User manual

Azimuth Digital 0.3

Azimuth Digital plays a show from a playlist of video clips and stills, in Google Chrome, to a projector or switcher. It works the way PlaybackPro Plus does: Preview and Program, Take, Loop, Freeze, Link, End All, the same keys and the same remote commands.

New to Azimuth? The quick start takes ten minutes. This manual explains everything in detail, using the test clips (T01–T08) as examples.

1. Welcome

How Azimuth works

Azimuth has three parts. You mostly see the first two.

- **The operator screen** in Chrome: where you build the playlist and run the show.
- **The output window** in Chrome, full screen on the projector or switcher display: it plays the clips, does the cuts, dissolves and loops, and sends the sound to your audio interface.
- **The helper**: the black window that opens when you start Azimuth. It keeps the show, serves the media, and listens for Companion, PlaybackPro commands and OSC. Keep it open during the show.

The output does everything time-critical itself, frame by frame. If the helper or the operator screen is closed by accident, the clip on air keeps playing; start Azimuth again and everything reconnects.

For PlaybackPro Plus users

The layout, words and behaviour follow PlaybackPro Plus: Preview is blue and Program red; durations are signed (negative = dissolve, 0 = cut, positive = delay); the Loop, Freeze and Link temps reset from the clip's own settings on every Take; at the end of a clip Loop wins over Freeze, Freeze over Link, Link over stop. The keyboard map and the TCP/UDP commands are the same, so Companion's "PlaybackPro Plus" module works unchanged.

What is different: Azimuth runs in Chrome, so it plays the formats Chrome plays (H.264, HEVC, VP9, AV1). ProRes and similar files are converted inside Azimuth (see Converting ProRes). Azimuth also adds live monitors on other computers and tablets, its own Companion module with tally, and OSC.

What you need

- Windows 10 or 11 (64-bit) with Google Chrome. A Mac works too, with Node.js installed (see Install).

- A graphics card that decodes H.264 and HEVC in hardware for 4K playback. Most PCs from 2016 on do; Output setup shows what yours can do.
- A second display output for the projector or switcher. With one screen you can test in a window.

2. Install, start, update

Install

1. Download `Azimuth-Digital-<version>-windows.zip` from the GitHub release and unzip it, for example to `C:\Azimuth Digital`. Nothing is installed in Windows; everything stays in that folder.
2. For the test clips, unzip `Azimuth-test-clips.zip` into the `Media` folder (it is created on first start, or create it yourself).

Start and stop

Double-click **Start Azimuth.bat**. The helper window opens and Chrome opens the operator screen. The first time, Windows Firewall asks about `azimuth-helper.exe`: allow **Private networks**, so Companion, OSC and remote screens can reach it.

To stop Azimuth, close the helper window. The show is saved first and the output window closes. Starting Azimuth again while it runs simply opens another operator screen.

Update

Close Azimuth and unzip the new version over the old folder. `Media`, `Shows`, `Logs`, `config.json` and the downloaded ffmpeg are not in the zip, so they are kept.

What Azimuth sets up for the show

The operator screen and the output run in Azimuth's own Chrome windows (their own profiles, apart from your everyday Chrome), set up for playback:

- The output keeps the display and the computer awake, also while it holds black or a still, so the projector never loses its signal to a power setting.
- Play/pause keys on a keyboard or headset cannot pause the show, and the output is never treated as hidden or in the background.
- No updates, sync or other background downloads run in these windows.
- The output sends pixel values to the projector unchanged, whatever colour profile Windows has for that display, and on a laptop with two graphics chips it plays on the faster one.
- On Windows the helper runs a little above normal priority, so takes from Companion and the monitor pictures stay prompt when the computer is busy; conversions run below normal.
- The monitor pictures are made and decoded in background workers, away from the output's playback and the operator screen.

Mac

Install Node.js from nodejs.org, then double-click **Start Azimuth (Mac).command**. The first time, run `chmod +x "Start Azimuth (Mac).command"` in Terminal. To convert ProRes on a Mac, install ffmpeg once with `brew install ffmpeg`.

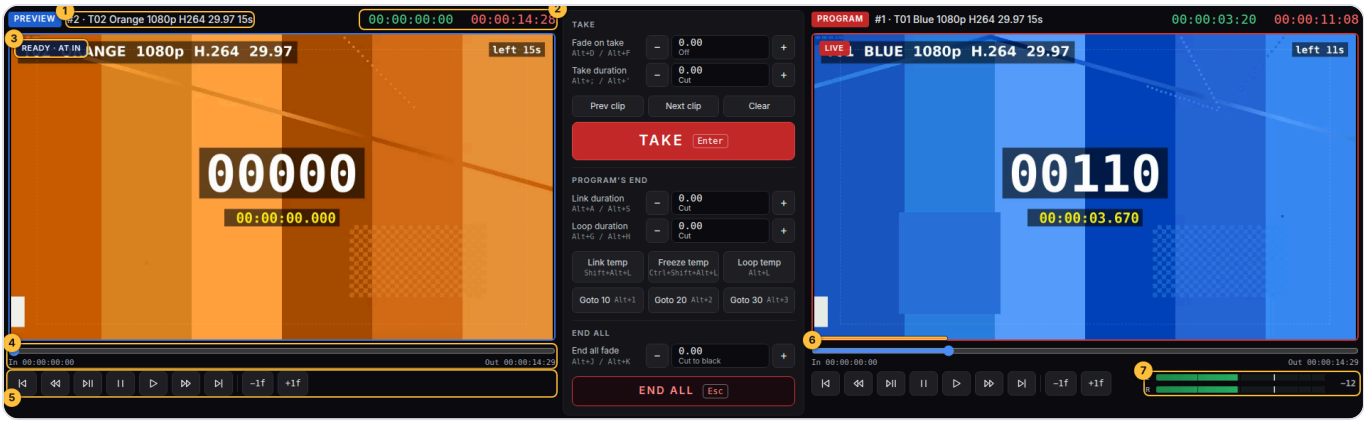
3. The operator screen



T01 is on air (Program), T02 is cued (Preview).

1. **Show menu**: New, Open..., Save, Save as..., Keys (the key map), Log (events and transition timing), Convert (media conversion). **Help** (`F1`) opens this manual. The show name and **Saved** / **Unsaved** are on the left.
2. **Status pills**: helper, output window (with its resolution), audio device, PlaybackPro TCP and UDP, OSC and Companion when they are on. Green is good, red needs attention. The clock shows the time of day.
3. **Output setup**: displays, picture, audio, remote access, network control, this computer.
4. **Preview** (blue): the cued clip with its picture, elapsed and remaining time, scrubber and transport.
5. **Show controls**: Take, take duration, Program's end, temps, Goto and End All.
6. **Program** (red): what is on the output now.
7. **Preview clip settings**: In, Out, Slate, fades, geometry and levels of the cued clip.
8. **Playlist**: the running order.
9. **Program clip settings**: the same for the clip on air. Changes apply at once.
10. **Last**: the last action, from here or from a remote (remote actions show where they came from).
11. **Computer load**: CPU, memory, GPU and video decode, then the output's frame rate and any dropped frames. See Watching the computer.

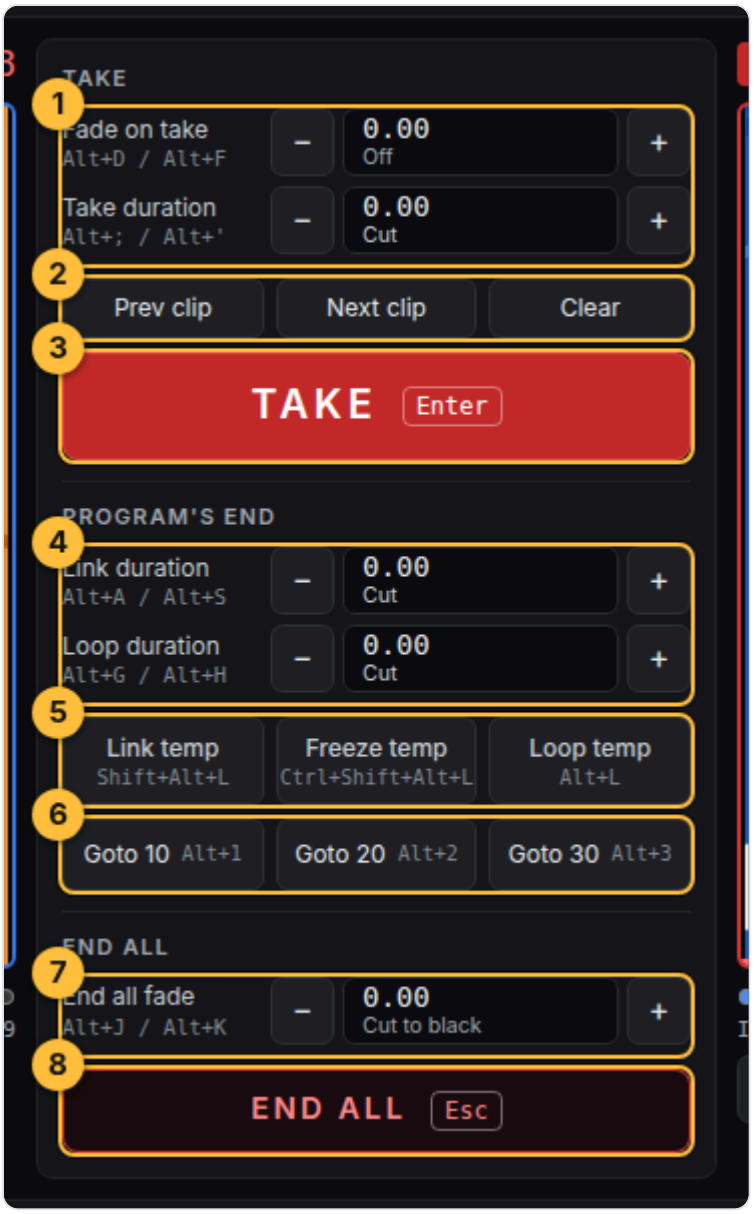
Preview and Program monitors



1. **Clip # and title.**
2. **Elapsed** from the In point (green) and **remaining** to the Out point (red), in hours:minutes:seconds:frames.
3. **State**: Preview shows READY · AT IN, LOADING..., PLAYING IN PREVIEW or WILL NOT PLAY. Program shows LIVE (with LOOP or LINK when those temps are on), PAUSED, FROZEN · LAST FRAME, STILL · HOLD, TRANSITION, BLACK · DELAY or FADING OUT.
4. **Scrubber** with the In and Out points. Drag it to move through the clip.
5. **Transport**: go to In, fast reverse, play/pause, pause, play, fast forward, go to Out, and one frame back or forward. Preview transport never changes the output; Program transport does.
6. The thin bar under the Program picture shows how far the clip has played.
7. **Audio meters**: the output's left and right level, −60 to 0 dBFS (green to −12, amber to −3, red above), with a 1.5 s peak hold and the highest recent peak as a number. The number turns red for 2 s when the sound reaches 0 dBFS (clipping). They show what the output sends to the sound device, after Master and the clip's Volume.

