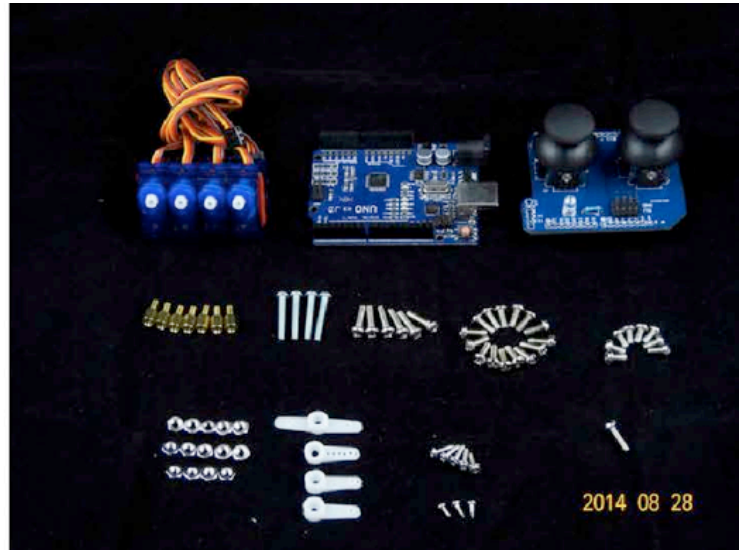
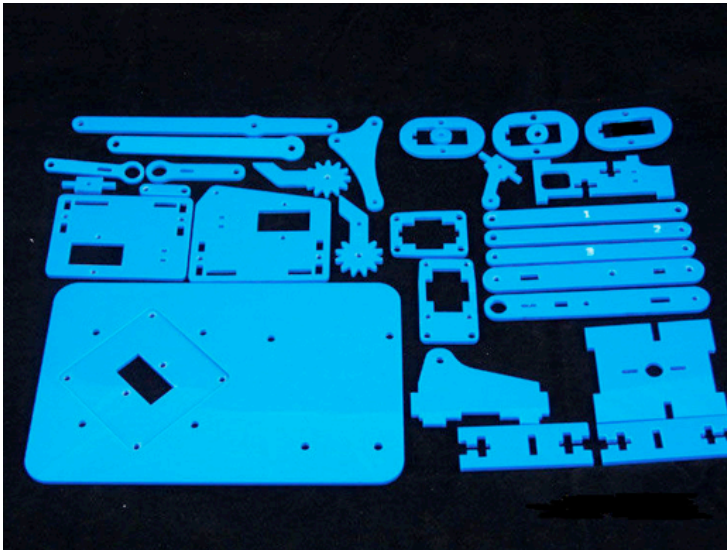


meArm.Joystick 是時下最發燒的桌上型機器手臂，藉由 DIY 套件，它不只能帶你走入 maker 世界，更能透過 30 餘程式教程培養程式設計能力，從學生到社會人士都適合玩。本文件為 DIY 步驟，共 17 個步驟。

Step 1: 清點套件

部份部件有少許備品，例如：螺絲。

- (1) 20mm x 4
- (2) 12mm x 6
- (3) 10mm x 1
- (4) 8mm x 16
- (5) 6mm x 8
- (6) 銅柱 x 7
- (7) 螺帽 x 14
- (8) 伺服馬達 x 4
- (9) Arduino 主板 x 1
- (10) 搖桿擴充板 x 1

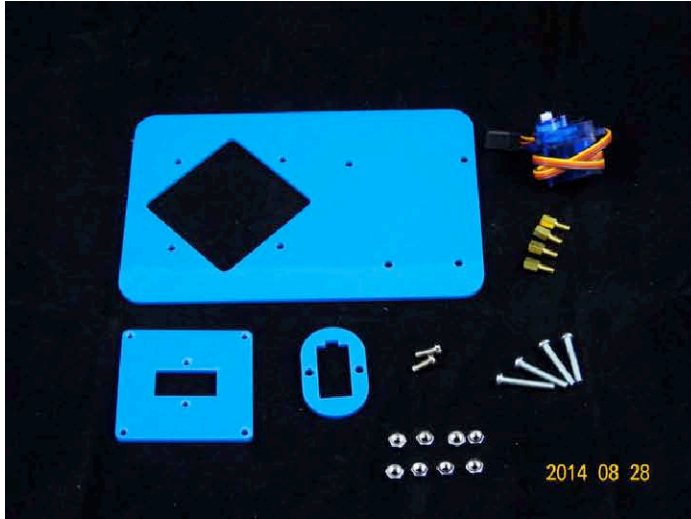


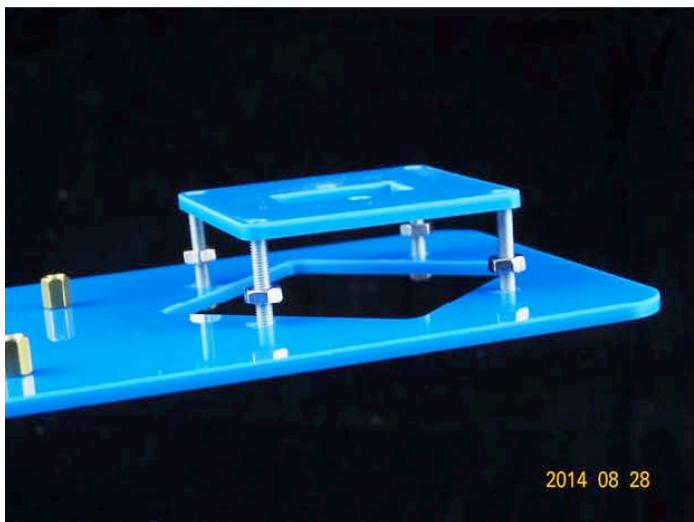
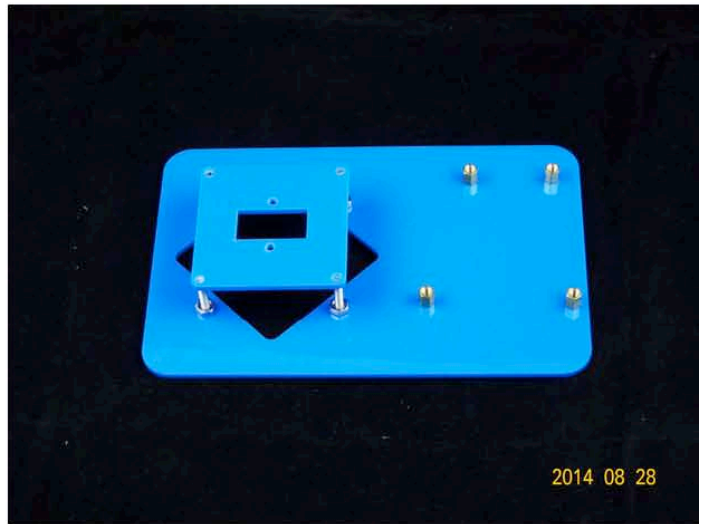
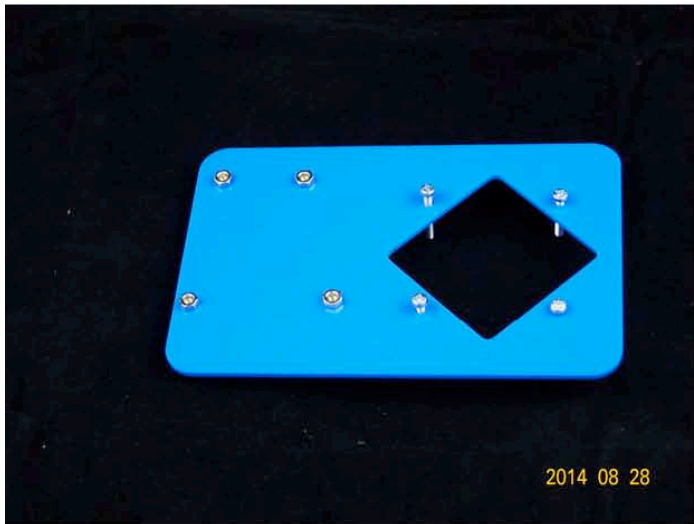
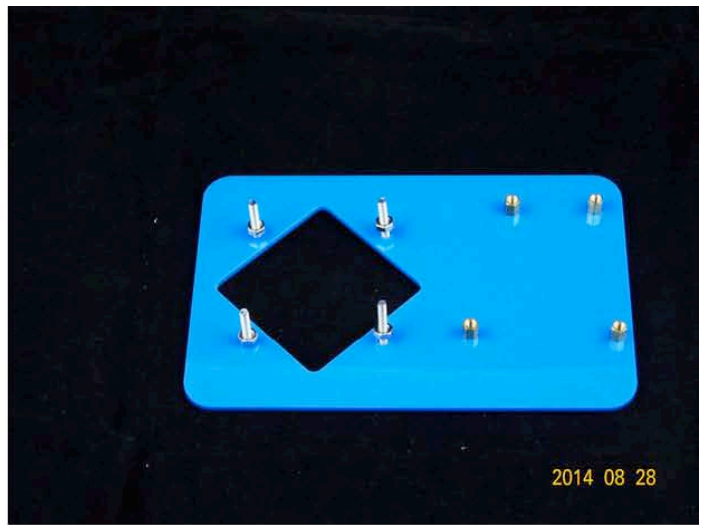
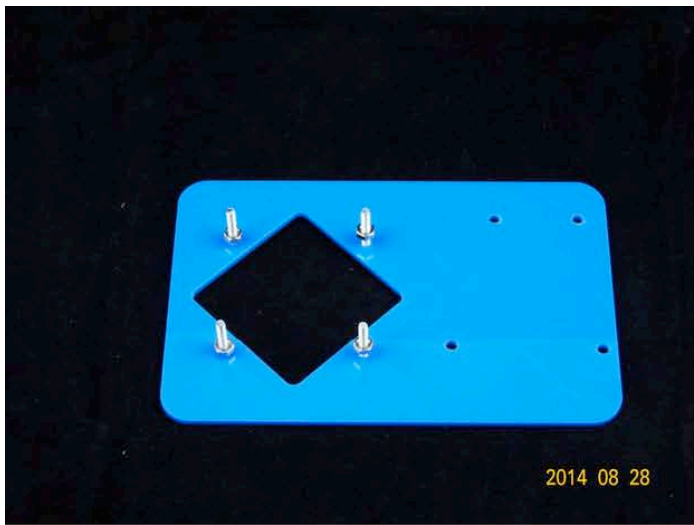
Step 2: 底座

