

MOVING iMAGE TECHNOLOGIES

INSTRUCTIONS

FOR

INSTALLATION, OPERATION, AND MAINTENANCE

OF

ALMS20L

AC / DC Lighting Controller

Part number A000235

Manual Version 0.2

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Manual ALMS20L



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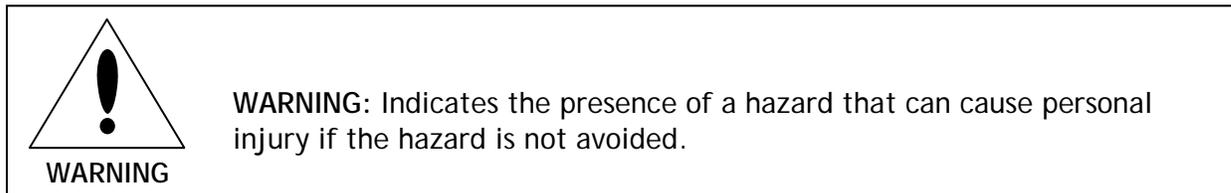
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1. INTRODUCTION & SAFETY

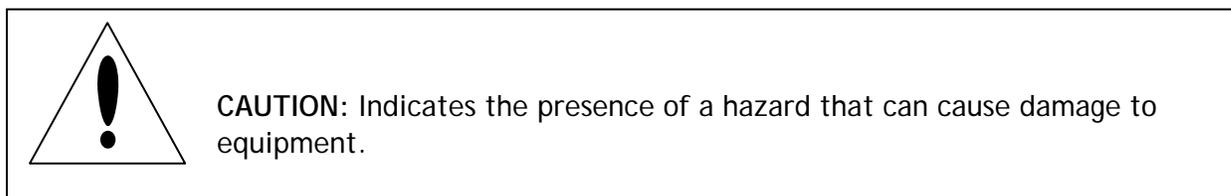
1.1 SPECIAL NOTICES

Two kinds of specific notices are used within this manual to emphasize information.

1.1.1 Warning



1.1.2 Caution



1.2 SAFETY

- ✓ AC lighting systems involve connection to high voltages ranging from 120V to 277V. This wiring must be done by licensed electricians or other personnel with appropriate training. **The technical information in this manual is provided for use by certified electricians and other qualified personnel ONLY.**
- ✓ **IMPORTANT:** This device includes two 1.0-10 VDC output terminals. Do not connect these terminals to any AC or DC voltage source! These outputs are intended to be connected to a light fixture low-voltage control input complying with IEC 60929 standard only.
- ✓ If the ALMS20L unit is installed as part of an emergency lighting system there are safety implications as far as national and local fire safety rules that the installation must comply with. Consult all relevant national and local codes.

2. GENERAL DESCRIPTION

The MiT ALMS20L is a 6-scene, 2-channel AC phase-control dimmer and low voltage DC lighting controller. There is an “All On” mode in addition to the 6 scene presets that may be used for emergency or cleaning modes. All outputs go immediately to 100% when the All On mode is active.

Scene cues may be received by contact closure (GPIO) or TCP/IP network protocol. The digital inputs are also outputs - if a command is received via the network connection, the corresponding pin on the I/O terminal block is pulsed. This allows the ALMS20L to become a master to control other dimmer units, for example older models that don't include a network interface.

Each AC output channel is rated for 7.5 amperes with a solid-state load, or 6.0 Amperes incandescent load. The device is intended to be mounted to a wall or vertical bulkhead. The unit has been optimized specifically to control smaller AC loads, for example modern LED fixtures. Each AC phase control output includes a choke for noise suppression.

In addition to the AC phase outputs the device includes two 1.0V-10.0 DC control voltage outputs conforming to the IEC 60929 architectural dimming standard, plus AutoNox™ extension. These outputs are intended to interface with MiT ALF series low voltage light fixtures, or other 1.0-10VDC LED fixture or dimmable driver with similar specifications.

Both the AC outputs and the 1.0-10VDC control outputs have a non-linear curve implemented so the dimming rate appears natural to the human eye. At 100% setting the AC output will be at the line voltage (120 or 230 VAC) whereas the DC output will be at 10.0 VDC. At 1% output The AC output will be close to zero VAC and the DC control output will be 1.0V. This is per the IEC 60929 standard. However if 0% is selected for a scene setting, the DC output voltage drops to about 0.5 VDC to activate the AutoNox™ mode in the ALF fixtures.

There are two switched AC outputs controlled by relays. These relays disconnect the AC line voltage from the AC phase control circuits internally, as well as switched outputs that may be used to control the power to LED power supplies. This feature enables the unit to be compatible with “green” energy requirements that require the AC power to be completely disconnected from the loads when off, for example Title 24 in California.

The unit comes from the factory programmed with settings that may be used for a typical cinema theater application (see Sec 4.3). Changing the programming is easily accomplished via the network connector with a user-friendly graphical interface.

Basic changes in output level and timing can also be made using the controls on the front panel.

½" and ¾" EMT knockouts are provided in the right and left side as well as the bottom for routing AC in, AC out, DC control out, and the network connection.

