

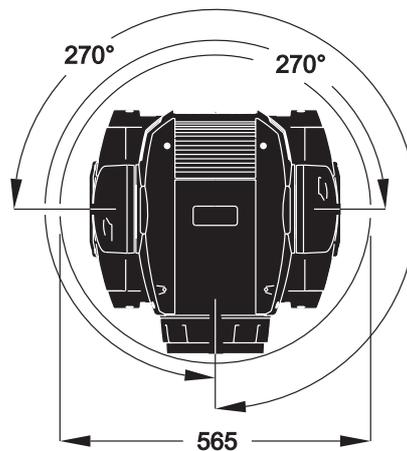
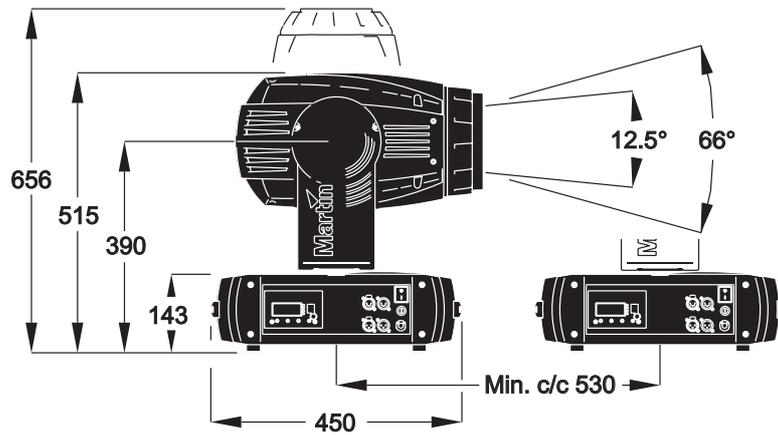
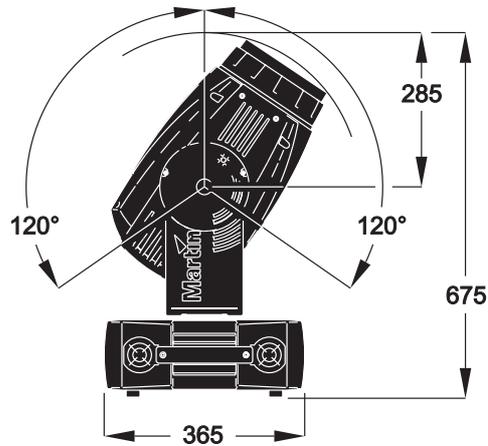
# MAC 700 Wash

user manual



# Dimensions

All measurements are expressed in millimeters



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P/N 35000185, Rev. C

# Safety information

**Warning!** *This product is for professional use only. It is not for household use.*

This product presents risks of lethal or severe injury due to fire and heat, electric shock, ultraviolet radiation, lamp explosion, and falls. **Read this manual** before powering or installing the fixture, follow the safety precautions listed below and observe all warnings in this manual and printed on the fixture. If you have questions about how to operate the fixture safely, please contact your Martin dealer or call the Martin 24-hour service hotline at +45 70 200 201.

## PROTECTION FROM ELECTRIC SHOCK

- Disconnect the fixture from AC power before removing or installing the lamp, fuses, or any part, and when not in use.
- Always ground (earth) the fixture electrically.
- Do not use the fixture with a damaged power cable or power plug.
- Use only power cable specified as extra hard usage
- Do not attempt to bypass fuses. Replace defective fuses with ones of the specified type and rating only.
- Use only a source of AC power that complies with local building and electrical codes and has both overload and ground-fault (earth-fault) protection.
- Do not expose the fixture to rain or moisture.
- Refer any service operation not described in this manual to a qualified technician.

## LAMP SAFETY

- Do not operate the fixture with missing or damaged covers, shields, lenses or ultraviolet screens.
- A hot discharge lamp is under pressure and can explode without warning. Allow the fixture to cool for at least 45 minutes and protect yourself with safety glasses and gloves before replacing the lamp or servicing the fixture internals.
- Do not stare directly into the light output. Never look at an exposed lamp while it is lit.
- Replace the lamp if it becomes visually deformed, damaged or in any way defective
- Replace the lamp at the latest when it reaches the limit of its average life as specified in this manual or by the lamp manufacturer.
- Install only an approved lamp.
- If the quartz envelope of a discharge lamp is broken, the lamp releases a small quantity of mercury and other toxic gases. If a discharge lamp explodes in a confined area, evacuate the area and ventilate it thoroughly. Wear nitrite gloves when handling a broken discharge lamp. Treat broken or used discharge lamps as hazardous waste and send to a specialist for disposal.

## PROTECTION FROM BURNS AND FIRE

**Danger!** *Intense heat. Avoid contact by persons and materials.*

***The exterior of the fixture can get very hot – up to 160° C (320° F). Allow the fixture to cool for at least 45 minutes before handling.***

***Prolonged exposure to an unshielded lamp can cause eye and skin burns.***

- Do not attempt to bypass thermostatic switches or fuses. Replace defective fuses with ones of the specified type and rating only.
- Keep all combustible materials (for example fabric, wood, paper) at least 0.5 meters (20 inches) away from the fixture. Keep flammable materials well away from the fixture.
- Do not illuminate surfaces within 1.2 meters (42 inches) of the fixture.
- Provide a minimum clearance of 0.1 meters (4 inches) around fans and air vents.
- Do not place filters or other materials over the lens.
- The exterior of the fixture becomes hot. Allow the fixture to cool for at least 45 minutes before handling.
- Do not use the fixture if any cable, component or cover is damaged, cracked or deformed.
- Do not modify the fixture in any way not described in this manual.
- Install only genuine Martin parts.
- Do not operate the fixture if the ambient temperature (Ta) exceeds 40° C (104° F).

## PROTECTION FROM INJURY DUE TO FALLS AND WHILE LIFTING

- Do not lift or carry the fixture alone.
- When installing the fixture above ground level, verify that all supporting structures, fasteners and lifting equipment can hold at least 10 times the weight of all installed devices.
- Check that all external covers and rigging hardware are securely fastened and use an approved means of secondary attachment such as a safety cable.
- Block access below the work area and work from a stable platform whenever installing, servicing or moving the fixture.



### Disposing of this product

Martin products are supplied in compliance with Directive 2002/96/EC of the European Parliament and of the Council of the European Union on WEEE (Waste Electrical and Electronic Equipment), as amended by Directive 2003/108/EC, where applicable.

Help preserve the environment! Ensure that this product is recycled at the end of its life. Your supplier can give details of local arrangements for the disposal of Martin products.

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# Introduction

Thank you for selecting the Martin MAC 700 Wash. This moving-head washlight features:

- 700 watt short-arc high-output discharge lamp with hot restrike
- full-range mechanical dimmer/shutter
- seamless CMY color mixing
- 5500 - 2800 K variable 0 - 100% color temperature correction
- color wheel with 8 replaceable filters (6 colors, 3200 - 4100 CTC and UV transmitter) plus open
- continuous and indexable rotating beam shaper
- 5:1 (12.5° - 66°) zoom
- 540° of pan and 246° of tilt with position correction system
- electronic "flicker-free" ballast
- auto-sensing switch-mode power supply
- clip-in/clip-out modular construction for fast service and maintenance with minimum fixture downtime

For the latest firmware updates, documentation, and other information about this and all Martin Professional products, please visit the Martin website at <http://www.martin.com>

Comments or suggestions regarding this document may be e-mailed to [service@martin.dk](mailto:service@martin.dk) or posted to:

Service Department  
Martin Professional A/S  
Olof Palmes Allé 18  
DK-8200 Aarhus N  
Denmark

**Warning!** *Read the safety precautions at the front of this manual before installing, operating or servicing the fixture.*

## Unpacking

The MAC 700 Wash is packaged in either a cardboard box or a two-unit flight case that is designed to protect the product during shipment. The following items are included:

- OSRAM HTI 700/D4/75 lamp (installed)
- 2 clamp attachment brackets
- this user manual
- one 6.3 AT fuse (installed) for use with 208 - 240 V power
- one 15 AT fuse for use with 100 -120 V power

## Using for the first time

Before applying power to the fixture:

- carefully review "Safety information" on page 3
- check that the main fuse in the fuseholder between the main on/off switch and the power cable matches the local AC power voltage as described in "Power supply and main fuse" on page 7
- install a plug on the power cable as described in "Power connection" on page 7
- unlock the tilt lock as described on page 20.

When powered up, check lamp alignment as described on page 9.

# AC power

**WARNING!** For protection from electric shock, the fixture must be grounded (earthed). The AC mains supply must be fitted with a fuse or circuit breaker and ground-fault (earth-fault) protection. Check that the correct fuse is installed before applying power.

## Power supply and main fuse

The MAC 700 Wash features an auto-ranging switch-mode power supply that automatically adapts to 100-120 V and 208-240 V nominal AC power at 50 or 60 Hz. However, a suitable main fuse must be installed to match the local voltage. The MAC 700 Wash is supplied with two main fuses:

- a 6.3 AT fuse (installed) for use with AC supplies of 208 - 240 V.
- a 15 AT fuse (packed with user manual) for use with AC supplies of 100 - 120 V.

To install the correct fuse:

1. Disconnect the fixture from AC power.
2. Remove the main fuseholder, which is located beneath the power switch.
3. For operation on 208 - 240 V power, install the 6.3 A fuse. For operation on 100 - 120 V power, install the 15 A fuse.

## Power connection

**Important!** Connect the MAC 700 Wash directly to AC power. Do not connect it to a dimmer system; doing so may damage the fixture.

You may need to fit the power cable with a power plug that is suitable for your AC power outlets. If so, install a grounding-type (earthed) plug following the plug manufacturer's instructions. Table 1 shows some possible pin identification schemes; if the pins are not clearly identified, or if you have any doubts about proper installation, consult a qualified electrician.

To apply power, first verify that the head tilt locks are released and then set the power switch on the base to the "I" position.

Wire Color	Pin	Symbol	Screw (US)
brown	live	L	yellow or brass
blue	neutral	N	silver
yellow/green	ground (earth)		green

**Table 1: Cord cap connections**

# Lamp

## About the discharge lamp

The MAC 700 Wash is designed for use with an OSRAM SharXS HTI 700 W/D4/75 lamp. This highly efficient double-ended short-arc source provides a color temperature of 7500 K, a color rendering index greater than 85, an average service life of 750 hours and hot restrike.

Note that lamp power is automatically reduced to 400 W after 10 seconds when the fixture is blacked out with the dimmer. The lamp returns to 700W as soon as the dimmer is opened.

