MAC 1200

INTRODUCTION

The *MAC 1200*, designed and manufactured by Martin Professionals, is a high performance, intelligent moving head projector meeting the demands of tomorrow's lighting designers. The rugged construction combined with the use of high quality components ensures that the *MAC 1200* will perform reliably for many years to come.

The *MAC 1200* features

LIGHT SOURCE
- 1200 Watt MSR lamp (5600K / 800 hours).
- Remote ON / OFF via controller.

MOVEMENT
- 305 by 438 degrees.
- 8 and 16-bit tracking available via DMX 512.

COLOR WHEEL
- 4 interchangeable colors plus white.
- Continuously color scroll.

CMY - COLOR MIXING SYSTEM
- Numerous color selection via CMY color mixing system.
- Instant color change or smooth color fades.

GOBO WHEEL
- One interchangeable gobo, 5 field angles plus open.

DIMMER / SHUTTER
- 0 to 100% smooth dimming with micro-stepping resolution.
- High-speed shutter for instant blackout
- Variable strobe effect (0.7 - 7 fps).

OPTICAL PATH
- Highly efficient optical system.
- Coated precision optics.
- Adjustable focus

MECHANICAL CONSTRUCTION
- Modular design for ease of servicing and flexibility.
- Four carrying handles.

CONTROL, SETTING AND MONITORING
- Can be controlled by DMX 512 or Martin RS-485.
- Simple digital addressing via control module with 4-digit display.
- Simple setting for pan/tilt invert and swap.
- Digital read-out of lamp and fixture usage.
- Calibration facility of pan, tilt, cyan, magenta, yellow and dimmer.

COOLING AND SECURITY.
- Efficient fan cooling.
- Overheating protection.

- Power Factor Correction for low current consumption.

About this Manual

These instruction notes only apply for the production series of the *MAC 1200* fitted with the following software:

Device	Version(s)	P/N
CPU A Section	2.0	219806
CPU B Section	2.0	219806
CPU Control Module	1.2	219825
EPROM A Section	2.1	219046
EPROM B Section	1.1	219045

SUGGESTIONS FOR SAFETY

- **NOT for domestic use.**

- **Always isolate from mains supply when:**
  * Relamping
  * Refusing
  * Rewiring
  * Removing any of the covers

- **To reduce risk of fire or electrical shock do NOT expose to rain or moisture.**

- **Do NOT rig or hang by means of the carrying handles.**

- **Do NOT block fans or air exhaustion holes.**

- **Do NOT look directly into the light.**

- **Maximum room temperature, t_a = 35°C.**

- **Minimum distance from flammable materials, d = 0.5 meters.**

- **Allow the fixture cool down for approximately 15 minutes before relamping.**

- **All service operations, except from those described in this manual, should be carried out by qualified servicing personnel only.**

- **Always ship/transport the fixture in its original Flight-Case or Cardboard Box.**

- **Do NOT lift the fixture it its head.**

BASIC INSTALLATION

Before starting to operate the *MAC 1200* you must:

*   **Install the MSR 1200 lamp (not included).**
*   **Fit a mains plug.**
*   **Check voltage and frequency settings.**
*   **Rig the fixture in its permanent site.**

The *MAC 1200* package comes complete with the following items:

*   ***MAC 1200*.**
*   **5 metres XLR-XLR cable for control.**
*   **Operator's Manual.**

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

Installing the lamp

The *MAC 1200* uses the single ended MSR 1200 lamp from Philips. Follow the steps below in order to install it properly.

1. Remove the two outermost Philips screws which secure the access plate of the lamp socket assembly at the rear of the *MAC 1200* head, and withdraw the lamp socket assembly.

2. Hold the lamp by the ceramic base, avoiding touching the glass part with your fingers, and carefully insert it into the lamp socket. If you accidentally touches 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 aluminium reflector, and tighten the finger screws.

