

PickPlace4 firmware information

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Developed by Volker Besmens 2014

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Axis Definitions

Axis number	Alias	Function
0	X	Move pickhead in X direction
1	Y	Move pickhead in Y direction
2	Z1	Move pickhead down
3	Z2	Move paste dispenser down
4	R1	Rotate pickhead
5	R2	Rotate paste worm drive (dispense solder paste)

Serial command format

Baudrate is 57600, 8N1, currently no handshake

Every command consists of a 3 letter mnemonic followed by a number of integer parameters separated by commas. The command can either end with a return (0x0D) or a semicolon (0x3B).

Sending an exclamation mark (0x21) will clear the buffer and stop the machine immediately.

Sending a start (0x2A) will clear the buffer only.

Example:

```
MOV100,200,300,0,0,0;
```

Serial command list

Command	Description	Parameters
MOV	Move absolute	Move to the position (in steps). Number of parameters may vary from 1 to 6 commanding the position for axis 0 to 5. Parameters may not be negative.
MOA	Move axis	Move a single axis to an absolute position. Number of parameters is 2. The first parameter defines the axis used (0 to 5). The second parameter is the commanded absolute position which may not be negative.
JOG	Jog axis	Jog one axis. The number of parameters is 2. The first parameter defines the axis used (0 to 5). The second defines the velocity which may be positive for positive directions and negative for negative directions. A value of 0 stops the axis. It will also stop when reaching it's max position or min position. For details on the velocity format refer to the next chapter. If any other axis is jogging when sending the command, it will be stopped.
STP	Set trajectory parameters	This command has from one up to three parameters. The second and third are optional. The first parameter defines the maximum velocity, the second the acceleration / deceleration and the third the jerk value. For details on the velocity format refer to the next chapter. The jerk parameters are used for the other movement commands. The jog and ref command will only use the acceleration and jerk.
SPA	Set position of axis	Set the absolute position of an axis. Number of parameters is 2. The first parameter defines the axis used (0 to 5). The second parameter is the absolute position which may not be negative. This is only used for rotational axes R1 and R2.
REF	Reference axis	Reference the axis defined as the first parameter. The second parameter defines the velocity to use. The axis will move onto its limit switch. When the switch is reached it back's up with one fourth of the defined velocity until the switch is no longer pressed. When the referencing procedure is done the current position of the axis is set to 0. The rotational axes 4 and 5 (R1, R2) do not have a limit switch. Sending the REF command to them will only set their position to 0.

Serial command list (continued)

OUT	Output	<p>Set the value of an output with two or three parameters. The first defines the output (see below). The second parameter defines the value to set. The third parameter is only used for the windup tape from feeders and defines the number of dark / light transitions to rotate. This is currently unused. For non PWM outputs (marked with * below) sending a value of 0 will switch the output off. Any other value will switch it on. PWM values are 8 bit (max 255).</p> <p>0* Vacuum valve 1* Pressure (Puff) valve 2* Vacuum pump 3* Feeder needle 4* User LED 10 EXP1 11 EXP2 12 EXP3 13 Peelhead camera LED light 14 Fixed camera LED1 (red) 15 Fixed camera LED2 (green) 16 Vibratory feeder 18 DC windup left feeder (2 params) 19 DC windup right feeder (2 params) 20 DC windup left feeder (3 params) 21 DC windup right feeder (3 params)</p>
INP	Input	<p>Read the input value. There is one parameter defining the input to read (see below). The return value will either be 0 or 1 depending on the state of the sensor.</p> <p>0 : X Axis ref switch 1 : Y Axis ref switch and height detector switch 2 : Z1 Axis ref switch 3 : Z2 Axis ref switch 4 : Vacuum sensor and feeder solenoid switch 5 : Index signal left feeder (currently unused) 6 : Index signal right feeder (currently unused)</p>
POS	Get position	No parameter. Returns the position of all axes as 6 parameters.
INI	Initialize Ports	No parameter. This will initialize the machines output states by switching all outputs off.
GRS	Get reference state	No Parameters. Returns (as a binary bitfield in numeric format) the reference state of the axis. The axis is referenced if the bit is set and not referenced if the bit is not set. Axis are not referenced after power on or emergency stop.
SMM	Set Max Movement Area	Number of parameters is 6. This will set the maximum movement area for all axes.
MPO	Motor power off	No parameter. Turn off motor power. Also resets reference bits.
VER	Version	Returns firmware version. No parameters.