Server API

This article serves as the main reference point for all myCNC material related to the myCNC Server API. It will be expanded at a full manual.

The server API allows to control movement and machine coordinates remotely, via a series of commands. A list of such commands is presented below for jog control, etc.

Server API, Jog control

Command “SetJog” is used for Jog control through Sever API. Command syntax is “SetJog Parameter”. Parameters listed in table below:

Parameter	Description
x+	start jog X+ direction
x-	start jog X- direction
y+	start jog Y+ direction
y-	start jog Y- direction
z+	start jog Z+ direction
z-	start jog Z- direction
a+	start jog A+ direction
a-	start jog A- direction
b+	start jog B+ direction
b-	start jog B- direction
c+	start jog C+ direction
c-	start jog C- direction
x+y+	start jog in 2 axes X+,Y+ directions
x-y-	start jog in 2 axes X-,Y- directions
x+y-	start jog in 2 axes X+,Y- directions
x-y+	start jog in 2 axes X-,Y+ directions
xstop	stop jog in X axis
ystop	stop jog in Y axis
zstop	stop jog in Z axis
astop	stop jog in A axis
bstop	stop jog in B axis
cstop	stop jog in C axis
xystop	stop jog in X, Y axes

Server API, Pendant control emulation

Server API has a command to simplify Pendant control emulation. This command can be used for writing third-patry Pendant control device drivers.

SetPendant

Command: `SetPendant` *Format:* `SetPendant Parameter1;Parameter2`

- `Parameter1` - Emulated Hand wheel position. It's supposed the handwheel has resolution of “100”, such that the position range can be (0...99)
- `Parameter2` - 16-bit value, high byte is Step selector, low byte is Axis selector.
- Step selector values can be set through the following format:
  - 0 → “x0.001” (1 wheel step = 0.001 unit)
  - 1 → “x0.01” (1 wheel step = 0.01 unit)
  - 2 → “x0.1” (1 wheel step = 0.1 unit)
  - 3 → “x1” (1 wheel step = 1 unit)
- Axis selector values:
  - 0 → “OFF”
  - 1 → “X”
  - 2 → “Y”
  - 3 → “Z”
  - 4 → “A”
  - 5 → “B”
  - 6 → “C”

Example	Description
SetPendant 50;0x0300	Axis=OFF, Mul=1, Wheel=50 - initial position
SetPendant 50;0x0301	Axis=X, Mul=1, Wheel=50 - Turn ON X axis
SetPendant 55;0x0301	Axis=X, Mul=1, Wheel=55 - Rotate wheel +5 “clicks”, will move X +5*1.0=5.0 mm
SetPendant 55;0x0302	Axis=Y, Mul=0.01, Wheel=55 - Switch to Y axis
SetPendant 65;0x0302	Axis=Y, Mul=0.01, Wheel=65 - Rotate wheel +10 “clicks”, will move Y +10*0.01=+0.1 mm
SetPendant 65;0x0302	Axis=Z, Mul=0.1, Wheel=65 - Switch to Z axis
SetPendant 50;0x0302	Axis=Z, Mul=0.1, Wheel=50 - Rotate wheel -15 “clicks”, will move Z -15*0.1=-1.5 mm

Hardware outputs (binary, DAC, PWM) manipulation thourgh Server API

There are 3 ways to manipulate myCNC control board Hardware outputs through Server API:

1) Direct manipulation through commands “SetHWBinaryOutput”, “SetHWDAC”, “SetHWPWM” 2) Manipulation through running PLC procedure with Hardware Outputs manipulation. 3) Manipulation though running short G/M-codes program

Direct Manipulation

Set HW Binary Output

Command: `SetHWBinaryOutput`

Syntax: `SetHWBinaryOutput <Port number> <Port value>`

Port Number is number binary port. Its range is 0 to 159. Set Port value to “1” to turn ON binary output (relay, open collector), “0” to turn OFF the binary output.

