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1. General

LightMark is a LED control protocol which allows for creating wave-like LED animations and virtually dividing a Pixel LED strip into multiple segments and controlling each of those segments separately. This document offers explanation, instructions, and examples of how the LightMark functionalities can be applied.

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

LightMark is available on all XC-700 Series controllers:



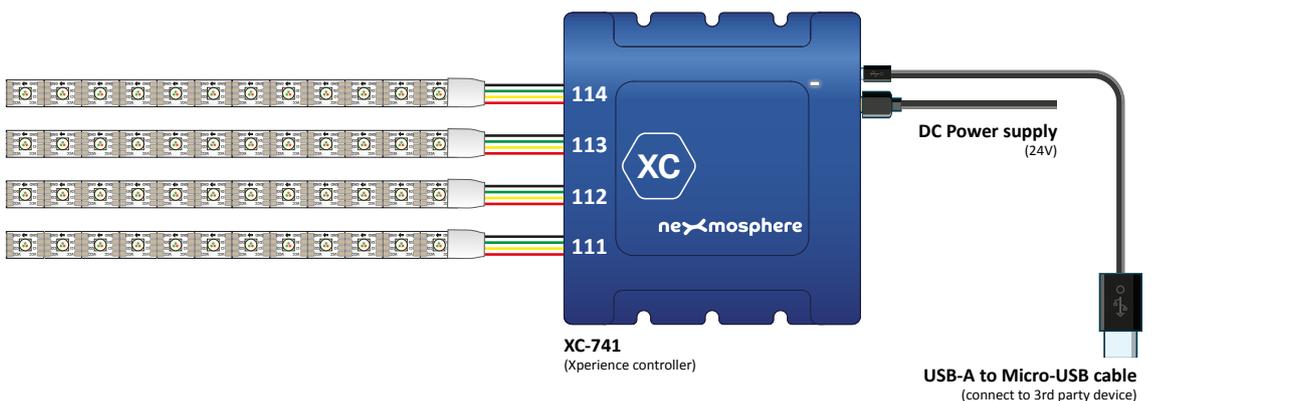
XC-720

XC-741

XC-748

XC-760

The XC-700 Series controllers have on-board LightMark enabled interfaces (from here on referred to as LightMark interface) to which a flexible Pixel LED strips can be connected and on which the LightMark protocol can be applied. The maximum amount of LEDs which one LightMark interface can *control* is 390 LEDs. Please note that next to this, the maximum amount of LEDs also needs to be calculated from a *power* perspective (see page 9 and 10).



3. Functionality - LED strip control

All LightMark interfaces provide the following options for controlling the output of an entire Pixel LED strip:

1. **Creating custom LED colors** - program custom colors with RGB values
2. **Single ramp LED output** - set the LED strip to a specific brightness and color within a specified ramp time
3. **Pulse LED output** - set the LED strip to a pulsing fade in/fade out animation
4. **Wave LED output** - set the LED strip to an animated wave effect with numerous options and variables

The following sections will cover each of these functionalities in detail and provide specific examples for each functionality.

3.1 - Creating custom LED colors

Each LightMark interface has 16 pre-programmed colors, labelled from 0 to F. These color labels are used in the LED output commands to indicate the color(s) to which the Pixel LED strip should be set. On the right, an overview of the default color palette is provided.

In case a non-default color is required, a custom color can be created and stored in one of the 16 available labels. Storing a custom color will overwrite a default color that was previously stored in the label.

The API command for programming a color label is as follows:

X001B[Cc=LRRGGBB]

Cc=	fixed - indicating the command type (Custom color)
L	Color label - value between 0-F - indicating the color label
RR	RGB Red value - hex value between 00-FF
GG	RGB Green value - hex value between 00-FF
BB	RGB Blue value - hex value between 00-FF

On the right, some example commands for programming custom colors are provided. When creating custom colors, consider the following:

- Programming a custom color does not set the LED output. Thus when sending one of the example commands (on the right), the LED output of the LightMark interface does not change. Only when sending a LED output command in which the color label of a custom color is used, the LEDs will be set to the custom color (see next pages).
- After a power cycle, the color labels are set back to default. Thus each time the system is started, the custom color commands need to be re-send.

Default colors

0  R: 255 FF G: 255 FF B: 255 FF	4  R: 255 FF G: 255 FF B: 0 00	8  R: 255 FF G: 0 00 B: 128 80	C  R: 0 00 G: 128 80 B: 255 FF
1  R: 255 FF G: 0 00 B: 0 00	5  R: 255 FF G: 0 00 B: 255 FF	9  R: 128 80 G: 255 FF B: 0 00	D  R: 255 FF G: 179 B3 B: 179 B3
2  R: 0 00 G: 255 FF B: 0 00	6  R: 0 00 G: 255 FF B: 255 FF	A  R: 0 00 G: 255 FF B: 128 80	E  R: 179 B3 G: 255 FF B: 179 B3
3  R: 0 00 G: 0 00 B: 255 FF	7  R: 255 FF G: 128 80 B: 0 00	B  R: 128 80 G: 0 00 B: 255 FF	F  R: 179 B3 G: 179 B3 B: 255 FF

Example commands

All examples assume the LightMark interface has X-talk address 005. Please refer to the Quick Start Guide of your Xperience controller for more info on the X-talk addresses.

