

Raptor HX

Features of the Raptor HX

- Lightweight extruded aluminium housing
- High torque microstepping motors
- Pure dichroic colours (8 solid colours or 7 split colour)
- 8 gobos (flat beam, tunnel, dots, star, swirl, wheel, small and large circles)
- External focusing
- Separate Blackout/strobe shutter (strobe in any colour or gobo)
- Halogen lamp
- Built-in lamp dimmer
- DMX, MIDI and 0-10V Analogue control
- "Data present" indicator
- Stand-alone operation using internal microphone
- Compensated for changes in mains voltage
- Inrush current suppressed.
- Temperature controlled fan.

IMPORTANT

Installer and Users please note:

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

Installation

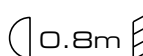
Fix the Raptor HX with the hanging bracket provided. To conform to Health & Safety Regulations, a safety chain must also be employed.

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

Connect the Raptor 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 Raptor 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 Raptor 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 lamp switch-on current.

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

It is also possible to connect the Raptor HX 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 Raptor HX. The Raptor HX must not be connected to a dimming pack or light dimmer. This is unnecessary as the Raptor HX has a built-in dimmer. The Raptor HX is an inductive load.

The Raptor HX is supplied with its handle attached. The handle can be lengthened or shortened by removing it from the unit and attaching it using the higher or lower set of fixing holes.

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

Fix the Raptor HX securely, and fit a safety chain to the loop provided. Tighten the handle fixing screws with the Allen key provided.

The Raptor HX should be operated with the fan at the lower end and the mirror barrel 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 Raptor 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. It is recommended that the Raptor HX 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 assembly. Remove the lamp connector and light screen from the back of the lamp. Remove the lamp from its clip, and replace by a new lamp type A1/259 (ANSI Code: ELC). Replace the lamp connector and light screen, re-fit into the unit and tighten the fixing knob.

Changing the fuse

If the fuse blows, replace with a new fuse type 20mm x 5mm 3.15 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).

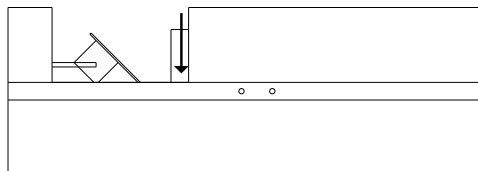
Focusing.

To focus slacken the focusing control 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 Raptor HX should be cleaned periodically as the light output will become less intense as smoke fluid residues build up on the mirrors 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 Raptor HX has a temperature controlled fan, which will only operate when the internal temperature exceeds 50°C. If the fan is obstructed and the internal temperature exceeds 70°C the lamp brightness will be gradually reduced to prevent heat build-up. If the internal temperature reaches 100°C, the lamp will be turned off. The Raptor also has thermal switch which will cut off all power to the unit if it overheats due to the ventilation being obstructed.

Setting up.

Setting the lamp brightness.

There are 10 lamp settings, allowing the brightness to be set as shown below. Press the **SELECT** button, until the letter L shows in the left-hand display, with the figure in the right-hand display flashing. Press the **ADJUST** button until the correct setting is shown.

setting	brightness (candela)	approximate life (hours)
L9	20000	50
L8	18500	70
L7	17000	100
L6	15500	140
L5	14000	200
L4	12500	330
L3	11000	550
L2	9500	1000
L1	8000	2000
L0	6500	4000

The figures in bold correspond to the two settings of other NJD lighting products fitted with a lamp brightness switch. The Raptor HX contains a circuit which adjusts the power to the lamp as the mains voltage varies. Brightness and lamp life will remain constant provided the mains voltage does not vary outside the limits set in BS7697.

In modes where DMX control of the dimmer is available these figures correspond to the full brightness setting of the dimmer. Operating at lower settings of the dimmer with further increase lamp life.

Operating modes.

The Raptor HX may be operated in one of four different Modes.

1) Independent or Master/Slave see page 6

The Raptor HX can be set to move to each bass beat, or continuously, going through a sequence of patterns at random, along with colour and gobo changing. In this mode it can also be enabled and disabled from a remote switch or switching panel.

