



X32 Practical Workflow

Advanced Workflows

Daisy-Chaining Multiple Stageboxes via AES50

Daisy chaining, routing, cable lengths and clocking

Workflow 1 of more than 20 • Supplement to the StageAID Behringer X32 Practical Manual



Original console image: Behringer X32 Full-Size



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Workflow 1: Daisy-chaining multiple stageboxes via AES50

*Daisy chaining, routing, cable lengths and clocking · Series: X32 Advanced Workflows · Supplement to the StageAID
Behringer X32 Practical Manual*

Requirements and materials

- X32 Full-Size, firmware 4.x or later.
- Two to three identical S16 stageboxes in standard operating mode. This workflow covers only a daisy chain of identical S16 units; with mixed models, channel blocks and operating modes differ (see note below).
- For each connection, one continuously shielded Cat5e cable suitable for AES50, fitted with robust etherCON connectors and of suitable length (see “The right AES50 cable”).
- Power supply for each stagebox at its installation position.
- A patch list (paper or tablet) for recording channel assignments and cable routes.
- Optional: a cable tester for Cat5e/etherCON runs, to rule out defective cables before setup.

Important: This workflow describes a daisy chain of identical S16 units. With mixed stagebox models (e.g. SD16, SD8, S32 or corresponding Midas devices), input/output counts, operating modes, daisy-chain behavior and channel-block logic differ and must be checked separately in the respective device manuals.

What this workflow covers

On larger stages, with choirs on a gallery, an orchestra pit, or several physically separated zones, the 32 local preamps or a single stagebox are often not enough. AES50 lets you connect several stageboxes in series (“daisy-chain” them), for example two S16 units, so inputs from different areas of the venue arrive together at the FOH console without requiring a second AES50 port or additional expansion cards.

Typical applications include a main stage with a separate gallery or backline area, an orchestra pit in addition to the stage, or a tent/outdoor area with its own local rack connected to the existing stagebox chain.

Technical fundamentals

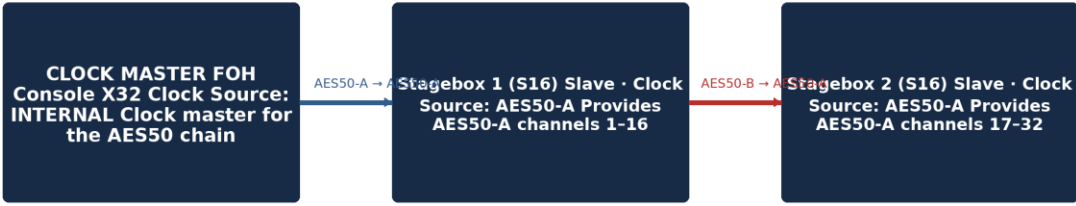
AES50 in 60 seconds

AES50 connects Behringer/Midas devices in the X32/M32 family via Cat5e cable with etherCON connectors. Every X32 Full-Size has two independent, fully bidirectional AES50 ports (A and B), each carrying up to 48 channels in each direction.

How the channel blocks are assigned

Daisy chaining means connecting several stageboxes one after another on the same AES50 port, port to port. The manufacturer recommends up to three S16 units per chain. The channel blocks are determined automatically by position in the chain; they are not freely assignable:

Daisy-Chained Stageboxes via AES50 - Topology



Signal flow and clock run from the master toward all slaves.

StageAID - simplified illustration

Figure 1: Basic daisy-chain topology

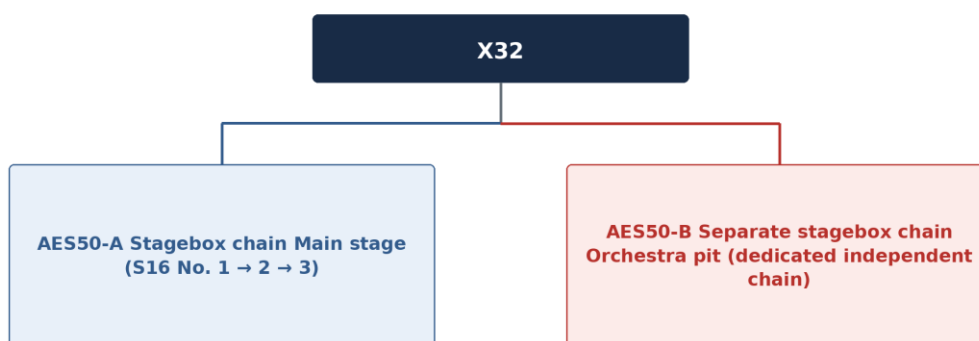


AES50 transports 48 input channels. The X32 itself has only 32 fully featured input channel strips.

