

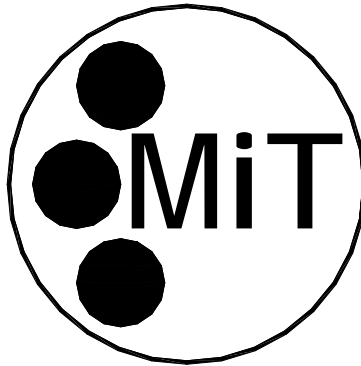
# FILM-TECH

**THE INFORMATION CONTAINED IN THIS ADOBE ACROBAT PDF FILE IS PROVIDED AT YOUR OWN RISK AND GOOD JUDGMENT.**

**THESE MANUALS ARE DESIGNED TO FACILITATE THE EXCHANGE OF INFORMATION RELATED TO CINEMA PROJECTION AND FILM HANDLING, WITH NO WARRANTIES NOR OBLIGATIONS FROM THE AUTHORS, FOR QUALIFIED FIELD SERVICE ENGINEERS.**

**IF YOU ARE NOT A QUALIFIED TECHNICIAN, PLEASE MAKE NO ADJUSTMENTS TO ANYTHING YOU MAY READ ABOUT IN THESE ADOBE MANUAL DOWNLOADS.**

**[WWW.FILM-TECH.COM](http://WWW.FILM-TECH.COM)**



# MOVING iMAGE TECHNOLOGIES

## INSTRUCTIONS

FOR

INSTALLATION, OPERATION, AND MAINTENANCE

OF

## M4a AUTOMATION

Manual Version 0.3

MOVING iMAGE TECHNOLOGIES, LLC.

Fountain Valley, CA

Telephone: (714) 751-7998

Fax: (714) 429-7717

[www.movingimagetech.com](http://www.movingimagetech.com)

## Operator's Manual M4a AUTOMATION

The information in this document is subject to change without notice and does not represent a commitment on the part of Moving Image Technologies (hereinafter referred to as MIT). MIT does not assume responsibility for errors that may appear in this document. MIT or its subsidiaries, designated representatives and any other vendor of the M4a Automation are not responsible in any way for any liabilities or loss resulting from the use or misuse of this document.

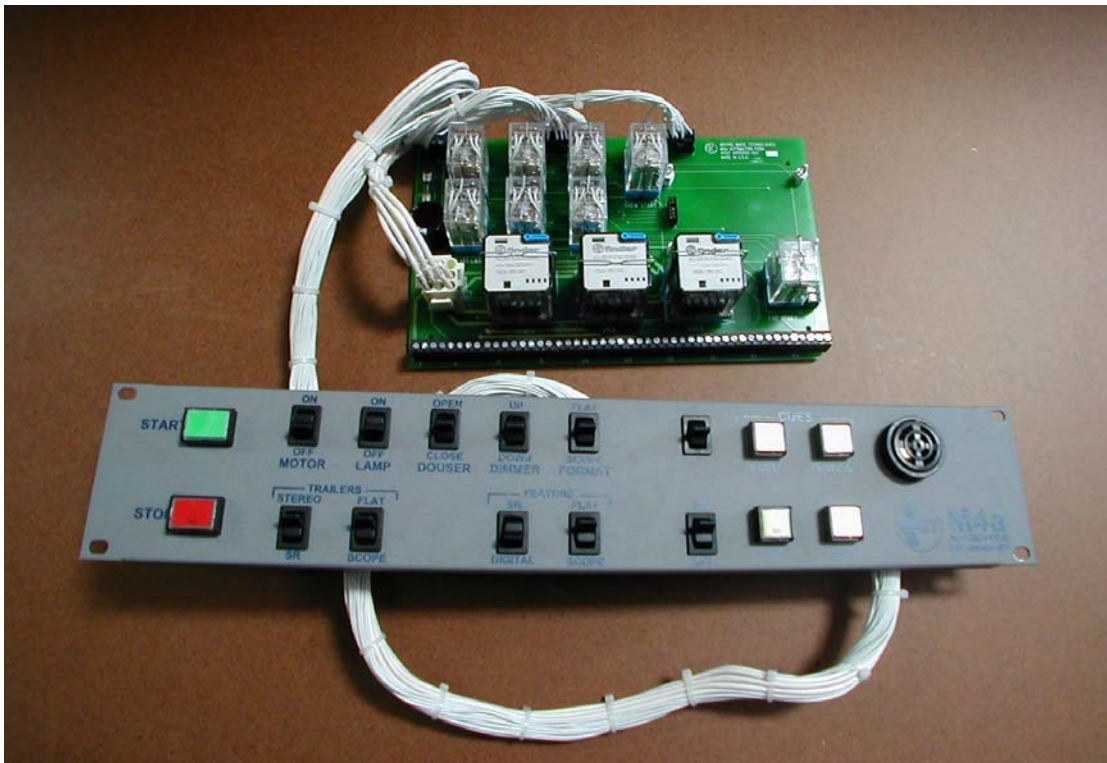
Copyright © 2004 by MIT  
All Rights Reserved