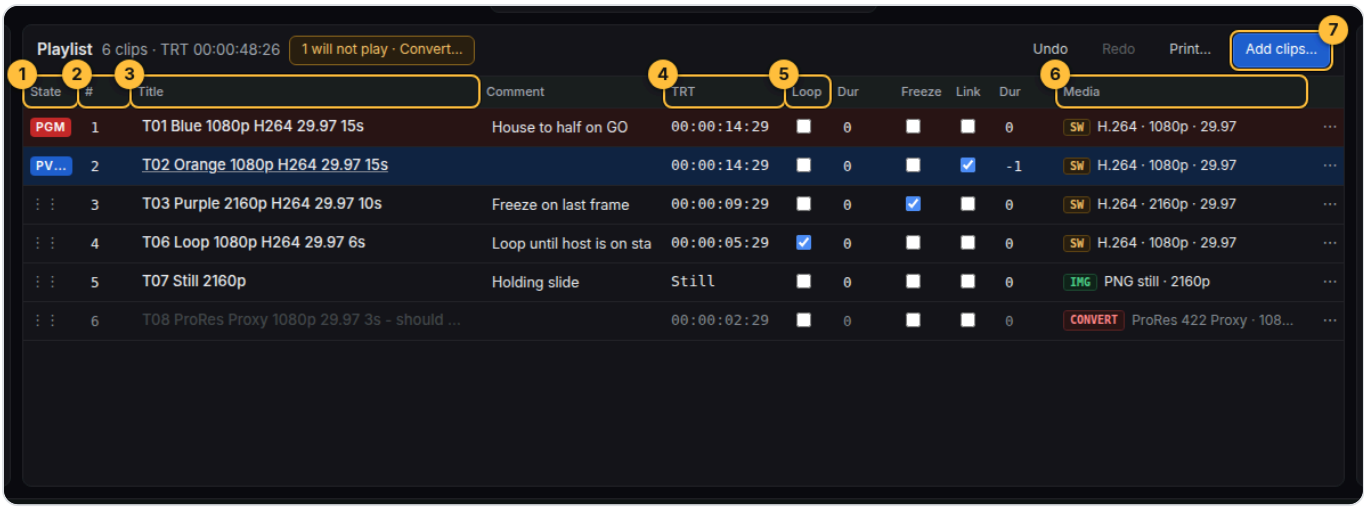
The pictures are live video made from what the output shows, including dissolves and levels. If the output freezes, so do these pictures, which makes them a true confidence monitor. You can switch them to snapshots or off in Output setup.

Show controls



1. **Fade on take** and **Take duration**. Click − / + to step, or click the value to type it. See Take and durations.
2. **Prev clip**, **Next clip** load the previous or next clip into Preview; **Clear** empties Preview.
3. **TAKE** (`Enter`) sends Preview to Program.
4. **Link duration** and **Loop duration**: how the clip on air links into the next clip, or loops (negative = dissolve, 0 = cut, positive = delay).
5. **Temps**: Link, Freeze and Loop for the clip on air (amber when on).
6. **Goto 10 / 20 / 30**: jump Program to 10, 20 or 30 seconds before its Out point, for rehearsing endings.
7. **End all fade**: how long End All takes (0 = cut to black).
8. **END ALL** (`Esc`): Program to black.

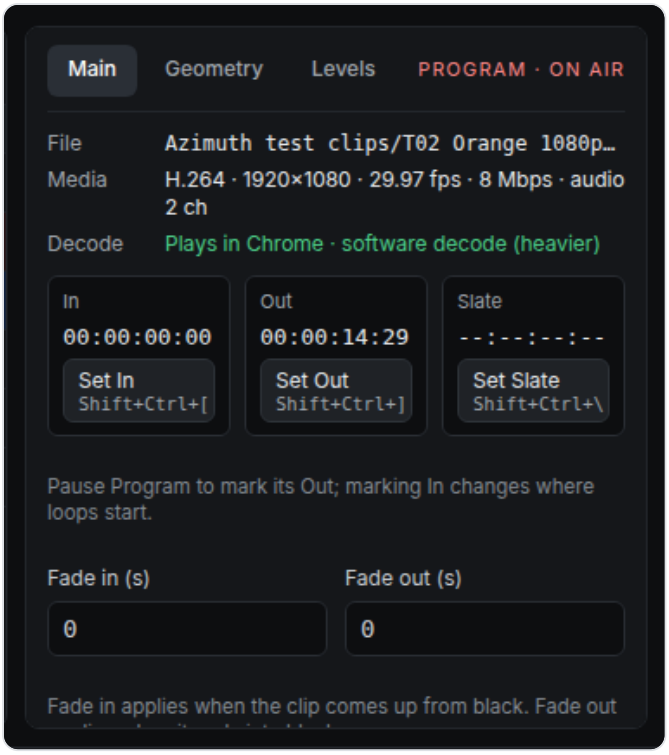
Playlist



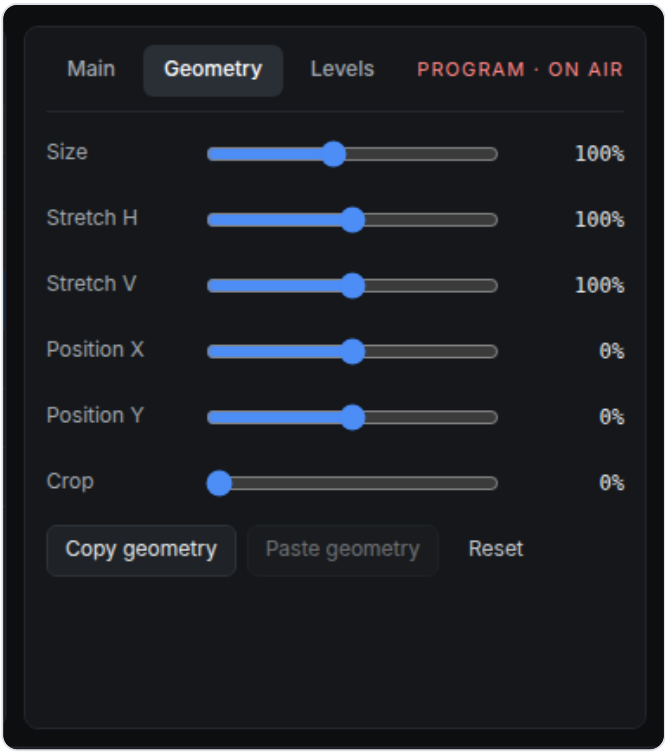
1. **State**: PGM on air, PVW cued. Drag the ⋮⋮ handle to reorder; click it to select the row (see Building a playlist).
2. **#**: the clip number. Type it on the keyboard to cue the clip; PlaybackPro commands such as `G012` use it too. It can contain letters (12A).
3. **Title**: click to cue the clip into Preview; double-click to rename. **Comment** is free text for your notes. Sections (Walk-in, Awards...) are set with Edit multiple and head the printed running order and the monitor page.
4. **TRT**: running time from In to Out.
5. **Loop** (with its **Dur**), **Freeze**, **Link** (with its **Dur**): the clip's own end settings, copied into the temps when it is taken.
6. **Media**: decode badge and format. HW hardware decode, SW software decode, IMG still image, CONVERT will not play until converted, OFFLINE file not found (click it to locate it). The ⋯ button opens the clip menu.
7. **Add clips...**; next to it **Print...**, **Undo** and **Redo**.

Clip settings

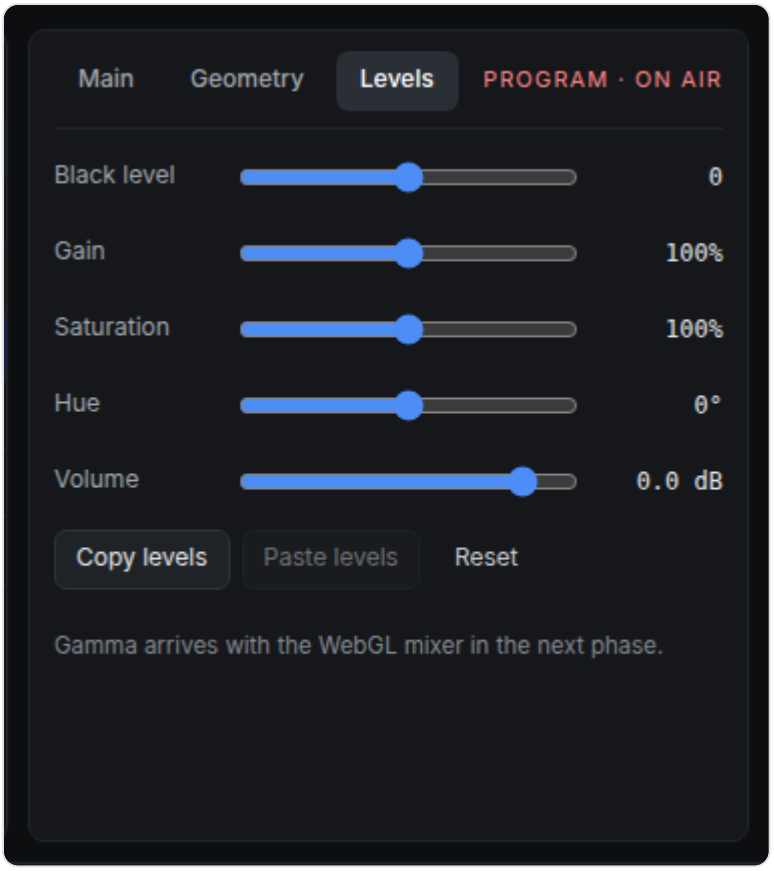
The panel on the left belongs to the Preview clip, the one on the right to the Program clip. Each has three tabs.



Main: file, format, decode, In / Out / Slate, fades.



Geometry: size, stretch, position, crop.



Levels: black level, gain, saturation, hue, volume.

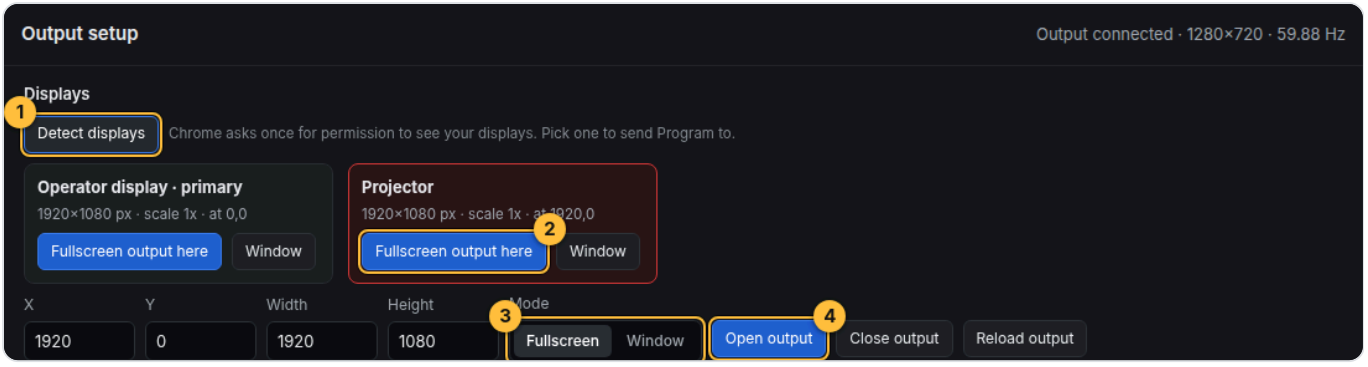
- **Main**: **Set In**, **Set Out** and **Set Slate** mark the current frame (see In, Out and Slate). **Fade in** applies when the clip comes up from black; **Fade out** when it ends into black.

- **Geometry**: Size 25–200 %, Stretch horizontal and vertical 50–150 %, Position X and Y ±50 %, Crop up to 25 %.
- **Levels**: Black level ±40, Gain 0–200 %, Saturation 0–200 %, Hue ±180°, Volume −40 to +6 dB.
- **Copy** / **Paste** copies geometry or levels from one clip to another; **Reset** goes back to normal. Edit multiple can paste them onto many clips at once.

Changes on the Program clip show on the output immediately. Gamma will come with a later version.