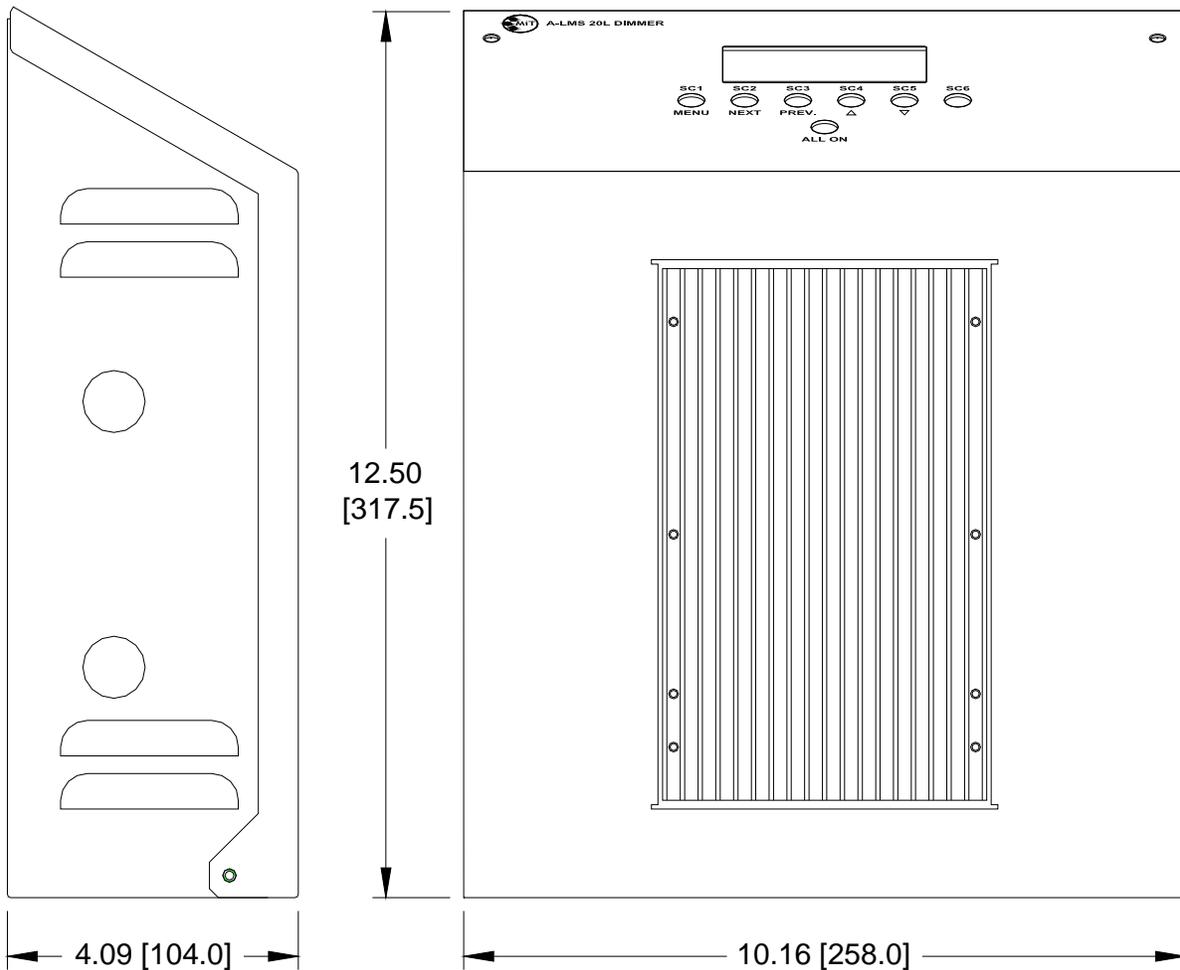


Figure 1-1: ALMS20L Outline

3. UNPACKING



CAUTION: Users are urged to read this instruction manual thoroughly and understand the procedures described herein before installing the system.



CAUTION: National and Local electrical codes should be observed at all times, where applicable.

3.1 Unpacking

Open and inspect the shipping carton as soon as possible after receiving it for any shipping damage. If damage is found, notify the freight company immediately.

The contents of the carton contains the following items:

- One ALMS20L Lighting Controller
- This manual, document R000202

Note: the hardware required to mount the unit varies depending on the mounting surface and installation method to be used, and is not included.

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4 INSTALLATION AND WIRING

4.1 Installation

The ALMS20L is intended to be permanently mounted to a wall or vertical bulkhead. Remove the two screws on the front panel and hinge the cover downward. Place the ALMS20L in the desired mounting position and mark where the mounting holes need to be. Drill four holes and install anchors, or whatever preparation is needed for the desired support mechanism.

4.2 Electrical Wiring

Under full load the ALMS20L will draw up to 15 Amperes. This will normally require dedicated service to the unit with a 20A breaker to avoid nuisance tripping. AC wiring must be enclosed in rigid or flex metallic conduit in accordance with the National Electrical Code and all pertinent state and local codes.

With the front cover open the 8-position AC terminal block is revealed. See Figure 4-1.

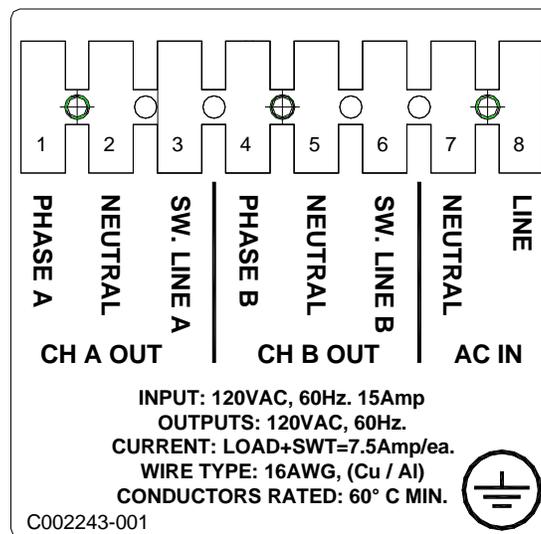


Figure 4-1: AC Connections

Connections as follows:

1. Phase Output A. 120 / 230V phase-controlled AC to an AC dimmable fixture.
2. AC Neutral out. For connection to fixtures or LED power supplies.
3. Switched AC Line output CH A. Supplies 120 / 230V line voltage when on.
4. Phase Output B. 120 / 230V phase-controlled AC to an AC dimmable fixture.

5. AC Neutral out. For connection to fixtures or LED power supplies.
6. Switched AC Line output CH B. Supplies 120 / 230V line voltage when on.
7. AC Input - Neutral (zero volts).
8. AC Input - Line (120 / 230V).

A grounding bar is also provided inside the device.

Wire used for making AC connections should be copper, 16 AWG or larger conductors.

Units are configured during manufacturing for 120V or 230V operation, and labeled accordingly.

