MAC 2000 Profile II

user manual

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INTRODUCTION

Thank you for selecting the MAC 2000 Profile II. This extraordinary 1200 watt luminaire from Martin Professional provides CMY color mixing, continuous 0 - 178 mireds color correction, a color/gobo wheel with 4 dichroic color filters and 3 fixed glass gobos, 10 indexed-rotation gobos on 2 wheels, a 2-position rotating-effect wheel with 3-facet prism, beam shaper, and variable frost; combined full-range dimmer and shutter, iris, zoom, focus, 540° of pan, and 267° of tilt. It is available with a magnetic or electronic ballast.

For the latest firmware updates, documentation, and other information about this and all Martin Professional products, please visit the Martin web site at http://www.martin.dk.

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 hot line at +45 70 200 201.

Protecting against 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.
- Use only a source of AC power that complies with local building and electrical codes and has both overload and ground-fault protection.
- Do not expose the fixture to rain or moisture.
- Refer any service operation not described in this manual to a qualified technician.

Protecting against UV radiation and lamp explosion

- Never operate the fixture with missing or damaged lenses and/or covers.
- When replacing the lamp, allow the fixture to cool for at least 15 minutes before opening the fixture or removing the lamp. Protect your hands and eyes with gloves and safety glasses.
- Do not stare directly into the light. Never look at an exposed lamp while it is lit.
- Replace the lamp if it becomes defective or worn out, or before usage exceeds the maximum service life.

Protecting against burns and fire

- Never attempt to bypass the thermostatic switch or fuses. Always replace defective fuses with ones of the specified type and rating.
- Keep all combustible materials (for example fabric, wood, paper) at least 1 meter (39 inches) away from the fixture. Keep flammable materials well away from the fixture.
- Do not illuminate surfaces within 3 meter (10 inches) of the fixture.
- Provide a minimum clearance of 0.1 meters (4 inches) around fans and air vents.
- Never place filters or other materials over the lens.
- The exterior of the fixture can get very hot. Allow the fixture to cool for at least 5 minutes before handling.
- Do not modify the fixture or install other than genuine Martin parts.
- Do not operate the fixture if the ambient temperature (Ta) exceeds 40° C (104° F).

Protecting against injury due to falls

- Do not lift or carry the fixture alone.
- When suspending the fixture, verify that the structure can hold at least 10 times the weight of all installed devices.
- Verify 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 whenever installing or removing the fixture.

TRANSPORTATION

Important!   Release the transport locks before operating the fixture.

Included items

The MAC 2000 Profile II is shipped in a 1 or 2 unit flight case that contains the following items.

- User manual
- 2 clamp attachment brackets
- 2 x 20 A main fuses (for use with 100-130 V local power supply)
- 2 x 15 A main fuses (for use with 200-250 V local power supply)
- XLR cable

Transport locks

The head and yoke may be locked for transportation and service. The locks are shown in Figure 1. The fixture must be unlocked before operation.
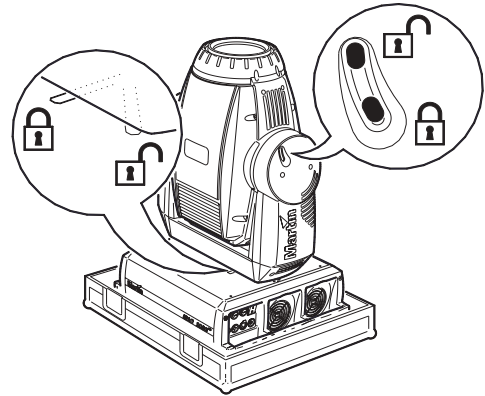
Figure 1: Pan and tilt locks

Single flight case

Unpacking the fixture

1   Remove the top of the flight case.

2   With one person on each side, lift the fixture out of the bottom of the flight case.

3   Release the pan and tilt locks before operating.

Packing the fixture

1   Disconnect the fixture from power and allow it to cool.

2   Lock the head and yoke in the position shown in Figure 2.

3   Place the fixture in the bottom of the flight case. Place the top section over the fixture without forcing.
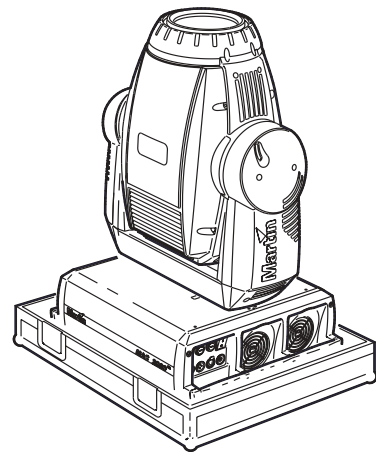
Figure 2: Single unit transport position

Double flight case

Unpacking

1   Open the flight case and pull the drawer all the way out.

2   Release the head (tilt) transport lock.

3   Install rigging hardware as described on page 12.

4   With one person on each side, lift the fixture out of the flight case.

Packing

1   Disconnect the fixture from power and allow it to cool.

2   Turn the yoke parallel to the sides of the base with the tilt lock closest to the back.

3   Pull the transport drawer all the way out. With one person on each side, place the fixture on the drawer with the arrow pointing in.

4   Remove and stow rigging hardware. Coil and stow the power cord in the door.

5   Tilt the head so that the lens points away from the door as shown in Figure 3. Lock the head in the horizontal position. Do not lock the yoke.

Figure 3: Double unit transport position

6   Slide the drawer all the way in without forcing. Close the flight case.

Setup for flight case testing

The double flight case has two slide-out arms from which the fixture can hang for testing and setting. Though unnecessary, the pan and tilt reset can be cancelled by pressing [Menu] and [Enter] at the same time.

1   Open the flight case and pull the drawer all the way out. Release the transport locks.

2   Pull the test arms all out. Tilt the fixture up and over the slide arms so that the handle cross-braces that are second from the back rest on the arms. The fixture should rest at an angle.

3   Push the transport drawer into the flight case.

LAMP

About the HMI 1200 W/S lamp

The MAC 2000 Profile II comes with a double-ended OSRAM HMI 1200 W/S discharge lamp installed. This highly-efficient short-arc source provides an exceptionally stable 6000K color temperature, a color rendering index greater than 90, and an average life of 750 hours.

The lamp is capable of hot restrike. This feature, however, is only supported by the MAC 2000 Profile II with electronic ballast.

The ends of the lamp have specially-developed keys, shown in Figure 6, to ensure proper installation. Do not use HMI 1200 W/S lamps with the non-keyed SFc 10-4 base.

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

The lamp has an average life of 750 hours. To reduce the risk of explosion, replace the lamp before usage exceeds 125% of the average life, i.e., before it exceeds 940 hours. To read lamp hours from the control panel, please refer to Readouts on page 14.

For optimum performance, avoid turning off the lamp before it has warmed up fully.
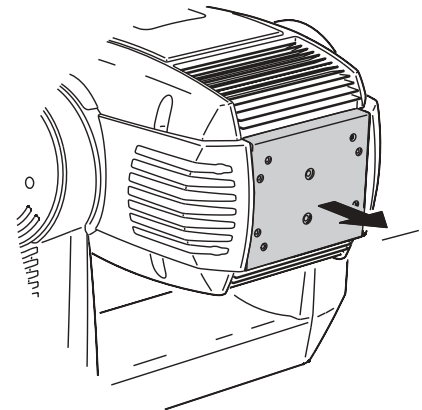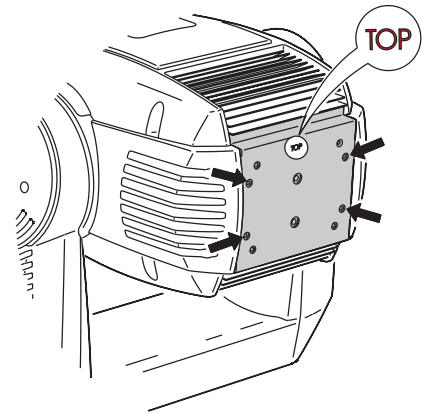
Figure 4: Lamp access

Lamp replacement

Important! ***Do not touch the quartz bulb with bare fingers.***

Replacement lamps are available from your Martin dealer. Please order Martin P/N 97010304.

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.

Replacing the lamp

1 Disconnect the fixture from power and allow it to cool. Lock the head horizontally with the top up.

2 See Figure 4. Release the 4 quarter-turn fasteners marked with arrows on the rear plate. Pull the lamp assembly straight back as far as it goes and let it rest in place.

3 See Figure 5. Pull the retention spring on the left end up and then swing the end of the lamp out. Pull the other end out of the socket.
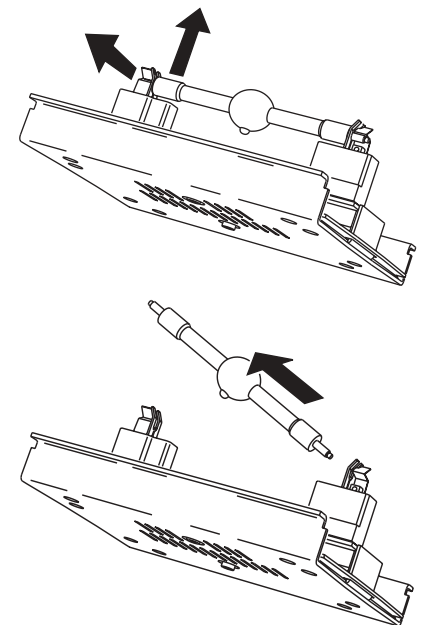
Figure 5: Lamp removal

4   See Figure 6. With the nipple on the bulb facing the back, insert the right end of the new lamp in the socket. Pull up on the left spring and snap the other end into place.

5   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. Lock the 4 quarter-turn fasteners.

6   When installing a new lamp, reset the lamp hour and lamp strike counters as described on page 14.

Aligning the lamp

1   Switch on the MAC 2000 Profile II and allow it to reset. Using either a controller or the control module, turn on the lamp and project an open white beam on a flat surface.

2   Center the hot spot vertically using the top Allen-head adjustment screw in the center of the rear plate.

3   If there is significant hot spot, turn the bottom adjustment screw 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 clockwise until the light is bright and evenly distributed.