StageAID - simplified illustration

Figure 2: Channel blocks of the three S16 units

Two independent AES50 ports allow two separate AES50 chains:



Port B creates a second, independent connection - but it does not add extra X32 input channel strips.

Figure 3: Two independent AES50 runs

48 channels transported does not mean 48 channels mixed

An AES50 port carries up to 48 channels in each direction, but the X32 has only 32 fully featured mono input channels (see graphic above). Additional AES50 signals can partly be brought in via Aux In, but without a full channel strip. Transported is not the same as mixed, even when the second AES50 port is used.

The right AES50 cable

Use a continuously shielded Cat5e cable; robust etherCON connectors are strongly recommended for stage use. Correctly terminated shielding and clean cable construction are what matter; a higher cable category is not automatically better suited. Unshielded office patch cables are a common source of problems on stage. A standard network cable tester checks only conductors and pinout, not whether the cable will remain error-free under AES50 conditions. The AES50 specification allows up to 100 metres per direct device-to-device connection; this limit applies to each individual point-to-point run, not to the entire chain as a whole.

StageAID practical tip: For mobile work, allow sufficient spare cable, avoid unnecessary couplers, and where possible keep critical runs below roughly 80 metres. This is a practical recommendation, not an additional technical limit.

One master provides the clock

Exactly one device in the chain is the clock master (normally the FOH console, with Clock Source set to INTERNAL under SETUP → Global → Synchronization). The S16 stageboxes receive the system clock via their AES50-A port and automatically follow the X32 as slaves. Within the daisy chain, the AES50-B port is used to connect to the next stagebox; the stand-alone SN-MASTER mode is not used here.

Two devices set to INTERNAL at the same time create a clock conflict (clicks, dropouts or silence). All devices in the chain must also use the same sample rate.

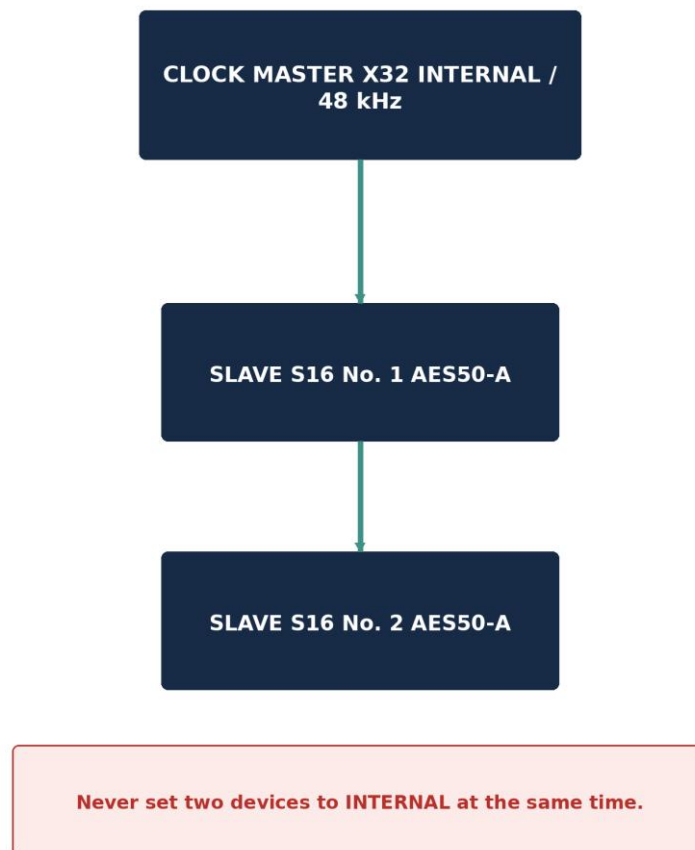


Figure 4: Clock master/slave principle

Settings at a glance

Quick reference for setup and soundcheck – X32 on one side, stagebox on the other:

Setting	On the X32 (Clock Master)	On the stagebox (Slave)
Clock Source	INTERNAL, under SETUP → Global → Synchronization	No separate selection required – automatically follows as slave
Sample Rate	48 kHz, under SETUP → Global → Synchronization	Automatically adopts the master rate
Input routing	ROUTING → HOME: assign AES50-A channels to input channels	Supplies inputs automatically as a fixed block according to position in the daisy chain
Output channel selection	ROUTING → AES50-A: assign the required sources to blocks AES50-A 1–8 / 9–16 / 17–24 (in addition to local X32 outputs under ROUTING → OUT)	CONFIG button + encoder: select the channel block (default 1–8, OUT +8 → 9–16, OUT +16 → 17–24) – this only determines which block appears at the XLR outputs, not the signal assignment itself
Cabling	AES50-A port to Stagebox 1 (AES50-A)	AES50-B port to the next stagebox (AES50-A)

Preparation

Before connecting the cabling, spend a few minutes planning on paper: How many inputs are needed in each zone, which box covers which area, how long are the cable runs, and which device will act as clock master? A simple topology sketch (as in Figure 1) helps the whole crew, especially during setup and teardown under time pressure.

Printable quick reference: AES50 daisy chain in twelve steps

1. Plan the setup and channel requirements.
2. Check the S16 operating mode (normal stagebox mode, not SN-MASTER).
3. Connect X32 AES50-A to AES50-A on S16 No. 1.
4. Connect AES50-B of each S16 to AES50-A of the next S16.
5. Set the X32 to INTERNAL / 48 kHz.
6. Check Link and Sync indicators on all stageboxes.
7. Verify inputs on AES50 1–16, 17–32 and 33–48.
8. Set the second S16 to OUT +8.
9. Set the third S16 to OUT +16.
10. Route the required AES50 inputs to the 32 X32 input channels.
11. Test every input and output individually.
12. Save the scene and keep a copy of the patch list.

Quick checklist

- ☐ Plan setup and channel requirements
- ☐ Check S16 operating mode
- ☐ Connect AES50 cabling
- ☐ Set X32 to INTERNAL / 48 kHz
- ☐ Check Link and Sync indicators
- ☐ Check input and output routing
- ☐ Run a functional test
- ☐ Save scene and patch list

Step by step

1. Define the network topology

Define the order of the boxes in the daisy chain, note the resulting channel blocks (with S16 units, automatically 1–16 / 17–32 / 33–48), and designate the FOH console as clock master. Up to three S16 units can be daisy-chained on one AES50 port, providing 48 inputs in total. If further stagebox connections are required, build a separate chain on the second AES50 port; do not add a fourth box to the first chain.

Example: A main stage uses Stagebox 1 (AES50-A 1–16), while a gallery uses Stagebox 2 (AES50-A 17–32); the two are daisy-chained, while the orchestra pit is connected separately to AES50-B.

Avoid:

- Discovering the channel blocks only while patching instead of calculating them in advance from the stagebox type and chain position and writing them down.
- Connecting more than three boxes in a single daisy chain simply because another cable can physically be plugged in.

2. Connect the cabling

First switch off all devices or bring levels down, then connect the AES50 cables: connect AES50-A on the X32 to AES50-A on the first stagebox; connect AES50-B on the first stagebox to AES50-A on the second. Route cables so they do not run parallel to dimmer, motor or other high-power supply lines, and provide strain relief.

Example: The AES50 cable to the gallery is routed in the same cable channel as the loudspeaker cable, but with sufficient distance from the dimmer power lines.