Example	Description
SetHWBinaryOutput 0 1	Turn ON binary output #0
SetHWBinaryOutput 1 1	Turn ON binary output #1
SetHWBinaryOutput 23 1	Turn ON binary output #23
SetHWBinaryOutput 0 0	Turn OFF binary output #0
SetHWBinaryOutput 1 0	Turn OFF binary output #1
SetHWBinaryOutput 19 0	Turn OFF binary output #19

Set HW PWM

Command: `SetHWPWM`

Syntax: `SetHWPWM <PWM channel> <PWM value>`

PWM channel is the number of the PWM pin. Software range is 0 to 3, however the number of PWM channels depends on the myCNC Ethernet controller model. Controllers ET1, ET3, ET5 each contain 3 PWM pins.

Example	Description
SetHWPWM 0 2000	Set value “2000” to PWM#0 (PWM1). Max PWM value is 4095
SetHWPWM 0 0	Set value “0” to PWM#0 (PWM1). Max PWM value is 4095
SetHWPWM 2 3500	Set value “3500” to PWM#2 (PWM3). Max PWM value is 4095
SetHWPWM 1 4095	Set value “4095” (Maximum) to PWM#1 (PWM2). Max PWM value is 4095

Set HW DAC

Command: `SetHWDAC`

Syntax: `SetHWDAC <DAC channel> <DAC value>`

DAC channel is number of the DAC pin. Software range is 0 to 1, however real number of DAC channels depends on myCNC Ethernet controller model. Controllers ET1 and ET3 each contain 1 DAC pins, while the ET5 controller contains 6 DAC pins.

Example	Description
SetHWDAC 0 1000	Assign value “1000” to DAC#0 (DAC1). Max DAC value is 4095
SetHWDAC 0 0	Assign value “0” to DAC#0 (DC1). Max DAC value is 4095
SetHWDAC 1 4095	Assign value “4095” (Maximum) to DAC#1 (DAC2)

Manipulation through PLC procedure

Server API command “RunPLC” loads and runs PLC procedure on the controller end with a given parameter. We can run a PLC procedure that manipulates Hardware outputs to get a similar result. Normally every profile configuration contains PLC procedures for Hardware outputs manipulation :

M62

PLC procedure: M62 *Syntax:* M62 <Parameter> M62 allows the user to turn ON a binary output pin with a given number (Parameter=Port number)

Example	Description
M62 1	Turn ON binary output #1
M62 0	Turn ON binary output #0
M62 15	Turn ON binary output #15

M63

PLC Procedure: M63 *Syntax:* M63 <Parameter>

M63 allows the user to turn OFF a binary output pin with a given number (Parameter=Port number)

Example	Description
M63 1	Turn OFF binary output #1
M63 0	Turn OFF binary output #0
M63 15	Turn OFF binary output #15

DAC

Syntax: DAC <Parameter>

The low 12 bits (11…0) contain the value of DAC to be written, high bits (14..12) contain the DAC channel.

Example	Description
DAC 0	Set value “0” to DAC#0 (DAC1). Max DAC value is 4095
DAC 0x0600	Set value “0x600” (1536) to DAC#0 (DAC1). Max DAC value is 4095
DAC 0x1400	Set value “0x400” (1024) to DAC#1 (DAC2). Max DAC value is 4095
DAC 0x1000	Set value “0” to DAC#1 (DAC2). Max DAC value is 4095

PWM

Syntax: PWM <Parameter>

The low 12 bits (11…0) contain the value of PWM to be written, high bits (14..12) contain the PWM channel number.

Example	Description
PWM 0	Set value “0” to PWM#0 (PWM1). Max DAC value is 4095
PWM 0x0600	Set value “0x600” (1536) to PWM#0 (PWM1). Max PWM value is 4095
PWM 0x1400	Set value “0x400” (1024) to PWM#1 (PWM2). Max PWM value is 4095
PWM 0x2000	Set value “0” to PWM#2 (PWM3). Max PWM value is 4095

Examples of running these PLC procedures through the Server API are shown table below:

Binary input manipulation	
Example	**Description**
RunPLC M62 1	Turn ON output#1
RunPLC M62 0	Turn ON output#0
RunPLC M63 3	Turn OFF output#3
RunPLC M63 5	Turn OFF output#5

