

The public address system that checks itself.

Intelligent IP public address with continuous speaker-line supervision, centralised multi-zone control and tablet operation — for malls, supermarkets, transport hubs, campuses, hospitals and residential towers.

Automatic line supervision

Multi-zone & multi-site

Tablet touchscreen control

70V / 100V compatible

Fire alarm interface

01 The problem WAVMerlaud solves

The failure mode nobody plans for in a public address system is silence.

A speaker tap burns out. A contractor cuts a cable above a ceiling tile. Water gets into a car park horn. A zone is disconnected during a fit-out and never reconnected. A conventional 100V public address system reports none of it, because it has no way to know. The gap is discovered during an evacuation, a fire inspection, or a complaint from a tenant.

WAVMerlaud closes that gap. Every speaker circuit is measured continuously against a baseline captured at commissioning, and any deviation is reported with the zone, the amplifier, the circuit and the time it occurred.

It checks itself Open lines, shorts, earth faults, missing speakers and failed amplifiers are detected automatically and reported by location.	It is one system Every zone across every floor — and every building — managed from a single console and a single fault dashboard.	Anyone can run it A touchscreen tablet with zones named the way your building names them. No rack, no switch panel, no manual.
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02 System overview

WAVMerlaud replaces the rack of analog amplifiers, matrix switchers and home-run speaker cable that a conventional system depends on. Audio, control, paging and supervision data travel over the building's IP network. A zone is a network endpoint, not a pair of wires on a selector switch.

The speaker circuits themselves do not change. Each network amplifier still drives conventional 70V or 100V constant-voltage lines, so standard ceiling, horn, column and cabinet speakers all work. What changes is that the amplifier *measures* those lines rather than simply feeding them.

	CONVENTIONAL 100V PA	WAVMERLAUD IP PA
Speaker line condition	Unknown until someone listens	Continuously supervised and reported
Fault location	Manual tracing, circuit by circuit	Reported as zone, amplifier and circuit
Zone expansion	Limited by amplifier and matrix channels; rack rebuild	Add a network endpoint; no change to existing hardware
Cabling to zones	Home-run 100V cable from a central rack	Cat6 / fibre to a local amplifier; short speaker runs
Distance limit	Voltage drop over long 100V runs	100 m per copper hop; fibre beyond
Multi-building	Separate systems, separate operators	One logical system over WAN or VPN
Control	Switch panel and a gooseneck microphone	Tablet, workstation, SIP phone or mobile
Source routing	Fixed matrix wiring	Software routing — any source to any zone
Audit trail	None	Every page, schedule and fault logged with time and user

Topology principle

Put the amplifier near the speakers and the network near everything. A network amplifier sits in each riser or zone cabinet, fed by Cat6 or fibre. Speaker runs become short, voltage drop stops driving cable sizing, and a fault is contained to one amplifier's circuits rather than a whole floor.

On cost, plainly. IP public address typically costs more per zone in hardware than a single large analog amplifier, and less in cable, labour and rework. The saving is largest on sprawling sites — terminals, multi-building campuses, wide-footprint supermarkets — and smallest on one compact floor plate.

03 Intelligent self-checking

It tells you a speaker is dead before the day you need it.

Conditions detected

CONDITION	WHAT IT MEANS ON SITE	HOW IT IS DETECTED
Open circuit	Cable cut, terminal backed out, speaker removed	Line impedance rises above baseline tolerance
Short circuit	Crushed cable, water ingress, wrong termination	Impedance collapses; circuit isolated to protect the amplifier
Partial load loss	One or more speakers failed or disconnected	Impedance shifts by the load step of the missing speakers
Overload / added load	Speakers added beyond the rated tap budget	Impedance below the designed load
Earth / ground fault	Insulation damage, moisture, damaged conduit	Leakage measured between speaker line and earth
Amplifier fault	Output stage failure, thermal shutdown, DC offset	Amplifier self-test and output monitoring
Endpoint offline	Network amplifier or paging station lost	Heartbeat missed at the controller
Audio path failure	Source silent, stream lost, DSP fault	End-to-end path verification
Power / supply fault	Mains loss, battery or UPS condition	Supply monitoring at each amplifier

How the supervision works

- **Baseline impedance learning.** Each circuit is measured at commissioning with its full designed speaker load connected. Faults are reported as deviation from that reference, not against a generic threshold, so the system works with any mix of speaker types and tap settings.
- **Continuous line measurement.** Impedance is measured using a test signal outside the audible band, so supervision runs while music or paging is playing and is inaudible to occupants.
- **End-of-line verification.** An end-of-line device at the last speaker closes the loop, so the whole run is verified — not just the first few metres.
- **Earth fault monitoring.** Leakage to building earth is measured separately from impedance, and is the leading early indicator of moisture ingress in car parks, loading bays and outdoor areas.
- **Amplifier and path self-test.** Each amplifier verifies its output stage, thermal state and supply, and confirms the audio path from source to output. Where a backup amplifier is fitted, a failure transfers its circuits automatically.
- **Fault escalation.** Every fault is logged, shown on the tablet and dashboard, and can be sent by email, SMS or SNMP trap to facilities, the maintenance contractor or a monitoring centre.

