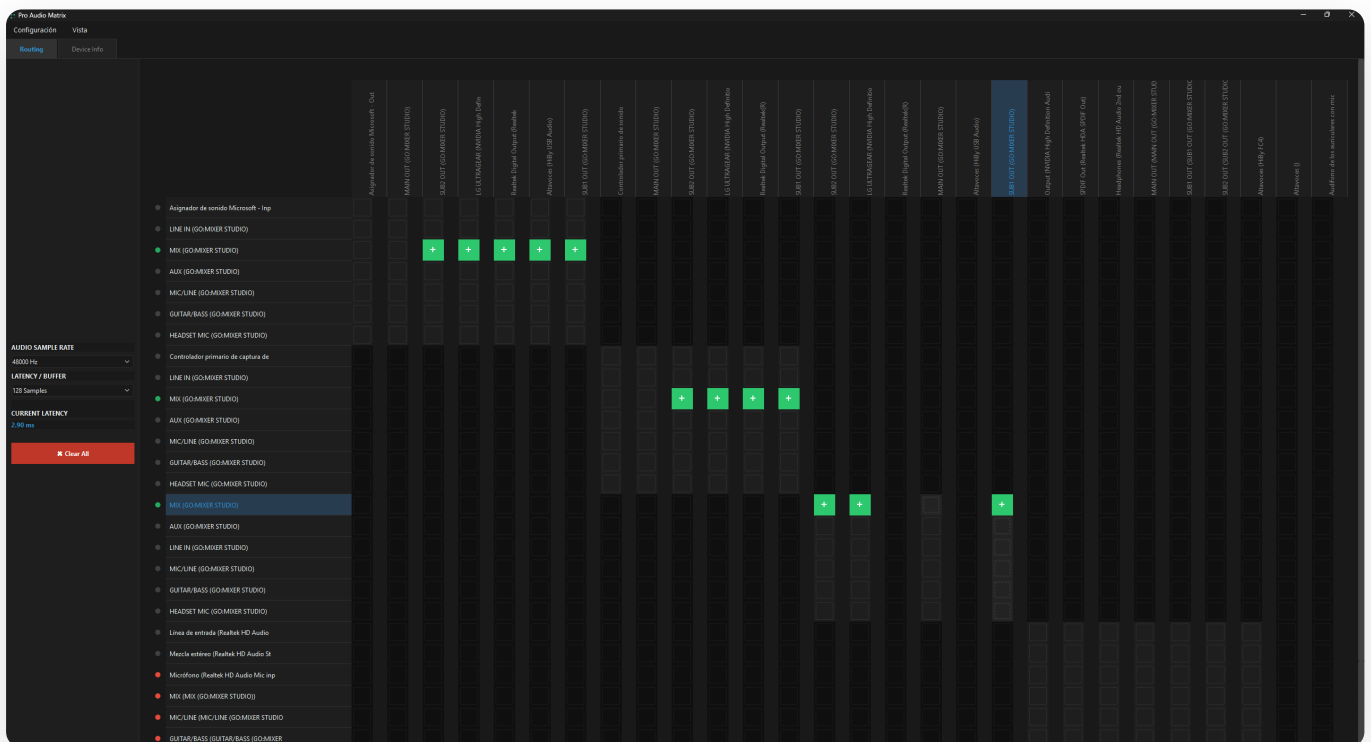


USER MANUAL

Pro Audio Matrix V16 is a high-performance audio routing and management software designed for professional broadcast environments, radio and television studios, and complex public address systems. Utilizing the sounddevice library with native support for ASIO and Windows WASAPI, the program offers ultra-low latency and unwavering stability.

The philosophy behind Pro Audio Matrix is to provide a "connection wall" (digital patch-bay style) where any hardware input can be routed to any output simultaneously, supported by a Dark Mode graphical interface optimized for visual fatigue in studios operating round the clock.



Main Capture of Pro Audio Matrix: Real-Time Monitoring

SYSTEM REQUIREMENTS (24/7/365)

To ensure Pro Audio Matrix operates with **absolute continuity and stability guarantees** in mission-critical environments year-round (24/7/365), meeting the following specifications is essential:

Component	Minimum Requirements	Recommended for Broadcast (24/7)
Processor (CPU)	Intel Core i3 / AMD Ryzen 3 (Quad-Core)	Intel Core i7 / AMD Ryzen 7 or higher. (Avoid thermal throttling)
RAM Memory	8 GB DDR4	16 GB or 32 GB DDR4/DDR5 (ECC memory recommended to avoid corruption)
Storage	128 GB SATA SSD	256 GB NVMe M.2 SSD (With dedicated UPS to prevent power failures)
Operating System	Windows 10 Pro (64-bit)	Windows 10/11 Pro or Enterprise LTSC (Disable automatic updates)
Audio Hardware	Basic stereo sound card	Professional Audio Interface (exclusive ASIO or WASAPI) via USB or PCIe
Other	1x USB Port for Dongle key	Liquid cooling or high-performance heatsink to prevent overheating. Redundant power supply if possible.

