

More



Fun with High-Voltage Toys

M. KEITH MOORE

NIXIEKEITH@GMAIL.COM

Quick Overview

- ▶ Ask Questions!
- ▶ Tools
- ▶ Parts and Availability
- ▶ Simple Toys
- ▶ More sophisticated uses
- ▶ Web Resources
- ▶ Hands-on Session
 - ▶ Plug and play with some of the tubes



Starting Equipment

- A decent voltmeter
- Soldering equipment
 - Iron/solder
 - Third-hand
 - Magnifying device
- Oscilloscope (optional)
- Grounding strap
- Power supply wall warts – LOTS of power supplies and/or a bench power supply
- Supply sources for:
 - Tubes/arcane parts
 - Standard electronics (eBay, Mouser, Digi-Key, Jameco, etc.)
- If using computers, the programming set-up
 - (i.e. Arduino/PIC/TI and requisite programming tools)



Things that GLOW!

THE TOYS...



Toys...

- Things to do...
 - Box of tubes to look at. (To me, this is almost the most fun!)
 - Magic Eye – Decibel meters
 - Spinners (Dekatrons)
 - Clocks – Analog and Digital (Nixie, Dekatrons)
 - Integrated with Digital Processors
 - Arduino (Atmel)
 - PIC

Magic Eyes

- Any number of choices for eyes
- Kits from “Mr. Nixie” (pricey) <http://nixiekits.eu/>
- M. Moorrees plans
<http://threeneurons.wordpress.com/magic-eye-stuff/>



Dekatron Spinners

- Some great analog kits are sold by Michael Moorrees in California.
- I will have at least 4 tube types and 2 different spinners.
- We can swap tubes and see the differences.



Nixies



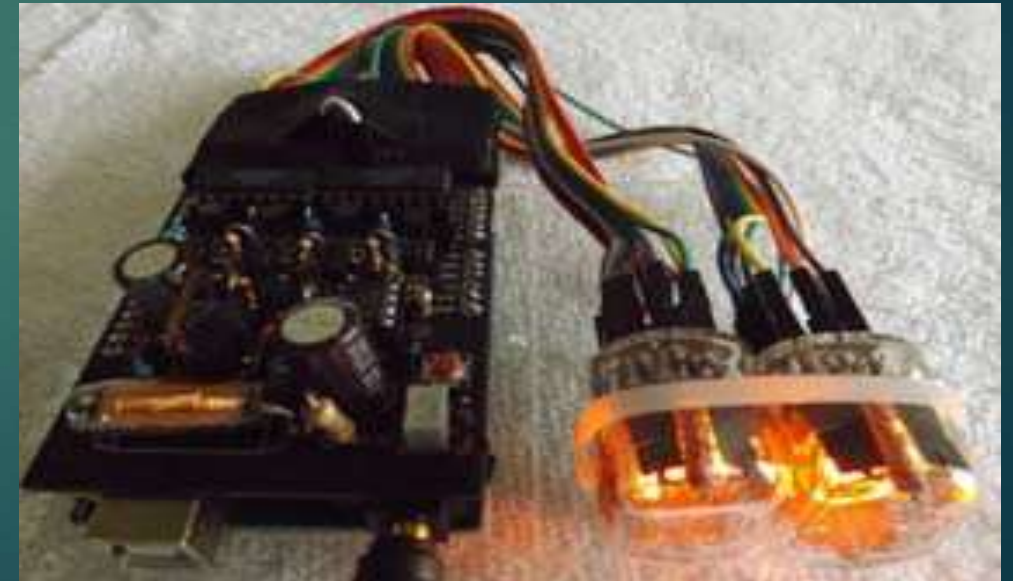
▶ Arduinos

- ▶ An open Arduinix shield and wires for us to play with
- ▶ Inductive Nixie. (Tic-Tac-Toe board is broken ☹)
- ▶ Clocks
- ▶ Rotary Phone Calculator



DIY and Arduinix

- Arduinix – Arduino breadboard/daughter for Nixie (FVD?)
 - VERY cool! And easy to use!
 - Completely open source/hardware
 - I used the plans to make completely from scratch using OSHPark (PCB), and parts from electronic supply.
 - Supports up to 6 (8?) nixies using 20+3 pins with simple/fast current management



Clocks - Analog

- Several sources for kits and computer controlled nixies.
- There are Dekatron-only, Dekatron + Nixie, and Nixie kits available



Clocks – Digital – Assemble in 5 minutes or less!

- Smartnixie – Taylor Electronics
<http://www.tayloredge.com/storefront/SmartNixie>
- ESP-12 WeatherClock



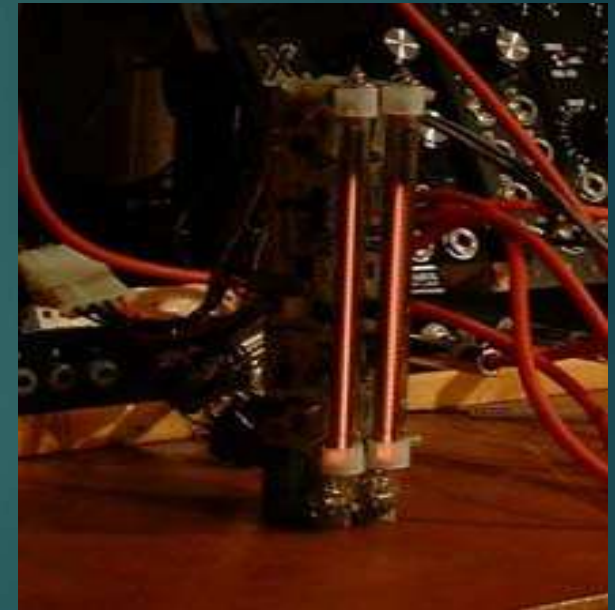
Bars

I have this Vacuum florescent device you can look over. It is an expensive kit, but the VFD is NOT expensive.

