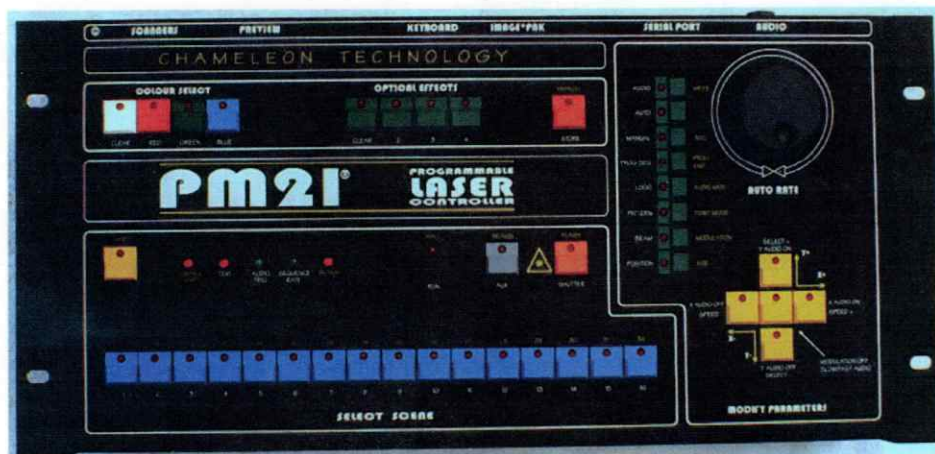


PM21 CONTROLLER

Users Manual



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or contact our representative or distributor in your region.

E&EO

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Review the following safety precautions to avoid injury and prevent damage to this product or any other products connected to it. To avoid potential hazards, use this product only as specified.

Use only the power cord specified for this product and certified for the country of use.

Do not connect or disconnect connectors while they are connected to a voltage source.

This product's case is grounded through the grounding conductor of the power cord. To avoid electric shock, the grounding conductor must be connected to earth. Before making connections to the input or output connectors of this product, ensure that the product is properly grounded.

To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product. The common terminal of non isolated connectors is at ground potential. Do not connect to elevated voltages. Do not apply a potential to any terminal, including common terminals that exceed the rating of that terminal.

Do not operate this product with covers or panels removed.

Use only the fuse type and rating specified on the product or in the manual for this product.

Do not touch exposed connections and components when power is present even if the product is switched off.

If you suspect there is damage to this product, do not use and have it inspected by qualified service personnel.

Do not obstruct cooling vents, ensure that sufficient air can circulate.

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There are national guidelines in most countries defining how laser systems should be used in entertainment venues and these should always be followed.

Most lasers used for the generation of laser effects can cause severe permanent eye damage if the beam is directed straight into the eye. No damage occurs if the exposure is extremely short, this explains why it is safe to look directly into a continuous wave scanning laser beam providing the exposure is less than health and safety regulations (scanned pulsed lasers should not be viewed at all). If the system was to fail while being viewed in this way the eye could be exposed to a stationary beam and damage would occur before the viewer had time to look away.

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IT IS THEREFORE RECOMMENDED THAT NO LASER SYSTEM SHOULD
BE INSTALLED THAT WILL SCAN THE LASER BEAM INTO ANYBODY'S
EYES

The complete laser system must include safety interlocks to prevent both the viewers being scanned by the operator or part of the system failing. i.e. provision must be made for the complete system to be fail safe.

Further guidelines on the safe use of laser will be supplied by the local health and safety organisation, if they are unable to help laser associations, for example ILDA, will be able to give guidance on the safe use of lasers in entertainment venues.

Product: PM21 Controller	Version No.
Serial No.	Date Purchased:
Supplied by:	
Name:	
Company Name:	
Building Name/No.:	
Street 1 :	
Street 2 :	
Street 3 :	
City :	
County/Area :	Country :
Email:	
Post/Zip Code:	Phone No.
	Fax. No.
We are always interested in feedback from our customers. Any suggestions, comments or requests for improvement :	
Please return to: CHAMELEON LASERS Laburnum House, Church Hill, Lover, Wiltshire, SP5 2PJ UK Tel: +44 (0) 1725 514 900 Fax: +44 (0) 1725 514 905 email Sales@chamtech.co.uk	

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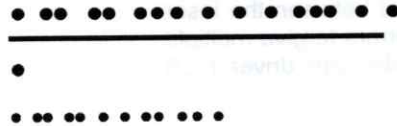
 .
 Chameleon Lasers
 .
 PM21 Controller
 .
 Version 1.0

Is designed to meet the following product specifications:

- • • EN60065, resp. EN 60950
- • • EN55014
- • • EN55011
-

All cables must be shielded and the shielding must be connected to ground and to the case of equipment this unit is installed in. Also the unit and all connected apparatus must be earthed.





