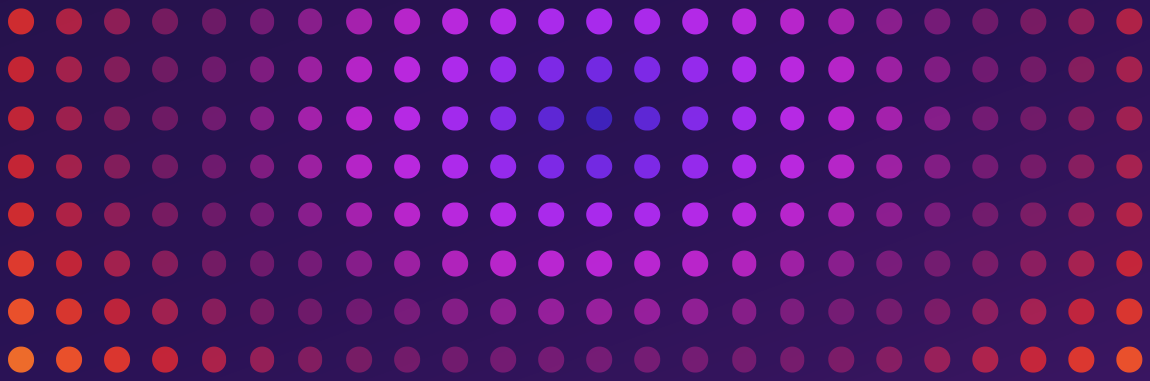
Lumaestro

PhoneShow

Turn the phones in your audience into one big light show.
Manual for the Windows program.



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1 What PhoneShow is

PhoneShow turns the phones of an audience into the pixels of a light show. People scan a QR code, open a web page and tap **Join in**. From then on the screen of their phone is a point of light. You choose a colour, a wave, an image or a line of lyrics in the control panel, and all phones switch at the same moment.

The audience installs nothing. The page runs in the normal browser of the phone, on iPhone and Android alike.

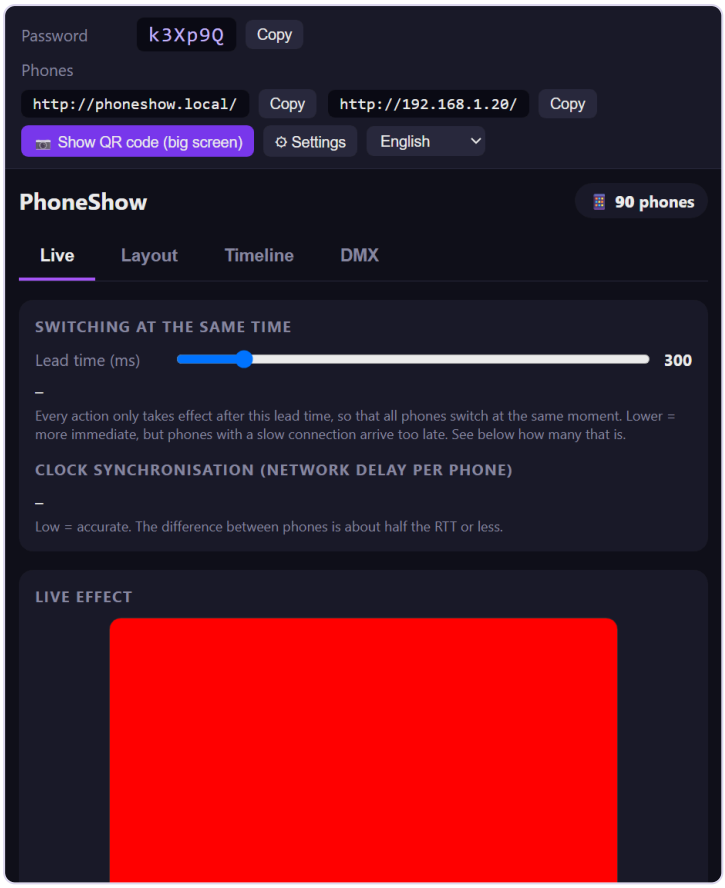
What you need

- A Windows 10 or 11 PC (64-bit) for the program. It is one file, `PhoneShow.exe`, with no installer.
- A network that the audience's phones can reach the PC on. For a few dozen phones a normal wifi router does. For a big room you need good venue wifi, or the server version on the internet (see section 11).
- A screen or poster to show the QR code.

> **GOOD TO KNOW**
> PhoneShow works with a lead time. Every action gets an agreed moment a fraction of a second in the future, so that phones with a slower connection still switch together. Section 5 explains how to set it.

