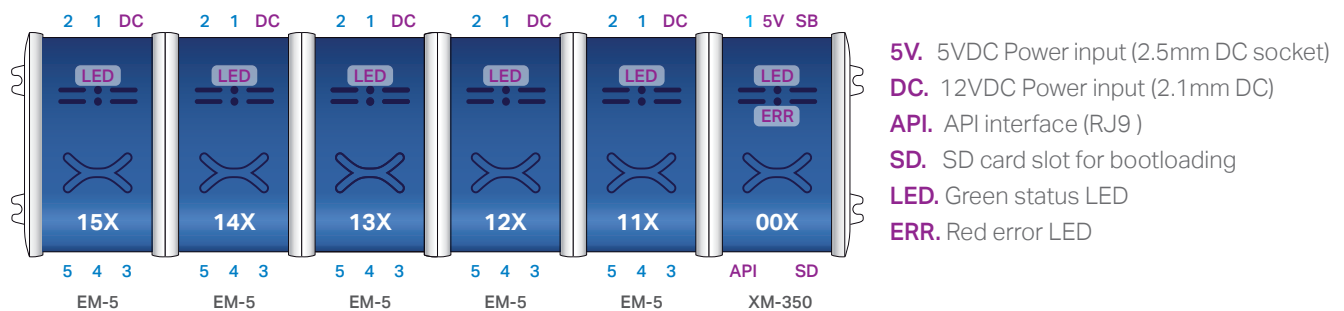## Xperience platform

All of Nexmosphere's controllers are built on the same platform principles. If this is your first time using a Nexmosphere controller, we recommend to first read https://nexmosphere.com/technology/xperience-platform/ to learn the basics about our platform and its terminology.

XM-350 with EM-5 expansion

The XM-350 is an Xperience controller with 1 X-talk interface. It can be expanded at our factory with up to 5 EM-5 modules. An EM-5 module has 5 mono LED outputs. The API address of an LED output is determined by adding the number of the output to the base address of the XM or EM module. For example, if a message is sent to LED output 2 of the EM-5 module closest to the XM-controller, the API address of the LED output is 112. The API address of the X-talk interface on the XM-350 controller is 001.

5V. 5VDC Power input (2.5mm DC socket)
DC. 12VDC Power input (2.1mm DC)
API. API interface (RJ9)
SD. SD card slot for bootloading
LED. Green status LED
ERR. Red error LED

Hardware setup

1. Connect an Element to the X-talk interface on the XM-350 module.

2. Connect one or more 12V mono LED strips to any of the LED outputs on the EM-5 module(s).

3. Connect a serial cable* to the API interface and to a 3rd party device (e.g. Mediaplayer or PC).

4. Connect a 12VDC power supply to the DC power socket on the EM-5 module(s). **

5. Wait until the green status LED on the XM-350 controller stops blinking. This lasts about 10 seconds.

*Nexmosphere has 2 serial cables available which are compatible with the XM-350: **CA-9J9B** (RJ9 to 3.5mm jack) and **CA-9D9B** (RJ9 to DB-9).
Next to these serial cables, a compatible Serial-to-USB cable is also available: **CA-9U9B** (RJ9 to USB-A). The driver for this cable can be downloaded here.

**No more then 2 power supplies may be connected to an assembled Xperience Controller (XM + EM modules)

Software setup for testing (Terminal)

Typically, the XM-350 controller is connected to a 3rd party device, such as a Digital Signage Player, on which CMS software is installed which has built-in functionality for sending and receiving Serial Events. However, if you want to do a first test on a PC or Mac, follow the instructions below:

1. Download a terminal program. For example Termite, Hercules or SerialTools.

2. Open the Terminal program and go to settings. Choose the COM port to which the XM-350 controller is connected*.

3. Set the COM port settings to the following values

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

4. Set the COM port to "Open". **The controller is now ready for use.**

5. When sending consecutive API serial commands to the XM-350 controller, place a 75mS delay between each command.

*In case the XM-350 controller is connected via a Serial-to-USB cable or adapter, typically this is the highest available number in the COM port drop-down setting.

Functionality

The XM-350 runs our API which provides serial output when a specific sensor Element is triggered (for example a pick-up, or -motion sensor or touch button) and provides control over output Elements (for example controlling LED strips) via serial input commands. These API serial commands are typically used to create interactive Xperiences for Digital Signage.

The complete API Manual and additional helpful documents can be found on https://nexmosphere.com/support-documentation. To get you started, we've included some starter examples of our Elements and the corresponding API serial commands on the following pages.

