X-SCRIPT SERIAL API | Q1 2021

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.

Table of content

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 interpretted 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.
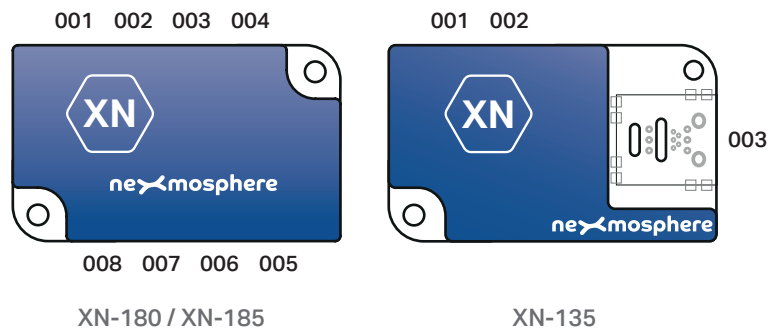
ADDRESSING

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.
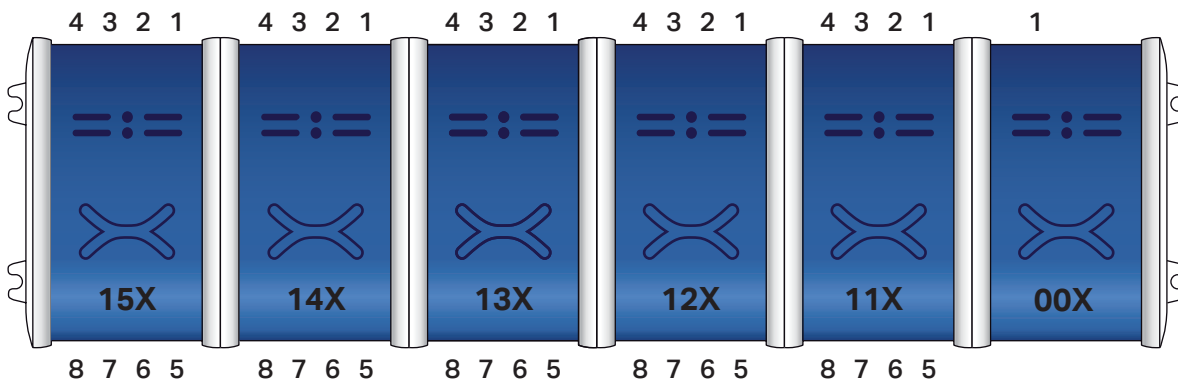
XN-Range

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.

XN-180 / XN-185   **XN-135**

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

4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1
96X	95X	94X	93X	92X	91X
8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5

IN

• • •

4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1
46X	45X	44X	43X	42X	41X
8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5

IN

OUT

ShopBus Cable

4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1
36X	35X	34X	33X	32X	31X
8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5

IN

OUT

ShopBus Cable

4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1
26X	25X	24X	23X	22X	21X
8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5

IN

OUT

ShopBus Cable

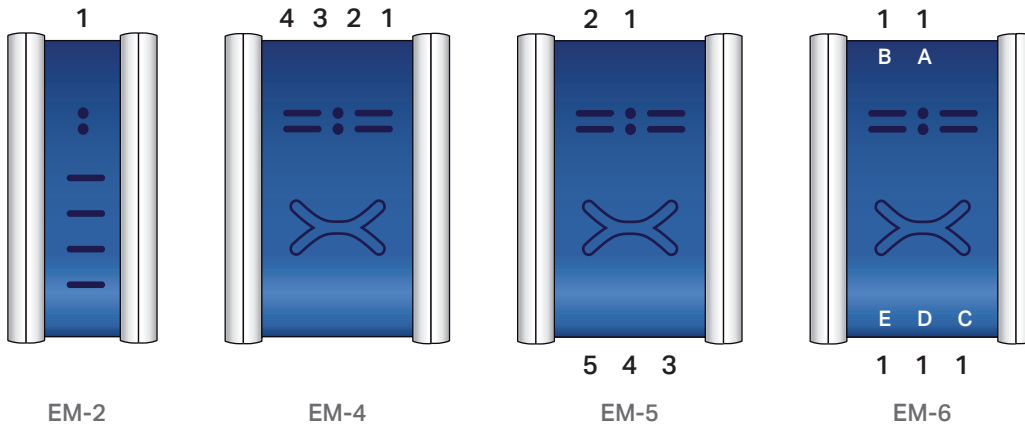| 4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	4 3 2 1	1
15X	14X	13X	12X	11X	00X
8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5	8 7 6 5	