Program color label 0 to RGB #3C96FF (60, 150, 255)

```
X005B[Cc=03C96FF]
```

Program color label 3 to RGB #AAFF90 (170, 255, 144)

```
X005B[Cc=3AAFF90]
```

Program color label A to RGB #FF9090 (255, 144, 144)

```
X005B[Cc=FF9090]
```

Program color label F to RGB #B22598 (178, 37, 152)

```
X005B[Cc=FB22598]
```

3.2 - Single ramp LED output

Each LightMark interface can drive a Pixel LED strip to a specific LED color and intensity within a specified ramp time. This is the most basic LightMark output command available. It sets all LEDs on the Pixel LED strip to the same value.

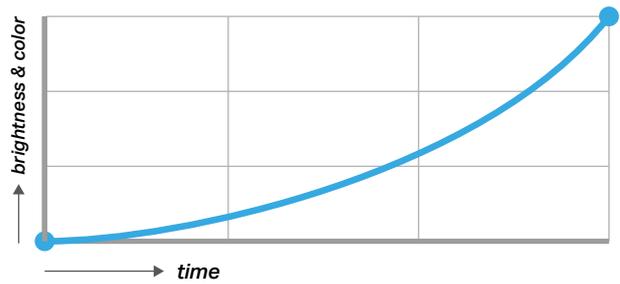
The API command for setting a single ramp LED output is as follows:

X001B[Lc=RBBCTT]

Lc=R	fixed - indicating the command type (LED control - Ramp)
BB	LED brightness - value between 00-99
C	Color label - value between 0-F - indicating the color
TT	Ramp time - value between 00-99 - units of 0.1s

On the right, example commands for setting the LED output to a single ramp are provided. When setting single ramp LED outputs, take the following into account:

- A single ramp LED command will set all LEDs on the Pixel LED strip to the same value.
- When changing the color of one of the color labels (see page 2), the single ramp LED output command must be sent again in order to set the LEDs to the new color.
- The maximum LED intensity value is 99. Although 99 suggests that there is 1 percent intensity left, 99 coincides with the absolute max. brightness that the LEDs can emit.
- The ramp starts from the state the LED strip is in at the time the command is sent. This means that the ramp animation towards an end state (light output value) can vary depending on the start state. E.g. if the Pixel LED is at 50% white, a 1.0-second ramp towards 100% will appear slower than as it would when starting from 0% white.
- When also using Segment Control, a single ramp LED command defines the Background state. See page 8 for more information.



Example commands

All examples assume the LightMark interface has X-talk address 005. Please refer to the Quick Start Guide of your Xperience controller for more info on the X-talk addresses.

Single ramp (**Lc=R**) to **50%** brightness with color **1** in **0,5s**

```
X005B[Lc=R50105]
```

LED output result



Single ramp (**Lc=R**) to **80%** brightness with color **3** in **1,0s**

```
X005B[Lc=R80310]
```

LED output result



Single ramp (**Lc=R**) to **90%** brightness with color **C** in **9,9s**

```
X005B[Lc=R90C99]
```

LED output result



Single ramp (**Lc=R**) to **99%** brightness with color **0** in **0,7s**

```
X005B[Lc=R99007]
```

LED output result



3.3 - Pulsing LED output

Each LightMark interface can control a pulsing pattern on a Pixel LED strip with fade in/fade out ramps between two states using just one single command. It sets all LEDs on the Pixel LED strip to the same value.

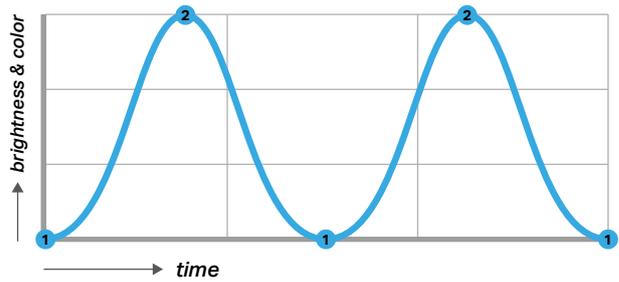
The API command for a pulsing LED output is as follows:

X001B[Lc=PBBCTTPPOBBCTTNNRR]

