ZEST PAGA A + B / N + 2 TOPLOGY

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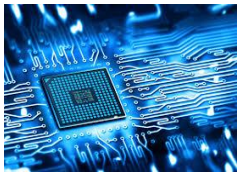


Ziztel are a UK based manufacturer of PAGA / MBS and Intercom products. Our systems are mainly designed for use in the Military, Marine, Hazardous Oil, Gas and Petrochemical industries.

The Ziztel PAGA solution is specifically designed for mission critical life safety applications and can be arranged to provide service by a number of different system architectures depending on the level of security specified.

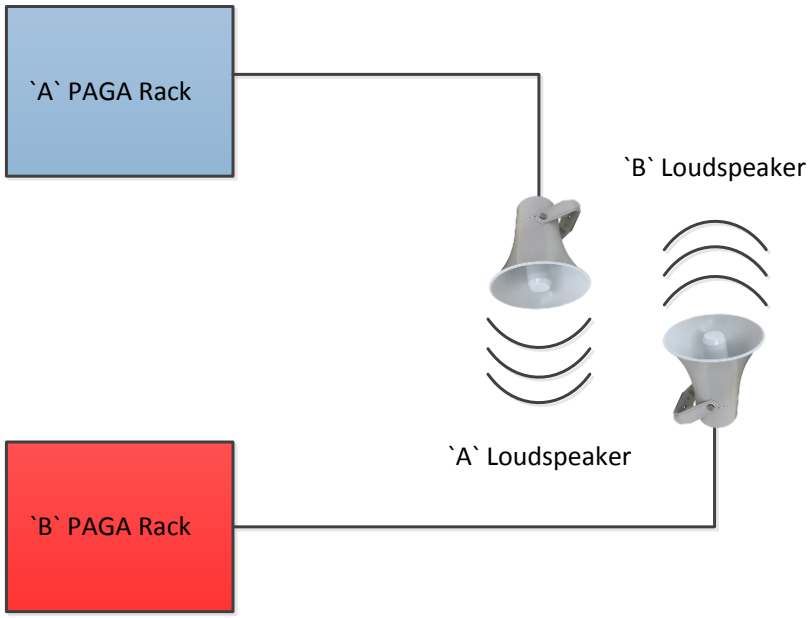
This technical data sheet introduces A + B / N +2 topology which provides a dual redundant package maintaining service to *all* field devices even in the event of catastrophic loss of one of the system central equipment panels. The advantage of this solution is that there is no reduction in acoustic or visual coverage associated with a similar failure scenario in a more basic A + B solution.

DUPLICATED CRITICAL PATH WITH HOT - STANDBY PWER AMPLIFICATION / FLASHING BEACON CONTROL

Background

The PAGA / MBS system is a safety critical package, for high security applications all field equipment is required to remain operational even in the event of a catastrophic failure of key equipment. The A + B / N +2 architecture enhances the classical A + B dual centralised topology guaranteeing continued management and broadcast capability to all serviceable loudspeakers (and flashing beacons where visual annunciation is to signal an emergency situation in high noise areas) in event of complete disconnection of either the A or B critical path.

Basic A + B topology; in this arrangement a failure anywhere in either A or B critical path could result in loss of PAGA service to all respective sub system field devices. The reduction in acoustic and visual alarm coverage is factored into the system design to ensure that even with potential 50% loss of capability adequate PAGA service is maintained from the remaining operational equipment.



