

PAL 1200 (E, FX)

user manual



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section 1

INTRODUCTION

Congratulations on your choice of the *PAL 1200*, *PAL 1200 E*, or *PAL 1200 FX*, designed and manufactured by Martin Professional. The PAL is a high performance automated profile luminaire that provides endless possibilities for lighting designers in a variety of applications. Rugged construction and high quality components ensure that your PAL will perform reliably for many years.

Common features

- Choice of Osram or Philips 1200 W discharge lamp.
- Remote lamp ON / OFF via controller.
- Highly efficient optical system with precision coated lenses ensures very high light output.
- Flat field using hot-spot elimination filter.
- Smooth and accurate movement.
- 287° pan by 85° tilt (10,200 by 1,504 positions).
- 8 and 16-bit pan/tilt tracking and vector protocols via DMX 512.
- 0 to 100% smooth dimming with micro-stepping resolution.
- CMY subtractive color mixing system for wide range of mixable colors.
- Instant color snaps and seamless fades.
- Excellent color uniformity.
- 4 rotating and indexible gobos, one fixed and one open.
- Standard D-size easily interchangeable.
- Motorized focus.
- 15° to 26° motorized zoom.
- Optional narrow angle (10.5° to 14°) or wide angle (20° to 36°).
- Variable motorized wash filter.
- Modular design for ease of servicing and flexibility.
- Easy access to serviceable parts.
- Adjustable mounting bracket with graduated scale (+70°/-60°).
- Control by DMX-512 and Martin RS-485 protocols.
- Simple digital address setting via control module with 4-digit LED display.
- Simple setting for pan and tilt invert, and pan/tilt swap.
- Digital read-out of lamp and fixture usage.
- Power Factor Correction for low current consumption.
- Silent fan cooling.
- Remote control of fan speed.
- Overheating protection.
- Access door cut-off switch.

The PAL 1200 and PAL 1200 E feature

- Four individually controlled profile shutters in a frame that swivels 45°.
- Five interchangeable dichroic color filters including color temperature corrector (CTC).
- Option for installing metal and glass gobos on color wheel.

The PAL 1200 FX features

- 5% to 100% motorized iris.
- 2 additional rotating and indexible gobos.
- 2 additional fixed gobos.
- Rotating 3-facet prism.

The PAL 1200 E features

- Flicker-free operation suitable for digital and high-speed television cameras.
- Power-saving standby mode.

About this manual

This manual covers the following fixtures:

- The *PAL 1200* with automated framing shutters and magnetic ballast
- The *PAL 1200 E* with automated framing shutters and electronic ballast
- The *PAL 1200 FX* with iris and additional rotating effects and magnetic ballast

“PAL” is used in this manual when describing features or procedures common to all 3 models.

The software versions are shown below. Update information and the latest documentation is available from the Martin web site at <http://www.martin.dk>.

Device	PCB	Designator	PAL 1200, PAL 1200 E		PAL 1200 FX	
			Software version	P/N	Software version	P/N
CPU	Receiver	IC101	1.3	62122013	1.1	62122014
CPU	A-section	IC101	2.0	62122024	2.0	62122024
EPROM		IC102	2.0	62121021	1.2	62121023
CPU	B-section	IC101	2.0	62122024	2.0	62122024
EPROM		IC102	1.7	62121019	1.1	62121022

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.

To protect yourself and others 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.
- 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.

To protect yourself and others from 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.

To protect yourself and others from 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 0.5 meters (20 inches) away from the fixture. Keep flammable materials well away from the fixture.
- Do not illuminate surfaces within 1 meter (39 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 or mirror.
- The exterior of the fixture becomes very hot during operation. 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 (T_a) exceeds 40° C 104° F).

To protect yourself and others from injury due to falls

- When suspending the fixture above ground level, verify that the structure can hold at least 10 times the weight of all installed devices.
- Hang the fixture by the mounting bracket only: do not the carrying handles for primary or secondary attachment.
- 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.

section 3

BASIC INSTALLATION

Before operating the PAL you need to:

- Mount the pan/tilt unit.
- Remove the transport fixture.
- Fit the pan/tilt mirror.
- Install a lamp (not included).
- Fit a mains plug.
- Check voltage and frequency settings.
- Rig the fixture in its location.

The PAL comes complete with the following items:

- Hanging bracket
- Pan/tilt unit
- Pan/tilt mirror
- 5 meter XLR-XLR control cable
- User manual

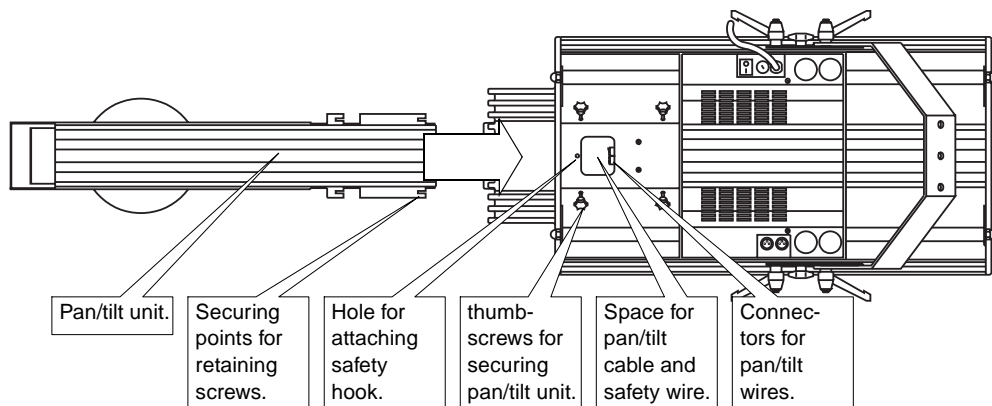
Mounting the pan/tilt unit

IMPORTANT

Never disconnect the pan and tilt cables while the PAL is under power. Doing so *will* damage the driver ICs.

This procedure is not required for units shipped from the factory in flight cases.

1. Release the four thumbscrews located on the top front of the PAL.
2. Attach the safety wire of the pan/tilt unit to the dedicated hole in the PAL body.
3. Connect the pan and tilt cables from the pan/tilt unit to the terminals on the body. Ensure that the connectors are pressed firmly into place.



4. Place the pan/tilt unit on top of the PAL so that the four securing points are right in front of the retaining thumbscrews. Verify that the pan/tilt cable and the safety wire fit properly in the space under the pan/tilt shaft.
5. Slide the pan/tilt unit towards the rear of the PAL so that the securing points and the thumbscrews slide into one another. Tighten the thumb screws.

To remove the pan/tilt unit, follow the above procedure in the reverse order.

Removing the transport fixture

In order to protect the pan/tilt assembly from becoming damaged during shipment it has been secured with black plastic straps. Cut and remove these plastic straps.

Fitting the mirror

1. Release the two thumbscrews on the tilt motor.
2. Place the mirror on the tilt motor.
3. Tighten the two thumbscrews.
4. Carefully remove the surface protection foil from the mirror.

Installing the lamp

WARNING!

Make sure that the fixture is isolated from the mains supply.

The PAL may be used with either the Osram HSR 1200 or the Philips MSR 1200 lamp.

1. Remove the three screws that secure the access plate of the lamp socket assembly at the rear of the PAL and withdraw the lamp socket assembly.
2. Hold the lamp by the ceramic parts, avoiding touching the glass part with your fingers, and carefully insert it into the lamp socket. If you accidentally touch the glass part with your fingers you must clean it thoroughly with the cleaning cloth supplied with the lamp. You can also use a clean lint free cloth wetted with alcohol.
3. Replace the lamp socket assembly, ensuring that the lamp locates properly into the aluminum reflector, and tighten the Philips screws.

NOTE: The lamp position is adjusted at the factory, however, re-adjustment may be necessary to optimize the light output and the color uniformity with the CMY (Cyan, Magenta, Yellow) system. Please refer to “Optimizing the lamp alignment” on page 21.

Fitting the mains plug

The PAL is delivered from the factory without a plug on the mains cable. You will have to fit a plug that conforms to your local mains outlet. The double-insulated mains cable contains three wires.

1. Connect the BROWN wire to the LIVE pin.
2. Connect the BLUE wire to the NEUTRAL pin.
3. Connect the YELLOW/GREEN wire to the EARTH pin.

Checking voltage and frequency settings

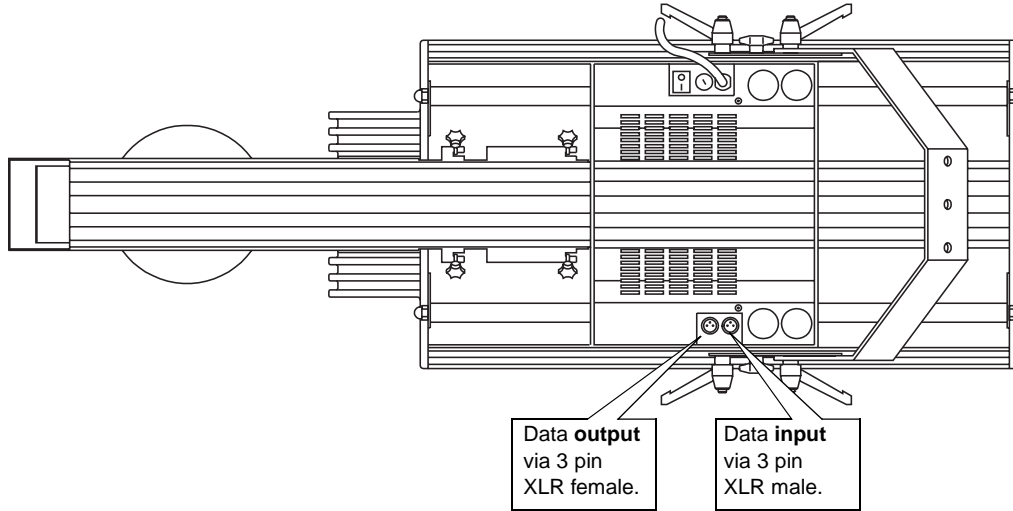
It is vital that both voltage and frequency settings of the PAL match the local power supply. If this is not the case, you will have to rewire the fixture as described under “Voltage and frequency settings” on page 22. The factory setting of voltage and frequency is printed on the serial number label at the back of the fixture.

Rigging the PAL

You can now rig the fixture by means of its mounting bracket. The PAL has a graduated scale on each side of the body which allows you to align it with other fixtures. The mounting bracket allows you to tilt the fixture from 70° up to 60° down. Use the lever handles on the sides to lock the fixture into the desired angle.

section 4 CONNECTING THE CONTROLLER

All effects in the PAL are fully DMX-512 and Martin RS-485 implemented. Control data is transmitted from the controller's output, via XLR data link cables, to the data input on the PAL. The data output on the PAL allows the serial data link to be continued to additional lights, and this way up to 32 fixtures can be connected on the same data link.



