References and Presentation at:
http://www.elinux.org/LCNA-opentools
Introduction

- Dave Anders aka prpplague
Introduction

- Dave Anders aka prpplague
- Currently Contracted with TI
Introduction

- Dave Anders aka prpplague
- Currently Contracted with TI
- Partners in TinCanTools
Introduction

- Dave Anders aka prpplague
- Currently Contracted with TI
- Partners in TinCanTools
- Open Hardware Tools
Introduction

- Dave Anders aka prpplague
- Currently Contracted with TI
- Partners in TinCanTools
- Open Hardware Tools
  - Open Tools History and Background
Introduction

- Dave Anders aka prpplague
- Currently Contracted with TI
- Partners in TinCanTools
- Open Hardware Tools
  - Open Tools History and Background
  - Open Oscilloscope Solutions
Introduction

- Dave Anders aka prpplague
- Currently Contracted with TI
- Partners in TinCanTools
- Open Hardware Tools
  - Open Tools History and Background
  - Open Oscilloscope Solutions
  - Open Logic Analyzer Solutions
Open Tools Background

- Open Tools in Science
Open Tools Background

- Open Tools in Science
  - Experiments often require special tools
Open Tools Background

- Open Tools in Science
  - Experiments often require special tools
  - New tools are shared with other scientists
Open Tools Background

- Open Tools in Science
  - Experiments often require special tools
  - New tools are shared with other scientists
  - Robert Bunsen - Bunsen Burner
Open Tools Background

- Open Tools in Science
- Maker Community
Open Tools Background

- Open Tools in Science
- Maker Community
  - Emphasis on Open
Open Tools Background

- Open Tools in Science
- Maker Community
  - Emphasis on Open
  - Microcontrollers with ADC
Open Tools Background

- Open Tools in Science
- Maker Community
  - Emphasis on Open
  - Microcontrollers with ADC
    - Atmel AVR (Arduino)
Open Tools Background

- Open Tools in Science

- Maker Community
  - Emphasis on Open
  - Microcontrollers with ADC
    - Atmel AVR (Arduino)
    - TI MSP430
Open Tools Background

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- Maker Community
  - Emphasis on Open
  - Microcontrollers with ADC
    - Atmel AVR (Arduino)
    - TI MSP430
    - MicroChip PIC
Open Tools Background

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- Maker Community
  - Emphasis on Open
  - Microcontrollers with ADC
    - Atmel AVR (Arduino)
    - TI MSP430
    - MicroChip PIC
    - STMicro STM32
Open Tools Background

- Open Tools in Science
- Maker Community
  - Emphasis on Open
  - Microcontrollers with ADC
  - USB Bridge Chips
Open Tools Background

- Open Tools in Science
- Maker Community
  - Emphasis on Open
  - Microcontrollers with ADC
  - USB Bridge Chips
    - FTDI FT2232
Open Tools Background

- Open Tools in Science
- Maker Community
  - Emphasis on Open
  - Microcontrollers with ADC
  - USB Bridge Chips
    - FTDI FT2232
    - Cypress EZ-USB FX2
Open Tools Background

- Open Tools in Science
- Maker Community
- Inspiration for Open Tools
Open Tools Background

- Open Tools in Science
- Maker Community
- Inspiration for Open Tools
  - Cost
Open Tools Background

- Open Tools in Science
- Maker Community
- Inspiration for Open Tools
  - Cost
    - Samples Per Second
    - Analog Bandwidth
    - Resolution
    - Number of Channels
Open Tools Background

- Open Tools in Science
- Maker Community
- Inspiration for Open Tools
  - Cost
  - Ease of use
Open Tools Background

- Open Tools in Science
- Maker Community
- Inspiration for Open Tools
  - Cost
  - Ease of use
  - Emphasis on Open
Open Oscilloscope