2 Quick start

1. **Download** `PhoneShow.exe` from lumaestro.com/phoneshow and put it in a folder of its own. The program stores its shows next to itself.
2. **Start it** with a double-click. Windows may ask whether the program may use the network: allow it for **private networks**. If Windows says "Windows protected your PC", click **More info** and then **Run anyway**. The program is not digitally signed.
3. **A window opens** with a password, the addresses for the phones and the control panel. Keep this window open: closing it stops the show.
4. **Show the QR code.** Click **Show QR code** and put the screen on the beamer or hold a printout up. The phones must be on the same network as the PC.
5. **Pick a colour.** In the panel, click an effect or a quick colour. All phones that have joined switch.



The program window: password and phone addresses at the top, the control panel below.

3 The program window

At the top of the window you find what you need to start:

Password	The password of the control panel. It is chosen at random every time you start the program. The panel inside this window logs in by itself. If you open the panel in another browser or on another device, type this password.
Phones	The addresses the audience opens. The first one, `phoneshow.local`, works on iPhone and most phones. The second one is the IP address of your PC, which also works on Android devices that do not understand `.local`. Click **Copy** to copy an address.
Show QR code	Opens a full-screen page with a QR code for each address. Use the first code for most phones and the second if some Android phones cannot open it.
Settings	Change the **port for the phones** (80 by default) and the **name** before `.local` (`phoneshow` by default). Phones that already joined stay connected.
Language	The list next to the buttons switches the window and the control panel between Dutch and English.

> **PORT BUSY?**
> If another program already uses port 80, PhoneShow switches to port 8081 and shows a notice in the window. The addresses and the QR code follow automatically.

The control panel on another device

The panel also runs on port 8080 of your PC. On a laptop or tablet on the same network you open `http://` followed by the IP address of the PC and `:8080/control`, and type the password. This is handy to run the show from the middle of the room.

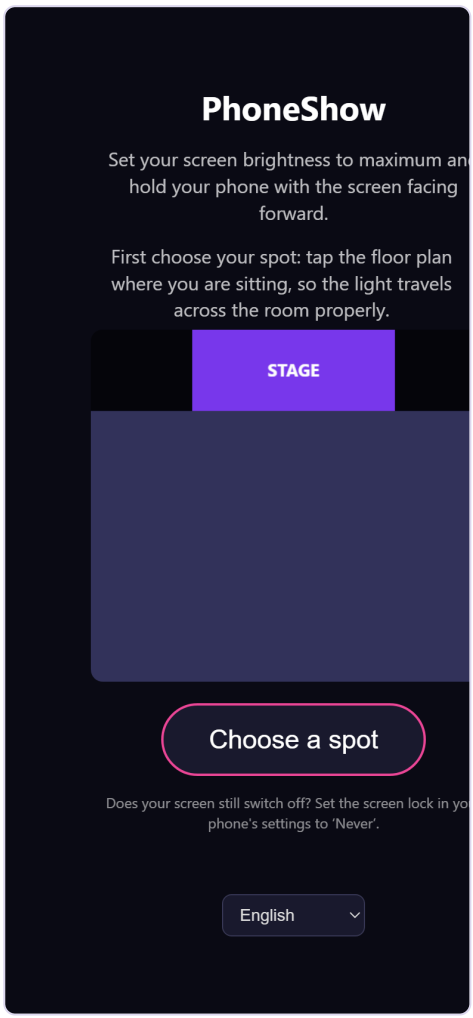
4 What the audience sees

A visitor scans the code and sees a start screen with a map of the room.

1. **Choose a spot.** Tap the map where you sit. The button says **Choose a spot** until they do. Waves, rings and fans then travel across the room in the right order.
2. **Join in.** After choosing a spot the button says **Join in**. Tap it. The screen goes full screen and stays on.
3. **Done.** The phone now shows the light of the show. Tapping the screen switches full screen off and on.

Under the button is a list to choose the language. The phone page is available in 33 European languages and follows the language of the phone by default.

> **TIP FOR THE AUDIENCE**
> Set the screen brightness to maximum and hold the phone with the screen facing the room. If the screen still switches off, set the screen lock in the phone's settings to Never.



