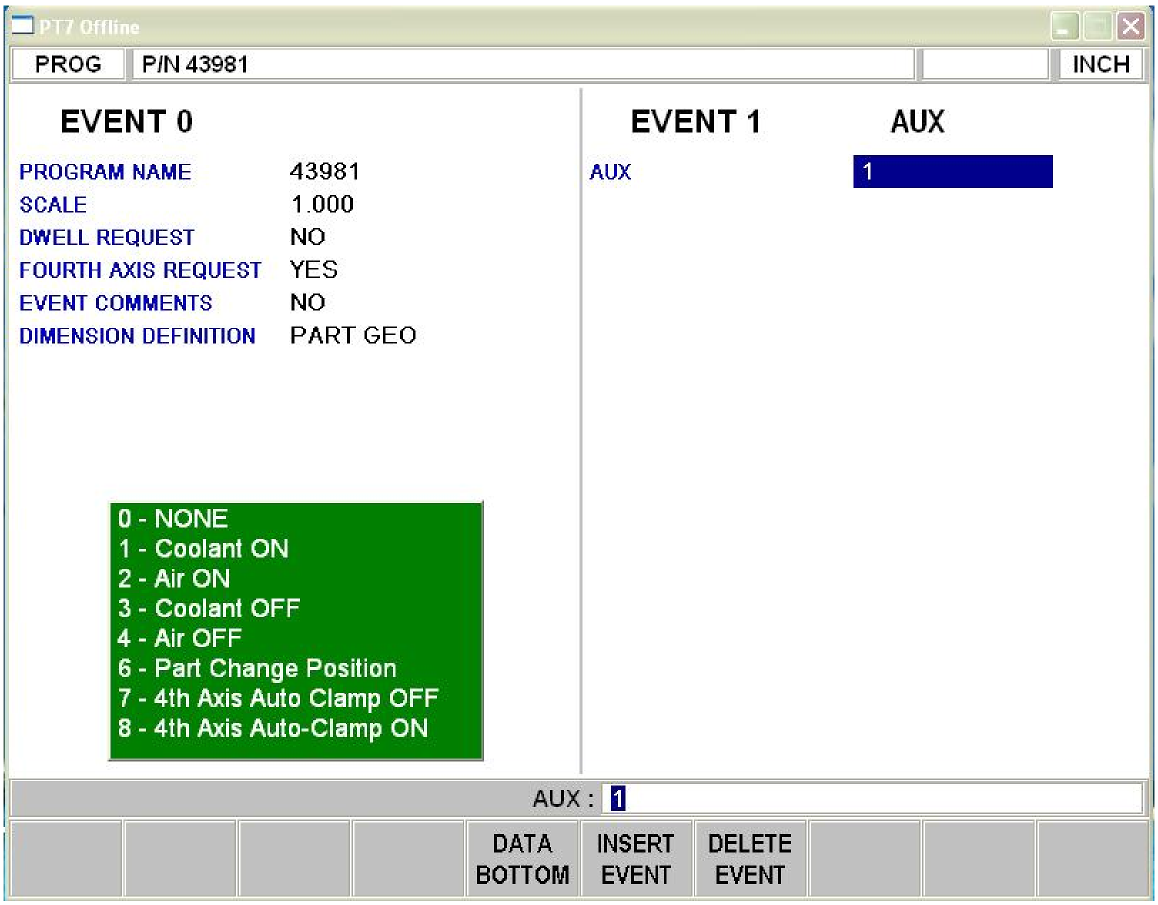
PART PROGRAM TOOL TABLE

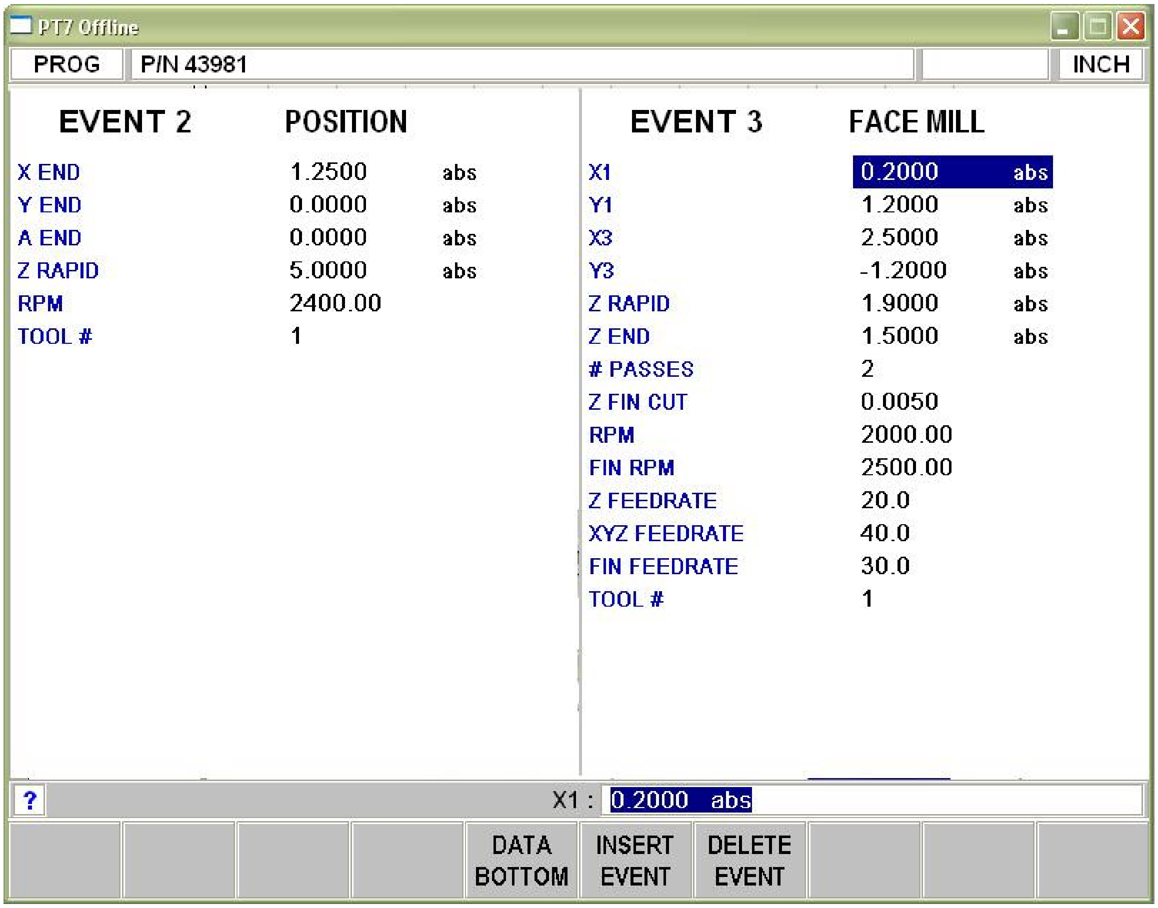
Tool No	Dia	Type	ATC Loc
1	2.0000	Face Mill	2
2	0.3750	Ctr Drill	1
3	0.1870	Drill	3
4	0.4370	Fin EM	4

