6.095 Humanoid Robot Competition

Massachusetts Institute of Technology

Hardware Assembly

Overview

You will assembly the CPU board SEMB1200A.

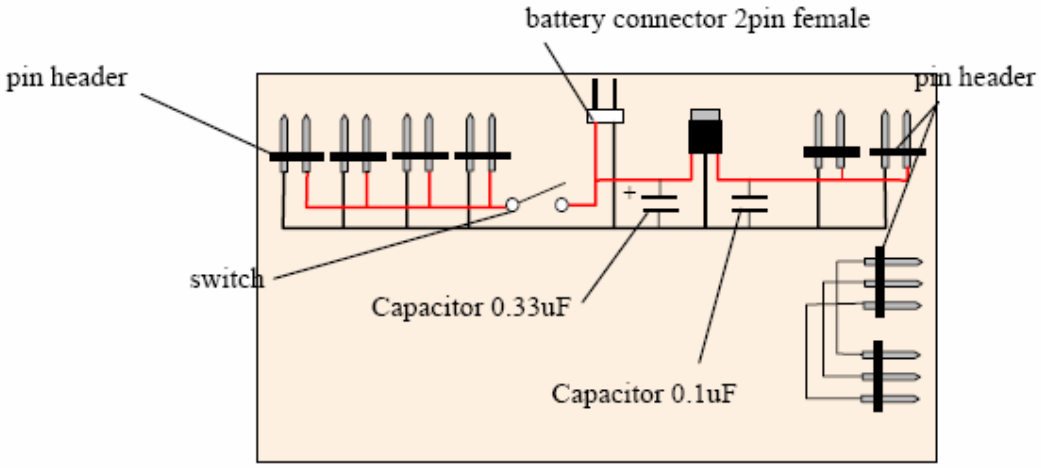
Material

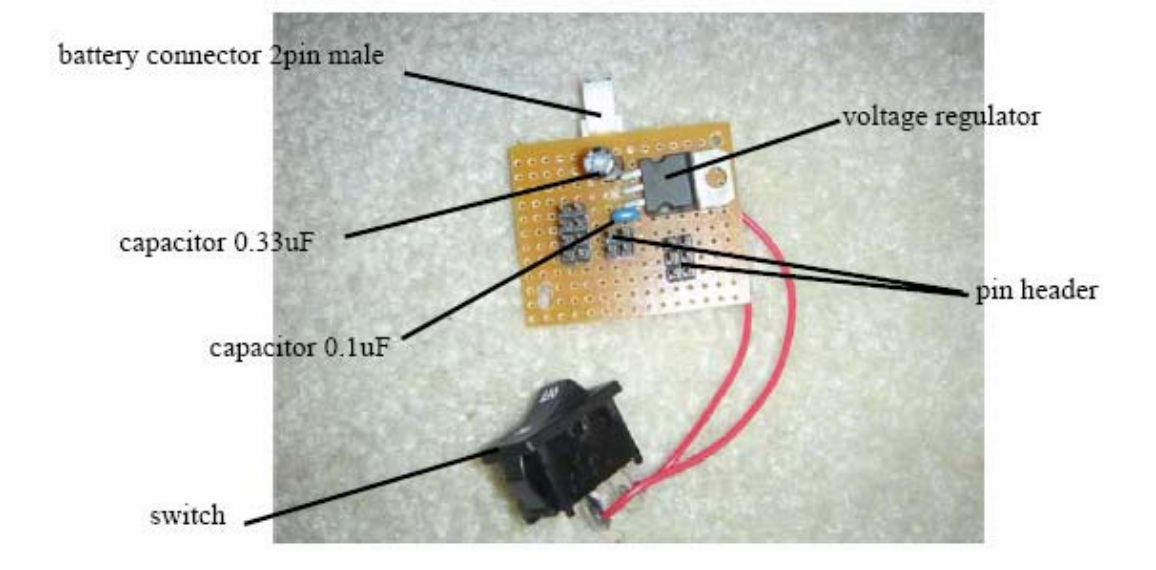
Tools

1. Power Regulator

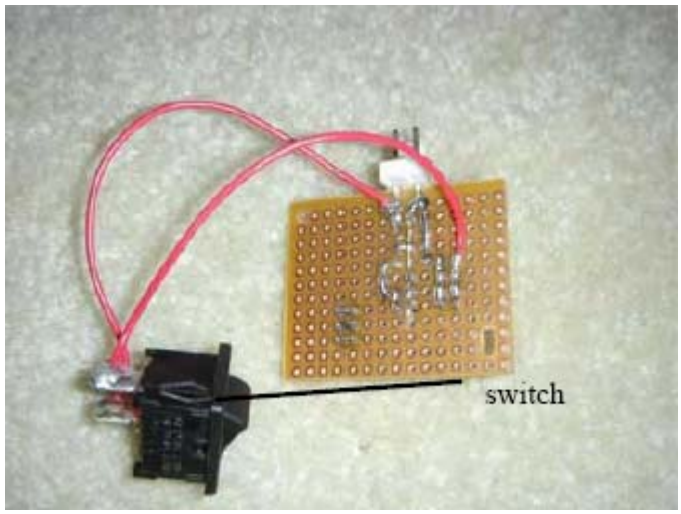
When fully charged, the battery outputs more than 10.8V. However, the input to SEMB1200A must be 6 to 9V. We need to decrease voltage level from 10.8V to 9V. We will use a voltage regulator to do this. In addition, we need to add a switch for the power of the servos because of SEMB1200A and servo specification.

Note: The 0.33uF capacitor is directional. If it is wired in the wrong direction, it could explode.