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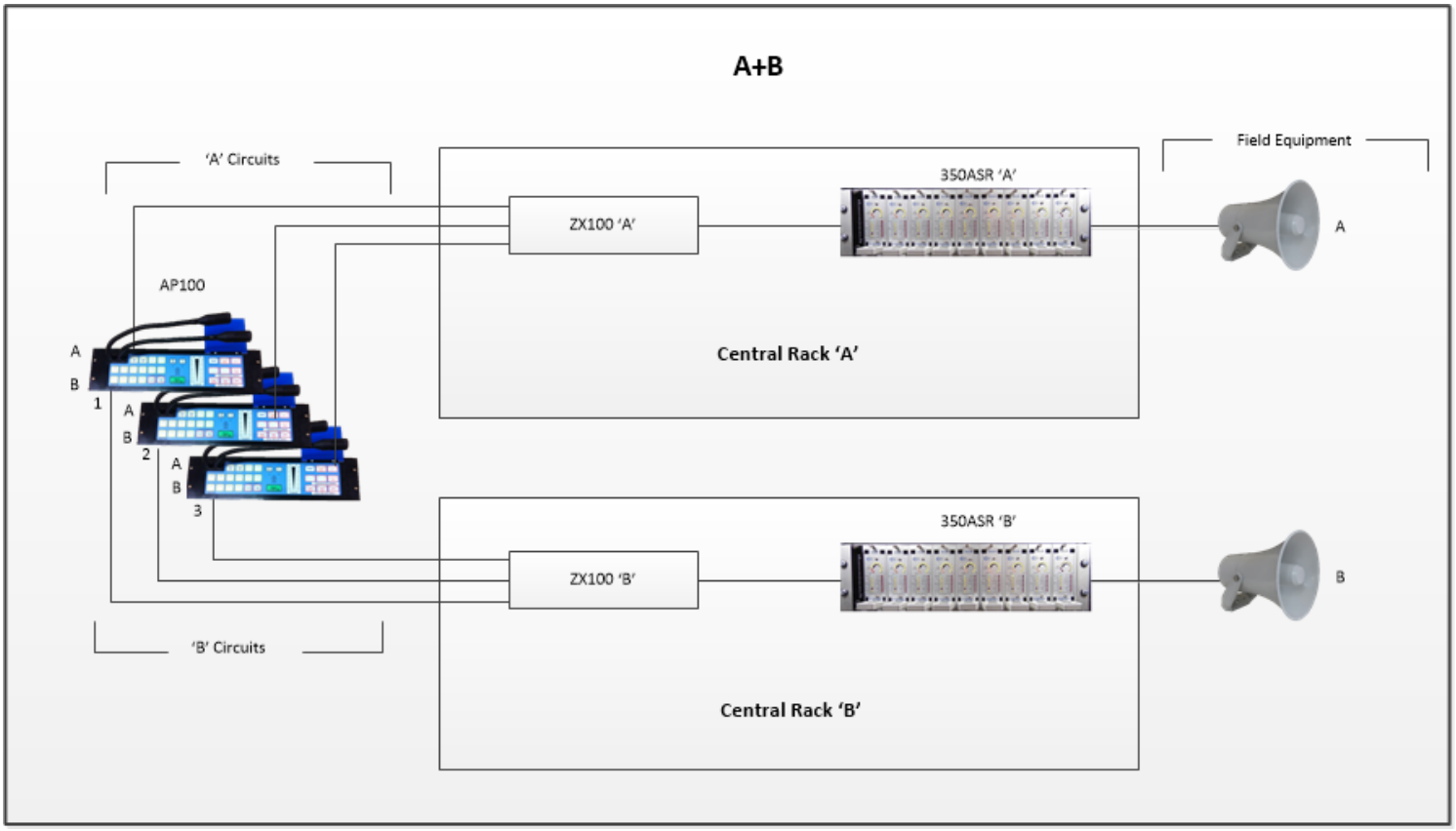
Where A + B / N + 2 is specified each A / B central rack incorporates sufficient resources to manage and power the entire site field equipment without compromise.

In a healthy situation the A system rack manages the respective A system field equipment; the same situation applies to the B system rack and respective field equipment. The critical path within each A / B sub system is automatically supervised and if a fault in the on line system is detected the associated field devices are transferred to hot standby hardware located and managed in the remote rack. For example mains power supply disconnection to the A rack will trigger a transfer of A system loudspeakers and flashing beacons to the hot standby apparatus located in the B system host rack and service to all field equipment is maintained.

A + B / N + 2 lends its self to applications where loss of one sub system would result in PAGA broadcast coverage to fall below minimum sound pressure level (or visual warning) specification or where multiple fault tolerance is required.

Classical A + B PAGA / MBS architecture



It should be noted that field equipment cabling assignment is not affected by choice of A + B / N + 2 and all interconnection topologies are allowed i.e. star wired, tree / branch, radial wired and loop wired loudspeaker and flashing beacon circuits.