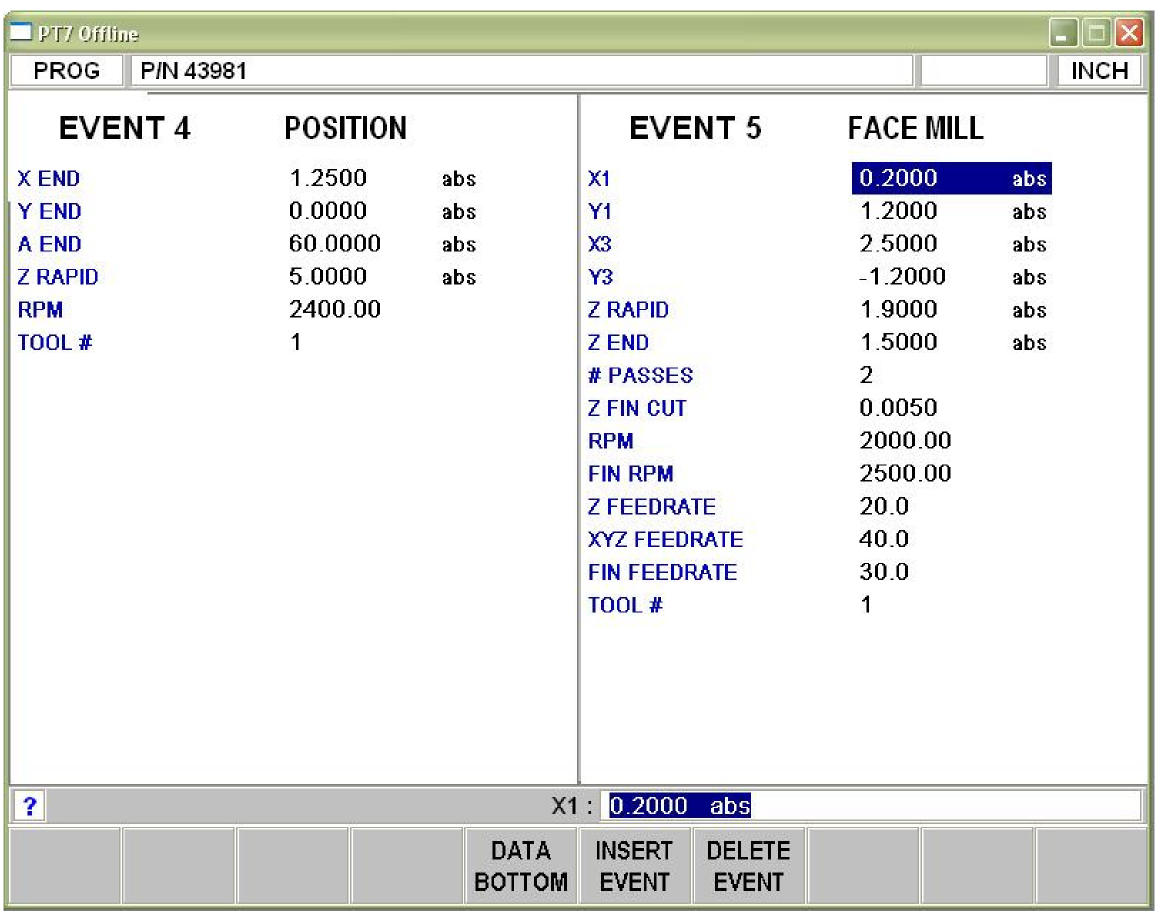
ATC LOCATION : 2

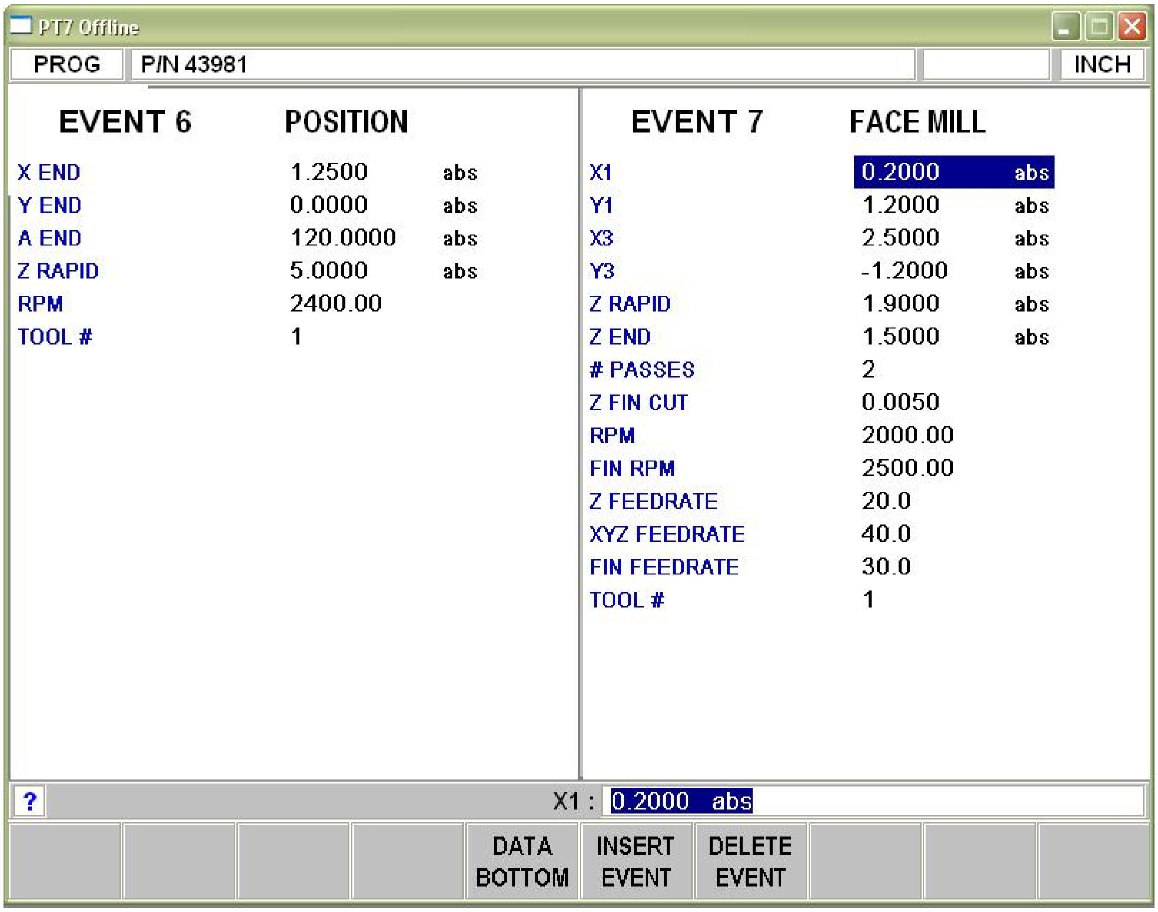
TOOL CRIB	REMOVE TOOL	NOTES	DISABLE LOC						RETURN

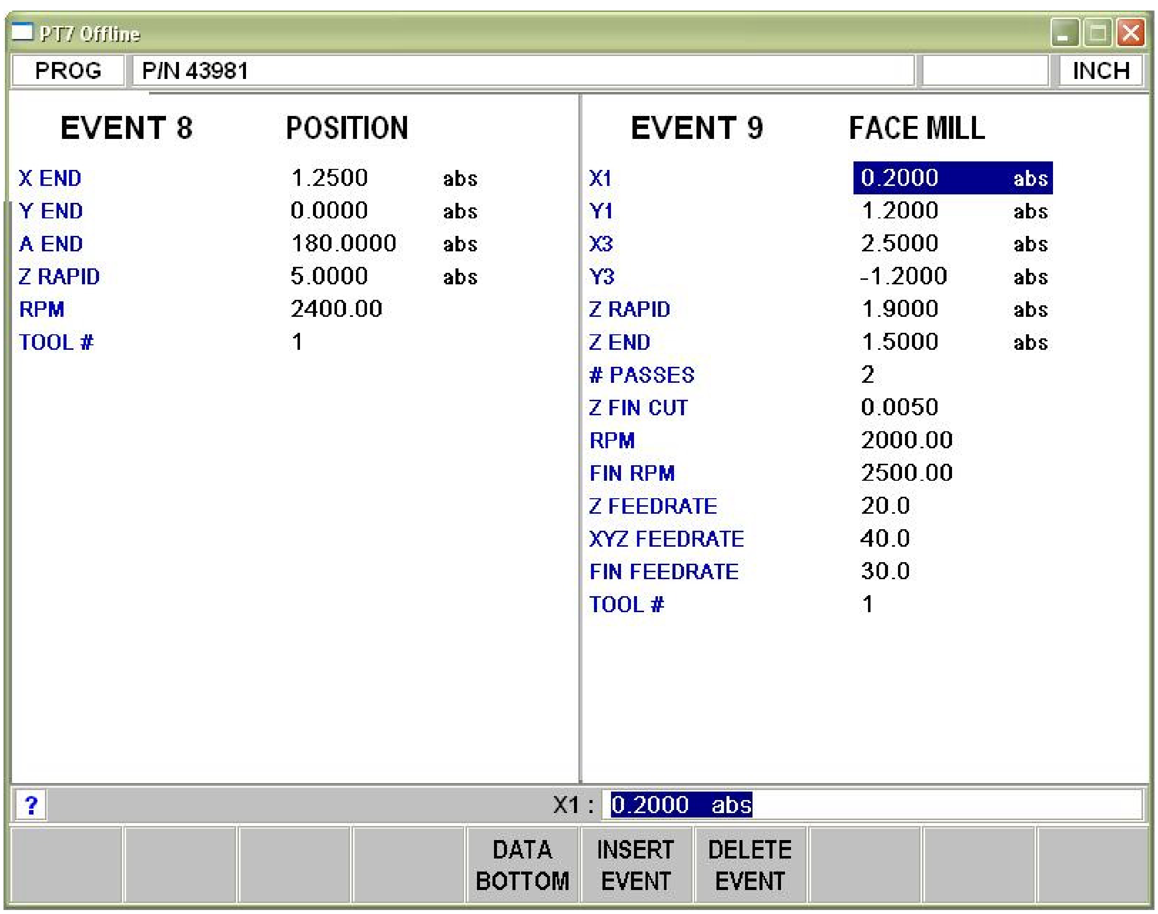
- **Programming Aspects Shown On This Part**
  - **OPERATION 1, TOOL 1:**
  - **A axis starting at 0.000 degrees**
  - **EVENT 1:** Turn on Auto Coolant
  - **EVENT 2 thru 13:** Using 2.000” facemill to mill all six sides of workpiece . Finish size of the “hex” is 3.000” x 2.500” in length.