所需螺絲

(1) 20mm x 4

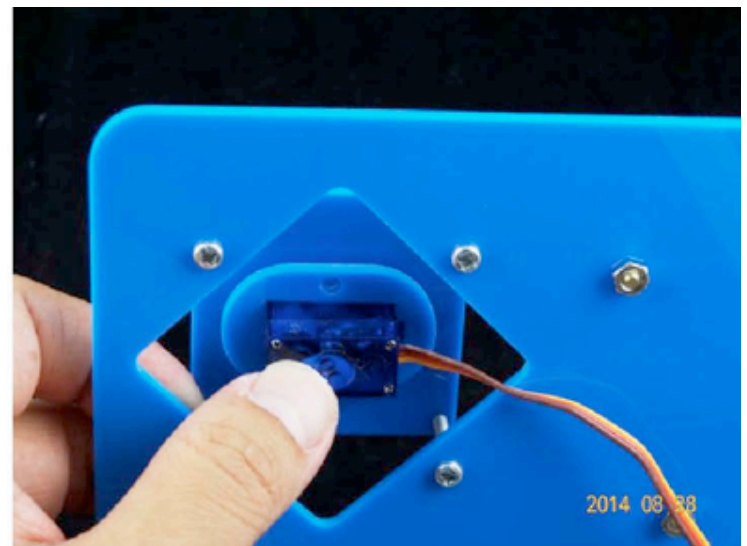
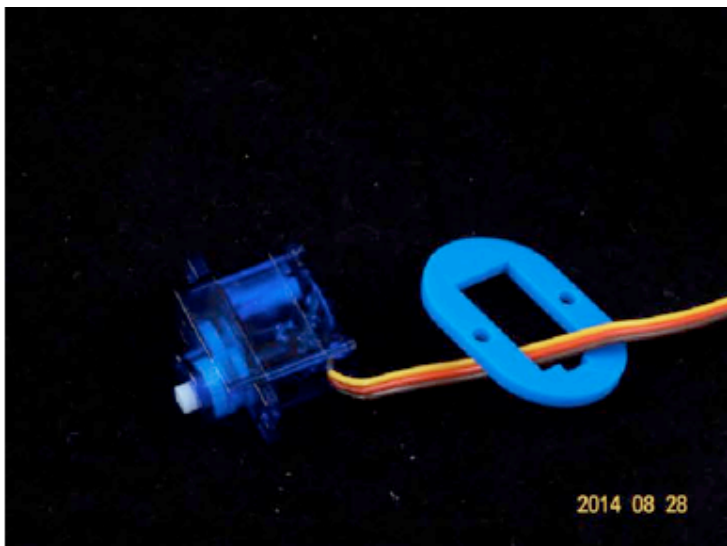
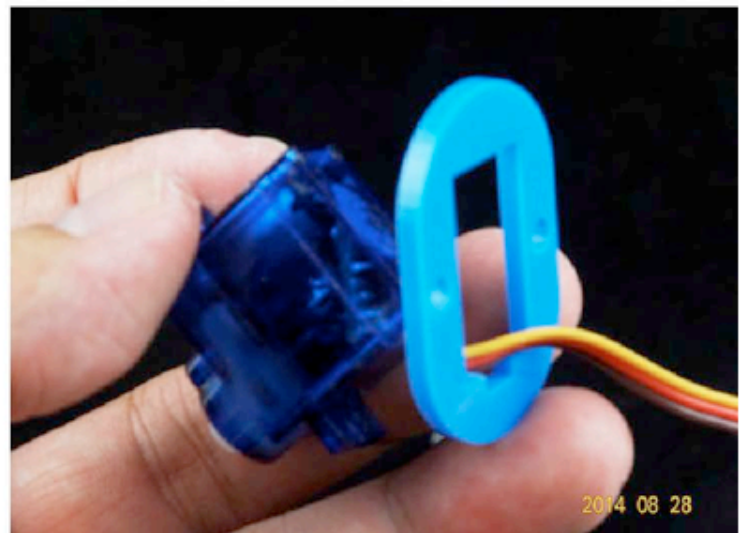
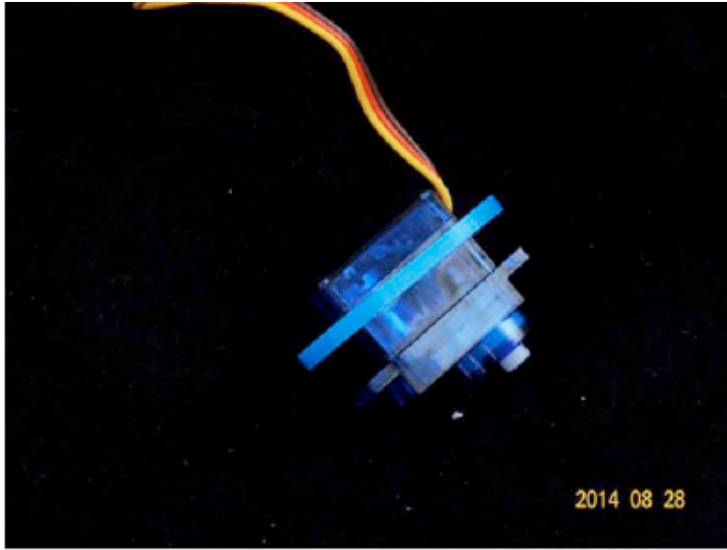
(2) 8mm x 2

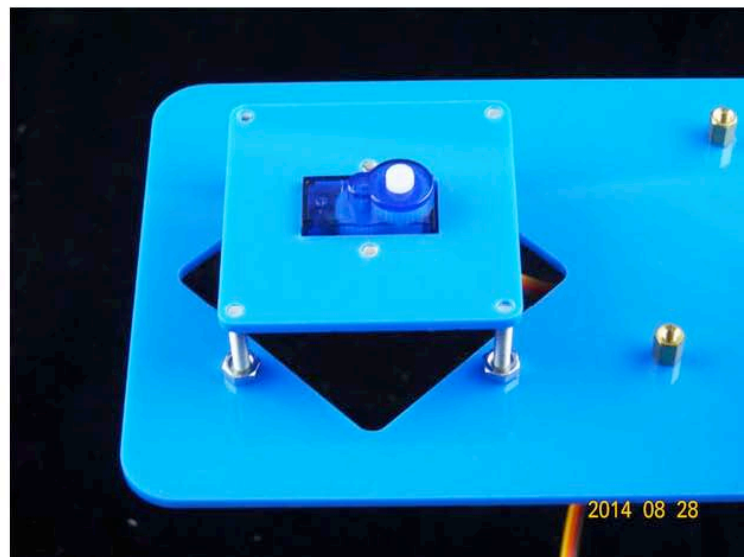
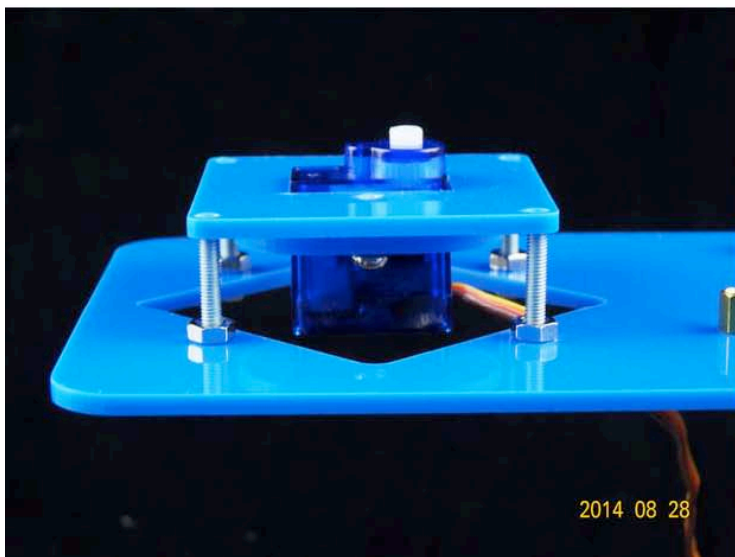
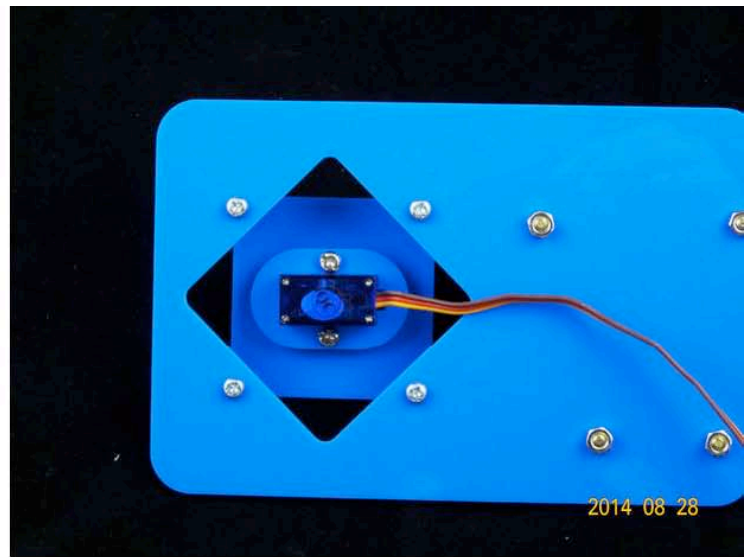
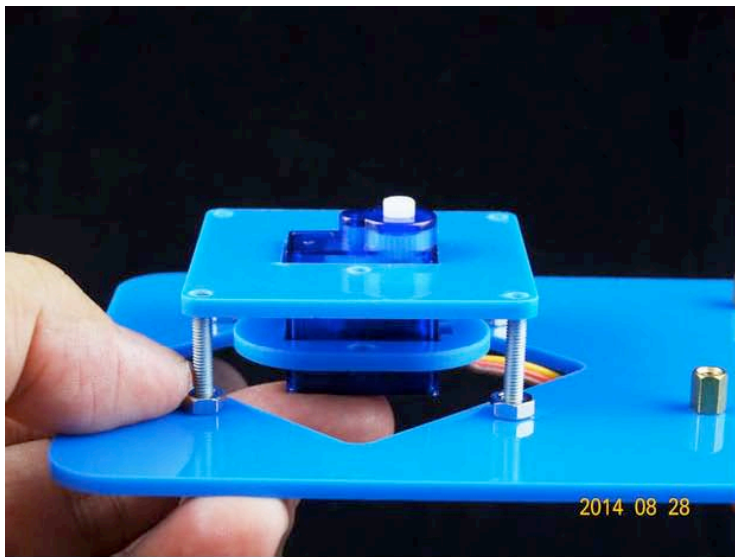




Step 3: 第一顆馬達

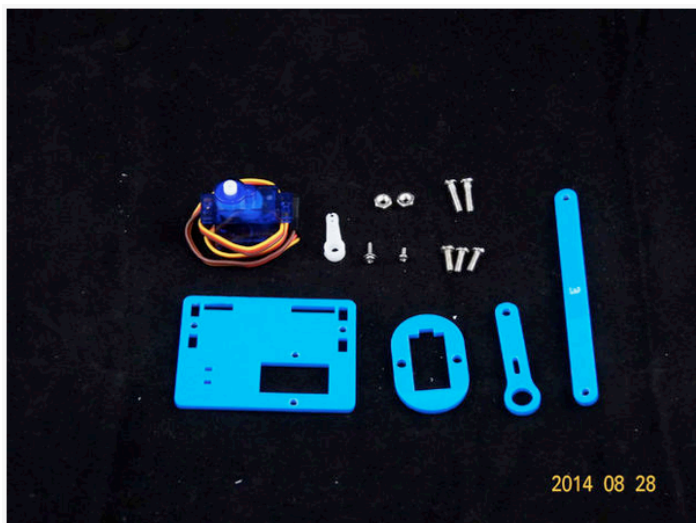
注意：馬達尺寸和壓克力很密合，所以施力要慢，以免弄破壓克力，之後在裝馬達是也要同樣留意。

