

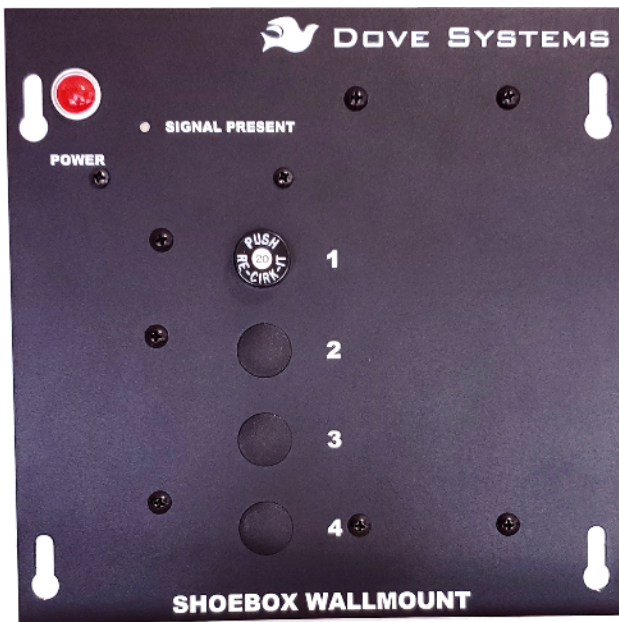


**DOVE SYSTEMS**

# DimmerMaster Shoeboxes

Wall Mount Dimmer Packs

## User Manual



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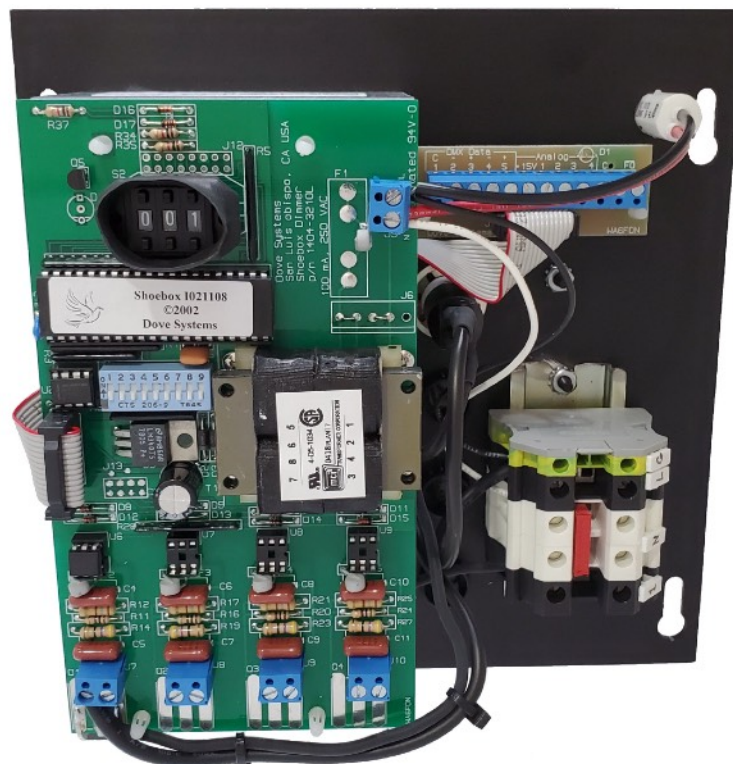
## Receiving Your Unit

Congratulations, and thank you for choosing Dove Systems. Every one of our American designed and manufactured products are hand-built by qualified technicians who pride themselves on our long-standing reputation for quality and value. Our products are built to perform for decades and are inspected just prior to shipping to ensure all leave our facility meeting our highest standards. Although rare, mishaps do occasionally happen during shipping. If it appears your product arrived damaged, please contact the carrier immediately to make a claim, as well as our office so we can offer a solution. For over 40 years, the satisfaction of our customers has always been our number one priority.

## Features

This manual covers Dove Lighting Systems, Inc.'s line of wall-mount DimmerMasters: DM124-WM, DM124-WMS, DM412-WM, and DM412-WMS.