All copyrights and trademarks are the property of their respective owners.

**MOVING iMAGE TECHNOLOGIES, LLC.**  
Fountain Valley, CA  
Telephone: (714) 751-7998  
Fax: (714) 429-7717  
[www.movingimagetech.com](http://www.movingimagetech.com)

## TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1. INTRODUCTION	4
2. GENERAL DESCRIPTION	5
3. INSTALLATION	7
4. OPERATION	9
5. MAINTENANCE	13
6. TROUBLESHOOTING	14
APPENDIX A: DIAGRAMS, SCHEMATICS AND PARTS LISTS	15



## 1. INTRODUCTION

---

### 1.1. CONTENTS OF THE MANUAL

---

This manual provides information suitable for various purposes. For details on operating the projector and for general information, see:

- Section 2: General Description
- Section 3: Installation and Assembly
- Section 4: Operation
- Section 5: Periodic Maintenance
- Section 6: Troubleshooting

Additional reference information is contained in the appendices.

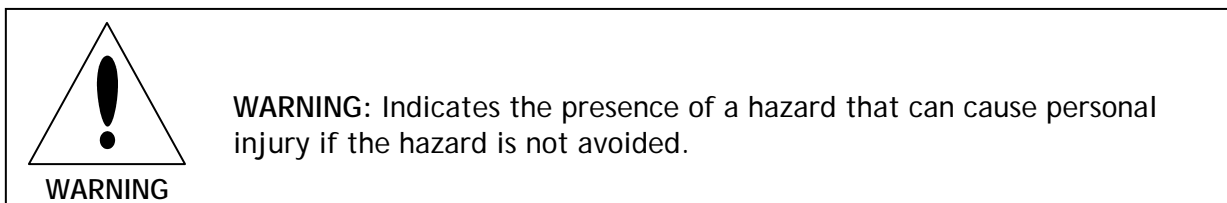
### 1.2 SPECIAL NOTICES

---

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

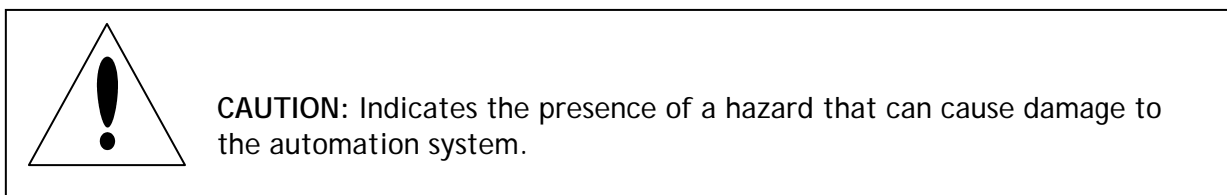
#### 1.2.1 WARNING

---



#### 1.2.2 CAUTION

---



## 2. GENERAL DESCRIPTION

---

The MIT M4a is a console-mounted, cue-driven automation designed especially for the MIT XLC console (but adaptable to other systems also). This cost-efficient design provides control of most booth and auditorium functions including: the projector motor, Xenon lamp, changeover douser, house light dimmer (up/mid/down), audio switching (Stereo/SR/Digital/Non-sync), stage curtains, slide projector, remote status indication (run/stop/fault/ready), built-in two-projector interlock, full remote capability, lens turret/masking control and fire alarm relay circuitry.

