Xperience platform

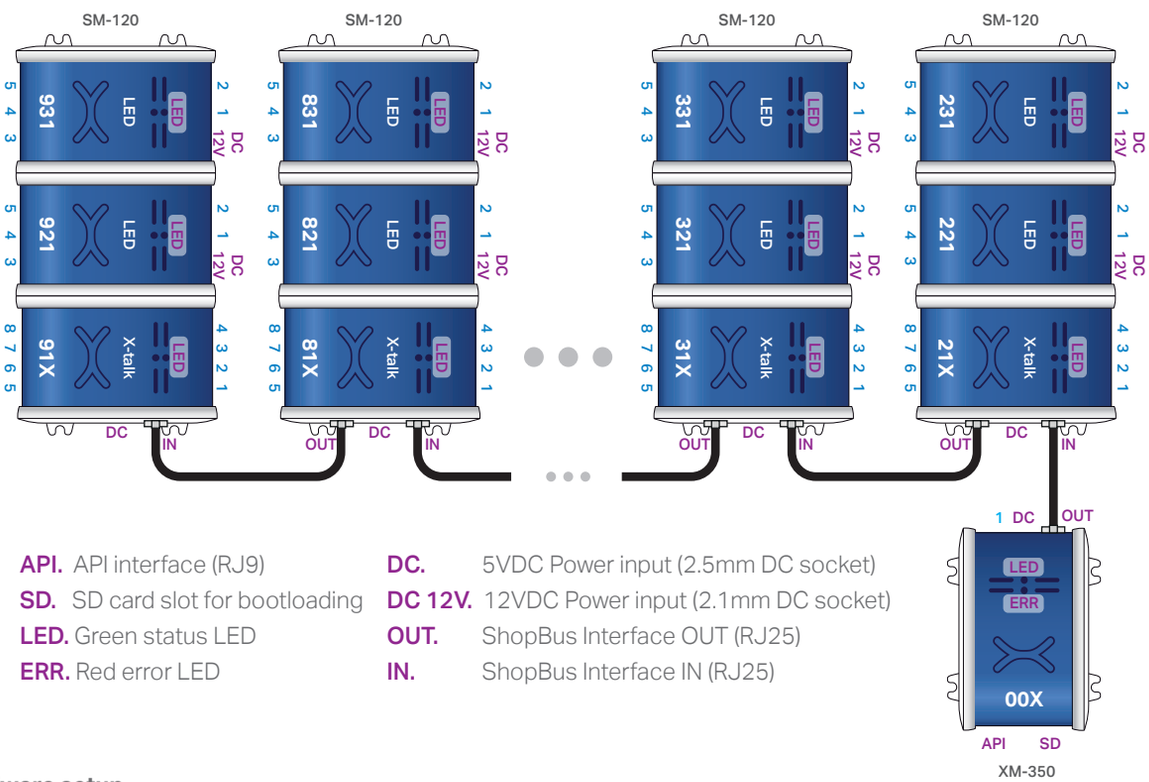
All of Nexmosphere's controllers are built on the same platform principles. If this is your first time using a Nexmosphere controller, we recommend to first read https://nexmosphere.com/technology/xperience-platform/ to learn the basics about our platform and its terminology.

XM-350 with SM-120 ShopBus Module

The XM-350 is an Xperience controller with 1 X-talk interface and a ShopBus interface. To the ShopBus interface, up to 8 ShopBus modules can be connected. An SM-120 ShopBus module has 8 X-talk interfaces and 10 mono LED outputs.

The API address of an X-talk interface is determined by adding the number of the X-talk interface to the base address of the XM or ShopBus module. For example if a message is sent to X-talk interface 7 of the ShopBus module closest to the XM-controller, the API address of the X-talk interface is 217.

An SM-120 ShopModule has 2 LED modules, each with 5 mono LED outputs. Both modules have a separate base address. 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 3 of the first LED module of the SM-120 closest to the XM-controller, the API address of the LED output is 223.



