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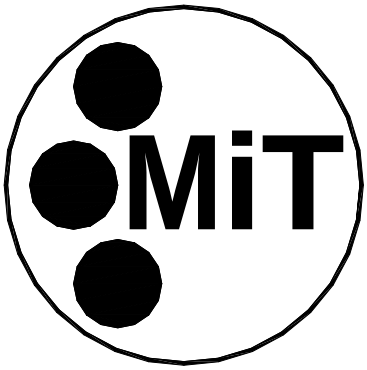

MOVING iMAGE TECHNOLOGIES

INSTRUCTIONS

FOR

INSTALLATION, OPERATION, AND MAINTENANCE

OF

XLC Xenon Console

Manual Version 0.1

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Operator's Manual
XLC Console

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1. INTRODUCTION

1.1 CONTENTS OF THE MANUAL

This manual contains installation, operation, and operator maintenance procedures for the MiT XLC Console. The material covered includes:

- general description
- installation procedures
- principles of operation
- maintenance and adjustments
- troubleshooting

1.2 PURPOSE 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: Principles of Operation
- Section 5: Periodic Maintenance
- Section 6: Troubleshooting

Additional reference information is contained in the appendix.

1.3 SPECIAL NOTICES

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

1.3.1 WARNING

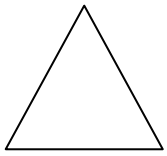
WARNING

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

1.3.2 CAUTION

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

1.3.3 NOTE



NOTE: Provides additional information.

1.4 Safety Concerns

- ✓ Never look directly at the Xenon lamp. Serious and permanent eye damage can be caused by the ultraviolet radiation of the lamp.
- ✓ Do not open the lamp compartment for at least 10 minutes after switching the lamp off.
- ✓ Always wear authorized protective clothing when opening the lamp compartment or handling an unprotected lamp.
- ✓ Disconnect the AC lines before working on anything inside the console.

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2. GENERAL DESCRIPTION

The MiT XLC Console is a commercial-grade Xenon light source for motion picture projection. Contained in this unit are a low ripple DC power supply, high efficiency electro-formed nickel reflector, high voltage AC igniter, power protection/distribution wiring, and structural mechanisms for supporting projectors and ancillary equipment.

WARNING

WARNING: Xenon lamps are highly pressurized and can be extremely dangerous. Please consult the lamp manufacturer's safety instructions prior to handling or installing any lamps.

2.1 Physical Specifications

See Table 2-1 for weights, and Figure 2-1 for dimensions of finished consoles.

Table 2-1:

Model	Weight (lbs) [kg]
XLC 2030	650 [295]
XLC 4070	750 [340]

