STENTOFON

ARCHITECTURAL AND ENGINEERING SPECIFICATION

AlphaCom E Integrated Security Audio and Building Communication System

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1 GENERAL

1.1 SCOOPE OF WORK

A. Scope of work shall include the on-site Security Audio and Building Communication Node including all intercom stations.

B. The Security Audio and Building Communication Node shall be configured as a part of the Security Management System and provide seamless integration with the following systems:
- Access control, intrusion detection and alarm systems
- Emergency notification, audio paging and radio paging
- Two-way radios, PBX system and public telephone network
- Video surveillance systems
- Fire alarm systems

C. The Security Audio and Building Communication shall be able to be operated as part of the IT operation system including support for:
- Network monitoring servers (SNMP, Syslog)
- Network time servers
- E-mail notification
- Remote system programming
- Remote system upgrade

See chapter 3.2 for more details

D. The system shall be designed around a life-cycle concept – starting with the needs of users and the organization in which it will be placed, regulations, and the financial ambitions, from there to features and system planning, and then to operations, system changes and maintenance.

E. System shall be capable of adding optional features, capacity, equipment and interfaces listed in the specifications, even if not initially included or shown on the plans.

1.2 QUALITY ASSURANCE AND WARRANTY

A. All equipment shall be new, in current production, and standard products of a manufacturer of intercom equipment.

B. Manufacturer shall be certified as complying with the standards of ISO-9001 for quality control.

C. Manufacturer shall guarantee availability of parts for a minimum of (_5_) years from date of shipment.

D. If required, manufacturer shall be able to demonstrate features, functions, operating characteristics and clarity of sound to owner.

E. System shall include a factory warranty that equipment is free from defects in design, material, manufacturing and operation.

F. Factory warranty period shall be for 12 months from date of shipment.

G. Installing communications contractor shall guarantee the equipment, connections, cabling and installation for 12 months from date of acceptance.

H. The manufacturer shall have more than 20 years experience with security audio systems, and upon request it shall document comparable installations (and references hereof).

I. The manufacturer shall, upon request, be able to document the fulfilment of all certifications.

1.3 SUBMITTALS

A. Shall include an equipment list, data sheets, system description and block diagrams on equipment to be furnished.

B. Shall include all data necessary to evaluate design, function, quality, and configuration of proposed equipment and system(s).

C. Shall include technical manual(s) relevant to the installed equipment and user manual(s) related to the use of functions in the intercom system.

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2 SYSTEM OPERATIONS REQUIREMENTS

2.1 SYSTEM PLANNING

The manufacturer shall provide an IP Network Planning Guide (see Ref.1 Stentofon, 2006).

2.2 SYSTEM INSTALLATION, TESTING AND TRAINING

A. The system shall be installed by qualified technicians.

B. Wiring shall be uniform and in accordance with national and international electric codes and manufacturers' instructions.

C. All cable runs at the main terminal board and in all junction boxes shall be tagged and identified.

D. Installation of the communication systems shall be coordinated with the installation of other related systems such as:
- Local Area Network (LAN) and external IP network (WAN)
- CCTV video switching, audio paging, radio paging, access control, two-way radio, alarm and telephone systems.

E. Directory numbers, feature codes and special programming shall be documented, printed and made available to owner.

F. System shall be completely tested to assure that the exchange and all components, stations, speakers and accessories are connected and in working order.

G. System shall be pre-tested by contractor and certified to function in accordance with plans and specifications.

H. System shall be tested in presence of owner's representative.

I. Installation contractor shall conduct up to 4 hours of instruction in use and operation of the system to designated owner representatives within 30 days of system acceptance.

J. Installation contractor shall conduct up to 4 hours of technical training in programming, troubleshooting and service of the system to designated owner representatives within 30 days of system acceptance.

K. Contractor shall provide owner with 2 copies of standard factory prepared operation, installation and maintenance manuals.

L. Contractor shall provide owner with 2 copies of any risers, layouts and special wiring diagrams showing any changes to standard drawings, if required on project.

2.3 SYSTEM OPERATION AND USAGE

A. It shall be possible for owner to print directory number plans for distribution to users.

B. Manufacturer shall conduct periodic technical training seminars and make them available to those responsible for on-going maintenance of the system.

2.4 SYSTEM SUPPORT AND SPARES

A. On-site maintenance and repair service shall be available locally and within 8 hours of notification for emergency conditions.

B. The following system spares shall be made available locally within 8 hours of notification:
- (_1_) Central exchange spare parts kit
- (_1_) Desk master station
- (_1_) Tamper resistant substation
- (_1_) Wall master station.

(Note to specifier: Indicate items needed)

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3 SYSTEM OVEREVIEW

3.1 AUDIO STATIONS

Security Audio
Node A

Master Station
Control Room #1

Master Statior

Star wire and/or IP Network

Substation

WLAN PDA
(Voice Client)

IP
Substation

LAN / WAN
Link

WLAN PDA
(Voice Client)

Master Statior

Star wire and/or IP Network

Substation

IF
Substation

Master Statior
Control Room #2

Security Audio
Node B
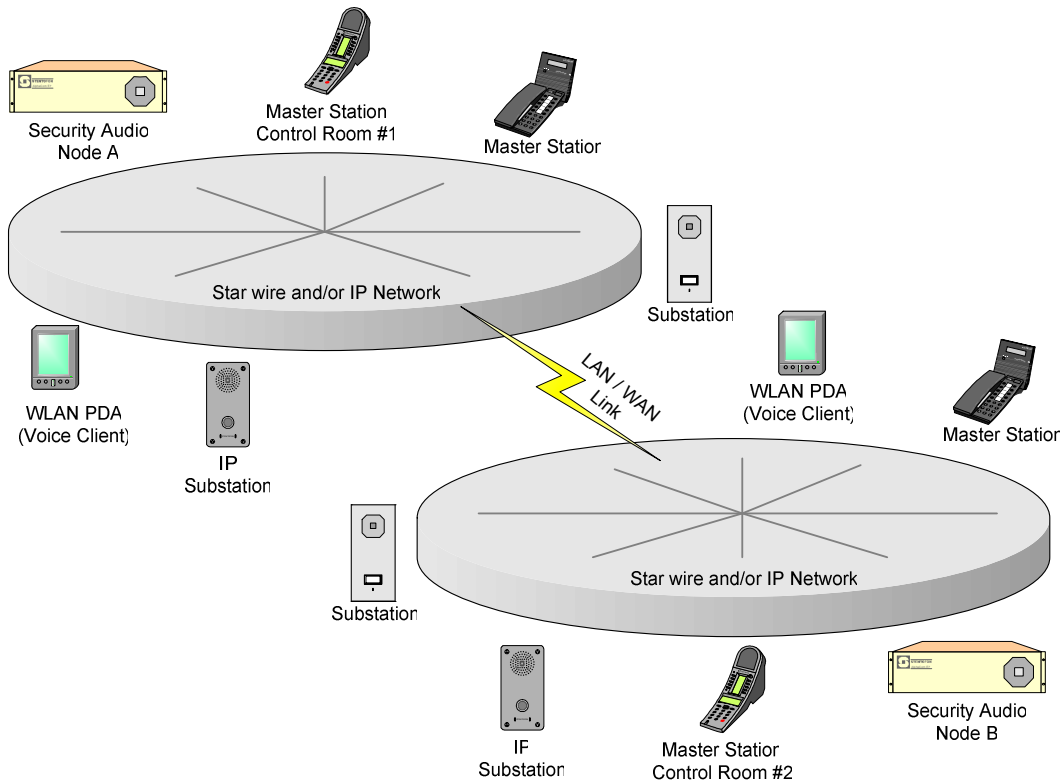
Figure 1 A generic building with Integrated Security Audio Network

