

Remote Control Robotic Development Kit Reference Manual

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Overview

The Diligent Remote Control Robotic Development Kit (RDK-Remote) is an ideal platform for robotic applications. When used with any of several available Diligent embedded controllers and our extensive line of peripheral modules (Pmods), countless designs can be implemented, from basic experiments through more advanced systems.

Included parts:

- PmodJSTK
- PmodRJ45F
- PmodRJ45M
- two PmodHB5 2A H-bridge motor amplifiers with attachment clips
- Cerebot 32MX4
- Ethernet cable
- rugged metal platform with holes on 1/2-inch center
- rugged metal motor mount
- two 1/19 ratio motor/gearbox drives with ABS plastic wheels (1/53 gear ratio motors are available)
- rugged plastic wheels and drag button
- AA battery holder (holds four AA batteries)
- all wiring and assembly hardware included

Functional Description

The rugged steel components have holes on 1/2-inch centers allowing Diligent circuit boards and other vendors' products to be easily attached.

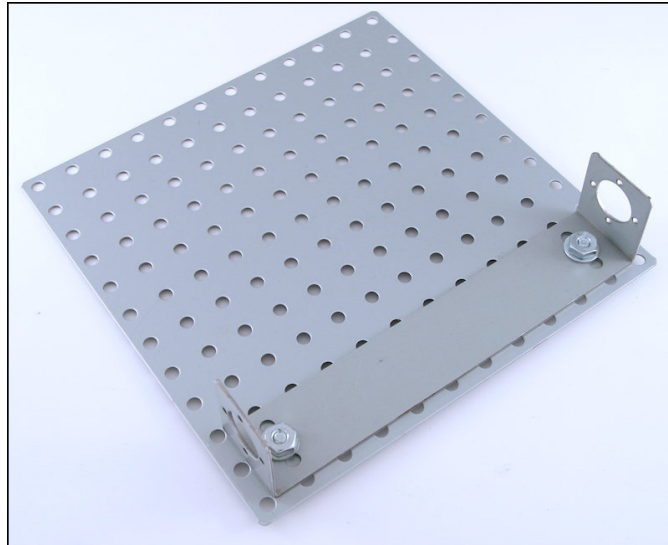
The following tools are recommended for robot assembly:

- regular and small Phillips head screwdriver
- small wrench
- pliers
- wire stripper

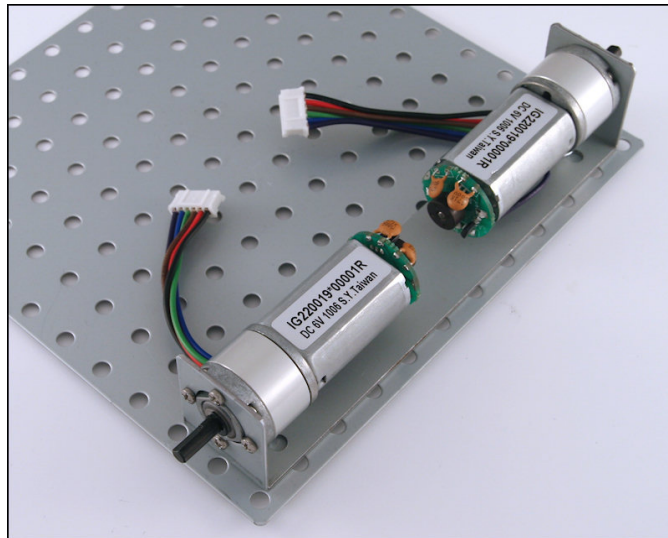
Example Assembly

The following example assembly makes use of the *RDK_RemoteControl* reference design, available at www.digilentinc.com:

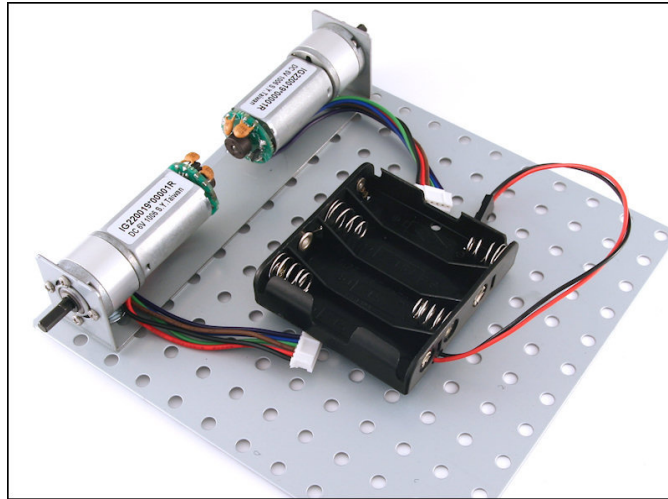
1. Take out the metal platform and place the metal motor mount on the top right side. Attach screws accordingly.



