

This is the Revision A version of the [Harness RoboBrick](#). The status of this project is it has been [replaced](#) by the [Revision B](#) version.

Harness Robobrick (Revision A)

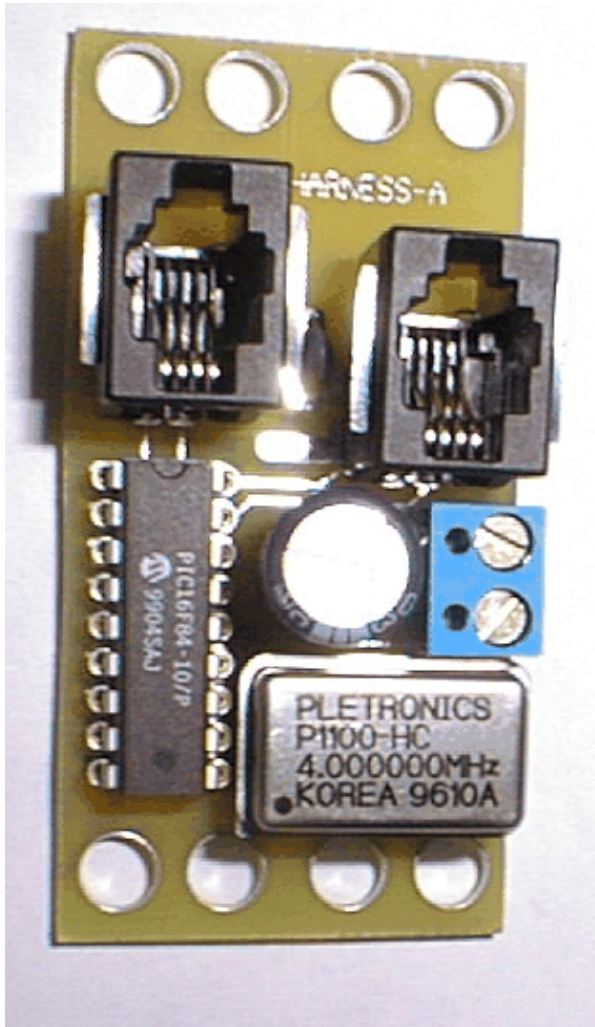
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1. Introduction

The Harness RoboBrick is used to test a [RoboBrick](#) network. It is built using a PIC16F84 microcontroller from [MicroChip](#). The PIC16F84 is used so that the software can easily be changed for testing purposes. Either a dumb terminal or a terminal emulator is connected to the Harness RoboBrick via a [Tether](#) RoboBrick. Communication occurs at 2400 baud. A picture of a Harness–A RoboBrick is shown below:



2. Programming

The Harness commands are summarized as follows:

Ns

Send *N* (where *N* is an octal number) to the RoboBrick with the high order two bits set. Do not wait for any reply bytes.

Nw

Send *N* (where *N* is an octal number) to the RoboBrick with the two high order bits set to '10'. The program waits for response bytes until one of the bytes comes back with the high order bit set. All returned bytes are printed as 3-digit octal numbers.

