

X-SCRIPT SERIAL API | Q3 2022

The general concept of this API is to have a flexible command set for both input and output operations which provides full scripting control to the connected 3rd party device. The Nexmosphere controller acts as a sensor/actuator hub which provides serial output when a sensor Element is triggered (for example a pick-up, motion or touch) and provides control over output Elements (for example animated LEDstrips or audio switches) via serial input commands. Furthermore, the settings of each Element can be controlled via serial commands, such as custom trigger zones for the presence sensors.

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COMMAND STRUCTURE

The command structure for each command is as follows:

TYPE ADDRESS FORMAT [COMMAND]

TYPE = type of command

X= X-talk command

G = Generic control command

S = System command

D = Diagnostic command

ADDRESS = channel address to which the command is send

value between 0-999

FORMAT = format of the command

A = short command (number between 0-255)

B = long command (string of 0-30 characters)

S = setting command (custom format for each setting)

[= start of command

fixed

COMMAND = the actual command

for each function and Element the command is specified in this document

] = end of command

fixed

COMMAND TYPES

Based on the Element or functionality which needs to be controlled, the correct command type needs to be chosen in order to indicate to the Xperience controller how the command should be interpreted and routed throughout the system. A total of 4 command types are available:

X-talk commands

X-talk commands are used to control individual X-talk Elements which are connected to an X-talk interface. This includes controlling output functionality as well as receiving (sensor) input. Each Element has its own specific set of available commands which are listed on page 10 to 31.

Generic control commands

Generic control commands are used to control generic in –and outputs which are functionalities of the controller, such as 12/24V LED control or audio channel switching. Each functionality has its own specific set of available commands which are listed on page 32 to 36.

System commands

System commands are used to control the general system settings and behavior of the Controller. The list of available system commands is described on page 37.

Diagnostic commands

Diagnostic commands are used to request system and configuration information. The list of available Diagnostic commands is described on page 38.

ADDRESSING

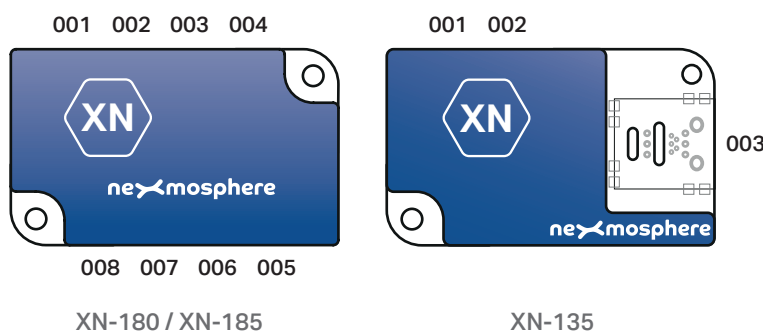
When sending an X-script command from a 3rd party device to the Xperience controller, the address in the command structure indicates to the Xperience controller to which Element or function the command is addressed. Vice versa, when receiving an X-Script command from the Xperience controller, the address indicates from which Element or function the command was sent. Below, the address structure for X-talk commands and Generic control commands are explained. The address structure for system commands is fixed and therefore integrated into the command list further on in this document.

Addressing X-talk commands

X-talk commands are used to control individual X-talk Elements which are connected to an X-talk interface of an Xperience controller. Therefore the address of the X-talk command should be the same as the X-talk interface number to which the command should be sent. Below, the X-talk interface addresses are explained for both the XN and XM controllers.

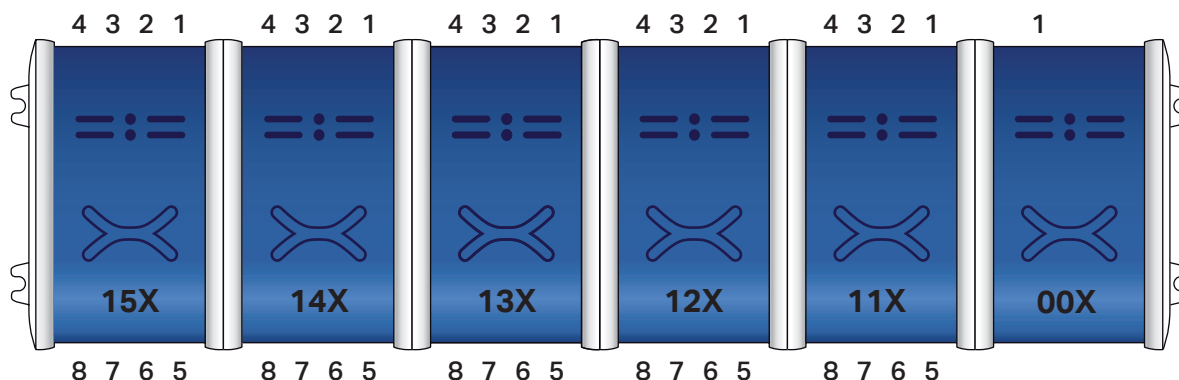
XN-Range

The XN-180 and XN-185 both have 8 X-talk interfaces, addressed 1 to 8. As an address in an X-script command should always consist out of 3 digits, the addresses are numbered 001, 002, and so on. The physical layout of the addresses on the XN-180 and XN-185 controller are indicated in the image on the right. The XN-135 has 3 X-talk interfaces of which the 3rd is a MicroBay. The XN-165 has 2 X-talk interfaces and additionally 4 push-button interfaces which can be controlled using X-talk address 003.



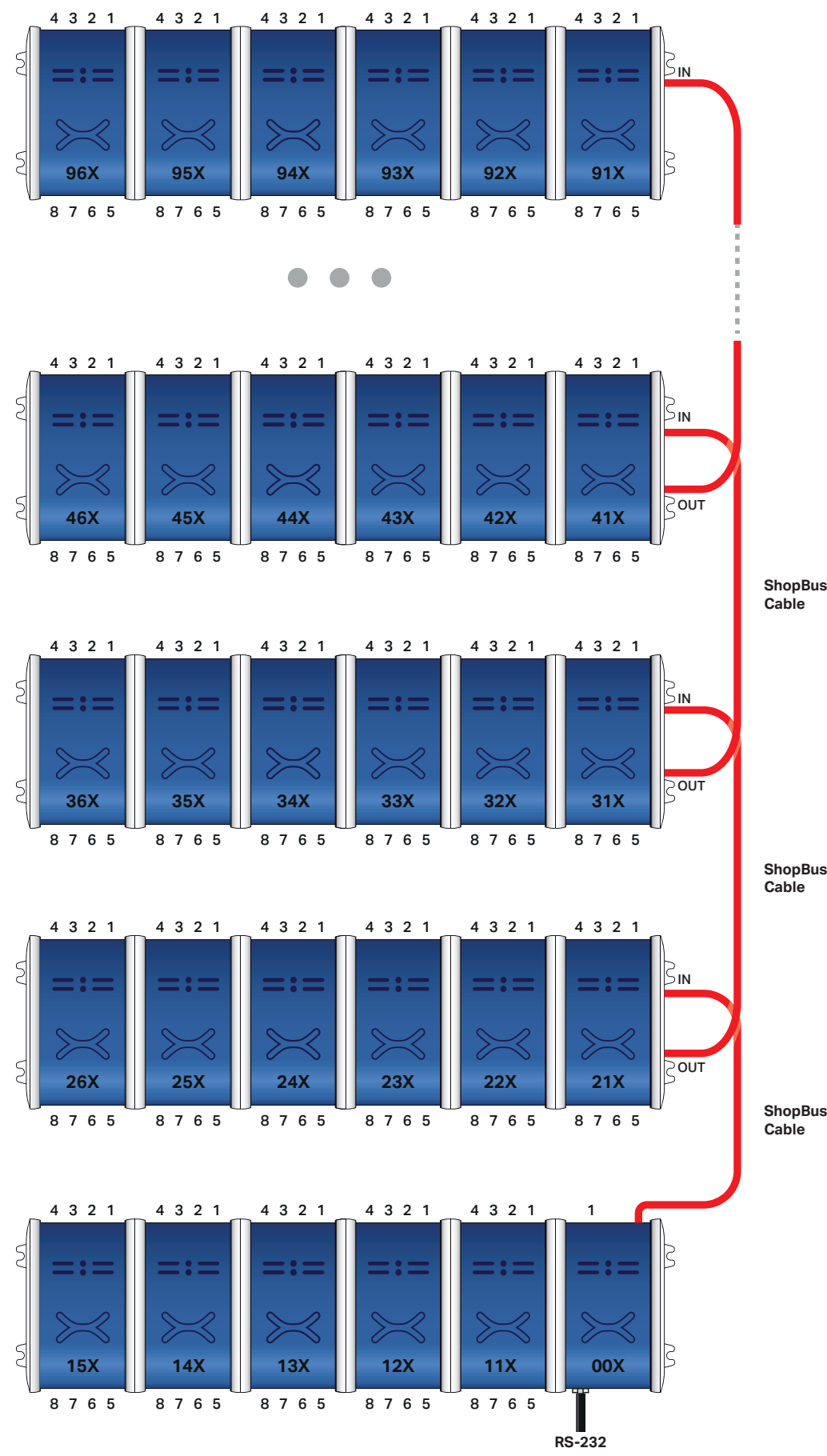
XM-Range

The XM-Range has 3 types of modules with X-talk interfaces: XM-Modules (all), EM-Modules (EM-8 and EM-7) and SM Modules (SM-8). An XM-Controller always has a base address of 000. Each EM-module connected to the XM Module gets a base address of 100 + 10. For example: the base address of the second EM-module connected to the XM controller is 120 (base 100 + 2x10). When sending an X-talk command, the interface address of the X-talk interface needs to be added. For example if a message is sent to the X-talk interface 7 of the 3rd EM-Module connected to the XM-controller, the address becomes 137.



When connecting ShopBus modules to the XM controller, the address of the first shopbus module has a base address of 210. Each consecutive ShopBus module has a base address of +100. For example, the second shopbus module has an address of 310. When connecting EM-Modules to the ShopBus module, each EM-module gets an address of the base address +10. For example, the second EM-module connected to the 3rd ShopBus module gets an address of 420. Also in this case, the X-talk interface number needs to be added when sending an X-talk command. On the following page, a visual of the ShopBus addressing is provided.

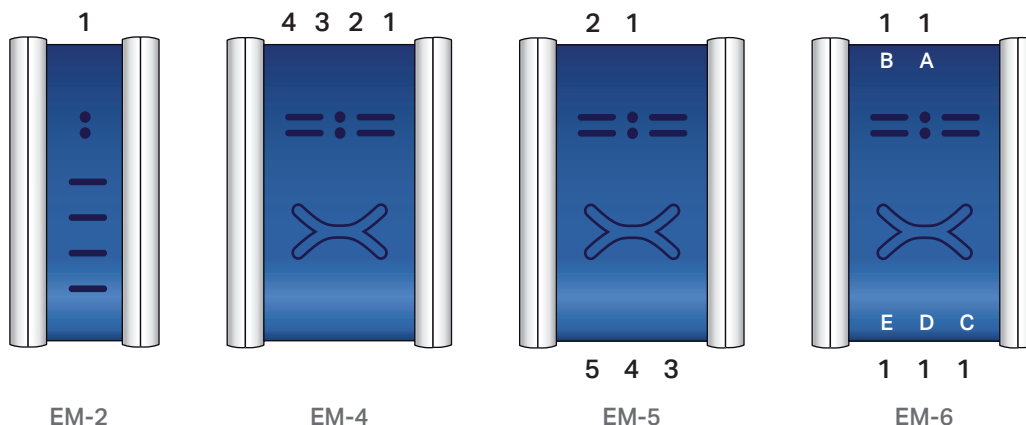
ADDRESSING



ADDRESSING

Addressing Generic commands

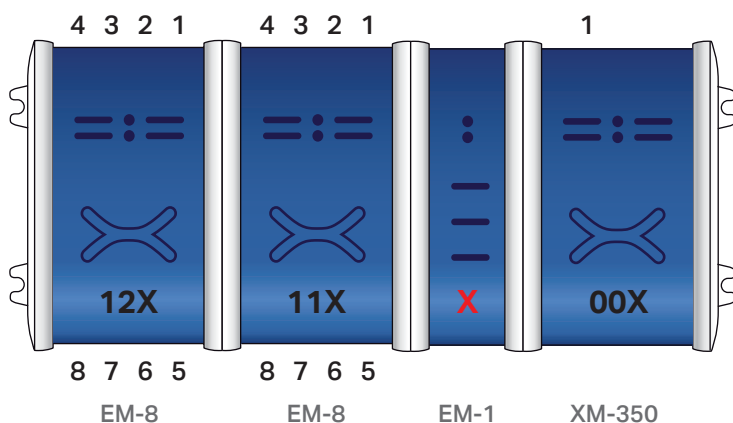
Addressing generic commands works very similar to addressing X-talk commands. Instead of adding the X-talk interface number to the module address, the address of the generic I/O needs to be added. There are 3 EM-modules to which generic commands can be sent: EM-2, EM-4, EM-5 and EM-6. Below for each the I/O address are provided.



