

Predator MX

Features of the Predator MX

- Lightweight extruded aluminium housing
- Microstepping motors
- Pure dichroic colours (8 solid colours or 7 split colour)
- 7 gobos (squares, tunnel, dots, star, triangle, segments, circle)
- External focusing
- Internal power factor correction
- Blackout/strobe shutter (strobe in any colour)
- Long life/high output CSS575 metal halide lamp (supplied)
- 0-10V Analogue control
- Stand-alone operation using internal microphone

IMPORTANT

Installer and Users please note:

These instructions should be read carefully and left with the user of the product for future reference.

Installation

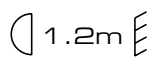
Fix the Predator MX with the hanging bracket provided. To conform to Health & Safety Regulations, a safety chain must also be employed.

The Predator MX must be installed by a competent electrician in accordance with the current IEE wiring regulations.

Connect the Predator MX to the mains supply with the lead provided. The wires are colour-coded as follows:

- Brown = Live (phase)
- Blue = Neutral
- Green/Yellow = Earth
- The Predator MX must be earthed for safe and reliable operation.

The supply must be fitted with an isolating switch, or plug and socket, and protected by fuse or circuit breaker rated at between 6A and 16A. If the Predator MX circuit is connected via an MCB then it is recommended that a time-delay MCB is used (Type 3 or Type C to BS3871). This will reduce the possibility of "nuisance tripping" due to the large inrush current of the power factor correction capacitors.



This symbol means that, in order to reduce the risk of fire, the Predator MX should be installed more than 0.8 metres from any object that it is illuminating.

It is also possible to connect the Predator MX to a switching pack such as the NJD SP10000 but this is not recommended. If connecting via a power pack, ensure that the outputs of the power pack have sufficient capacity to switch the VA rating of the Predator MX. The Predator MX should not be connected to a dimming pack or light dimmer. The Predator MX is an inductive load.

The Predator MX is supplied with its handle pre-assembled. The handle can be lengthened by removing the four pozidriv screws fixing the three sections together and re-assembling in a different position. The U-shaped piece can also be fitted at right angles to the side pieces so that the Predator MX can be fixed to a wall.

By removing the handle completely, and re-assembling the other way round, the Predator MX can be tilted in the opposite direction.

Fix the Predator MX securely, and fit a safety chain. Tighten the

handle fixing screws with the Allen key provided.

The Predator MX should be operated with the fan at the lower end and the mirror at the upper end. Operating the other way up may reduce lamp life.

Adjust the hanging bracket until the light beams are in the best position. The Predator MX may be moved whilst it is operating, the lamp is not vulnerable mechanical damage . It is recommended that the Predator MX is allowed to cool for 5 minutes after switching off before moving.

Changing the lamp.

Disconnect from the mains supply. Slacken the knob on the lamp cover and remove the lamp/reflector assembly. Remove the lamp from the reflector, holding it with a cloth to avoid getting fingerprints on the glass. Replace with a new lamp, type CSS575, being careful not to touch the glass envelope of the lamp. Replace the cover and tighten the lid-fixing knobs. The lamp has a life of around 1000 hours running at 230V, it is recommended that it is changed after 1000 hours use as there is a slight chance that the glass envelope may explode at the end of its life.

Changing the fuse

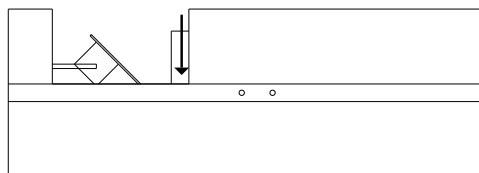
If the fuse blows, replace with a new fuse type 20mm x 5mm 8 Amp Anti-surge, High breaking capacity. This type of fuse has a ceramic case. Do not replace with any other type or value of fuse. If the new fuse blows, consult a dealer. The fuse is located in a small drawer beneath the mains inlet connector (remove the mains cable to gain access).

Focusing.

To focus slacken the two focusing controls on the front of the unit, move forwards or backwards as required, and re-tighten the screw when the best image is obtained.

Cleaning.

The Predator MX should be cleaned periodically as the light output will become less intense as smoke fluid residues build up on the mirror and lenses.



← Disconnect from the mains supply and remove the cover as follows: Remove the 6 screws at the positions indicated by the arrows using a #2 Pozidriv screwdriver. The top section of the cover

can be lifted off vertically to gain access to the optics.