The Integrated Security Audio Network in a (generic) building shall have Security Voice stations in many of the functional locations in the building (see Ref. 2: Owen, etc.)

The station type shall be selected according to use and environment as specified in the list below.

In most rooms which need special security attention, it is recommended that there should be at least two stations:
 - One master station in the operating area of the room.
 - One alarm substation at the door on the inside of the room.

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Location in Large Buildings	MASTER STATIONS						SUBSTATIONS		
	Standard Desk	Wall and flush mount	Dual Display	Light Industrial	Operation room	Control Room	Vandal Resistant IP	Wall mount	Tamper Resistant
Doors	YES								YES
Entrances		YES (in)					YES (out)	YES (out)	
Stairways								YES	
Corridors (every 15 meter)								YES	
Manual fire alarm points								YES	
Roof areas								YES	
Elevators & elevator entrances								YES	
Elevator machine rooms				YES					
Mail and parcel delivery rooms		YES							
HEVAC & machine rooms				YES				YES	
Loading docks (every 10 meter)				YES				YES	
Garbage collection areas				YES					
Electrical switch & patch rooms		YES						YES	
Cable / patch rooms		YES							
IT rooms		YES							
Parking - entrance / exit / pay points							YES		
Parking – doors and help points							YES		
Offices	YES		YES						
Campuses – academic & business							YES		
Medical treatment rooms/Operating Theatres					YES				
Supplies & storage rooms		YES							
Rest rooms, showers and changing rooms								YES	
Shopping and service areas								YES	
Guard locations			YES						
Building control rooms			YES			YES			
Reception	YES	YES	YES						

3.2 INTEGRATION WITH IP/IT ADMINISTRATION

There should be two IP networks, one for the building security audio system and one for the IT administration.

AlphaPro   AlphaWeb   Network monitoring

Administration Network

Separate Management Interface

Serial Data RS323

Security Audio Node   Printer

IP Substation

Security Network

IP Substation

IP Substation   IP Substation   Entry Access   CCTV control
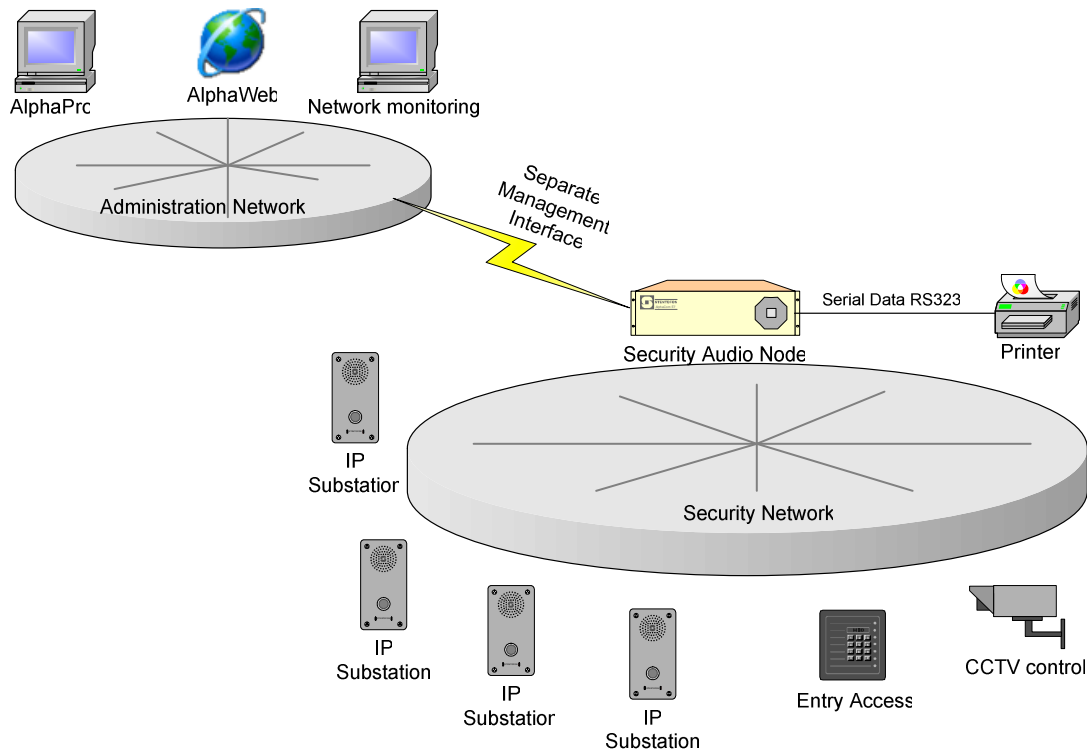
Figure 2. A generic separation of Security Audio network and Administration network

There shall be a dedicated IP network for the building security application (security audio, CCTV, access control, etc.).

This security IP network shall be separated from the other IP networks in the building.

> **Note!**
> *The supervision and fault handling of hardware is often undertaken by the IT department. That means that if there is a Security Audio and Building Communication Node or a station which are not functioning correctly, the IT department will handle the issue. The security functions of the building can then focus on the security application and not whether or not there is a fault in the system.*

The Security Audio and Building Communication Node shall have a separate IP management interface, allowing integration to the IT administration network and application.

