## 2.1 GENERAL EQUIPMENT

A. RACK ENCLOSURES: All rack-mount Paging System (PS) equipment shall be housed in EIA standard 19” equipment enclosures. Given the distributed networked nature of the system, it may be necessary to locate such rack enclosures at multiple sites throughout the facility, where each site is secure from the public. Each rack may be wall-mounted or floor-mounted, as required by specific instructions, or by the space(s) available.

1. Adequate ventilation shall be supplied for each rack, and temperatures at all critical components shall not exceed 95 degrees F. Convection or forced-air cooling may be used, as long as this heat threshold is not surpassed, regardless of external factors. System components featuring internal forced-air cooling shall be provided adequate hot air extraction through the rear of the enclosure.
2. Each rack shall be constructed of 16-gauge steel with 14-gauge steel mounting rails. All joints shall be welded and bonded.
3. Rear access to each rack shall be lockable.
4. The height of each rack shall be as required for the specified equipment, plus 25% spare space for future growth.
5. Blank panels shall be provided to fill all unused rack space.
6. Acceptable rack manufacturers:
    1. Middle Atlantic
    2. Atlas Sound

B. NETWORK: The Paging System (PS) shall be based on IEEE 802.3.af PoE Ethernet Network Infrastructure. All cabling, conventions and equipment shall be consistent with this IEEE standard.

1. SWITCHES shall be managed-type, with VLAN capabilities and Power-Over-Ethernet (PoE) for all devices except AMPLIFIERS and SERVERS. Care should be taken to ensure that each Switch be able to supply adequate PoE power to the endpoint devices it serves. Uplink ports for each switch shall be via Optical Fiber. Either Multimode or Single-mode fiber may be used, as



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determined by the length of the required uplink runs. Each port on each Switch shall be capable of sustained 100MBit data rates.

2. SWITCHES for life safety compliant system components (Amplifiers, Life Safety Interface, Emergency Paging Station) shall be rugged industrial types with dry contact output for switch failure.
3. SPANNING TREE single-point failure-resistant network topology shall be used, if the system is required to be life-safety capable or withstand failure of a network sector.
4. UPS (uninterruptable power supply) systems shall be provided for all life-safety critical network components. UPS units shall have the capacity to power the units they serve for a minimum of 90 minutes from removal of mains power. UPS units shall monitor their proper functioning, and provide alerts via Form-C contact closures upon mains or any other failure.
5. One consistent VLAN (Virtual Local Area Network) shall be established across each managed Switch, with enough ports to accommodate the PS devices attached to it, plus 25% for future expansion. A second VLAN may be required to handle additional VoIP traffic to/from certain devices, and a third VLAN may be required for third-party control, and communication to other PS systems.

C. COMPUTER (CPU): A CPU may be present as part of the PS, but is not required for PS to function. It is recommended that the CPU and its monitor be rack-mounted, but rackmounting is not a requirement. The CPU and its accessories shall meet the following minimum specifications:

1. Microsoft Windows 7, Windows 8 or Windows Vista.
2. Intel Pentium Dual Core processor, 2.6 GHz.
3. 2 GB RAM.
4. 160 GB SATA hard drive.
5. Integrated video adapter, minimum 1280x1024 native output at 32-bit color.
6. Integrated gigabit Ethernet port.
7. User Interface shall be a single rack-space combined 17” LCD monitor, keyboard and track-pad mouse. Monitor shall be active-matrix color type, capable of native 1280x1024 resolution.



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2.2 PAGING SYSTEM (PS):

A. The PS shall be distributed in structure, such that there is no “head end” control location, and thus has no central point of failure.

B. The PS shall use the VLAN for transport of all digital audio data, including all recorded and live voice messages, preambles, background music and other audible signals, routine or emergency. This same Network shall carry monitoring and control data to and from each PS device. This audio data traffic shall be standard CobraNet at a sample rate of 48 kHz and latency of 5.33ms. For particulars, please access www.cobranet.info.

C. All PS components shall be continuously monitored for presence, proper function and faults. Each and every fault must be logged internally to the unit, and be able to viewed and copied to an attached Monitoring Computer, running software supplied by the Manufacturer.

D. All PS components shall be addressable on the CobraNet VLAN by means of dual 4-bit rotary ID switches.

E. All PS preambles, voice prompts and recorded announcements shall be in 16-bit monaural WAV file format. The Paging System shall be capable of importing custom preambles, prompts and announcements using an AUDIO FILE MANAGER function, through the Manufacturer Software running on an attached computer.