i

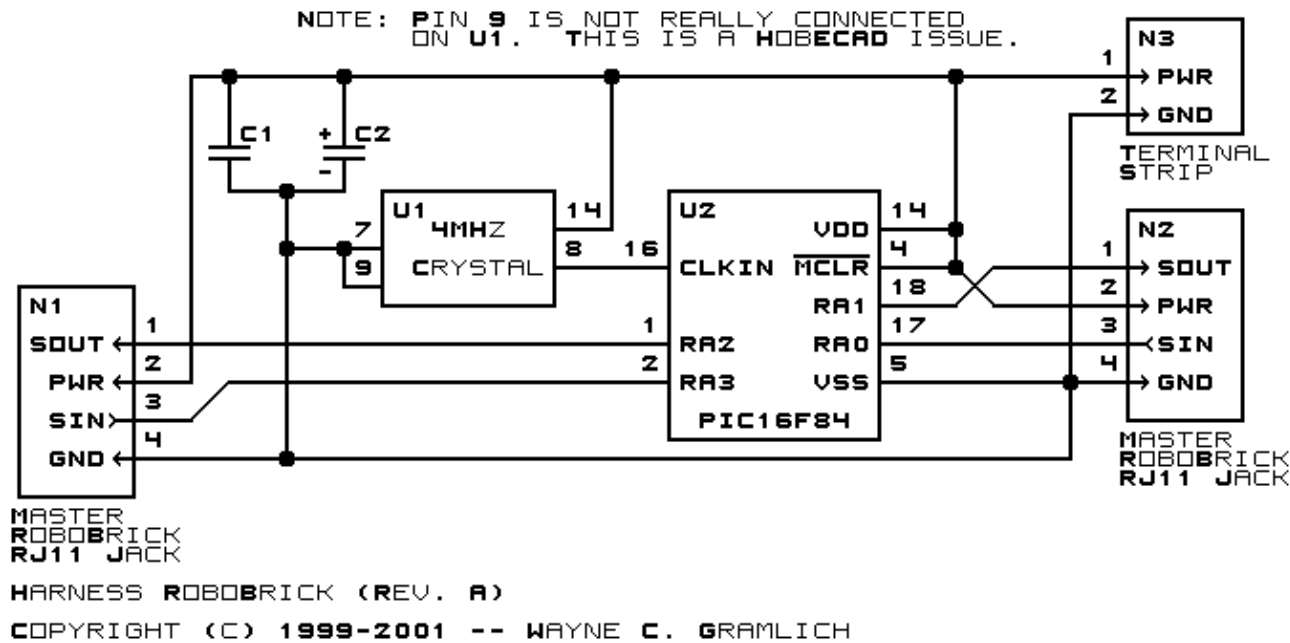
Interrogate the RoboBrick to find out its identification information.

3. Hardware

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

3.1 Circuit Schematic

The schematic for the Harness RoboBrick is shown below:



The parts list kept in a separate file --- [Harness.ptl](#).

3.2 Printed Circuit Board

The printed circuit board files are listed below:

[harness_back.png](#)

The solder side layer.

[harness_front.png](#)

The component side layer.

[harness_artwork.png](#)

The artwork layer.

[harness.gbl](#)

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

[harness.gtl](#)

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

[harness.gal](#)

The RS-274X "Gerber" artwork layer.

[harness.drl](#)

The "Excellon" NC drill file.

[harness.tol](#)

The "Excellon" NC drill rack file.

4. Software

The Harness software is available as one of:

[harness.ucl](#)

The μ CL source file.

[harness.asm](#)

The resulting human readable PIC assembly file.

[harness.lst](#)

The resulting human readable PIC listing file.

[harness.hex](#)

The resulting Intel[®] Hex file that can be fed into a PIC12C5xx programmer.

5. Issues

The revision A Harness RoboBrick has the following issues:

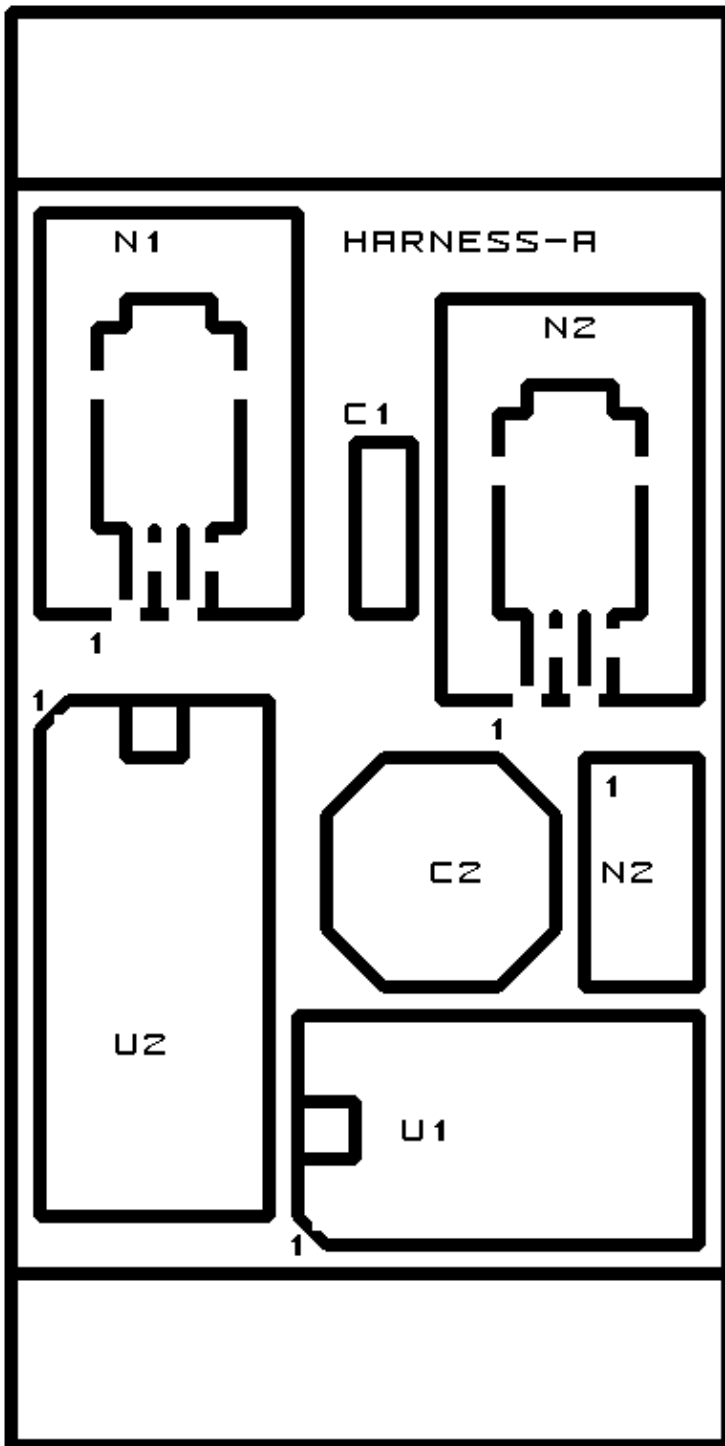
- The Lego peg holes did not line up properly.
- The pegs for the RJ11 sockets did not line up properly.
- The holes for the terminal block pins were too small.
- The bottom edge of the terminal block interfered with the crystal. Move it up .05".
- A tiny sliver of the terminal block is hanging over the edge. Move it left by .05".
- The electrolytic capacitor is too close to the terminal block. Move it left by .05". This may cause an interference with the PIC.
- There is plenty of space to move the RJ11 sockets up.
- Think about using a smaller crystal oscillator.
- Add a power on LED.
- Move the thick power trace away from the edge.
- Add a reset button.
- It might be nice to talk to two bricks at the same time.

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A. Appendix A: Parts List

```
# Parts list for Harness RoboBrick (Rev. A)
#
C1: Capacitor10pF - 10 pF Ceramic Capacitor [Jameco: 15333]
C2: Capacitor2200uF - 2200 uF 6.3V Electrolytic Capacitor [Jameco: 133145]
N1-2: RJ11Female4_4.RBMaster - Female RJ11 (4-4) Phone Jack [Digikey: A9071-ND]
N3: TerminalStrip2.Harness - 2 Junction Terminal Strip [Jameco: 189675]
U1: Oscillator10MHz - 10 MHz Crystal Oscillator [Jameco: 27887]
U2: PIC16F84.Harness - MicroChip Microcontroller [Jameco: 145120]
```

B. Appendix B: Artwork Layer



D. Appendix D: Front (Component Side) Layer