✓ CORRECT	✗ INCORRECT
• Shielded Cat5e cable • etherCON connectors • Strain relief provided • Distance from dimmer/motor lines • No unnecessary couplers	• Office patch cable • Damaged connectors • Several couplers in series • Run parallel to dimmer power lines • Cable under tensile/kink stress

Figure 5: Cabling – correct and incorrect

3. Configure the local outputs of the second and third S16

When daisy-chaining, the inputs automatically shift by 16 channels per box; the eight analogue XLR outputs on each box do not. Without configuration, several S16 units initially reproduce the same AES50 1–8 output block. On the second and third boxes, use the CONFIG button and encoder to select the appropriate channel block for the local outputs:

- S16 No. 1 (inputs AES50 1–16): local outputs AES50 1–8, default setting.

- S16 No. 2 (inputs AES50 17–32): set to OUT +8 → local outputs AES50 9–16.
- S16 No. 3 (inputs AES50 33–48): set to OUT +16 → local outputs AES50 17–24.



Figure 6: Three-stage output routing

X32 Menu (simplified): ROUTING → AES50-A - Assign Outputs



Highlighted: the three AES50-A output blocks. This is where BUS/OUT/USER OUT signals are assigned.

Figure 7: X32 menu ROUTING → AES50-A (excerpt)

Important: OUT +8/+16 only selects which channel block appears at the stagebox XLR outputs. The signals themselves must also be assigned to those blocks on the X32 under ROUTING → AES50-A.

Example: With three daisy-chained S16 units, set the second box to OUT +8 (delivering AES50 9–16 at its XLR outputs) and the third to OUT +16 (delivering AES50 17–24). This provides 24 different output signals instead of the same eight signals repeated three times.

Avoid:

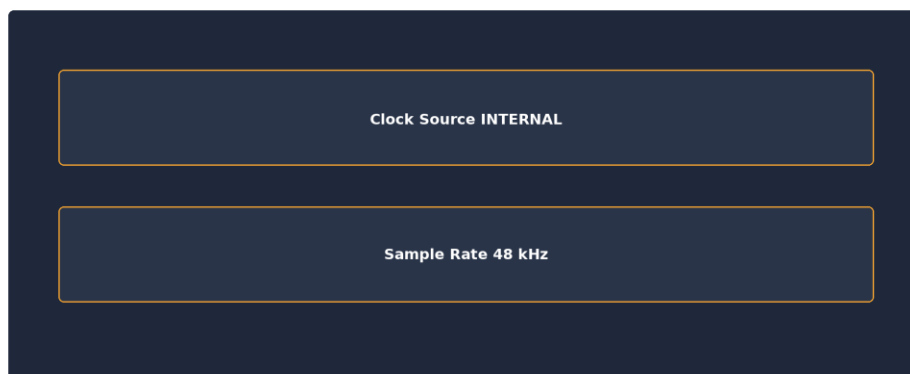
- Leaving the local outputs of the second and third boxes unchanged on AES50 1–8; all boxes would then output the same eight signals.
- Checking the CONFIG setting on only one box and forgetting the others.

4. Configure the clock

On the X32, go to SETUP → Global → Synchronization and set Clock Source to INTERNAL and Sample Rate to 48 kHz. The daisy-chained S16 units remain in normal stagebox mode and automatically receive the AES50 clock from the X32. Only then check the signal flow.

Example: On the FOH X32, SETUP → Global → Synchronization is set to INTERNAL / 48 kHz; all daisy-chained S16 units follow automatically. Multiple consoles in the same chain (e.g. an additional monitor console) are covered in Advanced Workflow 2, “Using FOH and monitor consoles together”.

X32 Menu (simplified): SETUP → Global → Synchronization



Highlighted: Clock Source = INTERNAL and Sample Rate = 48 kHz. The X32 is the clock master.