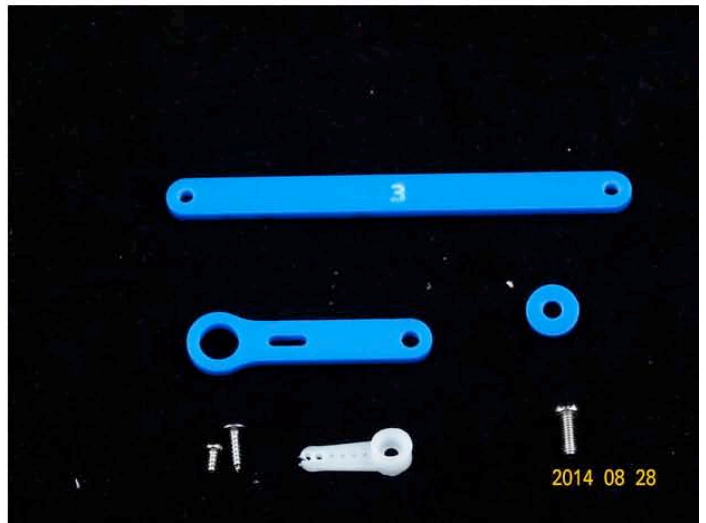
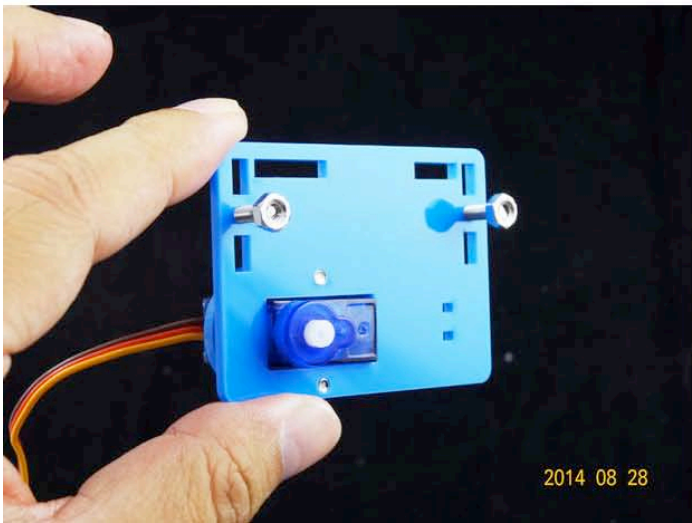
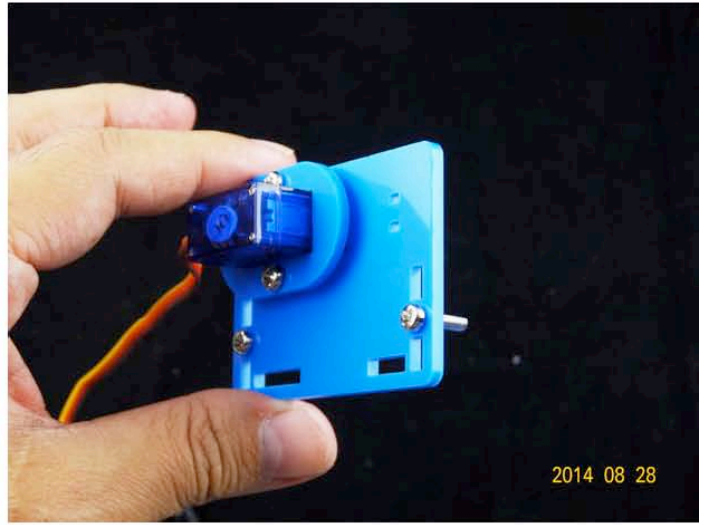
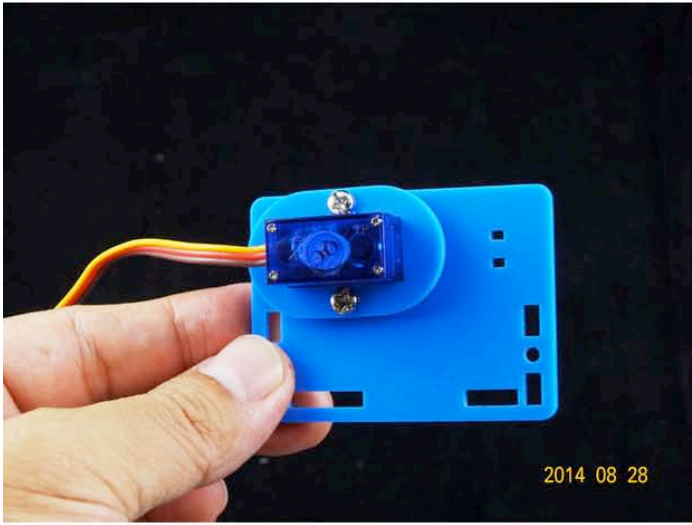
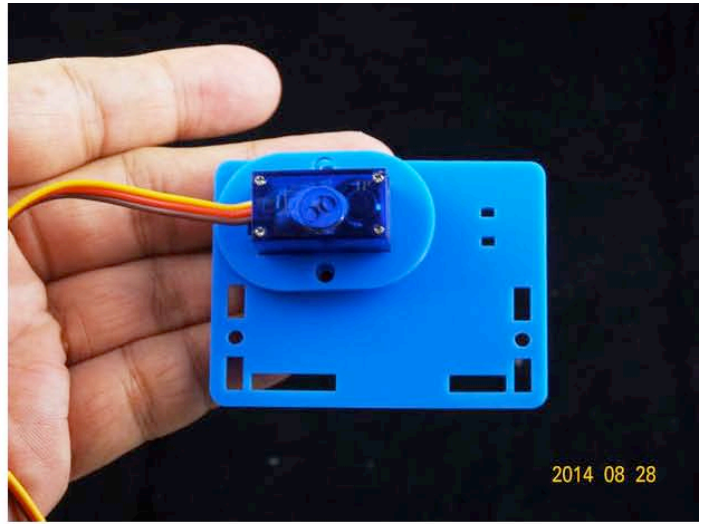
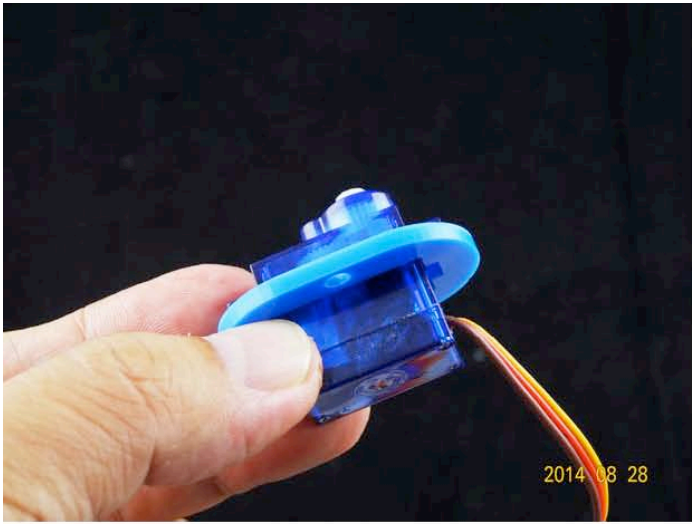


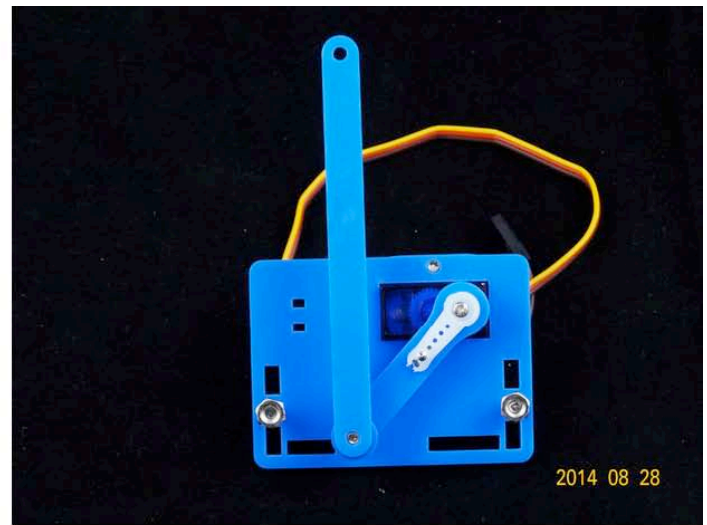
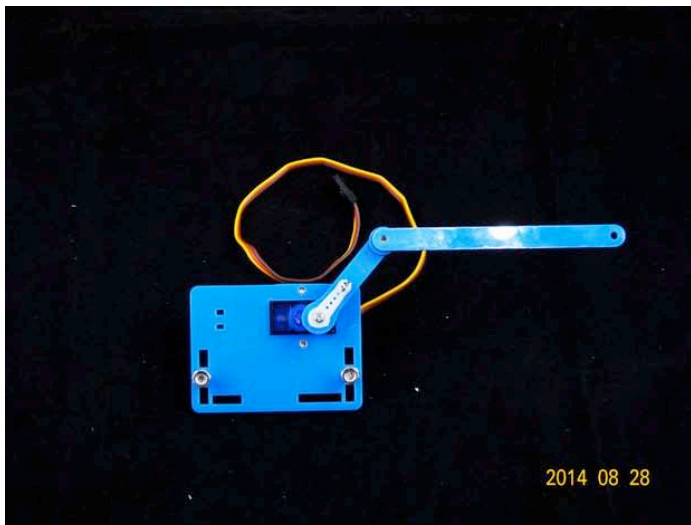


Step 4: 左臂

此步驟重點是馬達角度調整，請先為馬達套上小白套，“順時鐘”旋至不能旋為止，再裝成倒數第4張圖，然後再“逆時鐘”轉成倒數第3張圖。（其中長桿號碼為3，小圓圈不需放上）







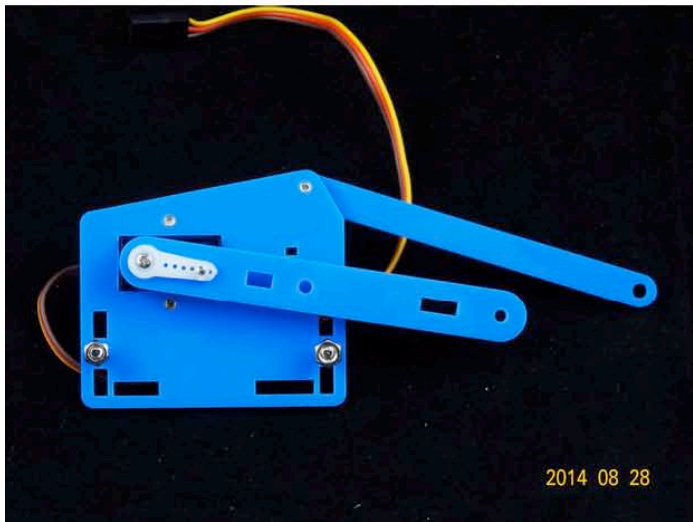
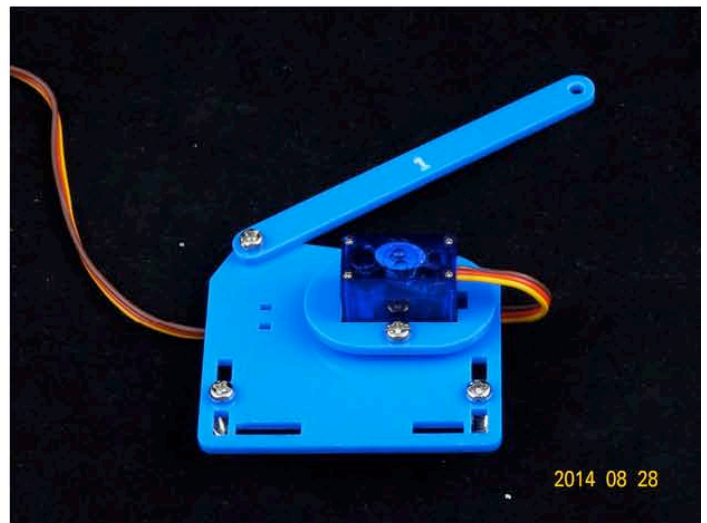
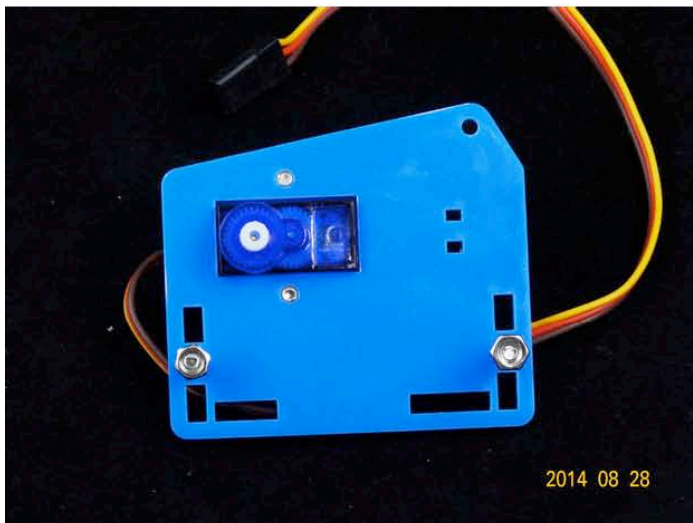
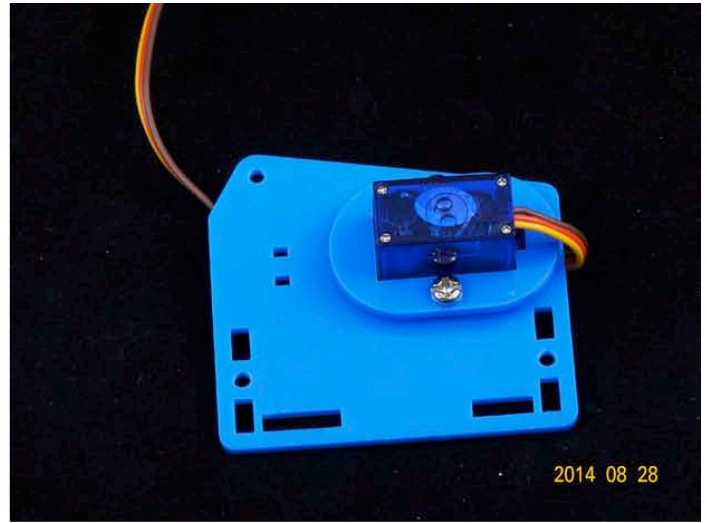
Step 5: 右臂

