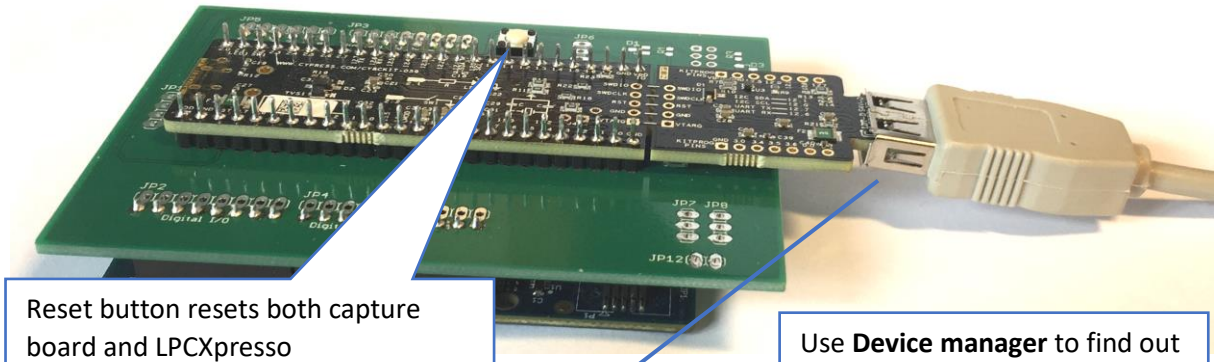
XY-plotter simulator user guide

Plotter simulator is a hardware assisted system for emulating the XY-plotter. A cypress PSoC-based board captures stepper motor, servo, and laser cutter control signals from the LPCXpresso board and sends them through USB-COM port to simulator software that runs on a Windows PC. The PC software uses the received data to move virtual print head and to plot pixels on the drawing canvas.

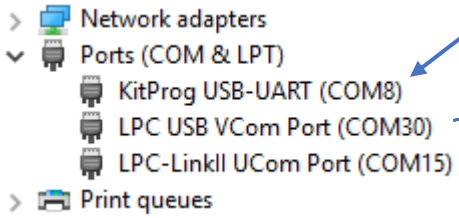
The data flows mostly from PSoC to PC with one exception, the limit switches. The drawing area of the simulator is configurable and the limit switches are controlled by the PC software. When the virtual print head hits a limit switch the simulator sends a command to the capture board to close the limit switch in question.

The PSoC-board needs to be programmed with the capture software. The hex-file of the capture software and the programmer can be downloaded from the course workspace. When you install the programmer, PSoC programmer, you get drivers for both the programmer (KitProg) and the USB-UART. USB UART drivers are needed to communicate with the PC-based simulator. PSoC programmer is not needed after the capture board has been programmed.



Reset button resets both capture board and LPCXpresso

Use **Device manager** to find out the COM-port number of the capture board



CDC UART

Debug UART (DEBUGOUT(), Board_UART…-functions).