Both line outputs are protected inside the device by fast-blow, 8 Amp fuses. Fuses should always be replaced with the same size and type of fuse. Figure 4-2 shows wiring in a typical installation.

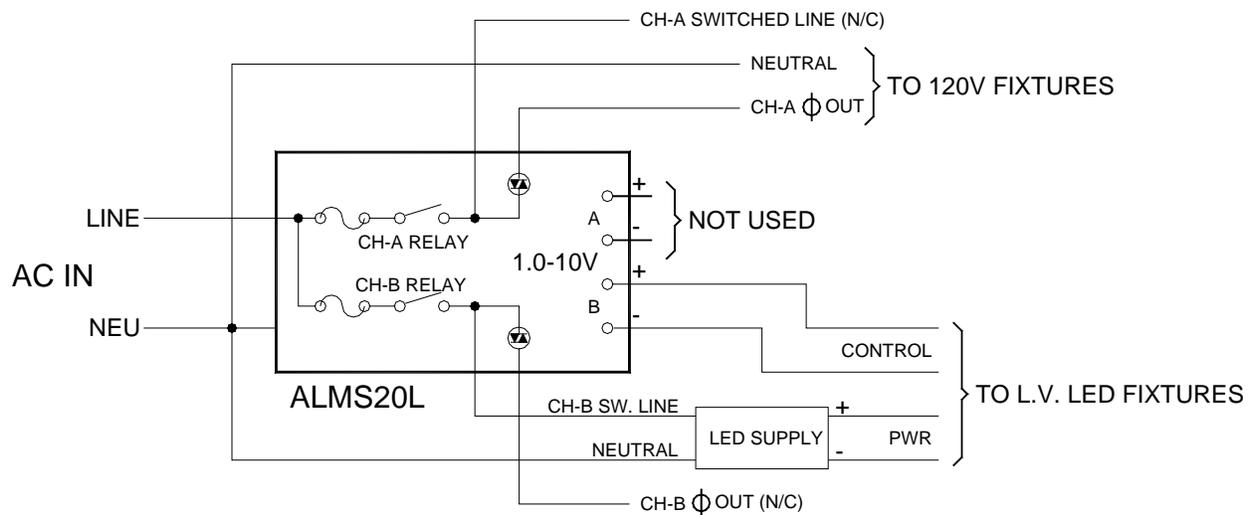


Figure 4-2: Typical wiring

In the example shown in Figure 4-2, the Channel A phase control output is driving AC dimmable fixtures, Channel B is controlling low-voltage LED fixtures using the 1.0-10V control voltage for brightness. On Channel A the switched AC line output and the 1.0-10VDC control lines aren't needed and have no connection. On Channel B, the AC phase control output isn't needed and has no connection.

Note: Outputs aren't mutually exclusive between 120V fixtures or Low Voltage fixtures. The same channel(s) can drive both, provided the same dimming settings provide acceptable light levels for both types of fixtures connected to the channel, and that the 7.5 Amp maximum current per channel isn't exceeded.

Any installation intended to provide exit illumination for emergency use has certain requirements of the wiring to be in compliance with safety codes. The installer should refer to local safety codes or consult an architect experienced with these requirements.

4.3 Signal Wiring

Low voltage connections are made directly to the main PCB. See Figure 4-3.