The EM-2 and EM-6 modules don't have separate addresses for each RGB channel. Instead, each channel can be addressed within the command itself. How this can be done is explained in detail on page 32.

Exceptions

The EM-1 is an audio output module without any controllable functionality. Therefore an EM-1 does not have an address and should be skipped when determining the address for a module.



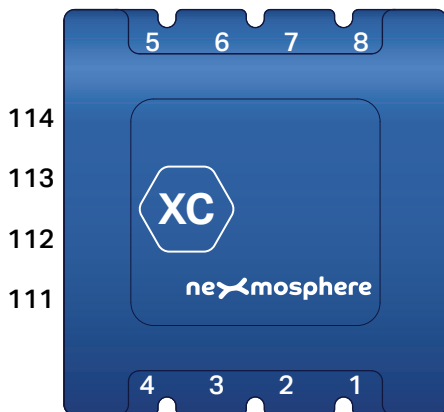
XC-Range

The XC-Range offers several combinations of the following functionalities: **X-talk interfaces**, **RGBW LED output**, **LightMark Pixel LED control**, **analog audio switching**, **optical audio switching**. Therefore the XC controllers use both X-talk commands and Generic commands. On the following pages, both the X-talk addresses and Generic addresses for each XC-module are listed.

The XC controllers with RGBW functionality don't have separate addresses for each RGBW channel. Instead, each channel can be addressed within the command itself. How this is done is explained in detail on page 33.

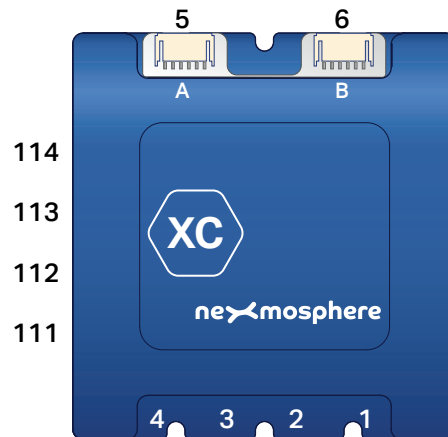
ADDRESSING

XC-700 Series



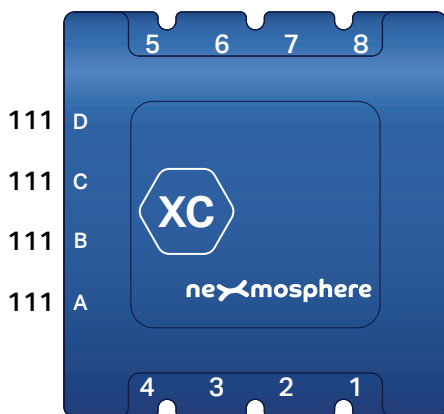
	XC-741
1-8	X-talk address 001 - 008
111.	X-talk address 111 (LightMark interface)
112.	X-talk address 112 (LightMark interface)
113.	X-talk address 113 (LightMark interface)
114.	X-talk address 114 (LightMark interface)

	XC-101
1-8	X-talk address 001 - 008

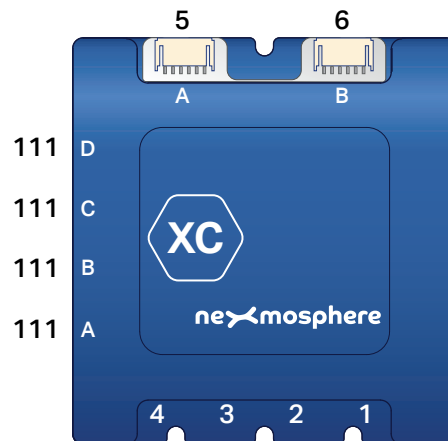


	XC-720	XC-748	XC-760
1-4	X-talk address 001 - 004	X-talk address 001 - 004	X-talk address 001 - 004
5.	X-talk address 005 (LightMark)	Generic addr. 005 (RGBW, ch A)	X-talk address 005 (LightMark)
6.	X-talk address 006 (LightMark)	Generic addr. 005 (RGBW, ch B)	X-talk address 006 (LightMark)
111.	-	X-talk address 111 (LightMark)	X-talk address 111 (LightMark)
112.	-	X-talk address 112 (LightMark)	X-talk address 112 (LightMark)
113.	-	X-talk address 113 (LightMark)	X-talk address 113 (LightMark)
114.	-	X-talk address 114 (LightMark)	X-talk address 114 (LightMark)

XC-800 Series



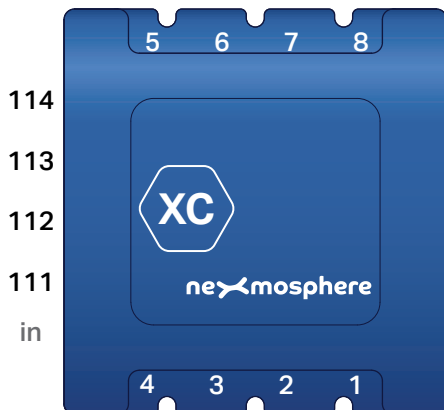
	XC-841
1-8	X-talk address 001 - 008
111.	Generic addr. 111 (RGBW ch. A)
112.	Generic addr. 111 (RGBW ch. B)
113.	Generic addr. 111 (RGBW ch. C)
114.	Generic addr. 111 (RGBW ch. D)



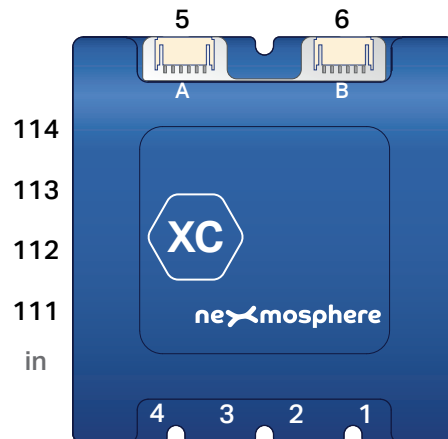
	XC-820	XC-847	XC-860
1-4	X-talk address 001 - 004	X-talk address 001 - 004	X-talk address 001 - 004
5.	Generic addr. 005 (RGBW ch. A)	X-talk address 005 (LightMark)	Generic addr. 005 (RGBW ch. A)
6.	Generic addr. 005 (RGBW ch. B)	X-talk address 006 (LightMark)	Generic addr. 005 (RGBW ch. B)
111.	-	Generic addr. 111 (RGBW ch. A)	Generic addr. 111 (RGBW ch. A)
112.	-	Generic addr. 111 (RGBW ch. B)	Generic addr. 111 (RGBW ch. B)
113.	-	Generic addr. 111 (RGBW ch. C)	Generic addr. 111 (RGBW ch. C)
114.	-	Generic addr. 111 (RGBW ch. D)	Generic addr. 111 (RGBW ch. D)

ADDRESSING

XC-900 Series | XC-93x

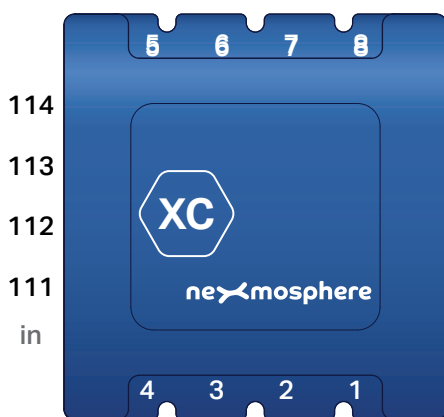


	XC-931
1-8	X-talk address 001 - 008
111.	Generic address 111 (Optical switch)
112.	Generic address 112 (Optical switch)
113.	Generic address 113 (Optical switch)
114.	Generic address 114 (Optical switch)

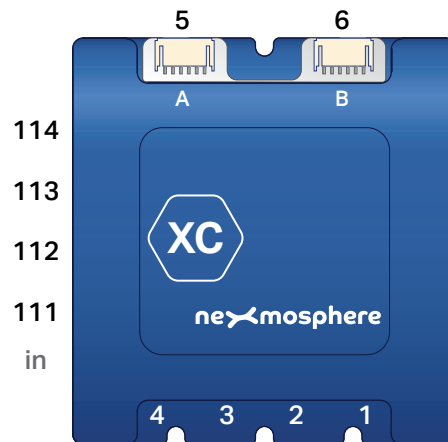


	XC-937	XC-938
1-4	X-talk address 001 - 004	X-talk address 001 - 004
5.	X-talk address 005 (LightMark)	Generic addr. 005 (RGBW ch. A)
6.	X-talk address 006 (LightMark)	Generic addr. 005 (RGBW ch. B)
111.	Generic address 111 (Optical switch)	Generic address 111 (Optical switch)
112.	Generic address 112 (Optical switch)	Generic address 112 (Optical switch)
113.	Generic address 113 (Optical switch)	Generic address 113 (Optical switch)
114.	Generic address 114 (Optical switch)	Generic address 114 (Optical switch)

XC-900 Series | XC-94x



	XC-941
1-8	X-talk address 001 - 008
111.	Generic address 111 (Analog switch)
112.	Generic address 112 (Analog switch)
113.	Generic address 113 (Analog switch)
114.	Generic address 114 (Analog switch)



	XC-947	XC-948
1-4	X-talk address 001 - 004	X-talk address 001 - 004
5.	X-talk address 005 (LightMark)	Generic addr. 005 (RGBW ch. A)
6.	X-talk address 006 (LightMark)	Generic addr. 005 (RGBW ch. B)
111.	Generic address 111 (Analog switch)	Generic address 111 (Analog switch)
112.	Generic address 112 (Analog switch)	Generic address 112 (Analog switch)
113.	Generic address 113 (Analog switch)	Generic address 113 (Analog switch)
114.	Generic address 114 (Analog switch)	Generic address 114 (Analog switch)

SERIAL SETTINGS

The serial settings are the same for each X-Script API enabled Xperience controller.

Serial settings

Baudrate:	115200
Parity:	None
Data Bits:	8
Stop Bits:	1
Flow Control:	None
Protocol:	ASCII
EOL:	CR+LF

USB interface

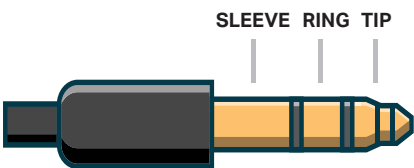
An Xperience controller with USB interface manifests itself as a USB-to-Serial converter (COM port) and is compatible with all mainstream operating systems and Digital Signage players.

RS-232 interface pinouts

All Xperience controllers with RS-232 interface have full RS-232 signaling. Serial input at TTL voltage levels are supported.

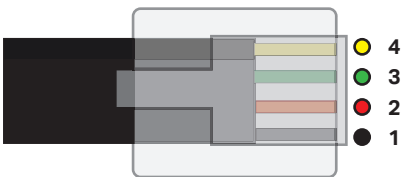
3.5mm Jack connector (XN-Range)

Sleeve:	Ground
Ring:	Rx (receive data into Nexmosphere controller from 3rd party device)
Tip:	Tx (sent data from Nexmosphere controller to 3rd party device)



RJ-9 connector (XM-Range)

1:	Ground
2:	Not used
3:	Rx (receive data into Nexmosphere controller from 3rd party device)
4:	Tx (sent data from Nexmosphere controller to 3rd party device)



X-TALK COMMANDS

X-talk commands are used to control individual X-talk Elements which are connected to an X-talk interface. This includes controlling output functionality as well as receiving (sensor) input. Each Element has its own specific set of available commands which are listed on the following pages.

X-Eye Presence & proximity	XY-1xx	11	XE Ambient light sensor	XE-A20	24
X-Eye Presence & airbutton	XY-2xx	12	XE Temperature sensor	XE-T50	25
X-Eye Motion	XY-320	13			
X-Eye Gender	XY-5xx	14	X-Snapper XS/XL	XSx-xxx, XLxx-xxx	26
XR Antenna Driver	XR-DR1	15	X-Dot Serial interface	XDW-S30, XDW-S40, XDW-S50	27
XR Antenna Driver	XR-DR2, XR-DW2	16	X-Dot I/O interface	XDW-I35, XDW-I56	28
			X-Dot Analog interface	XDW-A50	29
XF wireless pick-up sensor	XF-P3x, EM-Fx	17	X-Dot Buzzer interface	XDW-B06, XDW-M06	30
X-Wave (Linear interface)	XW-L56/96, XW-DL6	18	X-Dot X Wired pick-up	XDW-X16, XDW-X25, XDW-X36	31
X-Wave (Selection interface)	XW-DS6	19			
Lightmark Pixel LED control	XC-700 Series, XC-847	20	XT Touch button boards	T-4xx, XT-1xx	32
			XT Push button interface	XT-B4N6	33
XZ Light sensor	XZ-L20	21	XT-EF Air Gesture sensor	XT-EF30, XT-EF630	34
XZ Color sensor	XZ-H60	22		XT-EF650, XT-EF680	
XZ Angle sensor	XZ-A40	23			

General definitions

Trigger output

A trigger output is a serial command send from the Nexmosphere controller to the 3rd party device. By default, a trigger output is sent when the sensor value of an X-talk Element changes (e.g. an X-Snapper which is picked up).

