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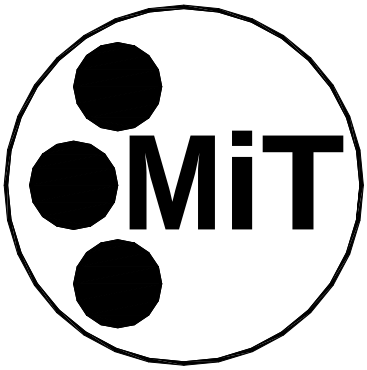

MOVING iMAGE TECHNOLOGIES

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

Operator's Manual
M4a AUTOMATION

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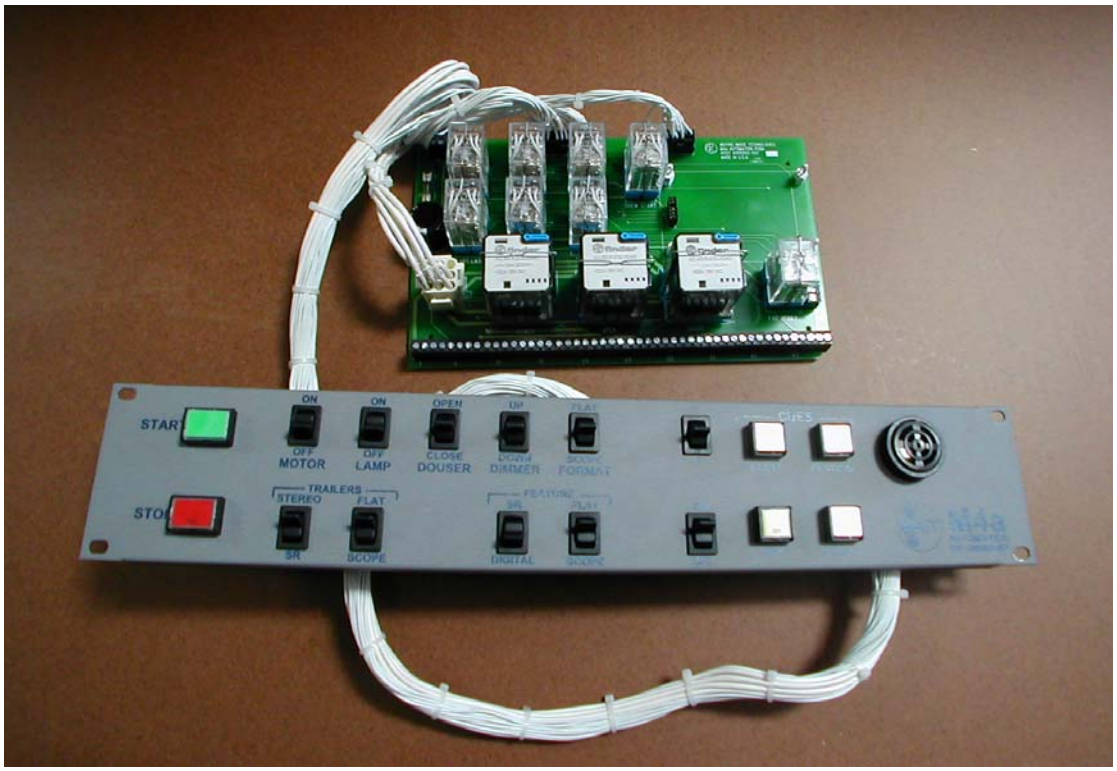

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1. INTRODUCTION

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

WARNING

WARNING: Indicates the presence of a hazard that can cause personal injury if the hazard is not avoided.

1.2.2 CAUTION

CAUTION: Indicates the presence of a hazard that can cause damage to the automation system.

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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.

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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.

