Modern Robotics Inc. Core Power Distribution Module Deep Teardown

Deep teardown of the Modern Robotics Inc. Core Power Distribution Module.

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INTRODUCTION

This is (almost) the full teardown of the Modern Robotics Inc. Core Power Distribution Module. The PDF attached contains estimated cost breakdowns, more images, and other information not shown in this guide.

This teardown with additional information may be downloaded at the start of this guide.

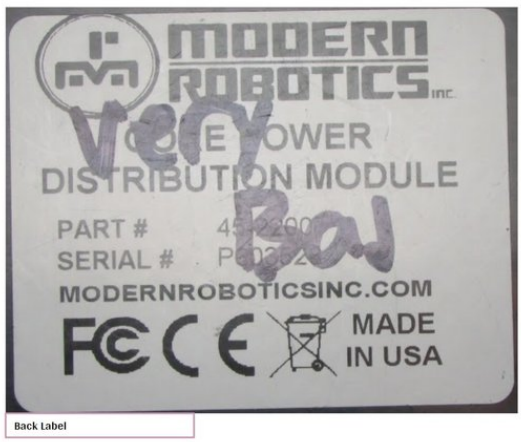
Step 1 — Modern Robotics Inc. Core Power Distribution Module Deep Teardown

- Brand: Modern Robotics Inc.
- Model: Core Power Distribution Module
- Retail Price: $90
- Release Date: Unknown
- Connectivity: USB mini; 7 USB A ports; 6 power ports

Note: This picture is from Modern Robotics Inc.; all other pictures in this report are taken by me.

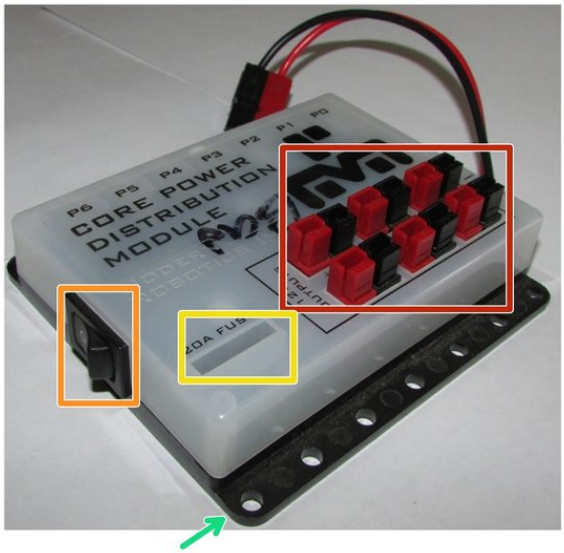
The words 'Very Bad' and 'Bad' does not come with the unit.

Step 2



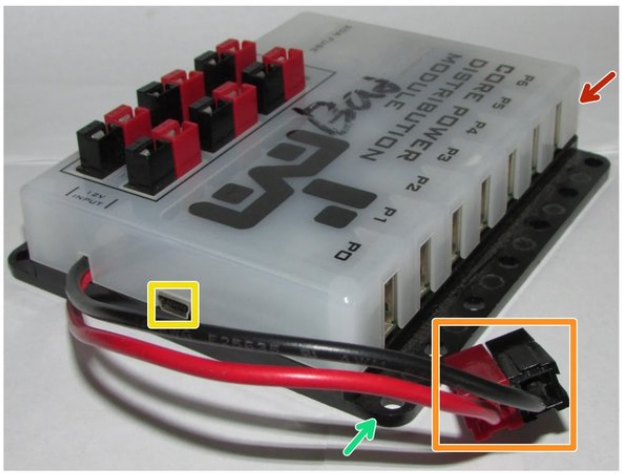
- Back Label:

Step 3



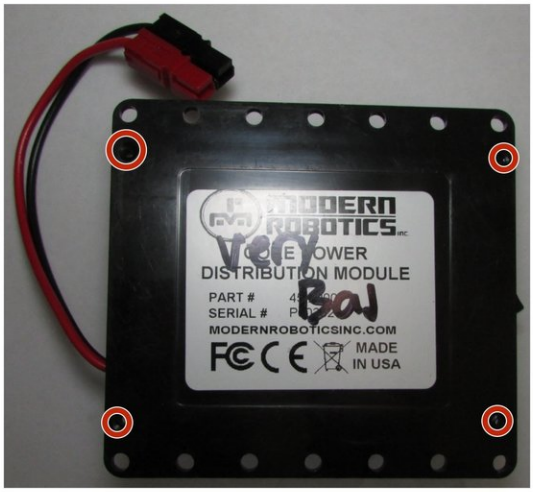
- Exterior Features Pt. 1:
  - Powerpole Outputs
  - Power Switch
  - 20 Amp Fuse Socket
  - Mounting Holes