Power regulator (top view)



Power regulator (back view)

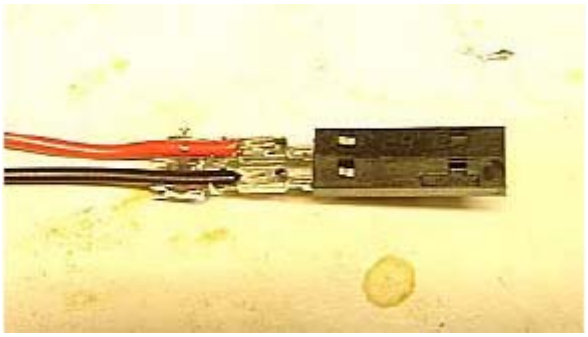
2. Connectors

Before implementation of the new CPU, we also need some connectors in order to connect the CPU with power circuit, distribution board and so on. We need to make five connectors:

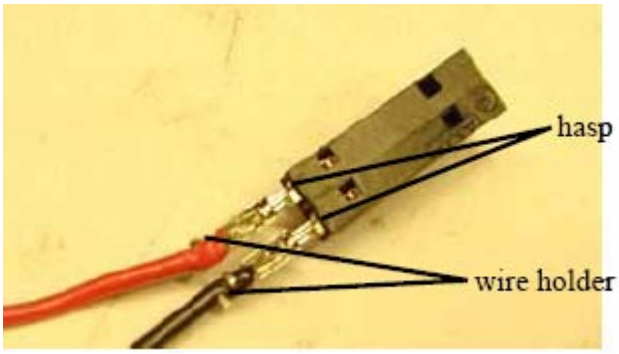
1 2pin header connector for SEMB1200A
1 3pin header connector to SH 5 pin
3 2pin to 2pin header connector

This is how to solder the wire and connector:

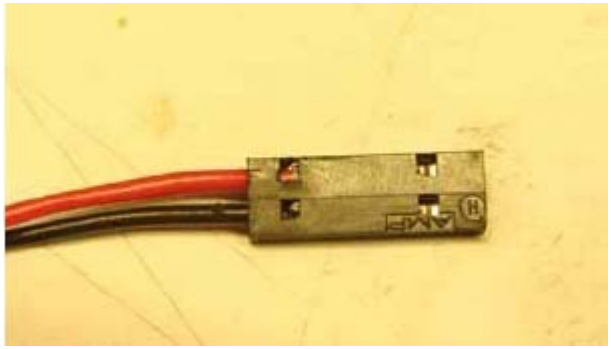
Strip the insulation off the wires and solder them to the pins.



Bend the hasps and wire holder using a plier.

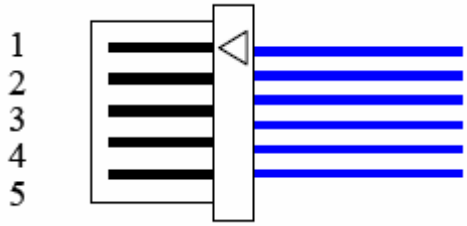


Insert pins in the plastic end.