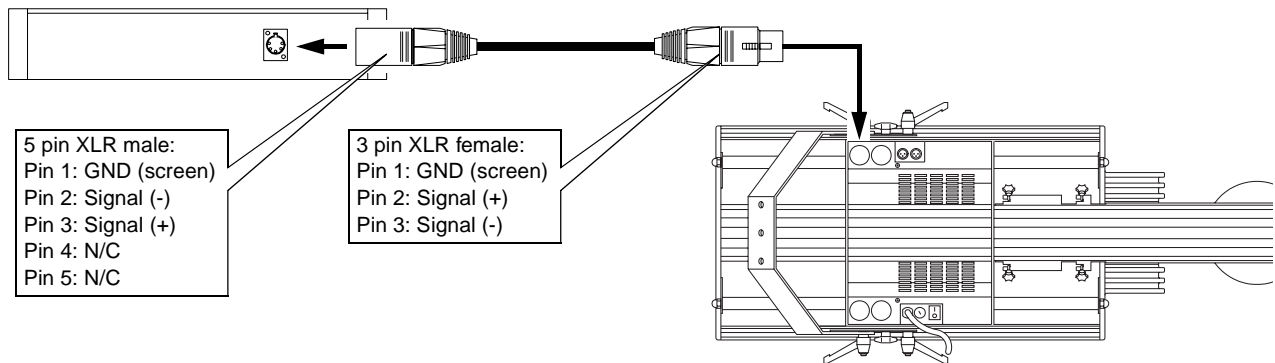
Connecting the serial link

USING THE PAL AND OTHER MARTIN LIGHTS ONLY

1. Connect the data output of your lighting controller to the data input on the PAL.

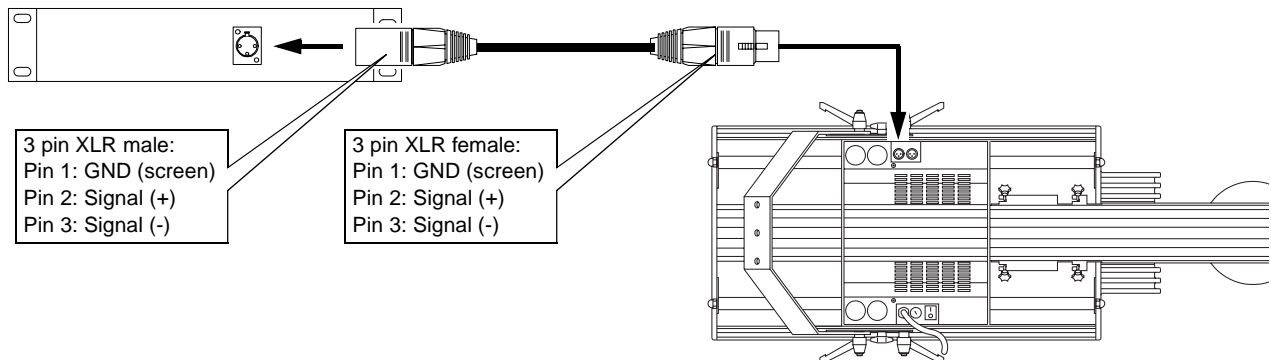
DMX Controller

with standard 5 pin XLR output.



Martin Controller

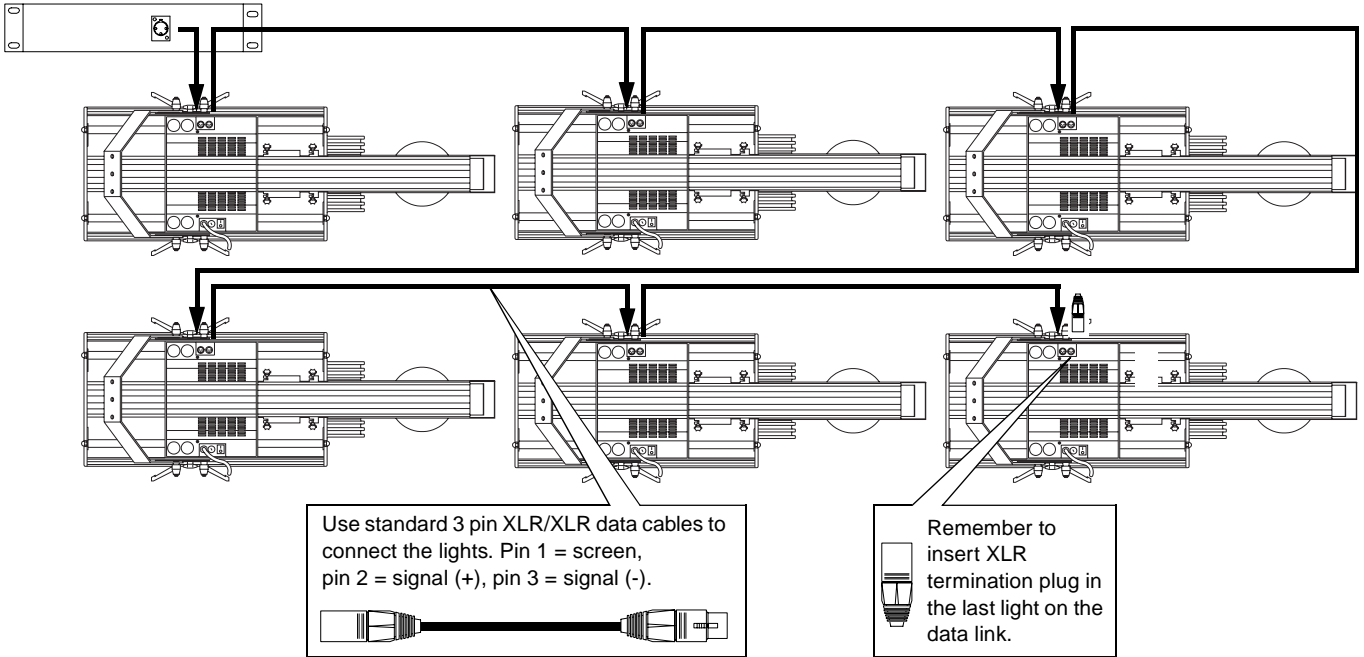
with standard 3 pin XLR output.



MARTIN CONTROLLER: Use the XLR-XLR or DSUB-XLR cable supplied with the controller.

DMX CONTROLLER: Most DMX controllers have 5 pin XLR sockets for data output. For this reason you must use a cable that adapts from the 5 pin DMX output to the 3 pin XLR input on the PAL. The following figure shows the proper connections in such a cable (P/N 11820003). Note that the (+) and (-) signal wires are reversed between the output of the DMX controller and the input of the PAL.

2. Connect the data output of the first PAL to the data input of the next using the XLR-XLR cable supplied with the PAL.
3. Continue the link this way, always connecting output to input (daisy-chain), until all fixtures are linked together (max. 32 per data link).



4. Finally, insert a male XLR termination plug in the free output socket of the last light on the link.

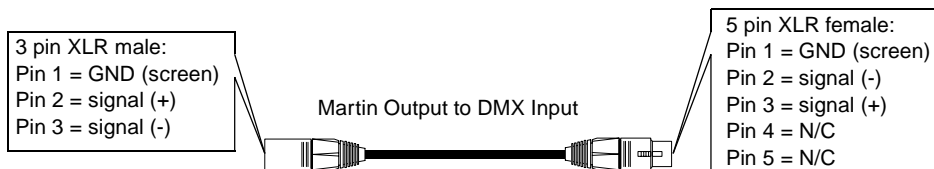
MARTIN CONTROLLER: Use the 120 Ω termination plug supplied with the controller.

DMX CONTROLLER: Use a 3 pin XLR male plug with a 120 Ω resistor between pins 2 and 3.

NOTE: It is very important to insert the termination plug to ensure correct and error-free communication between the controller and the fixtures.

INSERTING NON-MARTIN DMX LIGHTS

If you are using a DMX controller it is possible to insert non-Martin lights, using 5 pin XLRs in and out, on the link. In this case you will need a cable that adapts from the 3 pin XLR female output on the preceding Martin light to the 5 pin XLR male input on the next non-Martin DMX light. The connections in such a cable (P/N 11820002) are shown in the following figure.



Addressing the PAL

The control module on the left side of the PAL allows you to assign the fixture address, which is defined as the first channel from which the PAL responds to the controller. Depending on which DMX mode you selected, the PAL requires more or less channels for control. E.g., if the particular DMX mode requires 22 channels and you address the fixture to channel 1, it will use channels 1 to 22. You must address the PAL fixtures according to your controller configuration, or vice versa, ensuring no channels are being used by more than one fixture. If two or more fixtures of the same type share the same address they will perform identically.

1. Switch on the PAL1200 (E) and wait until the reset has finished (see 'Switching On' below).
2. Press [menu] once to access the main menu and browse through the options, using the arrow keys, until the display shows 'dAdr' or 'Adr' depending on whether you want to assign the fixture a DMX or Martin address, respectively. Confirm by pressing [enter].
3. Use the arrow keys to select the desired address and confirm by pressing [enter].

The DMX channel requirements are listed in the following table. The PAL requires 2 channels when operated via a Martin RS-485 controller.

DMX Mode	Mode 1	Mode 2	Mode 3	Mode 4
Pan / tilt resolution	8 bit	16 bit	8 bit	16 bit
control	Tracking		Tracking / Vector	
PAL 1200, PAL 1200 E	22 channels	24 channels		26 channels
PAL 1200 FX	16 channels.	18 channels		20 channels

Switching on

After switching on, the PAL will index all effects and return these to their default positions. Some effects use a mechanical indexing method causing some noise. This noise is completely normal and only lasts for a short period of time. The display on the side of the fixture will show the software versions installed in the PAL and then advance to protocol auto-detect. As soon as data is transmitted from your controller, the PAL automatically detects whether it is a Martin RS-485 or DMX 512 controller and responds accordingly. When this occurs the display reads "PASS."

Operating the fixture

If you are using a Martin RS-485 controller then please refer to that controller's manual for further operating instructions. If you are using a DMX 512 controller then please refer to the DMX 512 protocol listed in appendix A of this manual. The functions are briefly described under "REMOTELY CONTROLLABLE FUNCTIONS" on page 11.

NOTE: The PAL is fitted with a remotely operated lamp relay, allowing the lamp to be switched on and off via the controller without affecting other functions of the fixture. However, after switching on the PAL, the lamp itself remains OFF until a 'Lamp ON' command is sent from the controller. Any attempt to start the lamp within 4 minutes after having switched it off, will be ignored by the lamp circuit, however, the PAL stores the instruction and automatically ignites the lamp once the 4 minute period has expired. This is to ensure a safe strike of the lamp.

When switching on the lamp, the PAL draws a surge (peak) current which may be several times the normal operating current. For this reason, it is suggested that you program a 'Lamp On' sequence at the controller, which will turn on the lamps one at a time with an interval between each 'Lamp On' command of approximately 5 seconds.

section 5

REMOTELY CONTROLLABLE FUNCTIONS

This section briefly describes the various functions that can be remotely controlled via the serial data input on the fixture.