F. Each PS device shall have sufficient on-board memory to retain its configuration and settings in the event of power loss.

G. All PS components shall be CE marked, UL listed and shall comply with the RoHS directive.

H. CARD FRAME AMPLIFIER: CFPS amplifier shall be located throughout the facility, as available space and efficiencies dictate. Each CFPS amplifier shall meet the following specifications:

1. Power scalable in software from 100 Watts to 600 Watts per output channel, in 100 Watt increments.
2. Up to 2400 Watts output power capability from each amplifier chassis.
3. Each channel provides selected power into low impedance load, 70V line or 100V line, without the need for external transformer.

4. Front panel indications for Signal Present, Card Failure, Signal Clip, Over-Temperature, Fan Fault.
5. Up to eight (8) amplifier modules per amplifier chassis.
6. Complete DSP (digital signal processing) per output channel, including page ducking, 5-band parametric filters, compressor/limiter, 8-band speaker equalization, and delay adjustable up to 2700 milliseconds.
7. Programmable channel-to-channel fail-over capability or chassis-to-chassis failover capability.
8. With additional failover module installed 2 x 3:1 or 7:1 failover shall be possible within the amplifier chassis.
9. Fail-over Link connector, for chassis-to-chassis fail-over logic.
10. Ability to support end-of-line monitoring devices (ELDs). Each amplifier output module shall support up to 15 ELDs.
11. Ability to support Ambient Noise Compensation (ANC) circuitry, to allow for consistent Background Music (BGM) and routine page levels per amplifier channel or group of channels.
12. 
13. Primary and Secondary CobraNet data ports wired to the CobraNet VLAN.
14. Ability to store emergency messages in on-board non-volatile digital memory.
15. Ability to report and log all detected faults internal to each amplifier module and any ANC or ELD device attached to it.
16. Design Make/Model: Biamp Vocia VA-8600 or VA-8600c, with AM-600 or AM-600c amplifier modules.

I. SMALL AMPLIFIERS: PS amplifiers shall be located throughout the facility, as available space and efficiencies dictate. Each PS small amplifier shall meet the following specifications:

1. Power variants are 2 x 60 Watts or 4 x 30 Watts per amplifier chassis
2. Up to 120 Watts output power capability from each amplifier chassis.
3. Each channel provides selected power into low impedance load, 70V line or 100V line, without the need for external transformer.



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4. Front panel indications for Signal Present, Card Failure, Signal Clip, Over-Temperature, Fan Fault.
5. If local line level input or dual power input is required then the ‘e’ version of amplifiers shall be used.
6. Complete DSP (digital signal processing) per output channel, including page ducking, 5-band parametric filters, compressor/limiter, 8-band speaker equalization, and delay adjustable up to 500 milliseconds.
7. Programmable channel-to-channel fail-over capability or chassis-to-chassis failover capability. 3:1 failover shall be possible in the four channel amplifier variants.
8. Fail-over Link connector, for chassis-to-chassis fail-over logic.
9. Ability to support end-of-line monitoring devices (ELDs). Each amplifier output module shall support up to 15 ELDs.
10. Ability to support Ambient Noise Compensation (ANC) circuitry, to allow for consistent Background Music (BGM) and routine page levels per amplifier channel or group of channels.
11. Primary and Secondary CobraNet data ports wired to the CobraNet VLAN.
12. Ability to store emergency messages in on-board non-volatile digital memory.
13. Ability to report and log all detected faults internal to each amplifier module and any ANC or ELD device attached to it.
14. Design Make/Model: Biamp Vocia VA-2060/VA-2060e or Biamp Vocia VA-4030/VA-4030e.

J. MIDSIZE AMPLIFIERS: MPS amplifiers shall be located throughout the facility, as available space and efficiencies dictate. Each MPS amplifier shall meet the following specifications:

1. Power variants are 8 x 150 Watts or 4 x 300 Watts per amplifier chassis.
2. Up to 1200 Watts output power capability from each amplifier chassis.
3. Each channel provides rated power into 70V or 100V line without the need for external transformer.
4. Front panel indications for Signal Present, Card Failure, Signal Clip, Over-Temperature, Fan Fault.