2) Externally controlled from any DMX controller such as Merlin, IQ-MX80, IQ-MX60 or IQ-MX40. see page 8

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

The IQ-MX40 can control 4 channels of Raptor HXs 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.

The IQ-MX60 includes all the functions of the IQ-MX40, plus two user-writable programs, and a joystick for manual control.

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

3) Externally controlled by Midi. see page 11

The mirror movements, colour, gobo, strobe and dimmer can be controlled from a Midi sequencer.

4) Analogue control from a 0-10V output controller see page 14.

0-10V can be used to directly control the colour, gobo and beam movement.

Independent mode.

If the Raptor HX is to be operated in the "independent" mode, then proceed as follows:

Press the **SELECT** button, until the letter F shows in the left-hand display, with the figure in the right-hand display flashing. Press the **ADJUST** button until the correct setting is shown. Settings from F11 to F16 are the independent mode. In modes F11 to F15 the Raptor can be switched remotely using a 10V enable signal. In mode F16, the Raptor runs all the time.

Note: In Modes F11 to F15, if the +10V enable is not connected the Raptor will not operate.

F 11 Slow movement, no sound activation, no strobe

Advertising mode, rotation speed limited to 25% of max. A custom gobo-wheel can be obtained to allow the Raptor to project advertising logos.

F 12 No sound activation, no strobe

No sound activated patterns, 16% of patterns are waving, no strobe,

F 13 No sound activation

No sound activated patterns, 16% of patterns are waving.

F 14 No strobe

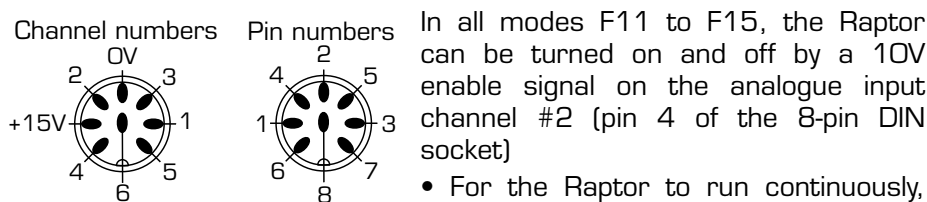
25% of patterns are sound activated movement, 16% of patterns are waving. No strobe.

F 15 Full auto run

Full auto run including strobe. 25% of patterns are sound activated movement, 16% of patterns are waving.

F 16 Full auto run, no enable (continuously running)

Full auto run including strobe. 25% of patterns are sound activated movement, 16% of patterns are waving.



#2).

- To switch the Raptor on and off from a controller with +10V output, connect the +10V output from the controller to pin 4 (Channel #2) and connect the 0V from the controller to OV on the Raptor (pin 2).

- To control from an external switch, connect the switch between pin 1 (+15V) and pin 4 (Channel #2).

In Modes F11 to F15, if the +10V enable is not connected the Raptor will not operate.

Synchronizing other Raptors.

To synchronize other Raptor HXs without a controller, proceed as follows:

- Connect a DMX lead from the **DMXout** socket on the first Raptor HX to **DMXin** on the second, from **DMXout** on the second Raptor HX to **DMXin** on the third, and so on.

- Connect a terminator to the **DMXout** socket of the final Raptor HX. A terminator is a 5-pin XLR plug with a 120Ω resistor connected between pins 2 and 3. Set the other Raptors as follows:

- Set the function to F1 or F3. Use F1 to make the slave units copy the master exactly, or F3 to make them reverse the movement of the barrel scan. This is useful if two groups of Raptors are mounted facing each other as it means that they all move in the same direction.

*To set the function press the **SELECT** button, until the letter F shows in the left-hand display, with the figure in the right-hand display flashing. Press the **ADJUST** button until the correct setting is shown.*

- Set the DMX address to 001.

To do this, press SELECT until the hundreds digit flashes, and then press ADJUST until it shows 0. Press SELECT until the tens digit flashes, and then press ADJUST until it shows 0. Press SELECT until the units digit flashes, and then press ADJUST until it shows 1.