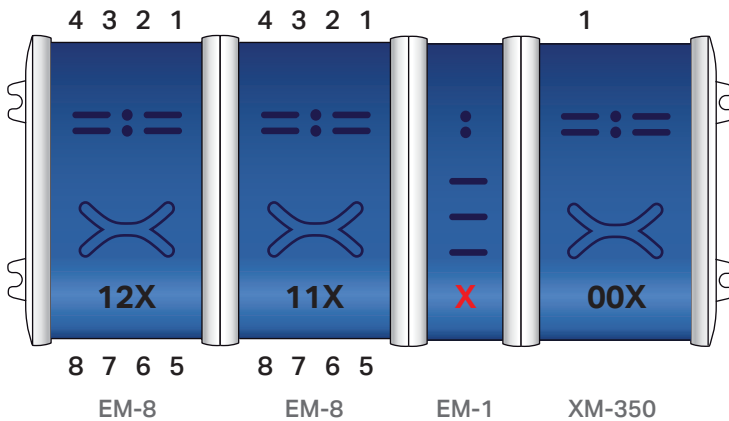**RS-232**

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.

EM-2   EM-4   EM-5   EM-6

The EM-2 and EM-6 modules don't have seperate 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.

EM-8   EM-8   EM-1   XM-350

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 seperate 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

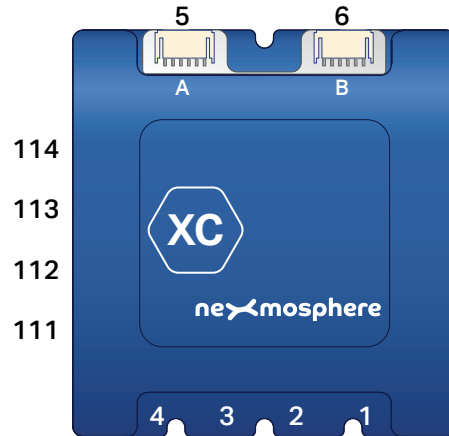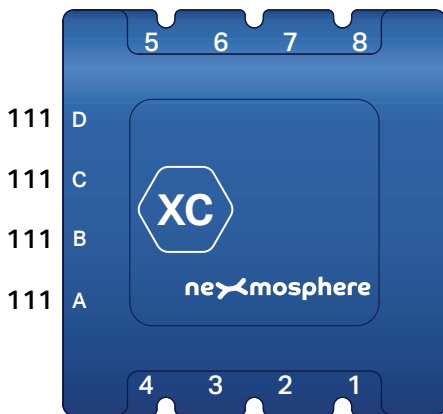|	XC-720	XC-748	XC-760
1-4	X-talk address 001 - 004	X-talk address 001 - 004	X-talk address 001 - 004
5.	X-talk address 005 (LightMark)	Generic addr. 005 (RGBW, ch **A**)	X-talk address 005 (LightMark)
6.	X-talk address 006 (LightMark	Generic addr. 005 (RGBW, ch **B**)	X-talk address 006 (LightMark)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

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

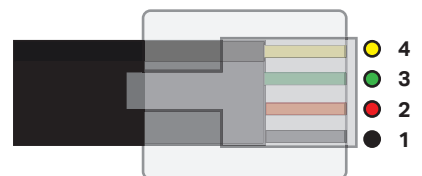The white or green status LED of a Controller blinks when a correct Control input command is received or when a Trigger output is sent. The red error LED blinks when an incorrect Control input command is received or multiple commands are sent too fast.

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.
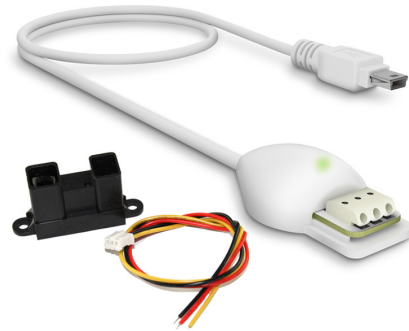
Recommended timing between commands

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.

X-EYE PRESENCE & PROXIMITY | XY-116, XY146, XY-176, XN-135M3

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

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

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 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 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 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

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 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 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 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 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 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

*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.