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5. Complete DSP (digital signal processing) per output channel, including page ducking, 5-band parametric filters, compressor/limiter, 8-band speaker equalization, and delay adjustable up to 32 seconds.
6. Programmable channel-to-channel fail-over capability or chassis-to-chassis failover capability. 3:1 failover shall be possible in the four channel amplifier variants.
7. Fail-over Link connector, for chassis-to-chassis fail-over logic.
8. Ability to support end-of-line monitoring devices (ELDs). Each amplifier output module shall support up to 15 ELDs.
9. Ability to support passive end of line monitoring devices (PLDs). Each amplifier shall support a combination of PLD or ELD on different channels if required.
10. Ability to support Ambient Noise Compensation (ANC) circuitry, to allow for consistent Background Music (BGM) and routine page levels per amplifier channel or group of channels.
11. Primary and Secondary CobraNet data ports wired to the CobraNet VLAN.
12. Ability to store emergency messages in on-board non-volatile digital memory.
13. Ability to report and log all detected faults internal to each amplifier module and any ANC or ELD device attached to it.
14. Design Make/Model: Biamp Vocia VA-8150CV or Biamp Vocia VA-4300CV.

K. END-OF-LINE DEVICE (ELD):

1. Each ELD shall be Power over Ethernet (PoE), Class-3, and wired to the CobraNet VLAN.
2. Each ELD shall be housed in a small, surface-mountable enclosure.
3. Each ELD shall be compatible with low impedance and constant voltage systems.
4. Each ELD shall respond to a digital integrity signal sent down the speaker line from the amplifier channel module. Once the channel module to ELD link is established, the absence of a response from an associated ELD shall result in a Speaker Line Fault.


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5. Each ELD shall monitor its attached speaker line, and report faults to its associated amplifier.
6. Faults monitored by the ELD shall include short circuit, open circuit and ground fault as per EN54-16 requirements.
7. Design Make/Model: Biamp Vocia ELD-1.

L. PASSIVE END OF LINE DEVICES (PLD):

1. Each PLD shall be installed on the end of the speaker line and will not require any additional cabling.
2. Each PLD shall be housed in a small, surface-mountable enclosure.
3. Each PLD shall be compatible with 70v or 100v constant voltage systems.
4. Each PLD shall respond to a pilot tone integrity signal sent down the speaker line from the amplifier channel module. Once commissioned, the absence of a PLD shall result in a Speaker Line Fault.
5. Each PLD shall monitor its attached speaker line, and report faults to its associated amplifier.
6. Faults monitored by the PLD shall include short circuit, open circuit and ground fault as per EN54-16 requirements.
7. Design Make/Model: Biamp Vocia PLD-1 or Biamp Vocia PLD-2.

M. AMBIENT NOISE COMPENSATORS (ANC):

1. Each ANC shall be Power over Ethernet (PoE), Class-3, and wired to the CobraNet VLAN.
2. Each ANC shall be housed in a small, surface-mountable enclosure.
3. Each ANC shall respond to its associated amplifier channel module(s), advising that channel module(s) of a substantial change in ambient noise level.
4. Each ANC shall have two microphone inputs, each with 48V phantom power.
5. Each ANC shall offer software-adjustable microphone gain and phantom power controls.



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6. If two microphones are attached to an ANC, the ambient level reported to the associated amplifier channel(s) shall be the sum of the two microphones.
7. Each ANC shall use an adaptive algorithm to incorporate the use of a reference, in order to accurately distinguish ambient noise from PS-generated announcements and background music. Gap sensing ANC technology shall not be employed.
8. Design Make/Model: Biamp Vocia ANC-1.

N. AMBIENT NOISE SENSING MICROPHONE (AMIC): AMICs shall be located in the ceiling of a zone, away from individual speakers and persons paging. These microphones are to be uninhibited by other ceiling systems.

1. Each AMIC shall have a pickup pattern best suited for the specific application.
2. Each AMIC shall be Self-Polarized Condenser type, phantom-powered from its ANC.
3. Each AMIC shall be mountable to ceiling tiles and panels of at least one inch thickness, or into a deep single-gang electrical box.
4. Design Make/Model:

O. RACK-MOUNTED INPUT DEVICE (RMID): Devices of this type serve to allow input from low-priority analog sources, such as Background Music (BGM) sources and local entertainment systems. Each RMID shall meet the following minimum specifications:

1. Powered over Ethernet (PoE), Class-3, and wired to the CobraNet VLAN.
2. The ability to output a Multicast Bundle of 6 monaural signals to the CobraNet VLAN.
3. Four pairs of unbalanced RCA jacks plus four balanced inputs. Each RCA jack pair shall mix to a single signal prior to digitization for stereo to mono summing.
4. Two balanced Mic/Line inputs with phantom power, to accommodate other sources.
5. Adjustment of input gain and phantom power via software.