Clean the lens and the mirror using a soft lint-free cloth and methylated spirit, isopropyl alcohol or hi-fi cleaning fluid. Also, make sure that the fan is not becoming obstructed.

The Predator MX has a thermal switch which will cut off power if it overheats due to the ventilation being obstructed.

Setting up.

The Predator MX may be operated in one of four different Modes.

1) Independent (internal microphone) see page 5

The Predator MX will move to each bass beat, going through a sequence of patterns at random, including up/down, side-to-side, square, octogon, diamond, figure-of-eight, random and chevron, along with colour and gobo changing.

2) Synchronized (internal microphone) see page 6

The Predator MX will perform the above patterns either synchronised together, or with the movement mirrored. In addition, the colours and gobos will operate in one of three modes: random, synchronised or chasing. The movement can be reversed by setting the control switches in order that two rows of Predator MXs can be set up opposed to each other, and will continue to move in synchrony.

3) Externally controlled from any DMX controller such as Merlin, IQ-MX80, IQ-MX60 or IQ-MX40. see page 7

The IQ-MX80 has 10 preset programs, 10 user-programmable programs, real-time programming and a joystick. and can control any number of Predator MXs and Predator HXs arranged as up to 16 channels.

The IQ-MX40 can control 4 channels of Predator MXs and has a total of 256 selectable functions including fourteen patterns, each with selectable colour/gobo, four different colour/gobo change modes (fill, random, shift and sync), and four different run-sequences of colours and gobos.

With a programmable DMX controller such as Merlin, up to 32 channels of Predator MXs can be controlled, there is no limit to the number of Predator MXs on each channel. The beam can be positioned to an accuracy of 0.7°, and the colour/gobo can be selected.

4) Analogue control from a 0-10V output controller (Touch panel, or AR1 remote controller) see page 10.

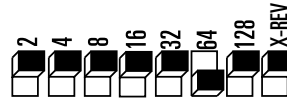
0-10V can be used to directly control the colour and movement, or to select the sound animated patterns.

Independent mode.

If the Predator MX is to be operated in the “independent” mode, then proceed as follows:

1) To allow the Predator MX to select an operating mode at random (i.e. change colour to sound, rotate to sound etc.) set all the DMX address switches to OFF.

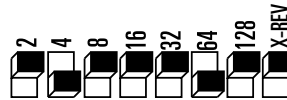
2) If you wish to select the operating mode turn switch “64” ON, then turn the following switches on to decide which operating mode you would like



To select all gobos and magenta, yellow, cyan or pink turn switch 2 ON.



To select colours with no gobos (red, green, blue and white) turn switch 4 ON.



To select change-colour-to-sound, beam stationary, turn switch 8 ON.



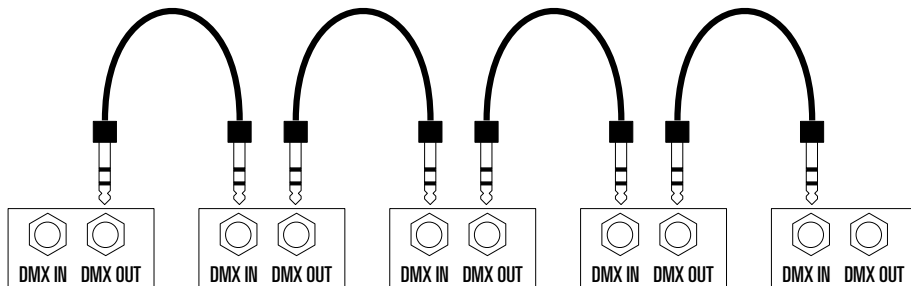
To select flash-to-sound, turn switch 16 ON.



If more than one of the switches is turned on, then the Predator MX will sequence through the selected operating modes in turn. Switches “16”, “32” and “128” must be turned OFF.

Synchronized operation without a controller

To synchronize Predator MXs without a controller, connect a DMX lead from the **DMXout** jack on the first Predator MX to **DMXin** on the second, from **DMXout** on the second Predator MX to **DMXin** on the third, and so on.



DMX line termination is performed automatically by the Predator MX. DMX leads must never be joined (apart from end-to-end) or split. Using a 2-to-1 splitter or similar will prevent the system working.

To obtain the the correct movement the switches on the back of each Predator MX must be adjusted to tell it which channel it is set to. The switches are labelled 128, 64, 32, 16, 8, 4, 2 and 1. These set the DMX address.

The "16" switch reverses the movement of the beams in order to allow two rows of Predator MXs to be installed facing each other.

Setting the DIL switches.

