

This is the Revision A version of the [PIC876Hub10 RoboBrick](#). The status of this project is [work in progress](#).

PIC876Hub10 Robobrick (Revision B)

Table of Contents

This document is also available as a [PDF](#) document.

- [1. Introduction](#)
- [2. Programming](#)
- [3. Hardware](#)
 - ◆ [3.1 Circuit Schematic](#)
 - ◆ [3.2 Printed Circuit Board](#)
- [4. Software](#)
- [5. Issues](#)

1. Introduction

The PIC876Hub10 RoboBrick is a master RoboBrick that can control up to N slave RoboBricks. It uses a PIC16F876 microcontroller from [MicroChip](#)[®]. One of the hub ports can be connected to a communications RoboBrick to provide the ability to talk to the development platform.

There is a three terminal connector, one for ground and the other two for power. One power connector is connected to a standard 3-terminal 5 volt regulator to provide 5 volts to the slave RoboBricks. The other power regulator is only sensed for voltage level. The microcontroller has a built in analog to digital converter that allows it to sense the power level on both power terminals. When the power goes below a preset level, the robot platform can choose to enter a 'hungry' behavior mode.

2. Programming

There is no programming specification for the PIC876Hub10 RoboBrick yet.

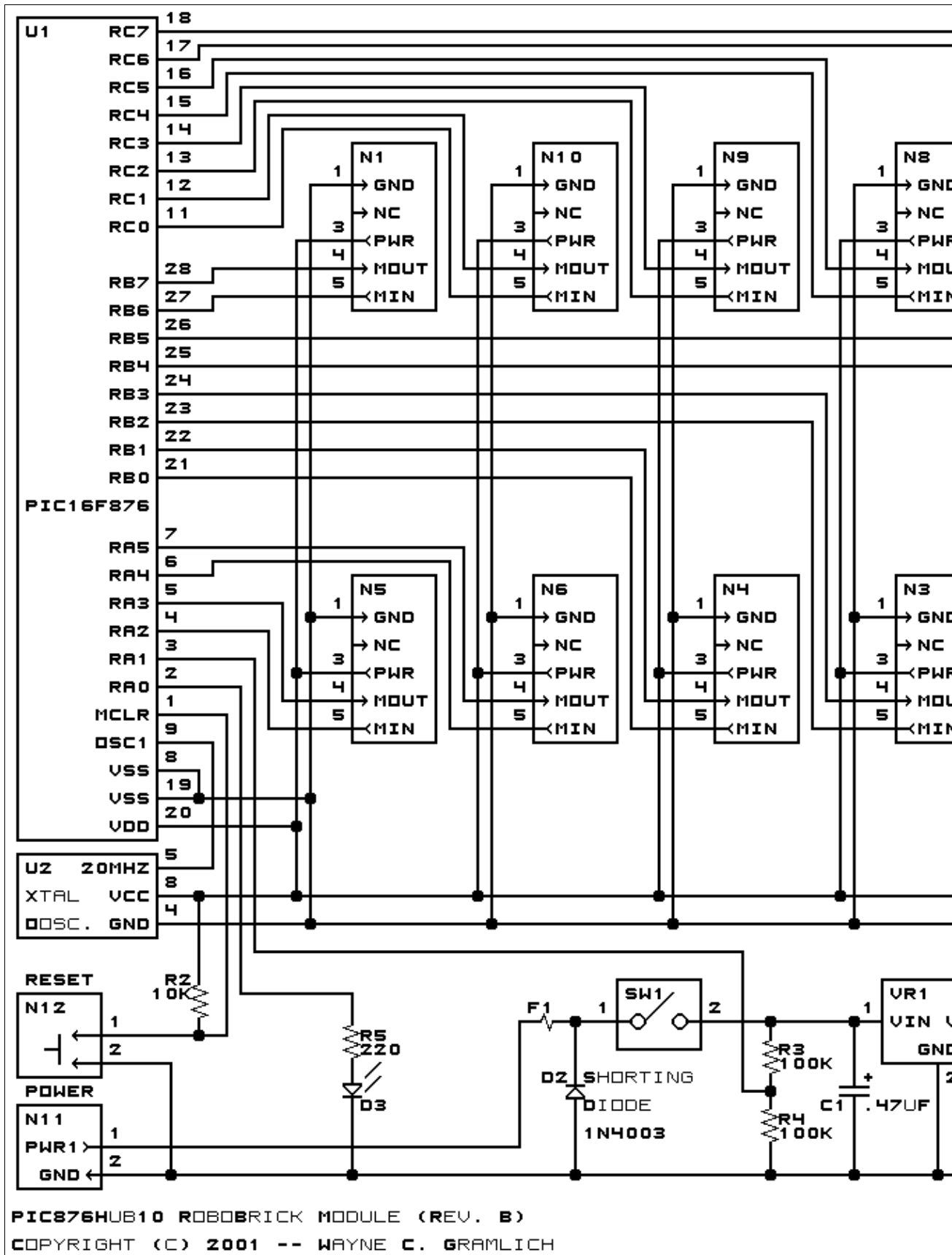
3. Hardware

The hardware consists of a circuit schematic and a printed circuit board.

