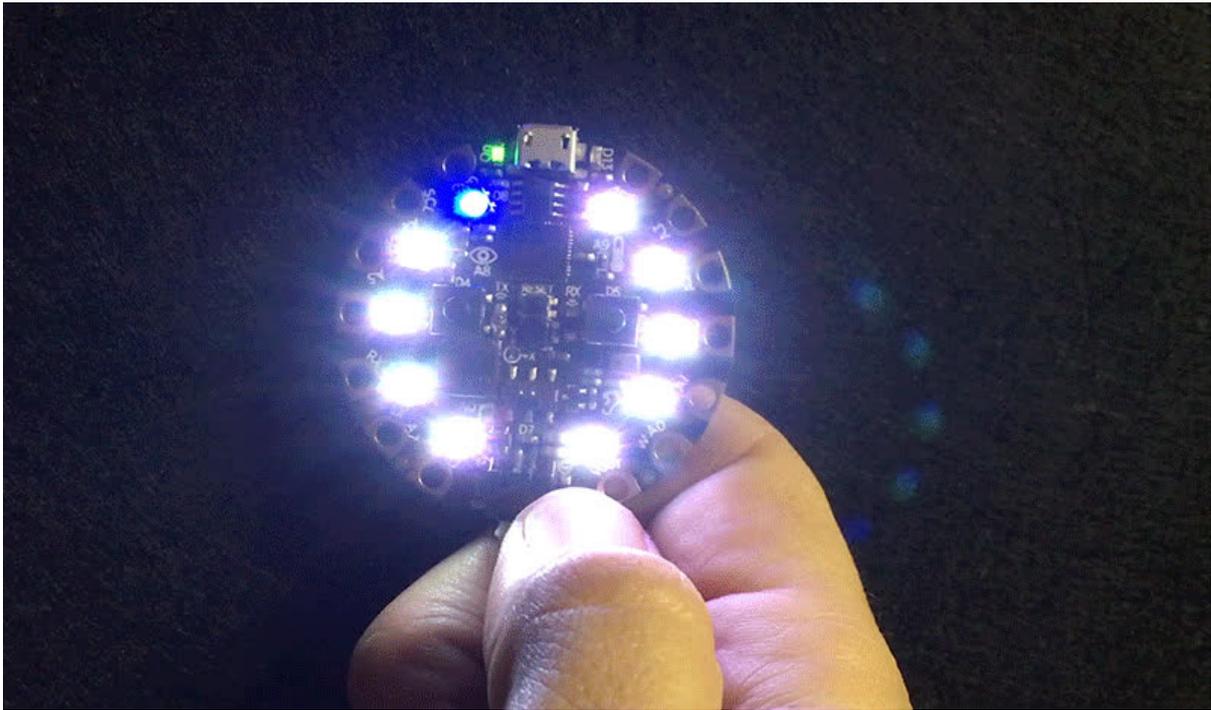# New Year Countdown Clock with Circuit Playground Express

Created by John Park

https://learn.adafruit.com/new-year-countdown-clock-with-circuit-playground-express

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Overview

Press a button on your Circuit Playground Express to begin the countdown of the last ten seconds of the year! It will count them down on the NeoPixel LEDs, and play Auld Lang Syne when the New Year has begun!

Plus, you can flip the switch to get to Party Favor Noisemaker mode, where you can blow on the Circuit Playground Express and it will animate the lights and play festive sounds!

1 x Circuit Playground Express
super awesome microcontroller board

https://www.adafruit.com/product/3333

1 x 3 x AAA Battery Holder
with On/Off Switch, JST, and Belt Clip

https://www.adafruit.com/product/3286

1 x Alkaline AAA batteries
3 pack

https://www.adafruit.com/product/3520

Or, get the bundle of all the parts, plus a USB cable and mini storage box:

1 x Circuit Playground Express
Base Kit

https://www.adafruit.com/product/3517

Program It With MakeCode

You'll begin by getting familiar with MakeCode, in case you haven't used it before, by following this guide (https://adafru.it/AgQ). Then, return here to program your Circuit Playground Express with the NYE Clock code.