Lc=P	fixed - indicating the command type (LED control - Pulse)
BB (1)	LED brightness state 1 - value between 00-99
C (1)	Color label state 1 - value between 0-F
TT (1)	Time at state 1 - value between 01-99 - in units of 0.1s
PP	Animation program - fixed - only program available (01)
O	Animation option - fixed - no options available (0)
BB (2)	LED brightness state 2 - value between 00-99
C (2)	Color label state 2 - value between 0-F
TT (2)	Time at state 2 - value between 01-99 - in units of 0.1s
NN	Number of repeats - value between 00-99 (00 = infinite)
RR	Ramp time - value between 02-99 (must be <= then TT(1) and TT(2))

On the right, example commands for setting the LED output to a pulse are provided. When setting pulsing LED outputs, take the following into account:

- “Time at state 1” and “Time at state 2” are **including** the ramp time. For example, if Time at state 1 is 2.0 seconds and ramp time is 0.5 seconds, state 1 LED output will be for 1.5 seconds.
- The total time of 1 pulse is “Time at state 1” + “Time at state 2”.
- The ramp time must be smaller than or equal to Time at state 1 and Time at state 2.
- Animation program (01) and Animation option (0) are fixed and are therefore the same in every command.
- If the number of repeats is set to 00, the pulse will go on indefinitely.
- If the number of pulses is set to a fixed number, for example 3, the end state will be State 2.
- A LED pulse output will set all LEDs on the Pixel LED strip to the same value.
- When also using Segment Control, a Pulse LED command defines the Background state. See page 8 for more information.



Example commands

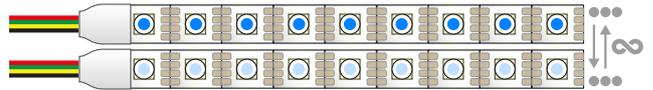
All examples assume the LightMark interface has X-talk address 005. Please refer to the Quick Start Guide of your Xperience controller for more info on the X-talk addresses.

Set LED output to Pulse (Lc=P)

State 1: **99% brightness - color C - 1.8 seconds**
 Animation: **program is fixed: 01 - option is fixed: 0**
 State 2: **20% brightness - color C - 1.8 seconds**
 Timing: **infinite repeats (00) - ramp time: 1.8 seconds**

X005B[Lc=P99C1801020C180018]

LED output result

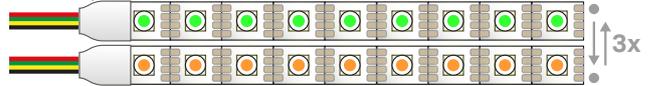


Set LED output to Pulse (Lc=P)

State 1: **99% brightness - color 2 - 0.6 seconds**
 Animation: **program is fixed: 01 - option is fixed: 0**
 State 2: **82% brightness - color 7 - 0.6 seconds**
 Timing: **repeats (03) - ramp time: 0.4 seconds**

X005B[Lc=P99206010827060304]

LED output result

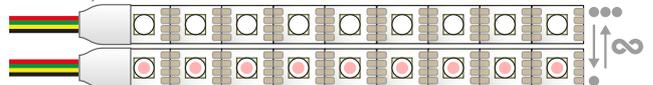


Set LED output to Pulse (Lc=P)

State 1: **00% brightness - color D - 1.8 seconds**
 Animation: **program is fixed: 01 - option is fixed: 0**
 State 2: **99% brightness - color D - 0.6 seconds**
 Timing: **infinite repeats (00) - ramp time: 0.6 seconds**

X005B[Lc=P00D1801099D060006]

LED output result



3.4 - Wave LED output

Each LightMark interface can control an animated wave pattern which moves across the Pixel LED strip.

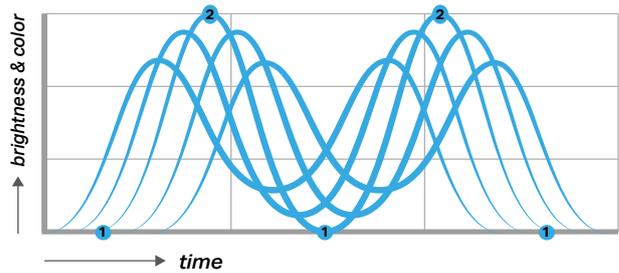
The API command for setting a Wave LED output is as follows:

X001B[Lc=WBBCDDPPOBBCRRNN]

- Lc=W** fixed - indicating the command type (LED control - Wave)
- BB (1)** LED brightness state 1- value between 00-99
- C (2)** Color label state 1 - value between 0-F
- D** Duration of animation - value between 01-99 - in units of 0.1s
- PP** Animation program - 00-01 (sinewave) or 51-59 (discrete)
00 = Symmetrical sinewave 01 = Asymmetrical sinewave
51-59 = Discrete running light (1-9 LEDs "running")
- O** Animation option - indicates direction - 01-04
1 = Left 2 = Right 3 = Outwards 4 = Inwards
- BB (2)** LED brightness state 2- value between 00-99
- C (2)** Color label state 2 - value between 0-F
- RR** Reserved - currently unused in this command type - 00-99
- NN** Number of LEDs for animation - value between 01-99