PT7 Offline
PROG
P/N 43981
INCH
EVENT 2
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 0.0000 abs
Z RAPID 5.0000 abs
RPM 2400.00
TOOL # 1
EVENT 3
FACE MILL
X1 0.2000 abs
Y1 1.2000 abs
X3 2.5000 abs
Y3 -1.2000 abs
Z RAPID 1.9000 abs
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 BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
P/N 43981
INCH
EVENT 4
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 60.0000 abs
Z RAPID 5.0000 abs
RPM 2400.00
TOOL # 1
EVENT 5
FACE MILL
X1 0.2000 abs
Y1 1.2000 abs
X3 2.5000 abs
Y3 -1.2000 abs
Z RAPID 1.9000 abs
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 BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
P/N 43981
INCH
EVENT 6
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 120.0000 abs
Z RAPID 5.0000 abs
RPM 2400.00
TOOL # 1
EVENT 7
FACE MILL
X1 0.2000 abs
Y1 1.2000 abs
X3 2.5000 abs
Y3 -1.2000 abs
Z RAPID 1.9000 abs
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 BOTTOM
INSERT EVENT
DELETE EVENT


PT7 Offline
PROG
P/N 43981
INCH
EVENT 8
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 180.0000 abs
Z RAPID 5.0000 abs
RPM 2400.00
TOOL # 1
EVENT 9
FACE MILL
X1 0.2000 abs
Y1 1.2000 abs
X3 2.5000 abs
Y3 -1.2000 abs
Z RAPID 1.9000 abs
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 BOTTOM
INSERT EVENT
DELETE EVENT

PT7 Offline

PROG | P/N 43981 | INCH

EVENT 10 POSITION

X END	1.2500	abs
Y END	0.0000	abs
A END	240.0000	abs
Z RAPID	5.0000	abs
RPM	2400.00	
TOOL #	1	

EVENT 11 FACE MILL

X1	0.2000	abs
Y1	1.2000	abs
X3	2.5000	abs
Y3	-1.2000	abs
Z RAPID	1.9000	abs
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 BOTTOM | INSERT EVENT | DELETE EVENT

PT7 Offline

PROG | P/N 43981 | INCH

EVENT 12 POSITION

X END	1.2500	abs
Y END	0.0000	abs
A END	300.0000	abs
Z RAPID	5.0000	abs
RPM	2400.00	
TOOL #	1	

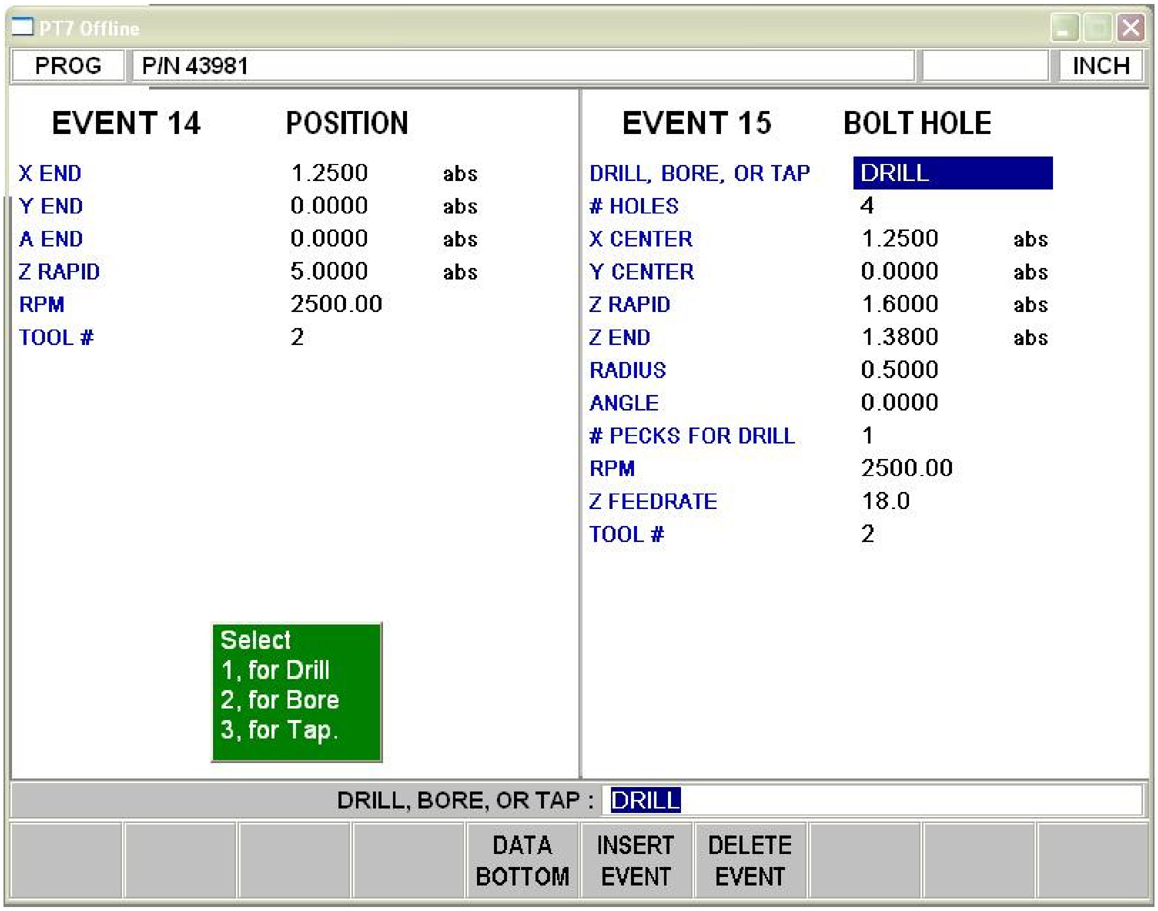
EVENT 13 FACE MILL

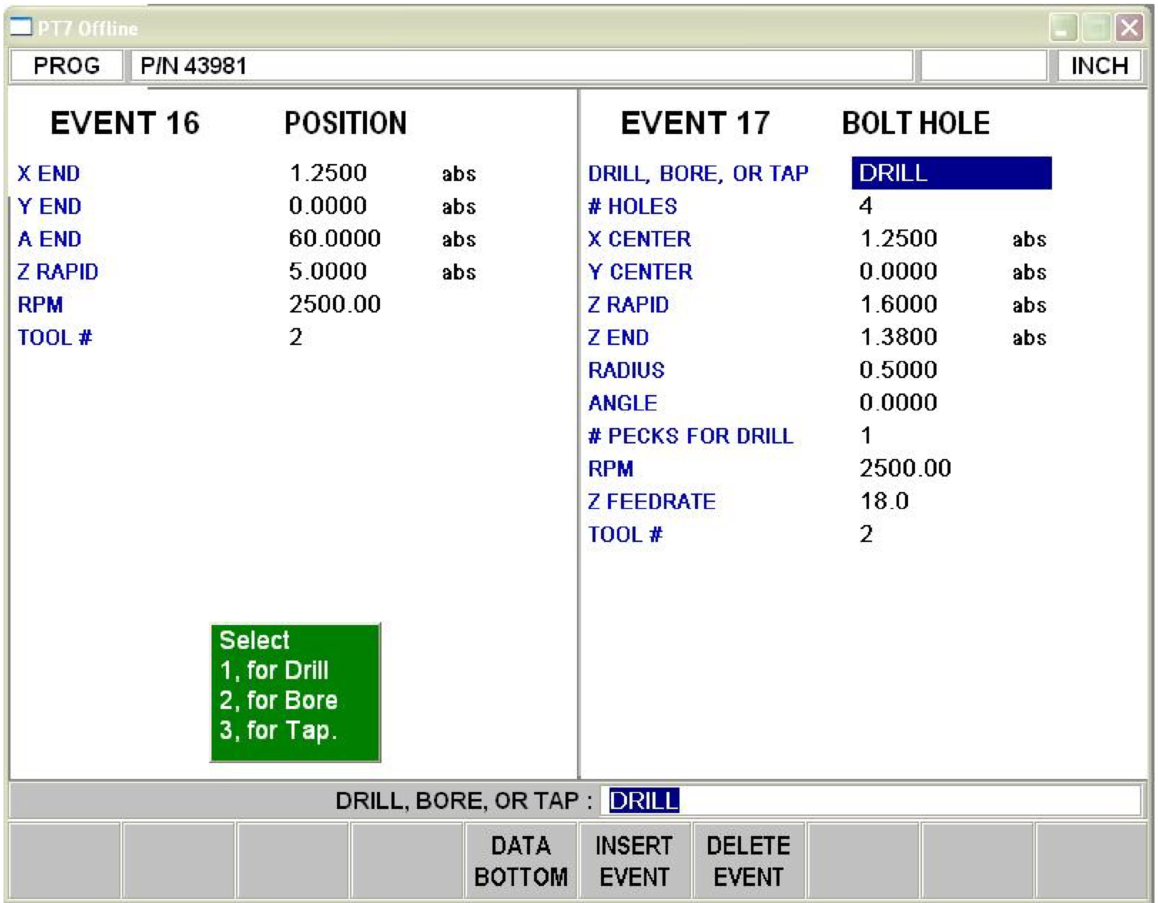
X1	0.2000	abs
Y1	1.2000	abs
X3	2.5000	abs
Y3	-1.2000	abs
Z RAPID	1.9000	abs
Z END	1.5000	abs
# PASSES	2	
Z FIN CUT	0.0050	
RPM	2000.00	
FIN RPM	2500.00	
Z FEEDRATE	20.0	
XYZ FEEDRATE	40.0	
FIN FEEDRATE	30.0	
TOOL #	1	