Figure 8: X32 menu SETUP → Global → Synchronization

Avoid:

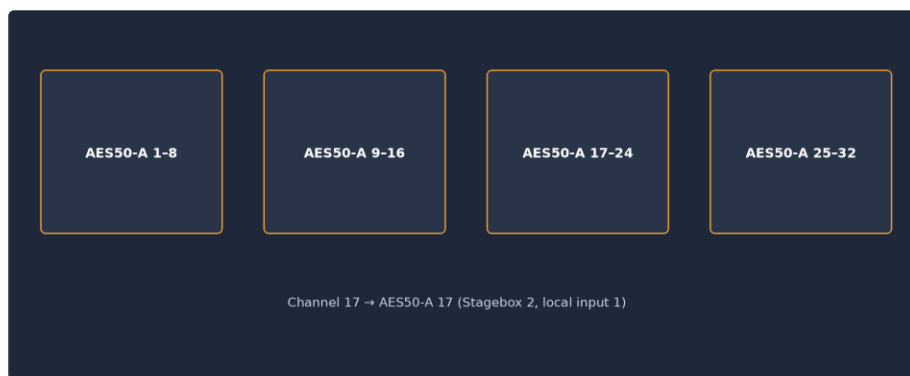
- Setting two consoles in the same chain to INTERNAL at the same time.
- Leaving devices in the chain at different sample rates.

5. Assign and label channel routing

In ROUTING → HOME, assign the appropriate AES50 input to each channel and label it clearly straight away. With two daisy-chained S16 units, the second box is normally on AES50-A 17–32; its local input 1 therefore corresponds to AES50-A channel 17, not channel 25. A written patch list with channel number, source, stagebox and position is a useful addition and makes later troubleshooting much easier.

Example: Local input 1 on the second stagebox is AES50-A channel 17. The X32 channel to which this input is assigned in ROUTING is labelled directly as “Gallery Vox 1”.

X32 Menu (simplified): ROUTING → HOME - Patch Inputs



Highlighted: all four AES50-A blocks. Assign the block to the appropriate X32 input channels.

Figure 9: X32 menu ROUTING → HOME (excerpt)

Example patch list

This is how a completed patch list reads in practice – input 1 of the second stagebox is immediately identifiable as AES50 channel 17:

X32 channel	AES50 channel	Stagebox	Local input	Signal
1	AES50-A 1	S16 No. 1	Input 1	Kick
2	AES50-A 2	S16 No. 1	Input 2	Snare
17	AES50-A 17	S16 No. 2	Input 1	Gallery Vocal 1
18	AES50-A 18	S16 No. 2	Input 2	Gallery Vocal 2

Avoid:

- Assuming routing is correct without actively checking it in the menu; this is a common mistake, especially after replacing a stagebox.
- Assigning channel blocks by guesswork instead of deriving them from stagebox type and chain position.

6. Functional test before soundcheck

Tap or test every channel individually (for example by tapping the microphone or using a test tone) and verify that the signal arrives on the correct channel, especially at the transitions between daisy-chained boxes. Do not begin the actual soundcheck until all channels are correctly assigned and clean.

Example: Before soundcheck, a technician works through the patch list channel by channel and confirms over radio that every signal arrives on the correct channel strip.

Avoid:

- Skipping the functional test and relying on planning alone; cables can be swapped during setup.

Troubleshooting

Two common cases can be narrowed down with a short flowchart each: no signal reaches the X32, or an input is present but the S16 output remains silent.