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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

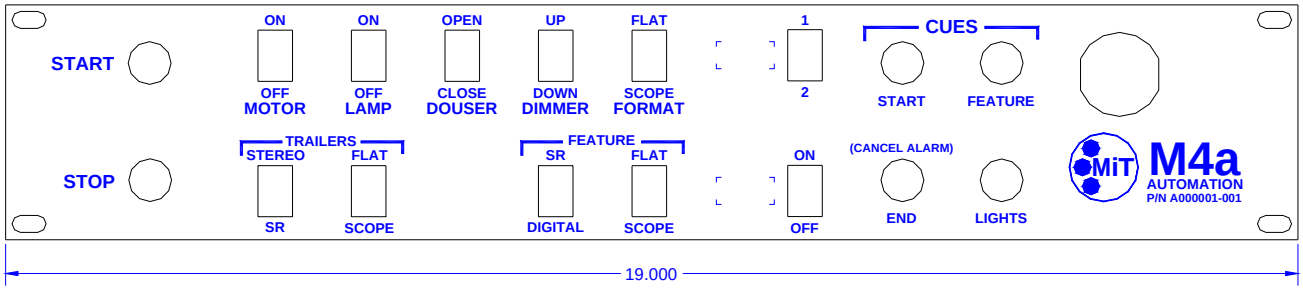
End Credits – [cross cue]
- placed at the start of the ending credits.

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.

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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

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

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

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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

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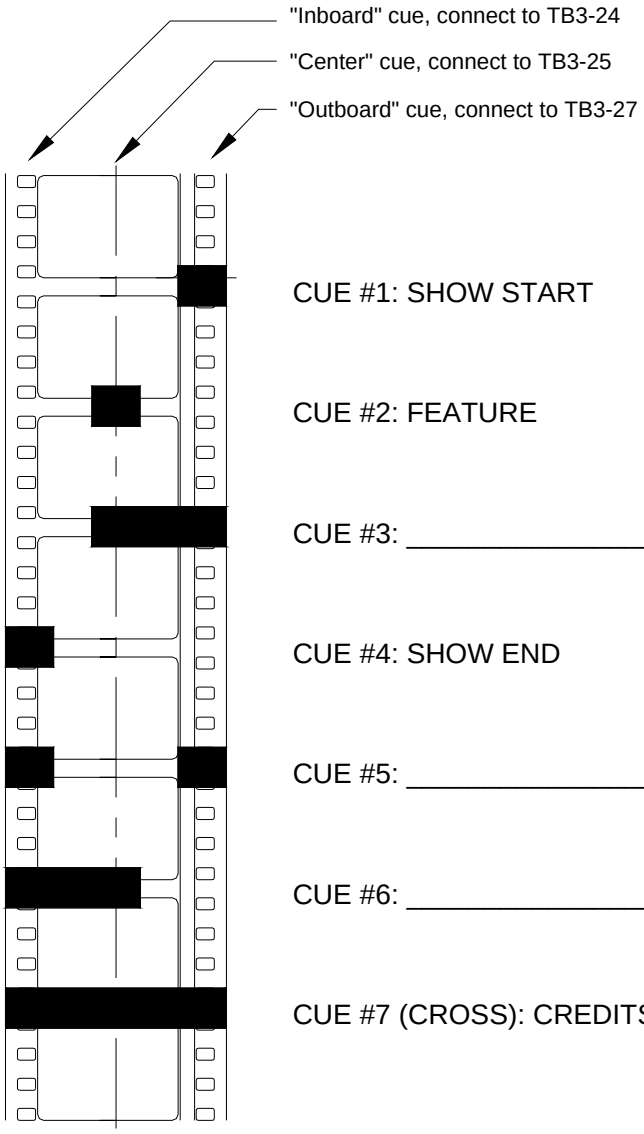
PLACEMENT OF CUES, M4a AUTOMATION

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.



CUE #1: SHOW START

CUE #2: FEATURE

CUE #3: _____

CUE #4: SHOW END

CUE #5: _____

CUE #6: _____

CUE #7 (CROSS): CREDITS