Digilent Robotic Starter Kit Reference Manual

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215 E Main Suite D | Pullman, WA 99163
(509) 334 6306 Voice and Fax

Overview

The Digilent Robotic Starter Kit (RSK) is an ideal platform for robotic applications. When used with any of several available Digilent Embedded Controllers and our extensive line of Peripheral Modules (PMods), countless designs can be implemented, from basic experiments through more advanced systems.

Included parts:

- Rugged metal platform with holes on 1/2" center
- Two 1/19 ratio motor/gearbox drives with ABS plastic wheels (1/53 gear ratio motors are available)
- Two Digilent PMOD HB5, 2A H-bridge motor amplifiers with attachment clips
- Rugged plastic wheels and drag button
- Rugged metal motor mount
- AA Battery Holder (holds four AA batteries)
- All wiring and assembly hardware included

Functional Description

The rugged steel components have holes on 1/2" centers allowing Digilent circuit boards and other products (even those from other vendors) to be easily attached.

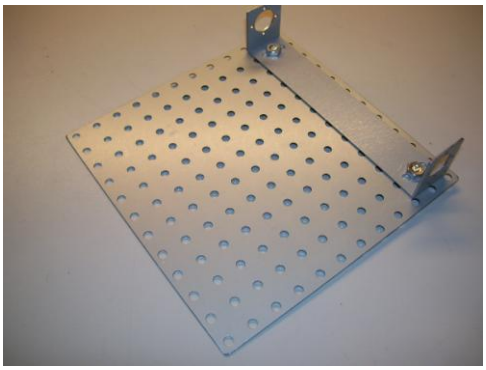
The following tools are recommended for robot assembly:

- Regular and small Phillips head screwdriver
- Small wrench
- Pliers
- Wire stripper

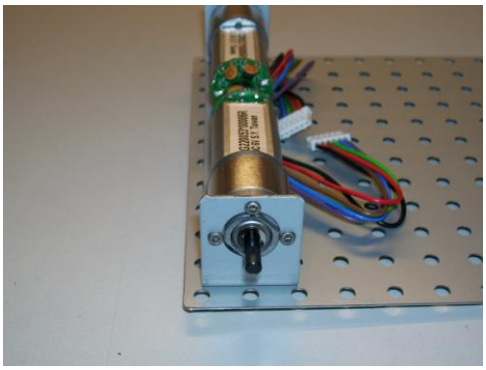
Example Assembly

There are many ways in which to assemble the Digilent Robotic Starter Kit. An example assembly, using the Cerebot-II board *RSK_StartupDesign* reference design, is detailed below:

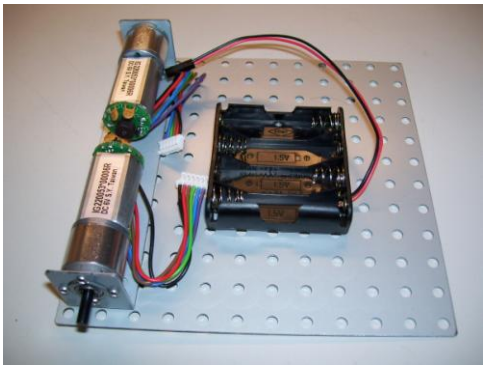
1. Take out the metal platform and place the metal motor mount on the top right side. Attach screws accordingly.



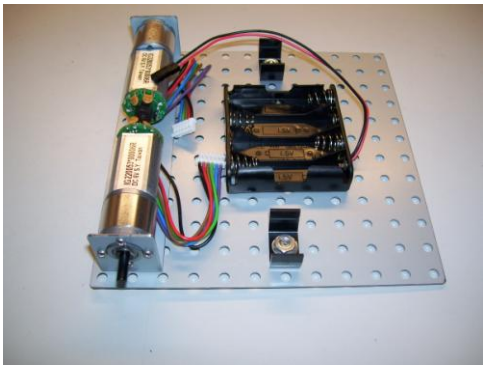
2. Attach motors to the metal motor mount with miniature screws.