    NOTE: The lamp position is already adjusted from the factory, however, re-adjustment may be necessary to optimize the light output and the color uniformity from the CMY (Cyan, Magenta, Yellow) system. Please refer to section 8 - 'BASIC SERVICE OPERATIONS'.

Fitting the mains plug

The *MAC 1200* 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 *MAC 1200* matches the local power supply. The factory setting of voltage and frequency is printed on the serial number label at side of the base.

Rigging the fixture

You can now rig the fixture by means of its two mounting brackets. You may hang it in any desired position, but ensure that the head can move freely.

CONNECTING THE LIGHTING CONTROLLER

All effects in the *MAC 1200* are fully DMX-512 and Martin RS-485 implemented. Control data are transmitted from the controller's output, via XLR data link cables, to the input on the *MAC 1200*. The data output on the *MAC 1200* allows the serial data link to be continued to further lights, and this way up to 32 fixtures can be connected on the same data link.
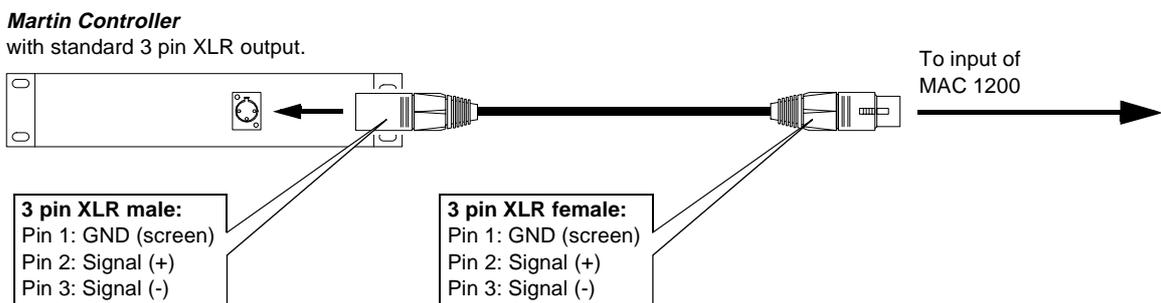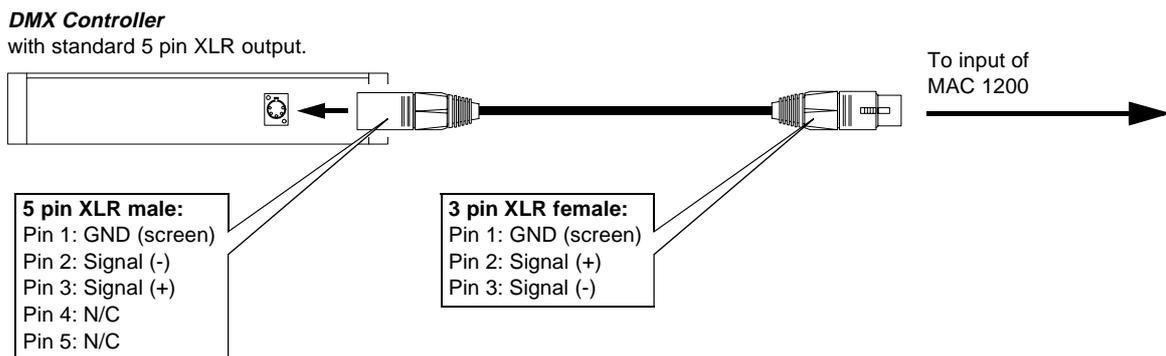
Connecting the serial link

You should follow this instruction carefully in order to connect a proper serial data link:

USING THE *MAC 1200* AND OTHER MARTIN LIGHTS ONLY

1. Connect the data output of your lighting controller to the data input on the *MAC 1200*.

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 *MAC 1200*. The following figure shows the proper connections in such a cable (available as part# 309162). Please note that the (+) and (-) signal wires swap from the DMX output to the input on the *MAC 1200*.
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DMX Controller
with standard 5 pin XLR output.