The Security Audio and Building Communication Node shall be able to integrate into the IT network monitoring servers by means of SNMP and syslog.

It shall be possible to monitor and log the status of the Security Audio and Building Communication Node and all Audio Stations from the IT administration network.

The software on the Security Audio and Building Communication Node and all IP Audio Station shall be able to be upgraded using a standard Web -browser

It shall be possible to configure and program the Security Audio and Building Communication Node from the IT administration network.

3.3   INTEGRATION WITH OTHER BUILDING SECURITY SYSTEMS

The Security Audio System shall be configured as a part of the entire Security Management System and provide seamless integration with systems like:
- access control, intrusion detection and alarm systems
- emergency notification, audio paging and radio paging
- two-way radios, PBX system and public telephone networks
- video surveillance system
- fire alarm systems

Figure 3 Main Systems for Building Security Management

3.3.1   OPEN INTEGRATION POINTS

The Security Audio and Building Communication Node shall support the following types of open integration points:
- Switches and relays
- Serial data protocols
- TCP/IP protocols
- Analogue audio (0 dB, 600 Ohm)
- VoIP audio using SIP
- Traditional telephone interfaces (ISDN and analogue)
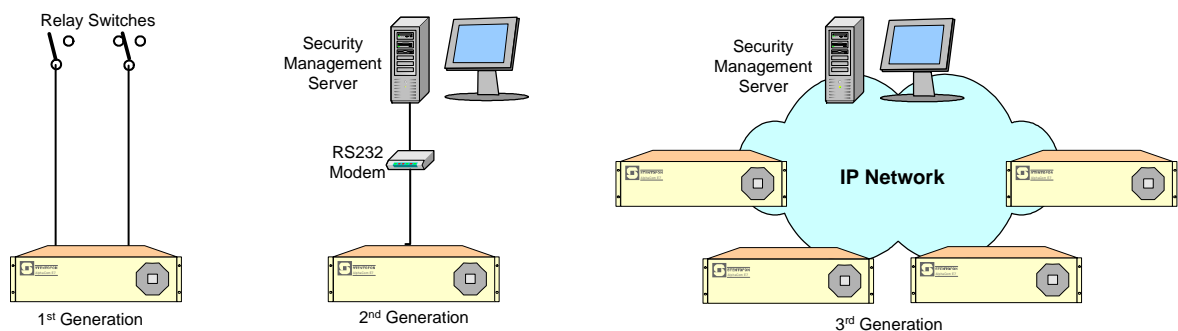
Figure 4   Overview Open Integration Points

3.3.2 PUBLIC ADDRESS

A. The Security Audio System shall be able to interface <product name> Public Address System.

B. The manufacturer shall be able to document installation and references of integration with <product name> or similar product upon request.

C. It shall be possible to dispatch PA calls from the intercom stations.

D. It shall be possible to switch and network the PA calls over the internal network between the Security Audio and Building Communication Node with a minimum bandwidth of 7 kHz.

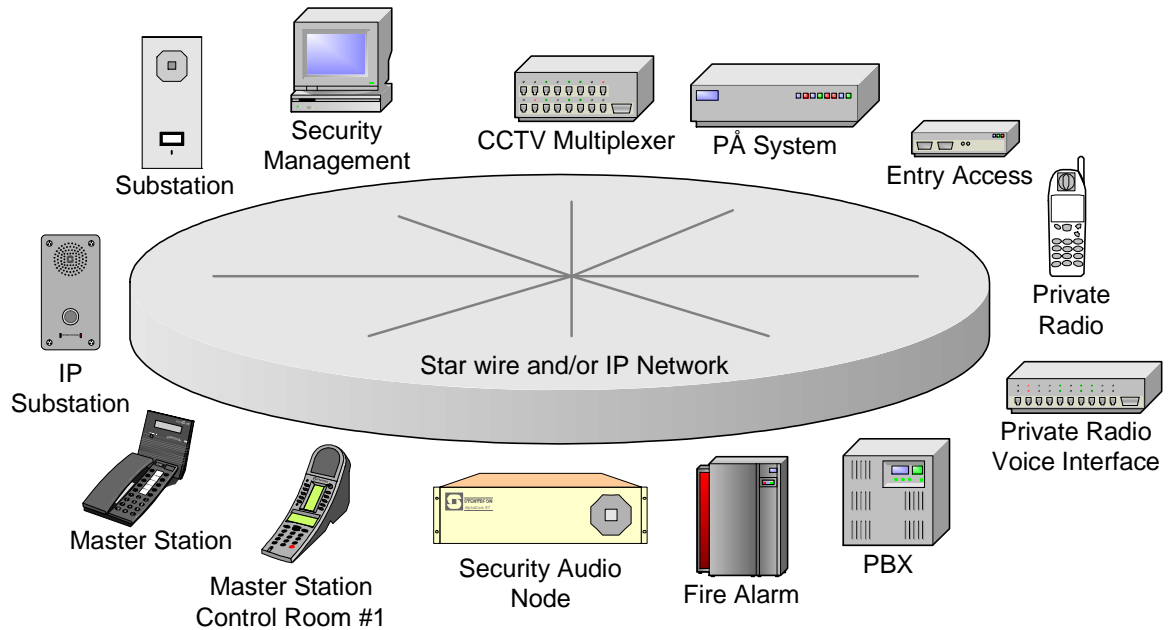E. The Security Audio and Building Communication Node shall be able to interface up to 6 PA zones.

3.3.3 TWO WAY RADIO

A. The Security Audio System shall be able to interface <product name> Private Radio System.

B. The manufacturer shall be able to document installation and references of integration with <product name> or similar product upon request.

C. It shall be possible to set up multiple intercom system to listen to a radio group.

D. It shall be possible to talk into the radio channels from the intercom stations.

E. It shall be possible to dispatch calls between the private radio system and the PBX system, the public telephone system as well as intercom stations.

F. It shall be possible to transfer private radio calls from an intercom station to the PBX and public telephone system.

3.3.4 FIRE ALARM

A. The Security Audio System shall be able to integrate with <product name> Fire Alarm System.

B. The manufacturer shall be able to document installation and references of integration with <product name> upon request.

C. When a fire alarm is activated, the Security Audio System shall automatically establish a call from the control room to the area where the fire alarm was generated.
The guard can then verify with people in the neighbourhood whether this is a valid fire alarm and the severity of the fire.

D. The Security Audio and Building Communication Node shall be able to use information from the fire alarm detectors to provide safe automatic voice guided evacuation.

