

**Praesideo
Architect's and Engineer's
Specification**

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1. Executive summary

The Praesideo system is designed to meet the highest audio and Public Address requirements and to be completely compliant to the relevant international and national standards for voice evacuation in mind. Full compliancy to the international IEC60849 standard is certified by an independent certification agency.

1.1. Digital audio

The Praesideo system provides the full advantages of digital audio processing. With this system, almost any small or large public address and emergency system requirements can be satisfied. The Praesideo system has 28 simultaneous audio channels available for audio transportation. The Praesideo system is designed for a ring network so that a single break in the system does not affect the system performance. A branched tree topology without redundancy is also allowed.

The Praesideo system also provides extensive audio processing facilities. The equipment is provided with digital audio processing facilities for all audio inputs and outputs. The call stations are also provided with audio processing facilities. The audio transport from the call stations to the power amplifier is achieved by using digital audio technology right up to the amplifying circuits, before which the digital audio is converted to analogue audio.

1.2. Web-based technology

The Internet has changed expectations from all kinds of systems. The Praesideo system network controller includes a web server, which can be accessed by any properly authorized workstation connected to the network. It means that for diagnostic & logging or even configuration, there is no need to have dedicated software installed in the PC.

The web technology-based system gives users significant benefits. More and more companies are using web technology for their user interfaces and system interaction. The Praesideo system is the world's first web technology-based digital public address and emergency system.

1.3. The functional combination

The Praesideo system is designed to satisfy even the most difficult requirements. Various functions are combined and incorporated in each system unit, such as audio processing and speaker line monitoring in the power amplifier. Even the delay function amplifier channel is also incorporated in the power amplifiers. With various functions incorporated in the different system units, it is very easy for installers to create a system, which can satisfy any specific requirements. The network-based concept also makes the choice of system units easier.

1.4. Software

The system is provided with configuration and diagnostic & logging software as standard. The configuration software can be used to configure all system parameters. The software is designed to allow even first-time users to navigate through the configuration and to enter various parameters of the system. The configuration software ensures that if the installer follows the sequence as displayed on the menu, there will be no chance of missing any of the configuration items.

The diagnostic & logging software provides extensive diagnostic and logging functions. This software enables the user to find details of the status changes in the system, including the status of the call events.

1.5. Display on equipment

The system units have a 2 x 16-character display for user interaction. The navigation control enables the user to view settings of that particular equipment on the display, including channel selection for audio monitoring.

1.6. External interfaces

The network controller has two types of interfaces; Ethernet and control inputs/outputs for interfacing with other systems. In most public address and emergency systems, the fault status and other status changes have to be reported to a central building management system.

The Praesideo system can accept large numbers of control inputs, which can be used to initiate actions in the Praesideo system. The system also has control outputs, which can be used to interface with external systems.

1.7. Using the architect's specification

When preparing a specification, tender or quotation for a digital public address or emergency system, it may be necessary to provide a detailed functional description of all the equipment supplied. The architect's and engineer's specifications presented in this publication are intended to be used for these purposes and may be copied and/or reproduced as required.

2. Introduction

2.1. *Praesideo system*

Praesideo is a fully digital public address system that meets all the requirements placed by professional users on a public address/emergency system. Full compliance to the international IEC 60849 standard is certified by an independent certification agency. The heart of the system is the network controller, which includes also a web server, and can handle even complex functions. The Praesideo system is the first public address and emergency system to use web technology and digital audio transportation and processing. The Praesideo system provides a very user-friendly user interface.

The system design is based on a network-based concept. This means that the system allows additional functions to be added at any time by adding more equipment. The system conforms to all the emergency specifications.

2.2. *Architect's specification*

This architect's specification meets the need of contractors, consultants, end users and other professionals involved in project management or in designing, specifying and purchasing public address or emergency systems.

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3. Scope of the specification

The specification covers the provision, installation and maintenance of the Praesideo system, which includes various functional requirements of the system. The specification covers all the emergency requirements under IEC60849 and other emergency requirements in force in various other countries. The specific requirements for digital announcement and chimes are also part of this specification.

Selection and combination of the required network based system units shall provide the specific functions needed in any individual situation. The system can be extended in functionality and size by adding the required number of compatible units, thereby providing simple and cost effective solutions.

4. System summary

4.1. System overview

The public address and emergency sound system shall provide digital audio signal processing and transmission of audio signals via a simple network system. The audio transportation in the system shall be in digital form except for the 100V loudspeaker lines from the power amplifiers. It shall be possible to use the system with or without a PC connected to the network controller. The network controller shall be based on web technology. The system shall be tested and certified to compliant to the IEC60849 specification.

The public address and emergency sound system shall be a networked sound management system. The system elements shall be connected by the daisy chain principle. The interconnection between the system units shall be achieved by using either plastic or glass optical fibre cable. The units shall have individual addresses, which are automatically checked by the network controller. These addresses will be input by the user and the network controller shall verify the input data. The network controller shall have Ethernet and RS232 interfaces. The system cabling shall be done in such a way that a single failure on the system cable shall not affect the proper functioning of the system.

The system shall have both audio and data communication via the fibre cable. All equipment with either audio input or output functions shall have built-in audio processing facilities. The audio processing shall be done in the digital domain. The user-friendly audio-processing user interface can be used for adjusting the audio processor for various audio inputs and outputs.

