

FOR AV & IT INSTALLERS

Connecting the Recorder Unit to a PA system

How to get clean, reliable audio into a Recorder Unit — signal levels, connectors, and safe ways to tap a 100V line

Overview

This guide explains how to connect a venue's existing PA system to an Announce Again Recorder Unit — whatever's behind it, from a mixing desk down to nothing more accessible than a 100V speaker line. Start with the quick-reference table below to find the scenario that matches your installation, read **Audio fundamentals** for the concepts referenced throughout, then turn to the matching numbered section in **Connecting in each scenario** for step-by-step guidance.

Quick-reference summary

SCENARIO	WHAT TO LOOK FOR	CONNECTOR(S)	SIGNAL LEVEL	RECORDER UNIT NEEDS
1 · Best case	Mixing desk output	XLR, balanced jack	Pro line level	USB audio interface with line/XLR input
2 · Good case	Amplifier's dedicated output	Phono/RCA, XLR, or jack	Consumer or pro line level	USB audio interface with matching input
3 · Workable case	The 100V speaker line, via a purpose-built adapter	Speakon in, XLR out	~100V in → pro line level out	USB audio interface with XLR/line input — never wire the 100V line directly into ordinary audio gear
4 · Caution case	Amplifier headphone output	3.5mm or 1/4" jack	Variable, volume-dependent	USB audio interface + attenuator, fixed volume, checked periodically
5 · Last resort	Microphone near PA speaker	XLR or USB mic	Mic level	USB microphone, or USB interface with mic input (+ phantom power for a condenser mic)

PART 1 · AUDIO FUNDAMENTALS

Signal levels: line level vs microphone level

Microphone level is tiny — roughly 1–10mV from normal speech — and needs a preamp (×100 to ×1000 gain) before it's usable. **Line level** is already amplified: consumer line level (~0.3V, phono/RCA outputs on hi-fi-style gear) and professional line level (~1.2V, XLR or balanced-jack outputs on mixing desks and pro amplifiers) are the two common flavours.

Match the source to the input. A line-level source needs a line-level input — a proper USB audio interface, not a bare mic-level dongle. Feeding a line-level signal into a mic input causes harsh, unrecoverable clipping — not just "too loud." Feeding a genuine mic signal into a line input comes through far too quiet, since there's no gain stage to boost it back up.

If only a mic-level dongle is on hand and the only accessible signal is line level: a passive DI box alone won't attenuate enough (~22dB, versus the ~50dB needed). Instead, either use a proper USB audio interface with a line input and gain control, or a purpose-made line-to-mic attenuator pad — stacking the source's own output attenuator with the pad to reach the required reduction.

USB Audio Capture

The Recorder Unit supports USB Audio Class devices natively — no drivers to install, they're simply detected as a sound card. Three types of device cover almost every scenario:

USB microphones

Self-contained, with the microphone capsule and analogue-to-digital converter built into the one device. Simplest option for scenario 5 below — plug in and done.

USB audio interfaces

A small external box with proper XLR / jack / phono inputs (e.g. Behringer UCA202, Focusrite Scarlett Solo). The right choice for a mixing desk or amplifier feed — handles line level properly, usually has a gain control, and some models supply phantom power.

Generic USB sound card dongles

The very cheap unbranded ones. Usually mono and mic-level only, sometimes with a small "plug-in power" bias — not true phantom power. Fine for a basic microphone; risky for a line-level signal (see Signal levels above).

If the chosen interface is power-hungry, use a powered USB hub rather than relying on the Recorder Unit's own USB port alone, particularly if other devices share it.

Balanced vs unbalanced wiring, and connectors

Unbalanced connections (phono/RCA, or TS jack) use two conductors — signal and ground. Simple and universal, but the cable itself can pick up hum and interference over distance; keep runs under about 5–6 metres.

Balanced connections (XLR, or TRS jack) use three conductors and cancel out noise picked up along the run, so they can carry hundreds of metres with no meaningful penalty — often exactly the situation venues are in, with PA racks a long way from a convenient power or network point.

CONNECTOR	TYPICALLY	WHERE YOU'LL FIND IT
XLR (3-pin)	Balanced, professional	Mixing desk main out, aux send, direct out; better amplifiers. Best choice for long cable runs.
1/4" (6.35mm) jack	Could be either	TRS (three contacts) is usually balanced line level on pro gear; TS (two contacts) is usually unbalanced, often instrument level.
Phono / RCA	Unbalanced, consumer line level	Hi-fi-style amplifiers and mixers, labelled "tape out," "rec out," "aux out," "monitor out," "pre out."
3.5mm mini-jack	Unbalanced, level varies	Cheaper / consumer PA gear and powered speakers.

100V Line Public Address Systems

Most PA amplifiers drive their speakers over a **100V line** (a "constant voltage" distribution system — the exact figure varies by region, the principle doesn't). It lets one amplifier feed many speakers over thin cable without impedance-matching each one: the amplifier steps its output up to 100V for distribution, and each speaker steps it back down via its own small transformer.

Never wire this into the Recorder Unit, directly or otherwise. This is a speaker output, not a signal output. 100V is vastly higher than anything line-level or mic-level audio gear is designed for — connecting it directly risks serious damage to equipment, not just a bad recording.