3rd party devices and software

This Quick Start Guide offers a generic explanation of the setup and operation of the XM-350 controller with EM-5 expansion. It does not cover information on how to integrate the Controllers, Elements and their API triggers in specific 3rd party devices or software. We have manuals available with step-by-step instructions on how to integrate Nexmosphere products with the products of our hardware, -and software partners. You'll find these on the support and partner pages of our website.

Example 1 | mono LED control

To control a mono LED strip connected to LED output 1, 2, 3, 4 or 5 of an EM-5 module, send one of the following API example commands from the 3rd party device to the XM-350 controller:

Set the LED strip connected to LED output **111** to **100**% brightness with **0.5** seconds ramp time: `G111A[7935]`

Set the LED strip connected to LED output **113** to **0**% brightness with **0.5** seconds ramp time: `G113A[7680]`

Set the LED strip connected to LED output **122** to **50**% brightness with **1.0** seconds ramp time: `G122A[3962]`

Set the LED strip connected to LED output **125** to **100**% brightness with **0.1** seconds ramp time: `G125A[38655]`

Set the LED strip connected to LED output **111** to **100**% brightness with **5.0** seconds ramp time: `G111A[1023]`

The value between the brackets determines both the Brightness and Ramp time. This value can be calculated as follows:

value = 256 $*$ (15/R) $+$ B
R = Ramp time value in seconds, fixed list of available options (255 in total)
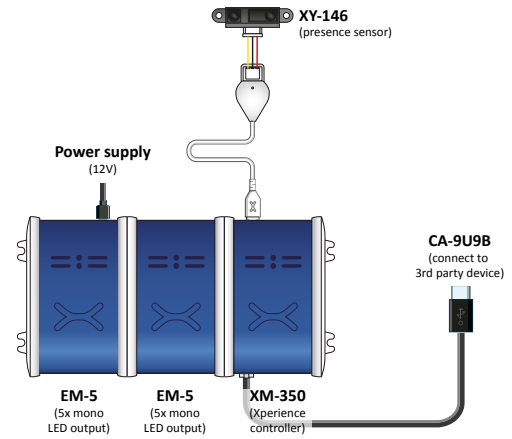*B = Brightness value between 0-255. (0 = 0% brightness, 255 = 100% brightness)*

Due to the nature of the formula, the available ramp times are fixed. There are a total of 255 available ramp times ranging from 0,06s to 15s.
An example list of ramp times and corresponding LED output commands is provided on the final pages of this document.
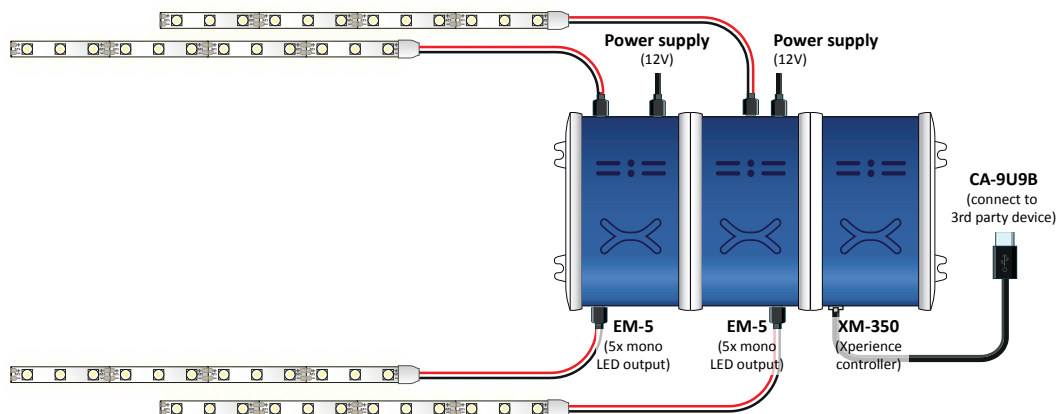
Example 2 | Presence sensor

When an XY-Presence sensor connected to X-talk interface 001 detects a person in distance zone 4, the following API serial command is sent from the XM-350 to the 3rd party device: X001A[4]

When an XY-Presence sensor connected to X-talk interface 001 does not detect a person, the following API serial command is sent from the XM-350 to the 3rd party device: X001A[1]

XY-146
(presence sensor)

Power supply
(12V)

CA-9U9B
(connect to
3rd party device)

EM-5
(5x mono
LED output)

EM-5
(5x mono
LED output)

XM-350
(Xperience
controller)