**Getting Started with MakeCode**

https://adafru.it/AgQ

Clock and Noisemaker

We'll give the Countdown Clock a few different capabilities:

- Turn it on to hear a short intro to Auld Lang Syne, the lights turn on purple and white
- Press the B button (the one on the right) to hear the intro again at any time

- Blow on the microphone to create a party horn noisemaker sound as long as you blow
- Press the A button at ten seconds until midnight -- it will count down the seconds with the NeoPixel LEDs, and then play a festive animation, and the full rendition of Auld Lang Syne
- Flip the switch to the left to disable the noisemaker

This is the embedded code window for MakeCode. If you like, you can download it and then drag it onto you Circuit Playground Express in CPLAYBOOT mode to start playing with the clock and noisemaker immediately. If you'd like to take a closer look at how it works, follow on below.
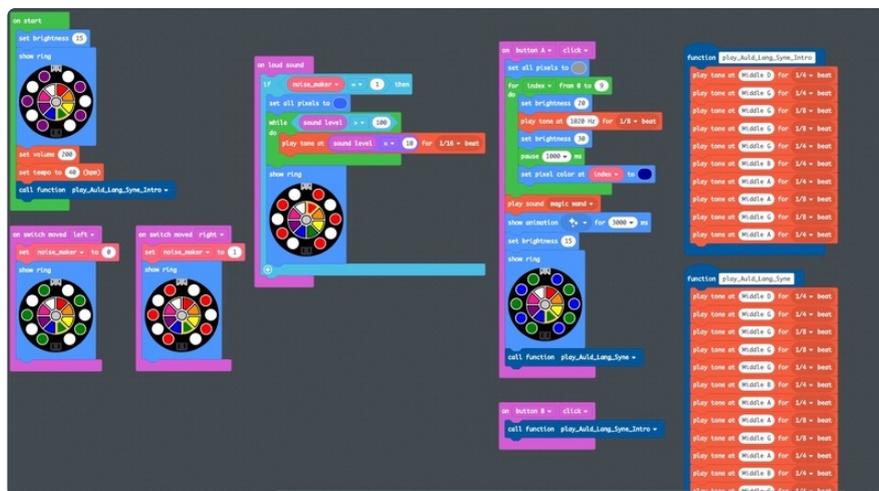

On Start

Follow the image below to create the **on start** block. The code contained within it will run once at start-up. This is a good place to set parameters, such as:

- **set brightness** to control NeoPixel brightness
- **set volume** to set the base volume level for notes and songs
- **set tempo** to set the meter for songs

You'll also add a show ring block to turn on the NeoPixels in an alternating white/ purple pattern by clicking a color wedge and then clicking each pixel circle in the wheel.
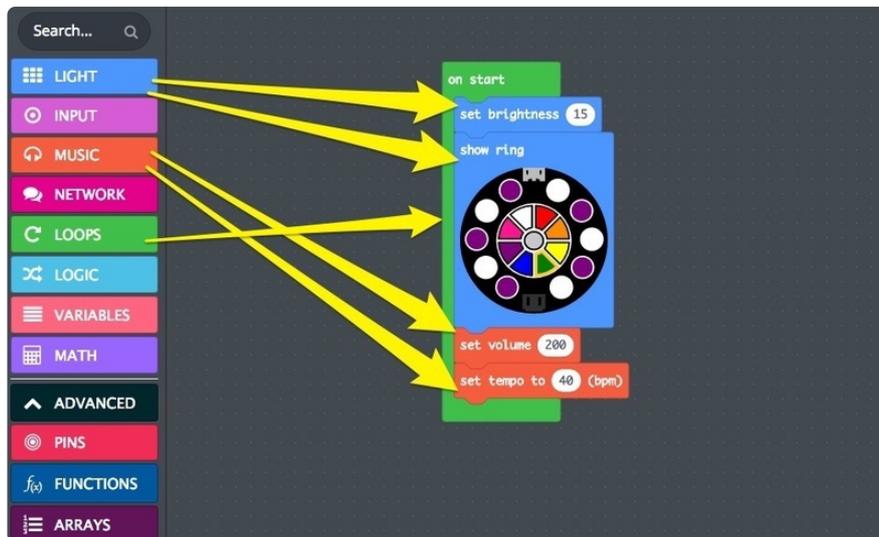
Functions