On the right, example commands for setting the LED output to a wave animation are provided. When setting wave animations, take the following into account:

- The NN variable (number of LEDs for animation), determines the "length" of the wave animation. E.g. if LL is set to "15" and the Pixel LED strip is 30 LEDs in length, the result will be a double sinewave, each with a length of 15 LEDs. Vice versa, LL can also be set to a higher number of LEDs than the number of LEDs available on the Pixel LED strip, resulting in a longer, calmer appearing, wave animation.
- Animation program 00 is a symmetrical sinewave
- Animation program 01 is an asymmetrical sinewave with a short front and long tail.
- When also using Segment Control, a Wave LED command defines the Background state. See page 8 for more information.



Example commands

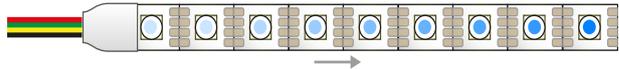
All examples assume the LightMark interface has X-talk address 005. Please refer to the Quick Start Guide of your Xperience controller for more info on the X-talk addresses.

Set LED output to Wave (**Lc=W**)

- State 1: 99% brightness - color C
- Animation: 1.8s - program 00 (sine) - option 2 (right)
- State 2: 20% brightness - color C
- Length: Unused variable 00 - LEDs for animation: 16

X005B[Lc=W99C1800220C0016]

LED output result

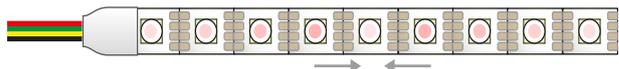


Set LED output to Wave (**Lc=W**)

- State 1: 99% brightness - color D
- Animation: 2.1s - program 01 (sine) - option 4 (inward)
- State 2: 33% brightness - color 0
- Length: Unused variable 00 - LEDs for animation: 12

X005B[Lc=W99D210143300012]

LED output result

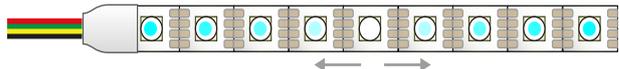


Set LED output to Wave (**Lc=W**)

- State 1: 99% brightness - color 6
- Animation: 2.4s - program 01 (sine) - option 3 (outward)
- State 2: 00% brightness - color 0
- Length: Unused variable 00 - LEDs for animation: 70

X005B[Lc=W996240130000060]

LED output result

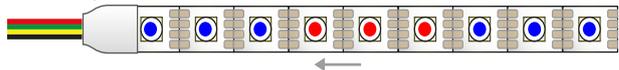


Set LED output to Wave (**Lc=W**)

- State 1: 99% brightness- color 1
- Animation: 0.6s - program 53 (discrete 3) - option 1 (left)
- State 2: 99% brightness - color 3
- Length: Unused variable 00 - LEDs for animation: 18

X005B[Lc=W991065319930018]

LED output result

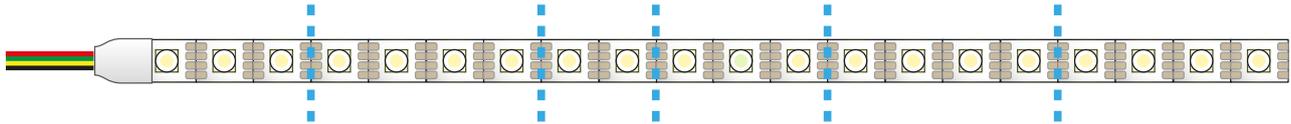


3. Functionality - Segment control

All LightMark interfaces provide the following options for dividing a Pixel LED strip into segments and controlling these segments separately:

1. **Define LED segments** - virtually divide the pixel LED strip into multiple segments
2. **Define segment states** - define the output of a Segment State
3. **Control LED segments** - set an LED segment to a specific Segment State

The following sections will cover each of these functionalities in detail and provide specific examples for each functionality.



4.1 - Define LED segments

The LightMark protocol allows to virtually divide a Pixel LED strip into multiple segments (26 max). The command to do so needs to be sent once after each power cycle.

The API command for defining the LED segments is as follows:

X001B[Sd=SSS...]

- Sd=** fixed - indicating the command type (Segment define)
- SSS** **number of LEDs per segment** -value between 1-F (1-15 LEDs) every subsequent character indicates the number of LEDs for a segment, starting with segments A, going up to segment Z (max).