**Warning!** *Installing any other lamp may create a safety hazard or damage the fixture!*

To reduce the risk of explosion, replace the lamp when it reaches the limit of its average service life, i.e. when usage reaches 750 hours. *Never* exceed the lamp's average service life by more than 10%. To read lamp hours from the control panel, please refer to "Readouts" on page 13. Replace the lamp immediately if it is deformed or in any way defective.

For maximum service life, avoid dousing the lamp before it has warmed up for at least 5 minutes.

## Lamp replacement

**Important!** *Do not touch the quartz bulb with bare fingers. Wear safety glasses and gloves when handling lamps.*

Replacement lamps are available from your Martin dealer (P/N 97010212).

The clear quartz bulb must be clean and free of any oils from your fingers. Clean the lamp with an alcohol wipe and polish it with a dry cloth, particularly if you accidentally touch the bulb.

### To replace the lamp

1. Disconnect the fixture from power and allow it to cool for at least 45 minutes or until the lamp access plate is cool enough to touch. Lock the head right-side up.
2. Release the 4 quarter-turn fasteners marked with arrows on the lamp access plate, as shown in Figure 1. Pull the lamp assembly straight back as far as it goes and let it rest in place.
3. Push down the retention spring on the right end of the socket and push out the pin. You can use a screwdriver to gently pry the lamp out of the socket as shown in Figure 2. Remove the lamp.

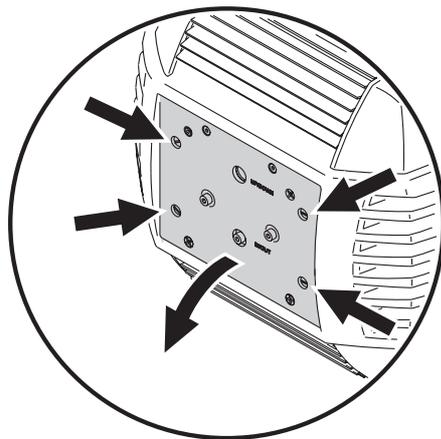


Figure 1: Lamp access

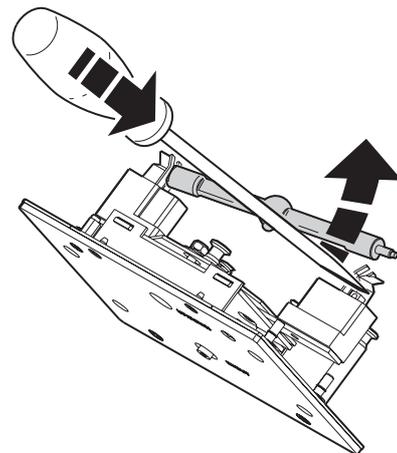
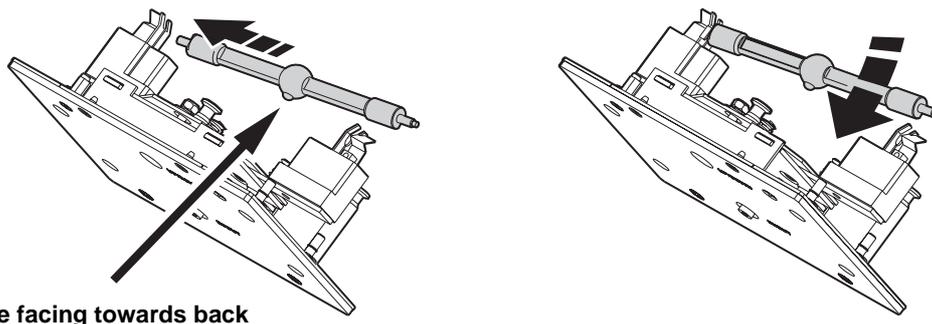


Figure 2: Lamp removal

4. Inspect the lamp socket for signs of discoloration or pitting, and replace if necessary (see "Replacing the lamp socket" on page 22).

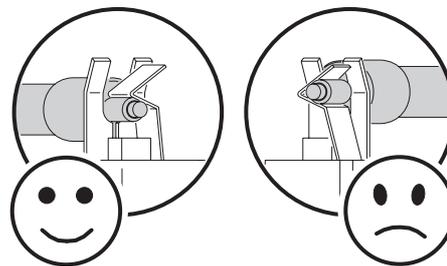
- With the nipple on the replacement lamp facing towards the back as shown in Figure 3, insert the left pin into the socket. Push down on the right-hand spring and snap the pin into place.



**Nipple facing towards back**

**Figure 3: Lamp insertion**

- See Figure 4. Make sure that the terminals on the lamp sit below the V-section in the lampholder clips and not in the V-section itself.
- Lift the lamp assembly so that lamp is level with the center of the reflector. Push the assembly straight in until it seats, making sure the lamp passes through the reflector opening.
- Push and turn the 4 fasteners a quarter turn or so clockwise to close the lamp access panel.
- After installing a new lamp, reset the lamp hour and lamp strike counters. See "Time" on page 13.

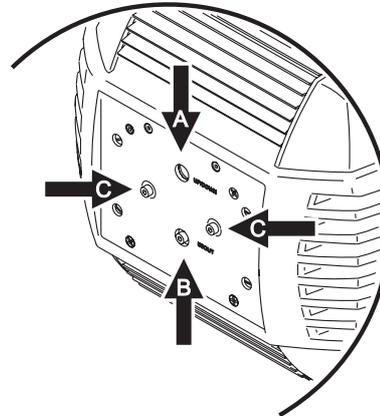


**Figure 4: Lamp terminals**

## To align the lamp

**Important!** *Align the lamp carefully. An excessive hot-spot will damage optical components.*

- Apply power and allow the MAC 700 Wash to reset. Using either a controller or the control menu, strike the lamp and project an open white beam on a flat surface.
- See Figure 5. Center the hot spot vertically using the top Allen-head adjustment screw (A) in the center of the rear plate. Center the hot spot horizontally using the side-to-side adjustment screws (C).
- If there is an excessive hot spot, turn the bottom adjustment screw (B) counterclockwise until the light is evenly distributed. If the light is brighter around the edge than it is in the center, or if light output is low, turn the bottom adjustment screw (B) clockwise until the light is bright and evenly distributed.



**Figure 5: Lamp adjustment screws**

# DMX data link

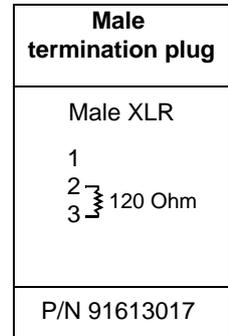
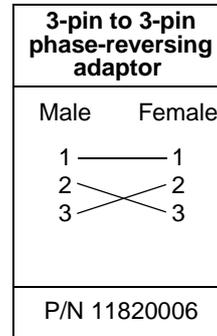
**Important!** *Never connect more than 1 data input and 1 data output.*

The MAC 700 Wash has both 3-pin and 5-pin XLR sockets for DMX input and output. The pin-out on all sockets is pin 1 to shield, pin 2 to cold (-), and pin 3 to hot (+). There is no connection to pins 4 and 5.

The sockets are wired in parallel: both inputs connect to both outputs. *To avoid damage to the fixture, never use more than one input and one output socket!*

## Tips for reliable data transmission

- Use shielded twisted-pair cable designed for RS-485 devices: standard microphone cable cannot transmit control data reliably over long runs. 24 AWG cable is suitable for runs up to 300 meters (1000 ft). Heavier gauge cable and/or an amplifier is recommended for longer runs.
- Never use both outputs to split the link. To split the serial link into branches use a splitter such as the Martin 4-Channel Opto-Isolated RS-485 Splitter/Amplifier.
- Do not overload the link. Up to 32 devices may be connected on a serial link.
- Terminate the link by installing a termination plug in the output socket of the last fixture. The termination plug, which is a male XLR plug with a 120 Ohm, 0.25 Watt resistor soldered between pins 2 and 3, "soaks up" the control signal so it does not reflect and cause interference. If a splitter is used, terminate each branch of the link.
- Some older fixtures have reversed polarity data sockets (pin 2 hot and pin 3 cold). Polarity is normally labelled on devices and described in user manuals. *Use a phase-reversing cable between the MAC 700 Wash and any device with reversed polarity.*

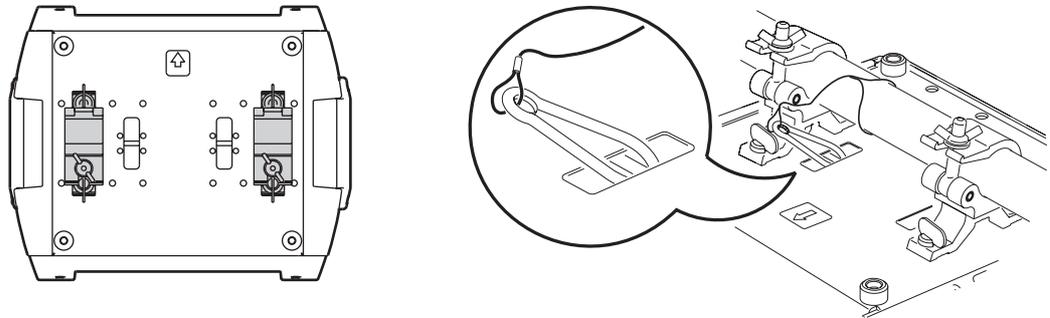


## To connect the data link

1. Connect the DMX data output from the controller to the MAC 700 Wash's 3-pin or 5-pin input (male) socket.
2. Using the sockets that match your data cable, connect the output of the fixture closest to the controller to the input of the next fixture.
3. Insert a male 120 Ohm XLR termination plug in the 3-pin or 5-pin output of the last fixture on the link.

# Rigging

The MAC 700 Wash can be placed on stage or clamped to a truss in any orientation. The mounting points allow the clamp brackets to be fastened parallel or perpendicular to the front as shown Figure 6.



**Figure 6: Clamp bracket positions and safety wire attachment point**

**Warning!** Always use 2 clamps to rig the fixture. Lock each clamp with both 1/4-turn fasteners. The fasteners are locked only when turned fully clockwise.

**Warning!** Attach an approved safety cable to the attachment point labelled “SAFETY WIRE” in the base. Never use the carrying handles for secondary attachment.

## To clamp the fixture on a truss

1. Check that the rigging clamps are undamaged and can bear at least 10 times the weight of the fixture. Check that the structure can bear at least 10 times the weight of all installed fixtures, clamps, cables, auxiliary equipment, etc.
2. Bolt each clamp securely to a clamp bracket with an M12 bolt (minimum grade 8.8) and lock nut.
3. Align a clamp with 2 mounting points in the base. Insert the fasteners into the base and turn both levers a full 1/4-turn clockwise to lock. Install the second clamp.
4. Block access under the work area. Working from a stable platform, hang the fixture on the truss with the arrow towards the area to be illuminated. Tighten the rigging clamps.
5. Install a safety wire that can bear at least 10 times the weight of the fixture. The attachment point is designed to fit a carabiner clamp.
6. Check that the tilt lock is released.
7. Check that there are no combustible materials within 0.5 meters (20 inches) of the fixture, no surfaces to be illuminated within 1.2 meters (42 inches) of the fixture, and that there are no flammable materials nearby. Check that there is 0.1 meters (4 inches) clearance around air vents.
8. Check that there is no possibility of heads or yokes colliding with other fixtures.