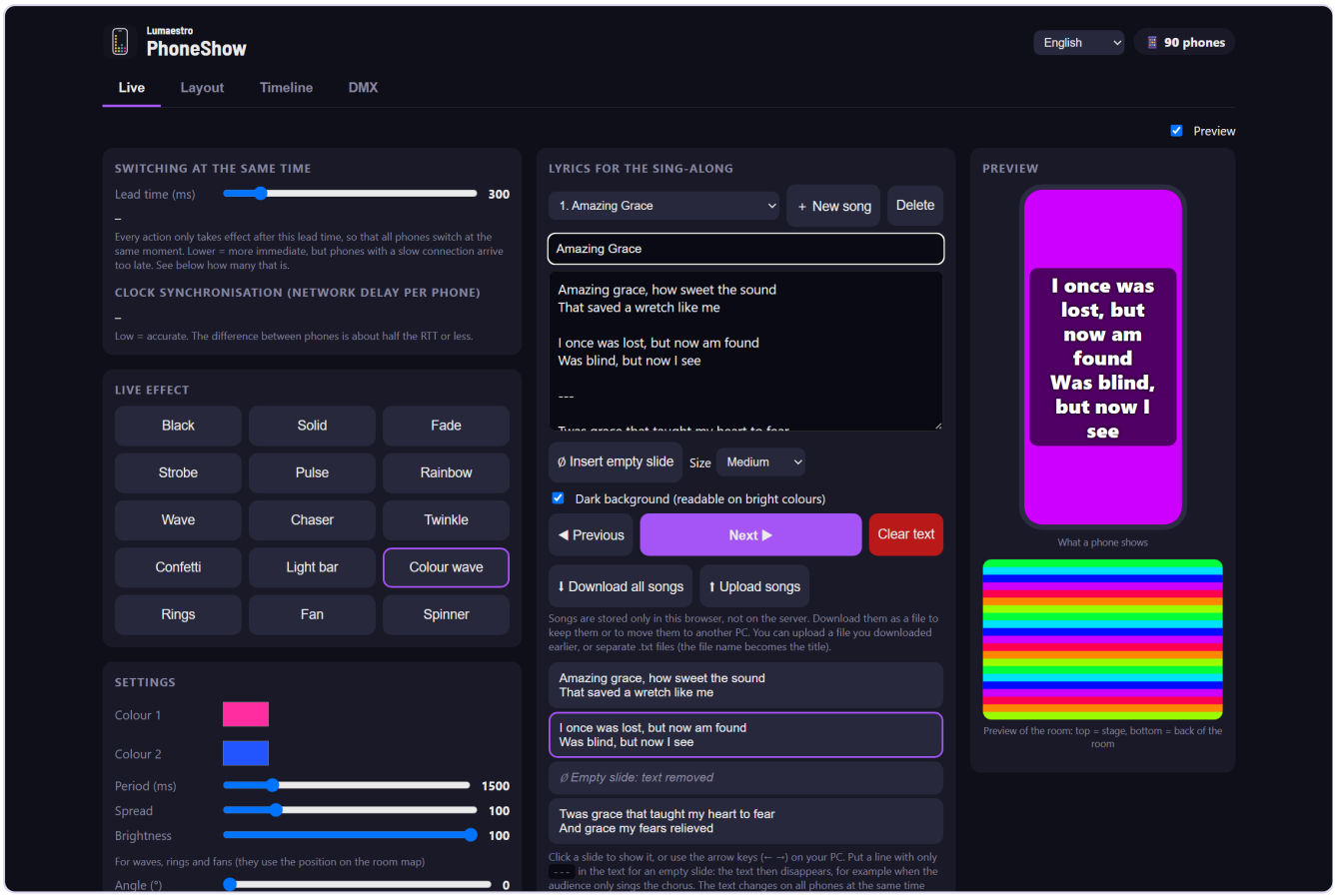
The start screen with the room map.

If you switch the floor plan off (section 7), the map disappears and visitors join with one tap. Their place in the room is then random but fixed.

Lyrics and explanations on the phone

A lyric appears large and centred over the light, and changes on all phones at the same moment. An explanation appears in a speech balloon at the top of the screen. You control both from the panel.

5 The control panel: Live



The Live page: timing and effects on the left, the lyrics in the middle and the preview on the right.

Preview

On the right of the Live and Timeline/Program pages is a preview that stays in view while you scroll. It shows what a phone in the middle of the room displays at this moment: the colour or effect, an image, the lyric in the centre and the speech balloon at the top. Under it is a small map of the room, where every cell is one phone at its spot. The preview follows what the phones really receive, so it also follows a show that is playing and actions from another panel. Tick or untick **Preview** above the page to switch it on or off (it is not shown on Layout and DMX); the choice is remembered in your browser. On a narrow screen the preview sits above the other cards.

Switching at the same time

Lead time is the delay between your click and the moment the phones switch. 300 ms is a good start on wifi. On 4G or over the internet use 600 to 1000 ms. The panel reports after every action how many phones were late. If that number is not zero, raise the lead time.

The panel also shows the network delay per phone (RTT) and warns if phones do not keep their screen on and might fall asleep.

Effects

Click an effect to send it to all phones. With **Send on every change** switched on, every change of a setting goes out immediately. Switch it off and use **Send to phones** to send when you are ready.