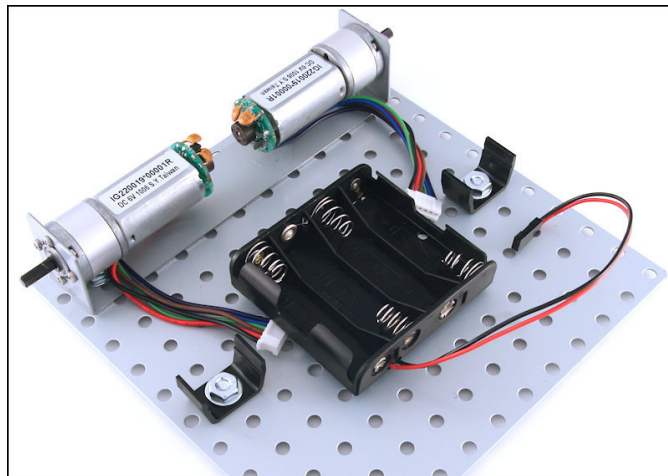
2. Attach motors to the metal motor mount with miniature screws.



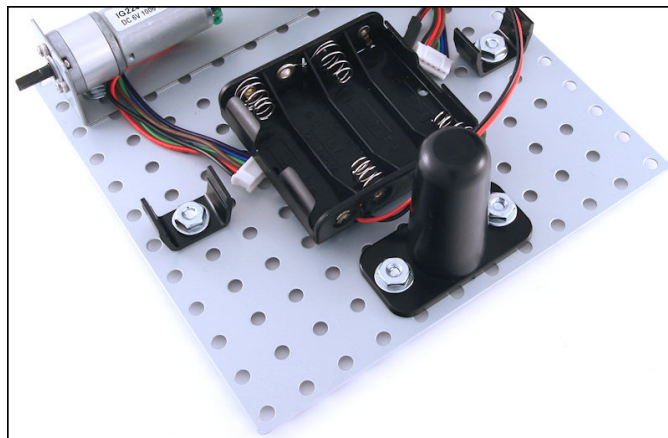
3. Attach the battery holder to the metal platform (below the motor mount) using the sticky Velcro.



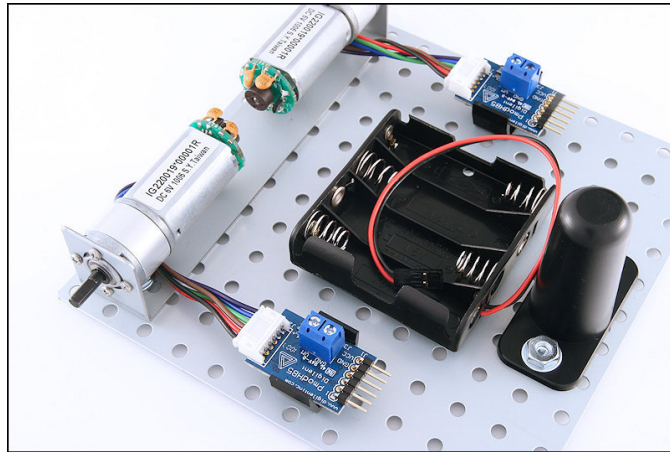
4. Attach the Pmod clips to the metal platform on either side of the battery holder.