The DimmerMaster “Shoebbox” Dimmer is a compact unit with four 1200W dimmers in the 412 and one 2400W dimmer in the 124. It may be wall mounted in a standard 8” x 8” electrical junction box and is perfect for tight spaces where conventional rack mount dimmer packs are too bulky. Drawing no more than 40 Amps (20 for the DM124), it may be powered from a single 120VAC circuit. By request when ordering, it may be configured for 240V input for use with 240V lamps in regions (such as Europe and South America) with 240V systems.



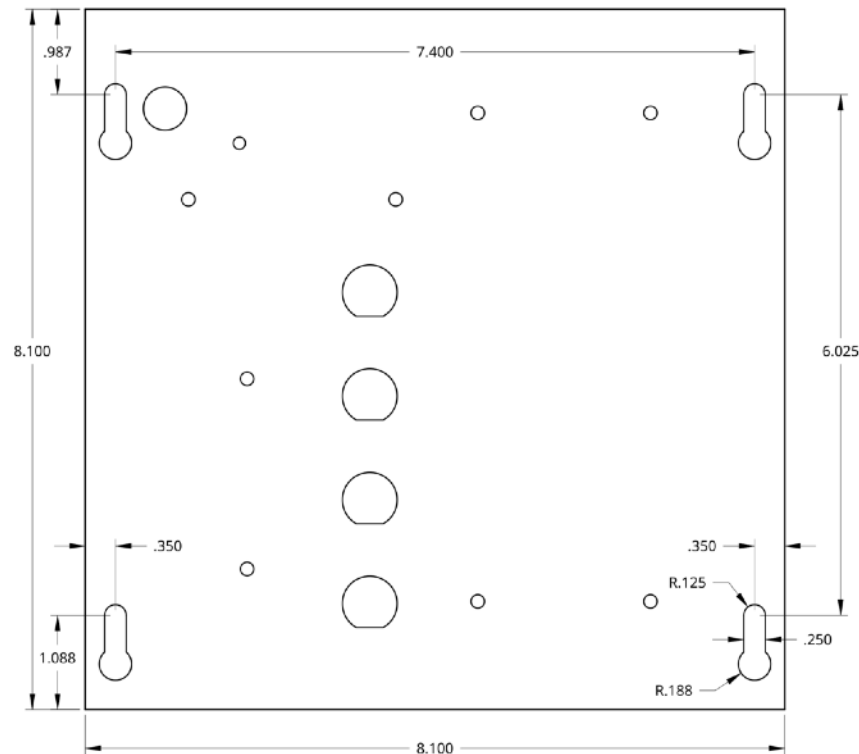
The unit accepts both DMX-512 and 0 to +10VDC control signals. The unit will let the higher of the two inputs (highest takes precedence, HTP) set the output level per channel. The starting DMX channel is set on the thumbwheel switch, which also provides load testing and local control. A status LED indicates the presence of a DMX signal. The control signals may be daisy-chained from pack to pack on the screw terminals. Also available on the screw terminals are contacts for +15VDC power and a remote Force On switch. The DMX signal may be terminated at the last pack by means of a DIP switch. Other switches set individual outputs for non-dim operation or force all outputs to full-on.

Another factory option that can be specified for the front panel at order time is either a neon lamp (-WM) indicating that the unit is receiving power or a push-on / push-off switch (-WMS) to force all channels full-on.

## Installation

### Mechanical Installation

The dimmer pack is designed to fit Milbank 884-SC1, or equivalent 8" x 8" x 4" screw cover enclosures (not included). The electrical box mounting holes are spaced 7.4" x 6.0".



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Maximum air temperature must not exceed 40°C (105°F). It is essential that this unit have adequate cooling for safe, reliable performance.

