

Chroma HX

Features of the Chroma HX

- 7 dichroic colours (magenta, yellow, cyan, pink, red, green, blue) and white
- 4 split colour
- Strobe in any colour
- Blackout shutter and lamp dimming control
- 250W halogen lamp with dichroic reflector
- Adjustable Focus from spot to flood
- Lamp brightness/extended life switch.
- DMX control
- 0-10V Analogue control
- Analogue control of operating modes
- 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 Chroma HX with the hanging bracket provided. To conform to Health & Safety Regulations, a safety chain must also be employed.

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

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

- Brown = Live (phase)
- Blue = Neutral
- Green/Yellow = Earth
- The Chroma HX 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 Chroma HX 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 halogen lamp.

In order to reduce the risk of fire, the Chroma HX should be installed more than 0.8 metres from any object that it is illuminating.

It is also possible to connect the Chroma HX to a switching pack such as the NJD SP10000 but this is not recommended. If connecting via a power pack, the outputs of the power pack should be de-rated by 50% from its "resistive load" capacity to allow for the large inrush current of the halogen lamp. The Chroma HX should not be connected to a dimming pack or light dimmer. The Chroma HX is an inductive load.

Adjust the hanging bracket until the light beam is in the best position. The Chroma HX may be moved whilst it is operating provided that it is done carefully, the lamp is most vulnerable to mechanical damage immediately after it has been switched off, before it has fully cooled. It is recommended that the Chroma HX is allowed to cool for 5 minutes after switching off before moving.

Lamp Brightness/Extended Life Switch

The high brightness/extended life switch is provided to select high brightness or extended lamp life, or to allow for lower or higher mains voltages (A higher mains voltage substantially reduces lamp life). The switch is positioned next to the incoming mains cable. If operating on a 220V supply, select high brightness, otherwise, select whichever mode is appropriate. In the centres of towns the mains voltage can be appreciably higher than 240V during the evenings, so the extended life setting may be advisable.

Changing the lamp.

Disconnect from the mains supply. Remove the lamp cover on top of the unit and remove the lamp from the lampholder. Disconnect the lamp connector. Replace with a new lamp, type A1/259, being careful not to touch the glass envelope of the lamp. Hold the lamp only by the edge of the reflector. Replace the cover and tighten the fixing knob.

Changing the fuse.

Occasionally, when the lamp fails the fuse may also blow. If this occurs, replace with a new fuse type 20mm x 5mm 3.15 Amp antisurge, 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 in the drawer beneath the mains inlet connector.

Focusing.

To focus slacken the focusing control on the top of the unit, move forwards or backwards as required, and re-tighten the screw when the best image is obtained. The focusing control may be moved fully forwards to obtain a diffuse wide flood beam.

Cleaning.

The Chroma HX should be cleaned periodically as the light output will become less intense as smoke fluid residues build up on the lenses. Disconnect from the mains supply and remove the cover by removing the top four screws on the rear plate and the bottom four screws on the front plate. Clean the lens and the dichroic filters 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.

Portable Appliance Testing

The Chroma HX 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.

Modes of Operation**• Independent (internal microphone)**

The Chroma HX will change colour to each bass beat, flash to sound, or scroll through all colours. (see page 5)

• Synchronized (internal microphone)

The Chroma HX will change colour to every bass beat as above, or will perform chase patterns, with either synchronised, random, or sequenced colours. (see page 6)

• Controlled by the Chroma MX-40.

The Chroma MX-40 was designed to control the Chroma 250, and has now been discontinued. The Chroma HX is backwards-compatible with the Chroma 250. (see page 8)

• **Externally controlled from Merlin, or any DMX output controller.**

With a programmable DMX controller such as Merlin, up to 128 channels (only 54 channels if your controller has only 108 outputs) of Chroma HXs can be controlled, there is no limit to the number of Chroma HXs on each channel. The brightness can be controlled to an accuracy of one part in 256, and the colour/gobo can be selected. (see page 9)

• **Analogue Control** (see page 10)

• **Control from a 0-10V switch panel or the AR1 remote control** (see page 11)

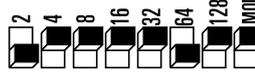
Independent mode.