PWM control	
Example	**Description**
RunPLC PWM 0x1350	Write to PWM#1 (PWM2) a value of 0x350
RunPLC PWM 0x250	Write to PWM#0 (PWM1) value 0x250
RunPLC PWM 0x2800	Write to PWM#2 (PWM3) value 0x800
RunPLC PWM 0x0	Write to PWM#0 (PWM1) value 0
RunPLC PWM 0x1000	Write to PWM#1 (PWM2) value 0
RunPLC PWM 0x2000	Write to PWM#2 (PWM3) value 0

SetHWDAC	
Example	**Description**
RunPLC DAC 0x1570	Write to DAC#1 (DAC2) value 0x570
RunPLC DAC 0x800	Write to DAC#0 (DAC1) value 0x800
RunPLC DAC 0x0	Write to DAC#0 (DAC1) value 0
RunPLC DAC 0x1000	Write to DAC#1 (DAC2) value 0

Manipulation through running G-codes

Server API command “SinglePlay” will run a G-code line (or a number of G-code lines separated by the “;” symbol). It's possible to control binary outputs by running M-functions “M62” and “M63” (similar to the method described above). P-parameter sets the binary output number to control.

M-code: M62 *Syntax:* `M62 P<number>`

This will turn ON the binary output pin with the given number.

Example	Description
M62 P1	Turn ON binary output #1
M62 P0	Turn ON binary output #0
M62 P15	Turn ON binary output #15

Syntax: `M63 P<number>`

This will turn OFF the binary output pin with the given number.

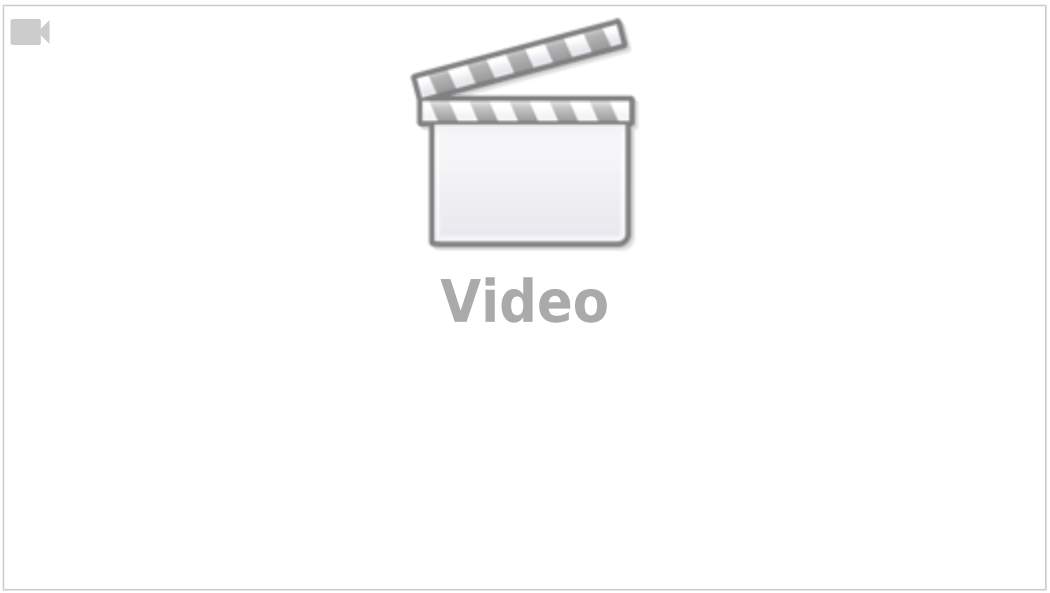
Example	Description
M63 P1	Turn OFF binary output #1
M63 P0	Turn OFF binary output #0
M63 P15	Turn OFF binary output #15

Any custom PLC function can be written and assigned to M-code, then loaded through the CNC Server API.