- Designed for the installation market
- Low cost with many functions
- Control of beam table and rotating head with addons
- Built in logo library.
- Ideal for use with low power DPSS lasers
- Sequence on each key
- Colour, Servo and Auxiliary outputs.
- Universal mains operation

The PM21 laser control desk is designed for small scale laser installations normally with a DPSS laser (sometimes referred as a diode YAD or frequency doubled YAG) which are becoming very popular as the cost decreases. As the desk can be configured with a number of different systems it is important that all local health and safety regulations are complied with by the complete system. The PM21 will drive a scanning head consisting of the following items:

1/ A pair of galvo's for X Y deflection of the laser beam.

These can be open loop (i.e. GM104's) or closed loop position sensor types (i.e. GM124PD's). The logo's supplied as standard with the desk are best displayed by closed loop galvo's.

2/ A colour control mechanism to select multiline output if the system has a suitable laser. This can either be a three position servo or three solenoids with filters attached. The output from the desk is three control lines.

3/ An effects disk on to which are fitted optical devices to modify the laser beam after it has been scanned. Three effect positions plus clear are provided.

4/ A shutter for blanking the laser beam when the system is not required to be used.

5/ An auxiliary output for control of options that may be added to the system.

6/ A beam table of up to 16 actuators can be positioned between the laser and the galvo's. They can be used with semi reflective mirrors to give multiple beams leaving the scanning at one time. Requires a decoder driver PCB available from Chameleon Lasers.

7/ A 360 degree scanning head using a mirror to enable the system to scan images in any direction. The position can be stored and the head rotated at variable speed. This is supported in the serial data sent from the controller. The hardware is not supplied.

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Before leaving the factory each and every Chameleon Lasers product is carefully tested and inspected for physical imperfections. As soon as your unit shipment is received, please check for any damage incurred during transit. If any damage has occurred, immediately notify the freight company and your dealer so that a claim to cover damages may be initiated. Be sure to retain the shipping carton and all packaging material for the freight company's inspection. Even if no damage has occurred, it is an advantage to retain the packaging materials should you have occasion to ship the unit.

COMPONENTS SUPPLIED

- 1 PM21 controller.
- 1 Manual.
- 1 Power IEC cable if for UK market

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To access the PM21 laser controller after switching on the power a 4 button code must be entered. In remote control mode the pass code must still be entered from the front panel. The controller has 3 possible codes:

- 1/ 1, 4, 2, 5
This allows full use of the controller.
- 2/ 9, 11, 10, 12
On entering this code the leds will flash off and the effect memory will be cleared to the default pattern.

3/ cursor_left, cursor_mid, cursor_right, store

This pass code allows the minimum size and minimum height for beam zapps to be programmed in. This will only respond if the internal DIP switch is disabling the minimum function. This should not be used in place of mechanical stops to mask the laser.

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The functions of the switches on the front panel will be described with the each switch or group of switches dealt with in turn. The switches fall into 3 groups the first being effect replay, the second for creating effects, and the third to control the speed of the sequencer. The name of switches is shown in this font SWITCH

GROUP 1	EFFECT SELECT
---------	---------------

EFFECT 1 to 16

These sixteen buttons are used to select the effect that the desk produces. The sixteen buttons are used in conjunction with the SHIFT button to give thirty two effects. Each effect can consist of a single static image or can be programmed with up to sixteen images. Images can be stepped through by manual action, by the internal timer in the auto mode, or by the audio input line. An image can be a pattern, logo, text, point mode logo, or text and these can be modulated in a number of different ways, including rotation, flipping, audio on both the X and Y axis. When a shifted effect is being displayed the LED on the SHIFT button is alight.

GROUP 2	CREATING IMAGES
---------	-----------------

COLOUR SELECT

FULL.BLUE.GREEN.RED

These four buttons are to select which optical filters are placed in the front of the laser to modify the colour of the projected beam. FULL has all the filters removed by all the outputs being off. Each colour when active drives its output

to high. The three colour signals can be used to drive individual solenoids or to drive a servo colour wheel. The outputs are TTL compatible. Each of the three outputs can be individually on or off. When all three outputs are off then the clear LED will light.

