

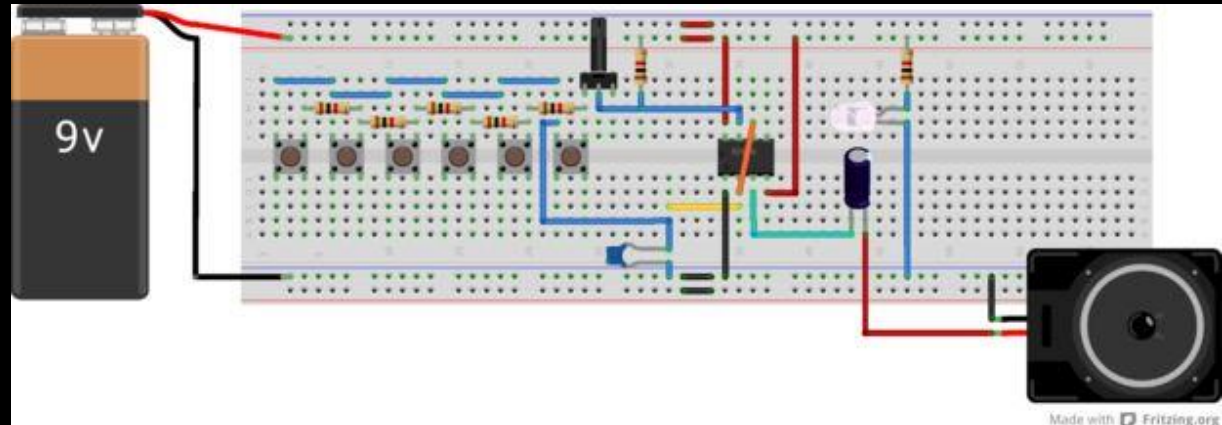
彰化縣自造教育示範中心

電子自造研習課程

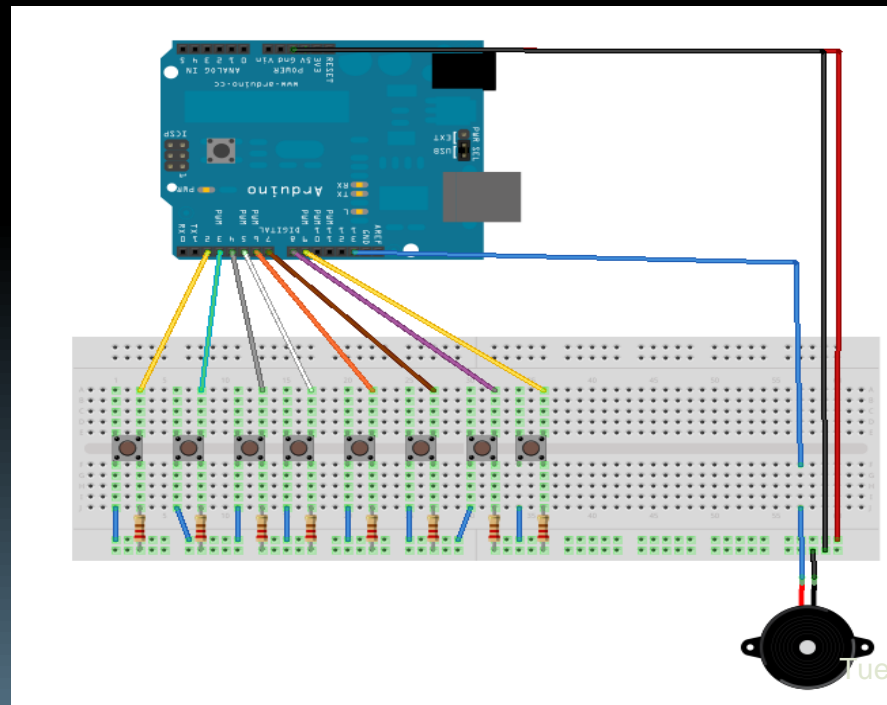
回顧與討論

簡易電子琴

555 IC



Arduino

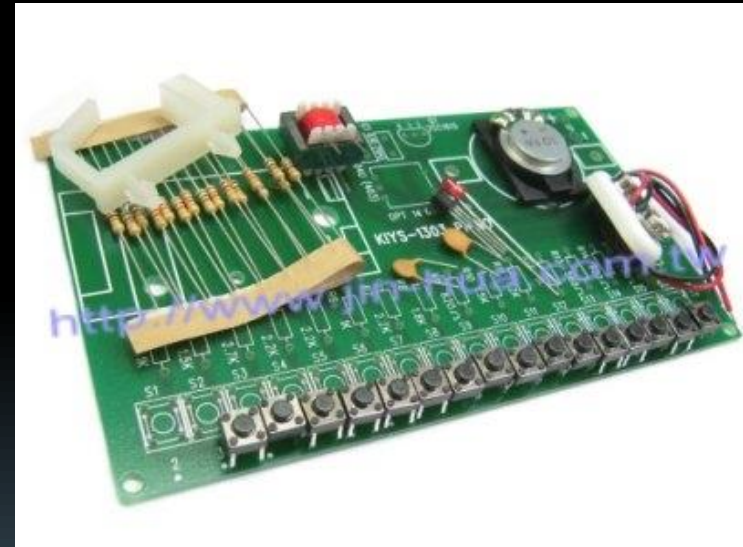


簡易電子琴製作與STEM 教學理念

- Science
 - 頻率與聲音
- Technology
 - 電子材料、工具
- Engineering
 - RC電路、開關電路、程式設計
- Mathematics
 - 電阻、電容、頻率關係函數

