APSC 1299
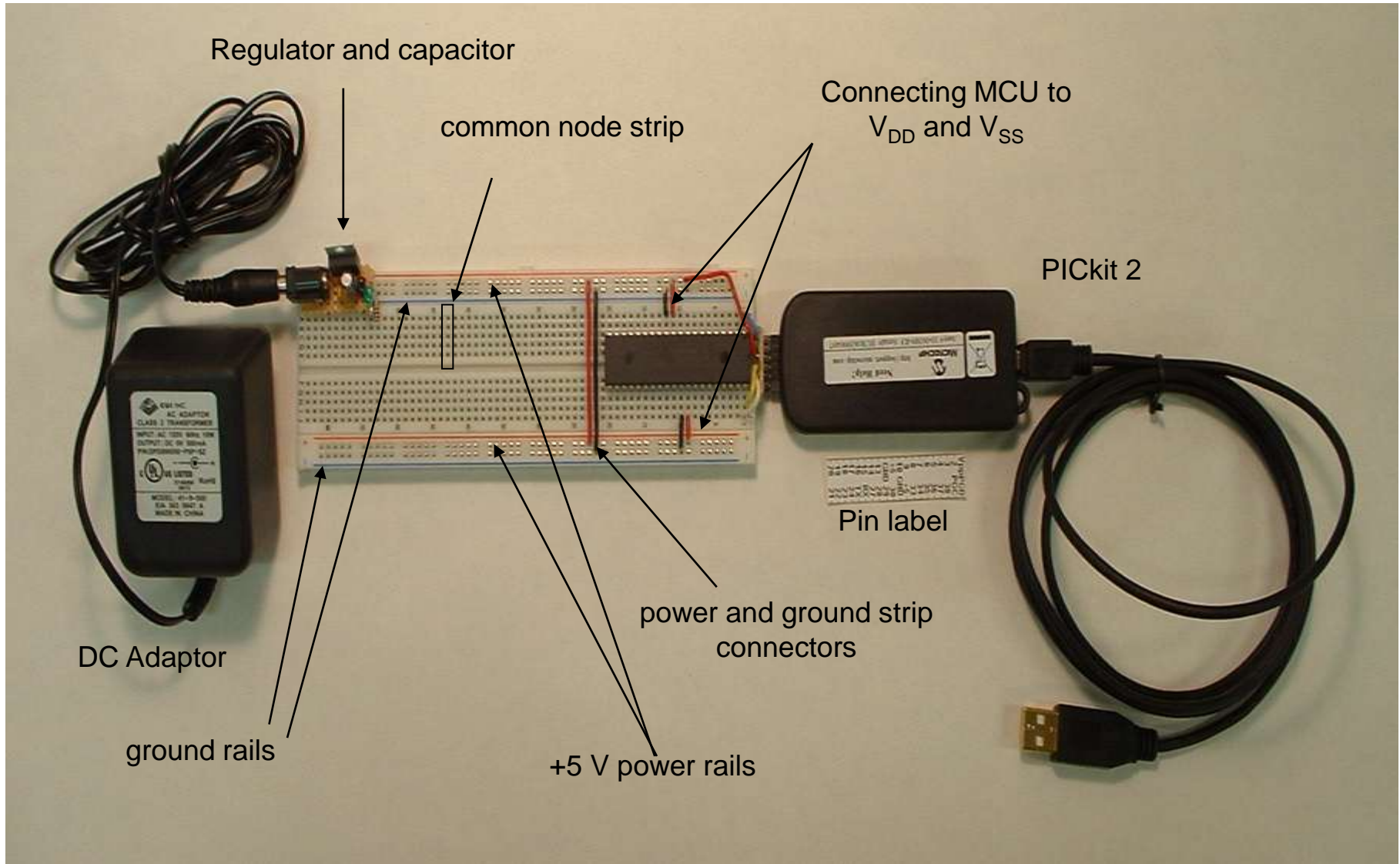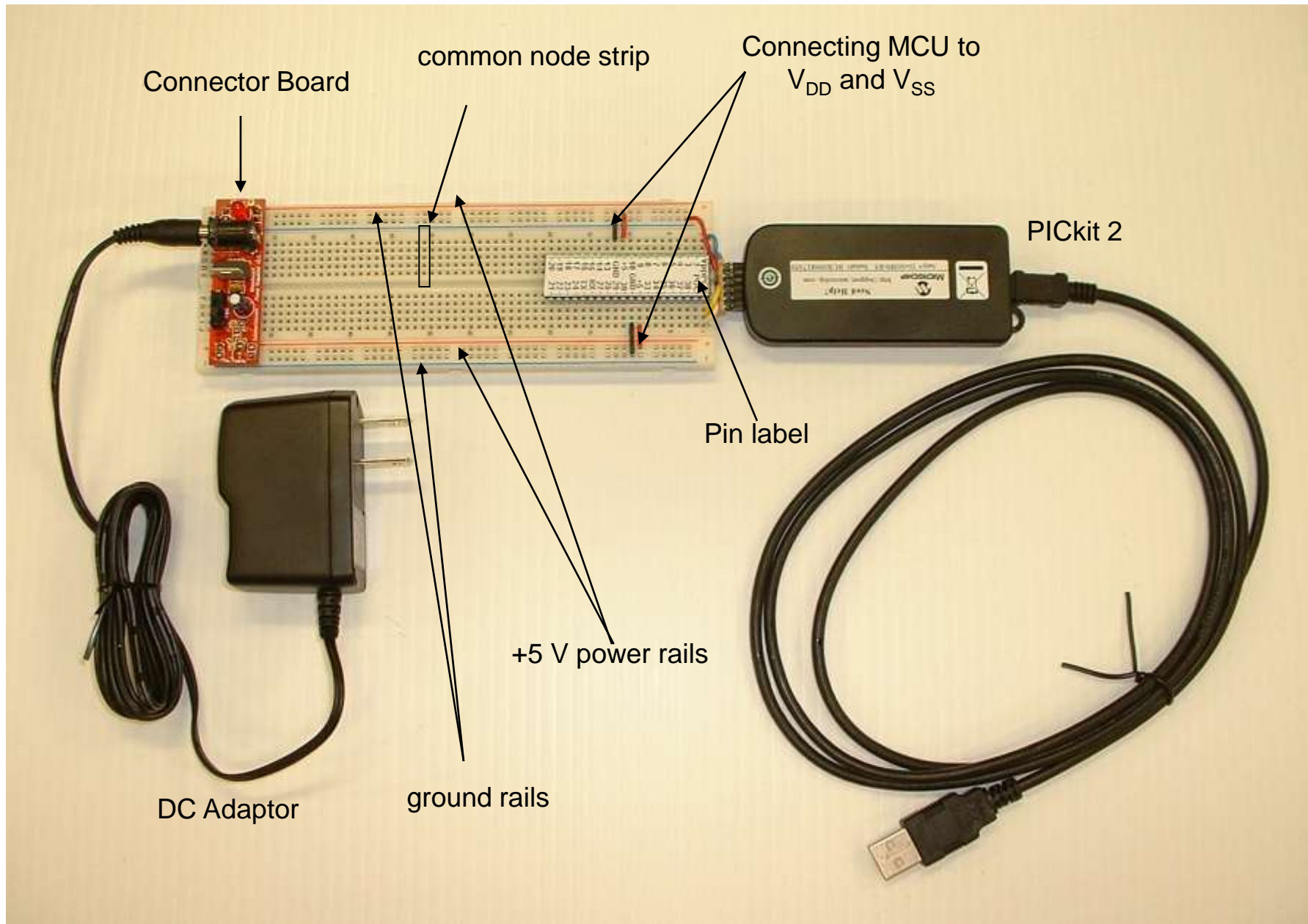
- Goal
- Program PIC/MCU (programmable integrated circuit/microcontoller unit)
- *Embedded device*
- Use PIC as brain of a robot and have robot follow a complex course

