An Inexpensive PC Based Light Board for Community Theaters

Background

Most community theaters with a stage have a light board. This typically is a hardware unit that can vary from the size of a standard keyboard to an entire desktop of equipment. The light board is connected to theater's lighting system via a plug-in cable, called the DMX cable. This is a standard cable that allows any light board to operate in any theater. The problem is that some light boards are complex to setup and operate, while others don't have all the features desired. In addition, they are all very costly. Usually they are priced into the thousands of dollars. In the last few years, several vendors have introduced PC based light boards but these are still priced at about a thousand dollars.

I came across an inexpensive PC to DMX interface unit (Velleman VM116). It is typically priced about $85. As an experiment, I thought it would be interesting to create a PC based light board based upon it. I ordered the unit, got out my old programming books and within a few days I was able to create a very practical PC based light board.

Basic Setup

This package needs the VM116 (available at www.sirs-e.com) , a PC running Windows 98SE, ME, XP, Vista or Windows 7. The PC must have an available USB port. Boot the PC and wait for it stabilize. Plug the VM116 into USB port. After a minute or so, you should get a message (first time only) that the human Interface device is ready for use. With Windows Vista, the message may be that the HID has stopped working. This is not normal but the message can be ignored. The red power light on the VM116 should come on.

Plug the VM116 into the theater's DMX circuit. You may need a 3-pin to 5-pin DMX plug/jack as the VM116 has a 3-pin jack but most theaters have a 5-pin plug. Having your own 3-pin 50 foot DMX (microphone) cable might also be handy.

Create a folder on your PC to contain the software. Copy the software from the

on-line software distribution folder

to this folder. The folder on your PC will now contain at least these two files:

```
DMXfinder.dat
```

MikeLight.dat

Rename these files

DMXfinder.exe
MikeLight.exe

There also may be theater or show files ending with .txt also. Such as:

Mulberry.txt
MellonPatch.txt
LakeMiona.txt
TheKingAndI.txt
BusStop.txt
IceHouse.txt
OcalaCivic.txt

Copy these in, if you might use them.

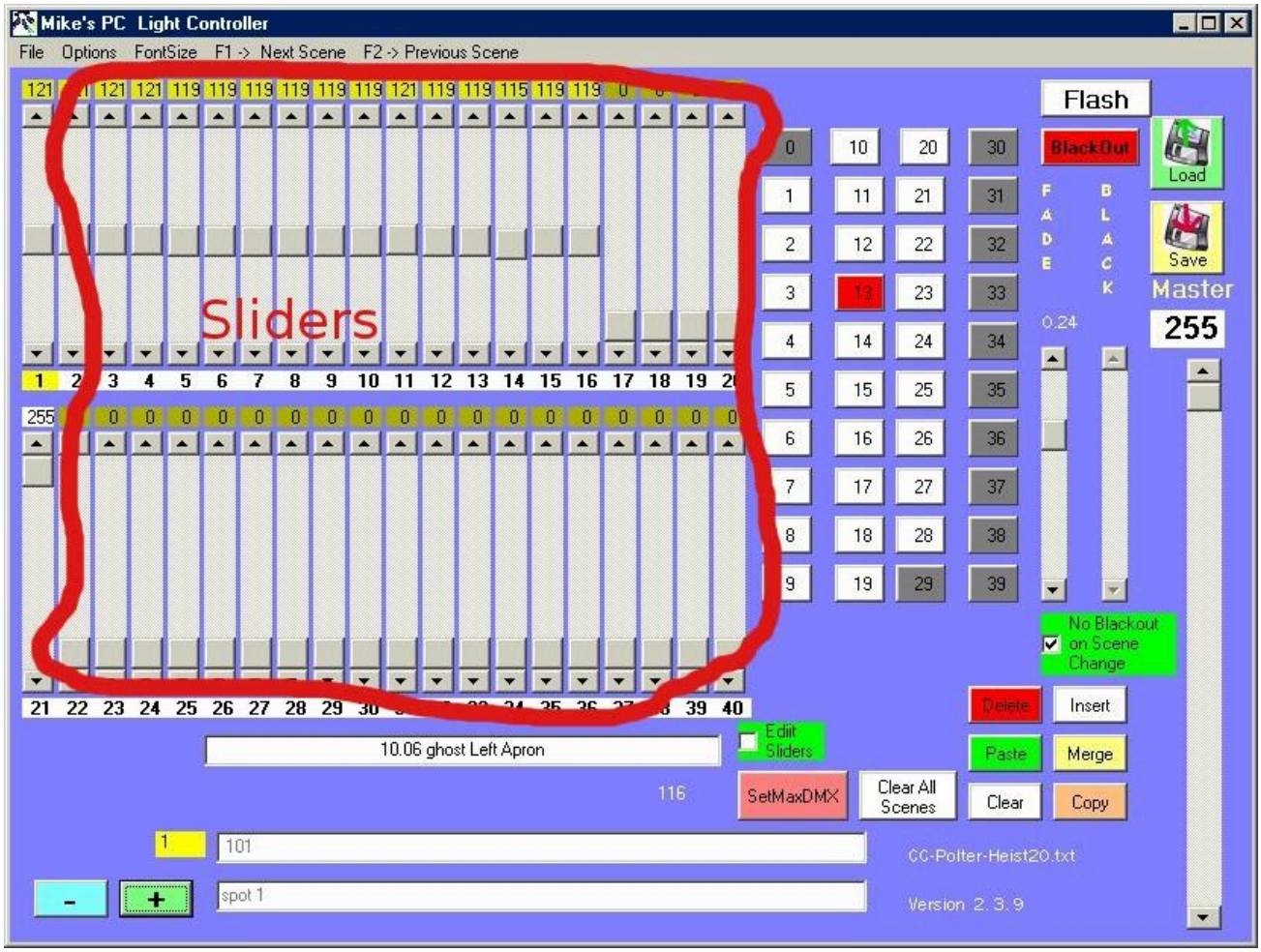
Next copy the files:

FASTTime32.dll
K8062D.dll
K8062e.exe

that are included with the VM116's CD into the same directory. You might want to create shortcuts on your desktop to either this folder and/or MikeLight and DMXfinder files.

Basic Operation

Start the main program by double clicking on MikeLight.exe. A screen like this should appear:

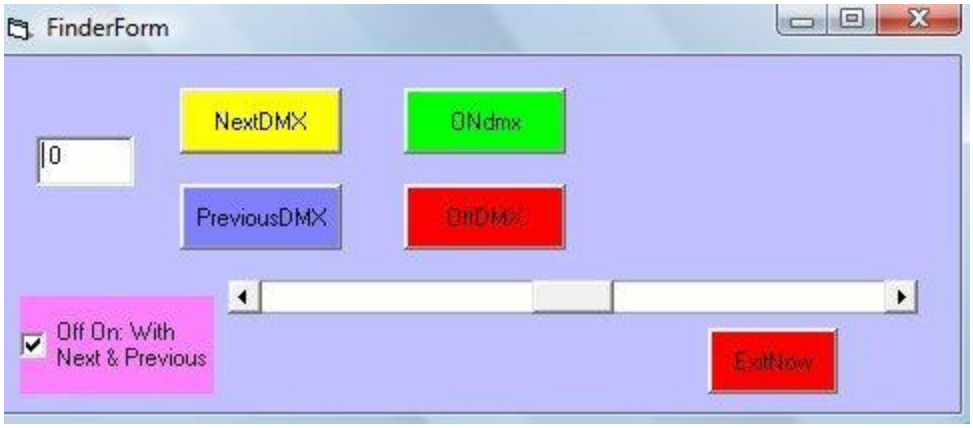


On some versions of Windows you might get the message that the program can't find some of the .OCX libraries. Sometimes this can be solved by running the program as the administrator. This can be done by right clicking on the MikeLight.exe file and selecting **run as administrator** or by setting the **run as administrator** flag in properties dialog of the short cut file that points to this file. I have been unable to resolve why this is needed on some versions of Windows as the program does nothing that needs administrator privileges. Other times, these Windows libraries are just plain missing. If running as administrator does not solve the problem, download the Package.dat file into a empty temporary folder. Change its name to Package.exe and run it. It should create 3 files. One being a setup.exe. Run this to install the missing libraries. Remove the temporary folder when done. When installing the libraries, you may get a message asking if you want to keep a newer version. The answer is always **Yes**. You only want to install missing libraries. This is a one time task, you will be able to update MikeLight.exe by just replacing this single file as the libraries rarely change. The MikeLight.exe included with the libraries may be out of date, so replace it with the latest version from the on-line software distribution folder.