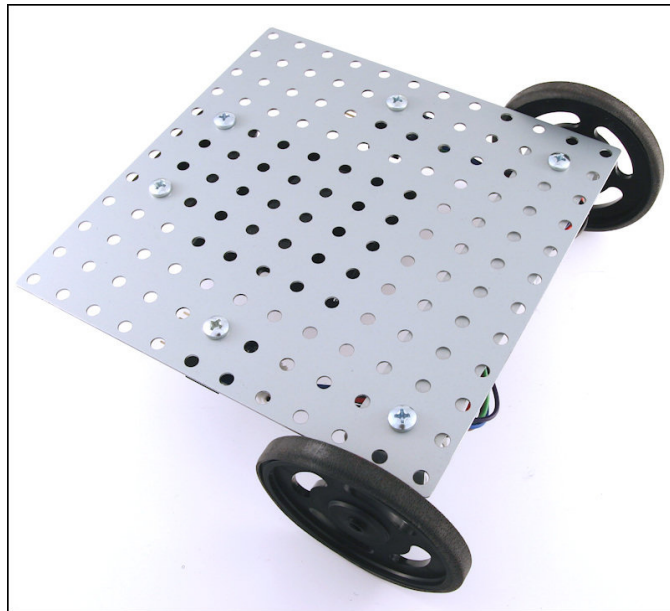
5. Attach the drag button to the metal platform, below the battery holder.



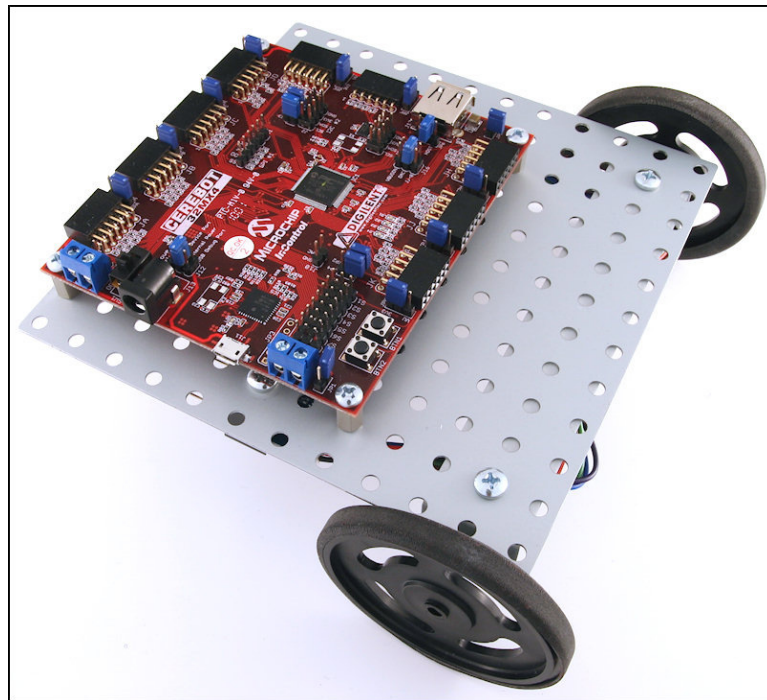
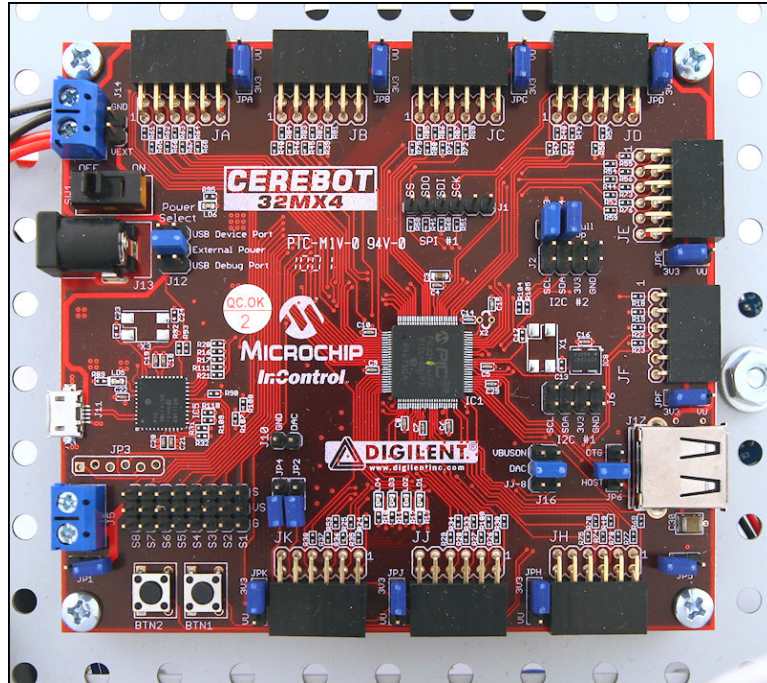
6. Attach the two PmodHB5 modules to the Pmod clips and connect them to the motors accordingly.