4. Output setup

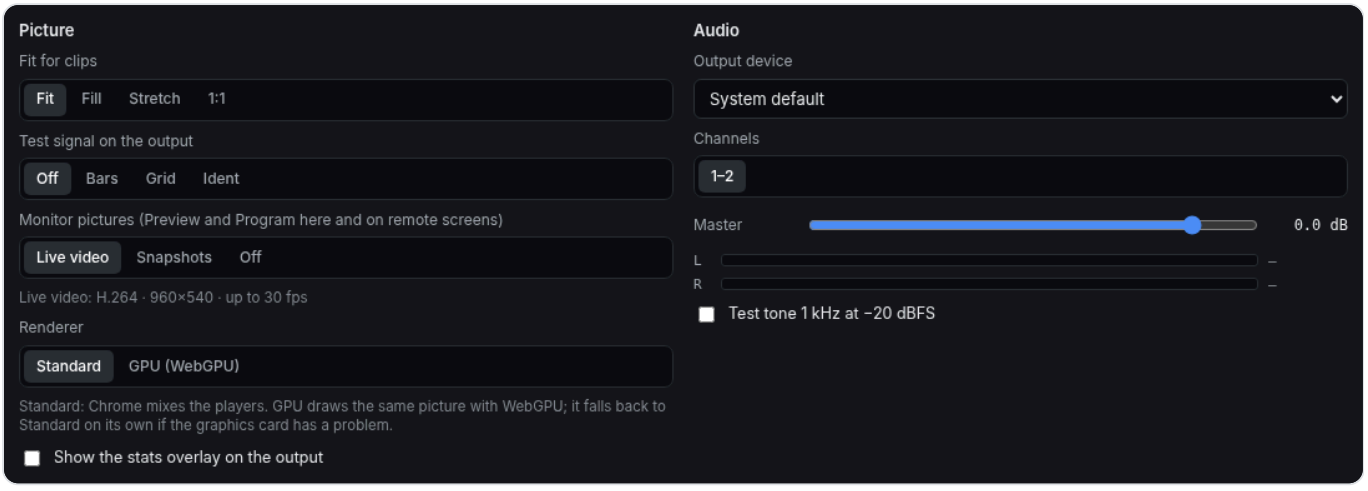
Displays



1. **Detect displays**. Chrome asks once for permission to see your displays ("Window management"): allow it.
2. **Fullscreen output here** opens the output full screen on that display; **Window** opens a movable window there. The display the output is on is outlined red.
3. **Mode** for the numbers below: Fullscreen or Window.
4. **Open output** with the X, Y, width and height typed in (useful when a display is not reported). **Close output** closes it; **Reload output** restarts the output window.

The output window opens in its own Chrome profile, without frame or cursor. Azimuth remembers the position for next time. Close the output with Close output, or `Alt` + `F4` on the output display.

Picture and audio

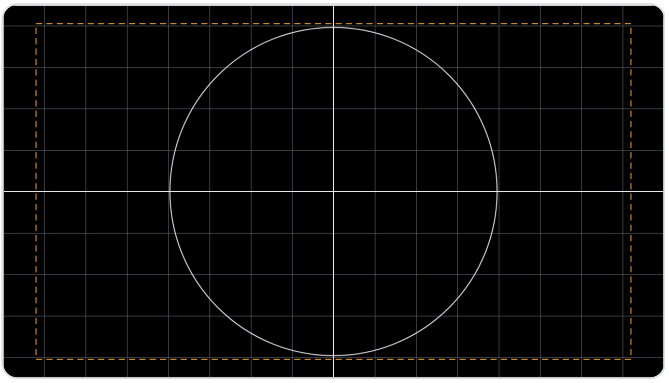


- **Fit for clips**: Fit (whole picture, black bars when the shape differs), Fill (no bars, crops), Stretch, or 1:1 (pixel for pixel).

- **Test signal on the output**: colour bars, a grid with safe areas, or an ident with the output's resolution and refresh rate. Turn it Off before the show.
- **Monitor pictures**: **Live video** (smooth 30 fps pictures on the operator screen and on remote screens, encoded by the graphics card), **Snapshots** (2–12 still pictures a second, lighter), or **Off**. The line below shows the encoder in use.
- **Renderer**: how the picture reaches the screen. **Standard** lets Chrome mix the video players. **GPU (WebGPU)** draws the same picture on the graphics card with WebGPU, frame by frame: it looks identical (same fit, geometry, crop, levels and dissolves) and is the base for later features such as gamma and projector blending. The line below shows the graphics card in use. If WebGPU is not available, or the graphics driver resets during the show, the output switches back to Standard by itself without stopping the clips, and the Log says why; switch to Standard and back to GPU to try again. Compare both on your show computer (GPU and dropped frames in the footer, the stats overlay, and the Loop lines in the Log) before you rely on GPU.
- **Show the stats overlay on the output**: a box on the output with resolution, refresh rate, dropped frames, decks, audio, computer load and the renderer. For testing only.
- **Audio output device**: any sound device Chrome can see. **Channels** picks the channel pair on a multi-channel interface. **Master** sets the overall level; L and R meters show what plays. **Test tone** plays 1 kHz at −20 dBFS.



Bars



Grid with 90 % safe area



Ident: the output's size and refresh rate

The rest of Output setup is covered in Remote screens, Control from other systems and Watching the computer.

5. Media and test clips

The media folder

Clips are played from the **media folder**: `Media` inside the Azimuth folder, or any folder you choose in Add clips (an absolute path such as `D:\Show media`). Files are used where they are and never changed. Sub-folders are fine.

Formats

FORMAT	PLAYS?	NOTES
H.264 (MP4, MOV)	Yes	Plays everywhere. 4K at 59.94 needs a strong graphics card.
HEVC / H.265 (MP4, MOV)	With hardware decode	Most PCs since 2016 and all Apple silicon Macs. Smaller files than H.264 at the same quality.
VP9, AV1 (WebM, MP4)	Yes	VP9 WebM can carry alpha (transparency).
ProRes, DNxHD/HR, HAP	No: convert	Azimuth converts them to H.264 or HEVC; see below.
PNG, JPEG, WebP, GIF, BMP stills	Yes	Stills hold until the next Take or End All.
WAV, MP3, AAC/M4A, AIFF, FLAC, OGG audio only	Yes	Play with a black picture.

Badges show what *this* computer's Chrome can do with each file: `HARDWARE` decoded on the graphics card, `SOFTWARE` on the processor (fine for HD, heavier for 4K), `NO` will not play. The table **Hardware decode in this Chrome** in Output setup › This computer lists the common formats.

The test clips

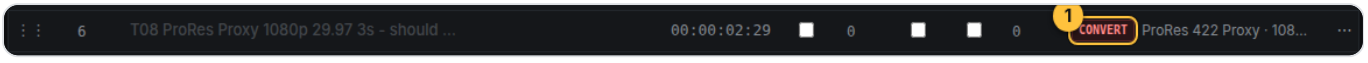
Each test clip shows a large frame counter, timecode, its name and format, a sweep bar and the seconds left, and beeps on every second (higher on the last), so you can see and hear exactly where it is.

CLIP	FORMAT	USE IT TO TEST
T01 Blue	1080p H.264 29.97, 15 s	Cue, take, cuts.
T02 Orange	1080p H.264 29.97, 15 s	Dissolves from and to T01; Link.
T03 Purple	2160p (4K) H.264 29.97, 10 s	4K load; Freeze on the last frame.
T04 Teal	2160p HEVC 29.97, 10 s	Hardware HEVC decode.
T05 Red	2160p HEVC 10-bit 59.94, 8 s	The hardest case: 4K, 10-bit, 60 frames a second.
T06 Loop	1080p H.264 29.97, 6 s	Seamless loops: the counter goes 00177, 00178, 00000 with no repeat or skip.
T07 Still	3840×2160 PNG	Stills.
T08 ProRes	ProRes Proxy 1080p, 3 s	Will not play on purpose: convert it.

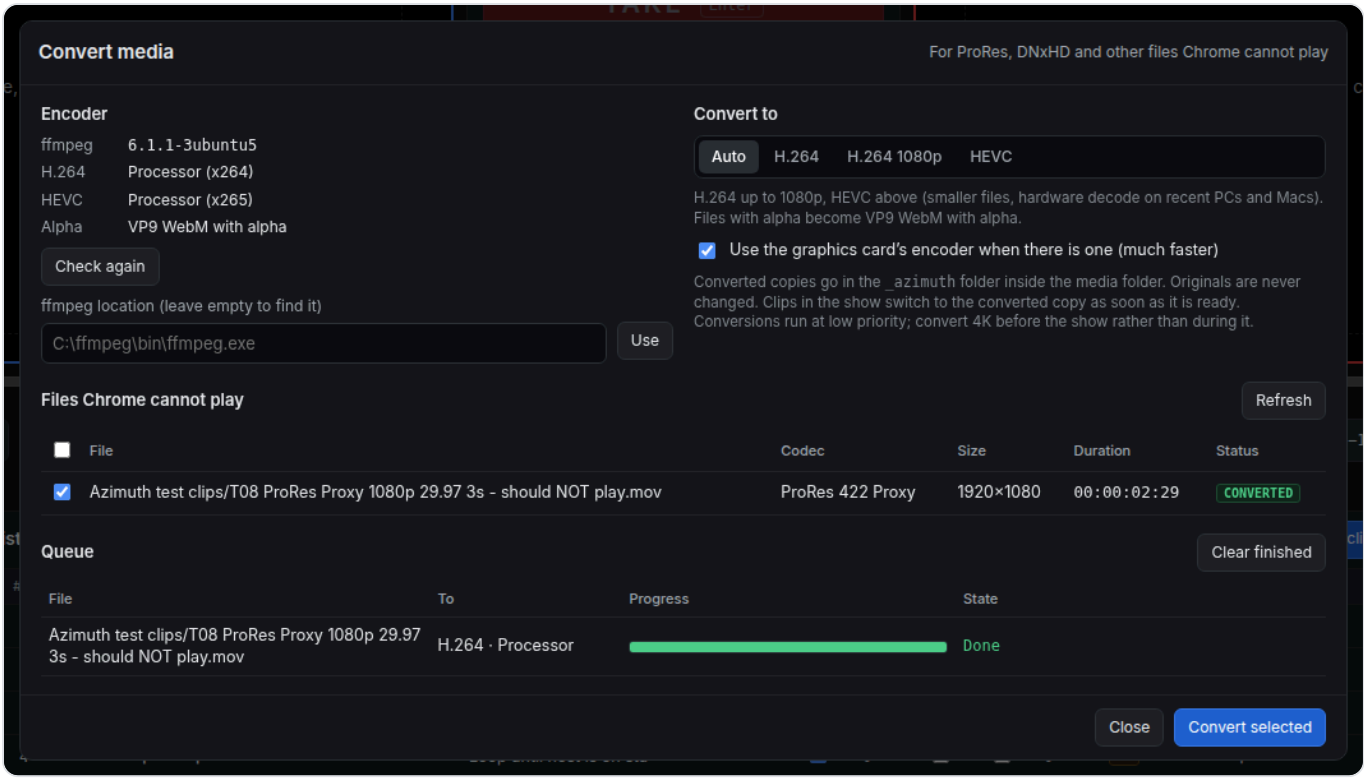
The pictures in this manual were taken in Google Chrome on a computer without a graphics card, so every clip shows SOFTWARE and T04 and T05 (HEVC) do not appear. On a show computer with a graphics card, H.264 and HEVC clips usually show HARDWARE.

Converting ProRes

Chrome cannot play ProRes, DNxHD or HAP. Azimuth converts them with ffmpeg and plays the converted copy. Originals are never changed; copies go into `Media\_azimuth` with the same folders.