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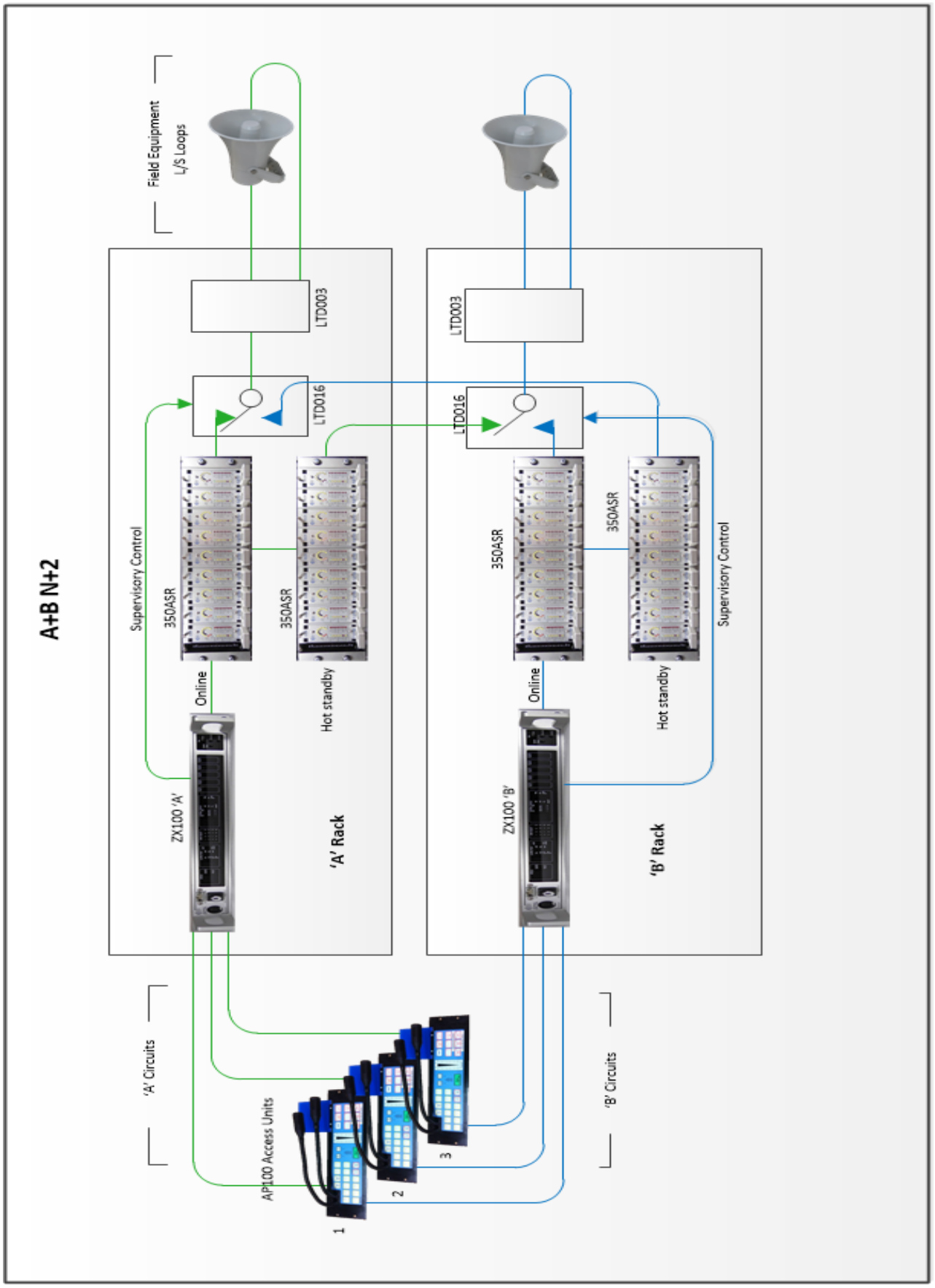

A + B / N + 2 architecture, in this example the flashing beacon circuits are removed for clarity. The system supports either LTD007 radial / spur (tree and branch) / star wired or LTD003 loop wired field circuit termination devices. Note the requirement for A to B and B to A system interconnection cables