On the right, example commands for defining the LED segments are provided. When defining LED segments, take the following into account:

- Only the segments which will be used need to be defined. As a result, the length of the command is variable.
- For each segment, a maximum amount of 15 (F) LEDs can be allocated. If in practice a segment needs to be larger than 15 LEDs, 2 segments should be used.
- An API command for defining LED segments always overwrites previously defined segments.
- Defining LED segments does not set the LED output. Thus when sending one of the example commands (on the right), the LED output of the LightMark interface does not change. Only when sending a "Control LED segment" command, the LED output is set (see page 8).

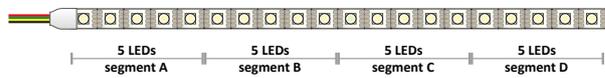
Example commands

All examples assume the LightMark interface has X-talk address 005. Please refer to the Quick Start Guide of your Xperience controller for more info on the X-talk addresses.

Define LED segments A-D as **5 LEDs** each

X005B [Sd=5555]

LED output result



Define LED segments A-E as **4, 3, 7, 3 and 3 LEDs**

X005B [Sd=43733]

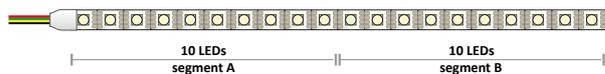
LED output result



Define LED segments A & B as **10 LEDs** each

X005B [Sd=AA]

LED output result



4.2 - Define the Segment States

Before a LED segment can be controlled, the Segment State needs to be defined. There are 4 different Segment States available, which each have a specific designator:

+ - \$ %

Each of these Segment States can be defined as any LightMark LED output command type, which are explained in detail on the previous pages:

Single ramp LED output (page 3)- define the Segment State as a specific brightness and color within a specified ramp time

Pulse LED output (page 4)-- define the Segment State as a pulsing fade in/fade out animation

Wave LED output (page 5) - define the Segment State as a an animated wave effect with numerous options and variables

The API command to define a Segment States is as follows:

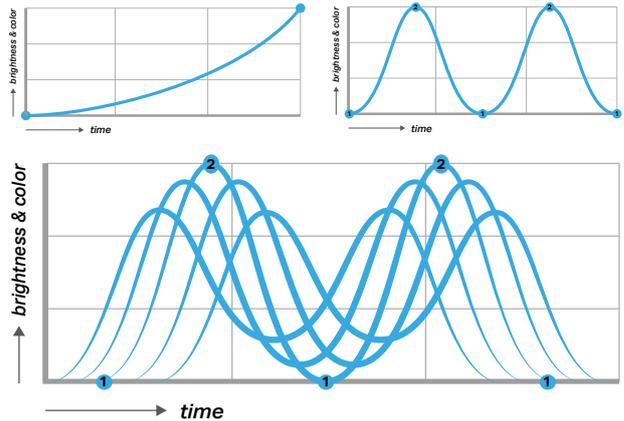
X001B[Ss=DTCCC.....]

Ss=	fixed - indicating the command type (Segment states)
D	Segment State designator - 4 options +, -, \$ or %
T	LED Control type - R (single ramp), P (Pulse) or W (Wave)
CCC...	command parameters - the command parameters (varies per type)

The LED control commands and its parameters are explained in detail in the previous pages of this document.

On the right, example commands for defining the Segment States are provided. When defining the Segment States, take the following into account:

- Defining the Segment State does not set the LED output. Thus when sending one of the example commands (on the right), the LED output of the LightMark interface does not change. Only when sending a "Control LED segment" command, the LED output is set (see page 8).



Example commands

All examples assume the LightMark interface has X-talk address 005. Please refer to the Quick Start Guide of your Xperience controller for more info on the X-talk addresses.

Define the + state (**Ss=+**) as a Ramp (**R**) with **99%** brightness, color **C** (default sky blue) with a ramp time of **0.3** seconds

```
X005B [Ss=+R99C03]
```

LED output result

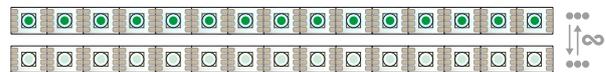


Define the \$ state (**Ss=\$**) as a Pulse (**P**) with parameters:

- State 1: **99%** intensity - color **2** - **1.8** seconds
- Animation: program is fixed: **01** - option is fixed: **0**
- State 2: **20%** intensity - color **2** - **1.8** seconds
- Timing: infinite repeats (**00**) - ramp time: **1.8** seconds

```
X005B [Ss=$P99218010202180018]
```

LED output result



Define the % state (**Ss=%**) as a Wave (**W**) with parameters:

- State 1: **99%** intensity - color **D**
- Animation: **2.1s** - program **01** (sine) - option **4** (inward)
- State 2: **33%** intensity - color **0**
- Length: Unused variable **00** - LEDs for animation: **15**

```
X005B [Ss=%W99D210143300015]
```

LED output result



4.3 - Control LED segments

Each LED segment can be set to one of the Segment States. The API command for setting one or more segments to the +, -, \$, or % state is as follows:

X001B[Sc=DSSS...DSSS...]