4   Repeat step 2.
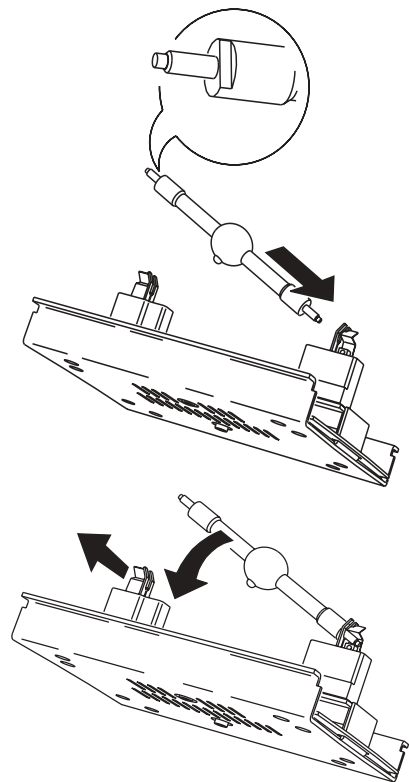
Figure 6: Lamp insertion
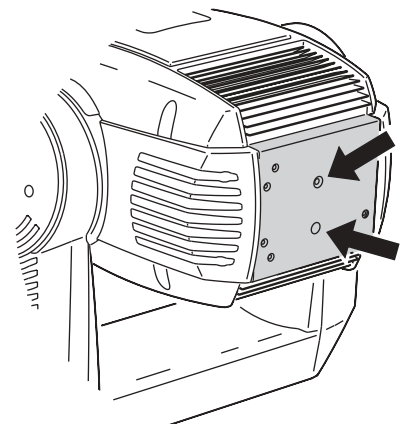
Figure 7: Lamp adjustment

AC POWER

WARNING! **For protection from electric shock, the fixture must be grounded (earthed). The AC mains supply shall be fitted with a fuse or circuit breaker and ground-fault protection.**

Important! **Verify the power supply settings before applying power.**

The chapter describes:

• Installing fuses
• Power supply adjustments for the various MAC 2000 Profile II models
• Connection to a power supply (see page 10)
• The reduced power function (see page 10)

Fuses

The MAC 2000 Profile II comes with two:

• 20 AT (time delay) main fuses for use with AC supplies of 100 - 120 volts.
• 15 A main fuses for use with AC supplies of 200 - 250 volts.

Install the appropriate fuses in the holders near the power switch.

Power supply adjustments

The MAC 2000 Profile II (identified as such by the label on the base of the product) comes with an electronic or magnetic ballast and an auto-sensing, auto-ranging switch-mode power supply. Manual adjustments are not necessary unless you have the magnetic ballast version.

Magnetic ballast configuration

In magnetic ballast models the ballast must be tapped correctly for the local AC voltage and frequency. The wrong setting can cause overheating, damage, and poor performance. The factory settings are printed on the serial number label.

CHANGING THE MAGNETIC BALLAST SETTINGS

1 Disconnect the fixture from AC power. Remove the rear base cover as shown in Figure 8.

2 To expose the ballast connection block, remove the screws from each end of the side plate and tilt it down (Figure 8).

3 Find the ballast setting in Table 1.

AC frequency	AC voltage	Setting
50 Hz	200 - 218 V	208 V / 50 Hz
	219 - 238 V	230 V / 50 Hz
	239 - 250 V	245 V / 50Hz
60 Hz	200 - 218 V	208 V / 60 Hz
	219 - 241 V	230 V / 60 Hz

Table 1: Magnetic ballast settings
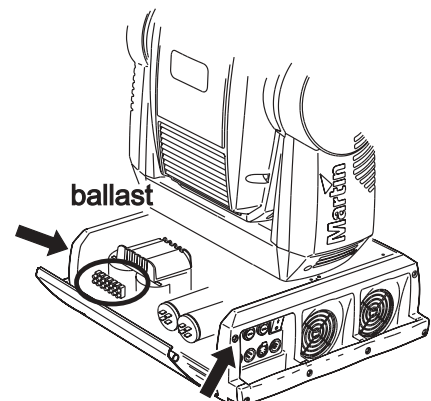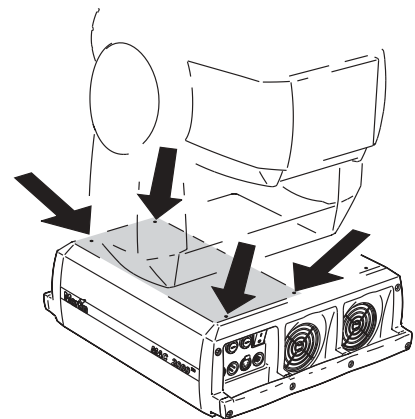
Figure 8: Power supply access

4   Move the brown wire on the ballast connection block to the position shown Figure 9.

5   Close the base before applying power.
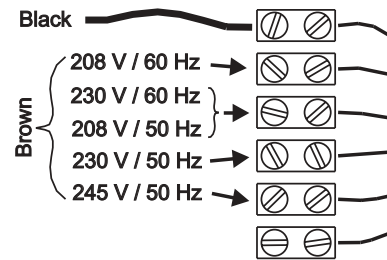
Figure 9: Magnetic ballast connections

Power connection

Important! ***Connect the MAC 2000 Profile II directly to AC power. Do not connect it to a dimmer system; doing so may damage the fixture.***

You may need to install a cord cap that fits your supply on the power cable. A 3-prong grounding-type plug must be installed following the manufacturer's instructions. The table 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, 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	$\perp$	green

Table 2: Cord cap connections

Reduced power function

The MAC 2000 Profile II has an automatic power reduction function, which reduces the consumption to 700W if the shutter/dimmer is closed for more than 10 seconds. This not only increases the lamp life, but also further decreases the overall noise emission of the fixture.

DATA

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

The MAC 2000 Profile II 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. *For reliable data transmission and to avoid damage to the fixture, however, use one input and one output!*

Connecting fixtures

- 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.

- Martin fixtures introduced before 1997 have reversed polarity data sockets (pin 2 hot and pin 3 cold). The socket polarity is labelled. *Use a phase-reversing cable between the MAC 2000 Profile II and any Martin device with reversed polarity.*

CONNECTING THE DATA LINK

1 Connect the DMX data input from the controller to the MAC 2000 Profile II'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 Ω XLR termination plug in the 3-pin or 5-pin output of the last fixture on the link.

RIGGING

The MAC 2000 Profile II can be placed on stage or clamped to a truss in any orientation. The Fast-Lock system enables quick and easy fastening of the clamp brackets in 4 positions as shown Figure 10.
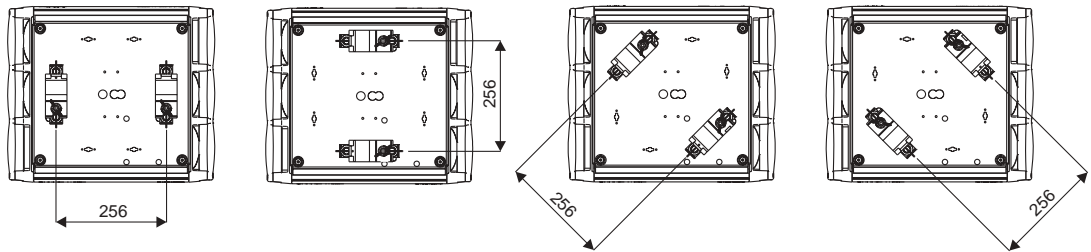
Figure 10: Clamp bracket positions

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. Attach an approved safety cable to the attachment hole in the base. Never use the carrying handles for secondary attachment.*

Clamping the fixture to a truss

1   Verify that the rigging clamps (not included) are undamaged and can bear at least 10 times the weight of the fixture. Verify 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 (grade 8.8 or better) 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   If the truss can be lowered, fixtures can be clamped on directly from the double flight case. If the fixture must be lifted, block access under the work area. Working safely 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 caribiner clamp.

6   Verify that the pan and tilt locks are released. Verify that there are no combustible materials or surfaces to be illuminated within 1 meter of the fixture, and that there are no flammable materials nearby.
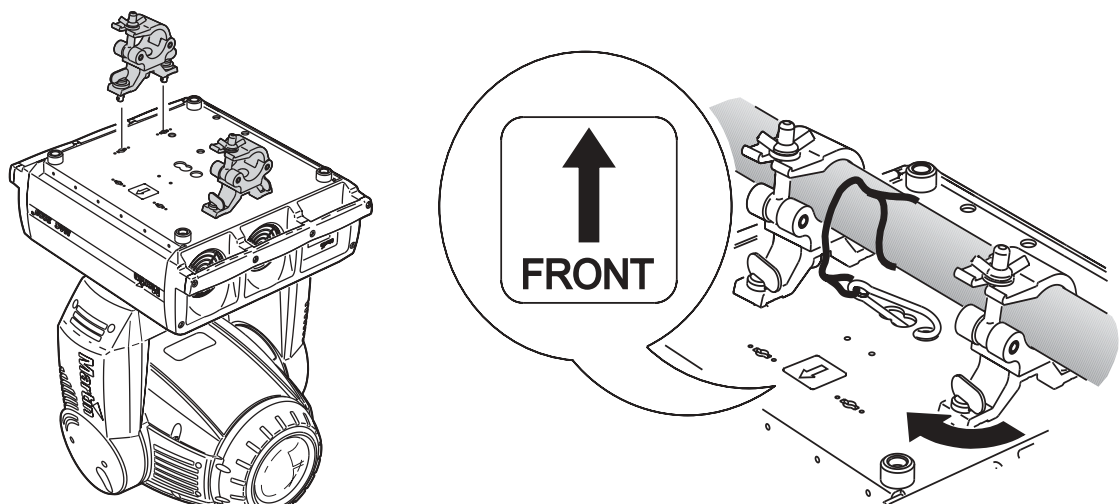
Figure 11: Rigging hardware installation

CONTROL PANEL

The LED control panel is used to set the address and personalities, read lamp hours and other information, calibrate effects, and run a test routine. Most of these functions may be performed remotely via the serial link with the Martin MP-2 Uploader.

Navigation

The DMX address and any messages (see page 34) are displayed when the MAC 2000 Profile II is turned 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.

See Table 4 on page 28 for a complete list of the menu items.

DMX address and protocol setting

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 2000 Profile IIs 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.

Two DMX protocols, 8-bit and 16-bit, are available. The 8-bit mode uses 20 control channels and provides full basic control. The 16-bit mode uses 4 additional channels to provide finer gobo and pan/tilt positioning.

Setting the 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 8bit or 16bt and press [Enter].

Tailoring performance

Movement

The MAC 2000 Profile II provides options for optimizing movement for different applications.

