

Boston Connection Steenbeck Motor Speed Regulator Board Set Up and Calibration

Software version P0.5/P0.6

The Boston Connection motor speed regulator board is an after market board designed to replace the original Steenbeck design and has several advantages over the original design.

- LED readout of frame rate in **XX.X** (tenths of frames) at speeds below 100 FPS and **XXX** format at speeds of 100 FPS or higher.
- Four forward sync speeds (18, 24, 25, 30 FPS) are available by changing switch settings and following a simple calibration procedure.
- Boards with custom frame rates are available at an additional cost.
- Designed for use on 16mm and 35mm editors.
- Simple calibration. No test equipment is required to calibrate the board. Only a small screwdriver is needed.
- A strobe output that runs at the frame rate set by the board switches. An optional external LED may be connected to this output to monitor/verify editor frame rate.
- The SYNC position can be set to the first or second detent on the hand control. (software version P0.6 only)

NOTE: *The software in the present design is designed to work with motors that have 75 teeth on the motor tachometer gear (common in the US).*

Board Set Up and Calibration Procedure

Whenever a speed regulator board is installed in an editor, the board must be calibrated to the editor. This is to account for variations in the output of the speed control lever from system to system and local line voltage. Performing the calibration in the order below will properly set up the board to work with the editor.

Note: Whenever the switch settings are altered, the entire calibration procedure should be performed.

Setting the DIP Switches:

There are seven switches located near the bottom edge of the board in a single DIP (Dual In-line Package). The switches are numbered (left to right) from 1 to 7. When the switch is in the down position it is OFF.

To set the synchronized frame rate, set the switch position 1 and 2 as follows:

Frame Rate	Switch 1	Switch 2
18 FPS	OFF	OFF
24 FPS	OFF	ON
25 FPS	ON	OFF
30 FPS	ON	ON

To set the editor type set switch position 3 as follows:

Film Size	Switch 3
16 mm	OFF
35mm	ON

The forward SYNC speed position can be set to the first or second detent position on the hand control. By using the second detent position the first detent position will provide a creep speed of about 3-5 FPS and the top speed of the editor will be limited to about 35 FPS (assuming a sync speed of 24 FPS).

To set the SYNC detent position set switch position 7 as follows:

SYNC at	Switch 7
1 st detent	OFF
2 nd detent	ON

Switches 4, 5, and 6 are not used at this time and the settings of these are ignored although it is suggested they be set in the OFF (or down) position.

Powering up the board:

Plug the board in to the speed regulator slot in the card cage. When the editor is powered up you will see three or four codes displayed on the LED display. Each code is displayed for about 1 second.

Note: The speed regulator board will not respond to the operator's speed control lever until the following these startup codes have been displayed (about 3-4 seconds).

First code:

The first code displayed is the program version number and will appear as "PX.X" where **P** indicates "Program" and **X.X** identifies the program version number. If you have a question or problem with the board, please have the program version number available.

Second code:

The second code displayed indicates the frame rate the board is set to (by the DIP switches above) that the editor will run at in the forward sync mode. This will appear as “**FXX**” where **F** indicates “Frame rate” and **XX** indicates the synchronized frame rate (18, 24, 25 or 30 for a standard board).

Third code:

The third code displayed indicates the editor type (as set by the DIP switches above) and in the format “**EXX**” where **E** indicates Editor and **XX** is set to 16 (for 16 mm editors) or 35 (for 35 mm editors).

Fourth code (Software version P0.6 only):

The fourth code displayed indicates if the forward sync position is at the first detent “**d1**” or the second detent “**d2**” position.

Calibrating the board:

For best long term results, allow the board to warm up for at least 2-3 minutes before performing the calibration procedure. Calibration may be done with no film on the editor.

Calibration of the board is very simple. No electronic test equipment is required. The only tool needed is a small screwdriver.