1. A clip that will not play shows a red **CONVERT** button. Click it to convert that file. You can also use **Convert** in the top bar for whole sets of files, or **Convert selected...** in Add clips.



The Convert window after converting T08.

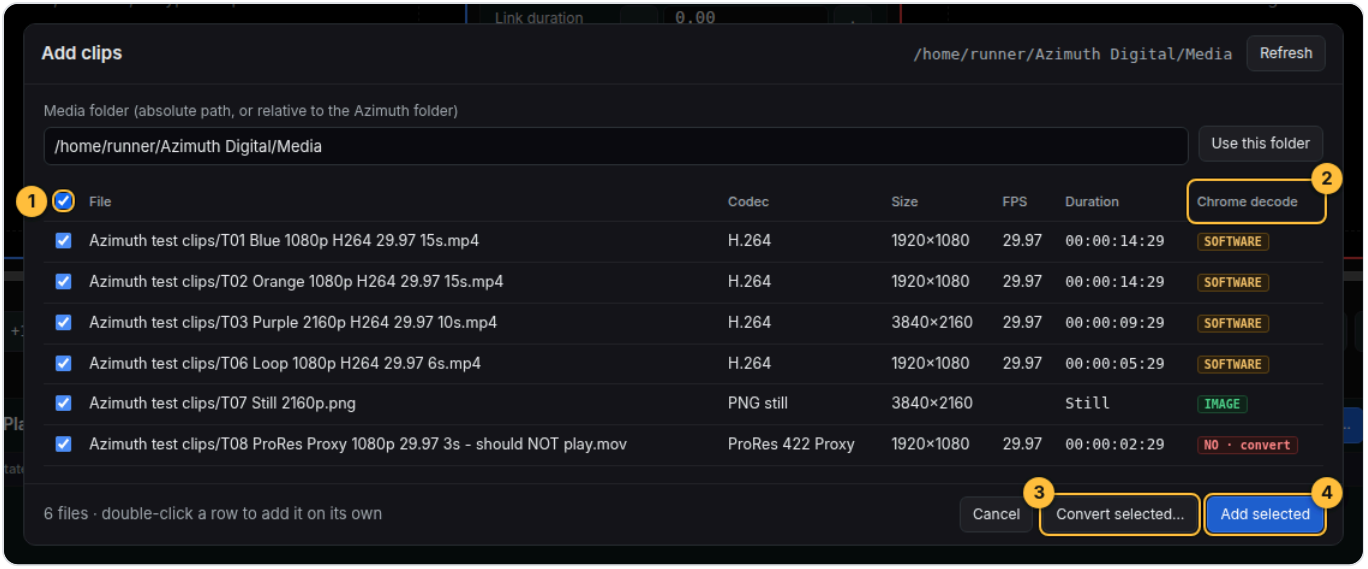
- **Encoder**: the first time, Azimuth asks to **Download ffmpeg** (about 90 MB, into `tools\ffmpeg`). It then tests the graphics card's encoder (NVIDIA NVENC, Intel Quick Sync or AMD) and uses it when it works, which is many times faster than the processor. On a Mac, install ffmpeg with Homebrew. You can also point to your own ffmpeg.
- **Convert to**: **Auto** makes H.264 up to 1080p and HEVC above (half the size, hardware decode). H.264, H.264 1080p (scaled to fit 1920×1080) and HEVC are also available. Files with alpha (ProRes 4444) become VP9 WebM and keep their transparency. Interlaced sources are deinterlaced; two mono tracks become stereo.
- **Files Chrome cannot play**: everything in the media folder that needs converting, ticked if it has not been converted yet.
- **Queue**: progress, speed (1.0x = real time) and time left; Cancel stops a conversion.

Clips in the show switch to the converted copy as soon as it is ready; the media column then says "conv." and the clip settings show the source. Row menu › **Use original file** switches back.

> Conversion runs at low priority, but converting 4K during a show can still cost frames on the output. Convert before the show.

6. Building a playlist

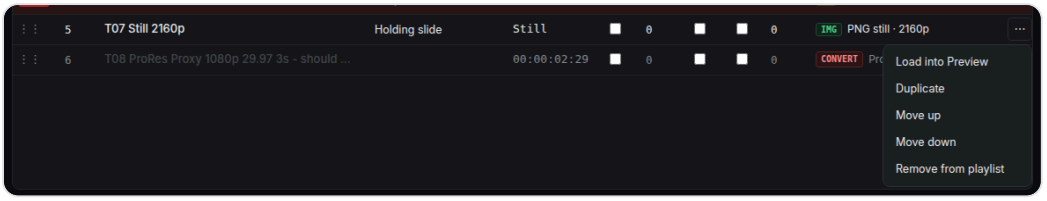
Adding clips



Add clips… lists the media folder with format, size, frame rate, duration and the decode badge. Tick files and **Add selected**, or double-click a row to add one file. Clips are numbered after the highest # in the playlist. A file that will not play can still be added; it shows CONVERT in the playlist. To use another folder, type its path and **Use this folder**.

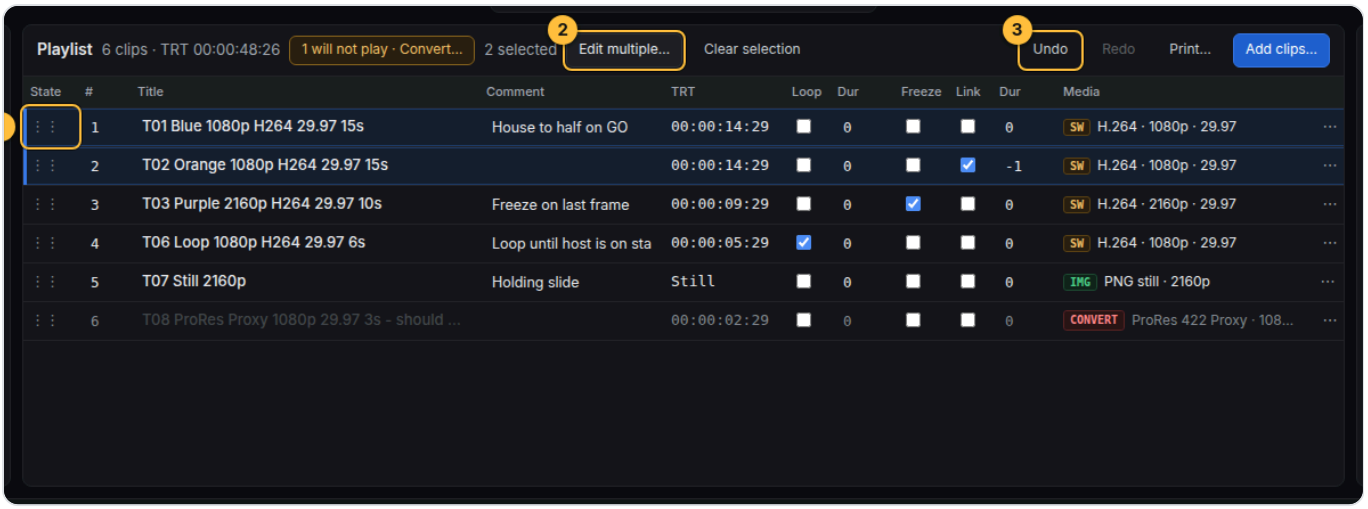
Editing

- Type directly in **#**, **Comment** and the Loop and Link **Dur** fields; `Enter` confirms, `Esc` cancels. To put clips in a **Section**, select them and use **Edit multiple**.
- Double-click a **title** to rename it.
- Drag the ⋮⋮ handle to reorder.
- The ··· menu on each row:

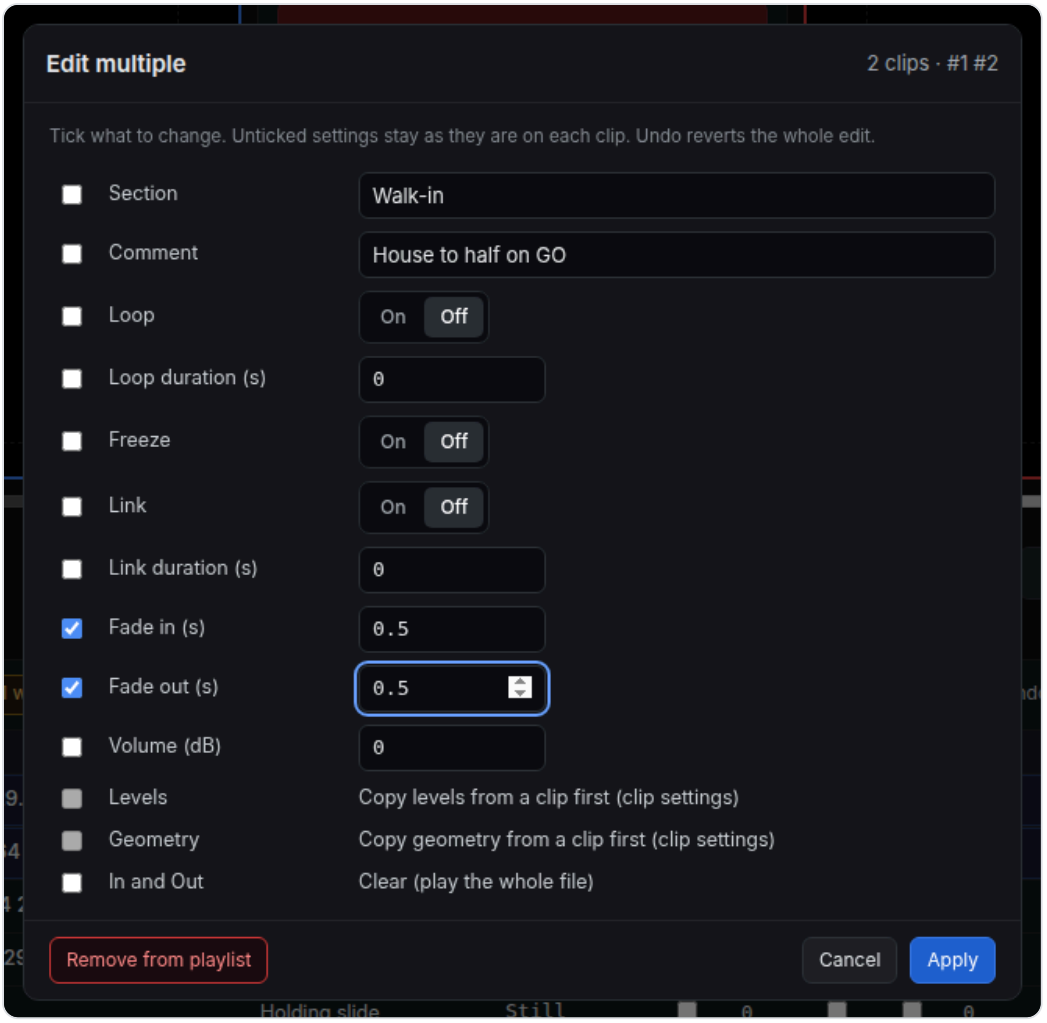


Load into Preview, Duplicate, Move up, Move down, Locate file… (offline clips), Convert for Chrome…, Use original file (converted clips), Remove from playlist.