The public address and emergency sound system range shall include network controllers, power amplifiers, call stations, audio expanders and both high- and low-level interfaces for connection to external systems. The system shall be able to monitor all equipment in the system and report faults to the network controller. Each audio input or output equipment shall have a headphone socket for audio monitoring. The network controller shall have a loudspeaker, which can be used for audio monitoring.

The PA system has various functions, the most important of which are as below:

- The PA system is the medium to make public broadcasts of routine, situational, important and emergency announcements.
- The PA system shall provide simultaneous broadcasting of different calls to different locations.
- The PA system is also the medium to broadcast background music to all or selected locations.
- The PA system shall provide an automatic announcement facility for making routine, situational and emergency announcements.

All the main functions shall be provided by the system. The system shall be simple and logical to operate for anyone. The system shall provide a means to give customized indications for the selection buttons of the call stations.

The system shall store at least the last 200 fault messages in the memory of the network controller. It shall be possible to log any changes in status of the system in an external PC connected to the Ethernet port of the network controller.

4.2. System functions

The system in its complete configuration shall provide the following functions:

- Routing of audio from any input to any output. The system shall be freely programmable.
- Routing of multiple background music to different zones or audio outputs.
- A minimum of 28 simultaneous audio channels shall be available for communication.
- The system shall satisfy the emergency specification IEC60849 and shall be tested and certified to be compliant to IEC60849.
- The system shall be configurable using the configuration software supplied.
- The network controller shall be able to be connected to the local area network of the building, and shall be accessible by any of the workstations connected to the network with password protection.
- The system shall control and execute calls and other activities according to priority settings.
- The system shall monitor the correct operational status of the amplifiers and shall change over to a spare power amplifier in case of a fault.
- The loudspeaker lines shall be monitored for short circuit, open circuit and short to ground. The loudspeaker line itself shall be the communication medium for the end-of-line unit to the power amplifier.
- All audio inputs and outputs shall be provided with digital parametric equalizers.
- Audio transportation between all system units shall be in the digital domain.
- The system shall provide interfaces to external systems either at high level or via control outputs. These interfaces may be for fault reporting or for reporting status changes.
- The system shall be easily expandable by adding new hardware and reprogramming the configuration data.
- The system shall include very user-friendly call stations at which the operator can easily determine whether the selected outputs are occupied by higher- or lower-priority calls. The operator shall also have the option of listening to the chime/pre-recorded announcements via the loudspeaker in the call station.
- Each part of the system from the call station microphone capsule to the end of the loudspeaker line shall be monitored. Any faults detected shall be reported to the network controller.
- The power amplifier channels shall be provided with digital delay for audio outputs. This delay shall be configurable in the configuration software.

4.3. Compliance

The system shall be certified to be compliant to IEC60849 and compliant to other relevant local standards.

4.4. System configuration

The PA system shall be a networked configuration with the following system configuration:

- Network controller, which controls and monitors all activities in the system.
- Call stations, which can initiate any actions in the system.
- Automatic messages stored in the network controller shall be able to be activated by any of the control inputs or call stations.
- The amplifier channels shall provide 100V, 70V or 50V audio outputs.
- The power amplifier types shall be 1 x 500W, 2 x 250W, 4 x 125W or 4 x 60W.
- Audio expander for providing additional audio inputs, audio outputs, control inputs and control outputs.
- The system shall have the possibility to provide custom-made call stations using the standard available hardware.
- The system shall have audio outputs, which can be used for recording of emergency announcements.

4.5. System installation and interconnection

The following aspects must be taken into account in the installation of the PA/emergency system:

- The whole building is divided into various functional zones. A functional zone consists of single or multiple public address and emergency sound system zones.
- The cable connections between the system units shall be arranged in a loop so that in case of a single interruption in the loop the system will still operate normally. The system cable fault shall be reported at the network controller.
- The system network cable shall be plastic fibre or glass fibre.
- It shall be possible to split the main fibre optic cable for branching of network lines.

4.6. Interfaces

- The network controller shall have provision for communication with the configuration PC via Ethernet.

4.7. Functional specification

- The system shall be designed in such a way that the individual PA/emergency/functional zone can be addressed.
- The whole building shall be divided into various emergency zones. An emergency zone shall consist of single or multiple PA zones. These emergency zones shall be individually addressable.
- Some of the zones shall be designed to have dedicated local music sources. These music sources shall also be located at the zones where the music has to be broadcast. These zones shall be occupied with the local music source only when it is available. If the local music source is not available, the zone shall receive music from the common music channels.
- It shall be possible to inject power to the system at any part of the system cabling using the network splitter or fibre interface.
- The network controller, power amplifiers and audio expander shall have a 2 x 16 LCD display to show their own settings.