When doing the connectors, you need to be very **careful with the pin numbering**. If the numbering in your connector is wrong, the board will not work properly or could be damaged. The pin header and SH connector pin-numbers are as follows:

In the pin header connector, the wires are numbered from the X.



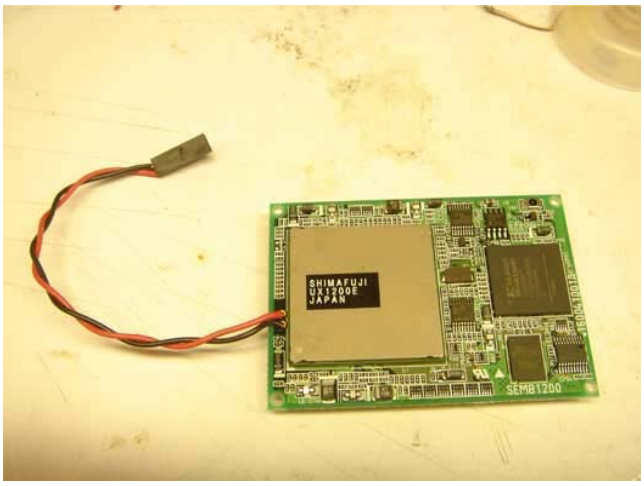
In the SH connector, the wires are numbered from the triangle.

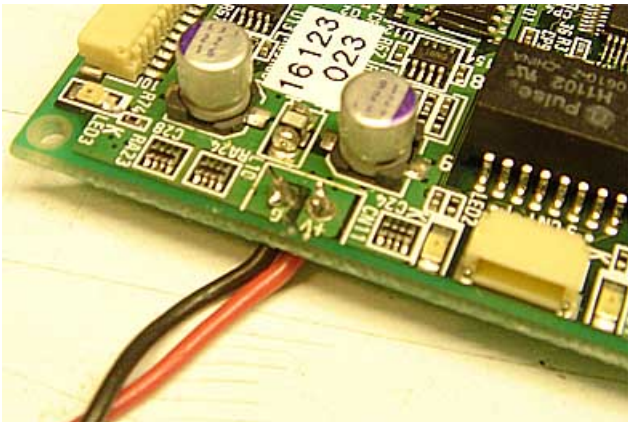
When you have finished building a cable, it is always good to check the connectivity with a multimeter.

2.1 2pin header pin connector which comes from SEMB1200A

Wires must be more than 12cm. Connect the wires according to this table:

SEMB1200A	Pin header connector
+ terminal on board	Pin 1
Ground terminal on board	Pin 2





2.2 3pin header connector to SH 5pin connector

Just replace the D-sub 9pin connector with a 3pin header.

3 pin header connector	SH connector
Pin 1	Pin 1
Pin 2	Pin 2
Pin 3	Pin 3
Not connected	Pin 4
Not connected	Pin 5

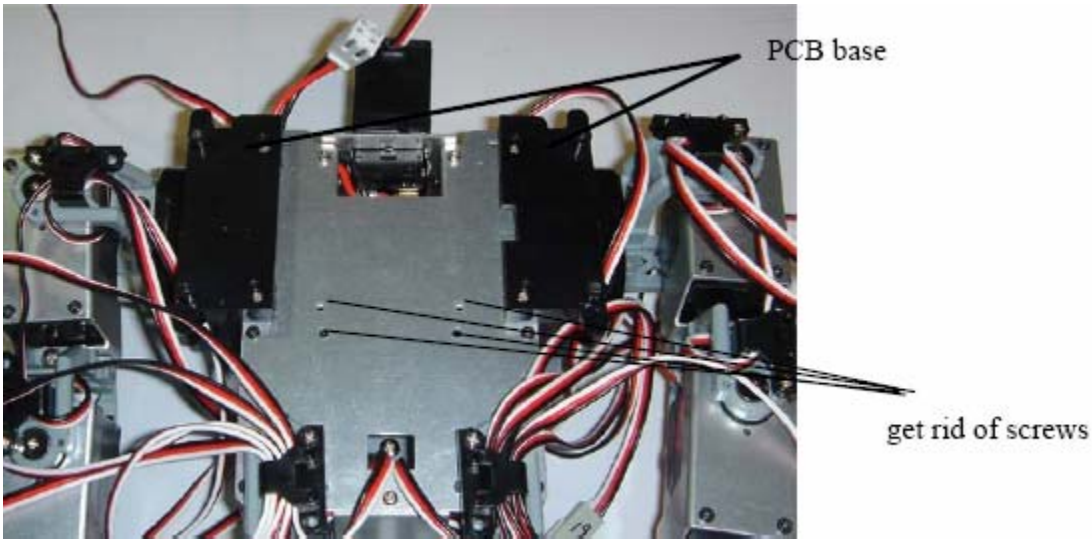
2.3 2pin to 2pin header connector x3

You need to make three of these cables. Wires must be more than 12cm.