Be sure to set the **Master** slider all the way to its uppermost position (as show) before starting. Use the mouse to move the various **Sliders** up and down. The various lights should come on as you move the sliders. If they do you can skip to the Basic Scene Setup section of this document. If they don't, the theater has non standard patching. It is possible that somebody has already figured out the patching for this theater. So, click on the **Load** item from the **File** menu (top line), this should open a window to allow you to select a file name from the folder with the .txt files. If you are lucky, there will be a file name with the name of the theater. Select this file and click on **Open**. Now try moving the sliders up and down. If they now operate the lights, skip to the Basic Scene Setup section of this document. If they don't or if there was no file for this theater, you are going to have to patch the sliders to the DMX channels.

DMX Finder Program

Exit the main program by clicking on **Exit** from the **File** menu. Start the DMX finder program, by clicking on "DMXfinder.exe". The screen should look like this:

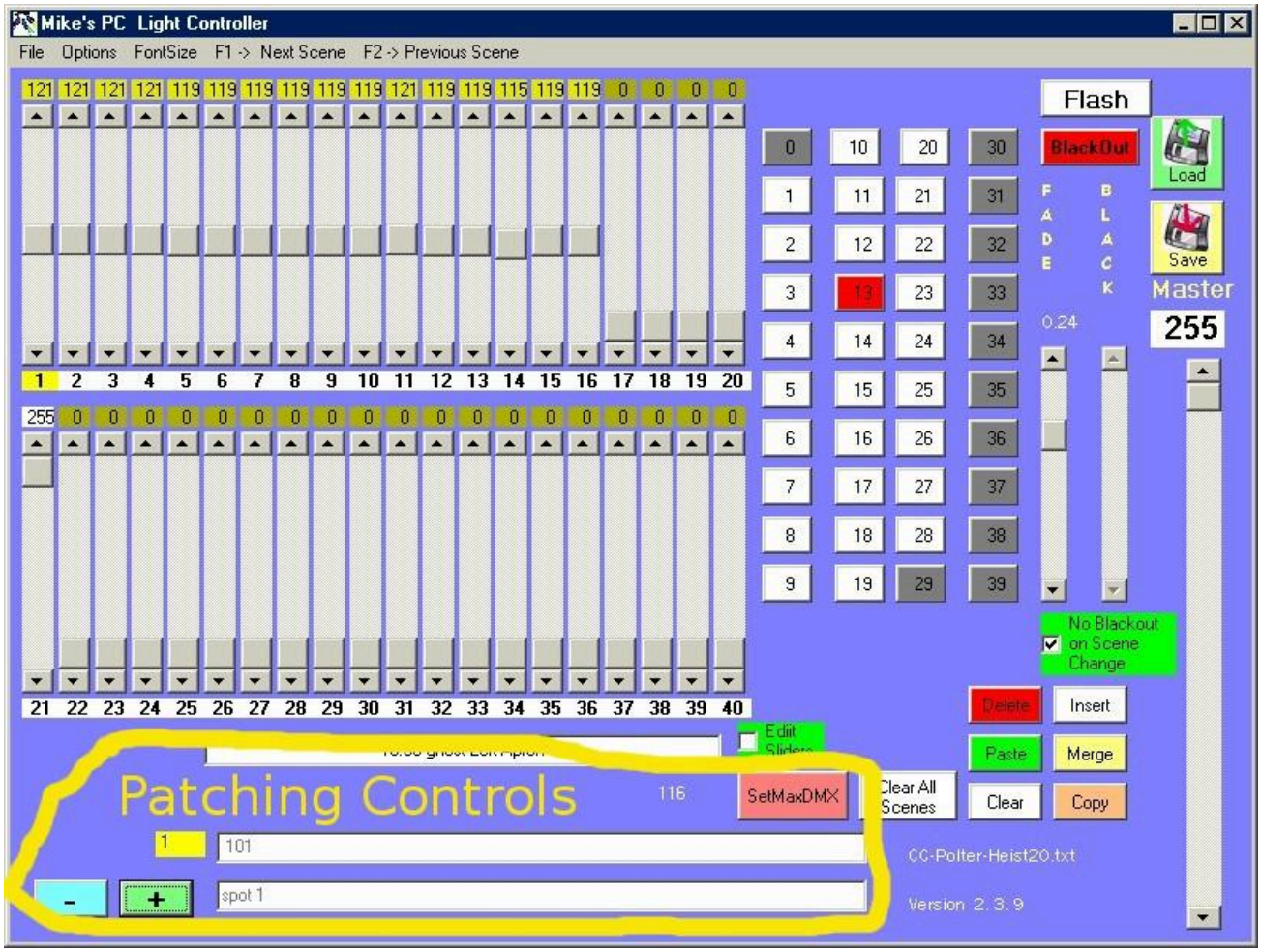


1. The text box indicates the current DMX channel. Each time you click on NextDMX (or PreviousDMX) the current DMX channel is turned off and the next higher (lower) channel is turned on. By clicking on these two, you should be able to quickly identify which DMX channel controls which lights. You may enter a number directly into the text box to quickly skip to another channel.
2. I have found it useful to keep notes in a file as to which DMX channel controls which lights. An entry might be, for example, "DMX channel 13 controls the left most stage light".
3. The ONdmx and OFFdmx allow you to turn a channel on on or off without changing the channel.