# Control panel

You can set the MAC 700 Wash's DMX address, configure individual fixture settings (personality), read out data, and execute service utilities from the fixture's control panel. Settings can also be changed remotely via the DMX link with the Martin MP-2 uploader.

See also the control menu overview starting on page 26 for a complete list of the menus and commands available in the control panel.

## Menu navigation

The DMX address and any status messages (see page 31) are displayed on the control panel when the MAC 700 Wash is powered on. To enter the menu, press [Menu]. Press [Up] and [Down] to move within the menu. To select a function or submenu, press [Enter]. To escape a function or menu, press [Menu].

Note: [Enter] must be pressed and held for a few seconds to enter the Utilities menu.

## DMX address and protocol

The DMX address, also known as the start channel, is the first channel used to receive instructions from the controller. For independent control, each fixture must be assigned its own control channels. Two MAC 700 Wash fixtures may share the same address, however, if identical behavior is desired. Address sharing can be useful for diagnostic purposes and symmetric control, particularly when combined with the inverse pan and tilt options.

Depending on the selected DMX mode, the MAC 700 Wash requires 16 or 23 DMX channels. The basic mode uses 16 channels and provides coarse control of all effects plus fine control of pan, and tilt. The extended mode uses 23 channels and provides the basic mode features plus fine control of the dimmer, CMY color mixing and variable CTC, color wheel and zoom.

The MAC 700 Wash's DMX address cannot be set higher than 497 in basic mode or 490 in extended mode. This makes it impossible to set the DMX address so high that you are left without enough control channels for the fixture.

### To set DMX address and protocol

1. Press [Menu] to enter the main menu.
2. Press [Up] until **ADDR** is displayed. Press [Enter]. To snap to channel 1, press [Enter] and [Up]. Scroll to the desired channel and press [Enter].
3. Select **PSET** from the main menu and press [Enter]. Select **16BT** for basic mode, or **16E\*** for extended mode. Press [Enter].

## Tailoring performance

### MOVEMENT

The MAC 700 Wash provides several options for optimizing movement for different applications.

- The protocol setting (**PSET**) setting selects the basic (**16BT**) or extended (**16E\***) control mode. Extended mode provides finer position control of the dimmer, CMYC color mixing, color wheel and zoom lens than the basic mode.
- The pan and tilt invert (**PATI**) menu swaps and/or inverts pan and tilt.
- The pan/tilt speed (**PTSP**) menu provides 3 settings: **FAST**, **NORM**, and **SLOW**. **NORM** is best for most applications. **FAST** provides better performance in applications where speed is most important. **SLOW** provides the smoothest movement and is best in long-throw applications with slow movements through narrow angles.
- The studio mode (**STUD**) setting optimizes all effects besides pan and tilt for quietness or speed.
- The shortcuts (**PERS**→**SCUT**) setting determines whether the color wheel takes the shortest path between two positions, crossing the open position if necessary, or always avoid the open position.

## DIMMER

The dimmer curve setting (*PERS*→*DIKU*) provides two options for dimmer behavior. Select *DIM 1* for a near-linear dimming curve or *DIM 2* to simulate tungsten lamp dimming characteristics.

## DISPLAY

The display intensity (*PERS*→*DIINT*) setting controls display brightness. Select *AUTO* for automatic display or manually set the intensity to a level from *10* to *100*.

The display on/off setting (*PERS*→*DIISP*) determines whether the display remains on (*ON*), remains on for 2 minutes after the last key press (*2 MN*), or for 10 minutes after the last key press (*10MN*).

To flip the display, press [Up] and [Down] simultaneously.

## LAMP

There are two settings that modify lamp control: Automatic Lamp On (*PERS*→*ALON*) and DMX Lamp Off (*PERS*→*DLDF*).

When *ALON* is *OFF*, the lamp remains off until a “lamp on” command is received. When *ALON* is *ON*, the lamp strikes automatically after the fixture is powered on. When *ALON* is set to *DMX*, the lamp strikes automatically when the fixture receives DMX data, and it douses 15 minutes after DMX data is lost.

When *ALON* is set to either *ON* or *DMX*, the automatic lamp strike timing is staggered to prevent all lamps from striking at once. The delay is determined by the fixture address.

The DMX Lamp Off (*DLDF*) setting allows you to enable (*ON*) or disable (*OFF*) the DMX command that switches off the lamp. The special combination of DMX values listed on page 23 allows you to execute the lamp-off command even when disabled.

## DMX RESET

The DMX reset (*PERS*→*DRSE*) setting controls the behavior of the reset command. When set to *ON*, the command is fully enabled. When set to *OFF*, the command is disabled to prevent accidental resets. When set to *5SEC*, the command must be sent for five seconds. The special combination of DMX values listed on page 23 allows you to execute a reset even when the command is disabled.

## CMY BLACKOUT

The CMY blackout (*PERS*→*CMY B*) setting enhances blackout effectiveness. When set to *ON*, the CMY flags deploy 3 seconds after dimmer blackout. These absorb any light that may escape past the dimmer.

The CMY flags take a fraction of a second longer to open than the dimmer blades, however, so setting CMY blackout to *OFF* (the default setting) allows the fixture to snap open more rapidly after a blackout.

## CUSTOM SETTINGS

The custom configuration function *DFSE*→*CUS 1- CUS 3* allows you to save and recall three sets of fixture settings. The savable settings are DMX mode, pan/tilt speed, pan/tilt inverse and swap, DMX lamp off and reset, display settings, shortcuts, studio mode, automatic lamp on, effects feedback, tracking algorithm, and tracking samples.

# Readouts

## TIME

*INFO*→*TIME* provides readouts of fixture hours (*HRS*), lamp hours (*L HR*), and lamp strikes (*L ST*). Under each item is a resettable (*RSET*) increment counter and a non-resettable (*TOTL*) counter for total accumulated hours/strikes since fabrication. To reset an increment counter, display it and then press [Up] until it reads *0*. (This may also be done remotely using the MP-2 Uploader.)

## TEMPERATURE

*INFO*→*TEMP* provides temperature readouts for the head, lamp, PCB and power supply in Celsius and Fahrenheit.

## FIRMWARE VERSION

*INFO*→*VER* displays the version number of the installed firmware. The firmware version is also displayed briefly at startup.

## DMX

The DMX log (*DMXL*) menu provides useful information for troubleshooting control problems.

*RATE* displays the DMX refresh rate in packets per second. Values lower than 10 or higher than 44 may result in erratic performance, especially when using tracking control.

*QUAL* displays the quality of the received DMX data as a percentage of packets received. Values much below 100 indicate interference, poor connections, or other problems with the serial data link that are the most common cause of control problems.

*STCO* displays the DMX start code. Packets with a start code other than 0 may cause irregular performance.

The remaining options under *DMXL* display the DMX values received on each channel. If the fixture does not behave as expected, reading the DMX values can help you troubleshoot the problem.

## Service messages

The Service LED on the control panel lights under conditions that require fixture service, and there is a message describing the service required. To display the message, select *SMSG* in the main menu. This item is available only when the LED is lit. There are two service messages.

*REPLACE LAMP* is displayed when the lamp counter exceeds 750 hours, which is the rated average life for the lamp.

*FIXTURE OVERHEATING* is displayed when the head temperature exceeds 85° C (185° F). Overheating is probably due to dirty air filters, fans, or air vents; incorrect power supply settings, or a defective fan.

## Manual control

The manual control menu (*MAN*) provides commands for resetting the fixture (*RST*), striking the lamp (*LDN*), and dousing the lamp (*LOFF*). It also permits you to position and move individual effects.

## Service utilities

**Important!** *[Enter]* must be held for several seconds to access the utilities menu.

### TEST SEQUENCES

*TSEQ* provides a general test of all effects that can be run without a controller. *UTIL*→*PCBT* provides routines for circuit board testing that are for service use only.

### FEEDBACK TOGGLES

An on-the-fly position correction system monitors the color wheel. If a position error is detected, the shutter closes while the color wheel resets. This feature can be disabled by turning effects feedback (*UTIL*→*EFF B*) off. The off setting is not saved and the system will be re-enabled the next time the fixture starts.

The automatic pan/tilt position correction system may be temporarily turned off under *UTIL*→*FEBA*. The off setting is not saved and the system will be re-enabled the next time the fixture starts. If the system cannot correct the pan/tilt position within 10 seconds, feedback is automatically disabled.

### ADJUSTMENT

The adjustment menu (*UTIL*→*ADJ*) provides manual control for making mechanical adjustments. See page 29.

## CALIBRATION

The calibration menu (*UTIL*→*CAL*) provides utilities to define offsets in software that are relative to the mechanical reset or home positions. This allows you to fine tune optical alignment and achieve uniform performance between fixtures. Dimmer and zoom are calibrated to defined points. The other effects are calibrated relative to an arbitrary reference fixture.

All offsets can be set to *128* (the middle of their adjustment range) with the default offset command: select *UTIL*→*CAL*→*DOF*→*SURE* then press [Enter].

### To calibrate effects

1. Apply power but do not strike the lamp until zoom has been calibrated.
2. To calibrate zoom, first remove the bottom head cover. Select *UTIL*→*CAL*→*ZDOF* and press [Enter]. Adjust the offset until the face of the zoom lens plate is flush with the back edge of the focus plate. Press [Enter] to save the setting. Replace the bottom head cover.
3. Pan calibration is most useful when multiple fixtures are stacked vertically. To calibrate, set zoom and tilt position for easy one-over-the-other comparison and set each fixture to the same pan DMX value. Select one fixture to be the reference fixture. On the other fixtures, select *UTIL*→*CAL*→*P DOF* and press [Enter]. Adjust the offset as necessary to align the beam with the reference beam. Press [Enter] to save the setting.
4. Tilt calibration is most useful when multiple fixtures are arranged horizontally. To calibrate, set zoom and pan position for easy side-by-side comparison and set each fixture to the same tilt DMX value. Select one fixture to be the reference fixture. On the other fixtures, select *UTIL*→*CAL*→*T DOF* and press [Enter]. Adjust the offset as necessary to align the beam with the reference beam. Press [Enter] to save the setting.
5. To calibrate the dimmer, select *UTIL*→*CAL*→*D DOF* and press [Enter]. Hold a piece of paper over the lens. Set the offset to zero and then increase it until a clearly defined M shape with minimal light spill is projected onto the paper. Press [Enter] to save the setting and remove the paper.
6. To calibrate color mixing flags (cyan, magenta, yellow and CTC), project white beams with no dimming and position them for easy comparison. On each fixture, *including the reference*, select *UTIL*→*CAL*→*CDOF* and press [Enter]. This adds a defined amount of cyan. Select one fixture to be the reference. Adjust the offsets on the other fixtures to match the reference color. Press [Enter] to save the setting. Repeat for *M DOF* (magenta), *Y DOF* (yellow) and *CCOF* (CTC).