Resolution, stated honestly. Impedance-based supervision detects the loss of a speaker by the change in circuit load. On a lightly loaded circuit it resolves a single speaker reliably; where many speakers share one circuit, the change caused by one small unit may fall inside normal tolerance. WAVMerlaud circuits are therefore designed to a maximum-loading rule **TBC** so that the loss of any single speaker is detected.

Commissioning mode

During installation the installer connects a circuit, triggers a test from the tablet, and sees immediately whether the measured load matches the design. A tap set to 6W instead of 3W, a speaker wired out of the loop, or a missing end-of-line device shows on the spot — not at handover testing weeks later with the client standing there. The commissioning report is generated from the system's own measurements and becomes the reference every future fault is judged against.

04 Multi-zone control and centralised management

A zone is defined in software, not by wiring. A supermarket can run the sales floor, deli counter, stockroom, loading bay and car park as five independent zones, group them as "public areas" and "back of house", and change those groupings later without touching a cable.

CAPABILITY	DETAIL
Independent zone audio	Different source, volume and schedule per zone
Zone grouping	Any zone in any number of groups; groups nest
Priority and override	Ranked priority; emergency audio takes every zone regardless of local state
Ducking	Background music attenuates under paging, then restores
Per-zone volume limits	Administrator-set maximum and minimum, so staff cannot mute a safety zone
Ambient noise compensation	Optional zone microphone raises output as background noise rises
Scheduling	Time-of-day, day-of-week and calendar schedules — opening routines, shift bells, class periods
Background music	Scheduled playlists per zone; licensed streams; local storage for offline resilience
Paging	From tablet, desk station, SIP phone or mobile; pre-announcement chime; talk-back confirmation
Message library	Stored announcements triggered by button, schedule or contact input
Contact I/O	Dry-contact inputs trigger messages or zones; outputs drive lighting, doors, signage
Logging	Every page, schedule, override and fault logged with time, zone and user

Across multiple sites

A retail chain, school district or property group sees every building in one console. Each site runs autonomously — if the WAN link drops, local paging, schedules and supervision carry on — while configuration, playlists, message libraries and fault reporting are managed centrally.

One head-office operator can verify that every speaker in twenty stores is working, before opening, without leaving their desk.

05 Tablet touchscreen control

Most public address systems fail operationally long before they fail electrically. The person who knew the rack has left, the microphone is behind a locked door, and the zone switches are labelled in marker pen from a fit-out three tenants ago. WAVMerlaud is operated from a touchscreen tablet — wall-mounted at the duty station or carried by the duty manager.

SCREEN	CONTENTS
Home	Live zone map with status colour per zone, active source, volume, open faults
Page	Select zones or a group, press and hold to talk, chime first, release to end
Messages	Stored announcements as labelled buttons — store closing, lost child, vehicle call, drill
Music	Playlist or stream per zone, volume within administrator limits
Schedule	Today's events, with the ability to skip or hold one occurrence
Faults	Open faults with zone, circuit, description and time; acknowledge and annotate
Reports	Announcement log, fault history, system health for the period
Settings	Administrator only — zones, groups, priorities, users, schedules, thresholds

Roles

ROLE	CAN DO	CANNOT DO
Staff	Page assigned zones, play stored messages, adjust volume within limits	Change configuration; silence a fault
Duty manager	All staff functions, all zones, schedule holds, fault acknowledgement	Change system configuration or user accounts
Administrator	Full configuration, users, supervision thresholds, integrations	—
Service	Diagnostics, commissioning mode, firmware, remote support	Scope defined per contract TBC

Sign-in is by PIN or card, and every action is logged against the user who took it. In a dispute about an announcement that was or was not made, the log settles it.

The tablet is a client, not the system. If it is dropped, stolen or taken for repair, announcements, schedules and supervision keep running. A replacement tablet signs in and works in minutes, and the system can also be operated from a browser.