To input of
MAC 1200

5 pin XLR male:
Pin 1: GND (screen)
Pin 2: Signal (-)
Pin 3: Signal (+)
Pin 4: N/C
Pin 5: N/C

3 pin XLR female:
Pin 1: GND (screen)
Pin 2: Signal (+)
Pin 3: Signal (-)

Martin Controller
with standard 3 pin XLR output.

To input of
MAC 1200

3 pin XLR male:
Pin 1: GND (screen)
Pin 2: Signal (+)
Pin 3: Signal (-)

3 pin XLR female:
Pin 1: GND (screen)
Pin 2: Signal (+)
Pin 3: Signal (-)

2. Connect the data output of the first *MAC 1200* to the data input of the next using the XLR-XLR cable supplied with the *MAC 1200*.

3. Continue the link this way, always connecting output to input (daisy-chain), until all lights are linked together.

4. Finally, insert a male XLR termination plug in the free output socket of the last light on the link.
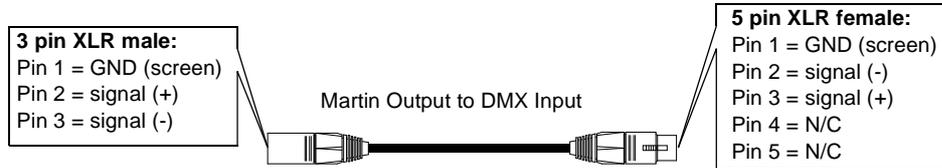**MARTIN CONTROLLER:** Use the 120 Ω termination plug supplied with the controller.
DMX CONTROLLER: Use a 3 pin XLR male plug with a 120 Ω resistor between pin 2 and 3.

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, with 5 pin XLR in and out, on the link. In that case you will need a cable that adapts from the 3 pin XLR female output on the Martin light to the 5 pin XLR male input on the following non-Martin DMX light. The connections in such a cable are shown in the following figure (part# 309163).


```
3 pin XLR male:                                    5 pin XLR female:
Pin 1 = GND (screen)                               Pin 1 = GND (screen)
Pin 2 = signal (+)      Martin Output to DMX Input Pin 2 = signal (-)
Pin 3 = signal (-)                                 Pin 3 = signal (+)
                                                   Pin 4 = N/C
                                                   Pin 5 = N/C
```

Addressing the *MAC 1200*

The control module on the *MAC 1200* base allows you to assign the fixture address, which is defined as the first channel from which the *MAC 1200* responds to the controller. Depending on which protocol (Martin RS-485 or DMX 512) and which DMX mode (1, 2, 3 or 4) you have selected, the *MAC 1200* requires more or less channels for control. E.g., if the particular mode requires 10 channels and you address the fixture to channel 11, it will use channel 11 to 20 for control. You must address the *MAC 1200* 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 similar. Follow this procedure for each of the *MAC 1200*s on the link:

1. Switch on the *MAC 1200* 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 arrow keys to select the desired address and confirm by pressing [enter].
   The DMX channel requirements for the *MAC 1200* are listed in the following table.

Mode 1	Mode 2	Mode 3	Mode 4
10 chl.	12 chl.		14 chl.
8 bit pan/tilt	16 bit pan/tilt	8 bit pan/tilt	16 bit pan/tilt
Tracking		Tracking/Vector	

Switching On

After switching on, the *MAC 1200* will index all effects and return them to their default positions. Some effects use a mechanical indexing method. This method is a bit noisy, but completely normal and does only last for a short period of time. The display on the side of the fixture will show the software versions installed in the *MAC 1200* and then advance to protocol auto-detect if enabled on the control module (default disabled - see section 6). As soon as data is transmitted from you controller, the *MAC 1200* automatically detects whether this is a Martin RS-485 or DMX 512 controller and respond accordingly. When this happens the display reads "PASS" very shortly.

NOTE: Protocol auto-detect is default off. You will have to enable

Operating the fixture

If you are using a Martin RS-485 controller then please refer to the 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. All remotely controllable functions are briefly described in section 5.

