

# Step Indexer 2.2 Readme

Date: 4/5/2014

This is the documentation file for an update to the original Step Indexer version 2.1 that appeared in the Winter 2013/2014 issue of Digital Machinist magazine. More information may be found in the Digital Machinist forum at [this address](#), as well as my website at <http://www.liming.org/millindex>

Version 2.2 contains the following changes:

## New Functionality

New mode added: the Ratio Mode

In 2.1 if you wanted to use the Step Indexer with more than one work fixture that had different gear ratios, you had to edit the Arduino code, compile and reload the unit. In 2.2 you can specify up to three gear ratios and select between them with the keypad.

Let's say you have 3 fixtures that have gear ratios of 3, 40, and 90. (This is not all that strange, as the fixture in the article is 3, an indexing head is usually 40, and a rotary table is 90.) You would edit the following 2.2 Arduino code:

```
#define GearRatio1 3    // Change these three values to reflect any front end gearing you
#define GearRatio2 40  // are using for three different devices. If no gearing, then
#define GearRatio3 90  // define this value to be 1. GearRatio1 is the default
```

and specify the 3 different ratios you want to use. If you only have one fixture, make them all the same, or make the first one the one you want and you do not have to select the ratio mode. If there is one ratio you use more than others, the first ratio in the code is the default. After compiling and reloading, you can select the ratio mode and then use the up/down keys to select one of the three ratios you want to use to match the work fixture.

Also, when the unit first powers up or is reset, the flash screen that will now say "Step Index 2.2" as well as indicate which is selected on the next line with "Ratio = ".

If anyone needs more than 3 ratios, it is fairly simple to add more: first, add more lines of

```
#define GearRatioX XXX
```

for each one you want to add under the three above. Then, in the next line, change

```
#define GearRatioMax 3
```

to the number of gear ratios you defined above, for example

```
#define GearRatioMax 5
```

and later on down in line 97 change:

```
int    gear_ratio_array[GearRatioMax] = {GearRatio1,GearRatio2,GearRatio3};
```

to add the GearRatio variables you defined above, like:

```
int gear_ratio_array[GearRatioMax]={GearRatio1,GearRatio2,GearRatio3,GearRatio4,GearRatio5};
```

if you added two more ratios, for example.

## Bug fixes

1. Changed data type for some variables from a 16 bit number to an unsigned long to handle large gear ratio numbers.
2. Changed the MotorENABLE pin from 4 to pin 11 in the code. This does not require you to change the wiring.
3. Some miscellaneous housekeeping, like changing some hard-coded numbers to defines and comment editing, mostly to better document the code.

To make the wiring clearer here are some illustrations of which pins are used:

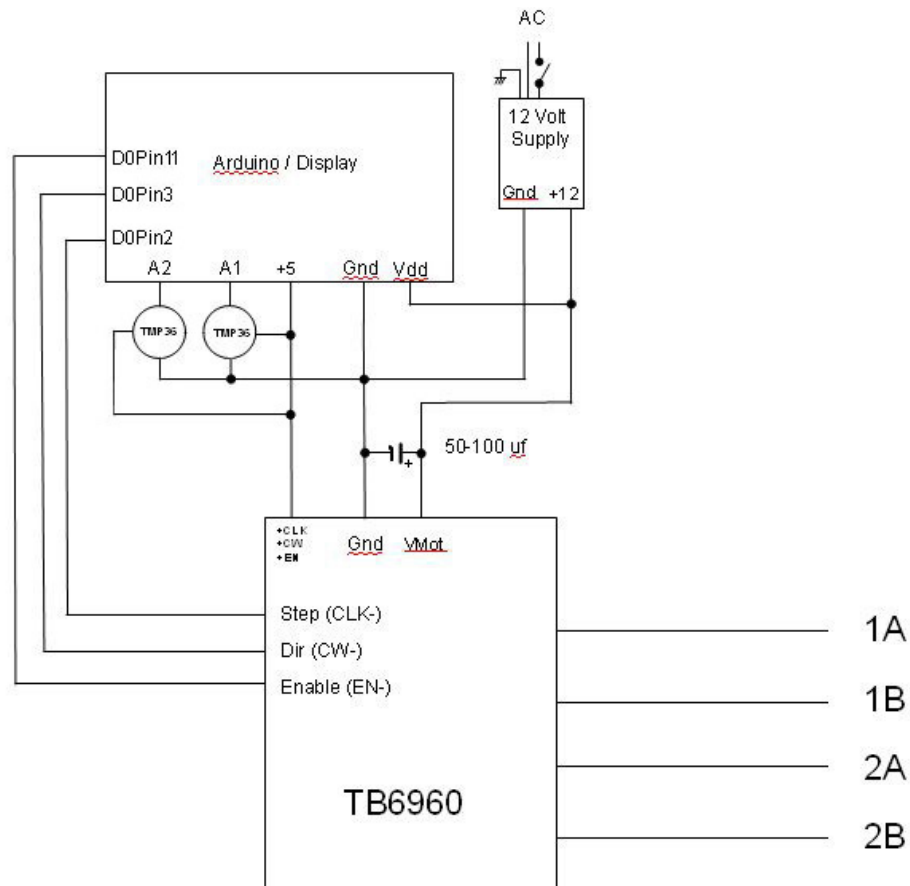


Figure 1. Revised Schematic

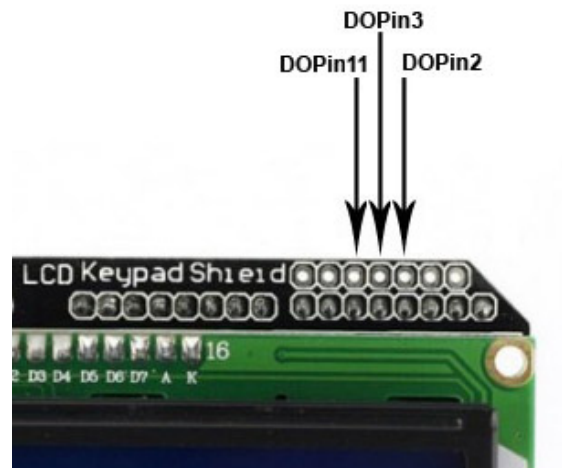


Figure 2. Digital Pin locations  
Upper right corner of LCD/Keypad shield

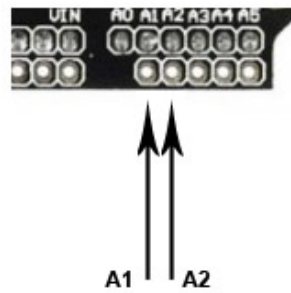


Figure 3. Analog Pin Locations  
Lower right corner of LCD/Keypad shield  
(if temperature sensors are used)