The automation provides manual control of all functions and cues as well as two user assignable option switches pre-wired to the main terminal board. To initiate the various automated functions, the automation uses a reliable cue detector instead of a cam timer. The compact printed circuit board design provides reliable, trouble-free operation with the familiarity and simplicity of electro-mechanical relays.

### SUMMARY OF FEATURES

- Integrated cue expander; for use with any three-head proximity detector.
- Four cue operation (typical)
- Compact 2RU front panel
- Independent trailer and feature audio and image format selection
- Two-piece design for easy integration into console or wall-mount installations
- LED indicators for start, stop and cues
- Integrated fire alarm relay circuit
- Remote control and status capability
- Reliable, relay-based, low-cost design
- Timing driven by electro-optical cues on the film
- Two customizable option functions
- Two wire interlock
- Manual control of all basic projection system and auditorium functions
- 12VDC circuitry
- Panel mount 2800Hz buzzer/alarm
- Countdown start/intermission timer optional
- Low cost of ownership
- Designed specially for the MIT XLC console

## 2.1 UNPACKING

---



**NOTE:** Carefully inspect the system for any shipping related damage. If damage is found, notify shipping agent immediately.

The M4a Automation will typically come installed and pre-wired in a console. Inspect for tie wraps and other shipping restraints to be removed and disposed of. If purchased separately, remove the unit from the packaging and dispose or recycle the packaging materials.

## 2.2 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:

- M4a serial number.
- Part name and part number, as shown in this manual.
- 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.

## 3. INSTALLATION

---



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

### 3.1 M4A ASSEMBLY INSTRUCTIONS

---

The M4A comes from the factory completely assembled and tested. The on-site installation for the automation consists of connecting the external control and status wiring to the other booth/auditorium equipment. If the automation was factory installed in a console, all applicable wiring to the projector and console will be complete and tested. See Section 3.2 for other wiring.

#### 3.1.1 Power Supply Wiring

---



**CAUTION:** Local and national electrical codes should be observed at all times.

The M4A Automation requires 12VDC. This input power must be connected to TB1 on the M4a Circuit Board. If installed in an MiT console, this power is provided from a low-voltage power supply located within the main rectifier/ballast. If the M4a is sold separately, an AC to DC wall-mounted adapter is provided with the unit.

#### 3.1.2 Interlock Wiring

---

If two projectors with M4a automation systems will be used in Interlock mode, each M4a must have a jumper connected from its TB3-43 to TB3-47 and another jumper connected from TB3-45 to TB3-46. Also add a jumper connecting TB3-42 on both automations, and another jumper connecting TB3-44 on both automations.



### 3.1.3 Status Panel Wiring

---

For connection to the optional Status Panel display, four separate wires are required from each projector's automation to its segment of the panel. Run, Stop, Fault and Ready status are indicated by the LEDs. Ready status is indicated by all LEDs remaining dark. Connections are as follows:

TB3-32	+12VDC
TB3-33	Run Indicator (Green LED)
TB3-34	Stop Indicator (Yellow LED)
TB3-35	Fault/Alarm (Red LED)

### 3.1.4 Cue Detector Selection & Wiring

---

When the M4a Automation is used *without* the MiT Cue Expander Module, jumper shunts must be installed across header J4, and a 3- or 4-head cue detector with active-low outputs must be connected as follows:

TB3-24	Show Start Cue
TB3-25	Feature Cue
TB3-26	End Credits Cue (no connection with 3-head cue detector)
TB3-27	Show End Cue

When the M4a Automation is used with the MiT Cue Expander Module installed, a 3-head cue detector with active-high outputs must be connected to TB3-24, 25, and 27. Active-low inputs will not be recognized, and TB3-26 has no internal connection. See Sec. 4.2 and Appendix A for details on correct application and operation of cues.