NOTE: The *MAC 1200* 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. After switching on the *MAC 1200,* the lamp itself remains OFF until a 'Lamp ON' command is sent from the controller. It is not possible to start the lamp within 4 minutes after having switched it off, however, the *MAC 1200* will store any attempt and strike the lamp as soon as the 4 minutes period has expired.

When switching on the MSR 1200 lamp, the *MAC 1200* draws an inrush (peak) current which may be several times the normal operating current. For this reason, it is suggested to program a 'Lamp On' sequence on the controller, that 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 *MAC 1200* uses the Philips MSR 1200 lamp. This 1200 Watt discharge lamp provides a very high luminous output and the 5600 K color temperature only varies slightly throughout its rated life of 800 hours.

A high-power relay inside the *MAC 1200* allows you to turn the lamp on and off via your controller and without affecting other functions of the fixture. It is important to note that after switching on the *MAC 1200,* the lamp itself remains off until a 'Lamp On' command is sent from the controller. It is not possible to start the lamp within 4 minutes after having switched it off, however, the *MAC 1200* will store any attempt and strike the lamp as soon as the 4 minutes period has expired.

When switching on the MSR 1200 lamp, the *MAC 1200* draws an inrush (peak) current which may be several times the normal operating current. For this reason, it is suggested to program a 'Lamp On' sequence on the controller, that will turn on the lamps one at a time with an interval between each 'Lamp On' command of approximately 5 seconds.

NOTE: To avoid accidentally switching off the lamp, the 'Lamp Off' feature is only supported by DMX when enabled on the control module (see section 6) or when cyan, magenta and yellow channels are set between 230 and 232.

MOVEMENT
The head on the *MAC 1200* can be moved to any desirable position within the range of 305 degrees by 438 degrees. The micro stepping control of the motors ensures high precision and smooth movement. Selecting the B/O speed will blackout the fixture whilst moving the head.

COLOR WHEEL
The color wheel offers four 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. It is possible to scroll the wheel continuously.

CMY - COLOR MIXING
The CMY color mixing system is based on three set of color flags: Cyan, Magenta and Yellow. These filters can be inserted individually from 0 to 100%. An almost infinite number of colors can be produced by inserting one or two, of the three color flags and the color is determined by the inserted percentage (0 to 100%) of each color flag. 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 (see section 8).

GOBOS
One interchangeable gobo, 5 field angles plus open can be selected. The B/O speed blackout the fixture whilst changing gobo. It is possible to scroll the wheel continuously.

DIMMER/SHUTTER
A high resolution, 0 to 100% smooth dimming is provided by the combined dimmer/shutter system. Use a high speed dimming if you wish to open or close the dimmer instantly. A variable strobe effect can also be produced.

FROST
You can soften the beam by inserting the frost filter.