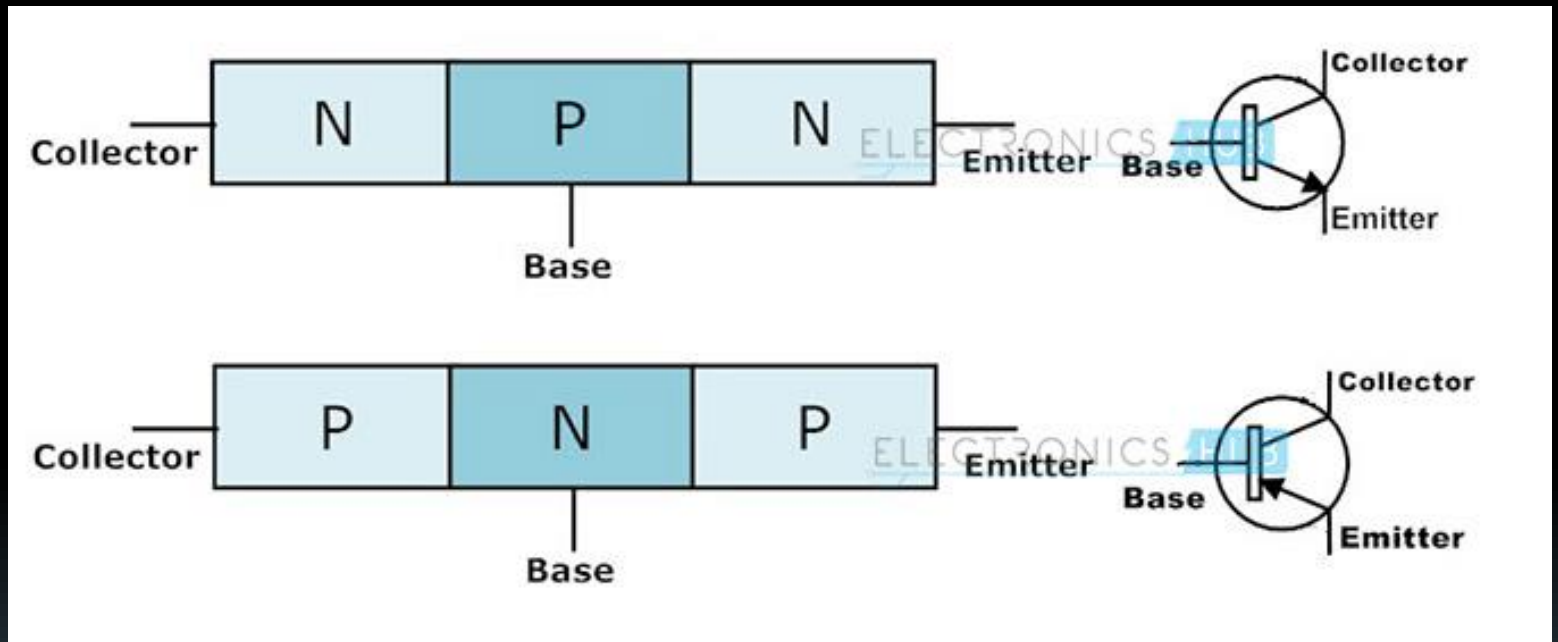
回顧與討論

- 電子琴實習套件

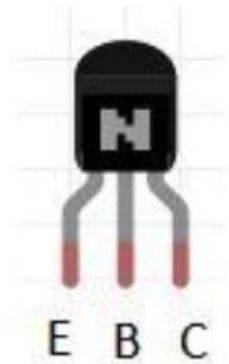
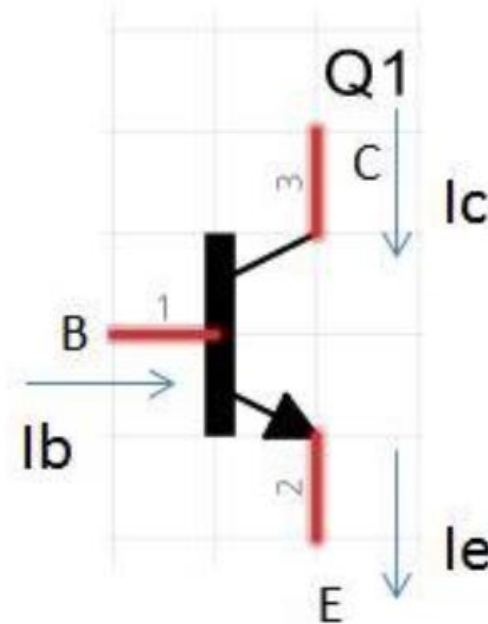
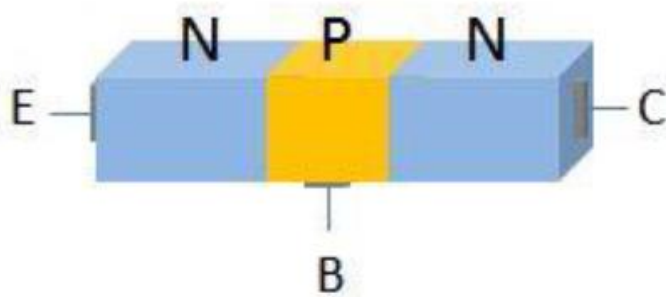