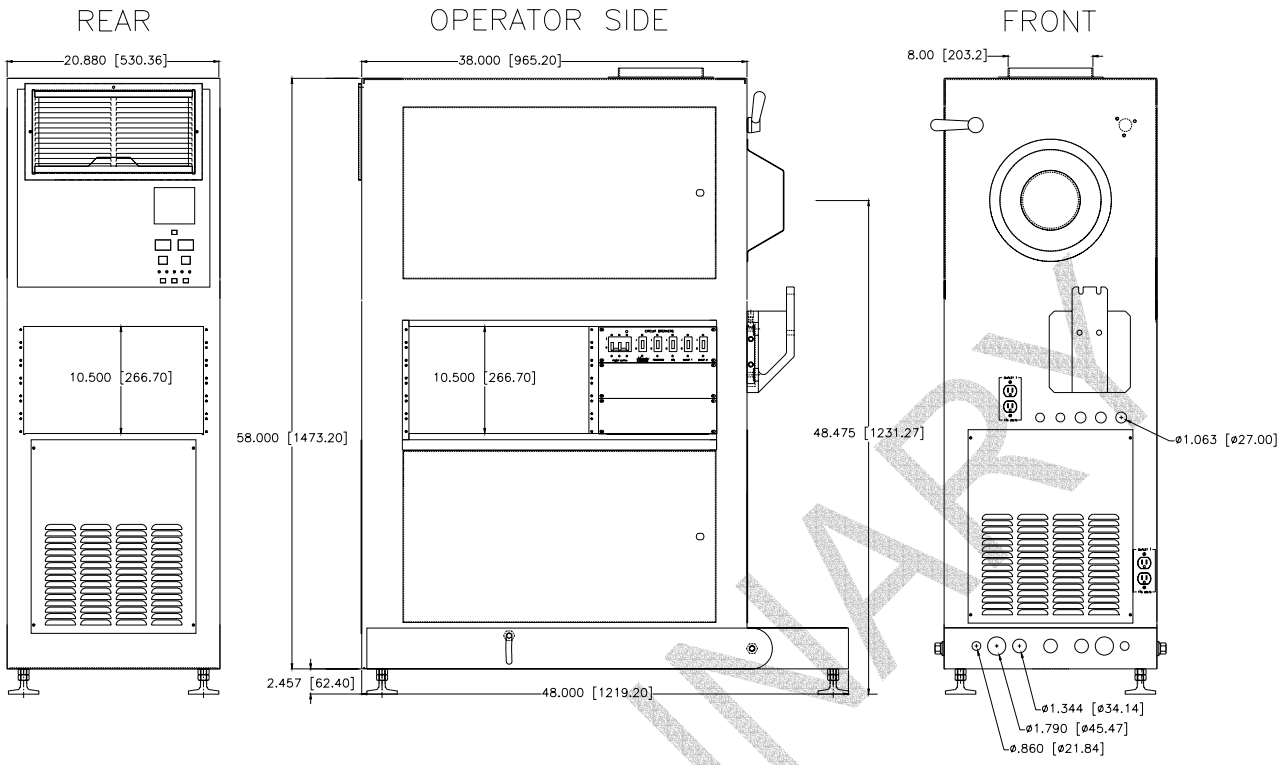

Figure 2-1: Console Outline, all models

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3 INSTALLATION PROCEDURES

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

3.1 UNPACKING

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

Once the XLC console has been placed in the appropriate location at the desired auditorium projection port, remove any protective plastic or cardboard shipping materials. Internally there may be tie wraps and other shipping restraints that must be removed. Dispose of the packaging materials.

3.2 ASSEMBLY INSTRUCTIONS

The XLC comes from the factory completely assembled and tested. The on-site installation for the console consists of installing the threaded leveling feet, electrical wiring, Xenon lamp installation, exhaust extraction provisions and properly aligning the system to the screen.

3.2.1 Leveling Feet Installation

Two lengths of leveling feet are provided, 3.5" and 6". The shorter feet go on the front of the unit to reduce labor in assembly, the longer ones go in the back to add additional downward tilt capability. These will be found packaged and restrained inside the power supply compartment of the console.

Although other methods of installation are possible, the following process is typical:

- With the assistance of another person, tilt the console to its side, installing the right front and right rear leveling feet. Feet should be completely threaded in for maximum stability. Only adjust them outward if system leveling or additional tilt is required.
- Repeat this procedure for the opposite side, installing the front left and rear left feet.
- Use a carpenter's level to adjust the feet to ensure the system is level and is stable to its support base.

3.2.2 Electrical Wiring

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

The XLC console requires one three-phase power feed (single phase power is created internally within the unit to run the projector, fans, and accessories). See Table 3-1 for electrical service requirements.

Refer to the automation manual for control and low voltage wiring.

3.2.3 Input voltage and Power Output settings

The XLC-2030 ships from the factory configured for the correct voltage range, either ~220 or ~400V, depending on the destination country. This should never require a change in the field. However within a given country, particular regions may have high or low voltage compared to the standard. Provision is made to accommodate this variation with a HI/Low voltage selection link on the Primary circuit board. In addition, the current output of the power supply must be configured for the correct lamp.

The XLC-2030 ships from the factory configured for a 3KW lamp, whereas the XLC-4070 ships configured for 6K-7KW lamps. Both are configured for HI local voltage. The power supply must be configured for the correct input voltage and lamp if they differ from this.

The HI/LO voltage selector links are located on the Primary PCB, under the tap switch assembly. See Table 3-1 for settings.

Note: When possible, the HI/LO voltage links should be left in the factory HI position, even when operated at a lower input voltage. This keeps the noise level low, minimizes the stress on the transformer, and will maximize its operating life. The voltage selector links should only be moved to the Low setting if insufficient current is obtained at the highest tap setting.