CONTROL AND RECEIVER MODULE

The control and receiver module on the side of the *MAC 1200* offers several useful features. You can easily set the fixture address, have a read-out of lamp and fixture usage, enable special features etc. The main-menu is accessed by pressing the [menu] key and can be browsed with the up and down keys. The function hierarchy is shown in the following diagram which includes the 'SPEC' sub-menu.
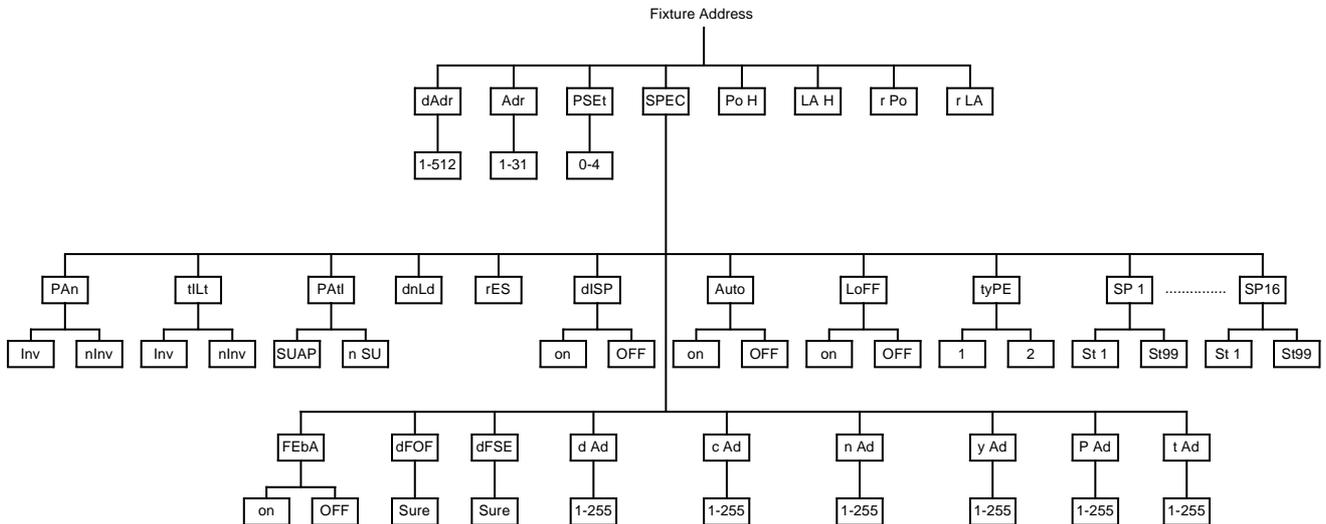
Main functions

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 *MAC 1200*, it automatically detects whether the controller is transmitting DMX 512 or Martin RS-485. If a DMX controller is detected the *MAC 1200* 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 *MAC 1200* 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. Either way you will return to the main menu.

Mode 1	Mode 2	Mode 3	Mode 4
10 channels	12 channels		14 channels
8 bit pan / tilt	16 bit pan / tilt	8 bit pan / tilt	16 bit pan / tilt
Tracking		Tracking / Vector	

FIXTURE USAGE (Po H)
This option provides a read-out of the total number of hours the *MAC 1200* has been powered on.

LAMP USAGE (LA H)

This option provides a read-out of the total number of hours the MSR 1200 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 *MAC 1200* 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 MSR 1200 lamp has been powered on. However, it is possible to reset this counter by keeping the [up] key pressed for approx. 5 seconds. For example, use this facility to reset the counter whenever replacing the lamp, thus keeping track of the current lamp usage.

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 black-out 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 *MAC 1200* 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 (PAtl)

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.

DISABLE FEEDBACK CIRCUIT (FEbA)

This feature allows disabling of the pan/tilt feedback, thus enabling you to force the head out of position. This is especially useful when servicing the fixture. 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. Please note that this setting defaults to 'off' when switching off the fixture.

tyPE

This option is used to switch the DMX protocol between the two *MAC 1200* types. Type 1 is the profile and type 2 is the fresnel. Press [enter] to confirm.

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

This function allows you to calibrate the dimmer and color mixing systems, thus allowing several *MAC 1200* fixtures 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. Simply, line up the *MAC 1200* fixtures 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
FbEr	Feedback error

The following information messages may appear on the display:

HOT MESSAGE (Hot)

This message appears if you attempt restrike the lamp within 4 minutes after having switched it off. The *MAC 1200* 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 *MAC 1200* 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.

REPLACING AND OPTIMISING THE LAMP

Replacing the lamp

To reduce the risk of the lamp exploding it is strongly recommended that the lamp is replaced before the rated average lamp life has been exceeded by 25%. Since the rated average lamp life for the MSR 1200 lamp is 800 hours, it should be replaced before 1000 hours of use. The procedure for installing the lamp is described in section 3.