LAMP

The PAL uses the Philips MSR 1200 or the Osram HSR 1200 lamp and is fitted with a relay that allows the lamp to be switched on and off via the controller. After switching on the PAL, the lamp itself remains OFF until a 'Lamp ON' command is sent from the controller. Any attempt to start the lamp within 4 minutes after having switched it off will be ignored by the lamp circuit. However, the PAL stores the instruction and automatically ignites the lamp once the 4 minute period has expired.

When switching on the lamp, the PAL draws a surge (peak) current which may be several times the normal operating current. For this reason, it is suggested that you program a 'Lamp On' sequence at the controller, which turns on the lamps one at a time with an interval between each 'Lamp On' command of approximately 5 seconds. This is to ensure a safe strike of the lamp.

NOTE: To avoid accidentally switching off the lamp, the 'Lamp Off' feature is only supported by DMX-512 if enabled on the control module (see "LAMP OFF VIA DMX (LoFF)" on page 14) or if cyan, magenta and yellow channels are set to a certain value (see appendix A).

MOVEMENT

The pan/tilt mirror on the PAL allows you to move the beam to any desired position within the range of 287° by 85° and micro stepping control of the motors ensures smooth and accurate movement at all speeds. 10,200 positions on pan and 1,504 positions on tilt can be achieved when using either a Martin controller or 16-bit pan/tilt resolution via DMX. Selecting the B/O speed will blackout the fixture whilst moving the mirror.

COLOR WHEEL

The color wheel offers five easily interchangeable dichroic color filters, plus an open white position. The B/O speed will blackout the fixture whilst changing from one color to another.

CMY - COLOR MIXING

The CMY color mixing system is based on three sets of color flags: Cyan, Magenta and Yellow. These filters can be adjusted individually between 0 and 100%. A wide range of colors can be produced by proportionally inserting one or two of the three color flags at the same time. The precise color is determined by the percentage (0 to 100%) of each color flag which is applied. Instant color changes are achieved when programming the color flags with a high speed. Slower speeds provide a smooth cross-fade from one color into another. Please note that an optimized lamp adjustment is very important for perfect color uniformity across the beam.

ROTATING GOBOS

Four rotating, indexable gobos, two fixed and one open, can be selected. All rotating gobos are bi-directional and can be programmed to any desired orientation. The B/O speed blacks out the fixture whilst changing the gobo or the orientation of the gobo.

ROTATING EFFECTS (PAL 1200 FX)

Three rotating indexable gobos/effects, one fixed and one open, can be selected. All rotating effects are bi-directional and can be programmed to any orientation. The B/O speed blacks out the fixture whilst changing gobos or orientation.

DIMMER/SHUTTER

High resolution, 0 to 100% smooth dimming is provided by the combined dimmer/shutter system. Use a high speed for dimming if you wish to open or close the dimmer/shutter instantly.

FOCUS

Motorized focus allows remote focusing at any time.

ZOOM

Motorized zoom allows you to vary the beam angle between 15 and 26°.

FRAMING SHUTTERS (PAL 1200, PAL 1200 E)

Four shutters, each individually controlled by two motors, allow you to produce almost any desired frame. In addition, the entire frame can be swivelled +/- 22.5° from the default position.

IRIS (PAL 1200 FX)

The beam diameter can be reduced from 100% to 5% using the motorized iris.

VARIABLE WASH

Inserting the wash filter produces a wash-light effect. The effect of the wash filter can be varied over a wide range depending on the proportion of the filter used.

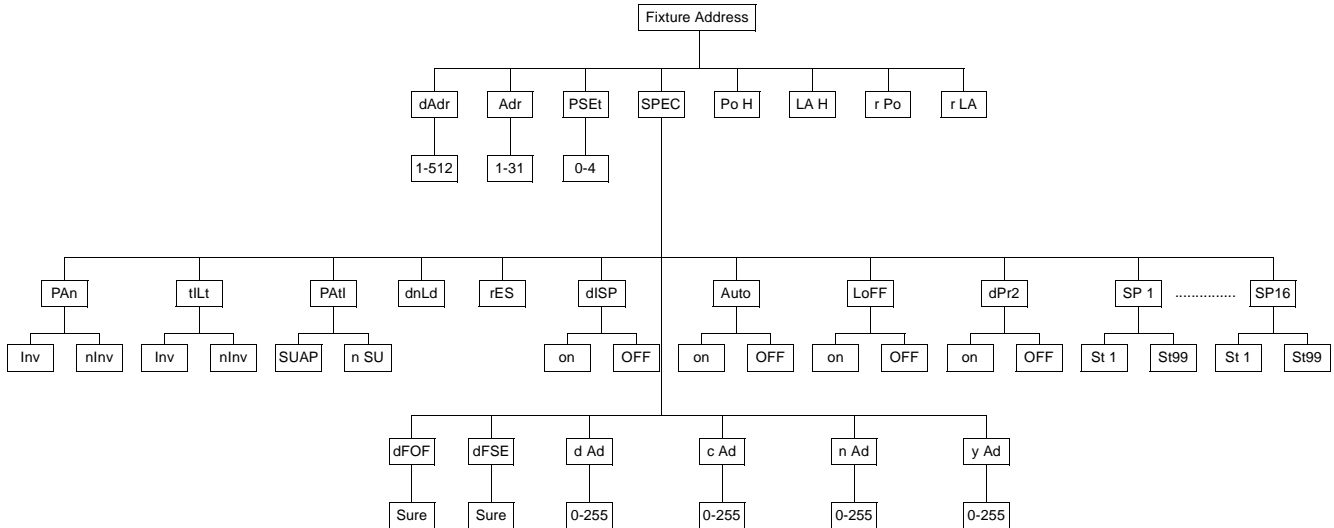
FAN

The PAL is efficiently cooled by means of its low-noise axial fans. It is possible to reduce fan speed should extremely silent performance be required. Low fan speed reduces the cooling of the fixture and should only be used when the ambient temperature is 25°C or lower. If the temperature inside the fixture exceeds a certain level (the cut-out threshold), a built-in thermostat automatically switches off the lamp. This situation, **which should be avoided**, may occur if the fixture is operated with low fan speed over a long period of time in high temperature surroundings.

NOTE: When switching off the lamp, the fans automatically power off after 4 minutes.

section 6 CONTROL AND RECEIVER MODULE

The control and receiver module on the side of the PAL offers several useful features. You can set the fixture address, read out lamp and fixture usage, enable special features etc. The main-menu is accessed by pressing the [menu] key and can be browsed using the [up] and [down] keys. The menu hierarchy is shown in the following diagram, which includes the 'SPEC' sub menu.



Main functions

DMX 512 ADDRESS (dAdr)

Use the arrow keys to select the fixture address when using a DMX-512 controller and press [enter] to confirm or [menu] to cancel. Either way you will return to the main menu.

MARTIN RS-485 ADDRESS (Adr)

Use the arrow keys to select the fixture address when using a Martin RS-485 controller and press [enter] to confirm or [menu] to cancel. Either way you will return to the main menu.

PROTOCOL SET-UP (PSEt)

After switching on the PAL, it automatically detects whether the controller is transmitting DMX 512 or Martin RS-485. If a DMX controller is detected the PAL defaults to the DMX protocol (1, 2, 3 or 4) selected in the protocol setup (PSEt). The table below shows the difference between the four available DMX protocols. If a Martin controller is detected the PAL automatically switches to protocol 0, which is the Martin RS-485 protocol.

Use the arrow keys to select the desired protocol and press [enter] to confirm or [menu] to cancel.

DMX Mode	Mode 1	Mode 2	Mode 3	Mode 4
Pan / tilt resolution	8 bit	16 bit	8 bit	16 bit
control	Tracking		Tracking / Vector	
PAL 1200, PAL 1200 E	22 channels	24 channels	26 channels	
PAL 1200 FX	16 channels.	18 channels	20 channels	

FIXTURE USAGE (Po H)

This option provides a read-out of the total number of hours the PAL has been powered on.

LAMP USAGE (LA H)

This option provides a read-out of the total number of hours the lamp has been used.

FIXTURE USAGE - RESETABLE (r Po)

As with the 'Po H' counter, this option provides a read-out of the number of hours that the PAL has been powered on. However, it is possible to reset this counter by keeping the [up] key pressed for approx. 5 seconds.

LAMP USAGE - RESETABLE (r LA)

As with the 'La H' counter, this option provides a read-out of the number of hours the lamp has been powered on. However, it is possible to reset this counter by keeping the [up] key pressed for approx. 5 seconds. Use this facility to reset the counter whenever replacing the lamp to keep track of lamp life.

Special functions (SPEC)

Selecting this function presents you with a sub-menu of special functions. As in the main-menu, you can browse through the options and select the one displayed by pressing [enter].

AUTOMATIC BLACKOUT OF DISPLAY (dISP)

Use the arrow keys to toggle between 'on' and 'off'. Select 'on' by pressing [enter], if you wish the display to blackout 2 minutes after the last press of any of the keys, in order to avoid audience distraction. Otherwise, select 'off'. The blackout function will not affect the appearance of error and information messages.

PROTOCOL AUTO-DETECT (Auto)

This option can be used to disable the protocol auto-detect function when switching on the fixture. Use the arrow keys to toggle between on and off. Select 'on', by pressing [enter], if you wish the protocol auto-detect function to be enabled after switching on the fixture, and 'off' if you wish to disable this function.

If protocol auto-detect is disabled (Auto = OFF) the PAL defaults to the protocol selected in the protocol set-up (0 = Martin, 1 = DMX1, 2 = DMX2, 3 = DMX3 or 4 = DMX4).

PAN INVERT (PAN)

This function allows you to invert the pan movement (DMX protocol only). Use the arrow keys to toggle between 'Inu' for inverted pan, and 'nInu' for non inverted and press [enter] to confirm or [menu] to cancel. Either way you will return to the SPEC-menu.

TILT INVERT (tiLt)

This function allows you to invert the tilt movement (DMX Protocol only). Use the arrow keys to toggle between 'Inu' for inverted tilt, and 'nInu' for non inverted and press [enter] to confirm or [menu] to cancel. Either way you will return to the SPEC-menu.

NOTE: If using the Martin 3032 Controller, pan and tilt invert can be enabled from the link configuration menu.

PAN AND TILT SWAP (PAtI)

This function allows you to swap the pan and tilt channels in DMX. Use the arrow keys to toggle between 'SUAP' for swapped protocols and 'n SU' for non swapped and press [enter] to confirm or [menu] to cancel. Either way you will return to the SPEC-menu.

DOWNLOAD (dnLd)

For factory programming only - do not use.

RESET OF RECEIVER MODULE (rES)

Pressing [enter] on this option resets the receiver CPU and activates the protocol auto-detect function.

LAMP OFF VIA DMX (LoFF)

This option allows you to enable/disable the 'Lamp Off' function via DMX. Use the arrow keys to toggle between 'on' and 'off' and select 'on' by pressing [enter] if you wish to enable this feature and 'off' if you wish to disable the feature.