- The system shall be able to perform monitoring of all equipment and cabling. Any faults in the system shall be reported to the network controller.
- The system shall be configured from a PC connected to the network controller. The network controller shall be able to operate in stand-alone mode.
- The system shall be able to make emergency calls (all calls) even if the network controller has failed.
- The system shall have built-in and configurable facilities for automatic volume control.
- The network controller shall be compatible for connection to a local area network. The call functioning shall be independent of any failure in the local area network.
- It shall be possible to enable and disable any equipment in the system even though it is still physically present in the system.
- It shall be possible to enable and disable any of the system's inputs and outputs.
- It shall be possible to assign an IP address to the network controller according to the local area network addresses used in the building.
- The power switch of the power amplifiers shall be at the rear of the unit so that accidental switching is avoided.
- The individual zones shall be able to have different volume settings using a two-time slot. The volume settings shall be different for background music and call.
- The fans in the units shall be temperature controlled.
- It shall be possible to have one start chime and an end chime for a call.
- The system shall have distributed audio processing facilities so that the network controller is dedicated to routing and resource control functions.
- The system shall have an internal real time clock.
- The network controller shall have automatic message storage, with an audio storage capacity depending only on the memory size of the flash card. The message player shall be able to play 4 audio messages simultaneously. The audio messages shall be monitored for presence.
- The network controller shall be able to route up to 28 audio channels simultaneously through the network using dynamic channel allocation to avoid/minimize any call conflicts in the system.
- The network controller shall store the last 200 fault messages in the system.
- The network controller shall be able to be connected to the local area network of the building. The system status can be viewed by authorized users with a valid access user id and password at a PC connected to the local area network.
- It shall be possible to assemble customized call stations using standard hardware from the system.
- The background music volume shall be able to be controlled from a call station, for zones, which are pre-assigned to the call station.
- The control input shall be able to monitor the cable connected to it.
- The system shall have distributed control inputs, which are freely programmable.
- The characteristics of the control input shall be configurable for momentary or toggle. The characteristics can be configured using configuration software.
- The system shall have distributed control outputs, which shall be freely programmable for faults or calls.
- The power amplifiers shall be able to be placed anywhere in the system as long as the unit address matches with the hardware connections.

- The power amplifiers shall be provided with control outputs, which can be locked to the amplifier channels (zones) so that these can be used for amplifier channel-related functions such as volume control override.
- The power amplifiers shall have the provision to connect a 48V DC supply, and the availability of the 48V DC supply shall be monitored.
- The power amplifiers temperature shall be measured, if the temperature rises above the normal operating level it shall be reported to the network controller.
- All zones shall have individual amplifier channels.
- It shall be possible to configure the system in off-line mode. This will allow any modifications in the system configuration to be made in advance and downloaded when there is no activity in the system to avoid disturbances in the system.
- The file transfer between the PC and the network controller shall use the standard Windows applications with a user-friendly user interface.
- The operating status of the call station microphone capsule shall be monitored.
- It shall be possible to monitor the audio output of the power amplifier using the headphone socket of the power amplifier. The display shall show the VU meter reading of all the amplifier channels in the default mode.
- Faults in the system shall be acknowledged to mute a sounder connected to the audible alarm relay. The fault status shall be set automatically to resolved after the fault has been resolved, then the fault can be reset.
- The call station shall be able to make a partial call. If a call is partially interrupted by a call with higher priority, the call shall be broadcast to the available zones without any interruption.
- The call station keypad address shall be assigned with a switch so that in case of any fault the keypad can be replaced without any reprogramming.
- If a call macro is selected using a keypad key, the call macro associated with the press-to talk button shall be overruled by the selected call macro.
- It shall be possible to recall the last call with a recall key.
- The configuration settings shall be able to be downloaded to the PC from the network controller.
- It shall be possible to have real-time adjustment of the audio processing facility with the user interface.
- There shall be limited event logging on the network controller with the name of the triggering unit of an activity.
- Configuration changes in an operational system shall be made on a shadow except for the real-time adjustments. These changes will become effective after saving and rebooting.
- The user shall be able to give names to pre-recorded messages. The pre-recorded messages shall be stored as a set of wav files.
- It shall be possible to allocate multiple pre-recorded messages to a selection key, together with the outputs and press-to-talk functions.
- It shall be possible to create a call macro which is a combination of call activities, properties and destinations that can be used by any call station or control input.
- The audio input type (line/mic.) shall be assigned in the configuration software.
- It shall be possible to set the background music volume for individual zones.
- All calls shall be logged with date, time, initiating unit, key details and destinations in the PC log file.
- The fault and event file in the network controller shall be a circular file so that no file management is required.

- The emergency call station shall be able to add zones to a running call.
- It shall be possible to make emergency announcements even if the network controller is faulty.

5. Network controller

The control unit is the heart of the public address system. The unit is capable of routing 28 audio channels, delivering power to the system, fault reporting and controlling of the system. The audio inputs can be calls from call stations, background music or local audio inputs. This unit can work either in stand-alone mode or with a PC connected to it. The control unit can be configured for any complex public address configuration via the PC. The PC connected to the network controller unit shows all status changes in the system with the configuration and diagnostic & logging software. The unit is supplied with user-friendly configuration and diagnostic & logging software. The unit shall be certified to be compliant to IEC60849 and compliant to other relevant local standards.