I made a silly Arduino shield to demonstrate IN-13/9 Bar tube. It uses an SR-04



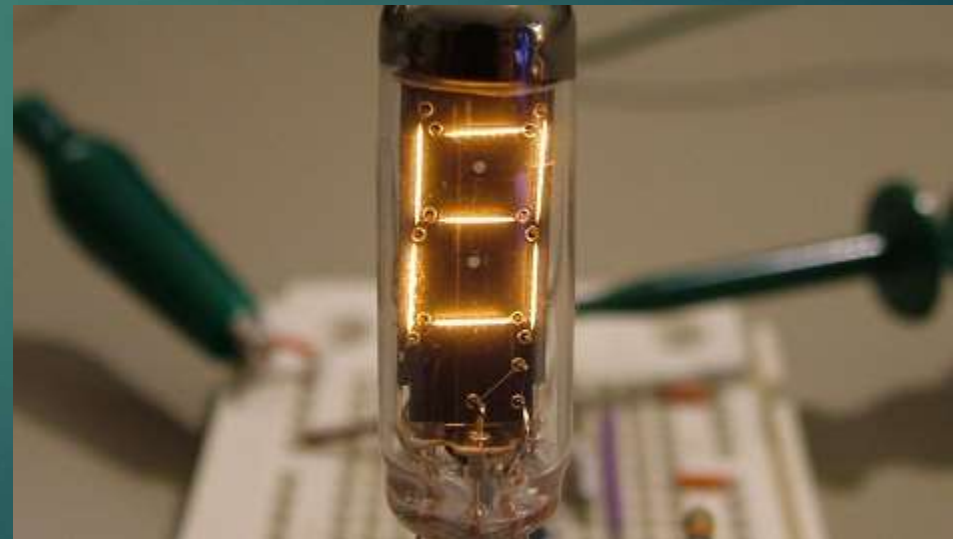
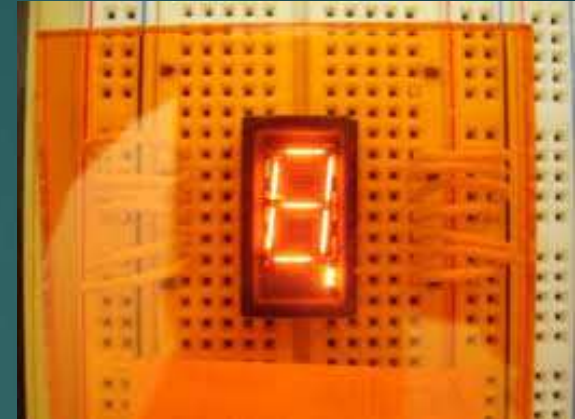
IV-26 (FVD)



Nixie (IN-9 or IN-13)

Numitrons

- ▶ Usually a segment display
- ▶ Most are vertical display (not on top)
- ▶ A Great way to start
 - ▶ Inexpensive
 - ▶ Low-Voltage (5 Volts!)
 - ▶ Easy to use with Arduino/Rasp/TI/PIC
 - ▶ Relatively plentiful supply



Let's Get Ready to Play!



PC Speedometer



Bar Display SR04 Distance meter (needs fixing)



Mild Safety Note...

- We have lots of examples.
- Feel free to play with them, but...
 - These are medium-to-high-voltage!
 - Do not play with them unless you can take accidental shock. In all of these, I have only been hit a couple times, but you have to expect it will happen.
 - Normally, this is not normally life threatening unless you have physical conditions that cannot take a jolt. (e.g. Pacemaker, heart issues, other condition)

Rules

1. BE SAFE!

- ▶ UNPLUG before you decide to play inside the device!!
- ▶ WAIT SEVERAL SECONDS before changing a tube or a pin/piece.
- ▶ **YOU WILL GET SHOCKED if you do not let the stored energy to dissipate.**

2. BE POLITE! We have limited room/resources.

- ▶ Do not hog!
- ▶ Play in groups if you can.
- ▶ If you want to try something out, ask if somebody next to you wants to join.

3. PLAY! Have Fun.

- ▶ It is okay if you break it! Just tell me.

4. PLEASE do not change any DIP switches or straps.

5. If you are not sure if you should touch/do something. (e.g. power on test for the smart nixie?) PLEASE ASK ME?? PLEEEEEEEZ?!??!

Break into groups...

- ▶ Dekatron players
- ▶ Nixie Clock players
- ▶ Nixie Arduino w/Arduinix
- ▶ Other Numitron Arduino breadboard? (Maybe?)
- ▶ Inductive Nixie stand/Nixie Bar Arduino
- ▶ Or just plain fondling Tubes...
- ▶ If you choose a tube or type
you your own resources to determine pin config.
YES, I will help.
But see if you can find it as part of the challenge.
(Hint: Google is your friend. Use "Nixie" + to the tube name.
Search IN-2 Nixie datasheet and you will get an IN-2 datasheet.



Questions?



Play!



PC Speedometer



Bar Display SR04 Distance meter (needs fixing)