Sometimes, there are pieces of code that are complex or long, and need to be used in multiple places throughout your program. In this program, the songs that we'll play qualify. Both the startup and button presses cause the songs to play, so we don't want to have to write the songs, note by note, in multiple places. This is where **functions** come in!

A **function** is a user-defined block you can create and name, which you can then refer to elsewhere with a **call function** block. Create one by clicking **ADVANCED** category dropdown, and then the **FUNCTIONS** category, and then clicking **Make a Function.** Name the function **play_Auld_Lang_Syne_Intro.**

You'll see the blue **function play_Auld_Lang_Syne_Intro** block appear on the canvas. We'll add code to it later. For now, drag the **call function play_Auld_Lang_Syne** block to your **on start** block as shown.

Go ahead and make a second one the same way, named **play_Auld_Lang_Syne**.

Switch It

We'll use the switch to turn on and off the loud sound detection that will be used to control the noisemaker function.

Create two **on switch moved** blocks. Set one to **left** and one to **right**. Create a variable called **noise_maker** to use in a couple of **set item to 0** blocks as seen below. Place one in the **on switch moved left** block and leave the value at **0**, then place the other in the **on switch moved right** block, and change the value to **1**. This variable can then be read inside another block to change functionality based on the switch position.
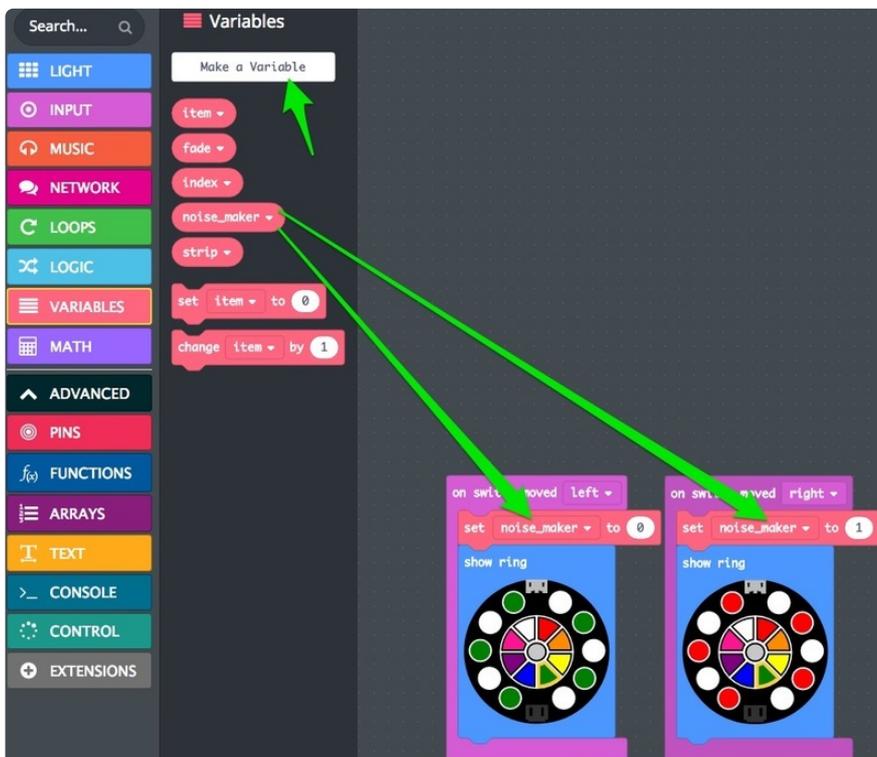
You'll also use another pair of **show ring** blocks to change the colors. Green means "safe" and red means "it's gonna get noisy in here!"
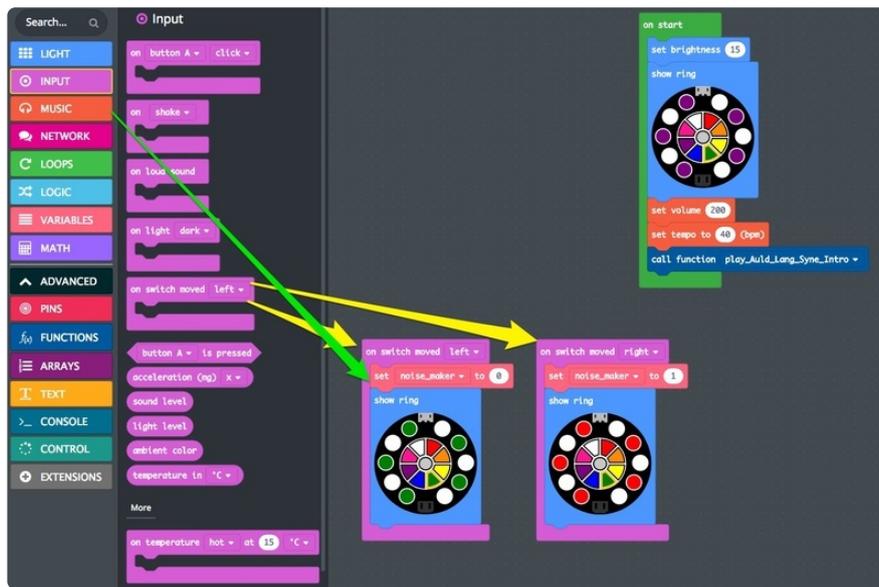