- The protocol setting (PSET) setting selects 8-bit or finer 16-bit control of pan, tilt, and gobo index.
- 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 speed or quietness.
- The shortcuts (SCUT) setting determines whether the color, gobo, and effect wheels always take the shortest path between two static positions or oscillate between outer positions.

Tracking Response

The MAC 2000 Profile II has a filter algorithm that looks at several position updates in tracking control mode and calculates the ideal response for smooth movement. Tracking response is adjustable to compensate for variations in controller performance. In most cases the default settings work well.

If tracking mode movement is not satisfactory there are 2 parameters that can be adjusted. The first is selected under PERS/TRAC/MOdE. The default, MOd1, is the best choice with controllers that calculate intermediate positions at a steady rate. Begin by selecting the alternative, MOd2, which is better if the intermediate positions stray significantly from the line of travel.

The second parameter is the number of position updates used to calculate speed. The level is adjustable between 1 and 10 under PERS/TRAC/CAL. Increasing the number of samples increases the distance over which speed is calculated, making movement smoother but less responsive to sudden changes. Experiment for best results.

Display

The display intensity (dINT) setting controls display brightness. The display on/off setting (dISP) determines whether the display remains on or extinguishes two minutes after the last key-press. To flip the display, press [Up] and [Down] simultaneously.

Lamp

There are two settings that modify lamp control: Automatic Lamp On (ALON) and DMX Lamp Off (DLoF).

When ALON is off, the lamp remains off until a "lamp on" command is received from the controller. 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 extinguishes 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.

If striking lamps from the controller, note that striking many lamps at once may cause a voltage drop large enough to prevent lamps from striking or trip the main circuit breaker. Avoid this by programming a "lamp on" sequence that strikes lamps one at a time at 5 second intervals.

Power to the lamp can be turned off from the controller if DMX Lamp Off (dLOF) is on. If dLOF is off, a DMX lamp off command is executed only if position 7 is selected on the color wheel and gobo 5 is selected on both gobo wheels. *Be careful*: with the magnetic ballast model, it is not possible to restrike the lamp until it has cooled for a few minutes. (The electronic ballast model provides hot restrike.)

DMX reset

The fixture can be reset from the controller if DMX reset (PERS/dRES) is ON. If DMX reset is OFF, the reset command can only be executed if position 7 is selected on the color wheel and gobo 5 is selected on both gobo wheels.

Custom settings

The custom configuration function 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

Note: The MP-2 Uploader provides commands to display the time, temperature, and version readouts on the fixture control panel.

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 counter for total accumulated hours/strikes since fabrication (TOTL). 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 readouts of the head and base temperature 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 `DMXL` menu shows the DMX start code (`STCO`) and DMX values received for each effect.

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 HMI 1200 W/S lamp. The maximum service life is 125% of the average life, or 940 hours.

`Fixture overheating` is displayed when the head temperature exceeds 120° C (248° F). Overheating is likely due to dirty air filters, fans, or air vents; incorrect power supply settings, or a defective fan.

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, gobo wheels, gobos, rotating effects, and effect wheel. If a position error is detected, the shutter closes while the effect resets. This feature can be disabled by turning effects feedback (`UTIL/EFFb`) off.

The automatic pan/tilt position correction system may be temporarily turned off under `UTIL/FEbA`. The off setting, however, 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 33.

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.

Default offset settings may be restored by selecting default offsets (`UTIL/dFOF`).

CALIBRATING 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/ZOOF` and press [Enter]. Adjust the offset until the face of the zoom lens plate is flush with the back edge of the focus plate (Figure 12). Press [Enter] to save the setting. Replace the bottom head cover.
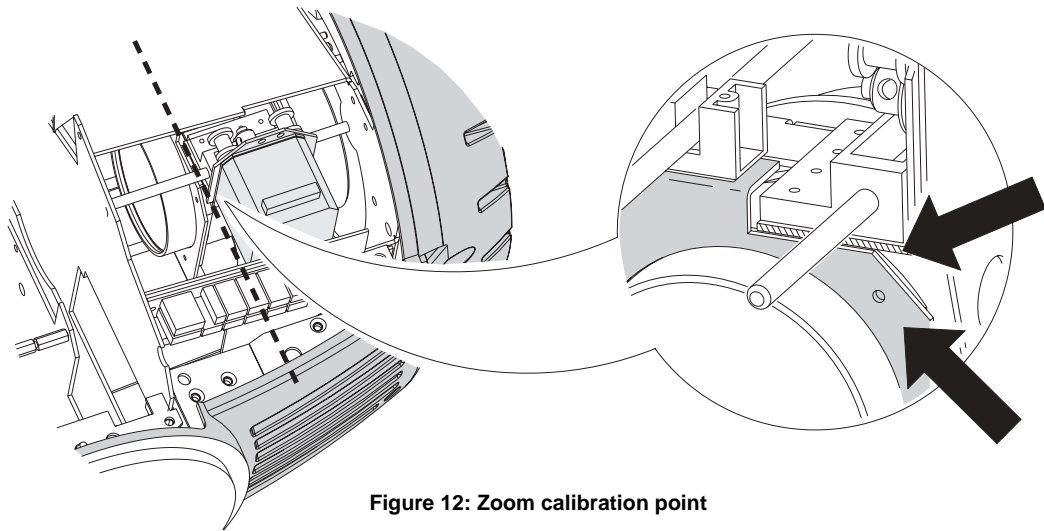
Figure 12: Zoom calibration point

3   Pan calibration is most useful when multiple fixtures are stacked vertically. To calibrate, set zoom, focus, iris, 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 OF 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, focus, iris, 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 OF 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 OF and press [Enter]. Hold a piece of paper over the lens. Set the offset to 0 and then increase it until light is clearly projected onto the paper. Press [Enter] to save the setting. Remove the paper.

6   To calibrate color mixing flags (cyan, magenta, yellow, and color temperature correction), project white beams with no dimming and position them for easy comparison. On each fixture, *including the reference*, select UTIL/CAL/C OF 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 OF (magenta), Y OF (yellow), and CTOF (CTC).

7   Focus calibration is useful when two or more fixtures are the same distance from a projection surface. To calibrate focus, set up all fixtures with the same focus, zoom, dimming, iris, and gobo values. Select a focussed fixture to be the reference. On the other fixtures, select UTIL/CAL/FOOF and press [Enter]. Adjust the offset to focus the image. Press [Enter] to save the setting.

Software upload

The software update mode is normally engaged automatically by the upload device. See Software installation on page 23.

OPTICAL CONFIGURATION

Gobos

Specifications

All gobo slots including the seven color/gobo wheel positions accept round theatrical size-E glass gobos. Aluminum gobos are suitable for short-term use only. For best results, custom gobos should meet the following criteria.

Outside diameter: . . . . .37.5 +0/-0.3 mm (1 15/32 +0/-0.01 in.)
Maximum image diameter: . . . . .30 mm (1 3/16 in.)
Material: . . . . High temperature Borofloat or better glass
Coating: . . . . Dichroic or enhanced aluminum

The color/gobo wheel accepts 1.1 mm thick gobos and color filters. Thinner gobos must be secured with a drop or two of glue. Use a high-temperature silicone adhesive such as Dow Corning's 732 Multi-Purpose Sealant.

The rotating-gobo wheel positions hold gobos up to 3 mm thick with the gobo retention spring. Gobos thicker than 3 mm must be glued in the holder.

Orientation

Coated gobos are inserted with the coating against the rim of the holder (away from the spring). Textured gobos are inserted with the smooth side against the spring. This provides the best results when combining rotating gobos.

Coated side   **Uncoated side**
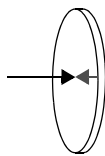
When an object is held up to the coated side there is no space between the object and its reflection. The back edge of the gobo cannot be seen when looking through the coated side.
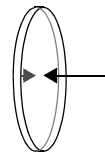
When an object is held up to the uncoated side there is a space between the object and its reflection. The back edge of the gobo can be seen when looking through the uncoated side.

Figure 13: Finding the coated side

Rotating gobo wheels

Figure 14 shows the standard gobo configuration.

Gobo wheel 1   Gobo wheel 2   Color/gobo wheel
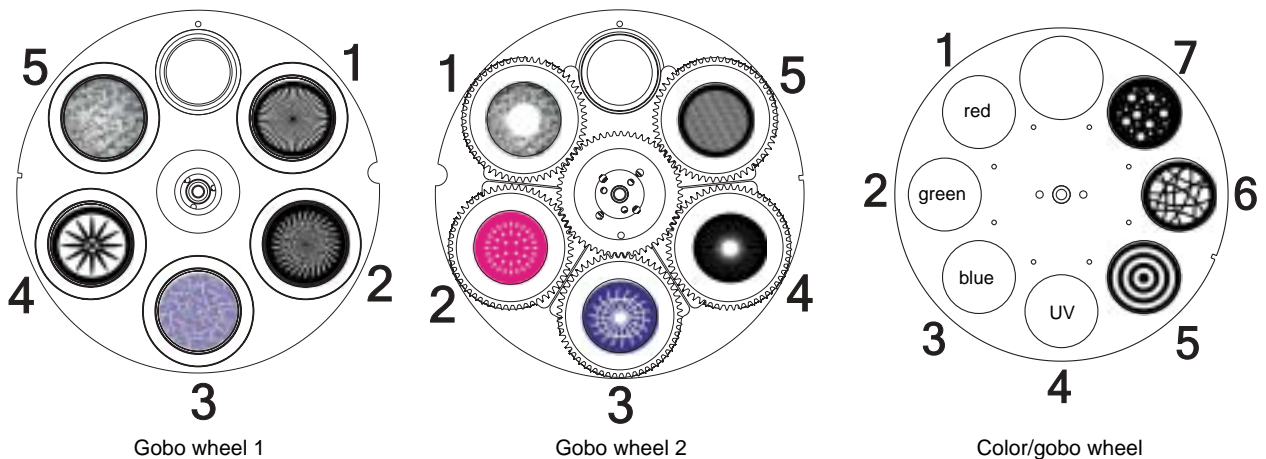
Figure 14: Standard gobo configuration as seen from lamp

Replacing rotating gobos

Important!   The gobo can fall out if the spring is inserted backwards.

1   Disconnect the fixture from power and allow it to cool.

2   See Figure 15. Lock the head in the upside down position and remove the bottom cover. Turn the gobo wheels as required to access the desired position. Pull the gobo holder away from the wheel slightly to release. Remove the gobo holder.

3   Remove the gobo retention spring from the gobo holder and drop the gobo out of the holder. Insert the new gobo in the holder. *Insert the spring with the narrow end against the gobo.* To identify the narrow end, press the spring flat: the narrow end is on the inside. Push the end of the spring in under the lip of the holder.