3.1 Circuit Schematic

The schematic for the PIC876Hub10 RoboBrick is shown below:

PIC876Hub10 RoboBrick (Revision B)



The parts list kept in a separate file --- pic876hub10.ptl.

3.2 Printed Circuit Board

The printed circuit board files are listed below:

[pic876hub10_back.png](#)

The solder side layer.

[pic876hub10_front.png](#)

The component side layer.

[pic876hub10_artwork.png](#)

The artwork layer.

[pic876hub10.gbl](#)

The RS-274X "Gerber" back (solder side) layer.

[pic876hub10.gtl](#)

The RS-274X "Gerber" top (component side) layer.

[pic876hub10.gal](#)

The RS-274X "Gerber" artwork layer.

[pic876hub10.drl](#)

The "Excellon" NC drill file.

[pic876hub10.tol](#)

The "Excellon" tool rack file.

4. Software

There is no software for this RoboBrick yet.

5. Issues

The following fabrication issues came up:

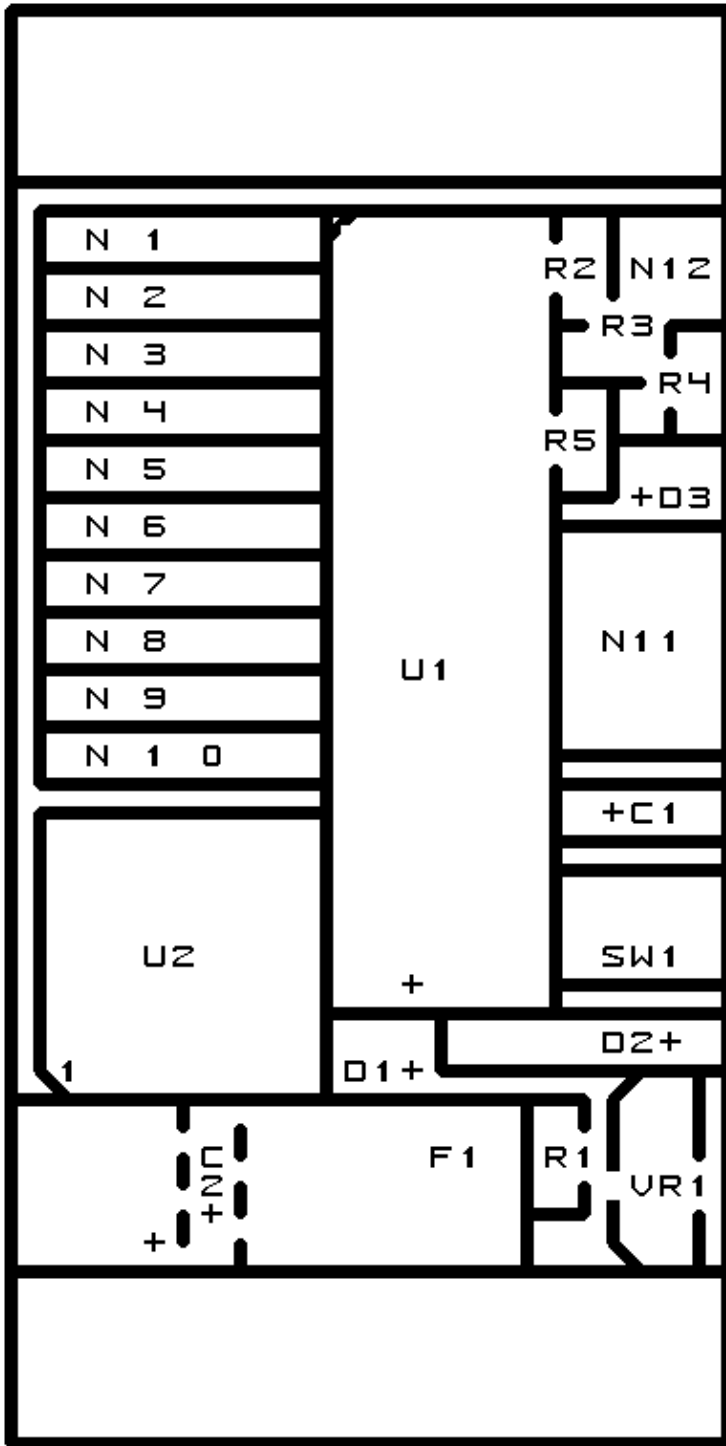
- The switch needs to be replaced with a physically beefier switch that does not disintegrate after a few hundred switch throws. The Jameco 109170 SPDT slide switch is the current best candidate. It only supports .5Amp of current though.
- Consider loosing the crystal oscillator chip and replacing with a crystal and a couple of capacitors. Perhaps use a ceramic resonator instead.
- It may be necessary to make the shorting diode go vertical to make room for the larger switch footprint.