See scenarios 1–4 in **Connecting in each scenario** for where to find a safe feed instead — including a purpose-built adapter for when the 100V line is genuinely the only accessible point.

Ground loops and hum

Wiring the Recorder Unit (earthed through its own power supply) to a PA amplifier or mixer (separately earthed) can introduce a ground loop and a low hum, particularly over unbalanced (phono/RCA) connections — balanced XLR/TRS is inherently more resistant. Where only an unbalanced connection is available, keep the cable run as short as possible, and use a ground-lift switch (found on many DI boxes and some audio interfaces) if hum appears.

PART 2 · CONNECTING IN EACH SCENARIO

1 · Best case — Mixing desk output

CONNECTOR(S)	SIGNAL LEVEL	BALANCED?	RECORDER UNIT NEEDS
XLR, balanced jack	Pro line level	Yes	USB audio interface with line/XLR input

If there's a mixer upstream of the PA amplifier, this is the best case. Use one of the mixer's line-level outputs — main out, an aux send, a direct/insert out, or a spare subgroup — connected to a USB audio interface with a line or XLR input. Clean, balanced and long-cable-friendly: XLR cable can run hundreds of metres with no meaningful noise penalty, which suits a Recorder Unit mounted well away from the desk.

2 · Good case — Amplifier's dedicated output

CONNECTOR(S)	SIGNAL LEVEL	BALANCED?	RECORDER UNIT NEEDS
Phono/RCA, XLR, or jack	Consumer or pro line level	Depends on connector	USB audio interface with matching input

Where there's no separate mixing desk, most amplifiers still have a dedicated line-level output — separate from the speaker terminals — provided specifically so installers can tap the signal without touching the speaker line. Look for phono/RCA sockets labelled "rec out," "tape out," "monitor out," "pre out," or "aux out," or, on better equipment, a balanced XLR or TRS jack serving the same purpose. Match the connector to the right USB audio interface input: phono/RCA is unbalanced consumer line level; XLR and TRS are typically balanced professional line level.

3 · Workable case — The 100V speaker line

CONNECTOR(S)	SIGNAL LEVEL	BALANCED?	RECORDER UNIT NEEDS
Speakon in, XLR out	~100V in → pro line level out	Yes (adapter's output)	USB audio interface with XLR/line input

Use this route only where neither a mixing desk nor a dedicated line-level output exists, and the only accessible point is the 100V speaker line itself.

Only ever via a purpose-built adapter. Never wire the 100V line directly into a USB interface or any other ordinary audio gear — see *Audio fundamentals · 100V Line Public Address Systems*.

A purpose-built 100V-to-line-level adapter — such as the Canford 100V Line to Line Level Adapter — takes the 100V line in via a Speakon connector and outputs a proper balanced signal via XLR, with a front-panel attenuator to dial in the right level. This is a legitimate, safe way to derive a feed from a 100V line, but only with a device engineered for the job: a DIY resistor divider or an ordinary DI box is not rated for speaker-level voltages and must not be improvised as a substitute.

4 · Caution case — Amplifier headphone output

CONNECTOR(S)	SIGNAL LEVEL	BALANCED?	RECORDER UNIT NEEDS
3.5mm or 1/4" jack	Variable, volume-dependent	No	USB audio interface + attenuator

Use the amplifier's headphone output only when nothing else is accessible. Beyond the level and gain caveats covered in *Audio fundamentals*, a headphone socket is, by design, a control anyone standing at the amplifier can touch. Its level is set by a volume knob with no reason to stay put — a member of staff, a cleaner, or someone adjusting the PA can silently change or mute the Recorder Unit's feed with no indication it's happened. Connect via a USB audio interface with an attenuator, set the volume once, and check the setting periodically — or lock or label the control — rather than treating it as a set-once connection.

5 · Last resort — Microphone near the PA speaker

CONNECTOR(S)	SIGNAL LEVEL	BALANCED?	RECORDER UNIT NEEDS
XLR or USB mic	Mic level	Depends	USB mic, or interface + phantom power for a condenser mic

This is the worst case — no accessible line-level feed at all — so the microphone needs to reliably capture the announcement and reject everything else. A USB microphone is the simplest option: plug in and done. If using a condenser microphone instead, the Recorder Unit's USB audio interface needs to explicitly support 48V phantom power — a generic dongle won't drive one; a dynamic microphone, or an electret mic that doesn't need 48V at all, sidesteps the issue and is often the more practical choice for an unattended, permanently-installed fallback mic.

- Position it close to and aimed directly at the PA speaker cone — proximity matters hugely (doubling the distance quarters the level).
- Use a directional microphone (cardioid, supercardioid, or shotgun) rather than omnidirectional, so it rejects sound arriving from other directions.
- Outdoors, use a foam windscreen (or a purpose-made "dead cat" for shotgun mics) — unprotected wind noise will swamp the announcement.
- A small acoustic hood or enclosure around the mic-and-speaker pairing further isolates it from ambient or crowd noise.
- Mount securely, out of public reach, with cabling routed safely away from foot traffic — this is a permanent installation, not a temporary rig.
- Consider weatherproofing (an IP-rated housing or cover) for anything mounted outside.