

Arduino as a Tool for EPICS training

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Why Arduino for EPICS training

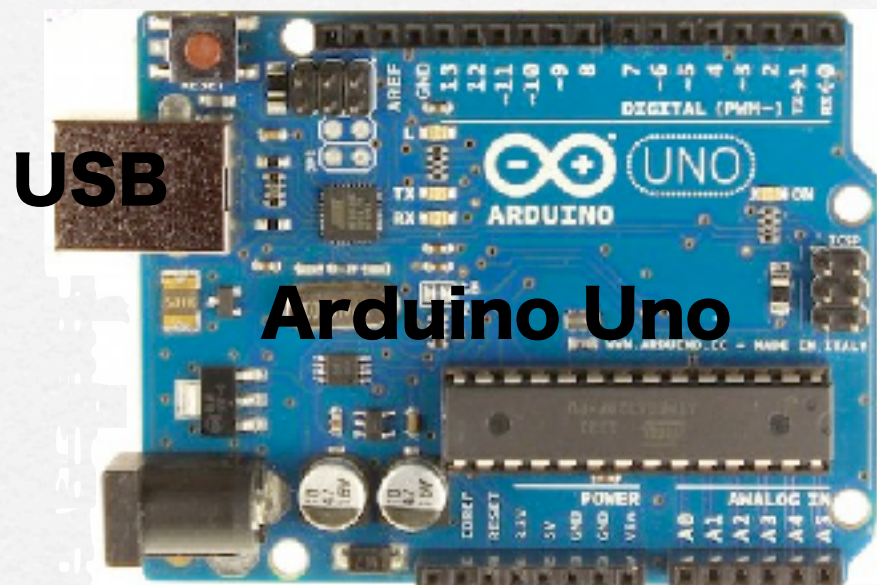
- **EPICS training**
 - **Good material available on Web.**
 - **SoftIOc is good for training**
 - **but it better to have HW which can be controlled by EPICS when trainees are very beginner of control systems.**

What is Arduino

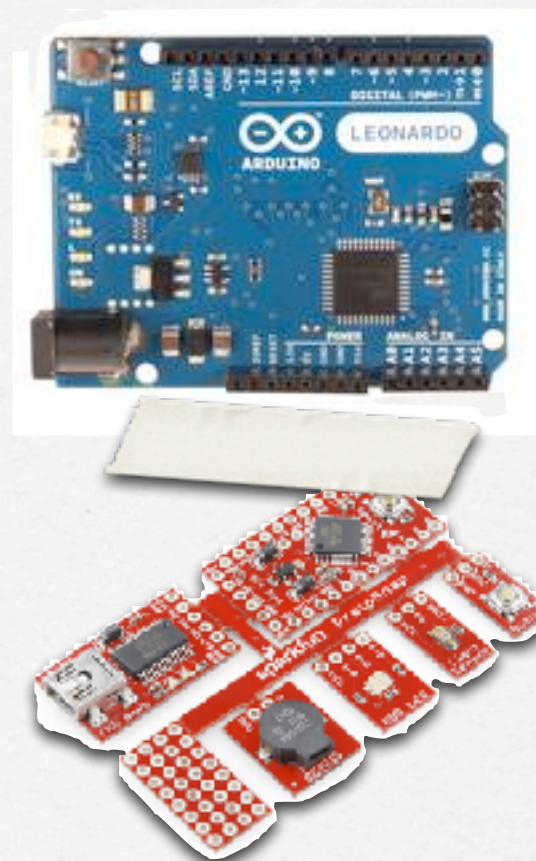
- ❑ **Inexpensive HW capable of handling DI/DO/AI/AO(pwm)**
 - ❑ **design of Arduino is Open. So many vendors produces Arduino-like.**
- ❑ **USB connection: works with most PC hardware.**
 - ❑ **works as one of CDC device**
- ❑ **Free development tool. Also called Arduino.**
 - ❑ **Compile a sketch(Arduino program) to machine code and download it to CPU on Arduino.**