X-EYE MOTION | XY-320

Trigger output

Amount of motion   X001A[X]
X= between 1-255
Typically X will be a value between 0-20.
0= no motion, 0= very high amount of motion

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   X001S[3:X]
***Default X = 25**

Setting 5: Size/range of detection area
Any number between 1-125   X001S[5:X]
***Default X = 12**
Range indication:
1 =   +/- 10 meter range
12 =   +/- 3.5 meter range*
25 =   +/- 2 meter range
125 =   +/- 1 meter range

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.

X-EYE GENDER | XY-510, XY-520

Trigger output

Shopper profile		X001B[PGCACG]
P=	Person detected	0= No Person, 1=Person
G =	Gender	M=Male, F=Female, U=Unidentified
C=	Confidence level gender	X = Very Low, L=Low, H=High
A=	Age Group**	value between 0-7
C	Confidence level age	X = Very Low, L=Low, H=High
G =	Gaze	L=Left, C=Center, R=Right, U=Unidentified

Element settings

Setting 4: Filter Level
Any number between 1-5   X001S[4:X]

Default X = 2

Setting 5: Minimum detection distance
Any number between 1-100   X001S[5:X]

Default X = 1

Setting 6: Maximum detection distance
Any number between 1-100   X001S[6:X]

Default X = 100

Setting 7: Canvas X Left
Any number between 1-100   X001S[7:X]

Default X = 1

Setting 8: Canvas X Right
Any number between 1-100   X001S[8:X]

Default X = 100

Setting 9: Canvas Y top
Any number between 1-100   X001S[9:X]

Default X = 1

Setting 10: Canvas Y bottom
Any number between 1-100   X001S[10:X]

Default X = 100

Setting 12: Gender confidence level Low
Any number between 1-100   X001S[12:X]

Default X = 10

Setting 13: Gender confidence level High
Any number between 1-100   X001S[13:X]

Default X = 50

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   X001S[16:X]

Default X = 10

Setting 17: Age confidence level High
Any number between 1-100   X001S[17:X]

Default X = 50

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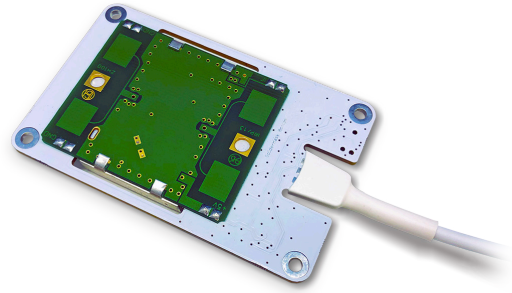2. No, no trigger at gaze change   X001S[19:2]*

*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 gouping 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

XR ANTENNA DRIVER | XR-DR1

Trigger output

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

1st message | tag information

Tag 1 picked up	**XR[PU001]**
Tag 250 picked up	**XR[PU250]**
Tag 1 placed back	**XR[PB001]**
Tag 250 placed back	**XR[PB250]**

2nd message | antenna information

Pickup on antenna connected to X-talk 001	**X001A[1]**
Pickup on antenna connected to X-talk 158	**X158A[1]**
Placement on ant. connected to X-talk 001	**X001A[0]**
Placement on ant. connected to X-talk 158	**X158A[0]**

Status request

Request current status XR-DR1**   **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]

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: Distortion indication (red LED)

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

Setting 6: Filter level for ghost pick-ups

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

*Default X = 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.

XF BATTERY-POWERED WIRELESS PICKUP SENSORS | XF-P3, EM-F

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[1*ARRGGBB*]**

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[2*IICTT*]**

2 =	*Fixed*	
II =	*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[3*IICTTPPOIICTTRRTT*]**

3 =	*Fixed*	
II =	*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*
II =	*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[4*IICDDPPOIICRRLL*]**

4 =	*Fixed*	
II =	*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*
II =	*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.

X-WAVE SELECTION | XW-DS, XN-135M8S

Control input

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

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[0*ABC...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.