OPERATING SYSTEM OPTIMIZATION

For 24/7 operations, disable computer sleep, hard disk spin-down, and USB selective suspend in Windows Power Options. Windows updates must be configured to manual mode to avoid unexpected reboots during broadcast.

USER INTERFACE

The interface (GUI) is designed under the PySide6 framework offering a **darkened digital console theme**.

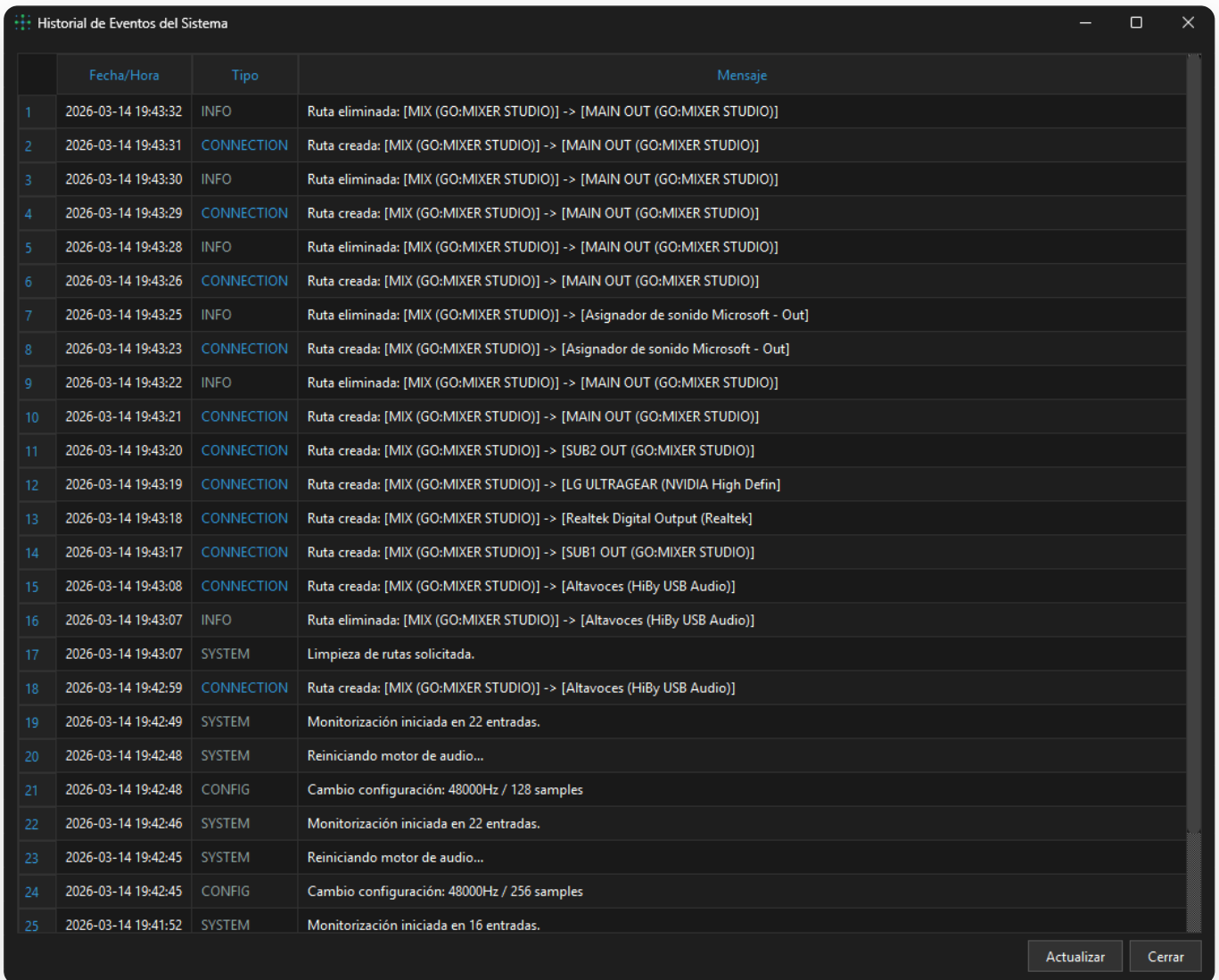
- **Sidebars (Inputs):** On the left, all capture devices (Microphones, Virtual input lines) are listed. They feature real-time LED meters.
- **Top Bars (Outputs):** At the top, arranged vertically, are the destinations (Transmitters, Output lines, Monitors).
- **Central Matrix:** A grid of interactive buttons where rows and columns intersect. A click activates (green) or deactivates the point-to-point connection.