The position of the lamp-holder may need to be re-adjusted to ensure optimum performance when the *MAC 1200* is installed in its permanent site. The adjustment procedure is as follows:

Optimising the lamp alignment

After each lamp replacement it may be necessary to optimize the lamp adjustment. Please follow this procedure.

1. Switch on the *MAC 1200* and wait until the reset has finished.

2. Switch on the lamp, using a controller. Before you continue with next step you should wait about 5 minutes until the lamp has reached full brightness.

3. Open the dimmer and select the open gobo. Then move the head, still using the controller, so that the image is projected onto a flat surface and focus the beam.

4. On the back of the head there are three thumb screws for lamp adjustment. 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 optical configuration with diffusing filter, and without the condenser lens mounted, there is only very little hot-spot. In that case adjust the lamp until you achieve an almost even distribution of the light all over the image.

5. If you are not satisfied with the light output you can try to adjust the lamp further by turning all three adjustment screws a 1/4 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 being reduced then turn the adjustment screws a 1/4 turn counterclockwise and observe the result. Proceed this way as long as the result improves.

6. Insert all three set of CMY flags, by setting these to about 75%. Now, make slight adjustments to the screws until the *MAC 1200* provides a uniform color projection 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 may see a white edge around the image, when using the CMY to produce very light colors. The white edge can not be totally avoided when using this optical configuration.

DMX channel offset				value	function
DMX1	DMX2	DMX3	DMX4		
0 **Note:** Lamp Off is only allowed with 'SPEC'/'LoFF' set to 'On', or with 'SPEC'/'LoFF' set to 'OFF' and all Cyan, Magenta and Yellow flags set between 230 and 232.				0 - 9 10 - 49 50 - 177 178 - 207 208 - 217 218 - 227 228 - 237 238 - 247 248 - 255	**Strobe, Fan, Reset Unit, Lamp ON/OFF** Shutter closed No function Strobe on (Fast → Slow) No function Reset fixture No function Lamp ON (Power ON) No function Lamp OFF (Power OFF) (T > 5 seconds)
1				0 - 255	**Intensity** 0 → 100%
2				0-255	**Cyan** White → Cyan
3				0-255	Magenta White → Magenta
4				0-255	**Yellow** White → Yellow
5				0 0 - 39 40 41 - 79 80 81 - 119 120 121 - 159 160 161 - 166 167 - 172 173 - 178 179 - 184 185 - 191 192 - 255	**Color Scroll** White White → Color 1 Color 1 Color 1 → Color 2 Color 2 Color 2 → Color 3 Color 3 Color 3 → Color 4 Color 4 **Fixed Colors** Color 4 Color 3 Color 2 Color 1 White **Continuous Color Scroll** Fast → slow

DMX channel offset				value	function
DMX1	DMX2	DMX3	DMX4		
6					**Gobo Scroll**
				0	Open
				0 - 30	Open → Gobo 1
				31	Gobo 1
				32 - 57	Gobo 1 → Gobo 2
				58	Gobo 2
				59 - 82	Gobo 2 → Gobo 3
				83	Gobo 3
				84 - 105	Gobo 3 → Gobo 4
				106	Gobo 4
				107 - 125	Gobo 4 → Gobo 5
				126	Gobo 5
				127 - 161	Gobo 5 → Gobo 6
				162	Gobo 6
					Fixed Gobos
				163 - 166	Gobo 6
				167 - 170	Gobo 5
				171 - 174	Gobo 4
				175 - 178	Gobo 3
				179 - 182	Gobo 2
				183 - 186	Gobo 1
				187 - 191	Open
					Continuous Gobo Scroll
				192 - 255	Fast → slow
7				0 - 255	**Frost** Full OFF → Full ON
8	-	8	-	0 127 255	**Pan** Max Left Neutral Max Right
9	-	9	-	0 127 255	**Tilt** Max Up Neutral Max Down
-	8	-	8	0 127 255	**Pan MSB** Max Left Neutral Max Right
-	9	-	9	0 127 255	**Pan LSB** Max Left Neutral Max Right
-	10	-	10	0 127 255	**Tilt MSB** Max Left Neutral Max Right
-	11	-	11	0 127 255	**Tilt LSB** Max Up Neutral Max Down