3.3.5 VIDEO SURVEILANCE

A. The Security Audio System shall be able to integrate with <product name> video surveillance system.

B. The manufacturer shall be able to document installation and references of integration with <product name> or similar product upon request.

C. It shall be possible to associate intercom stations with the active camera to give the guard a listen or talk option using a single touch button.

D. It shall be possible to select a camera from the guard intercom station.
When the guard is in conversation with a station, he shall have a single touch option to switch on the camera associated with that intercom station.

3.3.6 ACCESS CONTROL

A. The Security Audio System shall be able to interface <product name> Access Control system.

B. The manufacturer shall be able to document installation and references of integration with <product name> or similar product upon request.

C. When a door fails to open using an access card and/or access code, the station in proximity to the door shall be turned on and the guard can ask what the trouble is.
The guard shall then be able to open the door by pressing a key.

D. There should be an intercom substation next to any door access control.
By pushing the substation button, the visitor will make a call request to a guard. The guard shall then be able to be in voice conversation with the visitor by pressing a key. The door can be opened by the guard by pressing a key.

3.3.7 ALARM MANAGEMENT SYSTEMS

A. The Security Audio System shall be able to interface <product name> Alarm Management System.

B. The manufacturer shall be able to document installation and references of integration with <product name> or similar product upon request.

C. There should be a vandal proof intercom station in locked areas like prison cells etc.
By pushing the station button, the locked-up person will make a call request to a guard. The guard shall then answer the call by pressing a key.

D. The Security Audio System shall be able to initiate a 'scream alarm' when it is high noise in an area.

E. It shall be possible to associate intercom stations with alarm calls.
The guard is given a single key touch listen-and-talk option to the area where the alarm was initiated.

3.3.8 EXTERNAL TELEPHONE NETWORK

A. The Security Audio and Building Communication Node shall be able to interconnect with a PBX system and the public telephone systems.

B. The interconnection to external telephone systems shall be done by:
 - Analogue telephone lines (FXO)
 - ISDN BRI
 - ISDN PRI
 - Session Initiation Protocol (SIP) VoIP trunking

C. The Security Audio and Building Communication Node shall support up to 30 channels to the external telephone systems.

D. Calling number presentation shall be supported between the PBX system and Security Audio System.

E. The Security Audio and Building Communication Node shall be able to share a private number plan with the external PBX system.

F. The Security Audio and Building Communication Node shall have possibility to undertake SIP-based trunking to Cisco Call Manager PBX.

3.3.9 VoIP TELEPHONE, PDAs AND PCs

A. The Security Audio and Building Communication Node shall support standard VoIP telephones using SIP.

B. The Security Audio and Building Communication Node shall be able to place calls to PDAs and PCs using SIP.

C. The Security Audio and Building Communication Node shall support up to 50 VoIP telephones and clients.

D. The Audio Security Node shall be able to send an e-mail notification to PDAs and PCs when an alarm or event is triggered.

E. It shall be possible to include a click-to-call link in the e-mail, which will set up a call from the PC or PDA to the intercom that is associated with the alarm or event.

3.4   REQUIREMENTS OF DAILY SECURITY ROUTINES

The system shall support the following daily security routines:

A. Transfer of responsibility from Guard Station to Central Control Room:
 - Shall be done by simple button-pressing on Master Station.
 - Shall let all calls go to Master Station in Central Control Room.

B. Transfer of responsibility from Central Control Room #1 to Central Control Room #2 (for example by time of day or weekend).
 - Shall be done by simple button pressing on Master Station, OR
 - Shall be done by pressing of buttons on web interface

C. Simple analysis of alarms every 4 hours.
 - It shall be possible to print and read directly all alarms for the last 12 hours.

4 SYSTEM REQUIREMENTS

4.1 GENERAL SYSTEM PROFILE

4.1.1 SECURITY AUDIO AND BUILDING COMMUNICATION NODE PROFILE

The Security Audio System shall be able to provide communications both under normal circumstances and in emergencies (*Ref: Craighead, 2003*).

AlphaCom E7

36 subscribers

AlphaCom E20

80 subscribers

AlphaCom E26

138 subscribers

Security Audio and Building Communication Nodes in the STENTOFON AlphaCom E series comply with all specifications in this document.

A. The system shall support dual networking for stations; 2 pair wiring and IP-based stations.

B. The exchange shall be backward compatible with older systems and equipment of the same brand.

C. The system shall be capable of automatic duplex hands-free operation without the use of handsets, at both the initiating and receiving station.

D. System capacity shall include at least one Security Audio and Building Communication Node cabinet wired and equipped for:

  _____stations/numbers   and _____ speech channels. (See details in Annex A.)

E. Each exchange system shall be expandable to _____ stations by adding plug-in boards and additional Security Audio and Building Communication Node modules.

F. The central exchange shall include at least _____ simplex conference channels, at least _____

  programmable group calls per exchange and _____ global group calls in network configuration.

  (Note to specifier: indicate size and capacity of exchange)

G. If temporarily blocked, and a high priority call is initiated, the system shall automatically disconnect the call with the lowest priority and setup the call with the higher priority.

H. The exchange shall support IP-based audio communication without additional hardware.

I. There must be an interface between the conventional and the IP network infrastructures in the Security Audio and Building Communication Node.

J. The Security Audio and Building Communication Node shall be able to connect:
- Analogue telephones
- Master stations
- Control room station
- Dual Display station
- Substations
- IP substations
- IP master stations
- SIP based telephones

4.1.2 SECURITY AUDIO AND BUILDING COMMUNICATION NODE – SUBSCRIBER BOARDS

A. All subscriber boards shall be identical and interchangeable.

B. Malfunction of one subscriber board shall not affect more than six stations.

C. Malfunction of one wire to a subscriber board shall not affect more than one station.

4.2 CAPACITY OF SECURITY AUDIO AND BUILDING COMMUNICATION NODE

A. The Security Audio and Building Communication Node shall have a general processor with minimum 200 MHz frequency.

B. The Security Audio and Building Communication Node shall have a media processor (DSP) with minimum 200 MHz frequency and above 1.000 MIPS in performance.

C. The RAM on the Security Audio and Building Communication Node shall be higher than 100 MByte.

D. The Security Audio and Building Communication Node shall have at least 1 MByte of Non-Volatile RAM that will survive re-start and power outage. Important information such as time, xxx shall be stored in the Non-Volatile RAM.