4   Work the rim of the gobo holder under both clips and snap the gobo holder back into position. If necessary, a small screwdriver or similar tool may be used to pry the clips away from the wheel.

5   Replace the bottom cover and release the pan and/or tilt locks before operating.

Color/gobo wheel

The color/gobo wheel houses four dichroic glass color filters and three static gobos as shown in Figure 14. These are normally installed with the coated side in towards the wheel.

Replacing color filters or gobos

1   Disconnect the fixture from power and allow it to cool.

Access gobos from the bottom of the head. Tilt out and remove the holder.

coated side

The narrow end is on the inside when the spring is pressed flat.

Insert spring with narrow end against gobo.
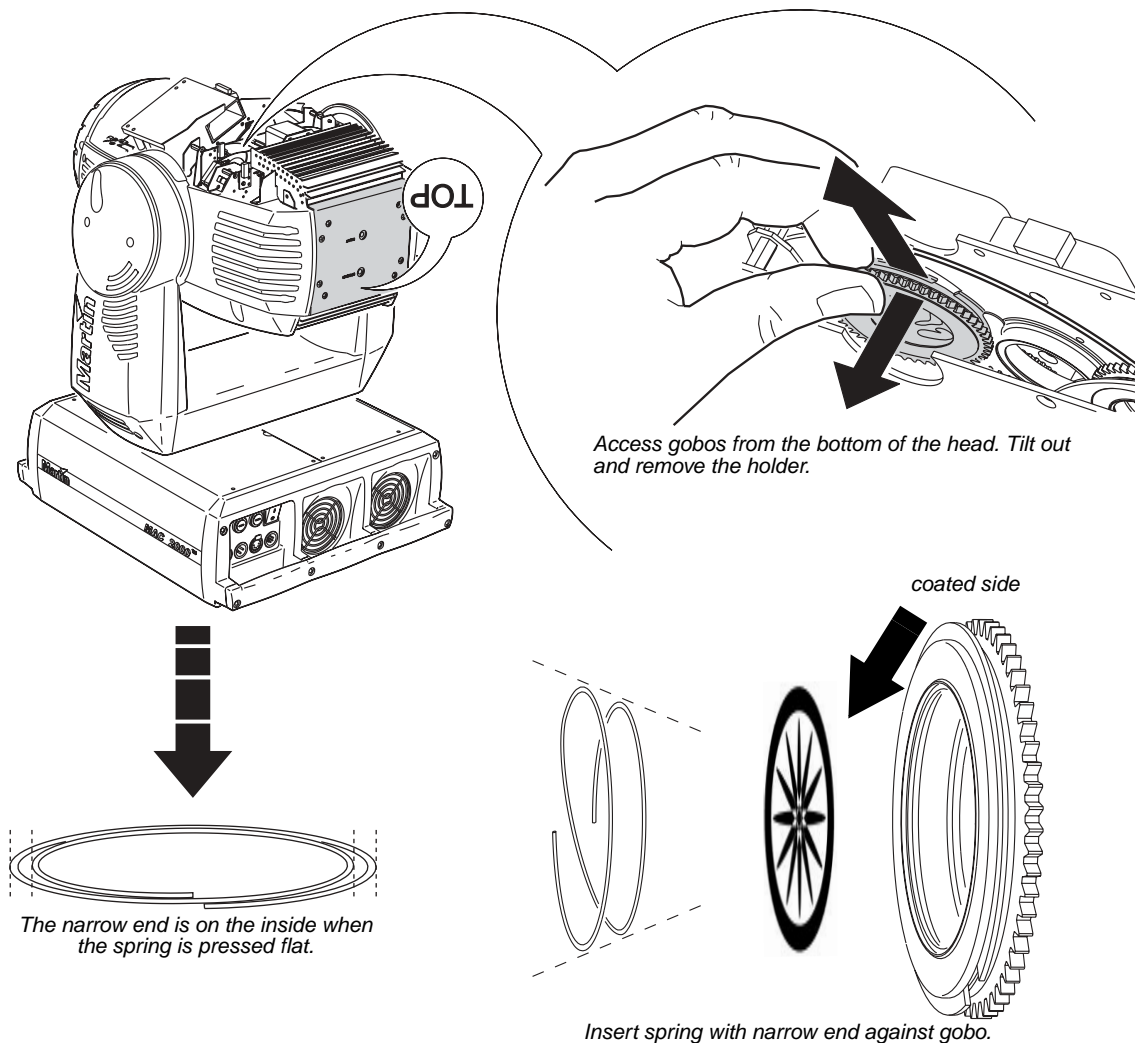
Figure 15: Replacing rotating gobos

2   Lock the head in the upside down position and remove the bottom cover. Turn the color/gobo wheel as required to access the desired position.

3   To remove, press the filter or gobo from the lamp side to release it. Remove from wheel.

4   To insert, work the filter or gobo under the retention spring and position it between the pins. The long edge of the six-sided color filters must be precisely aligned with the inside of the hub in order to fit.

5   Replace the bottom cover and unlock the head before operating.

Install filters and gobos with coating down, towards the lamp.
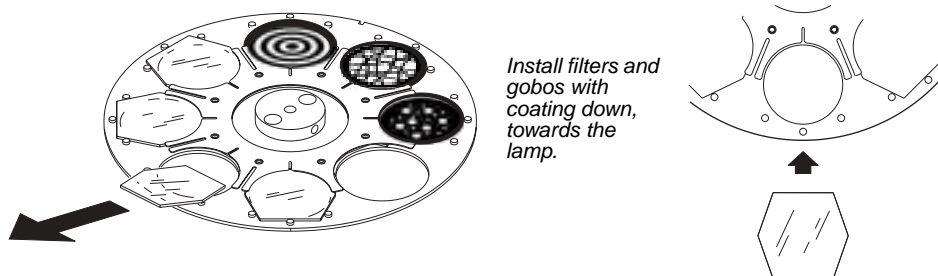
Figure 16: Replacing color filters and fixed gobos

Effect wheel

The effect wheel provides two positions for rotating effects. Effects are glued into holders and are changed by replacing the assembled effect and holder.

Replacing rotating effects

1   Disconnect the fixture from power and allow it to cool.

2   Lock the head in the upside down position and remove the bottom cover. Turn the effect wheel so that the locking plate is under the sensor bracket.

3   To remove, hold the rim of the effect holder and pull back on the locking plate. Remove effect from wheel.

4   To insert, pull back on the locking plate. If both effects are removed, pull straight back on both tabs. Position the groove in the effect holder over the fixed plate. Release the locking plate and verify that the effect is properly seated.

5   Replace the bottom cover and unlock the head before operating.

Locking plate

Position the effect holder groove over the fixed plate.
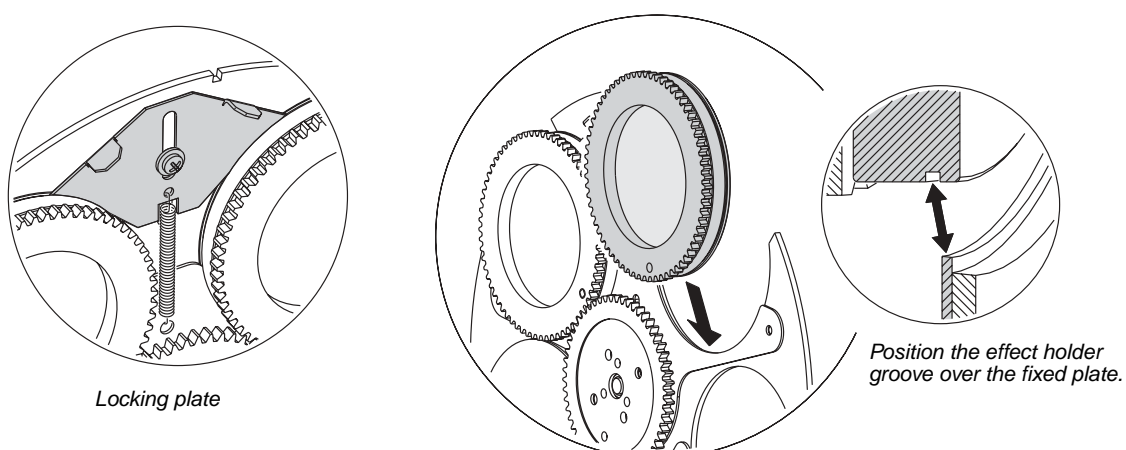
Figure 17: Replacing rotating effects

EFFECTS

The MAC 2000 Profile II is compatible with USITT DMX512 controllers. The fixture has two DMX operating modes, 8-bit and 16-bit. 16-bit mode requires four more DMX channels than 8-bit mode but provides more precise gobo indexing and pan/tilt positioning. All other functions are identical. The complete DMX protocol begins on page 24.

Dimming and strobe

The mechanical dimmer/shutter system provides smooth, high-resolution 100 percent dimming, instant open and 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.

Color mixing

The color mixing system uses continuous dichroic cyan, magenta, and yellow (CMY) color filters. It is a subtractive system that removes color from white light. Inserting all three filters results in loss of light: for maximum brightness, mix 2 colors at a time.

Color temperature correction

The color temperature correction (CTC) system uses a continuous 0 - 178 mireds color filter that lowers the color temperature from 6000 K to 2900 K.

Random color mixing

Variable speed random color mixing using the CMY filters may be selected at the top of channel 7. When selected, channels 3 - 5 set the maximum or minimum amount of each color in the mix. Values up to 127 set a minimum amount: the color is randomly inserted from the selected value up to 100%. Values over 127 set a maximum amount: the color is inserted from 0% up to the selected value. To use the full range of a color in the random mix, select a minimum value of 0% or a maximum value of 100%. To exclude a color from the random mix, select a maximum value of 0%.

Fixed colors and gobos

The color/gobo wheel provides seven slots with four dichroic color filters and three glass gobos. To change the color or gobo, see Replacing color filters or gobos on page 18.

The wheel can be scrolled, allowing for split color effects, snapped to fixed positions, and continuously rotated in both directions at different speeds. When the effects speed channel is set from 252 to 255, the dimmer automatically closes while the color wheel is moving between static positions.

Gobos

Two overlapping gobo wheels provide room for 10 glass gobos. See page 17 to change gobos.

Gobos may be rotated and shaken at varying speeds and indexed to any position. Extremely accurate positioning is available in 16-bit mode.