SERVO WHEEL

CLEAR A, B, C

The servo wheel is a mechanical arrangement to move optical devices into the beam path after the scanning mirrors. The four buttons are encoded onto the 2 output lines servo A and servo B as follows

Function		servo A	servo B	outputs
CLEAR	I	low	low	
A	I	high	low	
B	I	low	high	
C	I	high	high	

These are TTL compatible output lines.

SHUTTER

This button is used to blackout the laser light in the scanning head so that no image can be seen. The button toggles so the first press will turn on the laser output and the second turns it off.

FLASH (shift SHUTTER)

When this mode is selected it will over ride the shutter function as explained above so that the image can only be seen when the EFFECT buttons are held down, releasing the EFFECT button will blackout the image. This function will toggle on and off.

AUX

Controls the Aux. output line to the scanning head to control any option that may be fitted. It toggles the output on and off.

BEAMS (shift AUX)

This allows programming the beam table. Pressing on of the 16 EFFECT switches will bring in the beam table actuator (up to 16 if all are

fitted). Pressing STORE will exit back to normal operation. If BEAM LOGO or PATTERN will exit without the beam mode being stored.

POS

Controls the function of the cursor buttons so that the position of an image on the scanning target area can be moved and stored under an effect key. See under CURSOR buttons for their use.

SIZE (shift POS)

Controls the size of an image that is being displayed. This will not vary the position as the size is adjusted. If the minimum size option is selected on the DIL switch then the size of an image cannot be adjusted down to zero but limits at the programmed minimum size. See under CURSOR buttons for their use.

SEQUence

Each of the 32 effects can be up to a 16 step sequence that will run whenever the EFFECT button is pressed. The sequence may be triggered from the internal timer, adjusted by the slider on the front panel, or by the audio input or finally from the pressing of the MANUAL step button. If an EFFECT button has text on it then programming a sequence will destroy the text. Likewise if text is wanted on an EFFECT button that has a sequence on it the sequence must be cleared by pressing SEQUENCE and then immediately pressing END sequence (shift SEQUENCE).

END (shift SEQUENCE)

As explained above is used to exit from programming a sequence that contains less than 16 steps.

STORE

Whenever an image has been created that is desired to be kept it can be stored under the current EFFECT button by pressing STORE and the LED will blip red to confirm that the image has been stored. When an image has been recalled by the EFFECT buttons it can be changed as desired but the original will not be modified unless the STORE button is pressed. That is a second press on the same EFFECT button will restore the original image.

DEFAULT (shift STORE)

Is a quick way of returning the image to a known state, if in pattern mode a circle is output, if in logo mode the first logo is output. Size and position are set to mid values.

WRITE (shift AUDIO)

When a logo is selected this will cause the image to be drawn starting from a single dot. The speed of the draw is controlled by the sequence speed slider. As the draw is slower than a single step of a sequence it is not practical to use it in a sequence.

BEAM

Selects a single beam from the scanning system. This can be positioned by using the cursor keys (see next section). Usually the beam will target onto mirrors around the display area.

MOD (shift BEAM)

Modulation is used with patterns and logos to manipulate the image, for example by spinning it around its centre point. See cursor section for details of operation.

PAT

The pattern generator allows the selection of pre-programmed patterns and adjust their scanning speeds using the cursor keys. See cursor section for details of use.

POINT (shift PAT)

Point mode allows simple logo's to be entered by hand into the controller. Eight such images can be stored with a maximum length of 380 points. On entering the mode the first eight EFFECT keys light. Select which of the 8 images is to be used. At this point there are two possible choices, the first is to display an image that has previously been entered. By pressing STORE that image will be output. The second choice is to program a new image and this is selected by pressing PROG SEQ. Now by moving the cursor keys the scanned beam will move. Each time the STORE key is pressed the point will be fixed and scanned. If a point is stored by accident it can be undone by pressing the POS key. When all points are entered press the PROG SEQ key and the image will be saved.

CURSOR BUTTONS

CURSOR UP, CURSOR DOWN, CURSOR MID CURSOR LEFT, CURSOR RIGHT

The five cursor buttons have a number of uses depending on the function that is selected at the time, remember that if the cursor button is held down the function will auto repeat after a short time delay, the functions that control what the cursor buttons do are listed below :

POSITION selected

CURSOR.UP

A single press will raise the scanned image vertically, continuous pressing will auto repeat the movement. A single press of the cursor mid button followed by the cursor up will move the image to the top extreme

CURSOR.DOWN

This move the image vertically down if the Y min option is switched on then the beam will only travel to this limit. Same options as cursor up.