1. With the speed control lever in the stop position, adjust the top pot (marked “STOP ADJ”) until the yellow STOP LED is illuminated. Note the “end points” of the pot adjustment range (where the yellow LED just comes on) and adjust the pot to the approximate center of this range.
2. Move the speed control lever to the forward sync position. If the blue LED comes on, adjust the middle pot (marked SYNC ADJ) in either direction until the blue LED goes out.
3. With the control level in the forward sync position, adjust the bottom pot (marked GAIN ADJ) until the frame rate in the LED display is approximately equal to the desired frame rate when the editor is synchronized (the frame rate set by switches 1 and 2).
4. With the film editor running at approximately the correct sync speed with the control lever in the forward sync position and the blue LED not illuminated, adjust the middle pot (marked SYNC ADJ) until the blue LED turns on. For best results

find the ends of the pot adjustment where the blue LED comes on then adjust the pot for the approximate center of this range.

The board is now calibrated.

Important Calibration Notes:

1. The transport motor in the editor runs directly off the AC line voltage and is, therefore, unregulated. AC line voltage may vary over the course of the day or the time of the year and may result in the film speed being a little too fast (or a little too slow) when the control level is initially moved to the forward sync position. The regulator board will sense the error and correct for line voltage variations but it may take 1-2 seconds to attain the sync speed. It is recommended that the board be calibrated at the same time of day that the editor would normally be in use to minimize this potential initial offset in film speed..
2. The editor should run at approximately its forward sync rate when the speed control lever is moved to the corresponding in the reverse direction. If there is a significant difference, it may be due to the voltage from the control lever not being at 0.00 volts when it is in the STOP position. With the lever in the STOP position, the voltage between pin 4 (GND) and pin 21 (control input pin) of the speed regulator board should be very close to 0.00 volts. If it is not, mechanical adjustment at the control lever should be performed to attain 0.00 volts on pin 21. Once this step has been performed the regulator board must be recalibrated.
3. The synchronized frame rate may affect the top speed of the editor in both the forward and the backwards direction. The slower the synchronized speed the slower the fast forward/reverse speed may be.
4. Avoid running 35 mm editors faster than 100 FPS
5. Avoid running 16 mm editors faster than 200 FPS

Using the Motor Speed Regulator Board

Under normal operating conditions this board is out of sight from the operator. This section of the user's guide contains a few notes that may be of interest to the user.

LED DISPLAY:

The LED display serves several functions. At power up it will display the micro controller's program version number, the synchronized frame rate (as set by the DIP switches), the editor type 16/35 mm (as set by the DIP switches), and if running software version P0.6 the hand control detent used for the forward SYNC position (d1 or d2). From that point on this LED display indicates the editors actual frame rate. For

speeds below 100 Frames Per Second (FPS) the frame rate is shown in tenth's of frames per second (**XX.X**). At frame rates of 100 or higher the LED display shows the frame rate in whole frames per second (**XXX**). Note that only the 16 mm editors may display frame rates that get into the hundreds range.

The frame rate shown in the LED display may vary as much as +/- 0.2 frames from the actual frame rate. When running in synchronized mode it is normal to see this value vary slightly (although most of the time it stays within +/- 0.1 FPS).

The method used to obtain and calculate the frame rate is less accurate and independent from the software used to control the motor speed. When in forward sync mode it is expected that the frame rate displayed will frequently show frame rates +/- 0.1 frame per second from the true speed.

STROBE OUTPUT:

The board has a strobe output that always runs at the synchronized frame rate set by the DIP switches. An optional high intensity LED can be connected directly to this output and used to verify the frame rate by shining the LED onto any of the moving sprocket drives on the editor table.

BE GENTLE ON YOUR FILM:

The software is designed to be gentle on the film placed on the editor. If the operator rapidly moves the control lever from the fastest forward position to the fastest reverse position, or vice versa, the software will change the motor speed at a slower rate until it catches up with the command from the speed control lever. Of course it is suggested that the operator not rapidly flip the control lever from one extreme to the other under any conditions since a large amount of film on any take up spindle may take time to come up to speed and possibly snap the film. For best (and more gentle) operation it is suggested that the control lever not be moved faster than 1 second from the stop position to the full forward or reverse speed and when changing directions it is suggested you pause the speed control lever in the STOP position until the editor comes to a stop before reversing the direction of the film.