Control input

A control input is a serial command send from the 3rd party device to the Nexmosphere controller. Control commands are used to set output on an X-talk Element (e.g. a LED pattern on an X-Wave).

Element settings

An Element setting is a serial command send from the 3rd party device to the Nexmosphere controller. Element settings are used to control the settings of an X-talk Element (e.g. the status LED behavior). Element settings are always restored to the default value after a power cycle.

General behavior

Status LEDs

The white or green status LED of a Controller blinks when a correct Control input command is received or when a Trigger output is sent. The red error LED blinks when an incorrect Control input command is received or multiple commands are sent too fast.

Element status request

Each X-talk Element supports a status request. When the Nexmosphere controller receives a status request for an X-talk Element, the Nexmosphere controller responds with the current value of the trigger input. The status request command for each Element is listed on the following pages. Please note that the status request is not intended to be used as a polling mechanism.

Recommended timing between commands

When sending consecutive control commands to an Xperience controller, it is recommended to place a delay between each command. If consecutive control commands are sent too fast after each other, a command can be missed. Although the required delays depend on the specific setup, we recommend a delay between 50-100ms.

Trigger output

Person / object detected in distance zone 1	X001A[1]
Person / object detected in distance zone 2	X001A[2]
Person / object detected in distance zone 3	X001A[3]
Person / object detected in distance zone 4	X001A[4]
Person / object detected in distance zone 5	X001A[5]
Person / object detected in distance zone 6	X001A[6]
Person / object detected in distance zone 7	X001A[7]
Person / object detected in distance zone 8	X001A[8]
Person / object detected in distance zone 9	X001A[9]
Person / object detected in distance zone 10	X001A[10]

Raw proximity distance X001A[X]
X= between 1-255



Status request

Request current status X001A[]

Element settings

Setting 1: Status LED behavior

1. LED on	X001S[1:1]
2. LED off	X001S[1:2]
3. LED on, blink at slot transition	X001S[1:3]*
4. LED off, blink at slot transition	X001S[1:4]

Setting 18: custom zone 5 lower value X001S[18:X]

**Default: XY-116 = 45 XY-146 = 49 XY-176 = 99*

Setting 19: custom zone 5 upper value X001S[19:X]

**Default: XY-116 = 56 XY-146 = 64 XY-176 = 108*

Setting 4: Measure mode

1. Raw proximity distance (1-255)	X001S[4:1]
2. Distance zones (1-10)	X001S[4:2]*

Setting 20: custom zone 6 lower value X001S[20:X]

**Default: XY-116 = 57 XY-146 = 65 XY-176 = 109*

Setting 21: custom zone 6 upper value X001S[21:X]

**Default: XY-116 = 66 XY-146 = 76 XY-176 = 124*

Setting 5: Sample time

Any number between 1-255 X001S[5:X]
Default X = 10

Setting 22: custom zone 7 lower value X001S[22:X]

**Default: XY-116 = 67 XY-146 = 77 XY-176 = 125*

Setting 23: custom zone 7 upper value X001S[23:X]

**Default: XY-116 = 82 XY-146 = 94 XY-176 = 126*

Setting 10-29: Custom distance zone values

The total range of raw proximity measurement is 1-255. There are 10 zones available in which the total range can be divided. See the X-Eye Presence Product Manual for more info on these zones when used on their default settings. By changing the default zone settings, custom zones can be created.

Setting 10: custom zone 1 lower value X001S[10:X]

**Default: XY-116 = 1 XY-146 = 1 XY-176 = 1*

Setting 11: custom zone 1 upper value X001S[11:X]

**Default: XY-116 = 24 XY-146 = 26 XY-176 = 76*

Setting 24: custom zone 8 lower value X001S[24:X]

**Default: XY-116 = 83 XY-146 = 95 XY-176 = 127*

Setting 25: custom zone 8 upper value X001S[25:X]

**Default: XY-116 = 106 XY-146 = 122 XY-176 = 136*

Setting 12: custom zone 2 lower value X001S[12:X]

**Default: XY-116 = 25 XY-146 = 27 XY-176 = 77*

Setting 13: custom zone 2 upper value X001S[13:X]

**Default: XY-116 = 30 XY-146 = 32 XY-176 = 80*

Setting 26: custom zone 9 lower value X001S[26:X]

**Default: XY-116 = 107 XY-146 = 123 XY-176 = 137*

Setting 27: custom zone 9 upper value X001S[27:X]

**Default: XY-116 = 152 XY-146 = 154 XY-176 = 146*

Setting 14: custom zone 3 lower value X001S[14:X]

**Default: XY-116 = 31 XY-146 = 33 XY-176 = 81*

Setting 15: custom zone 3 upper value X001S[15:X]

**Default: XY-116 = 36 XY-146 = 38 XY-176 = 90*

Setting 28: custom zone 10 lower value X001S[28:X]

**Default: XY-116 = 153 XY-146 = 155 XY-176 = 147*

Setting 29: custom zone 10 upper value X001S[29:X]

**Default: XY-116 = 255 XY-146 = 255 XY-176 = 255*

Setting 16: custom zone 4 lower value X001S[16:X]

**Default: XY-116 = 37 XY-146 = 39 XY-176 = 91*

Setting 17: custom zone 4 upper value X001S[17:X]

**Default: XY-116 = 44 XY-146 = 48 XY-176 = 98*

*Settings marked * are default*

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

Trigger output

Detection in distance zone AB	X001B[Dz=AB]
Detection in distance zone 01	X001B[Dz=01]
Detection in distance zone 02	X001B[Dz=02]
Detection in distance zone 03	X001B[Dz=03]
Detection in distance zone 04	X001B[Dz=04]
Detection in distance zone 05	X001B[Dz=05]
Detection in distance zone 06	X001B[Dz=06]
Detection in distance zone 07	X001B[Dz=07]
Detection in distance zone 08	X001B[Dz=08]
Detection in distance zone 09	X001B[Dz=09]
Detection in distance zone 10	X001B[Dz=10]

Absolute distance measurement X001B[Dv=ddd]
ddd = distance, value between 000-250 or XXX in case of no read

Raw sensor values X001B[Dr=ddd:nnn:sss:e]
ddd = distance, value between 000-500
nnn = noise level, value between 000-999
sss = signal level, value between 000-999
e = error level, value between 0-8

Data requests

Request current distance zone	X001B[ZONE?]
Request current absolute distance	X001B[DIST?]
Request current raw values	X001B[RAW?]

Element settings

Setting 1: Status LED behavior

1. LED on	X001S[1:1]
2. LED off	X001S[1:2]
3. LED on, blink at slot transition	X001S[1:3]*
4. LED off, blink at slot transition	X001S[1:4]

Setting 4: Output mode

1. Distance zone triggers	X001S[4:1]*
2. Absolute distance change triggers	X001S[4:2]
3. No triggers, use data requests	X001S[4:3]
4. Raw data mode, continuous data	X001S[4:4]

Setting 5: Change in absolute distance for trigger

Any number between 1-250 (cm) X001S[5:X]
Default X = 10

Setting 6: Range of interest

Any number between 1-50 (*10cm) X001S[6:X]
Default X = 25 for XY-240 Default X = 17 for XY-241

Setting 7: Sample averaging

1. No averaging	X001S[7:1]*
2. Running average of 2 samples	X001S[7:2]
3. Running average of 3 samples	X001S[7:3]
4. Running average of 4 samples	X001S[7:4]
5. Running average of 5 samples	X001S[7:5]
6. Running average of 6 samples	X001S[7:6]
7. Running average of 7 samples	X001S[7:7]
8. Running average of 8 samples	X001S[7:8]

Setting 8: Hysteresis for distance zones

Any number between 1-50 (cm) X001S[8:X]
Default X = 25



Setting 9: Sensor measurement duration

1. 20mS	X001S[9:1]
2. 33mS	X001S[9:2]
3. 50mS	X001S[9:3]
4. 100mS	X001S[9:4]
5. 200mS	X001S[9:5]*
6. 500mS	X001S[9:6]

Setting 20: Airbutton zone enable/disable

1. Disable Airbutton zone	X001S[20:1]*
2. Enable Airbutton zone	X001S[20:2]

Setting 21: Airbutton zone range

Any number between 1-250 (cm) X001S[21:X]
Default X = 10

*Settings marked * are default*

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

Trigger output

Amount of motion

X= between 1-255

Typically X will be a value between 0-20.

0= no motion, 255= very high amount of motion

X001A[X]

Status request

Request current status

X001A[]

Element settings

Setting 1: Status LED behavior

- | | |
|--|-------------|
| 1. LED on | X001S[1:1] |
| 2. LED off | X001S[1:2] |
| 3. LED on, blink when motion detected | X001S[1:3]* |
| 4. LED off, blink when motion detected | X001S[1:4] |

Setting 3: Measurement duration

Any number between 1-250

**Default X = 25*

X001S[3:X]

Setting 5: Size/range of detection area

Any number between 1-125

**Default X = 12*

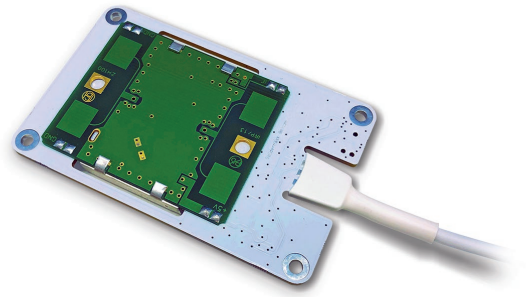
Range indication:

- | | |
|-------|----------------------|
| 1 = | +/- 10 meter range |
| 12 = | +/- 3.5 meter range* |
| 25 = | +/- 2 meter range |
| 125 = | +/- 1 meter range |

X001S[5:X]

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.



Trigger output

Shopper profile

P= Person detected

G = Gender

C= Confidence level gender

A= Age Group**

C Confidence level age

G = Gaze

X001B[PGCACG]

0= No Person, **1**=Person

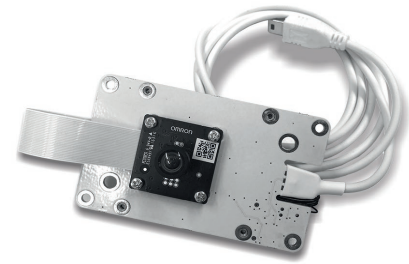
M=Male, **F**=Female, **U**=Unidentified

X = Very Low, **L**=Low, **H**=High

value between **0-7**

X = Very Low, **L**=Low, **H**=High

L=Left, **C**=Center, **R**=Right, **U**=Unidentified



Element settings

Setting 4: Filter Level

Any number between 1-5

*Default X = 2

X001S[4:X]

Setting 5: Minimum detection distance

Any number between 1-100

*Default X = 1

X001S[5:X]

Setting 6: Maximum detection distance

Any number between 1-100

*Default X = 100

X001S[6:X]

Setting 7: Canvas X Left

Any number between 1-100

*Default X = 1

X001S[7:X]

Setting 8: Canvas X Right

Any number between 1-100

*Default X = 100

X001S[8:X]

Setting 9: Canvas Y top

Any number between 1-100

*Default X = 1

X001S[9:X]

Setting 10: Canvas Y bottom

Any number between 1-100

*Default X = 100

X001S[10:X]

Setting 12: Gender confidence level Low

Any number between 1-100

*Default X = 10

X001S[12:X]

Setting 13: Gender confidence level High

Any number between 1-100

*Default X = 50

X001S[13:X]

Setting 14: Trigger at low confidence gender

1. No, no trigger at low confidence gender X001S[14:1]
2. Yes, trigger at low confidence gender X001S[14:2]*

Setting 15: Age Group**

1. Age map 1 X001S[15:1]*
2. Age map 2 X001S[15:2]
3. Age map 3 X001S[15:3]
4. Age map 4 X001S[15:4]

Setting 16: Age confidence level Low

Any number between 1-100

*Default X = 10

X001S[16:X]

Setting 17: Age confidence level High

Any number between 1-100

*Default X = 50

X001S[17:X]