The unit can be installed freestanding on a tabletop or mounted in a 19" rack. It shall have the following functions:

- The network controller shall have 4 analogue audio inputs. Two of these inputs shall be selectable between microphone and line. The other 2 inputs shall be fixed as line inputs.
- There shall be 8 control inputs, which are freely programmable. These can be programmed for actions to be done in the system and assigned priorities.
- The network controller shall have 4 analogue audio line outputs.
- The audio line outputs shall have a selectable 20kHz monitoring signal.
- The control output shall be freely programmable for faults and calls.
- The network controller shall be able to feed up to 61 nodes in a redundant ring network. The unit shall be supplied with a switch mode power supply.
- The network controller shall have a redundant network wiring capability.
- The network controller shall have the capability to handle 256 priorities and 248 zones.
- The front panel shall have a 2 x 16-character LCD display and a rotary control to navigate through the menu.
- The network controller shall be provided with a storage facility for the last 200 fault messages in the system.
- The network controller shall have a socket for the flash memory card, which is available commercially as the storage device for the pre-recorded audio messages. The user shall be able to select the memory size of the compact flash memory card according to his storage requirements for the audio messages. The network controller shall be capable of playing four messages simultaneously. The status of the digital audio storage and the messages shall be monitored. The audio messages (stored as a set of wav files) can be downloaded from a computer via the Ethernet link.
- The network controller shall monitor the status of all equipment in the system and report status changes.
- The network controller shall monitor the microphone capsule of a call station microphone and report any fault.
- The external cables connected to the control inputs shall be monitored for short and open circuits.
- Attention and alarm tone definitions shall be stored in the network controller. These tones can be accessed by any call stations or control inputs for announcement broadcast or alarm broadcast.

- The network controller shall have an internal real time clock.
- The network control unit shall have extensive audio processing possibilities for audio inputs and audio outputs. Parametric equalisation, limiter, and gain can be adjusted with the configuration software.

5.1. Interfaces

- Ethernet interface for connection to a PC or any external devices/systems.
- 2x system network connection.

5.2. Indications and controls

- 2 x 16-character LCD display for status display.
- Rotary control for selection of system enquiry mode and change in volume for the headphone or internal speaker.
- Power supply ON/OFF switch and indication

5.3. Inputs

- 8 x control inputs.
- 2 x selectable analogue audio inputs between line and mic.
- 2 x selectable analogue line audio inputs

5.4. Outputs

- 5 x control outputs (of which two dedicated fault contacts)
- 4 x analogue audio line outputs
- 1 x internal speaker
- 1 x headphone output

6. Audio expander

The audio expander shall be able to insert external audio signals to the system and extract audio signals from the system. This unit shall be provided with control inputs and control outputs for external interfacing. The audio inputs can be routed to any of the zones or other audio outputs permanently or conditionally. The routing condition can be configured using the configuration software. The audio output can be programmed for extracting audio from any of the audio inputs. The unit shall be certified to be compliant to IEC60849 and compliant to other relevant local standards. The equipment can be used as tabletop or 19" rack mounting.

- The audio expander shall have 4 analogue audio inputs. Two of these inputs shall be selectable between microphone and line. The other 2 inputs shall be fixed as line inputs.
- There shall be 8 control inputs, which are freely programmable. These can be programmed for actions to be done in the system and assigned priorities.
- The audio expander shall have 4 analogue audio line outputs.
- The audio line outputs shall have a selectable 20kHz monitoring signal.
- It shall have 5 control outputs, which are freely programmable for faults and calls.
- It shall be possible to use the microphone/line input like a call station input if it is programmed conditionally to any control input
- The 2 x 16-character display and rotary control shall provide the possibility to carry out status enquiries belonging to that particular unit. The display shall show the VU meter reading when the audio monitoring mode is selected. The audio output can be monitored by connecting a headphone to the headphone socket. The fault status of the unit shall be monitored continuously and reported back to the network controller.
- The control input shall be programmable for momentary or toggle operation. This selection can be made in the configuration software.
- Each control input shall have the ability to monitor the cable between the control input and the external switch for open and short circuits.
- The control output shall have break and make contacts.
- The audio expander shall be designed for redundant network wiring.

6.1. Interfaces

- 2x system network connection.

6.2. Indications and controls

- 2 x 16-character LCD display for status display.
- Rotary control for selection of system enquiry mode and change in volume for the headphone or internal speaker.
- Power supply ON/OFF switch and indication.

6.3. Inputs

- 8 x control inputs
- 2 x selectable analogue audio inputs between line and mic.
- 2 x analogue line level audio inputs

6.4. Outputs

- 5 x control outputs
- 4 x analogue line level audio outputs
- 1 x headphone output

7. Network splitter

The network splitter is used in conjunction with the system installation to provide two tap offs in the main cable run. The unit can be connected to an external DC supply or it can use the supply from the network controller. If a local supply is connected, the unit shall automatically be powered from the local supply. It shall be possible to reduce the maximum power fed to tap-off outlets.

- The network splitter shall have 2 LEDs for diagnostic purposes.
- The current limit shall be selectable. The selection can be made after opening the cover.
- The external power from the local supply shall only feed the added branches.
- The local power supply shall be 48V DC.

7.1. Interfaces

- 2 x system network main connection
- 2 x system network tap off connection

7.2. Indications and controls

- 2 LEDs for the following status indications:
 - No power
 - Functioning correctly
 - No network connected or network fault
- One jumper to select if power to the branches is switched off when the power from the main branch is removed.

8. Fibre interface

The fibre interface is used in conjunction with the system installation to convert from glass fibre optical cable to plastic fibre optical cable or vice versa. This unit shall support the redundant wiring topology. The unit can be provided with an external DC supply or it can use the supply from the network controller. If the local supply is connected, the unit shall automatically be powered from the local supply.

- The fibre interface has 2 LEDs for diagnostic purposes (see the table).
- The local power supply shall be 48V DC.