Effect	What it does
Black	All screens dark.
Solid	One colour (Colour 1).
Fade	Fades from Colour 1 to Colour 2 during the period.
Strobe	Colour 1 flashes on and off. A shorter period is faster. Be careful with people who are sensitive to flashing light.
Pulse	All phones fade softly in and out together.
Rainbow	Colours cycle through the rainbow, shifted from phone to phone in order of joining.
Wave	A wave of Colour 1 on a Colour 2 background runs through the phones in order of joining.
Chaser	A running dot of light.
Twinkle	Random phones light up in Colour 1 on a Colour 2 background.
Confetti	Every phone gets its own random colour, which changes every period.
Light bar	A band of light travels across the room. Uses the spot on the room map.
Colour wave	The whole rainbow flows across the room.
Rings	Rings expand from a centre point (Centre X and Centre Y).
Fan	Beams from a point, by default the stage, swing left and right.
Spinner	Beams rotate around a point. **Rainbow colours** gives every beam its own colour.

Settings

Setting	Meaning
Colour 1, Colour 2	The main colour and the background or end colour.
Period (ms)	The time of one cycle. Lower is faster.
Spread	How many phones fit in one cycle of a wave, rainbow or chaser.
Brightness	Overall brightness, 0 to 100.
Angle, Count, Width	For light bar, colour wave, rings and fan: direction (0° runs from front to back, 90° from left to right), the number of bands or beams, and how wide they are.
Centre X, Centre Y	The centre of rings, fan and spinner. Y 0 is at the stage.

The **quick colours** send a solid colour with one click.

Lyrics for the sing-along

1. Click **New song**, type a title and paste the lyrics.

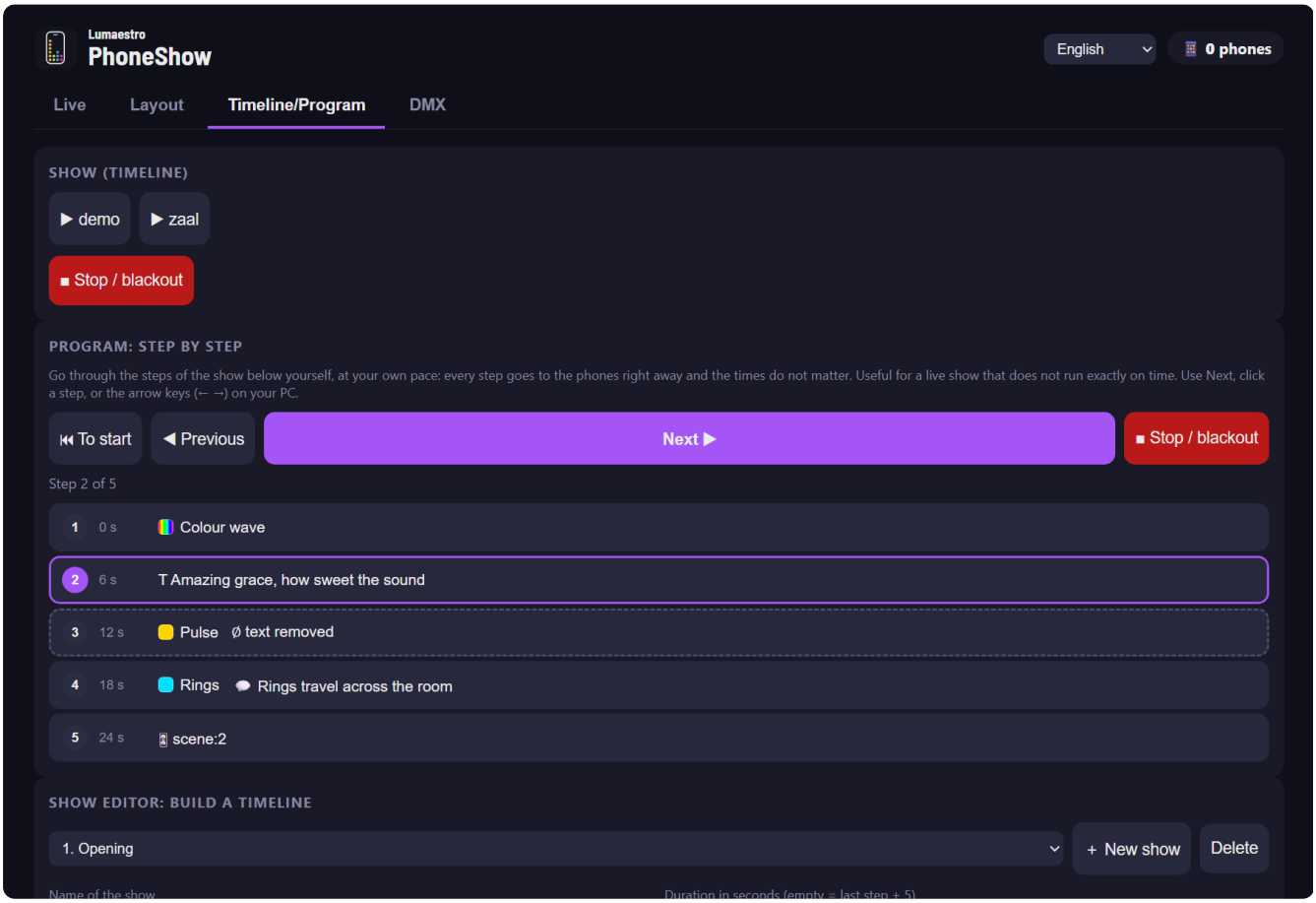
2. A blank line between two parts starts a new slide, for example a verse. Without blank lines every line is its own slide.
3. A line with only `---` is an **empty slide**: the text disappears from the phones. Use it when the audience only sings the chorus. The button **Insert empty slide** puts it at the cursor.
4. Click a slide to show it, or press the arrow keys `←` `→` on your keyboard. **Clear text** removes the text at once.