Example 3 | RFID sensor

When tag 2 is picked up from an antenna connected to X-talk interface 001, the following API serial commands are sent from the XM-350 to the 3rd party device:
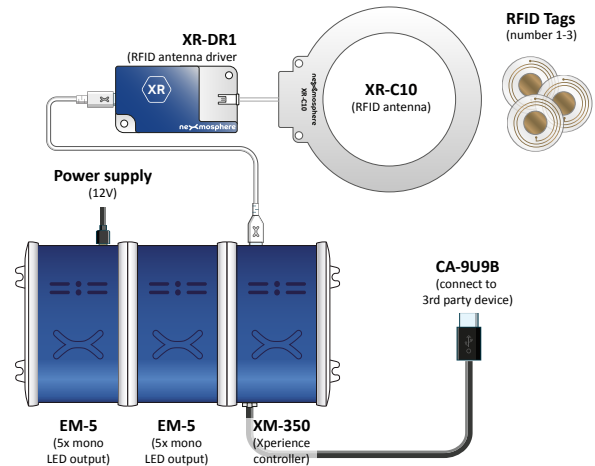XR[PU002]
X001A[1]

When tag 1 is placed on an antenna connected to X-talk interface 001, the following API serial commands are sent from the XM-350 to the 3rd party device:
XR[PB001]
X001A[0]
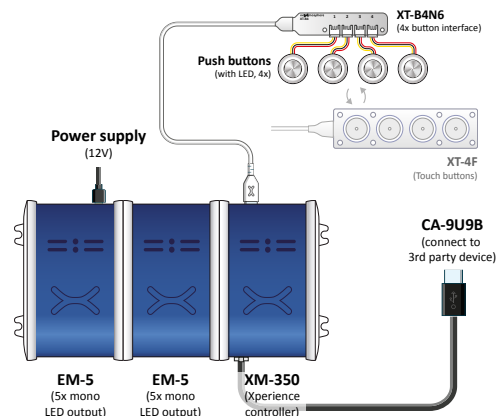

XR-DR1
(RFID antenna driver)

RFID Tags
(number 1-3)

XR-C10
(RFID antenna)

Power supply
(12V)

CA-9U9B
(connect to
3rd party device)

EM-5
(5x mono
LED output)

EM-5
(5x mono
LED output)

XM-350
(Xperience
controller)

Example 4 | Button input

When button 1 of a (touch) button interface connected to X-talk interface 001 is pressed, the following API serial commands are sent from the XM-350 to the 3rd party device: X001A[3]

When button 4 of a (touch) button interface connected to X-talk interface 001 is pressed, the following API serial commands are sent from the XM-350 to the 3rd party device: X001A[17]

XT-B4N6
(4x button interface)

Push buttons
(with LED, 4x)

XT-4F
(Touch buttons)

Power supply
(12V)

CA-9U9B
(connect to
3rd party device)

EM-5
(5x mono
LED output)

EM-5
(5x mono
LED output)
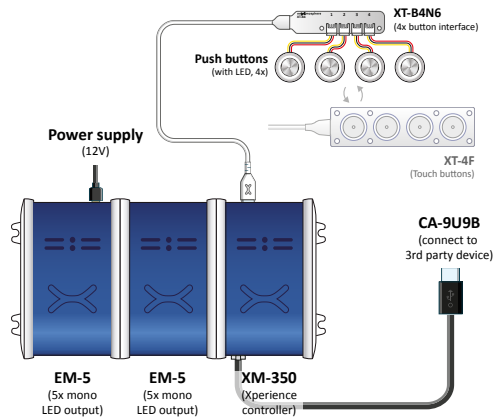
XM-350
(Xperience
controller)

Example 4 | Button LED control
To set all button LEDs of a (touch) button interface connected to X-talk interface 001 to "on", send the following API commands from the 3rd party device to the XM-350 controller:

`X001A[255]`

To set all button LEDs of a (touch) button interface connected to X-talk interface 001 to "off", send the following API commands from the 3rd party device to the XM-350 controller:

`X001A[0]`

Combining Elements

The XM-350 Xperience controller with EM-5 expansion has up to 25 mono LED outputs and 1 X-talk interface to which any Element can be connected. To illustrate, Example 1 can be combined with any other example in this Quick Start Guide. The API commands and operation will remain the same. In case more X-talk interfaces are required, the XM-350 can also be expanded with EM-8 modules (see XM-350 with EM-8 Quick Start Guide). When connecting multiple Elements that require a high amount of current (LEDs or push buttons with LED ring), calculate the total required current of the Elements and check if this is within the specification of the controller and its power supply source.
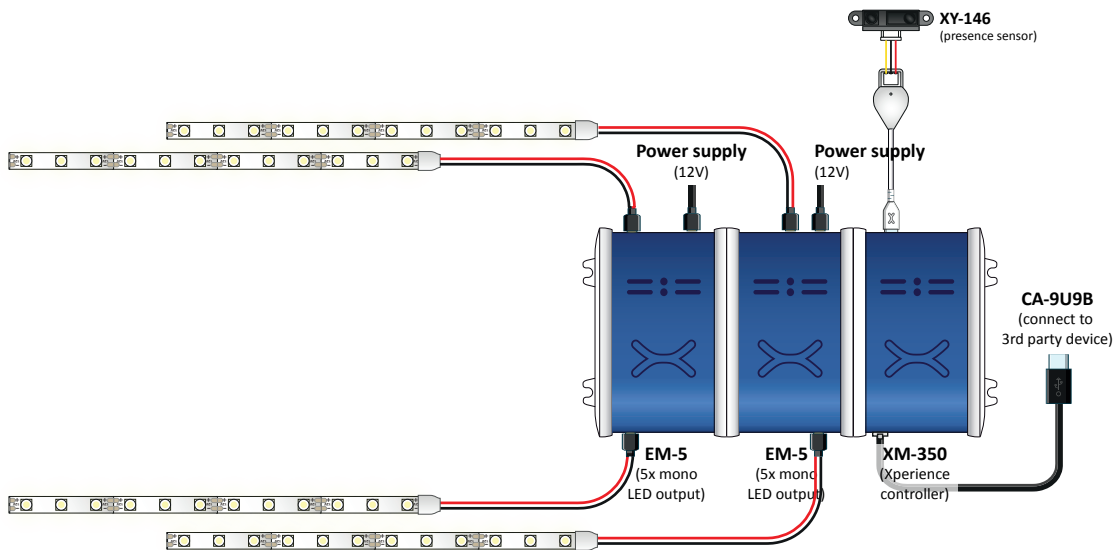
List of ramp times for Mono LED control
On the following page, a list of 70 ramp time options for Mono LED control and the corresponding commands at different brightness levels is provided.

List of available ramp times for Mono LED control

Ramp time in seconds		Brightness 0 (off)	128 (half)	255 (full)	Ramp time in seconds		Brightness 0 (off)	128 (half)	255 (full)
15,00	=	256	384	511	0,41	=	9472	9600	9727
7,50	=	512	640	767	0,39	=	9728	9856	9983
5,00	=	768	896	1023	0,38	=	9984	10112	10239
3,75	=	1024	1152	1279	0,37	=	10496	10597	10751
3,00	=	1280	1408	1535	0,36	=	10752	10880	11007
2,50	=	1536	1664	1791	0,35	=	11008	11136	11263
2,14	=	1792	1920	2047	0,34	=	11264	11392	11519
1,88	=	2048	2176	2303	0,33	=	11520	11648	11775
1,67	=	2304	2432	2559	0,32	=	12032	12160	12287
1,50	=	2560	2668	2815	0,31	=	12288	12416	12543
1,36	=	2816	2944	3071	0,30	=	12800	12928	13055
1,25	=	3072	3200	3327	0,29	=	13056	13184	13311
1,15	=	3328	3456	3583	0,28	=	13568	13696	13823
1,07	=	3584	3712	3839	0,27	=	14080	14208	14335
1,00	=	3840	3968	4095	0,26	=	14592	14720	14847
0,94	=	4096	4224	4351	0,25	=	15104	15232	15359
0,88	=	4352	4480	4607	0,24	=	15872	16000	16127
0,83	=	4608	4736	4863	0,23	=	16384	16512	16639
0,79	=	4864	4992	5119	0,22	=	17408	17536	17663
0,75	=	5120	5248	5375	0,21	=	17920	18048	18175
0,71	=	5376	5504	5631	0,20	=	18944	19072	19199
0,68	=	5632	5760	5887	0,19	=	19712	19840	19967
0,65	=	5888	6016	6143	0,18	=	20992	21120	21247
0,63	=	6144	6272	6399	0,17	=	22016	22144	22271
0,60	=	6400	6528	6655	0,16	=	23296	23424	23551
0,58	=	6656	6784	6911	0,15	=	24832	24960	25087
0,56	=	6912	7040	7167	0,14	=	26624	26752	26879
0,54	=	7168	7296	7423	0,13	=	28672	28800	28927
0,52	=	7424	7552	7679	0,12	=	30976	31104	31231
0,50	=	7680	7808	7935	0,11	=	33536	33664	33791
0,48	=	7936	8064	8191	0,10	=	36608	36736	36863
0,47	=	8192	8320	8447	0,09	=	40448	40576	40703
0,45	=	8448	8576	8703	0,08	=	45312	45440	45567
0,43	=	8960	9088	9215	0,07	=	51456	51584	51711
0,42	=	9216	9344	9471	0,06	=	59136	59264	59391