## Electrical Installation

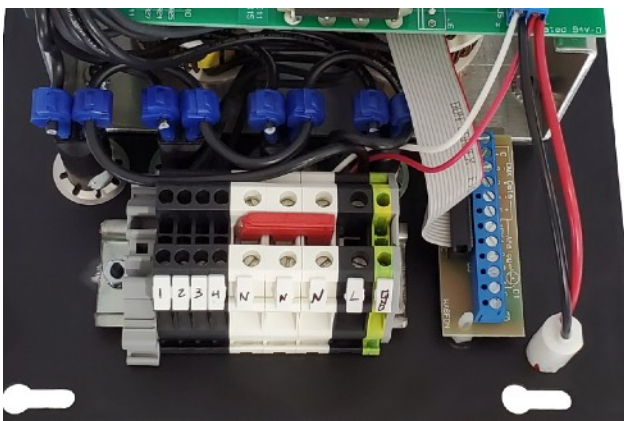
The DM412-WM pack consists of four 1200W dimming channels, not to exceed 4800 Watts total, and the DM124-WM has one 2400W dimming channel. They require a source of 120 Volts AC 50/60Hz with current capacity 40 or 20 Amps, respectively.

The actual amount of power consumed is determined by the total wattage of the connected loads used; the dimmer itself consumes negligible power. It is recommended that no other equipment be connected to the circuit which is used for the pack, including other outlets on same fuse or circuit breaker. If the building circuit breaker trips, it may be necessary to reduce one of the loads.

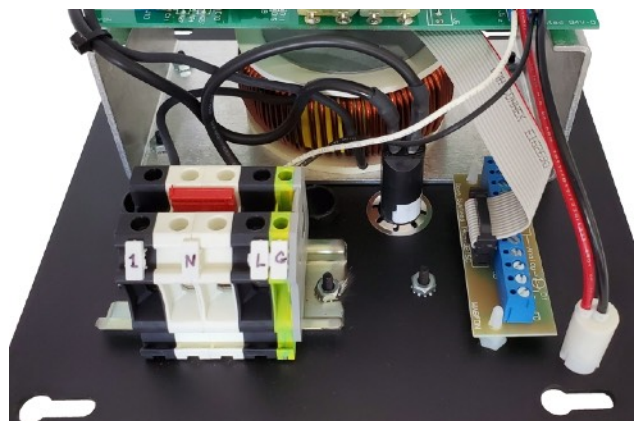
Line to neutral voltage is always 120 volts (unless the 240V version has been special ordered). It is very important that the input voltage be checked with a meter to insure that it is correct. A mistake can place 208 to 240 volts across a 120 volt lamp. The breaker will protect the unit but may not save the lamp. A double check of voltages before applying power can guard against such disaster.

The power input connector is a terminal block. The power feed connects to the terminal marked "L." The neutral connection is made on the terminal to its left marked "N." The ground connection is made on the ground terminal on the right end and labeled "G." The pack has circuit breakers to protect each dimmer channel, but the primary circuit protection and disconnect is to be provided by the user. A single pole 20 to 40 amp circuit breaker is required.

When power is connected, the neon power indication lamp will light up (if so equipped). In addition, the status LED will light up in red (60Hz line), yellow (50Hz line), and turn green when a DMX signal is present.