Pin header connector	Pin header connector
Pin 1	Pin 1
Pin 2	Pin 2

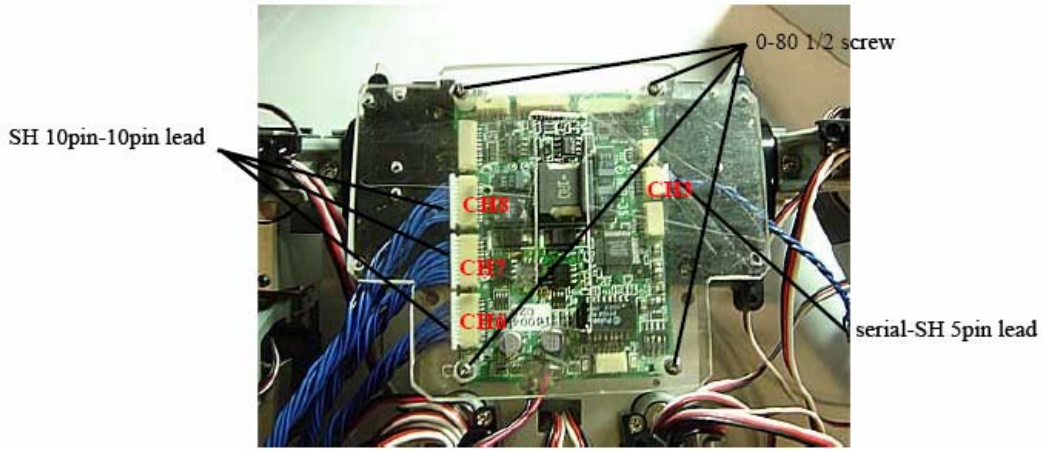
3 Hardware implementation

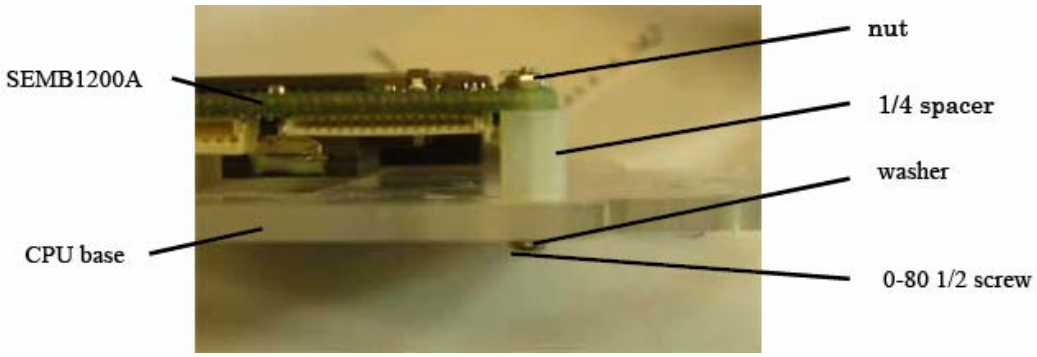
3.1 Cut the PCB base (TAs will take care of this)



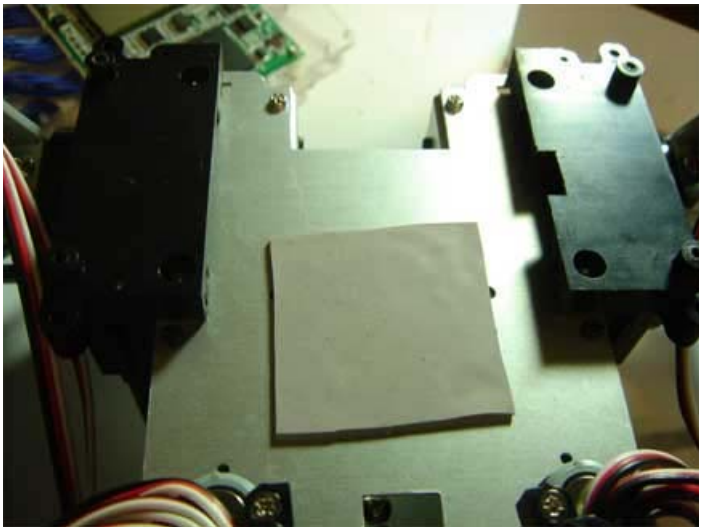
3.2 Put the SEMB1200A on CPU base

Make sure that the wires never interfere with anything.