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6. Complete DSP (digital signal processing) per input channel, including 5-band parametric filters and compressor/limiter.
7. Four Control Inputs, each with variable trigger thresholds and operation modes: high/low/toggle high/toggle low.
8. Four Form-C contact outputs with variable operation modes: high/low/pulse high/pulse low.
9. Ability to report and log any and all failure conditions associated with its operation.
10. Design Make/Model: Biamp Vocia VI-6.

P. ENHANCED RACK-MOUNTED INPUT DEVICE (ERMID): Devices of this type serve to allow input from third party analog or CobraNet sources, such as other paging/audio systems. In emergency systems it can act as a slave device to the LSI and be connected to building safety systems such as the Fire Alarm System (FAS) or Building Management System (BMS). It can also operate as a standalone device for non-emergency purposes. Each ERMID shall meet the following minimum specifications:

1. Primary and secondary power for ERMID shall be from approved 24VDC external power source.
2. Primary and Secondary CobraNet data ports wired to the CobraNet VLAN.
3. The ability to output a Multicast Bundle of 8 monaural signals to the CobraNet VLAN.
4. Eight balanced Mic/Line audio inputs with phantom power. Each balanced input shall mix to a single signal prior to digitization for stereo to mono summing.
5. Each balanced MIC/Line audio input shall be able to be automatically triggered when audio is sent to it (VOX).
6. Adjustment of input gain and phantom power via software.
7. Complete DSP (digital signal processing) per input channel, including 5-band parametric filters and compressor/limiter.
8. Eight Control Inputs, each with variable trigger thresholds and operation modes: high/low/toggle high/toggle low.
9. Eight Form-C contact outputs with variable operation modes: high/low/pulse high/pulse low.



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10. Ability to report and log any and all failure conditions associated with its operation.
11. Design Make/Model: Biamp Vocia VI-8.

Q. RACK-MOUNTED OUTPUT DEVICE (RMOD): Devices of this type serve as zone outputs to non-monitored sub-systems such as legacy amplifiers, audio recording devices or local entertainment systems. Each RMOD shall meet the following minimum specifications:

1. Power over Ethernet (PoE), Class-3, and wired to the CobraNet VLAN.
2. Four balanced analog audio outputs, selectable in software for +4/0/-10 dBu output levels.
3. Complete DSP (digital signal processing) per output channel, including page ducking, 5-band parametric filters, compressor/limiter, crossover, 8-band speaker equalization, and delay adjustable up to 500 milliseconds.
4. Four Control Inputs, each with variable trigger thresholds and operation modes: high/low/toggle high/toggle low.
5. Four Form-C contact outputs with variable operation modes: high/low/pulse high/pulse low.
6. Ability to report and log any and all failure conditions associated with its operation.
7. Each PSD10 will provide four auxiliary ports that can be used to input audio, relay input for triggering page codes and support for auxiliary microphones (AM) and Paging Station Interfaces (PSI).
8. Design Make/Model: Biamp Vocia VO-4.

R. ENHANCED RACK-MOUNTED OUTPUT DEVICE (ERMOD): Devices of this type serve as zone outputs to monitored sub-systems such as legacy amplifiers, audio recording devices, active loudspeakers or local entertainment systems that require provision for emergency messages and redundancy. Each ERMOD shall meet the following minimum specifications:

1. Power over Ethernet (PoE), Class-3, and wired to the CobraNet VLAN.
2. Four balanced analog audio outputs, selectable in software for +4/0/-10 dBu output levels.



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3. Complete DSP (digital signal processing) per output channel, including page ducking, 5-band parametric filters, compressor/limiter, crossover, 8-band speaker equalization, and delay adjustable up to 2700 milliseconds.
4. Programmable channel-to-channel fail-over capability or chassis-to-chassis failover capability.
5. Four Control Inputs, each with variable trigger thresholds and operation modes: high/low/toggle high/toggle low.
6. Provision for dual 24 VDC power input.
7. Primary and Secondary CobraNet data ports wired to the CobraNet VLAN.
8. Four Form-C contact outputs with variable operation modes: high/low/pulse high/pulse low.
9. Ability to report and log any and all failure conditions associated with its operation.
10. Ability to store emergency messages in on-board non-volatile digital memory.
11. Ability to support Ambient Noise Compensation (ANC) circuitry, to allow for consistent Background Music (BGM) and routine page levels per amplifier channel or group of channels.
12. Ability to support end-of-line monitoring devices (ELDs). Each ERMOD output module shall support up to 15 ELDs.
13. Primary and Secondary CobraNet data ports wired to the CobraNet VLAN.
14. Design Make/Model: Biamp Vocia VO-4e.