The Predator MX at the start of the chain (the one with no plug in its **DMXin** socket) acts as master, the others act as slaves, controlled by the master. Set the DIL switches on the master as described in "independent operation" on page 6.

Set the DIL switches on the slaves as follows:

Either: If it is intended that all the Predator MXs should operate identically, set all the DIL switches OFF on the slaves.

To reverse the movement of any of the units, turn switch 16 ON

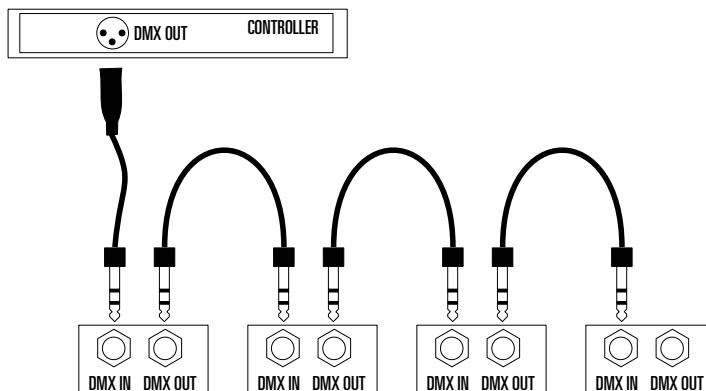
Or: To obtain four channel colour changing sequences, set the DIL switches as shown in the table below: (Predator MXs 5 to 8 repeat the actions of numbers 1 to 4)

Predator	DMX start address	Switches ON (other switches OFF)
1	1	None
2	5	4
3	9	8
4	13	8, 4
1 (reversed in X direction)	17	16
2 (reversed in X direction)	21	16, 4
3 (reversed in X direction)	25	16, 8
4 (reversed in X direction)	29	16 , 8, 4
1 (reversed in Y direction)	33	32
2 (reversed in Y direction)	37	32, 4
3 (reversed in Y direction)	41	32, 8
4 (reversed in Y direction)	45	32, 8, 4
1 (reversed in X and Y directions)	49	32, 16
2 (reversed in X and Y directions)	53	32, 16, 4
3 (reversed in X and Y directions)	57	32, 16, 8
4 (reversed in X and Y directions)	61	32, 16, 8, 4

Reversing the movement is useful if two or more Predators are facing each other. Reversing the x-direction movement makes the beams from both units move the same way in the air.

DMX operation

Using the Predator MX with NJD's dedicated DMX controllers
(IQ-MX range)



To connect to a controller: Connect a DMX lead from the **DMXout** from the controller to **DMXin** on the first Predator MX . Connect a DMX lead from the **DMXout** jack on the first Predator MX to **DMXin** on the second. Connect from **DMXout** on the second Predator MX to **DMXin** on the third, and so on.

DMX line termination is performed automatically by the Predator MX . DMX leads must never be joined (apart from end-to-end) or split. Using a 2-to-1 splitter or similar will prevent the system working.

Refer to the User Guide accompanying your controller for information on how to set the switches.

Connecting to Merlin or any Lighting control desk with DMX output.

The DMX system has 512 addresses, each address can be the brightness of a single dimmer, or a position on a motor. The Predator MX controls 4 motors: it requires four DMX addresses. The Predator MX can be programmed to any address from 1 to 255, so there can be up to 64 channels of Predator MXs on a controller. Any number of Predator MXs can be assigned to each channel or address. If two Predator MXs are assigned to the same address then they will perform identically.

Each Predator MX occupies four DMX channels. The DMX address of the first channel can be set to any odd-numbered start address by using the switches on the back of the Predator MX .

The switches are labelled 128, 64, 32, 16, 8, 4 and 2.

Add up the numbers of the switches that are ON and then add 1. This number is called the **start address**.

The X-motor appears at the start address, the Y-motor at start address plus 1, colour motor at start address plus 2 and the gobo motor at start address plus 3. (i.e. If switches 32 and 8 are ON, then start address is $32+8+1 = 41$, the X motor is on channel 41, the y-motor on channel 42, the colour motor on channel 43, and the gobo motor on channel 44.)

The X-REV switch reverses the movement in the x direction. Use this switch to make the Predator MX move the same way as the controller joystick, which depends on whether the Predator MXs is facing towards or away from the controller. This switch has no effect on the DMX address set on the other 7 switches.

The DMX dimmer levels control the movement as follows:

X-motor: 0 is extreme left (right for X-REV selected), 255 is extreme right (left for X-REV selected), 128 is central.

