



User Manual

STATION

Advanced Work Offset Manager



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Commands

31) STATION #_ x_ y_ z_ b_

This command works in two modes:

1. When entered above the first tool command in your program, it asks several questions, and “loads” data (much like a G10 in G-code)
2. Any time Station is commanded after the first tool command, it asks only 1 question. Then, when you enter the desired station #, G-ZERO clears your drawing, and redraws only the cutting instructions and geometry which “belong” to that station number. Note: to view all stations simultaneously, enter **STATION #0**, then press **F2**. Please be sure to delete any STATION #0 commands before post processing.

#_

WHAT STATION WOULD YOU LIKE TO WORK ON NEXT?

Enter a number **1** or greater. On most CNCs this corresponds to **G54** thru **G59**. If you have more than **6** stations, then G-ZERO automatically uses **G52** or **G10** or **G92** or advanced work offset registers.

To pre-load the stations place **Station** commands just before the first tool command.

```
Ex:  3  STATION  #1 x0 y0 z0 b0
      4  STATION  #2 x10.1 y.02 z.11 b0
      5  STATION  #3 x21.2 y0 z0 b0
      6  TOOL 1 ...
```

x_

WHAT IS THE X OFFSET FOR THIS STATION?

Enter the distance in **X** from your program zero to this **Station**. Your answer will typically be 0 for **Station #1** and something like **X10** for **Station #2**, etc.

- If this is **Station #0**, then this **X** dimension is the master **Station** offset. That means the **X** value will be added to every other **Station X**. **Station #0** shifts all other stations.

y_

WHAT IS THE Y OFFSET FOR THIS STATION?

Enter the distance in **Y** from your program zero to this **Station**. Your answer will typically be 0 for **Station #1** and something like **Y.1** for **Station #2**, etc.

- If this is **Station #0**, then this **Y** dimension is the master **Station** offset. This **Y** will be added to every other **Station**.

z_

WHAT IS THE Z OFFSET FOR THIS STATION?

Enter the distance in **Z** from your program zero to this **Station**. Your answer will typically be 0 for **Station #1** and something like **Z.1** for **Station #2**, etc.

- If this is **Station #0**, then this **Z** dimension is the master **Station** offset. This **Z** will be added to every other **Station**.

b_

WHAT IS THE B POSITION FOR THIS STATION?

Enter the 4th axis rotation angle for this **Station**. If your machine's 4th axis is in the wrong position, then when you call **Station**, G-ZERO automatically rotates the 4th axis for you.

%ORDER sp, sp, sp...

Determines the order/sequence in which each station should be called.

s: should be replaced by a number to identify each station.

p: should be replaced by a letter to identify each different pattern.

For each tool, the program will first read and store the patterns (cutting instructions and geometry) of all stations listed under that tool. Then, it will follow the %ORDER sequence to work on the stations which contain the stored patterns.

If the list of stations do not fit on one line in your program, use %+ORDER on the next line to continue the list.

%ZSAFE n

Sets safe z value to rapid to **n** whenever tombstone turns. Note that your post must rapid to Z #43 before indexing B AXIS. Example: section 3029:

```
? {#43}G0Z#43
```

% FCBOX/xmin,ymin,zmin,xmax,ymax,zmax

Tells NC Verify^(*) software to draw gray tombstone.

Typical example: % FCBOX -6,0,-6,6,18,6

Note: Must have one space after % so that feedrates are not altered (%F)

%#TLEN = n

Tells NC Verify^(*) software to draw tool length of **n** value.

%#HOLDER

%#HOLDER OFF

Tells NC Verify^(*) software to draw standard tool holder.

(*) NC Verify is *Sirius System*'s solid modeling program and it is sold separately.

Programming Tips

Ideal Usage of G-ZERO's Station

- Mills with G54 type work offsets
- 4th axis work
- Tombstone work

The G-ZERO CAM System for Mills comes standard with 2 commands that make complex multi-part (and multi-position) setups easier. Choice **36) Multiply** asks how many parts are on your machine, and how far apart they are. Everything programmed after **Multiply** is automatically repeated over and over until all parts are machined. Choice **37) B Axis** controls positioning of the machine's 4th axis, making short work of most simple 4-axis work as well as tombstone work.

Optional choice **31) Station used in conjunction with %ORDER** replaces use these 2 commands by allowing them to work in concert, eliminating long, complicated programs. **Station** also improves programmer control of work offsets (also called work coordinates).