LIGHTMARK LED CONTROL | XC-700 SERIES, XC-847

Control input

Custom color palette
X001B[Cc=*ARRGGBB*]

Cc=	*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)*

Single ramp LED output
X001B[Lc=R*BBCTT*]

Lc=R	*Fixed*	
BB	*LED brightness*	*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[Lc=P*BBCTTPPOBBCTTNNTT*]

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

Wave LED output
X001B[Lc=W*NNCDDPPONNCRRNN*]

Lc=W	*Fixed*	
BB	*LED brightness 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*
BB	*LED brightness 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*
NN	*Number of LEDs*	*value between 04-99*

Define segments
X001B[Sd=*SSS*...]

Sd=	*Fixed*	
SSS	*number of LEDS per segment*	*value between 1-F (1-15 LEDs)*

Define Segment **States**
X001B[Ss=*DTCCC*...]

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

Control LED segments
X001B[Sc=*DSSS*...*DSSS*...]

Sc=	*Fixed*	
D	*Designator Segment State*	*+, -, $ or %*
SSS	*Segments*	*A-Z (indicating the segments)*
D	*Designator Segment State*	*+, -, $ or %*
SSS	*Segments*	*A-Z (indicating the segments)*

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

XZ LIGHT SENSOR | XZ-L20

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.

XZ ANGLE SENSOR | XZ-A40

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   X001B[X?]
Reply is X001B[X=+XXX] (+XXX in °)

Request current angle of Y-axis   X001B[Y?]
Reply is X001B[Y=+YYY] (+YYY in °)

Request current angle of Z-axis   X001B[Z?]
Reply is X001B[Z=+ZZZ] (+ZZZ in °)

Request angle for all 3-axis separately   X001B[ALL?]
Reply is:
X001B[X=+XXX]
X001B[Y=+YYY]
X001B[Z=+XXX]

Request current orientation   X001B[O?]
Reply is X001B[O=+XXX, +YYY,+ ZZZ]

Request raw vector values   X001B[V?]
Reply is X001B[V=+XXX, +YYY,+ ZZZ]

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	X001B[CLEAR=ALL]
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, 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   X001S[6:X]
Default X = 5

Setting 7: Motion filter
Any number between 1-100   X001S[7:X]
Default X = 20

Setting 8: Sample averaging
Any number between 1-20   X001S[8:X]
Default X = 8

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   X001S[10:X]
Default X = 15

*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]

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]

*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 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   X001B[Tv=+XX,X]
+XX,X is °C

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

Humidity is only accurately measured when the temperature is >= 1°C. Due to condensation, it can take a few minutes before decline in high humidity is detected.

Data request

Request current temperature value	X001B[TEMP?]

Reply is X001B[Tv=+XX,X]

Request current humidity value	X001B[HUMI?]

Reply is X001B[Hv=XX]

Request all current values	X001B[ALL?]

Reply is:
X001B[Tv=+XX,X]
X001B[Hv=XX]

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	X001S[10:X]

*Default X = 75 (-25°C)

Setting 11: upper value temp range low	X001S[11:X]

*Default X = 100 (0°C)

Setting 12: lower value temp range medium	X001S[12:X]

*Default X = 101 (1°C)

Setting 13: upper value temp range medium	X001S[13:X]

*Default X = 140 (40°C)

Setting 14: lower value temp range high	X001S[14:X]

*Default X = 141 (41 °C)

Setting 15: upper value temp range high	X001S[15:X]

*Default X = 175 (75 °C)**

** 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	X001S[20:X]

*Default X = 1

Setting 21: upper value humidity range low	X001S[21:X]

*Default X = 34

Setting 22: lower value humidity range med	X001S[22:X]

*Default X = 35

Setting 23: upper value humidity range med	X001S[23:X]

*Default X = 65

Setting 24: lower value humidity range high	X001S[24:X]

*Default X = 66

Setting 25: upper value humidity range high	X001S[25:X]

*Default X = 100

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.

X-SNAPPER / XL-SNAPPER | XSW, XSB, XLW, XLB

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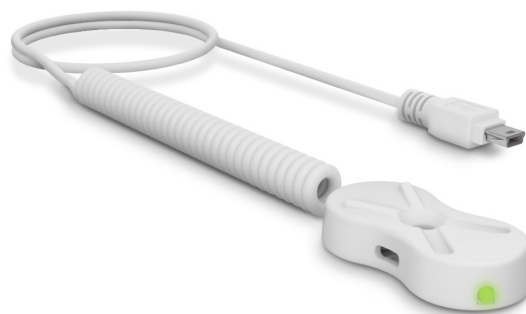|		
1.	Pickup enabled / Alarm enabled	X001S[3:1] *
2.	Pickup enabled / Alarm disabled	X001S[3:2]
3.	Pickup disabled / Alarm enabled	X001S[3:3]
4.	Pickup disabled / Alarm disabled	X001S[3:4]

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.