8.1. Interfaces

- 1 x system network connection for plastic optical fibre.
- 1 x system network connection for glass optical fibre.

8.2. Indications and controls

- 2 LEDs for status indications. Colours are yellow and green. Indications are as below:
 - Off; No external power available
 - Standby; external power to POF switched off
 - Operating; external power to POF switched on
 - Operating; no external power available but powered from the POF side
 - Fault; no external power available and no protocol received
 - Fault; external power available but no protocol received

8.3. Inputs

- 2 x control inputs

9. Power amplifiers

9.1. Power amplifier 1 x 500W

The main function of the power amplifier is the amplification of audio signals for the loudspeakers. It shall be possible to select the output voltage between 100V, 70V or 50V by changing jumpers. The power amplifiers are provided with a 2 x 16-character display for status display. The unit shall be certified to be compliant to IEC60849 and compliant to other relevant local standards.

The equipment can be used as tabletop or 19" rack mounting.

- The power amplifiers shall have 2 auxiliary audio inputs.
- The audio input of the power amplifier can be selected as automatic volume control input.
- The 8 x control inputs are freely programmable. These can be programmed for actions to be initiated in the system and can be assigned with priorities.
- The 1 x control output shall be freely programmable and can be programmed for faults and calls.
- The 2 x 16-character display and rotary control on the front panel are used for status enquiries and monitoring functions. The display shall show the VU meter reading when the audio monitoring mode is selected. The audio output can be monitored by connecting a headphone to the headphone socket. Status changes of the unit shall be monitored continuously and reported to the network controller for fault/status reporting.
- The control input can be programmed for momentary or toggle operation. This selection can be made in the configuration software.
- The control input shall have the ability to monitor the cable between the control input and the external switch against open and short circuits.
- The power amplifier shall be designed for redundant network wiring.
- The amplifier monitoring and changeover facility shall be incorporated in the power amplifier. The changeover relays shall be included in the unit.
- The unit shall incorporate digital audio processing possibilities for 3 sections of parametric equalisation and 2 sections of shelving equalisation and audio delay.

9.1.1. Interfaces

- 2 x system network connection.

9.1.2. Indications and controls

- 2 x 16-character LCD display for status display
- Rotary control for selection of system enquiry mode and change in volume for the headphone
- Power supply ON/OFF switch on the back

9.1.3. Inputs

- 8 x control inputs
- 2 x audio inputs

9.1.4. Outputs

- Selectable 100V, 70V or 50V outputs for each power amplifier. An additional fixed 50V output shall be provided for each amplifier channel.
- 1 x control output
- 1 x amplifier channel outputs
- 1 x headphone output

9.2. *Power amplifier 2 x 250W*

The main function of the power amplifier is the amplification of audio signals for the loudspeakers. It shall be possible to select the output voltage between 100V, 70V or 50V by changing jumpers. The power amplifiers are provided with a 2 x 16-character display for status display. The unit shall be certified to be compliant to IEC60849 and compliant to other relevant local standards.

The equipment can be used as tabletop or 19" rack mounting.

- The power amplifiers shall have 2 auxiliary audio inputs with microphone/line level selection.
- The audio input of the power amplifier can be selected as automatic volume control input.
- The 8 x control inputs are freely programmable. These can be programmed for actions to be initiated in the system and can be assigned with priorities.
- The 2 x control outputs shall be freely programmable and can be programmed for faults and calls.
- The 2 x 16-character display and rotary control on the front panel are used for status enquiries and monitoring functions. The display shall show the VU meter reading when the audio monitoring mode is selected. The audio output can be monitored by connecting a headphone to the headphone socket. Status changes of the unit shall be monitored continuously and reported to the network controller for fault/status reporting.
- The control input can be programmed for momentary or toggle operation. This selection can be made in the configuration software.
- The control input shall have the ability to monitor the cable between the control input and the external switch against open and short circuits.
- The power amplifier shall be designed for redundant network wiring.
- The amplifier monitoring and changeover facility shall be incorporated in the power amplifier. The changeover relays shall be included in the unit.
- The unit shall incorporate digital audio processing possibilities for 3 sections of parametric equalisation and 2 sections of shelving equalisation and audio delay.

9.2.1. Interfaces

- 2 x system network connection

9.2.2. Indications and controls

- 2 x 16-character LCD display for status display
- Rotary control for selection of system enquiry mode and change in volume for the headphone
- Power supply ON/OFF switch on the back

9.2.3. Inputs

- 8 x control inputs
- 2 x audio inputs

9.2.4. Outputs

- Selectable 100V, 70V or 50V outputs for each amplifier channel. An additional fixed 50V output shall be provided for each amplifier channel.
- 2 x control outputs
- 2 x amplifier channel outputs
- 1 x headphone output

9.3. ***Power amplifier 4 x 125W***

The main function of the power amplifier is the amplification of audio signals for the loudspeakers. It shall be possible to select the output voltage between 100V, 70V or 50V by changing jumpers. The power amplifiers are provided with a 2 x 16-character display for status display. The unit shall be certified to be compliant to IEC60849 and compliant to other relevant local standards.

The equipment can be used as tabletop or 19" rack mounting.