SPECIAL DMX PROTOCOL (dPr2)

This option applies for the PAL 1200 and PAL 1200 E only - not the PAL 1200 FX - and should be enabled only when operated by MA Lighting's "Scancommander". The 'dPr2' option reconfigures the DMX channel configuration, thus enabling the Scancommander to control the PAL 1200 as if it were two individual fixtures (consult appendix A for the DMX channel configuration). The protocol may be suitable for other lighting controllers with limitations in terms of the number of DMX channels available per fixture.

Use the arrow keys to toggle between 'on' and 'off' and select 'on' by pressing [enter] to enable 'dPr2'.

CALIBRATION OF DIMMER AND COLOR MIXING (d Ad, c Ad, n Ad, y Ad)

This function allows you to calibrate the dimmer and color mixing systems, thus allowing several PALs to dim out at precisely the same value and produce equal colors when set to the same values. The procedure is quite simple and the same for both dimmer and color mixing. First, line up the PALs you wish to calibrate. Then select the relevant calibration parameter (d Ad = dimmer, c Ad = cyan, n Ad = magenta, y Ad = yellow) and use the arrow keys to adjust each individual fixture until they all produce the same output (the values can be set between 1 and 255). Finally, store the calibration by pressing [enter].

DEFAULT/CLEAR SETTINGS (dFSE)

This function will restore all receiver module settings (such as pan/tilt swap, pan invert, tilt invert etc.) to the factory default setting. The default function needs to be confirmed by pressing [enter] when the display reads “SurE” (sure?). Once all settings are reset to default, the display shows “donE” (done). NOTE: This function will not clear calibrations of dimmer, cyan, magenta and yellow.

DEFAULT/CLEAR CALIBRATIONS

This function clears the calibrations of dimmer, cyan, magenta and yellow. The default function needs to be confirmed by pressing [enter] when the display reads “SurE” (sure?). Once all registers are cleared, the display shows “donE” (done).

SPECIAL SEQUENCES (SP 1 to SP20)

Up to 20 special service and adjustment sequences are available. These are mainly used for servicing purposes. After selecting a sequence, use the arrow keys to step through the sequence. Press [menu] twice to return to the SPEC-menu. Please consult appendix C for a full description of the sequences.

Error and information messages

The following error messages may appear on the display: Please consult appendix E for full information.

Display Read-out	Message
LErr	Lamp error
ErAb	A/B module error
ErrA	A module error
ErrB	B module error
ShEr	Short error
TErr	Time keeper error

HOT MESSAGE (Hot)

This message appears if you attempt restrike the lamp within 4 minutes after having switched it off. The PAL stores the ‘Lamp On’ instruction and re-ignites the lamp once the 4 minute period has expired.

Auto / address and PASS

After having switched on the PAL it will default to protocol auto-detect mode which is indicated by the display switching between ‘Auto’ and the previously used fixture address. The message ‘PASS’ appears for about half a second when the protocol version (Martin or DMX) has been detected and communication between the electronics modules verified.

section 7 REPLACING GOBOS AND COLOR FILTERS

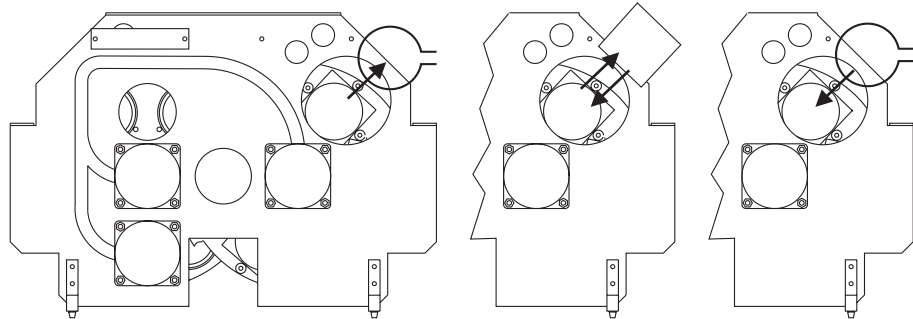
WARNING!

Before attempting any of the following, ensure that the fixture is isolated from mains.

COLOR FILTERS

The PAL uses 52 mm square dichroic color filters, all easily interchangeable. You can also fit D-size gobos on the color wheel. To hold these in place you will need a specially made metal frame (P/N 17320130)

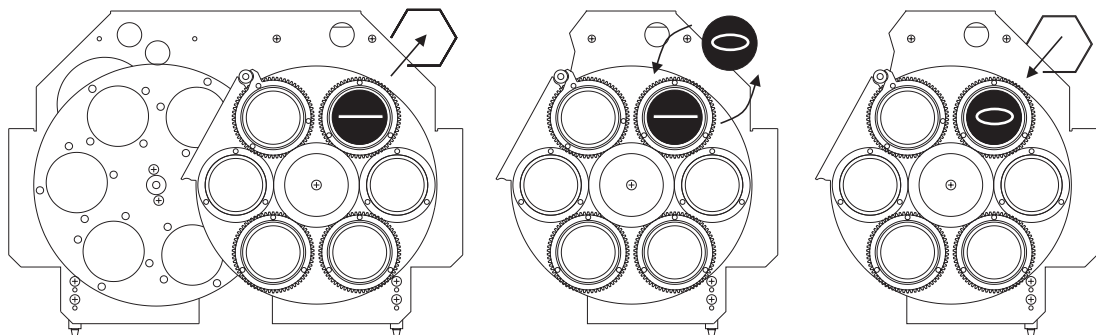
1. Access and remove the color/gobo module as described on page 19.
2. Turn the color wheel until the color filter you wish to replace becomes accessible. The color filter is held in place by a spring. Remove the spring by pressing the two ends together, then remove the color filter.
3. Insert the new color filter and replace the spring. .



GOBO INSTALLATION

The PAL uses standard D-size metal gobos or glass gobos with overall diameter between 49.5 mm and 50.0 m. Both types are easily interchangeable. Custom made glass gobos should have the same image size as a standard D-size gobo, i.e. Ø 44 mm.

1. Access and remove the color/gobo module as described on page 19.
2. Turn the gobo wheel until the gobo you wish to replace becomes accessible.
3. The gobo is held in place by a spring. Remove this spring by pressing the two ends together, then remove the gobo.
4. Insert the new gobo and replace the spring.

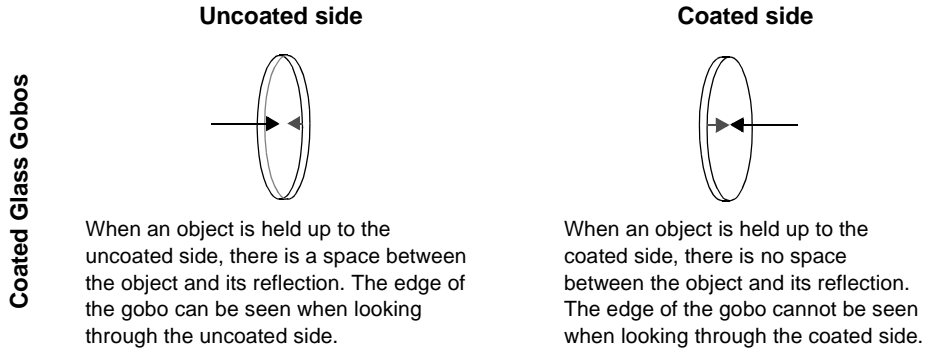


GOBO ORIENTATION

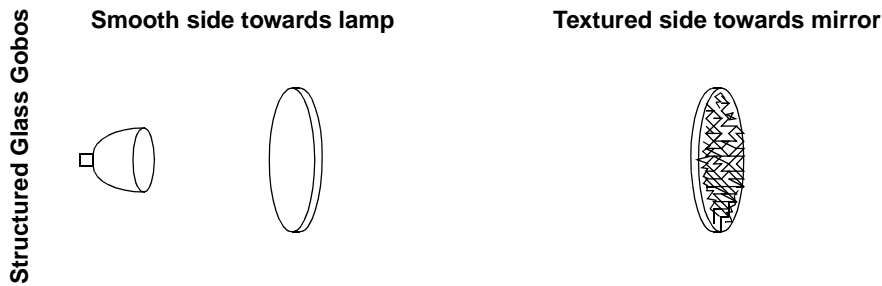
As a general rule, install gobos with the most reflective side towards the lamp in order to minimize heat buildup.

Heat buildup is typically not a problem when installing coated glass gobos in the PAL. Chrome-coated glass gobos, however, should be installed with the coated surface facing the lamp if the optional condenser lens is installed.

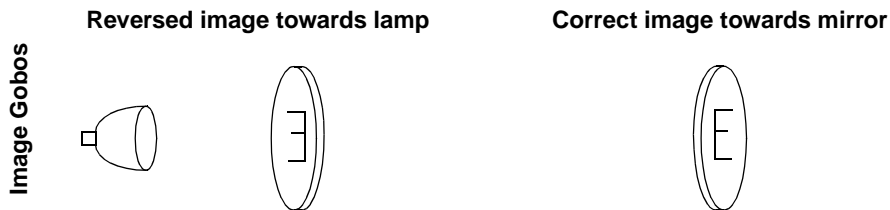
Otherwise, glass gobos may be inserted however necessary to achieve correct projection or best focus. On the color/gobo module, best focus is achieved when the coated side faces the mirror. Gobos on the effect wheel (PAL 1200 FX), however will morph better if they are installed with the coated side towards the lamp. Correct projection is achieved when the true image faces the mirror.



Textured glass gobos must be installed with the smooth side facing the lamp.