此步驟重點也是馬達角度調整，請先為馬達套上小白套，“順時鐘”旋至不能旋為止，再裝成如最後一張圖的3點鐘角度，之後就可自由轉動。

（其中長桿號碼為1）

所需螺絲：

- (1) 12mm x 3
- (2) 8mm x 2
- (3) 6mm x 1



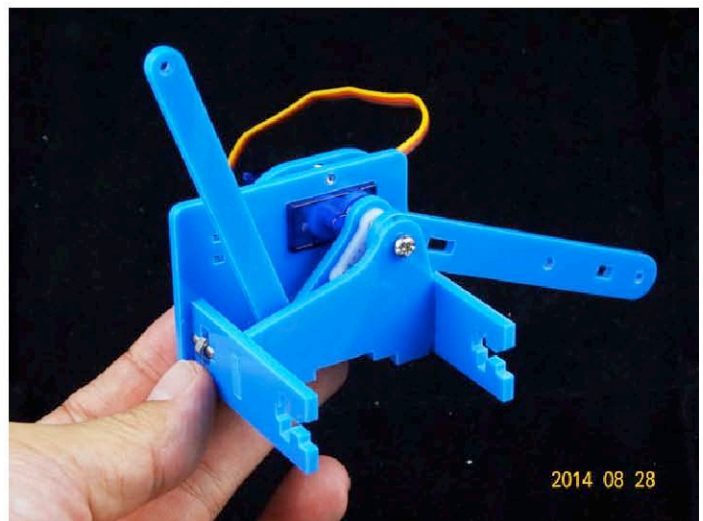
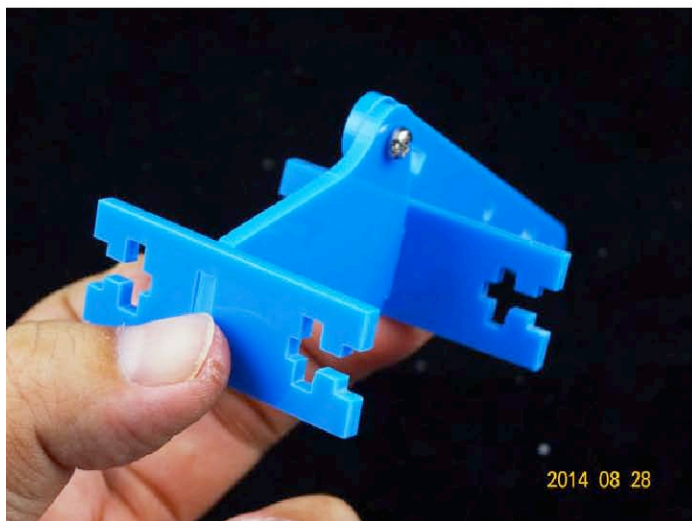
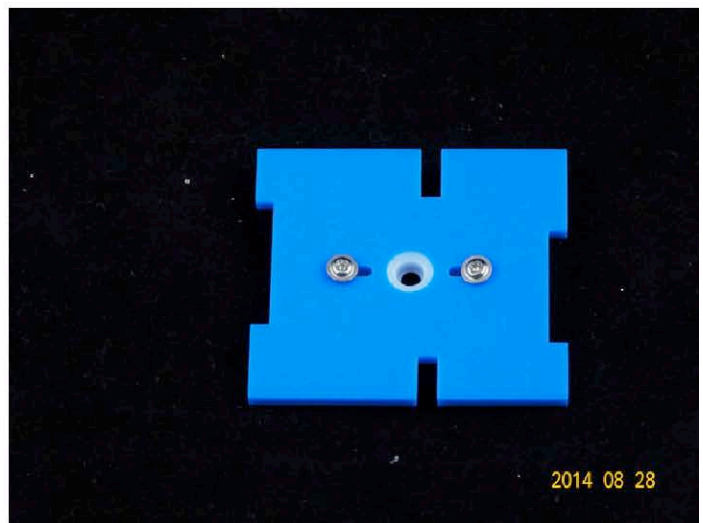
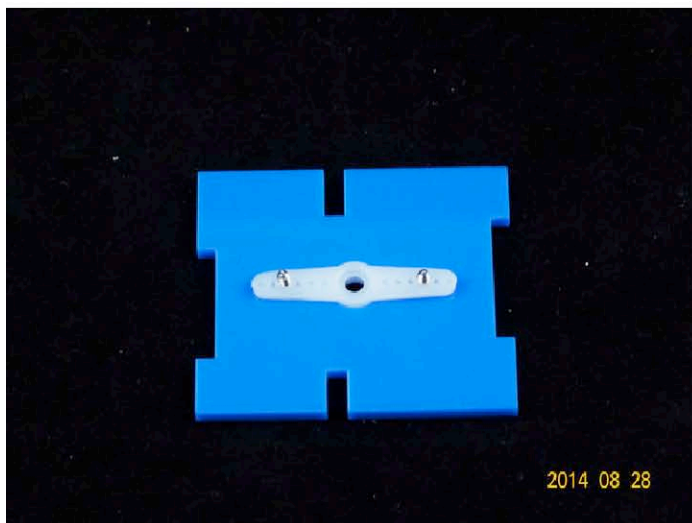
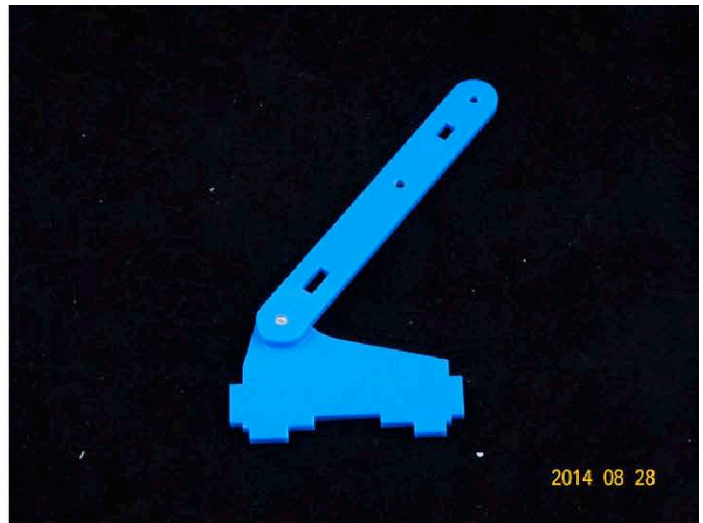
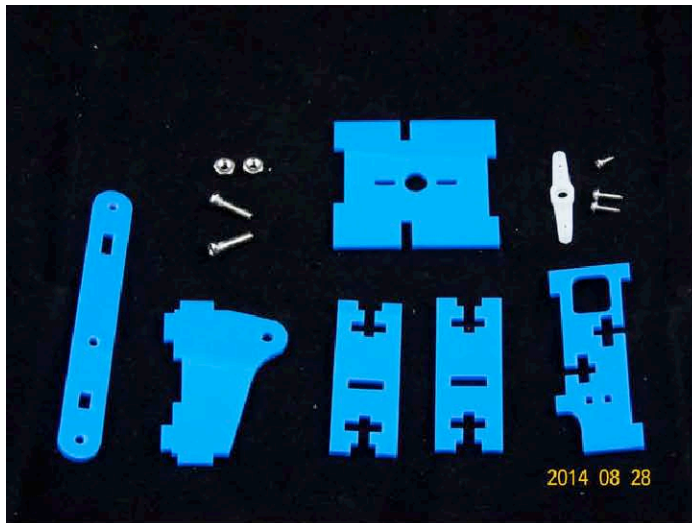
Step 6: 左臂 + 底盤

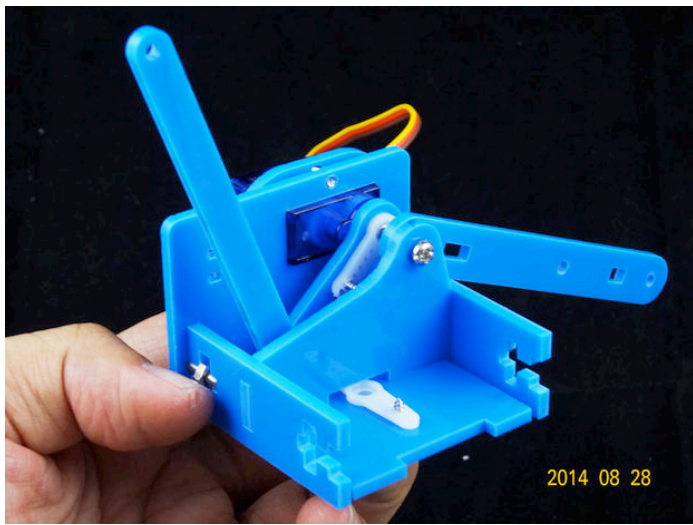
倒數第 2 張圖合體後，再慢慢鎖緊螺絲，最後才上底盤。

所需螺絲：

(1) 12mm x 2

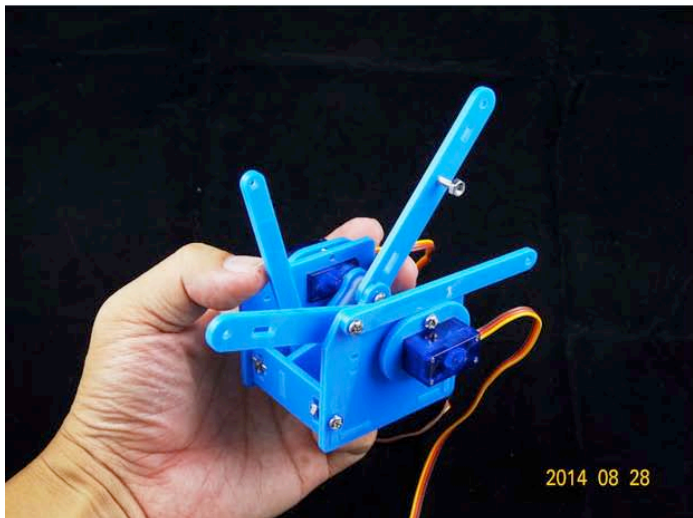
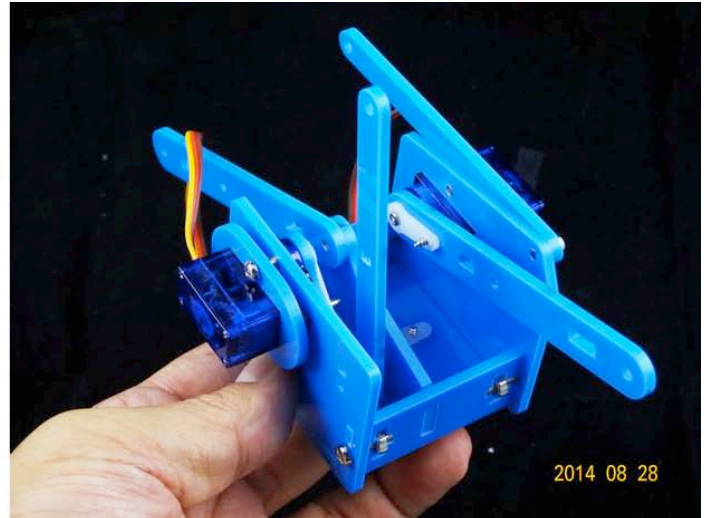
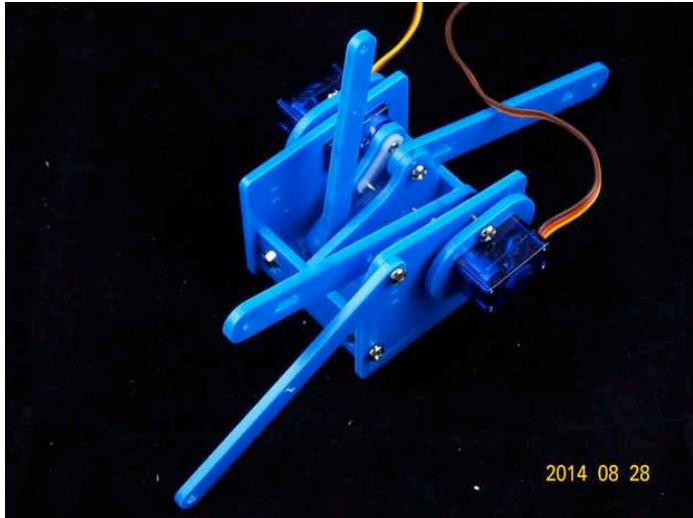
(2) 6mm x 1