E. The FLASH memory on Security Audio and Building Communication Node shall be higher than 32 MByte for storing of local log files, software and configuration.

F. The Security Audio and Building Communication Node shall support optional FLASH cards with at least 4 GByte of memory in order to add future services.

G. PROM memory shall not be used for storing software or configuration.
> **Note!**
> *An IP environment is a dynamic environment, which requires regular updates of the servers to support the latest technologies. A solution with PROM memory would then demand high operational costs.*

H. Hard disk drivers (HDD) shall not be used for storing software and configuration files.
> **Note!**
> *HDD has moving parts and a normal life length of 3 years.*

I. The Call Capacity of the Security Audio and Building Communication Node shall be above 10.000 calls per hour.

J. The phone cards should manage at least 6 phones per card.

K. The intercom cards should manage at least 6 intercoms per card.

L. There shall be an option of additional audio boards which each has a capacity of minimum 6 programming and audio channels – configurable as input or output.

M. There shall be an option for additional Input/Output boards in the Security Audio and Building Communication Node with at least 8 inputs and 8 outputs.

N. The Security Audio and Building Communication Node shall have at least 2 serial ports

O. The Security Audio and Building Communication Node shall have at least 2 Ethernet ports.

P. The Security Audio and Building Communication Node shall have a capacity of up to 30 channels for interconnection to other Security Audio and Building Communication Nodes.

Q. The Security Audio and Building Communication Node shall have a capacity of up to 30 lines for interconnection to legacy PBXes.

4.3 SYSTEM MONITORING & LOGGING

4.3.1 LINE & BOARD TESTING

A. The system shall automatically test the wiring to legacy station wiring and detect faults within one second.

B. The system shall automatically test the link to every IP station every 5 seconds and detect a fault within 10 seconds.

C. The system shall have possibility of periodic tone testing of station – i.e. loudspeaker and microphone.

D. The system shall have possibility of automatic and periodic board testing.

4.3.2 SYSTEM LOGGING

A. The system shall provide the following types of log:
 - Statistics and call log.
 - System log.
The system log provides technical events for monitoring the health of the system.

B. Debugging log.
The debugging log includes low level system events that software engineers and support personnel use for troubleshooting.

C. The statistics log shall provide an event for each function that is requested and executed by the Security Audio and Building Communication Node. This shall include events and information like:
 - Call detail information, including VoIP statistics and time and duration of call.
 - Time and details for all call request.
 - Time and date for all alarm requests.
 - Time and date for all transfer functions.

D. System log level shall minimum include the following information:
 - Software errors.
 - Hardware errors.
 - Line errors.
 - Alarms.
 - Remote input on/off.

E. The Security Audio and Building Communication Node shall be able to send the different types of log to multiple remote destinations. This destination could be:
 - IT helpdesk.
 - Security control room in the same building.
 - Security control room at remote sites.
 - System responsible for the Security Audio and Building Communication Node.

F. The Security Audio and Building Communication Node shall be able to output the log events to:
 - Local file system.
 - Syslog.
 - Standard used by main IT network monitoring servers and tools.
 - E-mail.
 - SNMP trap (standard used by main IT network monitoring servers and tools).

G. The system shall be able to perform filtered logging conditioned upon destination (like Alarms only).

H. The Security Audio and Building Communication Node shall have a web interface where it is possible to retrieve the local log file as well as search and retrieve in the different log files.

I. Time synchronization of events among nodes and other systems.

J. All Security Audio and Building Communication Nodes in the network shall get time information from a defined NTP server (Network Time Protocol).

K. All log events shall be synchronized in time with the central network clock.

> **Note!**
> *In an IP network a failure in on sub-system can spread across the network in a matter of milliseconds. It is therefore essential to synchronise the clocks on all equipment in order to find what fault that happen first, thus finding what started the failure situation. NTP is able to synchronize the clocks across the network with accuracy less than 10 milliseconds.*

4.3.3 SYSTEM MONITORING

The system shall provide the following important system status information for monitoring:

A. General node information
- Node states
- HW configuration
- SW configuration
- HW identity (MAC address)

B. Station status
- List of all stations
- Status per station

C. Status internal networking
- List of AlphaNet links
- Status per link
- Network delay for VoIP AlphaNet links

D. Status external VoIP networking (SIP)
- List of SIP trunks with destination address
- Number of licenses pr SIP trunk
- List of SIP users with destination address
- Status per user

E. VoIP audio statistics
- List of VoIP links
- Connections
- Packet loss
- Network delay
- Other VoIP statistics

F. The Security Audio and Building Communication Node shall have a Web server where it is possible to read all important system status information.

G. The Security Audio and Building Communication Node shall be able to provide important system information over SNMP

H. The Security Audio and Building Communication Node shall support SNMP MIB II

4.4 SYSTEM MAINTENANCE AND CONFIGURATION / PROGRAMMING

A. The system shall have an easy to use configuration and programming tool.

B. The configuration and programming tool shall have context sensitive online help.

C. The configuration tool shall be able to connect to the Security Audio and Building Communication Node over the IP network.

D. It shall be possible to perform remote system upgrade of the Security Audio and Building Communication Node using a standard Web browser. The upgrade procedure must take less than 2 minutes.

E. It shall be possible to perform remote system upgrade of all IP stations connected to the system.

> **Note!**
> *An IP environment is a dynamic environment, which requires regular updates of the servers to support the latest technologies.*

F. System configuration and database shall be possible to back-up and restore via a standard Web browser.

4.5 NETWORKING

4.5.1 NETWORKING BETWEEN SECURITY AUDIO AND BUILDING COMMUNICATION NODES

A. The total system (x number of Security Audio and Building Communication Nodes and stations / phones) shall easily be networked up to 100 nodes / sites.

B. The communication (signalling and audio communication) between the nodes shall be able to take place on IP network with private or public addresses, or a mix of the two.

C. Each Security Audio and Building Communication Node in the network shall have support of E1/T1 and IP infrastructure for networking.

D. All features of the Security Audio and Building Communication Node shall be operational across the total network.

E. High Priority calls shall release lower priority calls if all channels are occupied.

F. The Security Audio and Building Communication Node shall not delay any audio flow through itself with more than 5 ms when it is serving as a transit switch.

G. Alternative routing of calls shall be supported.

4.5.2 CLUSTERING OF SECURITY AUDIO AND BUILDING COMMUNICATION NODES

A. It shall be possible to set-up up to four Security Audio and Building Communication Nodes as an exchange cluster in order to add more capacity for more legacy subscriber extensions.