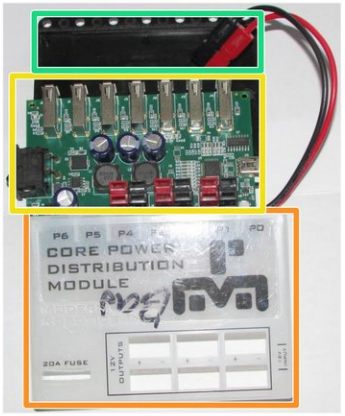
Step 4



- Exterior Features Pt. 2:
  - USB Outputs
  - 12V Power Input (Not Original Connector)
  - USB Mini Input
  - Mounting Holes

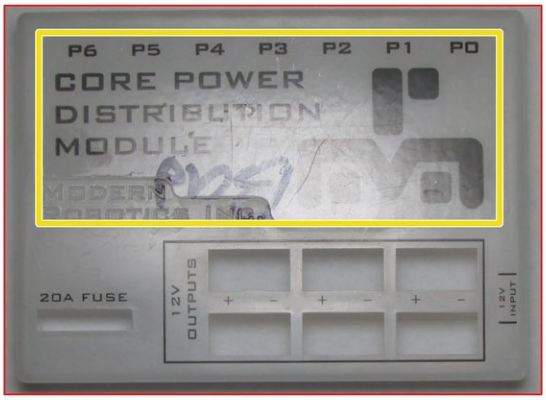
Step 5

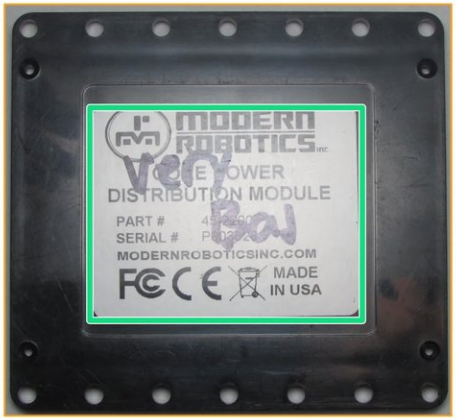




- Product Disassembly:
  - Unscrew 4 Phillips screws to get access to the insides
- Parts of this Product:
  - Top Plastic Case
  - Main PCB
  - Bottom Plastic Piece

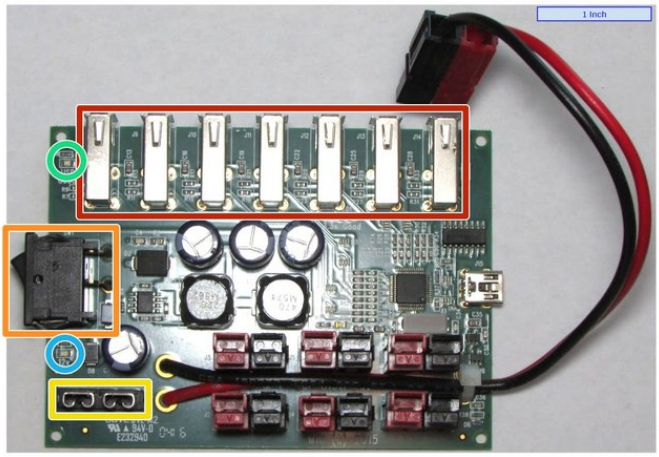
Step 6





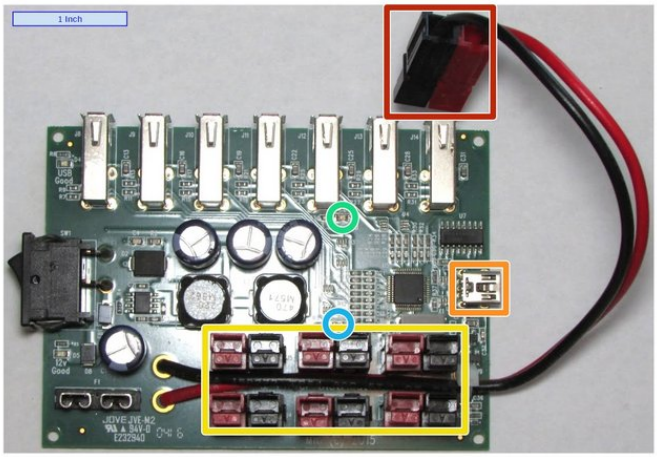
- Plastic Piece Annotations:
  - Front
    - Clear Label
  - Back
    - Label