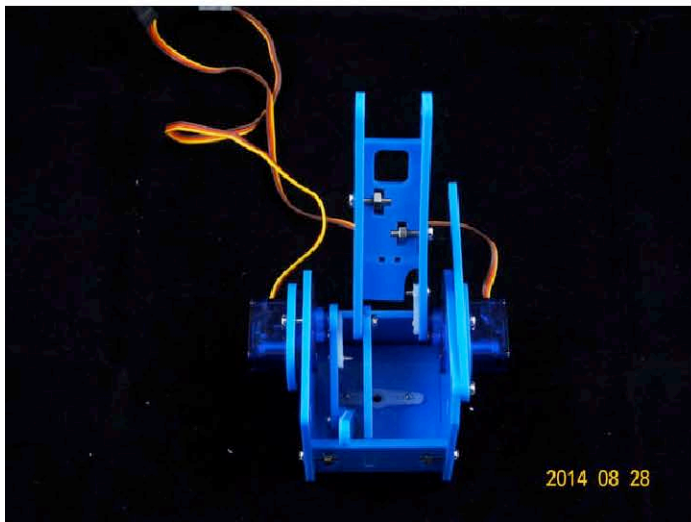
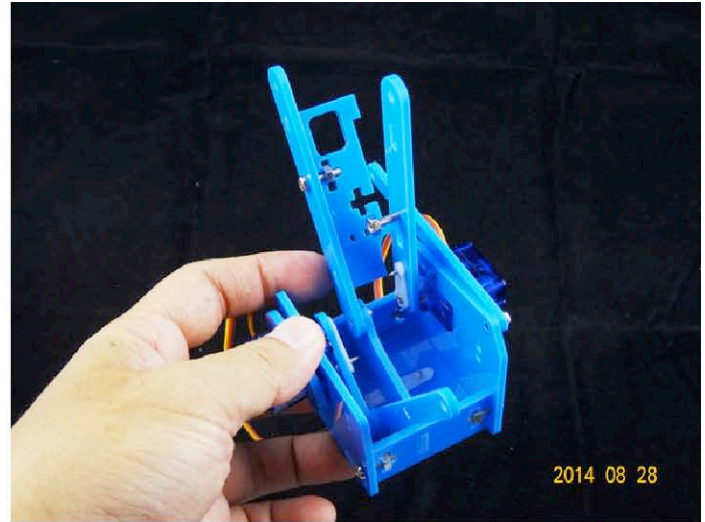
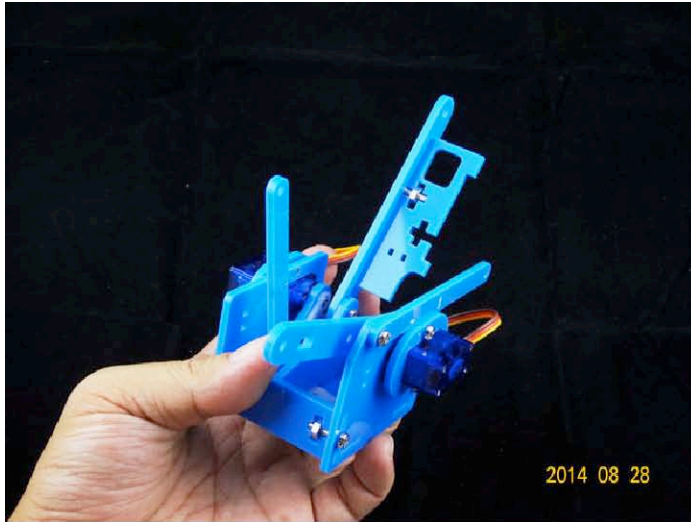
Step 7: 右臂 + 底盤

稍微套上再鎖緊螺絲，手要巧。



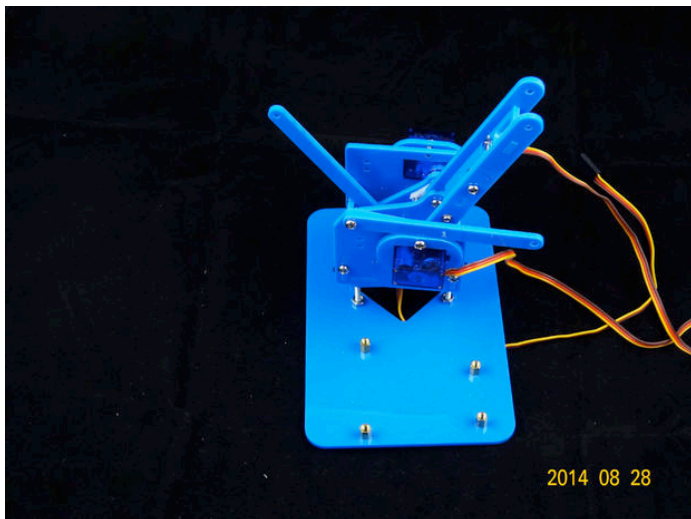
Step 8: 中間支架

螺帽微微套上後再套支架，卡入後再鎖緊螺絲。



Step 9: 與基座合體

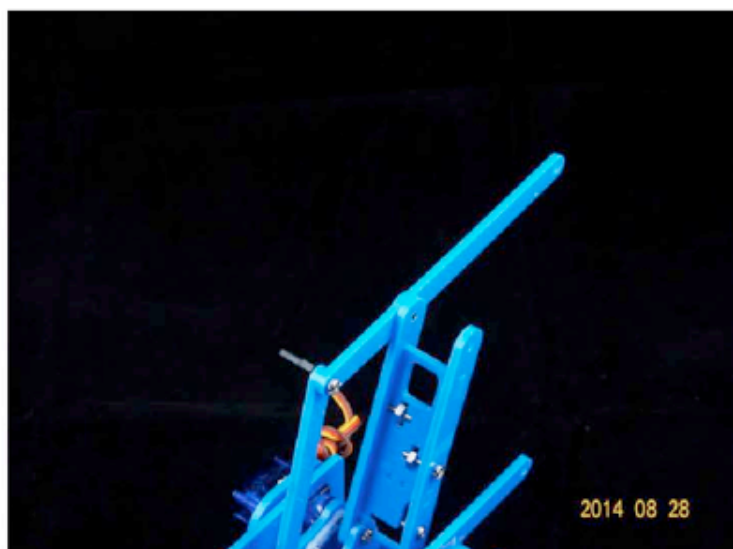
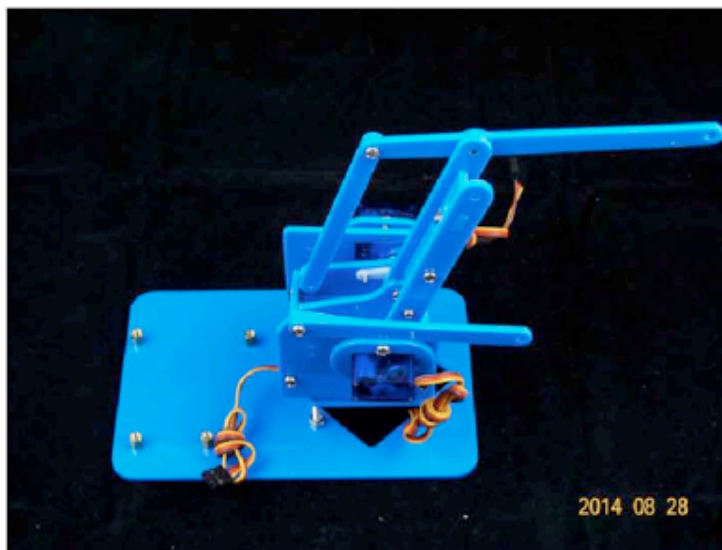
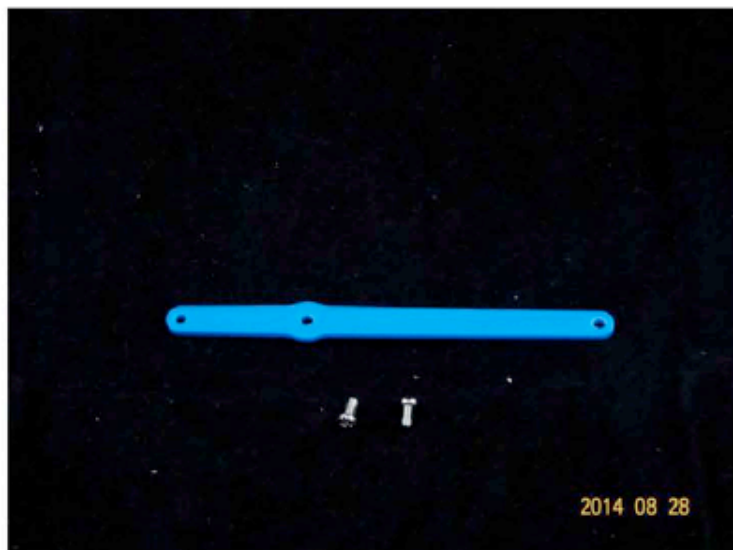
套上後“順時鐘”轉至極至，再合體成 3 點鐘方向，之後便可任意旋轉。（記得要鎖上馬達中間螺絲喔。）



