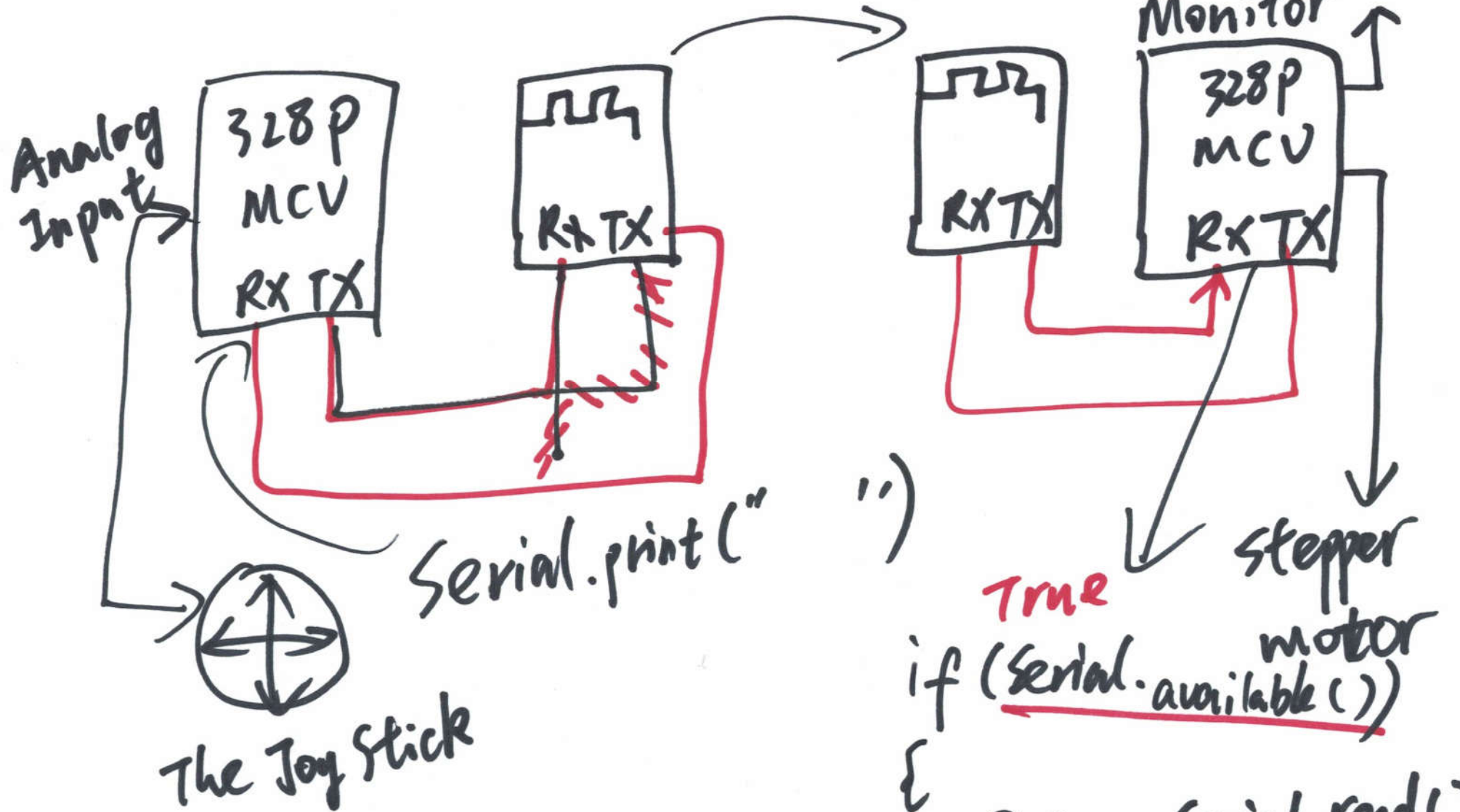


HW3 Open-Smart 2.4 GHz Wireless Module



```

if (Serial.available())
{
  Data = Serial.read();
}
  
```

The Balancing Car

① ACCEL_XOUT, ACCEL_YOUT, ACCEL_ZOUT

② PID Controller

$$P: K_p \cdot e(t) \quad I: K_i \int_0^t e(t) dt \quad D: K_d \frac{de(t)}{dt}$$

③ Loop Time (dt)

```
void setup() {
```

```
}
```

```
void loop() {
```

```
}
```

↕ dt

```
void setup() {
```

```
    loop_timer = micros() + 4000;
```

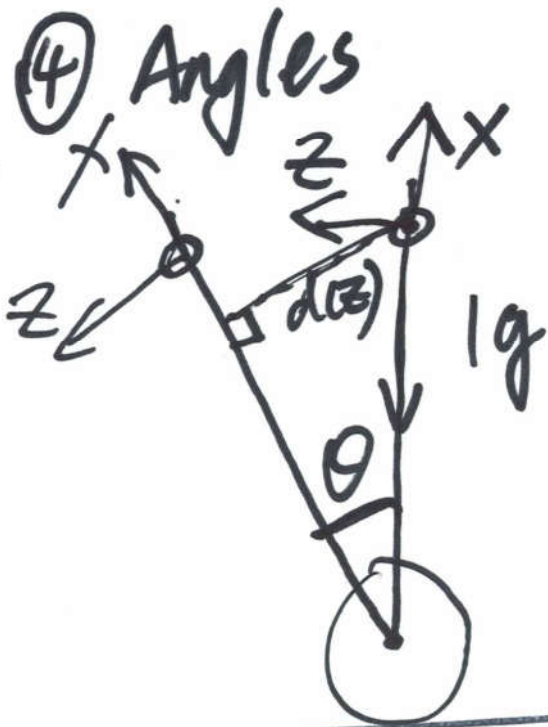
micros() is a timer begins when the board is powered up.

```
void loop() {
```

```
    while (micros() < loop_timer);  
    loop_timer + = 4000;
```

```
}
```

(3)



$$\theta = \text{asin}(\text{Accel-z}/1g)$$

radians

$$\text{asin}(\text{float}) \text{ accel-z}/8192.0) \cdot \frac{360^\circ}{2\pi}$$

$$\frac{360^\circ}{2\pi} = \frac{180^\circ}{\pi} = \underline{\underline{57.296}}$$

$$\textcircled{5} \quad \frac{\text{XXX LSB}}{\text{131 LSB}} \times 0.0045$$

= degree

= XXX degrees

⑤