## FANS

The cooling fans can be set to either full speed or thermostatically regulated operation via *UTIL*→*FANS*. In lower ambient temperature environments, regulated operation is recommended if reduced noise levels are desired. Service life of lamps, fans, etc. is maximized if fans are set to full speed.

## SOFTWARE UPLOAD

The upload mode command (*UTIL*→*UPL D*) prepares the fixture for a software update. This command is not normally necessary, as upload mode is engaged automatically by the uploader.

# Effects

This section describes the effects in the MAC 700 Wash with reference to the DMX channels used to control them. See page 23 for the complete DMX protocol.

The MAC 700 Wash has two DMX operating modes, 16-bit basic and 16-bit extended. The 16-bit basic mode uses 16 DMX channels, and 16-bit extended mode uses 23 channels. Extended mode provides all features of the basic mode plus fine control of the dimmer, cyan, magenta, yellow, CTC, color wheel and zoom.

Where fine control is available, the main control channel sets the first 8 bits (the most significant byte or MSB), and the fine channels set the second 8 bits (the least significant byte or LSB) of the 16-bit control byte. In other words, the fine channel works within the position set by the coarse channel.

## Lamp power

### LAMP-ON

The lamp-on command on channel 1 strikes the lamp if it is off. If the lamp is on, this command has no effect.

Note: A peak of electric current that can be many times the operating current is drawn for a fraction of a second when striking a discharge lamp. Striking many lamps at once may cause a voltage drop large enough to prevent lamps from striking or draw enough current to trip circuit breakers. If sending lamp-on commands to multiple fixtures, program a sequence that strikes lamps one at a time at 5 second intervals.

### LAMP-OFF

The lamp can be doused from the controller with the lamp-off command on channel 1. The command must be sent for 5 seconds.

If the lamp-off command is disabled in the control menu (*PERS*→*ILDF*→*OFF*), the lamp-off command can still be selected on channel 1 if the following effects are also selected:

- color wheel at slot 1 by sending DMX value 17 on channel 7 (basic mode) or 12 (extended mode)
- beamshaper on by sending DMX value from 1 to 255 on channel 8 (basic mode) or 14 (extended mode)

### 400 W AND 700 W LAMP POWER MODES

If full light output is not required, the lamp can be switched to 400 W mode by sending a DMX value from 238 to 242 on channel 1. Running in 400 W mode will significantly increase lamp life.

If the shutter is closed for longer than 10 seconds while the lamp is in 700 W mode, lamp power is automatically switched to 400 W. When the shutter is opened again, the lamp returns to 700 W mode.

## Fixture reset

If an effect loses its indexing and fails to move to programmed positions, the fixture can be reset from the controller by sending the "Reset" command on channel 1.

If DMX reset is disabled in the control menu (*PERS*→*RES*→*OFF*), the reset command can only be executed if the conditions listed under "Lamp-off" are met. If it is set to *5SEC*, the reset command must be sent for 5 seconds before it is executed.

## Dimming and strobe

The mechanical dimmer/shutter system provides smooth, high-resolution 100% dimming, instant snap open and snap closed (blackout), random and variable strobe effects up to 10 Hz, and random and variable pulses in which the dimmer snaps open and slowly dims or snaps closed and slowly opens.

Snap dimming 0-100% or 100-0% is instant. However, because of the way the fixture processes dimming commands, you need to set effects speed to the fastest speed in vector mode by sending DMX value 3 on

channel 16 (in basic mode) or 23 (in extended mode) if you want to obtain instant snap dimming to/from intermediate values (e.g. if you want a snap from 100% to 50% or from 20% to 70%).

Fine control of the dimmer is available on channel 3 in extended mode.

## Cyan, magenta, yellow and color temperature control

Cyan, magenta, yellow and CTC can be added on channels 3, 4, 5 and 6 respectively (4, 6, 8 and 10 in extended mode). Fine control is available on channels 5, 7, 9 and 11 in extended mode.

## Color wheel

The color wheel with 6 color filters, a 3200 - 4100 K CTC filter and a UV transmitter filter is available on Channel 7 (12 in extended mode). The color wheel can scroll continuously (allowing split colors) or in full-color steps. Random or continuous color scrolling and random full colors are also available at different speeds.

Fine control of the color wheel is available on channel 13 in extended mode.

## Beam shaper

On channel 8 (14 in extended mode), the beam shaper can be applied and its position indexed from 0° to 360°. If continuous beam shaper rotation is selected on the macro channel (9 in basic mode, 15 in extended mode) the beam shaper can be rotated clockwise and counterclockwise at varying speeds.

## Effect macros

Channel 9 (15 in extended mode) provides pre-programmed variable-speed macros that use the color wheel shake effect and the beam shaper (either alone or in combination) or use random CMY color mixes. If continuous beam shaper rotation is selected by sending a DMX value from 56 to 95, direction and speed of rotation can be varied on channel 8 (14 in extended mode).

## Zoom

On channel 10 (16 in extended mode), the separate zoom lens varies the one-tenth peak beam angle from 12.5° to 66°. Fine control of zoom is available on channel 17 in extended mode.

## Pan and tilt

Pan and tilt are controlled on channels 11 to 14 (18 to 21 in extended mode). Coarse and fine control are available in both basic and extended modes.

## Pan/tilt speed and effects speed channels

### TRACKING VERSUS VECTOR CONTROL

**Important!** *Effect movement may be rough and unpredictable if controller fade times are combined with vector speed values.*

The effects speed channels 15 and 16 (22 and 23 in extended mode) provide two methods for controlling the speed at which effects move that are known as “tracking” and “vector”.

if you select tracking control, effects speed is determined by the cross-fade time programmed on the controller. With this method, the controller divides a movement into tiny steps that the fixture “tracks”, or follows.

If you select vector control, effects speed is determined by the DMX value you send on the speed channel. Vector control allows you to control effects speed on controllers without cross-faders. It can give smoother movement, particularly at slow speeds, when using a controller that sends slow or irregular tracking updates. Setting a fast vector speed gives the fastest dimming to or from scenes in which the dimmer is partly open or partly closed.

If the DMX controller has variable cross-fade times, set them to zero when using vector control.

## **BLACKOUT**

When “blackout while moving” is selected on a speed channel, the shutter closes when an effect moves to make the transition invisible. The shutter opens when the movement is complete. This function is available for pan and tilt on channel 15 (22 in extended mode) and for effects on channel 16 (23 in extended mode).

## **PERSONALITY OVERRIDES**

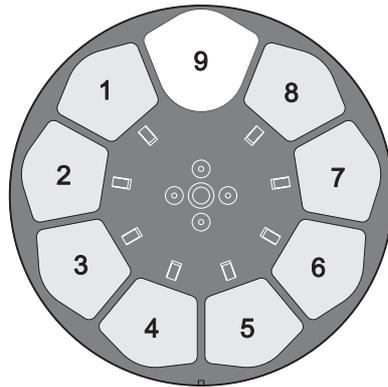
The pan/tilt speed channel provides tracking values that allow you to override the pan/tilt speed setting from the controller.

The effects speed channel provides values for overriding the shortcuts setting for the color wheel.

# Optical configuration

## Color wheel

The MAC 700 Wash features a color wheel with 8 interchangeable dichroic color filters and an open position. As standard the MAC 700 Wash is supplied with six color filters, a 3200 - 4100 K CTC filter and a UV transmitter filter that gives ultraviolet 'black light' installed. The illustration shows the filter positions as seen from the lamp side. The DMX Protocol on page 23 gives details of color filter selection.



Slot 1 - Blue 110
Slot 2 - Green 206
Slot 3 - Pink 312
Slot 4 - Orange 306
Slot 5 - Half minus green
Slot 6 - CTC 3200-4100 K
Slot 7 - UV transmitter
Slot 8 - Red 308
Slot 9 - Open

Figure 7: Filter positions, seen from lamp

## To replace a color filter

Note: Wear cotton gloves while handling color filters and use only genuine Martin filters.

1. Disconnect the fixture from AC power and allow it to cool.
2. Lock the head in the upside-down position (the indication TOP on the back of the head must be upside down) and remove the bottom cover.
3. See illustration on right. Turn the color wheel to access the desired filter position. Press the filter forwards slightly (A) to release it and then grasp it by the edges and remove it (B). If your fingers are too large, protect the glass with a piece of paper that has been folded several times and grasp the filter with needle nose pliers.
4. To insert a filter, slide it under the retention spring until it snaps into place. Check that it is securely seated.
5. Replace the cover and unlock the head before applying power.

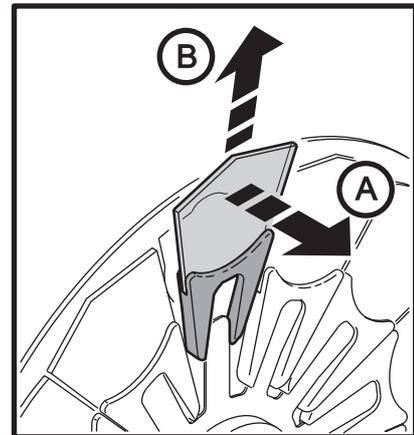


Figure 8: Filter replacement

# Routine maintenance

The MAC 700 Wash requires routine cleaning. The schedule depends heavily on the operating environment. It is essential to follow the cleaning guidelines given later in this section.

Refer any service operation that is not described here to a qualified Martin technician.

**Important!** *Excessive dust, smoke fluid, and particulate buildup degrades performance, causes overheating and will damage the fixture. Damage caused by inadequate maintenance is not covered by the warranty.*

**Warning!** *Disconnect the fixture from power and allow to cool for at least 45 minutes before removing any cover.*

## Tilt lock

**Important!** *Release the tilt lock before operating the fixture.*

The tilt position of the head can be locked for transportation and service with the tilt lock. To lock or unlock the head, pull the lock out and turn it one-quarter turn in either direction.

