

- First a little background on some things that I had a hard time with at the start.
- My wording of these may not be correct but I hope it at least gives the correct information in a way that people like me can understand.

- Mach4 is not exactly one big program. It is made of several smaller programs that work together. I have heard them referred to as “chunks” I believe. Sometimes things done in one part are not immediately seen in another part. Example: If running a macro the GUI LED’s and DRO’s are not updated until the macro finishes running.
- Something that works in a button may not work in a macro.
 - Example: mcAxisHome works in a button but not in a macro. I have been told both it will and it won’t but I could not get it to work in a macro.
 - Also, reading and writing to a DRO will work realtime in a button but not a macro.

- The mc calls can be found at C:\Mach4Hobby\Docs\Mach4CoreAPE.chm
- The scr calls can be found online at (thanks to Brett and Craig); <https://www.machsupport.com/forum/index.php?topic=39762.0>
- Whenever possible use the mc calls and codes to get and set variables \ information not the scr calls.

- Registers are a great way to get information from one part of Mach4 to another. They are updated immediately across all parts of Mach4.
- The main part of Mach4 has a PLC built in. The PLC runs constantly in the background and can be used to do things depending on a register setting or a physical button push on the machine. Example: I have a physical button on one of my machines that is used as a pause button. I have also used it to look at a register and when the register changed to 1 it did an action.
- In the following sections I will explain how to get to the PLC and how to make new registers as well as use the registers.
- I am going to try starting with the simplest and working my way up.

- Macros go in the macros folder of whatever profile you are using.
- Use macro numbers of 100 and up other than m162 & m163 (laser).

- **Macros can use a name instead of a number.**

Name()

Example:

```
toolheightset()
```

- **Here is the format of a macro.**

```
function m#()  
    your code  
end  
if (mc.mclnEditor() ==1) then  
    m#()  
end
```

The last 3 lines let you run or step through the macro while in the editor.

Example: (for this example the GetInstance is not needed but....)

```
Function m111()  
    local inst = mc.mcGetInstance()  
    mc.mcCntlGcodeExecute ("G0 X10.050")  
end  
if (mc.mclnEditor() ==1) then  
    m111()  
end
```

- **Comments are very helpful in your code.**

Put - - in front of anything you want to comment out.

Example:

```
-- this is a comment
```

- **Some things need numbers (math calculations) and others need a string (registers).**

To change to a number.

```
local variable = tonumber(value)
```

Example:

```
local Number = tonumber(3.0)
```

or

```
local Num = 3.0
```

```
local Number = tonumber(Num)
```

To change to a string.

```
local variable = tostring(value)
```

Example:

```
local String = tostring(3.0)
```

or

```
local Str = 3.0
```

```
local String = tostring(Str)
```

- **One thing that is needed at the start of any code is the following.**

```
Local inst = mc.mcGetInstance()
```

- **How to make the program pause for a set amount of time in a button, macro or in the PLC.**

I use this to allow air cylinders to complete their stroke.

```
wx.wxSleep(seconds)
```

```
wx.wxMilliSleep(milliseconds)
```

Example:

```
wx.wxSleep(1)
```

```
wx.wxMilliSleep(1000)
```

- **How to read a DRO's value.**

```
local variable = scr.GetProperty('DRO Name', 'Value')
```

Example:

```
local StartPos = scr.GetProperty ('dro Current Pos Y', 'Value')
```

- **How to write to a DRO.**

```
scr.SetProperty('DRO Name', 'Value', tostring(variable))
```

Example:

```
local Temp = 3.00
```

```
scr.SetProperty ('droTempPos', 'Value', tostring(Temp))
```

****If the DRO has an mc call use that instead****

- **How to get a LED's state.**

```
local variable = scr.GetProperty('LED Name', 'Value')
```

Example:

```
local StartSet = scr.GetProperty ('LEDStartComplete', 'Value')
```

- **How to set a LED's state.**

```
scr.SetProperty('LED Name', 'Value', 'State')
```

Examples:

```
scr.SetProperty ('LEDStartComplete', 'Value', '1')
```

LED set to on.

```
scr.SetProperty ('LEDStartComplete', 'Value', '0')
```

LED set to off.

- **How to set a buttons state.**

```
scr.SetProperty('Button Name', 'Button State', 'State')
```

Examples:

```
scr.SetProperty ('TangKnifeUpDn', 'Button State', '1')
```

Button set to on.

```
scr.SetProperty ('TangKnifeUpDn', 'Button State', '0')
```

Button set to off.