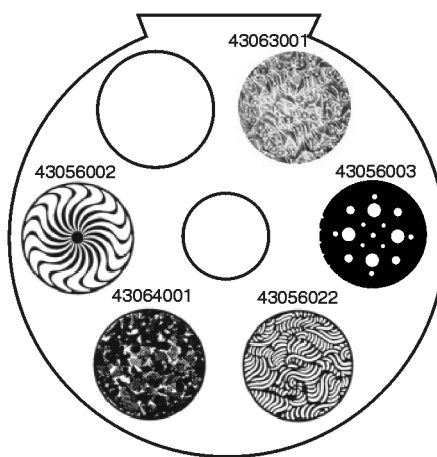
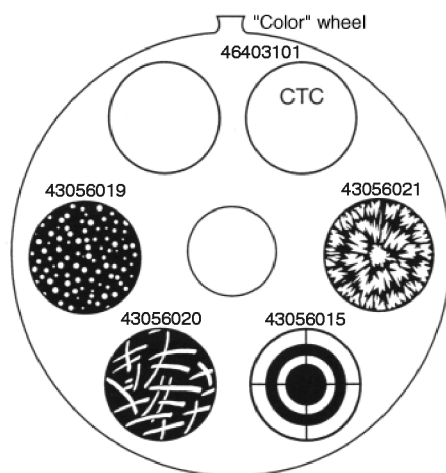
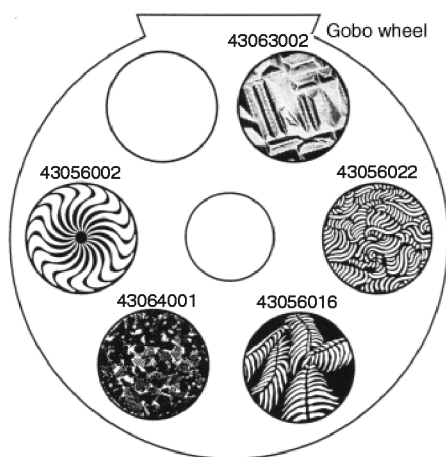
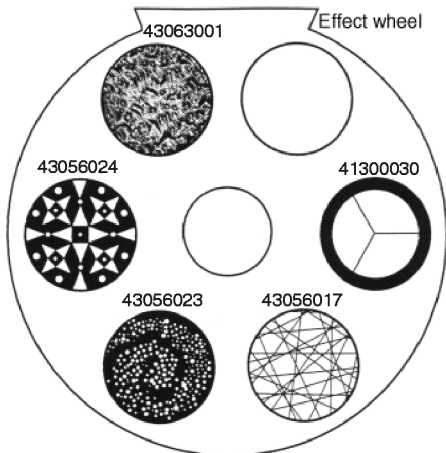
Logos and other images should be installed with the image facing the mirror.



DEFAULT GOBO LAYOUT

PAL 1200 FX

PAL 1200



section 8

MAINTENANCE AND BASIC SERVICE

With regular maintenance you can ensure that the PAL performs at its optimum without interruptions. Dirty lenses and filters reduce the brightness and diffuse the projected image. Cooling fans covered by dust may cause overheating, thus causing the thermostat to cut out the lamp intermittently. This section not only takes you through the general maintenance procedures, but also describes some basic service operations which you can carry out yourself.

IMPORTANT!

Read the following descriptions carefully before attempting to make any adjustments whatsoever. If you do not feel completely competent to make the corrections you should consult qualified service personnel for assistance.

Removing and replacing modules

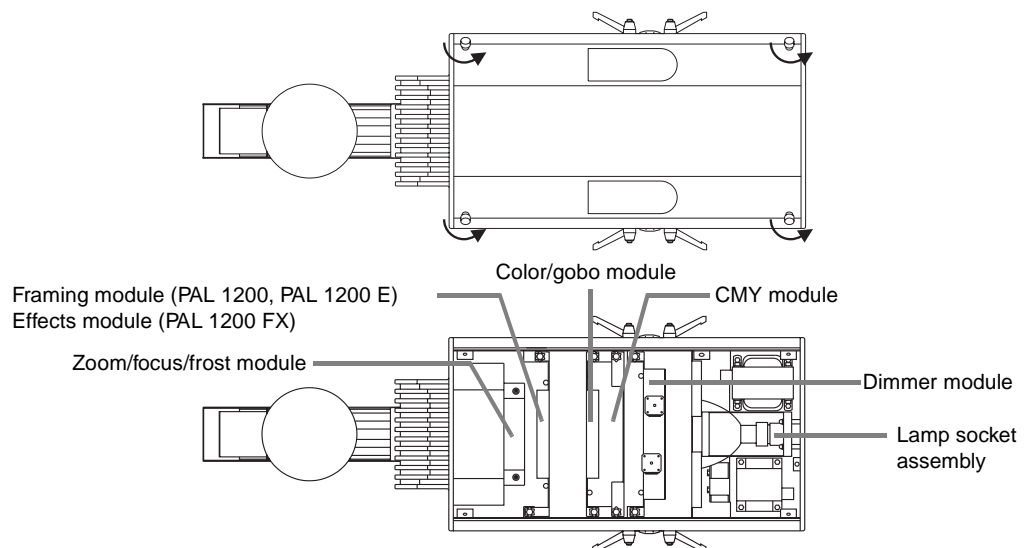
The PAL has been designed with ease of servicing and maintenance in mind and is constructed in a totally modular fashion. If there is a problem in any particular section, or you want to put in your own custom gobos or color filters, or you need to clean parts of the fixture, it is a simple operation to remove and replace any module.

WARNING!

Ensure that the fixture is disconnected from mains power before proceeding.

REMOVING A MODULE

1. The bottom cover is secured by means of four 1/4-turn fasteners. Release the cover by turning the fasteners counter clockwise, and then remove the cover downwards, thus revealing the inside of the fixture (see diagram on next page). As you remove the cover you will notice that a safety wire secures it to the chassis. You may leave the cover hanging on the safety wire while servicing the fixture.



2. Locate the module that you wish to remove from the fixture. You will see that there are some PCB connectors connecting the module to a wiring loom. Remove these connectors taking care to note the location and direction of each one.
3. On each side of every module there is a thumbscrew. Unscrew these and carefully pull the module straight out of the fixture.

REPLACING A MODULE

To replace a module simply reverse the steps above. Make sure that the module is straight and locates properly: there are two pins on the top of the module that fit in holes in the inner casing.

PAL 1200 FX note: The PAL 1200 FX uses the same wiring harness as the PAL 1200 so that either unit may be converted to the other. Connect the wires to the effect module as follows.

Wire	Effects module terminal (PAL 1200 FX)
KN1B	GOBO
K-WHEEL	R-GOBO
KN3B	IRIS
KN4A	unlabeled right connector
KN1A, KN2A, KN3A, KN2B	unlabeled left connectors (any order)
KN4B	Do not connect

Cleaning the optical path

Be very careful when cleaning the optical components (color filters, glass gobos, lenses, reflector and mirror). The colored surface on the filters is achieved by means of special multi-layer coatings and even small scratches in these might be visible. Use only a clean, soft and lint-free cloth like the ones used for cleaning camera lenses. You may need to wet the cloth with a non-aggressive glass cleaning liquid if the filters or lenses are greasy. It may also be necessary to clean the gobos and shutter blades and special care should be taken not to damage these fragile parts.

DIMMER MODULE

Remove the dimmer module and clean the heat reflection filter on both sides.

CMY MODULE

Remove the CMY module and carefully clean:

- All six color filters.
- The diffusion filter (if mounted).

COLOR/GOBO MODULE

Remove the color/gobo module and carefully clean:

- The color filters. The color filters can easily be removed from the color wheel to ease cleaning.
- The gobos. If you have used the gobo indexing facility in your lighting programs then do not remove the gobos from the wheel whilst cleaning these. Otherwise, you will need to reprogram all scenes with indexed gobos, if you are not able to replace the gobo in exactly the same position.
- The condenser lens (if mounted).

PROFILE MODULE

Remove the module and carefully clean all four profile shutters.

FOCUS/ZOOM MODULE

It is recommended to leave the focus /zoom module in the fixture when cleaning the lenses.

PAN/TILT MIRROR

The PAL uses a front coated mirror to ensure a sharp and un-distorted image. Clean the reflective side of the mirror using a soft, lint-free cloth wetted with a non-aggressive glass cleaner.

FANS

To ensure proper cooling of the fixture it's important that the fans are free of dust. Clean the fans if the air flow seems to be reduced. The fan grill at the rear end of the fixture can be removed by unscrewing the 3 Phillips screws that secure it to the back plate.

Replacing the lamp

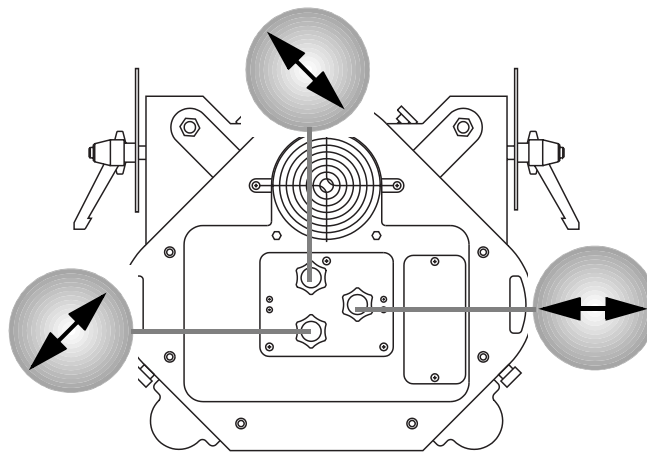
Discharge lamps operate under high pressure. As the lamp ages the glass envelope becomes more fragile and the risk of lamp explosion increases. Therefore it is strongly recommended that the lamp be replaced before its rated average life has been exceeded by 25%.

The procedure for installing the lamp is described on page 7. The position of the lamp-holder may need to be re-adjusted to ensure optimum performance when the PAL is installed in its permanent site. The adjustment procedure follows.

Optimizing the lamp alignment

After lamp replacement it may be necessary to optimize the lamp adjustment. Thanks to some built-in sequences this adjustment can be made without connecting a controller to the PAL. However, should you prefer to do the adjustment using a controller you may do that as well.

1. Switch on the PAL and wait until the reset has finished.
2. Via the control module select sequence 'SP 2', thus igniting the lamp. Before you continue with the next step you should wait approx. 5 minutes until the lamp has reached full brightness.
3. Select sequence 'SP 4', step 'St 1'. This leaves you with an open white gobo focused to approx. 5 meters.
4. Carefully move the mirror by hand so that the image is projected onto a flat surface.
5. On the back of the fixture there are three lamp adjustment screws (see following diagram). Turning these clockwise will pull the lamp towards the rear of the lamp housing, and vice versa. Center the hot-spot (the brightest part of the image) by using the three adjustment screws. When only using one screw at a time you will drag the hot-spot diagonally across the projected image. If you are using the standard optical configuration with diffusion filter, and without the condenser lens mounted, there is practically no hot-spot. In that case adjust the lamp until you achieve an even distribution of the light all over the image.
6. If you are not satisfied with the light output you can try to adjust the lamp further by turning all three adjustment screws a quarter turn clockwise, making sure that the hot-spot remains centered. If the result is an improvement then repeat this procedure until there is no more improvement. If the light-output is reduced then turn the adjustment screws a quarter turn counter clockwise and observe the result. Proceed this way as long as the result is an improvement.



7. Select step 'St 2' from the currently selected sequence (SP 4) thus inserting all three sets of CMY flags into the beam. Now, make slight adjustments to the screws until the PAL projects an almost uniform color across the entire image. Please note that if you are using an optical configuration without the diffusion filter and/or with the condenser lens fitted, you will not be able to achieve a completely uniform color projection.