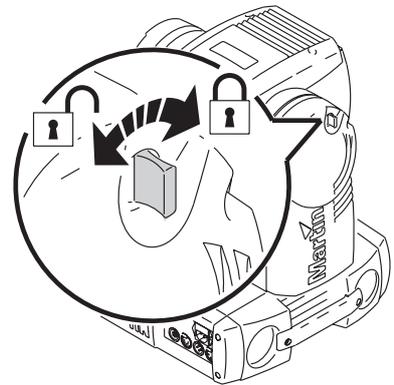


Figure 9: Tilt lock

## Disassembly

### To access the effects module

1. Disconnect the fixture from power and allow it to cool for 45 minutes.
2. Turn the four retaining screws in the top and bottom head covers one quarter-turn counter-clockwise to release the covers.
3. Remove the front lens by twisting one quarter-turn counter-clockwise.

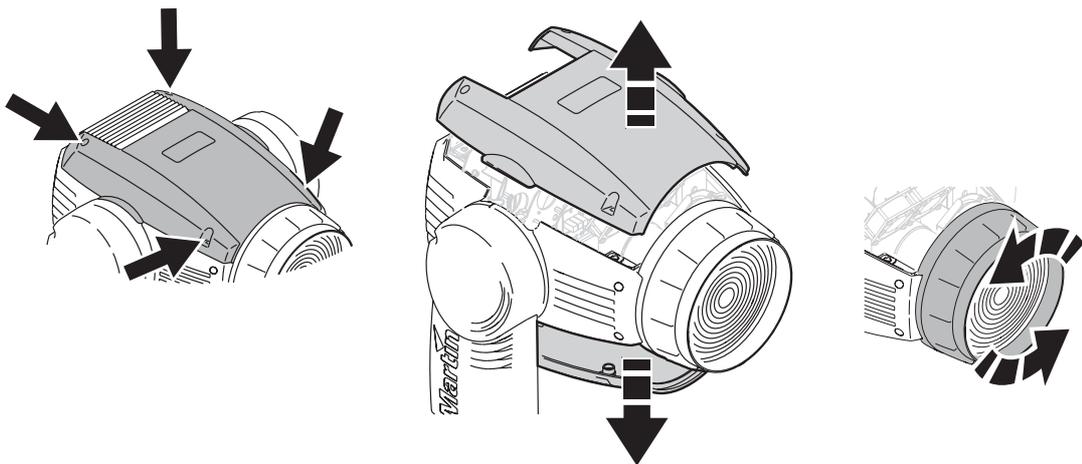
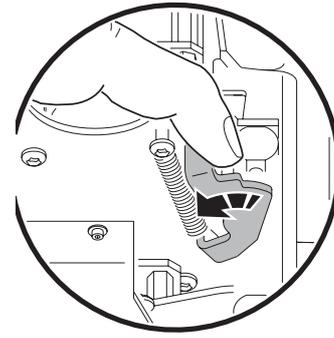


Figure 10: Releasing top and bottom covers and removing front lens

4. Position the head top side up so that you have access through the top. Holding the zoom lens by its base, slide it out to its limit at the front of the fixture.

5. Unlock the main module by pulling the levers on each side towards the center. Lift the module up 1 cm (0.5 in.) and release the levers. Lift the module straight up to remove from the head.
6. When reinstalling the module, verify that the guide pins are correctly seated and that the module is securely locked.



**Figure 11: Main module locking levers**

## Cleaning

Regular cleaning is very important for fixture life and performance. Buildup of dust, dirt, smoke particles, fog fluid residues, etc. degrades the fixture's light output and cooling ability.

Cleaning schedules for lighting fixtures vary greatly depending on the operating environment. It is therefore impossible to specify precise cleaning intervals for the MAC 700 Wash. Cooling fans suck in airborne dust and smoke particles, and in extreme cases fixtures may require cleaning after surprisingly few hours of operation. Environmental factors that may result in a need for frequent cleaning include:

- Use of smoke or fog machines.
- High airflow rates (near air conditioning vents, for example).
- Presence of cigarette smoke.
- Airborne dust (from stage effects, building structures and fittings or the natural environment at outdoor events, for example).

If one or more of these factors is present, inspect fixtures within their first 25 hours of operation to see whether cleaning is necessary. Check again at frequent intervals. This procedure will allow you to assess cleaning requirements in your particular situation. If in doubt, consult your Martin dealer about a suitable maintenance schedule.

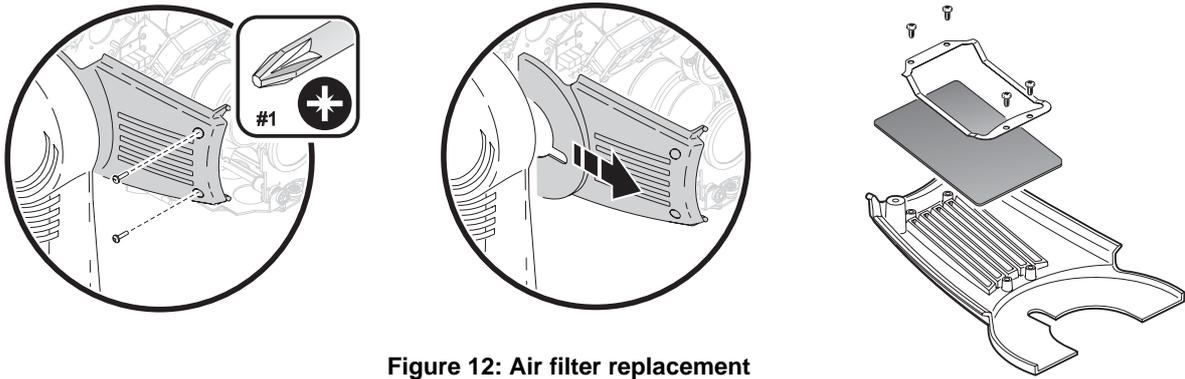
Use care when cleaning optical components and work in a clean, well lit area. The coated surfaces are fragile and easily scratched. Do not use solvents that can damage plastic or painted surfaces.

### To clean the fixture

1. Disconnect the fixture from power and allow the components to cool completely.
2. Remove the covers, front lens and main module as described earlier.
3. Vacuum or gently blow away dust and loose particles with compressed air.
4. Carefully clean the optical components. Remove smoke and other residues with cotton swabs or unscented tissues moistened with isopropyl alcohol. A commercial glass cleaner may be used, but residues must be removed with distilled water. Clean with a slow circular motion from center to edge. Dry with a clean, soft and lint-free cloth or compressed air. Remove stuck particles with an unscented tissue or cotton swab moistened with glass cleaner or distilled water. Do not rub the surface: lift the particles off with a soft repeated press.
5. Remove dust from the head fans and air vents with a soft brush, cotton swab, vacuum, or compressed air.
6. See Figure 12. On each side of the head, remove the 2 screws that hold each side cover. Slide the covers forward to remove. Remove the air filter retaining screws and clips. Clean or replace the air filters. If they are saturated with smoke fluid, etc., soak them in warm soapy water and blot dry. Reinstall the filters in the side covers and reinstall the side covers.
7. Reassemble the head.
8. Remove the screws from the side cover/grill on the front of the base (front is indicated by an arrow on the bottom). Remove the top cover from the front of the base. Lift the power supply / ballast module up and out to expose the base fans for inspection and cleaning.
9. Reinstall the power supply / ballast module and base cover.

## Lubrication

The MAC 700 Wash does not require lubrication under normal circumstances. Sliding parts are lubricated with a long-lasting teflon-based grease that can be reapplied by a Martin service partner if necessary.



**Figure 12: Air filter replacement**

## Replacing the lamp socket

The lamp holder used in the MAC 700 Wash eventually wears out due to the high voltages that pass through the contacts.

Wear begins to show up as discoloration at the contact surfaces. When this happens, resistance increases and the lamp becomes harder to strike. If this process is allowed to continue, the lamp is likely to fail prematurely.

Each time the lamp is replaced, inspect the lamp holder and have it replaced by a qualified technician as soon as there are signs of discoloration or pitting at the contact surfaces. Damage caused by failure to replace a worn and/or discolored lamp holder is not covered by the product warranty.

## Software installation

Software updates are available from the Martin web site and can be installed via the data link with a Martin upload device.

The following are required in order to install software.

- The MAC 700 Wash update file, available for download from the User Support Area of the Martin web site (<http://www.martin.com>).
- The Martin Software Uploader program, version 5.0 or later, available for download from the User Support Area of the Martin web site.
- A Martin MP-2 Uploader connected to a Windows 95/98/ME/2000/XP PC, or one of the PC controller DMX interfaces supported by the Martin Software Uploader software.

### To install software, normal method

Please refer to the MP-2 user manual and the Martin Software Uploader online help file.

### To install software if all else fails (boot sector update)

Note: Use this procedure only if the firmware is totally corrupted, which is evident if the control panel does not respond when power is applied, or if the software update notes call for a boot sector update. In the event of a check sum error, repeat the normal upload procedure.

1. Disconnect the fixture from power.
2. Remove the side cover from the side of the base that has the control panel to expose the main PCB.
3. Locate the "BOOT" jumper on the main PCB (see page 33) and move the jumper cap to the "INIT" position.
4. Perform a boot mode upload as described in the uploader documentation.
5. When the upload is complete, disconnect the fixture from power and move the jumper back to the "DISABLE" position.
6. Reassemble the base.