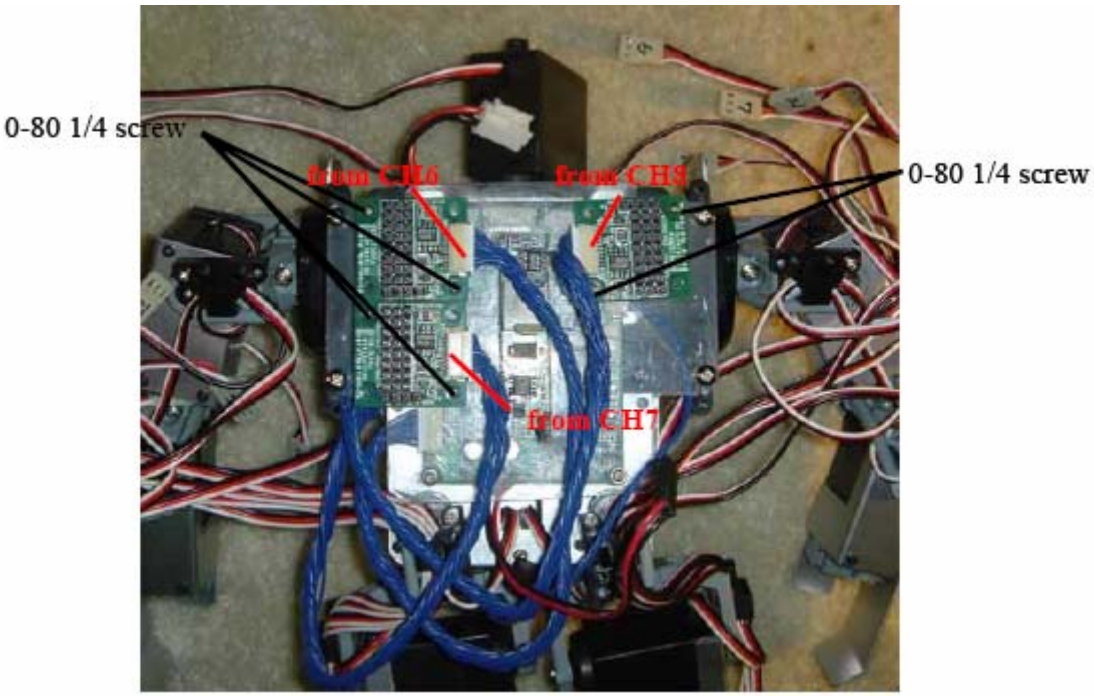


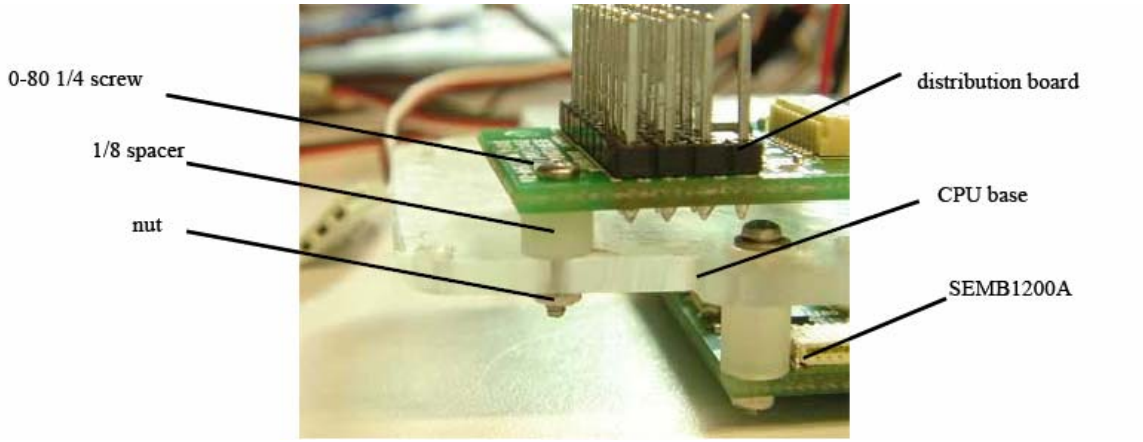
Put the head sheet on the back of KHR-2HV.



