

Components Used:

- Arduino Mega 2560
- Adafruit RGB LCD Shield kit w/ 16x2 Character Display
- 4x4 Membrane Keypad
- ClearPath MCPV Motor
- ClearPath I/O Cable
- 330 Ohm Resistor
- Various jumper wires

Setup: (Note: this setup matches the code provided.)

- Build the LCD Shield
- Mount the Shield on the Arduino Mega
- Connect the 4x4 Keypad to the pins on the Arduino Mega as follows:
  - Note: The 4x4 Keypad has a 1 and 8 inscribed on the connector for reference

Arduino Mega Pin #	4x4 Keypad Pin #
32	1
33	2
34	3
35	4
36	5
37	6
38	7
39	8

- Connect the Wires from the clearpath I/O cable as follows:

Arduino Mega Pin #	ClearPath Color/Pin #
44->330 $\Omega$ ->	GRN/1
52	GRN/1
50	BLK/2
48	WHT/3
46	BLU/4
53	RED/5
51	YEL/6
49	BRN/7
47	ORN/8

(See also: attached drawing)

Additionally, there are certain variables that exist both in ClearPath MSP and the Arduino source code. They need to match, as seen in the screen shots below.

```
//+++++SCENARIO SPECIFIC VARIABLES+++++  
//The following are config file variables, changeable within MSP. They must match the values in MSP  
#define MinAltPulse 20 //Min Alt Pulse [ms]  
#define InputResolution 6400 //Pulses/Revolution  
#define HomingSpeed 100.0 //RPM  
#define MovingSpeed 900.0 //RPM  
  
#define MaxStroke 100.0 //inches  
//ThouPerPulse represents the physical distance the stage will move per pulse sent by the Arduino  
//It is calculated based off of the Input Resolution defined in the config file in MSP (6400 pulses/rev)  
// as well as the diameter of the pulley for the belt stage (1.379 in).  
// Calculation: (1/resolution)*(pi*Diameter)*(unitconversion)  
// Example: (1/6400 [rev/pulse])*(pi*1.379 [in/rev])*(1000 [thou/in]) = 0.677 [thou/pulse]  
#define ThouPerPulse 0.677 //Physical Move Res. [Thou/Pulse]
```

The screenshot shows the ClearPath MSP configuration interface. Red boxes highlight the following settings, with arrows pointing to their corresponding definitions in the code above:

- Input Resolution (Pulses/Revolution):** Set to 6400. A red box highlights this value, with an arrow pointing to the `#define InputResolution 6400` line in the code.
- Min Alt Pulse (ms):** Set to 20. A red box highlights this value, with an arrow pointing to the `#define MinAltPulse 20` line in the code.
- Speed Limit (RPM):** Set to 900. A red box highlights this value, with an arrow pointing to the `#define MovingSpeed 900.0` line in the code.
- Homing Setup:** The **Homing** section shows **Enabled** selected. A red box highlights the **Setup...** button, with an arrow pointing to the `#define HomingSpeed 100.0` line in the code.
- Homing Move Settings:** A red box highlights the **Homing Speed (RPM)** field, which is set to 100. An arrow points from the text "Note: The homing speed is under Homing setup, on the right." to this field.

**Note:** The homing speed is under Homing setup, on the right.

Pin Diagram for Clearpath I/O