Selecting several clips and Edit multiple



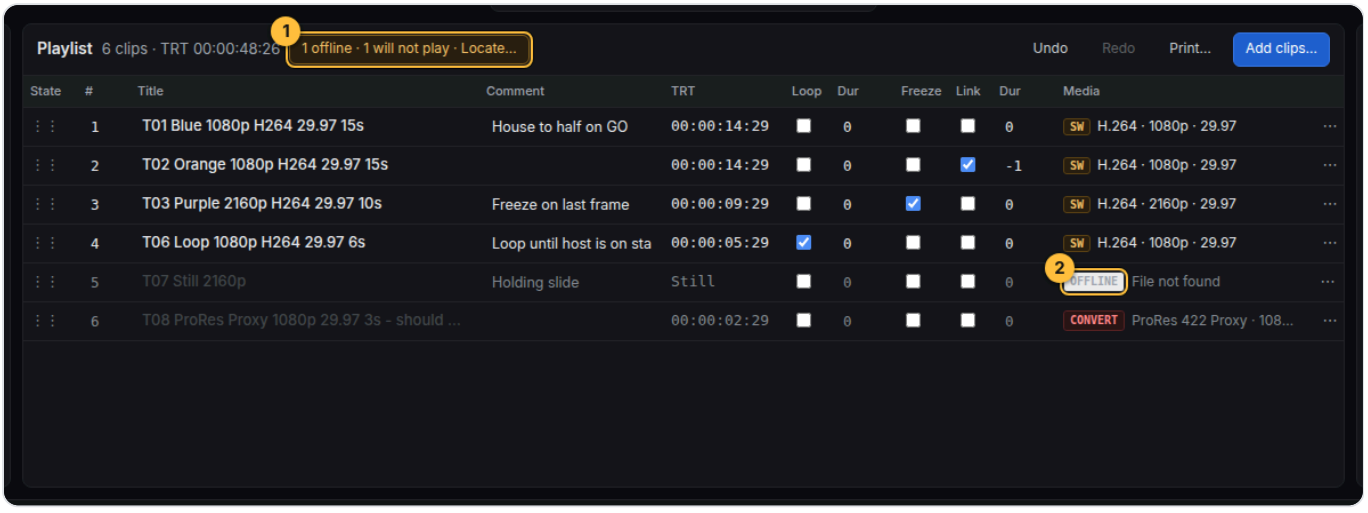
1. Click the **State** cell (⋮⋮) to select a clip; `Ctrl`+click adds or removes clips; `Shift`+click selects a range; `Ctrl` + `A` selects all.
2. **Edit multiple...** (`Ctrl` + `E`) changes settings on all selected clips at once.
3. **Undo** and **Redo** (`Ctrl` + `Z`, `Ctrl` + `Shift` + `Z`) work for every playlist change: edits, adds, removes, moves, marks, Locate, conversions. A slider drag counts as one step. Undo never removes the clip on air.



Tick what to change; everything else stays as it is on each clip. Here: a half-second fade in and out on T01 and T02.

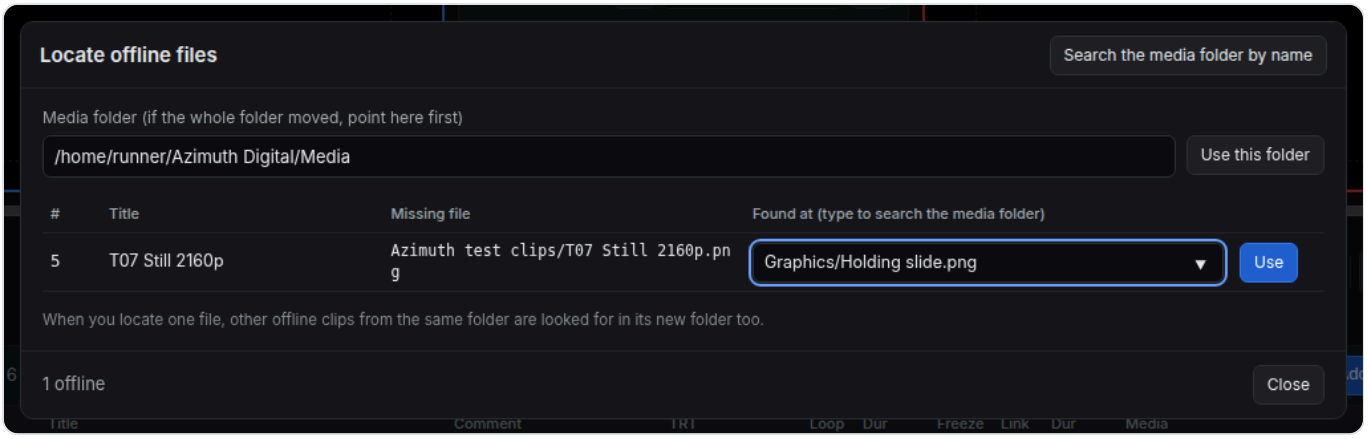
Offline files and Locate

When a file is moved or renamed, its clip goes **offline**. Azimuth first looks for a file with the same name anywhere in the media folder. If it cannot find one:



The playlist bar shows how many clips are offline: click **Locate...**.

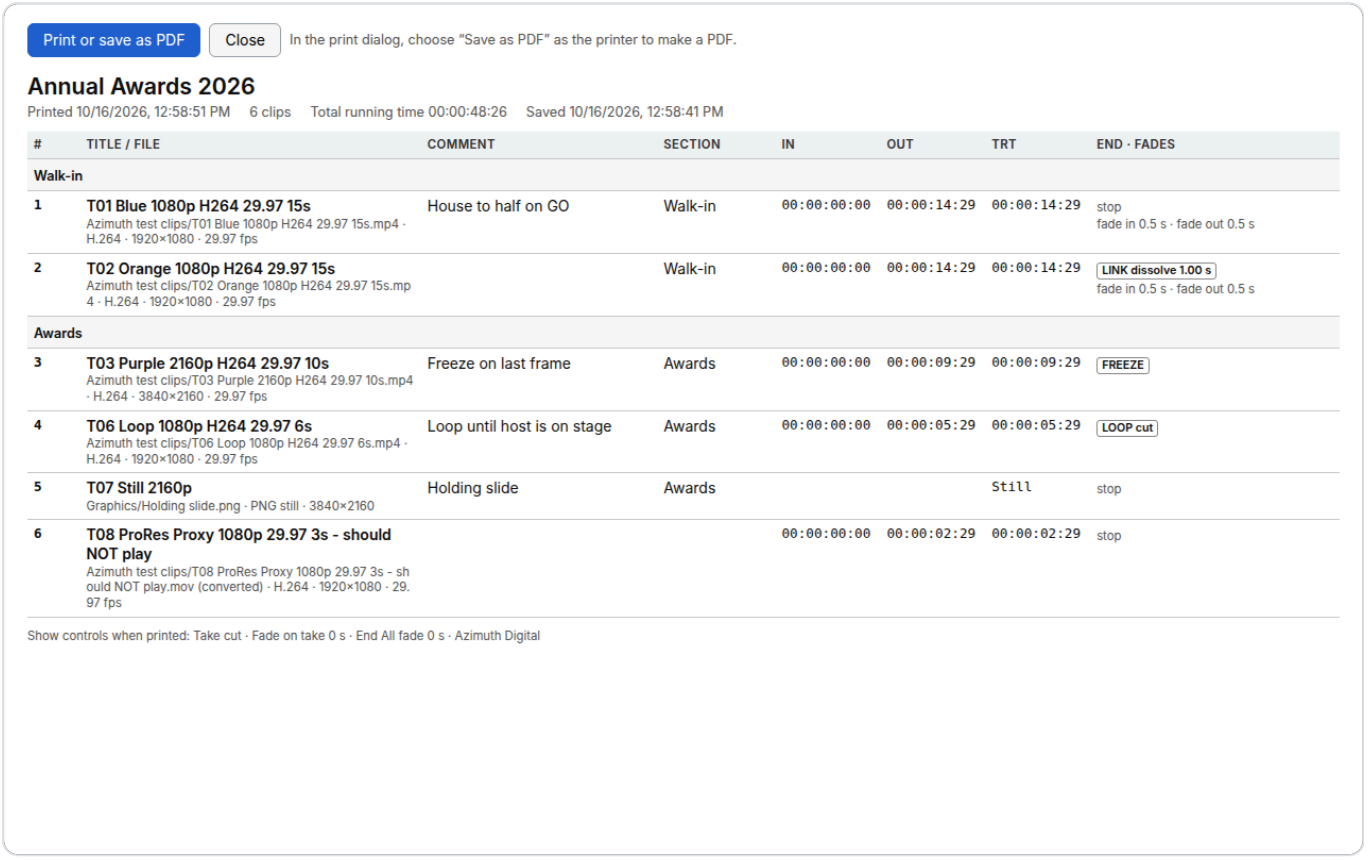
2. The clip shows `OFFLINE`; click it to locate that one.



Type part of the new name and pick it, then Use. Other missing clips from the same old folder are looked for in the new folder automatically.

If the whole media folder moved (another drive, another computer), set the new media folder at the top of the Locate window first.

Printing the playlist



Print... (`Ctrl` + `P`) opens a printable running order with sections, In, Out, running time, end settings, fades and files. In the print dialog, choose **Save as PDF** as the printer to make a PDF.

7. Running a show

Cueing

- Click a title in the playlist.
- `↓` / `↑` (or Next clip / Prev clip) load the next or previous playable clip.
- Type the clip's **#** (for example `1` `2`) then `Enter`. The number appears above TAKE while you type; the next `Enter` takes it.
- `Delete` clears Preview.

A cued clip loads, waits at its In point and shows **READY · AT IN**. You can play it in Preview to check it (`Alt` + `P`); that never affects the output.

Take and durations

TAKE (`Enter`) puts the Preview clip on Program. How it arrives depends on the **Take duration**:

TAKE DURATION	WHAT HAPPENS
Negative, e.g. −1.00	**Dissolve** from the clip on air to the new clip over that many seconds.
0	**Cut**. With a **Fade on take**, the clip on air first fades to black over that time, then the new clip cuts in.
Positive, e.g. +2.00	**Delay**: Program goes to black (cut, or faded over Fade on take), holds black that many seconds, then the new clip starts.

When nothing is on Program, a Take is always a cut. The new clip's own **Fade in** applies when it comes up from black. Durations step in half seconds (`Alt` + `;` / `Alt` + `'` for Take, `Alt` + `D` / `Alt` + `F` for Fade on take); click a value to type it. They go to ±30 s.



Take duration −2: T01 dissolving into T02 on the output.

Program's end: Loop, Freeze, Link

What happens when the clip on air reaches its Out point is set by the three **temps**:

- **Loop** (`Alt` + `L`): start again at the In point. **Loop duration** 0 is a seamless cut, negative dissolves into the loop, positive holds black first.
- **Freeze** (`Ctrl` + `Shift` + `Alt` + `L`): hold the last frame. Turning Freeze off while frozen lets the clip end (into Link, if on).
- **Link** (`Shift` + `Alt` + `L`): go on to the next clip, which is cued automatically. **Link duration**: negative dissolves, 0 cuts, positive holds black. Link on every clip loops the whole playlist.
- None: cut to black (or fade, with the clip's Fade out).

If more than one is on, **Loop** wins over **Freeze**, Freeze over **Link**. On every Take the temps are set from the new clip's own Loop, Freeze and Link settings in the playlist; changing a temp affects only the clip on air.



1. The Loop temp is lit: T06 loops.
2. The Program state shows LIVE · LOOP.

Goto 10 / 20 / 30 (`Alt` + `1` / `2` / `3`) jumps Program to that many seconds before its Out point and plays, to rehearse an ending. **END ALL** (`Esc`) takes Program to black over the **End all fade** time.