## 4. OPERATION

---

### 4.1 Typical Show Operation

---

The various functions that occur upon each cue or manual input are shown below.

- ▶ **Start Button**
  - Motor On
  - Lamp On
  - Douser Close
  - Slide Projector Off
  - Lens/Masking to Start Format (selectable)
  
- ▶ **Start Cue [at beginning of trailers]**
  - Dimmer Mid or Down
  - Curtain Open
  - Douser Open
  - Start Audio to Stereo or SR (selectable)
  - Status Indicator to Run
  
- ▶ **Feature Cue [at beginning of feature]**
  - Dimmer Down
  - Feature Audio to Stereo, SR or Digital (selectable)
  - Lens/Masking to Feature Format (selectable)
  
- ▶ **End Credits [at beginning of end credits]**
  - Dimmer Mid
  
- ▶ **Show End Cue [at end of feature credits]**
  - Curtain Close
  - Douser Close
  - Dimmer Up
  - Audio to Non-Sync
  - Lens/Masking to Start Format (selectable)

- ▶ **Film Run Out**
  - Motor Off
  - Lamp Off
  - Slide Projector On
  - Status Indicator to Stop
  
- ▶ **Fault (Film Break)**
  - Motor Off
  - Lamp Off
  - Dimmer Up
  - Slide Projector On
  - Status Indicator to Fault
  - Alarm Sounds
  
- ▶ **Cancel Alarm**
  - Shuts off Alarm
  - Douser Close
  - Audio to Non-Sync

## 4.2 Cue Placement

---

The MIT M4a automation uses four different cues for normal show operation. A general description follows. For details on Cue tape positions see Appendix A.

**Show Start** - [outboard cue]

- placed two feet prior to the start of the trailers

**Feature** - [center cue]

- placed two feet prior to the start of the feature or policy trailer

**End Credits** - [cross cue]

- placed at the start of the ending credits.

**Show End** - [inboard cue]

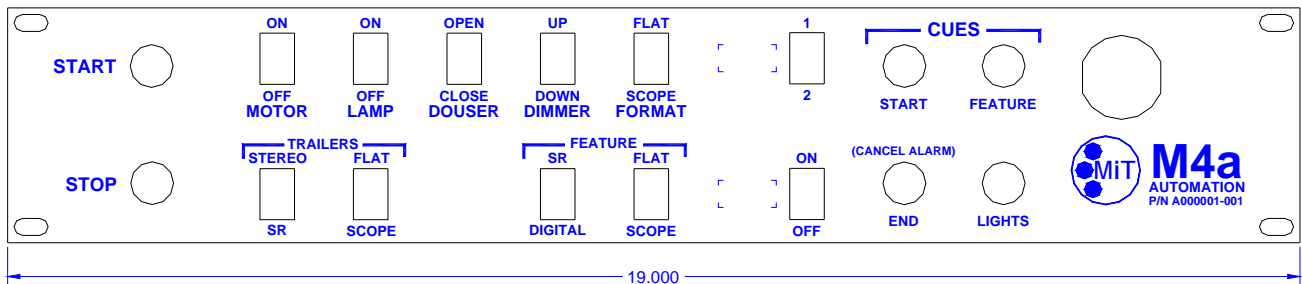
- placed two feet prior to the end of the credits