S. PAGING STATION, DESK-TYPE 4-BUTTON (PSD4):

1. Each PSD4 shall be Power over Ethernet (PoE), Class-3, and wired to the CobraNet VLAN.
2. Each PSD4 shall have four buttons, each assignable to a specific paging task, plus a large round push-to-talk button and LEDs to indicate “wait” and “talk now.”
3. Each PSD4 shall be equipped with a high quality dynamic cardioid (unidirectional) element, with integral secondary element for signal path testing, mounted on a flexible gooseneck.

4. Each PSD4 shall have integral DSP functions: 5-band parametric filters and compressor/limiter.
5. Each PSD4 shall have internal memory, sufficient to store delayed pages of up to 120 seconds duration, as well as four preamble WAV files.
6. Each PSD4 shall have a backlit LCD display, indicating page code (program) selected, availability of destination zones and security code entry, as well as other optional information.
7. Each PSD4 shall be capable of storing a live page message, when some destination zones are busy. The PSD4 shall release the message when all destination zones become available.
8. Each PSD4 shall have the ability to report and log any and all failure conditions associated with its operation.
9. Each PSD4 shall have the ability to be used for infinite live paging.
10. Each PSD4 shall have the ability to store a message from the microphone input and give the end user the ability to replay the message with an adjustable repetition count and/or repetition length.
11. Design Make/Model: Biamp Vocia DS-4.

T. PAGING STATION, DESK-TYPE 10-BUTTON (PSD10):

1. Each PSD10 shall be Power over Ethernet (PoE), Class-3, and wired to the CobraNet VLAN.
2. Each PSD10 shall have ten buttons (0 through 9, telephone-style), for the purposes of entering three-digit page codes and security codes. PSD10 shall also include a large round push-to-talk button and LEDs to indicate “wait” and “talk now.”
3. Each PSD10 shall be equipped with a high quality dynamic cardioid (unidirectional) element, with integral secondary element for signal path testing, mounted on a flexible gooseneck.
4. Each PSD10 shall have integral DSP functions: 5-band parametric filters and compressor/limiter.
5. Each PSD10 shall have internal memory, sufficient to store delayed pages of up to 120 seconds duration, as well as four preamble WAV files.


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6. Each PSD10 shall have a backlit LCD display, indicating page code (program) selected, availability of destination zones and security code entry, as well as other optional information.
7. Each PSD10 shall be capable of storing a live page message, when some destination zones are busy. The PSD10 shall release the message when all destination zones become available.
8. Each PSD10 shall have the ability to report and log any and all failure conditions associated with its operation.
9. Each PSD10 shall have the ability to be used for infinite live paging.
10. Each PSD10 shall have the ability to store a message from the microphone input and give the end user the ability to replay the message with an adjustable repetition count and/or repetition length.
11. Each PSD10 will provide an auxiliary port that can be used to input audio, control data (RS-232), relay input for triggering page codes and support for auxiliary microphones (AM) and Paging Station Interfaces (PSI).
12. Design Make/Model: Biamp Vocia DS-10.

U. PAGING STATION, WALL-TYPE 4-BUTTON (PSW4):

1. Each PSW4 shall be Power over Ethernet (PoE), Class-3, and wired to the CobraNet VLAN.
2. Each PSW4 shall have four buttons, each assignable to a specific paging task, plus LEDs to indicate “wait” and “talk now.”
3. Each PSW4 shall be equipped with a dynamic noise-canceling close-talking microphone with push-to-talk button, on a 4.5-foot heavy-duty coil cord, and with an integral secondary element for signal path testing.
4. The coil cord of each PSW4 shall be strain-relieved to its metal base structure, and shall be easily replaced with simple hand tools.
5. Each PSW4 shall have integral DSP functions: 5-band parametric filters and compressor/limiter.
6. Each PSW4 shall have internal memory, sufficient to store delayed pages of up to 120 seconds duration, as well as four preamble WAV files.
7. Each PSW4 shall have a backlit LCD display, indicating page code (program) selected, availability of destination zones and security code entry, as well as other optional information.



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8. Each PSW4 shall be capable of storing a live page message, when some destination zones are busy. The PSW4 shall release the message when all destination zones become available.
9. Each PSW4 shall have the ability to report and log any and all failure conditions associated with its operation.
10. Each PSW4 shall have the ability to have the hand-held microphone replaced at the project site.
11. Each PSW4 shall have the ability to be used for infinite live paging.
12. Each PSW4 shall have the ability to store a message from the microphone input and give the end user the ability to replay the message with an adjustable repetition count and/or repetition length.
13. Each PSW10 shall have the ability to be used as an Emergency Wall Station Type 4 button (EPSW10) purely by designating it as such in the manufacturers software application.
14. Design Make/Model: Biamp Vocia WS-4.