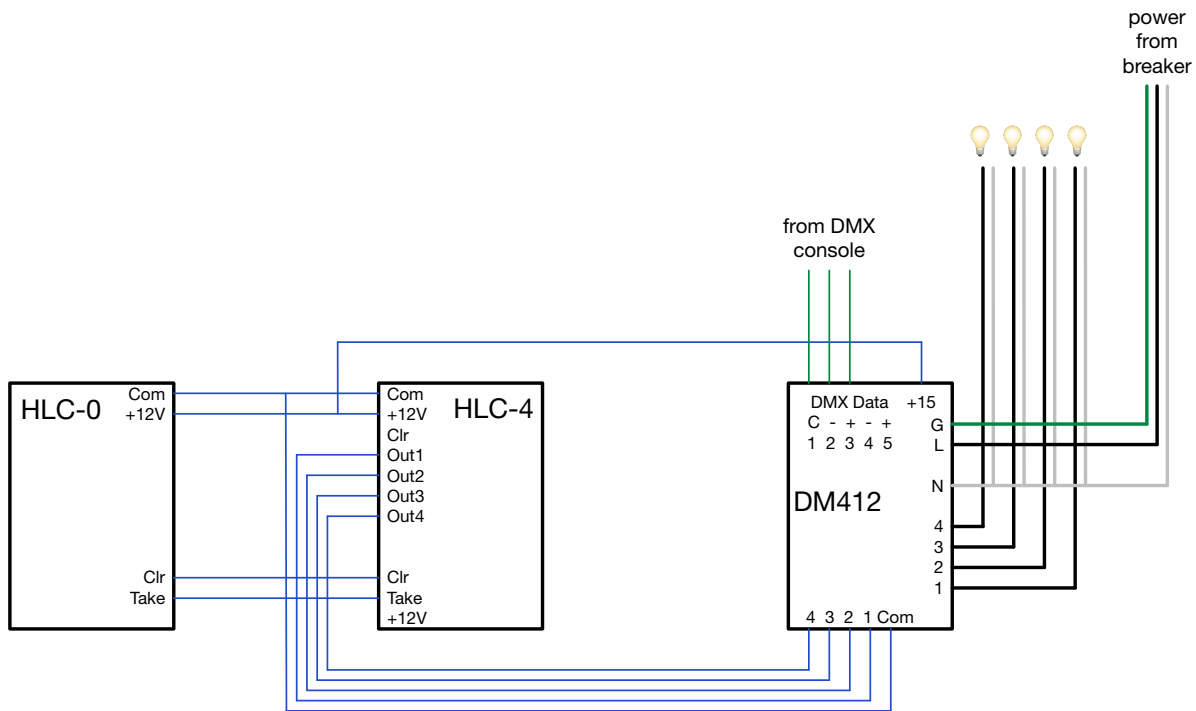
*DM412-WM Power Terminals*



*DM124-WM Power Terminals*

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**Warning:** This device is required to be connected to a building electrical circuit with over current protection corresponding to the input current on the equipment label.



Example Wiring Diagram of DM412-WM, HLC-4, and HLC-0

## Grounding

The term “*grounding*” refers to a separate wire, usually with green insulation, which is connected from the equipment case to earth ground. This is not the same as the neutral or common and must not be confused with them. The *neutral* is a separate, load-carrying conductor, and *common* refers to the control signal’s common or reference voltage which should only be allowed to reach ground at a single point in the entire system (typically at the control console) to avoid ground loops.

## Load Connections

The pack will dim any load up to 1200W per channel on the DM412 or up to 2400W per channel on the DM124. The load may be incandescent, inductive or resistive. This includes conventional incandescent, quartz incandescent, “rain lights”, pin-beams, and similar “low-voltage” lighting loads containing transformers. Fluorescent and neon loads can be controlled by the Shoebox with no damage to the dimmer, but the nature of these loads requires specialized circuitry to get full range dimming. Consult the factory if you need to dim such loads.



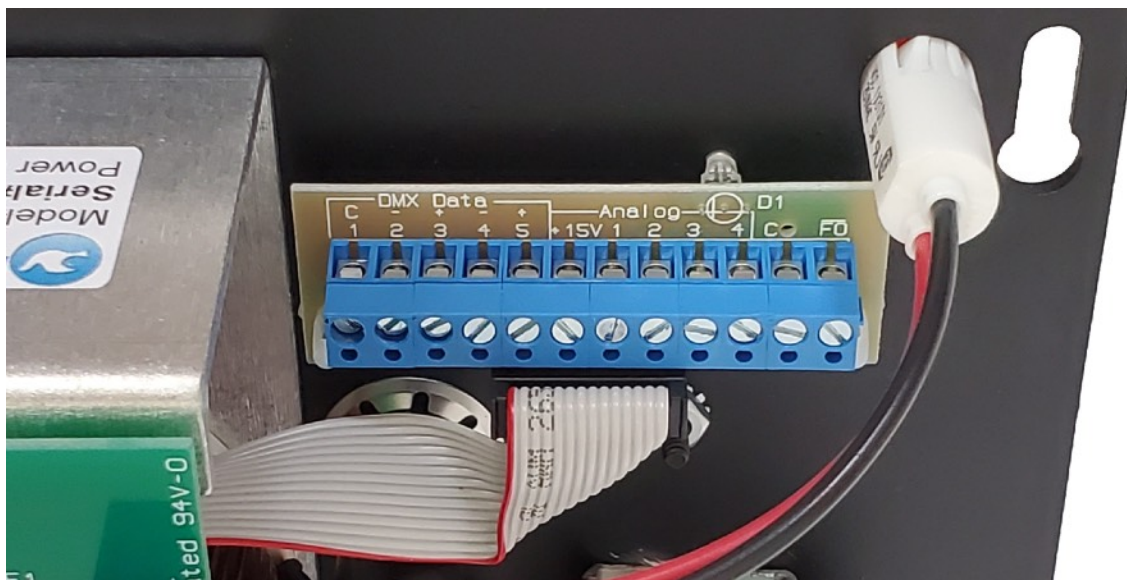
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Many “dimmable” LED bulbs work fine with the Shoeboxes (though it’s common for them to only dim to about 10% before turning completely off which can be disappointing), and the percentage of those in the market continues to increase with time as bulb manufactures improve their circuitry’s compatibility. Still, some LED bulbs will flicker at low power levels. There are a few approaches to dealing with these bulbs: The easiest is to test several different bulb models, and just avoid the trouble makers. Some control consoles can be programed to avoid the problematic low power levels. In some cases, the flickering can be mitigated by adding parallel loads in the form of a low power incandescent bulb or resistors. Dove Systems offers factory installed 4.7kΩ output resistors by special order or retrofit.

