

LED linearity tester – quick summary

Input power:

9 to 15 V DC. Exact voltage is not critical, but it must be regulated. I tested the units on 12V.

Output:

There are two LEDs: one on the board, and another to illuminate the CCD.

The one on the board provides a visual indication the device is working.

I provide an ultrabright green LED (Maplin code N19BY) which you can use to illuminate the CCD, but you'll have to mount and connect this, and arrange the CCD illumination, yourself. A 1500 ohm resistor is provided in series with this – with 3V forward drop and 5V supply, that's 1.3 mA. This is much less than the 10mA limit of the PIC output, but you can reduce it still further if you wish by putting extra resistors in series.

Operation:

The device has two modes, HALT and RUN, selected with the toggle switch.

In HALT mode the device reads the settings on the DIL switches.

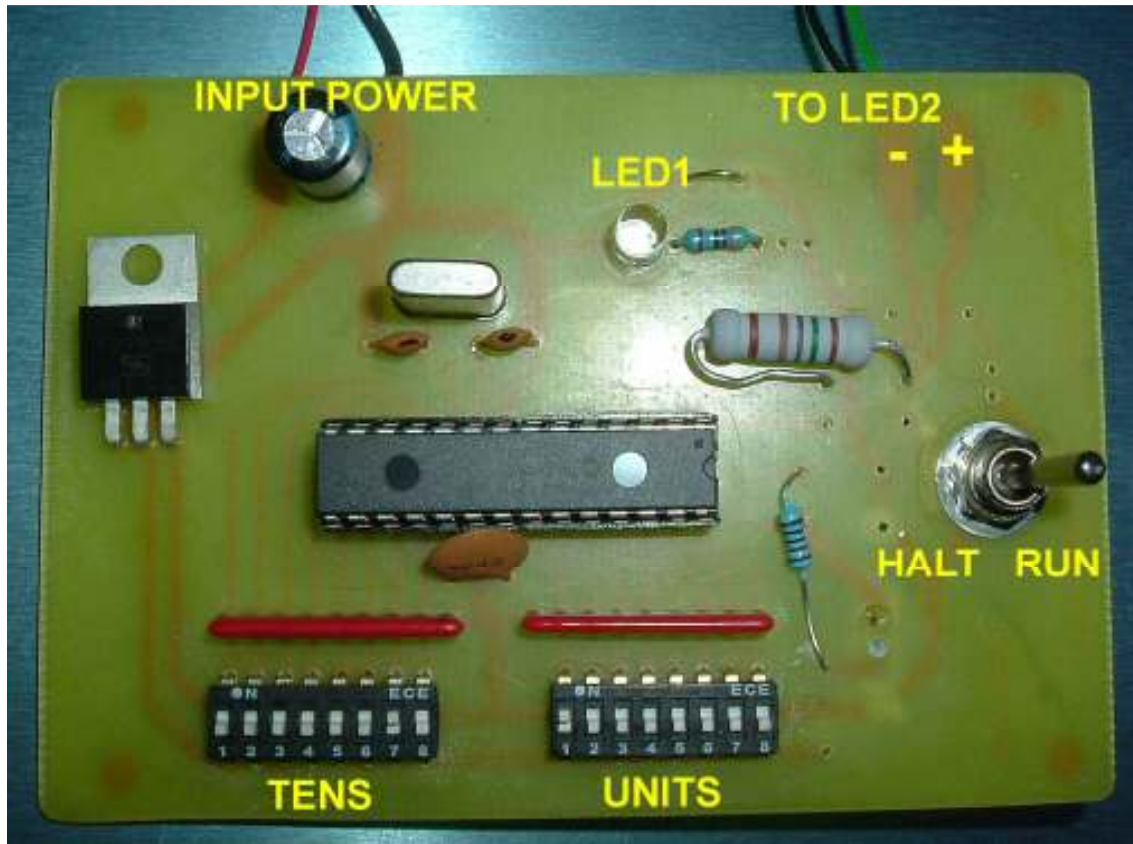
On switching to RUN mode, it generates a series of identical pulses, and then pauses, before repeating the pulse train. The pause time is set to give a total cycle time of 4 seconds.