For each wheel, the gobo and type of rotation (indexed or continuous, with or without shake) are selected on the wheel's Gobo & Function Channel, which also provide commands for continuous wheel rotation. The gobo position index and rotation speed are selected on its Position/Velocity Channel. In 16-bit mode, the position is further adjusted on the wheel's Fine Position Channel.

Effect wheel

The effect wheel provides a variable frost filter and two rotating slots that house a beam shaper and a three-facet prism. The position and velocity of the rotating slots are selected on the effect wheel's Position / Velocity Channel.

Iris

The iris closes down to 15 percent of its full-open diameter with high, 200-step resolution. The Iris Channel also provides random and variable speed pulsating iris effects.

Focus and zoom

The focus lens focusses the beam from approximately 2 meters (6.5 feet) to infinity. The zoom lens widens the beam from approximately 10° at full spot to 28° at full flood.

Pan and tilt

The yoke pans 540° and the head tilts 267°. For maximum positioning accuracy, select 16-bit mode.

The pan/tilt speed (fast, norm, or slow) may be selected on the pan/tilt speed channel. Setting the pan/tilt speed channel to "blackout" causes the shutter to black out the light while the head is moving.

Speed control

There are two ways to control the speed at which effects move from one static position to another. These are known as tracking control and vector control and are selected on the Pan/Tilt Speed and Effect Speed Channels. These channels are independent so you may, for example, combine a vector control pan movement with a tracking control color fade.

In tracking mode, speed is determined by the cross-fade time. The controller continuously sends small position changes that the fixture "tracks." To enable tracking mode, set the relevant speed channel to a tracking value. Note that in addition to enabling tracking control, some tracking values also provide overrides of the menu settings.

In vector mode, speed is set directly on a speed channel. *The cross-fade time must be 0.* Vector control provides a way to set speed on controllers that do not have programmable fade times and results in smooth movement regardless of the cross-fade time or the controller's processing power.

To open the iris slowly in:

- Tracking mode, for example, you program a scene with the iris fully closed and a second scene with the iris fully open. Then you set a cross-fade time between the two scenes of, say, 10 seconds. The controller gradually changes the iris position value from 199 (closed) to 0 (open).
- Vector mode, you program the iris closed and open as before. Then you set the cross-fade time to 0 and program a slow speed, in the second scene, on the Effect Speed Channel.

Routine maintenance

The MAC 2000 Profile II requires routine cleaning. The schedule depends heavily on the operating environment; please consult a Martin service technician for recommendations. Refer all service not described here to a qualified Martin technician.

Important! **Excessive dust, smoke fluid, and particulate buildup degrades performance and causes overheating and damage to the fixture that is not covered by the warranty.**

Warning! **Disconnect the fixture from power before removing any cover.**

Cleaning

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.

Inspect the air filters regularly and clean before they become clogged. Replace the air filters with new ones when replacing the lamp.

To maintain adequate cooling, dust must be cleaned from the fans and air vents periodically.

Cleaning optical components

1 Disconnect the fixture from power and allow the components to cool completely. Remove the head cover.

2 Vacuum or gently blow away dust and loose particles with compressed air.

3 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.

4 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.

Cleaning the fan and air vents

• Remove dust from the fans and air vents with a soft brush, cotton swab, vacuum, or compressed air.

Cleaning or replacing the air filters

1 Disconnect the fixture from power. On each side of the head, remove the 2 screws that hold the side cover using a Torx-20 screwdriver. Slide the cover forward to remove. Lift the filter off of the cover.

2 Clean the filters with a vacuum or compressed air, or replace them. If they are saturated with smoke fluid, etcetera, soak them in warm soapy water and blot dry.

3 Place the filters on the covers and replace the covers.
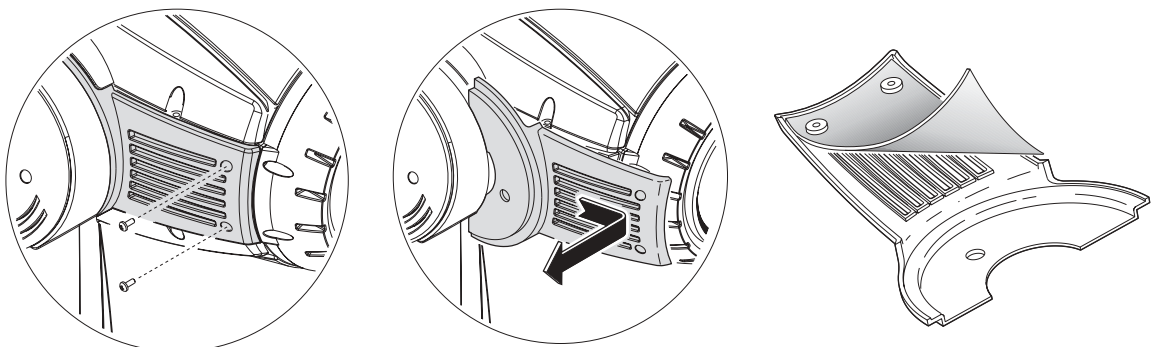
Figure 18: Removing air filters

Software installation

Software updates are installed in the MAC 2000 Profile II using a Martin MP-2 Uploader or a LightJockey 4064 DMX interface card. The procedure is found in the MP-2 user manual and the Martin Software Uploader online help file.

Requirements

The following are required in order to install software.

- The MAC 2000 Profile II update file, available for download from the User Support Area of the Martin web site (http://www.martin.dk).
- The Martin Software Uploader program, version 4.0 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 a LightJockey DMX Interface card.

Preventing software updates on a MAC 2000 Profile II

Software updates are enabled by default, but on a MAC 2000 Profile II you can disable this by setting the Write jumper (see Circuit board connections on page 36) to disable.

Boot sector jumper

If the normal upload procedure does not work, or if the software update notes call for a boot sector update, move the boot sector jumper on the printed circuit board to the BOOT position before uploading software.

SETTING THE BOOT SECTOR JUMPER

1 Disconnect the fixture from power.

2 Remove the top screws from the ends of the front side panel and tilt the panel down to expose the main circuit board.

3 Using the appropriate diagram in Circuit board connections on page 36 or the label inside the base, locate the BOOT jumper. This is PL16 on a MAC 2000 Profile II. Move the jumper to the "BOOT" position.

4 Perform a boot mode upload. When the upload is complete, disconnect the fixture from power and move the jumper back to the locked or normal position.
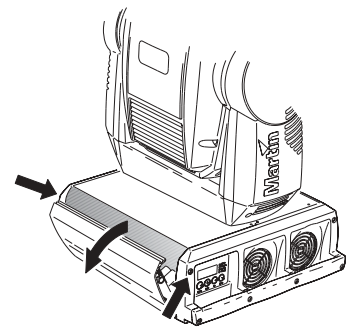
DMX PROTOCOL

DMX channel				Start code = 0
8-bit	**16-bit**	**Value**	**Percent**	**Function**
1				**Shutter, Strobe, Reset, Lamp On/Off**
		0 - 19	0 - 7	Shutter closed
		20 - 49	8 - 19	Shutter open
		50 - 72	20 - 28	Strobe, fast→slow
		73 - 79	29 - 31	Shutter open, lamp power reduced (MAC 2000 E only)
		80 - 99	31 - 39	Opening pulse, fast →slow
		100 - 119	39 - 47	Closing pulse, fast →slow
		120 - 127	47 - 50	Shutter open
		128 - 147	50 - 58	Random strobe, fast
		148 - 167	58 - 65	Random strobe, medium
		168 - 187	66 - 73	Random strobe, slow
		188 - 190	74 - 75	Shutter open
		191 - 193	75 - 76	Random opening pulse, fast
		194 - 196	76 - 77	Random opening pulse, slow
		197 - 199	77 - 78	Random closing pulse, fast
		200 - 202	78 - 79	Random closing pulse, slow
		203 - 207	80 - 81	Shutter open
		208 - 217	82 - 85	Reset fixture[1]
		218 - 227	85 - 89	Shutter open
		228 - 237	89 - 93	Lamp power on
		238 - 247	93 - 97	Shutter open
		248 - 255	97 - 100	Lamp power off (hold 5 seconds)[2]
2		0 - 255	0 - 100	**Intensity** 0 → 100%
3		0 - 255	0 - 100	**Cyan** White → Cyan Cyan limit for random CMY color
		0 - 127	0 - 50	At least 0 → 100%
		128 - 255	50 -100	At most 0 → 100%
4		0 - 255	0 - 100	**Magenta** White → Magenta Magenta limit for random CMY color
		0 - 127	0 - 50	At least 0 → 100%
		128 - 255	50 -100	At most 0 → 100%
5		0 - 255	0 - 100	**Yellow** White → Yellow Yellow limit for random CMY color
		0 - 127	0 - 50	At least 0 → 100%
		128 - 255	50 -100	At most 0 → 100%
6		0 - 255	0 - 100	**CTC** Cold → Warm (0-178 mireds)

[1] *If reset is disabled, i.e., $dRES=OFF$, the command executes only when position 7 is selected on the color wheel and gobo 5 is selected on both gobo wheels.*

[2] *If lamp off is disabled, i.e., $dLOF=OFF$, the command executes only when position 7 is selected on the color wheel and gobo 5 is selected on both gobo wheels.*