API. API interface (RJ9)
SD. SD card slot for bootloading
LED. Green status LED
ERR. Red error LED

DC. 5VDC Power input (2.5mm DC socket)
DC 12V. 12VDC Power input (2.1mm DC socket)
OUT. ShopBus Interface OUT (RJ25)
IN. ShopBus Interface IN (RJ25)

Hardware setup

1. Connect one or more Elements to any of the X-talk interfaces on the XM-350 or SM-120 module(s).
2. Connect one or more 12V LED strips to any of the mono LED outputs (2.1mm DC ⊖-C-⊕) on the SM-120 module(s).
3. Connect a serial cable* to the API interface and to a 3rd party device (e.g. Digital Signage Player or PC).
4. Connect the SM-120 Module(s) to the XM-350 interface using ShopBus cables.**
5. Connect a 12VDC power supply to one or both of the 12VDC power sockets on the SM-120 module(s).***
6. Connect a 5VDC power supply to the 5VDC power socket of the XM-350 module.
7. 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.*

***Nexmosphere has 2 types of ShopBus cables available: black (CAS-N..B) and red (CAS-N..R). Black ShopBus cables don't have power feedthrough and are required for connecting SM-120 modules.*

****No more then 2 power supplies may be connected to one SM-120 module. The 5VDC Power input on the SM-120 is typically not used.*

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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 SM-100 ShopBus Module. 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

The LED control commands for the SM-120 module are identical to the commands for the EM-5 module. 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:

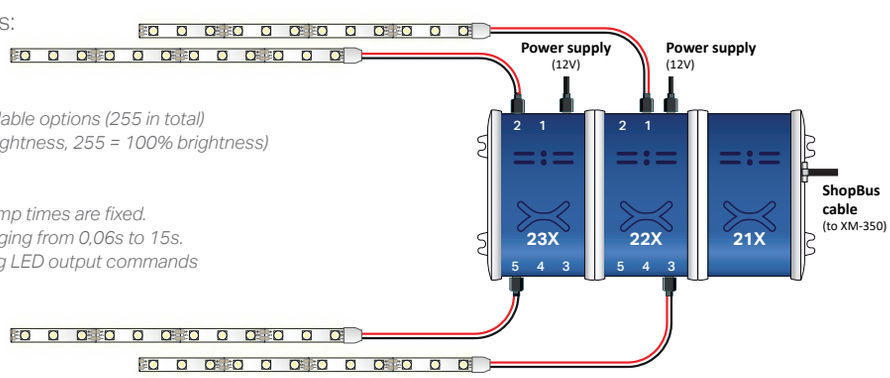
Set the LED strip connected to LED output **221** to **100**% brightness with **0.5** seconds ramp time: `G221A[7935]`
Set the LED strip connected to LED output **223** to **0**% brightness with **0.5** seconds ramp time: `G223A[7680]`
Set the LED strip connected to LED output **232** to **50**% brightness with **1.0** seconds ramp time: `G232A[3962]`
Set the LED strip connected to LED output **225** to **100**% brightness with **0.1** seconds ramp time: `G225A[38655]`
Set the LED strip connected to LED output **223** to **100**% brightness with **5.0** seconds ramp time: `G223A[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.



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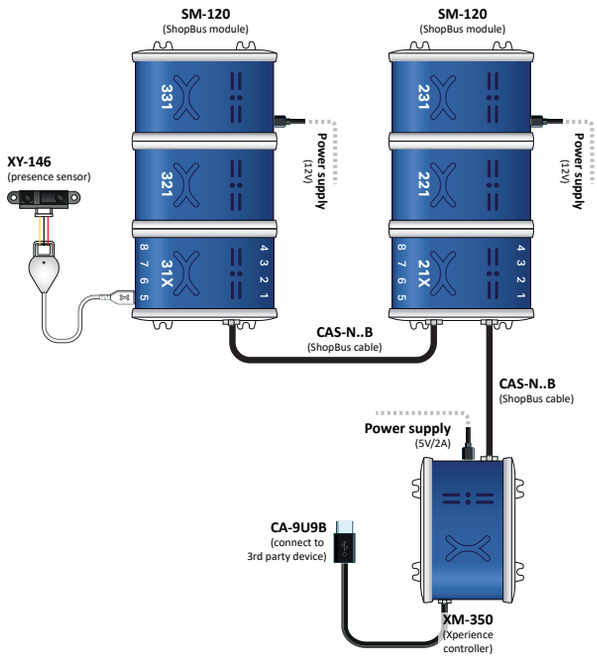
Example 2 | Presence sensor

When an XY-Presence sensor connected to X-talk interface 315 detects a person in distance zone 4, the following API serial command is sent from the XM-350 to the 3rd party device: **X315A[4]**