CURSOR.LEFT

Image moves to the left same options as the cursor up button

CURSOR.RIGHT

Image moves to the right same options as the cursor up button

CURSOR.MID

If a single press is made then it will affect the operation of the four other cursor buttons. This action will enable the other cursor keys to reach the extreme of their travel with two button presses. This action will time out in approx. 5 seconds after the press of the cursor mid button. Pressing the cursor mid key twice in close succession will return the image to centre position.

SIZE (shift position) selected

CURSOR.UP

Increases the vertical size of an image, holding down and it will auto repeat, cursor mid then cursor up will give max size. If the desk is in BEAM mode then this will have no effect.

CURSOR.DOWN

Decreases the vertical size, if the minsize option is switched off then the size will go to zero, options as cursor up.

CURSOR.LEFT

Decreases the horizontal size ,again if minsize option is off then the size will go to zero, options as cursor up.

CURSOR.RIGHT

Increases the horizontal size, options as cursor up

CURSOR.MID

If a single press is made then it will affect the operation of the four other cursor buttons. This action will enable the other cursor keys to reach the extreme of their travel with two button presses. This action will time out in approx. 5 seconds after the press of the cursor mid button. Pressing the cursor mid key twice in close succession will return the image to centre position.

BEAM selected

The cursor buttons do exactly the same as if the position function was active

MOD (shift beam) selected

CURSOR.UP

This steps forward through the available selection of modulation effects.

CURSOR.DOWN

Steps backwards through the available modulation effects

CURSOR.LEFT

Slows down the cycle rate of the modulation, as the time difference between steps is small a large number of steps may be needed to slow the modulation to its slowest speed. If the button is held down the function will auto repeat

CURSOR.RIGHT

Speeds up the rate of modulation see note above under cursor left regarding number of steps to achieve required speed.

CURSOR.MID

Will exit from the modulation and restore the image to its original state.

PATTERN selected

CURSOR.UP

This steps through the selection of pre-programmed patterns that are stored in the desks memory in the forward direction

CURSOR.DOWN

This steps backwards through the programmed patterns.

CURSOR.LEFT

Slows down the scan rate of the displayed image, again as with the modulation speed there are a large number of steps in the possible range.

CURSOR.RIGHT

As above but speeds up the scanned image.

LOGO selected

CURSOR.UP

Selects a logo from the pre-programmed logo's held in memory, the number of logo varies from approximately 10 to 128 depending on their length, it selects in the forward direction. There are two banks of logo's, stepping forward will go from the end of the first to the start of the second. The forward stepping will run through both banks in turn.

CURSOR.DOWN

Selects a logo in the reverse direction from the selection held in memory in the current bank, it will not go backwards to the last bank.

CURSOR.LEFT

Slows down the scan rate of the displayed logo, again as in the modulation speed there are a large number of steps in the possible range.

CURSOR.RIGHT

As above but speeds up the logo scan rate.

AUDIO selected

CURSOR.UP

Switches on the audio modulation on the Y axis.

CURSOR.DOWN

Switches off the audio modulation on the Y axis.

CURSOR.LEFT

Switches off the audio modulation on the X axis.

CURSOR.RIGHT

Switches on the audio modulation on the X axis.

CURSOR.MID

Toggles the audio modulation between fast and slow response.
Slow response will increase and decrease the size of an image in time to the audio input. Fast response can be used to create effects such as oscilloscope displays of the audio input.

NOTE

Remember that the cursor buttons auto repeat when held down, the speed of the repeat can be controlled by the sequence auto speed fader. When the fader is at the top of its travel, sequence speed is fast, then the auto repeat is at its slowest. And the reverse applies if the fader is at the bottom of its travel then the auto repeat is at its fastest.

GROUP 3	SEQUENCE SPEED
---------	----------------

AUDIO

Selects the trigger for the sequence as the audio signal coming into the desk from the Jack socket on the rear panel. The audio level is compressed and then filtered to give a beat signal.

AUTO

Assigns the trigger for the sequence to the speed fader on the front panel

MAN

The first press will stop the sequence running and any further presses will step the sequence on one step.

360 REMOTE HEAD (shift MANUAL)

The CURSOR.LEFT and CURSOR.RIGHT switches move the 360 degree or control the speed of its rotation. To select between position and rotation the AUTO (rotation) and MAN (position) are used. The LEDS light to show which is selected. Any of the above switches will exit but the new position will stay only if it is now stored with the STORE switch.