# MAC 700 Wash DMX protocol

16-bit Basic Mode	16-bit Extended Mode	DMX Value	Percent	Function
1	1	0 - 19	0 - 7	<b>Shutter, strobe, reset, lamp on/off</b> Shutter closed (lamp switches to 400 W mode after 10 seconds while shutter is closed)
		20 - 49	8 - 19	Shutter open
		50 - 72	20 - 28	Strobe, fast → slow
		73 - 79	29 - 30	Shutter open
		80 - 99	31 - 39	Opening pulse, fast → slow
		100 - 119	40 - 47	Closing pulse, fast → slow
		120 - 127	48 - 50	Shutter open
		128 - 147	51 - 57	Random strobe, fast
		148 - 167	58 - 65	Random strobe, medium
		168 - 187	66 - 73	Random strobe, slow
		188 - 190	74	Shutter open
		191 - 193	75	Random opening pulse, fast
		194 - 196	76	Random opening pulse, slow
		197 - 199	77	Random closing pulse, fast
		200 - 202	78 - 79	Random closing pulse, slow
		203 - 207	80 - 81	Shutter open
		208 - 217	82 - 85	Reset fixture* **
		218 - 227	86 - 89	Shutter open
		228 - 237	90 - 93	Lamp on
		238 - 242	94 - 95	400 W mode (active until 700 W value is selected)
243 - 247	96 - 97	700 W mode		
248 - 255	98 - 100	Lamp off*		
2	2	0 - 255	0 - 100	<b>Dimmer (MSB)</b> Closed → open
-	3	0 - 255	0 - 100	<b>Dimmer, fine (LSB)</b>
3	4	0 - 255	0 - 100	<b>Cyan (MSB)</b> White → full cyan
		0	0	<b>Cyan range in random CMY color</b> when set on channel 11 (basic) or 16 (extended) Normal (full range)
		1 - 127	1 - 50	Minimum cyan setting (127 = full cyan)
		128 - 254	51 - 99	Maximum cyan setting (128 = no cyan)
		255	100	Normal (full range)
-	5	0 - 255	0 - 100	<b>Cyan, fine (LSB)</b>
4	6	0 - 255	0 - 100	<b>Magenta (MSB)</b> White → full magenta
		0	0	<b>Magenta range in random CMY color</b> when set on channel 11 (basic) or 16 (extended) Normal (full range)
		1 - 127	1 - 50	Minimum magenta setting (127 = full magenta)
		128 - 254	51 - 99	Maximum magenta setting (128 = no magenta)
		255	100	Normal (full range)
-	7	0 - 255	0 - 100	<b>Magenta, fine (LSB)</b>
5	8	0 - 255	0 - 100	<b>Yellow (MSB)</b> White → full yellow
		0	0	<b>Yellow range in random CMY color</b> when set on channel 11 (basic) or 16 (extended) Normal (full range)
		1 - 127	1 - 50	Minimum yellow setting (127 = full yellow)
		128 - 254	51 - 99	Maximum yellow setting (128 = no yellow)
		255	100	Normal (full range)
-	9	0 - 255	0 - 100	<b>Yellow, fine (LSB)</b>
6	10	0 - 255	0 - 100	<b>CTC (MSB)</b> White → full CTC

\*If disabled in the control menu, Reset fixture and Lamp off work only if the following effects are selected:

- Color wheel to slot 1 using DMX value 17 on channel 7 (in basic mode) or 12 (extended mode)
- Beam shaper on using DMX value 1 - 255 on channel 8 (basic) or 14 (extended)

\*\* A five-second delay for the Reset fixture command can be set in the control menu under **IRSES**.

16-bit Basic Mode	16-bit Extended Mode	DMX Value	Percent	Function
-	11	0 - 255	0 - 100	<b>CTC, fine (LSB)</b> White → increased CTC
7	12	0 1 - 16 17 18 - 33 34 35 - 50 51 52 - 67 68 69 - 84 85 86 - 101 102 103 - 118 119 120 - 135 136 137 - 152 153  154 - 158 159 - 163 164 - 168 169 - 173 174 - 178 179 - 183 184 - 188 189 - 193 194 - 198  199 - 219 220 - 240  241 - 245 246 - 250 251 - 255	0 1 - 6 7 8 - 12 13 14 - 19 20 21 - 26 27 28 - 32 33 34 - 39 40 41 - 46 47 48 - 52 53 54 - 59 60  61 - 62 63 - 64 65 - 66 67 - 68 69 - 70 71 - 72 73 - 74 75 - 76 77 - 78  79 - 86 87 - 94  95 - 96 97 - 98 99 - 100	<b>Color wheel (MSB)</b> <i>Continuous scroll</i> Open Open → slot 1 Slot 1 (Blue 110) Slot 1 → slot 2 Slot 2 (Green 206 IAD) Slot 2 → slot 3 Slot 3 (Pink 312) Slot 3 → slot 4 Slot 4 (Orange 306M) Slot 4 → slot 5 Slot 5 (Half minus green) Slot 5 → slot 6 Slot 6 (CTC 3200 - 4100 K) Slot 6 → slot 7 Slot 7 (UV transmitter) Slot 7 → slot 8 Slot 8 (Red 308) Slot 8 → open Open  <i>Stepped scroll</i> Slot 8 (Red 308) Slot 7 (UV transmitter) Slot 6 (CTC 3200 - 4100 K) Slot 5 (Half minus green) Slot 4 (Orange 306M) Slot 3 (Pink 312) Slot 2 (Green 206 IAD) Slot 1 (Blue 110) Open  <i>Continuous rotation</i> CW, fast → slow CCW, slow → fast  <i>Random color</i> Fast Medium Slow
-	13	0 - 255	0 - 100	<b>Color Wheel, fine (LSB)</b>
8	14	0 1 - 255	0 1 - 100	<b>Beam shaper: indexed angled position, rotation direction and speed</b> Open Indexed angle, 0° → 360°  <i>If continuous rotation is selected on Macro channel (9 in basic or 15 in extended mode)</i> Open CCW, fast → slow No rotation CW, slow → fast
9	15	0 - 15 16 - 55 56 - 95 96 - 135  136 - 175 176 - 215 216 - 255	0 - 6 7 - 22 23 - 37 38 - 53  54 - 69 70 - 84 85 - 100	<b>Macros</b> No effect Color wheel shake, slow → fast Beam shaper continuous rotation Color wheel shake, slow → fast, plus beam shaper continuous rotation  Random CMY (set min. max. limits on channels 3, 4 and 5 in basic mode or 4, 6 and 8 in extended mode) Fast Medium Slow
10	16	0 - 255	0 - 100	<b>Zoom (MSB)</b> Flood → spot

16-bit Basic Mode	16-bit Extended Mode	DMX Value	Percent	Function
-	17	0 - 255	0 - 100	<b>Zoom, fine</b> (LSB)
11	18	0 - 255	0 - 100	<b>Pan</b> (MSB) Left → right (128 = neutral)
12	19	0 - 255	0 - 100	<b>Pan, fine</b> (LSB) Left → right
13	20	0 - 255	0 - 100	<b>Tilt</b> (MSB) Left → right (128 = neutral)
14	21	0 - 255	0 - 100	<b>Tilt, fine</b> (LSB) Left → right
15	22	0 - 2 3 - 242 243 - 245 246 - 248 249 - 251 252 - 255	0 - 1 1 - 95 96 96 - 97 98 99 - 100	<b>Pan/tilt speed</b> Tracking Fast → slow (vector control mode) Tracking, <i>PTSP</i> = <i>SLOW</i> (menu override) Tracking, <i>PTSP</i> = <i>NORM</i> (menu override) Tracking, <i>PTSP</i> = <i>FAST</i> (menu override) Blackout while moving
16	23	0 - 2 3 - 245 246 - 251 252 - 255  0 - 2 3 - 245 246 - 248 249 - 251 252 - 255  0 - 251 252 - 255	0 - 1 1 - 96 96 - 98 99 - 100  0 - 1 1 - 96 96 - 97 98 99 - 100  0 - 98 99 - 100	<b>Effects speed</b> <i>Dimmer, cyan, magenta, CTC and zoom</i> Tracking Fast → slow (vector control mode) Tracking Blackout while moving  <i>Color wheel</i> Tracking Fast → slow (vector control mode) Tracking, <i>SCUT</i> = <i>OFF</i> (menu override) Tracking, <i>SCUT</i> = <i>ON</i> (menu override) Blackout while moving  <i>Beam shaper</i> Normal (no blackout) Blackout while moving

# Control menu

Menu	Item	Options	Notes (Default settings in bold print)
<i>ADDR</i>		<i>1 - 497</i> (16-bit basic) <i>1 - 490</i> (16-bit extended)	DMX address (new fixtures are supplied with address set to <b>1</b> )
<i>PSET</i>		<i>16BT</i>	<b>16-bit basic DMX mode</b> with 2-channel (coarse and fine) control of pan and tilt
		<i>16Ex</i>	<b>16-bit extended DMX mode</b> with basic mode features plus fine control of dimmer, cyan, magenta, yellow, CTC, color wheel and zoom
<i>PATI</i>	<i>SWAP</i>	<i>OFF</i>	<b>Normal pan and tilt control</b>
		<i>ON</i>	Map DMX pan control to tilt channel and vice versa
	<i>PINv</i>	<i>OFF</i>	<b>Normal pan control: left → right</b>
		<i>ON</i>	Reverse DMX pan control: right → left
	<i>TINv</i>	<i>OFF</i>	<b>Normal tilt control: up → down</b>
		<i>ON</i>	Reverse DMX tilt control, down → up
<i>PTSP</i>		<i>NORM</i>	<b>Normal pan/tilt speed</b>
		<i>FAST</i>	Optimize pan/tilt movement for speed
		<i>SLOW</i>	Optimize pan/tilt movement for smoothness
<i>EFSP</i>		<i>PTSS</i>	<b>Pan/tilt speed slave: effects speed copies the pan/tilt speed set via the control menu or via DMX</b>
		<i>NORM</i>	Normal effects speed
		<i>FAST</i>	Optimize effects movement for speed
		<i>SLOW</i>	Optimize effects movement for smoothness
<i>STUD</i>		<i>OFF</i>	<b>Optimize effects for speed</b>
		<i>ON</i>	Optimize effects for silence (studio mode)
<i>PERS</i>	<i>DISP</i>	<i>ON</i>	<b>Display remains on</b>
		<i>2 MN</i>	Display extinguishes 2 minutes after last key press
		<i>10MN</i>	Display extinguishes 10 minutes after last key press
	<i>DINT</i>	<i>AUTO</i>	<b>Display adjusts automatically for ambient light level</b>
		<i>100 - 10</i>	Adjust display intensity manually
	<i>DLOF</i>	<i>OFF</i>	<b>Disable lamp off via DMX</b>
		<i>ON</i>	Enable lamp off via DMX
	<i>DRES</i>	<i>ON</i>	<b>Enable reset via DMX</b>
		<i>OFF</i>	Disable reset via DMX
		<i>5SEC</i>	Enable reset via DMX when reset command is held for 5 seconds
	<i>ALON</i>	<i>OFF</i>	<b>No automatic lamp strike</b>
		<i>ON</i>	Lamp strikes automatically within 90 seconds of power on
	<i>SCUT</i>	<i>DMX</i>	Lamp strikes if DMX is present, douses after 15 mins. without DMX
		<i>ON</i>	<b>Color wheel turns shortest distance (across open)</b>
	<i>DICU</i>	<i>OFF</i>	Color wheel does not cross open
		<i>DIM 1</i>	<b>Near-linear dimmer curve</b>
	<i>CMYB</i>	<i>DIM 2</i>	Dimmer curve simulates tungsten incandescent bulb characteristics
		<i>OFF</i>	<b>Disable CMY blackout</b>
<i>DFSE</i>	<i>ON</i>	Enable CMY blackout	
	<i>FACT</i>	<i>LOAD</i>	Return all settings (except calibrations) to factory defaults
	<i>CUS 1, CUS 2, CUS 3</i>	<i>LOAD</i>	Load custom configuration
		<i>SAVE</i>	Save current custom configuration