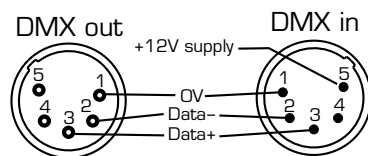
- If Raptors are being controlled in groups of four, it is possible to obtain colour and gobo changing patterns, whilst the beam movements are synchronized. To do this, set the DMX address as shown below:

2nd Raptor	009
3rd Raptor	017
4th Raptor	025

DMX operation

Connecting to IQ-MX range, the Merlin or any universal Lighting control desk with DMX output.

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



DMX connections are by 5-pin XLR socket, with an extra +12V supply on pin 5 to provide power for remote controls. This voltage does not exceed the RS485 maximum voltage specification, so no damage will result

if a DMX connection using pins 4 and 5 is connected to the Raptor.

Connect a terminator to the DMXout socket of the final Raptor HX. A terminator is a 5-pin XLR plug with a 120Ω resistor connected between pins 2 and 3

Use with the IQ-MX range of controllers.

To use with the IQ-MX40, IQ-MX60 or IQ-MX80, set the function to F2 or F4. Use F2 normally, or F4 to reverse the movement of the barrel scan. This is useful if two groups of Raptors are mounted facing each other as it means that they all move in the same direction.

*Press the **SELECT** button, until the letter F shows in the left-hand display, with the figure in the right-hand display flashing. Press the **ADJUST** button until the correct setting is shown.*

Refer to the User Guide accompanying your controller for information which DMX address to set.

The four lanterns appear at DMX channels 1, 5, 9 and 13 in the IQ-MX40 and IQ-MX60 controllers. On the IQ-MX80, the addresses of the 16 lanterns are shown overleaf:

Set the DMX address as follows. This example shows how to set DMX address 65. Press SELECT until the hundreds digit flashes, and then press ADJUST until it shows 0. Press SELECT until the tens digit flashes, and then press ADJUST until it shows 6. Press SELECT until the units digit flashes, and then press ADJUST until it shows 5. The DMX address is now set to 065.

The Data Present led will light if the Raptor is receiving DMX data.

IQ-MX80 Lantern number	DMX address
1	1
2	9
3	17
4	25
5	33
6	41
7	49
8	57
9	65
10	73
11	81
12	89
13	97
14	105
15	113
16	121

On the IQ-MX60 and IQ-MX80 the joystick will rotate the barrel when moved from left to right, and will scan the barrel from side to side when the joystick is moved up and down.

The colours appear in a different order to the fascia panel, and some changes have been made to the gobo patterns.

Use with the Merlin, or any universal Lighting control desk with DMX output.

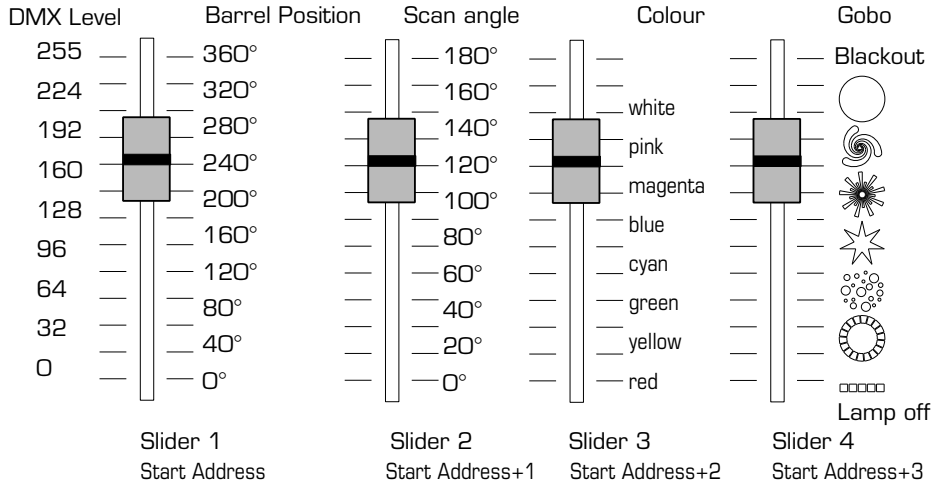
The DMX system has 512 addresses, each address can be the brightness of a single dimmer, or a position on a motor. The Raptor HX can be controlled by either 4 or 8 DMX channels.