DMX channel offset				value	function
DMX1	DMX2	DMX3	DMX4		
-	-	10	12	0 - 2 3 - 251 252 - 255	**Speed: Pan, Tilt** Tracking Speed Fast → Slow Blackout while moving
-	-	11	13	0 - 2 3 - 251 252 - 255 0 - 2 3 - 251 252 - 255	**Speed: Dimmer, Cyan, Magenta, Yellow** Tracking Speed Fast → Slow Fast speed **Speed: Color, Gobo** Tracking Speed Fast → Slow Fast speed

appendix c
SPEC SEQUENCES

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

Sequence	Step	Description
SP1	Reset All (indexes all effects)	
SP 2	Lamp On	
SP 3	Lamp Off	
SP 4	Lamp Optimising	
	St 1	CMY fully open (white)
	St 2	CMY to lamp optimising position
SP 5	CMY	
	St 1	Cyan, Magenta, Yellow open
	St 2	Cyan, Magenta, Yellow to adjust position
	St 3	Cyan, Magenta, Yellow closed
	St 4	Cyan closed
	St 5	Magenta closed
	St 6	Yellow closed
SP 6	Dimmer	
	St 1	Dimmer open
	St 2	Dimmer to adjust position
	St 3	Dimmer closed
	St 4	Dimmer open
	St 5	Strobe speed 1
	St 6	Strobe speed 5
	St 7	Strobe speed 16
SP 7	Color wheel	
	St 1	Open
	St 2	Color 1
	St 3	Color 2
	St 4	Color 3
	St 5	Color 4
	St 6	Continous color scroll

Sequence	Step	Description	
SP 8	Gobo wheel		
	St 1	Open	
	St 2	Gobo 1	
	St 3	Gobo 2	
	St 4	Gobo 3	
	St 5	Gobo 4	
	St 6	Gobo 5	
	St 7	Gobo 6	
	St 8	Continous gobo scroll	
SP 9	Frost		
	St 1	Open	
	St 2	Closed	
SP 10	Pan / Tilt		
	St 1	Pan Neutral	Tilt Neutral
	St 2	Pal Left	
	St 3	Pan Right	
	St 4	Pan Neutral	Tilt Up
	St 5	Pan Neutral	Tilt Down
	St 6	Pan Left	
	St 7	Pan Right	
	St 8	Pan Left	Tilt Up
	St 9	Pan Right	
SP 15	Test Sequence		
	St 1	Testing all effects	
SP16	Lamp Status (Feedback Sense)		
	St 1	Lamp ON	
	St 2	Lamp OFF	

ERROR MESSAGES

LErr

The lamp error message appears if the lamp doesn't ignite within 2 minutes after having received the 'Lamp On' instruction from the controller. The lamp error will not affect the affect the performance of the MAC 1200.

ErAb

The A/B-Module error indicates that there is no communication between the serial data receiver module and the A- and B-Section electronic-modules.

ErrA

The A-Module error indicates that there is no communication between the serial data receiver module and the A-Section electronic-modules.

Errb

The B-Module error indicates that there is no communication between the serial data receiver module and the A-Section electronic-modules.

ShEr

Short error. Appears if the MAC 1200 "detects" that the lamp is on but no 'Lamp On' command has been received. This can occur if the lamp relay has stocked in the on position or the lamp-power feedback circuit has failed.

TErr

This error appears if there is a failure in the time keeper circuit (internal clock). The error will not affect the performance or the hour-counter for lamp and fixture usage.

FbEr

This error appears if the pan/tilt feedback circuit is malfunctioning. It will still be possible to operate the fixture, though it goes into a "safe" mode where maximum move speed is reduced, thus preventing the fixture from loosing track of its index (home) position (loosing step).

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