Sc=	fixed - indicating the command type (Segment control)
D1	Designator Segment State +, -, \$, % or &
SSS	Segments- letter(s) between A-Z indicates which segment(s) will be set to the Segment State D1
D2	Designator Segment State +, -, \$ or %
SSS	Segments- letter(s) between A-Z indicates which segment(s) will be set to the Segment State D2

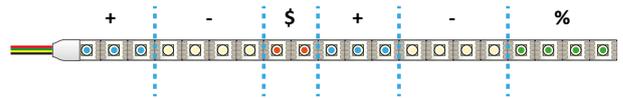
On the right, example commands for controlling the LED segments are provided. When setting the segments to a Segment State, please take the following into account:

- Before setting a segment to a specific Segment State, this Segment State must be defined. See page 7.
- There is a special indicator available for setting all other segments apart from the segments which are already set in the command. This indicator is #
- Next to the +, -, \$, or % Segment States, the segments can also be set (back) to its "Background state". The designator for the Background State is &.

Background State

The Background State is the regular output of the LightMark interface which controls the entire Pixel LED strip. At start-up, per default, no segments are defined, meaning that the entire Pixel LED strip is set to the LED output indicated in the LightMark LED strip control command (see page 3, 4 and 5). When segments **are** defined, then this output is referred to as "Background State".

- When segments are defined, only the segments which are set as Background State will show the output of a LightMark output command (see page 3, 4 and 5).
- When segments are set to a different state then the Background state, they need to actively be set to Background State using the & designator.
- The Background State is only applied on the total combined length of all defined segments. For example: if the Pixel LED strip has 60 LEDs, and only 50 LEDs are defined as a segment (e.g. OAAAAA), the last 10 LEDs of the Pixel LED strip will remain off at all time.



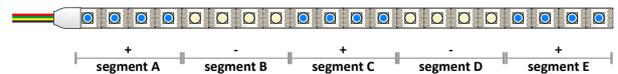
Example commands

All examples assume the LightMark interface has X-talk address 005. Please refer to the Quick Start Guide of your Xperience controller for more info on the X-talk addresses.

Set (Sc=) segment A, C, & E to the + state and all other segments (#) to the - state:

```
X005B [ Sc=+ACE-# ]
```

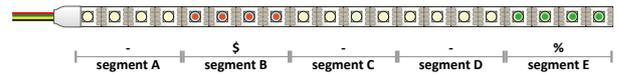
LED output result



Set (Sc=) segment B to the \$ state, segment E to the % state and all other segments (#) to the - state:

```
X005B [ Sc=$B%E-# ]
```

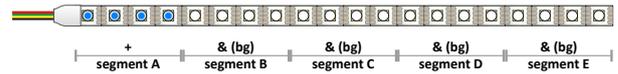
LED output result



Set (Sc=) segment A to the + state and all other segments (#) to the Background state (&)

```
X005B [ Sc=+A&# ]
```

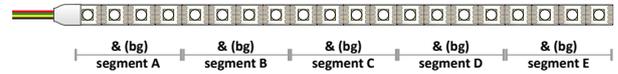
LED output result



Set (Sc=) all segments (#) to the Background state (&)

```
X005B [ Sc=&# ]
```

LED output result



5. Specifications

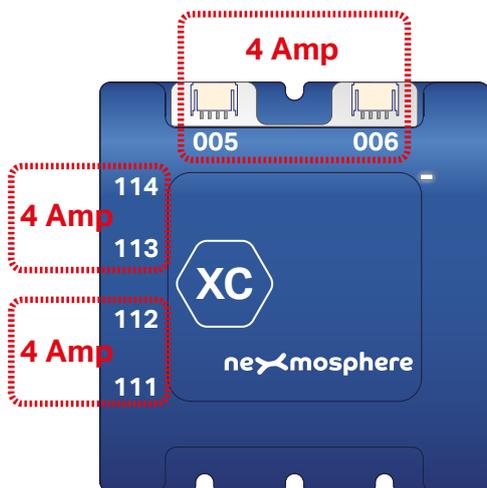
5.1 LightMark enabled products

LightMark is available on the following products

	XC-720	XC-741	XY-748	XY-760
LightMark interfaces	2	4	6	6
X-talk interfaces	4	8	4	4
RGBW LED outputs	-	-	2	-
Power supply input	12-24VDC	12-24VDC	12-24VDC	12-24VDC

5.2 Electrical specifications LightMark interface

The LightMark interface and connected Pixel LED strips operate on **5VDC**. Each XC-700 Series controller has on-board DC-DC converters which convert the 12-24DC input to a 5V supply. Per set of 2 LightMark interfaces, there is 1 DC-DC converter which can provide a maximum of 4A for both LightMark interfaces combined. The 4A can be distributed freely over the 2 LightMark interfaces. For example 4A/0A, 3A/1A or 2A/2A.