B. The exchange cluster shall be managed as one exchange enabling easy configuration and management.

C. The signalling and audio communication between the Security Audio and Building Communication Nodes in the cluster shall go over IP.

D. All features shall be operational across the Security Audio and Building Communication Node in the cluster.

4.6 AUDIO FUNCTIONS

A. Malfunction of one speech channel shall not affect operation of the system.

B. Every speech channel shall include compression circuits to automatically control and limit sound volume, audio distortion and clipping during conversation.

C. Audio power output to each station shall be adjustable up to 1 Watt.

D. Frequency response for both input and output shall be a smooth curve through the audio range of:
     - 200 - 10,000 Hz for intercom
     - 200 - 15,000 Hz on audio program channel.

E. Crosstalk shall be less than:
     - -80 dB @ 1000 Hz, and
     - S/N ratio shall be >80 dB during conversation.

F. Audio technology used across a network shall support:
     - Wideband 7 kHz (G.722),
     - Narrowband 3.4 kHz (G.711)

- Utilize Adaptive Jitter Buffers
- Utilize Adaptive Time Synchronization.

G. Audio technology used internally in the Security Audio and Building Communication Node for mixing and switching shall support:
 - High-Resolution 1-bit audio,
 - Hi-Fi 40 Hz - 18.5 kHz,

4.7 IP SERVICES AND SECURITY

A. The Security Audio and Building Communication Node shall have two independent IP network (Ethernet) ports, in which one can be used as a separate management interface and one can be dedicated to the building security IP network.

B. The Security Audio and Building Communication Node shall not provide IP forwarding between the two IP ports.

> **Note!**
> *If IP forwarding is enabled between the two IP ports, the node will be a backdoor between the two networks, breaking standard security rules.*

C. The Security Audio and Building Communication Node shall have a built-in firewall to prevent external attacks.

D. The IP stations shall have a built-in firewall to prevent external attacks.

E. The IP stations and Security Audio and Building Communication Node shall be protected with a login procedure.

F. Software packages that are installed in the Security Audio and Building Communication Node shall be verified with a digital signature in order to prevent downloading and installation of tampered software and reducing risks of viruses.

G. The system shall at least support the following IP standards:
 - IPv4   Internet Protocol version 4
 - TCP   Transmission Control Protocol
 - UDP   User Datagram Protocol
 - SNMP   Simple Network Management Protocol
 - Syslog   System logging
 - HTTP   HyperText Transfer Protocol
 - XML   eXtensible Markup Language
 - NTP   Network Time Protocol
 - SIP   Session Initiated Protocol
 - RTP/RTCP Real Time Protocol / Real-time Transport Control Protocol
 - DiffServ   Differentiated Services
 - IP ToS   IP Type of Service

4.8 STANDARD SYSTEM FEATURES

4.8.1 MASTER CALLS

A. A call shall be placed from any master station to any other station in the system, unless specifically blocked, by dialling the appropriate number of the desired station or using one of the direct access buttons.

B. Either party can cancel call by pressing the C-button.

C. Master stations with graphic displays shall provide individually programmable menu functions and subscriber directory with alphanumeric search for numbers/names.

4.8.2 SUBSTATION CALLS

A. Each substation shall be programmed to call a specific master station by pressing a button.

B. Pressing button on substation shall provide call request verification by blinking LED on station and giving voice message (with optional voice board).

C. A substation call-request call shall be identified on a display master station with text message, or flash an associated LED and sound a unique tone on a CRM type control room master station.

4.8.3 DIRECT ACCESS KEYS (DAK)

A. All Desk Master stations shall include (10) direct access keys programmable for single button speed dialling to other stations, to execute features or to get access to telephone lines.

B. Dual Display Master stations shall be capable of at least (20) direct access key functions.

C. Control room master stations type CRM shall have direct access key modules available in (48) button size, each station capable of up to 96 direct access keys.

D. Station user shall easily program direct access keys at any time.

4.8.4 ALL-CALL

A. All master stations shall be able to initiate an all-call page to all other stations in the system.

B. It shall be possible to remove stations, through programming, from receiving all-call and restrict any station from initiating an all-call.

C. Selected stations shall receive all-call announcements at full volume, regardless of station volume setting.

4.8.5 GROUP-CALL

A. All master stations shall be able to initiate selective paging to predetermined groups of stations in the system.

B. Ability to initiate group-call shall be restricted to designated stations.

C. A station may be programmed for membership in several groups.

D. It shall be possible to program up to 100 groups.

E. There shall be no limitations to the number of stations in any group.

F. It shall be possible to program up to 4 adjacent stations out of a group-call so as to eliminate audio feedback.

G. The system shall be able to send out several group-calls simultaneously.

H. There shall be up to 4 levels of priority, each group priority shall be programmed to one of 4 call announce chime tones.

I. Answer function is done by dialling a code on any station in the called group.

4.8.6 OVERHEAD PAGING

A. All master stations shall be able to dial or use direct access into one or more voice paging system(s) for zoned and/or department paging over amplified speakers, unless specifically restricted through programming.

4.8.7 AUTOMATIC SEARCH

A. Each station shall have a pre-programmed list of actions that can automatically take place when their station is called when they are either busy, in private or absent.

B. System shall allow call to be automatically rerouted to another station, leave a call request, initiate a group call etc. Each station can have up to 3 different search call numbers.

4.8.8 REPLY FEATURE

A. A person hearing a page or group call shall be able to begin an immediate normal hands free conversation with the person who initiated the page by simply pressing an answer code on any convenient master station in the group.

B. System shall allow multiple page/reply functions simultaneously.

C. The max. waiting time shall be programmable.

4.8.9 DUPLEX / MANUAL OPERATION

A. Once a call connection is established, normal conversation shall take place in duplex mode, whereby each person may talk hands-free.

B. Each master station shall have a manual simplex button that when used shall control the direction of the conversation (press to talk, release to listen).

C. Momentarily depressing the simplex button shall restore duplex mode.

4.8.10 REMOTE CONTROL FUNCTIONS

A. Each station port in the exchange shall include 1 RCO (Remote Control Output) to be freely used for control of external equipment. A Relay Board may be required.

B. The RIO (Remote In/Out) unit shall be monitored by the exchange for connectivity and is reported as fault of device if disruption occurs.

4.8.11 VOLUME CONTROLS

A. The volume of each station shall be adjustable by programming the appropriate subscriber board in the exchange, either from the station or from PC programming.