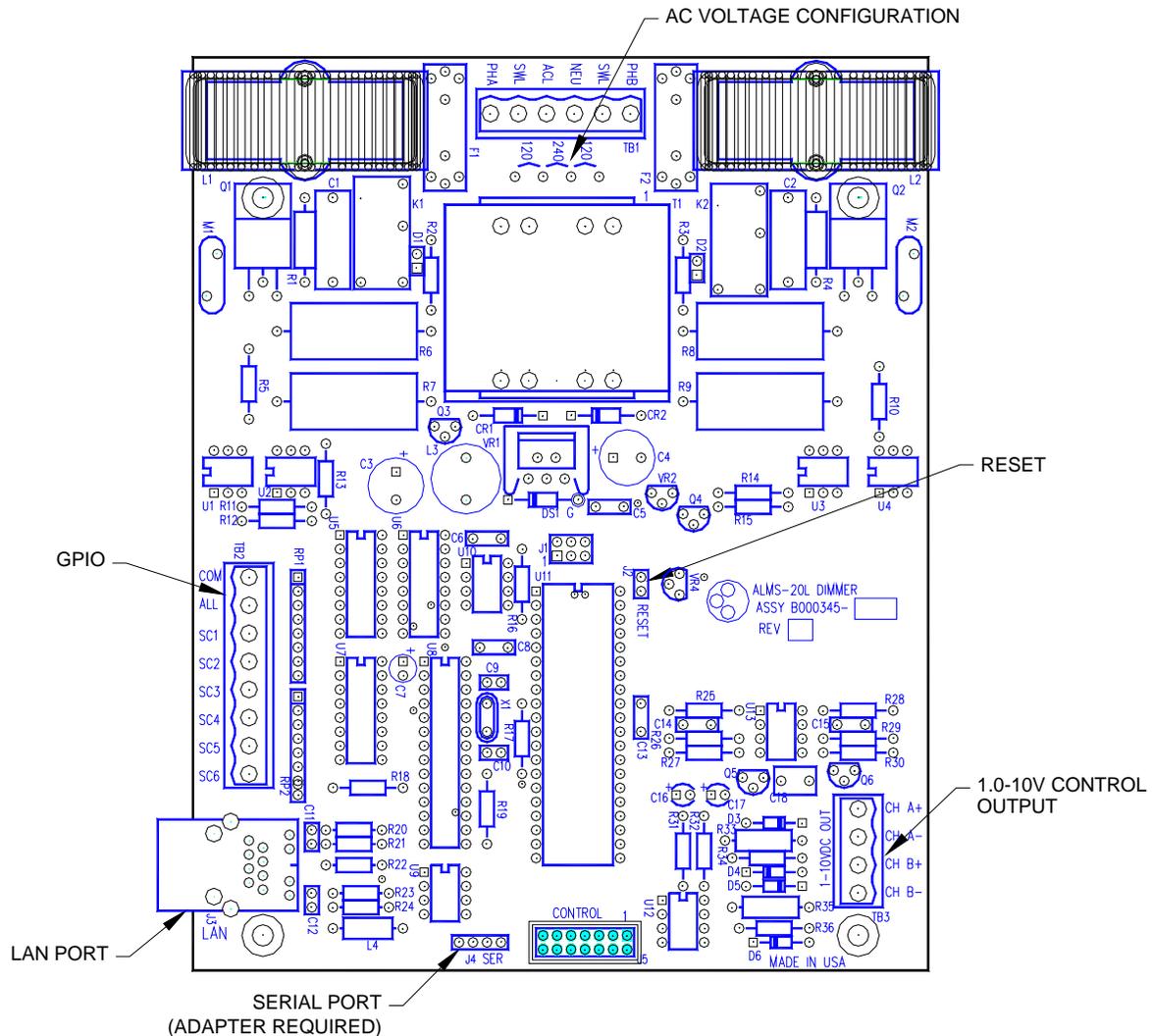


Figure 4-3: Signal Connection

4.3.1 GPIO port

The GPIO port accepts scene cues as digital inputs. An input is activated by briefly connecting the appropriate scene input to the Common terminal. The input terminals are each pulled up to +5V internally. The inputs may be connected in parallel with other devices, provided the other devices are also referenced to a +5V logic supply voltage. These terminals may also be used as an output to cue other devices. Any command that comes in by the LAN port will also echo out these pins. In this way the ALMS20L may be used to trigger equipment that doesn't have network capability.

The digital inputs are optically isolated to minimize noise and reduce the chance of receiving unintended cues, however it's good practice to not run wiring connected to these pins through the same conduit carrying AC power.

Slaving a Second Dimmer

In certain cases it may be desirable to send commands to the ALMS20L and have it pass those commands on to a second dimmer. The second dimmer may be an older type that doesn't have network or serial connectivity. In the example below we'll assume the ALMS20L will be controlling an MiT M4800 dimmer.

The scene commands may be sent to the ALMS20L over the network and the ALMS20L will then echo those cues out the GPIO connector to the M4800 (or other model dimmer). If the commands are being received from an automation or other device as GPIO (contact closures) the wires can simply be connected to both devices in parallel. In either case, because the ALMS20L has 6 scenes and the M4800 only has four, there's a mismatch in the number of scenes. We've defined Scene 1 on the ALMS20L as the Cleaning mode. There's no corresponding scene on the M4800. So the GPIOs for the remaining scene cues should be connected between the two as shown in Figure 4-4.

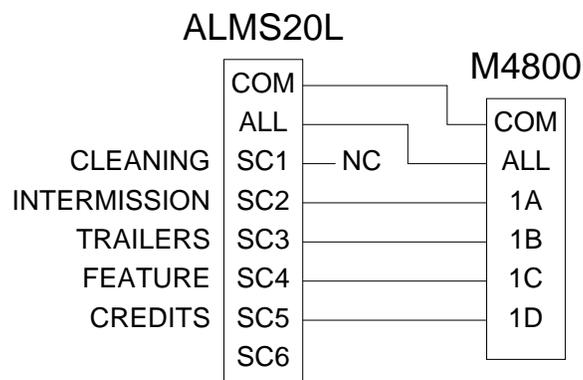


Figure 4-4: Slaving Signals to 2nd dimmer

4.3.2 LAN port

Standard network connection interface, 10/100/1000 Base-T compatible. This is the interface that will normally supply cues to the ALMS20L from a server, and also used for configuring the device. The cable to this port should not be run through conduit carrying AC voltages.

4.3.3 1.0-10VDC Variable Control voltage

This connector provides the output to control low-voltage lighting fixtures corresponding to the IEC 60929 dimming standard. The connection pins are:

- Channel A +
- Channel A -
- Channel B +
- Channel B -

The two DC control outputs are designed for 100mA maximum output current. 22 AWG wire is sufficient to carry the signal. MiT recommends that twisted pair cable is used for these connections, one pair for the channel A output, and one pair for channel B output. For maximum immunity from noise and interference we also recommend that this cable is shielded. The shield drain wire may be connected to the grounding bar

inside the ALMS20L. Normally the drain wires should not be connected to anything at the other end of the cable. This wiring should not be run through the same conduit carrying AC voltages.

Note: The Ch A and Ch B minus pins are connected to the logic common on the PCB, however it is recommended that each channel uses both wires + & - to avoid crosstalk between the two channels.

4.3.4 RS-232 Serial port

The preferred way to receive scene commands is via the LAN port, however the ALMS20L PCB includes a serial port in the form of a 4-pin header. An adapter will be required to use it. These can easily be sourced online, or contact MiT for assistance.

4.3.5 Reset Connector

If connectivity via the LAN port becomes lost because someone has changed the IP address, it may be set back to the default factory value by briefly shorting the two pins of connector J2 (see Figure 4-3 for the location).

4.4 Configuring the ALMS20L

The ALMS20L may be configured by making a connection with a laptop or PC to the LAN port. Open a web browser and enter the default IP address into the navigation bar, normally 192.168.10.31. The first thing you will see is the Login screen. The default login is *admin*, and the password is also *admin*. With that entered you will proceed to the 'Scene' GUI. Figure 4-5 shows the ALMS20L 'Scene' GUI.