- **How to get an input or output state.**

```
variable = mc.mcSignalGetHandle(inst, signal name)
```

```
variable2 = mc.mcSignalGetState(variable)
```

Examples:

```
hsig = mc.mcSignalGetHandle(inst, mc.ISIG_MOTOR0_HOME)
```

```
MatHome = mc.mcSignalGetState(hsig)
```

Returns a 1 or 0 depending on if motor 0 has been homed.

```
hsig2 = mc.mcSignalGetHandle(inst, mc.OSIG_OUTPUT8)
```

```
ArmDown = mc.mcSignalGetState(hsig2)
```

Returns a 1 or 0 depending on if output 8 is activated or not.

- **How to set an output state.**

```
variable = mc.mcSignalGetHandle(inst, signal name)
```

```
mc.mcSignalSetState(variable, state)
```

Examples:

```
notch = mc.mcSignalGetHandle(inst, mc.OSIG_OUTPUT8)
```

```
mc.mcSignalSetState(notch, 1)
```

Turns output 8 active or on.

```
mc.mcSignalSetState(notch, 0)
```

Turns output 8 inactive or off.

- **How to run G Code in a button, macro or screen script.**

This can be done directly using G Code or using variables.

```
mc.mcCntlGcodeExecute(inst, "g code")
mc.mcCntlGcodeExecuteWait(inst, "g code")
```

****only use the "Wait" version in a macro****

Example:

```
mc.mcCntlGcodeExecute(inst, "G1 X22.375 F200.0")
```

or

```
local variable = "g code to run"
mc.mcCntlGcodeExecuteWait(inst, variable)
```

Example:

```
local ClearPosition = "G1 X22.375 F200.0"
mc.mcCntlGcodeExecuteWait(inst, ClearPosition)
```

or

```
local variable = value
local variable2 = stringformat("G0" .. variable .. "X" .. variable)
mc.mcCntlGcodeExecute(inst, variable2)
```

Example:

```
local zero = 0
local GoToZero = stringformat("G0 X" .. zero .. "Y" .. zero)
mc.mcCntlGcodeExecute(inst, GoToZero)
```

- **To run a function from a button.**

```
function name()
```

Example:

```
function toolcal()
```

- **To call an m code or function from an m code or function.**

****This will not work while in editor****

****all functions & m code macros are compiled into a single file called mLua.mcc****

****so a function or m code can call another function or m code****

****Do not use GcodeExecute command****

```
m#()
```

or

```
name()
```

Example:

```
m101()
```

or

```
settool()
```

- **Message box**

This can be used to let you know an action has been completed or anything else you need to know is done or needs doing such as a note to change the tool.

```
wx.wxMessageBox('message')
```

Example:

```
local inst = mc.mcGetInstance()  
wx.wxMessageBox('Hello, now click the button')
```

- **How to turn on Registers.**

Go to **Configure, Control, Plugins** tab then place a green check next to **Regfile**.

- **How to make a new Register.**

Go to **Configure, Plugins** then **Regfile**.

Click on the green plus sign.

Give the register a name. (no spaces)

Give the register a starting value.

Put in a longer description.

Persistent

A green check will keep value on exit from Mach4.

A red x will start every new start of Mach4 with the starting value.

- **How to read a Register.**

```
local variable = mc.mcRegGetHandle(inst, 'path')
```

```
local variable2 = mc.mcRegGetValue(variable)
```

Examples:

```
local hreg = mc.mcRegGetHandle(inst, 'Encoder_0')
```

```
local EncRawVal = mc.mcRegGetValue(hreg)
```

or

```
local hreg = mc.mcRegGetHandle(inst, 'ESS/EncRaw')
```

```
local EncRawVal = mc.mcRegGetValue(hreg)
```

or

```
local hreg = mc.mcRegGetHandle(inst, 'iRegs0/NotchTime')
```

```
local EncRawVal = mc.mcRegGetValue(hreg)
```

- **How to write to a Register. (this might be wrong)**

```
local variable = mc.mcRegGetHandle(inst, 'path')  
local mc.mcRegSetValue(variable, value)
```

or

```
local variable = mc.mcRegGetHandle(inst, 'path')  
local mc.mcRegSetValue(variable, tostring(value))
```

Example:

```
local hreg = mc.mcRegGetHandle(inst, 'ESS/EncRaw')  
local mc.mcRegSetValue(hreg, 23.35)
```

or

```
local Num = 23.35  
local hreg = mc.mcRegGetHandle(inst, 'ESS/EncRaw')  
local mc.mcRegSetValue(hreg, tostring(Num))
```