Choose the size (small to extra large) and whether the text gets a dark background, which keeps it readable on bright colours. Songs are stored in your browser, not on the server. Use **Download all songs** to keep them in a file and **Upload songs** to bring them back, or to load a plain `.txt` file, whose name becomes the title.

Images

Click **Add images** or drag files onto the card. PhoneShow shrinks each image and sends it to all phones in advance, so that it appears at once on every screen. Wait with showing it until the bar under the picture is full. The colour behind the image is Colour 2, and **Display** chooses between the whole image and filling the screen. An image can be up to 25 MB before it is shrunk.

6 The control panel: Timeline/Program



A show is a list of steps on a time line. The show is loaded on the phones before it starts and then runs on the clock, so it stays in sync even if the network hiccups.

Playing a show from the list

At the top you see the shows in the `shows` folder next to the program, each as a button. Click one to play it. **Stop / blackout** stops the show and turns the phones off.

Stepping through a program by hand

A live show does not always run on time: a speech runs long, a choir needs a moment. The **Program** card, under the list of shows, lists the steps of the show that is open in the editor. Every step goes to the phones the moment you ask for it, and the times in the steps do not matter then.

- **Next** (or the arrow key `→`) runs the next step. It only sets what that step contains, so a new lyric does not restart the light.
- **Previous** (`←`) goes back one step and puts the light, lyric and balloon back as they were at that point in the show.
- Click a step in the list to jump to it. The phones then get the state of the show at that step.
- **To start** moves the position back to the beginning without sending anything. **Stop / blackout** stops everything.

A Lumaestro action in a step runs once, when you reach that step. The same steps also play on the clock with **Play on the phones**, so you can choose per evening how to run a show.

Building your own show

1. Click **New show** and give it a name. Leave the duration empty to end five seconds after the last step.
2. Click **Add step**. Each step has a time in seconds and any combination of four parts: **Light**, **Lyrics**, **Balloon** and **Lumaestro**.
3. For **Light** choose an effect and colours. **More settings** opens all sliders, and **Copy panel settings** takes over what you set on the Live page.
4. For **Lyrics** type a text or pick a slide from your songs. The choice **Empty step: text removed** clears the text at that moment.
5. For **Balloon** type a short explanation. It appears at the top of the screen. An empty balloon removes it.
6. The strip above the steps shows the whole show. Click a block to jump to its step.
7. Click **Play on the phones** to try it. The show is sent to the phones for this run only.

Saving and sharing

Your own shows are stored in your browser. **Download my shows** saves them as a file, and **Upload shows** loads such a file again. **Save on server** puts the show in the `shows` folder next to the program, so that it also appears as a button at the top. **Load from server** copies such a show back into the editor.