In, Out and Slate

Move to a frame (scrub, play, or step with `Alt` + `←` / `→`), then:

- **Set In** (`Ctrl` + `[`): the clip starts here.
- **Set Out** (`Ctrl` + `]`): the clip ends after this frame. Freeze then holds exactly this frame.
- **Set Slate** (`Ctrl` + `\`): marks a reference frame, as in PlaybackPro. It is saved with the clip and does not change playback.
- **Clear In and Out** plays the whole file again.

Marks land exactly on frames. On **Program**, add `Shift` (`Ctrl` + `Shift` + `[`). Marking In on Program changes where a loop starts. To mark Out on Program, pause Program first: marking Out on a playing clip would end it at once, so Azimuth refuses that.

Rehearsal with the test clips

This run-through exercises everything a show needs. Afterwards, check Log › Transition timing and the footer for dropped frames.

1. Add all test clips. Take duration **0**. Cue **T01**, `Enter` : a cut from black.
2. Take duration **−1**. Cue **T02**, `Enter` : a one-second dissolve.

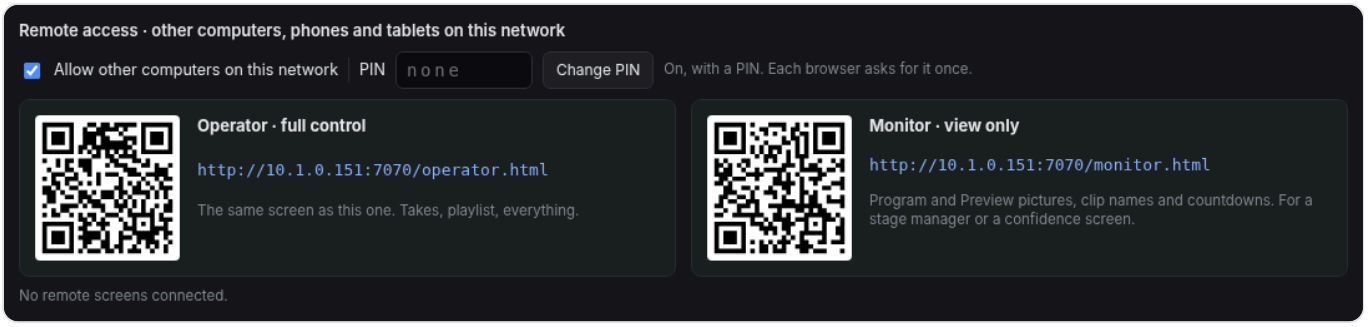
3. Tick **Loop** on **T06**, take it, watch the seam (00178 → 00000) and listen for the beep. Try Loop duration −1.
4. Cue **T03** (4K), scrub to a frame, `Ctrl` + `]` (Set Out), tick **Freeze**, take it: it holds exactly that frame.
5. Turn on **Link** on T01 and T02 with Link duration −1 and take T01: the playlist runs on by itself.
6. Take **T04** and **T05** (HEVC 4K): watch the footer's GPU, DECODE and dropped frames.
7. **Fade on take** 0.5, Take duration +1, take **T07**: fade to black, one second of black, then the still.
8. Click CONVERT on **T08**, then take it.
9. `Esc`: End All.

8. Show files

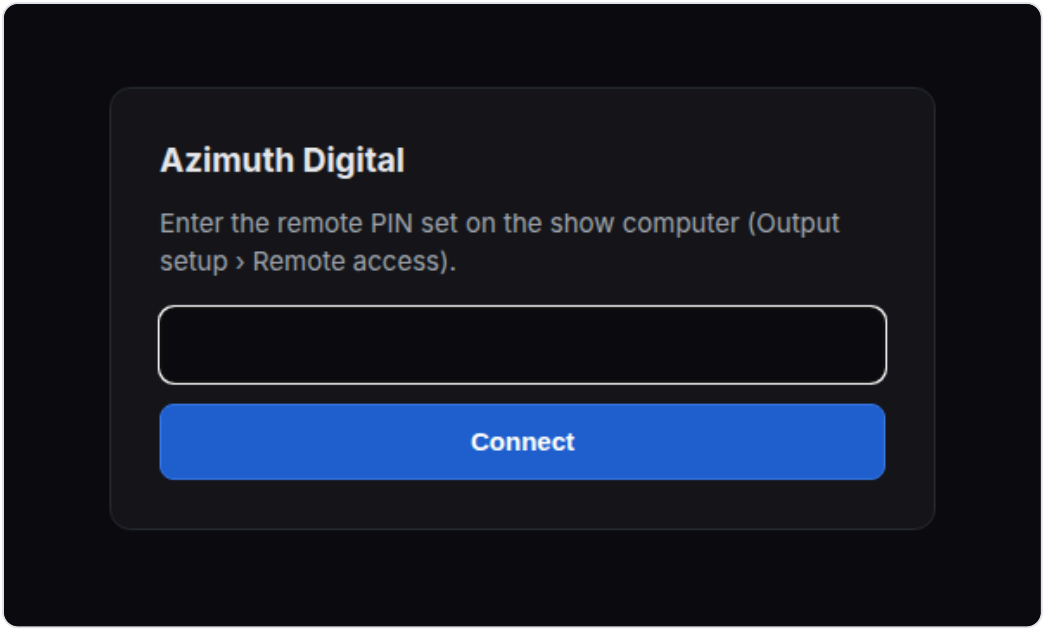
- **Save** (`Ctrl` + `S`) saves to `Shows\<name>.azshow` and keeps a backup copy; the last 30 backups are in `Shows\backups` .
- Azimuth also **saves automatically** a moment after every change, so a crash or power cut loses almost nothing. The badge next to the show name says Saved or Unsaved.
- **Save as...** (`Ctrl` + `Shift` + `S`) saves under a new name. **Open...** (`Ctrl` + `O`) lists saved shows; **New** starts an empty show.
- The last show opens again when Azimuth starts.
- A show refers to files in the media folder by their path inside it. To move a show to another computer, copy the show file and the media folder; set the media folder in Add clips if it has another path.

9. Remote screens

Other computers, phones and tablets on the same network can open the operator screen (full control) or a view-only **monitor**. This is off until you turn it on, and only the show computer can change it.

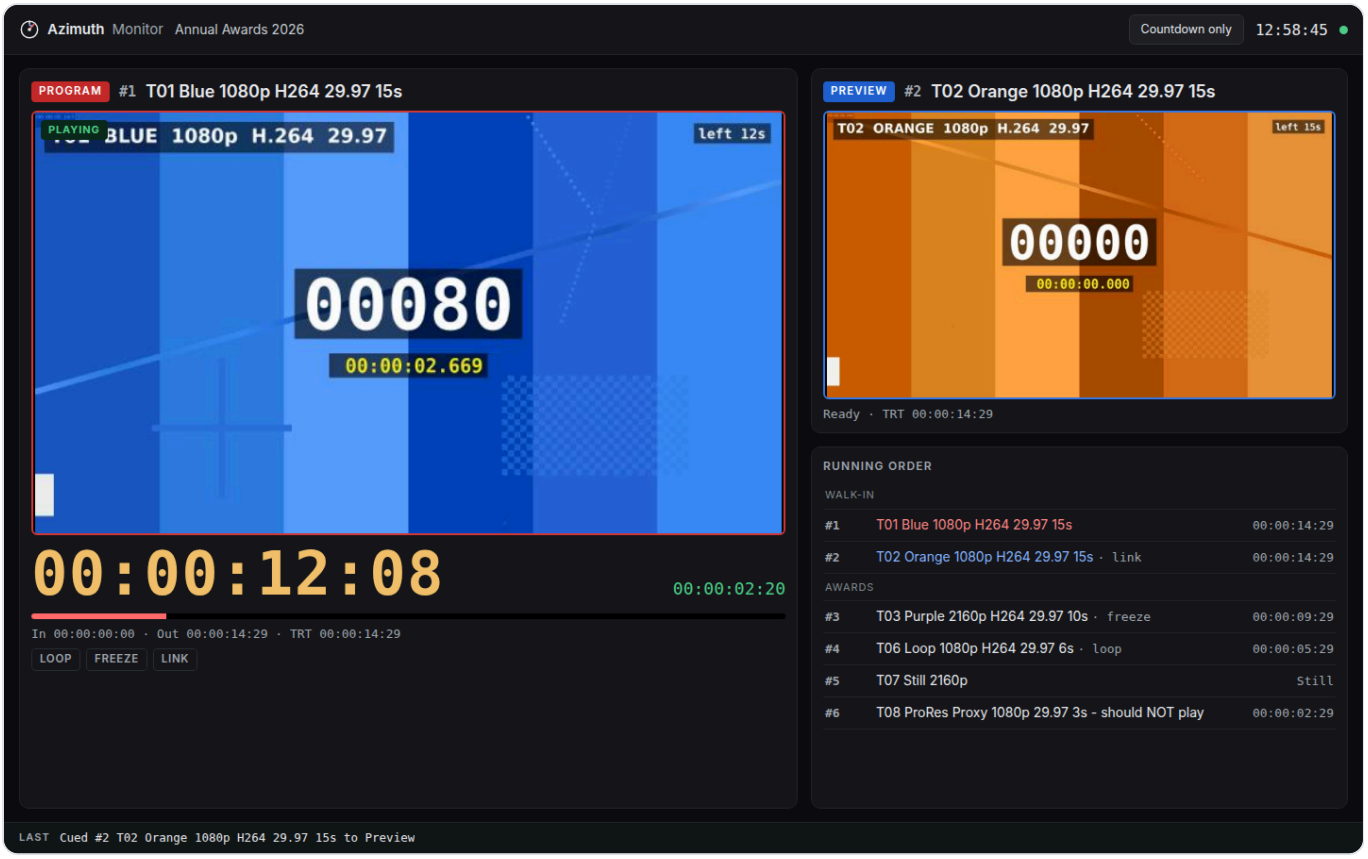


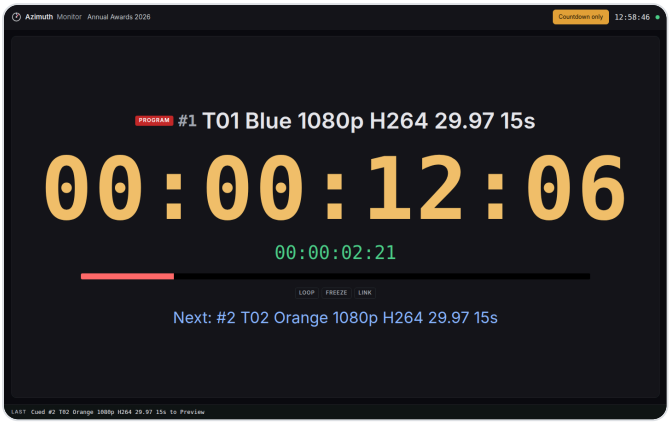
1. Output setup › Remote access: set a **PIN** (digits) if anyone else uses the network, then tick **Allow other computers on this network**.
2. On the other device, open the address shown, or scan the QR code. The first time, the browser asks for the PIN.