Table 3: DMX protocol

8-bit	16-bit	Value	Percent	Function
				Color/Gobo Wheel
				Continuous scroll
		0 - 20	0 - 7	White → Position 1
		20 - 40	7 - 16	Position 1 → Position 2
		40 - 60	16 - 23	Position 2 → Position 3
		60 - 80	23 - 31	Position 3 → Position 4
		80 - 100	31 - 39	Position 4 → Position 5
		100 - 120	39 - 47	Position 5 → Position 6
		120 - 140	47 - 55	Position 6 → Position 7
		140 - 160	55 - 63	Position 7 → Open
				Stepped scroll
		160 - 163	63 - 64	Position 7 (Dots)
		164 - 167	64 - 65	Position 6 (Highways)
7		168 - 171	66 - 67	Position 5 (Triple Cone)
		172 - 175	67 - 68	Position 4 (UV)
		176 - 179	69 - 70	Position 3 (Blue 111)
		180 - 183	70 - 72	Position 2 (Green 201)
		184 - 187	72 - 73	Position 1 (Red 308)
		188 - 191	74 - 75	Open
				Continuous rotation
		192 - 217	75 - 85	CW, fast → slow
		218- 243	85 - 95	CCW, slow → fast
				Random CMY color (set limits on ch. 3 - 5)
		244 - 247	96 - 97	Random color, fast
		248 - 251	97 - 98	Random color, medium
		252 - 255	99 - 100	Random color, slow
				Gobo Wheel 1, Gobo & Function
		0 - 9	0 - 3	Open
				Indexed gobo rotation
		10 - 14	3 - 5	Gobo 1 (Jet Fan)
		15 - 19	5 - 7	Gobo 2 (Pipe Dreams)
		20 - 24	7 - 9	Gobo 3 (Double Worms)
		25 - 29	9 - 11	Gobo 4 (Inverted King Star)
		30 - 34	11 - 13	Gobo 5 (Limbo)
				Continuous gobo rotation
		35 - 39	13 - 15	Gobo 1
		40 - 44	15 - 17	Gobo 2
		45 - 49	17 - 19	Gobo 3
		50 - 54	19 - 21	Gobo 4
		55 - 59	21 - 23	Gobo 5
8				Indexed gobo shake
		60 - 74	23 - 29	Gobo 1, shake slow → fast
		75 - 89	29 - 35	Gobo 2, shake slow → fast
		90 - 104	35 - 40	Gobo 3, shake slow → fast
		105 - 119	41 - 46	Gobo 4, shake slow → fast
		120 - 134	47 - 52	Gobo 5, shake slow → fast
				Rotating gobo shake
		135 - 149	53 - 58	Gobo 1, shake slow → fast
		150 - 164	59 - 64	Gobo 2, shake slow → fast
		165 - 179	65 - 70	Gobo 3, shake slow → fast
		180 - 194	70 - 76	Gobo 4, shake slow → fast
		195 - 209	76 - 82	Gobo 5, shake slow → fast
				Gobo wheel rotation
		210 - 232	82 - 91	CW, slow → fast
		233 - 255	91 - 100	CCW, fast → slow

Set position / velocity on next channel. Fine position on ch. 10 (16-bit).

Table 3: DMX protocol

8-bit	16-bit	Value	Percent	Function
9	9	0 - 255	0 - 100	**Gobo Wheel 1, Position/Velocity** Coarse Position (MSB), Min → Max
		0 - 2 3 - 127 128 - 252 253 - 255	0 - 1 1 - 50 50 - 98 99 - 100	Rotation velocity No rotation CCW, slow → fast CW, fast → slow No rotation
-	10	0 - 255	0 - 100	**Gobo Wheel 1, Fine Position** Fine Position (LSB), Min → Max
10	11	0 - 9	0 - 3	**Gobo Wheel 2, Gobo & Function** Open
		10 - 14 15 - 19 20 - 24 25 - 29 30 - 34	3 - 5 5 - 7 7 - 9 9 - 11 11 - 13	Indexed gobo rotation Gobo 1 (Limbo Donut) Gobo 2 (Triangle Cones) Gobo 3 (Congo Star) Gobo 4 (Space Sun) Gobo 5 (Waves)
		35 - 39 40 - 44 45 - 49 50 - 54 55 - 59	13 - 15 15 - 17 17 - 19 19 - 21 21 - 23	Continuous gobo rotation Gobo 1 Gobo 2 Gobo 3 Gobo 4 Gobo 5
		60 - 74 75 - 89 90 - 104 105 - 119 120 - 134	23 - 29 29 - 35 35 - 40 41 - 46 47 - 52	Indexed gobo shake Gobo 1, shake slow → fast Gobo 2, shake slow → fast Gobo 3, shake slow → fast Gobo 4, shake slow → fast Gobo 5, shake slow → fast
		135 - 149 150 - 164 165 - 179 180 - 194 195 - 209	53 - 58 59 - 64 65 - 70 70 - 76 76 - 82	Rotating gobo shake Gobo 1, shake slow → fast Gobo 2, shake slow → fast Gobo 3, shake slow → fast Gobo 4, shake slow → fast Gobo 5, shake slow → fast
		210 - 232 233 - 255	82 - 91 91 - 100	Gobo wheel rotation CW, slow → fast CCW, fast → slow
11	12	0 - 255	0 - 100	**Gobo Wheel 2, Position/Velocity** Coarse Position (MSB), Min → Max
		0 - 2 3 - 127 128 - 252 253 - 255	0 - 1 1 - 50 50 - 98 99 - 100	Rotation velocity No rotation CCW, slow → fast CW, fast → slow No rotation
-	13	0 - 255	0 - 100	**Gobo Wheel 2, Fine Position** Fine Position (LSB), Min → Max

Set position / velocity on next channel. Fine position on ch. 13 (16-bit).

Table 3: DMX protocol

8-bit	16-bit	Value	Percent	Function
				Effect Wheel Selection and Macros
				Effect selection
		0	0	Open
		1 - 175	1 - 68	Variable frost, 0 → 100%
		176 - 183	69 - 72	Effect 1, indexed rotation
		184 - 191	72 - 75	Effect 2, indexed rotation
		192 - 199	75 - 78	Effect 1, continuous rotation
		200 - 207	78 - 81	Effect 2, continuous rotation
		208 - 215	81 - 84	Open
12	14			
				Macro selection
		216 - 220	85 - 86	1
		221 - 225	87 - 88	2
		226 - 230	89 - 90	3
		231 - 235	91 - 92	4
		236 - 240	92 - 94	5
		241 - 245	94 - 96	6
		246 - 250	96 - 98	7
		251 - 255	98 - 100	8
				Effect Wheel, Position / Velocity
		0 - 255	0 - 100	Position, Min → Max
				Rotation velocity
13	15	0 - 2	0 - 1	No rotation
		3 - 127	1 - 50	CCW, slow → fast
		128 - 252	50 - 98	CW, fast → slow
		253 - 255	99 - 100	No rotation
				Iris
		0 - 199	0 - 78	Open → closed
		200 - 215	78 - 84	Closed
		216 - 229	85 - 90	Pulse opening, fast →slow
14	16	230 - 243	90 - 95	Pulse closing, fast →slow
		244 - 246	96 - 96	Random pulse opening, fast
		247 - 249	97 - 98	Random pulse opening, slow
		250 - 252	98 - 99	Random pulse closing, fast
		253 - 255	99 - 100	Random pulse closing, slow
15	17	0 - 255	0 - 100	**Focus** Infinity → near
16	18	0 - 255	0 - 100	**Zoom** Flood → spot
17	19	0 - 255	0 - 100	**Pan Coarse** (MSB) Left → right (128 = neutral)
-	20	0 - 255	0 - 100	**Pan Fine** (LSB) Left → right
18	21	0 - 255	0 - 100	**Tilt Coarse** (MSB) Up → down (128 = neutral)
-	22	0 - 255	0 - 100	**Tilt Fine** (LSB) Up → down
				Pan/Tilt Speed
		0 - 2	0	Tracking
		3 - 242	1 - 95	Fast → slow
19	23	243 - 245	95 - 96	Tracking, PTSP = SLOW (slow pan/tilt speed)
		246 - 248	96 - 97	Tracking, PTSP = NORM (normal pan/tilt speed)
		249 - 251	98	Tracking, PTSP = FAST (fast pan/tilt speed)
		252 - 255	99 - 100	Blackout
				Effect Speed (Dimmer, Color, Gobos, Effects, Indexed Rotation, Iris, Focus, and Zoom)
		0 - 2	0 - 1	Tracking
		3 - 239	1 - 94	Fast → slow
20	24	240 - 242	94 - 95	Tracking, STUd = OFF (studio mode off)
		243 - 245	95 - 96	Tracking, STUd = ON (studio mode on)
		246 - 248	96 - 97	Tracking, SCUT = OFF (shortcuts off)
		249 - 251	98 - 98	Tracking, SCUT = ON (shortcuts on)
		252 - 255	99 - 100	Fast. *Blackout "speed" for color wheel*

> *Set position / velocity on next channel.*

Table 3: DMX protocol

CONTROL MENU

Menu	Item	Options	Notes (Default settings in bold print)
AddR	–	**1**-512	DMX address
PSET	–	8bit	Full control with coarse pan, tilt, and gobo indexing
		16bt	Full control with fine pan, tilt, and gobo indexing
PATI	SWAP	ON	Map DMX pan control to tilt channel and vice versa.
		OFF	Normal pan and tilt control
	PINV	ON	Reverse DMX pan control, right → left
		OFF	Normal pan control, left → right
	TINV	ON	Reverse DMX tilt control, down → up
		OFF	Normal tilt control, up → down
PTSP	–	**NORM**	Medium pan/tilt speed
		FAST	Optimize movement for speed
		SLOW	Optimize movement for smoothness
Stud	–	**OFF**	Optimize effects for speed
		ON	Optimize effects for silence
PERS	dISP	**ON**	Display remains on
		OFF	Display extinguishes 2 minutes after last key press
	dINT	10-**100**	Adjust display intensity
	dLOF	ON	Enable DMX lamp off command
		OFF	Disable DMX lamp off command
	dRES	**ON**	Enable DMX reset command
		OFF	Disable DMX reset command
	ALON	ON	Lamp strikes automatically within 90 seconds of power on
		OFF	No automatic lamp strike
		dMX	Lamp strikes if DMX is present, douses 15 mins. after it's missing
	SCUT	**ON**	Color, gobo, and effect wheels turn shortest distance
		OFF	Color, gobo, and effect wheel paths oscillate
	TRAC	MOdE	**MOd1**: Absolute delta value algorithm (for most controllers) moD2: Real delta value algorithm
		CAL	1-10. Tracking samples. Increase if pan/tilt is not smooth. (Default = **6**)
	CSPd	**NORM**	Normal color/gobo wheel speed.
		FAST	Increases gobo/color wheel acceleration to maximum and provides faster color bumps. Note that gobo/color wheel step loss my occur under low power or high temperature conditions that decrease motor torque. The NORM option is slower, but less prone to step loss.
dFSE	FACT	LOAD	Return all personality settings (not calibrations) to factory defaults
	CUS1,CUS2, CUS3	LOAd	Load custom configuration
		SAVE	Save current configuration

Table 4: Control menu

Menu	Item	Options	Notes (Default settings in bold print)
INFO	TIME/HRS	TOTL	Total hours of operation since fabricated
		RSET	Hours of operation since counter reset. To reset, display counter and press [↑] for 5 seconds.
	TIME/L HR	TOTL	Total hours of operation with lamp on since fabricated
		RSET	Lamp hours since counter reset. To reset, display counter and press [↑] for 5 seconds.
	TIME/L ST	TOTL	Total number of lamp strikes since fabricated
		RSET	Number of lamp strikes since counter reset. To reset, display counter and press [↑] for 5 seconds.
	TEMP	HEAd	Head temperature
		bASE	Base temperature
	VER	–	CPU firmware version
dMXL	–	STCO	Decimal value of the DMX start code. The start code must be 0 for the MAC 2000 Profile II to function properly.
		dIM..E SP	DMX value (from 0 - 255) received for each channel.