### 4.3 Component Functions

---

Start	(B1)	Latches Start Relay, engaging motor and lamp. Turret/masking to start format, closes douser, audio to non-sync. Slide projector OFF. Projector will not start if fail-safes are down. LED illuminated green when active
Stop	(B2)	Disengages Start Relay, motor and lamp OFF. Slide projector ON. LED illuminated red when active or fail-safes are down
Motor	(S1)	Manual motor control
Lamp	(S2)	Manual lamp control
Douser	(S3)	Manual opening and closing of changeover douser
Dimmer	(S4)	Manual raising or lowering of house lights
Format	(S5)	Manual control of lens turret/aperture/masking
Start Audio	(S6)	Selects trailer audio format to Stereo or SR
Start Format	(S7)	Selects trailer picture format to Flat or Scope
Feature Audio	(S8)	Selects feature audio format to Stereo, SR or Digital
Feature Format	(S9)	Selects feature picture format to Flat or Scope
Start Cue	(B3)	Manual Show Start Cue. Active only when Start Relay is latched. Brings lights to MID, audio to Mono/Stereo, douser open, curtain open. LED lit when pulsed
Feature Cue	(B4)	Manual Feature Cue. Active only when Start Relay is latched. Brings lights to LOW, audio to Stereo/SR, feature picture format to Flat or Scope. LED lit when pulsed
End Credits	(B5)	Manual End Credits Cue. Sets lights to MID. LED lit when pulsed
Show End Cue	(B6)	Manual Show End Cue, also Alarm Cancel. Brings lights UP, audio to non-sync, douser close, curtain close, start picture format to Flat or Scope. LED lit when pulsed
Option 1	(S10)	ON/OFF Switch May be used for interlock activation.
Option 2	(S11)	Momentary Switch, may be used for manual curtain control.
Buzzer	(X1)	Sounds alarm if a film break occurs.
Start Latch Relay	(K5)	Latches through Stop Relay. Holds Power Relay latched engaging motor and lamp.
Stop Relay	(K6)	Disengages Start Relay. Relay is latched when fail-safes are down.

Alarm Relay	(K7)	Sounds alarm if Stop Relay is latched due to fail-safe. Alarm sounds if show is between the Show Start and Show End Cues
Show End Relay	(K1)	Actuates Show End Cue functions. Disengages Alarm Relay
Feature Relay	(K2)	Actuates all Feature Cue functions
Show Start Relay	(K4)	Actuates all Show Start Cue functions. Latches Alarm Relay
End Credits Relay	(K3)	Sets Dimmer to 'mid', activates 'Credits Notifier' output (if enabled by using the Cue Expander Module or a 4-head cue detector).
Power Relay	(K9)	Activated by Start Relay engages motor and lamp. 3PDT, 12VDC coil, contacts rated 10A
Open Relay	(K10)	Opens douser and stage curtains. 3PDT, 12VDC coil, contacts rated 10A
Close Relay	(K11)	Closes douser and stage curtains. 3PDT, 12VDC coil, contacts rated 10A
Fire Relay	(K8)	Activates Stop relay, Dimmer Up and Audio mute. Coil voltage to match Fire system. (Not included, to be supplied by the user if required).



**M4a Front Panel Controls**

## 5. MAINTENANCE

---



**CAUTION:** Disconnect AC feeds to the Automation prior to performing any maintenance.

### 5.1 Electrical Connections

---

Periodic tightening of the electrical connections is recommended.

---

# 6

---

## 6. TROUBLESHOOTING

---

This section helps the user to identify and, where possible, correct system malfunctions. The sections below are organized by component. For each component, the manual lists symptoms associated with possible problems and then present a table containing probable causes and steps to be taken to correct the problem.

MiT suggests that, when using these troubleshooting procedures to correct a malfunction that users copy the appropriate tables, record observations and include them with maintenance/repair records for future reference.

### 6.1. System Doesn't Power-up [No Indicator Lights]

---

	Probable Cause	Corrective Action
A	Breakers tripped or not on.	Verify breakers on the Console and at the wall/building feed are activated.
B	Fuse blown	LED on PCB at base of fuse should be lit. Verify 12VDC at terminals TB3 29 and 23. Verify continuity of 1A fuse.