X-DOT I/O INTERFACE | XDW-I36, XDW-I56

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[MSSEEDD]

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 continously 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, ofn 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:

X-DOT MOTION INTERFACE | XDW-M06

Trigger output

Sensor output range 1	X001A[1]
Sensor output range 2	X001A[2]
Sensor output range 3	X001A[3]
Sensor output range 4	X001A[4]
Sensor output range 5	X001A[5]
Sensor output range 6	X001A[6]
Sensor output range 7	X001A[7]
Sensor output range 8	X001A[8]
Sensor output range 9	X001A[9]
Sensor output range 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 3: Sensor type
1. 4.0V reference   X001S[3:1]*
2. 2.0V reference   X001S[3:2]

Setting 4: Output mode
1. Raw sensor output   X001S[4:1]
2. Range output 1-10   X001S[4:2]*

Setting 6: Sample time
Any number between 0-255   X001S[6:X]
Default X = 10

Setting 10-29: Custom slot values
The raw analog output of the motion sensor is converted into a digital number 1-255. There are 10 output ranges available to divide the raw output into custom trigger ranges.

Setting 10: custom slot 1 lower value   X001S[10:X]
Default X = 1
Setting 11: custom slot 1 upper value   X001S[11:X]
Default X = 25

Setting 12: custom slot 2 lower value   X001S[12:X]
Default X = 26
Setting 13: custom slot 2 upper value   X001S[13:X]
Default X = 50

Setting 14: custom slot 3 lower value   X001S[14:X]
Default X = 51
Setting 15: custom slot 3 upper value   X001S[15:X]
Default X = 75

Setting 16: custom slot 4 lower value   X001S[16:X]
Default X = 76
Setting 17: custom slot 4 upper value   X001S[17:X]
Default X = 100

Setting 18: custom slot 5 lower value   X001S[18:X]
Default X = 101
Setting 19: custom slot 5 upper value   X001S[19:X]
Default X = 125

Setting 20: custom slot 6 lower value   X001S[20:X]
Default X = 126
Setting 21: custom slot 6 upper value   X001S[21:X]
Default X = 150

Setting 22: custom slot 7 lower value   X001S[22:X]
Default X = 151
Setting 23: custom slot 7 upper value   X001S[23:X]
Default X = 175

Setting 24: custom slot 8 lower value   X001S[24:X]
Default X = 176
Setting 25: custom slot 8 upper value   X001S[25:X]
Default X = 200

Setting 26: custom slot 9 lower value   X001S[26:X]
Default X = 201
Setting 27: custom slot 9 upper value   X001S[27:X]
Default X = 225

Setting 28: custom slot 10 lower value   X001S[28:X]
Default X = 226
Setting 29: custom slot 10 upper value   X001S[29:X]
Default X = 255

*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.

X-DOT BUZZER INTERFACE | XDW-B06, XDW-B46

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[OOHHLLHHLL…]**
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.

X-DOT X WIRED PICKUP SENSOR | XDW-X16, XDW-X26, XDW-X36

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.

X-TOUCH CAPACITIVE TOUCH BUTTON | XT-4, XT-1

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]
***Default X = 5**

Setting 5: Touch sensitivity upper threshold
Any number between 3 – 255   X001S[5:X]
***Default X = 110**

Setting 6: Touch trigger time
Any number between 1 – 255   X001S[6:X]
***Default X = 2**

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.

XT PUSH BUTTON INTERFACE | XT-B4N, XN-165

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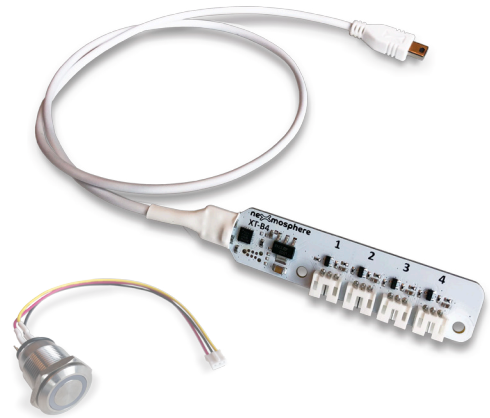
LED 1 off / other LEDs on   X001A[252]
LED 2 off / other LEDs on   X001A[243]
LED 3 off / other LEDs on   X001A[207]
LED 4 off / other LEDs on   X001A[63]