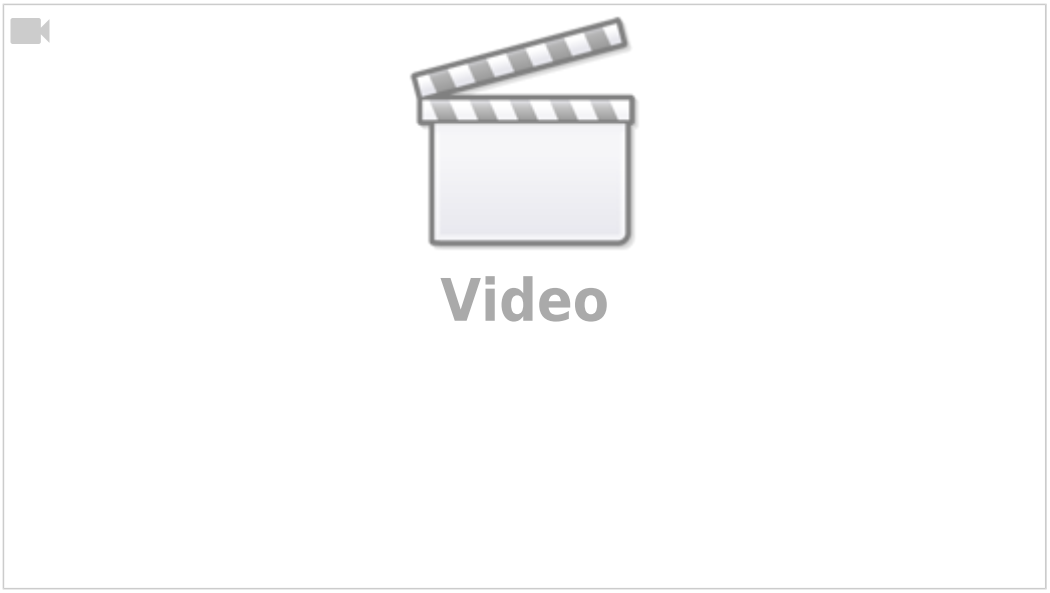
Demo Videos

The following videos show examples of using the server API to control a myCNC system (older versions of the software are used, however the principle is the same):

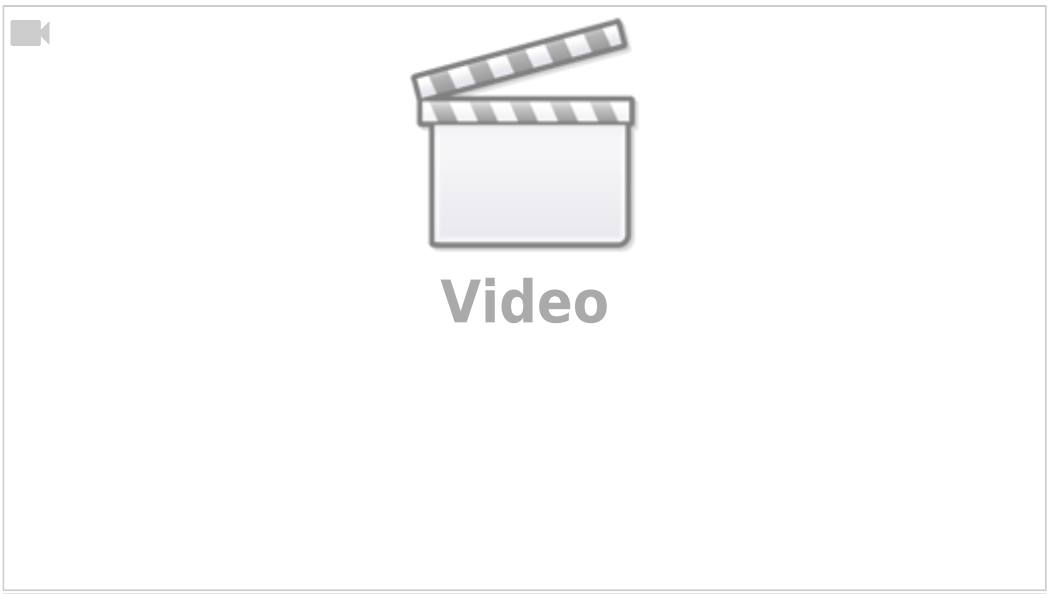
ProgramFileOpen and SetScale:

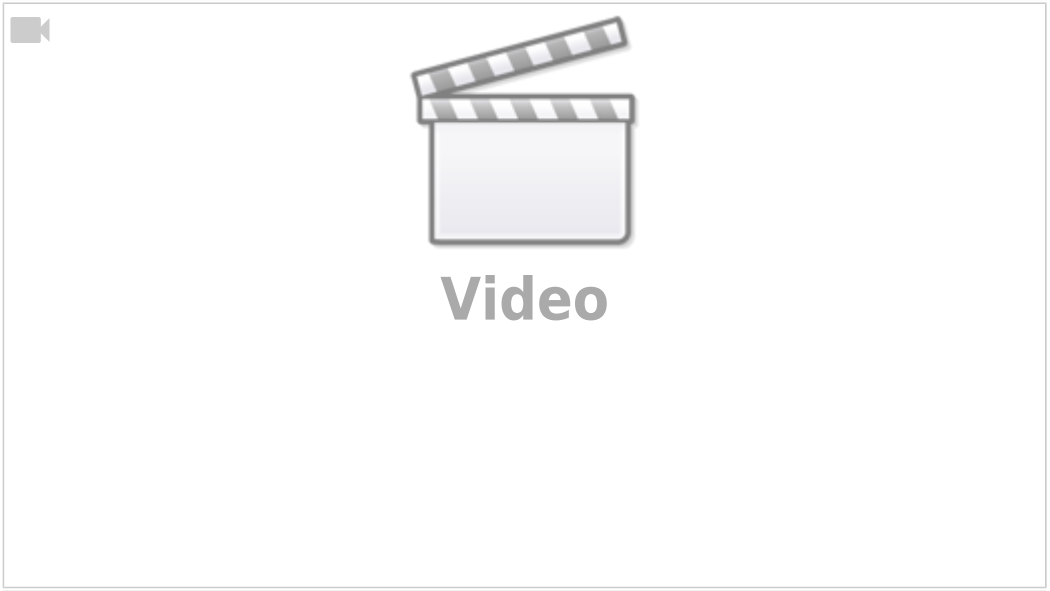


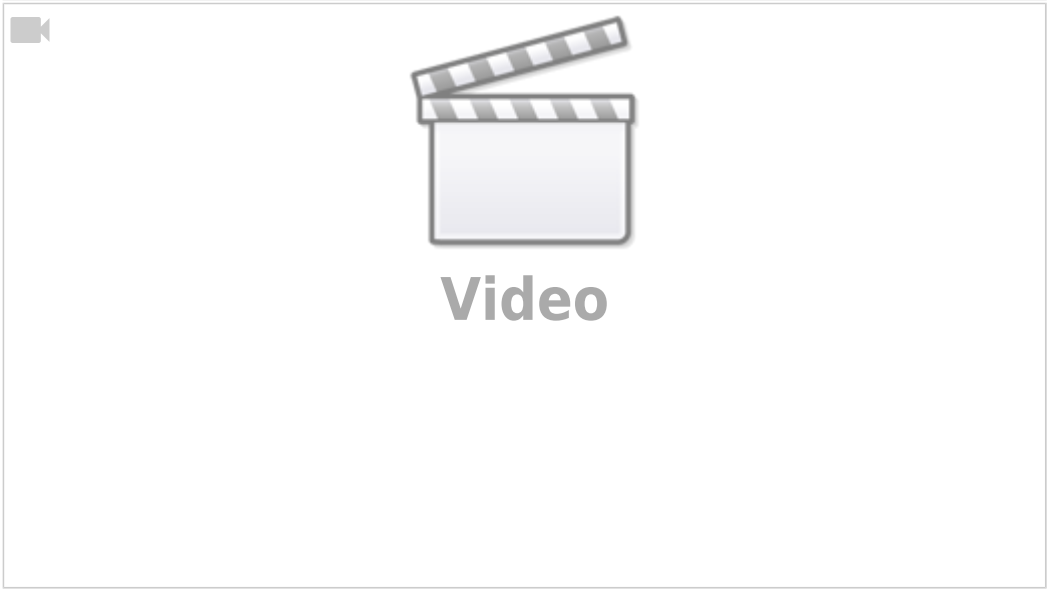
Hardware Binary Outputs:



Set Scale and Rotation Angle:


Video


Video


Video

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