V. PAGING STATION, WALL-TYPE 10-BUTTON (PSW10):

1. Each PSW10 shall be Power over Ethernet (PoE), Class-3, and wired to the CobraNet VLAN.
2. Each PSW10 shall have ten buttons (0 through 9, telephone-style), for the purposes of entering three-digit page codes and security codes plus LEDs to indicate “wait” and “talk now.”
3. Each PSW10 shall be equipped with a dynamic noise-canceling close-talking microphone with push-to-talk button, on a 4.5-foot heavy-duty coil cord and with an integral secondary element for signal path testing.
4. The coil cord of each PSW10 shall be strain-relieved to its metal base structure, and shall be easily replaced with simple hand tools.
5. Each PSW10 shall have integral DSP functions: 5-band parametric filters and compressor/limiter.
6. Each PSW10 shall have internal memory, sufficient to store delayed pages of up to 120 seconds duration, as well as four preamble WAV files.
7. Each PSW10 shall have a backlit LCD display, indicating page code (program) selected, availability of destination zones and security code entry, as well as other optional information.


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8. Each PSW10 shall be capable of storing a live page message, when some destination zones are busy. The PSW10 shall release the message when all destination zones become available.
9. Each PSW10 shall have the ability to report and log any and all failure conditions associated with its operation.
10. Each PSW10 shall have the ability to have the hand-held microphone replaced at the project site.
11. Each PSW10 shall have the ability to be used for infinite live paging.
12. Each PSW10 shall have the ability to store a message from the microphone input and give the end user the ability to replay the message with an adjustable repetition count and/or repetition length.
13. Each PSW10 shall have the ability to be used as an Emergency Wall Station Type 10 button (EPSW10) purely by designating it as such in the manufacturers software application.
14. Design Make/Model: Biamp Vocia WS-10.

W. PAGING STATION INTERFACE MODULE (PSIM): In the event that the client requires a third-party paging solution to be created then the PSIM shall be used to interface that solution into the PS.

1. The PSIM shall be connected to a paging station via RS-232, balanced analog audio and a relay to allow Push To Talk functionality.
2. It shall be powered via the paging station or RMID over Cat5, Cat5e, Cat6 or Cat7 cabling.
3. The PSIM shall support user adjustable audio input sensitivity.
4. It shall have an LED to indicate powered status.
5. It shall be CE marked, UL listed and comply with the RoHS directive.
6. Design Make/Model: Biamp Vocia VPSI-1.

X. AUXILIARY STATION, WALL-TYPE 1-BUTTON (AS1): In applications such as airports or in an industrial environment a simplified version of the paging station is required for areas such as jetways or shop floors. For this purpose a single button wall mount microphone that connects to either a paging station or a Rack Mounted Input Device shall be used.


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1. Each AS1 shall be wired using standard CAT5, CAT5e or CAT6 cabling and connected to a paging station or Rack Mounted Input Device.
2. The AS1 is not an Ethernet device and therefore should not be connected to a network switch.
3. The zone routing, priority level and type of message will be determined in the manufacturers software and is fixed so that by simply pushing the PTT button the required page code shall be called.
4. Each AS1 shall be equipped with a dynamic noise-canceling close-talking microphone with push-to-talk button, on a 4.5-foot heavy-duty coil cord and with an integral secondary element for signal path testing.
5. The coil cord of each AS1 shall be strain-relieved to its metal base structure, and shall be easily replaced with simple hand tools.
6. The DSP functions for the AS1 shall be found in the supporting device (either paging station or RMID).
7. Each AS1 will have two LEDs that indicate wait, talk now and paging unavailable states.
8. The AS1 is fully monitored by the device it is connected to (either paging station or RMID).
9. Each AS1 shall have the ability to have the hand-held microphone replaced at the project site.
10. Each AS1 shall have the ability to be used for infinite live paging.
11. Design Make/Model: Biamp Vocia VAM-1.

Y. MESSAGE SERVER (MS): The Message Server is a device that supports advanced paging functionality such as prerecorded message storage, scheduled events, third party control interfacing, storage of logged system data, auto configuration of replacement devices, inter PS paging & control, time server support and VoIP telephone paging.

1. Each MS shall be a single rack space Linux server, powered by 120-240VAC Mains.
2. Each MS shall be wired to the CobraNet VLAN and the Control Network VLAN. If Telephone Paging is enabled, then it shall be wired to the VoIP VLAN as well if required by the VoIP PABX.