**Note: You can double-click the name of any Input or Output to rename it to a more friendly alias (e.g., "Announcer Mic 1" instead of "USB Audio Device").*

DSP ENGINE OPERATION

By clicking on a matrix node, the underlying audio engine (C++) establishes an in-place buffer transfer from the input to the specified output. The system supports **one-to-many** operations (one input routing to multiple simultaneous outputs) without signal degradation, by creating independent low-latency threads for each crossover.

The integrated RMS (Root Mean Square) VU meter analyzer constantly calculates the input signal power, lighting the LEDs in green when audio presence is detected (> 0.003 level), providing vital visual feedback to the operator.



The screenshot shows a window titled "Historial de Eventos del Sistema" with a table of system events. The table has three columns: "Fecha/Hora", "Tipo", and "Mensaje". The events are numbered 1 through 25. The "Tipo" column contains values like INFO, CONNECTION, and SYSTEM. The "Mensaje" column contains detailed logs of audio routing changes, such as "Ruta eliminada" and "Ruta creada", and system actions like "Monitorización iniciada" and "Reiniciando motor de audio".

	Fecha/Hora	Tipo	Mensaje
1	2026-03-14 19:43:32	INFO	Ruta eliminada: [MIX (GO:MIXER STUDIO)] -> [MAIN OUT (GO:MIXER STUDIO)]
2	2026-03-14 19:43:31	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [MAIN OUT (GO:MIXER STUDIO)]
3	2026-03-14 19:43:30	INFO	Ruta eliminada: [MIX (GO:MIXER STUDIO)] -> [MAIN OUT (GO:MIXER STUDIO)]
4	2026-03-14 19:43:29	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [MAIN OUT (GO:MIXER STUDIO)]
5	2026-03-14 19:43:28	INFO	Ruta eliminada: [MIX (GO:MIXER STUDIO)] -> [MAIN OUT (GO:MIXER STUDIO)]
6	2026-03-14 19:43:26	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [MAIN OUT (GO:MIXER STUDIO)]
7	2026-03-14 19:43:25	INFO	Ruta eliminada: [MIX (GO:MIXER STUDIO)] -> [Asignador de sonido Microsoft - Out]
8	2026-03-14 19:43:23	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [Asignador de sonido Microsoft - Out]
9	2026-03-14 19:43:22	INFO	Ruta eliminada: [MIX (GO:MIXER STUDIO)] -> [MAIN OUT (GO:MIXER STUDIO)]
10	2026-03-14 19:43:21	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [MAIN OUT (GO:MIXER STUDIO)]
11	2026-03-14 19:43:20	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [SUB2 OUT (GO:MIXER STUDIO)]
12	2026-03-14 19:43:19	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [LG ULTRAGEAR (NVIDIA High Defin)]
13	2026-03-14 19:43:18	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [Realtek Digital Output (Realtek)]
14	2026-03-14 19:43:17	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [SUB1 OUT (GO:MIXER STUDIO)]
15	2026-03-14 19:43:08	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [Altavoces (HiBy USB Audio)]
16	2026-03-14 19:43:07	INFO	Ruta eliminada: [MIX (GO:MIXER STUDIO)] -> [Altavoces (HiBy USB Audio)]
17	2026-03-14 19:43:07	SYSTEM	Limpieza de rutas solicitada.
18	2026-03-14 19:42:59	CONNECTION	Ruta creada: [MIX (GO:MIXER STUDIO)] -> [Altavoces (HiBy USB Audio)]
19	2026-03-14 19:42:49	SYSTEM	Monitorización iniciada en 22 entradas.
20	2026-03-14 19:42:48	SYSTEM	Reiniciando motor de audio...
21	2026-03-14 19:42:48	CONFIG	Cambio configuración: 48000Hz / 128 samples
22	2026-03-14 19:42:46	SYSTEM	Monitorización iniciada en 22 entradas.
23	2026-03-14 19:42:45	SYSTEM	Reiniciando motor de audio...
24	2026-03-14 19:42:45	CONFIG	Cambio configuración: 48000Hz / 256 samples
25	2026-03-14 19:41:52	SYSTEM	Monitorización iniciada en 16 entradas.

Central Matrix: Active and Inactive Intersection Points

EVENT HISTORY AND DIAGNOSTICS

Pro Audio Matrix does not perform any actions in the background. It features a dual **EventHistoryManager** system:

- **Technical Log:** Continuous text file (`matrix_pro.log`) useful for technical support engineers, where deep exceptions and memory dumps are recorded.
 - **User Record (JSON):** Accessible from the interface itself via the History button. It displays in a readable table (with color codes) the last 1000 system events, such as route creations, disconnections, level drops, and Dongle validations.
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