06 Architecture and network

COMPONENT	ROLE	LOCATION
System controller	Routing, priority, scheduling, supervision database, logging, users	Main comms room, 1U rack
Management server	Multi-site dashboard, reporting, configuration	Head office or cloud
Network zone amplifier	Decodes network audio, drives 70V/100V circuits, performs line supervision	Local riser, IDF or zone cabinet
Operator tablet	Day-to-day control and fault visibility	Duty station, service desk, security room
Paging station	Fixed desk microphone with zone keys, supervised	Reception, control room, station office
End-of-line device	Terminates and verifies each supervised circuit	Last speaker on every circuit
I/O interface	Dry contacts in and out; fire alarm interface	Beside the fire alarm panel and controller
Speakers	Standard 70V/100V ceiling, horn, column, cabinet, pendant	Throughout

Redundancy options

OPTION	PROTECTS AGAINST
Dual power supply per amplifier	Supply failure — recommended for life-safety zones
Backup amplifier, auto-changeover	Amplifier failure; one spare covers TBC zones
Class-A (loop) speaker wiring	A single cable break — speakers keep working from the other side
Redundant network paths	Switch or link failure (RSTP or dual-homed endpoints)
Controller redundancy	Controller failure; endpoints keep local schedules regardless
Battery / UPS backup	Mains loss — standby duration sized per project TBC

Redundancy items are priced as options unless stated otherwise in the project quotation.

Network requirements

REQUIREMENT	SPECIFICATION
Switch	Managed, gigabit, IGMP snooping enabled where multicast is used
PoE	TBC — class per endpoint
VLAN	Dedicated audio VLAN recommended
QoS	DSCP marking for audio and control; audio prioritised
Bandwidth per stream	TBC
Latency	TBC — end to end on a local network
Copper run	100 m maximum per hop; Cat6 recommended
Fibre	Single or multimode for inter-building links
WAN for multi-site	TBC minimum upstream; sites operate autonomously if the link drops
Ports and protocols	Full list issued for IT security review on request

07 Technical specifications

Values marked **TBC** are pending final verification against production hardware and are not a commercial commitment. A confirmed specification is issued with every project quotation.

System capacity

PARAMETER	SPECIFICATION
Zones per controller	TBC
Zones per networked system	TBC
Simultaneous independent audio streams	TBC
Speaker circuits per amplifier	TBC
Speakers per supervised circuit	TBC — design rule for single-speaker fault detection
Paging stations per system	TBC
Concurrent tablet / web clients	TBC
Sites per management server	TBC
Stored messages / schedules	TBC
Event log retention	TBC on device; unlimited on server

Audio performance

PARAMETER	SPECIFICATION
Sample rate / bit depth	TBC
Frequency response	TBC
THD+N	TBC
Signal-to-noise ratio	TBC
Per-zone DSP	Parametric EQ, high-pass, limiter, delay, ambient noise compensation
Speech intelligibility	STI / STIPA verified at commissioning; target set per project and code

Amplifier

PARAMETER	SPECIFICATION
Output power per channel	TBC — model range
Output voltage	70V and 100V constant voltage
Low-impedance output	TBC
Channels per unit	TBC
Amplifier class	TBC
Protection	Short circuit, open circuit, overload, thermal, DC offset
Cooling / form factor	TBC

Supervision

PARAMETER	SPECIFICATION
Method	Impedance measurement against learned baseline, with end-of-line verification
Test signal	Out-of-band, inaudible during normal operation TBC
Supervision interval	TBC
Fault tolerance threshold	TBC — adjustable per circuit
Detected conditions	Open, short, partial load loss, overload, earth fault, amplifier fault, endpoint offline, supply fault
Fault annunciation	Tablet, dashboard, email, SMS, SNMP trap, dry contact
Fault log	Time, zone, amplifier, circuit, condition, acknowledging user

Power and environment

PARAMETER	SPECIFICATION
Mains input	220–240 V AC, 60 Hz
DC backup input	TBC
Power consumption, idle / rated	TBC
Operating temperature / humidity	TBC — non-condensing
Ingress protection	Controller and amplifier IP20 indoor; outdoor speakers and enclosures per project
Certification	TBC
Warranty / software updates	TBC

08 Integration

INTEGRATION	WHAT IT DOES	INTERFACE
Fire alarm panel	Fire condition triggers evacuation messaging to affected or all zones, overriding everything	Supervised dry contact per zone or group; protocol where supported
SIP / IP-PBX	Page a zone by dialling an extension from any desk phone or softphone	SIP registration per zone or paging group
Networked audio	Interoperate with existing mixers, DSPs and streaming encoders	Dante / AES67 TBC
Building management	PA status and faults surfaced in the BMS; BMS events trigger announcements	BACnet / Modbus / SNMP TBC
Access control / security	Lockdown message triggered from the security platform	Dry contact or API
CCTV / incident management	Announcement triggered from the VMS operator console	API
Network monitoring	Faults raised into existing NOC tooling	SNMP traps, syslog, email
REST API	Everything the tablet can do, available to another system	Authenticated HTTPS

Fire alarm interface. WAVMerlaud accepts supervised inputs from the building's fire alarm panel. A fire condition takes absolute priority over all other audio in the affected zones, including zones a staff member has muted. Loss of the interface is itself reported as a fault. The cause-and-effect matrix is configured per project with the fire safety consultant.