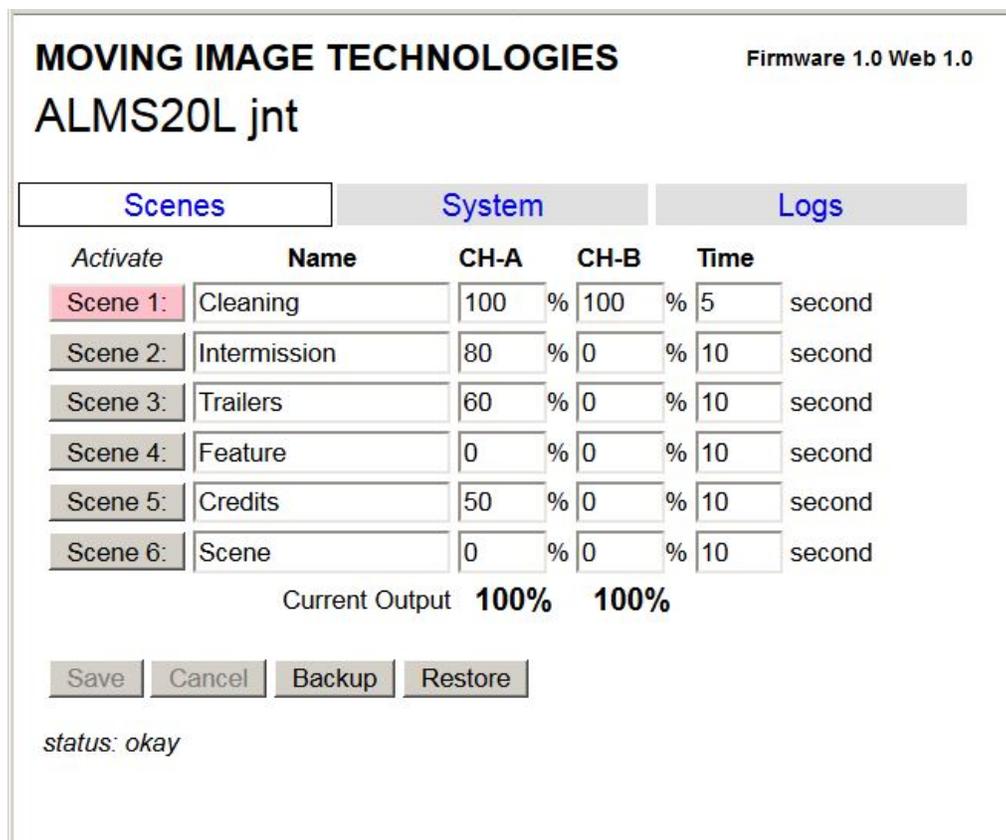


Figure 4-5: Scene Tab GUI

Fields display the name of the scene / cue, the channel A brightness setting, channel B brightness setting, and the time the unit will take to activate each scene. Below that is an indication of the current output level of each channel. Buttons on the left side allow the user to select the various scenes during programming to preview the results. At the bottom are buttons to Save changes, Backup the settings to the computer being used to program the unit, and to Restore settings to the ALMS20L that may be stored on the Computer. This makes it easy to configure one unit, then copy the same settings to all the other units in the theater.

Note: These same settings apply to both the AC phase control and to the low voltage DC output control voltage.

Note: When power is applied to the unit it will always default to Scene 1. Therefore Scene 1 should always have both outputs set to a fairly high level for safety purposes, in case power is intermittent in an emergency situation.

To make a change to a setting, select the field you wish to change, enter the new value, and click on the Save tab below to save the change.

Q: If Scene 1 is set to 100% on both channels, what is the difference between All On mode and Scene 1 mode?

1. Although the *factory preset* level for Scene 1 mode is 100% for both channels, these levels may be configured to different values by the user. Conversely, All On mode is always 100% on all channels and is not user-configurable. This enables the All On mode to be used for emergencies as well as cleaning mode.
2. Activating Scene 1 will use the fade time entered in that field, whereas the All On mode activates immediately with no delay.

Figure 4-6 shows the 'System' tab, used to set basic parameters of the device, including the name assigned to the unit, the IP address, the Serial Number of the unit, and the basic operational parameters of the unit.