- F1 DMX 8-channel mode
- F2 DMX 4-channel mode (movement reversed)
- F3 DMX 8-channel mode
- F4 DMX 4-channel mode (movement reversed)

In four channel mode, four sliders control the position of the barrel, the colour and gobo, the blackout shutter and lamp on/off. Barrel rotation, waving, strobing, colour scrolling and lamp brightness control are not available.

If two Raptor HXs are assigned to the same address then they will perform identically.

4-channel operation (modes F2 or F4):

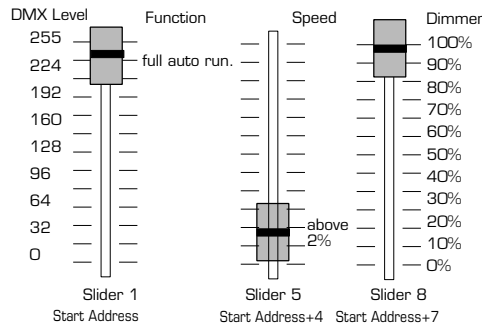


Four sliders control the position of the barrel, the colour and gobo, the blackout shutter and lamp on/off. Barrel rotation, waving, strobing, colour scrolling and lamp brightness control are not available.

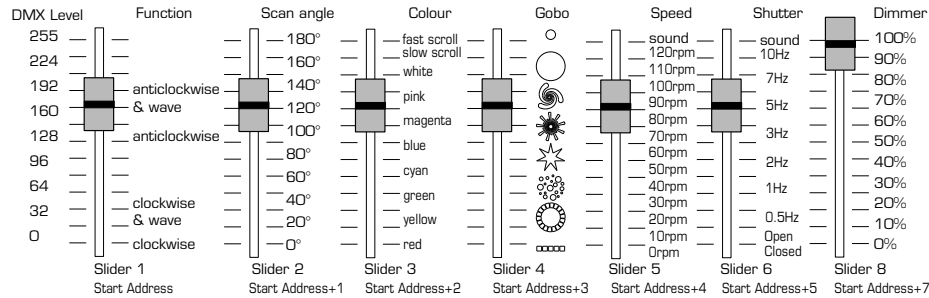
8-channel operation (modes F1 or F3):

In 8 channel operation there are three modes of operation:

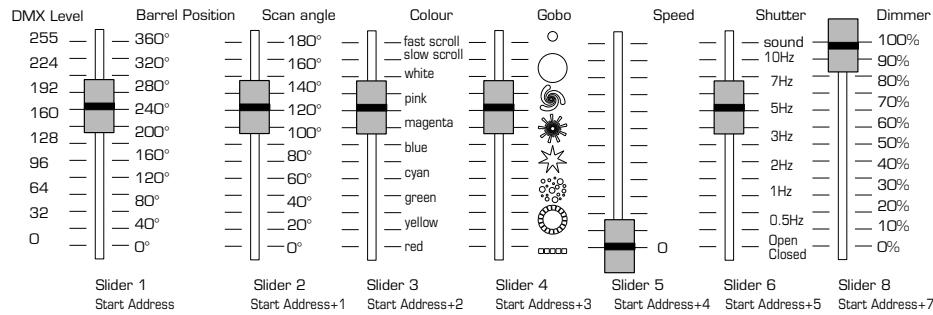
1. Full auto run: with slider 1 fully up, and slider 5 above 2%, the Raptor will select colours, gobos, strobe speed, and barrel movement automatically. Only the lamp brightness is manually controlled.



2. Speed control: With slider 5 above 2%, the speed of rotation and waving of the barrel can be controlled, and the colours and gobos can be selected. Sound animation of the shutter and barrel movement can be selected, as can colour scrolling at different speeds.



3. Position Control: For full manual control, the position of the barrel, not its rotation speed can be selected, useful for fully choreographed shows. This is selected by setting slider 5 to zero.



