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Control board design for SBV fundus camera.

General description

The aim of this board is to support LEDs, step motor\s, battery and serial communication control.

Detailed description

Supported parts:

1. Osram LZ7 customized LED array –
   1. LZ7 is 7 channels LED array each is in different color.
   2. We need to control each LED illumination intensity and duration separately.
   3. We need to control combinations of LEDs illumination as group – each one of them has its own intensity and duration, however they are triggered simultaneously, i.e. say we have white and green LEDs the white will be set with intensity x and duration t, and the green is set to intensity x1 and duration t1 – and they are triggered to start illumination simultaneously or with phase change between them.
   4. The LED control should have LED illumination combination memory - including each LED intensity and duration, phase change of each combination, etc.
   5. Option to set illumination triggering of combinations as sequence
   6. Option to synchronize illumination with camera HW trigger – the controller will trigger the camera acquiring.
   7. Intensity minimal step 8bit – minimal intensity to maxima intensity range will be divided to minimal 8bit range – higher resolution is better (12-16bit).
   8. Duration – millisecond resolution – higher resolution is better (nice to have)
2. Osram LZ4 customized LED array – same definitions as (1)
3. Physical camera triggering interface – as standard – output configurable V & A to support most common industrial cameras triggering standard – especially IDS, Allied etc. – we will provide definitions
4. Physical triggering pin – in order to control the acquisition process including LED illumination synchronizing, this pin will be used as HW interface of triggering preplanned acquisition process i.e. a sequence of LED illuminating, synchronized with camera triggering at predefined timing.
5. Step motor\s –
   1. Controlling step motor moves at its maximal accuracy – i.e. PWM implementation if needed.
   2. Home definition – SW controlled.
   3. Step size definition – above (5.1) – SW controlled.
   4. Movement boundary definition – SW controlled.
   5. Speed definition – SW controlled.
   6. Trigger pin to stop operation – as interrupt for safety trigger for all moving parts.
6. Battery –
   1. Battery status sampling – SW controlled
   2. Battery status display – 8bit definition – full to empty.
   3. Battery status LED – red\green LED HW implementation.
      1. Optional battery status LED output pins to support 2-3 color LED – nice to have both.
7. Serial communication –
   1. USB 3.0 or RS232 – TODO – define needs
8. Serial number ‘burning’ via SW interface for our factory use – optional – nice to have.
9. General instructions –
   1. Protection from input spikes
   2. Insert several extra PWM ports with physical output pins– nice to have.
   3. We’ll get the firmware and SDK source codes.
10. Control SW –
    1. General:
       1. Firmware update via serial communication
    2. Firmware:
       1. TODO – supports all the above definitions (1-7) and specifications.
    3. PC SDK -
       1. C++11 implementation.
       2. Ubuntu 18.04 – NVIDIA Jetson Nano compatible
       3. TODO