On the DM412-WM, there is one terminal for each output and two larger output neutral terminals. On the DM124-WM, there is one output terminal and one output neutral terminal. Terminals are labeled according to their circuits, see photos above. There should be a separate neutral returning from each load circuit.

Each output channel is protected by a 10 Amp circuit breaker (20A on the DM124). If a circuit breaker trips, it is generally due to an overload or short in the output load. However, elevated ambient temperatures or lack of ventilation can also result in breakers tripping just shy of their rated current.

## Control Connections



*Control Terminal Block (Neon Power Indicator option shown)*

The pack accepts both DMX-512 and analog 0 to +10VDC control signals. **DMX control** signals are input through the first three terminals (Common, Data-, and Data+) of the 12

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contact control terminal block. Each terminal is large enough to accommodate multiple signal wires so the control signals can be easily daisy-chained from pack to pack. However, do not create Ys in the DMX signal path as these can lead to signal integrity issues that result in poor reliability and flickering. Instead, use one of the specialty interface boxes for this purpose (for example, the Dove DMX-Y).

Terminals 4 and 5 are typically not used, but can be used to aid in splicing another pair of signal wires like a second DMX universe. **DIP switch 9** will connect Terminal 5 to +15V when in the on position and should be loaded with less than 100mA. This is an unregulated power source and will typically vary between 12 and 18 Volts. Under no-load conditions it can reach 25V. An example application of this feature would be to power a Dove DMX-Y.

Terminal 6 is **+15VDC** referenced to Common. This is an unregulated power source and will typically vary between 12 and 18 Volts. Under no load conditions it can reach 25V. It will typically source over 200mA before dropping below 12V. This source is typically used to power the Dove 0-10V House Light Controls or our DMX-Y.

Terminals 7 through 10 are **0-10V analog control** inputs for outputs 1 through 4 respectively. (The DM124-WM ignores terminals 8 through 10.) The higher of the analog or DMX for a given channel will take precedence (HTP). Terminal 11 is the common for these analog inputs and therefore must be connected to the analog control source as well. It is also connected to Terminal 1 internally.

Finally, Terminal 12 is the **Force-On** input. When this terminal is connected to common (Terminals 1 & 11), all channels will be turned on to 100% overriding any DMX or Analog control signals. The Wall Mount DimmerMasters' **push-button option** (-WMS) replaces the standard Neon Power Indicator with a push-button connected to Terminals 11 & 12. One can easily connect a remote switch to activate this feature on one or multiple dimmers for use as a "maintenance light switch." Multiple dimmers are likely already sharing a common for their DMX and/or Analog inputs, so a single wire would need to be added to terminal 12. Also, keep in mind that this input can be useful in troubleshooting the lighting system.

