SPLAT

Small robotic Platforms for Limited Access Terrain

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Operations Manual

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Operations Manual

Materials Needed:

- SPLAT Wallcrawler
- Transmitter
- 12V Battery (ATV)
- Electrical Wiring

Controller Setup:

- Although the transmitter has 6 open channels, only 3 are needed to operate the wallcrawler
- The right joystick (channels 1 and 2) controls all of the wheel movement
    - The right joystick is spring loaded, so untouched it is located in the middle
        - This is the neutral setting→ no movement will occur
        - Note that using the adjustable gains(the small black knobs located to the left and bottom of the joystick can also be used to change the settings slightly. If the crawler is moving with the joystick in the neutral position adjust these separately to zero the drive motors
    - Pressing the joystick up makes the crawler go forward
    - Pressing the joystick down makes the crawler go in reverse
    - Pressing the joystick left makes the crawler turn left
    - Pressing the joystick right makes the crawler turn right
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- The left joystick(channel 3) controls the fan/impeller speed
    - Because this joystick is not spring loaded the neutral position is all the way down, not in the middle of the pad
    - Moving the joystick up will increase the fan speed
        - Pushing the stick to the very top will result in maximum RPM
            - Note that running the fan at high speed for extended periods of time may overheat the motor/controller
    - Adjusting the black knob to the right of this joystick controls the gain, and can also be used to vary the fan speed slightly
        - Moving the joystick left or right will have no effect on the fan, because that is channel 4 which is not being used

- The other channels can be used to make future modifications to the crawler in case changes or improvements are needed

Getting Started:

- Connecting the power source
    - Before the crawler can be used it must first be connected to the battery
        - Note that the battery should be fully charged before starting
    - Run the red wire, extending from the fan's speed controller to the positive terminal on the ATV battery, and connect with the alligator clips provided
        - A 20 Amp fuse partitions this wire to avoid burning up the fan motor and controller
    - Next connect the black wire from the speed controller to the negative terminal on the battery with the second alligator clip

- Setting the Controller:
    - Make sure that the left knob is set to the off position (all the way down) before powering on
    - Now you can turn on the transmitter
        - The controller should work automatically without any configuration
            - If the speed controller beeps twice when the switch is set to the on position then it must be calibrated before continuing
                - Move the joystick all the way to the top, wait two seconds, and then move it back to the very bottom (This will tell the controller that neutral is the bottom position)
    - Now the crawler is ready for operation

Horizontal to Vertical Transition:

- For best results the fan should be off when approaching the wall
    - Contact the wall at a slow speed, and the platform should tip with ease
        - If any problems occur you might need to approach the wall at a slight angle or slower speed to increase the torque
    - When the robot approaches a 45 degree angle turn the fan on, so suction will occur
    - Continue moving forward slowly until the platform becomes vertical
        - If any slip occurs increase the fan RPM until enough traction is achieved to continue vertical ascent

Troubleshooting

- ***The speed controller does not beep after the battery is connected***
    - Check all of the electrical connections. This means that the speed controller is not getting any power, and thus one of the wires has most likely come loose, or is not getting a good connection

- If all of the connections are connected properly then check the battery to make sure it has charge

- ***The wall crawler starts to move even though the right joystick is in the neutral position***
  - Adjust the gain knobs slightly to vary the power going to each motor. If the left motor is running use the bottom knob, and if the right motor is running adjust the left knob.
  - If this is unsuccessful, or if the motor will only turn in one direction than it is possible the servo dashpot has been adjusted somehow. You will need to open the servo and turn the output shaft to vary the dashpot settings.
    - See: http://www.robotstore.com/download/Servo_Mod_Notes_1.0.pdf for more instructions on how to make the servo continuous