4. The slider can be used to vary the brightness of the current lamp.
5. Unchecking the "On Off with Next Previous" cause NextDMX and PreviousDMX to increment (or decrement) the DMX channel without turning the light on (or off).
6. After you have identified all the lights to their DMX channel, click on ExitNow.

Patching DMX Channels to Sliders

After you identified which lights are on each DMX channel. Exit the DMXfinder program and start the main program by clicking on MikeLight.exe. A screen like this should appear:



Notice the yellow text box near the bottom left side of the screen. This is the slider number. Note that the number corresponding slider (above) is also in yellow.

From the **Options** menu (top line) click on **Edit Sliders** option. In the text box just to the right enter the DMX channel(s) you wish to assign to that slider. In the text box just below the previous one, enter a comment that explains what light(s) this slider controls. The comment is optional but I find it helpful to remind myself what a slider does without having to turn on that slider during the show.

For example, you might set slider 1 to control leftmost stage light (spot 1) on DMX channel 101. The upper text box would have "101" and lower text box would have "Spot 1". Click the "**Set Slider**" button. This will record a DMX channel for the current slider. You can use the "⇓" and "⇑" buttons to cycle through all the sliders or you can click on a slider itself to quickly select that slider. Be sure to click the "**Set Slider**" button before selecting another slider to patch else your patching for the current slider will be lost.

If you wish to assign more than DMX channel to the same slider, enter the channel numbers separated by commas. For example: "56, 78, 103".