	XC-720	XC-741/748	XY-760
LightMark set 1 (4A)	005 and 006	-	005 and 006
LightMark set 2 (4A)	-	111 and 112	111 and 112
LightMark set 3 (4A)	-	113 and 114	113 and 114

5.3 Electrical specifications Pixel LED strip

Pixel LED strips compatible with a LightMark interface have the following specifications:

	Pixel LED strip		
Nexmosphere product code	L-P1....W	L-P2....W	L-P3....W
Pitch	30 LEDs/meter	60 LEDs/meter	144 LEDs/meter
Operating voltage	5VDC	5VDC	5VDC
Power consumption (max)	1.5A/meter	3.0A/meter	7.2A/meter
Protocol	APA102 / APA107	APA102 / APA107	APA102 / APA107
Dimensions (width)	12mm	12mm	12mm
Dimensions (length)	33.3mm/LED	16.7mm/LED	6.9mm/LED

5.4 Power consumption Pixel LED strip

When creating an installation including Pixel LED strips, the power consumption of the LEDs, versus the max power that the Xperience controller and the LightMark interface can provide should be taken into account. Use the table below to calculate the power consumption of the Pixel LED strip.

Brightness	White - FFFFFF	Red- FF0000	Green - 00FF00	Blue - 0000FF
100%	50mA per LED	21mA per LED	17mA per LED	18mA per LED
80%	41mA per LED	18mA per LED	15mA per LED	15mA per LED
60%	33mA per LED	14mA per LED	12mA per LED	12mA per LED
40%	22mA per LED	11mA per LED	9mA per LED	9mA per LED
20%	13mA per LED	7mA per LED	6mA per LED	6mA per LED

Example calculation

When using a Pixel LED strip of 32 LEDs, the maximum power consumption @100% white is:

32 (number of LEDs * **50mA** (power consumption @ 100% white) = **1600mA**.

For more detailed information and advanced calculations, please see the Nexmosphere [Application Note on LED Lighting](#).

The max power consumption of all Xperience controllers and interfaces are indicated on the datasheets under Electrical specifications. When in doubt if the power consumption of an installation falls within specification of the Xperience controller, contact support@nexmosphere.com for advice.

6 - Settings

LightMark has multiple settings which determine the behaviour and LED output. The settings can be adjusted by sending X-talk setting commands via the API. After a power cycle, the settings always return to back to default.

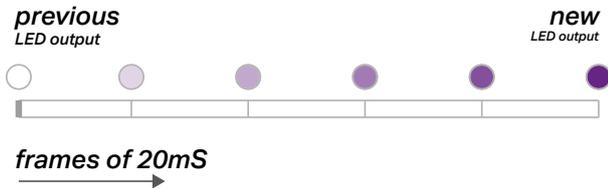
Setting 14: Power limit

Set power limit `X005S [14 : X]`

X is a value between **1-250** and it's default value is **40**. It sets the power limit of a LightMark interface in steps of 0.1A. So the default value of the power limit is 4A. When the power limit is reached, the LED output will be shortened. For example, if the output is set to 299003 (all LEDs to full Brightness white), the power limit will be reached at +/- 80 LEDs. If the Pixel LED strip is longer, LEDs after the 80th LED will remain off. **We highly recommend to not increase this setting without contacting Nexmosphere Support for advice in advance.**

Setting 15-19: Fade settings - Animation transitions

These settings determine the fade transition when a new LED control command is send and apply on Pulse and Wave animations. The higher the fade setting, the smoother and softer the transition between the previous and new LED output. The lower the fade setting, the more instant and direct the transition between the previous and new LED output will be. All fade settings for animation transitions can be a value between **1-100** and they represent steps of 20mS. The default value is **10** (200mS).



- Fade setting & (Background) state `X001S [15 : X]`
- Fade setting + state `X001S [16 : X]`
- Fade setting - state `X001S [17 : X]`
- Fade setting \$ state `X001S [18 : X]`
- Fade setting % state `X001S [19 : X]`

