Shutter glasses as 3D imager for the Vectrex

2016 March MountainGoat

Instructions for building a 3D Imager for the Vectrex using 3d shutter glasses and an Arduino.

Introduction:

      The idea behind this project came from the Vectrex message board
 http://vectorgaming.proboards.com/board/20/vectrex . The goal was to build an inexpensive alternative 3d imager. Using and Arduino, a pair of active shutter glasses originally made for 3D TVs we were able to accomplish the goal.

Parts:

- Panasonic Viera TY-ER3D4MU shutter glasses – other types of active shutter glasses would most likely also work. (Source from ebay ~$15)

- Arduino UNO or other Arduino that has 5V outputs. (Source from ebay ~$7)

- L293D H-bridge chip. (Source from ebay around a dollar each)

- One momentary push button (RadioShack or ebay, pennies)

- DB9 connector/cable to the Vectrex (Ebay, a few dollars, Sega Genesis controller cables work)

- Wires, breadboard, solder, etc. (Amazon, ebay)

Circuit:

      Using and Arduino we are going to drive the LCD lenses in the shutter glasses directly and also will provide the required synchronization signal to the Vectrex.

      Using an H-bridge we are going to alternate the polarity on each lens for each cycle of turning them on. We can also adjust the voltage higher than the 5V used and required by both the Vectrex and the Arduino in order to make the glasses darker when triggered.

      Since the signal sent to the Vectrex is basically controller 2 button 4 we will add a trigger pushbutton to the Arduino so that we only start sending the signal once the game is started. The Vectrex requires a signal to be available once the game starts, if it is not present, no picture will be shown on the Vectrex screen.

      With the original 3d imager the Vectrex was responsible to drive the little DC motor that turned the disks in the imager. For this reason the Vectrex has a PWM signal out to the imager to accomplish this. In our shutter glasses version this signal is not necessary and basically is ignored.

      Here is what the timing of these signals looks like, yellow is the signal from the Arduino to the