- The power amplifiers shall have 2 auxiliary audio inputs with microphone/line level selection.
- The audio input of the power amplifier can be selected as automatic volume control input.
- The 8 x control inputs are freely programmable. These can be programmed for actions to be initiated in the system and can be assigned with priorities.
- The 4 x control outputs shall be freely programmable and can be programmed for faults and calls.
- The 2 x 16-character display and rotary control on the front panel are used for status enquiries and monitoring functions. The display shall show the VU meter reading when the audio monitoring mode is selected. The audio output can be monitored by connecting a headphone to the headphone socket. Status changes of the unit shall be monitored continuously and reported to the network controller for fault/status reporting.
- The control input can be programmed for momentary or toggle operation. This selection can be made in the configuration software.
- The control input shall have the ability to monitor the cable between the control input and the external switch against open and short circuits.
- The power amplifier shall be designed for redundant network wiring.
- The amplifier monitoring and changeover facility shall be incorporated in the power amplifier. The changeover relays shall be included in the unit.
- The unit shall incorporate digital audio processing possibilities for 3 sections of parametric equalisation and 2 sections of shelving equalisation and audio delay.

9.3.1. Interfaces

- 2 x system network connection

9.3.2. Indications and controls

- 2 x 16-character LCD display for status display

- Rotary control for selection of system enquiry mode and headphone volume
- Power supply ON/OFF switch on the back

9.3.3. Inputs

- 8 x control inputs
- 2 x audio inputs

9.3.4. Outputs

- Selectable 100V, 70V or 50V outputs for each amplifier channel. An additional fixed 50V output shall be provided for each amplifier channel
- 4 x control outputs
- 4 x amplifier channel outputs
- 1 x headphone output

9.4. ***Power amplifier 4 x 60W***

The main function of the power amplifier is the amplification of audio signals for the loudspeakers. It shall be possible to select the output voltage between 100V, 70V or 50V by changing jumpers. The power amplifiers are provided with 2 x 16-character display for status display. The unit shall be certified to be compliant to IEC60849 and compliant to other relevant local standards.

The equipment can be used as tabletop or 19" rack mounting.

- The power amplifiers shall have 2 auxiliary audio inputs with microphone/line level selection.
- The audio input of the power amplifier can be selected as automatic volume control input.
- The 8 x control inputs are freely programmable. These can be programmed for actions to be initiated in the system and can be assigned with priorities.
- The 4 x control outputs shall be freely programmable and can be programmed for faults and calls.
- The 2 x 16-character display and rotary control on the front panel are used for status enquiries and monitoring functions. The display shall show the VU meter reading when the audio monitoring mode is selected. The audio output can be monitored by connecting a headphone to the headphone socket. Status changes of the unit shall be monitored continuously and reported to the network controller for fault/status reporting.
- The control input can be programmed for momentary or toggle operation. This selection can be made in the configuration software.
- The control input shall have the ability to monitor the cable between the control input and the external switch against open and short circuits.
- The power amplifier shall be designed for redundant network wiring.
- The amplifier monitoring and changeover facility shall be incorporated in the power amplifier. The changeover relays shall be included in the unit.
- The unit shall incorporate digital audio processing possibilities for 3 sections of parametric equalisation and 2 sections of shelving equalisation and audio delay.

9.4.1. Interfaces

- 2 x system network connection.

9.4.2. Indications and controls

- 2 x 16-character LCD display for status display.
- Rotary control for selection of system enquiry mode and change in volume for the headphone.
- Power supply ON/OFF switch on the back.

9.4.3. Inputs

- 8 x control inputs
- 2 x audio inputs

9.4.4. Outputs

- Selectable 100V, 70V or 50V outputs for each amplifier channel. An additional fixed 50V output shall be provided for each amplifier channel.
- 4 x control outputs
- 4 x amplifier channel outputs
- 1 x headphone output

10. Call station basic

The call station is used for making a manual or pre-recorded call to any pre-assigned zones or executing a predefined action. The call station shall have one key. The call station shall have a fixed microphone to transmit speech over the network and a press-to-talk key. The call station shall also have a headset socket. Once the headset is connected the microphone will be muted. The unit shall be certified to be compliant to IEC60849 and compliant to other relevant local standards.

- The call station shall have a speech filter with a cut-off frequency at 340Hz to improve intelligibility and prevent clipping of the audio input on low-frequency signals.
- The call station unit can be connected with a maximum of 16 call station keypad units via serial data communication links.
- The power supply to the call station keypad units shall be provided from the call station.
- The call station shall have a volume control for the monitoring loudspeaker at the call station. The volume control shall also control the volume of the headset.
- The call station shall be programmable for momentary actions on make contact and toggle actions without repeat on make contact.
- It shall be possible to assign 256 priorities.
- Analogue-to-digital audio conversion shall be performed at the call station.
- The call station shall also have a digital signal processor, which can be used for audio processing. It can be used to adjust sensitivity, limiter and parametric equalizer.
- The monitoring loudspeaker shall be on when that particular call station activates a chime or pre-recorded message, and will be switched off when its own live audio channel is open.