Regulator and capacitor

common node strip

Connecting MCU to V_{DD} and V_{SS}
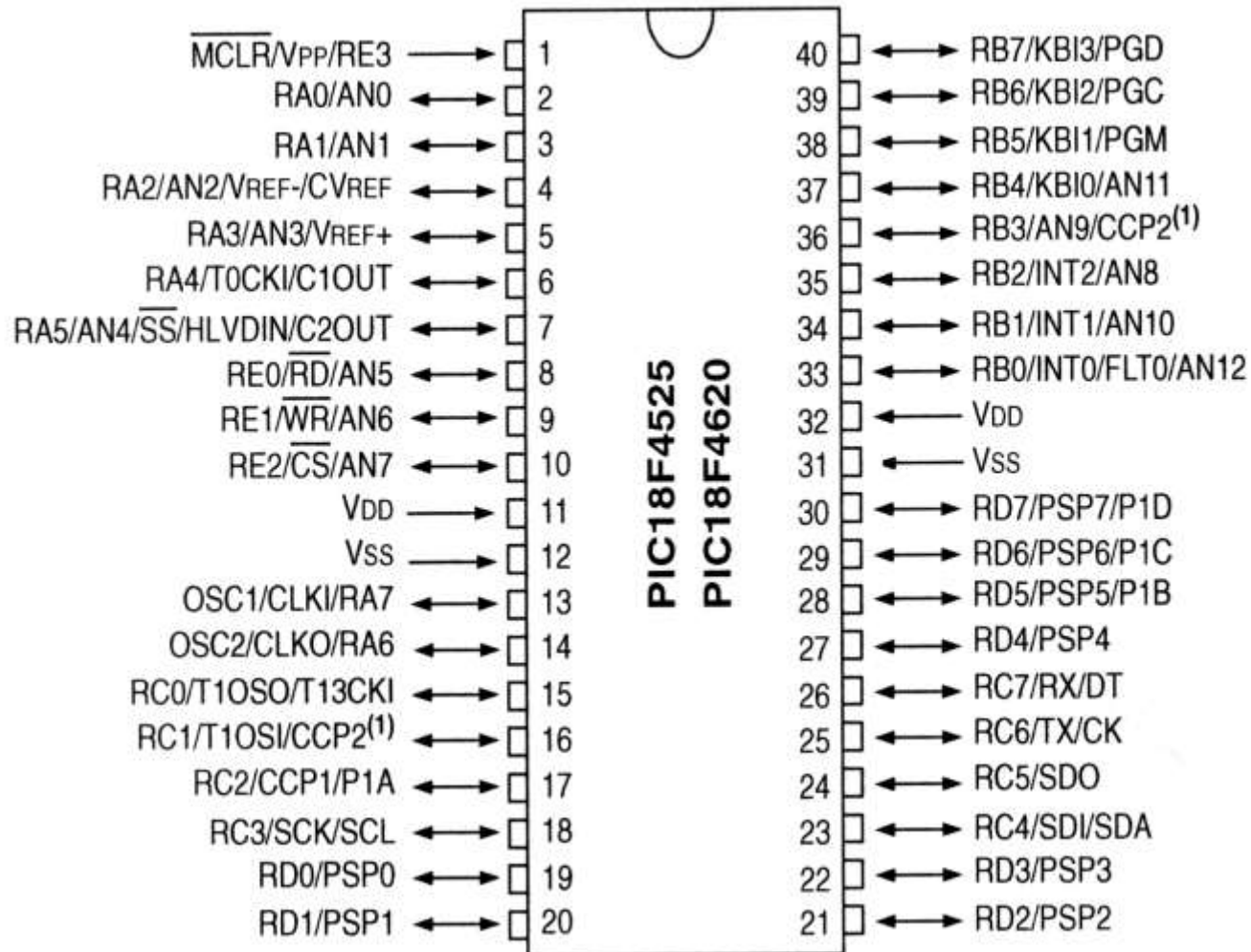
PICkit 2