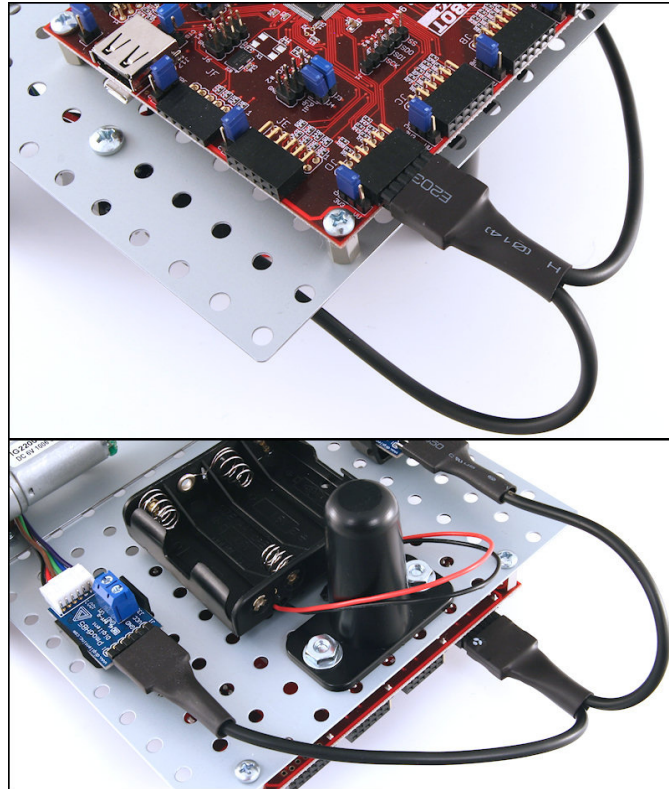
7. Attach the plastic wheels to the motors.



- Compare the Cerebot 32MX4 board to the picture below. Note that the blue shorts are attached to each jumper as depicted. Remove the rubber feet from the bottom of the corners of the Cerebot32MX4. Attach the standoffs to the board using the corresponding mounting screws. Mount the Cerebot 32MX4 board to the top side of the metal platform. Be careful not to cross thread screws while mounting the Cerebot 32MX4 board.



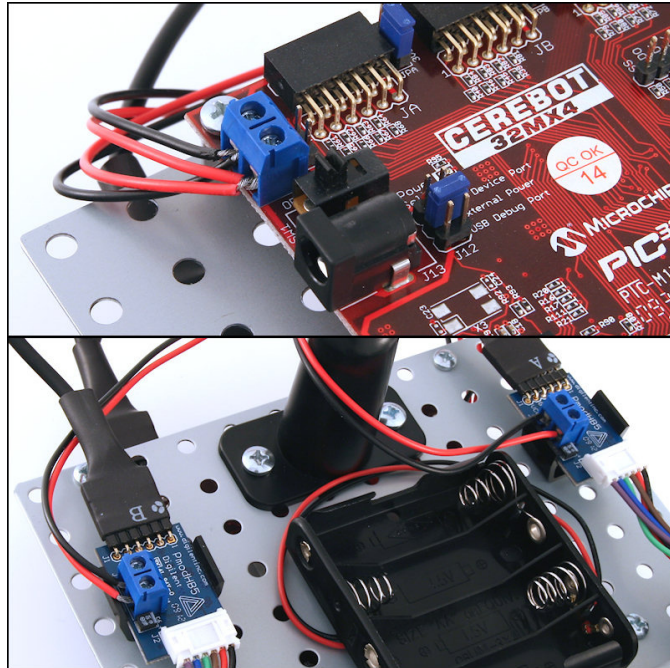
9. Connect the two PmodHB5 modules to port JD on the Cerebot 32MX4 board using the 2x6 Pin to dual 6 pin cable. Use the marker on the cable connector to ensure that pin placements are in alignment when connecting the boards.