Setting 18: Trigger at low confidence age

1. No, no trigger at low confidence age X001S[18:1]
2. Yes, trigger at low confidence age X001S[18:2]*

Setting 19: Trigger at Gaze change

1. Yes, trigger at gaze change X001S[19:1]
2. No, no trigger at gaze change X001S[19:2]*

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

** Default age grouping is as follows:

Group 0 = age 0/? - age 11

Group 1 = age 12 - age 17

Group 2 = age 18 - age 24

Group 3 = age 25 - age 34

Group 4 = age 35 - age 44

Group 5 = age 45 - age 54

Group 6 = age 55 - age 64

Group 7 = age 65 and older

Each tag pick-up or placement will result into two consecutive serial messages:

Tag 1 picked up
Tag 250 picked up

XR[PU001]
XR[PU250]

Tag 1 placed back
Tag 250 placed back

XR[PB001]
XR[PB250]

Pickup on antenna connected to X-talk 001	X001A[1]
Pickup on antenna connected to X-talk 158	X158A[1]

X001A[1]
X158A[1]

Placement on ant. connected to X-talk 001	X001A[0]
Placement on ant. connected to X-talk 158	X158A[0]

X001A[0]
X158A[0]

Request current status XR-DR1** X001B[]

X001B[]

the Controller replies with 4 decimal numbers indicating the 4 (max) tags which are detected by the antenna. E.g when tag 2 and 4 are placed on the antenna, the reply is:
X001B[d004 d 002 d000 d000]

Setting 1: Status LED behavior

- | | | |
|----|------------------------------|-------------|
| 1. | LED on | X001S[1:1] |
| 2. | LED off | X001S[1:2] |
| 3. | LED on, off when tag present | X001S[1:3]* |
| 4. | LED off, on when tag present | X001S[1:4] |

1.	23 dB, minimum detection range	X001S[4:1]
2.	33 dB, medium detection range	X001S[4:2]
3.	38 dB, high detection range	X001S[4:3]*
4.	43 dB, very high detection range	X001S[4:4]
5.	48 dB, very high detection range	X001S[4:5]

1. Only show distortion level 3	X001S[5:1]*
2. Show all distortion levels	X001S[5:2]
3. Off	X001S[5:3]

Distortion levels:
 Level 1: light distortion red LED blinks 1x
 Level 2: medium distortion red LED blinks 2x
 Level 3: high distortion red LED blinks 3x

Any number between 1-20
*Default X = 2

X001S[6;X]

The image shows two components. On the left is a blue rectangular development board labeled 'next-mosphere' and 'XR'. It has a silver-colored metal base with a connector labeled 'T-MX'. On the right is a square, thin, white sensor module with a black border and three wires (red, black, and white) extending from one corner.

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

Trigger output

In case of output setting UID (default)

Tag detected **X001B[TD=UID:XXXXXXXXXXXXXXXX]**
 Tag removed **X001B[TR=UID:XXXXXXXXXXXXXXXX]**
XXXXXXXXXXXXXXXX = Unique Tag ID (UID) - 14 ASCII Characters

In case of output setting Tag Nr

Tag detected **X001B[TD=TNR:XXXXX]**
 Tag removed **X001B[TR=TNR:XXXXX]**
XXXX = Tag number 00001-65535

In case of output setting Label 1

Tag detected **X001B[TD=LB1:XXXXXXXXXXXXXXXXXX]**
 Tag removed **X001B[TR=LB1:XXXXXXXXXXXXXXXXXX]**
XXXXXXXXXXXXXXXXXX = Label 1 - 16 ASCII characters

In case of output setting Label 2

Tag detected **X001B[TD=LB2:XXXXXXXXXXXXXXXXXX]**
 Tag removed **X001B[TR=LB2:XXXXXXXXXXXXXXXXXX]**
XXXXXXXXXXXXXXXXXX = Label 2 - 16 ASCII characters

In case of output setting Label 3

Tag detected **X001B[TD=LB3:XXXXXXXXXXXXXXXXXX]**
 Tag removed **X001B[TR=LB3:XXXXXXXXXXXXXXXXXX]**
XXXXXXXXXXXXXXXXXX = Label 3 - 16 ASCII characters

Data request

Request UID **X001B[UID?]**
 Request Tag number **X001B[TNR?]**
 Request Label 1 **X001B[LB1?]**
 Request Label 2 **X001B[LB2?]**
 Request Label 3 **X001B[LB3?]**

All replies are identical to the Trigger outputs listed above

Control input

Write TagNr **X001B[WR=TNR:XXXXX]**
XXXX = Tag number 00001-65535

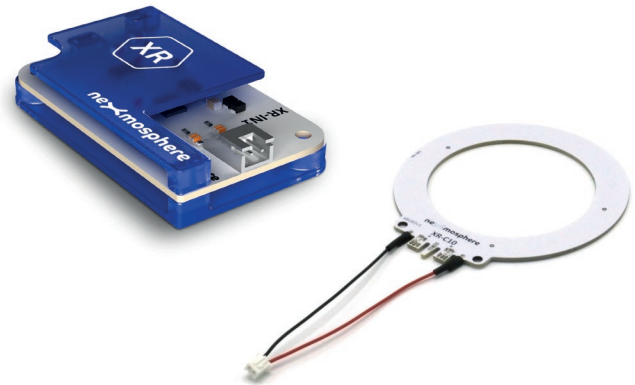
Write Label 1 **X001B[WR=LB1:XXXXXXXXXXXXXXXXXX]**
 Write Label 2 **X001B[WR=LB2:XXXXXXXXXXXXXXXXXX]**
 Write Label 3 **X001B[WR=LB3:XXXXXXXXXXXXXXXXXX]**
XXXXXXXXXXXXXXXXXX = Label 1 - 16 ASCII characters

Erase Tag number and Labels **X001B[ERASE=ALL]**
 Erase Tag number **X001B[ERASE=TAGNR]**
 Erase Labels **X001B[ERASE=LABELS]**
 Formate NTAG **X001B[FORMAT]**

Set password **X001B[PASSWORD=XXXXXXXX]**
XXXXXXXX = 8 characters 0-9 and/or A-F

Lock tag with password **X001B[LOCK]**
 Unlock tag with password **X001B[UNLOCK]**

Reload all NDEF data **X001B[RELOAD=NDEF]**



Element settings

Setting 1: Status LED behavior

- | | |
|---------------------------------|--------------------|
| 1. LED on | X001S[1:1] |
| 2. LED off | X001S[1:2] |
| 3. LED on, off when tag present | X001S[1:3]* |
| 4. LED off, on when tag present | X001S[1:4] |

Setting 4: Gain level

- | | |
|-------------------------------------|--------------------|
| 1. 23 dB, minimum detection range | X001S[4:1] |
| 2. 33 dB, medium detection range | X001S[4:2] |
| 3. 38 dB, high detection range | X001S[4:3]* |
| 4. 43 dB, very high detection range | X001S[4:4] |
| 5. 48 dB, very high detection range | X001S[4:5] |

Setting 5: Interference indication (red LED)

- | | |
|-----------------------------------|--------------------|
| 1. Only show interference level 3 | X001S[5:1]* |
| 2. Show all interference levels | X001S[5:2] |
| 3. Off | X001S[5:3] |

Setting 6: Filter level for ghost pick-ups

Any number between 1-20 **X001S[6:X]**
**Default X = 2*

Setting 9: Trigger mode

- | | |
|--|--------------------|
| 1. Trigger on tag detected and removed | X001S[9:1]* |
| 2. Trigger on tag detected | X001S[9:2] |
| 3. Trigger on tag removed | X001S[9:3] |
| 4. No triggers (use data requests) | X001S[9:4] |

Setting 10: Output format

- | | |
|---------------------------------|---------------------|
| 1. UID | X001S[10:1]* |
| 2. Tag number | X001S[10:1]* |
| 3. Text Label 1 | X001S[10:1]* |
| 4. Text Label 2 | X001S[10:1]* |
| 5. Text Label 3 | X001S[10:1]* |
| 6. UID, Tag number and Label 1 | X001S[10:1]* |
| 7. Label 1, Label 2 and Label 3 | X001S[10:1]* |
| 8. Custom output format | X001S[10:1]* |

*Settings marked * are default*

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

Trigger output

XF-P3 Pickup	X111A[3]
XF-P3 Placement	X111A[0]

Control input

Set wireless X-talk channel 111 to pair mode	X111B[PAIR]
Unpair wireless X-talk channel 111	X111B[UNPAIR]

Status request

Request current status	X111A[]
------------------------	---------



*For each example, wireless X-talk channel 111 is used (X111).
When the specific Element is paired to another wireless X-talk
channel, replace the 111 with the specific number of the wireless
X-talk channel.*

*For a more detailed explanation on how to setup, pair and integrate the wireless pickup sensors, please contact our
support team via support@nexmosphere.com.*

Control input

Program color palette

X001B[1ARRGGBB]

1 =	Fixed	
A =	Color number	value between 0-F (16 options)
RR =	RGB Red value	value between 00-FF (256 options)
GG =	RGB Green value	value between 00-FF (256 options)
BB =	RGB Blue value	value between 00-FF (256 options)

Make sure there is a minimum delay of 300ms between each color program command. The 16 color palette slots are pre-programmed with preset colors which can be overwritten, but are set back to their default state after a power cycle.

Single ramp LED output

X001B[2IIC TT]

2 =	Fixed	
I =	LED intensity	value between 00-99 (% of LED intensity)
C =	Color label	value between 0-F (number of programmed color)
TT =	Ramp time	value between 00-99 (units of 0,1s)

Pulsing LED output

X001B[3IIC TT PP O IIC TT RR TT]

3 =	Fixed	
I =	LED intensity 1	value between 00-99 (% of LED intensity)
C =	Color label 1	value between 0-F (number of programmed color)
TT =	Time at intensity 1	value between 02-99 (units of 0,1s)
PP =	Animation program	fixed value: 01
O =	Animation option	fixed value: 0
I =	LED intensity 2	value between 00-99 (% of LED intensity)
C =	Color label 2	value between 0-F (number of programmed color)
TT =	Time at intensity 2	value between 02-99 (units of 0,1s)
RR =	Number of pulses	value between 00-99 (00 = infinite repeat)
TT =	Ramp time	value between 02-99 (units of 0,1s)

Wave LED output

X001B[4IIC DD PP O IIC RR LL]

4 =	Fixed	
I =	LED intensity 1	value between 00-99 (% of LED intensity)
C =	Color label 1	value between 0-F (number of programmed color)
DD =	Duration of animation	value between 01-99 (units of 0,1s)
PP =	Animation program	fixed value: 01
O =	Animation option	1 = right, 2 = left, 3 = outwards, 4 = inwards
I =	LED intensity 2	value between 00-99 (% of LED intensity)
C =	Color label 2	value between 0-F (number of programmed color)
RR =	Reserved	fixed value: 00
LL =	Number of LEDs	value between 04-99

For a more detailed and elaborate explanation on controlling pixel LEDs with the X-Wave protocol, please see the X-Wave manual.

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.



Control input

Program color palette **X001B[1ARRGGBB]**

1 =	Fixed (command type)	
A =	Color number	value between 0-F (16 options)
RR =	RGB Red value	value between 00-FF (256 options)
GG =	RGB Green value	value between 00-FF (256 options)
BB =	RGB Blue value	value between 00-FF (256 options)

The 16 color palette slots are pre-programmed with preset colors which can be overwritten, but are set back to default after a power cycle. Make sure there is a minimum delay of 100ms between each "Program color" command.

Define LED segments **X001B[0ABC...XYZ]**

0 =	Fixed (command type)	
A-Z =	LEDs per segment	value between 1-F (amount of LEDs per segment), number of characters is variable (1-26)

Every subsequent characters indicates the amount of LEDs for a segment, starting with segment A, going up to segment Z. For each segment a value of 1-F (1-15) LEDs can be allocated.

Example: define segment A-I (9 segments) as 3, 4, 3, 3, 5, 4, 3, 3, 2 LEDs: X001B[0343354332]

Make sure there is a minimum delay of 100ms between each "Define LED segments" command.

Define ON and OFF state **X001B[5+2BBCRR-2BBCRR]**

5 =	Fixed (command type)	
+2 =	Fixed	
BB =	Brightness ON STATE	value between 00-99 (% of LED intensity)
C =	Color label ON STATE	value between 0-F (number of programmed color)
RR =	Ramp time ON STATE	value between 00-99 (units of 0,1s)
-2 =	Fixed	
BB =	Brightness OFF STATE	value between 00-99 (% of LED intensity)
C =	Color label OFF STATE	value between 0-F (number of programmed color)
RR =	Ramp time OFF STATE	value between 00-99 (units of 0,1s)

Example: define the ON state as 70% brightness on color C (default is sky blue) with a ramp time of 0.3 seconds and the OFF state as 00% brightness on color 0 with a ramp time of 0.3 seconds: X001B[5+270C03-200C03]

Make sure there is a minimum delay of 100ms between each "Define On/Off state" command.