Step 10: 支桿一

所需螺絲：

(1) 6mm x 2



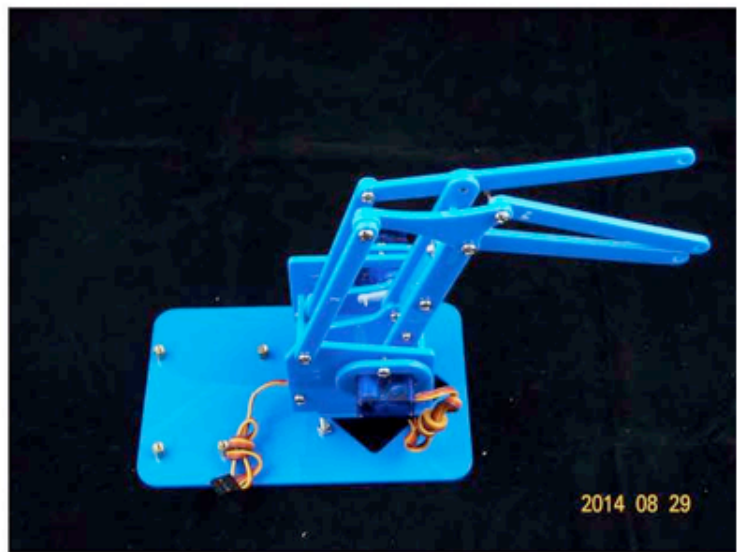
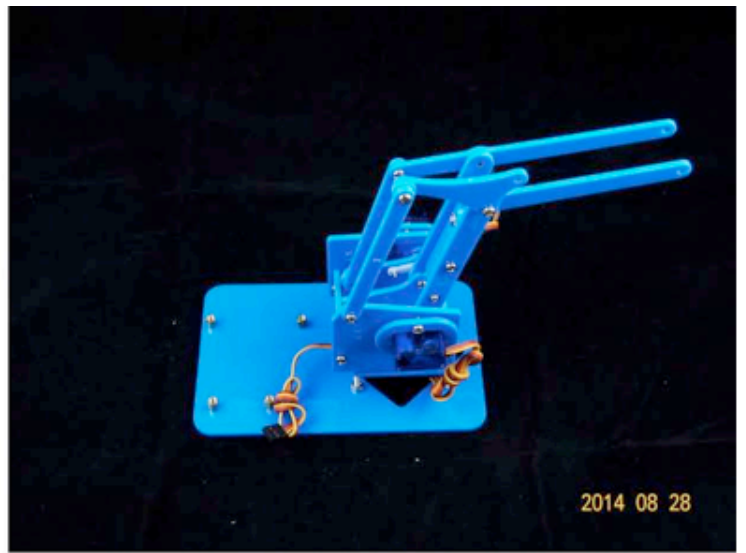
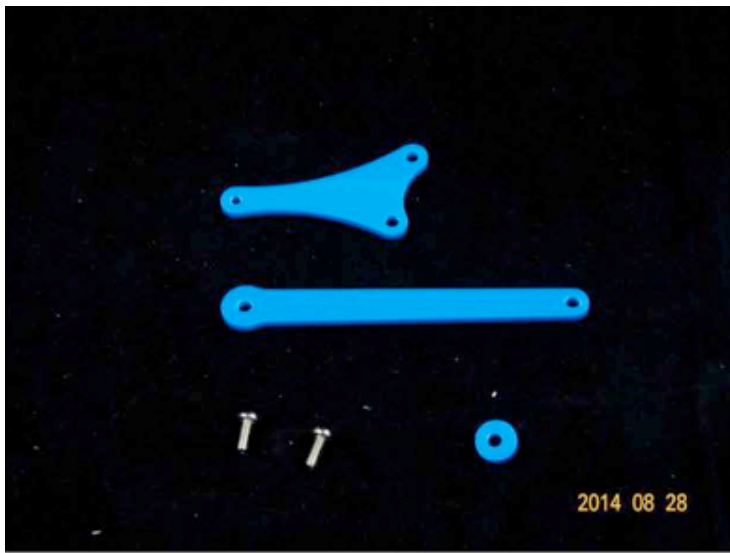
Step 11: 支桿二

長桿號碼為 2

所需螺絲：

(1) 8mm x 1

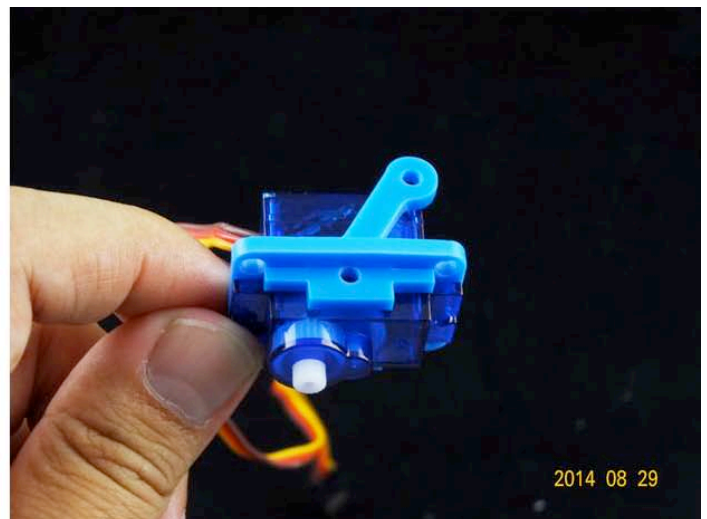
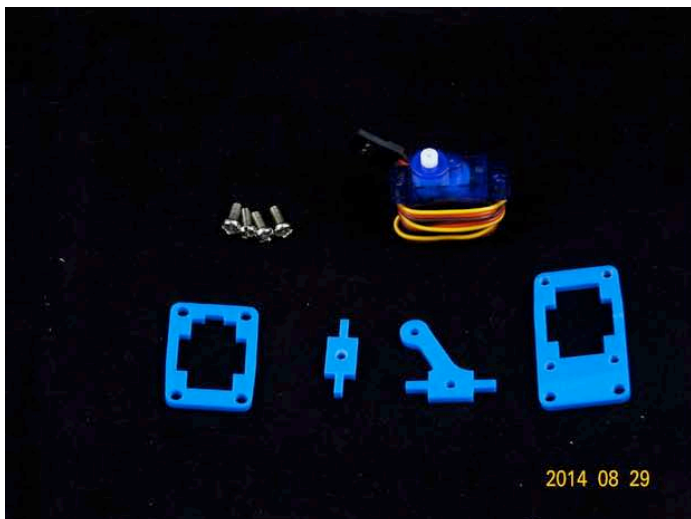
(2) 6mm x 1

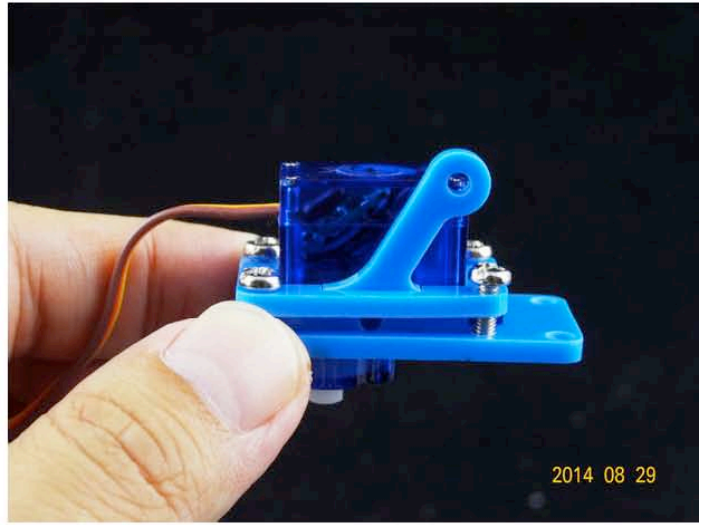
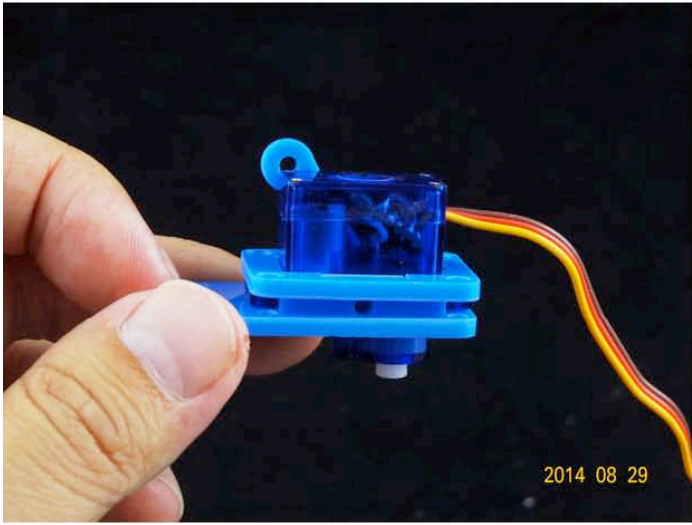
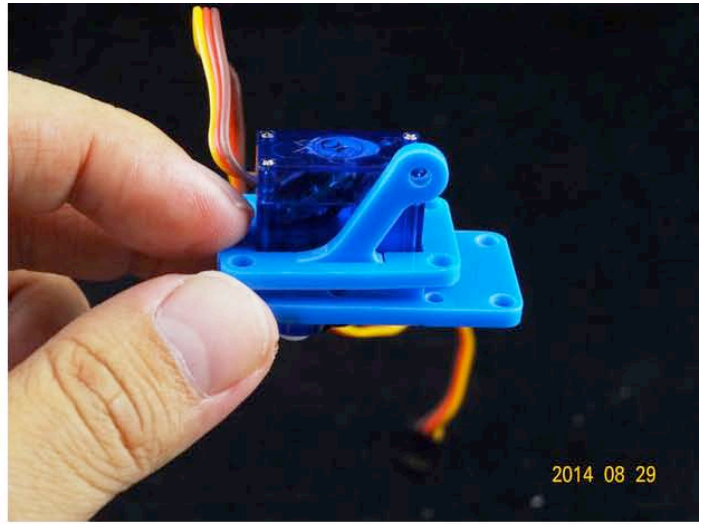
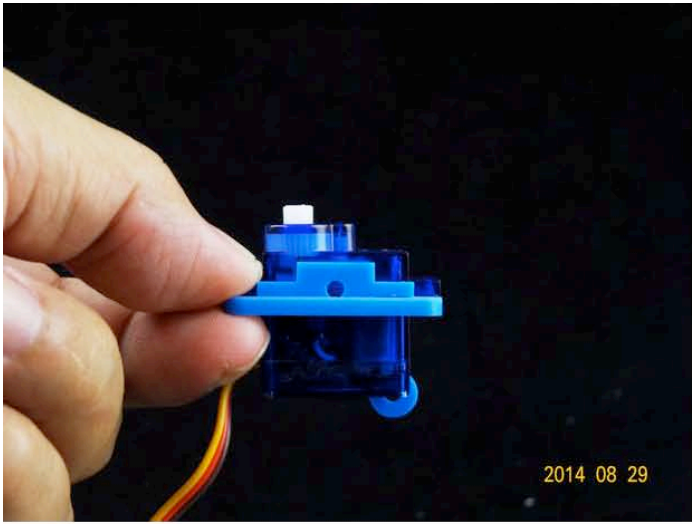