Midi control

The Raptor may also be controlled by Midi, either by using *Note-on* and *note-off* commands, or by using *control change* commands. The Raptor can be set to respond to any Midi channel, or any group of 8 note numbers (or controller numbers).

To control by Midi, set the function to F5, Fb, F7 or F8.

F5 = Midi control by note-on/note-off

Fb = Midi control by control-change

F7 = Midi control by note-on/note-off (movement reversed)

F8 = Midi control by control-change (movement reversed)

To set the Function, press the **SELECT** button, until the letter F shows in the left-hand display, with the figure in the right-hand display flashing. Press the **ADJUST** button until the correct setting is shown. Reversed movement is useful if two groups of Raptors are mounted facing each other as it means that they all move in the same direction.

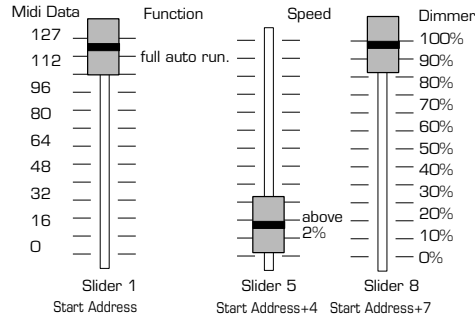
The DMX address is used to set the Midi channel and note number. Set the DMX address as follows:

		Midi Channel															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1	0	32	64	96	128	160	192	224	256	288	320	352	384	416	448	480	
5	1	33	65	97	129	161	193	225	257	289	321	353	385	417	449	481	
9	2	34	66	98	130	162	194	226	258	290	322	354	386	418	450	482	
13	3	35	67	99	131	163	195	227	259	291	323	355	387	419	451	483	
17	4	36	68	100	132	164	196	228	260	292	324	356	388	420	452	484	
21	5	37	69	101	133	165	197	229	261	293	325	357	389	421	453	485	
25	6	38	70	102	134	166	198	230	262	294	326	358	390	422	454	486	
29	7	39	71	103	135	167	199	231	263	295	327	359	391	423	455	487	
33	8	40	72	104	136	168	200	232	264	296	328	360	392	424	456	488	
37	9	41	73	105	137	169	201	233	265	297	329	361	393	425	457	489	
41	10	42	74	106	138	170	202	234	266	298	330	362	394	426	458	490	
45	11	43	75	107	139	171	203	235	267	299	331	363	395	427	459	491	
49	12	44	76	108	140	172	204	236	268	300	332	364	396	428	460	492	
53	13	45	77	109	141	173	205	237	269	301	333	365	397	429	461	493	
57	14	46	78	110	142	174	206	238	270	302	334	366	398	430	462	494	
61	15	47	79	111	143	175	207	239	271	303	335	367	399	431	463	495	
65	16	48	80	112	144	176	208	240	272	304	336	368	400	432	464	496	
69	17	49	81	113	145	177	209	241	273	305	337	369	401	433	465	497	
73	18	50	82	114	146	178	210	242	274	306	338	370	402	434	466	498	
77	19	51	83	115	147	179	211	243	275	307	339	371	403	435	467	499	
81	20	52	84	116	148	180	212	244	276	308	340	372	404	436	468	500	
85	21	53	85	117	149	181	213	245	277	309	341	373	405	437	469	501	
89	22	54	86	118	150	182	214	246	278	310	342	374	406	438	470	502	
93	23	55	87	119	151	183	215	247	279	311	343	375	407	439	471	503	
97	24	56	88	120	152	184	216	248	280	312	344	376	408	440	472	504	
101	25	57	89	121	153	185	217	249	281	313	345	377	409	441	473	505	
105	26	58	90	122	154	186	218	250	282	314	346	378	410	442	474	506	
109	27	59	91	123	155	187	219	251	283	315	347	379	411	443	475	507	
113	28	60	92	124	156	188	220	252	284	316	348	380	412	444	476	508	
117	29	61	93	125	157	189	221	253	285	317	349	381	413	445	477	509	
121	30	62	94	126	158	190	222	254	286	318	350	382	414	446	478	510	
125	31	63	95	127	159	191	223	255	287	319	351	383	415	447	479	511	