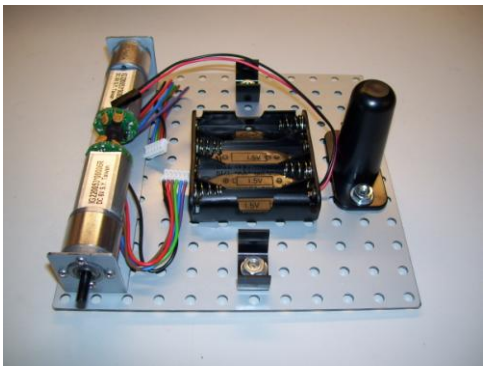
3. Attach the battery holder to the metal platform, below the motor mount using the sticky Velcro.



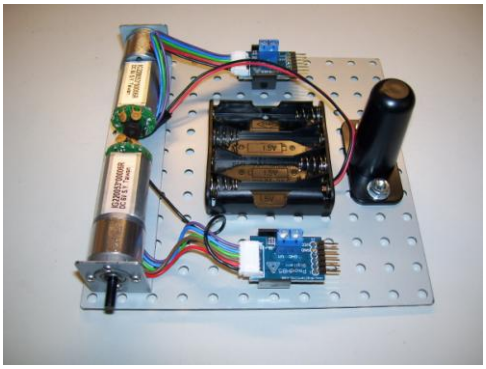
4. Attach the Pmod clips to the metal platform on either side of the battery holder.



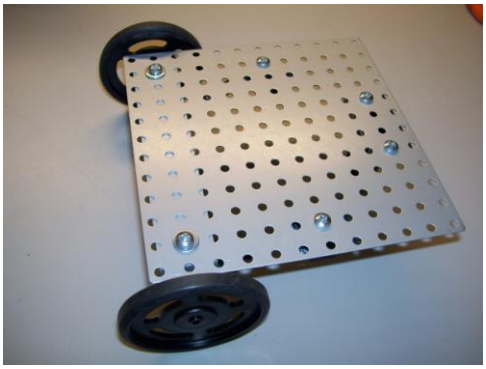
5. Attach the drag button to the metal platform, below the battery holder.



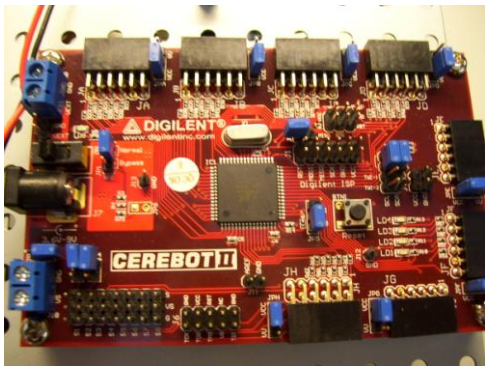
6. Attach the two Pmod HB5 modules to the Pmod clips and connect them to the motors accordingly.

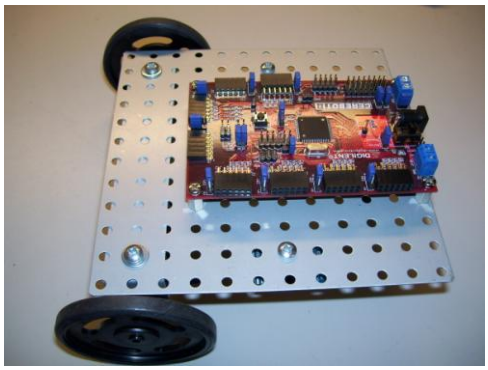


7. Attach the plastic wheels to the motors.

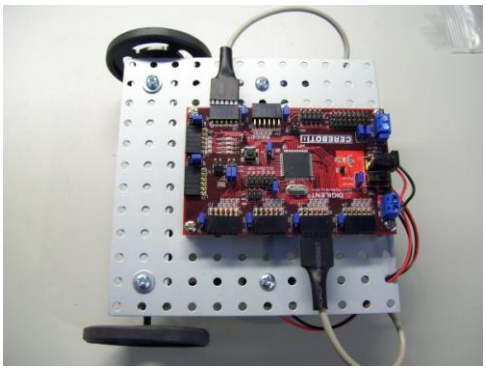


8. Examine the Cerebot-II board by comparing to the picture below, making note that the blue shorts are attached to each jumper as depicted. Attach the Cerebot-II board to the top side of the metal platform. Be careful not to cross thread screws while mounting the Cerebot-II Board.

