A random timer
Repurposing an EzyPoints kit
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Members are increasingly adding adding animations and sound effects to their layouts. Some may be operated by a switch, while others may be triggered by train detectors, etc. Another option is to have activities that are activated at random times.

What is available?
There is currently no kit that fully provides this option. PMP20 provides output pulses at regular intervals.   This is useful to have your town clock sound every 15 minutes, but most other real-world activities do not happen at such set periods.   PMP12 does switch LEDs on and off at random. This is ideal for lights in buildings but the only control is over the time the lights may change. There is no ability to set a <u>minimum</u> time, which is required for other layout activities.   After all, we would not be popular at an exhibition if our church's bells pealed again just 10 seconds after finishing!

What does this module do?
This module has three trimmer controls.   One sets the minimum time before an output activates. The second trimmer sets the maximum delay between output pulses. The third trimmer sets the duration of the pulse. There are two outputs, one with a pulse that goes low (0V) and one that goes high (+5V).   You choose the output that is required for the device this module is to control.
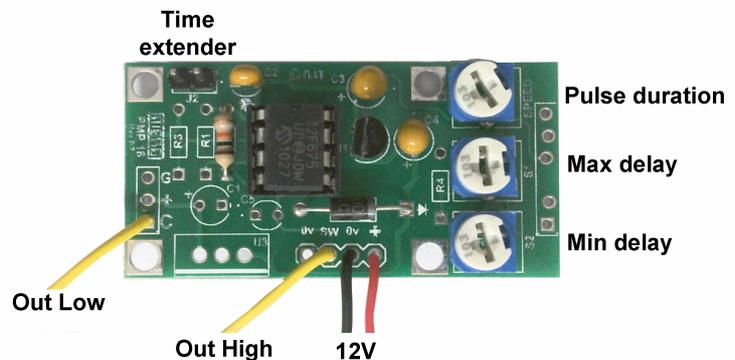
How is it built?
It uses the EzyPoints kit PMK18 from the Kit Locker.
It contains all the parts you need. In fact, as the illustration shows, you omit R1, R3, R4, C1, C5 and U3.
Just follow the build instruction for the PMK18 kit, apart from these components.
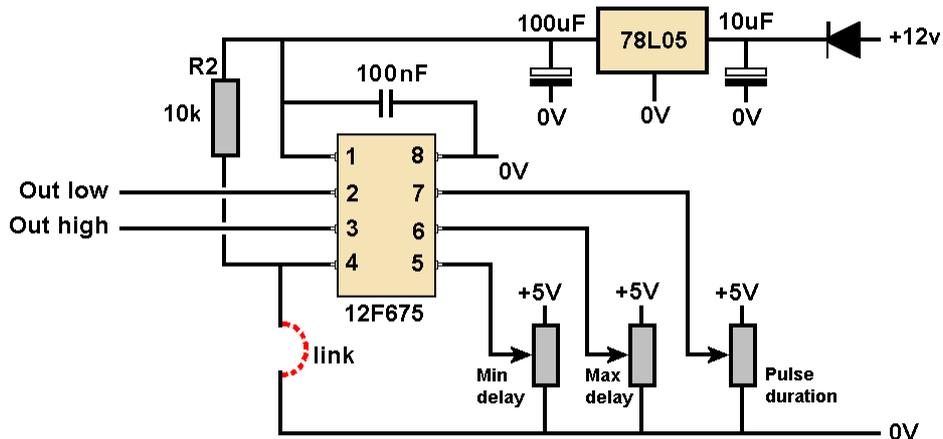J2 is still used as a link, this time to further extend the delay periods, if required.
I cut one of the pins off the 3-pin header so that a jumper could be used at J2.
An ordinary piece of wire can be soldered across J2 if you wanted extended times; otherwise, fit nothing to J2.

Note
Although no additional parts are required, the PIC chip has to be reprogrammed with the random delay code replacing the EzyPoints code.   The JAL and hex files for this are in available on request.

100uF 78L05 10uF +12v

R2
10k   100nF
              0V
         0V   0V   0V

         1   8
              0V
Out low 2   7
Out high 3   6
         4   5

         12F675

link
         +5V   +5V   +5V

         Min   Max   Pulse
         delay delay duration

                          0V

How is it set?
There are only three settings and these can be adjusted while the program runs, allowing you to tweak the values for your particular needs.

Pulse duration
The duration of the output pulses are set by adjusting the upper trimmer.   The output pulses can be set for very short bursts of a few seconds, up to a long pulse of over 4 minutes.
Long pulses can be used for animations (e.g. factory machinery, conveyor belts, etc.).
Some sound modules, and the Sequencer kit, only require a short pulse to start a single sequence.

Settings delays
The minimum delay between output pulses is set by adjusting the middle trimmer. With no link fitted in J2, the minimum delay between output pulses can be set from 0 secs to 4 mins 15 secs.
Adjusting the lower trimmer, sets the maximum delay by adding up to another 4 min 15 secs on to the minimum time.
Examples:
        Short delays - Min 10 secs, max 30 secs
        Long delays - Min 3 mins, max 7 mins

Extended delays
For longer delays, fit a link in J2.
Examples:
        min 12 secs, max 15 mins
        min 7 mins, max 17 mins

Modifications
Currently, fitting the link doubles the delay times.
This is set in line 65 of the JAL code
        delay_factor = 2
You can change this value to whatever you need.