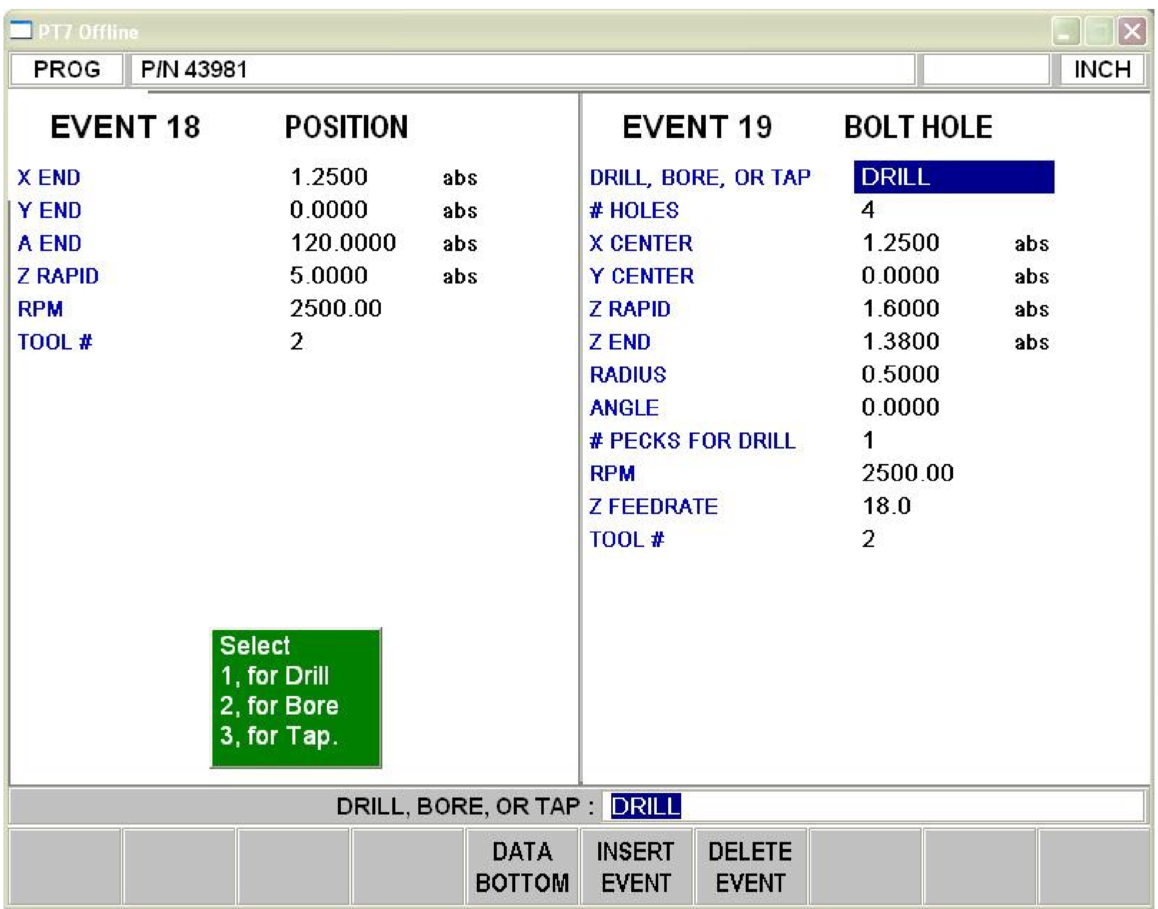
? X1 : 0.2000 abs

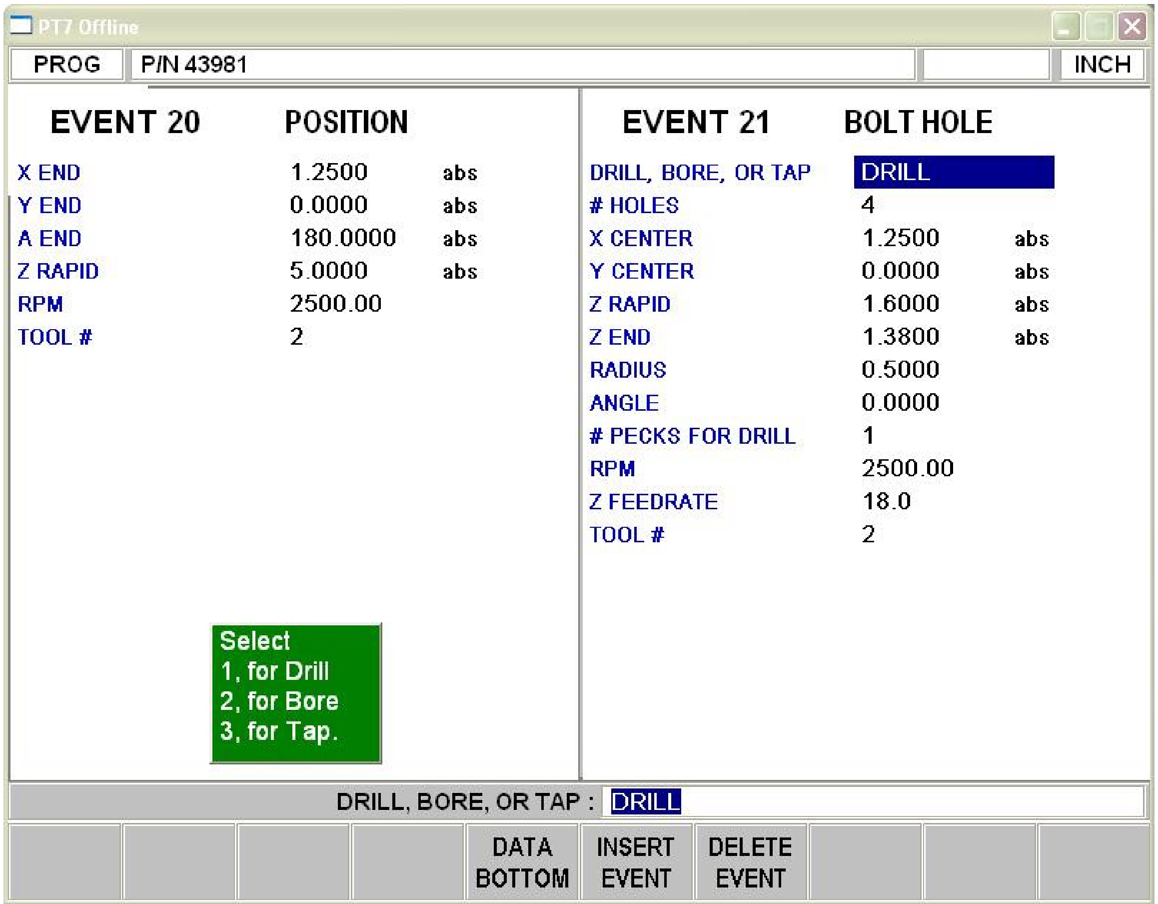
DATA BOTTOM | INSERT EVENT | DELETE EVENT

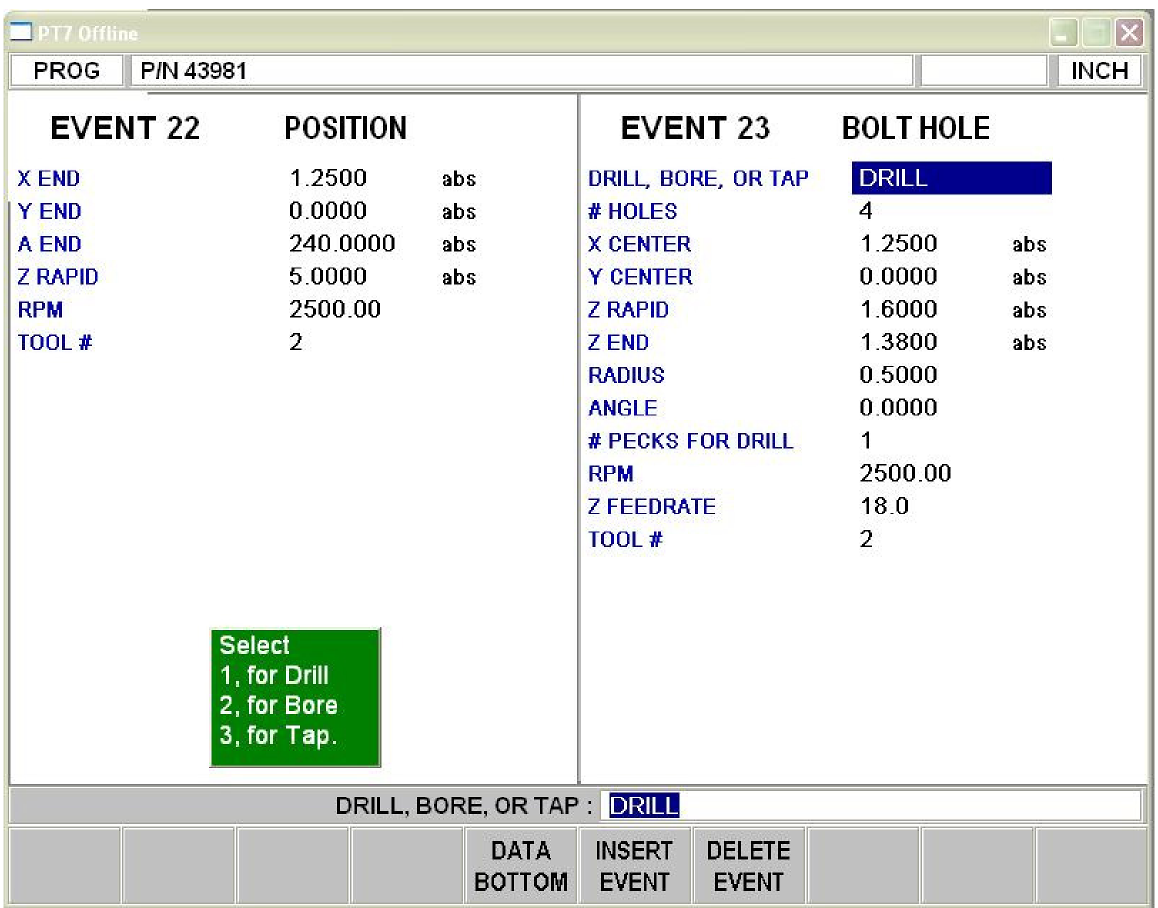
- **OPERATION 1, TOOL 2:**
- **A axis starting at 0.000 degrees**
- **EVENT 14 thru 25:** Using a .375" dia center drill, a 4 hole BOLT HOLE pattern was center drilled on all six sides of the workpiece