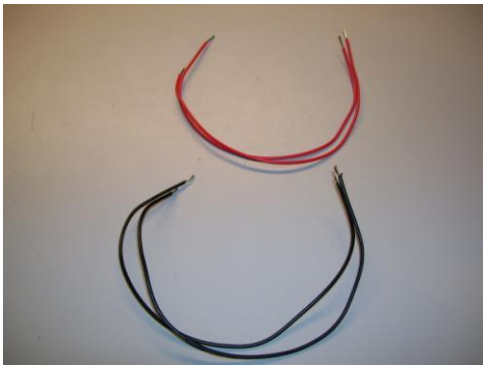




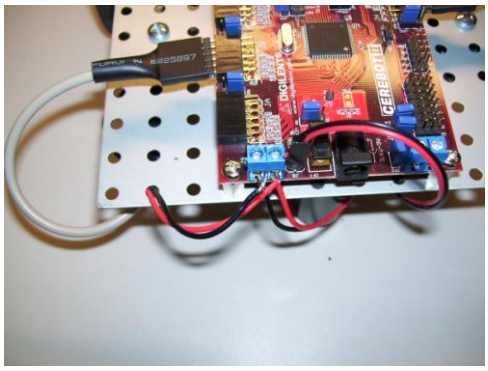
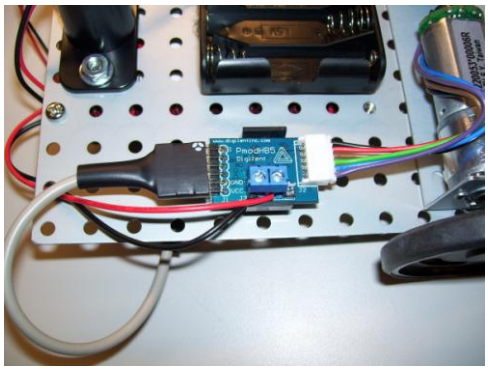
9. Connect the two Pmod HB5 modules to ports on the Cerebot-II board via 6-pin cable connector to ports JG and JB(top port). Use the marker on the cable connector to ensure that pin placements are in alignment when connecting the boards.



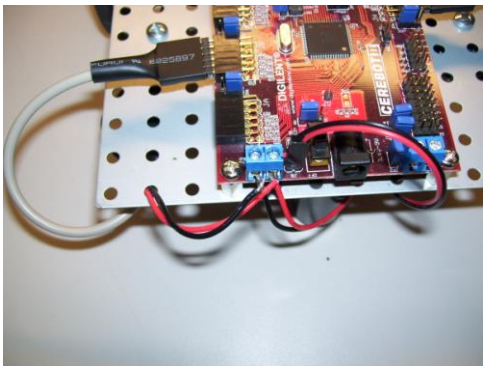
10. Strip a centimeter's length of wire sheath from both ends of all red and black 22 guage power wires.



11. Route power wires from each Pmod HB5 to the J9 power connector on the Cerebot-II board, noting ground and voltage connections.

12. Attach the power cable from the battery back to the J8 battery power connector on the Cerebot-II board.



13. Use the following steps to program the RSK_StartupDesign.hex file onto the board:
    a. Connect a JTAG programming cable from the PC to the J1 programming header on the Cerebot-II board. (Note: JTAG programming cable sold separately from RSK and Cerebot-II board.)
    b. Turn the board on.
    c. Open AVR programmer (free download from www.digilentinc.com)
        i. Select the JTAG programming cable (see AVR Programmer Reference Manual)
        ii. Go to the Program Tab.
        iii. Select ATmega64 as the AVR Device.
        iv. Under Program Flash, click … and browse to the appropriate directory where the RSK_StartupDesign.hex file is located. Select the file and click Open.
        v. Click Program.

    Once the board has been programmed with RSK_StartupDesign.hex both motors should turn, confirming that the RSK has been assembled correctly.