Table 4: Control menu

Menu	Item	Options	Notes (Default settings in bold print)
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, MAG,YEL	0-255	White →Cyan/Magenta/Yellow
	CTC	0-255	Color temperature correction. Cold →Warm (0-178 mireds)
	COL	OPEN	Color wheel in open position.
		C1-C7	Color wheel positions 1 →7.
		CW F	Clockwise rotation - fast
		CCWF	Counter clockwise rotation - fast
		CW M	Clockwise rotation - medium
		CCWM	Counter clockwise rotation - medium
		CW S	Clockwise rotation - slow
		CCWS	Counter clockwise rotation - slow
		RNdF	Random color - fast
		RNdM	Random color - medium
		RNdS	Random color - slow
	gOb1	OPEN	Gobo wheel 1. Open position
		g1 I-g5 I	Gobo wheel 1. Indexed gobos 1→5
		g1 g-g5 R	Gobo wheel 1. Rotating gobos 1→5
		g1IS-g5IS	Gobo wheel 1. Indexed gobo shake 1→5
		g1RS-g5RS	Gobo wheel 1. Rotating gobo shake 1→5
		CW F	Gobo wheel 1. Clockwise rotation - fast
		CCWF	Gobo wheel 1. Counter clockwise rotation - fast
		CW M	Gobo wheel 1. Clockwise rotation - medium
		CCWM	Gobo wheel 1. Counter clockwise rotation - medium
		CW S	Gobo wheel 1. Clockwise rotation - slow
		CCWS	Gobo wheel 1. Counter clockwise rotation - slow
	I/S1	0-255	Clockwise rotation of gobo wheel 1. Slow→fast.

Table 4: Control menu

Menu	Item	Options	Notes (Default settings in bold print)
MAN cont.	gOb2	OPEN	Gobo wheel 2. Open position
		g1 I-g5 I	Gobo wheel 2. Indexed gobos 1→5
		g1 g-g5 R	Gobo wheel 2. Rotating gobos 1→5
		g1IS-g5IS	Gobo wheel 2. Indexed gobo shake 1→5
		g1RS-g5RS	Gobo wheel 2. Rotating gobo shake 1→5
		CW F	Gobo wheel 2. Clockwise rotation - fast
		CCWF	Gobo wheel 2. Counter clockwise rotation - fast
		CW M	Gobo wheel 2. Clockwise rotation - medium
		CCWM	Gobo wheel 2. Counter clockwise rotation - medium
		CW S	Gobo wheel 2. Clockwise rotation - slow
		CCWS	Gobo wheel 2. Counter clockwise rotation - slow
	I/S2	0-255	Clockwise rotation of gobo wheel 2. Slow→fast.
	EFF	F 0-F175	Effects. Variable frost 0→100%
		E1 I-E2 I	Effect 1 or 2 - indexed rotation.
		E1 R-E2 R	Effect 1 or 2 - continuous rotation.
	I/SE	STOP	Effect wheel - no rotation.
		R 1-R125	Effect wheel - clockwise rotation. Slow→fast.
		L125-L 1	Effect wheel - counter clockwise rotation. Fast→slow.
		STOP	Effect wheel - no rotation.
	IRIS	I 0-I199	Iris - Open→Closed
		POUT	Pulse opening
		P IN	Pulse closing
		RNdO	Random pulse opening
		RNdI	Random pulse closing
	FOC	0-255	Focus - Infinity→Near
	ZOOM	0-255	Zoom - Flood→spot
	PAN	0-255	Pan - Left→Right
	TILT	0-255	Tilt - Up→Down
TSEQ	–	RUN	Run a general test of all effects

Table 4: Control menu

Menu	Item	Options	Notes (Default settings in bold print)
	FEbA	**ON**	Enable pan/tilt position correction system
		OFF	Disable pan/tilt feedback. Setting not saved.
	EFFb	**ON**	Enable on the fly reset of color, gobo, and effect wheels
		OFF	Disable on the fly reset of color, gobo, and effect wheels
	Adj	–	See Table 5
	CAL/P OF	1–255	Pan offset
	CAL/T OF	1–255	Tilt offset
	CAL/d OF	1–255	Dimmer offset
	CAL/C OF	1–255	Cyan offset
	CAL/M OF	1–255	Magenta offset
UTIL (Press and hold Enter for a few seconds to use this menu)	CAL/Y OF	1–255	Yellow offset
	CAL/CTOF	1–255	CTC offset
	CAL/COOF	1–255	Color wheel offset
	CAL/G1OF	1–255	Gobo wheel 1 offset
	CAL/G2OF	1–255	Gobo wheel 2 offset
	CAL/EFOF	1–255	Effect wheel offset
	CAL/IROF	1–255	Iris offset
	CAL/FOOF	1–255	Focus offset
	CAL/ZOOF	1–255	Zoom offset
	dFOF	SURE	Return all offsets to the default settings
	PCbT	LEd	PCB test for service use only.
	FANS	REG	Regulate the effect cooling fans for quieter performance. Enabling this option increases the operating temperature and thus increases wear on the components.
		FULL	Operate cooling fans at full speed. This is the default from software version 1.4.
	UPLd	SURE	Manually set fixture to software update mode
SMSG	Replace lamp		Displayed when lamp hours exceed average life (750 hours)
	Fixture overheating		Displayed if head temperature exceeds 120° C (248° F)

Table 4: Control menu

ADJUSTMENT SUBMENU

This menu is located under `UTIL/Adj`.

Menu	Item	Options	Notes
RST	–	–	Reset fixture
L ON	–	–	Strike lamp
LoFF	–	–	Douse lamp
HEAd	dIM	Adj	Turn dimmer to adjustment position (closed mechanical stop)
		OPEN	Open dimmer
		CLOS	Close dimmer
		STRO	Strobe
	CYAN, MAG, YEL, CTC	MIN	Color flags out
		MAX	Color flags in
	COL	OPEN	Turn color wheel to open position
		Adj	Turn color wheel to adjustment position
		C1-C7	Select color
	GOb1, GOb2	OPEN	Turn gobo wheel to open position
		Adj	Turn gobo wheel 1 to adjustment position
		G1 I-G5 I	Turn gobos to index position
		G1-G5LS	Select and rotate gobos
	EFF	OPEN	Turn effect wheel to open position
		Adj	Turn effect wheel to adjustment position
		FROS	Turn effect wheel to maximum frost position
		EFF1-E2LS	Select and rotate effects
	IRIS	Adj	Set iris to adjustment position (open mechanical stop)
		OPEN	Open iris
		CLOS	Close iris
	FOCU	NEAR	Move focus lens to front
		FAR	Move focus lens to back
	ZOOM	NARR	Zoom to full spot
		WIdE	Zoom to full flood
PATI	–	NEUT	Move pan and tilt to neutral positions
		PNTd	Pan neutral, tilt down
		PNTU	Pan neutral, tilt up
		PLTN	Pan left, tilt neutral
		PRTN	Pan right, tilt neutral
		PLTd	Pan left, tilt down
		PRTU	Pan right, tilt up

Table 5: Adjustment menu

DISPLAY MESSAGES

Message	Appears when...	What to do
RST (Reset)	... the fixture is indexing effects at startup.	Wait for reset to complete.
SRST (Serial reset)	... the fixture has received a reset command from the controller.	Wait for reset to complete. Set PERS/dRES to off to prevent accidental reset commands.
HOME	... the effects have been indexed and are moving to their default positions.	Wait a few moments.
OPEN	...the lamp access cover is not fully closed.	Verify that the lamp access cover is locked in place.
LERR (Lamp error)	... the lamp doesn't ignite within 10 minutes of receiving the 'Lamp ON' command. Likely reasons are a missing or defective lamp, or insufficient AC voltage.	Check the lamp. Check that the voltage and frequency settings match the local supply.
MERR (Memory error)	...the EEPROM memory cannot be read.	Contact Martin service personnel for assistance.
ShER (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 effected.	Contact Martin service personnel for assistance.
bTER (Base temperature error) HTER (Head temperature error)	... there is a fault with the temperature sensor in the base or head.	Contact Martin service personnel for assistance.
FbEP (Feedback error pan) FbET (Feedback error tilt) FbER (Feedback error pan/tilt)	...pan (FbEp), tilt (FbET) or both (FbER) feedback circuits are malfunctioning. It will still be possible to operate the fixture, though it goes into a "safe" mode where maximum speed is reduced, thus preventing the fixture from losing track of its home position (losing step).	Contact Martin service personnel for assistance.
PAER (Pan time-out) TIER (Tilt time-out) CYER (Cyan time-out) MAER (Magenta time-out) YEER (Yellow time-out) CTER (CTC time-out) FOER (Focus time-out) ZOER (Zoom time-out)	...the electric indexing circuit is malfunctioning. The fixture will, after the time-out, establish a mechanical stop, and continue to work normally.	Reset fixture again. Contact Martin service personnel if problem continues.
COER (Color wheel time-out) g1ER (Gobo wheel 1 time-out) R1ER (Gobo wh. 1 index time-out) g2ER (Gobo wheel 2 time-out) R2ER (Gobo wh. 2 index time-out) EFER (Effect wheel time-out) REER (Effect wheel index time-out)	...the magnetic-indexing circuit malfunctions (e.g. sensor defective or magnet missing). After the time-out, the effect in question stops in a random position.	Reset fixture again. Contact Martin service personnel if problem continues.
S3SC (Gobo wh. sensor short) S4SC (Gobo rot. sensor short) S5SC (Effect wh. sensor or zoom/focus switch short) S6SC (Color wh. or effect rot. sensor short) S7SC (Yellow or CTC switch short) S8SC (Cyan or magenta switch short)	...an effect does not move away from the index position under reset, a sensor or micro-switch circuit is shorted, or a micro-switch is stuck or connected incorrectly.	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 mains inlet).	Disconnect fixture and replace fuse.
	Secondary fuse(s) blown (located on PCB inside base).	Disconnect fixture. Check fuses on PCB 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 protocol settings.
	One of the fixtures is defective and disturbs data transmission on the link.	Bypass one fixture at a time until normal operation is regained: unplug the XLR in and out connectors and connect them directly together. Have the 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.
Magnetically indexed effect resets correctly but wanders after fixture reaches operating temperature.	Effect wheel requires mechanical adjustment.	Disable effects feedback (page 15). Contact Martin technician for service.
Mechanical effect loses position.	The transformer setting does not match local voltage.	Disconnect fixture. Check transformer setting and correct if necessary.
	Mechanical train requires cleaning, adjustment, or lubrication.	Contact Martin technician for service.
No light and "LERR" error message displayed.	The ballast and transformer settings do not match local AC voltage and frequency.	Disconnect fixture. Check ballast and transformer settings and correct if necessary.
	Lamp blown	Disconnect fixture and replace lamp.
	Lamp not installed	Disconnect fixture and install lamp.
	Lamp access safety switch open	Verify that lamp access plate is fully seated and locked in place.
	Lamp too hot to strike	Send a lamp off command. Allow the lamp to cool for 5 - 10 minutes and try again.
Lamp cuts out intermittently.	Fixture is too hot.	Allow fixture to cool. Clean air filters. Reduce ambient room temperature.
	The ballast and transformer settings do not match local AC voltage and frequency.	Disconnect fixture. Check ballast and transformer settings and correct if necessary.