Comment [GJM1]:

TEXT

The controller can also generate scrolling text of up to 126 characters, including spaces. To enter text an IBM PC compatible keyboard must be plugged into the 5 way DIN socket on the rear panel. The keyboard should only be plugged in and out with the controller switched off. Pressing *F1* on the keyboard will make the entry mode active. If a mistake is made *backspace* can be used to correct it. *Carriage return* will exit the entry mode and display the text on the scanners. The speed of the scrolling is controlled by the *AUTO RATE* knob. If a sequence exists on the effect key intended for text it must be cleared to a single step by pressing *PROG SEQ* and then *END* (shift *PROG SEQ*). If text cannot be entered on a key this clearing of the sequence steps must be done first.



These switches are used to set various options for operation of the desk. To change the setting of the DIP switches the rear cover must be removed, having first disconnected from the mains supply, by undoing the screws down either side of the desk. Remove the side brackets, and then by pulling gently, the front panel will come clear of the back cover. The switches are located in the centre of the PCB at the bottom edge.

The function of the switches is as follows

- 1: Disables the pass code, a by product of this is that the desk cannot be reset to default patterns in this mode
- 2: When switched on it enables the safety feature of limiting the minimum size that an image can be reduced to and the lowest point on the vertical an image can be moved to (BEAMS only). In *WRITE* mode the logo is not drawn from a dot but a small section at the start of the logo. When the image is being modulated the image can go through a momentary dot. To program the minimum size a passcode is used at power on and the switch must be switched to the disable position (open). This is so that once the levels have been set they cannot be adjusted when this mode is in use without opening the controller up. This should not be used in place of mechanical shutters to mask the laser from the audience.
- 3: This enables a time out feature when switched on, so that if the desk is left with no use for longer than approx. 10 minutes it will return to the passcode mode. This is useful in preventing untrained personal access to the laser system and may be required by some laser safety regulations.
- 4: This must be in the off position for correct operation of the desk. It is used for testing.

The last 4 switches are to configure the controller and must not be touched.

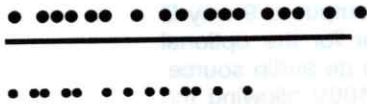
NOTE

The default setting is switch 1 on and all others off, ie pass code is enabled at power on.

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The RS232 interface is set to 9600 baud 8 data bits 1 stop bit and no parity.
At the current time this is set internally and cannot be changed.



The PM21 laser control desk is designed for small scale laser installations normally with an air cooled system. As the desk can be configured with a number of different systems it is important that all local health and safety regulations are complied with by the complete system.

The PM21 will drive a scanning head consisting of the following items:

- 1/ A pair of galvo's for X Y deflection of the laser beam.
These can be open loop (i.e. GM104's) or closed loop position sensor types (i.e. GM124PD's). The logo's supplied as standard with the desk are best displayed by closed loop galvo's.
- 2/ A colour control mechanism to select multiline output or one of two single lines. This can either be a three position servo or two solenoids with filters attached. The output from the desk is three control lines.
- 3/ An effects disk on to which are fitted optical devices to modify the laser beam after it has been scanned. Three effect positions plus clear are provided.
- 4/ A shutter for blanking the laser beam when the system is not required to be used. The response speed of the shutter should be short so that when the FLASH mode is used there is no lag after an EFFECT button has been pressed. The shutter may also be used by external safety interlocks to prevent emission of laser light. Such signals may come from mirror ball rotators to show that they are in motion
- 5/ An auxiliary output for control of options that may be added to the system.
- 6/ A beam table of up to 16 actuators can be positioned between the laser and the galvo's. They can be used with semi reflective mirrors to give multiple beams leaving the scanning at one time.
- 7/ A 360 degree scanning head using a mirror to enable the system to scan images in any direction. The position can be stored and the head rotated at variable speed.

The laser desk is linked to the scanning head by a multicore cable so that the desk can be positioned to enable the operator to have a clear view of the laser target area. This is a requirement of most health and safety regulations. The multicore should have an overall screen and can be up to 50 metres in length.

The controller has a 15 way D series socket for the laser output ,a 9 way D series for the RS232 interface, a five way DIN connector for the optional keyboard, and finally a stereo jack socket for connection to an audio source. The controller will accept an audio input from 250mV to 100V allowing the input to come from either preamps or power amps.

The controller can be mounted either horizontally or vertically. The unit does not require any ventilation provision. The unit should not be used in locations of high humidity.