認識電晶體

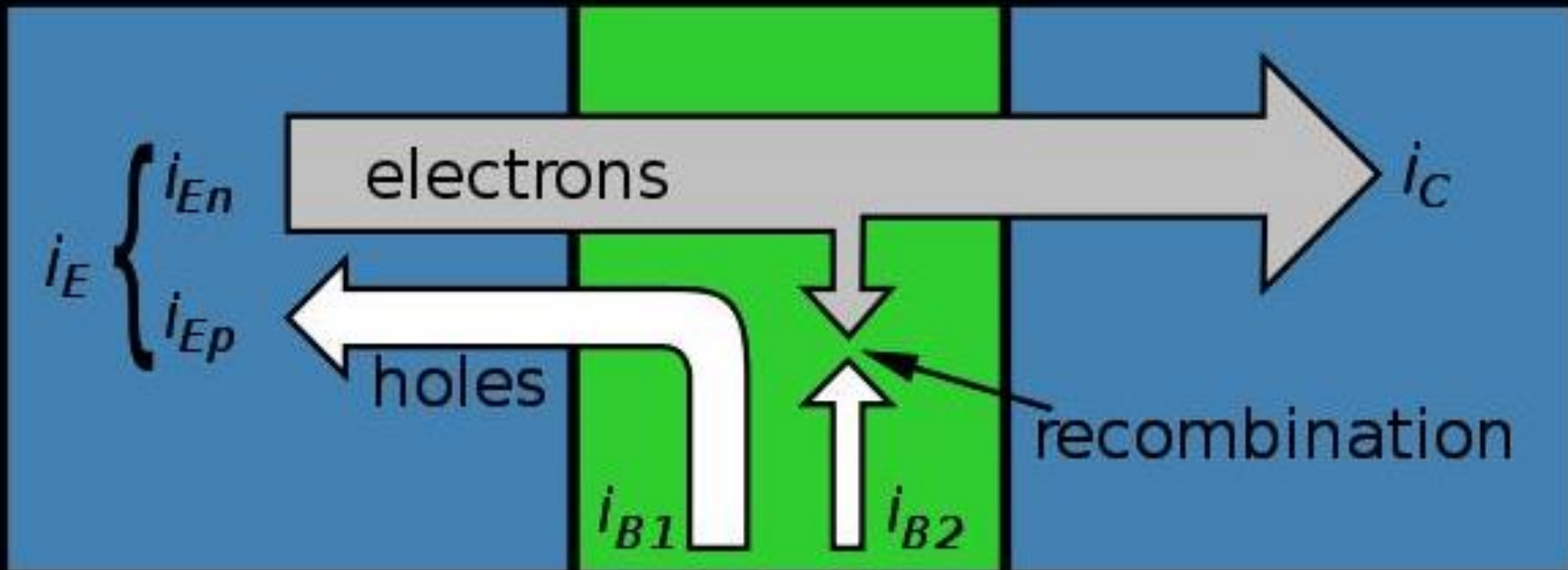
■ NPN 與 PNP



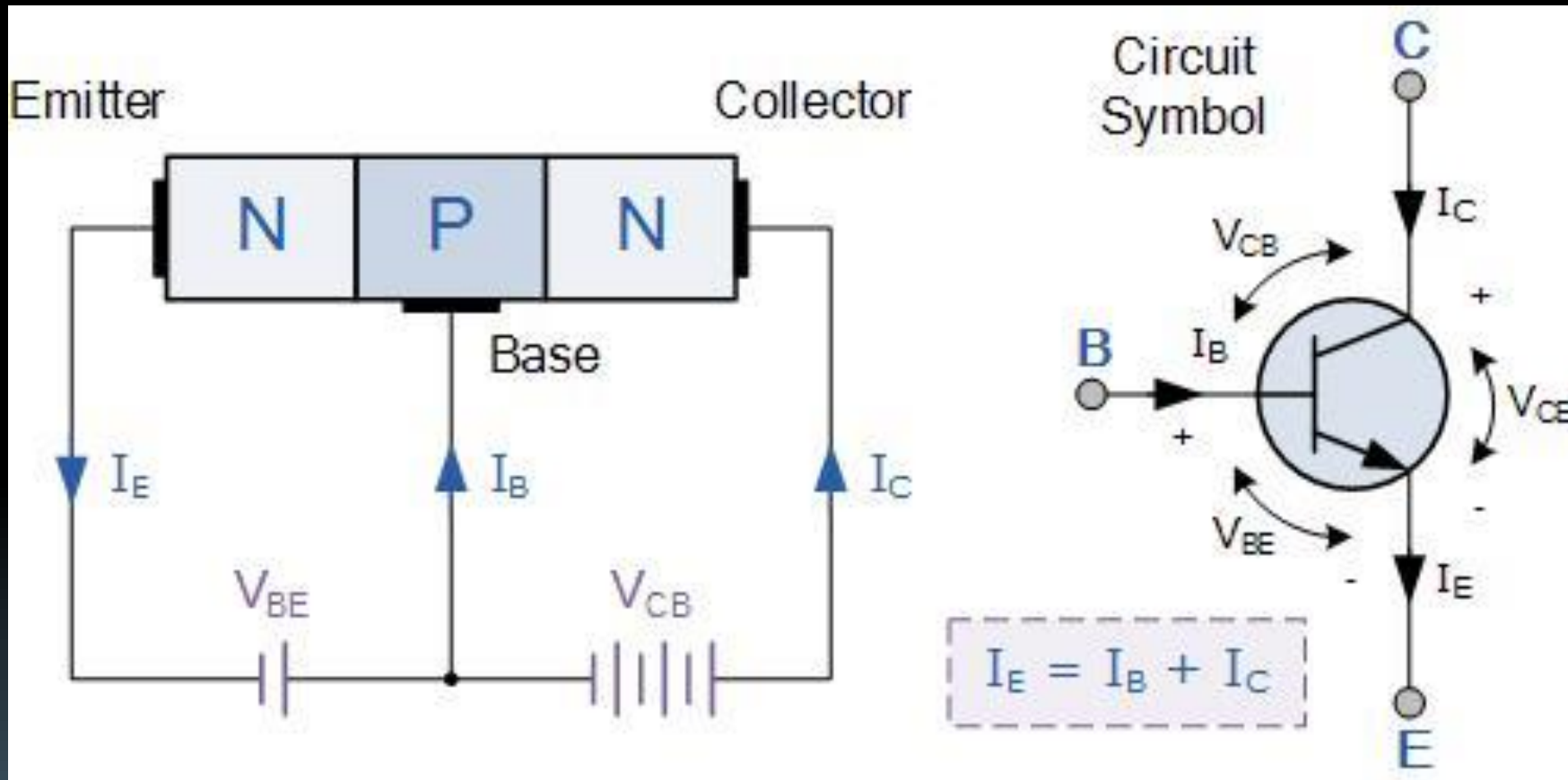
NPN 電晶體



NPN 電晶體內部 電子與電洞

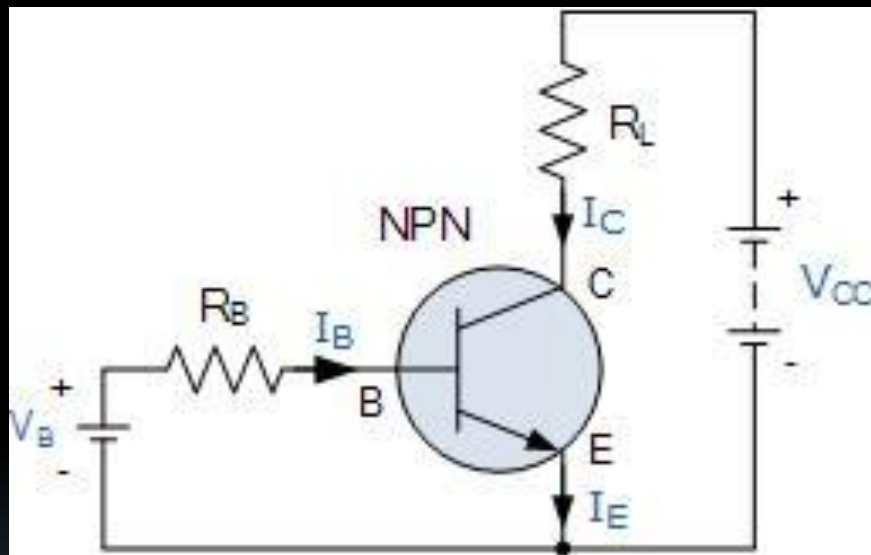


NPN 電晶體 偏壓電路

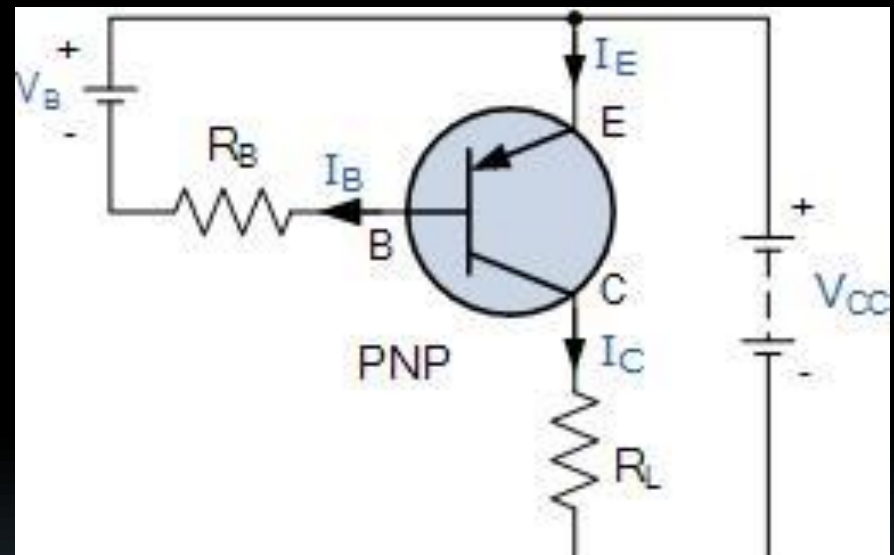


電晶體開關