Station as a View Manager

31) Station works in conjunction with the 17) Mat'l command to allow different sized blanks for the different parts (or sides of one part) you are machining. Example:

```
STATION #1 x-10 y0 z-10 b0 ***
MAT'L   xmin-5 xmax5 ymin-5 ymax5 thk.5 type2=303
STATION #2 x0 y0 z0 b0 ***
MAT'L   xmin0 xmax2.2 ymin0 ymax10 thk.7 type0=STELALOY
STATION #3 x10 y0 z-10 b0 ***
MAT'L   xmin-2 xmax2 ymin-2 ymax2 thk-.7 type0=STELALOY
```

Typical Sample Programming

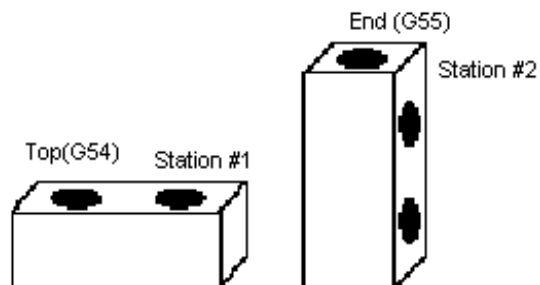
Station as a Work Offset Manager

To program a multi-position setup on a vertical mill, just program a new Station for each side of the part to machine:

```
1  Mat'l      xmin0 xmax5 ymin-2.5 ymax0 thk2 type0=STELALLOY
2  Station  #1 x0 y0 z0 b0
3  Station  #2 x6.5 y0 z3 b0
```

Then let Station handle all the XYZ offsets for you automatically:

```
4  Tool 1    dia.875 flutes2 type20=HSS Drill
5  Station  #1
6  Drill     g81 zrap.1 zcut-1 pecks1 tip0 zret.1 f7.5
7  Point     x1.5 y-1.25
8  Point     x3.5 y-1.25
9  Station  #2
10 Drill     g83 zrap.1 zcut-4.5 pecks6 tip0 zret.1 f4.3
11 Point     x1 y-1.25
```



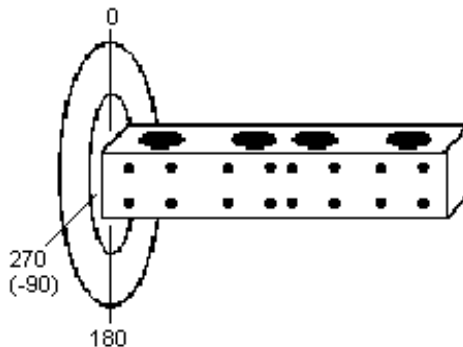
Station as a 4th Axis Manager

To work on several sides of the same part on a 4-axis vertical mill, program a new Station for each new angle to machine:

```
1  Mat'l      xmin0 xmax8 ymin-2.5 ymax0 thk2 type0=STELALLOY
2  Station    #1 x0 y0 z0 b0
3  Station    #2 x0 y0 z.5 b-90
4           %ZSAFE=3.5
```

Then let Station control angles and offsets:

```
5  Tool 1     dia.1 flutes2 type29=CENTERDRILL
6  Station    #1
7  Drill      g81 zrap.1 zcut-.1 pecks1 tip0 zret.5 f20
8  Point      x1.5 y-1.25
9  Point      x3.5 y-1.25
10 Station    #2
11 Drill      g81 zrap.1 zcut-.1 pecks1 tip0 zret.5 f20
12 Grid
13 Grid
14 Tool 2     dia.25 *** SMALL HOLES
15 Station    #2
16 Drill
17 Repeat     from12 thru13
18 Tool 3     dia.875 *** BIG HOLES
19 Station    #1
20 Drill
21 Repeat     from8 thru9
```



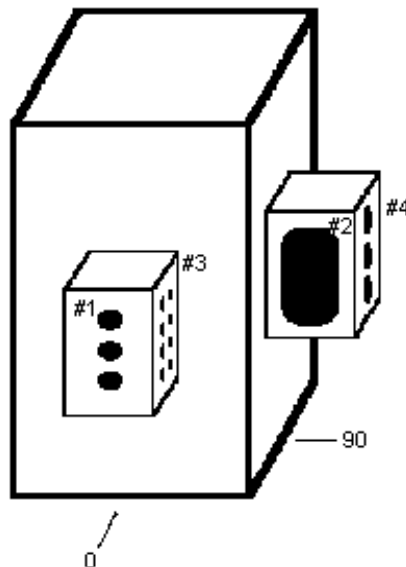
Station as a Tombstone Manager

To program several sides of a tombstone on a horizontal mill, use Station with both an offset and an angle:

```
1 Mat'l      xmin0 xmax3 ymin-5 ymax0 thk3 type0=STELALOY
2 Station   #1 x0 y0 z0 b0
3 Station   #2 x10 y0 z-8.6 b0
4 Station   #3 x0 y0 z0 b90
5 Station   #4 x-10 y0 z-8.6 b90
6           %ZSAFE=2.1
```

Then let Station control angles and offsets:

```
7 Tool 1    dia.1 flutes2 type29=CENTERDRILL
8 Station   #1
9 Drill     g81 zrap.1 zcut-.1 pecks1 tip0 zret.5 f20
10 Point
11 Point
12 Point
13 Station  #3
14 Drill     g81 zrap.1 zcut-.1 pecks1 tip0 zret.5 f20
15 Grid
16 Station  #4
17 Drill     g81 zrap.1 zcut-.1 pecks1 tip0 zret.5 f20
18 Point
19 Point
20 Point
21 Tool 2    dia.25 *** SMALL HOLES
22 Station  #3
23 Drill
24 Repeat   from15 thru15
etc.
```