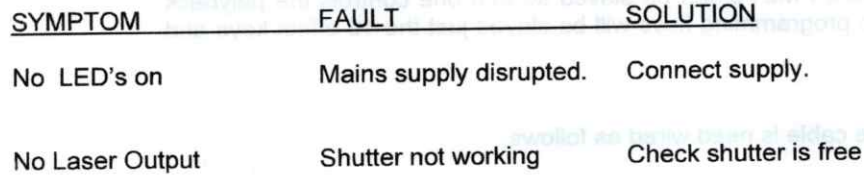
The PM21 requires an IEC mains lead to connect power to the back panel, the on/off switch is positioned next to the power inlet. Other connections along the back panel are

- 1 output to the scanning head via a 15 way Dseries female connector
- 2 preview output of X,Y, and blanking via a 6 way DIN connector
- 3 serial interface to PC for down load via a 9 way D series
- 4 keyboard interface via a 5 pin DIN
- 5 Audio input to desk this is a stereo input but is mixed to mono before use

The preview and serial are not needed to get the desk working but it is recommended that an audio input is connected to get the best from the controller. Once the controller is connected to the laser scanning system the desk then the laser should be powered up.

All connectors should be installed in such a way that the cable weight will not pull on the connector or its solder joints. The mains supply should be reliable and if remotely switched should do so cleanly.

Once installed the unit will output a pulsing circle after the pass code has been entered. Pressing the shutter will allow this to be visible.●

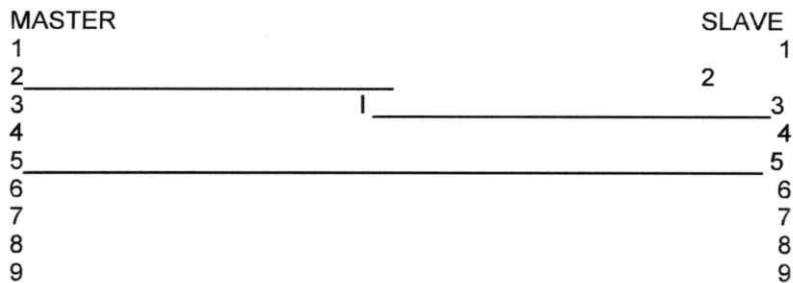


Appendix A – SLAVING CONTROLLERS

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Two or more PM21's can be slaved so that one controls the playback of the others. No programming keys will be slaved just the 16 effect keys and the shift key.

A two core cable is need wired as follows :



To add further slaves just add in parallel to the slave socket.

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This feature is only in the latest version of software. If needed an upgrade EPROM is available from Chameleon Technology.

Appendix B – LOGO FORMAT

The logos displayed by the desk are stored on 2 EPROM's inside the desk. When the desk is opened three EPROM's can be seen. U22 is the control EPROM and should not be changed. U23,U24 are the logo EPROM's, U23 is the default one which is displayed first. The desk holds 2D logos so the format is x byte y byte repeated then 00 to mark the end. All the logos are stored one after each other. At the top of the eeprom is a table pointing to the start of each logo

address 0000

logo1 x

y

x

y

.

.

0

0

logo2 x

y

x

y

.

.

0

0

etc.

repeat the logos as needed

address 07f80 hex

pppp logo1 offset from start of EPROM plus 4000hex

pppp logo2

etc.

repeat for the number of logos max. of 64 then fill with 00hex to end of

●

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15 Way D series socket

Stereo Jack socket

6 Pin Din

5 Pin 180 Din

9 way D series

3 Pin IEC

+ - 10 Volt

TTL compatible 0V off 5V on

TTL compatible 0V off 5V on

TTL compatible

A	B
1	1
1	2
1	3
1	4
1	5
1	6
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TTL compatible 0V off 5V on