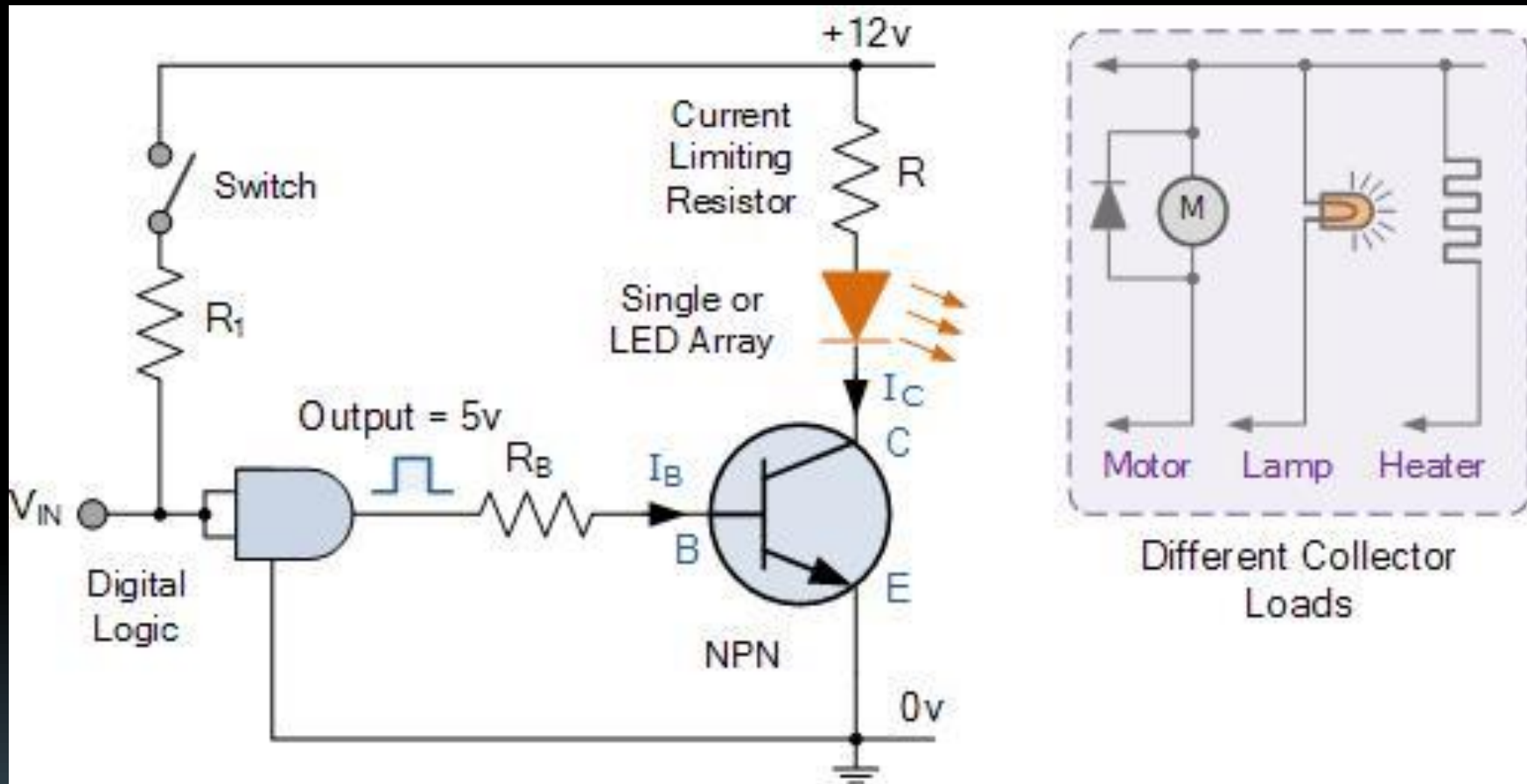
NPN



PNP



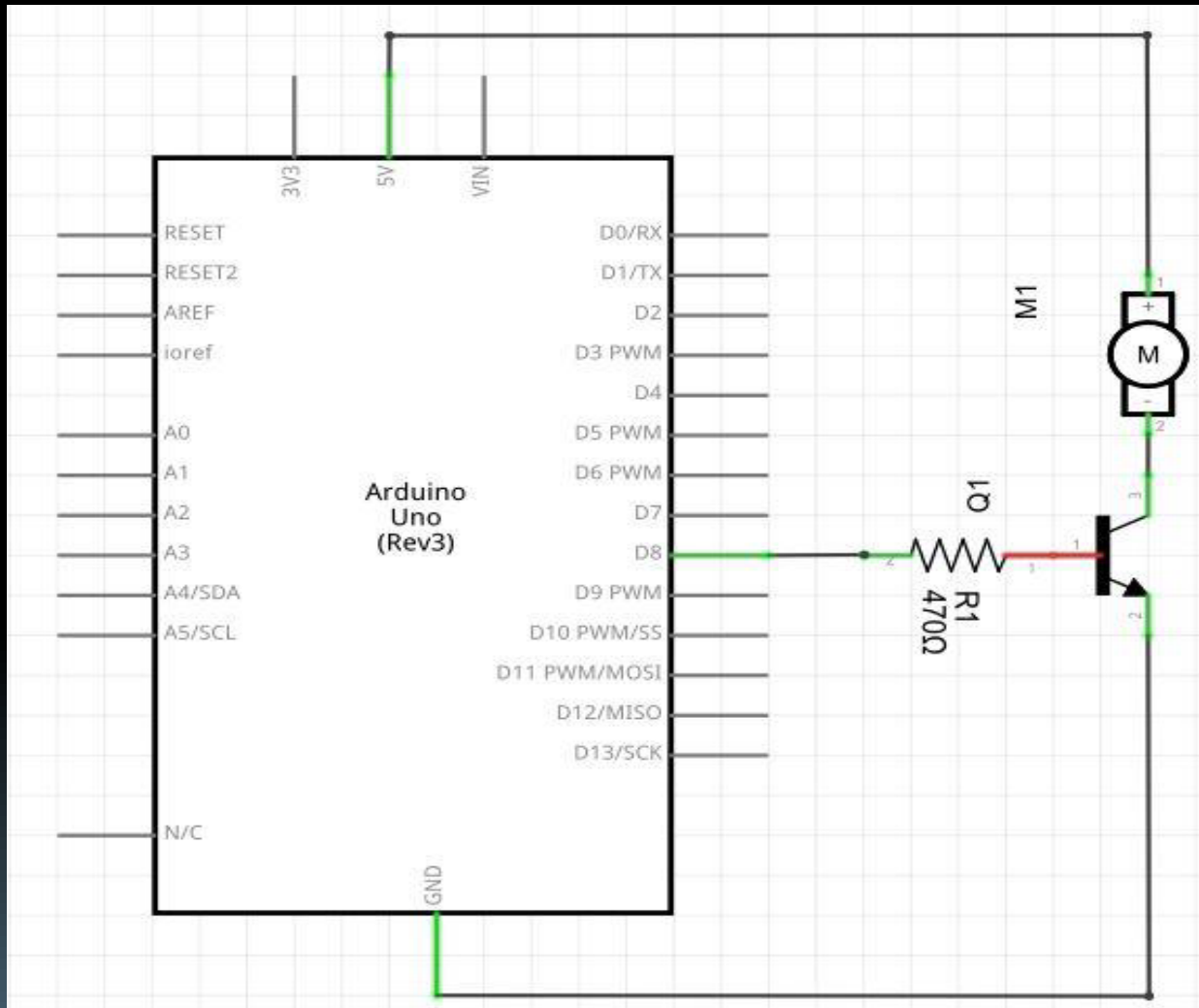
電晶體開關電路



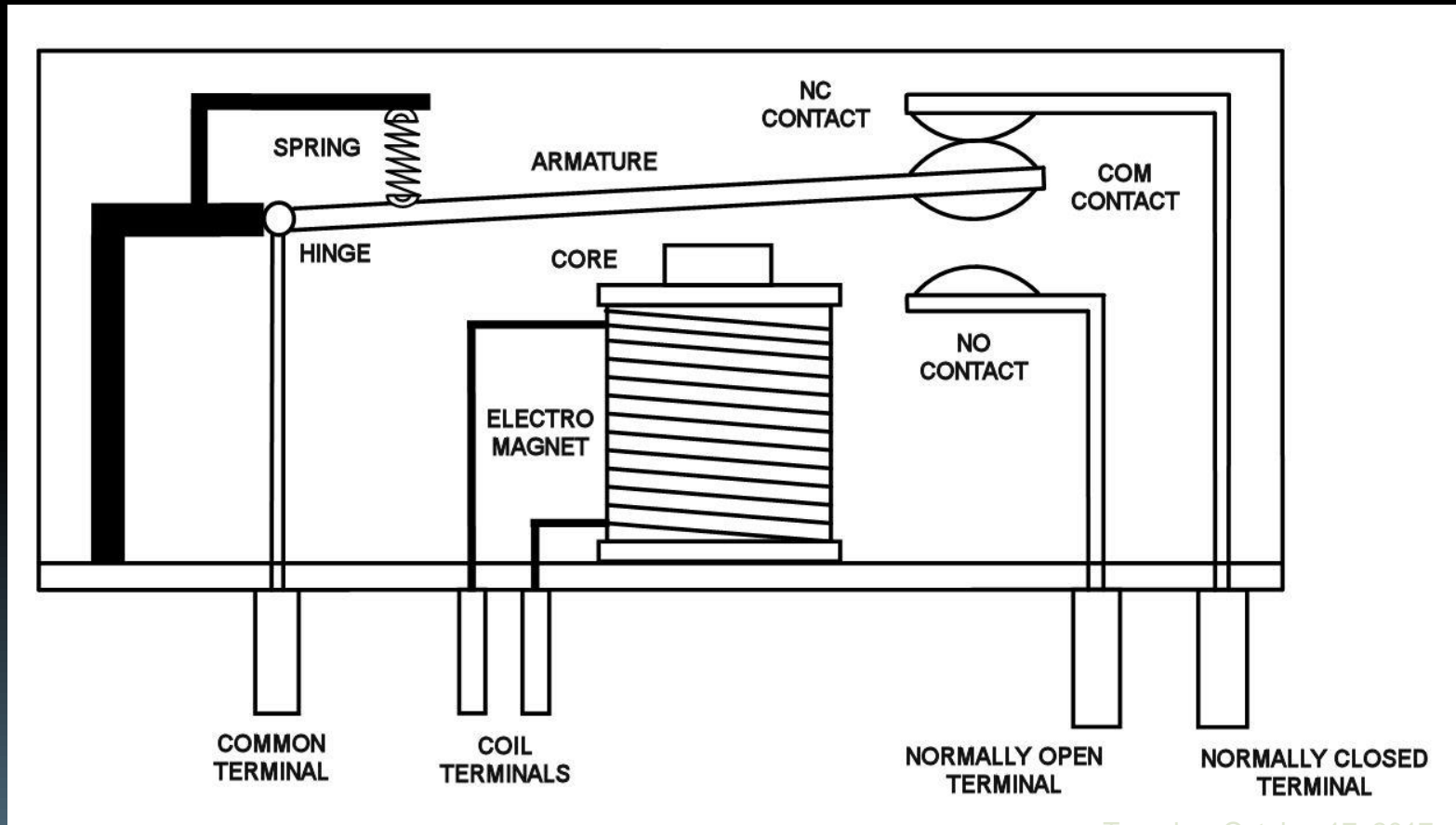
三用電表 電晶體測量



Arduino 控制直流馬達

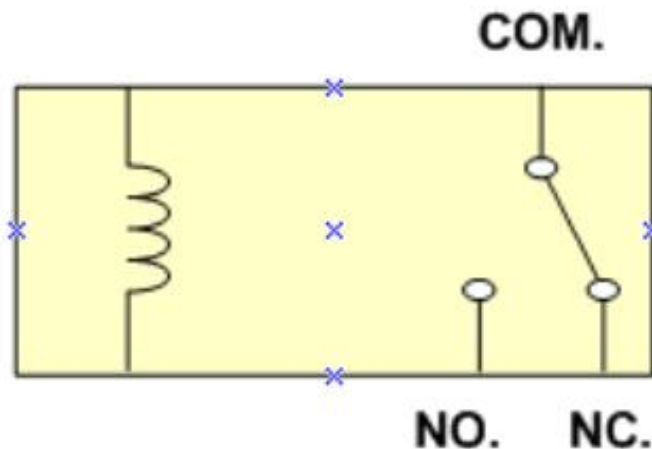


認識繼電器

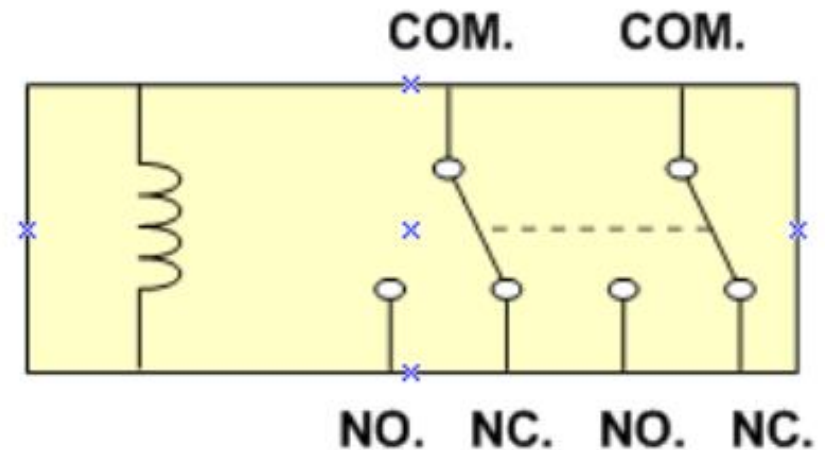