The switches on the Chroma HX can be used to control the chase patterns and colour changing sequences.

With all switches off the Chroma HX will select an operating mode at random.

To select the operating mode, set switch 64 ON 

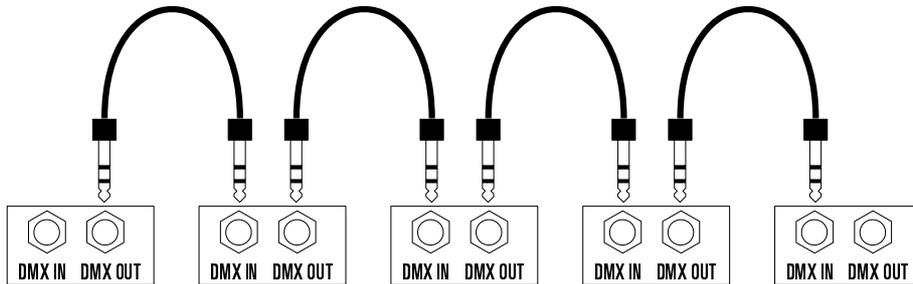
Switches 2, 4, 8 and 16 then control the chase patterns.

Switch 2	Single channel chase	
Switch 4	Pairs chase	
Switch 8	Triples chase	
Switch 16	Colour Scroll	

Selecting more than one switch will make the Chroma HX run through all the selected patterns in turn.

Synchronised Operation without a controller

To synchronise Chroma HXs without a controller, connect a DMX lead from the **DMXout** jack on the first Chroma HX to **DMXin** on the second. Connect from **DMXout** on the second Chroma HX to **DMXin** on the third, and so on. DMX line termination is performed



automatically by the Chroma HX. 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. See drawing overleaf.

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

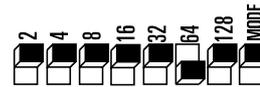
The Chroma HX produces 4-channel colour-changing sequences, the four channels are set on the switches as follows: The first Chroma HX, that is, the one with no jack in its DMXin socket controls all the others. It operates as channel 1, regardless of the position of the switches.

If all Chroma HXs are required to operate identically, set all the switches to channel 1. To achieve the colour and gobo changing sequences, set the switches so that a group of 4 Chroma HXs has the first set to channel 1, the second to channel 2, the third to channel 3 and the fourth to channel 4. Set the MODE switch to the OFF position.

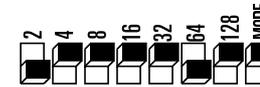
Channel.	Switches ON (other switches OFF)
1	None
2	4
3	8
4	4,8
5	None
6	4
7	8
8	4,8

Channels 5 to 8 repeat the actions of Channels 1 to 4.

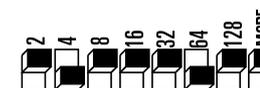
The switches on the first Chroma HX (the one with no jack in the input socket) can be used to control the chase patterns and colour changing sequences. To select this mode, set switch 64 ON. Switches 2, 4, 8 and 16 control the chase patterns.



Switch 2 Single channel chase



Switch 4 pairs chase



Switch 8 Triples chase



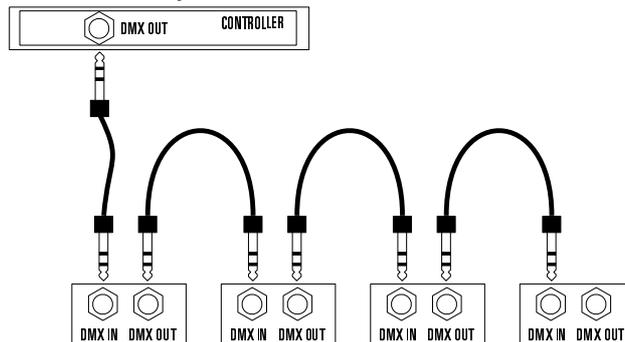
Switch 16 Colour Scroll



Selecting more than one switch will make the Chroma HX run through all the selected patterns in turn.