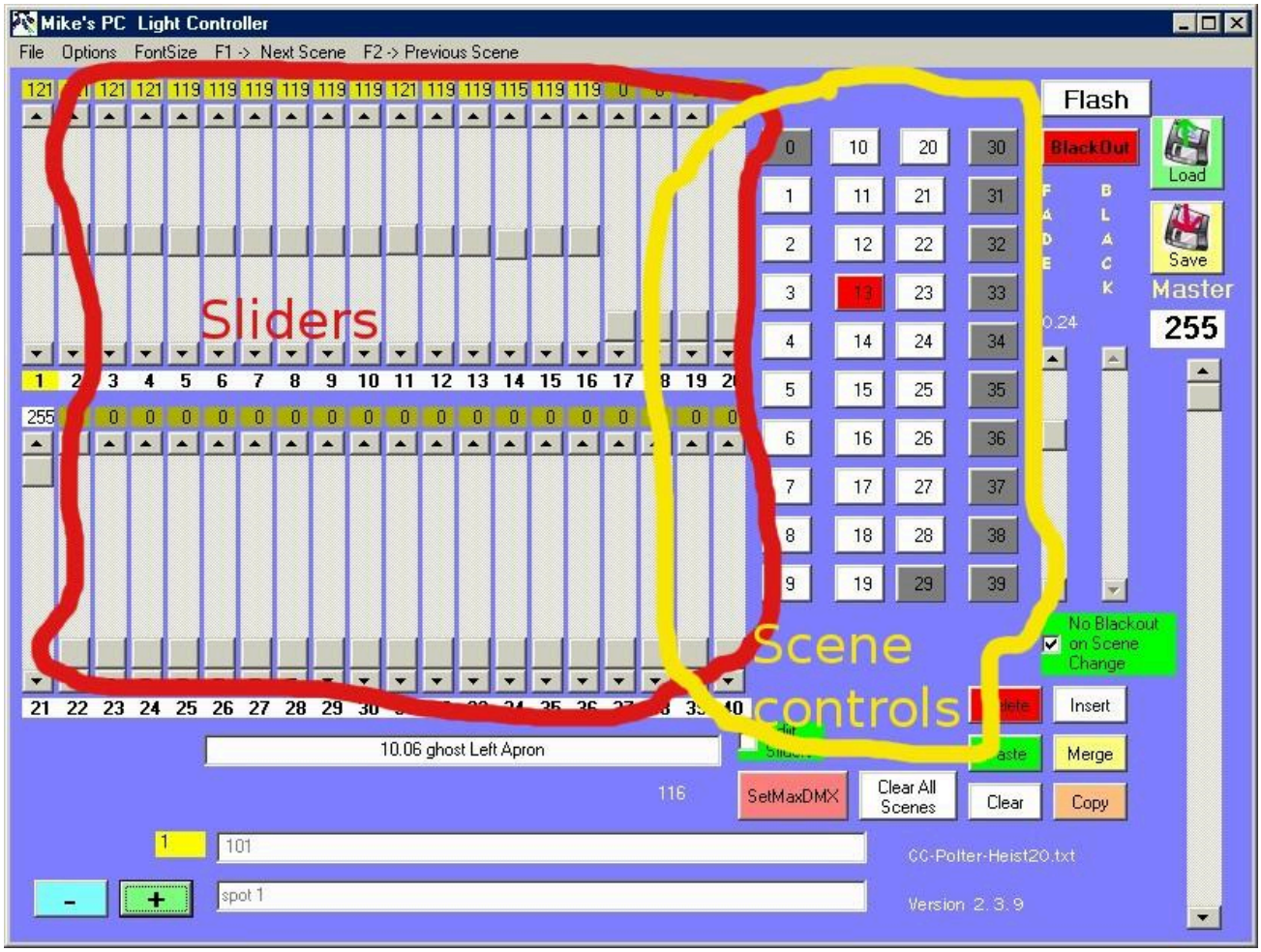
After all the DMX channels have been assigned. Click the **SetMaxDMX** button. If more than one slider has been assigned to the same DMX channel an error message will appear. It will indicate which sliders have the same DMX channel assigned. Click on a conflicting slider to edit its DMX channel assignment(s).

When clicking the **SetMaxDMX** button no longer causes an error message, click off the **Edit Sliders** item from the **Options** menu. Next click the **Save** item from the **File** menu (top line). A save file dialog will appear, create a file by the name of the of the theater and save it.

In the future, use the **Load** item to select this file when in this theater.

Basic Scene Setup

Start the main program, if it is not already running, by clicking on MikeLight.exe. A screen like this should appear:



A scene is a set of user defined setting of the various sliders. For example, a scene to light the left half of the stage might involve 3 to 5 sliders set at various levels.

For now, set the **Fade** slider at its uppermost position and the check box below it should indicate "No Blackout on Scene Change".

To make this a defined scene that you can quickly select, first select (click) on an unused (grayed) **Scene Button**, these are the numbered buttons to the right of the sliders. Adjust the numbered **Sliders** to get the desired effect on the stage. The **Master** slider, on the lower right may also be used to achieve the desired effect. In the text box right below the sliders you should assign a name to the scene to remind yourself what or where this scene is used. I usually start each name with the page number in the script (e.g. **07**) followed by the cue within the page (e.g. **4**). For example "**07.4 Light up center stage**". I find the name helpful for both off-line editing and to remind myself during the show that I'm on the correct lighting pattern for the current scene in the production. Once the desired scene is

achieved click the **Record** button.

Repeat this process for all of the scenes desired using a different scene button each time. A grayed scene button indicates all the **Sliders** recorded for that scene are at the lowest (off) level. A white scene button indicates at least one of the recorded **Sliders** is on. The red scene button is the current scene.

Finally, click on **Save** from the **File** menu to record your scene settings into a file. It is suggested that the file name be the name of the show. For example, "You_Cant_Take_It_With_You.txt".

Basic Scene Usage

After several scenes have been recorded and saved you can quickly change the stage lighting by just clicking on the scene button desired.

SceneList

By clicking the **SceneList** item from the **Options** menu (top line) a movable and resizeable frame with a scrollable list of the scenes appears. The current scene's name is shown highlighted. Clicking on a scene's line in this list has the same effect as pressing the button of the scene that has that name. This option's setting is saved on a per user basis within the registry.