- COM (Common) 為共接點
- NO (Normal Open) 為常開接點
- NC (Normal Closed))為常關接點

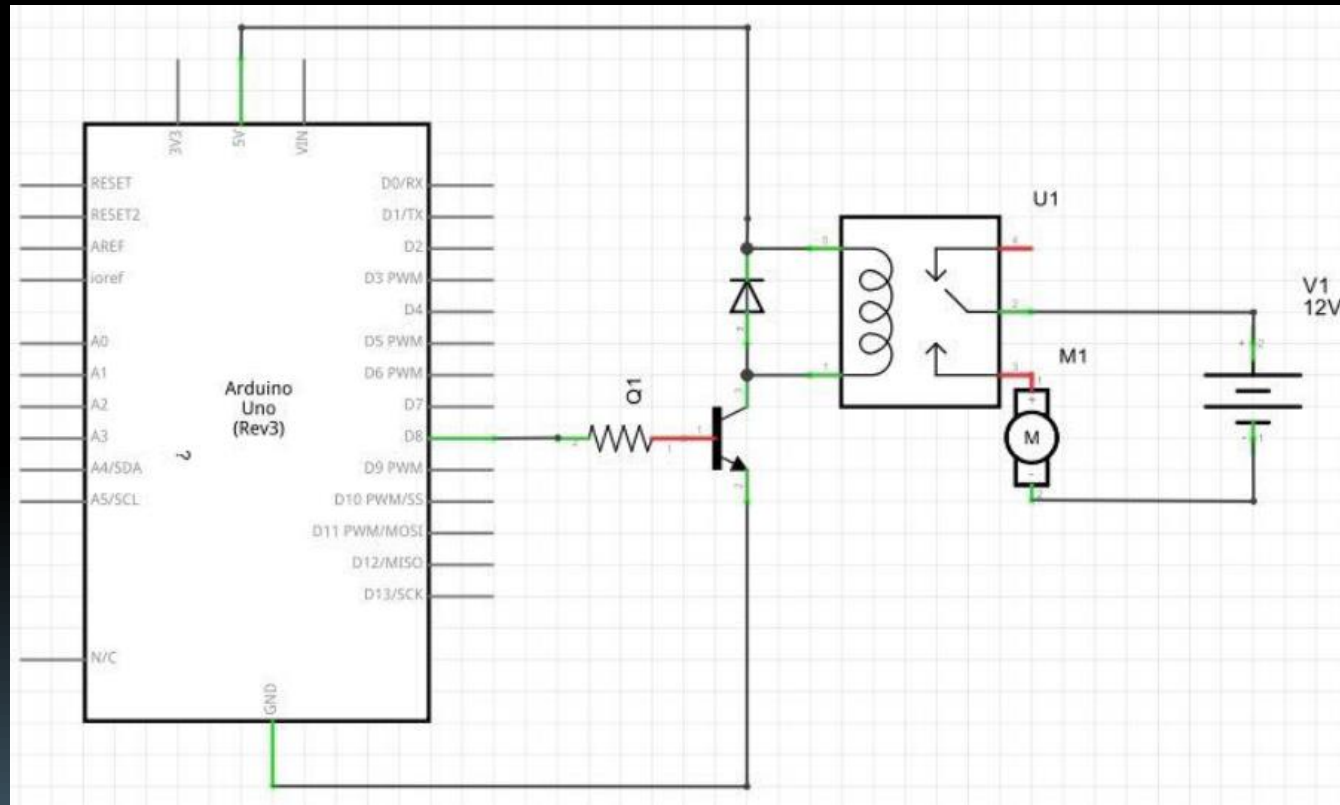
SPDT 單刀雙擲繼電器



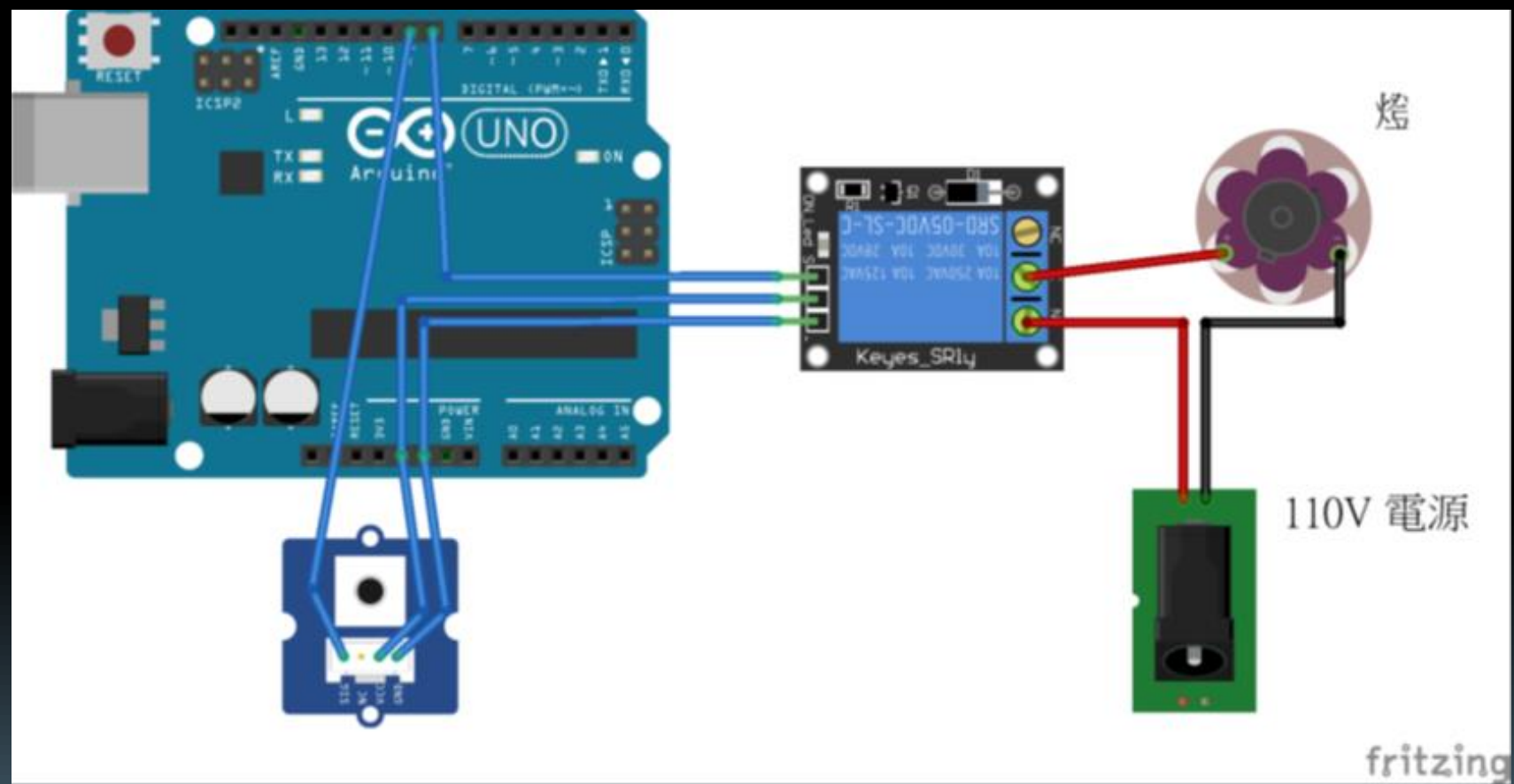
DPDT 雙刀雙擲繼電器



繼電器模組

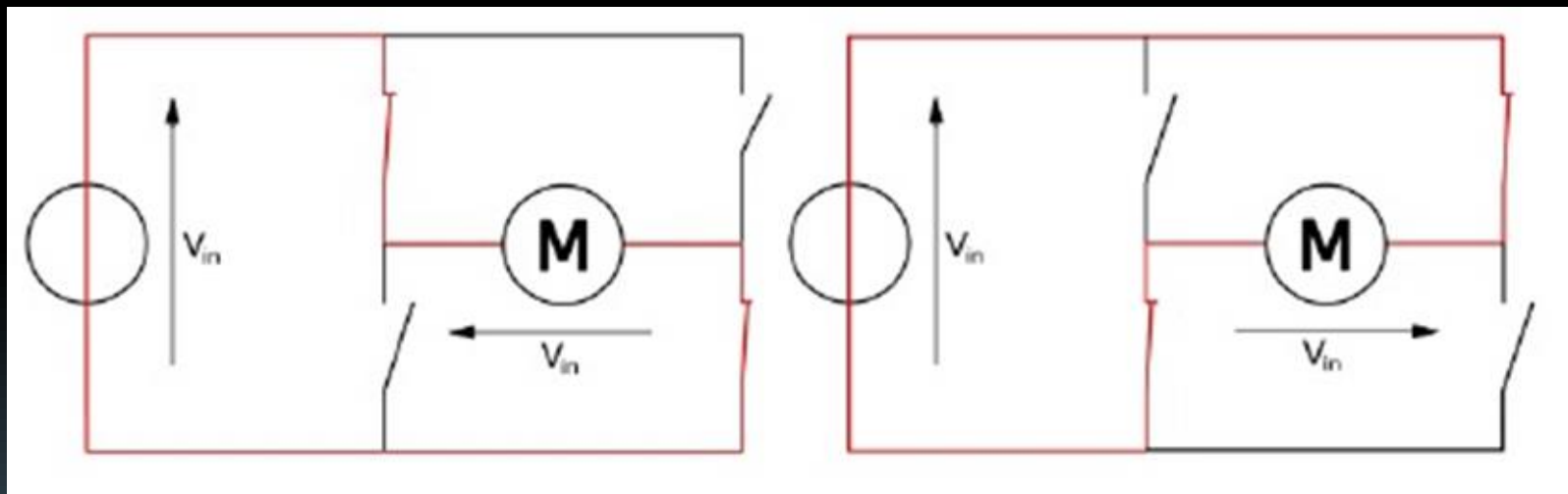