Using the Chroma HX with the Chroma-MX40

To connect to a controller: Connect a DMX lead from the DMXout from the controller to **DMXin** on the first Chroma HX. Connect a DMX lead from the **DMXout** jack on the first Chroma HX to **DMXin** on the



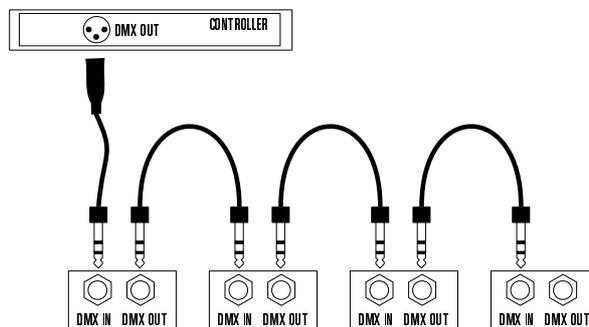
second. Connect from **DMXout** on the second Chroma HX to **DMXin** on the third, and so on. DMX line termination is performed automatically by the Chroma HX. DMX leads must never be joined (apart from end-to-end) or split. Using a 2-to-1 splitter or similar will prevent the system working. Refer to the User Guide accompanying your controller for information on how to set the switches. When used with the Chroma MX40, set the MODE switch ON.

"Mode" switch

The Mode switch should be switched to ON for compatibility with the Chroma MX-40, and the Chroma 250. It should be switched to OFF for compatibility with the IQ-MX60, IQ-MX80. When used with the Merlin, either mode can be used, but if set for compatibility with the Chroma MX40, pink and colour scrolling are not available.

Using the Chroma HX with NJD's dedicated DMX controllers (IQ-MX range, and CX256)

To connect to a controller: Connect a DMX lead from the DMXout from the controller to **DMXin** on the first Chroma HX. Connect a DMX lead from the **DMXout** jack on the first Chroma HX to **DMXin** on the second. Connect from **DMXout** on the second Chroma HX to **DMXin** on the third, and so on. DMX line termination is performed



automatically by the Chroma HX. 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. The joystick will operate as follows: left-right will have no effect, up-down will control the dimmer. When used with the IQ-MX80 or IQ-MX60, set the MODE switch OFF.

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 Chroma HX can be programmed to any address from 1 to 255 in steps of two, so there can be up to 64 channels of Chroma HXs on a controller. Any number of Chroma HXs can be assigned to each channel or address. If two Chroma HXs are assigned to the same address then they will perform identically. Each Chroma HX occupies four DMX channels. The DMX address of the first channel can be set to any odd number, by using the switches on the back of the Chroma HX. The switches are

labelled 128, 64, 32, 16, 8, 4 and 2. Add up the numbers of the switches that are on and add 1, to give the start address. The dimmer control appears at the start address plus 1, the colour at the start address plus 2, and the shutter at start address plus 3. (i.e. If switches 32 and 8 are ON, then start address is $32+8+1 = 41$, the brightness is on channel 42, the colour is on channel 43, and the blackout control on channel 44.)

The DMX dimmer level represents colours as follows:

0 - 31	is magenta
32 - 63	is yellow
64 - 95	is cyan
96 - 127	is pink
128 - 159	is green
160 - 191	is red
192 - 223	is blue
224 - 255	is white

The fourth channel controls the blackout as follows:

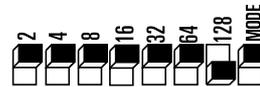
0	lamp off
1 - 223	normal operation
224 - 255	blackout shutter

These settings refer to the mode switch in the **OFF** position, either mode can be used, but if set for compatibility with the Chroma MX40, (mode switch **ON**) pink and split colours are not available but the Chroma HX only occupies 2 DMX channels.

Direct Analogue control (0-10V)

The dish rotation and dimmer may be controlled directly using analogue channels 1 and 3 and 4. The microphone circuitry is disabled.

Set the DMX address switches with



switch 128 ON and all other switches OFF.

The 0-10V inputs control the Chroma HX as follows:

Channel 2: (pin 5) controls the dimmer: 0V is off, 10V is fully on, 5V is half brightness.