RS485 at 62k5 baud

powder coated

Steel powder coated

19 Inch Rack mounting

19 Inch Rack mounting

1	Ground
2	Shutter
3	Y positive

WACT 1100
230 x 130

7432

7474

74299

74125

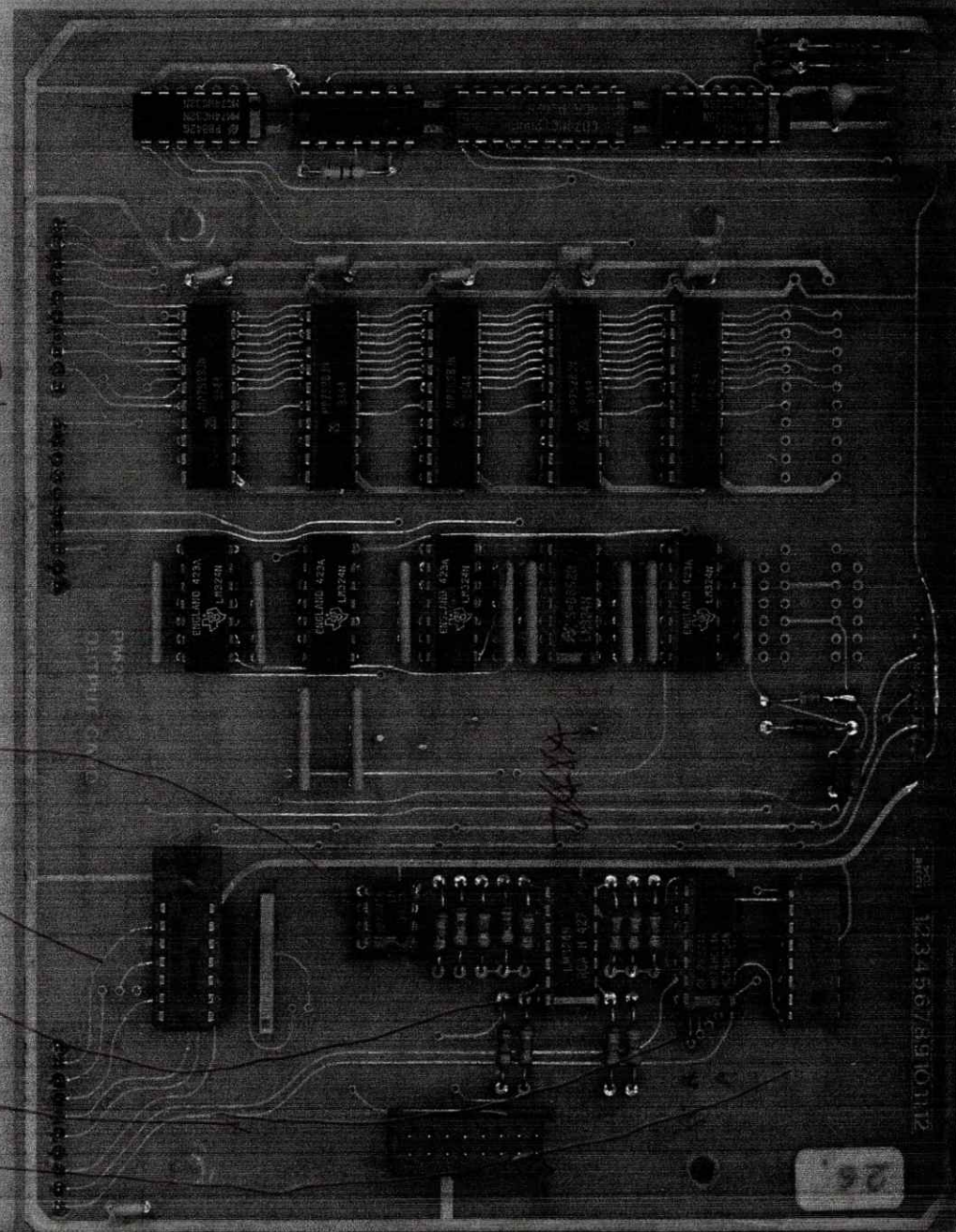
825T +23

741

7414

7414

DG508



123456789101112

When down loading from PC LOGO to view logo go to point mode and press effect 1 to select first point mode logo.

6A : SELECT LOGO
command byte followed by single byte to select logo puts desk into logo mode

6B : SELECT BEAM
command byte followed by two bytes first being X position then Y position

6C : AUX ON
single byte command

6D : AUX OFF
single byte command

6E : MODULATION
command byte followed by modulation number and then modulation speed sent as two bytes most significant byte first

6F : DUMP OUT
command byte followed by effect number and desk responds by outputting 256 bytes of data

70 : DUMP IN
command byte followed by effect number followed by 256 bytes of data

71 : LOAD LOGO
command byte followed by logo number (0-7) followed by x point then y point repeated for max of 378 points terminated by 00

72 : MOD LOGO
command byte followed by logo number followed by two byte logo number (msb first) followed by new value x y point

73 : INSERT POINT
command byte followed by logo number followed by point number followed by the point x y

74 : DELETE POINT
command byte followed by logo number followed by point number

75 : OUTPUT POINT LOGO
command byte followed by logo number

76 : INPUT TEXT
command byte followed by button codes for text string \$1c to exit

77 : RESET
send command twice to reset desk

78 : WRITE LOGO
command byte followed by 0 for off or 1 for on and desk will draw logo when new logo selected

79 : SERVO
command byte followed by value 0 to FF hex output on pin 8

All codes that do not fall into the above two groups are ignored by the desk.