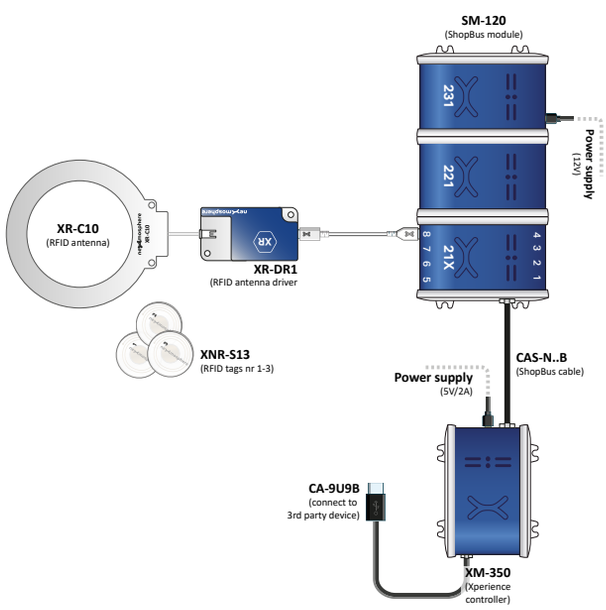
When an XY-Presence sensor connected to X-talk interface 315 does not detect a person, the following API serial command is sent from the XM-350 to the 3rd party device: **X315A[1]**



Example 3 | RFID sensor

When tag 2 is picked up from an antenna connected to X-talk interface 218, the following API serial commands are sent from the XM-350 to the 3rd party device:
XR[PU002]
X218A[1]

When tag 1 is placed on an antenna connected to X-talk interface 218, the following API serial commands are sent from the XM-350 to the 3rd party device:
XR[PB001]
X218A[0]



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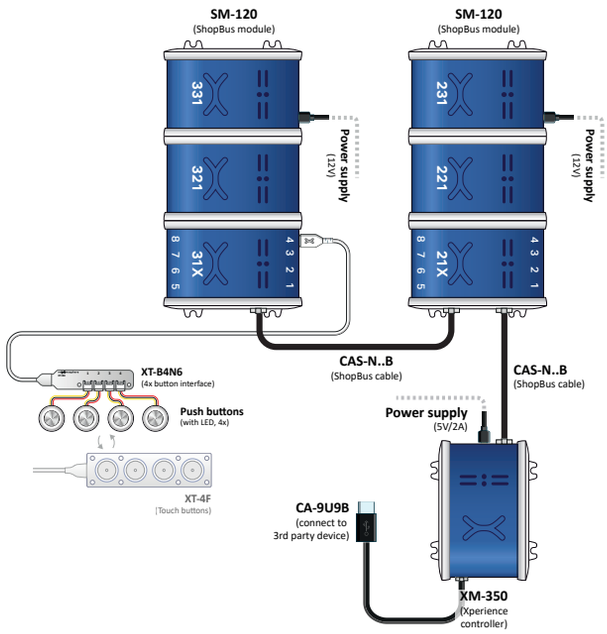
Example 4 | Button input

When button 1 of a (touch) button interface connected to X-talk interface 314 is pressed, the following API serial commands are sent from the XM-350 to the 3rd party device: **X314A[3]**

When button 4 of a (touch) button interface connected to X-talk interface 314 is pressed, the following API serial commands are sent from the XM-350 to the 3rd party device: **X314A[17]**



Example 5 | Button LED control

To set all button LEDs of a (touch) button interface connected to X-talk interface 314 to "on", send the following API commands from the 3rd party device to the XM-350 controller:

```
X314A[255]
```

To set all button LEDs of a (touch) button interface connected to X-talk interface 314 to "off", send the following API commands from the 3rd party device to the XM-350 controller:

```
X314A[0]
```

Example 6 | X-Wave LED control

To initiate an X-Wave LED pattern on an X-Wave connected to X-talk interface 217, send one of the following API example commands from the 3rd party device to the XM-350 controller:

40% brightness, color 0 (white), 0.5 second ramp time

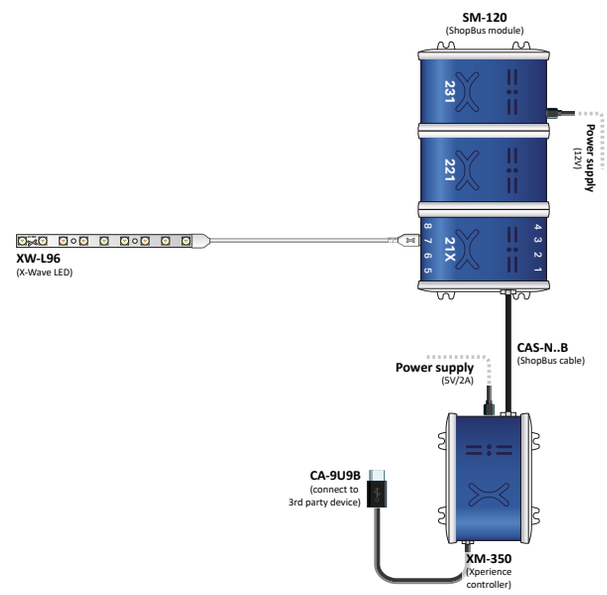
```
X217B[240005]
```

Blue pulsing pattern (99% to 20%), 1.8 second ramp time

```
X217B[399C1801020C180018]
```

White wave pattern moving to the left

```
X217B[499018001200009]
```



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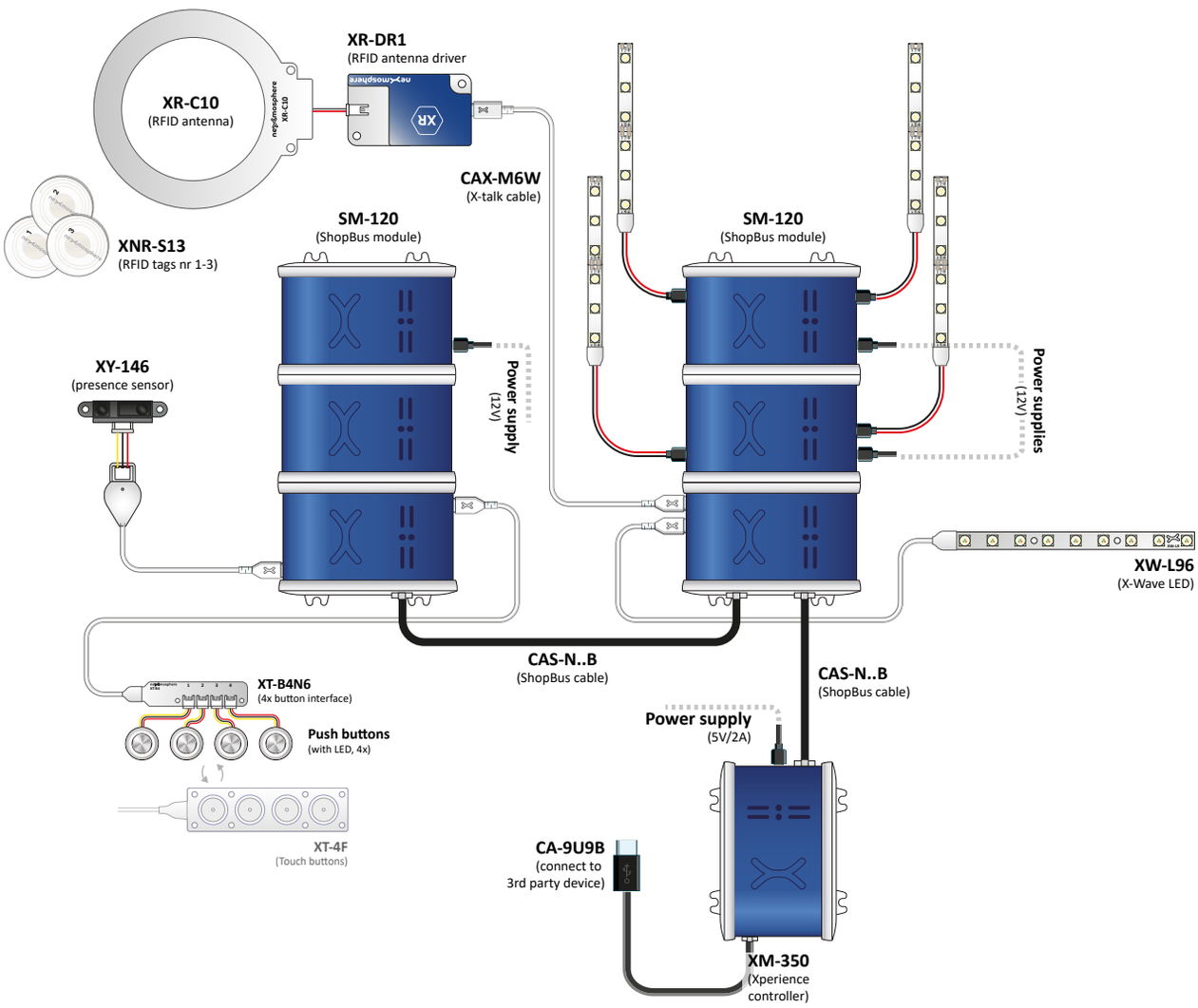
Combining Elements

The XM-350 Xperience controller with SM-120 ShopBus module has a scalable amount of X-talk interfaces to which any combination of Elements can be connected. For example, all examples in this Quick Start Guide can be combined on an XM-350 with 2 SM-120 ShopBus modules. The API commands and operation will remain the same. 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.