Optional: programmatic in-store audio

A WAVMerlaud site is a licensed, addressable, zoned audio network with a scheduler — the same infrastructure WAVHub uses to deliver programmatic in-store audio. Operators can turn the background music channel into a measurable, zone-targeted advertising channel and offset the cost of the system against the revenue it generates. Available as an option; ask us how it works for your site.

09 Standards and compliance

Fire safety requirements in the Philippines are set by Republic Act 9514, the Fire Code of the Philippines, and its Revised Implementing Rules and Regulations (2019), enforced by the Bureau of Fire Protection. The RIRR determines when an occupancy requires a fire detection and alarm system and when voice communication is required, based on occupancy type, height and occupant load. Philippine practice references NFPA standards, with NFPA 72 covering emergency communications systems.

STANDARD	COVERS
EN 54-16	Voice alarm control and indicating equipment
EN 54-24	Loudspeakers for voice alarm systems
ISO 7240-16	Voice alarm control and indicating equipment (international equivalent of EN 54-16)
ISO 7240-19	Design, installation, commissioning and service of sound systems for emergency purposes (supersedes the withdrawn IEC 60849)
NFPA 72	National Fire Alarm and Signaling Code, including emergency communications systems

How WAVMerlaud is specified for life-safety projects. WAVMerlaud is a public address and voice communication system that interfaces with the building's fire alarm panel; fire detection remains the panel's function. The equipment is engineered to recognised voice-alarm supervision and fault-reporting principles. Compliance for any given installation is established per project against RA 9514's Revised IRR and the applicable NFPA references, with the project's fire safety consultant and the Bureau of Fire Protection.

Product certification status **TBC** — certification marks and certificate numbers will be stated here only where held.

What is demonstrable on site

- Continuous supervision of speaker circuits, with faults reported by zone and circuit.
- Priority override giving emergency audio every zone regardless of local state.
- A complete, timestamped log of announcements and faults, exportable for inspection.
- Speech intelligibility verified by STI/STIPA measurement at commissioning, reported per zone.
- Supervised interface to the building's fire alarm panel.

10 Applications

SECTOR	PRIMARY DRIVER	THE CAPABILITY THAT MATTERS MOST
Malls and retail	Tenant churn and life-safety compliance	Faults detected after tenancy fit-out works, not at the next fire drill
Supermarkets	Daily operations and chain consistency	Head-office dashboard confirming every branch before opening
Transport hubs	Intelligibility and uptime across large footprints	Ambient noise compensation and supervision reporting by circuit
Schools, hospitals, offices	Scheduling and code compliance	Calendar scheduling, priority override and an inspectable log
Residential towers	Emergency readiness with low daily use	Proof the system works without a manual walk-through

In a condominium the PA may go unused for months at a time — exactly the condition under which undetected faults accumulate. Supervision replaces the annual walk-through with a report.

11 Deployment and service

STAGE	WHAT HAPPENS	OUTPUT FOR THE CLIENT
Site survey	Walk the site, measure ambient noise, map zones against how the building operates	Zone plan and speaker layout
Design	Speaker coverage, amplifier sizing, circuit loading, network design, redundancy	System design, BOM, quotation
Installation	Speaker and cable installation, amplifier and controller fit-out, network commissioning	Installed system
Commissioning	Baseline impedance capture per circuit, level and EQ per zone, STI/STIPA measurement, priority matrix test	Commissioning report with per-circuit measurements
Training	Operator training on the tablet, administrator training on configuration	Signed training record, quick reference card
Handover	As-built drawings, zone schedule, cause-and-effect matrix, test certificates	Handover pack
Service	Annual inspection, remote monitoring, firmware updates, spares	Service report per visit

SERVICE TIER	INCLUDES
Standard warranty	Hardware warranty TBC , software updates, business-hours support
Monitored	Remote fault monitoring with proactive notification, annual inspection
Full service	Monitored, plus response SLA TBC , on-site attendance and spares holding

Find out what your building's speakers are actually doing.

Book a site assessment. We walk your site, map the zones the way you operate, and give you a design and a quotation — plus an honest assessment of what you can keep from the system you already have.

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