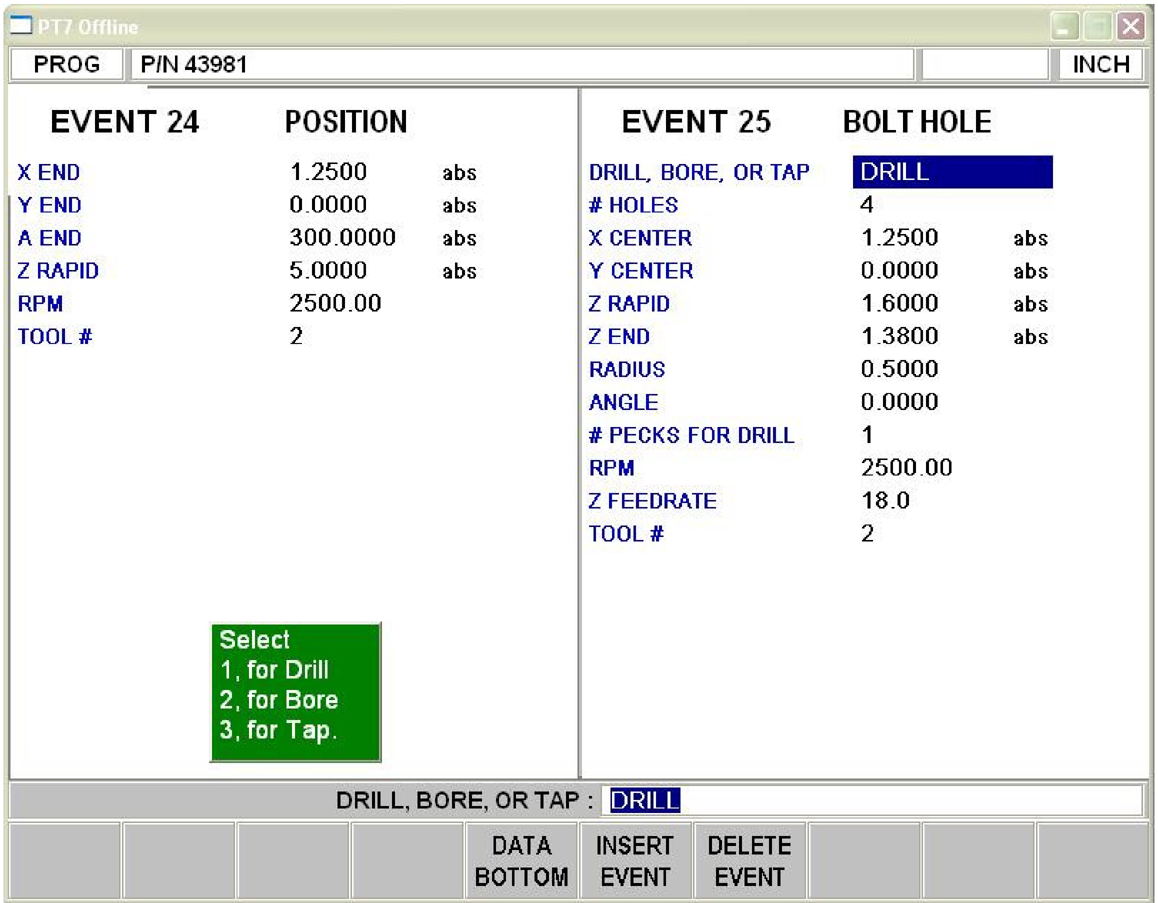



PT7 Offline
PROG
P/N 43981
INCH
EVENT 16
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 60.0000 abs
Z RAPID 5.0000 abs
RPM 2500.00
TOOL # 2
EVENT 17
BOLT HOLE
DRILL, BORE, OR TAP DRILL
HOLES 4
X CENTER 1.2500 abs
Y CENTER 0.0000 abs
Z RAPID 1.6000 abs
Z END 1.3800 abs
RADIUS 0.5000
ANGLE 0.0000
PECKS 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

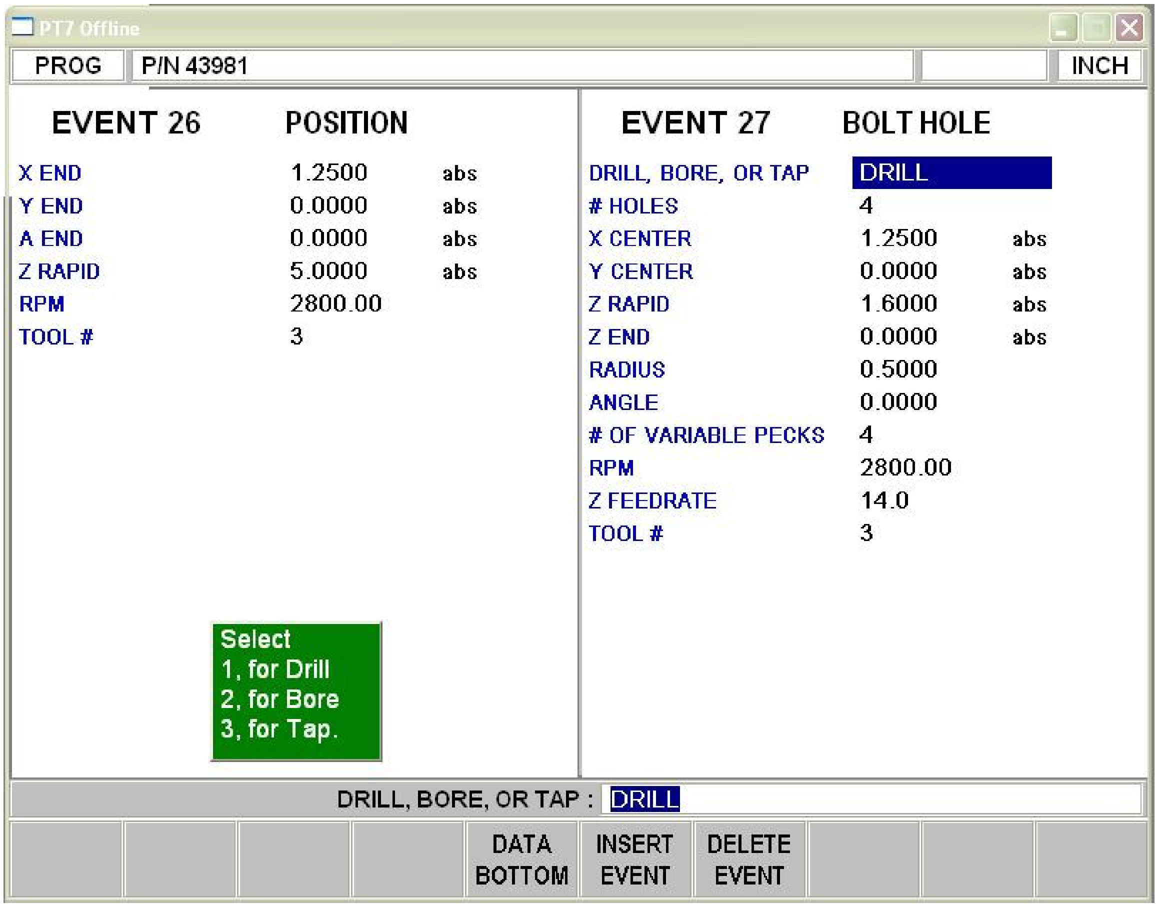

PT7 Offline
PROG
P/N 43981
INCH
EVENT 18
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 120.0000 abs
Z RAPID 5.0000 abs
RPM 2500.00
TOOL # 2
EVENT 19
BOLT HOLE
DRILL, BORE, OR TAP DRILL
HOLES 4
X CENTER 1.2500 abs
Y CENTER 0.0000 abs
Z RAPID 1.6000 abs
Z END 1.3800 abs
RADIUS 0.5000
ANGLE 0.0000
PECKS 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