TABLE 3-1: Jumper link settings

Console	Lamp	Lamp Power (W)	3ph AC Power V-A (min)	HI / LO Voltage setting	HI / Low Power setting
XLC 2030	MXL-20	2000	200-220V 15A 350-380V 10A	Low	Low
XLC 2030	MXL-20	2000	221-240V 15A 381-415V 10A	High	Low
XLC 2030	MXL-30	3000	200-220V 20A 350-380V 12A	Low	High
XLC 2030	MXL-30	3000	221-240V 20A 381-415V 12A	High	High
XLC 4070	MXL-40	4000	200-220V 20A 350-380V 12A	Low	Low
XLC 4070	MXL-40	4000	221-240V 20A 381-415V 12A	High	Low
XLC 4070	MXL-45	4500	200-240V 25A 350-415V 15A	Low	Low
XLC 4070	MXL-60	6000	200-220V 25A 350-380V 15A	Low	High
XLC 4070	MXL-60	6000	221-240V 25A 381-415V 15A	High	High

3.2.4 Xenon Lamp Installation

WARNING: Xenon lamps are pressurized and can explode.
Protective gear must be worn when handling Xenon lamps.

The XLC console does not require any tools for lamp installation or replacement. The following steps should be followed for proper replacement of Xenon lamps.

1. Existing lamp should be allowed to cool for at least 10 minutes prior to attempting to replace it. Xenon lamps internal pressure increases with temperature as does the possibility of explosion or other physical injury. Protective gloves, vest and face shield should be worn when handling Xenon lamps.

2. AC power should be completely disconnected from the console to prevent electrical shock.

3. From either the operator or non operator side of the console, open the upper lamphouse access door using the appropriate key and, if desired, remove the door completely using the quick release pins at the hinge point of the door.

4. Using the integral lamp clamping levers, loosen the front and rear lamp connections (it shouldn't be necessary to turn them more than 1 or 2 turns).

5. Remove the forward lamp connector and let it move aside out of the way.

6. If the lamp is a HTP (threaded pin) slowly rotate the lamp by grasping the cathode (rear) end, until it releases from the rear bulb adaptor. Do not put excessive torque on the lamp.

7. Slowly slide the lamp out from the reflector and place it in a protective housing or packaging.

8. Take this opportunity to inspect the forward and rear lamp connectors for corrosion. If necessary, you may also clean the reflector using a clean cotton rag and de-natured or methyl alcohol.

9. To install a new lamp repeat steps 2-7 in reverse order. Take care not to touch the envelope of the lamp with your bare hands. If touched, the envelope of the lamp must be cleaned with an alcohol dampened towel to prevent devitrification of the quartz.

10. Double check that the connections are tight on both the anode and cathode ends.

11. Record the old and new lamp information on the lamp record card. Reset the **LAMP HOUR** meter by pressing the recessed reset button at the meter panel on the back of the console directly below the lamp hour meter.

12. Dispose of the old lamp according to the recommended procedure of the lamp manufacturer and/or according to your specific company's policies.

3.2.5 Xenon Lamp Alignment

CAUTION: Proper alignment of the XLC console and Xenon lamp requires the use of a calibrated light meter. Permanent film damage is possible from improperly aligned Xenon lamps, particularly at the higher wattages.

The reflector and optical bench has been factory aligned for the best possible performance - adjustment of the optical bench should not be required for routine lamp replacement. The following procedure should be followed for optimal lamp alignment.

1. With the hand/manual douser closed, strike the lamp and let it warm-up for at least ten (10) minutes.

2. Remove the 'flat' lens from its holder or turret.

3. Open the hand/manual douser and observe the image formed on the screen by the lamp and reflector.

4. Make sure the dark 'spot' formed by the image or shadow of the lamp in the reflector is centered on the screen.

5. Adjust the lamp X, Y and Z position to center the 'spot' and make it as small as possible.

6. Observe the concentric rings that are formed when the lamp is moved forward and aft. [If the rings are not concentric, adjustment of the optical bench/reflector or projection head may be necessary.]

