Installation and Operations Manual
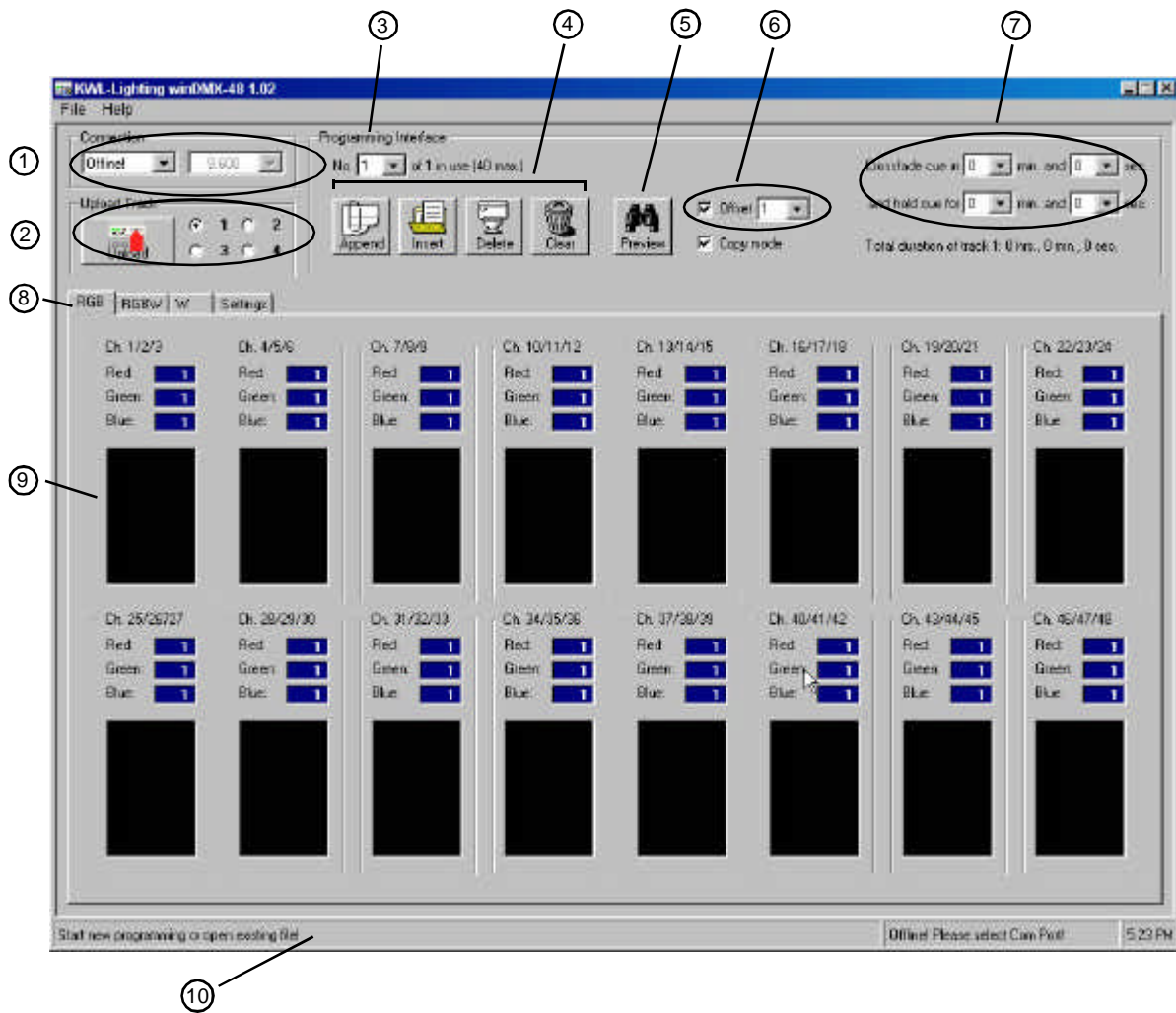
WinDMX Applications Software Version 1.02

DXG-48 Color Sequencer

brightline ™

WinDMX Main Screen

1. Connection section, where the baud rate and com ports are set up.

2. Track Set: the Upload button to transfer settings to theDXG-48; and the Track number radio buttons

3. Where the active cue is chosen

4. Cue Append, Insert, Delete and Clear buttons

5. Preview/Stop Preview button

6. Offset level selector

7. Cue timing and Cue hold selectors

8. Tabs to change programming interface for different fixture types

9. Color selector

10. Status Bar

Installation of the DXG-48

The first thing that you will need to do is to find a place to install the DXG-48. It may be used without any enclosure; and it is also configured to fit into a DIN-Rail relay rack. If yours did not come with an enclosure, you may want to procure one for it. It will need a source of AC power (120V 60Hz or 230V 50Hz depending on your locality).