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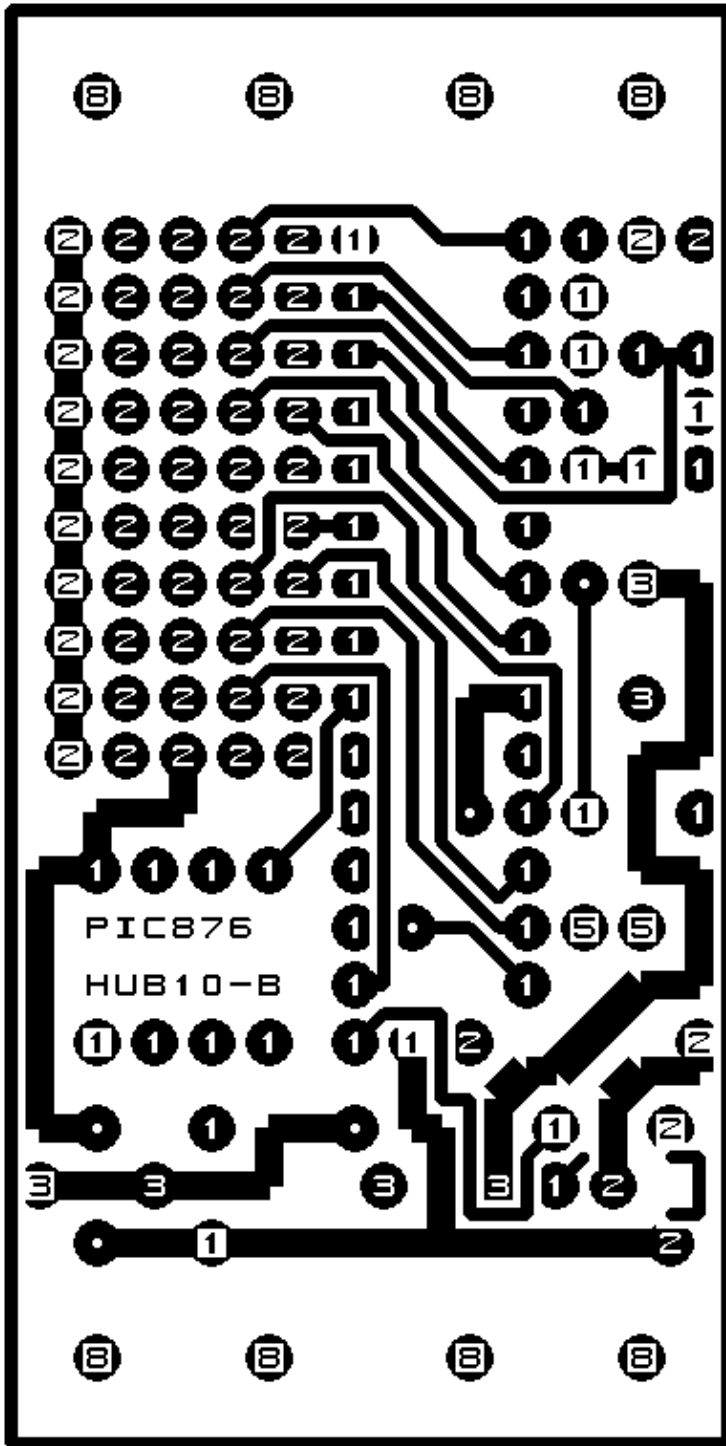
A. Appendix A: Parts List

```
# Parts list for PIC876Hub10 RoboBrick (Rev. B)
#
C1: Capacitor470nF - .47uF Tantalum Capacitor [Jameco: 33531]
C2: Capacitor22uF - 22uF Tantalum Capacitor [Jameco: 94094]
D1: LEDGreen - Small Green LED [Jameco: 34606]
D2: 1N4003 - 3 Amp Silicon Diode [Jameco: 76970]
D3: LEDGreen - Small Green LED [Jameco: 34606]
F1: Fuse5x20mmSide.PIC876Hub10B - 5 x 20 mm Fuse Holder Clips [Jameco: 119280]
N1-10: Header1x5.RBMaster_PIC876Hub10A - 1x5 Male Header [5/80 Jameco: 117196]
N11: TerminalStrip2.PIC876Hub10 - 1x2 Male Header [Jameco: 189675]
N12: Header1x2.PIC876Hub10 - Small Plunger Switch [2/40 Jameco: 160881]
R1: Resistor220.Vertical - 220 Ohm 1/4 Watt Resistor [Jameco: 30470]
R2: Resistor10K.Vertical - 10K Ohm 1/4 Watt Resistor [Jameco: 29911]
R3-5: Resistor220.Vertical - 220K Ohm 1/4 Watt Resistor [Jameco: 30470]
SW1: SwitchSPST - SPST Power Switch [Jameco: 72160]
U1: PIC16F876.PIC876Hub10 - Microchip PIC16F876 [Digikey: PIC16F876-20/P-ND]
U2: Oscillator20MHzHalf - 20MHz Crystal Oscillator [Digikey: X220-ND]
VR1: LM2940CG-5 - 5 Volt Low Dropout Voltage Regulator [Jameco: 107182]
```

B. Appendix B: Artwork Layer



C. Appendix C: Back (Solder Side) Layer



D. Appendix D: Front (Component Side) Layer