## Control

### Starting Channel

The starting channel is set on a thumbwheel switch. When the switch reads 001, the dimmer pack runs on DMX channels 1 - 4. Setting 005 runs on channels 5 - 8, setting 009 runs on channels 9 - 12, and so on. Valid addresses range from 001 to 509 (512 for the DM124). The starting dimmer may be any channel, and dimmers on different packs can overlap some channels, though it is usually preferred to run them one dimmer per channel. Dimmer



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channels should not overlap channels for other DMX equipment, including strobe lights, & fog machines. It is not *necessary* to set the starting channels in sequence (ie. 1-4, 5-8, 9-12).

The Wall Mount DimmerMasters have a heat-shrink guard around the thumbwheel switch. While this can make it a little more challenging to manipulate the buttons, it generally prevents the settings from being inadvertently changed by bumping into wires as the unit is installed in the electrical box enclosure after configuration — a far more frustrating issue to troubleshoot.

## Load Test & Local Control

The thumbwheel switch enables the load testing / local control functions. The load test is useful for determining which load is plugged in. Set the first digit to 6 and the second digit to the dimming channel (from 1 to 4, but only 1 on the DM124). Set the third digit to the dimming level, from 0 (off) to 9 (full on). Levels thus set remain in effect until the power is disconnected or control is returned to DMX.

Here is an example:

- Set the thumbwheel switch to 600 for local control.
- Set the second digit to 1 to control the lamp on channel one. Set the third digit to 5 to put lamp one at half power. (The first load will now stay at half power)
- Next, set the second load to half power by setting the thumbwheel to 625. (The first and second load are now both at half power)
- Finally, set the thumbwheel to 639. This will set the third load to full on while leaving the first two loads at half power.

A **Crossfade Chase** function is also available for stand alone operation without a DMX source. Set the thumbwheel switch to 701 through 799 and the unit will perform a crossfading chase with 1 (701) to 99 second (799) steps between each of the four channels. On the single channel DM124, the chase function only fades the channel up and down with a 50% duty cycle.

Example:

Thumbwheel switch is set to 710. The unit will then crossfade from channel #1 to channel #2 in 10 seconds. Then the unit will crossfade from channel #2 to channel #3 in ten seconds, from channel #3 to channel #4 in ten seconds, and then back to channel #1. This will repeat until you change the thumbwheel setting or power down the unit.

To return to DMX operation, set the thumbwheel switch to the DMX start channel of your choice (1-512).

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## DMX Termination

DMX termination may be made on the **DIP switch 1** on the circuit board. Signal reflections can cause corruption of the DMX-512 data, typically causing flickering or flashing of lights in systems with long (>100 ft total) cable runs. Only the last pack in the chain should have termination enabled.

## Non-Dim & Emergency On Functions

In addition to DMX termination (DIP1), the **DIP switches 3 through 6** set individual channels (1-4 receptively) for non-dim (full on or off) operation. The DM124 ignores DIP4-6. In non-dim mode, the dimmer forces that channel on when it receives a DMX value of 50% or more and turns the channel off when it receives a DMX value less than 50%.

The Emergency On function, **DIP2**, forces all outputs on regardless of the control level — an easy first step when troubleshooting.

If the external Force On (Terminal 12 of the control terminal block) is connected to other dimmer packs, they will also be turned on. However, this would be a very unusual condition since the DIP Switches are not accessible when the Wall Mount DimmerMasters are fully installed in their enclosures.

## In Case of Trouble

### Troubleshooting

A review of the following paragraphs may save you the cost of a service visit or of shipping and repair. Even if something is still wrong, this process will help you explain the malfunction to the service technician.

First, read the operating instructions carefully. Be sure you know how to operate the equipment. Do not expect this equipment to operate exactly like others. Many apparent failures result from not being familiar with the unit's operating characteristics.

Check all lamps and wiring for shorts that can cause damage to the dimmers.

There are three forms of malfunctions common to solid state dimmers:

- “Failed Off” (in which the lights do not come on)
- “Failed On” (in which the lights are on only)
- “Flickering” (where the levels will not maintain)

If a load has "failed off," check that the instrument is plugged in and that the lamp has not burned out. Verify that the dimmer pack is on (the LED will glow). Use the load test feature

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(see above) to see if the load can be controlled at the pack. Check if the circuit breaker on the unit needs to be reset — the button with the current rating on it will pop out, just push it back in to reset. Check that the control cable runs all the way back to the controller without damage and that the signal has not been terminated at a pack somewhere up the chain. Check the controller, paying particular attention to the softpatch feature if so equipped.