Control segments ON/OFF **X001B[6+ABC...-DEF.]**

6 =	Fixed (command type)	
+=	Fixed	
A-Z =	ON segments	value between A-Z (segments labels), number of characters is variable (1-26)
+=	Fixed	
A-Z =	OFF segments	value between A-Z (segments labels), number of characters is variable (1-26)
In case all segments other than those set to the ON state should go off, a double hashtag (##) can be placed after the - instead of the separate segment letters.		

Example: set segment A, C, E, G and I to the ON state and all other segments OFF: X001B[6+ACEGI-##]

Make sure there is a minimum delay of 50ms between each "Control segments" command.

For a more detailed and elaborate explanation on controlling pixel LEDs with the Selection LED protocol, please see the Selection LED manual.

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.



Control input

Custom color palette

X001B[Cc=ARRGGBB]

Cc=	<i>Fixed</i>	
A	<i>Color number</i>	<i>value between 0-F (16 options)</i>
RR	<i>RGB Red value</i>	<i>value between 00-FF (256 options)</i>
GG	<i>RGB Green value</i>	<i>value between 00-FF (256 options)</i>
BB	<i>RGB Blue value</i>	<i>value between 00-FF (256 options)</i>

Single ramp LED output

X001B[Lc=RBBCTT]

Lc=R	<i>Fixed</i>	
BB	<i>LED brightness</i>	<i>value between 00-99 (% of LED intensity)</i>
C	<i>Color label</i>	<i>value between 0-F (number of programmed color)</i>
TT	<i>Ramp time</i>	<i>value between 00-99 (units of 0,1s)</i>

Pulsing LED output

X001B[Lc=PBCTTPPOBBCTTNNTT]

Lc=P	<i>Fixed</i>	
BB	<i>LED brightness 1</i>	<i>value between 00-99 (% of LED intensity)</i>
C	<i>Color label 1</i>	<i>value between 0-F (number of programmed color)</i>
TT	<i>Time at state 1</i>	<i>value between 02-99 (units of 0,1s)</i>
PP	<i>Animation program</i>	<i>fixed value: 01</i>
O	<i>Animation option</i>	<i>fixed value: 0</i>
BB	<i>LED brightness 2</i>	<i>value between 00-99 (% of LED intensity)</i>
C	<i>Color label 2</i>	<i>value between 0-F (number of programmed color)</i>
TT	<i>Time at state 2</i>	<i>value between 02-99 (units of 0,1s)</i>
NN	<i>Number of repeats</i>	<i>value between 00-99 (00 = infinite repeat)</i>
TT	<i>Ramp time</i>	<i>value between 02-99 (units of 0,1s)</i>

Wave LED output

X001B[Lc=WNNCDDPPONNCRRNM]

Lc=W	<i>Fixed</i>	
BB	<i>LED brightness 1</i>	<i>value between 00-99 (% of LED intensity)</i>
C	<i>Color label 1</i>	<i>value between 0-F (number of programmed color)</i>
DD	<i>Duration of animation</i>	<i>value between 01-99 (units of 0,1s)</i>
PP	<i>Animation program</i>	<i>fixed value: 01</i>
O	<i>Animation option</i>	<i>1 = right, 2 = left, 3 = outwards, 4 = inwards</i>
BB	<i>LED brightness 2</i>	<i>value between 00-99 (% of LED intensity)</i>
C	<i>Color label 2</i>	<i>value between 0-F (number of programmed color)</i>
RR	<i>Reserved</i>	<i>fixed value: 00</i>
NN	<i>Number of LEDs</i>	<i>value between 04-99</i>

Define segments

X001B[Sd=SSS...]

Sd=	<i>Fixed</i>	
SSS	<i>number of LEDs per segment</i>	<i>value between 1-F (1-15 LEDs)</i>

Define Segment States

X001B[Ss=DTCCC...]

Ss=	<i>Fixed</i>	
D	<i>Segment State designator</i>	<i>4 options +, -, \$ or %</i>
T	<i>LED control type</i>	<i>R (single ramp), P (Pulse) or W (Wave)</i>
CCC	<i>Command parameters</i>	<i>varies per LED control type</i>

Control LED segments

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

Sc=	<i>Fixed</i>	
D	<i>Designator Segment State</i>	<i>+, -, \$ or %</i>
SSS	<i>Segments</i>	<i>A-Z (indicating the segments)</i>
D	<i>Designator Segment State</i>	<i>+, -, \$ or %</i>
SSS	<i>Segments</i>	<i>A-Z (indicating the segments)</i>



For a more detailed and elaborate explanation on controlling pixel LEDs with the LightMark protocol, please see the LightMark manual.

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

Trigger output

When set to Trigger mode "pick-up detection"

Light value dark (no-pick) X001A[0]
Light value bright (pick-up) X001A[3]

When set to Trigger mode "raw light value"

Raw light value X001A[X]
X= between 1-255
1= dark, 255=light

Status request

Request current status X001A[]

Element settings

Setting 1: Status LED behavior

1. LED on X001S[1:1]
2. LED off X001S[1:2]
3. LED on, blink at trigger X001S[1:3]*
4. LED off, blink at trigger X001S[1:4]

Setting 4: Trigger mode

1. Pick-up detection (dark/bright) X001S[4:1]*
with manual trigger range values
2. Raw light value (1-255) X001S[4:2]
3. Pick-up detection (dark/bright) X001S[4:3]
with auto-calibration

Setting 6: Sample averaging

1. No averaging X001S[6:1]
2. running AVG 2 samples X001S[6:2]*
3. running AVG 4 samples X001S[6:3]
4. running AVG 8 samples X001S[6:4]
5. running AVG 16 samples X001S[6:5]
6. running AVG 32 samples X001S[6:6]
7. running AVG 64 samples X001S[6:7]
8. running AVG 128 samples X001S[6:8]
9. running AVG 256 samples X001S[6:9]
10. running AVG 1024 samples X001S[6:10]
11. running AVG 2058 samples X001S[6:11]
12. running AVG 4096 samples X001S[6:12]

Setting 10-13: dark/bright range values

Setting 10: lower value dark range X001S[10:X]
*Default X = 1
Setting 11: upper value dark range X001S[11:X]
*Default X = 128
Setting 12: lower value bright range X001S[12:X]
*Default X = 129
Setting 13: upper value bright range X001S[13:X]
*Default X = 255

Setting 14: Auto-calibration dark threshold**

Any number between 1-255 X001S[14:X]
*Default X = 25

Setting 15: Auto-calibration bright threshold**

Any number between 2-255 X001S[15:X]
*Default X = 225

Setting 18: Sensor sensitivity**

Any number between 1-250 X001S[18:X]
*Default X = 50 (50 x 0.1mS = 5ms)

Setting 19: Output skip**

Any number between 1-250 X001S[19:X]
*Default X = 2 -> sends only every second value on X-talk

Settings marked * are default

Settings marked ** are advanced settings which should only be adjusted if default settings do not provide the desired behavior. Please contact support@nexmosphere.com for more info.

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.



Trigger output

When Trigger on object detection is enabled, the command below is automatically sent. In this mode the sensor light is off until it triggers.

In case of output setting HSL **X001B[Cv=hhh,sss,III]**

In case of output setting Hue **X001B[Hv=hhh]**

In case of output setting Saturation **X001B[Sv=sss]**

In case of output setting Lightness **X001B[Lv=III]**

In case of output setting All
X001B[Hv=hhh]
X001B[Sv=sss]
X001B[Lv=III]

hhh = Hue, value between 000-360
sss = Saturation, value between 000-100
III = Lightness, value between 000-100

In case no object/color is detected, the output will be XXX for all 3 values

Data request

In "no trigger" mode the sensor light is off until a data request is received.

Request current HSL values **X001B[HSL?]**
Reply is **X001B[Cv=hhh,sss,III]**

Request current Hue values **X001B[HUE?]**
Reply is **X001B[Hv=hhh]**

Request current Saturation values **X001B[SAT?]**
Reply is **X001B[Sv=sss]**

Request current Lightness values **X001B[LIGHT?]**
Reply is **X001B[Lv=III]**

Request All values **X001B[ALL?]**
Reply is:
X001B[Hv=hhh]
X001B[Sv=sss]
X001B[Lv=III]

Request current reflection value **X001B[REFL?]**
Reply is **X001B[Rv=rrr]**
rrr = Reflection, value between 000-999

Control input

Calibrate background **X001B[CALI=BG]**
Calibrate white **X001B[CALI=WH]**
Factory reset **X001B[FACTORYRESET]**

Element settings



Setting 1: Status LED behavior

- | | |
|------------------------------|--------------------|
| 1. LED on | X001S[1:1] |
| 2. LED off | X001S[1:2] |
| 3. LED on, blink at trigger | X001S[1:3]* |
| 4. LED off, blink at trigger | X001S[1:4] |

Setting 4: Trigger mode

- | | |
|---|--------------------|
| 1. Trigger on object detection (reflection > X) | X001S[4:1]* |
| 2. No triggers (use data request) | X001S[4:2] |

Setting 5: Set output mode

- | | |
|----------------------|--------------------|
| 1. Output Hue | X001S[5:1] |
| 2. Output Saturation | X001S[5:2] |
| 3. Output Lightness | X001S[5:3] |
| 4. Output All | X001S[5:4] |
| 5. Output HSL | X001S[5:5]* |

Setting 11: Reflection trigger level (for setting 4:1)

Any number between 1-100 (refl / 10) **X001S[11:X]**
Default X = 15 (reflection value 150)

Setting 12: Reflection trigger - number of valid reads

Any number between 1-8 **X001S[12:X]**
Default X = 3

Setting 13: Reflection trigger - delta of valid reads

Any number between 1-100 **X001S[13:X]**
Default X = 20

Setting 16: Saturation correction

- | | |
|-----------------------------|---------------------|
| 1. No saturation correction | X001S[16:1] |
| 2. Correction for human eye | X001S[16:2]* |

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk Channel.

Trigger output

When Trigger on position change is enabled:

Orientation Position 1	X001B[P=1]
Orientation Position 2	X001B[P=2]
Orientation Position 3	X001B[P=3]
Orientation Position 4	X001B[P=4]
Orientation Position 5	X001B[P=5]
Orientation Position 6	X001B[P=6]
Orientation Position 7	X001B[P=7]
Orientation Position 8	X001B[P=8]

When Trigger on value change is enabled:

Orientation	X001B[O=+XXX, +YYY, +ZZZ]
+XXX = Orientation of X-Axis in +/- 180°	
+YYY = Orientation of Y-Axis in +/- 180°	
+ZZZ = Orientation of Z-Axis in +/- 180°	

Data request

Request current angle of X-axis
Reply is X001B[X=+XXX] (+XXX in °)

X001B[X?]

Request current angle of Y-axis

Reply is X001B[Y=+YYY] (+YYY in °)

X001B[Y?]

Request current angle of Z-axis

Reply is X001B[Z=+ZZZ] (+ZZZ in °)

X001B[Z?]

Request angle for all 3-axis separately

Reply is:
X001B[X=+XXX]
X001B[Y=+YYY]
X001B[Z=+ZZZ]

X001B[ALL?]

Request current orientation

Reply is X001B[O=+XXX, +YYY, +ZZZ]

X001B[O?]

Request raw vector values

Reply is X001B[V=+XXX, +YYY, +ZZZ]

X001B[V?]

Control input

Store current orientation pos. 1	X001B[STORE=P1]
Store current orientation pos. 2	X001B[STORE=P2]
Store current orientation pos. 3	X001B[STORE=P3]
Store current orientation pos. 4	X001B[STORE=P4]
Store current orientation pos. 5	X001B[STORE=P5]
Store current orientation pos. 6	X001B[STORE=P6]
Store current orientation pos. 7	X001B[STORE=P7]
Store current orientation pos. 8	X001B[STORE=P8]

Clear position 1	X001B[CLEAR=P1]
Clear position 2	X001B[CLEAR=P2]
Clear position 3	X001B[CLEAR=P3]
Clear position 4	X001B[CLEAR=P4]
Clear position 5	X001B[CLEAR=P5]
Clear position 6	X001B[CLEAR=P6]
Clear position 7	X001B[CLEAR=P7]
Clear position 8	X001B[CLEAR=P8]

Clear all positions
Factory reset

X001B[CLEAR=ALL]
X001B[FACTORYRESET]



Element settings

Setting 1: Status LED behavior

1. LED on	X001S[1:1]*
2. LED off	X001S[1:2]
3. LED on, off at alarm	X001S[1:3]
4. LED off, on at alarm	X001S[1:4]

Setting 4: Trigger mode

1. Trigger on position change (1-8)	X001S[4:1]
2. Trigger on orientation value change (X°)	X001S[4:2]*
3. Trigger on both value/pos change	X001S[4:3]
4. No triggers (use data request)	X001S[4:4]

Setting 5: Trigger axis for orientation value change

1. Trigger on X-axis change	X001S[5:1]
2. Trigger on Y-axis change	X001S[5:2]
3. Trigger on Z-axis change	X001S[5:3]
4. Trigger on X-axis and Y-axis change	X001S[5:4]
5. Trigger on X-axis and Z-axis change	X001S[5:5]
6. Trigger on Y-axis and Z-axis change	X001S[5:6]
7. Trigger on all 3 axis	X001S[5:7]*

Setting 6: Sensitivity / Trigger bandwidth

Any number between 1-45
Default X = 5

X001S[6:X]

Setting 7: Motion filter

Any number between 1-100
Default X = 20

X001S[7:X]

Setting 8: Sample averaging

Any number between 1-20
Default X = 8

X001S[8:X]

Setting 9: Show irrelevant axis

1. Don't show irrelevant axis, show *** instead	X001S[9:1]
2. Show irrelevant axis	X001S[9:2]*

Setting 10: Filter level (for setting 9) higher is stricter

Any number between 1-25
Default X = 15

X001S[10:X]

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk Channel.