- The Oscilloscope
Open Oscilloscope

- The Oscilloscope
  - Oscillograph
Open Oscilloscope

- The Oscilloscope
  - Oscillograph
  - CRT Oscilloscope
Open Oscilloscope

- The Oscilloscope
  - Oscillograph
  - CRT Oscilloscope
  - Digital Storage Oscilloscope
Open Oscilloscope

- The Oscilloscope
- Hardware Solutions
  - PIC Based
    - 5M samples/second
    - 8 bit resolution
    - 256 sample memory depth
    - 1MHz analog bandwidth
    - 100mV/Div-5V/Div sensitivity
    - Save and display up to 6 captures to memory
    - Transfer screen capture to PC as a bitmap file (serial adapter not included)
    - $60.00 from Sparkfun.com
Open Oscilloscope

- The Oscilloscope
- Hardware Solutions
  - PIC Based
  - AVR Based
    - Easy Assembly
    - Under $30
Open Oscilloscope

- The Oscilloscope
- Hardware Solutions
  - PIC Based
  - AVR Based
  - STM32 Based – Nano-DSO
    - Color display
    - 6 triggering mode
    - 1MHz Analog Bandwidth
    - Built-in Signal Generator
    - $99 from Sparkfun.com
Open Oscilloscope

- The Oscilloscope
- Hardware Solutions
- Software Solutions
  - XOscillo
Open Oscilloscope

- The Oscilloscope
- Hardware Solutions
- Software Solutions
  - XOscillo
  - OsciPrime
Open Logic Analyzers

- The Logic Analyzer
Open Logic Analyzers

- The Logic Analyzer
  - Originally a variation of Oscilloscope
    - Voltmeters
    - Oscillators
    - Oscilloscopes
    - Spectrum Analyzer
Open Logic Analyzers

The Logic Analyzer

- Originally a variation of Oscilloscope
- HP Created Modern Digital Logic Analyzers
Open Logic Analyzers

- The Logic Analyzer
  - Originally a variation of Oscilloscope
  - HP Created Modern Digital Logic Analyzers
  - More Concerned with Timing than Shape
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
  - Open Logic Sniffer
    - 70MHz+ sample speeds
    - 32 channels
    - 16 buffered, 5volt tolerant
    - USB powered
    - USB upgradable everything
    - Make it as DIY as possible
    - $30-$40 price range
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
  - Open Logic Sniffer
  - FX2 Based
    - 16 Channels
    - 24MHz Sample Rate
    - $20 to $150
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
  - Open Logic Sniffer
  - FX2 Based
  - Logic Shrimp
    - 4 channels @ 256K samples per channel
    - 20/12/6/3/2/1MHz capture rates, and lower
    - USB connection, USB upgradable
    - $35.00 from SeeedStudio
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
  - Open Logic Sniffer
  - FX2 Based
  - Logic Shrimp
  - MSP430 Based
    - $25 to $35
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
  - Open Logic Sniffer
  - FX2 Based
  - Logic Shrimp
  - MSP430 Based
  - AVR Based
    - $35 to $50
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
- Software Solutions
  - Sigrok
Open Logic Analyzers

- The Logic Analyzer
- Hardware Solutions
- Software Solutions
  - Sigrok
  - Logic Sniffer
Conclusion

- Long History of Open Tools
Conclusion

- Long History of Open Tools
- Low Cost Microcontrollers
Conclusion

- Long History of Open Tools
- Low Cost Microcontrollers
- Incentive to contribute
Conclusion

- Long History of Open Tools
- Low Cost Microcontrollers
- Incentive to contribute
- Transition to open tools
Conclusion

- Long History of Open Tools
- Low Cost Microcontrollers
- Incentive to contribute
- Transition to open tools
- Support Vendors who are Open Friendly
Conclusion

- Long History of Open Tools
- Low Cost Microcontrollers
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- Documentation
  
  http://www.elinux.org/LCNA-opentools
Conclusion

Questions?