If a load has "failed on," especially after resetting a breaker, it is probably due to a shorted triac. Triacs can fail when a short in the output overloads it faster than a circuit breaker can protect it. The short can be in the cable, in the connectors, in the light fixture, or in most often the lamp itself. Please check the load by plugging it into a known good *wall* outlet **before** plugging it into other dimming channels.

Flickering can be the result of a failing control console. Try an alternate control source or console power supply.

Channels which flicker or cut in and out can be victims of an intermittent connection somewhere, including broken slide controls. This can occur if dirt, coffee, or some other liquid is spilled into the slide control slot. Curing this problem usually requires the replacement of the control. Cleaning with WD-40 or TRI-FLOW may fix it temporarily.

Sometimes flickering is caused by a problem with the control cable. If DMX termination has not already been set at the last pack, set it. Crushed or pinched cables can cause intermittent failures. Try an opto isolator to eliminate any potential control cable ground loop problems. Swap control cables. Route them away from motors or other sources of noise. Do not use passive splitters.

Make sure the thumbwheel switch is set to a value from 001 to 509, DIP switches are configured correctly, and the Force-On input is not connected to common. For the -WMS versions, if all channels are stuck on, try the Push On / Push Off button — maybe it got pressed. Using the Force-On input by momentarily shorting it to common will confirm the dimmers can supply power to the loads.

The plastic shroud around the channel selection thumbwheel switch is there to minimize the chances of wiring in the junction box inadvertently changing the channel when closing the box, but it is not always 100% effective. Excessive amounts of wire or stiff wires can be the source of great frustration. Awareness of this potential hidden-gotcha can save a great deal of troubleshooting time.

In some installations, a Shoebox's breaker may trip after a long time in use. This is most likely to occur when a channel is loaded at or near its maximum rating and there are high ambient temperatures or limited ventilation. The solution will be to either decrease the load or improve cooling. Cooling can be improved by increasing the free space around the unit. They should never be installed in an enclosed space without plentiful free flowing air.

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## Obtaining Service

We are always happy to help you troubleshoot. Emailing photos of the situation to [Dove@DoveSystems.com](mailto:Dove@DoveSystems.com) will provide a helpful point of reference for a phone call, 805-541-8292.

Service technicians are generally available between the hours of 8am to 3pm (Pacific Time) Monday through Friday. It is helpful to have a complete description of the problem and to be in the theatre or otherwise have access to the equipment when placing the call.

It is recommended that all equipment be repaired at the factory. If the unit is under warranty, it MUST be repaired at the factory. Replacement parts are available, but because the DimmerMaster packs are microcontroller based product running proprietary software, schematics CAN NOT be released.

For repairs, please visit the Repairs page of our website, [www.DoveSystems.com/repairs](http://www.DoveSystems.com/repairs), download the Repair Form, and follow the instructions. We will get your Shoebox operating like new and return it quickly.



## WARRANTY INFORMATION

The manufacturer agrees that the DimmerMaster shall be free from defects in material or workmanship from date of shipment over a period of one year. Said warranty will not apply if equipment is used under conditions of service for which it is not specifically intended. The manufacturer is not responsible for damage to its apparatus through improper installation, physical damage, or poor operating practice. If any device is found unsatisfactory under the warranty, the buyer should notify the manufacturer, and after receipt of shipping advice, buyer may return it directly to Dove Systems, San Luis Obispo, CA, shipping prepaid. Such equipment will be replaced or put in proper operating condition, free of all charges except transportation. The correction of any defects by repair or replacement by the manufacturer shall constitute fulfillment of all obligations to the purchaser. Manufacturer does not assume responsibility for unauthorized repairs to its apparatus, even though defective.

Manufacturer shall not be liable for any consequential damage in case of any failure to meet the conditions of any warranty of shipping schedule, nor will claims for labor, loss of profits, repairs, or other expenses incidental to replacement be allowed. No other representations, guarantees or warranties, expressed or implied, are made by the manufacturer in connection with the manufacture and sale of its equipment. This warranty is non-transferable and applies to the original buyer only.

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