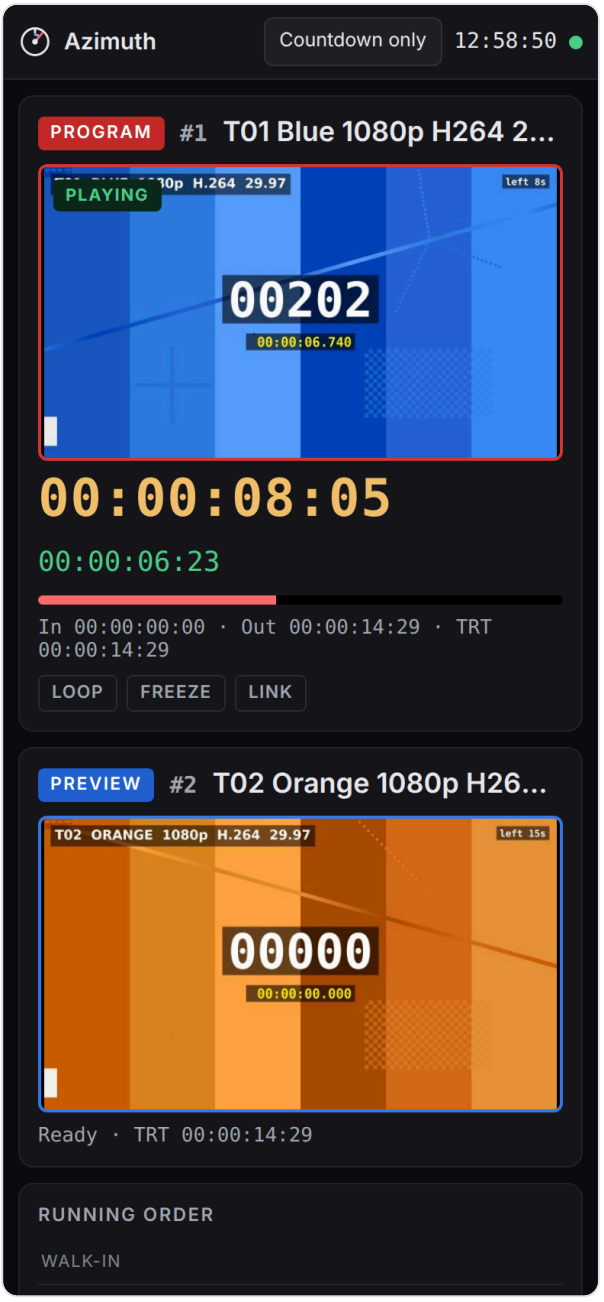
Operator is the same screen as on the show computer: takes, playlist, everything. Its actions show the device's address in the log and in Last. Detect displays and the decode table describe the device you are using, so set up displays on the show computer.

Monitor is for a stage manager, a director or a confidence screen: Program and Preview pictures, clip names, a large countdown and the running order. It cannot change anything.





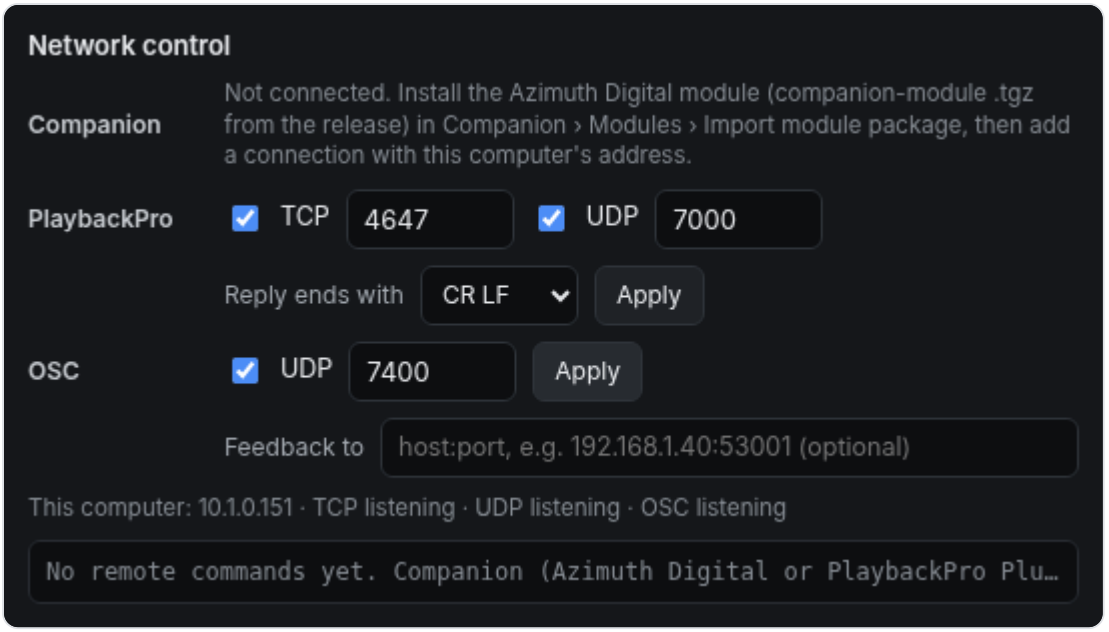
Countdown only fills the screen with the time left on Program and the next clip. The countdown turns amber in the last 30 seconds and blinks in the last 5.



On a phone.

Changing the PIN or turning remote access off disconnects remote screens at once. The output itself always runs on the show computer.

10. Control from other systems



Output setup › Network control: Companion status, PlaybackPro TCP/UDP, OSC, and the recent remote commands with what each one did.

Keyboard



Keys in the top bar shows this list. Keys work when you are not typing in a field. On a Mac, Alt is Option and Ctrl is Command.

ACTION	WINDOWS
Take	`Enter`
End All	`Esc`
Previous / next clip to Preview	`↑` / `↓`
Clear Preview	`Delete`
Cue by #	digits, then `Enter`
Take duration − / +	`Alt` + `;` / `Alt` + `'`
Fade on take − / +	`Alt` + `D` / `Alt` + `F`
Link duration − / +	`Alt` + `A` / `Alt` + `S`
Loop duration − / +	`Alt` + `G` / `Alt` + `H`
End All fade − / +	`Alt` + `J` / `Alt` + `K`
Loop / Link / Freeze temp	`Alt` + `L` / `Shift` + `Alt` + `L` / `Ctrl` + `Shift` + `Alt` + `L`
Goto 10 / 20 / 30	`Alt` + `1` / `2` / `3`
Mark In / Out / Slate on Preview	`Ctrl` + `[` / `]` / `\`
Mark In / Out / Slate on Program	`Ctrl` + `Shift` + `[` / `]` / `\`
Go to In / Out (Preview; add Shift for Program)	`Ctrl` + `-` / `Ctrl` + `=`
Play / pause (Preview; add Shift for Program)	`Alt` + `P` (Mac: `Option` + `Space`)
Step one frame (Preview; add Shift for Program)	`Alt` + `←` / `Alt` + `→`
Save / Save as / Open	`Ctrl` + `S` / `Ctrl` + `Shift` + `S` / `Ctrl` + `O`
Duplicate the Preview clip	`Ctrl` + `D`
Undo / Redo	`Ctrl` + `Z` / `Ctrl` + `Shift` + `Z` (or `Ctrl` + `Y`)
Select all clips / Edit multiple	`Ctrl` + `A` / `Ctrl` + `E`
Print the playlist	`Ctrl` + `P`

Windows keeps `Alt`+`Space` for its window menu, so Preview play/pause is `Alt`+`P` there.

PlaybackPro commands (TCP 4647, UDP 7000)

Azimuth understands the PlaybackPro Plus remote commands: two letters, no line ending needed, several in one message allowed. Companion's "DT Videolabs PlaybackPro Plus" module and other controllers work unchanged. Several TCP clients can connect at once. Ports and the reply line ending are in Output setup › Network control.

COMMAND	ACTION	COMMAND	ACTION
`TA`	Take	`KL`	End All
`G012`	Cue clip #12	`GT12`	Cue and take #12
`SI3`	Cue the 3rd clip in the playlist	`TI3`	Cue and take the 3rd clip
`NX` / `PR`	Next / previous clip to Preview	`CL`	Clear Preview
`LT` / `FT` / `IT`	Toggle Loop / Freeze / Link temp	`SL` / `EL`	Loop temp on / off
`T-` `T+`	Take duration	`F-` `F+`	Fade on take
`I-` `I+`	Link duration	`L-` `L+`	Loop duration
`K-` `K+`	End All fade	`10` `20` `30`	Goto 10 / 20 / 30
`PL` / `PA` / `OP`	Program play / pause / toggle	`EP`	Preview play / pause
`OI` / `OO`	Program to In / Out	`EI` / `EO`	Preview to In / Out
`O-` `O+`	Program step a frame	`E-` `E+`	Preview step a frame
`OF` / `OR`	Program fast forward / reverse	`EF` / `ER`	Preview fast forward / reverse
`ES` / `EE`	Mark In / Out on Preview	`SA`	Save show

Inquiries answer with one line: `GN` / `GU` / `GD` Program name / # / duration, `VN` / `VU` / `VD` the same for Preview, `TE` / `TR` Program elapsed / remaining, `PS` Program playing (1/0), `LS` Loop temp (Yes/No), `AN` / `AU` / `AD` all names / numbers / durations, `ID` numbers with file names, `SF` show name.

Companion

The **Azimuth Digital** module for Bitfocus Companion 4.0 and later shows what is happening on the buttons: the clip on air lights red, the cued clip blue, temps amber, and button text can show clip names and the time left. (The PlaybackPro Plus module still works too, but it cannot show anything on the buttons.)

1. In Companion, **Modules** › **Import module package**: choose the `.tgz` from the `Companion module` folder of the download (it is also on the release page).
2. **Connections** › add **Azimuth Digital**. *Azimuth computer*: `127.0.0.1` when Companion runs on the show computer, otherwise its address (with Remote access on and the PIN entered in the connection). *Web port*: 7070.
3. **Buttons** › **Presets** › Azimuth Digital: drag in what you need.

PRESET GROUP	BUTTONS
Show control	Take (brighter red when Preview is ready), End All, Next (shows the next #), Prev, Clear Preview, Goto 10 / 20 / 30, Save.
Status	Program with # and title and time left (red while playing, blue when frozen, amber in the last 10 s); a large countdown; Preview; Next; output window.
Temps	Loop, Freeze, Link, amber while on.
Durations	− and + for take, fade on take, link, loop and End All fade, showing the value.
Transport	Play/pause, to In, to Out for Program and Preview.
Clips	One button per playlist position with # and title: red on air, blue cued, grey when the file will not play. Two sets: *cue, second press takes*, or *load and take*.

Clip buttons follow the playlist position (button 5 = fifth clip, whatever its #). Actions and feedbacks can refer to a clip by **#** instead. Variables work on any button, for example `$(azimuth:pgm_title)`, `$(azimuth:pgm_remaining_short)` (m:ss), `$(azimuth:pvw_title)`, `$(azimuth:next_title)`, `$(azimuth:dur_take_text)` and `$(azimuth:clip5_title)`. The module's help in Companion lists them all.

Output setup › Network control shows "Companion connected" and the header shows a Companion pill while it is connected.

OSC

For QLab, lighting and sound consoles, TouchOSC and other show control. Turn it on in Output setup › Network control › OSC (UDP port 7400) and Apply. OSC has no PIN: use it on networks you trust, like the PlaybackPro commands.

