Background:

My sister Regina Sandoval is Psychotherapist and she use EMDR technique in your sessions with their patients.

Because I am an engineer of electronic product development, she asked me in January 2015 to explore the possibility to design and manufacture a like existing commercial equipment that would allow you to use this technique in clinical electronic equipment.

I set to work first studying the state of the art and the ability to innovate in the realization of this device.

Initially the following requirements and functions described below for further design and manufacture is described.

The following paragraphs describe the functionality and especificacionesque should have the apparatus and have served as a guide to design and manufacture the prototype, covering aspects of HW (envelope and electronics) and SW (functionality and code that implements it)

The project is to design a single controller on RGB LEDs 24 arranged in a horizontal line. In total there will therefore: 72 LEDs (24 red, 24 green and 24 blue) to be controlled by the SW + HW.

Operating Modes of the visual stimulator.

Being arranged in a line of 24 four-color light spots (Red, Green, Blue and White as the sum of the three) can achieve the following modes:

- **Operating mode 1**:

They light up one by one from left to right speed Cte. From the first to the last, and once it was on the last will turn in the opposite direction (from right to left) at the same speed

- **Operating mode 2**:

Light up just as in the previous case but a brief pause in the LEDs first and last. This pause will be fixed for each speed.

- **Operating mode 3**:

They will turn on only the first 2 of the left, then the two on the right, repeat the 2 on the left and so on.

To select any of the 3 modes be pressed 1, 2 or 3 times the button and go mode called mode indicator lighting by 3 green LEDs on the panel. When pressed a fourth time, this will push back the effect of mode 1 and back again.

Speed adjustment

In all three modes of operation it may regulate the speed of evolution of displacement in 10 steps and be represented by the vertical segments LED indicator called speed. To select the desired speed will be pressed on the upper button next to the indicator to increase and lower to decrease.

Adjusting the light intensity

You may also adjust the brightness of the LED bar in 10 steps and is represented by vertical indicator segments called intensity LEDs. To select the desired intensity will be pressed on the upper button next to the indicator to increase and lower to decrease.

Color Adjustment

The color can be selected from four possible: Blue, Red, Green and White, the latter obtained as a result of firing of the 3 simultaneously.

Pressing the button repeatedly on color selection, will go a LED lighting that show the color current show.

Using the device

To start a session using the device will proceed to make the speed settings, color, light intensity and operating mode desired for the session, according to the instructions described in the preceding paragraphs.

This adjustment process is called: programming mode

Once that has been done scheduling the meeting, it passed the check mode settings by pressing the START key.

If the result is not to your liking, you must press the STOP button and going back to the programming mode, returning to make the adjustments desired speed, intensity, etc.

If instead the mode selected if it were sought, and therefore meets the requirements pursued, also we would click the STOP button, but this time we would not press any key adjustment, thus leaving memorized the latest schedule, and waiting pressing the sTART key to start the session.

Even when the computer turns off the main switch, they will be recorded adjustments that were selected for the last session, so that when you turn on the computer, the first session always begins with the setting of the last session, however, if wanted to change the schedule, only have to act on any button adjustment, ie programming can be made to turn on the computer or by pressing the STOP button.

Peripherals Needed

1. **Control panel and LED display for programming**:

   keyboard with 8-key for::

   - Mode Selection
   - Selection of Color
   - Increase Brightness
   - Decrease Brightness
   - Increase Speed

- Decrease speed

- Sart

- Stop

The keyboard functionality will "auto-repeat" for all keys except START and STOP the time to start the "auto-repeat" may be 2-3 seconds after the start and go to 1 second.

Panel indicators:

- Vertical bar indicator LEDs speed of 10 levels

- Vertical bar indicator LEDs intensity 10 levels

- Three green LEDs to indicate the operating mode

- A red LED to indicate on / off

- A tricolor LED display the selected color

2. Remote Control IR

You must have the 8 keys incorporating the panel.

The settings display is displayed using the bar itself LEDs and described below.

The remote control is an additional option that will have to pay extra.

To be able to incorporate the remote control, the RB0 pin (which can be used to interrupt the uC) should be reserved for the output of infrared detector.

3. To regulate the brightness of the PWM will be used

4. To store the "factoring setting" and the “operation setting”

The E2PROM of the micro computer be used

5. By default will drive LCD (2x16) and RS232 to communicate with the PC.

The reason is that you can use in debugging. Then optionally may be used (or not) in the final development if it is useful.