### 6.2. Cues not activating

---

	Probable Cause	Corrective Action
A	Improper placement or insufficient cue tape	Simulate cue with a flat head screwdriver. Verify and/or correct cue placement.
B	No power to cue detector	Verify LED on cue detector and automation.
C	Defective cue detector	Check manual function of cues. Swap cue detector

---

# Appendix A

---

## Appendix A: Diagrams, Schematics and Parts Lists

---

<u>Description</u>	<u>Page</u>
A.1 Terminal Assignment Schedule	16
A.2 Wire Harness Connections	17
A.3 Part Numbers	18
A.4 Product Warranty	19
A.5 Cue Placement Details/worksheet	20
A.6 Electrical Schematic	21



## A.1 Terminal Assignment

---

### A.1.1 TB1 Power input

---

1. +12VDC
2. 12V common

### A.1.2 TB2 Fire Alarm input (from building alarm/enunciator system)

---

1. V+
2. V-

Note: The Fire Relay, K8, must have a coil voltage matching the Fire system voltage.

### A.1.3 TB3 Field Connections

---

- |                                   |   |
|-----------------------------------|---|
| 1. Motor                          | 26. End Credits Cue (if 4-head detector, otherwise matrixes from pins 24, 25, and 27) |
| 2. Motor                          | 27. Show End Cue (typ: outboard)  |
| 3. Lamp                           | 28. Failsafe/Stop   |
| 4. Lamp                           | 29. Ground  |
| 5. Douser Common                  | 30. Ground  |
| 6. Douser Open                    | 31. 12VDC   |
| 7. Douser Close                   | 32. 12VDC   |
| 8. Curtain Common                 | 33. Run Indicator   |
| 9. Curtain Open                   | 34. Stop Indicator  |
| 10. Curtain Close                 | 35. Fault/Alarm (connected internally to pin 46)                                      |
| 11. Slide Common                  | 36. Lens Common   |
| 12. Slide N.C. Contact            | 37. Lens Flat   |
| 13. Slide N.O. Contact            | 38. Lens Scope  |
| 14. Dimmer Common                 | 39. Option 1 Common   |
| 15. Dimmer Up                     | 40. Option 1 #1 (Up)  |
| 16. Dimmer Mid                    | 41. Option 1 #2 (Down)  |
| 17. Dimmer Down                   | 42. Option 2A On  |
| 18. Audio Common                  | 43. Option 2A Off   |
| 19. Audio Digital                 | 44. Option 2B On  |
| 20. Audio SR                      | 45. Option 2B Off   |
| 21. Audio Stereo                  | 46. Failsafe Bus (connected internally to pin 35)                                     |
| 22. Audio Mute                    | 47. Start Bus   |
| 23. Audio N/S                     | 48. Credits Notifier (ground pulse)   |
| 24. Show Start Cue (typ: inboard) |   |
| 25. Feature Cue (typ: center)     |   |

### A.1.4 TB4 Show Start output, delayed (film motion enable)

---

This extra set of relay contacts are provided as an output to enable a film motion monitor (connected to the Alarm enable relay, K7).

1. Relay COM
2. Relay N.O.

## **A.2 Harness Interfaces - Main PCB to Front Panel**

---

### **A.2.1 J1 Low-Current Connector A**

---

- |                    |                           |
|--------------------|---------------------------|
| 1. Dimmer Common   | 13. 12VDC                 |
| 2. Dimmer Up       | 14. Run Indicator         |
| 3. Dimmer Down     | 15. Stop Indicator        |
| 4. Audio Common    | 16. Fault/Alarm Indicator |
| 5. Trailer Audio   | 17. Lens Common           |
| 6. Feature Audio   | 18. Lens Flat             |
| 7. Show Start Cue  | 19. Lens Scope            |
| 8. Feature Cue     | 20. Trailer lens format   |
| 9. End Credits Cue | 21. Feature lens format   |
| 10. Show End Cue   | 22. Failsafe Bus          |
| 11. Failsafe/Stop  | 23. Start Bus             |
| 12. Ground         | 24. Buzzer output         |