繼電器控制 110V交流電源

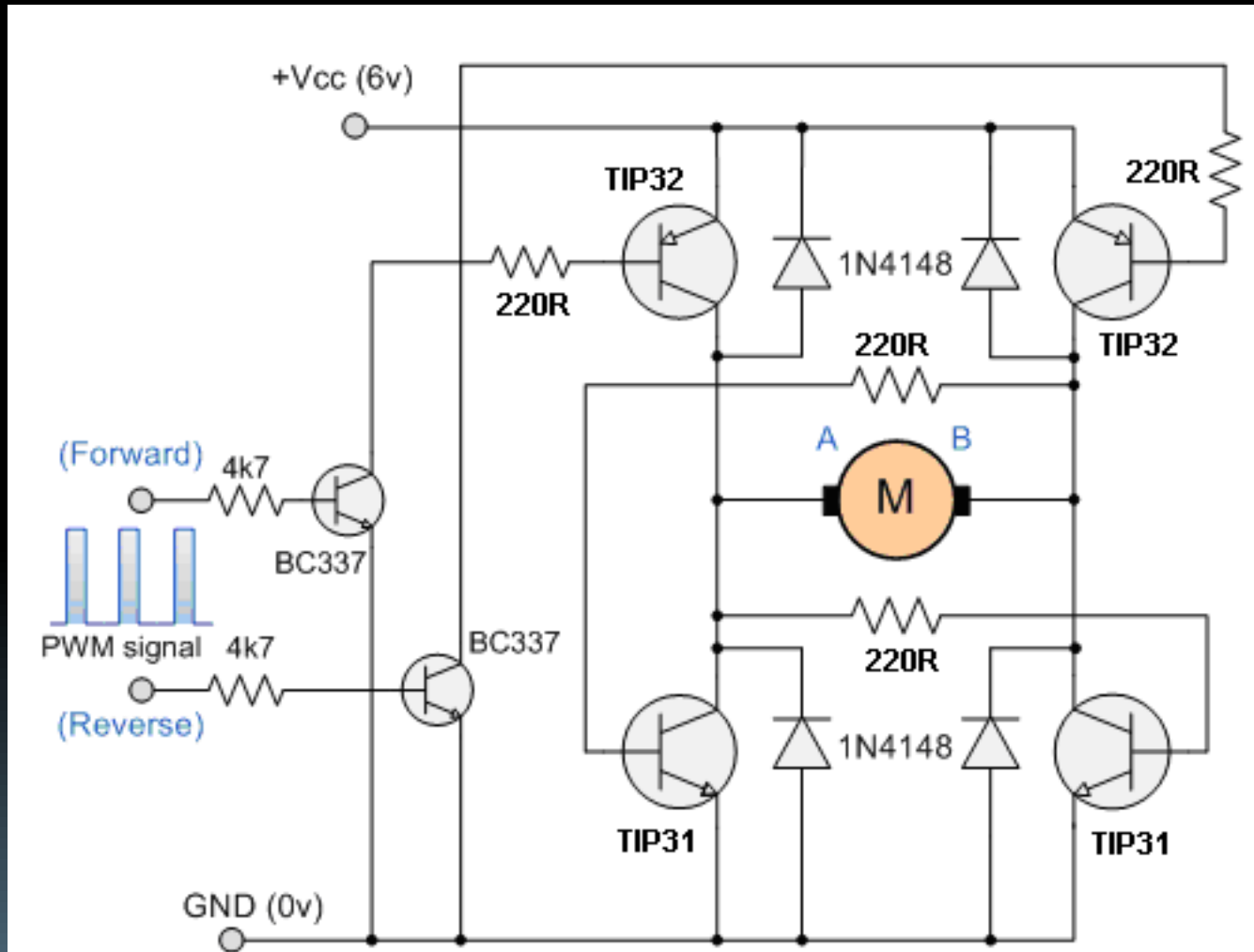


直流馬達旋轉方向、速度控制

- H-Bridge

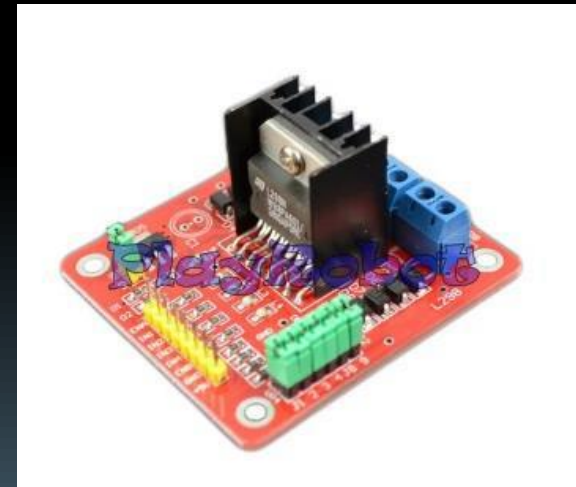
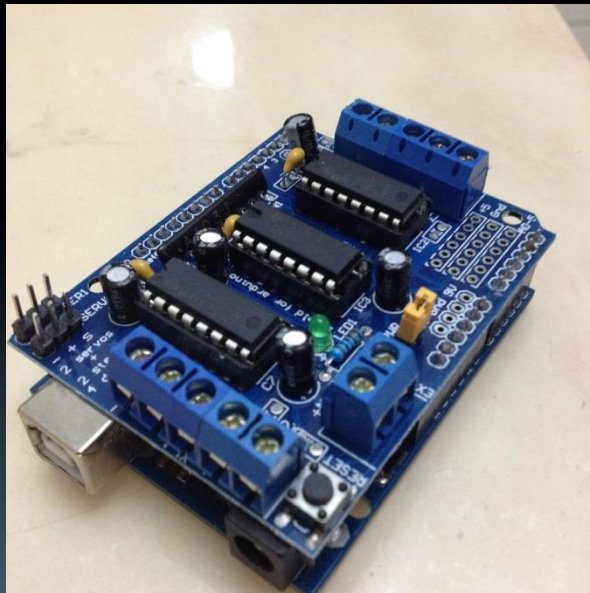
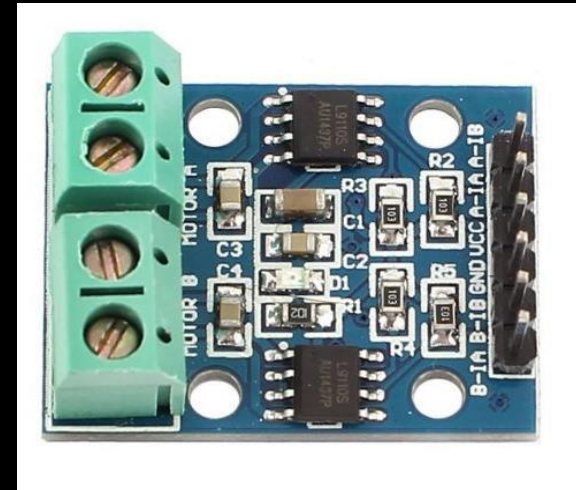


H-Bridge 電路圖



直流馬達驅動模組

- L9110S