On the top of the DXG-48, there is a label that among other things, indicates where the wiring should be connected (*see the DXG-48 Terminals Diagram, below)*. There are two horizontal rows of wire clamps, with each position having two places wires may be inserted, and a corresponding slot for opening the terminal. The clamps are spring-loaded, and by inserting a small screwdriver into the slot *above* the corresponding clamp and pushing down they may be opened for inserting the wiring.

The low voltage wiring should be installed before installing the power connectors. The DMX output wires should be inserted into the DAT+, DAT- and GND positions on the upper row. The Standard method of wiring a DMX plug (5-Pin XLR-type) is that Pin 1 is GND, Pin 2 is DAT- and Pin 3 is DAT+.

If switches were not provided by **brightline**, they need to be Momentary Contact, Normal Open. The Voltage and Current Flow are 3.3V at 2mA. The switches need to be connected between the GND and the T1, T2, T3 and T4 positions in the bottom row. If the switches are provided with LEDs, they should be connected to the upper row between GND and L1 through L4, respectively (make sure you observe the correct polarity for the LED). A constant current source of 2mA is provided for each LED, so in most situations it is not necessary to use a current limiting resistor. In most situations, an actual switch is provided; but of course any device (like a timeclock) that functions as a switch can be used.

Finally, connect the power wiring to the L (Line) and N (Neutral) terminal positions. No position for power Ground is provided or needed. NOTE: WHEN THE DXG-48 IS CONNECTED TO AC POWER, THE "L" AND THE "N" TERMINALS ARE AT LINE VOLTAGE POTENTIAL. MAKE SURE THAT NONE OF THE OTHER TERMINALS ON THE DXG-48 ARE CONNECTED TO THESE TWO TERMINALS OR TO THE POWER SOURCE. ALL WIRING ON THE DXG-48 SHOULD BE DONE WITH THE POWER REMOVED, AND BY QUALIFIED PERSONNEL. It should go without saying that all wiring should comply with National and Local Codes and safe electrical practice.

	AC Power			DMX Output				Track Switch LEDs				
Upper Row	L	N	n/c	GND	DAT-	DAT+	n/c	GND	L1	L2	L3	L4
Lower Row	n/c	n/c	n/c	n/c	n/c	n/c	n/c	GND	T1	T2	T3	T4

DXG-48 Terminals   Track Switches

To program the DXG-48, you will need a Windows PC with WinDMX48 software installed. To install the software, refer to the separate sheet with installation instructions. In order for WinDMX to display properly, your monitor should be set for a minimum resolution of 1024x768 pixels, using 16 bit or 32 bit color resolution (see the instructions that came with your PC if you do not know how to do this).

To connect the DXG-48 to the computer, you will need a Null Modem cable, which may have been provided by **brightline**. (A cable with "straight through" wiring will not work). The connector on the top of the DXG-48 is a DB9 Male, so the cable needs a DB9 Female connector. The serial connector on most computers is also DB9 Male. Connect it to the Serial (COM) Port of your computer and to the receptacle on the top of the DXG-48. The total cable length should be under 50' (15m) but the shorter, the better. On most desktop and tower computers, it is on the rear of the processor; it is

normally a "male" receptacle with 9 pins. Usually, but not always, the external receptacle will be COM1 and if there is a Modem on the PC, it will be on COM2. If your PC has been changed from the default Windows Communications Settings, you may need to adjust the Port parameters. See Appendix #1 for instructions on how to change these values.

Configuration of the WinDMX Software

WinDMX does not need a fancy, high-speed PC to operate on; but it is recommended that no other software be running while in PC Mode, as WinDMX may not function correctly if another program is running. If your WinDMX software was installed properly, you can start the program with the Start>Programs>KWL-Lighting option, or you may create a Shortcut on your Desktop in the normal fashion. The program that you need to activate is WinDMX.exe. You should now see the WinDMX Main Screen. You may need to manually center it on your display so that you can read the Status Bar on the bottom of the Window.