DC Adaptor

Pin label

power and ground strip connectors

ground rails

+5 V power rails

Connector Board

common node strip

Connecting MCU to
V_{DD} and V_{SS}

PICkit 2

Pin label

+5 V power rails

DC Adaptor

ground rails

$\overline{MCLR}$/Vpp/RE3	→ 1	40	← RB7/KBI3/PGD
RA0/AN0	↔ 2	39	↔ RB6/KBI2/PGC
RA1/AN1	↔ 3	38	↔ RB5/KBI1/PGM
RA2/AN2/VREF-/CVREF	↔ 4	37	↔ RB4/KBI0/AN11
RA3/AN3/VREF+	↔ 5	36	↔ RB3/AN9/CCP2[1]
RA4/T0CKI/C1OUT	↔ 6	35	↔ RB2/INT2/AN8
RA5/AN4/$\overline{SS}$/HLVDIN/C2OUT	↔ 7	34	↔ RB1/INT1/AN10
RE0/$\overline{RD}$/AN5	↔ 8	33	↔ RB0/INT0/FLT0/AN12
RE1/$\overline{WR}$/AN6	↔ 9	32	← VDD
RE2/$\overline{CS}$/AN7	↔ 10	31	← Vss
VDD	→ 11	30	↔ RD7/PSP7/P1D
Vss	→ 12	29	↔ RD6/PSP6/P1C
OSC1/CLKI/RA7	↔ 13	28	↔ RD5/PSP5/P1B
OSC2/CLKO/RA6	↔ 14	27	↔ RD4/PSP4
RC0/T1OSO/T13CKI	↔ 15	26	↔ RC7/RX/DT
RC1/T1OSI/CCP2[1]	↔ 16	25	↔ RC6/TX/CK
RC2/CCP1/P1A	↔ 17	24	↔ RC5/SDO
RC3/SCK/SCL	↔ 18	23	↔ RC4/SDI/SDA
RD0/PSP0	↔ 19	22	↔ RD3/PSP3
RD1/PSP1	↔ 20	21	↔ RD2/PSP2

PIC18F4525 PIC18F4620

Pin out schematic of the PIC18F4525.

Pins

- Pins have numbers and designations

- VDD and VSS are power (+5V) and ground (0V)

- Some pins are *multiplexed* can handle different types of operations

Basic PIC pin operations - Output

- DIO (Digital Input Output)
  - Turn On (+5V) or Off (0V) signal at pin
  - Ex. Light up LED
- PWM (Pulse Width Modulation)
  - Square wave (control period and on off times)
  - Ex. Play tone on speaker or control motor speed

Basic PIC pin operations - Input

- DIO (Digital Input Output)
  - Read On (+5V) or Off (0V) signal at pin
  - Ex. Respond to a button
- ADC (Analog to Digital Conversion)
  - Digitize a continuous signal
  - Ex. Read voltage
- Timing
  - Time rising or falling voltages (edges) at pin
  - Ex. Photogate timers.

Notebooks

- Keep track of, and explain, circuits used
- Keep track of code
- Keep track of how to use modules and which choices allow you to do what
- Keep track of error and warning messages and how to fix.
- You should summarize what you learn in each lab
- Bring notebook to tests!!!