- L298P
- L293D 擴充板

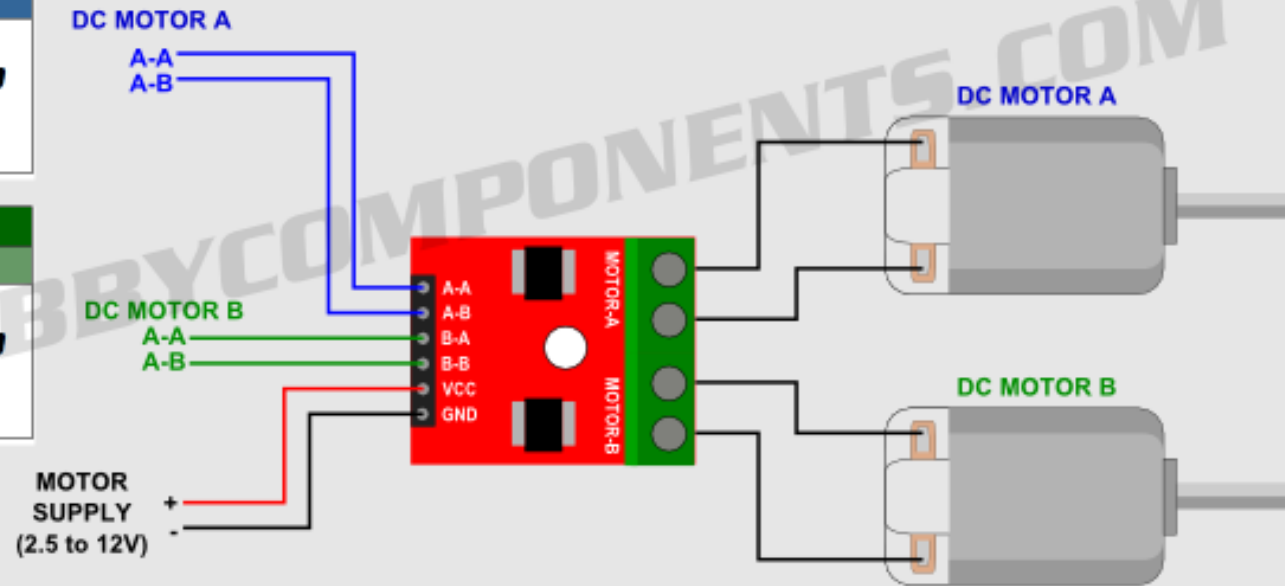


L9110S 模組

L9110S DC/Stepper Motor Driver H-Bridge (HCMODU0033)

DC MOTOR A		
A-A	A-B	MOTOR
LOW	LOW	STOP
HIGH	LOW	FORWARD
LOW	HIGH	REVERSE
HIGH	HIGH	STOP

DC MOTOR B		
B-A	B-B	MOTOR
LOW	LOW	STOP
HIGH	LOW	FORWARD
LOW	HIGH	REVERSE
HIGH	HIGH	STOP



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類比搖桿

- 未操作搖桿的情況下， VR_x 與 VR_y 大致是在 $2.5V$ ，
- 如果在 X 方向移動， VR_x 會有 0 到 $5V$ 變化，如果在 Y 方向移動， VR_y 也是有 0 到 $5V$ 變化



類比搖桿控制2個馬達