Y-motor: 0 is down, 128 is central, 255 is fully up.

DMX data	colour	gobo
0 - 31	magenta	squares
32 - 63	yellow	tunnel
64 - 95	cyan	dots
96 - 127	pink	star
128 - 159	green	triangle
160 - 191	red	flower
192 - 207	blue	circle
208 - 255	white	blackout

The gobo is always centralized but the colour can take any intermediate position allowing split colours and colour scrolling.

Direct Analogue Control.

The x and y movement and the colours and gobos may be controlled directly by using the 0-10V inputs.

Set the DIL switches as shown - Switch 128 ON all others OFF. Channel 1 controls the x movement, channel 2 controls the y-movement, channel 3 controls the colour and channel 4 controls the gobo and the blackout shutter.



The 0-10V dimmer levels control the movement as follows:

x-motor - increasing voltage moves the beam to the right. Use the X-REV switch to make the beam moves in the same direction as the control, depending on whether the Predator MX is facing towards or away from the operator

y-motor - increasing voltage moves the beam upwards

voltage	colour	gobo
8.75V to 10V	white	blackout
7.5V to 8.75V	blue	open circle
6.25V to 7.5V	red	segments
5V to 6.25V	green	triangle
3.75V to 5V	pink	star
2.5V to 3.75V	cyan	dots
1.25V to 2.5V	yellow	tunnel
0.5V to 1.25V	magenta	squares
0V to 0.5V	magenta	blackout

When using analogue control, units can be synchronized together using the DMX outputs - refer to the "Synchronized operation without a controller" section on page #.

Control from a low-voltage switch panel (such as Logic S12lv, Logic X12 or Logic T12) or the AR1 remote control

Set the DMX switches as follows: Turn switch 64 ON and all other switches OFF. Connect the output from the switching



panel to the 5-pin DIN socket.

Connect to channel 1 (pin 3) if you want to select gobos only,
connect to channel 2 (pin 5) if you want to select colours only.

Connect to channel 3 (pin 4) if you want to select change-colour-to-sound.

Connect to channel 4 (pin 1) if you want to select flash-to-sound.

If more than one channel is used, the Predator MX will sequence through all the selections in turn.

Voltage control.

The Predator MX may be controlled by two analogue channels from a lighting desk such as the Stage 12 or the Fade-4.

Set the DMX address switches with switch 32 ON and all the other switches OFF.



Connect the 0-10V input to channels 1 and 3 of the 5-pin DIN socket.

Channel 1 controls the pattern and channel 3 controls the colour, or the colour chasing mode. The levels that select various patterns and colours are explained below - all patterns are sound activated.

Channel 1 (patterns)

8.75V to 10V - runs through all patterns all colours

8.1V to 8.75V up-down

7.5V to 8.1V square

6.7V to 7.5V left-right

6.25V to 6.7V colour change

5.6V to 6.25V cross

5V to 5.6V diamond

4.4V to 5V figure of 8

3.75V to 4V octagon

3.1V to 3.75V up-down

2.5V to 3.1V square

1.8V to 2.5V left-right

1.25V to 1.8V random

0-1.25V shutdown

Additional Technical information

The DMX system is a high-speed digital data system, which can transmit all the information required for light dimmers, multi-motor lighting effects etc. down a single cable. It was invented in 1986 by the United States Institute of Theater Technicians for the control of dimming theatre lighting, and has since been adapted for the control of intelligent lighting.

The Predator MX outputs a DMX signal when operating from its own microphone, which can be used to synchronize other Predator MXs. Up to 32 units that can be connected to the DMX signal, but it is not recommended that the total cable length should exceed 250m.

Each unit connected to the DMX signal is given an address, and it compares this to the data being sent on the DMX cable, so it can determine which data is addressed to it. It then uses this data to move a motor or set a brightness level as required by the controller.

As the DMX system can transmit as much information as 512 analogue control wires down a single cable, it has to transmit very quickly, in fact, at a frequency 12 times higher than the highest audio frequency. Anyone who has used long leads for audio will realize that it is difficult to do without losing the higher frequencies. To make the DMX system work at such high frequencies, it requires special circuitry and special cable. Cable can be designed to pass high frequencies with no loss if it has the correct resistance connected at each end, this resistance is called the characteristic impedance of the cable. DMX cable has a characteristic impedance of 120Ω . All NJD DMX products fitted with $\frac{1}{4}$ " jacks are designed to ensure that the resistors are connected automatically. Without them, the signal reflects off the end of the cable and interferes with the new data coming the other way. If the cable is not correct, the system will not work. Most good quality low-capacitance screened twisted pair cables will work, but twin individually screened will not. Also, if the cable is split or joined other than end-to-end, the system will stop working.