Trigger output

When Trigger on range change is enabled:

Ambient light in range 0 – 1 lux	X001B[Ar=1]
Ambient light in range 1 – 50 lux	X001B[Ar=2]
Ambient light in range 50-250 lux	X001B[Ar=3]
Ambient light in range 250-1.000 lux	X001B[Ar=4]
Ambient light in range 1.000-5.000 lux	X001B[Ar=5]
Ambient light in range 5.000-15.000 lux	X001B[Ar=6]
Ambient light in range 15.000-40.000 lux	X001B[Ar=7]
Ambient light in range 40.000-80.000 lux	X001B[Ar=8]
Ambient light in range 80.000-120.000 lux	X001B[Ar=9]

When Trigger on value change is enabled:

Ambient light value	X001B[Av=XXXXXX]
xxxxxx = lux value (0-120000)	



Data request

Request current ambient light value (lux)	X001B[LUX?]
Reply is X001B[Av=XXXXXX]	
xxxxxx = lux value (0-120000)	

E.g. if 20000 lux is measured, the reply is X001B[Av=020000]

Element settings

Setting 1: Status LED behavior

2. LED off	X001S[1:2]
4. LED off, blink at trigger	X001S[1:4]*

Setting 4: Trigger mode

1. Trigger on ambient light range change	X001S[4:1]*
2. Trigger on ambient light value change (%)	X001S[4:2]
3. No triggers (use data request)	X001S[4:3]

Setting 5: Percentage for value change trigger

Any number between 1-100	X001S[5:X]
*Default X = 10 (10%)	

Setting 6: Sample averaging

1. No averaging	X001S[6:1]
2. Running AVG 2 samples	X001S[6:2]*
3. Running AVG 4 samples	X001S[6:3]
4. Running AVG 8 samples	X001S[6:4]
5. Running AVG 16 samples	X001S[6:5]
6. Running AVG 32 samples	X001S[6:6]
7. Running AVG 64 samples	X001S[6:7]
8. Running AVG 128 samples	X001S[6:8]

Settings marked * are default

Settings marked ** are advanced settings which should only be adjusted if default settings do not provide the desired behavior. Please contact support@nexmosphere.com for more info.

Setting 7: Range mapping

1. Full range	X001S[7:1]*
2. Low light	X001S[7:2]
3. Medium light	X001S[7:3]
4. Maximum light	X001S[7:4]

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

Trigger output

When Trigger on range change is enabled:

Temp value in range low	X001B[Tr=1]
Temp value in range medium	X001B[Tr=2]
Temp value in range high	X001B[Tr=3]

Humidity value in range low	X001B[Hr=1]
Humidity value in range medium	X001B[Hr=2]
Humidity value in range high	X001B[Hr=3]

When Trigger on value change is enabled:

Temp value +XX,X is °C	X001B[Tv=+XX,X]
---------------------------	-----------------

Humidity value XX is humidity %	X001B[Hv=XX]
------------------------------------	--------------

Humidity is only accurately measured when the temperature is $\geq 1^{\circ}\text{C}$. Due to condensation, it can take a few minutes before decline in high humidity is detected.

Data request

Request current temperature value Reply is X001B[Tv=+XX,X]	X001B[TEMP?]
---	--------------

Request current humidity value Reply is X001B[Hv=XX]	X001B[HUMI?]
---	--------------

Request all current values Reply is: X001B[Tv=+XX,X] X001B[Hv=XX]	X001B[ALL?]
--	-------------

Element settings

Setting 1: Status LED behavior

1. LED on	X001S[1:1]
2. LED off	X001S[1:2]
3. LED on, blink at trigger	X001S[1:3]
4. LED off, blink at trigger	X001S[1:4] *

Setting 4: Trigger mode Temperature sensing

1. No triggers (use data request)	X001S[4:1]
2. Trigger on range change (low/med/high)	X001S[4:2]*
3. Trigger on value change (0,1 °C)	X001S[4:3]
4. Trigger on both range and value change	X001S[4:4]
5. Trigger on temp. value change (1 °C)	X001S[4:5]

Setting 5: Trigger mode Humidity sensing

1. No triggers (use data request)	X001S[5:1]
2. Trigger on range change (low/med/high)	X001S[5:2]*
3. Trigger on value change (2 %)	X001S[5:3]
4. Trigger on both range and value change	X001S[5:4]

Setting 10-15: temperature range values

X - 100 = °C E.g. 125 = +25°C
Xmin = 75 (-25°C) | Xmax = 175 (+75°C)**

Setting 10: lower value temp range low *Default X = 75 (-25°C)	X001S[10:X]
Setting 11: upper value temp range low *Default X = 100 (0°C)	X001S[11:X]



Setting 12: lower value temp range medium *Default X = 101 (1°C)	X001S[12:X]
Setting 13: upper value temp range medium *Default X = 140 (40°C)	X001S[13:X]

Setting 14: lower value temp range high *Default X = 141 (41 °C)	X001S[14:X]
Setting 15: upper value temp range high *Default X = 175 (75 °C)**	X001S[15:X]

** the maximum operating temperature of the product is 50°C.

Setting 20-25: humidity range values

X = humidity in % E.g. 55 = 55% humidity
Xmin = 1 | Xmax = 99

Setting 20: lower value humidity range low *Default X = 1	X001S[20:X]
Setting 21: upper value humidity range low *Default X = 34	X001S[21:X]

Setting 22: lower value humidity range med *Default X = 35	X001S[22:X]
Setting 23: upper value humidity range med *Default X = 65	X001S[23:X]

Setting 24: lower value humidity range high *Default X = 66	X001S[24:X]
Setting 25: upper value humidity range high *Default X = 100	X001S[25:X]

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

Trigger output

No pickup / no alarm	X001A[0]
Pickup / no alarm	X001A[3]
No Pickup / alarm	X001A[4]
Pickup / Alarm	X001A[7]

Status request

Request current status	X001A[]
------------------------	---------

Element settings

Setting 1: Status LED behavior

1. LED on	X001S[1:1] *
2. LED off	X001S[1:2]
3. LED on, off at alarm	X001S[1:3]
4. LED off, on at alarm	X001S[1:4]

Setting 2: LED Brightness

1. LED Brightness 0%	X001S[2:1]
2. LED Brightness 11%	X001S[2:2]
3. LED Brightness 22%	X001S[2:3] *
4. LED Brightness 33%	X001S[2:4]
5. LED Brightness 44%	X001S[2:5]
6. LED Brightness 55%	X001S[2:6]
7. LED Brightness 66%	X001S[2:7]
8. LED Brightness 77%	X001S[2:8]
9. LED Brightness 100%	X001S[2:9]

Setting 3: Functionality control

1. Pickup enabled / Alarm enabled	X001S[3:1] *
2. Pickup enabled / Alarm disabled	X001S[3:2]
3. Pickup disabled / Alarm enabled	X001S[3:3]
4. Pickup disabled / Alarm disabled	X001S[3:4]

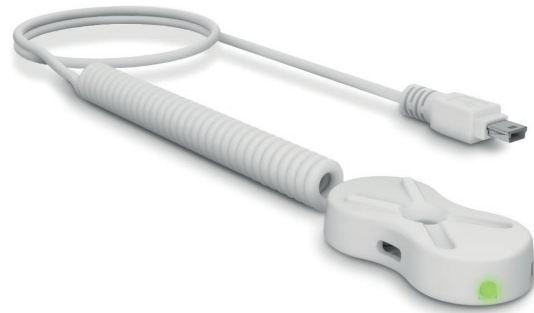
Setting 4: Status LED blink pattern

1. No blink(s)	X001S[4:1]
2. Short blink at pickup/place back	X001S[4:2]
3. Medium blink at pickup/place back	X001S[4:3] *
4. Long blink at pickup/place back	X001S[4:4]
5. Short blink at pickup	X001S[4:5]
6. Medium blink at pickup	X001S[4:6]
7. Long blink at pickup	X001S[4:7]
8. Short blink at place back	X001S[4:8]
9. Medium blink at place back	X001S[4:9]
10. Long blink at place back	X001S[4:10]

Short = 0,1 sec, Medium = 0,3 sec, Long = 1 sec

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.



Trigger output

Serial input X001B[X]
X is the received serial message from the 3rd party device in ASCII
1-29 characters

Control input

Serial output X001B[X]
X is the serial message which is sent to the 3rd party device in ASCII
1-29 characters



Element settings

Setting 1: Status LED behavior

- | | |
|-------------------------|-------------|
| 1. LED on | X001S[1:1] |
| 2. LED off | X001S[1:2] |
| 3. LED on, off at alarm | X001S[1:3]* |
| 4. LED off, on at alarm | X001S[1:4] |

Setting 5: Baudrate setting of X-Dot Element

- | | |
|-----------|-------------|
| 1. 9600 | X001S[5:1] |
| 2. 19200 | X001S[5:2] |
| 3. 38400 | X001S[5:3] |
| 4. 57600 | X001S[5:4] |
| 5. 115200 | X001S[5:5]* |

Setting 6: Termination of Serial input

- | | |
|------------|------------|
| 1. CR | X001S[6:1] |
| 2. LF | X001S[6:2] |
| 3. CR + LF | X001S[6:3] |

Setting 7: Termination of Serial output

- | | |
|------------|------------|
| 1. CR | X001S[7:1] |
| 2. LF | X001S[7:2] |
| 3. CR + LF | X001S[7:3] |

Setting 8: Time out for Serial input

Any number between 1-255 X001S[8:X]
Default X = 2

Setting 9: Time out error setting

When a Time out occurs:

- | | |
|---|-------------|
| 1. Message is not send, remains in buffer | X001S[9:1] |
| 2. Message is send, buffer is cleared | X001S[9:2]* |
| 3. Message is not send, buffer is cleared | X001S[9:3] |

Setting 10: Error message settings

- | | |
|---|-------------|
| 1. No error messages | X001S[10:1] |
| 2. Only time out error | X001S[10:2] |
| 3. Only buffer error | X001S[10:3] |
| 4. Both timeout and buffer error messages | X001S[10:4] |

*Settings marked * are default*

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk Channel.

Trigger output

I/O device logic high	X001A[1]
I/O device logic low	X001A[0]

Status request

Request current status	X001A[]
------------------------	----------

Control input

I/O output on	X001A[1]
I/O output off	X001A[0]
I/O output PWM	X001B[MSSEDD]

M = mode	1= on, 2=off, 3= single ramp, 4= pulse
SS = start value	value between 00-99
EE = end value	value between 00-99
DD = duration	value between 00-99 (units of 0,1s)

Example: to continuously pulse a LED from 0 to 99% brightness in 1 second, use the following command: X001B[4009910]

Element settings

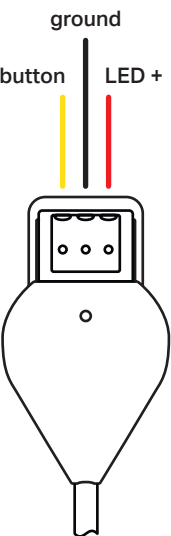
Setting 1: Status LED behavior

- | | |
|--|-------------|
| 1. LED on | X001S[1:1] |
| 2. LED off | X001S[1:2] |
| 3. On when input is high, off when low | X001S[1:3]* |
| 4. Off when input is high, on when low | X001S[1:4] |

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

The pinout of the X-Dot I/O is as follows:



Trigger output

When Trigger on Default range change is enabled:

Range 00 (Analog input 00-49) X001B[Dr=00]
Range 01 (Analog input 50-99) X001B[Dr=01]

...

