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1. General

The DMX interface is designed to control a single DMX512 universe, allowing multiple daisy-chained lighting fixtures to be controlled through one interface. Typically, this feature is used to add DMX lighting to interactive installations, allowing lighting effects to respond intelligently to sensor input. This document provides an explanation of the available functionalities and instructions on how to install and integrate the sensor into your digital signage installation.

The information in this document is created for users who are familiar with the Nexmosphere API and are able to control a basic setup with a Nexmosphere API controller. If this is not the case yet, please read the general documentation on the Nexmosphere serial API first.

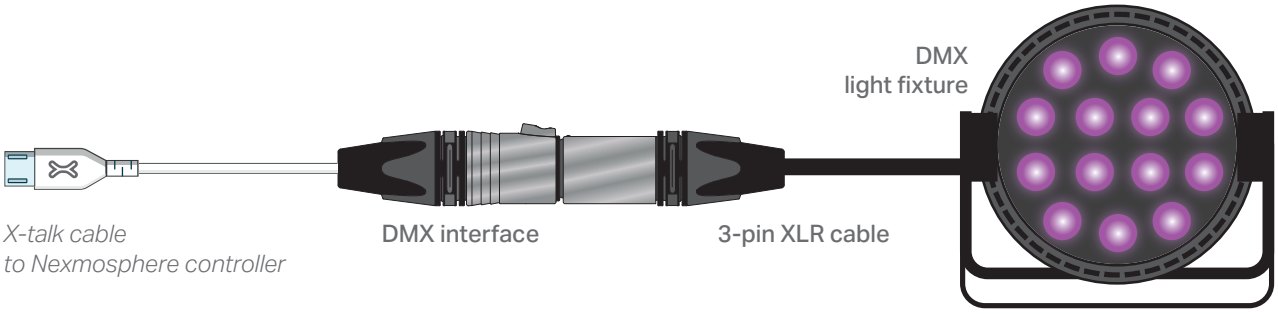
2. Product overview

The IX DMX Interface is available in 2 models:

	IX-DM3	IX-DM6
Control one DMX512 universe	✔	✔
Direct ramps of 4 channels	✔	✔
Transition between 4-channel states	✔	✔
Transition between 48-channel scenes	✖	✔

IX-DM3 | IX-DM6

The DMX interface is housed inside a 3-pin female XLR connector. It can be connected to a DMX fixture via an industry-standard 3-pin XLR cable. The DMX interface can control one DMX512 universe. Multiple DMX interfaces can be connected to a Nexmosphere controller to control multiple DMX universes.



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3. Functionalities and API commands

The IX DMX interface provides the following functionalities:

1. **Direct ramps** - of 4 DMX channels
2. **Define states** - of 4 DMX channels
3. **State transitions** - with a settable ramptime

The following sections will cover each of these functionalities in detail. Please note that for each API example in this document, X-talk address 001 is used (X001). When the DMX interface is connected to another X-talk channel, replace the "001" with the applicable X-talk address.

3.1 - Direct ramps

The DMX interface can drive DMX channels to a specific value within a specific ramp time. It can do so for a group of up to 4 channels, typically used to drive RGB(W) light fixtures to specific color and brightness. The API command for a direct ramp is as follows:

`X001B[Rx LIN NN XXX AAA BBB CCC DDD]` Direct ramp of 4 DMX channels

R	fixed	*indicates it is a ramp command*
x	value between ***A-Z***	*Ramp identifier*
LIN	fixed	*indicates it is a linear ramp*
NN	value between ***00-90***	*Ramp time 0.1 seconds*
XXX	value between ***001-512***	*DMX channel start number*
AAA	value between ***000-255***	*value 1st channel*
BBB	value between ***000-255***	*value 2nd channel*
CCC	value between ***000-255***	*value 3rd channel*
DDD	value between ***000-255***	*value 4th channel*

When implementing direct ramps, consider the following:

- A direct ramp command is immediately executed.
- Multiple ramp commands can be executed simultaneously by using different Ramp identifiers. For example, the first three commands on the right can be sent consecutively. Please note that most Nexmosphere controllers require a 50mS delay between each command.
- It is not required to fill in all 4 channels. A direct ramp command can also be used to control just 1, 2 or 3 channels. See the 4th and 5th example on the right.
- To set all 512 DMX channels immediately to 000 (without a ramp), a dedicated command is available:

  `X001B[DMX ALL OFF]`

Example API messages

Start ramp A with a 1.0 second ramp time, to drive channel 001, 002, 003 and 004 all to 255.

`X001B[RA LIN 10 001 255 255 255 255]`

Start ramp B with a 2.5 second ramp time, to drive channel 005 to 050, channel 006 to 100, channel 007 to 150 and channel 008 to 200.