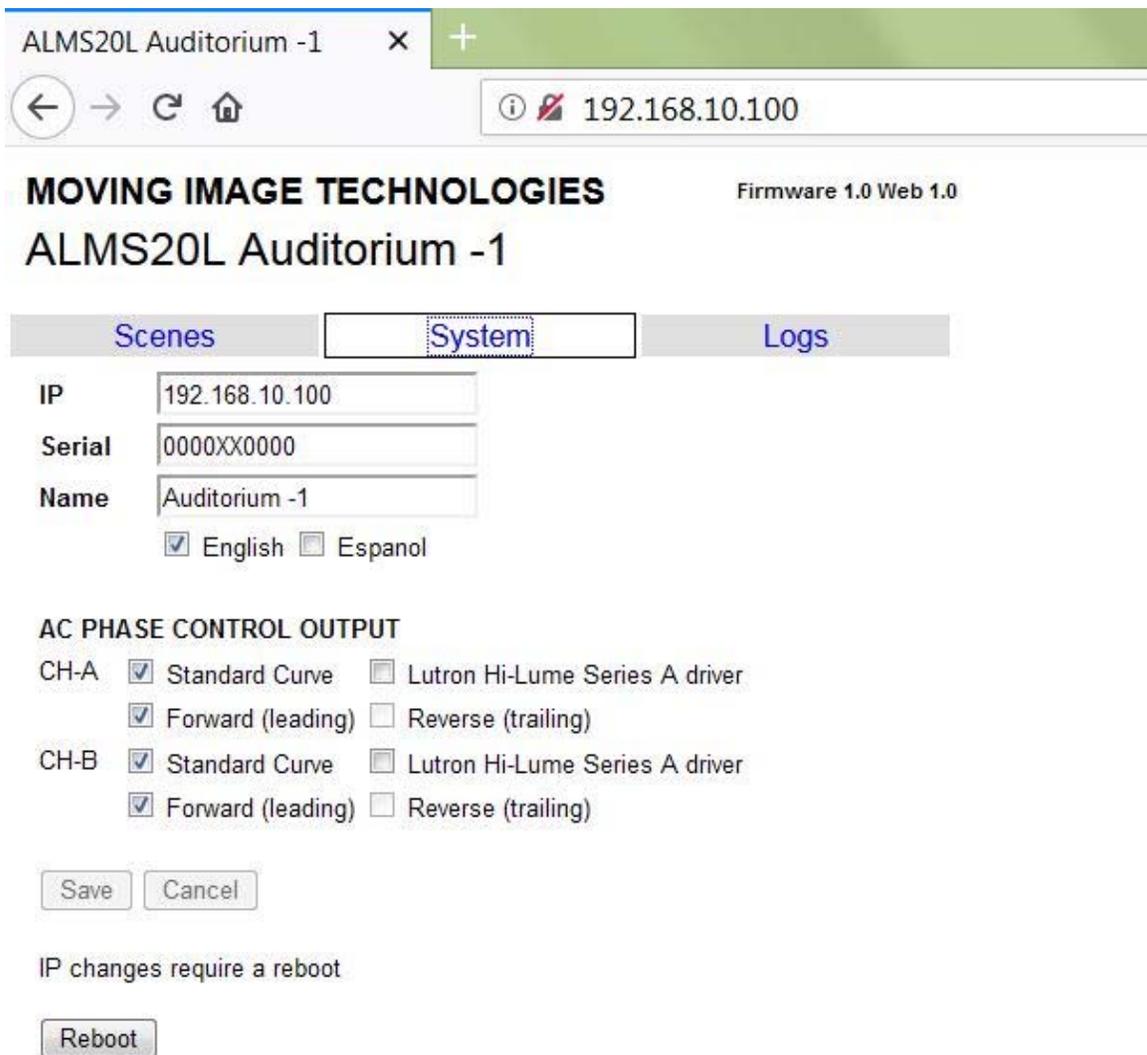


Figure 4-6: System Tab GUI

Besides the name, IP address and serial number, the operational parameters of the device are also set here. The AC phase control outputs have two options, Standard curve or a special curve for use with the Lutron Hi-lume series LED drivers. The Standard curve should be used for Incandescent, LED, CFL, or any dimmable AC driver or fixture except this one specific Lutron model driver. The Lutron driver has specific limitations on the voltage supplied to it to avoid damage to the driver so it requires a special curve just for it.

Forward phase dimming is the only mode supported currently, selecting the Reverse option has no effect at this time.

Buttons at the bottom allow changes to be saved, and to implement a reboot of the system if an IP change has been made.

Figure 4-7 illustrates the 'Logs' tab.

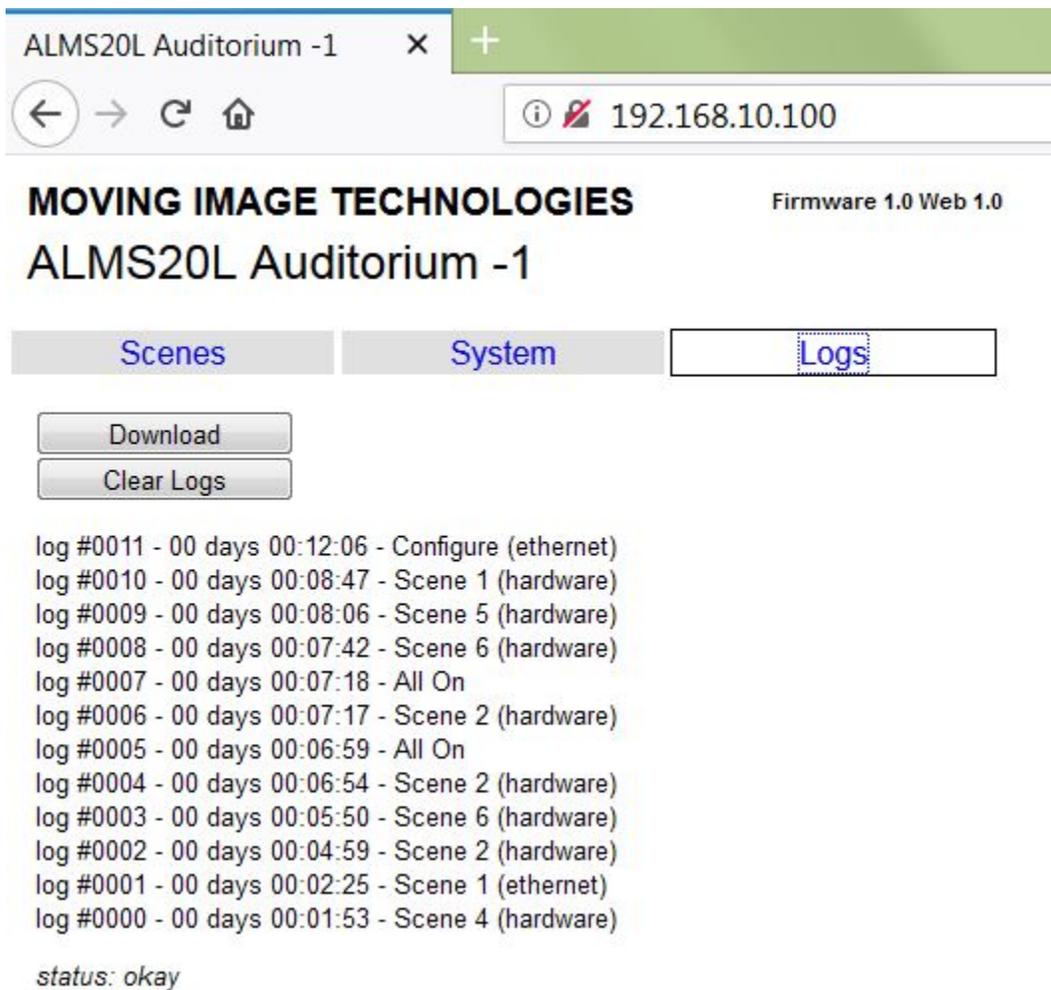


Figure 4-7: Logs Tab GUI

The 'Logs' tab allows the user to view the history of commands received, and *how* they were received. This can be useful for troubleshooting communication problems, or unintended scene changes. If a scene cue was received through the LAN port it will have the "(ethernet)" notation. If the cue was received by the GPIO port or by manually pressing a button on the front panel, the indication is "(hardware)".