Range 19 (Analog input 950-999) X001B[Dr=19]
Range 20 (Analog input 1000-1023) X001B[Dr=20]

When Trigger on Custom range change is enabled:

Custom range 00 X001B[Cr=00]
Custom range 01 X001B[Cr=01]

...

Custom range 19 X001B[Cr=19]
Custom range 20 X001B[Cr=20]

When Trigger on Value change is enabled:

Analog input value X001B[Av=XXXX]
xxxx = analog value (0-1023)

Data request

Request current analog input range X001B[RANGE?]
Reply is X001B[Dr=XX] or X001B[Cr=XX] (XX is range 00-20)

Request current analog input value X001B[VALUE?]
Reply is X001B[Av=XXXX] (XXXX is analog value 0000-1023)

Request current Custom ranges
X001B[SHOWCUSTOMRANGES]

Reply is all custom ranges which are NOT blank:

X001B[CR01:BOT=XXXX] (XXXX is analog value 0000-1023)
X001B[CR01:TOP=XXXX] (XXXX is analog value 0000-1023)

Control input

Set custom range 00 bottom X001B[CR00:BOT=XXXX]
Set custom range 00 top X001B[CR00:TOP=XXXX]
Set custom range 01 bottom X001B[CR01:BOT=XXXX]
Set custom range 01 top X001B[CR01:TOP=XXXX]

...

Set custom range 19 bottom X001B[CR19:BOT=XXXX]
Set custom range 19 top X001B[CR19:TOP=XXXX]
Set custom range 20 bottom X001B[CR20:BOT=XXXX]
Set custom range 20 top X001B[CR20:TOP=XXXX]

(XXXX is analog value 0000-1023 or **** (=blank))

Set all custom ranges to blank X001B[CRALL=****]
Factory reset X001B[FACTORYRESET]

Element settings

Setting 1: Status LED behavior

- | | |
|------------------------------|-------------|
| 1. LED on | X001S[1:1]* |
| 2. LED off | X001S[1:2] |
| 3. LED on, blink at trigger | X001S[1:3] |
| 4. LED off, blink at trigger | X001S[1:4] |

Setting 4: Trigger mode

- | | |
|------------------------------------|-------------|
| 1. Trigger on Default range change | X001S[4:1]* |
| 2. Trigger on Custom range change | X001S[4:2] |
| 3. Trigger on Value change | X001S[4:3] |
| 4. No triggers (use data requests) | X001S[4:4] |



Setting 5: Change in Value for trigger

Any number between 1-50 X001S[5:X]
Default X = 5

Setting 6: Hysteresis for Range trigger

Any number between 1-20 X001S[6:X]
Default X = 2

Setting 7: Sample averaging

- | | |
|-------------------------------------|-------------|
| 1. No averaging | X001S[7:1] |
| 2. Running average of 2 samples | X001S[7:2]* |
| 3. Running average of 4 samples | X001S[7:3] |
| 4. Running average of 8 samples | X001S[7:4] |
| 5. Running average of 16 samples | X001S[7:5] |
| 6. Running average of 32 samples | X001S[7:6] |
| 7. Running average of 64 samples | X001S[7:7] |
| 8. Running average of 128 samples | X001S[7:8] |
| 9. Running average of 256 samples | X001S[7:9] |
| 10. Running average of 512 samples | X001S[7:10] |
| 11. Running average of 1024 samples | X001S[7:11] |
| 12. Running average of 2048 samples | X001S[7:12] |

Setting 8: Time delay for sending new value

- | | |
|------------------|-------------|
| 1. No time delay | X001S[8:1]* |
| 2. 100mS | X001S[8:2] |
| 3. 250mS | X001S[8:2] |
| 4. 500mS | X001S[8:2] |
| 5. 1000mS | X001S[8:2] |
| 6. 2000mS | X001S[8:2] |
| 7. 3000mS | X001S[8:2] |

Setting 9: Voltage reference (Vref)

- | | |
|-------------|-------------|
| 1. 5V (Vcc) | X001S[9:1]* |
| 2. 4.096V | X001S[9:2] |
| 3. 2.048V | X001S[9:3] |
| 4. 1.024V | X001S[9:4] |

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk Channel.

Trigger output

Buzzer output A on	X001A[0]
Buzzer output A off	X001A[1]
Buzzer output B on	X001A[2]
Buzzer output B off	X001A[3]

Program buzzer pattern **X001B[OOHLLHLL...]**
OO = output channel AA, BB or AB
HH = time on 00-99 (units of 0, 1s)
LL = time off 00-99 (units of 0, 1s)
HH = time on 00-99 (units of 0, 1s)
LL = time off 00-99 (units of 0, 1s)
 ... (max of 30 characters)

Play pattern output A once	X001A[4]
Play pattern output A continuously	X001A[5]
Play pattern output B once	X001A[6]
Play pattern output B continuously	X001A[7]
Play pattern output A & B once	X001A[8]
Play pattern output A & B continuous	X001A[9]



Element settings

Setting 1: Status LED behavior

1. LED on	X001S[1:1]
2. LED off	X001S[1:2]
3. LED on, off when buzzer is activated	X001S[1:3]*
4. LED off, on when buzzer is activated	X001S[1:4]

*Settings marked * are default*

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

Trigger output

No pickup / no alarm	X001A[0]
Pickup / no alarm	X001A[3]
No Pickup / alarm	X001A[4]
Pickup / Alarm	X001A[7]

Status request

Request current status	X001A[]
------------------------	---------

Element settings

Setting 1: Status LED behavior

1. LED on, off at pickup	X001S[1:1]*
2. LED off, on at pickup	X001S[1:2]
3. LED on, off at alarm	X001S[1:3]
4. LED off, on at alarm	X001S[1:4]

Setting 2: LED Brightness

1. LED Brightness 0%	X001S[2:1]
2. LED Brightness 11%	X001S[2:2]
3. LED Brightness 22%	X001S[2:3]
4. LED Brightness 33%	X001S[2:4]
5. LED Brightness 44%	X001S[2:5]
6. LED Brightness 55%	X001S[2:6]
7. LED Brightness 66%	X001S[2:7]
8. LED Brightness 77%	X001S[2:8]
9. LED Brightness 100%	X001S[2:9]*

Setting 3: Functionality control

1. Pickup enabled / Alarm enabled	X001S[3:1]*
2. Pickup enabled / Alarm disabled	X001S[3:2]
3. Pickup disabled / Alarm enabled	X001S[3:3]
4. Pickup disabled / Alarm disabled	X001S[3:4]

Setting 4: Pickup sensitivity level

1. Sensitivity 1, highest sensitivity	X001S[4:1]
2. Sensitivity 2, high sensitivity	X001S[4:2]
3. Sensitivity 3, high sensitivity	X001S[4:3]
4. Sensitivity 4, medium sensitivity	X001S[4:4]
5. Sensitivity 5, medium sensitivity	X001S[4:5]*
6. Sensitivity 6, medium sensitivity	X001S[4:6]
7. Sensitivity 7, low sensitivity	X001S[4:7]
8. Sensitivity 8, low sensitivity	X001S[4:8]
9. Sensitivity 9, lowest sensitivity	X001S[4:9]

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

During start-up the sensor calibrates to its current position. Therefore please make sure the sensor is placed in a stable position and is not moving while powering up your setup.



Trigger output

No buttons pressed	X001A[0]
Button 1 pressed	X001A[3]
Button 2 pressed	X001A[5]
Button 3 pressed	X001A[9]
Button 4 pressed	X001A[17]

Status request

Request current status	X001A[]
------------------------	---------

Control input

All LEDs on	X001A[255]
All LEDs off	X001A[0]
All LEDs fast blink	X001A[85]
All LEDs slow blink	X001A[170]

LED 1 On / other LEDs off	X001A[3]
LED 2 On / other LEDs off	X001A[12]
LED 3 On / other LEDs off	X001A[48]
LED 4 On / other LEDs off	X001A[192]

LED 1 off / other LEDs on	X001A[252]
LED 2 off / other LEDs on	X001A[243]
LED 3 off / other LEDs on	X001A[207]
LED 4 off / other LEDs on	X001A[63]

LED 1 fast blink / other LEDs off	X001A[1]
LED 2 fast blink / other LEDs off	X001A[4]
LED 3 fast blink / other LEDs off	X001A[16]
LED 4 fast blink / other LEDs off	X001A[64]

LED 1 slow blink / other LEDs off	X001A[2]
LED 2 slow blink / other LEDs off	X001A[8]
LED 3 slow blink / other LEDs off	X001A[32]
LED 4 slow blink / other LEDs off	X001A[128]

All combinations of LED outputs (255 in total) are possible.
Please contact support@nexmosphere.com for a complete list of available X-Touch LED commands.

Element settings

Setting 4: Touch sensitivity lower threshold

Any number between 1 – 253	X001S[4:X]
<i>*Default X = 5</i>	

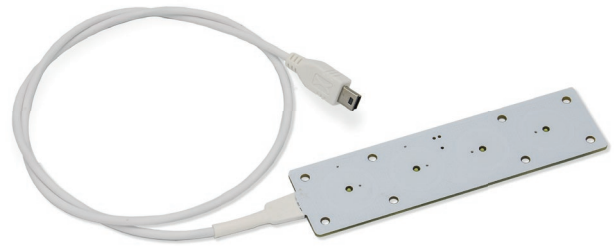
Setting 5: Touch sensitivity upper threshold

Any number between 3 – 255	X001S[5:X]
<i>*Default X = 110</i>	

Setting 6: Touch trigger time

Any number between 1 – 255	X001S[6:X]
<i>*Default X = 2</i>	

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.



Trigger output

No buttons pressed	X001A[0]
Button 1 pressed	X001A[3]
Button 2 pressed	X001A[5]
Button 3 pressed	X001A[9]
Button 4 pressed	X001A[17]

Status request

Request current status	X001A[]
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Control input

All LEDs on	X001A[255]
All LEDs off	X001A[0]
All LEDs fast blink	X001A[85]
All LEDs slow blink	X001A[170]

LED 1 On / other LEDs off	X001A[3]
LED 2 On / other LEDs off	X001A[12]
LED 3 On / other LEDs off	X001A[48]
LED 4 On / other LEDs off	X001A[192]

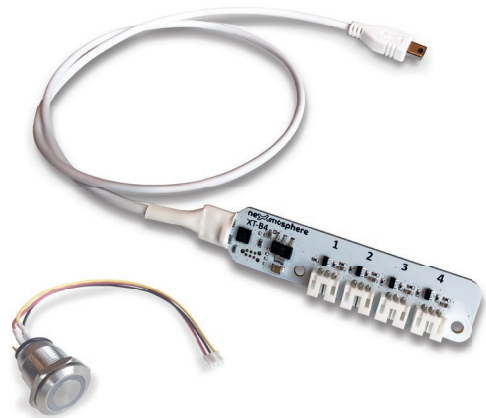
LED 1 off / other LEDs on	X001A[252]
LED 2 off / other LEDs on	X001A[243]
LED 3 off / other LEDs on	X001A[207]
LED 4 off / other LEDs on	X001A[63]

LED 1 fast blink / other LEDs off	X001A[1]
LED 2 fast blink / other LEDs off	X001A[4]
LED 3 fast blink / other LEDs off	X001A[16]
LED 4 fast blink / other LEDs off	X001A[64]

LED 1 slow blink / other LEDs off	X001A[2]
LED 2 slow blink / other LEDs off	X001A[8]
LED 3 slow blink / other LEDs off	X001A[32]
LED 4 slow blink / other LEDs off	X001A[128]

All combinations of LED outputs (255 in total) are possible.
Please contact support@nexmosphere.com for a complete list of available LED commands.

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.