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 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.
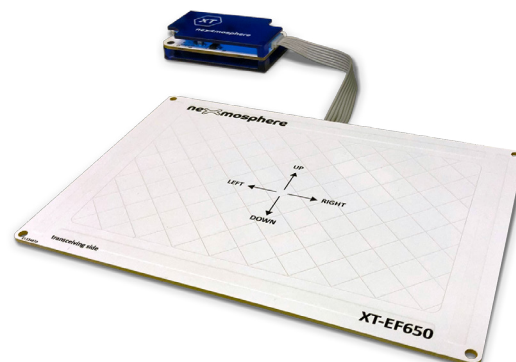
XT-EF AIR GESTURE SENSOR | XT-EF30, XT-EF630, XT-EF650, XT-EF680

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]

Control input

Set AirWheel absolute value	X001B[SETW=XXX)

XXX = 001-100

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   X001S[11:X]
Default X = 10

Setting 12: Detection range AirButton NEAR
Value between 1-100   X001S[12:X]
Default X = 20
For XT-EF680 default X = 15

Setting 13: Hysteresis for AirButton FAR
Value between 1-50   X001S[13:X]
Default X = 10

Setting 14: AirButton trigger delay
Value between 1-200   X001S[14:X]
Default X = 40

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 inteference indication	X001S[27:1]
2. Activate inteference 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:

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.
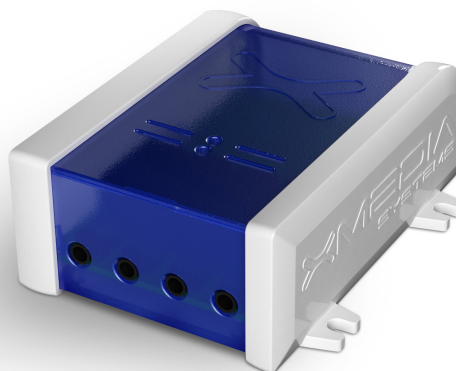
AUDIO CHANNEL SWITCHING | EM-4, XC-900 SERIES

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   value between 1-9
RRR =   Red value   value between 0-100
GGG =   Green value   value between 0-100
BBB =   Blue value   value between 0-100

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

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:
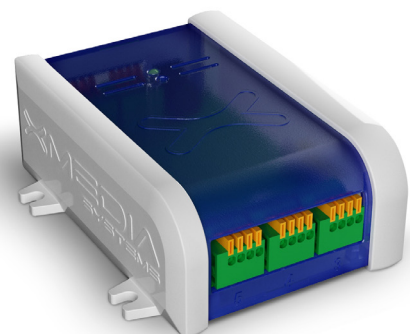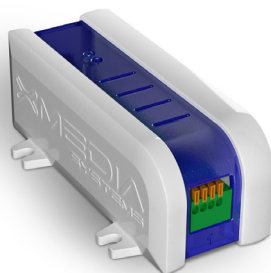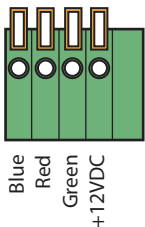Set RGB output (pulsing)   **G111B[O C BBB TTT C BBB TTT]**

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

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:

Blue Red Green +12VDC

Control input

Define color   **G111B[X RRR GGG BBB WWW]**

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

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

Example: set all channels to color 1 at 80% brightness, with a ramp time of 0.6 seconds: G111B[X 1 080 006].
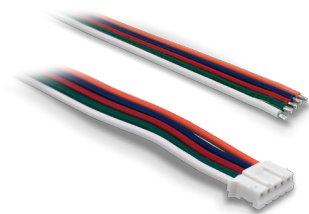
Set RGBW output (pulsing)   **G111B[O C BBB TTT C BBB TTT]**

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

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:

Deactivate X-talk channel 1	*S112B[1:OFF]*
Activate X-talk channel 1	*S112B[1:ON]*
Deactivate X-talk channel 5	*S112B[5:OFF]*
Activate X-talk channel 5	*S112B[5:ON]*

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]*