7. Re-install the flat lens, making sure it is positioned in the center of the focus range.

8. Adjust the lamp focus forward and aft and observe the image corners on the screen, when properly aligned the corners should start to fall off in brightness at the same time. Adjust the Left/Right and Up/Down light uniformity balance using a calibrated light meter. This is an iterative process to achieve the best possible performance.

9. As a safety precaution it is a good idea to run a loop of mostly black film with white text (e.g. trailer credits) to make sure that the lamp is not embossing, burning or otherwise damaging the film. This is particularly important with lamps over 4kW in size.

3.2.6 Exhaust Extraction

The XLC consoles have internal blowers to properly cool the reflector, lamp, and power supply. This heated air must be extracted from the system and away from the booth. The console has an 8-inch [203.2mm] flange at the top of the console system to attach a flexible duct. Typically a roof blower is used to draw this heated air from the building.

Depending on the size of the lamp being used, the external extraction rates in Table 3-2 will be required (measured at the exit of the console).

TABLE 3-2

Console	Lamp	Lamp Power (W)	Extraction (CFM)	Extraction (l/sec)
XLC 2030	MXL-20	2000	350-450	
XLC 2030	MXL-30	3000	400-500	
XLC 4070	MXL-40	4000	500-600	
XLC 4070	MXL-45	4500	550-650	
XLC 4070	MXL-60	6000	700-800	

Note: Provision is also available in this console model to duct outside air to the air intake of the lamphouse, which eliminates any negative pressure situation in the projection booth, reduces HVAC loads, and minimizes the buildup of popcorn oil and other food-related residues on optical components.

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4. PRINCIPLES OF OPERATION

The XLC console is designed to operate reliably with little to no daily user intervention. Once the breakers are on, the unit is ready for on/off control locally, or more typically by the cinema automation system. The automation system will strike (start) the lamp and shut it off at the end of a show.

The console collects and concentrates the light from the short arc Xenon lamp to fully illuminate the target aperture in the projector. Dichroic coatings remove IR and UV from the light which can be harmful to the projector and film. High precision focus mechanisms permit the accurate alignment of the lamp in the reflector to achieve optimal performance. Cumulative system hours and re-settable lamp hour meters are present at the back of the console, along with independent status indicators for the door and airflow interlocks. DC current and voltage metering is also available at the meter panel.

4.1 Lamp Operating Power

The XLC console is available in two models, capable of operating lamps from 2-3kW and 4-7kW. It is the user's responsibility to operate the lamp within the recommended operating power range specified by the lamp manufacturer. Typically the lamp model designates the recommended maximum operating power level, with 80% being the recommended *minimum* power level. Table 4-1 shows MiT's recommended lamps and their operating ranges.

TABLE 4-1: Lamps and their Operating limits

Lamp Model	Rated Power (W)	Current Min (A)	Current Max (A)	Typical Voltage (V)
MXL-10	1000	40	58	20-22
MXL-16S	1600	50	70	20-24
MXL-16SC	1600	50	70	20-24
MXL-20R	2000	50	90	22-25
MXL-20SC	2000	50	90	22-25
MXL-20	2000	50	90	22-25
MXL-25SC	2500	70	100	23-27

MXL-2500	2500	65	95	26-30
MXL-30R	3000	75	110	28-32
MXL-30SC	3000	75	110	28-32
MXL-30	3000	75	110	28-32
MXL-40	4000	90	140	27-32
MXL-40SC	4000	90	140	27-32
MXL-4200A	4200	90	150	27-32
MXL-45	4500	100	150	29-35
MXL-50SC	5000	100	160	30-37
MXL-60SC	6000	100	160	31-38
MXL-60	6000	100	160	31-38
MXL-70SC	7000	100	160	43-49

4.2. Lamp Power Adjustment

Power levels are adjusted at the power supply in the lower compartment of the XLC console. The XLC power supply offers three methods of adjusting the power output:

- Tap switch current control (5 levels of "fine" control from 75-100%).
- HI/LO links on the Secondary control PCB, for "coarse" power output. These are normally configured at the time of theatre installation (see sec. 3.2.3). All units are configured at the factory for the highest output setting. It is the end user's responsibility to reduce the output level to correspond to the lamp being used.
- HI/LO input voltage selection links on the Primary PCB indirectly affect the output power (see sec. 3.2.3). These links may need to be adjusted if output power is low. All units ship from the factory with the power supply links strapped for the 'High-V' setting. Because these links control the primary voltage, moving them to the 'Low-V' setting increases output power.