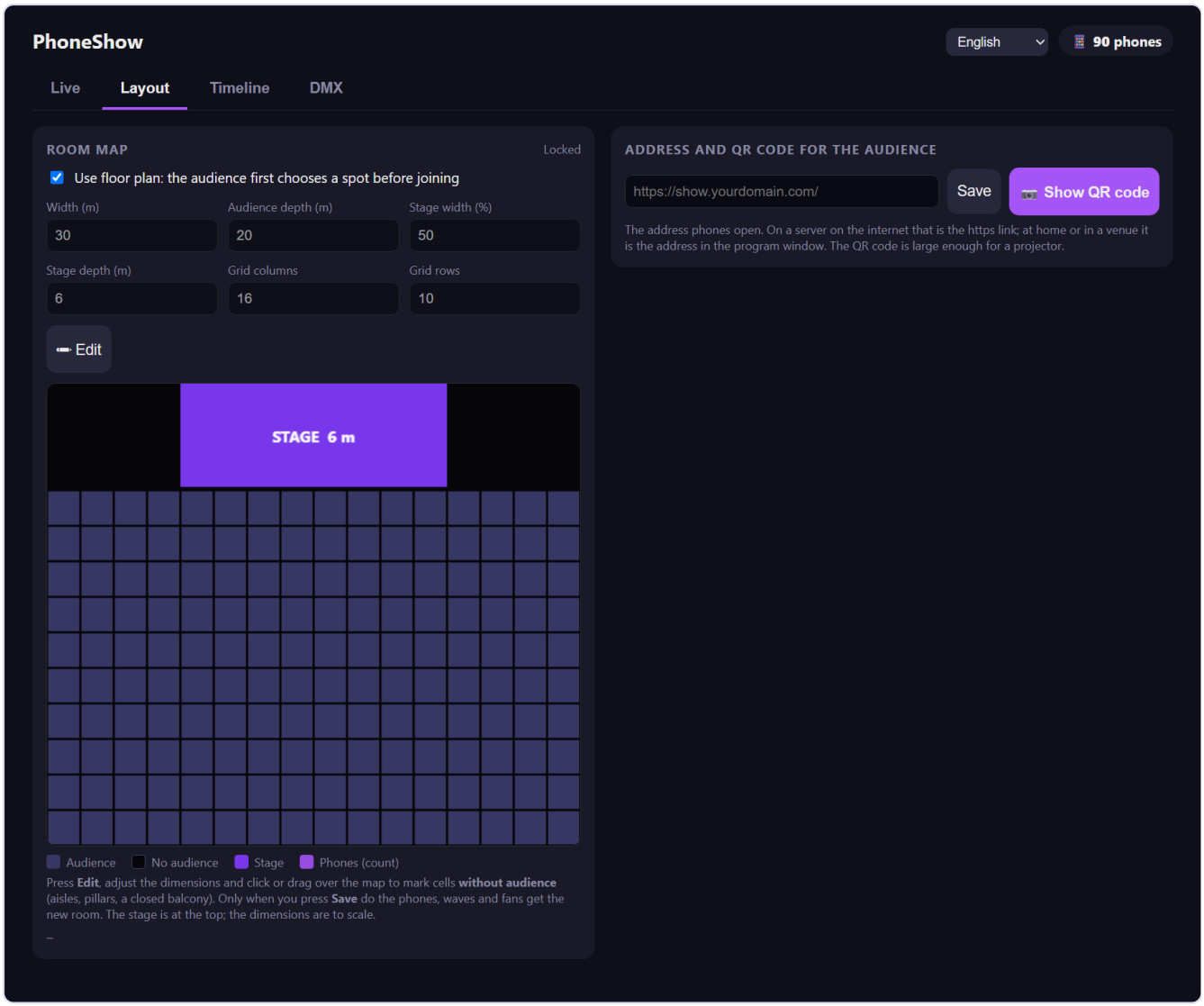
The show file

A show is a plain text file in JSON format. You can write one by hand or edit one that the editor made. Times are in milliseconds.

```
{
  "name": "Opening",
  "length": 30000,
  "cues": [
    { "at": 0,     "effect": "colorwave", "period": 3000 },
    { "at": 6000,  "text": "Amazing grace, how sweet the sound", "size": "l" },
    { "at": 12000, "effect": "pulse", "color": "#ffd400", "period": 800, "text": "" },
    { "at": 18000, "effect": "rings", "color": "#00e5ff", "note": "Rings travel across the room" },
    { "at": 24000, "lumaestro": "scene:2" }
  ]
}
```

Field	Meaning
`at`	Start time of the step in milliseconds.
`effect`	`blackout`, `solid`, `fade`, `strobe`, `pulse`, `rainbow`, `wave`, `chase`, `sparkle`, `confetti`, `sweep`, `colorwave`, `rings`, `fan`, `spin` or `image`.
`color`, `color2`	Colours as `#rrggbb`.
`period`, `spread`, `angle`, `count`, `width`, `px`, `py`, `brightness`	The settings of the Live page. `width`, `px`, `py` and `brightness` run from 0 to 1.
`rainbow`	`true` for rainbow beams on fan and spinner.
`image`, `fit`	The file name of an uploaded image, and `contain` or `cover`.
`text`, `size`, `bg`	Lyric text (empty text removes it), size `s`, `m`, `l` or `xl`, and `false` for no dark background.
`note`	Text of the speech balloon. Empty removes it.
`lumaestro`	An action for Lumaestro, such as `scene:2` (see section 8).
`length` (show)	Total length in milliseconds.