Step 12: 最後一顆馬達

所需螺絲：

- (1) 8mm x 4

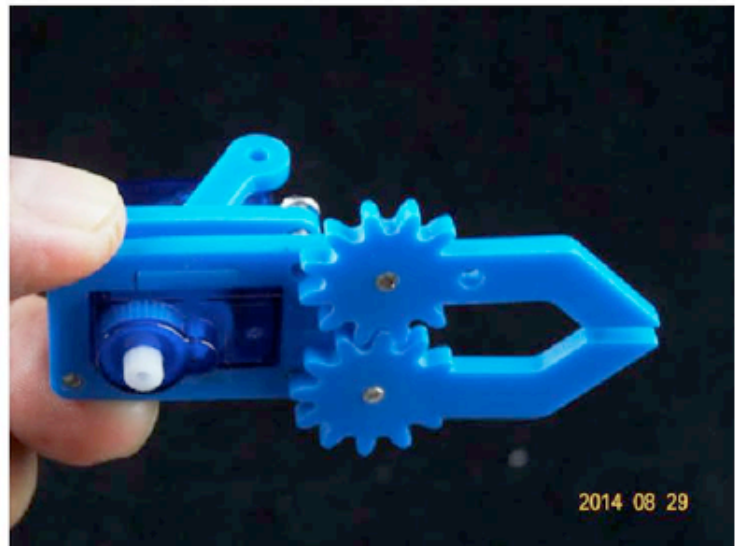
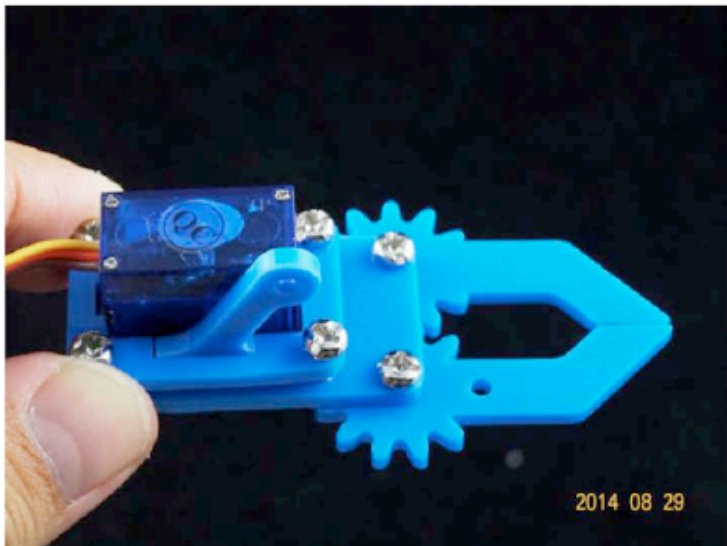
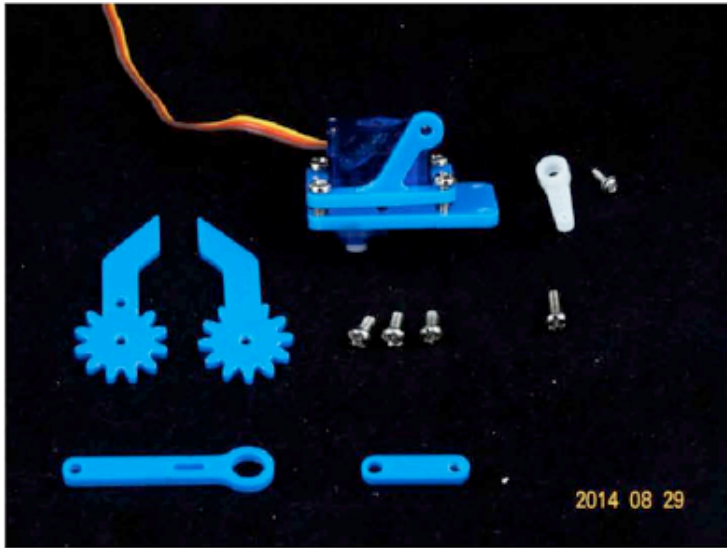




Step 13: 夾具一

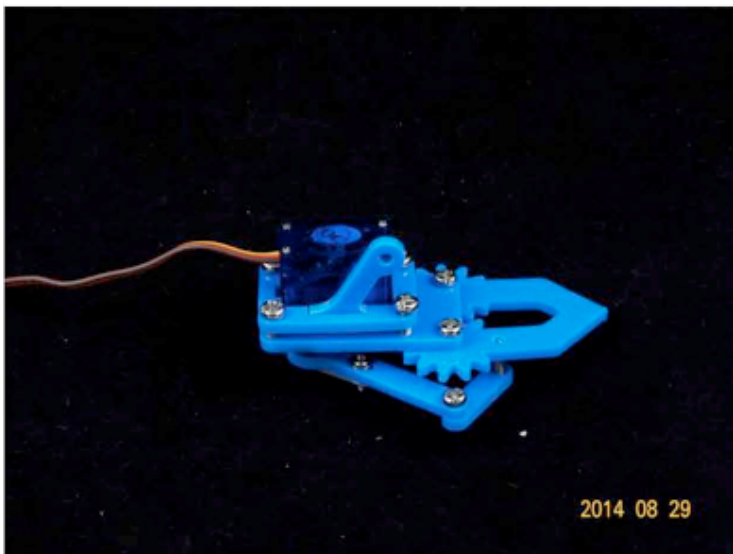
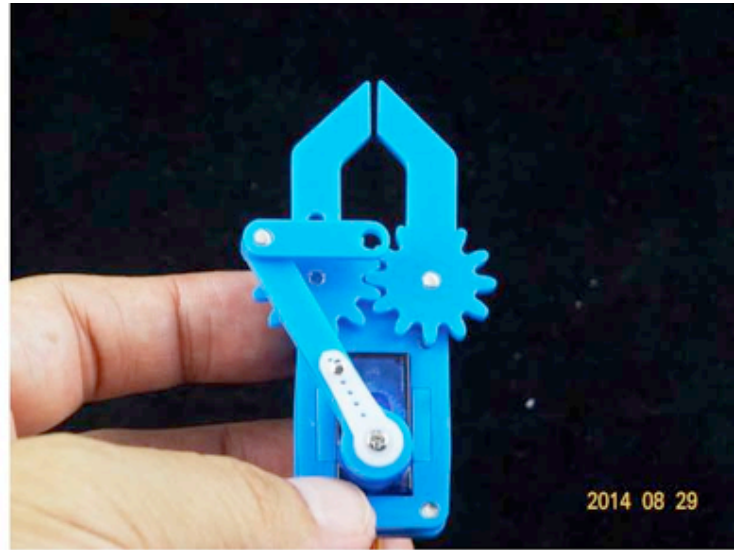
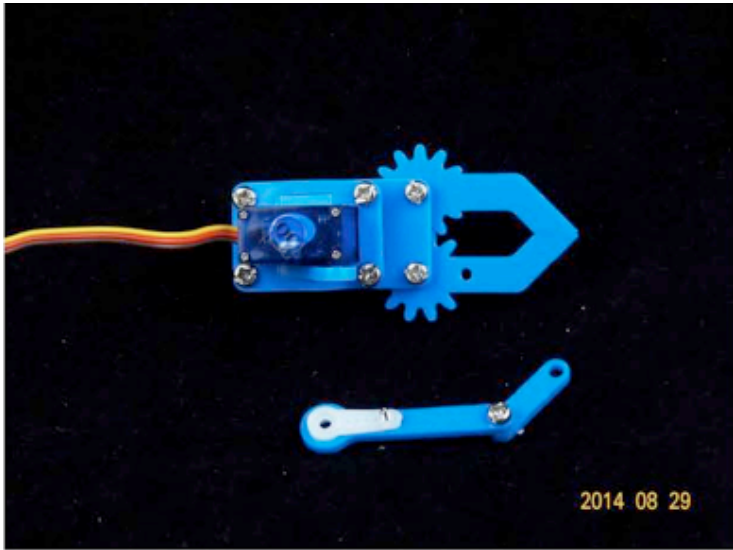
所需螺絲：

- (1) 8mm x 1
- (2) 6mm x 3

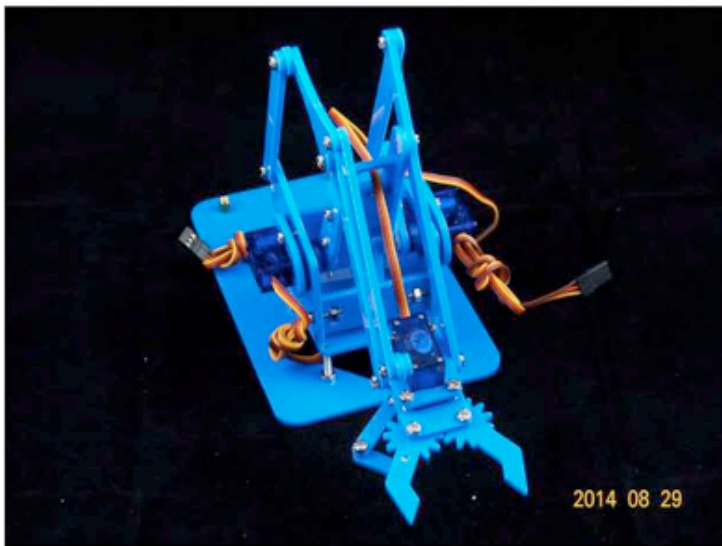
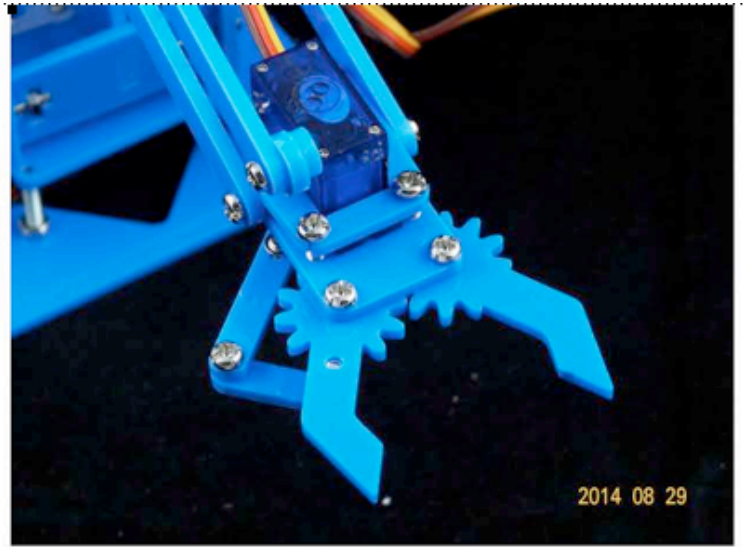
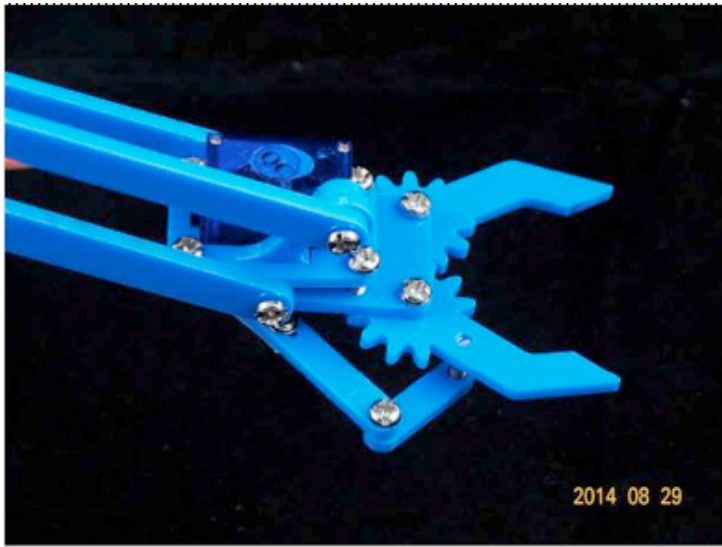
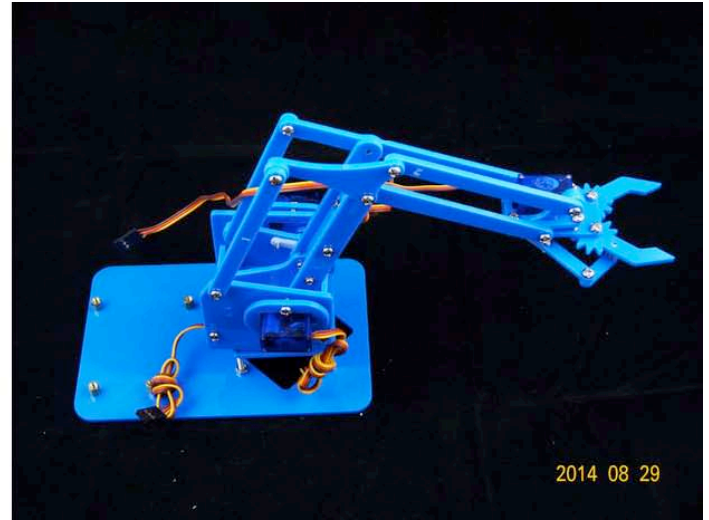
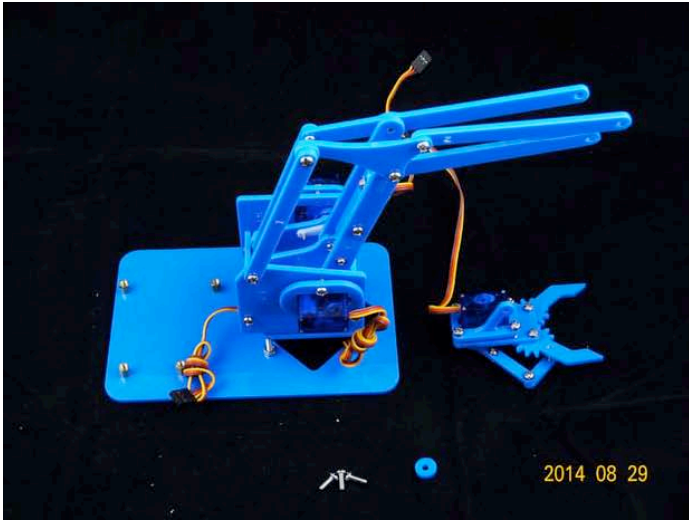