Vextrex – ~37 ms period with a 1 ms drop for the sync. The blue line shows the PWM signal coming from the Vectrex. As long as the Arduino keeps to the 37 ms period, the Vectrex maintains its duty cycle and works just fine:
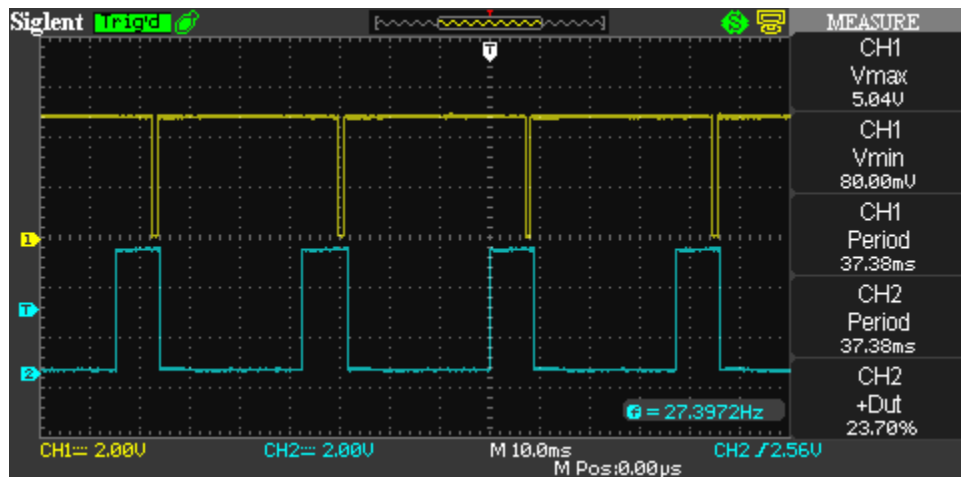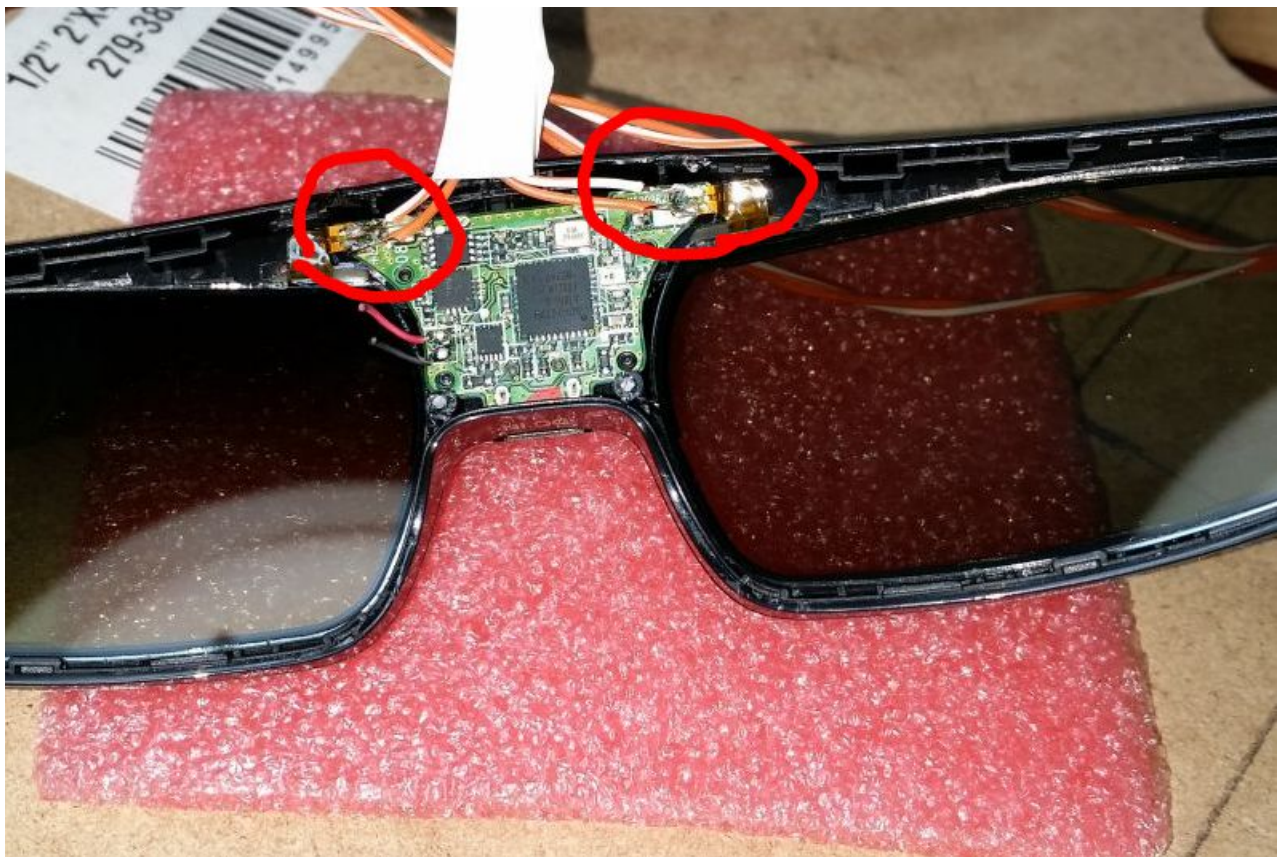

The circuit:
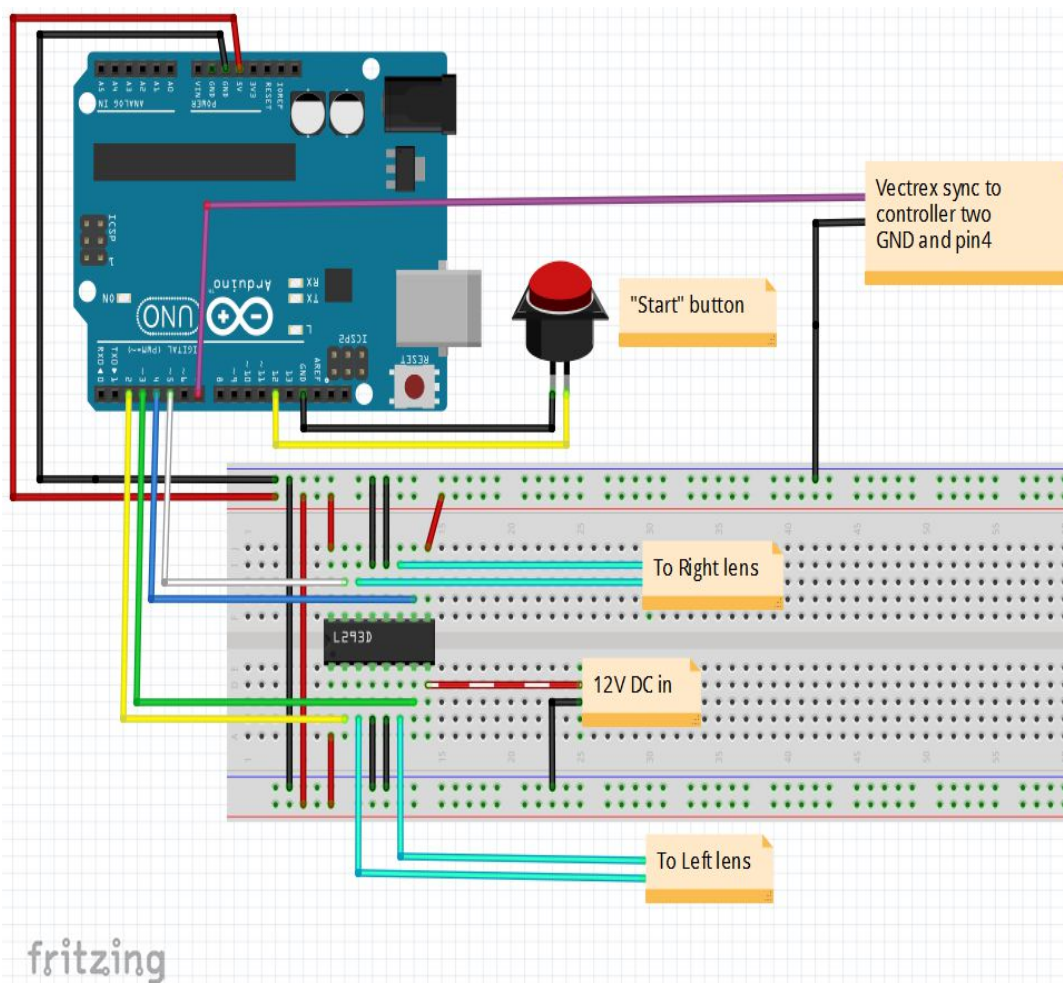
Notes:

- The L293D is getting powered by the Arduino 5V on its logic side.

- The enable pins for all channels are just pulled high

- We are using four Arduino digital (out) pins to drive the H-bridge (pins 2-5).

- We power the H-bridge with 12V on its Vcc2.

- Not using any extra heat sinks the chip does not seem to get warm at all.

- Digital pin 7 is used to drive the synchronization signal to the Vectrex.

Build:

Glasses taken apart, battery and bluetooth antenna cut out and wires soldered onto the two tabs where the lenses connect. Since we are going to switch the polarity back and forth with the software, it does not matter how they get connected, only that the two left and two right wires are connected to the right H-bridge channels (see above):
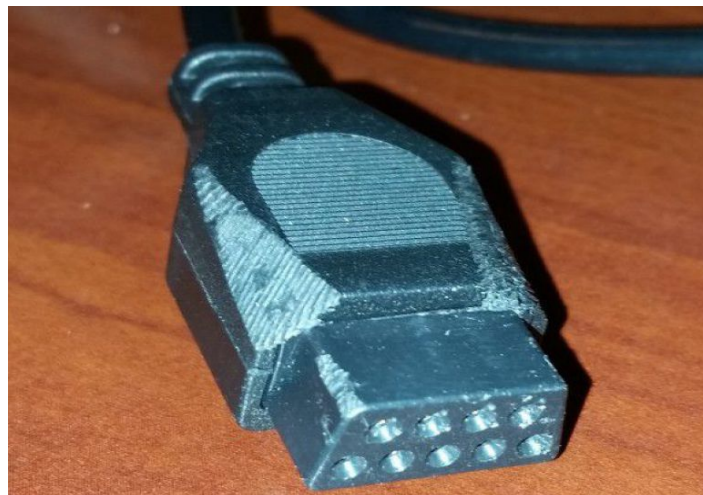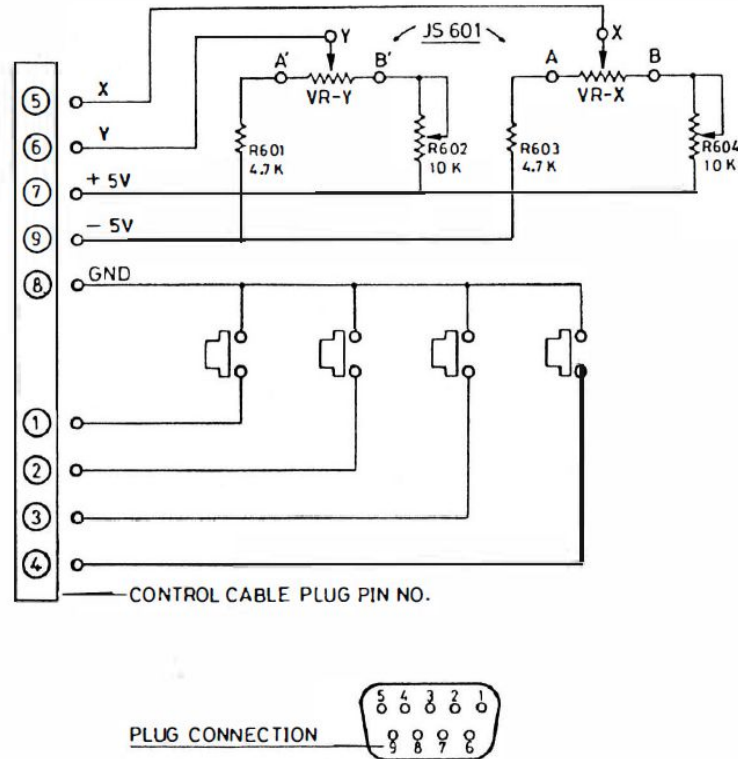
Breadboard showing the circuit:
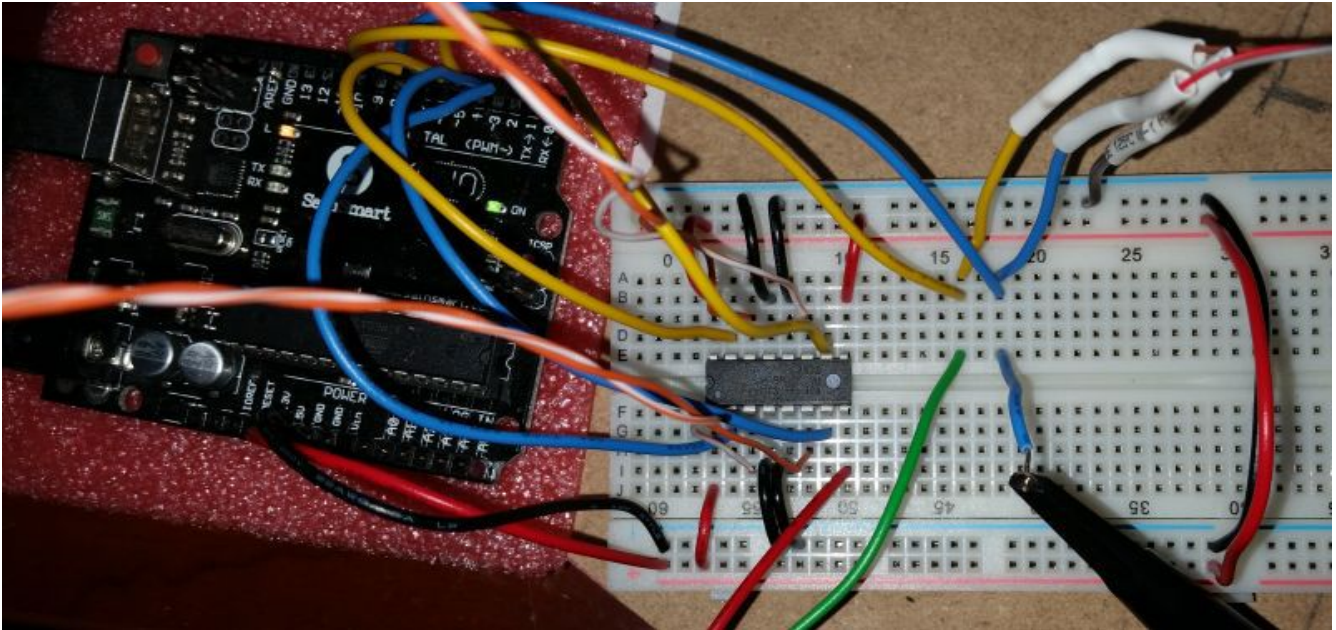
       The thin orange / orange-white wires are going to the glasses, the top right yellow-blue-black trio is going to the Vectrex. Currently the blue wire going to Arduino pin 6 is not used by the software.

Sega Genesis controller cable filed off to fit into the Vectrex:

The correct pinout using the numbering from the Vectrex Service Manual is:

- Vectrex Pin 8 – GND
- Vectrex Pin 3 – Arduino digital 6 (not used currently)
- Vectrex Pin 4 – Arduino digital 7 (sync to Vectrex)

Here is the pinout picture from the service manual:

CONTROL CABLE PLUG PIN NO.

PLUG CONNECTION

Software:

The Arduino software (and this document) can be found at:

https://github.com/mountaingoate/vectrex/tree/master/hardware/3dglasses

Links:

- Vectrex Service Manual: http://www.playvectrex.com/shoptalk/vecman.pdf
- L293D Datasheet: http://www.ti.com/lit/ds/symlink/l293.pdf
- Original Vectrex 3D imager: http://vectrex.wikia.com/wiki/3D_Imager