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List of available ramp times for Mono LED control

Ramp time *in seconds*		Brightness *0 (off)*	*128 (half)*	*255 (full)*
15,00	=	**256**	**384**	**511**
7,50	=	**512**	**640**	**767**
5,00	=	**768**	**896**	**1023**
3,75	=	**1024**	**1152**	**1279**
3,00	=	**1280**	**1408**	**1535**
2,50	=	**1536**	**1664**	**1791**
2,14	=	**1792**	**1920**	**2047**
1,88	=	**2048**	**2176**	**2303**
1,67	=	**2304**	**2432**	**2559**
1,50	=	**2560**	**2668**	**2815**
1,36	=	**2816**	**2944**	**3071**
1,25	=	**3072**	**3200**	**3327**
1,15	=	**3328**	**3456**	**3583**
1,07	=	**3584**	**3712**	**3839**
1,00	=	**3840**	**3968**	**4095**
0,94	=	**4096**	**4224**	**4351**
0,88	=	**4352**	**4480**	**4607**
0,83	=	**4608**	**4736**	**4863**
0,79	=	**4864**	**4992**	**5119**
0,75	=	**5120**	**5248**	**5375**
0,71	=	**5376**	**5504**	**5631**
0,68	=	**5632**	**5760**	**5887**
0,65	=	**5888**	**6016**	**6143**
0,63	=	**6144**	**6272**	**6399**
0,60	=	**6400**	**6528**	**6655**
0,58	=	**6656**	**6784**	**6911**
0,56	=	**6912**	**7040**	**7167**
0,54	=	**7168**	**7296**	**7423**
0,52	=	**7424**	**7552**	**7679**
0,50	=	**7680**	**7808**	**7935**
0,48	=	**7936**	**8064**	**8191**
0,47	=	**8192**	**8320**	**8447**
0,45	=	**8448**	**8576**	**8703**
0,43	=	**8960**	**9088**	**9215**
0,42	=	**9216**	**9344**	**9471**

Ramp time *in seconds*		Brightness *0 (off)*	*128 (half)*	*255 (full)*
0,41	=	**9472**	**9600**	**9727**
0,39	=	**9728**	**9856**	**9983**
0,38	=	**9984**	**10112**	**10239**
0,37	=	**10496**	**10597**	**10751**
0,36	=	**10752**	**10880**	**11007**
0,35	=	**11008**	**11136**	**11263**
0,34	=	**11264**	**11392**	**11519**
0,33	=	**11520**	**11648**	**11775**
0,32	=	**12032**	**12160**	**12287**
0,31	=	**12288**	**12416**	**12543**
0,30	=	**12800**	**12928**	**13055**
0,29	=	**13056**	**13184**	**13311**
0,28	=	**13568**	**13696**	**13823**
0,27	=	**14080**	**14208**	**14335**
0,26	=	**14592**	**14720**	**14847**
0,25	=	**15104**	**15232**	**15359**
0,24	=	**15872**	**16000**	**16127**
0,23	=	**16384**	**16512**	**16639**
0,22	=	**17408**	**17536**	**17663**
0,21	=	**17920**	**18048**	**18175**
0,20	=	**18944**	**19072**	**19199**
0,19	=	**19712**	**19840**	**19967**
0,18	=	**20992**	**21120**	**21247**
0,17	=	**22016**	**22144**	**22271**
0,16	=	**23296**	**23424**	**23551**
0,15	=	**24832**	**24960**	**25087**
0,14	=	**26624**	**26752**	**26879**
0,13	=	**28672**	**28800**	**28927**
0,12	=	**30976**	**31104**	**31231**
0,11	=	**33536**	**33664**	**33791**
0,10	=	**36608**	**36736**	**36863**
0,09	=	**40448**	**40576**	**40703**
0,08	=	**45312**	**45440**	**45567**
0,07	=	**51456**	**51584**	**51711**
0,06	=	**59136**	**59264**	**59391**

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