Any of these adjustments should only be performed by a trained/qualified individual. For maximum life and performance of the equipment, the tap switch should be changed with the lamp and breakers turned off.

Recommended practice is to start the lamp at 80% of maximum power and increase power as necessary over the life of the lamp to maintain recommended light levels on screen. Care should be taken to ensure proper lamp alignment and to not exceed

recommended lamp maximum current levels (See Table 4.1). Operating a Xenon lamp below 80% of rated power can result in flickering or an unstable arc.

Note: The current meter built into the XLC console senses the current from a transformer winding in the power supply. It will normally read somewhat below the actual current value until the unit has reached normal operating temperature.

5. MAINTENANCE

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

5.1 Checking Electrical Connections

Perform these preventive checks every 500 hours or 3 months.

- ✓ Check forward and rear lamp connections for corrosion and proper mechanical connection.
- ✓ Check integrity of all DC power connections.
- ✓ Check integrity of three phase input connections from power supply back to primary input points.

5.2 Cleaning Optical Surfaces

CAUTION: Excessive cleaning or improper cleaning of optical surfaces does more harm than good.

Exposed optical surfaces will collect dust particulates over time. The reflector and heat filter (if present) should be checked every 3 months for cleanliness. Use a clean, soft cotton towel and residue-free methyl alcohol to clean these critical surfaces of dust or oily residue. Inspect surfaces after cleaning to remove any smearing or residues by polishing the surface with a clean dry towel.

CAUTION: If an IR/UV filter is present it should also be cleaned/dusted but it is essential that it be replaced in the proper orientation or fracturing will occur.

5.3 Cleaning Blowers

It is highly recommended to use the intake air filter feature of the XLC console. When properly used this will reduce or eliminate the build-up of contaminants internal to the system. Replacement filters are MiT P/N: C000020-001 and should be replaced as necessary. Replacement interval will vary depending on general operating environments.

If necessary, the blades of the blower can be cleaned with paper towels and a multi-purpose degreasing cleaner (like Simple Green or 409).

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 presents 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 or Blower]

	Probable Cause	Corrective Action
A	Breakers tripped or not on.	Verify breakers on the console and at the wall/building feed are activated.
B	No 3-phase AC input.	Check the three LEDs on the Operator side of the power supply. If not lit, verify 3-phase power from building service all the way to the power supply input using a calibrated AC voltmeter.
C	Phase missing.	See LEDs, or use an AC voltmeter to verify all three phases are present and equal in value.

6.2. Lamp Doesn't Strike [Lamp not flashing or attempting to strike]

	Probable Cause	Corrective Action
A	Interlock not ready	Verify that the red LED indicators on the control panel of the console are all dark, and the green LED is on. This includes door switches, air flow switches and AC power indicators. If power is on but all LEDs are dark (both red and green), this indicates a problem with the power supply fan switch interlock.
B	Insufficient open-circuit voltage	Using a voltmeter, measure the voltage on the DC output leads. Make sure lamp switch is on. Proper operation requires ~100VDC. Insufficient open circuit voltage could be caused by a missing phase or defective diode/SCR.
C	Lamp defective	Replace lamp with known good lamp.
D	Igniter defective	The igniter will attempt to start the lamp approximately 2 seconds after sufficient open-circuit voltage is present, and every few seconds after that. If open-circuit voltage is present but the igniter isn't making a buzzing sound every few seconds, replace igniter.

6.3. Lamp Doesn't Strike [Lamp flashing but not staying lit]

	Probable Cause	Corrective Action
A	Insufficient open-circuit voltage	Using a voltmeter, measure the voltage on the DC output leads (make sure lamp switch is on). Proper operation requires ~100VDC. Insufficient open circuit voltage could be caused by a missing phase or defective diode/SCR.
B	Insufficient DC current	Adjust DC tap switch to a higher value (but staying within the lamp's approved operating range).
C	Lamp defective	Replace lamp with known good lamp.

Appendix A

Appendix A: Assembly Diagrams, Schematics and Parts Lists

Standard Product Warranty

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

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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:

- XLC model and 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.