3. Each MS shall have a hard drive with minimum capacity of 80 GB, for storage and playback of recorded announcements and preambles.
4. Each MS shall act as a Configuration Server for the entire PS, and have the ability to automatically program replacement devices, as needed.
5. Each MS shall include a VoIP Trunk Server, and support SIP (Session Initiation Protocol) calling, for purposes of telephone-based paging.
6. Callers using VoIP into the MS shall be given options relating to entering of security codes, the voice prompts provided and whether an extension will be directly linked to a three-digit page code. The voice prompts and extension numbers shall be programmable.
7. Each MS shall have an integral scheduler, for purposes of scheduling automated events throughout the PS system.
8. Each MS shall store log data from all system components, and be able to download that data to attached computer(s).
9. Third party control of the MS shall be possible via Ethernet or RS-232.
10. Multiple MS (up to 10) can be used in the same local paging system for redundancy and load sharing purposes. MS can be placed in separate locations to even larger paging systems in other physical locations.
11. Each MS shall be capable of supporting a complementary text to speech server (TTS).
12. Design Make/Model: Biamp Vocia MS-1e.

Z. WALL REMOTE (WR):

1. Each WR shall be Powered over Ethernet (PoE), Class-1, and wired to the CobraNet VLAN.
2. Each WR shall include a back-lit multifunction LCD display and four buttons for user control, and mount over a standard 2-gang North American electrical box.
3. Each WR shall allow level control over the BGM for the zone to which it is assigned.
4. Each WR shall allow selection of BGM sources, among those programmed to be available for the WR's assigned zone.



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5. Each WR shall allow muting of low, medium and high-priority pages, if this feature is enabled from the Manufacturer Software. Urgent priority and emergency level pages will not be affected.
6. Design Make/Model: Biamp Vocia WR-1.

AA. LIFE SAFETY INTERFACE (LSI): This unit acts as the interface to building safety systems such as the Fire Alarm System (FAS) or Building Management System (BMS), and adds the functions required to have the PS participate in a Life-Safety system.

1. Primary and secondary power for LSI shall be from approved 24VDC external power source.
2. Tertiary power for LSI shall be via Power over Ethernet (PoE) switch, Class-3, wired to the CobraNet VLAN.
3. Further backup power can be sourced for the LSI via PoE switch, Class-3, via the secondary CobraNet port.
4. LSI shall include front-panel LED indications for: Primary Power Present, System Fault, General Alarm, General Fault, Power Supply Fault, Protection Fault, Path Fault, Aux Power Present, Zone Alarms 1 through 8, Zone Faults 1 through 8.
5. LSI shall have control of four emergency zones. Optional module can be fitted to increase this to 20 emergency zones, and for further increases the GPIO device can be used to support emergency zones as a slave device to the LSI.
6. In EN54-16 and other certified systems the LSI shall be used in junction with the Control Interface (CI) as listed under x. of this specification.
7. The LSI is responsible for monitoring all emergency devices within the Paging System and reporting faults and alarms to the FAS and/or BMS.
8. The LSI is responsible for receiving and acting upon alarm triggers that are sent to it from the FAS.
9. Design Make/Model: Biamp Vocia LSI-16 or Biamp Vocia LSI-16e.

BB. CONTROL INTERFACE (CI): This unit acts as an interface to building safety systems such as the FAS and/or BMS, and adds the functions required to have the PS participate in a Life-Safety system under EN54-16 and other life safety standards.


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1. Primary power for CI shall be from approved 24VDC external power source.

2. Secondary power for CI shall be via an approved 24VDC power source.

3. LSI shall include front-panel push buttons that control the functions ‘Local Silence’, ‘System Test’ and ‘System Fault Reset’.

4. The CI shall be fitted with an internal local sounder which commences whenever any Alarm input receives an external signal from the fire detection equipment or control and indicating equipment (CIE) or equivalent. It will also commence when any Fault is detected.

5. The CI shall connect directly to the LSI as well as the FAS and/or the BMS and provide the LSI with power and alarm signal.

6. Design Make/Model: Biamp Vocia CI-1.

CC. GENERAL PURPOSE INPUT OUTPUT DEVICE (GPIOD): This unit has a dual purpose within the PS. It can be used to receive and output contact closures for both regular and emergency functions in the PS. In emergency systems it can act as a slave device to the LSI and be connected to building safety systems such as the Fire Alarm System (FAS) or Building Management System (BMS). It can also operate as a standalone device for non-emergency purposes.