First, you should make sure that your Serial cable is connected to your PC and to the DXG-48, and that the DXG-48 is connected to the AC power. Next, you need to check that your PC and the DXG-48 are properly communicating with each other. In the Connection section (#1 on the diagram) use the Pulldown Box to select the correct COM Port. The WinDMX software will try and establish a connection. If it is successful, it will show a message on the Status Bar that you are in "PC Mode," and the baud rate will be displayed next to where you set the COM Port. If it was *not* successful, the Pulldown Box will change back to "Offline!" and an error message will appear in the Status Bar. The software will set the speed of the connection to as fast a baud rate as possible (usually 115,200). When not in PC Mode the DXG-48 is in "Working Mode," which will allow it to function independently of the host computer.

It is beyond the scope of this Manual to try and troubleshoot serial communications problems, but if you cannot establish and maintain a connection 1) make sure that the proper type of Serial Cable (Null-Modem) is being used; 2) check the Communications Settings as indicated in Appendix #1; 3) make sure that you have chosen the correct Com Port and there is no conflict with its use (your Modem is not connected to it) and 4) the DXG-48 is properly connected to the AC power source.

Establishing a DMX Connection

If the WinDMX sofware can establish a proper connection, it now is in PC Mode. Any change in intensity levels will be directly sent to the DXG-48. You need to select the Fixture Type tab (#8 on the diagram) that is appropriate for the fixtures you are connected to. If they are Red-Green-Blue units you should choose the RGB Tab; if they are Red-Green-Blue-White choose RGBW. If you are controlling a regular fixtures or a dimmer rack with the software, choose the W tab.

Make sure that the DMX signal lines are run from the DXG-48 to each Master fixture. Of course, you should use proper DMX wiring techniques and appropriate signal cables. If you are in doubt, there are several guides for proper DMX installation techniques available

To use the WinDMX software correctly, the DMX addresses on the fixtures must be properly set, and the colored lamps must be in the proper sockets. With RGB fixtures, the correct DMX Start Addresses are in blocks of three, starting with 001, 004, 007, etc. up to 046. As the DXG-48 will only output 48 DMX Channels, any fixture Address set higher that 048 cannot be controlled. With RGBW fixtures, the software works with blocks of four Addresses, starting with 001, 005, 009, etc. up to 045. Within the block of three or four addresses, the lamps must be installed in the correct sockets. For a RGB fixture with a Start Address of 001, the Red lamp will be 001, the Green lamp 002, and the Blue lamp 003. If it is a RGBW unit, the White lamp will be 004. For the next fixture, you will set it up with

the next three (or four) channels in a similar fashion. Of course, if you have two sets of fixtures that will always be at the same levels (or colors) you can have multiple units with the same Start Address.

Testing your Setup

If the DMX is properly wired and the fixtures properly lamped and you are in PC Mode, you can now test your setup. If you are using a RGB fixture set to Address 001, click on the first Color Selector rectangle It will open a standard Windows Color Selector dialog box. You can either make a color choice from the 64 standard Windows choices on the left; you can move the "cursor" to pick a custom color, or you can type the values you want into the Hue-Saturation-Luminance or Red-Blue-Green Dialog Boxes. For now, select pure Red and click on "OK." If everything is setup correctly, the Red lamp on your fixture should light; the value shown for Red should be 255; and the Color Selector rectangle should be Red.. Next, test for Green on the same fixture; and then for Blue (and White). You might want to test all of the fixtures and colors in a similar fashion so you know that everything is addressed and lamped correctly.

If you have a RGBW fixture, you set the intensity of the White lamp not by the Color Selector box, but by a separate "slider" control. Click on the slider and drag the "handle" up or down. Notice that the color of the area directly above the slider will change from black through gray to white as the level increases. You may have already noticed that the intensity level for all channels is noted by a number from 0 to 255, with 0 being completely off and 255, completely on. This corresponds to the native resolution of the DMX control signal, in which there are $2^8 = 256$ possible intensity levels.

The Offset Pulldown Box (#6) establishes the lowest level that the lamp will dim to when it is turned "off." The purpose of having this control is to keep the fluorescent lamp from completely going off, as it will likely "flicker" or exhibit other undesirable behavior as the lamp goes from on at a low level to completely off or vice versa. This behavior is normal for fluorescent lamps. For stable operation, **brightline** recommends that the Offset be set at 1. If one or more your fixtures flickers at this level it can be increased. Sometimes, the low light level of the offset values will affect your output colors; so it may be necessary to make the Offset = 0 for some cues. When you are testing fixtures for proper wiring as described above, it might be helpful to zero the Offset (which you can do by clearing the checkbox) so that the functioning of the fixture may be seen more easily.