Station as a Multiplier - Standard Usage

When machining identical parts, %ORDER can be used to link Station commands. This produces results much like 36) Multiply, but with B axis moves interspersed.

```

1  Mat'l      xmin-2 xmax2 ymin-4 ymax2 thk3 type0=STELALLOY
2  Station  #1 x0 y0 z0 b0
3  Station  #2 x4 y0 z0 b0
4  Station  #3 x4 y4 z0 b0
5  Station  #4 x0 y4 z0 b0
6  Station  #5 x0 y0 z0 b90
7  Station  #6 x0 y-4 z0 b90
8      %ORDER 1A,2A,3A,4A,5B,6B
9      %ZSAFE=6.0

```

Then call Station only twice for each type of part:

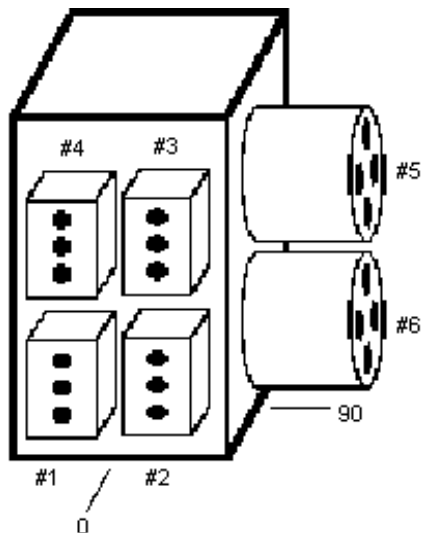
```

10 Tool 1     dia.1 flutes2 type29=CENTERDRILL
11 Station  #1
12 Drill      g81 zrap.1 zcut-.1 pecks1 tip0 zret.5 f20
13 Point
14 Point
15 Point
16 Station  #5
17 Drill      g81 zrap.1 zcut-.1 pecks1 tip0 zret.5 f20
18 Boltcr
   etc.

```

“Pattern A”

“Pattern B”



Station as a Multiplier - Alternate Usage #1

When all 4 sides of the cube are identical, use Station to describe the side, and use %BCOPY to copy around the cube:

1 Mat'l xmin0 xmax2 ymin-3 ymax0 thk2 type0=STELALLOY

2 Station #1 x0 y0 z0 b0

3 Station #2 x3 y0 z0 b0

4 Station #3 x3 y-3 z0 b0

5 Station #4 x0 y-3 z0 b0

6 Station #5 x0 y-6 z0 b0

7 Station #6 x3 y-6 z0 b0

8 %BCOPY 4,8100,9100

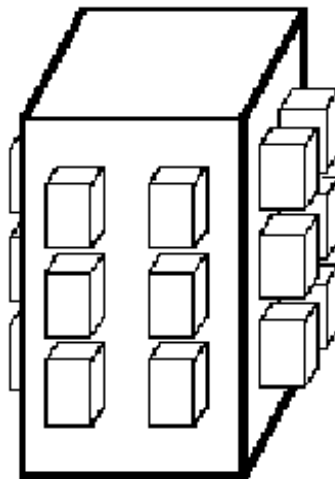
Where: 4 = number of sides on tombstone
8100 = Sub # to start at for main Subs
9100 = Sub # to start at for G10 Subs

9 %ZSAFE=5.5

10 Tool 1 dia.1 flutes2 type29=CENTERDRILL

11 Station #1

(do one whole part)



Same part on all 4 sides
of the tombstone.

Multiplied 6 times on each side.

Station as a Multiplier - Alternate Usage #2

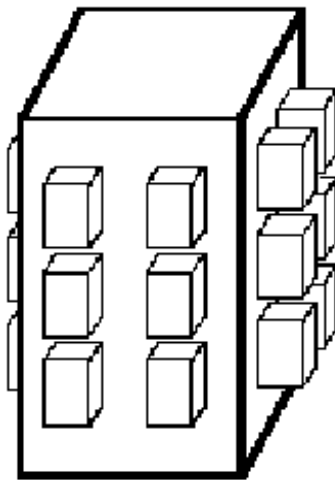
To use one **Multiply** at several **Stations**, program a different **Station** for each side of the cube, and then use **Multiply** with the special **sta360** flag.

Note: Number of groups must be equal to the number of **Stations**.

```
1 Mat'l      xmin0 xmax2 ymin-3 ymax0 thk2 type0=STELALOY
2 Station  #1 x0 y0 z0 b0
3 Station  #2 x0 y0 z0 b90
4 Station  #3 x0 y0 z0 b180
5 Station  #4 x0 y0 z0 b270
6 Multiply xn2 yn3 xs2.75 ys-3.667 gn4 gs0 sta360
7           %ZSAFE=8.1
```

Then just program for one part and let **Station** and **Multiply** do the work:

```
8 Tool 1     dia.1 flutes2 type29=CENTERDRILL
9 Station  #1
   (do one whole part)
```



Same part on all 4 sides
of the tombstone.

Multiplied 6 times on each side.

WARNING: Multiply used this way will use G92 to offset some parts.