Step 7



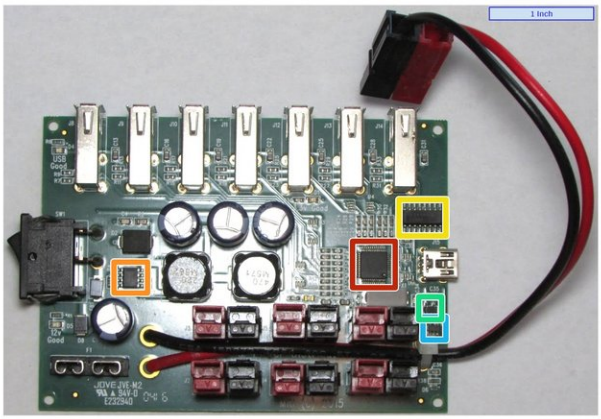
- Front PCB Annotations Pt. 1:
  - 7x USB A Outputs
  - Power Switch
  - 20 Amp Fuse Socket
  - USB Enabled LED
  - 12V LED Indicator

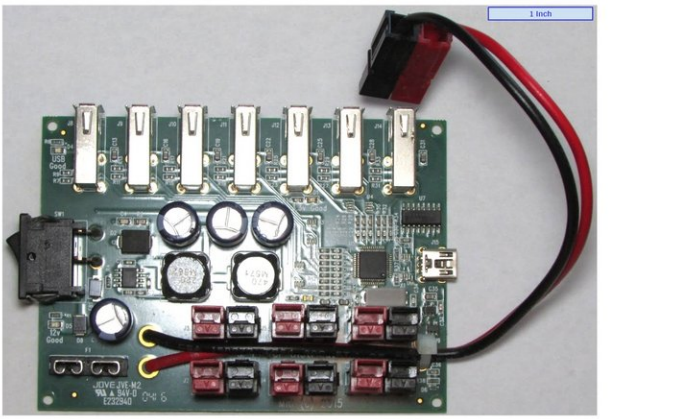
Step 8



- Front PCB Annotations Pt. 2:
  - 12V Power Input (Not Original Connector)
  - USB Mini Input
  - 6x 12V Powerpole Outputs
  - 3.3V LED Indicator
  - 5V LED Indicator

