# XY plotter specifications

## G-codes

### M10

Log of opening a COM port in mDraw.

```
<20180926220106.561 TX>
M10<LF>
<20180926220106.561 RX>
M10 XY 380 310 0.00 0.00 A0 B0 H0 S80 U160 D90<CR><LF>OK<CR><LF>
```

mDraw sends

Timestamps from COM port spy&logger SW

End of line

Plotter replies with two lines

Reply breakdown

```
M10 XY 380 310 0.00 0.00 A0 B0 H0 S80 U160 D90
```

Plot area height (Y) in mm

Plot area width (X) in mm

Stepper A (X-axis) direction

Stepper B (Y-axis) direction

Plotting speed (0 – 100%)

Stepper motor directions: 0 = clock wise, 1 = counter clockwise

Directions determine which way motor must be stepped to increase X and Y

```
M10 XY 380 310 0.00 0.00 A0 B0 H0 S80 U160 D90
```

Device type

Undocumented value

Undocumented value

Undocumented value

Pen up value (0 – 255)

Pen down value (0 – 255)

## M11

Limit switch status query

<20180926220233.877 TX>

M11<LF>

mDraw sends

<20180926220233.877 RX>

M11 1 1 1 1<CR><LF>OK<CR><LF>

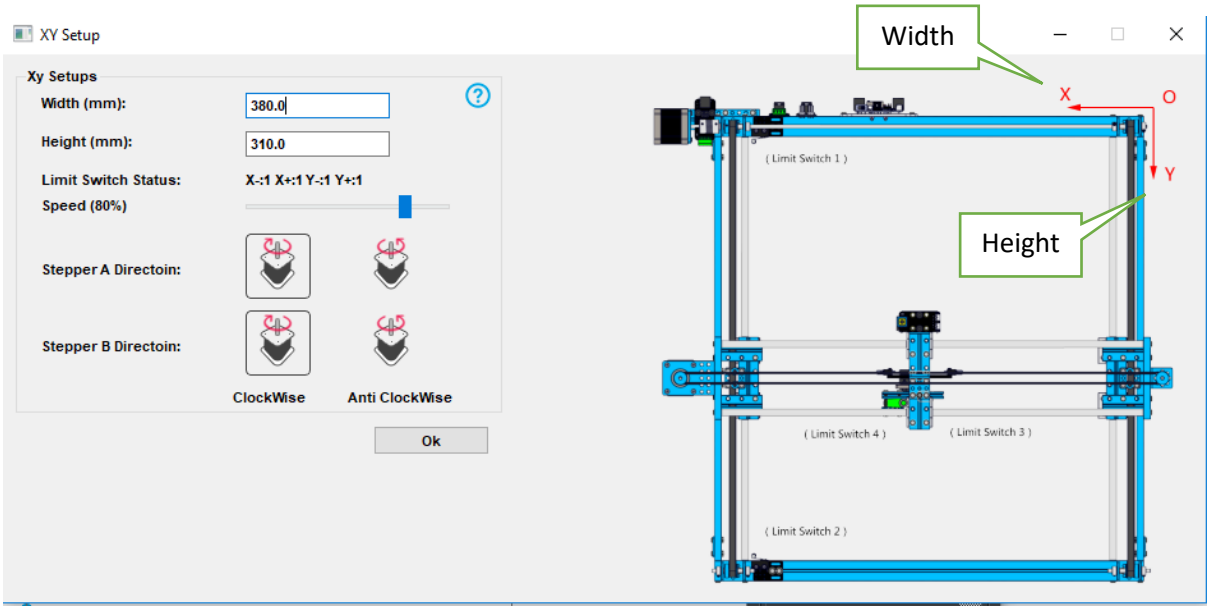
Plotter replies

Limit switches read one (high) when switch is open and zero (low) when closed.

The order of the switch status in the reply is:

M11 <L4> <L3> <L2> <L1>

L1 → Y+, L2 → Y-, L3 →X+, L4 → X-




## M2

Save pen up/down position. The saved values affect the reply to M10.

<20180926220143.603 TX>

M2 U150 D90<LF>

mDraw sends

<20180926220143.815 RX>

OK<CR><LF>

Plotter replies

## M1

Set pen position (control servo). Range 0 - 255. Remember that servo pulse (high) length must be between 1 - 2 ms and pulse frequency is 50 Hz.

```
<20180926235631.975 TX>
M1 90<LF>
```

mDraw sends

```
<20180926235631.975 RX>
OK<CR><LF>
```

Plotter replies

## M5

Save stepper directions, plot area, and plotting speed. The saved values affect the reply to M10

```
<20180926220235.168 TX>
M5 A0 B0 H310 W380 S80<LF>
```

mDraw sends

```
<20180926220235.388 RX>
OK<CR><LF>
```

Plotter replies

## M4

Set laser power. Range 0 - 255 (0 = off, 255 = 100% on). Note that when SCTimer is set to 0% with matchrel the timer still generates very small glitches at the output (about 1 us). The glitches generate EMC disturbance that will affect the performance of the (poorly protected) stepper and IO-boards on the plotter. Use an oscilloscope to verify that when laser is off there are no glitches at the output.

## G28

Go to the origin

## G1

Go to position. Coordinates are in millimetres. The last parameter tells is coordinates are relative or absolute (A0 = absolute, A1 = relative)

```
<20180926235632.632 TX>
G1 X85.14 Y117.29 A0<LF>
```

mDraw sends

```
<20180926235632.757 RX>
OK<CR><LF>
```

Plotter replies

## LPCXpresso pins

Pins used:

| Pin | Port | Description |
|---|---|---|
| D6 | 1_3 | Limit SW |
| D7 | 0_0 | Limit SW |
| D3 | 0_9 | Limit SW |
| D2 | 0_29 | Limit SW |
| D12 | 0_12 | Laser |
| D4 | 0_10 | Pen |
| D10 | 0_27 | XMotor |
| D11 | 0_28 | Xmotor Direction |
| D8 | 0_24 | YMotor |
| D9 | 1_0 | YMotor Direction |
| A0 | 0_8 | SW1 |
| A1 | 1_6 | SW2 |
| A2 | 1_8 | SW3 |

Note:

Limit switches are grounding switches. They read one when the switch is open (= not at a limit).

LASER PIN IS BY DEFAULT HIGH when the board boots up which powers on the laser at the maximum power. **Drive the laser pin low immediately after your program starts.**