No input signal at the X32

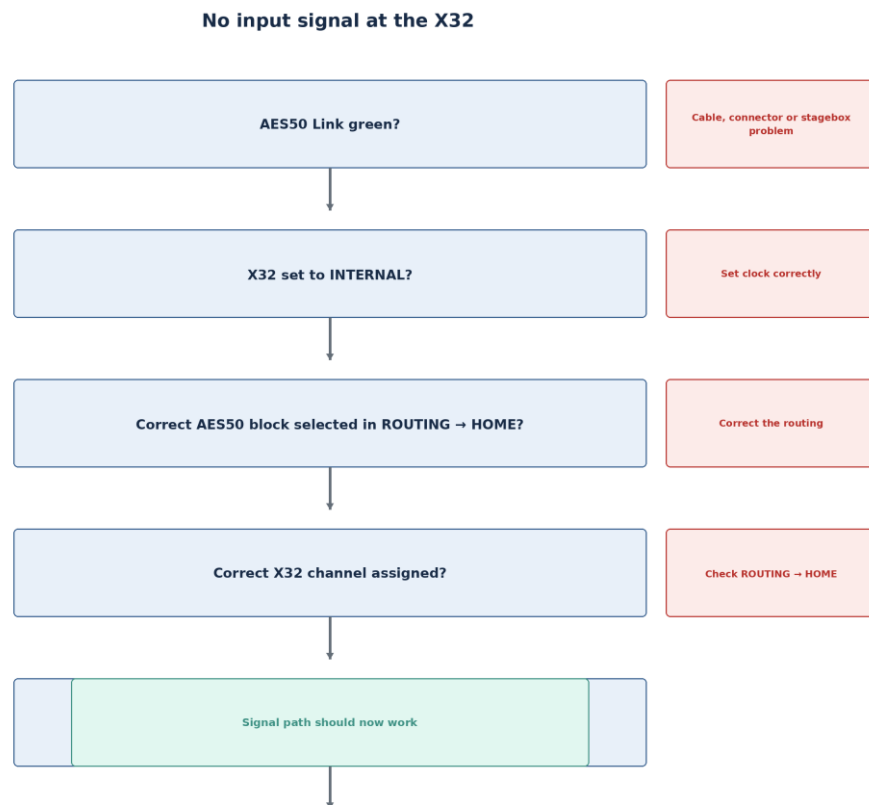


Figure 10: Troubleshooting – no input signal at the X32

Input present, but no signal at the S16 output?

If the input reaches the X32 correctly but a local S16 XLR output remains silent, the cause is usually the selected output block or the associated routing:

Input present, but no signal at the S16 output?

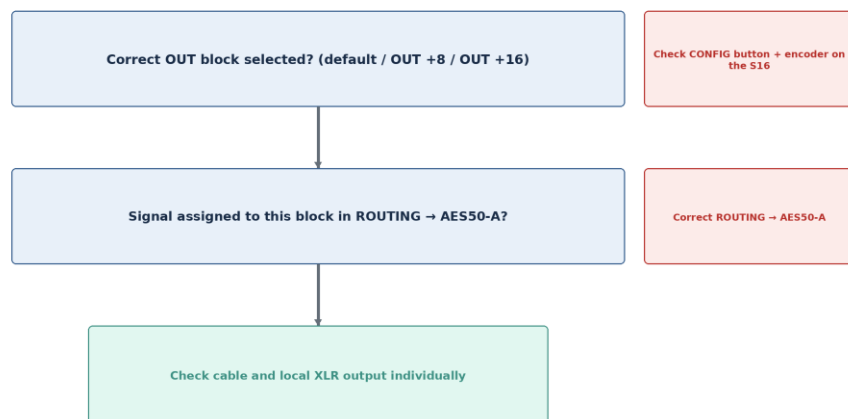


Figure 11: Troubleshooting – no signal at the S16 output

Common mistakes

- Two clock masters at the same time (both set to INTERNAL) – causes clicks, dropouts or complete loss of audio.

- Channel blocks calculated incorrectly, e.g. confusing input 1 of the second box with channel 25 instead of channel 17.
- Using unshielded cables or poorly terminated etherCON shields.
- Not setting the local outputs of the second or third S16 to OUT +8/OUT +16 – several boxes then output the same block.
- No output signal assigned to the required block on the X32 under ROUTING → AES50-A – the stagebox remains silent despite the correct OUT +8/+16 setting.
- Confusing the 48 channels transported over AES50 with the 32 X32 input channel strips that can be mixed simultaneously.

