

Lecture (02)

Applied Electric/Electronic Circuits II

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Agenda

- A Brief History of Microprocessors
- A Brief History of Microcontroller
- 16F84A driving leds
- 16F84A interfaced to press buttons

A Brief History of Microprocessors

- Intel manufactured the first microprocessor, the 4-bit 4004, in the early 1970s which was basically just a number-crunching machine.
- Shortly afterwards they developed the 8008 and 8080, both 8-bit.
- Intel fabricated here 16-bit microprocessors the 8086 and 8088;
- The first 32-bit microprocessor called 80386 and later their popular Pentium
- Each generation of processors grew smaller, faster, dissipated more heat, and consumed more power.

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- As touched upon above, from the introduction of Intel's 8086 through the Pentium 4 an increase in performance, from one generation to the next, was seen as an increase in processor frequency.
 - For example, the Pentium 4 ranged in speed (frequency) from 1.3 to 3.8 GHz over its 8 year lifetime.
 - The physical size of chips decreased while the number of transistors per chip increased; clock speeds increased which boosted the heat dissipation across the chip to a dangerous level.

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- Speeding up processor frequency had run its course in the earlier part of this decade; computer architects needed a new approach to improve performance.
 - Adding an additional processing core to the same chip would, in theory, result in twice the performance and dissipate less heat, though in practice the actual speed of each core is slower than the fastest single core processor.
 - the dual-core approach means you can get a significant boost in performance without the need to run at ruinous clock rates.
 - Multicore is now the most commercially available processors like i3, i5, and i7

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What is Microcontroller

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- A microcontroller is a small computer on a chip that has a small processor, memory, and multiple pins for input and output with the real world.
 - It's programmed usually in assembly, however; C and proprietary BASIC languages

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A Brief History of Microcontroller

- General Instruments developed the 8-bit PIC in 1975. In 1985 General Instruments restructured their business and PIC development was pretty much scrapped.
- Shortly after in 1989 Microchip Technology Inc. formed and rebuilt the PIC with EPROM memory allowing the program written to the chip to be re-written instead of one time use. However; it was still very costly to invest in the hardware to program and re-program these chips.
- It wasn't until 1993 when EEPROM memory was introduced allowing it to be erased electronically.
- Also, in 1993 the PIC16C84 featured a serial programming interface that allowed hobbyists to program it via the serial port on their personal computer.

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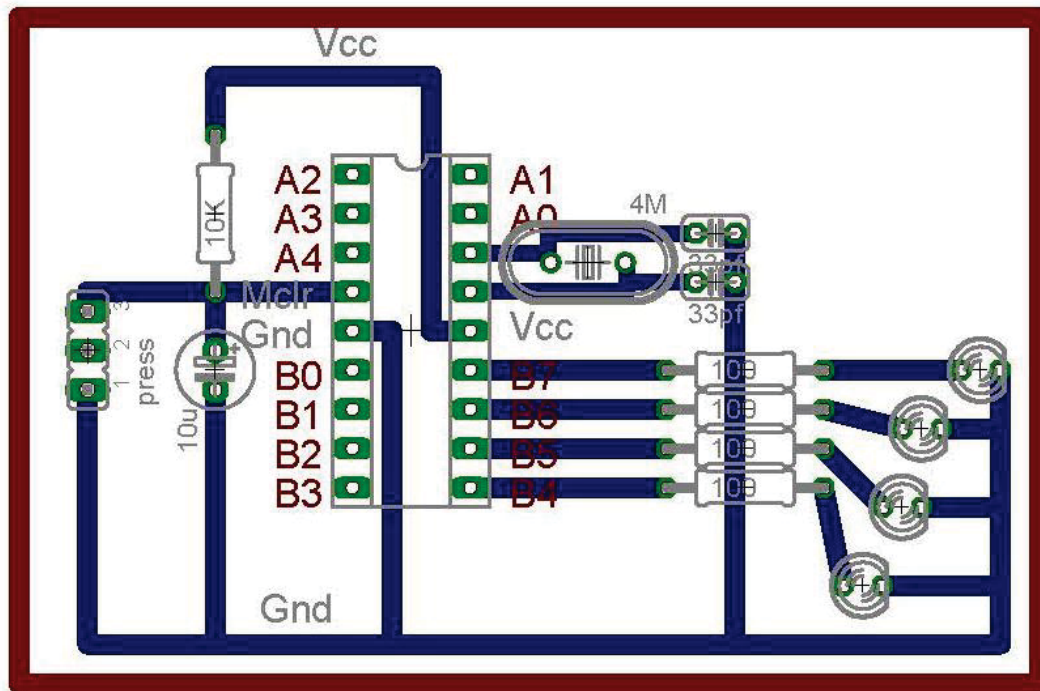
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- As such, the PIC microcontroller is still very popular among hobbyists and professionals.
 - The Arduino is of interest because it's a completely open device both software and hardware wise. Given you have the parts and skills, anyone can build their own Arduino microcontroller.
 - The device consists of an AVR microcontroller, the circuitry to program it and communicate with the computer to receive the program
 - anyone with a USB port can start building circuits with a microcontroller.
 - The UI is so easy to use that a 10 year old could start building circuits to blink LED's.

