Arduino, DC Motor controlled by a Rotary Encoder

I am working on project with an incremental Rotary encoder and a 12 volt DC motor, which I hope that you are able to help me with. I am missing the last pieces to get the job done.

I am are not used to work with coding, but are familiar with the basic routines in Arduino, the sketches, uploads and a minor part of the coding related to them.

I need a trained eye to take a look on the issue with the code.

To illustrate the job I have enclosed a couple of videoes.

Video A:
My target is illustrated in the first <u>video A.</u> It is a DC motor connected to a Rotary encoder. The two devices are communicating together via the green board on the video, which I wish to substitute with an Arduino Uno board. I do not have any knowledge of the code or software on the green PCB.

https://my.pcloud.com/publink/show?code=XZwXFlkZ5QnywoiFg4S0eIprPHWS0z8JHyX0

The DC motor is controlled by the rotary encoder. When the encoder is sending positive signals +1,2,3……500, Arduino shall convert these signals to CW revolutions for the DC motor. When the rotary encoder is counting down 500, 499. 498……Arduino shall convert these signals to CCW revolutions for the DC motor. There is not any limit for the positive counting (500,1000, 5000……).

When the power supply is turned on the encoder shall be starting a zero / 0 next time it the power supply is turned on, as the last position when the motor was stopped has no relevans, when it is starting again.

The DC motor and the encoder are working together with 3 gears:

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The gear in the middle is getting it's push/pulls by a spring with a weight on 5 kilos. When the DC motor has pulled the 5 kilos up, at a point gravity will change the direction of the encoder and it will start to send signals to Arduino and then the DC motor will change direction and shall start to run CCW. In this way the DC will be running CW, CCW, CW………….. for ever or as long as the the unit is powered .

In the enclosed link a movie is illustrating these movements. The motor on the film is a steppermotor with an optical encoder on the shaft. I wish to substitute this solution with a separate incrementalt rotary encoder to get more naturel movements. Futhermore the steppermotor is a bit noisy:

https://my.pcloud.com/publink/show?code=XZYHqlkZUeCLVpLleNRdYx2F86jECQjsEEaX

When the DC motor is starting up. It is moving a few turns CW and CCW. The DC do not have to start in a specific position - any position will do. When the gear on the encoder is beginning to move, the DC is moving in the same direction, and the DC will act in accordance with the movements from the encoder.

 If the encoder has been in the same position for a while then the DC will also stop in its movements. The DC and the encoder are connected with a gear between them (in the middle). After a period of time the DC will start moving a bit CW and CCW in the same way as the DC is doing in the start of the proces.

When the DC is starting up CW, it shall be with a modest speed and then it shall accellerate in some steps up to the limit of speed, which it is programmed for. When it is going in the oppesite direction it shall also be starting up in a modest speed and then in some steps or continuently reach the speedlimit. In the proces the motor do not nessecary need to reach it limit of speed, but it shall be able to switch from CW to CCW

instantly and the other way around. So the motor is running CW-CCW-CW-CCW......... with accellerating steps each time the direction is changed.

In the solutions there shall be a potentiometer to control the speed of the motor and another potentiometer shall work as timer so the motor can work for a specific period of time starting at 120 minutes going down to 10 minutes.

There shall be a separate switch for the power supply.

Video B:
Is illustrating the output of a Rotary Encoder, I have bought for experiments. It is an incremental Encoder with 400 steps pr. revolution. I have enclosed 2 sketches, which I have used together with the encoder. The connection is perfect and the encoder is counting up and down in accordance to my expectations. I assume that positive values are able to get the DC motor in the CW direction and the negative values in CCW direction. The steps per revolution are probably not critical for the project.

https://my.pcloud.com/publink/show?code=XZWFFlkZYcTJM0SUBuzUTic90jOrpbPEKXsk

Video C:
Is a simpel sketch which is illustrating the result of a manuel Rotary Encoder moving CW and CCW to get the two LED´s to switch of and on by turning the knob.

https://my.pcloud.com/publink/show?code=XZwFFlkZnot2lLOzHIYBiv1KNjiJsmPIaVS7

Video D:
Is a sketch which is illustrating the result of a manuel Rotary Encoder moving CW/CCW and how the respons from the DC motor is following the movements of the manuel Rotary Encoder. With a manuel Rotary Encoder the DC is out of action in the startposition 0/ zero, which is fine. When you start turning the the button of the encoder in positive or negative direction the motor is about to wake up but is "sleeping" until +60 or -60. In many ways the respons is ok, but the manuel Rotary Encoder is acting much to slow.

https://my.pcloud.com/publink/show?code=XZ3FFlkZyfk3svCuTBmpnqpewoLxrmkLGe47

Sketches for inspiration
Furthermore I have enclosed some sketches for inspiration:

https://my.pcloud.com/publink/show?code=VZxzFlkZPJjrz0q69X0BBLxE4MfPlSg6UrDX .

These will probably be of minor value for you, but they are illustrating, some of the issues with the project and the way I see a way to the solution.

Will Donaldson
As far as I can see Will in his video, has shown a vital part of the solution, but as I have mentioned earlier, I need a trained eye to look at the project and to integrate all the functions:

https://youtu.be/dMBrR4gDi3s

Target
Sketches (3 different drivers) for an Arduino Uno board in accordance with video A. I am expecting to use the following components for the solution, but are open for suggestions.

1) Arduino board uno
2) DC motor 12 Volt
2) Incremental Rotary Encoder – similar to the encoder on video A
3) 3 different drivers for the DC motor, L293D, L298N, L9110S
4) A potentiometer for the regulation of speed
5) A potentiometer to control the timer (120-10 minutes)
6) A main switch (On/Of button)
7) A power supply of 12 volt, which shall supply the DC and the Arduino Board

Connections / pins between Arduino, drivers, potentiometer speed, potentiometer / timer, and main switch shall be illustrated in a diagram with the exact adresses / pins on the Arduino board and the adresses / pins on drivers and potentiometers.

As I wish to do some experiment with the speed, it shall be easy to change the speed and if it is possible to ad a function with accelleration of speed when the direction of the revolution is changing from CW to CCW it would be appreciated.

I am looking forward in hearing from you and please state a time of delivery and a price for the job. If you need further informations please let me know. Or if you find some part of the solution to hard to manage, then let me know which part.

To close the deal I need the following:

  A) Three sketches with the three drivers. They must be more or less identical
  B) Diagrams for the 3 solutions (Arduino, DC, Potentiometers, switch for power supply, driver 1-2-3)
  C) A small video for demonstration of the solutions. The setup do not have to be with gears, but I shall be able to see the connection between the encoder and the DC motor.

Soren Jacobsen