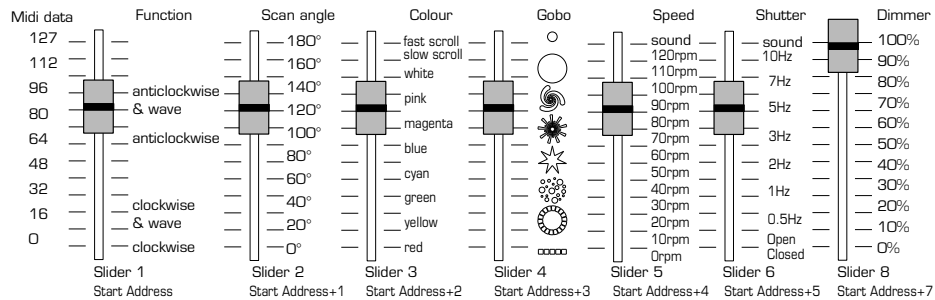
The Raptor is then operated by the controller (or note number) selected, and the following seven controllers (or notes), in exactly the same way as the 8-channel DMX control shown above.

The Data Present led will flash when the Raptor receives Midi data on the correct channel and note-number (or controller number)

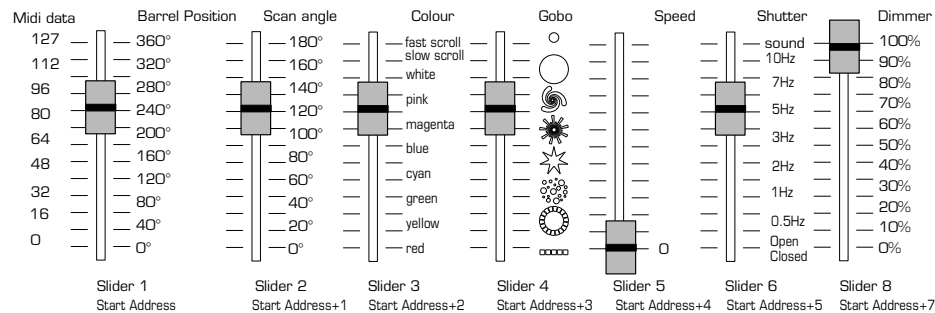
1. Full auto run: with slider 1 fully up, and slider 5 above 2%, the Raptor will select colours, gobos, strobe speed, and barrel movement automatically. Only the lamp brightness is manually controlled.



2. Speed control: With slider 5 above 2%, the speed of rotation and waving of the barrel can be controlled, and the colours and gobos can be selected. Sound animation of the shutter and barrel movement can be selected, as can colour scrolling at different speeds.



3. Position Control: For full manual control, the position of the barrel, not its rotation speed can be selected, useful for fully choreographed shows. This is selected by setting slider 5 to zero.



Analogue Control.

The Raptor may also be controlled by six 0-10V analogue inputs,
To control by 0-10V, set the function to F9, or F10.

F9 = Analogue control of position

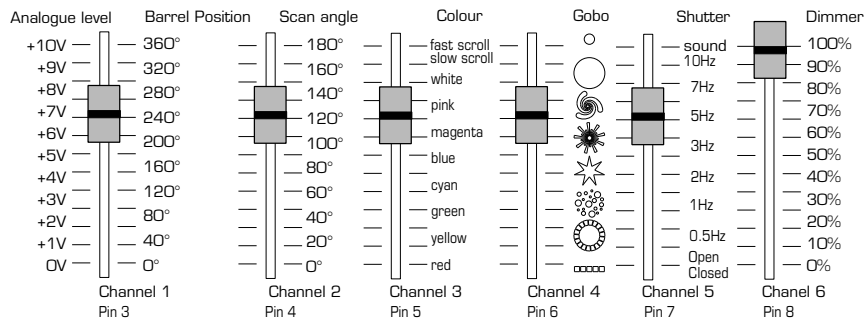
F10 = Analogue control of speed

To set the Function, press the **SELECT** button, until the letter F shows in the left-hand display, with the figure in the right-hand display flashing.