Programming a Track

The DXG-48 has the ability to store and run four "Tracks," each of which can have up to 40 "Cues." The DXG-48 can playback any of the Tracks on its own when it is in Working Mode. When the WinDMX Software indicates that you are in PC Mode, it is directly controlling the intensity of the fixtures. After one or more Tracks are built, they can then be uploaded to the DXG-48 which will then store them in its internal memory. The playback of a Track by the DXG-48 when it is in Working Mode can be initiated by closing a switch wired between GND and the appropriate Track terminal (T1 through T4).

A Track, as mentioned above, can have up to 40 Cues. Each Cue is separately built, one at a time, in the WinDMX software. If the DXG-48 is in PC Mode and connected to the fixtures, the results of the cues will be visible to the operator. For example, you want to create a sequence where the fixture starts with Red, changes to Green, changes to Blue, and then repeats the sequence. This succession of cues will then be recorded into Track 1. WinDMX selects the Cues through the Programming Interface Pulldown Box (#3).

Make sure that the Track 1 Radio Button is checked (#2). To create the first Cue, set the Offset appropriately; and then make sure that the Programming Interface (#3) indicates (Cue)1. Using the Color Selector, establish your Red color so that Red is at 255, Green at 1, and Blue at 1.

Next, you need to set the Cue Timing. Using the four Pulldown Boxes in the top right corner of the screen (#7) set the Cue Crossfade time in Minutes and Seconds; and the Cue Hold time in Minutes and Seconds. As their names imply, the Crossfade time is the duration of the change of intensities; and the Hold time controls how long a delay there is before the next Cue is run. Once the last Cue in a Track sequence is run, the cueing will "loop back" to the first Cue in the sequence; and the sequence itself will repeat until it is told to stop. Using the above example, set the Crossfade time to 5 seconds, and the Hold time to 3 seconds. Setting the Crossfade and Hold values to 0 has a special meaning to the DXG-48, as described below.

You should now have completed Cue 1. Click on the Append Button (#4) to add a Cue 2. What Cue 2 will look like is dependent upon the setting of the Copy Mode Checkbox. If it is checked (the default) whatever was in Cue 1 will now be set in Cue 2, including the timing values. If Copy Mode is turned off, each new Cue will have all the levels set to off (the Offset value) and the iming values at 0. Once you are in Cue 2, you can set with Green at full, Red off, and Blue off. Set the timing to be the same as the first Cue. When you are done, create Cue 3 by clicking on the Append button and set the color to Blue and the same timing as the others.

As with all Windows programs, you are wise to Save your File often. You can Save the sequence you have just created by clicking on File>Save As, just as with any other program. By default, all "Shows" you create have an Extension of KWL (an Extension is the three characters after the period in the File Name). We suggest that you do not change this. Of course, you will want to choose a File Name that you can easily remember. A suggestion for this exercise: TEST1.KWL. Store it on a location on your hard drive that's convenient.

Now, you can preview your creation: making sure that the Track 1 Radio Button is still checked, click the Preview Button (#5). Your cue sequence should start running. You can monitor that it has been recorded properly by watching the fixtures; or by seeing that the Color Selector boxes are changing as you expect them to. If you are where you can see both your computer and the fixtures, double-check that the color on the monitor matches the fixture. Clicking again on the Preview button (the label changes to Stop when a Preview is running) button will end the sequence. If necessary, make any required corrections and test it again. Save your result on your computer when you are done. Note that you are prohibited from making changes while in Preview mode. If you need to, other Tracks can be set in the same fashion.

The remaining buttons at the top act as their names would imply: Insert will let you add a Cue in the middle of a sequence. For example, if you have Cues 1, 2, & 3 set, and you want a new Cue between 1 and 2, select Cue 1 and click on Insert. What was Cue 2 is now 3, 3 is now 4, etc. Delete will remove a Cue from the sequence: clicking on your (new) Cue 2 will remove it, and what was Cue 3 will now be 2, etc. Clicking on Clear will set all of the levels in a Cue to off.

Any Cue that has its Crossfade and Hold Times set to 0 performs a special function on the DXG-48 when it is in Working Mode. When the DXG-48 encounters a Cue with these parameters, it stops the Track sequence until the Track button is pressed again. For example, if you want a Track sequence to execute only once, set its last Cue to the zero values; and the execution will pause there. One or more of these zero value Cues can be inserted into a Track sequence, which requires the Track button to be activated each time one is encountered in order to continue. Note that on Version 1.02 of WinDMX, the Preview function does *not* accurately emulate what will happen when a Cue with zero timing is run from the DXG-48.