7 The control panel: Layout



The Layout page: the room map with the phones that joined, and the address for the audience.

Room map

The map is a drawing of your room from above, with the stage at the top. Phones choose their spot on it, and the effects that use position (light bar, colour wave, rings, fan, spinner) travel across the real room.

1. Click **Edit**. The fields unlock.
2. Enter the **width** and the **audience depth** in metres, the **stage width** as a percentage, and the **stage depth** in metres. The drawing is to scale.
3. Set the **grid**: the number of columns and rows. Each cell is a seat area that visitors can tap.
4. Click or drag over the map to mark cells **without audience**: aisles, pillars, a closed balcony. Click again to undo. **All with audience** and **All empty** reset the whole map.
5. Click **Save**. Only now do the phones and the effects get the new room.

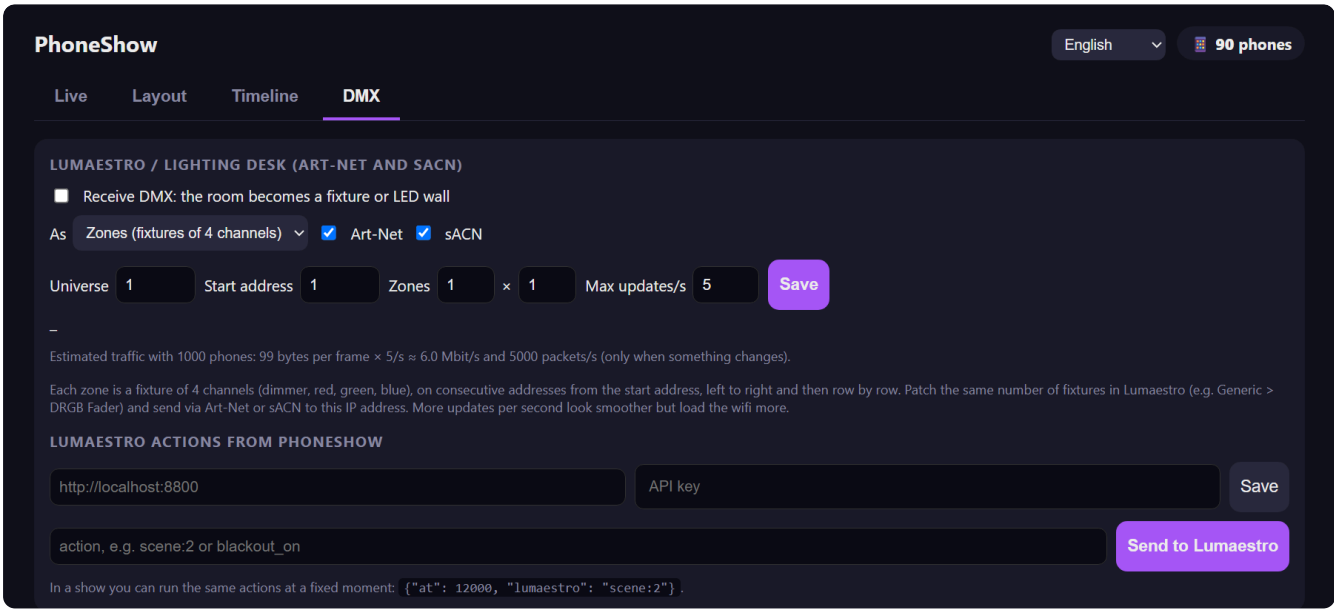
The numbers in the cells show how many phones chose that spot. Under the map you see how many phones chose a spot at all.

With **Use floor plan** switched off, phones show no map and join with one tap. You can switch it on and off at any time while the program runs.

Address and QR code

This is the address that the QR code points to. The program fills it in itself on a local network. If you run PhoneShow behind your own domain, type the full address here (for example `https://show.example.com/`), click **Save** and then **Show QR code**.

8 The control panel: DMX



The DMX page lets a lighting desk, or Lumaestro, control the phones through Art-Net or sACN. It works on a local network, so use it with the Windows program in the same network as the desk.

Receiving DMX

1. Tick **Receive DMX**, and choose Art-Net, sACN or both.
2. Choose **As: Zones** if the room should act as a set of fixtures, or **Matrix** if it should act as an LED wall.
3. Set **Universe** and **Start address**. They count from 1, like in Lumaestro.
4. For **Zones**, set the number of zones in columns and rows. Each zone is a fixture of four channels (dimmer, red, green, blue), from the start address, left to right and then row by row. Patch the same number of fixtures on your desk.
5. For **Matrix**, set the width and height in pixels and the colour order. The pixels follow each other row by row from the start address, 170 pixels per universe. Keep the matrix small: a bigger picture means more data to every phone.
6. Set **Max updates/s** and click **Save**. The status line shows when data arrives, from which address and how many packets per second.