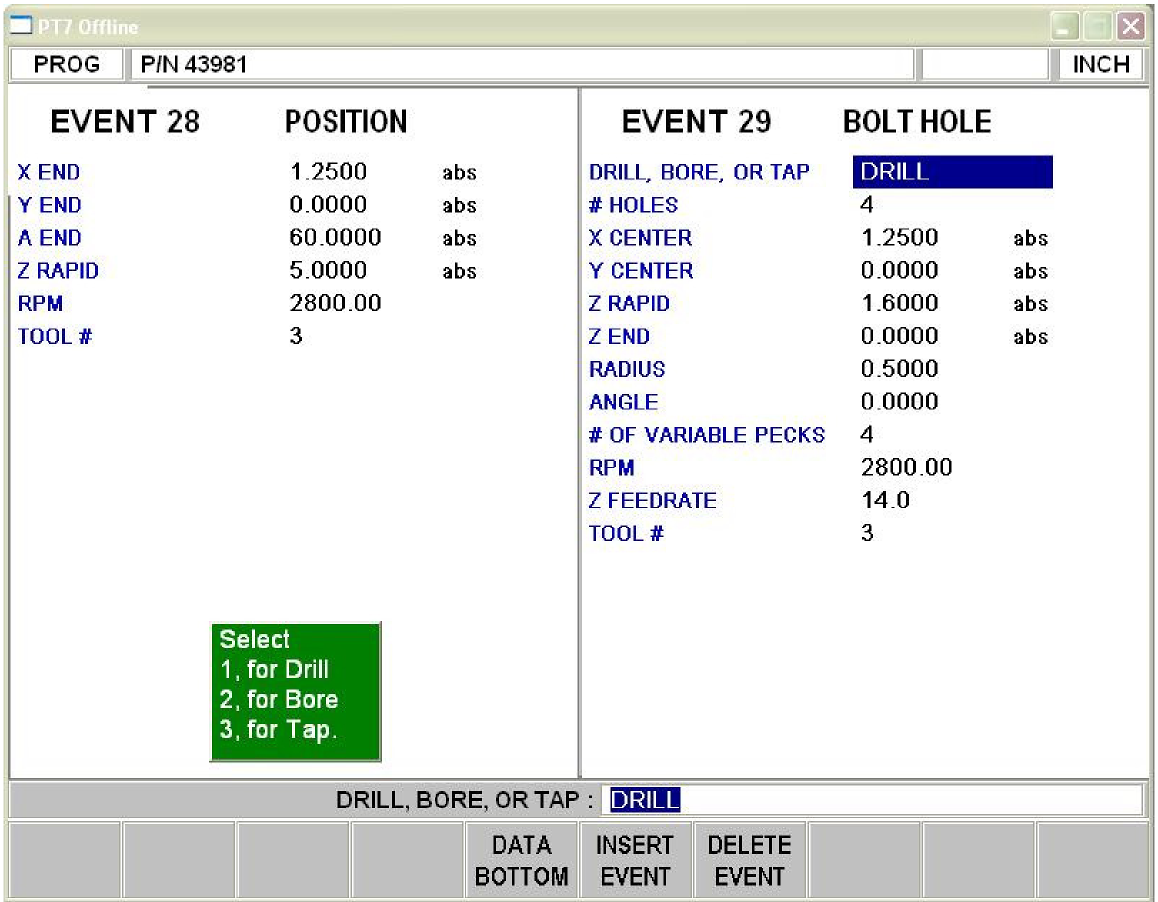

PT7 Offline
PROG
P/N 43981
INCH
EVENT 20
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 180.0000 abs
Z RAPID 5.0000 abs
RPM 2500.00
TOOL # 2
EVENT 21
BOLT HOLE
DRILL, BORE, OR TAP DRILL
HOLES 4
X CENTER 1.2500 abs
Y CENTER 0.0000 abs
Z RAPID 1.6000 abs
Z END 1.3800 abs
RADIUS 0.5000
ANGLE 0.0000
PECKS 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

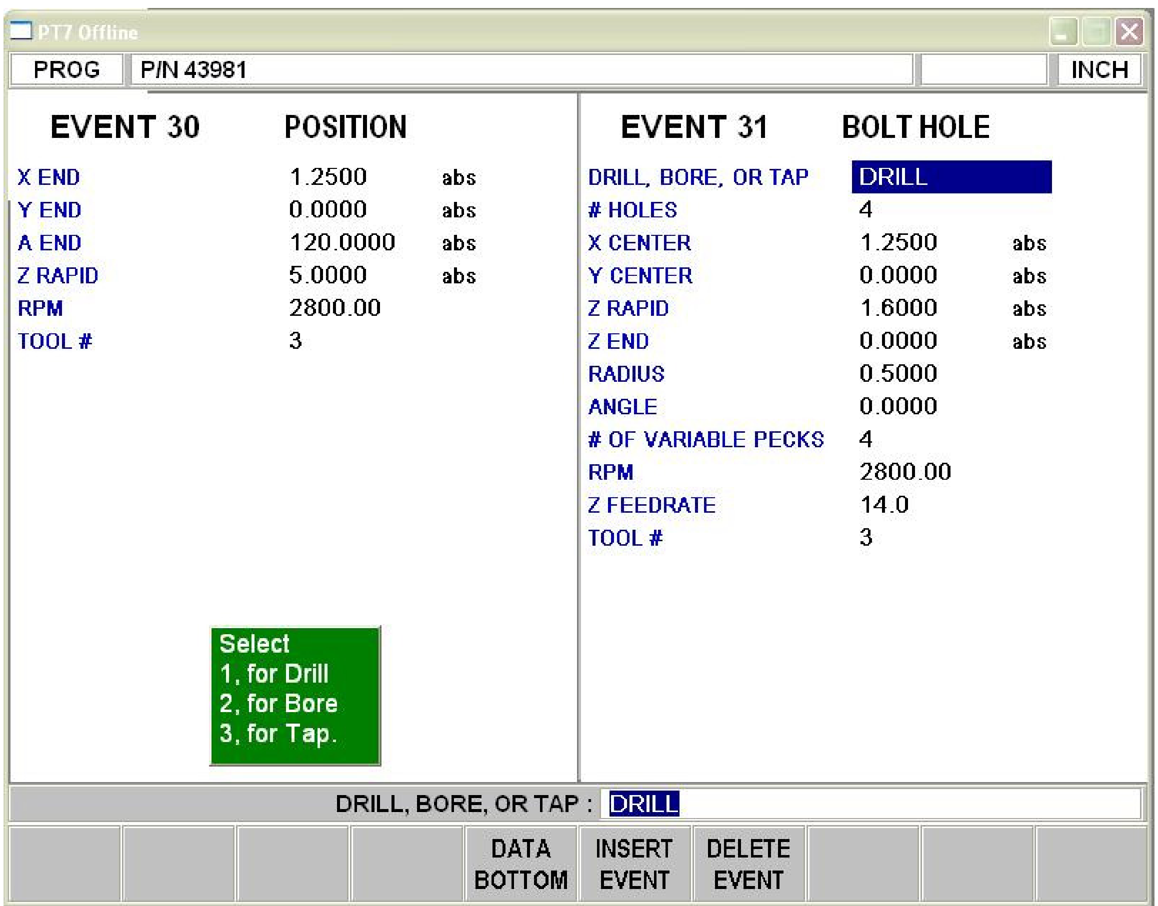

PT7 Offline
PROG
P/N 43981
INCH
EVENT 22
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 240.0000 abs
Z RAPID 5.0000 abs
RPM 2500.00
TOOL # 2
EVENT 23
BOLT HOLE
DRILL, BORE, OR TAP DRILL
HOLES 4
X CENTER 1.2500 abs
Y CENTER 0.0000 abs
Z RAPID 1.6000 abs
Z END 1.3800 abs
RADIUS 0.5000
ANGLE 0.0000
PECKS 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