Arduino

DI/DO/AO ports

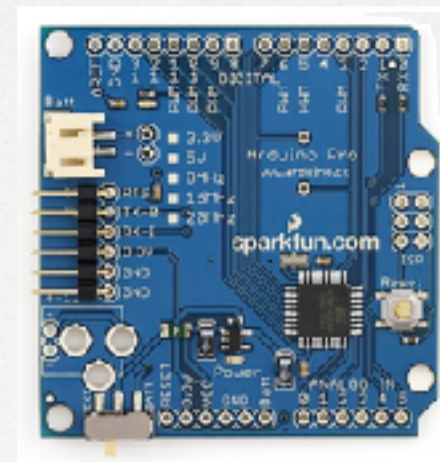
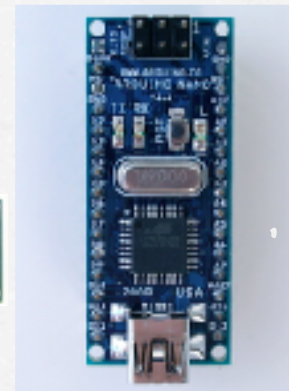
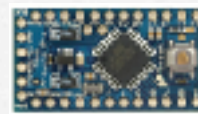
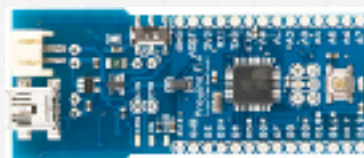
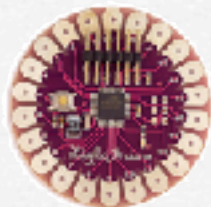