Below the settings the panel estimates the network traffic for 1000 phones. More updates per second look smoother but load the wifi more.

Lumaestro

PhoneShow can also start actions in Lumaestro. Fill in the address of the Lumaestro remote (`http://localhost:8800` by default) and the API key from Lumaestro, then click **Save**. Type an action such as `scene:2` or `blackout_on` and click **Send to Lumaestro**. In a show, the same action runs at a fixed moment with the `lumaestro` field.

9 Language

- **Phone page:** 33 European languages, namely Bulgarian, Catalan, Croatian, Czech, Danish, Dutch, English, Estonian, Finnish, French, German, Greek, Hungarian, Icelandic, Irish, Italian, Latvian, Lithuanian, Macedonian, Maltese, Norwegian, Polish, Portuguese, Romanian, Russian, Serbian, Slovak, Slovenian, Spanish, Swedish, Turkish, Ukrainian and Albanian. The page starts in the language of the phone, and visitors can change it with the list on the start screen.
- **Program window and control panel:** Dutch and English, with the list in the corner.

Texts that you type yourself, such as lyrics and balloons, are shown exactly as you wrote them.

10 Security

- The control panel is protected by the password from the program window. After a few wrong attempts the waiting time grows each time, and after 20 wrong attempts the address of the visitor is blocked.
- The window of the program is only reachable from your own PC. The password is never shown to other devices.
- Phones can only play the light and text that you send. They cannot change the show.
- Use the program on a network that you trust. Anyone on that network can open the phone page, but only someone with the password can open the panel.

The public demo

At **phoneshow-demo.lumaestro.com** you can try PhoneShow in the browser. The demo accepts at most 10 phones, plays a tour on its own and shows speech balloons that explain what you see. DMX, the Lumaestro link, uploads and your own text are switched off there. You can steer it at `/control` with the password `demo`; after you press something it pauses the tour for 90 seconds.

11 Tips for a big room

- **Wifi decides.** A normal home router handles a few dozen phones. For hundreds of phones you need venue wifi built for crowds, or let the audience use 4G or 5G through a server on the internet.
- **Server on the internet.** PhoneShow also runs as a server on the internet behind https, with a fixed address and a QR code. That version is not part of this download. Get in touch through qmix.nl if you want one.
- **Test beforehand.** Join with a few phones, run your show once and look at the late count on the Live page.
- **Put the QR code big and early.** People need a minute to join. Put the code on the screens before the show starts.
- **Choose the lead time on site.** Start at 300 ms, and raise it if phones are late.

What we measured

In our own test, 1000 simulated phones joined a PhoneShow server over the internet. The server used about 1% of its processor and 63 MB of memory on a VPS with 4 cores, and the server load stayed around 0.3. A colour and a lyric reached all phones that had finished joining, within a spread of roughly 60 ms. On real phones over 4G the delay per phone can be larger, which is why the lead time is adjustable.

12 Troubleshooting

Problem	What to do
The window does not open, or shows nothing	Close the program completely (also in the Task Manager) and start it again. If the window shows an error about the port, see the notice in the window: PhoneShow then uses port 8081 for the phones.
Phones cannot open the page	Check that the phone is on the same wifi network as the PC, and not on mobile data. Some venue and guest networks keep devices apart (client isolation): use another network or a small router of your own. Check that Windows allowed the program on private networks.
`phoneshow.local` does not work	Use the second QR code with the IP address. Some Android phones do not understand `.local`.
A phone's screen switches off	Ask the visitor to set the screen lock to Never and the brightness to maximum. The panel shows how many phones may fall asleep.
Phones are late	Raise the lead time on the Live page and run the action again.
An image does not show on some phones	Wait until the bar under the picture is full before you show it. Phones that joined late still need to load it.
Waves and rings do not follow the room	Check that Use floor plan is switched on and that visitors chose their spot. Phones without a spot get a random, fixed place.
I forgot the password	The password changes at every start. Look in the window of the program, or start it again.
My lyrics are gone	Songs and your shows live in the browser you used. Open the panel in the same browser, or load a file you downloaded earlier.
Windows or an antivirus program warns	The program is not digitally signed. Click **More info** and **Run anyway**, or ask your IT department to allow the file.



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PhoneShow is a Lumaestro product. The latest version and more information are at lumaestro.com/phoneshow.