`X001B[RB LIN 25 005 050 100 150 200]`

Start ramp C with a 0.3 second ramp time, to drive channel 509 to 187, channel 510 to 064, channel 511 to 000 and channel 512 to 235.

`X001B[RC LIN 03 509 187 064 000 235]`

Start ramp D with a 0.7 second ramp time, to drive channel 001 to 000, channel 002 to 180, channel 003 to 255

`X001B[RD LIN 07 001 000 180 255]`

Start ramp E with a 3.2 second ramp time, to drive channel 013 to 070 and channel 014 to 165

`X001B[RE LIN 32 013 070 165]`

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3.2 - Define states

The DMX interface offers the option to define a state of 4 DMX channels. Via a separate state transitions commands, the DMX interface can ramp to the predefined state. The API command to define a state is as follows:

X001B[Sy XXX AAA BBB CCC DDD] — Define a state of 4 DMX channels

S	fixed	*indicates it is a state definition*
y	value between ***A-Z***	*State identifier*
XXX	value between ***001-512***	*DMX channel start number*
AAA	value between ***000-255***	*value 1st channel*
BBB	value between ***000-255***	*value 2nd channel*
CCC	value between ***000-255***	*value 3rd channel*
DDD	value between ***000-255***	*value 4th channel*

When defining states, consider the following:

- A state definition command does not change the DMX output. A state transition command is required for this. See section 3.3 "State transitions"
- A total of 26 states (A-Z) can be defined.
- It is not required to fill in all 4 channels. A direct ramp command can also be used to control just 1, 2 or 3 channels. See the 3rd example on the right.

Example API messages

Define state A as channel 001 to 120, channel 002 to 008, channel 003 to 255 and channel 004 to 255.

```
X001B[SA 001 120 008 255 255]
```

Define state B as channel 017 to 000, channel 018 to 255, channel 019 to 147 and channel 020 to 067.

```
X001B[SB 017 000 255 147 067]
```

Define state C as channel 510 to 040, channel 511 to 230, channel 512 to 190.

```
X001B[SC 510 040 230 190]
```

3.3 - State transitions

Once a state has been defined (see section 3.2 "Define states"), the DMX interface can transition to that state with a settable ramp time. The API command to transition to a state is as follows:

X001B[Rx LIN NN Sy] — Transition to a state with settable ramp time

R	fixed	*indicates it is a ramp command*
x	value between ***A-Z***	*Ramp identifier*
LIN	fixed	*indicates it is a linear ramp*
NN	value between ***00-90***	*Ramp time 0.1 seconds*
S	fixed	*indicates it is a state definition*
y	value between ***A-Z***	*State identifier*

When transitioning states, consider the following:

- A state transition command is immediately executed.
- Multiple ramp commands can be executed simultaneously by using different Ramp identifiers. For example, the first three commands on the right can be sent consecutively. Please note that most Nexmosphere controllers require a 50mS delay between each command.

Example API messages

Start ramp A with a 1.3 second ramp time, to drive to state A

```
X001B[RA LIN 13 SA]
```

Start ramp B with a 0.7 second ramp time, to drive to state D

```
X001B[RB LIN 07 SD]
```

Start ramp C with a 9.0 second ramp time, to drive to state G

```
X001B[RC LIN 90 SG]
```

Start ramp A with a 0.1 second ramp time, to drive to state F

```
X001B[RA LIN 01 SF]
```


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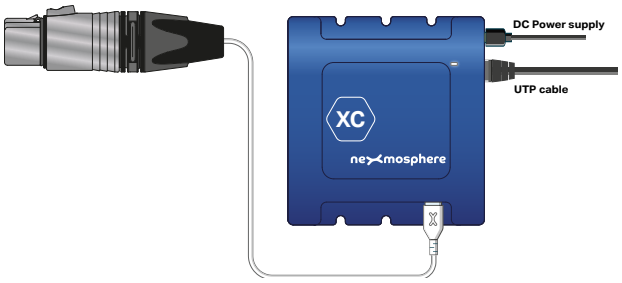
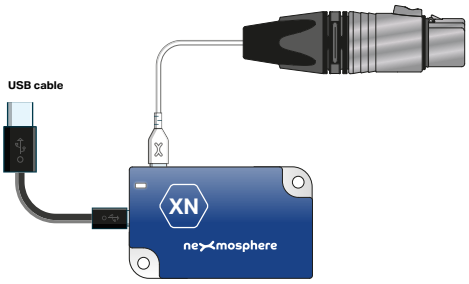
4.1 Connection Diagrams

The IX DMX interface can be connected to any X-talk channel and is therefore compatible with all Xperience controllers. Make sure the DMX interface is connected to the X-talk port before powering the Xperience controller. Otherwise, it will not be recognized by the Xperience controller and the DMX interface cannot be controlled.



