Cell Stretcher Controller User Manual

BU Electronic Design Facility
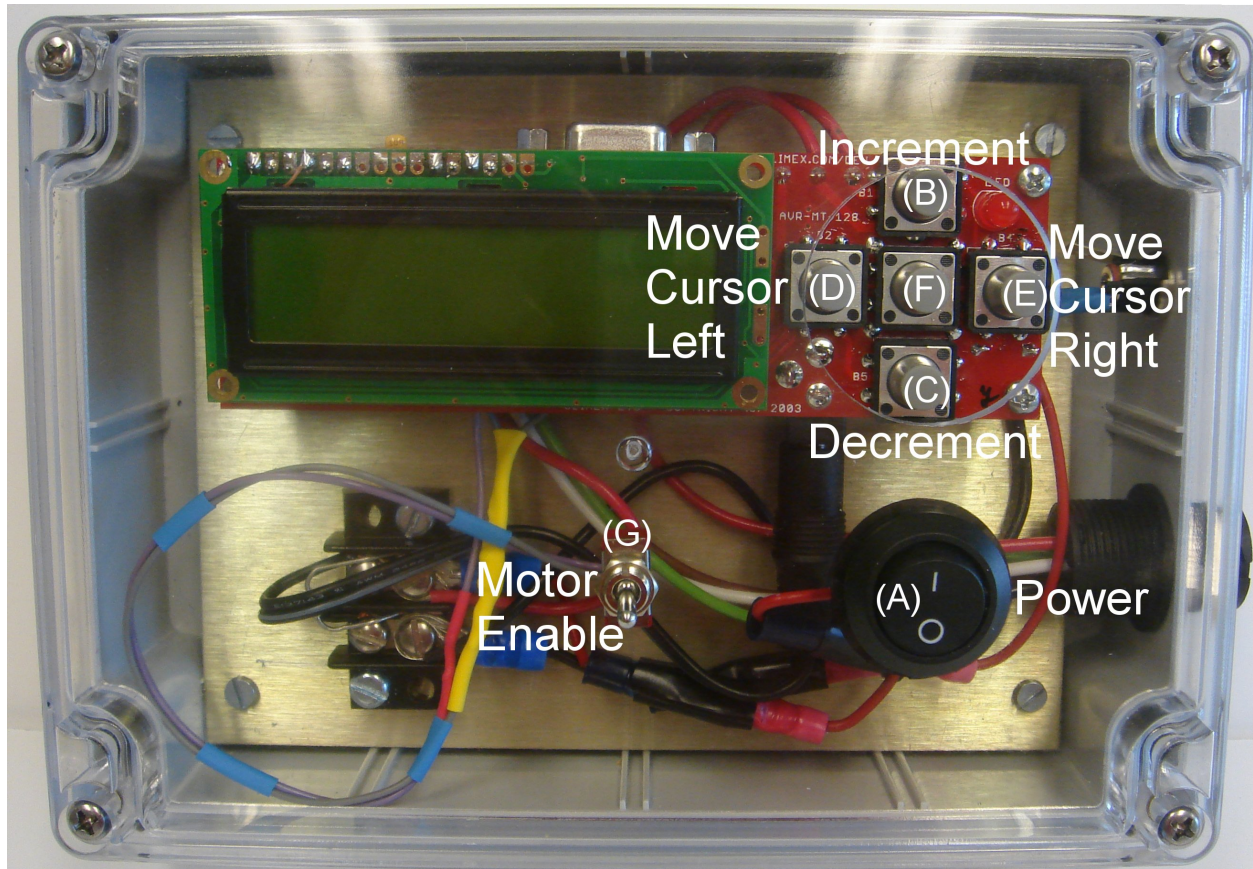
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Figure 1

Description

This Cell Stretcher Controller manipulates the mechanical movements of the cell stretcher apparatus by controlling the timing of the apparatus's motor. To operate the controller the user must input two time interval values. Each of these values directly correspond to the amount of time that will elapse when the apparatus is in either a relaxed or contracted state.

This design is based on the AVR-MT-128 development board from OLIMEX Ltd. for the ATMEGA128 microcontroller.

Controls (see Figure 1)

A) *Power:* the on/off toggle switch energizes the controller.

B) *Increment:* this button increments the numeric value under the blinking cursor.

C) *Decrement:* this button decrements the numeric value under the blinking cursor.

D) *Move Cursor Left:* this button moves the blinking cursor to the left.

E) *Move Cursor Right:* this button moves the blinking cursor to the right.

F) *Mode:* this button changes the mode of operation.

G) *Motor Enable:* this toggle switch enables the motor to operate.

Modes of Operation

Set A: The user can edit time interval A while in this mode. The first row displays time interval A in minutes, seconds, and tenth seconds (MM:SS.T). *Increment/Decrement* and *Move Cursor Left/Move Cursor Right* buttons are enabled in this mode.

```
 _____
| 03:10.6   Set A |
| 00:00.0         |
```

Set B: The user can edit time interval B while in this mode. The second row displays time interval B in minutes, seconds, and tenth seconds (MM:SS.T). *Increment/Decrement* and *Move Cursor Left/Move Cursor Right* buttons are enabled in this mode.

```
 _____
| 00:00.0         |
| 06:31.5   Set B |
```

Run: The user can enable the motor and run the cell stretcher while in this mode. *Increment/Decrement* and *Move Cursor Left/Move Cursor Right* buttons are disabled in this mode.

```
 _____
| 00:00.0    Run  |
| 00:00.0         |
```

Operation

1. Plug the 12V DC power supply into the controller unit.
2. Attach the cell stretcher apparatus to the controller unit with the supplied cable.
3. Turn the controller unit on by switching the power toggle switch.
4. Wait for the motor to move to the initial position.
5. While in "Set A" mode adjust time interval A by using the *Increment/Decrement* and *Move Cursor Left/Move Cursor Right* buttons.
6. Press the *Mode* button to enter "Set B" mode.
7. While in "Set B" mode adjust time interval A by using the *Increment/Decrement* and *Move Cursor Left/Move Cursor Right* buttons.
8. Press the Mode button to enter "Run" mode.
9. While in "Run" mode enable the motor by switching the *Motor Enable* toggle to the upward position to activate the cell stretcher.
10. While in "Run" mode disable the motor by switching the *Motor Enable* toggle to the downward position to deactivate the cell stretcher.
11. To change the time A and time B values press the *Mode* button to enter "Set A" mode. Continue to step 5

Diagrams

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