Uploading Tracks

Once one or more Tracks have been set, you have two choices. If you will always use a PC to run the Cue sequences, you should be all set. If however you want to have the DXG-48 run them itself, you need to upload them from the PC to the DXG-48. This is done by making sure that you have the correct Track set, and clicking the Upload button (#2). It will transfer the contents of the Track (levels and timing) and indicate on the Status bar when it has finished. In Version (1.02) of WinDMX, each Track has to be uploaded separately to the DXG-48: loading a new Track 1 will not affect what has been recorded on the other three Tracks.

In order for the DXG-48 to run cues on its own, it must be in Working Mode, i.e. not connected to a PC. You can either physically disconnect the Serial cable; or in the Connection section (#1) move the Pulldown box from your COM Port to Offline. If the Uploading has taken place correctly, by closing the appropriate switch the Track sequence will be initiated. If you are using switches with LED's, the LED will light to indicate that the Track is playing.

Operating Track Sequences

Operating the switch for a Track will start the execution of that Track. If a Track sequence needs to take place at certain times of day, a momentary-action time clock can be used. The DXG-48 will operate only one Track at a time. In other words, if Track 1 performs a set of color changes, and a second Track performs a different set, initiating the second Track sequence will completely take over the operation of the first one. Any Track sequence that has been initiated will continuously run (if no Cue in the sequence has zero time values set) until the DXG-48 is told to do something else. If you want to stop a running sequence, press the button for the running Track; the sequence will pause until the same or another Track button is pressed. If you want to establish a pause in a sequence, program one of the "middle" Cues in the Track with zero time values, as described above. The sequence will run until it encounters that Cue; and it will remain there until the same or another Track button is pushed.

If a sequence is continuously running and you want to turn the fixtures completely off, there are several methods.If you turn the fixture AC power off while the DXG-48 keeps operating, the Cue sequences will continue to run, but the fixture will not respond to them. When the fixture power is turned back on, the sequence will continue with whatever the DXG-48 is sending it. You can also program one of the Tracks (perhaps #4) for "Fixture Off" purposes. Set one Cue in that Track with all of the Channels at Off , the Offset at 0 (even if the Offset is at another value in the other Tracks, it should be set at 0 here so the lamps go completely off), and the Cue and Hold times at zero. Therefore, when that Track is engaged, the fixture will go dark until another Track is initiated. The choice of either method if of course up to the User; but the second method has the limitation that only three "operating" Track sequences can be recorded. The DXG-48 is equipped with non-volatile ROM, so that if its AC power is interrupted, the recorded Track sequences will be retained.

It will be up to the User whether a PC should be kept connected to the DXG-48 at all times. The limitation of the DXG-48 of having only four Tracks can be bypassed by merely opening new KWL files as needed. Cue sequences can be paused at will, or even changed. As mentioned earlier in this document, it is recommended that if a PC will be used as the primary control device, no other programs should be operating on the unit simultaneously with WinDMX.

Appendix #1 - Changing COM Port Settings

        The COM Port Settings may be changed by following these steps. Note: these are the steps you use for Windows 2000 and for Windows XP. Earlier versions of Windows may have different steps to access the COM Port Settings, but the Port Settings Dialog Box will work the same way.

- Click on the Start button (usually in the bottom right corner of your Screen)

- Click on Settings; then on Control Panel. The Control Panel Window will open.

- Double click on the System Icon (it looks like a monitor). In the Dialog Box that opens, click on the Hardware tab.

- Click on the Device Manager button. You should see a "tree view" listing of all of the devices on the system. Look for the item labelled Ports. Click on the plus + sign to expand the view. There should be a listing here for at least one COM Port and for your Printer Port.

- Double click on the COM Port listing for the Port you want to use (usually COM1). The COM Port Properties Dialog Box should open. Click on the Port Settings tab.

- Here is where you make changes, if necessary. If the settings are different from what is listed below, *make a note of the settings* in case you need ever need to reset them to your earlier values. Click on the Restore Defaults button. The settings should now be:

Bits Per Second	9600
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

- Now go back to the General tab on the COM Port Properties Dialog Box. If all is well, there should be a message in the Device Status section indicating that the Device is working properly. As well, make sure that under Device Usage the "Enable" option is chosen. If the above steps do not work, you can try clicking on the Troubleshooter button, which should help you diagnose problems.

- We recommend that you do not make any other changes in the Port Properties settings unless you know what you are doing!

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