Table 7: Troubleshooting

CIRCUIT BOARD CONNECTIONS

	Profile II
1	Gobo wheel 1
2	Gobo 2 rot.
3	Gobo wheel 2
4	Gobo 2 rot.
5	Color wheel
6	Iris
7	
8	
9	
10	
11	
12	Effect wheel
13	Effect wheel rot.
14	Focus
15	Zoom
16	Dimmer
17	CTC
18	Yellow
19	Magenta
20	Cyan
21	
22	
23	Door switch
24	Tilt feedback
25	Pan feedback
26/27	Gobo wheel 1
26/27	Gobo wheel 2
26/27	Gobo 1 rot.
26/27	Gobo 2 rot.
28/29	
30	P/T switch
31	Zoom / focus sw.
31	Effect wheel
31	Effect rot.
31	Color
32	Tilt
33	Pan
34	CMY switch
35/36	
36	Head temp.
41	Light sensor
42	Lamp hous. temp
F1	Head left fan
F2	Head right fan
F3	Head top fan
F4	Head bottom fan
F5	Base power fan
F6	Base dis. side fan
F7	E. ballast fan
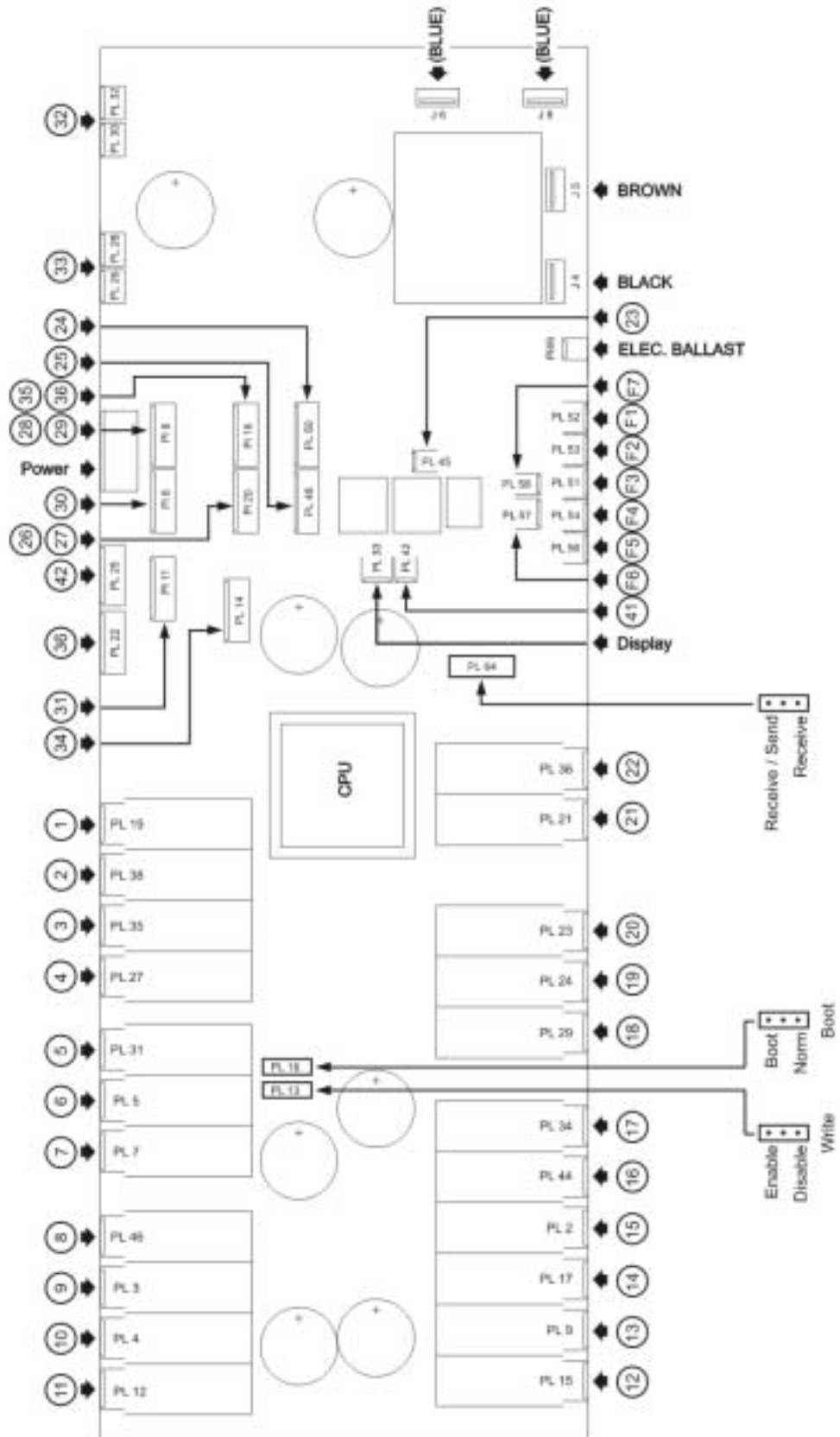
SPECIFICATIONS

MAC 2000 PROFILE II

Note that versions with electronic ballast are denoted with an 'E'.

PHYSICAL

Length: . . . . 408 mm (16.0 in)
Width: . . . . 490 mm (19.3 in)
Height: . . . . 743 mm (29.3 in)
Weight - MAC 2000 Profile II E: . . . . 38 kg (84 lbs)
Weight - MAC 2000 Profile II: . . . . .45 kg (99 lbs)

SOURCE

Lamp: . . . . 1200 W short arc discharge
Base: . . . . Double-ended SFc 10-4 with key
Approved models: . . . . Osram HMI 1200 W/S Short-Arc
Control: . . . . automatic and remote, hot re-strike w/ electronic ballast

THERMAL

Maximum ambient temperature (Ta) . . . . 40° C (104° F)
Maximum surface temperature. . . . . 140° C (284° F)

CONTROL AND PROGRAMMING

Protocol . . . . USITT DMX-512 (1990)
Receiver . . . . Opto-isolated RS-485
Control channels. . . . . 20 or 24
Data I/O . . . . locking 3-pin & 5-pin XLR, pin 1 shield, pin 2 cold (-), pin 3 hot (+)

ELECTRICAL

AC input: . . . . 3 m trailing cable w/o cord cap
Operating ranges (electronic ballast): . . . . .100-130/200-260 V, 50/60 Hz
Operating ranges (magnetic ballast): . . . . 200-260 V, 50/60 Hz
Main fuses (x 2 - when local AC supply is 200 - 250 V) . . . . .15 A
Main fuses (x 2 - when local AC supply is 100 - 120 V) . . . . T 20 A
Fuse F101 . . . . .T 6.3 A
Fuse F102 . . . . T 10 A
Fuse F103 . . . . .T 3.15 A
Fuse F104 . . . . .T 3.15 A
Power supply . . . . .Electronic auto-ranging

MAXIMUM POWER AND CURRENT - MAGNETIC BALLAST

208 V / 50 Hz . . . . 1520 W, 9.3 A
208 V / 60 Hz . . . . 1410 W, 7.5 A
230 V / 50 Hz . . . . 1470 W, 7.6 A
230 V / 60 Hz . . . . .1450 W, 7 A
250 V / 50 Hz . . . . 1480 W, 7.4 A

MAXIMUM POWER AND CURRENT - ELECTRONIC BALLAST

100 V / 50 Hz . . . . 1590 W, 19.8 A
100 V / 60 Hz . . . . 1560 W, 19.3 A
120 V / 50 Hz . . . . 1560 W, 16.8 A
120 V / 60 Hz . . . . 1540 W, 16.3 A
208 V / 50 Hz . . . . 1470 W, 10.5 A
208 V / 60 Hz . . . . 1470 W, 10.3 A
230 V / 50 Hz . . . . 1480 W, 9.6 A
230 V / 60 Hz . . . . 1470 W, 9.4 A
250 V / 50 Hz . . . . 1480 W, 8.6 A
250 V / 60 Hz . . . . 1480 W, 8.5 A

DESIGN STANDARDS

EU EMC . . . . EN 50 081-1, EN 50 082-1
EU safety . . . . EN 60598-1, EN 60598-2-17
Canadian safety . . . . .CSA C22.2 No. 166
US safety . . . . ANSI/UL 1573

CONSTRUCTION

Housing . . . . UV-resistant fiber-reinforced composite
Protection factor . . . . .IP 20

INSTALLATION

Mounting points . . . . 8 pairs of 1/4-turn locks, offset 45°
Orientation . . . . any

ACCESSORIES

MP-2 Uploader . . . . P/N 90758420
G-clamp . . . . P/N 91602003
Half-coupler clamp. . . . . P/N 91602005
The Wife DMX Tester . . . . P/N 91611038

ORDERING INFORMATION

MAC 2000 Profile II in 1-unit flight case . . . . P/N 90205610
2 MAC 2000 Profile IIs in a 2-unit flight case . . . . P/N 90205600
MAC 2000 Profile II E in 1-unit flight case . . . . P/N 90205810
2 MAC 2000 Profile II Es in a 2-unit flight case . . . . P/N 90205800
White MAC 2000 Profile II in a 1-unit flight case (minimum order – 10 pieces) . . . . P/N 90205620
White MAC 2000 Profile II E in a 1-unit flight case (minimum order – 10 pieces) . . . . P/N 90205820