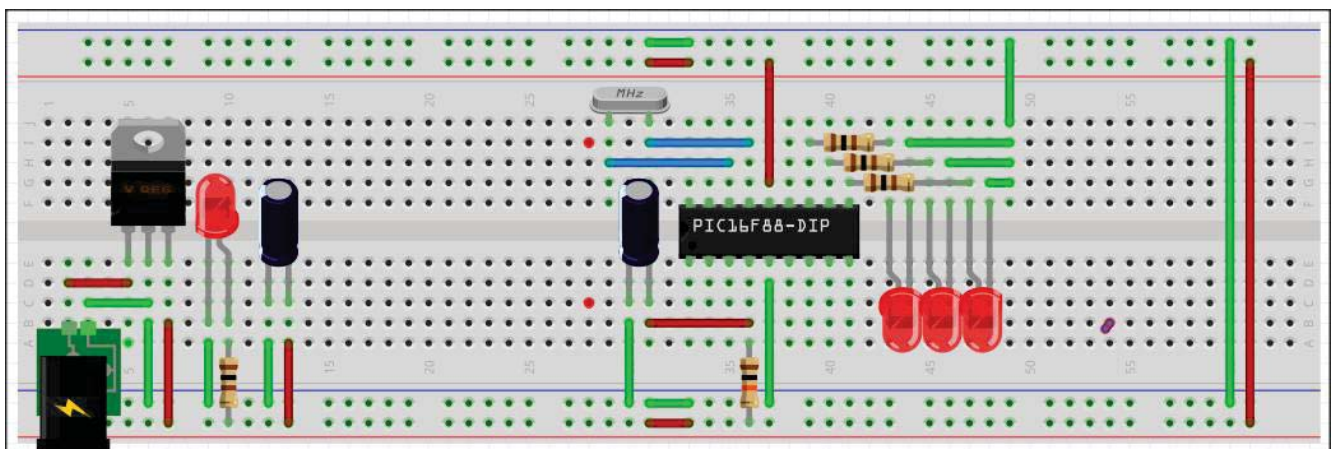
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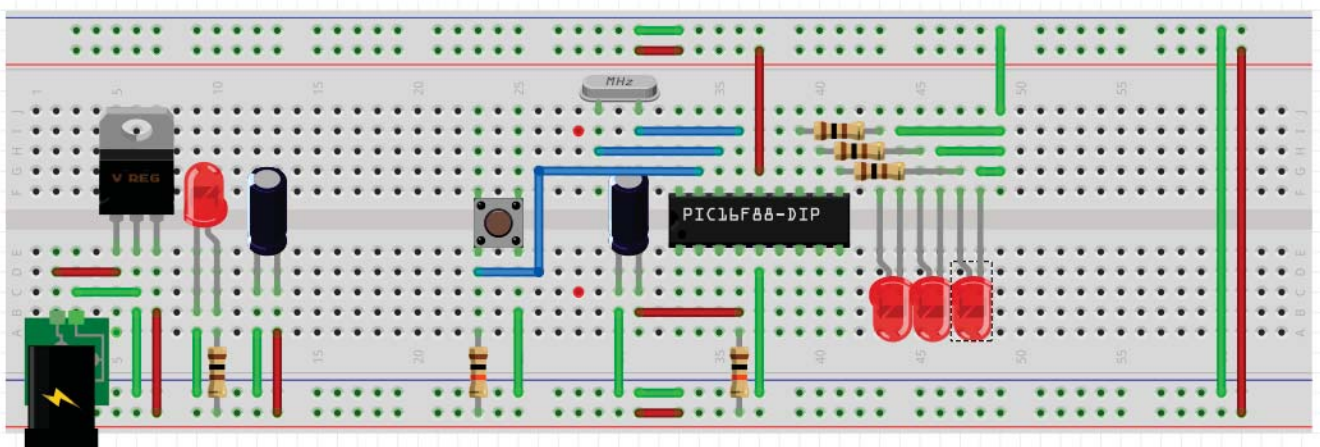
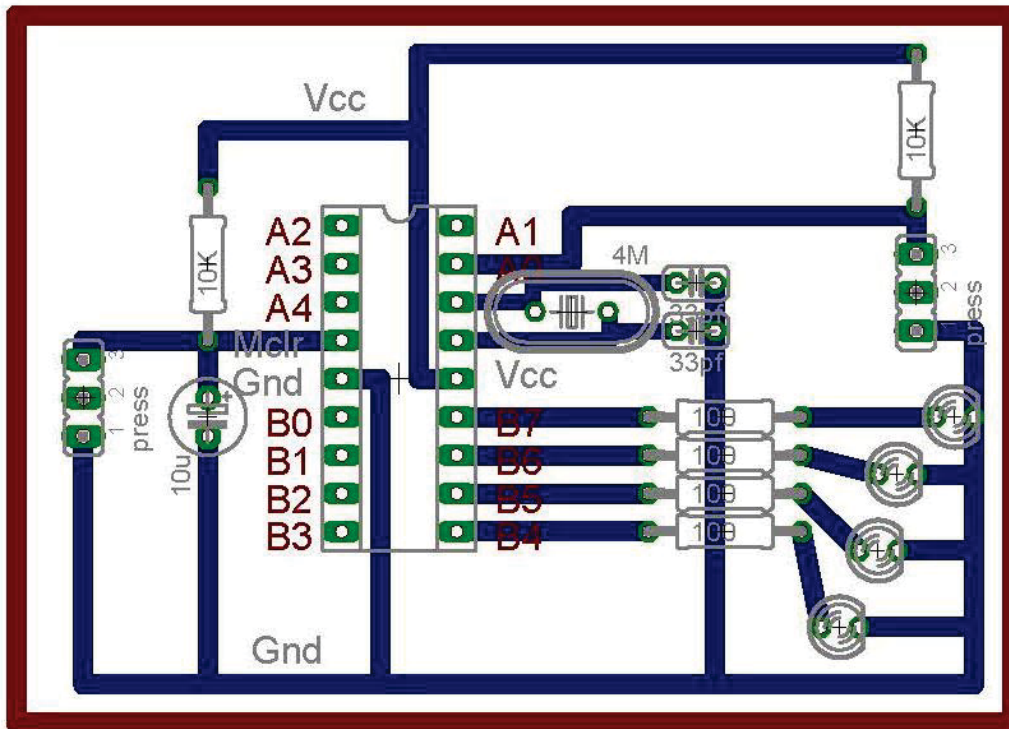
Connecting 16F84A (Led Flasher)



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Connecting 16F84A (press controlled Led Flasher)



Thanks,..
See you next week (ISA),...