Voltage and frequency settings

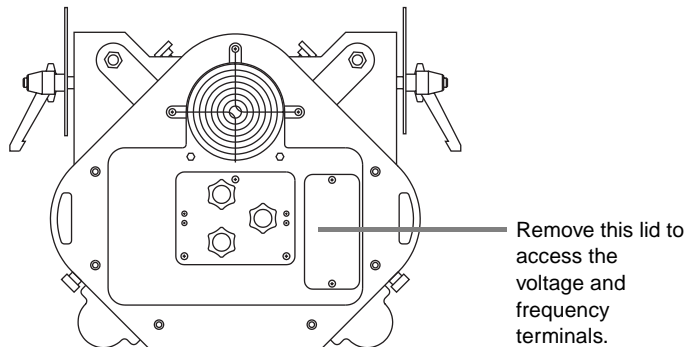
The PAL has five voltage settings and, except for the PAL 1200 E, two frequency settings (50 or 60 Hz) that can be selected in any combination. To ensure safe and proper operation, it is vital that those settings match the local power supply. The following table lists the correct voltage settings according to the mains supply.

Magnetic ballast: PAL 1200, PAL 1200 FX		Electronic ballast: PAL 1200 E	
Local AC voltage	Voltage setting	Local AC voltage	Voltage setting
95 - 110 V	100 V	95 - 110 V	100 V
110 - 130 V	120 V	110 - 130 V	120 V
200 - 220 V	210 V	207 - 225 V	218 V
220 - 240 V	230 V	225 - 240 V	230 V
240 - 260 V	250 V	240 - 260 V	250 V

WARNING!

Ensure that the fixture is disconnected from mains power before proceeding.

1. Remove the two Phillips screws which secure the small cover over the voltage and frequency terminals at the rear end of the fixture.



2. Connect the brown wire labelled 'V' to the correct voltage terminal (see the table above).
3. (PAL 1200, PAL 1200 FX) Connect the brown wire labelled 'F' to the correct frequency terminal.
4. Replace and secure the small cover again.

Regenerating malfunctioning lamps

Discharge lamps may not strike if the mains voltage applied to the fixture is too low (this could happen in areas with substantial voltage fluctuations). Instead of striking, the lamp burns with a faint blue arc, and after a period of time it becomes black on the inside. When this happens the lamp will refuse to strike even when mains voltage returns to normal level. However, in this situation it is possible to regenerate the lamp following the instructions below:

WARNING!

Ensure that the fixture is disconnected from mains power before proceeding.

1. Remove the two Phillips screws which secure the small cover over the voltage and frequency terminals on the rear end of the PAL (see previous section).

2. Locate the brown wire labelled 'V'. If this wire is connected to the 120V terminal then move it to the 100V terminal. If it is connected to the 230V or the 250V terminal then move it to the 210V or 230V terminal, respectively.
3. Switch ON and send a 'Lamp On' command to the fixture. If the lamp strikes let it burn at this voltage for approximately 5 minutes and then switch it off again.
4. The lamp will now be clear on the inside and ready to re-use at the normal voltage. Disconnect the fixture from the mains and re-connect the brown wire to the terminal where it was before.
5. Secure the cover over the voltage terminals before operating the fixture as normal.

If the lamp failed to start, then contact your local Martin dealer for assistance.

Reconfiguring the optical path

The optical system in the PAL can be configured to increase light output or eliminate the hot-spot. The following table lists the four different configurations that can be achieved. The first (#1) is the factory default configuration.

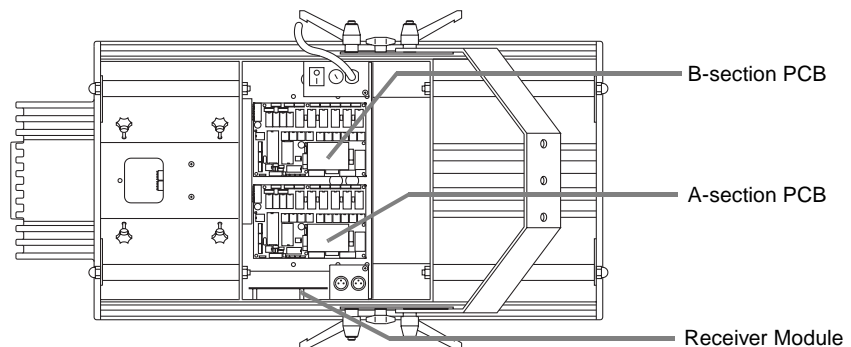
	Optical configuration			
	#1	#2	#3	#4
Hot-spot	none	some	little	evident
Light output	100%	138%	130%	163%
CMY uniformity	perfect	good	acceptable	acceptable
Condenser lens	no	yes	no	yes
Diffusion filter	yes	yes	no	no

You may remove or fit the condenser lens and diffusion filter in any combination you wish to obtain the desired performance. The condenser kit is available from your Martin dealer as P/N 91610004. The diffusion filter is mounted on the CMY module and the condenser lens on the color/gobo module.

Martin also provides an optional narrow (10.5° to 14°) and wide angle (20° to 36°) lens.

Accessing the electronics section

By removing the top cover from the PAL you will gain access to the printed circuit boards (PCBs). Please follow the instruction below.



WARNING!

Ensure that the fixture is disconnected from mains power before proceeding.

CAUTION!

The PCBs contain components which are sensitive to electrostatic discharges. To avoid damaging any components, always ensure that you touch the ground terminal before, and when, removing the PCBs or any component (CPU / EPROM) from a PCB.

1. Remove the two Phillips screws on the sides and the two on the top and then lift off the cover. You can now access the A and B-section PCBs.
2. To access the receiver module (see drawing above) you will first have to remove the four Phillips screws which secure it to the side panel of the fixture, and then carefully lift it upwards.

Replacing fuses

The PAL has 7 fuses - one primary and 6 secondary.

WARNING!

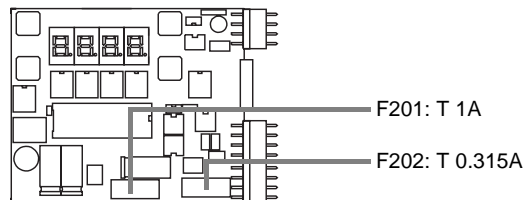
Ensure that the fixture is disconnected from mains power before proceeding.

MAINS SECTION

The primary fuse is located next to the mains-input cable and can be accessed by removing the fuse holder cap. The primary fuse is a T 20 A - 6.3 x 32 mm.

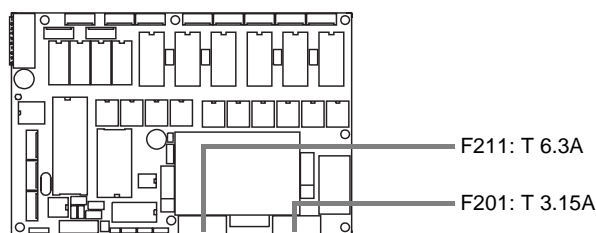
RECEIVER MODULE

There are two secondary fuses located on the receiver PCB as per the following diagram.



A-SECTION PCB / B-SECTION PCB

The A and B-section PCBs both have two secondary fuses located as per the following diagram.



Updating the software

It is possible to upgrade the software (EPROMs and CPU) in your PAL, should new features have become available since your purchase.

ORDERING SOFTWARE UPDATES

Upgrade software can be supplied by your Martin dealer, or, if you have the equipment to erase and program EPROMs, you can download the latest version of software from our Internet web site at <http://www.martin.dk>.

CPU software can be supplied only by your Martin dealer.

Please check with your Martin dealer, whether or not the particular software upgrade requires any mechanical changes to the PAL.

UPDATING A/B SECTION SOFTWARE (EPROM)

Having accessed the A and B-section PCBs, as described earlier in this section, you can now replace the EPROMs. Please follow the instruction below.

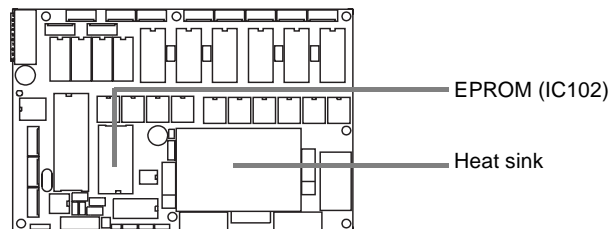
WARNING!

Ensure that the fixture is disconnected from mains power before proceeding.

CAUTION!

To avoid damaging the EPROM by electrostatic discharge you should touch the heat sink on the PCB (GND) before, and when, removing or inserting the EPROM.

1. On the A/B section PCBs remove the existing EPROM (IC102).
2. Place the new EPROM in the IC socket, ensuring that all pins enter the socket correctly, and that the EPROM is correctly oriented. Then press it firmly into the socket.



UPDATING THE RECEIVER MODULE

Having accessed the receiver module PCB, as described earlier in this section, you can now replace the CPU. Please follow the instruction below.

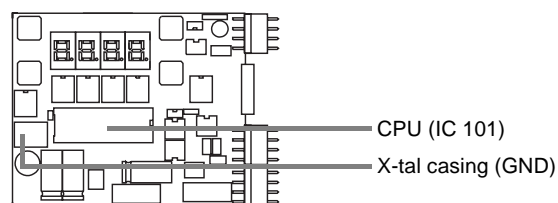
WARNING!

Ensure that the fixture is disconnected from mains power before proceeding.

CAUTION!

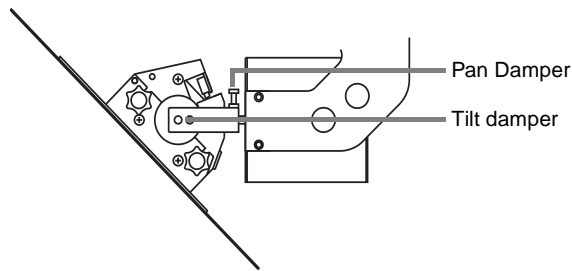
To avoid damaging the CPU by electrostatic discharge you should touch casing of the x-tal (GND) before, and when, removing or inserting the CPU.

1. On the PCB(s) remove the existing CPU (IC101).
2. Place the new CPU in the IC socket, ensuring that all pins enter the socket correctly, and that the CPU is correctly oriented. Then press it firmly into the socket.



Adjusting the mirror dampers

Re-adjustment of the pan and tilt dampers may be necessary after excessive use if the movement has become jerky at certain speeds. Adjustment is quite simple and can be carried out without need of any special tools.



1. Loosen both of the dampers, until the spring-loaded plastic pin is no longer touching the motor.
2. Using a controller, turn on the lamp and adjust the open gobo to a sharp focus.
3. Still using the controller, move the mirror from side to side at a slow speed and watch the beam movement. Tighten the pan damper until the smoothness of the mirror movement is affected and it becomes more 'twitchy'. At this point you should turn the dampers slightly back so that you restore the full smoothness of the mirror movement.
4. Similarly, adjust the tilt damper.

NOTE: If the dampers are set to a position that is too loose you will find that the mirror may lose steps when running at higher speeds. If the dampers are set to a position that is too tight you will find that it will affect the smoothness of the mirror movement at lower speeds.

appendix a DMX PROTOCOL

All features in the PAL are fully DMX implemented. When operating via DMX you can choose between the four modes listed in the table below. 'Tracking' mode means that speed of movement is determined by the slope (change in DMX value per time unit) generated by the DMX controller - the mirror is tracking this slope. When working in vector mode the speed is determined by a speed value set on a separate DMX channel. This channel also allows you to enable tracking mode instead. Tracking and Vector modes not only apply for mirror movement, but for all effects where the speed is variable.