Table 2: Control menu

Menu	Item	Options	Notes (Default settings in bold print)	
INFO	TIME→HRS	TOTL	Total hours of operation since manufacture	
		RSET	Hours of operation since counter reset (see page 13)	
	TIME→L HR	TOTL	Total hours of operation with lamp on since manufacture	
		RSET	Lamp hours since counter reset (see page 13)	
	TIME→L ST	TOTL	Total number of lamp strikes since manufacture	
		RSET	Number of lamp strikes since counter reset (see page 13)	
	TEMP	LAMP	Head temperature	
PCB		Base temperature		
SMPS		Switch mode power supply temperature		
VER	X.X.X	CPU firmware version		
DMXL	RATE		DMX transmission speed in packets per second	
	QUAL		Percent of packets received	
	STCO		Value of the DMX start code	
	SHUT - EFSP		DMX value (0 - 255) received on each channel Values for fine control channels (indicated with <b>F</b> in the display) can only be viewed if available in the DMX mode the fixture is set to	
MAN	RST		Reset fixture	
	L ON		Lamp on	
	LOFF		Lamp off	
	SHUT	OPEN		Open shutter
		CLOS		Close shutter
		STRF		Fast strobe
		STRM		Medium strobe
		STRS		Slow strobe
	DIM	0 - 255		Dimmer
	CYAN	0 - 255		Cyan
	MAG	0 - 255		Magenta
	YEL	0 - 255		Yellow
	CTC	0 - 255		Color temperature control
	COL	OPEN		Color wheel: open position
		C 1 - C8		Color wheel: filters 1-8
		CWF - CCWS		Color wheel continuous rotation: CW and CCW; fast, medium and slow
		RNDF - RNDS		Color wheel random rotation: fast, medium and slow
	BEAM	OUT		Beamshaper out
		I 0		Beamshaper index 0
		I 50		Beamshaper index 50%
		I 100		Beamshaper index 100%
		CCWF		Beamshaper rotation counterclockwise fast
		CCWS		Beamshaper rotation counterclockwise slow
CW S			Beamshaper rotation clockwise slow	
CW F			Beamshaper rotation clockwise fast	
MACR	NONE - MAC3		Select macro	
ZOOM	0 - 255		Zoom position, wide → narrow	
PAN	0 - 255		Pan position, left → right	
PANF	0 - 255		Pan position (fine)	
TILT	0 - 255		Tilt position, up → down	
TLTF	0 - 255		Tilt position (fine)	
TSEQ	RUN		Run a general test of all effects	

Table 2: Control menu

Menu	Item	Options	Notes (Default settings in bold print)
<b>UTIL</b> To access this menu, hold [Enter] pressed for a few seconds	FE]A	ON	<b>Enable pan/tilt position correction system. See page 14</b>
		OFF	Disable pan/tilt feedback. Setting not saved
	EFF]B	ON	<b>Enable on-the-fly reset of color wheel position. See page 14</b>
		OFF	Disable on-the-fly reset of color wheel position. Setting not saved
	A]J		<b>See "Adjustment submenu" on page 29</b>
	CAL (OF = offset)	P OF	Pan calibration (adjustment range: 1 - 255)
		T OF	Tilt calibration (adjustment range: 70 - 186)
		] OF	Dimmer calibration (adjustment range: 90 - 170)
		C OF	Cyan calibration (adjustment range: 1 - 255)
		M OF	Magenta calibration (adjustment range: 1 - 255)
		Y OF	Yellow calibration (adjustment range: 1 - 255)
		CCOF	CTC calibration (adjustment range: 1 - 255)
		COOF	Color wheel calibration (adjustment range: 103 - 153)
		ZOOF	Zoom calibration (adjustment range: 98 - 158)
	]FOF	SURE	Set all effects to calibration value 128
	PC]T		PCB test: for service use only
	FANS	FULL	<b>Cooling fans: full speed</b>
		REG	Cooling fans: temperature regulated
	UPL]J	SURE	Manually set fixture to software update mode

**Table 2: Control menu**

# Adjustment submenu

The *UTIL*→*ADJ* menu is for use by service technicians when performing adjustments.

Menu	Item	Item	Options	Notes
			<i>RST</i>	Reset fixture
			<i>L ON</i>	Strike lamp
			<i>L OFF</i>	Douse lamp
<i>HEAD</i>	<i>DIMM</i>	<i>DIM</i>	<i>ADJ</i>	Dimmer blades against stop
			<i>CLOS</i>	Close dimmer
			<i>OPEN</i>	Dimmer to open position
			<i>ST S</i>	Strobe slow
			<i>ST M</i>	Strobe medium
			<i>ST F</i>	Strobe fast
		<i>COL</i>	Same as <i>MAN</i> → <i>COL</i>	
		<i>CYAN</i>	<i>ON S</i>	Cyan flag on switch (retracted position)
			<i>MIN</i>	Minimum cyan position
			<i>MAX</i>	Maximum cyan position
		<i>MAG</i>	<i>ON S</i>	Magenta flag on switch (retracted position)
			<i>MIN</i>	Minimum magenta position
			<i>MAX</i>	Maximum magenta position
	<i>YEL</i>	<i>ON S</i>	Yellow flag on switch (retracted position)	
		<i>MIN</i>	Minimum yellow position	
		<i>MAX</i>	Maximum yellow position	
	<i>CTC</i>	<i>ON S</i>	CTC flag on switch (retracted position)	
		<i>MIN</i>	Minimum CTC position	
		<i>MAX</i>	Maximum CTC position	
			<i>TEST</i>	Test dimmer and CMYC effects
	<i>ZBM</i>	<i>ZOOM</i>	<i>ZI S - ZO F</i>	Zoom in/out, slow/medium/fast
		<i>BEAM</i>	<i>OUT - CW F</i>	Beamshaper positions and rotation: out, indexed 0%/50%/100%, counterclockwise fast/slow, clockwise slow/fast
		<i>TEST</i>		Test beamshaper and zoom
<i>PATI</i>		<i>NEUT</i>	Move pan and tilt to neutral positions	
		<i>PNTD</i>	Pan neutral, tilt down	
		<i>PNTU</i>	Pan neutral, tilt up	
		<i>PLTN</i>	Pan left, tilt neutral	
		<i>PRTN</i>	Pan right, tilt neutral	
		<i>PLTD</i>	Pan left, tilt down	
		<i>PRTU</i>	Pan right, tilt up	

Table 3: Adjustment submenu

# Control menu shortcuts

The following shortcuts are available using the buttons in the MAC 700 Wash control panel:

Shortcut	Function
Hold [Menu] and press [Up]	Resets fixture
Hold [Enter] and press [Up]	Strikes lamp
Hold [Enter] and press [Down]	Douses lamp
Hold [Menu] and [Enter] while applying power	Freezes pan and tilt
Hold [Up] and press [Down]	Invert display

Table 4: Control menu shortcuts

# Service messages

SMMSG (when service message LED is lit)	REPLACE LAMP	Displayed when lamp hours exceed average life (750 hours)
	FIXTURE OVERHEATING	Displayed if head temperature exceeds 85° C (185° F)

Table 5: Service messages

# Display messages

Message	Appears when...	What to do
<i>RST</i> (Reset)	... the fixture is indexing effects at startup.	Wait for reset to complete.
<i>SRST</i> (Serial reset)	... the fixture has received a reset command.	Wait for reset to complete. Note that you can set <i>PERS</i> → <i>DRS</i> to <i>OFF</i> to prevent accidental DMX reset commands.
<i>DDOR</i>	...the lamp access cover is not fully closed.	Check that lamp access cover is locked in place.
<i>LEER</i> (Lamp error)	... the lamp does not ignite within 30 seconds of receiving the 'Lamp ON' command. Likely reasons are a missing or defective lamp, or insufficient AC voltage.	Check lamp. Check that local voltage is within specification.
<i>MERR</i> (Memory error)	...the EEPROM memory cannot be read.	Contact Martin service personnel for assistance.
<i>UPL</i> / last character in display rotates (Upload error)	...a software upload is unsuccessful.	Reload software.
<b>■■■■</b>	... there is no communication between the control panel and motherboard (it is normal for this readout to appear briefly when the fixture is powered on).	Check fuses and replace accordingly. Check that cable between control panel and motherboard is connected properly. Reinstall software.
<i>SHER</i> (Short error)	... the fixture detects the lamp is ON but no 'Lamp ON' command has been received. This can occur if the lamp relay is stuck or if the lamp-power feedback circuit fails. The fixture may be operated but remote lamp on/off may be affected.	Contact Martin service personnel for assistance.
<i>BTER</i> (Base temperature sensor error) <i>LTERR</i> (Lamp temperature sensor error) <i>ETERR</i> (Switchmode/ballast side temperature sensor error)	...there is a malfunction in the temperature sensing circuit.	Contact Martin service personnel for assistance.
<i>LTCO</i> (Lamp temperature cut-out)	... the lamp temperature is too high and thermal protection circuits cut power to the lamp.	Allow fixture to cool. Ensure nothing is obstructing airflow around fixture. Clean air vents, air filters and fans. Reduce ambient temperature. Contact Martin service personnel if problem continues.
<i>FDEP</i> (Feedback error pan) <i>FDET</i> (Feedback error tilt) <i>FDER</i> (Feedback error pan/tilt)	...there is a malfunction in the optical pan/tilt monitoring circuit (e.g. sensor defective). After a time-out, the effect in question stops in a random position.	Reset fixture. Contact Martin service personnel if problem continues.
<i>PAER</i> (Pan time-out) <i>TIER</i> (Tilt time-out) <i>ZDER</i> (Zoom time-out)	...there is a malfunction in the electric indexing circuit for pan, tilt, focus or zoom. The fixture will, after the time-out, establish a mechanical stop, and continue to work normally.	Reset fixture. Contact Martin service personnel if problem continues.
<i>CDER</i> (Color wheel time-out))	...there is a color wheel indexing or indexing sensor error (e.g. color wheel will not index correctly, sensor circuit defective or magnet missing). After the time-out, the effect in question stops in a random position.	Reset fixture. Contact Martin service personnel if problem continues.
<i>CYER</i> (Cyan time-out) <i>MAER</i> (Magenta time-out)) <i>YEER</i> (Yellow time-out) <i>CCER</i> (CTC time-out) <i>BEER</i> (Beamshaper time-out) <i>BRER</i> (Beamshaper rotation time-out)	...there is an effect position or position sensor circuit error for one of the CMYC flags or the beamshaper.	Reset fixture. Contact Martin service personnel if problem continues.
<i>DRER</i>	...there is a driver error.	Contact Martin service personnel for assistance.
<i>DPER</i>	...there is an display programming error.	Contact Martin service personnel for assistance.