By checking the **Sorted** item from the **Sort** menu of this frame, the display of scene list is sorted alphabetically. For this to be useful, the scene names should be prefixed by the cue number and/or page number. The mapping of the scene buttons to scene names is not changed as this is a virtual sorting. While the sorted list is displayed, the **F1** and **F2** keys increment and decrement by order in this display.

Scene Copy, Paste, Merge, Clear

Clicking the **Copy** button places a copy of the live view (the settings of all the sliders (including the Fade, Black and Master sliders) as well as the status of the "[No] Blackout of Scene Change" check box and the scene name text box) into an internal clipboard. This might not be the values stored in the within the current scene's memory location.

Clicking the **Paste** button copies the clipboard contents to the live view. Thus, to copy scene 23 to scene 5 the procedure would be: Click on scene button 23, click Copy, click scene button 5, click Paste, finally click Record.

Clicking the **Merge** button merges the clipboard onto the live view sliders. If the setting of a slider within the clipboard is greater than the setting of that slider in the live view, the clipboard setting of that slider is copied to the live view slider. The clipboard's values of the Fade, Black and Master sliders and the check box setting are not considered during merge.

Clicking the **Clear** button clears the live view by setting all the sliders, the check box and the scene name text box to their default values

Note that these 4 buttons do not use nor change the data in any scene memory location, they only use and change the live view.

Scene Insert, Delete, Clear All

Clicking **Delete**, deletes the data in the current scene memory location and the data in all higher numbered scenes is moved down one scene number.

Clicking **Insert**, duplicates the data in the current scene memory location into the next higher numbered scene. The data from higher numbered scenes is moved up one scene number.

Clicking **Clear All Scenes**, clears the live view then copies the live view into all the scene memory locations.

Quick Buttons

Within the options menu, the item **Quick Buttons** is available. This option controls the displaying several of the buttons on the screen. These buttons provider quicker access to their associated functions than going through the top menu at the expense of a more cluttered screen. It is the user's choice to display them or not. This item's setting is saved on a per user basis within the registry.

Complex Fixtures

Within the options menu, the item **Complex Fixtures** is available. This option allows control of the features on complex fixtures. These features might include control of gobos, aiming, zoom, and color. When this option is set the high 16 channels (25-40) are not effected by the Master slider, flash button, blackout button nor fades between scenes. When this option is active, slider 37 (38,39, 40) should be mapped to be ALL of the complex fixtures' White (Red, Green, Blue) DMX channels (if any). Adjusting these sliders will change the color of ALL of the fixtures. Tip: When controlling fixtures like these with this option, start programming each scene with the color sliders (37, 38, 39 and 40) all the way up, if you start with them all the way down the color of ALL lamps will be BLACK (off) and no matter what you do with the intensity level sliders! The rectangular box below the scene name box shows the approximate color that has been selected by these four sliders. As the color mapping of the PC's screen and of the lamps are not exactly the same, there will be some differences. This item's setting is saved within the registry on a per user basis.

Scene Fade and Black Timing

When the **Fade** and **Black** sliders are in their uppermost positions, all scene changes take place as quickly as possible. Moving the Fade slider to a lower position slows the rate at which the old scene fades out and the new scene fads in. If the

check box indicates "**No Blackout on Scene Change**" the fade out and fade in overlap each other.

If the check box indicates "**Blackout on Scene Change**" the fade out will complete to blackout before the fade in begins. In this case, if the Black slider is lowered, there will be some noticeable period of total blackout between the fade out and fade in. The lower Black slider, the longer the blackout.

When a scene is recorded, with the **Record** button, the settings of the **Fade** and **Black** sliders as well as this check box are recorded with the sliders into the scene's memory location.

When changing between scenes, for example from scene 15 to scene 7, the settings from the old scene (15 in this case) are used to control both the fade out of scene 15 and the fade in of scene 7 as well as the blackout time (if any).

The numbers above the **Fade** and **Black** sliders indicate the duration, in seconds, of the fade or blackout.

Flash and Blackout/Resume

Clicking on the **Flash** button causes all lights to turn off for as long as the mouse button is held down. Releasing the mouse button causes the lights to restore to their previous levels. Clicking on the **Blackout** button causes all lights to turn off. Clicking on the **Resume** button causes the lights to be restored to their previous levels before the **Blackout** button was clicked.