Loud Sound

This is a pretty neat trick -- the microphone can be tested for loud sounds, and blowing on the mic happens to trigger it. So, we can blow on the mic just like a real party horn!

Create an **on loud sound** input block, and then add an **if true then** block as shown below. Drag in the noise_maker variable and change the **True** to a **1**. Now, the switch position will dictate if the code contained with in gets run or not.

When the switch is flipped right, and there's a loud sound, we can do the following:

- **set all pixels to blue**
- **while sound level > 100**
  - **play tone at sound level x 10 for 1/16 beat**
- **show ring**

This will create a really fun, noisy, squealy sound, because the pitch of the sound will vary based on the volume of the noise. Blow softly for a lower tone, and blow hard to raise the pitch!
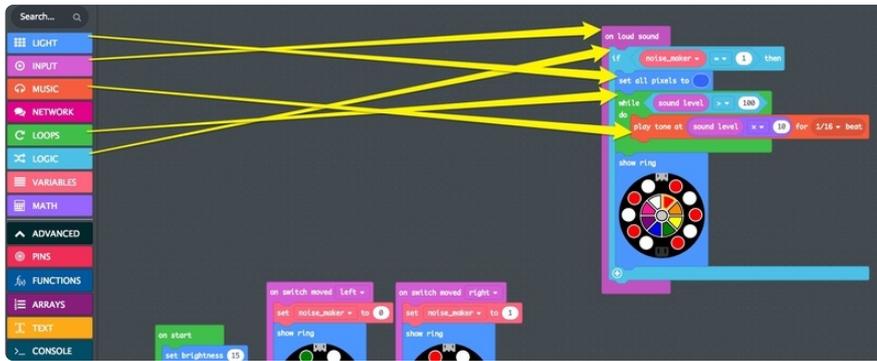
Write a Song Function