Note: The front panel pushbuttons are not differentiated from the GPIO digital inputs.

Note: Times provided in the log are the relative time since the last power cycle or reboot, not actual time of day.

4.5 Front Panel Interface

Figure 4-8 shows the ALMS20L front panel. A Liquid Crystal Display shows the current scene / status and the output levels of the two channels. Pushbuttons allow the user to manually select scenes and also provide an alternative method of programming the unit.

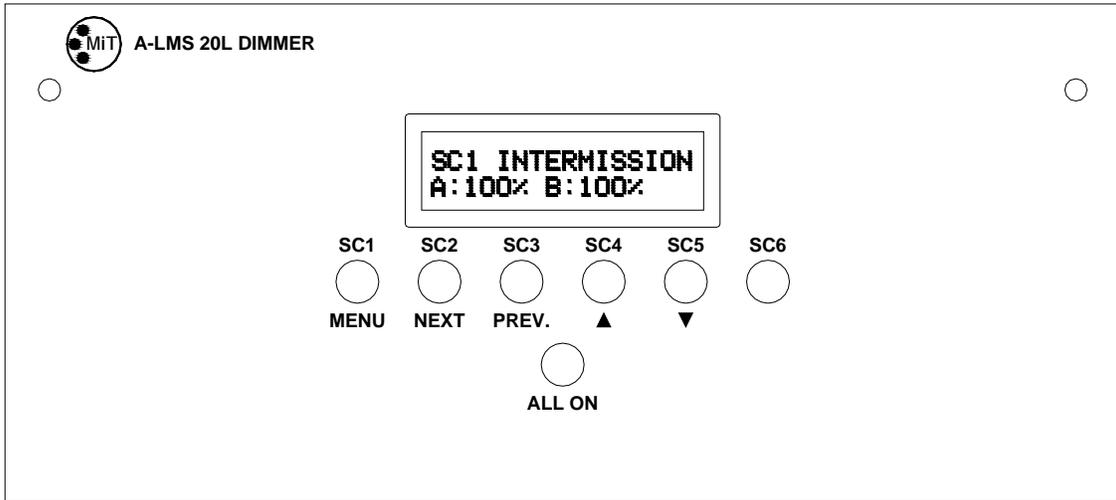


Figure 4-8: Front Panel

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5. 1-10V CONTROL OUTPUT

DC Control Output Electrical Drive Parameters

According to the IEC 60929 standard the dimming controlling device must sink current from the light fixture from its '+' terminal to its "—" terminal. The more current that is sunk from + to —, the lower the DC voltage will be at the fixture and the less bright the light output will be.

The two ALMS20L DC control outputs are rated for 100mA maximum output current. The current load on the control output from one light fixture will depend on the type of fixture but with the MiT ALF series fixtures is approximately 400 microamps or 0.4 mA at 1.0 VDC input voltage. This means one ALMS20L output channel should typically be able to control over 200 fixtures.

Full Output on Open Control Circuit

In accordance with IEC 60929, if either channel control line is unconnected that channel will go to full 100% light output. For any fixture that doesn't require dimming you may leave the control lines unconnected. This is how the emergency mode is usually implemented - by simply opening the control line connection between the controller and the fixture with a relay.

AutoNox™

The MiT ALF series LED fixtures have a feature called AutoNox™ that will automatically extinguish either channel of the fixture when the control voltage for that channel goes below approximately 0.9 Volts. The ALMS20L supports this feature by taking the output to ~0.5V if an output level of 0% is entered. If you are using the ALMS20L controller with MiT ALF series light fixtures, and you desire the fixtures to stay on during the movie, enter a value for brightness of 1% or more to keep them illuminated at a low level. On the ALMS20L a setting of 1% will cause the output control voltage to be right at the 1.0V minimum.

If you have entered a setting of 0% for one or both control channels and the fixtures are extinguished using the AutoNox™ feature, it may still be required in some regions to disconnect power completely to stop electricity drain (for example California Title 24). The switched AC power output terminals may be used for this purpose.

6 OPERATION

6.1 Front Panel Controls

The controls on the front panel consist of manual pushbuttons to select desired scenes, as well as to select the emergency ALL ON mode

During normal operating mode, pressing and releasing a scene pushbutton will select that scene, using the timing setting configured for that scene change. Pressing the ALL ON button immediately causes both channels to go to full output. The ALL ON mode is cancelled by pushing any other scene button (or receiving another cue from the GPIO or LAN inputs). Note: The All On digital input will normally be connected to the fire panel in the building. The ALMS20L cannot resume normal operation as long as the fire panel holds that input active. The All On input being held active is indicated by the LCD flashing on and off.

The upper 6 buttons are dual purpose, also used for changing the programming settings on the unit. To change the default programming, hold down the SC1 / MENU button for approximately 5 seconds to enter the programming mode. Once in the programming mode you may use the NEXT and PREV. buttons to navigate through the various scene and channel parameters, and then use the up and down arrows to change their values. Exit the programming mode by pressing the MENU button again. Brightness levels are updated in real time so you can see exactly what you're doing. Additional parameters are available to the user when using the network interface.

Test Loop Mode

Holding down SC5 and SC6 buttons simultaneously for approximately 5 seconds activates a mode where the two channels constantly fade up and down over a 10 second period. This may be convenient when testing compatibility of the dimmer with a new lighting fixture or lamp to ensure no glitches or flickering occurs throughout the range. The two channels are driven 180 degrees out of phase so one fades up as the other fades down and vice-versa, so the total load remains relatively constant while in this mode. Exit this mode by pressing any other Scene button.

6.2 Remote Operation

Scene cues may be received by the GPI input connector, the Serial connector, or the LAN connector. The GPI digital inputs accept switch or relay closures as described in Sec. 3.1.

To use the serial or LAN inputs to receive scene cues you will need to send ASCII text strings from the controlling device.