Channel 3: (pin 4) controls the colours.

Channel 4: (pin 1) controls the blackout shutter and lamp.

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

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

voltage	colour:
(8.75V - 10V)	white
(7.5V - 8.75V)	blue
(6.25V - 7.5V)	red
(5V - 6.25V)	green
(3.75V - 5V)	pink
(2.5V - 3.75V)	cyan
(1.25V - 2.5V)	yellow
(0-1.25V)	magenta

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

Set the DMX Address switches as follows:

Turn switch "64" on and all other switches OFF.



Connect the output from the controller to the 5-pin DIN socket.

Connect to channel 4 (pin 1) (or turn on switch #1 on the AR1) if you want to select colour scroll.

Connect to channel 1 (pin 3) (or turn on switch #2 on the AR1) if you want to select single channel chase.

Connect to channel 2 (pin 5) (or turn on switch #3 on the AR1) if you want to select pairs chase.

Connect to channel 3 (pin 4) (or turn on switch #4 on the AR1) if you want to select triples chase.

Connect 0V from the controller to pin 2 of the DIN socket.

More than one channel can be connected to the touch panel, so

that different pads may be used to select different effects. If more than one input is enabled at once, the Chroma HX will sequence through the selected modes in turn.

When all four channels are off (or all four switches off on the AR1) the lamp is turned off.

Background information on DMX

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 Chroma HX outputs a DMX signal when operating from its own microphone, which can be used to synchronize other Chroma HXs. 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 ¼" 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 Chroma HX complies with the following British and European Standards:

BS EN55015 - Electromagnetic Compatibility.

BS EN60598 - Electrical Safety Standard for Luminaires.

Fault Finding.

Stand-alone mode.

- *Does not start and go through set-up procedure.*

No mains supply - check mains lead

Fuse Blown - check fuse.

- *Lamp not lit*

Lamp failed - replace lamp.

In analogue control mode - make sure that the 4th channel is at the correct level.

- *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.*

colour filters or lens dirty - clean mirror and lens.

lamp misaligned in lampholder.

lamp blackened (about to fail)

Synchronized mode

- *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 and lamp off*

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

DMX controlled mode (see also synchronized mode)

- *Lamp off*

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

4th DMX channel at wrong level - move to central position

Lamp failed - replace lamp

Technical Specification.

Power supply:	230V AC 50Hz 1.3A 300VA
Fuse:	T3.15A (3.15 Amp anti-surge) 5x20mm HBC to IEC127 A HBC fuse has a ceramic case.
Switch-on Inrush:	4.2A (1000VA)
Inrush Duration:	100ms (5 mains cycles)
Lamp:	A1/259 (ELC) 24V 250W halogen with dichroic reflector
Colours:	7 dichroic plus white
CIE chromaticity co-ordinates (at full brightness)	
	Magenta: (0.399,0.137)
	Yellow: (0.544,0.452)
	Cyan: (0.294,0.432)
	Pink: (0.523,0.318)
	Green: (0.128,0.153)
	Red: (0.700,0.296)
	Blue: (0.128,0.153)
	White: (0.242,0.400)
Beam intensity:	50,000 candela
Beam width:	21cm diameter at 1 metre (5.5 msr)
Lamp life:	100 hours nominal @ 230V AC (high brightness) 750 hours nominal @ 230V AC (extended life)

Note: Although Britain has had a 230V supply since January 1995, the voltage is usually nearer 240V

Lamp Life:	60 hours nominal @ 240V AC (high brightness) 500 hours nominal @ 240V AC (extended life)
Motors:	Unipolar Hybrid stepper: microstepping
Microstep size:	6'45"
DMX input/output:	complies with DMX512 (1990) 4µsec
Connectors:	¼" jack
	Data+: Tip
	Data-: Ring
	Earth: Sleeve
Analogue input voltage:	0-10V
Analogue input impedance:	44kΩ
Analogue connector:	5-pin DIN Type A (180°)
	Channel 1: pin 3
	Channel 2: pin 5
	Channel 3: pin 4
	Channel 4: pin 1
	0V (ground): pin 2

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