3.3 Distribution boards

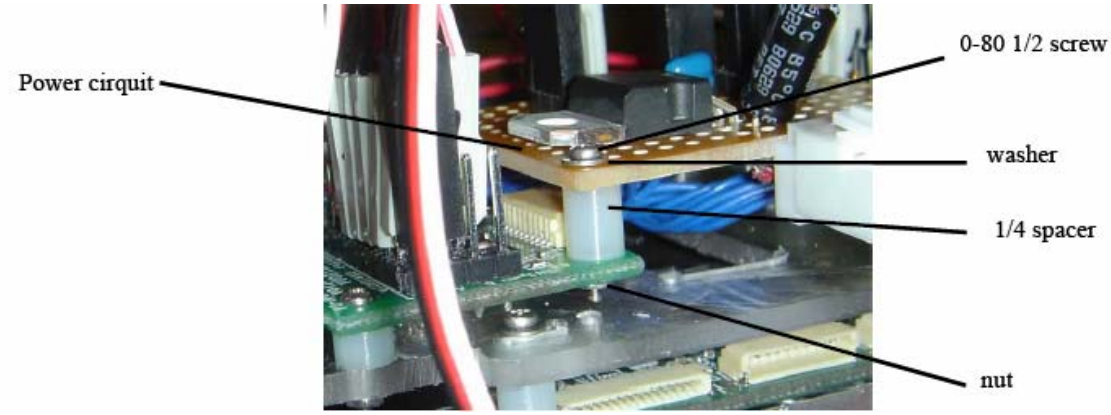
To connect the servos to the CPU board, we will use three distribution boards. Use two screws for each distribution board and connect them with the 10pin-10pin cables as shown in the figure. Some screws and nuts are difficult to assemble, please use pliers.

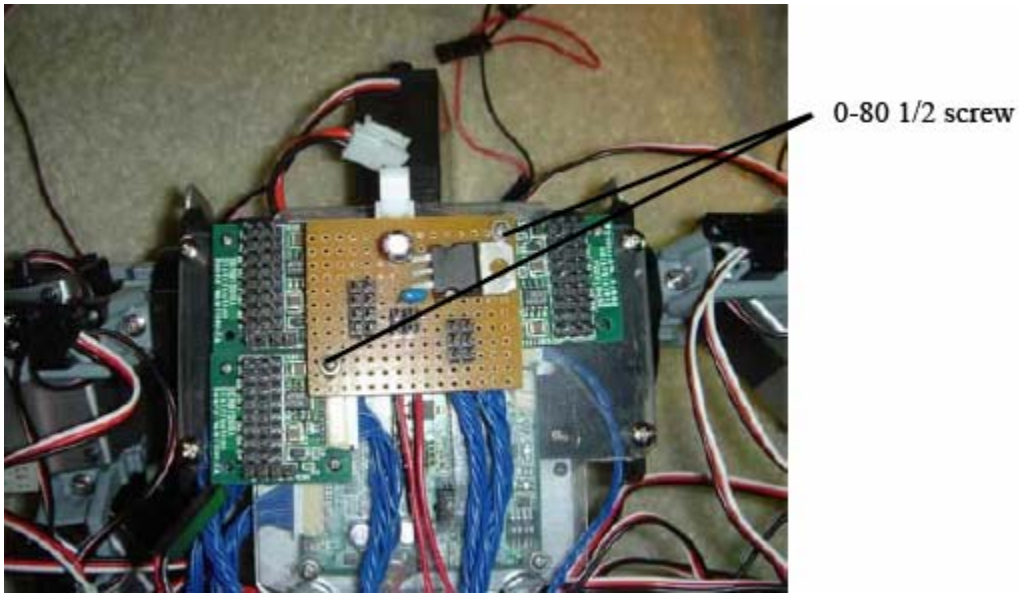




3.4 Mounting the power regulator

Use screws to fix the power circuit to the distribution boards.





3.5 Connection of the servos

Connect all the servos to the distribution boards as shown in the figure below.