To send scene cues to the A-LMS via the LAN connection, in addition to configuring the desired IP address described in Sec. 4.4, you will need to establish a TCP/IP connection to the Host address (192.168.10.31 or other IP address that you entered), using port 23, then send the appropriate text string. Commands may be sent manually using a terminal program, or may be programmed into the playlist on the server. See Table 6-1 for the commands accepted. Commands are not case-sensitive.

Table 6-1

GPI Input	LAN / Serial Command String	Function Desc
1	ALL-ON	All outputs on full
2	SCENE1	Activate Scene 1 settings
3	SCENE2	Activate Scene 2 settings
4	SCENE3	Activate Scene 3 settings
5	SCENE4	Activate Scene 4 settings
6	SCENE5	Activate Scene 5 settings
7	SCENE6	Activate Scene 6 settings
-	STATUS?	Report status and health of ALMS20L

6.3 Control by Server via LAN

Here is an example of the setup procedure for controlling the A-LMS with a D-cinema server (based on the GDC server, others should be similar):

1. Add the ALMS20L as a 'Network Socket'
2. Enter the IP address as previously configured
3. Enter the default port of 23
4. Transport control is TCP
5. Linefeed type is CR, LF. The 'None' option will not work.
6. Define the control cues.
 - a. Enter 'Lights-Intermission' for the name and 'SCENE2' for the Value.
 - b. Enter 'Lights-Previews' for the name and 'SCENE3' for the Value.
 - c. Enter 'Lights-Feature' for the name and 'SCENE4' for the Value.
 - d. Enter 'Lights-Credits' for the name and 'SCENE5' for the Value.
 - e. Enter a name you want to use for Scene 6 (if desired).
 - f. Enter 'Lights-Cleaning' for the name and 'SCENE1' for the Value, if you wish to activate Cleaning lights using the playlist.*
7. Enter the control cues in a playlist.
8. After these steps, Save. Now the ALMS20L device will be available to work with the usual automation macros defined for playlists.

*Note: cleaning or emergency lighting modes will often be selected by a hardware input rather than by the playlist in the server. If so you may skip step 6-f above.

Appendix

Parts List, Schematics, and Warranty

MODELS AND PART NUMBERS

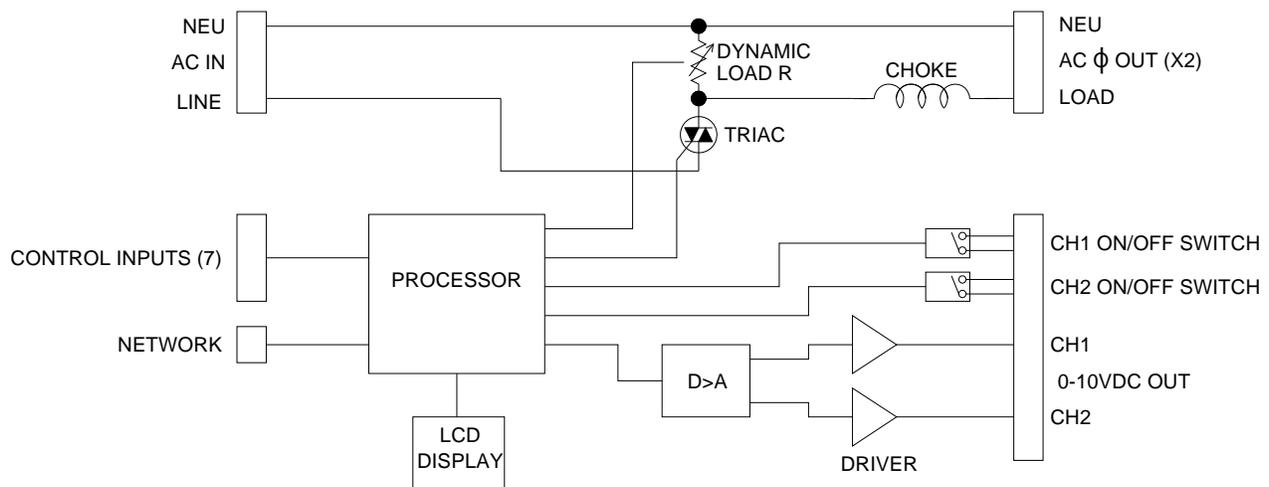
A000235-001 ALMS20L, prewired for 120 V service
A000235-002 ALMS20L, prewired for 230 V service

REPLACEMENT PARTS LIST

B000345-001 ALMS20L Main Control PCB, 120V
B000345-002 ALMS20L Main Control PCB, 230V
B000346-001 LCD Display/Control PCB
PE00021-080 Fuse, Fast Blow, 5 x 20mm, 250V, 8 Amp

Other Related Documents

R000157 ALF Emergency Wiring Diagram



ALMS20L Block Diagram

Standard Product Warranty

WARRANTY, DISCLAIMERS AND LIMITATION OF LIABILITY

Unless otherwise noted, all Moving Image Technologies products are covered by the warranty set forth in the following paragraphs.

The warranty is extended only to the purchaser of the Products directly from Moving Image Technologies, or an authorized dealer of Moving Image Technologies, as new merchandise. For a period of twelve (12) months from the date of original delivery to Buyer, the Products are warranted to be free from functional defects in materials and workmanship, provided they are operated under condition of normal use, and that repairs and replacements are made in accordance herewith. Moving Image Technologies does not warrant consumable components. The foregoing warranty shall not apply to Products that have been disassembled, altered or repaired other than by Moving Image Technologies (or by a Moving Image Technologies certified technician) or if the Product has been subject to abuse, misuse, negligence or accident.

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This warranty is subject to change at any time without notice.

CONTACTING MiT

To order parts or request information from MiT, use the address, telephone number, or fax number given on the inside front page of this document. When contacting MiT be prepared to provide:

- Model and serial number.
- Part name and part number, as shown in this manual.
- Original Purchase order number.

The purchase order number is essential for replacement parts requested under warranty. MiT issues credit for defective parts received. Please request a Return Authorization number from MiT for any defective parts.