B. In addition, each master station shall have an adjustable volume control.

C. Adjustments shall allow a total range of -14 dB to +16 dB.

D. Outgoing volume shall be automatically increased by +6 dB when using the simplex key for press-to-talk.

4.8.12 TONE SIGNALS

A. All features and functions such as off hook, call connection, busy, call forward, all-call, group-call, etc. shall be accompanied or preceded by a distinguishable tone.

B. All/group-call tone signals shall be programmable and tones shall be harmonic and undistorted.

C. It shall be possible to customize and change the length and frequency of all/group-call tones.

4.8.13 MICROPHONE MUTE

A. During conversation, a person shall be able to momentarily block the microphone on own master station by holding down one button (the 0-key).

4.8.14 CALL HOLD, INQUIRY & TRANSFER

A. Once a call is connected, it shall be possible to place the call on hold by pressing one button (digit 2), dialling and conversing with a third party, switching back and forth or transferring the call by pressing one button (digit 3).

4.8.15 STANDARD CONFERENCE

A. It shall be possible to establish and/or join a conference by dialling a standard or programmable digit code.

B. It shall be possible to include any number or all stations in a conference.

C. The system shall allow 50 different simultaneous conferences.

D. Voice control shall be manual, (press-to-talk, release-to-listen).

E. In a standard conference, intercom and paging announcements shall temporarily interrupt the conference.

F. One person at a time shall talk in an individual conference.

G. Stations can be programmed with the ability to override and take control of talking into or feeding the conference.

4.8.16 PRESET GROUP CONFERENCE

A. It shall be possible to set up a group-conference by dialling a 4-digit code, then a group number followed by the conference number.

B. System shall allow up to 50 conference groups.

C. Dialling the preset group conference number shall include all members of the group, and all members of the group shall be able to hear whoever is talking.

D. Each group member shall be able to speak to the group by holding down the simplex button on his master station.

E. It shall be possible to have a preset conference automatically activated by a remote alarm contact.

F. One person at a time shall talk in an individual conference.

G. Certain stations can be programmed with the ability to override and take control of talking into or feeding the conference.

4.8.17 OPEN DUPLEX CONFERENCE

A. It shall be possible to set up an open duplex conference by dialling a four-digit code.

B. It shall be possible to have 20 different open duplex conferences.

C. Upon dialling the code the station will start ringing
- enter the conference by lifting the handset
- leave the conference by placing handset back on hook
- dial the four-digit code to rejoin the open duplex conference.

D. It shall be possible to include a preset group of stations in an open duplex conference.

E. It shall be possible to program DAK keys on stations to allow for single button dialling to enter conference and also start a preset conference.

F. The number of participants in an open duplex conference is typically 4 stations, but by programming, an open duplex conference can have more stations if desired.

4.8.18 PRIORITY AND CLASS OF SERVICE

A. System shall have 4 levels of priority to allow or deny access to features, such as voice or pocket paging, all-call, group-calls, preset conferences, telephone lines, special interfaces, groups of stations and text display of alarm messages.

B. System shall include 16 classes of service which shall allow customization of features and functions available to stations.

4.8.19 DO-NOT-DISTURB

A. All master stations shall be equipped with a privacy/open switch to permit any user to put his station in the Privacy mode.

B. When in the privacy mode, an incoming call shall sound a unique privacy ring tone at both the initiating station and station being called.

C. Call may be answered by momentarily pressing the M-button.

D. It shall be possible to program selected stations with Privacy Override, whereby calls will be heard even if stations are in the privacy mode.

4.8.20 STATION NUMBERING

A. System shall have a true flexible numbering plan feature, whereby any number from 0 to 999999 may be assigned to stations or feature codes.

B. Dialling between remote exchanges shall be transparent.

C. System shall be factory programmed with an "auto-load" numbering plan of up to 650 separate numbers that may be changed on-site as required.

D. It shall be possible to change numbers at any time through programming with access codes, without any rewiring.

4.8.21 MUSIC DISTRIBUTION

A. Standard system shall allow up to 6 channels (E20/E26) or 2 channels (E7) of music to be distributed to all stations.

B. Each master station may select a desired channel by dialling a three-digit code.

C. Music shall be interrupted during intercom calls and return automatically upon completion of the call.

D. System shall also include a channel step function.

E. 32 additional channels shall be available through optional boards with a total of 38 channels of music possible.

4.8.22 INFORMATION CHANNEL

A. System shall allow one or more audio channels to be programmed to distribute audio information that is pertinent to the operation of the facility.

B. Channel shall be accessed and operated as described for music distribution.

4.8.23 REMOTE SET UP OF PROGRAMS

A. It shall be possible to individually program stations, or groups of stations to receive a channel from a remote master control station.

4.8.24 TEXT MESSAGES

A. The system shall allow multiple alpha/numeric text messages to be stored in queue on each master station.

B. The sequence of display shall be based on the priority of each message.

C. System shall include 9 absent, 9 functional and 3 alarm messages.

4.8.25 TECHNICAL ALARMS

A. It shall be possible to activate a preset 16 character text message on a selected display master station or group of master stations, or activate an audio message on the information channel from remote alarm contacts.

B. Each message can be customized and set with a priority level through programming.

C. The system shall include 6 inputs (E26/E20) or 2 inputs (E7) for technical alarms.

4.8.26 AUDIO ALERT OF TEXT MESSAGE

A. System shall allow 4 distinct types of audible alert tones to sound at the master station when text messages are activated.

B. System shall also allow connection of external alarm indicators (lamps, buzzers or bells) to sound for high priority messages in noisy environments.

4.8.27 CALL REQUESTS TO MULTIPLE MASTER STATIONS

A. It shall be possible to program up to10 masters to simultaneously receive and display text message call requests from substations.

B. When a call is answered at one master station, the message shall be deleted at all other stations.

4.8.28 TRANSFER OF CALL REQUESTS

A. It shall be possible to transfer call requests from substations (while allowing standard calls) to different master stations by dialling a 4-digit transfer code plus the receiving station number.

4.8.29 TRANSFER OF STANDARD CALLS

A. It shall be possible to redirect (Call Forward) all calls to another master station, a pager number, telephone number or group number by dialling a two-digit code plus the redirected number.

B. When in the 'transferred' mode, only the station selected to receive the diverted calls shall be able to call or transfer calls to the forwarded station.

C. It shall be possible to redirect calls while at the receiving station (Follow Me) by dialling a two-digit code plus the number of the forwarded station.