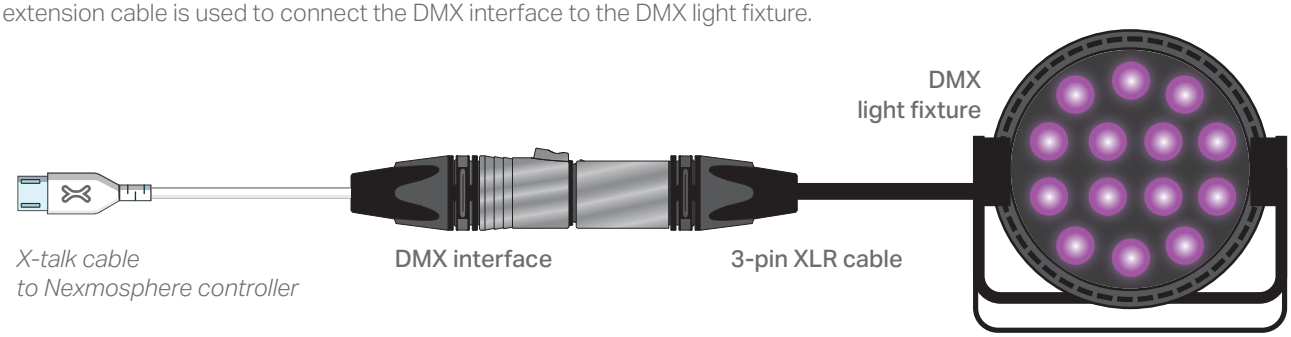
Example connection to XC-101U Controller (UDP API)



Example connection to XN Controller (USB API)

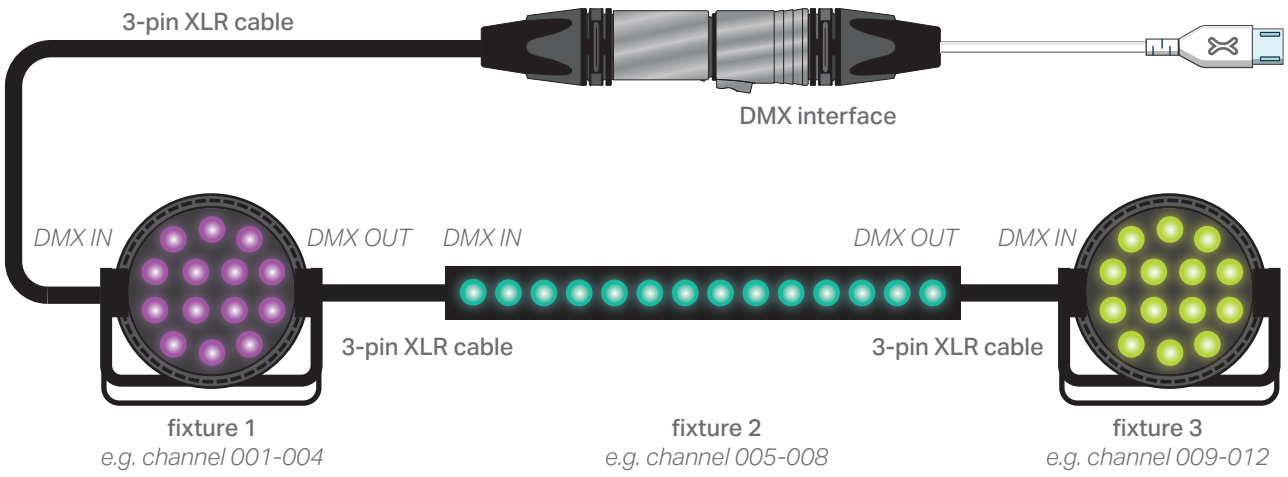
4.2 Hardware integration guidelines

The DMX interface is housed inside a 3-pin female XLR connector. Most DMX light fixtures have a 3-pin male XLR socket , labeled "DMX IN", to which the DMX interface can be directly plugged into. However, typically an industry standard 3-pin XLR extension cable is used to connect the DMX interface to the DMX light fixture.



Most DMX light fixtures also have a "DMX OUT", which usually is a 3-pin female XLR socket. This can be used to daisy chain multiple DMX light fixtures onto one DMX interface. These can be different light fixtures. For example, a RGBW spot and RGBW bar can be daisy chained to the same DMX interface.

When daisy chaining DMX light fixtures, make sure that each DMX light is set to a different DMX channel that corresponds with the control commands you implement (see chapter 3 "Functionalities and API commands").



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