The device reverts to HALT mode, when the switch is set to the HALT position for at least half a second.

Changing the DIL switches in RUN mode will have no effect until you switch to HALT mode.

Number of pulses:

This is set by the DIL switches. The number is the **total** of all the switches set. For example: if we set three switches - 80, 20 and 1 - to the ON position; this will produce 101 pulses. The maximum permissible number of pulses is 250.



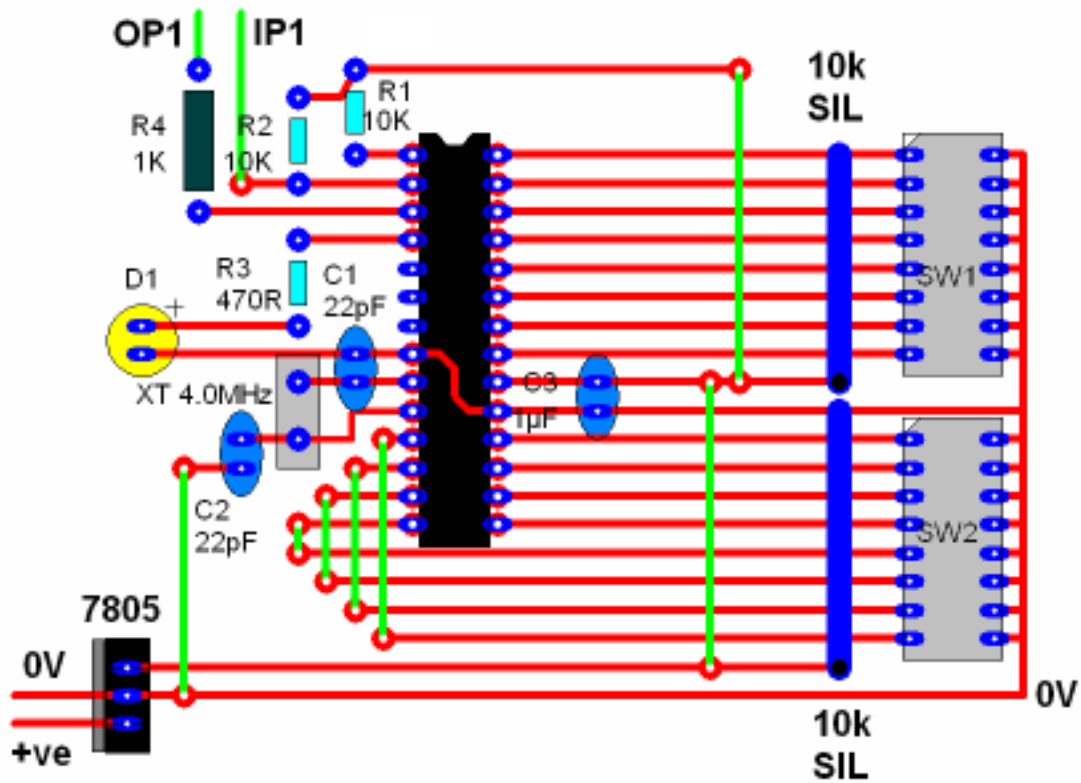
Other notes

I've tested these devices with a pulse counter to verify they do produce the expected number of output pulses.

If you look at the circuit board, you'll see it looks a bit bodged. The original design had a buffer (74HC4049) between the PIC output and the LED; given that the LED current is so low, I decided this wasn't necessary and so omitted it from later units. It should also be possible to construct the unit on strip board.

Circuit diagram

Layout is suitable for construction on stripboard



OP1 is to CCD illumination LED
IP1 is grounded to select PAUSE mode

Note on component values:

C3 is for decoupling, value not critical, is 220nF on present units.

R4 is series resistor for CCD illumination LED – not critical, presently 1500 ohms, and you may wish to add more resistance in series to reduce the LED current (thereby reducing heating in the LED).

Values for input pull-up resistors (R1, R2 and 10k SIL) are not critical.