### **A.2.2 J2 Low-Current Connector B**

---

1. Option 1 Common
2. Option 1 #1 (Up)
3. Option 1 #2 (Down)
4. Option 2a On
5. Option 2a Off
6. Option 2b On
7. Option 2b Off
8. Audio: Stereo
9. Audio: SR
10. Audio: Digital
11. N/C
12. N/C

### **A.2.3 J3 High-Current Connector**

---

1. Motor
2. Motor
3. Lamp
4. Lamp
5. N/C
6. Douser Open
7. Douser Close
8. Douser Common

### A.3 M4a Automation Part Numbers

---

A000002-001	Main PCB, M4a
A000060-001	Status display Assy, 10x ("1-10")
A000066-001	Status display Assy, 6x ("1-6")
A000061-001	Cue expander module
B000001-001	Harness, M4a
PE00006-001	Switch, Rocker-Bat, DPST, ON/OFF
PE00007-001	Switch, Rocker-Bat, SPDT, (ON)/ (ON)
PE00008-001	Switch, Rocker-Bat, SPDT, ON/ON
PE00009-001	Switch, Rocker-Bat, SPDT ON/OFF/ON
PE00010-001	Buzzer, Panel Mnt, 12VDC
PE00012-001	Switch, PB, DPDT, Green
PE00012-002	Switch, PB, DPDT, Red
PE00013-001	Switch, PB, SPDT, White
PE00015-012	Relay, 15A, 3PDT, 12VDC
PE00016-012	Relay, 5A, 4PDT, 12VDC
PE00021-010	Fuse, 5x20mm, 1A

## A.4 Standard Product Warranty

---

### 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.

Moving Image Technologies sole and exclusive warranty obligation and Buyer's sole and exclusive warranty consists of Moving Image Technologies, at its option, repairing or replacing free of charge products: (a) which contain a defect covered by the above warranty; (b) which are reported in writing to Moving Image Technologies not later than seven (7) days after the expiration of the twelve month warranty period; (c) which are returned to Moving Image Technologies promptly after discovery of the defects; and (d) which are found to be defective by Moving Image Technologies upon examination. Buyer shall pay all transportation charges.

Moving Image Technologies shall not be otherwise liable for any damages, including, without limitation, loss of profits or overhead, reimbursement, personal injury or property damage. The aforesaid warranty obligation of Moving Image Technologies constitutes its sole liability, and under no circumstances, shall the maximum liability of Moving Image Technologies under any legal theory (e.g. Contract, warranty, negligence, promissory, estoppel, strict liability, misrepresentation, tort) and for any reason whatsoever (e.g. Defect, delay or otherwise) exceed the purchase price of the defective part, regardless whether the claim is asserted by buyer or any other person or entity. The liabilities of Moving Image Technologies, as above set forth, shall not be extended because of advice given by it in connection with the design, installation or use of the products or parts thereof.

There are no express or implied warranties which extend beyond the warranties set forth above. Moving Image Technologies makes no warranty of merchantability or fitness for a particular purpose with respect to the products or any parts thereof.

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

## A.5 M4a Cue Placement Details



# Moving image Technologies

### PLACEMENT OF CUES, M4a AUTOMATION

When the MIT Cue Expander Module (p/n A000061-001) is used with the model M4a automation, cue locations on the film become dedicated to certain functions. There are three cues left unused, the contacts are made available to the user for other functions. Refer to the M4a manual and the diagram below for cue foil placement. Typical cue tape used is 1/4" wide, placed on framelines.

NOTE: Show Start and Show End Cues 1 and 4 may be swapped if desired, by swapping Inboard and Outboard connections at TB3-24 and 27. Be aware that if this is done, it will also swap cue #3 and 6.