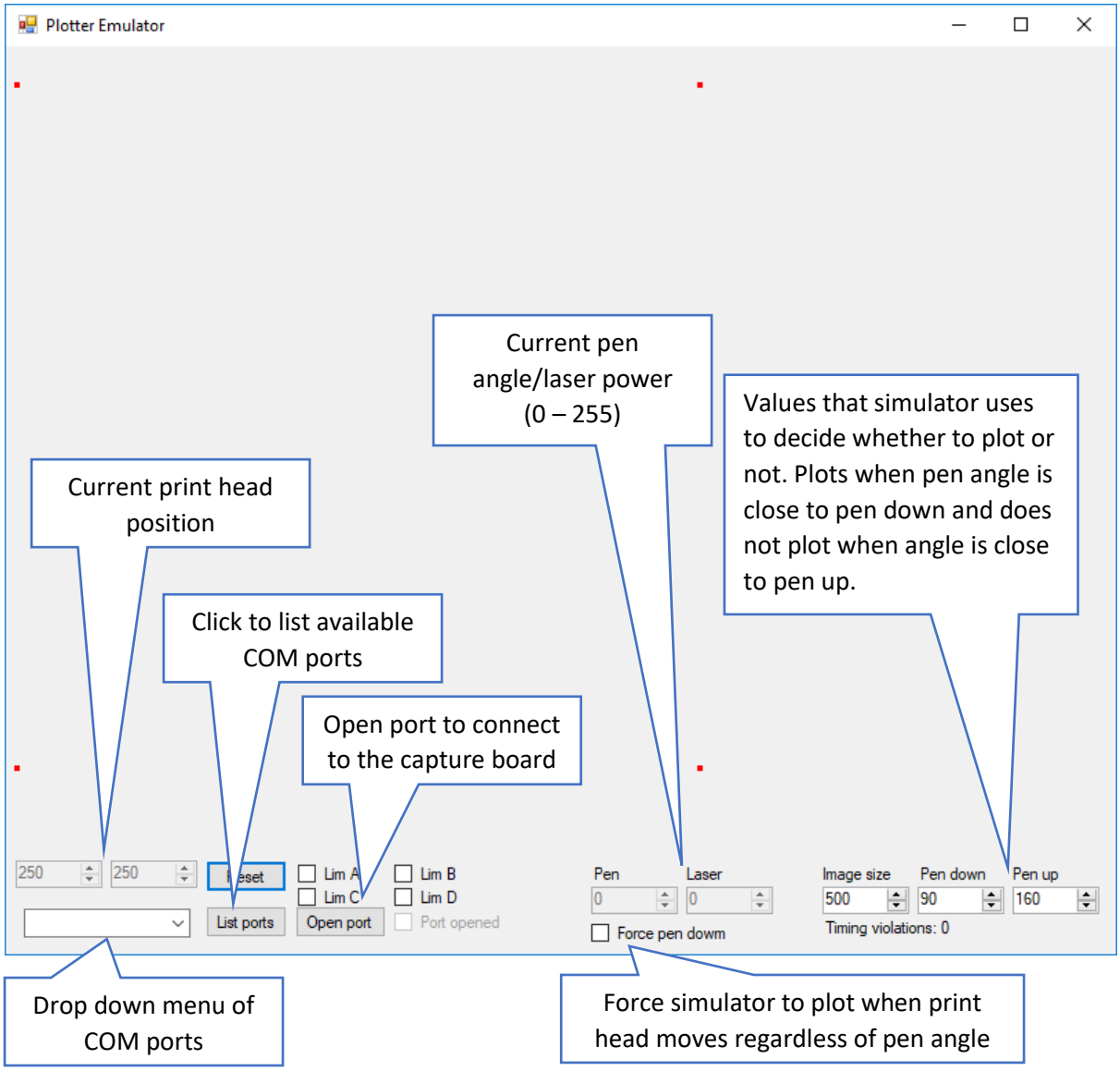
Available only when using debugger

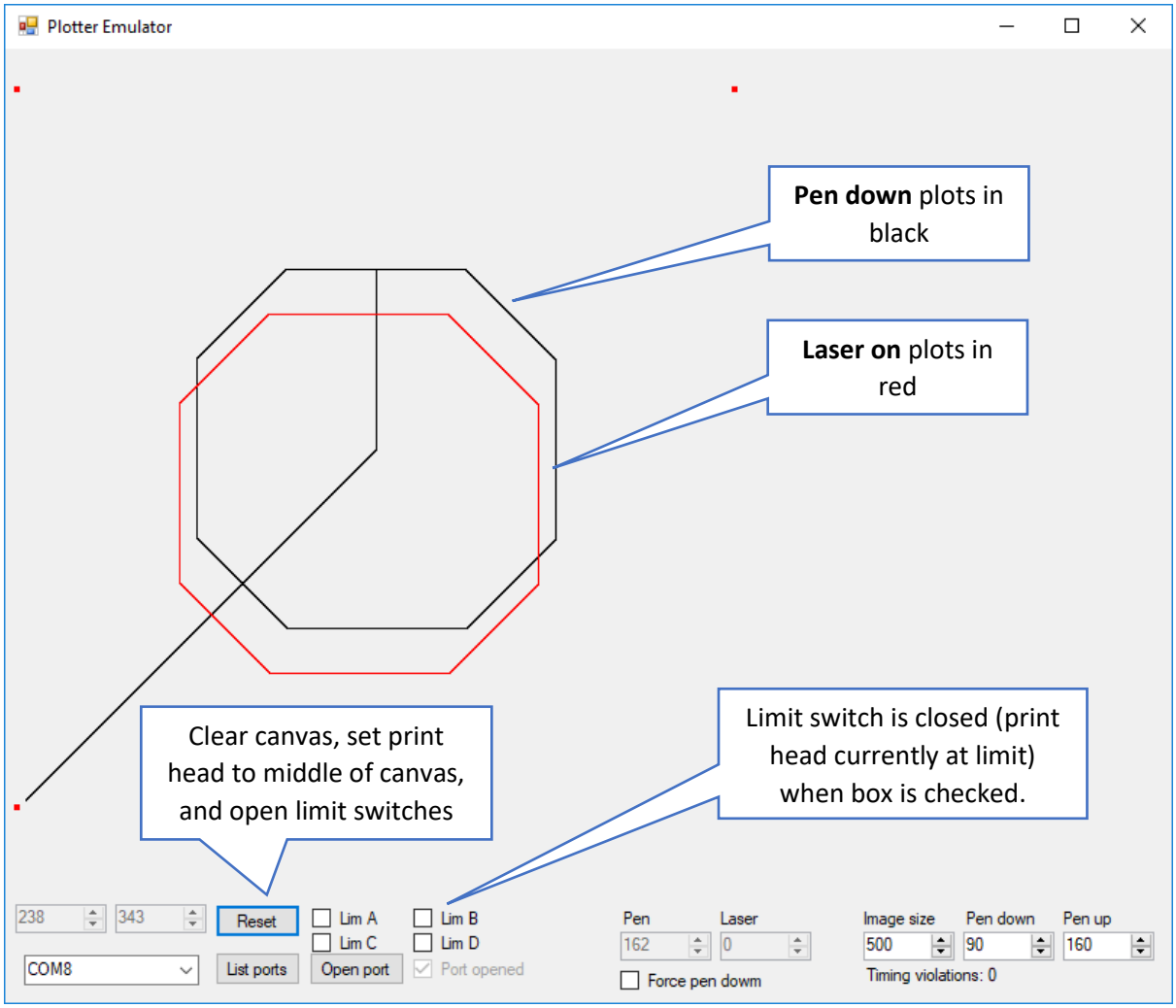
Note that because reset pin of PSoC and LPCXpresso are connected together the PSoC board is reset always when LPCXpresso is reset (by LPCXpresso debugger or by reset button**). It is important that you allow the pins to stabilize for a few milliseconds before your plotter software starts to read the state of limit switches.** Having this delay is a good idea also in the real hardware to ensure that pins have stabilized after the reset.

If your capture board shows up as a mass storage device press and hold reset for about 5 seconds. When the board is in mass storage programmer mode the green led near USB-connector blinks. Solid green means that the board if in standard mode. USB UART works only in standard mode.

The PSoC board needs a connection to the PC simulator before it starts the actual work.

After reset PSoC board keeps all limit switches closed until it gets a connection to the PC simulator. Make your plotter software wait until all limit switches are open before starting calibration. This requirement also applies to the real hardware since there is no reliable way to perform calibration if the plotter starts with limit switch(es) closed.




Plotter Emulator
Pen down plots in black
Laser on plots in red
Clear canvas, set print head to middle of canvas, and open limit switches
Limit switch is closed (print head currently at limit) when box is checked.
238
343
Reset
Lim A
Lim B
Lim C
Lim D
COM8
List ports
Open port
Port opened
Pen
Laser
162
0
Force pen dowm
Image size
Pen down
Pen up
500
90
160
Timing violations: 0