Ground rules for stable AES50 daisy chains

Eight Ground Rules for Stable AES50 Daisy Chains

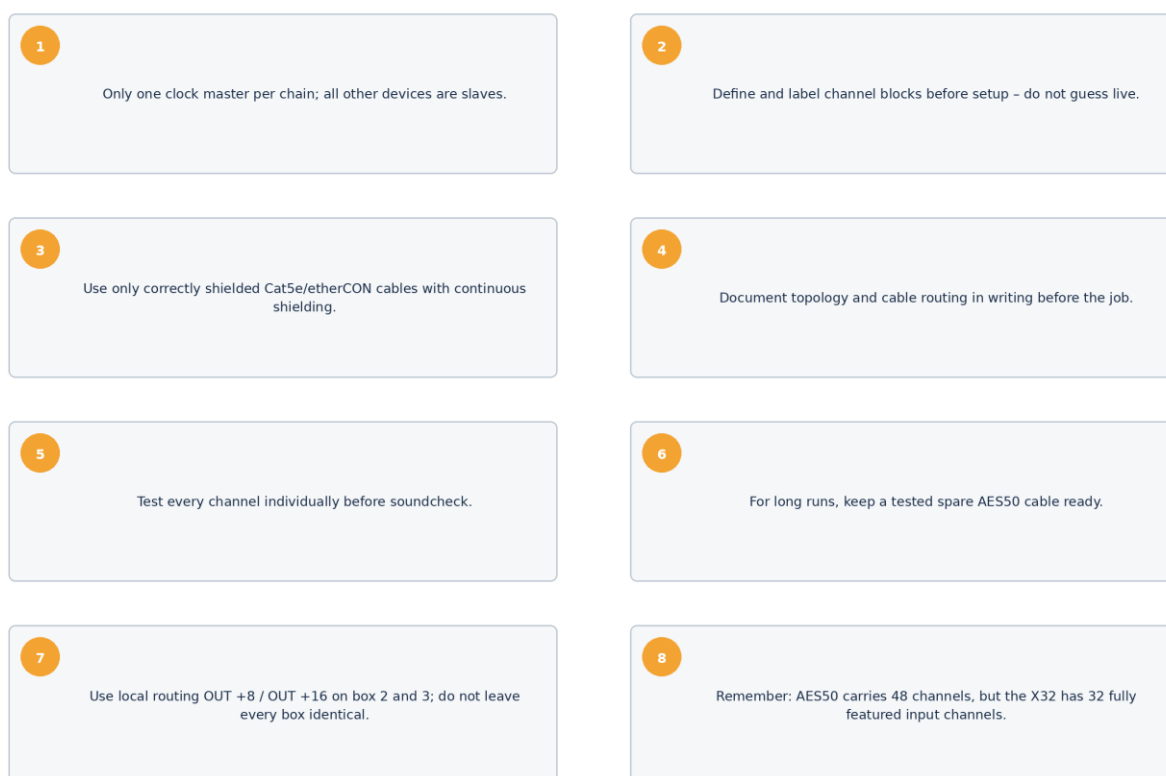


Figure 12: Ground rules for stable AES50 daisy chains

Glossary A–Z

XLR output: Analogue output on the S16. It remains silent if either the wrong OUT block is selected or the corresponding AES50 block is not assigned on the X32. → [Troubleshooting signal and connection problems](#)

Word clock: General term for the digital system clock; in this daisy chain it is distributed over AES50. → [Clock master and synchronization](#)

User Out: Flexible X32 output assignment. For more complex output configurations it can collect signals before AES50 block routing. → [Configure local S16 outputs](#)

Trim: Digital level correction after the preamp. It does not replace correct HA gain setting, but it does not change the analogue preamp either. → [Assign and label channel routing](#)

Topology: Plan showing devices, ports, chain order and cable routes of an AES50 connection. → [Define the network topology](#)

Sync indicator: Shows whether the device is properly synchronized to the common clock. → [Troubleshooting signal and connection problems](#)

Stagebox: External stage I/O device that exchanges audio signals with the console over AES50. → [Workflow setup and purpose](#)

SN-MASTER: Stand-alone S16 operating mode that is not used in the standard daisy chain described here. → [Clock master and synchronization](#)

SETUP → Global → Synchronization: X32 menu for Clock Source and Sample Rate. → [Configure the clock on the X32](#)

Shielding: Electrical shielding of cable and connector. It must be continuous and correctly connected over the entire AES50 run. → [The right AES50 cable](#)

Sample Rate: Sampling rate of the digital system. All devices in the chain must run at the same rate; here, 48 kHz. → [Configure the clock on the X32](#)

S16: Stagebox with 16 microphone inputs, eight XLR outputs and two AES50 ports. This workflow covers a daisy chain of identical S16 units. → [Workflow and requirements](#)