1. Primary and secondary power for GPIOD shall be from approved 24VDC external power source when used as an emergency device.

2. Power and data communications for the GPIOD shall also be able to be sourced via Power over Ethernet (PoE) switch, Class-3, wired to the CobraNet VLAN.

3. Further backup power and data communications can be sourced for the GPIOD via PoE switch, Class-3, via the secondary CobraNet port.

4. The GPIOD shall contain 16 inputs and 16 outputs for a total of 32 possible connections.

5. The GPIOD shall be able to support general functions, emergency functions or any combination of the two within the same chassis and configuration file.

6. General functions such as prerecorded message triggering and scheduler triggering require an MS device as noted under u. of this specification.

7. When used as an emergency device the GPIOD must be used in conjunction with the Life Safety Interface enhanced version (LSIe variant) as listed under w. of this specification.
8. The LSIe is responsible for monitoring all emergency devices including any attached GPIOD within the Paging System and reporting faults and alarms to the FAS and/or BMS.
9. The LSIe is responsible for receiving and acting upon alarm triggers that are sent to it from the GPIOD.
10. Design Make/Model: Biamp Vocia GPIO-1.

DD. TEXT TO SPEECH SERVER (TTS): The system shall be able to interface to an optional Text-to-Speech Server with available language packages, for proper enunciation of messages entered as text by the PS System Operator or applicable third party control systems. This device can also be used for interfacing with third party nurse call systems to automate code calling.

1. The TTS shall be on an industrial style 1RU server powered by 120/240 volt mains.
2. Each TTS shall be wired to the CobraNet VLAN and the Control Network VLAN.
3. The TTS is supported by the MS so this must be present and accessible on both the CobraNet and Control Network VLAN's.
4. The TTS shall support at least 65 different voice fonts.
5. Each voice font will contain a language, accent and gender that are specific to the voice font.
6. Voice fonts will be licensed and provision shall be made to ascertain the client's requirements for languages.
7. If nurse call functionality is required then the nurse call version of the TTS must be ordered.
8. The nurse call version will support the standard TAP language for control communications with the third-party nurse call system.
9. The nurse call version will allow the use of groups to construct the code calls for broadcast through the PS.
10. Design Make/Model: Biamp Vocia TTS-1e or Biamp TTS-1nce.



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EE. VOIP DEVICE (VOIPD): This unit can be used to receive VOIP calls from an attached VOIP system. These calls can be made live into the PS or via a voice prompt based delayed function. The VOIPD can be used as an emergency input device if required or as a standalone device.

1. Primary and secondary power for VOIPD shall be from approved 24VDC external power source when used as an emergency device.
2. Data communications for the VOIPD shall via Ethernet and wired to the CobraNet VLAN.
3. The VOIPD shall be factory fitted with either 2 or 4 VOIP input lines depending upon installation requirements.
4. The VOIPD shall support Session Information Protocol (SIP), and be capable of supporting G. 711, G.711A, G.722, G.729AB, G.723.1 voice codecs.
5. DTMF tones shall be supported on each VOIP line to trigger PS events.
6. The VOIPD shall support live paging input directly into the PS, and the ability for user defined voice prompts to be supported shall also be possible.
7. Signal processing shall include five band parametric equalization, compression and PIN code access per line.
8. When used as an emergency device the VOIPD must be used in conjunction with the Life Safety Interface enhanced version (LSIe variant) as listed under w. of this specification.
9. Design Make/Model: Biamp Vocia VOIP-1.

FF. POTS DEVICE (POTSD): This unit can be used to receive analog telephone calls from an attached analog phone system (POTS). These calls can be made live into the PS or via a voice prompt based delayed function. The POTSD can be used as an emergency input device if required or as a standalone device.

1. Primary and secondary power for POTSD shall be from approved 24VDC external power source when used as an emergency device.
2. Data communications for the POTSD shall via Ethernet and wired to the CobraNet VLAN.
3. The POTSD shall be factory fitted with either 2 or 4 VOIP input lines depending upon installation requirements.
4. The POTSD shall support Session Information Protocol (SIP).

5. DTMF tones shall be supported on each POTS line to trigger PS events.
6. The POTSD shall support live paging input directly into the PS, and the ability for user defined voice prompts to be supported shall also be possible.
7. Signal processing shall include five band parametric equalization, compression and PIN code access per line.
8. When used as an emergency device the POTSD must be used in conjunction with the Life Safety Interface enhanced version (LSIe variant) as listed under w. of this specification.
9. Design Make/Model: Biamp Vocia POTS-1.



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