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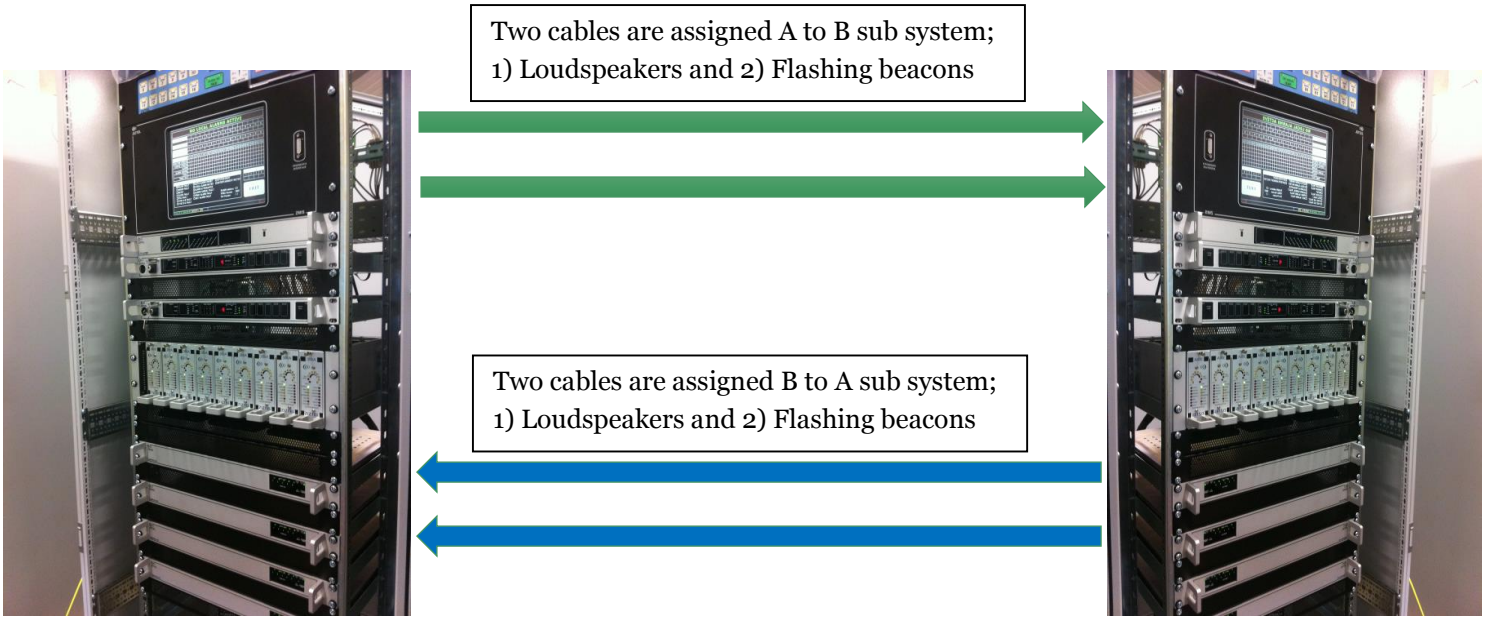
System interconnection

The A / B sub systems are interconnected by multi pair cable to enable transfer of field circuits from a system in fault to the hot standby equipment in the remote system rack. Considerations are as follows:-

Elimination of possible cross transference of a fault condition A to B and visa versa.

Galvanic isolation to ensure that in the event of potentially explosive gas ingress into a rack location isolated by ESD (Emergency Shut Down) that no sources of ignition are possible from the remaining live subsystem.

A cable pair is required for each amplifier loudspeaker and flashing beacon circuit. Example if there are ten on line amplifiers then a ten pair cable must be specified A to B and same B to A. Two multicore cables can be employed to carry the inter sub system circuits but A to B / B to A services should not be carried in the same cable. Instead these cables should follow different routing i.e. separate transits, cable trunking, ladder racking to improve resilience against common mode failure – example a fire or explosion affecting BOTH cable interconnections. Also where AC flashing beacons are specified the associated inter system cable should not form part of the loudspeaker circuit multi core cable.



Transfer switch LTD016

LTD016 termination device manages connectivity between the two sub systems. This unit is controlled by the ZX100 main processor and normally holds all field networks onto the local rack facilities. Only under defined failure conditions will the LTD016 transfer the field equipment to the distant rack. It should be noted that this unit is of ‘fail safe’ design and automatically initiates a transfer in the event of power loss to the host rack. The LTD016 is located in the PAGA cubicle MDF and features plug socket connectivity to the local rack hardware.

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Field equipment transfer cause and effect

Both systems incorporate automatic monitoring of the associated critical path, in the event of a condition that would prevent PAGA broadcasts from the respective sub system the monitoring a) displays the fault condition b) delivers a common alarm to signal an external system (example site supervisory) c) initiates a transfer of the field device circuits to the hot standby equipment located and managed in the remote rack.

The following table details failure scenarios with attendant cause and effect, note the 'B' PAGA system provides identical results:-

Cause	Effect	Transfer
A circuit Microphone access unit trouble	Loss of PAGA speech and control from this position to the A system loudspeakers	Yes
A central processor fail	Loss of PAGA speech and alarm tones to the A system loudspeakers / beacons	Yes
A alarm tone sub system trouble	Loss of alarm tones to the A system loudspeakers	Yes
A system power supply failure	Loss of PAGA speech and alarm tones the A system loudspeakers / beacons	Yes
A amplifier failure	Loss of PAGA speech and alarm tones to an A system loudspeaker network	Yes
A amplifier sub rack failure	Loss of PAGA speech and alarm tones to associated A system loudspeaker networks	Yes
A Loudspeaker cable open or short circuit	Loss of PAGA speech and alarm tones to the associated loudspeaker network, note if loop wiring is used then service maintained by self-healing to either side of a cable break	No
A Loudspeaker cable earth fault	Possible loss or reduction in loudspeaker sound pressure level	No
A Beacon cable open / short circuit	Loss of visual warnings to the associated flashing beacon network, note if loop wiring is used then service maintained by self-healing to either side of a cable break	No
A Standby amplifier trouble	Loss of back up facility for remote rack field devices	No

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