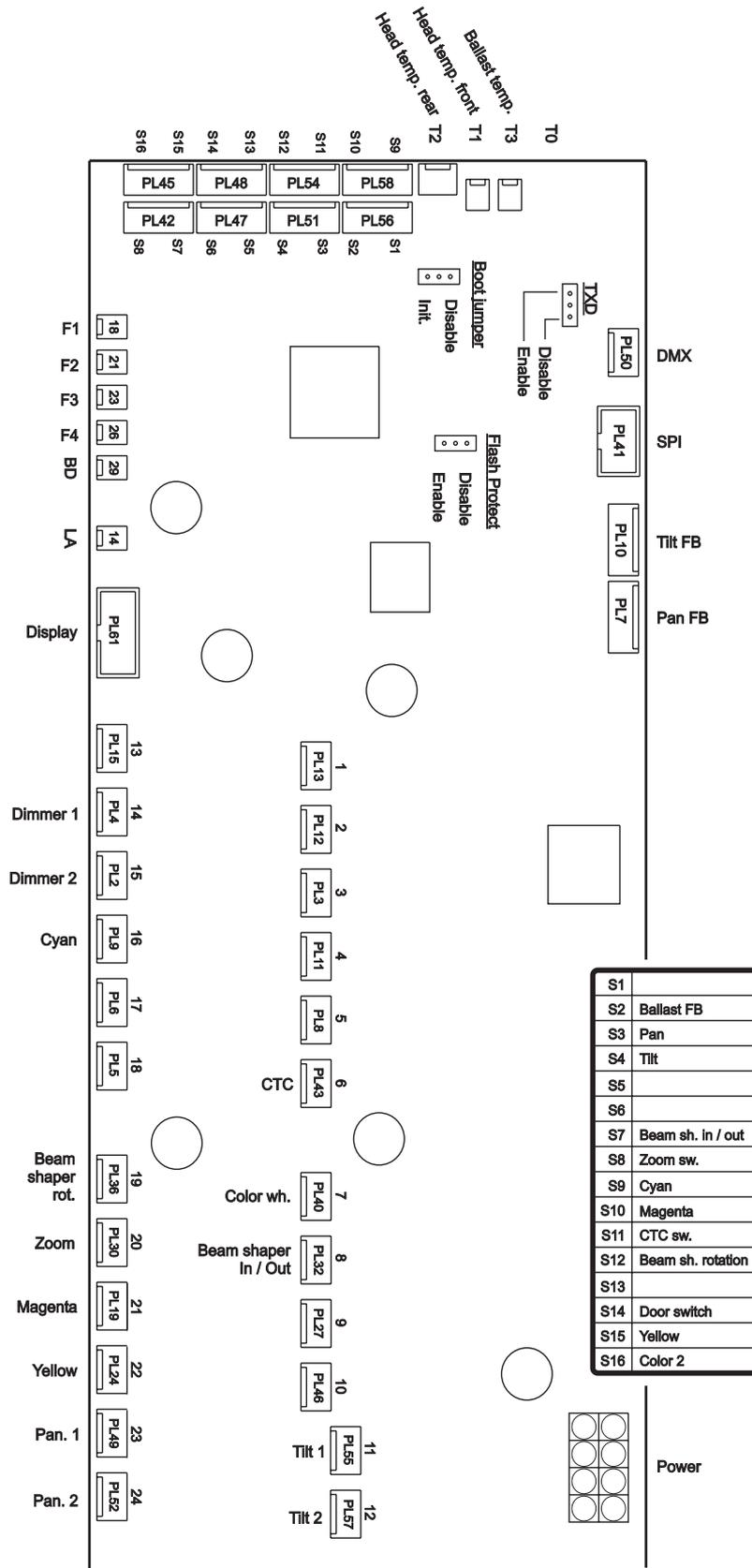
Table 6: Display messages

# Troubleshooting

Problem	Probable cause(s)	Remedy
One or more of the fixtures is completely dead.	No power to fixture.	Check that power is switched on and cables are plugged in.
	Primary fuse blown (located near power inlet).	Isolate fixture from power and replace fuse.
	Secondary fuse(s) blown (located on PCBs in base).	Isolate fixture from power. Check fuses and replace.
Fixtures reset correctly but respond erratically or not at all to the controller.	Bad data link.	Inspect connections and cables. Correct poor connections. Repair or replace damaged cables.
	Data link not terminated.	Insert termination plug in output jack of the last fixture on the link.
	Incorrect addressing of the fixtures.	Check fixture address and DMX mode settings.
	One of the fixtures is defective and is disturbing data transmission on the link.	Bypass one fixture at a time by unplugging XLR in and out connectors and connecting them directly together until normal operation is regained. Have the defective fixture serviced by a qualified technician.
	XLR pin-out on fixtures does not match (pins 2 and 3 reversed).	Install a phase-reversing cable between the fixtures or swap pins 2 and 3 in the fixture that behaves erratically.
Time out error after fixture reset.	Effect requires mechanical adjustment.	Disable effects feedback (see page 14). Contact Martin technician for service.
Mechanical effect loses position.	Mechanical train requires cleaning, adjustment, or lubrication.	Contact Martin technician for service.
Lamp fails to strike after turning the fixture off and on again, or after a power failure.	Electronic ballast does not recognize that the lamp is off.	Send LAMP OFF command before sending another LAMP ON command. The lamp will then strike. See DMX Protocol for override if <b>LAMP OFF</b> is set to <b>OFF</b> .
No light and <b>LERR</b> (lamp error) message displayed.	Lamp blown	Disconnect fixture and replace lamp.
	Lamp not installed	Disconnect fixture and install lamp.
	Lamp access safety switch open	Check that lamp access plate is fully seated and locked in place.
	Supply voltage too low	Check voltage
Lamp cuts out intermittently.	Fixture is too hot.	Allow fixture to cool. Clean fixture, especially fans, vents and filters. Reduce ambient temperature.

**Table 7: Troubleshooting**

# Circuit board connections



Label P/N: 33120079-A

# MAC 700 Wash specifications

## PHYSICAL

Length	450 mm (17.7 in)
Width	365 mm (14.4 in)
Height (head straight up)	656 mm (25.8 in)
Weight	32 kg (70.6 lbs)

## LAMP

Type	700 W short arc discharge
Approved model	OSRAM HTI 700/D4/75
Ballast	Electronic
Hot restrike	Yes
Socket	Double-ended SFc10-4 with key

## DYNAMIC EFFECTS

Color mixing	Seamless CMY, 0 - 100%, independent 8- or 16-bit control
Color wheel	8 replaceable filters (6 colors, 3200-4100 K CTC and UV) plus open, 8- or 16-bit control
Color temperature control	7500 - 3200 K variable 0 - 100%, 8- or 16-bit control
Beam effects	Indexable and high-speed continuous rotating beam shaper
Dimmer/shutter	0 - 100% dimming, 8- or 16-bit control, strobe effect variable 2 - 10 Hz, 8-bit control
Zoom	5:1 (12.5° - 66°), 8- or 16-bit control
Pan	540°, 8- and 16-bit control
Tilt	246°, 8- and 16-bit control
Position correction system	Yes

## OPTICS

Reflector	Glass cold light
One-tenth peak output	17000 lumens at 50°
One-tenth peak angle	12.5° - 66°
Total output	18700 lumens at 50° one-tenth peak angle
Cutoff angle	16.5° - 83°
Measurement conditions	230 V, 50 Hz, no effects applied
Measurement test lamp	Osram HTI 700/D4/75

## CONTROL AND PROGRAMMING

DMX channels	16 (16-bit basic mode) or 23 (16-bit extended mode)
Setting and addressing	Control panel or MP-2 uploader
Movement control options	Tracking and/or vector
Receiver	Opto-isolated RS-485
Protocol	USITT DMX-512 (1990)
Firmware update	Serial upload (MUF)

## CONSTRUCTION

Chassis	Steel & aluminum, shock resistant design
Housing	UV-resistant fiber-reinforced composite
Color	Black
Protection factor	IP 20

## INSTALLATION

Mounting points	2 pairs of 1/4-turn locks
Minimum distance from illuminated surface	1.2 m (48 in.)
Minimum distance from combustible materials	0.5 m (20 in.)
Orientation	Any

## CONNECTIONS

AC power input	3 m integral cable without power plug
DMX data in/out	3-pin and 5-pin locking XLR

## ELECTRICAL

AC power	100-120/208-240 VAC nominal, 50/60 Hz
Power supply	Auto-ranging electronic switch-mode
Main fuse (100 - 120 V power)	15 AT (slow blow), P/N 05020027
Main fuse (208 - 240 V power)	6.3 AT (slow blow), P/N 05020020

### Typical power and current

@ 100 V, 60 Hz	1019 W, 10.3 A, PF 0.996
@ 120 V, 60 Hz	988 W, 8.3 A, PF 0.995
@ 208 V, 60 Hz	949 W, 4.7 A, PF 0.976
@ 230 V, 50 Hz	944 W, 4.2 A, PF 0.973
@ 240 V, 50 Hz	940 W, 4.0 A, PF 0.970
@ 250 V, 50 Hz	940 W, 3.9 A, PF 0.966

PF = power factor

Note: Allow for a deviation of +/- 10% from typical figures listed above. Measurements made at nominal voltage. Local voltages can vary.

## THERMAL

Maximum ambient temperature ( $T_a$ )	40° C (104° F)
Maximum surface temperature, steady state, $T_a = 40° C$	160° C (320° F)
Cooling	Filtered forced air (temperature regulated, low noise)
Total heat dissipation (calculated, 230 V, 50 Hz / 110 V, 60 Hz)	3190 BTU/hr / 3430 BTU/hr

## APPROVALS



EU safety	EN 60598-1, EN 60598-2-17
EU EMC	EN 55015, EN 55103-1, EN 55103-2, EN 61000-3-2, EN 61000-3-3
US safety	ANSI/UL 1573
Canadian safety	CSA C22.2 No. 166

## INCLUDED ITEMS

Lamp	OSRAM HTI 700/D4/75 (installed): P/N 97010212
Dichroic filters	6 color, 1 CTC, 1 UV transmitter (installed)
Fuse for use with 208 - 240 V power	6.3 AT fuse (installed): P/N 05020020
Fuse for use with 100 -120 V power	15 AT fuse: P/N 05020027
2 omega clamp attachment brackets with quarter-turn fasteners	2 x P/N 91602001

## ACCESSORIES

Half-coupler clamp	P/N 91602005
G-clamp	P/N 91602003
Safety wire, universal, 50kg safe work load	P/N 91604003
DABS 1 PC/fixture interface device	P/N 91611144
MP-2 Uploader	P/N 90758420

## ORDERING INFORMATION

MAC 700 Wash in cardboard packing case	P/N 90207400
MAC 700 Wash in flight case	P/N 90207401