Step 14: 夾具二

此步驟重點是馬達先“順時鐘”轉到底，再套成圖二角度，馬達再稍微回撥後鎖上螺絲。

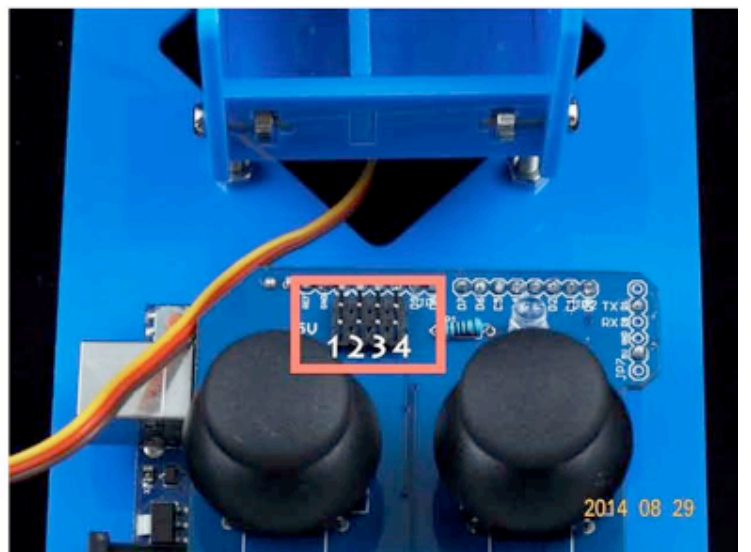
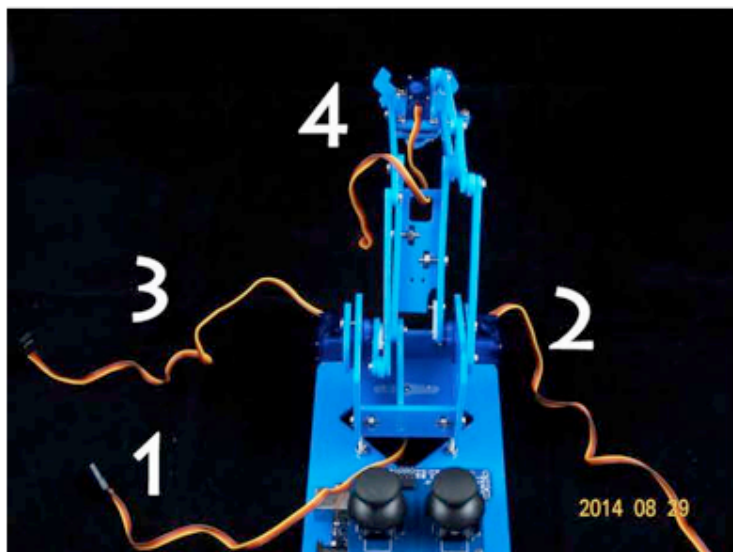
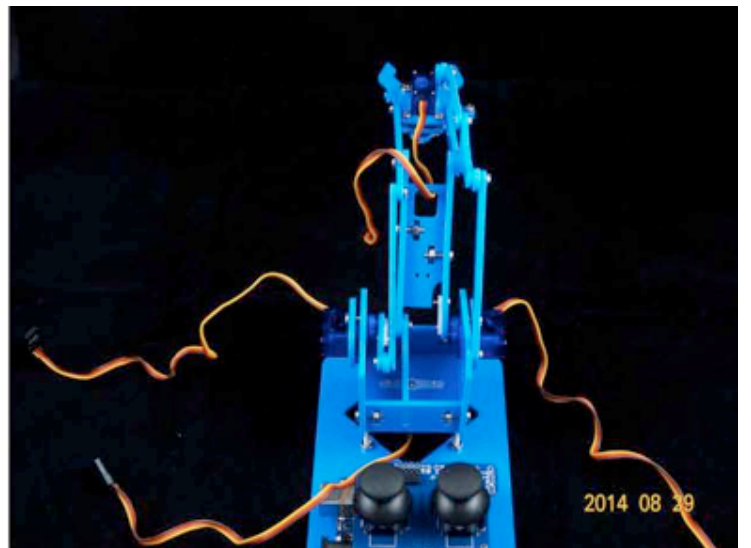
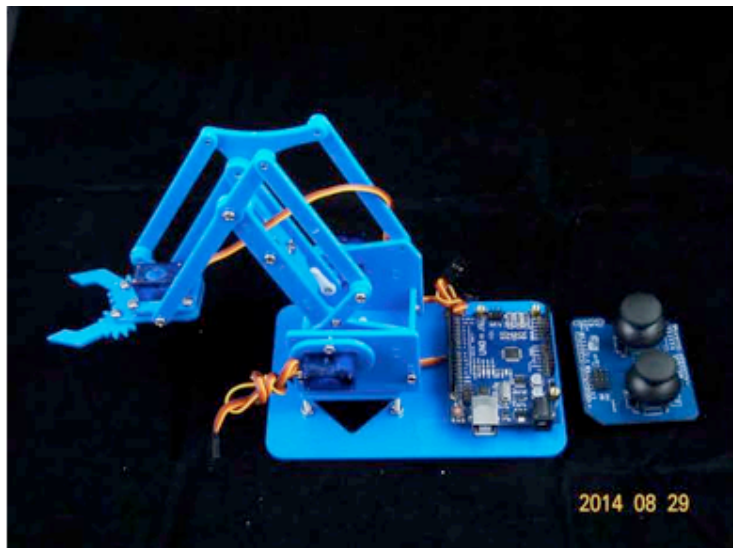
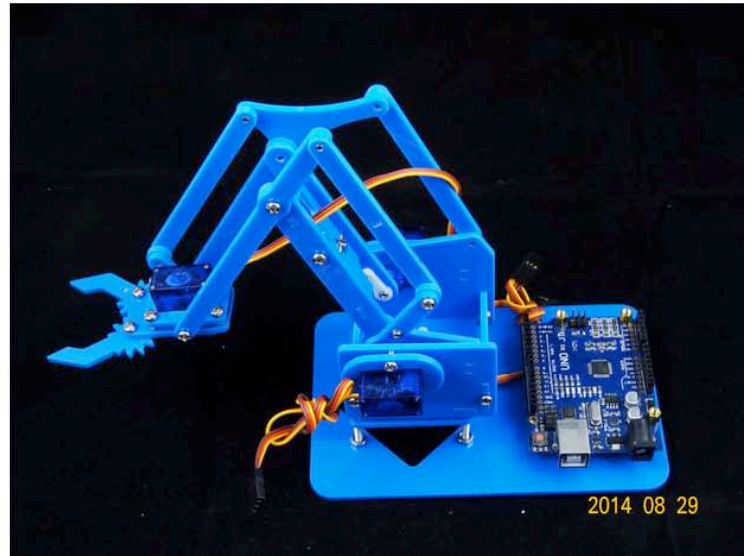
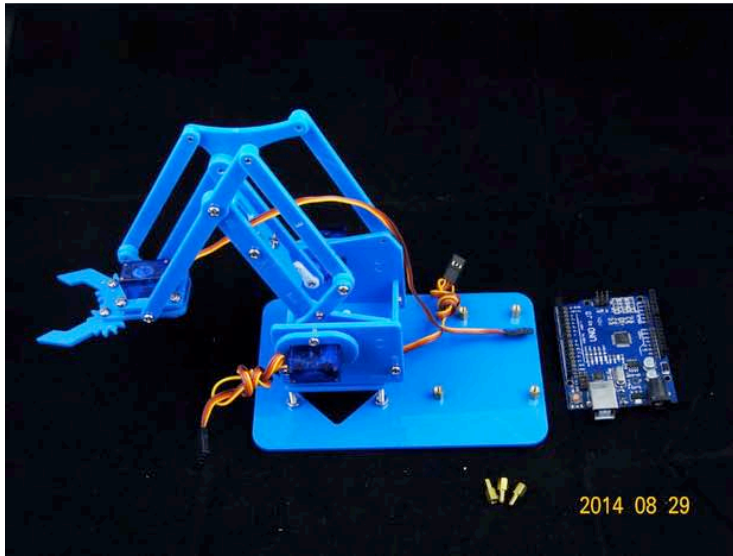


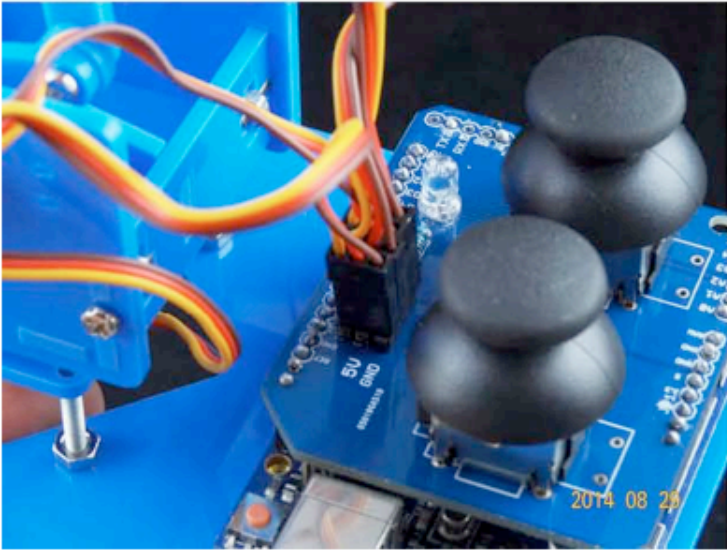
Step 15: 上夾具



Step 16: 最後上控制板

注意順序並注意排線顏色，其中咖啡色要靠搖桿，黃色則要靠手臂。這樣 meArm.Joystick 主體就大功告成啦。





Step 17: 故障排除

(1) 問：為什麼搖桿上的黃燈一直閃一直閃

(答) 正常情況下，主板 LED 燈會長亮，但因為 Arduino 電路板電流負荷過大，導致主板一直重開機。原因可能是因螺絲鎖太緊馬達轉不動或馬達轉超過機構最大角度（尤其是尖端夾具），導至馬達轉不到目標角度。解決方式如下：

- (A) 放鬆螺絲，寧願整組看起來散散的也不要太緊。
- (B) 拔掉全部馬達線，再一條一條插上測試
- (C) 如果夾具超出範圍卡住回不去，則輕輕用手扳一下幫它轉回去，恢復自由度。

(2) 問：為什麼手臂整個會吱吱叫？

(答) 理由同上，因為主板重複開機之故。

(3) 問：為什麼一開機，手臂會捲成奇怪的角度，或整團縮在一起？

(答) 手臂出廠時，每顆馬達都會有預設角度，如果組裝時沒按照標準步驟調整馬達角度，則開機時整台手臂就會變得很畸型。

解決方式：

- (A) 整台手臂砍掉重練，或
- (B) 在軟體中更改馬達初始角度

(4) 旋臂與底座馬達不易咬合

(答) 底座馬達不易吃整隻旋臂，原因通常是咬合不易，建議先將旋臂最底部正方形壓克力片先獨立出來與馬達試咬合，待有手感時再重新組裝試整隻旋臂。

(5) 馬達螺絲似乎有短少

(答) 為更方便組裝馬達，我們已將馬達螺絲統一改為小型螺絲，若仍有短少，請隨時聯繫我們。若有任何問題，[歡迎 email 我](#)，或[加我好友](#)，直接 PM 我或在 FB 上留言。