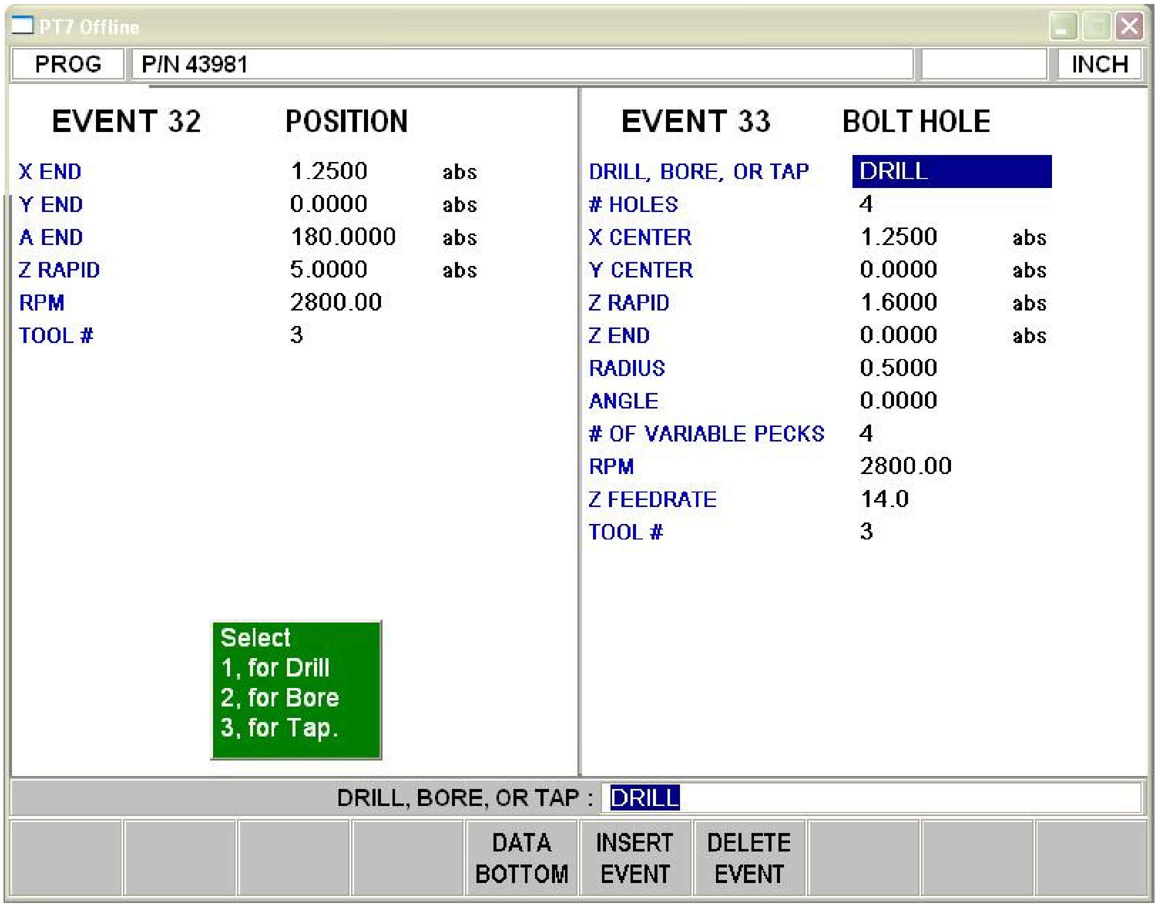

PT7 Offline
PROG
P/N 43981
INCH
EVENT 24
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 300.0000 abs
Z RAPID 5.0000 abs
RPM 2500.00
TOOL # 2
Select
1, for Drill
2, for Bore
3, for Tap.
EVENT 25
BOLT HOLE
DRILL, BORE, OR TAP DRILL
HOLES 4
X CENTER 1.2500 abs
Y CENTER 0.0000 abs
Z RAPID 1.6000 abs
Z END 1.3800 abs
RADIUS 0.5000
ANGLE 0.0000
PECKS FOR DRILL 1
RPM 2500.00
Z FEEDRATE 18.0
TOOL # 2
DRILL, BORE, OR TAP : DRILL
DATA BOTTOM
INSERT EVENT
DELETE EVENT

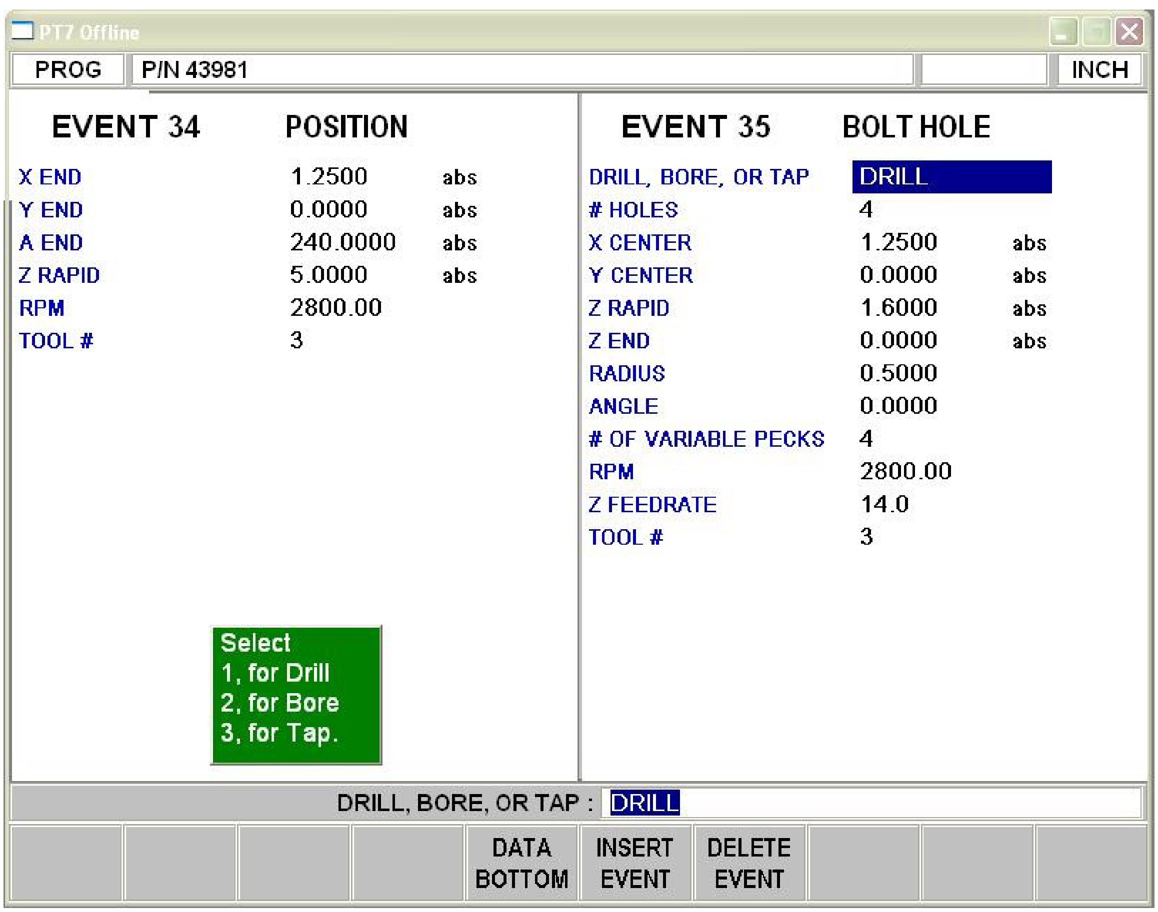
- **OPERATION 1, TOOL 3:**
- **A axis starting at 0.000 degrees**
- **EVENT 26 thru 37:** Using a .187” dia drill, a 4 hole BOLT HOLE pattern was drilled to a 1.0000” depth on all six sides of the workpiece

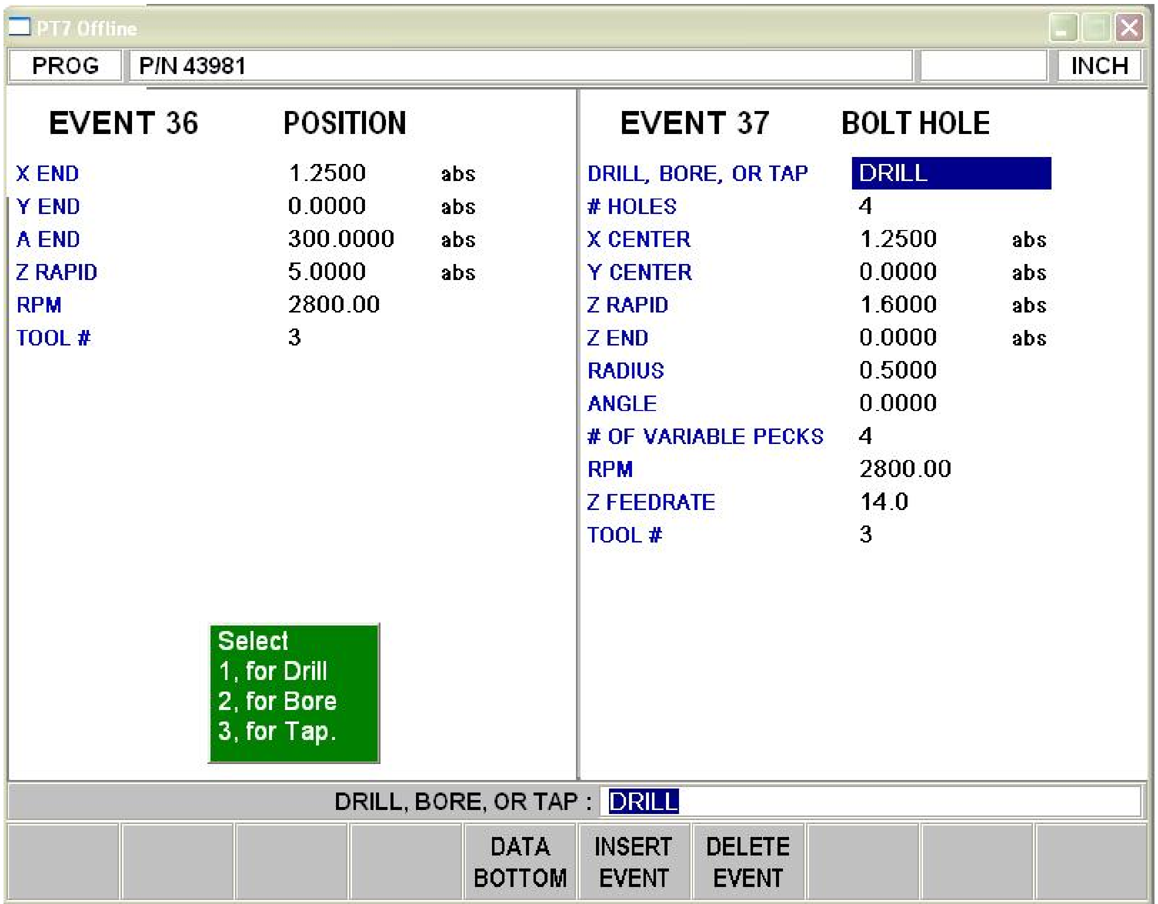



PT7 Offline
PROG
P/N 43981
INCH
EVENT 28
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 60.0000 abs
Z RAPID 5.0000 abs
RPM 2800.00
TOOL # 3
EVENT 29
BOLT HOLE
DRILL, BORE, OR TAP DRILL
HOLES 4
X CENTER 1.2500 abs
Y CENTER 0.0000 abs
Z RAPID 1.6000 abs
Z END 0.0000 abs
RADIUS 0.5000
ANGLE 0.0000
OF 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