DMX Mode	Mode 1	Mode 2	Mode 3	Mode 4
Pan / tilt resolution	8 bit	16 bit	8 bit	16 bit
control	Tracking		Tracking / Vector	
PAL 1200, PAL 1200 E	22 channels	24 channels	26 channels	
PAL 1200 FX	16 channels.	18 channels	20 channels	

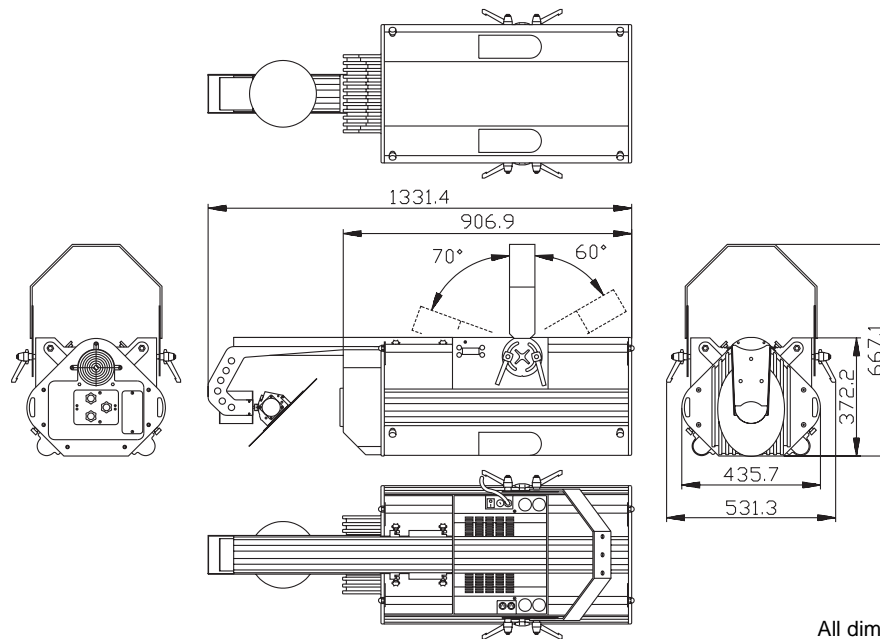
Each DMX channel in the PAL is used to provide several different functions depending on where it is set within 0-255 increments. The functions are described in the DMX protocol listed on the following pages.

DMX channel PAL 1200 FX				DMX channel PAL 1200, PAL 1200 E				Value	Function
M1	M2	M3	M4	M1	M2	M3	M4		
1 Note: Lamp Off will only take effect if 'SPEC'/'LoFF' is set to 'On', or if 'SPEC'/'LoFF' set to 'OFF' and all Cyan, Magenta and Yellow flags set between 230 and 232.				1 (10 with 'dPr2' = On) Note: Lamp Off will only take effect if 'SPEC'/'LoFF' is set to 'On', or if 'SPEC'/'LoFF' set to 'OFF' and all Cyan, Magenta and Yellow flags set between 230 and 232.				0 - 49 50 - 177 178 - 187 188 - 197 198 - 207 208 - 217 218 - 227 228 - 237 238 - 247 248 - 255	Strobe, Fan, Reset Fixture, Lamp ON/OFF No function Strobe on (Fast → Slow) No function Fan Low No function Reset Fixture No function Lamp ON (Power ON) No function Lamp OFF (Power OFF)
2				2 (11 with 'dPr2' = 'On')				0 - 255	Intensity 0 → 100%
-				3 (1 with 'dPr2' = 'On')				0 - 255	Profile shutter 1a Open → Closed
-				4 (2 with 'dPr2' = 'On')				0 - 255	Profile shutter 1b Open → Closed
-				5 (3 with 'dPr2' = 'On')				0 - 255	Profile shutter 2a Open → Closed
-				6 (4 with 'dPr2' = 'On')				0 - 255	Profile shutter 2b Open → Closed
-				7 (5 with 'dPr2' = 'On')				0 - 255	Profile shutter 3a Open → Closed
-				8 (6 with 'dPr2' = 'On')				0 - 255	Profile shutter 3b Open → Closed
-				9 (7 with 'dPr2' = 'On')				0 - 255	Profile shutter 4a Open → Closed
-				10 (8 with 'dPr2' = 'On')				0 - 255	Profile shutter 4b Open → Closed
-				11 (9 with 'dPr2' = 'On')				0 - 255	Profile orientation 22.6° CCW → 22.4° CW (128 = Neutral)
3				12				0-255	Cyan White → Cyan
4				13				0-255	Magenta White → Magenta
5				14				0-255	Yellow White → Yellow

DMX channel PAL 1200 FX				DMX channel PAL 1200, PAL 1200 E				Value	Function								
M1	M2	M3	M4	M1	M2	M3	M4										
6				15					Colors								
								0	All positions (tracking) White								
								33	Color 1								
								66	Color 2								
								99	Color 3								
								132	Color 4								
								167	Color5								
								168 - 181	Fixed colors Color 5								
								182 - 195	Color 4								
								196 - 209	Color 3								
								210 - 223	Color 2								
								224 - 237	Color 1								
								238 - 255	White								
7				16				0 - 22	Rotating Gobo selection Open Gobo								
Note: Index and continuous rotation parameters are programmed on channel 8.				Note: Index and continuous rotation parameters are programmed on channel 17.				23 - 45	Gobo 1 - Indexed								
								46 - 68	Gobo 2 - Indexed								
								69 - 91	Gobo 3 - Fixed								
								92 - 114	Gobo 4 - Indexed								
								115 - 137	Gobo 5 - Indexed								
								138 - 160	Gobo 5 - Rotation								
								161 - 183	Gobo 4 - Rotation								
								184 - 206	Gobo 3 - Fixed								
								207 - 229	Gobo 2 - Rotation								
								230 - 255	Gobo 1 - Rotation								
								8				17				0 - 126	Rotating Gobo Index Index CW
								Note: Gobo selection is programmed on channel 7.				Note: Gobo selection is programmed on channel 16.				127	Default Index
																128 - 255	Index CCW
0 - 2	Gobo Rotation Static																
3 - 127	CCW fast → slow																
128 - 254	CW slow → fast																
253 - 255	Static																
9				-												0 - 22	Rotating Effect selection Open
Note: Index and continuous rotation parameters are programmed on channel 10.																23 - 45	Effect 1 - Indexed
																46 - 68	Effect 2 - Fixed
																69 - 91	Effect 3 - Indexed
																92 - 114	Effect 4 - Fixed
																115 - 137	Effect 5 - Indexed
																138 - 160	Effect 5 - Rotation
								161 - 183	Effect 4 - Fixed								
								184 - 206	Effect 3 - Rotation								
								207 - 229	Effect 2 - Fixed								
								230 - 255	Effect 1 - Rotation								

DMX channel PAL 1200 FX				DMX channel PAL 1200, PAL 1200 E				Value	Function
M1	M2	M3	M4	M1	M2	M3	M4		
10								0 - 126 127 128 - 255	Rotating Effect Index Index CW Default Index Index CCW
Note: Effect selection is programmed on channel 8				-				0 - 2 3 - 127 128 - 254 253 - 255	Effect Rotation Static CCW fast → slow CW slow → fast Static
11				18				0 - 255	Focus Near → Far Focus
12				19				0 - 255	Zoom Wide → Narrow
13				-				0-255	Iris Open → Close
14				20				0 - 255	Variable Frost Full OFF → Full ON
15	-	15	-	21	-	21	-	0 - 255	Pan Max Left → Max Right (127 = Neutral)
16	-	16	-	22	-	22	-	0 - 255	Tilt Max Up → Max Down (127 = Neutral)
-	15	-	15	-	21	-	21	0 - 255	Pan MSB (Coarse) Max Left → Max Right (127 = Neutral)
-	16	-	16	-	22	-	22	0 - 255	Pan LSB (Fine) Max Left → Max Right (127 = Neutral)
-	17	-	17	-	23	-	23	0 - 255	Tilt MSB (Coarse) Max Up → Max Down (127 = Neutral)
-	18	-	18	-	24	-	24	0 - 255	Tilt LSB (Fine) Max Up → Max Down (127 = Neutral)
-	-	17	19	-	-	23	25	0 - 2 3 - 251 252 - 255	Speed Control: Pan and Tilt Tracking Speed Fast → Slow Blackout while moving
-	-	18	20	-	-	24	26	0 - 2 3 - 251 252 - 255	Speed Control: Cyan, Magenta, Yellow, Focus, Zoom, Frost, Dimmer, Profile Shutters Tracking Speed Fast → Slow Fast speed
-	-	18	20	-	-	24	26	0 - 2 3 - 251 252 - 255	Color, Gobo Indexing, Rotating Effect Indexing Tracking Speed Fast → Slow Blackout while moving
-	-	18	20	-	-	24	26	0 - 251 252 - 255	Gobo Change, Effect Change Shutter open while moving Blackout while moving

appendix b TECHNICAL SPECIFICATIONS



All dimensions in mm.

Physical

- Length 1331 mm (52.4 in.)
- Width..... 436 mm (17.2 in.)
- Height..... 372 mm (14.6 in.)
- Weight (PAL 1200, PAL 1200 FX) 61 kg (135 lbs)
- Weight (PAL 1200 E)..... 55 kg (121 lbs)

Lamp

- Philips MSR 1200..... 750 h, 6000K, 92 lm/W
- Osram HSR 1200..... 800 h, 6000K, 92 lm/W

Performance

- Light output, + diffuser - condenser (standard)9800 lumens
- Light output, + diffuser + condenser 13,500 lumens
- Light output, - diffuser - condenser 12,700 lumens
- Light output, - diffuser + condenser 16,000 lumens

Gobos

- Size (metal) D
- Size (glass)..... 50 mm +0/-0.3 mm (1.968 in. +0/-0.012 in.)
- Maximum image diameter 40 mm
- Glass type..... high temperature Borofloat or better
- Coating chrome, enhanced aluminum recommended if condenser installed

Thermal

- Maximum ambient temperature (T_a)..... 40° C (104° F)
- Maximum surface temperature 80° C (176° F)

Control and programming

- Data pinout..... pin 1 shield, pin 2 hot (+), pin 3 cold (-)
- Receiver Opto-isolated RS-485
- Protocols USITT DMX-512 (1990), Martin RS-485

Connections

- AC input 1.5 m trailing cable w/o cord cap
- Data input 3 pin XLR male
- Data output 3 pin XLR female

Maximum power and current

- @ 100 V, 50 Hz 1500 W, 18 A
- @ 120 V, 60 Hz 1500 W, 15 A
- @ 215 V, 60 Hz 1500 W, 9 A
- @ 230 V, 50 Hz 1500 W, 8 A
- @ 250 V, 60 Hz 1500 W, 7 A