Trigger output

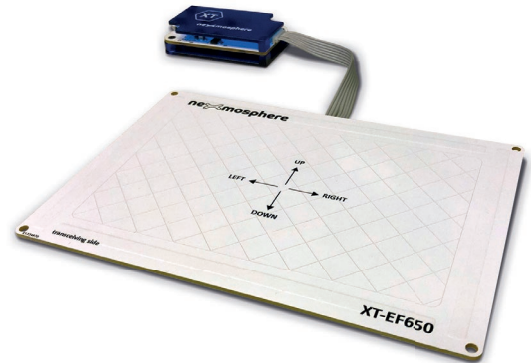
AirButton Far	X001B[Bs=FAR]
AirButton Near	X001B[Bs=NEAR]
AirButton Idle (hand left)	X001B[Bs=IDLE]
AirSwipe to Left	X001B[Sd=LEFT]
AirSwipe to Right	X001B[Sd=RIGHT]
AirSwipe up	X001B[Sd=UP]
AirSwipe down	X001B[Sd=DOWN]

When AirWheel incremental mode is enabled:

AirWheel Clockwise	X001B[Wd=CW]
AirWheel Counter-clockwise	X001B[Wd=CCW]

When AirWheel absolute value mode is enabled:

AirWheel value	X001B[Wv=XXX]
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Control input

Set AirWheel absolute value XXX = 001-100	X001B[SETW=XXX]
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Element settings

Setting 1: Status LED behavior

1. LED on	X001S[1:1]
2. LED off	X001S[1:2]
3. LED on, blink at trigger	X001S[1:3]
4. LED off, blink at trigger	X001S[1:4] *

Setting 5: (De)activate AirButton

1. Deactivate AirButton detection	X001S[5:1]
2. Activate AirButton detection	X001S[5:2] *

Setting 6: (De)activate AirSwipe

1. Deactivate AirSwipe detection	X001S[6:1]
2. Activate AirSwipe detection	X001S[6:2] *

Setting 7: (De)activate AirWheel

1. Deactivate AirWheel detection	X001S[7:1] *
2. Activate AirWheel incremental mode	X001S[7:2]
3. Activate AirWheel abs. value mode	X001S[7:3]

Setting 11: Detection range AirButton Far

Value between 2-100 Default X = 10	X001S[11:X]
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Setting 12: Detection range AirButton NEAR

Value between 1-100 Default X = 20 For XT-EF680 default X = 15	X001S[12:X]
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Setting 13: Hysteresis for AirButton FAR

Value between 1-50 Default X = 10	X001S[13:X]
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Setting 14: AirButton trigger delay

Value between 1-200 Default X = 40	X001S[14:X]
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Setting 21: Trigger resolution for AirWheel detection

1. Trigger 8x per rotation	X001S[21:1]
2. Trigger 4x per rotation	X001S[21:2]
3. Trigger 2x per rotation	X001S[21:3] *
4. Trigger 1x per rotation	X001S[21:4]

Setting 27: Deactivate interference indication (red LED)

1. Deactivate interference indication	X001S[27:1]
2. Activate interference indication	X001S[27:2] *

Setting 28: Calibration profile (XT-EF680 only)

1. No top panel - (for testing)	X001S[28:1]
2. Acrylic 3mm	X001S[28:2] *
3. Acrylic 6mm	X001S[28:3]
4. Acrylic 10mm	X001S[28:4]
5. Wood 18mm	X001S[28:5]
6. Wood 36mm	X001S[28:6]
7. Brick/stone	X001S[28:7]

Settings marked * are default

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk channel.

GENERIC CONTROL COMMANDS

Generic control commands are used to control generic in –and outputs which are functionalities of the Controller, such as 12/24V LED control and audio switching. Each functionality has its own specific set of available commands which are listed on the following pages:

Audio channel switching	35
EM-4	
XC-900 Series	
Mono LED control	36
EM-5	
RGB LED control	37
EM-2	
EM-6	
RGBW LED control	38
XC-800 Series	
XC-748	

Recommended timing between commands

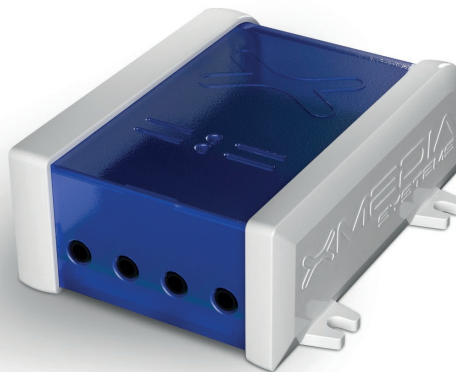
When sending consecutive control commands to an Xperience controller, it is recommended to place a delay between each command. If consecutive control commands are sent too fast after each other, a command can be missed. Although the required delays depend on the specific setup, we recommend a 50-100ms delay between consecutive commands.

Control input

Activate audio channel 1	G111A[1]
Activate audio channel 2	G112A[1]
Activate audio channel 3	G113A[1]
Activate audio channel 4	G114A[1]

Deactivate audio channel 1	G111A[0]
Deactivate audio channel 2	G112A[0]
Deactivate audio channel 3	G113A[0]
Deactivate audio channel 4	G114A[0]

For each example, channel address 11X is used (G11X). When the EM-4 module has a different address, replace the 11X with the correct address.



Control input

Set LED output **G111A[X]**

X = both the brightness of the LED output as well as the ramp time.

*X can be calculated by filling in the following formula: $X = 256 * (15/R) + B$*

R = Ramp time value in seconds, fixed list of available options (255 in total)

B = Brightness value between 0-255. (0 = 0% brightness, 255 = 100% brightness)

Some practical examples:

Brightness 255, ramptime 0,1s	G111A[38655]
Brightness 60, ramptime 0,1s	G111A[38460]
Brightness 0, ramptime 0,1s	G111A[38400]

Brightness 255, ramptime 0,25s	G111A[15615]
Brightness 60, ramptime 0,25s	G111A[15420]
Brightness 0, ramptime 0,25s	G111A[15360]

Brightness 255, ramptime 0,5s	G111A[7935]
Brightness 60, ramptime 0,5s	G111A[7740]
Brightness 0, ramptime 0,5s	G111A[7680]

Brightness 255, ramptime 1s	G111A[4095]
Brightness 60, ramptime 1s	G111A[3900]
Brightness 0, ramptime 1s	G111A[3840]

Brightness 255, ramptime 1,5s	G111A[2815]
Brightness 60, ramptime 1,5s	G111A[2620]
Brightness 0, ramptime 1,5s	G111A[2560]

Brightness 255, ramptime 3s	G111A[1535]
Brightness 60, ramptime 3s	G111A[1340]
Brightness 0, ramptime 3s	G111A[1280]

Brightness 255, ramptime 5s	G111A[1023]
Brightness 60, ramptime 5s	G111A[828]
Brightness 0, ramptime 5s	G111A[768]

Due to the nature of the formula, the available ramptimes are fixed. There are a total of 255 available ramptimes ranging from 0,06s to 15s. For the full list of available ramptimes please contact support@nexmosphere.com.

For each example, channel address 111 is used (G111). When the specific functionality has a different address. replace the 111 with the correct address.



Control input

Define color

G111B[X RRR GGG BBB]

X =	Color number	<i>value between 1-9</i>
RRR =	Red value	<i>value between 0-100</i>
GGG =	Green value	<i>value between 0-100</i>
BBB =	Blue value	<i>value between 0-100</i>

The EM-6 has preprogrammed default colors for each color number: 0=white, 1=red, 2=green, 3=blue
These colors can be adjusted by using the "Define color" control input.

Set RGB output (single ramp)

G111B[O C BBB TTT]

O =	Output channel	<i>A, B, C, D or E (A=1, B=2, C=3, D=4, E=5), X = all channels</i>
C =	Color number	<i>value between 1-9</i>
BBB =	Brightness	<i>value between 0-100</i>
TTT =	Ramp time	<i>value between 0-999 (* 0,1 seconds)</i>

Example: set all channels to color 1 at 80% brightness, with a ramp time of 0.6 seconds: G111B[X 1 080 006].

only available on EM-6:

Set RGB output (pulsing)

G111B[O C BBB TTT C BBB TTT]

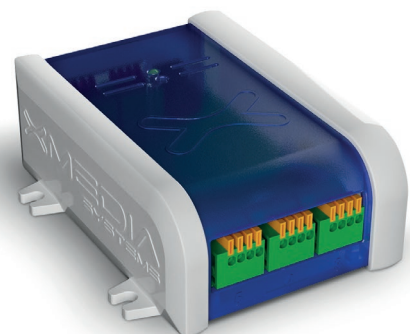
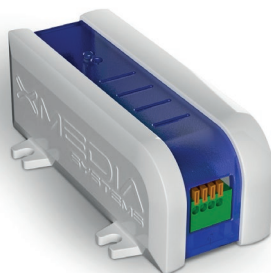
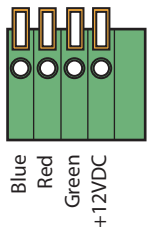
O =	Output channel	<i>A, B, C, D or E (A=1, B=2, C=3, D=4, E=5), X = all channels</i>
Ramp 1		
C =	Color number	<i>value between 1-9</i>
BBB =	Brightness	<i>value between 0-100</i>
TTT =	Ramp time	<i>value between 0-999 (* 0,1 seconds)</i>
Ramp 2		
C =	Color number	<i>value between 1-9</i>
BBB =	Brightness	<i>value between 0-100</i>
TTT =	Ramp time	<i>value between 0-999 (* 0,1 seconds)</i>

Example: set channel A to pulse with Ramp 1 to color 3 at 80% brightness in 1.2 seconds and Ramp 2 to color 3 at 10% brightness in 1.2 seconds: G111B[A 3 80 12 3 10 12].

The output channel indicates for which channel the command is determined. The EM-2 only has 1 output channel, thus the output channel should always be A.

For each example, channel address 111 is used (G111). When the specific functionality has a different address, replace the 111 with the correct address.

The pinout of the RGB LEDstrip connectors is as follows:



Control input

Define color

G111B[X RRR GGG BBB WWW]

X =	Color number	<i>value between 1-9</i>
RRR =	Red value	<i>value between 0-100</i>
GGG =	Green value	<i>value between 0-100</i>
BBB =	Blue value	<i>value between 0-100</i>
WWW =	White value	<i>value between 0-100</i>

The XC controller has preprogrammed default colors for each color number: 0=white, 1=red, 2=green, 3=blue
These colors can be adjusted by using the "Define color" control input.

Set RGBW output (single ramp)

G111B[O C BBB TTT]

O =	Output channel	<i>A, B, C, D or E (A=1, B=2, C=3, D=4, E=5), X = all channels</i>
C =	Color number	<i>value between 1-9</i>
BBB =	Brightness	<i>value between 0-100</i>
TTT =	Ramp time	<i>value between 0-999 (* 0,1 seconds)</i>

Example: set all channels to color 1 at 80% brightness, with a ramp time of 0.6 seconds: G111B[X 1 080 006].

Set RGBW output (pulsing)

G111B[O C BBB TTT C BBB TTT]

O =	Output channel	<i>A, B, C, D or E (A=1, B=2, C=3, D=4, E=5), X = all channels</i>
Ramp 1		
C =	Color number	<i>value between 1-9</i>
BBB =	Brightness	<i>value between 0-100</i>
TTT =	Ramp time	<i>value between 0-999 (* 0,1 seconds)</i>
Ramp 2		
C =	Color number	<i>value between 1-9</i>
BBB =	Brightness	<i>value between 0-100</i>
TTT =	Ramp time	<i>value between 0-999 (* 0,1 seconds)</i>

Example: set channel A to pulse with Ramp 1 to color 3 at 80% brightness in 1.2 seconds and Ramp 2 to color 3 at 10% brightness in 1.2 seconds: G111B[A 3 80 12 3 10 12]

For each example, channel address 111 is used (G111). When the specific functionality has a different address, replace the 111 with the correct address.

To connect RGBW LEDstrips to the XC controller, please use one of the CA5-S cables (pricelist accessories).



SYSTEM COMMANDS

System commands are used to control the general system settings and behavior of a Nexmosphere controller. The list of available system commands is described on the following pages.

Set X-talk autotrigger

Set autotrigger on	S111B[ON]
Set autotrigger off	S111B[OFF]

Activate/deactivate X-talk channel

Deactivate X-talk channel X	S112B[X:OFF]
Activate X-talk channel X	S112B[X:ON]

Some practical examples:

<i>Deactivate X-talk channel 1</i>	<i>S112B[1:OFF]</i>
<i>Activate X-talk channel 1</i>	<i>S112B[1:ON]</i>

<i>Deactivate X-talk channel 5</i>	<i>S112B[5:OFF]</i>
<i>Activate X-talk channel 5</i>	<i>S112B[5:ON]</i>

DIAGNOSTIC COMMANDS

Diagnostic commands are used to request system and configuration information. The list of available system commands is described on the following pages.

Request specific X-talk Element information

Print product code of X-talk Element **D001B[TYPE]**

Controller reply: **D001B[TYPE=XXXXXXX]**

Print serial number of X-talk Element **D001B[SERIAL]**

Controller reply: **D001B[SERIAL=XXXXX_XX-XXX-XX]**

For each example, X-talk channel 1 is used (X001). When the specific Element is connected to another X-talk channel, replace the 001 with the specific number of the X-talk Channel.

Please note that the XR-DR1 Element will be shipped with pre-programmed productcode starting in Q2 2019. All previous shipments of the XR-DR1 are not pre-programmed with a productcode and serialnumber.

Some practical examples:

Request the product code of an XY-146 **D003B[TYPE]**

connected to X-talk interface 003

-Controller reply

D003B[TYPE=XY146]

Request the serial number of an Element **D007B[SERIAL]**

connected to X-talk interface 007

-Controller reply

D007B[SERIAL=32132_18-101-24]