Earlier, we created a couple of functions for our songs. Now, we can populate them with **play tone at _ for _ beat** blocks. Follow the image to create the intro to Auld Lang Syne and then a second time for the full song.
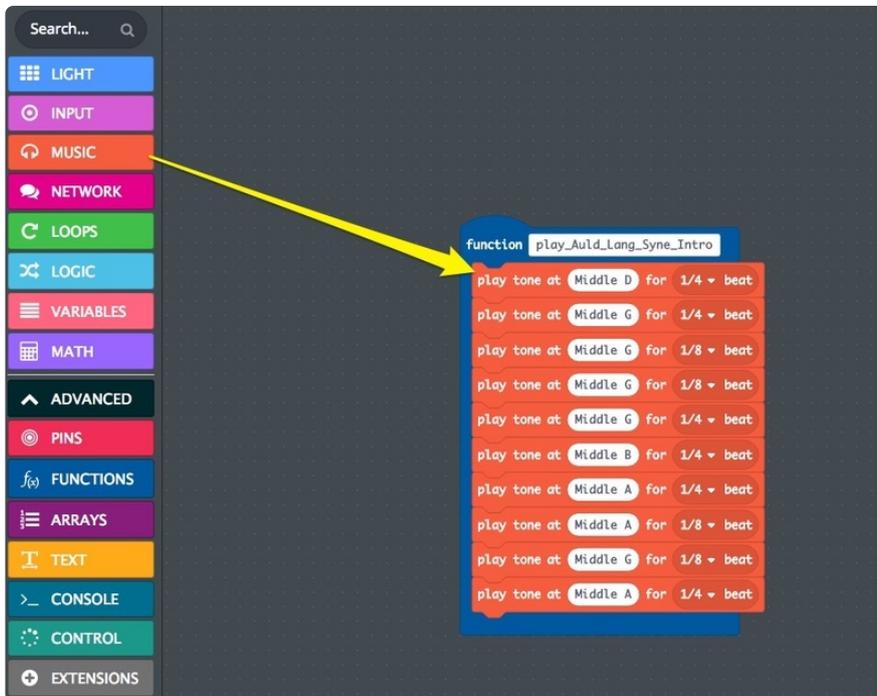
Countdown

Make an **on button A click** block, and an **on button B click** block.

The B button is simple -- we'll just use this to play the intro to the song. Add a **call function play_Auld_Lang_Syne_Intro** block.

Button A has more going on -- first, **set all pixels** to medium white.

Then, we'll count down the ten seconds with a **for index from 0 to 9** block. Inside this:
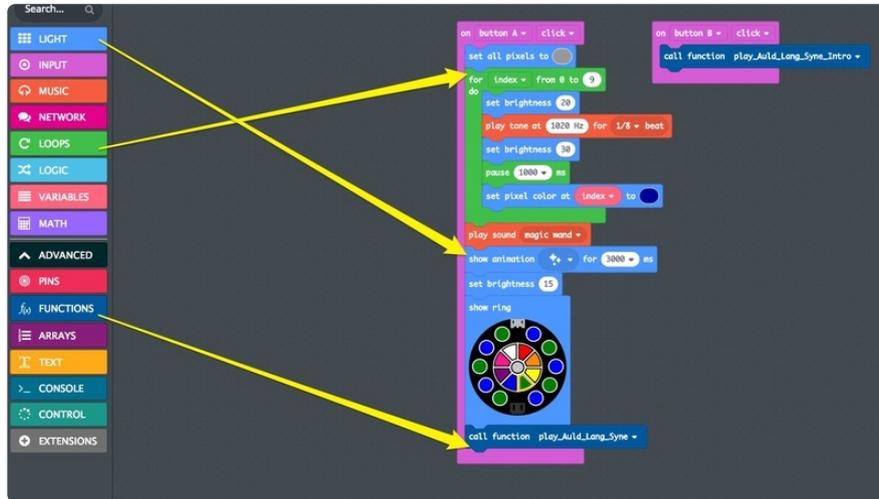
- **set brightness to 20**
- **play tone at 1020 Hz for 1/8 beat**
- **pause for 1 second**
- **set pixel color at index to blue**

Since the index variable changes with each iteration of the loop, this is what changes the color of each sequential NeoPixel.

Once the ten seconds have counted down, the **play sound magic wand** block plays, then **show animation sparkle for 3000 ms.**

Then, we'll **set brightness** down to 15, and **show ring** to alternating blue and green.

Finally, we get to play the full song with **call function play_Auld_Lang_Syne.**

Happy New Year!