Note

32 :	effect 11
33 :	effect 12
34 :	effect 13
35 :	effect 14
36 :	effect 15
37 :	effect 16
3C :	AUX
3D :	SHUTTER
44 :	BEAM
45 :	PATTERN
46 :	LOGO
49 :	CURSOR Y+
4F :	AUDIO speed
50 :	CURSOR X-
51 :	CURSOR MIDDLE
52 :	CURSOR X+
57 :	AUTO speed
59 :	CURSOR Y-
5C :	SIZE
5D :	PROG SEQUENCE
5E :	STORE
5F :	MANUAL SEQUENCE

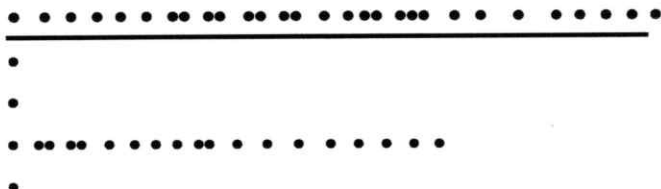
The shift button is activated by setting bit 7 in the above codes for example if shifted effect 1 was required then the code A8 hex must be sent.

GROUP 2 COMMANDS

These codes are only valid on the following value if bit 7 is set then the command is ignored

- 61 : CLEAR MEMORY
send command byte twice to clear effect memory
- 62 : VERSION NUMBER
command byte then desk will return version number of software
- 64 : SET POSITION
command byte is followed by two bytes the first is X position then Y
- 65 : SET SIZE
command byte is followed by two bytes the first is the X size then Y
- 66 : SHUTTER OFF
single byte command
- 67 : SHUTTER ON
single byte command
- 68 : SELECT EFFECT
command byte followed by single byte to select effect between 00hex and 3fhex

- 69 : SELECT PATTERN
command byte followed by single byte to select pattern puts desk into pattern mode



The PM21 is provided with a serial remote control input. This allows the desk to be controlled by any personal computer or other controller. The interface is a standard RS232 but does not have any flow control, so it is up to the external controller to ensure that it does not supply data at too fast a rate.

There are two groups of remote commands, the first group simply mimics the function of the buttons on the front panel and are only a single byte in length, the second group are complete commands to implement control functions and as such have a variable number of bytes in them.

The interface is serial at 19k2 baud, 8 data bits, no parity, and 1 stop bit. Details of a cable to interface to an IBM PC or compatible are at the end of this section. The 9 way D series socket is on the rear of the PM21 and is only fitted if requested at time of purchase. Note the internal DIP switch must have switch 1 in the on position to remotely control the desk. At power on the desk will output a message in the format PM21 version x.x that can be used to check which commands are in place.

Group 1 commands :

code in hex	button function
20 :	colour clear
21 :	colour blue
22 :	colour green
24 :	servo position 1
25 :	servo position 2
26 :	servo position 3
27 :	servo position 4
28 :	effect 1
29 :	effect 2
2A :	effect 3
2B :	effect 4
2C :	effect 5
2D :	effect 6
2E :	effect 7
2F :	effect 8
30 :	effect 9
31 :	effect 10

[illegible]

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● ●● ●● ● ●●● ● ●● ●● ●●

Should there be a need to ship the unit to the Chameleon Laser factory for repair, the unit must be shipped in its original package (or a replacement which is available at a small cost) and all freight charges must be pre-paid. If a warranty is established the unit will be repaired and returned freight collect.

2	3
3	2
5	7
4	20
6	6
7	4
8	5

- 4 Y negative
- 5 X positive
- 6 X negative
- 7 serial data +
- 8 serial data -
- 9 Col A (Red)
- 10 Col B (Green)
- 11 Col C (Blue)
- 12 Servo A
- 13 Servo B
- 14 Aux
- 15 not used

Keyboard 5 Pin DIN

- 1 Clock
- 2 Data
- 3 Reset
- 4 Ground
- 5 +5V

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Pin out of 9 way socket on PM21 is :

- 2 RXD receive data
- 3 TXD transmit data
- 5 GND signal ground

The pin out of a cable to link the PM21 controller to an IBM PC or compatible is :

PM20 Plug	9 way D series connectors	PC socket
2 RXD	TXD	3
3 TXD	RXD	2
5 GND	GND	5
7 RTS	CTS	8
8 CTS	RTS	7
	DTR	4
	DSR	6

If the IBM PC or compatible has a 25 way Dseries the following can be used to make up an adaptor :

9 way D series plug 25 way D series socket