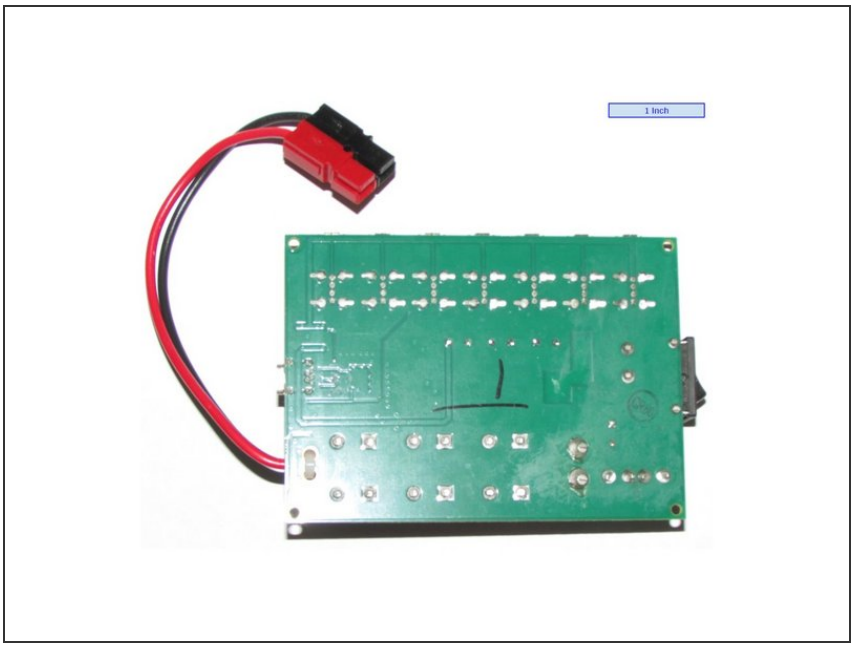
Step 9





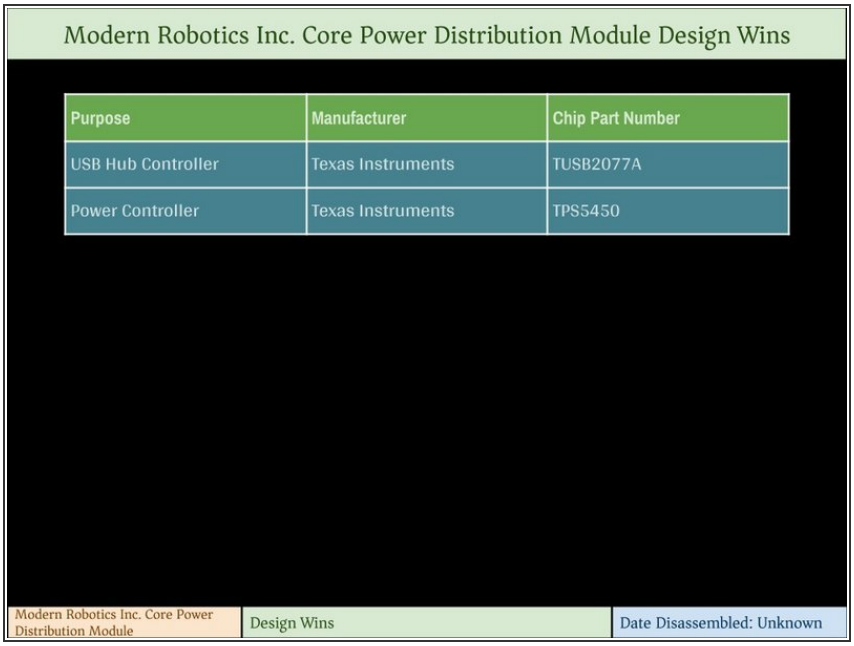
- Main PCB Front Chip Identification:
  - Texas Instruments TUSB2077A 7 Port USB Hub Controller
  - Texas Instruments TPS5450 5A Step Down Converter
  - Texas Instruments TPS2044B 4 Channel USB Power Switch
  - Texas Instruments LP2985-N 16V Low-Dropout Voltage Regulator
  - Texas Instruments SN74LVC1G08 Single 2-Input AND Gate

Step 10



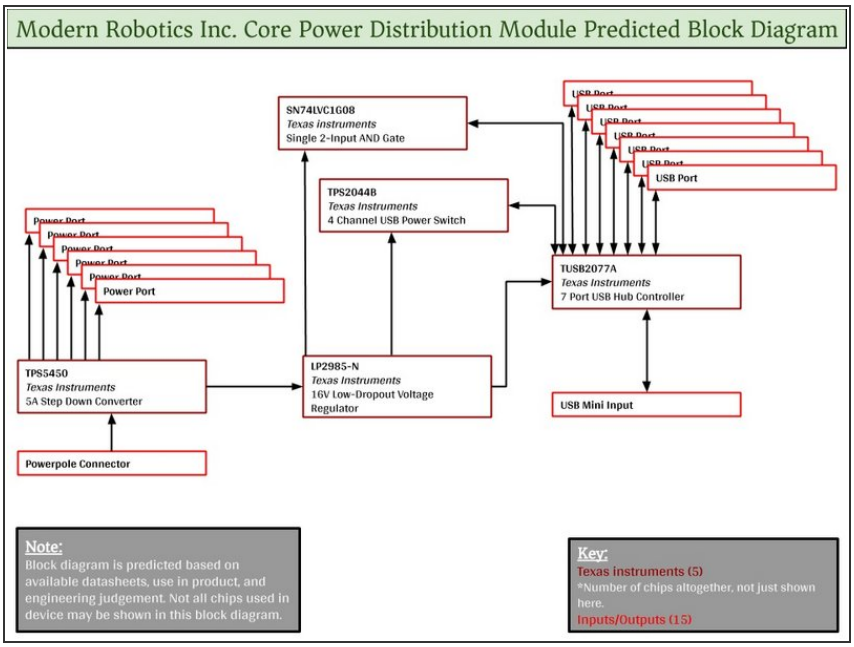
- Main PCB Back:
  - No Chips Here!

Step 11



- Design wins for this device:

Step 12



- Predicted block diagram for this device:

Step 13

Total Number of Chips		Total Number of Non-Chip Components	
5		112	
Total Estimated Cost ($)	2.159	Total Estimated Cost ($)	5.992

Total Number of Non-Electronic Components		Total Number of Supporting Materials	
4		3	
Total Estimated Cost ($)	1.957	Total Estimated Cost ($)	0.818

Estimated Total Cost to Produce ($)	11.978
Manufactured in	United States of America

- Conclusion:
  - Fix-ability: If you know what is broken, it should be relatively easy to fix as long as you are comfortable with soldering and have an equivalent part to replace it with. The device is relatively easy to take apart with just a standard Phillips screwdriver.
  - However, many robotics competitions do not allow the practice of modifying the device, which repair seems to be unfortunately considered under that. But if fixed, the device can be used as spare 'practice' robot part.