If making your own leads, it is important to use good quality connectors and make sure that the soldering is of a high standard.

Standards

The Predator MX complies with the following British and European Standards:

EN55015 - Electromagnetic Compatibility.

EN60598 - Electrical Safety Standard for Luminaires.

Fault Finding.

Stand-alone mode.

- *Does not start and go through set-up procedure, LED not lit*

No mains supply - check mains lead

Fuse Blown - check fuse.

- *Lamp not lit*

Lamp failed - replace lamp.

Lamp has recently been switched off. It will not re-strike until it has cooled down

- *No response to sound*

Jack plug in DMXin socket - remove jack for stand-alone operation.

Analogue mode selected - make sure DIL switches 16, 32, 64 and 128 are off.

- *Erratic response to sound*

Music not loud enough.

- *Light output dim.*

reflector or lens dirty - clean

lamp misaligned in reflector.

lamp blackened (about to fail)

lamp has just been switched on and has not reached operating temperature

Synchronized mode

- *Changes colour when it should move left-right, moves left-right when it should change colour*

Switch 2 ON, should be off

- *Movement erratic.*

Wrong type of cable - DO NOT use twin individually screened

Unterminated cable in DMXout jack of final lantern - do not connect to DMXout jack of final lantern.

- *No movement*

DMX jack not in socket correctly. - check jack plugs DMX lead broken or incorrectly wired. - check leads

DMX controlled mode (see also synchronized mode)

- *No movement*

DMX address set wrongly - check DIL switches, or see if lantern responds to a different address.

- *Lamp off but mirror moving*

Lamp failed - replace

Lamp has recently been switched off. It will not re-strike until it has cooled down

Portable Appliance Testing

The Predator MX should be checked for Electrical Safety annually, and if it is hire equipment, before it is hired out. A high-voltage test (at 500V or 1000V) should be carried out between live and earth, and an earth bonding test between the case and the earth connection (at 10A or 16A). Insulation resistance should be greater than 10M Ω and earth bonding resistance less than 0.1 Ω . A high voltage test may also be carried out between the DMX and analogue inputs and live, if the equipment has passed the live-earth test.

Not all parts of the case are bonded to earth - these are separated from live parts by double insulation.

Do not test high-voltage or earth bonding between DMX or analogue inputs and earth - this will destroy the electronics.

Note: a common cause of failure of the insulation test is the build up of smoke fluid inside the lantern.

Technical Specification.

Power supply:	230V nominal @ 50Hz 650VA (2.5A)
Power factor:	0.77
	210V minimum 255V maximum.
Fuse:	T8A (8 Amp anti-surge)
	5×20mm HBC to IEC127

A HBC fuse has a ceramic case.

Lamp:	CSS575
Colours:	7 dichroic plus white

CIE Chromaticity co-ordinates:

Magenta:	(0.262,0.073)
Yellow:	(0.513,0.482)
Cyan:	(0.104,0.348)
Pink	(0.423,0.250)
Green	(0.244,0.692)
Red:	(0.686,0.296)
Blue:	(0.132,0.117)

Gobos:	7
Beam intensity:	150,000 candela
Lamp life:	1000 hours nominal
Beam width:	210mm diameter at 1 metre (2½" diameter at 1 foot)
Beam Angle:	13° (227mrad)
Motors:	Unipolar Hybrid stepper: microstepping
Microstep size:	6'45" (1.95mrad)
DMX input/output:	complies with DMX512 (1990) 4µsec and EIA RS-485
Connectors:	¼" jack
Data+:	Tip
Data-:	Ring
Earth:	Sleeve

Guarantee

This product is guaranteed for a period of 24 months against faulty components (excluding lamps) or manufacture from the date of purchase. Upon proof of purchase, NJD shall, at its own option, repair or replace the defective item at no cost to the purchaser.

This guarantee is contingent upon the proper use of the product in the application for which it is intended and does not cover products that have been modified, subjected to unusual physical conditions, or electrical conditions outside its specification, or damaged in any way.

This guarantee is limited to the product only and does not cover carriage costs, installation costs or travel expenses. Your statutory rights are not affected.

In the event of any problems with this product contact the retailer from which it was purchased for technical assistance, or e-mail technical@njd-electronics.demon.co.uk

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