Construction

- Housing aluminum
- Metal finish electrostatic powder coating
- Protection factor IP 20

Installation

- Orientation any
- Minimum distance to combustible materials 0.5 m (20 in)
- Minimum distance to illuminated surfaces 1.0 m (39 in)

Accessories

- Philips MSR 1200 lamp 97010303
- Standard floor stand 91606001
- V-model floor stand 91606004
- Break-proof mirror 00500065
- Short mounting bracket 91606000
- 10° - 14° narrow angle kit 91610000
- 26° - 35° wide angle kit 91610006
- Condenser lens 91610004

52 x 52 x 1.1 mm color filters

Color	P/N	Color	P/N
3500 - 5600K CTC	46403139	5500 - 3400K CTC	46403101
Red 301	46403102	Blue 101	46403105
Red 304	46403131	Blue 102	46403106
Red 305	46403132	Blue 103	46403107
Red 308	46403133	Blue 104	46403108
Red 309	46403134	Blue 105	46403109
Green 201	46403114	Blue 106	46403110
Green 202	46403115	Blue 107	46403104
Green 203	46403116	Blue 108	46403111
Green 204	46403117	Blue 111	46403112
Green 205	46403118	Orange 302	46403124
Green 206	46403103	Orange 306	46403125
Green 208	46403119	Purple 502	46403129
Magenta 501	46403120	Purple 509	46403130
Magenta 504	46403121	Cyan 401	46403113
Magenta 505	46403122	Yellow 601	46403135
Magenta 507	46403123	Yellow 602	46403136
Pink 303	46403126	Yellow 603	46403137
Pink 307	46403127	Yellow 604	46403138
Pink 312	46403128	1/2 minus green	46403141

appendix c SPEC SEQUENCES

The following list provides a full description of the ‘SPEC’ sequences contained in the control module.

Sequence PAL 1200 FX	Sequence PAL 1200, PAL 1200 E	Step	Description
SP 1	SP 1	Reset All	
SP 2	SP 2	Lamp On	
SP 3	SP 3	Lamp Off	
SP 4	SP 4	Lamp Optimizing	
		St 1	CMY Flags fully open (white)
		St 2	CMY Flags to lamp optimizing position
SP 5	SP 5	Gobos	
		St 1	Open Gobo
		St 2	Gobo 1
		St 3	Gobo 2
		St 4	Gobo 3
		St 5	Gobo 4
-	SP 6	Profile Shutters	
		St 1	All Shutters Open
		St 2	Shutter 1A and 1B closed, rest open
		St 3	Shutter 2A and 2B closed, rest open
		St 4	Shutter 3A and 3B closed, rest open
		St 5	Shutter 4A and 4B closed, rest open
SP 6	-	Effects	
		St 1	Open
		St 2	Effect 1
		St 3	Effect 2
		St 4	Effect 3
		St 5	Effect 4
SP 7	SP 7	Variable Wash / Frost	
		St 1	Wash Filter open (no wash)
		St 2	Wash Filter closed (full wash)
SP 8	SP 8	Focus and Zoom	
		St 1	Focus and Zoom to extreme rear position
		St 2	Focus and Zoom to extreme front position
SP 9	SP 9	Colors	
		St 1	Open
		St 2	Color 1
		St 3	Color 2
		St 4	Color 3
		St 5	Color 4
-	SP10	Profile Orientation	
		St 1	Fully CCW
		St 2	Fully CW
SP10	-	Effects Rotation	
		St 1	Open
		St 2	Effect 1 - Static
		St 3	Effect 1 - CW Fast
		St 4	Effect 1 - CCW Fast
		St 5	Effect 1 - CW Slow
		St 6	Effect 1 - CCW Slow
		St 7	Effect 3 - Static
		St 8	Effect 3 - CW Fast
		St 9	Effect 3 - CCW Fast
		St10	Effect 3 - CW Slow
		St11	Effect 3 - CCW Slow
		St12	Effect 5 - Static
		St13	Effect 5 - CW Fast
		St14	Effect 5 - CCW Fast
		St15	Effect 5 - CW Slow
St16	Effect 5 - CCW Slow		

Sequence PAL 1200 FX	Sequence PAL 1200, PAL 1200 E	Step	Description
SP11 (fast) SP12 (slow)	SP11 (fast) SP12 (slow)	Pan and Tilt	
		St 1	Pan Neutral
		St 2	Pan Left
		St 3	Pan Right
		St 4	Pan Neutral
		St 5	Pan Neutral
		St 6	Pan Left
		St 7	Pan Right
		St 8	Pan Left
		St 9	Pan Right
			Tilt Neutral
			Tilt Up
			Tilt Down
			Tilt Up
SP13	SP13	CMY Flags	
		St 1	All Flags Open (White)
		St 2	All Flags to Index Position
		St 3	All Flags Closed
		St 4	Cyan Closed - Rest Open
		St 5	Magenta Closed - Rest Open
		St 6	Yellow Closed - Rest Open
SP14	SP14	Dimmer	
		St 1	Dimmer Closed
		St 2	Dimmer Open
		St 3	Strobe Speed 1
		St 4	Strobe Speed 5
		St 5	Strobe Speed 16
SP15	SP15	Gobo Rotation	
		St 1	Open Gobo
		St 2	Gobo 1 - Static
		St 3	Gobo 1 - CW Fast
		St 4	Gobo 1 - CCW Fast
		St 5	Gobo 1 - CW Slow
		St 6	Gobo 1 - CCW Slow
		St 7	Gobo 2 - Static
		St 8	Gobo 2 - CW Fast
		St 9	Gobo 2 - CCW Fast
		St10	Gobo 2 - CW Slow
		St11	Gobo 2 - CCW Slow
		St12	Gobo 4 - Static
		St13	Gobo 4 - CW Fast
		St14	Gobo 4 - CCW Fast
		St15	Gobo 4 - CW Slow
		St16	Gobo 4 - CCW Slow
		St17	Gobo 5 - Static
		St18	Gobo 5 - CW Fast
		St19	Gobo 5 - CCW Fast
		St20	Gobo 5 - CW Slow
St21	Gobo 5 - CCW Slow		
SP16	SP16	Lamp Status (Feedback Sense)	
		St 1	Lamp ON
		St 2	Lamp OFF
SP16	-	Iris	
		St 1	Open
		St 2	Closed

appendix d
ERROR AND INFORMATION MESSAGES

Display read-out	Appears if...	What to do
LErr Lamp error	... the lamp doesn't ignite within 2 minutes after having received the 'Lamp ON' instruction from the controller. Likely reasons are a missing or defective lamp, or insufficient mains voltage. The lamp error will not affect the performance of the PAL.	<ul style="list-style-type: none"> • Check the lamp and check that the mains setting of the fixture matches the mains supply.
ErAb A/B-section error	...the A and B-section PCBs do not communicate correctly with the receiver module.	<ul style="list-style-type: none"> • Check fuses on PCBs and that the ribbon cable which connects the three PCBs is connected properly.
ErrA A-section error	... the A-section PCB does not communicate correctly with the receiver module.	<ul style="list-style-type: none"> • Check fuses on A-section PCB and the that ribbon cable which connects the three PCBs is connected properly.
ErrB B-section error	... the B-section PCB does not communicate correctly with the receiver module.	<ul style="list-style-type: none"> • Check fuses on B-section PCB and that the ribbon cable which connects the three PCBs is connected properly.
ShEr Short error	... the PAL "detects" that the lamp is ON but no 'Lamp ON' command has been received. This can occur if the lamp relays are stuck in the ON position or the lamp-power feedback circuit has failed. You can still use the PAL 1200 but may not be able to remotely switch off the lamp.	<ul style="list-style-type: none"> • Contact your Martin dealer for assistance.
Hot Hot lamp	... you attempt to ignite the lamp within 4 minutes after having switched it off. The PAL will store the "Lamp ON" instruction and ignite the lamp once the 4 minute period has expired.	<ul style="list-style-type: none"> • Wait until the lamp strikes.
TErr Time keeper error	...there is a failure in the time keeper circuit (internal clock). This error will not affect the performance or the hour-counter for lamp and fixture usage.	<ul style="list-style-type: none"> • Consult qualified Martin service personnel.

appendix e TROUBLESHOOTING GUIDE

Problem	Probable cause(s)	Suggested remedy
None of the PALs respond to the controller.	The controller is disconnected from the data link.	<ul style="list-style-type: none"> Connect controller.
	Use of incorrect cable between the controller and the first PAL on the data link.	<ul style="list-style-type: none"> If using a DMX controller with standard 5 pin output socket, remember to use a 5 to 3 pin adapter cable that reverses pins 2 and 3, between the controller and the first PAL on the data link.
One or more of the PALs does not respond to the controller or responds erratically.	Bad data link connection.	<ul style="list-style-type: none"> Check connections/cables in the data link and correct accordingly.
	Data link not terminated with termination plug.	<ul style="list-style-type: none"> Insert termination plug in the last light on the data link.
	Incorrect addressing of the PALs.	<ul style="list-style-type: none"> Ensure that all lights are addressed in compliance with the controller configuration.
	PALs not powered on.	<ul style="list-style-type: none"> Power on PALs.
	PALs have failed in protocol auto-detection.	<ul style="list-style-type: none"> Switch off the PALs and then back on again. In general, switch on the controller before the PALs.
	One of the lights is defective and disturbs the data transmission on the link.	<ul style="list-style-type: none"> By-pass one light at a time until normal operation is regained. Do this by unplugging the XLR in-and-out connectors and then connect these directly together.
	Special DMX protocol (dPr2) option set incorrectly.	<ul style="list-style-type: none"> Navigate in control menu to SPEC > dPr2 and toggle the option to OFF unless using an MA <i>Scancommander</i>.
	Fuse, F201, on receiver board blown.	<ul style="list-style-type: none"> Replace fuse.
No light emission and "LErr" appears on the display.	The lamp will not strike due to insufficient mains voltage.	<ul style="list-style-type: none"> Measure mains voltage and check against ballast and transformer tapplings. Correct tapplings if necessary.
	There is no lamp in the fixture.	<ul style="list-style-type: none"> Install a lamp.
Fixture appears to be completely dead (no reset when switching on).	Mains fuse blown.	<ul style="list-style-type: none"> Replace mains fuse.
	PCB fuse(s) blown.	<ul style="list-style-type: none"> Replace PCB fuse(s).
Lamp is cutting out intermittently.	Ambient temperature is too high.	<ul style="list-style-type: none"> Reduce ambient temperature.
	Fans are running on reduced speed (desk controlled).	<ul style="list-style-type: none"> Switch to high fan speed via controller.
	Reduced air flow due to fan clogged by dirt and dust.	<ul style="list-style-type: none"> Clean fan.
	Incorrect ballast and transformer tapplings.	<ul style="list-style-type: none"> Measure mains voltage and check against ballast and transformer tapplings. Correct tapping if necessary.