10.1. Interfaces

- 2 x system network connection
- Serial data and power supply interfaces for call station keypad units
- Headset socket
 - Number of connectors : 1
 - Position : Front
 - Type : 3.5 mm jack
 - Maximum cable length : 1.5m
 - Audio : Mono microphone signal, mono earphone signal

10.2. **Indications and controls**

- The call station has three 2-color LEDs. These LEDs are used for the following indications:
 - Power on and no system/call station fault
 - Power not available
 - Fault in the system and power on
 - Call station fault and power on
 - Chime on or pre-recorded message playing
 - Ready to talk/live speech
 - No call status to display
 - Emergency announcement is on in the system. Possible to make normal calls to the zones which are not involved (emergency) indication has priority over other indications)
 - Lower-priority calls are on or reserved (to all or some of the pre-assigned zones of the PTT key of the call station and selected zones of the call station keypad unit if installed)
 - Calls with higher or the same priority (not emergency) are on or reserved (to all or some of the pre-assigned zones of the PTT key of the call station and selected zones of the call station keypad unit if installed)
 - No predefined or selected zones are in use or reserved by the system, nor is an emergency announcement being made
- Volume control for loudspeaker/headset

11. Call station keypad

The call station keypad is used in combination with the call station basic unit for making a manual or pre-recorded call to any pre-assigned zones or executing a predefined action. The call station keypad shall have 8 keys. The unit shall be certified to be compliant to IEC60849 and compliant to other relevant local standards.

- The call station keypad keys can be programmed for the following actions:
 - Control system functions: recall of selection, live speech call, cancel selection, BGM off, BGM volume control, programmable key for any action.
 - Select resources: BGM selection, pre-recorded message selection, attention and alarm tone selection.
 - Zone selection, system control output selection.
- Each key at the call station keypad shall have 2 colour LEDs.
- The call station keypad shall be provided with in and out connections for serial data and power supply.
- The keys are to be provided with a label slot for indicating the name of the action assigned to that particular key.
- The power supply for the call station keypad shall be provided from the call station basic unit.
- The call station keypad key can be programmed for momentary or toggle operation.

11.1. Interfaces

- Serial data and power supply interfaces for call station keypad units/call station basic.

11.2. Indications and controls

The call station keypad has one 2-color LED per key. These LEDs are used for the following indications:

- INDICATION 1..8
 - The selected resources are occupied by a lower-priority call
 - The selected resources are occupied by a call with higher or equal priority.
 - The selected resources are available/reserved for executing an action from that particular station
- KEY 1..8
 - Nothing is active, no LED indication. A function is still active, LED indication is still on.
 - Function(s) is(are) activated, LED indication goes on

12. Call station kit

The call station kit is used for making custom-made (emergency) call stations. The call station kit shall be suitable for making manual or pre-recorded calls to any pre-assigned zones or executing predefined actions. The call station kit shall have one control input and a headset socket. Once the headset is connected the microphone input will be muted. It shall be possible to connect an external power supply to the call station kit. The unit shall be certified to be compliant to IEC60849 and compliant to other relevant local standards.

- The call station kit shall have a speech filter with a cut-off frequency at 340Hz to improve intelligibility and prevent clipping of the audio input on low-frequency signals.
- The call station kit can be connected with a maximum of 16 call station keypads or keypad kits via serial data communication links.
- The power supply to the call station keypad (kit) units shall be provided from the call station.
- The call station kit shall have a volume control input, and the volume control shall apply to both the monitoring loudspeaker and the headset.
- The call station kit control input shall be programmable for momentary or toggle.
- It shall be possible to assign 256 priorities.
- Analogue-to-digital audio conversion shall be performed at the call station kit.
- The call station kit shall also have a digital signal processor, which can be used for audio processing. It can be used to adjust sensitivity, limiter and parametric equalizer.

12.1. Interfaces

- 2 x system network connection
- Serial data and power supply interfaces for call station keypad units
- Headset socket
 - Number of connectors : 1
 - Position : Front
 - Type : 3.5 mm jack
 - Maximum cable length : 1.5m
 - Audio : Mono microphone signal, mono earphone signal
- Backup supply input
- 2 x control inputs.

12.2. *Indications and controls*

- The call station kit has five colour LED outputs. These LED outputs are used for the following indications.
 - Power on, no system/call station tool kit fault
 - Power not available
 - Fault in the system and power on
 - Call station kit error and power on
 - No error status
 - Chime on or pre-recorded message playing
 - Ready to talk/live speech
 - No call status to display
 - Emergency announcement is on in the system. Possible to make normal calls to the zones which are not involved (emergency indication has precedence over other indications)
 - Lower-priority calls are on to all or some of the pre-assigned zones of the PTT key of the call station and selected zones of the call station extension unit, if installed)
 - Calls with higher or the same priority (not emergency) are on (to all or some of the pre-assigned zones of the PTT key of the call station and selected zones of the call station extension unit, if installed)
 - No calls are being made to the predefined zones (nor are emergency announcements being made)
- Volume control for loudspeaker/headset
- Connection for the control input

13. Call station keypad kit

The call station keypad kit is used in combination with a call station kit or call station basic unit for making a manual or pre-recorded call to any pre-assigned zones or executing a predefined action. The call station keypad has 8 input connections and 16 output connections. The input and outputs are freely programmable. The unit shall be certified to be compliant to IEC60849 and compliant to other relevant local standards.

- The call station keypad kit keys can be programmed for the following actions:
 - Control system functions: recall of selection, live speech call, cancel selection, BGM off, BGM volume control, programmable key for any action.
 - Select resources: BGM selection, pre-recorded message selection, attention and alarm tone selection.
 - Zone selection, system control output selection
- Each key at the call station keypad kit shall have two related contacts.
- The call station keypad kit shall be provided with input and outputs for the serial connection.
- The power supply for the call station keypad kit can be provided from the call station.
- The call station keypad kit key can be programmed for momentary or toggle operation.