ROUTING → HOME: X32 page used to assign incoming AES50 signals to the console input channels. → [Assign and label channel routing](#)

ROUTING → AES50-A: X32 page that determines which output signals are sent to which AES50-A channel block. → [Configure local S16 outputs](#)

Point-to-point run: A direct AES50 cable connection between two devices. The maximum cable length applies to each such run, not to the entire chain as a whole. → [The right AES50 cable](#)

Patch list: Written assignment of X32 channel, AES50 channel, stagebox, local socket and signal source. → [Assign and label channel routing](#)

OUT +16: S16 setting that maps AES50 17–24 to the local XLR outputs. → [Configure local S16 outputs](#)

OUT +8: S16 setting that maps the next block of eight, AES50 9–16, to the local XLR outputs. → [Configure local S16 outputs](#)

Local output: Physical XLR output on the S16. OUT +8 or OUT +16 selects which eight-channel AES50 block appears there. → [Configure local S16 outputs](#)

Local input: Physical XLR socket on an S16. Its AES50 channel number is determined by the stagebox position in the chain. → [Assign and label channel routing](#)

Link indicator: Status indicator for an established physical AES50 connection. Link alone does not prove that the signal path is correct. → [Troubleshooting signal and connection problems](#)

Daisy chaining: Connecting several stageboxes in series through the same AES50 port. → [Channel blocks and chain position](#)

Channel block: Fixed group of AES50 channels, for example 1–16, 17–32 or 33–48 for the inputs of daisy-chained S16 units. → [Channel blocks and chain position](#)

INTERNAL: Clock setting for the device that generates the system clock itself. Only one device in an AES50 chain may take this master role. → [Configure the clock on the X32](#)

HA Gain: Analogue preamplification at the stagebox head amp. It is set before A/D conversion and affects the shared AES50 signal level. → [Assign and label channel routing](#)

Firmware: Operating software of the X32. Menu labels and individual functions may vary slightly depending on firmware version. → [Workflow and requirements](#)

etherCON: Rugged, locking RJ45 connector for stage use. It mechanically protects the actual network connector. → [The right AES50 cable](#)

Daisy Chain: Connecting several devices in series; in this workflow, synonymous with daisy chaining. → [Channel blocks and chain position](#)

Clock Slave: Device that receives the clock over AES50. In normal stagebox mode, the S16 units automatically follow the X32. → [Configure the clock on the X32](#)

Clock Master: The single device that provides the clock. In this workflow, the X32 set to INTERNAL is the master. → [Configure the clock on the X32](#)

Clock: Common digital system clock for all connected devices. Without clean synchronization, clicks, dropouts or silence can occur. → [Clock master and synchronization](#)

Cat5e: Minimum category of data cable used. Continuous shielding, correct termination and suitability for stage use are what matter. → [The right AES50 cable](#)

Output block: Group of eight AES50 channels reproduced at the local XLR outputs of an S16. → [Configure local S16 outputs](#)

AES50-A / AES50-B: Two independent ports on the X32. Within an S16 daisy chain, A connects toward the console or previous box, while B connects to the next S16. → [Connect the cabling](#)

AES50: Bidirectional digital audio connection carrying up to 48 channels per port in each direction. The X32 provides independent AES50-A and AES50-B ports. → [AES50 in 60 seconds](#)

See also

[StageAID Behringer X32 Practical Manual](#)

Fundamentals, safe starting state, routing, patching, functional testing and troubleshooting.

[All 40 StageAID articles, tips and workflows](#)

The comprehensive StageAID X32 collection with all workflows, tips and lessons learned.

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Editorial note: This practical workflow is part of the StageAID series “X32 Advanced Workflows” and is an independent supplementary chapter to the Behringer X32 Practical Manual. Product and brand names are used solely for clear identification. StageAID has no commercial affiliation with the manufacturer. The mixing-console image on the cover is an unchanged original representation from the supplied template. All other figures are StageAID's own simplified illustrations. Menu labels may vary slightly depending on firmware version. In case of doubt, the installed firmware and the manufacturer's official documentation apply.

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