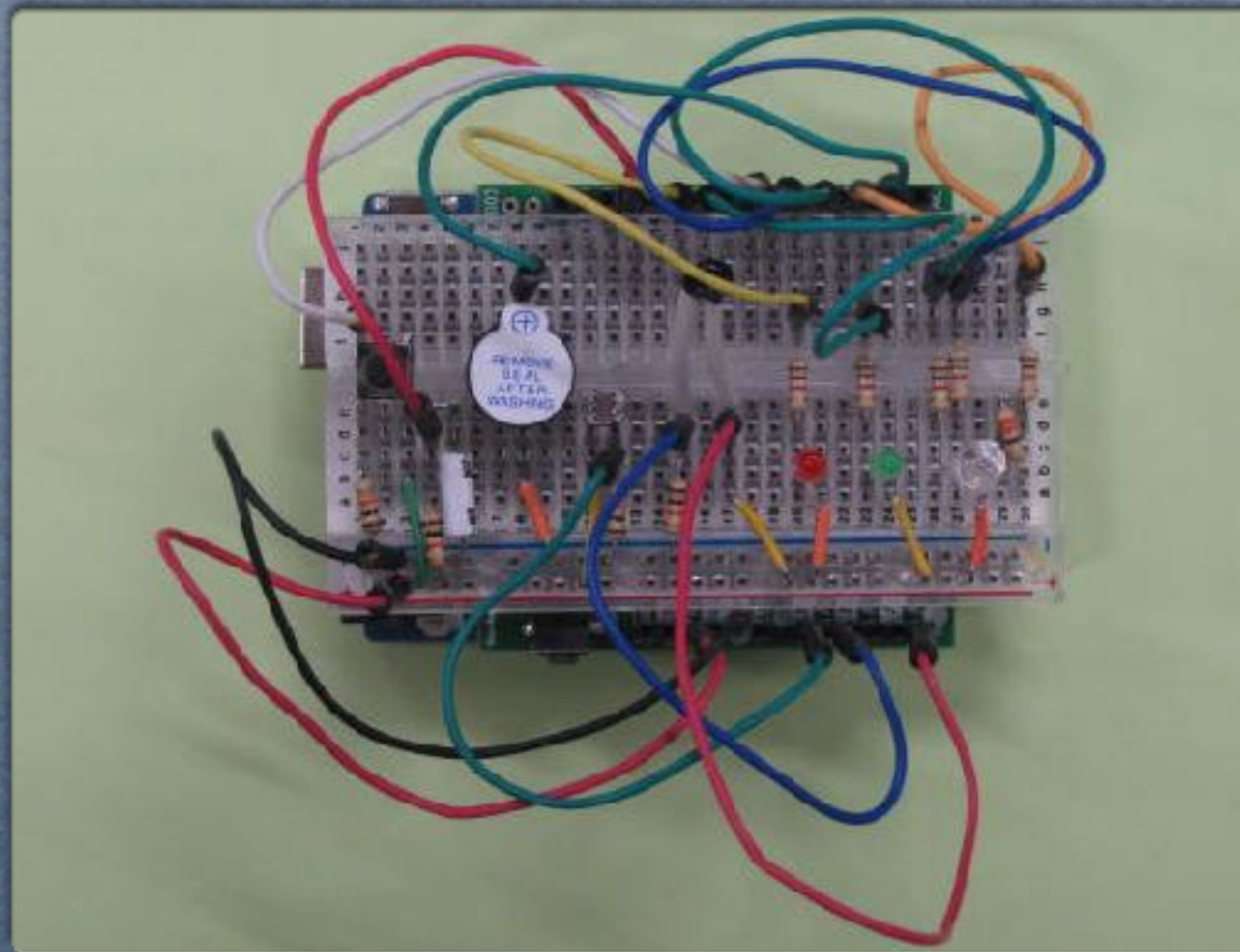
AI ports



**Arduino Leonardo
USB micro
Latest ver. of Arduino**

**Arduino ProtoSnap-Mini
includes 3color LED,
Buzzer, Light sensor
and Push Button**



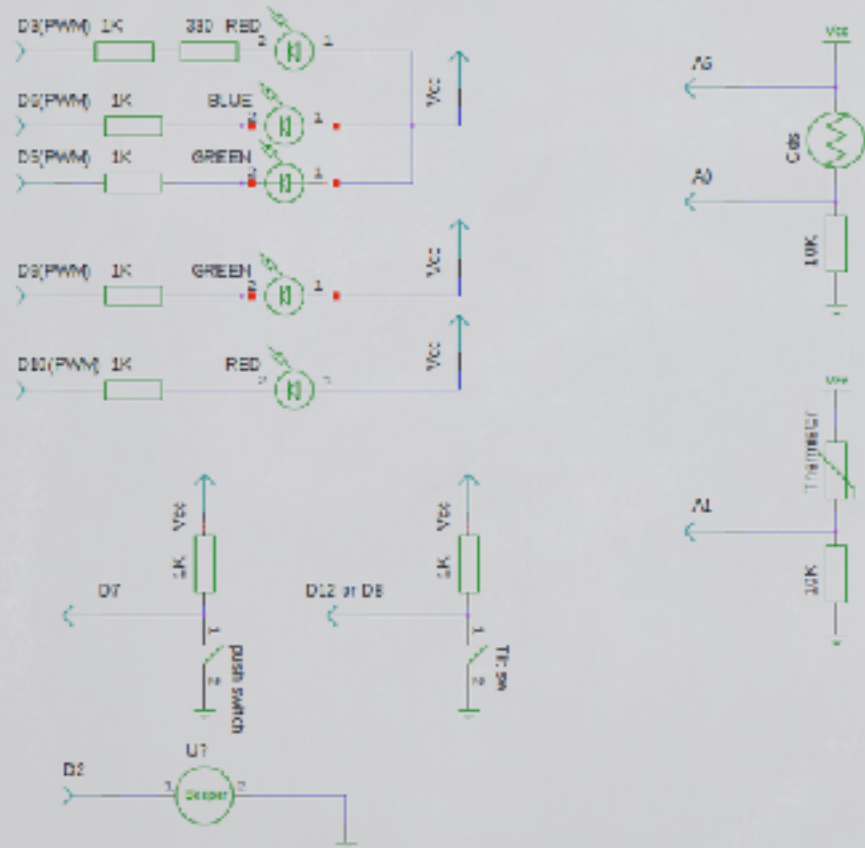


Includes
1 TriColor LED
2 LEDs
1 Buzzer
1 Push Switch
1 Thermistor
1 CdS
1 level Switch

~ 5,000JPY
including Arduino

Arduino shield(ext. board)
with Bread board
for EPICS training

parts connections



Arduino for EPICS training

FILE: OF REVISION: DRAWN BY:

D3(PWM)	3-LED(R)
D5(PWM)	3-LED(G)
D6(PWM)	3-LED(B)
D9(PWM)	LED
D10(PWM)	LED
D7(In)	Button SW
D2(out)	Buzzer
A0	Cds
A1	Thermistor
A5	Vdd
D 8 or D12	Tilt Switch

Gainermodoki.ino

- ❑ **Arduino Sketch(program in Arduino Language)**
- ❑ **read a simple command from serial/usb connection**
- ❑ **return response to PC through serial/usb connection.**
- ❑ **“modoki”:a Japanes word for “pseudo-” or “-like”**
 - ❑ **Gainer: a small USB I/O board produced in Japan.**

EPICS support

- ❑ **Stream device protocol file.**
- ❑ **Database**
- ❑ **Startup script**
- ❑ **No Interrupt support yet.**

Ubuntu + EPICS

- ❑ **Put a set of EPICS software and support files for Arduino in to Ubuntu**
- ❑ **bootable DVD image file or USB memory image**
- ❑ **Trainee can starts using EPICS to control Arduino right a way!**

Summary

- **Set of Arduino/EPICS on Ubuntu DVD(or USB memory) are provided**
- **We have one training session.**
 - **We had positive response from trainees**
- **We would like to have more training sessions in near future.**