13.1. Interfaces

- 2 x system network connection
- Serial data and power supply interfaces for call station keypad units

13.2. Indications and controls

- The call station keypad shall have 16 control outputs, which are programmable for any zone status, function status or faults.
- The input to the call station can be programmed for all the functions specified for the call station keypad.
- Call macros can be assigned to any of the inputs of the call station keypad kit.
- Once the control input is used for any function, the control output will be linked to the specific action to be initiated by that input.

14. Line supervision set

The system shall use the same loudspeaker line for communicating with the end-of-loudspeaker-line unit. The monitoring principle shall not be based on DC current or impedance measurement.

- The line monitoring unit shall be incorporated in the power amplifier unit itself to avoid any non-monitored parts of the cable.
- Loudspeaker line monitoring shall be provided without any additional wiring.
- The tone generator for loudspeaker monitoring shall be incorporated in the amplifier so that a single failure of the tone generator will not affect the monitoring of other amplifier channels.
- Loudspeaker line monitoring can be switched on/off from the configuration software.
- The power for the end-of-line monitoring units shall be supplied from the power amplifier.

15. Configuration/diagnostic & Logging Software

15.1. Configuration software

The configuration software is used for configuring the system. The configuration software shall be located in the network controller except for the file transfer facilities. Any PC with Internet Explorer version 5.0 or above will be able to connect to the network controller to access the configuration and logging functions. No special software shall need to be installed in the PC for configuration or logging. The system shall be able to operate without the configuration PC. The configuration software shall be required only during the installation and when changes are to be made in the existing system.

Fault enquiries can be made via the diagnostic section of the web interface. The configuration software shall be designed in such a way that even first-time users can navigate through the configuration easily.

- Configuration of system access rights. There are three authorization levels:
 - Administrator
 - Installer
 - User
- The access rights for these three levels are different.
- Configuration of call macro. Call macro is the function that allows the user to program different functions and/or actions that can be assigned to any inputs such as control input, call station or audio input. A single call macro can be assigned to multiple inputs. The call macro will define:
 - Start chime
 - Audio input
 - Message(s) – sequence of messages, number of repetitions, interval
 - End chime
- Zone grouping allows the user to group zones covering the same types of areas.
- In the zone configuration, zone-related items such as amplifier channel outputs, audio outputs and control outputs shall be grouped.
- The power amplifier shall be linked to a spare power amplifier so that if there is a fault in the main power amplifier its functions shall automatically be taken over by the spare power amplifier. The ratio of main power amplifiers to spare power amplifiers shall be configured according to the specific requirements of the installation.
- The configuration of all equipment inputs and outputs shall be carried out using configuration software.
- All audio inputs and outputs shall have audio processing facilities. The audio processing facility shall allow the user to perform parametric equalisation with high- and low-pass filters for inputs and outputs, and gain and limiter adjustments for inputs only.
- The power amplifier audio inputs shall be selectable between microphone and line.
- The delay can be configured for each amplifier channel individually.
- The level of the 20kHz monitoring signal shall automatically be adjusted for proper monitoring of the loudspeaker line.

- The call station keypad shall be programmable for different functions. Details of the functions for which the keys can be programmed are shown in the call station keypad section.
- It shall be possible to define the call station as an emergency call station to provide additional functions such as the possibility to add zones or audio outputs during the call.
- It shall be possible to configure a control input for a sequence of functions.
- The call station basic/call station keypad/call kit/call station keypad kit shall be programmable for the functions specified in their respective sections in the configuration software.
- The control input shall be able to be configured for monitoring of cables connected to it for open and short circuit.
- It shall be possible to configure each zone for 2 time-based volume settings.
- The BGM sources shall be assigned to music channels, which can be configured for different zones/audio outputs.

15.2. Diagnostic & logging software

The diagnostic & logging software has the main function of monitoring and recording the status of all the units in the PA system. It shall log all events such as calls and status changes of system units, and provide a current view of the system status. This software section can be used for real-time logging by connecting a PC with web browser.

- Modes of enquiry
 - General events
 - Specific
 - Individual unit status
 - Call logging
 - Fault logging
- This part of the software shall be capable of monitoring the following functions:
 - The fault status of the equipment
 - Any status changes in the system
- View historical log stored in the network controller
- View logged events of monitored external devices
- Control audible and visual fault indicators via the PC
- Individual unit status shall be displayed in the individual unit status screen.
- The alarm can be acknowledged and reset. The acknowledgment and reset actions are logged
- View the last 200 faults, which are stored on the network controller

15.2.1. Continuous remote logging of multiple systems

- A separate stand-alone PC-program shall allow for continuous logging of events and faults from up to four systems on a single network in a single view via a TCP/IP network connection the relevant systems.

16. File transfer software

- PC application
- Supplied together with the network controller
- User-friendly audio file assembling

The main purpose of the file transfer software is to transfer both the data and audio files from the PC to the network controller. It shall perform the following functions:

- User ID and password-protected access
- Assembly of the message set (a set with multiple wav files). The message set can be stored on the PC and can be sent to the network controller
- Download configuration file from the network controller

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