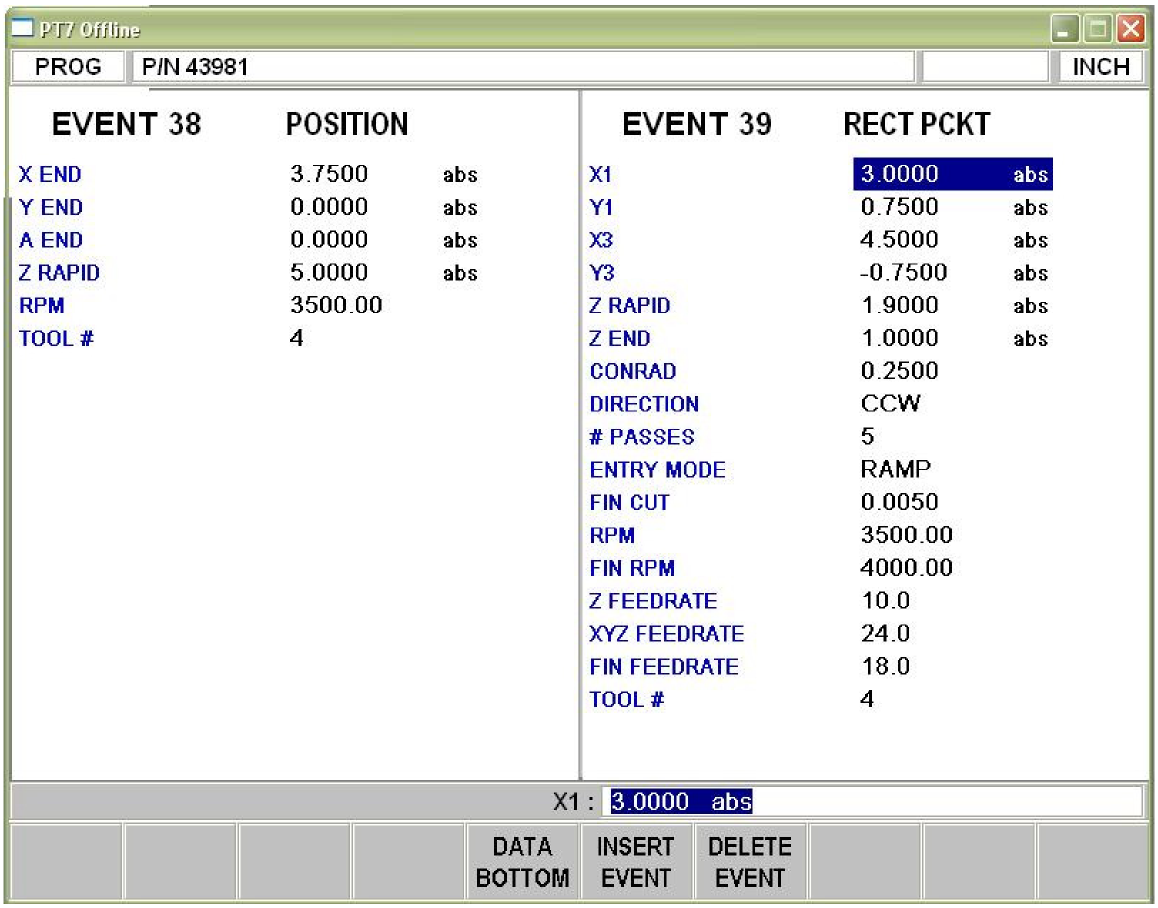

PT7 Offline
PROG
P/N 43981
INCH
EVENT 30
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 120.0000 abs
Z RAPID 5.0000 abs
RPM 2800.00
TOOL # 3
EVENT 31
BOLT HOLE
DRILL, BORE, OR TAP DRILL
HOLES 4
X CENTER 1.2500 abs
Y CENTER 0.0000 abs
Z RAPID 1.6000 abs
Z END 0.0000 abs
RADIUS 0.5000
ANGLE 0.0000
OF 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

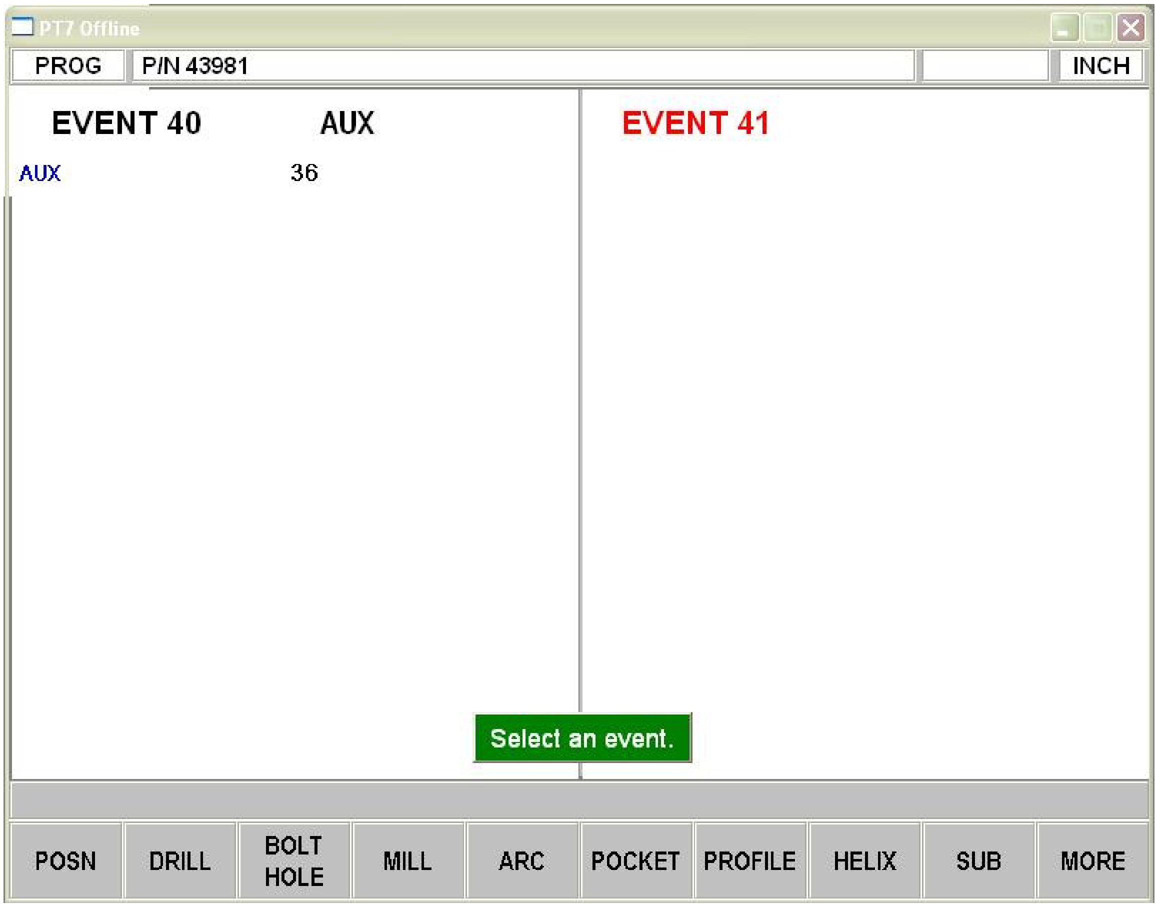

PT7 Offline
PROG
P/N 43981
INCH
EVENT 32
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 180.0000 abs
Z RAPID 5.0000 abs
RPM 2800.00
TOOL # 3
EVENT 33
BOLT HOLE
DRILL, BORE, OR TAP DRILL
HOLES 4
X CENTER 1.2500 abs
Y CENTER 0.0000 abs
Z RAPID 1.6000 abs
Z END 0.0000 abs
RADIUS 0.5000
ANGLE 0.0000
OF 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 34
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 240.0000 abs
Z RAPID 5.0000 abs
RPM 2800.00
TOOL # 3
EVENT 35
BOLT HOLE
DRILL, BORE, OR TAP DRILL
HOLES 4
X CENTER 1.2500 abs
Y CENTER 0.0000 abs
Z RAPID 1.6000 abs
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 36
POSITION
X END 1.2500 abs
Y END 0.0000 abs
A END 300.0000 abs
Z RAPID 5.0000 abs
RPM 2800.00
TOOL # 3
EVENT 37
BOLT HOLE
DRILL, BORE, OR TAP DRILL
HOLES 4
X CENTER 1.2500 abs
Y CENTER 0.0000 abs
Z RAPID 1.6000 abs
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.




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