Keyboard Function Keys

The keyboard function keys **F1** (for Next) and **F2** (for Previous) can be used to step through the scenes. If the scene buttons are shown, the these keys step through by button number order.

Solo Mode

Moving the mouse over a scene button and then holding the right mouse button down causes that scene to be immediately applied without any fade or blackout times. Releasing the button restores the previous lighting pattern without any fade or blackout times.

JoyStick (underdevelopment)

Clicking on the Enable JoyStick option under the JoyStick menu, enables use of a joystick. This is a new feature that has not been fully developed but you are welcome to try it out. It may change or be deleted in futures versions. Once the is

JoyStick is enabled the buttons on the JoyStick operate as follows:

Button 1 Does the same as the **F2** keyboard key.
Button 2 Increases the Master Slider by 40%.
Button 3 Does the same as the **F1** keyboard key.
Button 4 Decreases the Master Slider by 30%

Independent Mode

Double clicking on the number below a slider turns the number's background **red** and puts that slider in independent mode. In the mode this slider's value is only changeable manually. This is, you can only change it by selecting it with the mouse and moving it. Changing scenes has no effect on this slider, likewise **Paste, Merge**, **Clear**, **Blackout**, **Flash** and **Master** do not effect it. Double clicking on it again or on another slider's number releases it from independent mode.

Grouping Sliders

Clicking on the number above a slider turns the number's background **blue** and switches that slider in or out of the group. All sliders in the group move together. Thus, changing manually one slider in the group moves the rest of the group's sliders to that value also. The group is very temporal, changing scenes clears the group, likewise **Paste, Merge**, **Clear** and **Load** also clear the group.

Missing Features

As I built this software for my own use in community theaters, I did not include features that either I don't use or I can't test in a local theater. Such features as chases, the ability to aim or focus lights through the light board are not in this software. Nor does this software support any interface except the VM116. A more feature rich free software package you might want to consider if you want these features is FreeStyler. One attribute that this package does have that few others have is the ability to run on a Windows 98SE machine with only 64MB of memory. Many people have one these laptops sitting around. It is too limited for most applications but too good to throw away. This program also displays 40 sliders and 40 scene selection buttons on the screen at the same time. I find this a very helpful feature that no other program (that I'm aware of) has.

Technical Quirks

The signal sent to the DMX dimmer channel is a number from 0 to 255. In the first versions of this software a simple linear translation was used. That is, setting a slider to its half way point would send a signal of 128. This did not appear to dim

the light by half. So, it was changed from being linear to exponential. This makes the slider's position agree with the apparent light level. The actual formula used for the DMX level is: (slider's value)^2 * (master's value)^2 / (255)^3. This might be refined in the future.

Internally the program maintains a database of linking each scene button to a name and the various settings for that scene. The scene name list is a run time sorted mapping of scene names that link back to a scene buttons.

The time duration set by the **Fade** and **Black** controls is also exponential. The smallest time increment was set to be greater than the maximum time the program needs to process 20 channel level changes. This might be refined in the future.

The VM116 can become sluggish (up to 600 milliseconds) if it needs to process many channels. Thus, keep the maximum DMX channel number used as low as possible by assigning unused sliders to DMX channel 0.

The program never sends a signal to DMX channel 0. No dimmer should be configured to channel 0.

The program sends a 0 signal level to DMX channels 1 to 40 upon start up. This may change or become an option in the future.

When this program terminates, all channels are left at their current levels. It was considered saving the current state program from time to time and using this information to quickly restore everything at start up in case of a program crash in during a live show. So far, the program has proved to be incredibly stable and thus no need for such a feature.

Upon loading a .txt file, the program makes scene 0 from the file the current live scene. You might want to make is a default light setting. Perhaps some stage and house lights at about half brightness.

While not recommended nor supported, it is possible to assign a DMX channel to more than one slider. When a scene change or master level change occurs, the setting of the highest numbered slider is used to control the DMX channel. When a single slider's level is changed, that slider's level will be used to control the DMX channel. This may change in future versions of this software.

New versions of the files may be created from time to time. The documentation will be updated, if operational changes are made.

No Warranty

This software is distributed free of charge. There is no warranty that it will operate as documented nor that it will not cause inadvertent harm.

Questions and Comments

Questions and comments may be emailed to mikeveach43213@yahoo.com