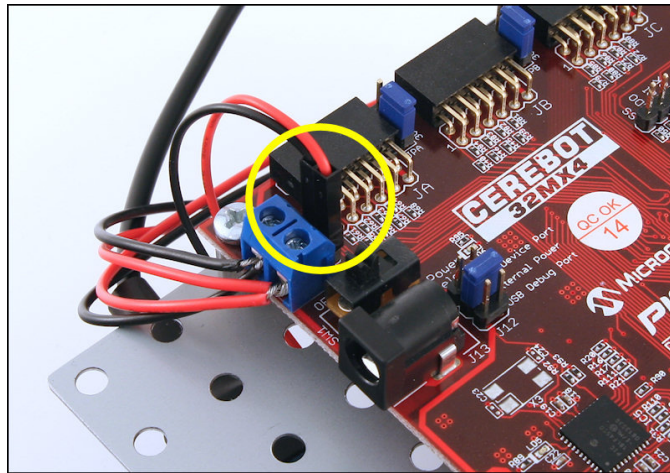
10. Strip 1/2-inch of insulation from both ends of all red and black 22 gauge power wires.



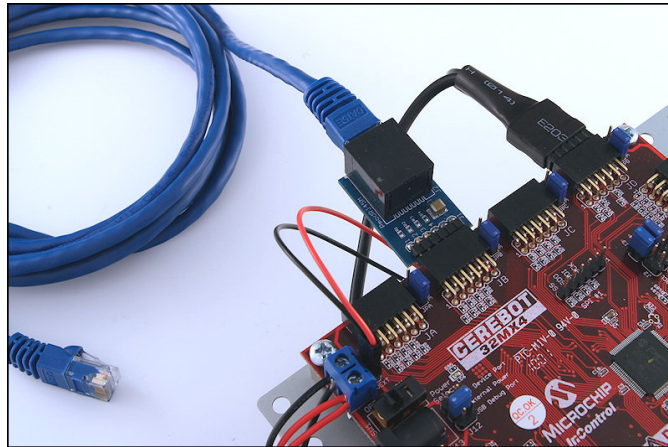
11. Route power wires from each PmodHB5 to the J18 power connector on the Cerebot 32MX4 board, noting ground and voltage connections.



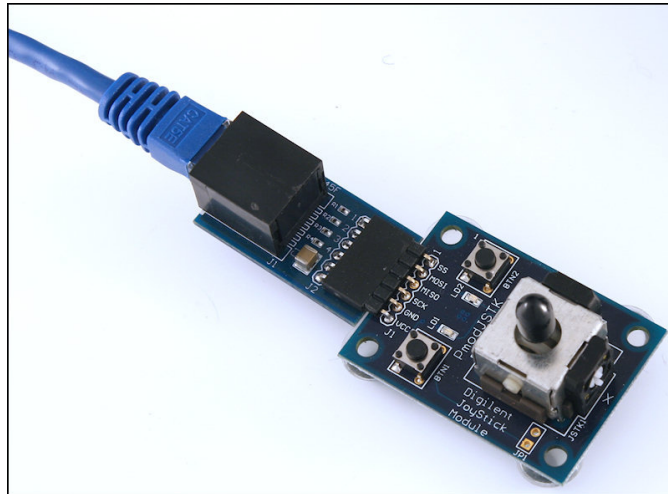
12. Attach the power cable from the battery back to the J14 battery power connector on the Cerebot 32MX4 board.



13. Connect the PmodRJ45M to the top JB Pmod header, and connect one end of the Ethernet cable to the PmodRJ45M.



14. Connect the other end of the Ethernet cable to the PmodRJ45F, and connect the PmodJSTK to the PmodRJ45F.



15. MPLAB can now be used to program the *RDK_RemoteControl* reference design to the board. For more information on how to program the Cerebot32MX4 using MPLAB, see the Cerebot32MX4 LED Demo project at www.digilentinc.com. Note that running the reference design that turns the motors requires that the power select mode jumper J12 be shorted to External Power.

Once the board has been programmed with the reference design, movement on the joystick should cause the robot to move in a similar fashion. Orient the Remote Control RDK Kit as shown below.