SEND	DOES
`/azimuth/take` · `/azimuth/endall`	Take · End All
`/azimuth/next` · `/azimuth/prev` · `/azimuth/clear`	Next / previous clip to Preview · clear Preview
`/azimuth/cue 12` · `/azimuth/cue/position 3`	Cue #12 · cue the 3rd clip
`/azimuth/loadtake 12` · `/azimuth/loadtake/position 3`	Cue and take
`/azimuth/goto 10`	Goto 10, 20 or 30
`/azimuth/loop 1` · `/azimuth/freeze 0` · `/azimuth/link`	Temps on (1), off (0) or toggle (no value)
`/azimuth/duration/take -1.5`	Set a duration (also `fade`, `link`, `loop`, `endall`); add `/up` or `/down` to step
`/azimuth/program/play` (pause, toggle, in, out, back, forward)	Program transport; `/azimuth/preview/…` for Preview
`/azimuth/mark/in` · `/azimuth/mark/out program`	Marks (Preview, or Program with the word program)
`/azimuth/pbp "GO12"`	Any PlaybackPro command; inquiry answers come back as `/azimuth/pbp/reply`
`/azimuth/save` · `/azimuth/ping`	Save · answers `/azimuth/pong` with the version

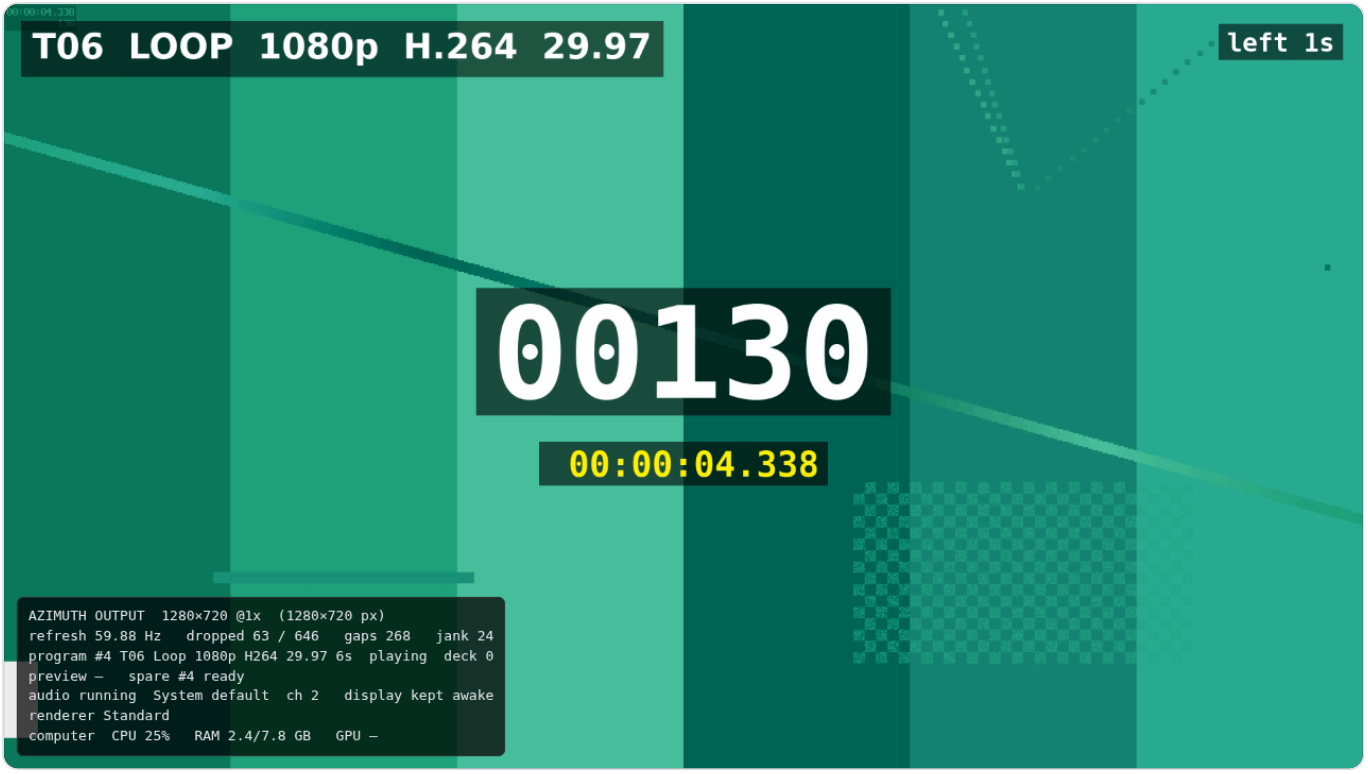
Feedback. Send `/azimuth/subscribe` (optionally with the port to reply to), or enter a fixed *Feedback to* address such as `192.168.1.40:53001` in Output setup. Azimuth then sends whenever they change: `/azimuth/program/number`, `/title`, `/state`, `/remaining` (hh:mm:ss:ff), `/remaining/short` (m:ss), `/remaining/seconds`, `/elapsed`; `/azimuth/preview/number`, `/title`, `/ready`; `/azimuth/next/number`, `/title`; `/azimuth/loop`, `/freeze`, `/link`; `/azimuth/duration/take` (and fade, link, loop, endall); `/azimuth/output`; `/azimuth/show`. Everything is sent again every five seconds in case a packet was lost.

QLab example: a Network cue with destination this computer, port 7400, OSC message `/azimuth/take`.

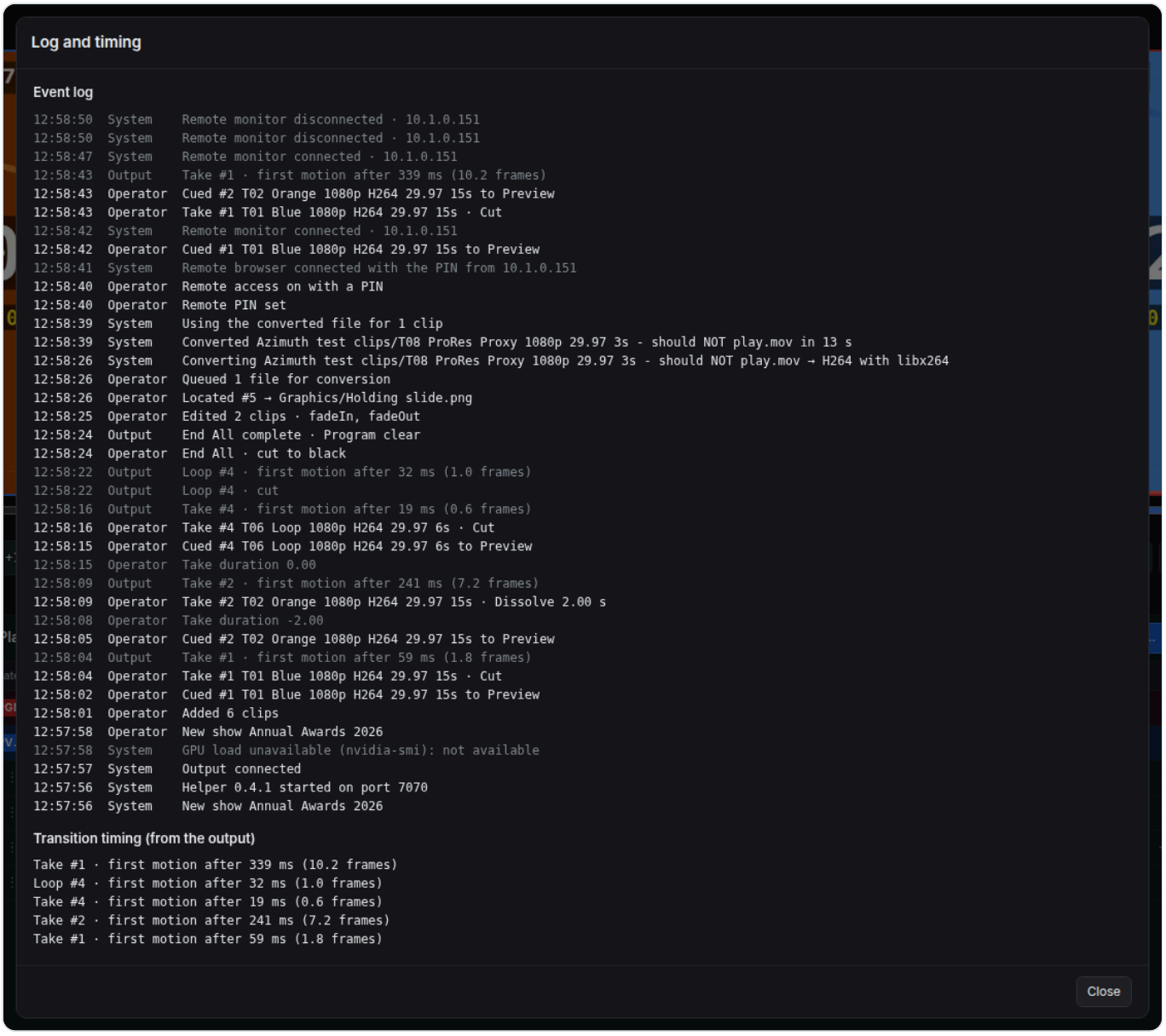
11. Watching the computer



- **CPU, RAM, GPU** and, on Windows, **DECODE** (the graphics card's video decoder) show the show computer's load. DECODE above 0 while a clip plays means the graphics card is decoding it. Hover for details; click for Output setup › This computer. Bars turn amber at 70 % and red at 90 %.
- **Output**: the output's refresh rate, **dropped** frames (frames Chrome could not show in time), **frame gaps** (frames skipped between pictures), **render hiccups** (late screen refreshes) and how fast the last Take started. These should stay still during a show.



The stats overlay on the output (Output setup › Show the stats overlay), for testing.



Log: every action with where it came from, and the timing of every Take, Link and Loop ("first motion": how long until the new clip moved; at 29.97 fps one frame is 33 ms). A daily log file is also written to the Logs folder.

> If a 4K clip drops frames: check DECODE (0 means software decoding), use Monitor pictures › Snapshots or Off, close other programs, and convert heavy files to HEVC with Convert. Output setup › This computer › Hardware decode in this Chrome shows which formats your graphics card decodes.

12. Troubleshooting

SYMPTOM	WHAT TO DO
"Output window not open"	Output setup › Detect displays › Fullscreen output here, or Open output. The Output pill turns green when it is connected.
The helper window says Chrome NOT FOUND	Install Google Chrome, or set `chromePath` in `config.json` to chrome.exe (Microsoft Edge also works).
Take is ignored	Last says why: nothing in Preview, Preview still loading, or the output window is not open.
A clip shows NO or CONVERT	Its format does not play in Chrome on this computer: click CONVERT. For HEVC, check the decode table; without hardware decoding, convert to H.264.
A clip shows OFFLINE	The file moved or was renamed: click OFFLINE or Locate... in the playlist bar.
No sound	Output setup › Audio: pick the device and the channel pair, check Master and the clip's Volume, and play the test tone. The Audio pill should say running.
Companion or another computer cannot connect	Allow azimuth-helper.exe in Windows Firewall on Private networks. For other computers, turn on Remote access and use the PIN. In Companion, the connection's status message says what is wrong.
"Helper not reachable"	The helper window was closed: start Azimuth again. The output keeps playing meanwhile.
Remote screens disconnect	The PIN was changed or remote access was turned off on the show computer: reload the page and enter the new PIN.

When reporting a problem, the most useful things are the Log (top bar), the footer numbers and the file in `Logs` for that day.

13. Reference

Folders

`app\`	The program (helper, operator, output, monitor and these documents).
`Media\`	Your clips, used in place and never changed. `Media\_azimuth` holds converted copies (safe to delete; convert again to remake).
`Shows\`	Show files (`.azshow`); `Shows\backups` keeps the last 30 saves.
`Logs\`	One log file per day with every action and where it came from.
`config.json`	Settings, written by Output setup.
`tools\ffmpeg\`	ffmpeg, downloaded the first time you convert.
`.chrome\`	Separate Chrome profiles for the operator and output windows.
`Companion module\`	The Companion module package.

Network ports

TCP 7070	Operator, monitor, remote screens and the Companion module (web and WebSocket).
TCP 4647	PlaybackPro commands.
UDP 7000	PlaybackPro commands.
UDP 7400	OSC (off until turned on).

Azimuth Digital uses Node.js, Google Chrome, FFmpeg (downloaded on request) and QR Code Generator for JavaScript; see THIRD_PARTY_NOTICES.txt.