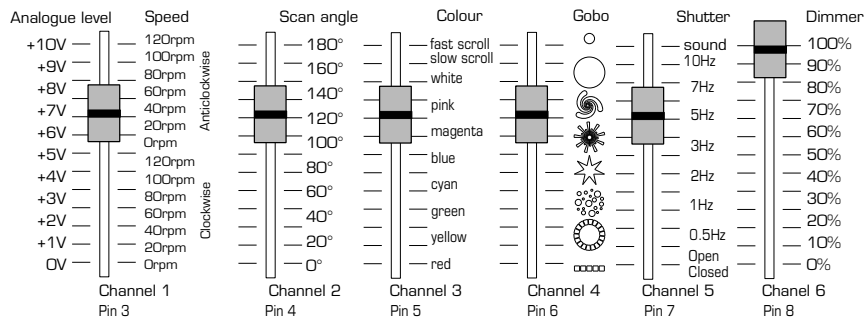
Press the **ADJUST** button until the correct setting is shown.

The analogue inputs control the Raptor as follows:

F9 = Analogue control of position



F10 = Analogue control of speed



For a full auto-run select one the the Stand-alone modes shown on page 6, which can be enable from a 0 - +10V switching panel.

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 Raptor HX outputs a DMX signal when operating from its own microphone, which can be used to synchronize other Raptor 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. 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 Raptor HX 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.

- *Sets up, but does nothing*

10V enable not connected.

- *Lamp not lit*

Lamp failed - replace lamp.

Product has overheated and shut down - check ventilation

- *No response to sound*

Set to a mode that does not have a sound response - change F settings.

- *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 set to a long life setting - change L setting.

Synchronized mode

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

DMX address on slaves not set correctly - should be 001, 009, 017 or 025

- *Movement erratic.*

Wrong type of cable - DO NOT use twin individually screened

Unterminated DMX line in DMXout XLR socket of final lantern - fit a terminator to the DMX out socket of the final lantern

- *No movement*

DMX XLR plug not in socket correctly. - check XLR plugs

DMX lead broken or incorrectly wired. - check leads

DMX controlled mode (see also synchronized mode)

- *No movement*

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

- *Lamp off but mirror barrel moving*

Lamp failed - replace

Lamp dimmer channel set to zero

- *Light output dim*

Lamp dimmer control set to a low level

Lamp set to a long life setting - change L setting.

Portable Appliance Testing

The Raptor 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.

Technical Specification.

Power supply:	230V \pm 10% @ 50Hz 300VA (1.3A)
Power factor:	0.99
Fuse:	208V minimum 255V maximum. T3.15A (3.15 Amp anti-surge) 5x20mm HBC to IEC127
Dimensions:	540mm x 340mm x 190mm
Weight:	13.7kg

A HBC fuse has a ceramic case.

Lamp:	A1/259 (ELC)
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:	8
Beam intensity:	20,000 candela (up to 8 beams)
Lamp life:	50 hours nominal at full brightness setting
Beam width:	210mm diameter at 1 metre (2½" diameter at 1 foot)
Beam Angle:	13°
Motors:	Bipolar Hybrid stepper: high torque, microstepping
Microstep size:	0.028°

DMX input/output:

complies with DMX512 (1990) 4µsec and EIA RS-485

Connectors:

5-pin XLR

Data+:

Pin 3

Data-:

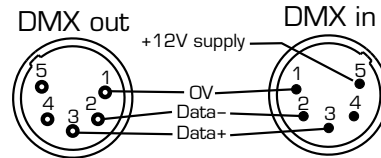
Pin 2

Earth:

Pin 1

+12V supply:

Pin 5 (on DMX input connector ONLY)

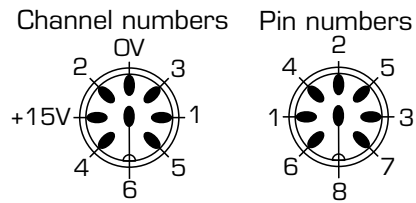


Analogue inputs:

0 - +10V

Connector:

8-pin DIN



Midi inputs:

5-pin DIN

(Wired to Midi standard)

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