Setting 20-24: Fade settings - State transitions

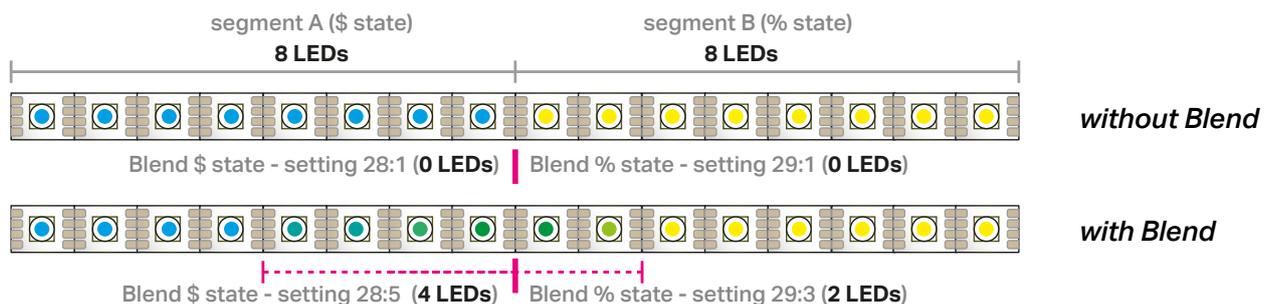
This setting determines the fade transition for a state switch and therefore applies on Segment control commands. The higher the fade setting, the smoother and softer the transition between the previous and new state. The lower the fade setting, the more instant and direct the transition between the previous and new state will be. When switching states (command type 6), the fade setting of the new state applies. All fade settings for state transitions can be a value between **1-100** and they represent steps of 20mS. The default value is **10** (200mS).

- Fade setting & (Background) state `X001S [20 : X]`
- Fade setting + state `X001S [21 : X]`
- Fade setting - state `X001S [22 : X]`
- Fade setting \$ state `X001S [23 : X]`
- Fade setting % state `X001S [24 : X]`

Setting 25-29: Blend settings - Segments

This setting determines the amount of LEDs over which adjacent segments with different States blend into each other. The blend settings can have a value between **1-6** and the default value is **1**. This amount of LEDs which blend is the setting value minus one. Therefore, when set at 1 (default), adjacent states do not blend. When set at a higher value then 1, adjacent states will blend over into each other. Blend applies on both the color and brightness of the Segment State.

- Blend setting & (Background) state `X001S [25 : X]`
- Blend setting + state `X001S [26 : X]`
- Blend setting - state `X001S [27 : X]`
- Blend setting \$ state `X001S [28 : X]`
- Blend setting % state `X001S [29 : X]`



7 - Example commands

On this page some example commands are listed. For more information on how to set up and connect your Xperience controller, please check the Quick Start Guide of the controller you are using:

Quick Start Guide [XC-720](#), [XC-741](#), [XC-748](#), [XC-760](#)

LED strip control

Set LED to Single Ramp (**Lc=R**)

80% brightness color **2** (green) and **0.7s** ramp

```
X005B [Lc=R80207]
```

Set LED to Pulse (**Lc=P**)

State 1: 99% brightness - color **C** (sky blue) - **1.8** seconds
Animation: program is fixed: **01** - option is fixed: **0**
State 2: 12% brightness - color **C** (sky blue)- **1.8** seconds
Timing: infinite repeats (**00**) - ramp time: **1.8** seconds

```
X005B [Lc=P99C1801012C180018]
```

Set LED to Wave (**Lc=W**)

State 1: 99% brightness - color **0** (white)
Animation: **1.2s** - program **01** (sine) - option **4** (inward)
State 2: 25% brightness - color **0** (white)
Length: Unused variable **00** - LEDs for animation: **60**

```
X005B [Lc=W990120142500060]
```

Set LED to Wave (**Lc=W**)

State 1: 99% brightness - color **4** (yellow)
Animation: **1.2s** - program **00** (sine) - option **1** (left)
State 2: 99% brightness - color **5** (purple)
Length: Unused variable **00** - LEDs for animation: **60**

```
X005B [Lc=W994120019950060]
```

Segment control

Define segments (**Sd=**)

Segment A: **8** LEDs Segment D: **15 (F)** LEDs
Segment B: **12 (C)** LEDs Segment E: **10 (A)** LEDs
Segment C: **7** LEDs Segment F: **8** LEDs

```
X005B [sd=8C7FA8]
```

Define + Segment State (**Ss=+**) as Ramp (**R**)

30% brightness, color **0** (white) and **0.3s** ramp

```
X005B [Ss=+R30003]
```

Define - Segment State (**Ss=-**) as Pulse (**P**)

State 1: 99% brightness - color **1** (red) - **0.8** seconds
Animation: program is fixed: **01** - option is fixed: **0**
State 2: 00% brightness - color **1** (red)- **0.8** seconds
Timing: infinite repeats (**00**) - ramp time: **0.8** seconds

```
X005B [Ss=-P99108010001080008]
```

Define \$ Segment State (**Ss=\$**) as Wave(**W**)

State 1: 99% brightness - color **5** (red)
Animation: **0.8s** - program **00** (sine) - option **3** (outward)
State 2: 99% brightness - color **7** (orange)
Timing: Unused variable **00** - LEDs for animation: **60**

```
X005B [Ss=$W995080039970060]
```

Control segment (**Sc=**)

Set segment **B** and **E** to State **\$**
and all other segments (**#**) to State **+**

```
X005B [Sc=$BE+#]
```

Control segment (**Sc=**)

Set segment **C** to State **-**

```
X005B [Sc=-C]
```