M-Functions

M-functions used in programs:

m10 (in bar mode): close collet and stop feed

m11 (in bar mode): open collet and start feed

m42: push2; for second feed, if necessary

m43: retract briefly *Note:m43 can be edited for more or less retract as required (see below)*

m47: load new bar or part

m48: eject bar or part and go home

m50: set bar mode

m51: set part mode

m52: set stop mode

m53: set 2part mode

m57: no push2 speed with m47 *(See next page for more detail)*

m59: push2 eject *(See next page for more detail)*

M-functions used for setup:

m40: knife up

m41: knife down

m42: push at push2 speed *(use for second feed, part modes)*

m44: stop pushing *(use for second feed, part modes)*

m45: extend stops

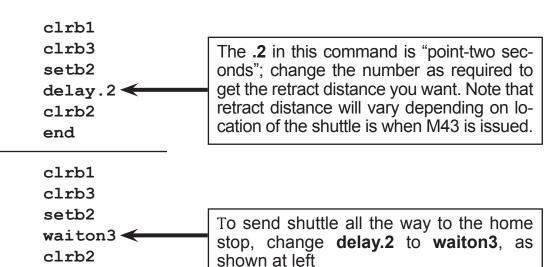m46: retract stops

m49: push at push1 speed

m56: force loader fault *(for troubleshooting; allows reset/initialize)*

To edit m43.usr: *(Retract shuttle)*

The m43 command can be edited to change the retract behavior.

To edit the m43 command follow these steps:

1 - At the CNC "splash" screen, press and hold the Ctrl key, then press "C" key (Ctrl-C).

2 - At the `K:\CNC>` prompt, type `C:` then press Enter

3 - At the `C:\RUNFILES>` prompt, type `EDIT M43.USR` then press Enter

4 - The standard program editor will open, with the m43.usr program displayed
    as shown below. Edit as required, then save & exit as usual.

```
clrb1
clrb3
setb2
delay.2
clrb2
end
```

The **.2** in this command is "point-two seconds"; change the number as required to get the retract distance you want. Note that retract distance will vary depending on location of the shuttle is when M43 is issued.

```
clrb1
clrb3
setb2
waiton3
clrb2
end
```

To send shuttle all the way to the home stop, change **delay.2** to **waiton3**, as shown at left

M57 & M59 - To Select Feed & Eject Speed

M57: Shuttle speed remains constant at speed set by Push1 flow control; Push2 sensor does not change shuttle speed. This feature allows Push2 speed to be set much faster than Push1 speed, to eject parts that have smaller diameter than pushrod without needing to turn down the pushrod tip to clear the collet. Put M57 near top of program on a block by itself.

M59: Default eject speed is the speed set by Push1 flow control. M59 selects speed set by Push2 flow control. Delicate parts sometimes benefit from slow eject speed, and parts smaller in diameter than the pushrod need fast eject speed to clear the collet while the pushrod stops behind the collet. Put M59 on a block by itself just before M48 selects the Push2 speed for eject.

Inertial Eject: Parts that are smaller in diameter than the pushrod can be ejected by inertia, without the need turn down the pushrod tip to clear the collet. For this apllication, Push2 speed is set much faster than the Push1 speed. The pushrod can be shortened to prevent hitting the collet, or the eject sensor can be set to the left so stock pushrod stops before hitting back of collet. Use M57 so the part can be loaded at the Push1 speed; use M59 to eject at Push2 speed. Edit M43.usr (see previous page) so shuttle will retract about two inches to left of Eject sensor. (Instead of editing M43, you can use two or more to retract sufficiently). M48 opens collet and pushes shuttle toward collet. When Eject sensor lights, shuttle will stop, then retract. Inertia will carry the part through the collet.

M97 - Jump to Sub-routine, Conditional

M97 is used to cause the part program to execute a sub-routine in response to an input from an external source, like a bar-feeder or auto-loader.

M97InCnPn
In is the PLC Input which is monitored (On the ZipLoader, PLC Input #10 is ON at End of Bar)
Cn is the Condition of the input to cause the jump: 1 (ON) or 0 (OFF)
Pn is the number of the sub-routine to execute

```
  code for program
     :
m97i10c1p2 (Execute Subroutine #2 when Input 10 turns on
     :
m30    (Or m02: end of program)

}1 code for subroutine #1
     :
m99    (End of sub routine)
}2 code for subroutine #2
     :
m99    (End of sub routine)
```

After the sub-routine completes (M99), the program resumes execution at the block immediately following the block that has the M97 that called the sub-routine. If the sub-routine includes M30, the program ends; if sub-routine includes M31, the program ends and Cycle Repeat is cancelled.