D. The system shall be able to simultaneously handle up to 100 call forward commands.

4.8.30 CAMP-ON BUSY

A. The system shall include ability to call a busy station or feature, hear a busy tone (reduced in volume after 5 seconds), wait for a preset time and automatically connect when the called station or feature is free.

B. Upon connection, both parties shall hear the normal connection tone.

C. Number of camp-on calls in the system shall be unlimited.

4.8.31 TEXT CALL-BACK MESSAGE

A. If the calling party does not wish to remain 'camped-on', it shall be possible to place the call in memory and display a call-back message on the called party's station by dialling a digit code.

B. The message shall be registered on the display.

C. It shall be possible to leave up to 9 pre-set text messages on the display of the called station.

D. The number of 'call-back' messages on any one station or in the whole system, shall be unlimited.

4.8.32 VOICE CALL-BACK MESSAGE

A. It shall be possible to leave a pre-set audio voice message by dialling a voice message code on the initiating intercom station.

B. The audio message shall be played back at the receiving station by dialling a two-digit code.

C. Voice messages require a voice storage board in the exchange (see options).

4.8.33 GROUP HUNT

A. The system shall allow programming of multiple 'Hunt' groups, whereby calls to a group number will search and connect to the first available station in the group.

B. The feature may be programmed to have a rotational or fixed start point.

C. Feature shall allow substation calls to be directed to a primary master, but if it is busy, search for an available master in the group.

D. Group Hunt shall allow automatic transfer on busy.

4.8.34 CALL REQUEST TRANSFER PRESET

A. Stations shall be allowed to automatically divert call request calls to pre-selected station or group of stations by dialling a standard or programmable digit transfer code, then the station number or group number.

4.8.35 SOFTWARE PROTECTION

A. All software and programmable information, including customer on-site changes, shall be retained in FLASH memory.

B. When instaaling new software on the Security Audio and Building Communication Node, the software file packages shall have a digital signature. The digital signature shall be checked in order to verify that no one has tampered with the software from the manufacturer.

C. It shall be possible to store the program on a PC using AlphaPro and also be able to download the contents of the FLASH memory as a file for troubleshooting via AlphaWeb.

4.8.36 EMERGENCY ALARM CALLS

A. Selected stations shall be able to initiate priority alarm calls to groups of stations in the system.

B. Alarm calls shall override all conversations in progress, override station volume settings and be heard even if handset is off-hook on desk master stations.

C. Stations can be exempted from receiving the emergency calls.

D. It shall be possible to initiate an alarm call from external equipment and give an automatic voice message.

4.8.37 WAKE UP REMINDER CALLS

A. The system shall allow up to 200 separate automatic date and time calls that will cause individual stations to ring at preset times.

B. This wake up time is entered at the selected station itself.

C. The duration and number of rings shall be programmable.

D. After initiation, dialling a digit or lifting the handset shall cancel the ring.

4.8.38 FAULT / ALARM LOGGING

A. The system shall be able to archive activities, fault and alarm conditions via a Syslog file.
    - Fault conditions within the system can be faulty boards, wiring or software.
    - External alarm conditions input through the intercom system will be printed as time and source of alarm.
    - Calls between intercom stations in the entire system will be logged.

B. It shall be possible to view the contents of the log file via AlphaWeb.

C. It shall be possible to use an OEM Syslog viewer to send the logged events to an external IP or e-mail address for remote monitoring of the system.

4.8.39 ALARM OVERIDE

A.   System shall allow priority calls and voice alarm messages to override standard intercom calls and come through speaker at full volume, even when handset is in use, privacy switch on and volume set low.

4.8.40 TONE TEST

A.   System shall have the capability to do a tone test of entire system. This tone test shall test the speaker and microphone circuits of all standard stations.

B.   This test can be performed automatically every day at a certain time or can be manually started to provide a system evaluation for troubleshooting purposes.

C.   The results of the tone test are sent to the Syslog file.

4.8.41 HOTLINE CALL

A.   System shall have the ability to perform a hotline call from any master station.

B.   This hotline call shall be performed by lifting the handset on a master station which in turn will place a call to a pre-programmed station or feature for default 5 seconds.

C.   Timer shall be system wide programmable for all stations.

4.8.42 EVENT HANDLING

A.   System shall be capable of providing programmable ASCII data strings to interface with external data systems such as CCTV, Card Access, etc.

B.   These data strings shall be fully programmable to meet the needs required by the external systems.

C.   It shall be possible to transmit ASCII data strings either on IP or serial link as desired.

4.9 SYSTEM OPERATION

4.9.1 MASTER-TO-MASTER CALLS

A.   All master stations shall be able to call all other stations in the system unless specifically blocked or restricted through programming by touch dialling a 1 - 6 digit number or by using direct access buttons.

B.   Once dialled, both stations shall be able to converse "hands free".

C.   All standard features shall be available to all master stations in the node or over a network.

4.9.2 CALL FROM SECURITY SUBSTATIONS TO CONTROL ROOM MASTER STATION

A.   A call request shall be initiated from a substation by activating an alarm button or the call-in button on the substation.

B.   The call request shall indicate to the calling party with a flashing green LED (and an audible call acknowledgment voice message) to comply with ADA (see options).

C.   It shall be possible to start an external strobe light (see options).

D.   This call request shall be annunciated at the Control Room Master station as follows:
- The display will show a call request from a station indicated by station number and associated text and type of call (priority).
- If several call requests are received without being answered, they should be stored in a queue sorted on priority and time.
- A rapidly repeating tone signal sounds and the direct access button associated with the calling station flashes if direct dial unit is used.
- Call request shall be answered at the Control Room Master station by pressing the appropriate direct access button or by scrolling the displayed queue and pressing the direct access button pre-programmed to answer call requests.

E.   When call is answered the following shall occur:
- A connection tone is heard at both the receiving and calling station.
-   The flashing green LED illuminates solid on the appropriate button if direct dial unit is used.
-   The number and text of the station that is connected appears in the display.
-   An in-use LED illuminates on the calling substation.
-   Clear, two-way communication shall take place.
-   Other calls from substations to the Control Room Master station during conversation shall each flash their appropriate direct access button LED if direct dial unit is used, and sound the call-in tone.

4.9.3   CALL FROM A CONTROL ROOM MASTER STATION TO ANY OTHER STATION

A.   A call shall be placed from a CRM station to any other station in the system by dialling the station number on the digit keypad or pressing the direct access key programmed for the actual station.

B.   The display on the CRM station shall indicate the number and text of the called station.

C.   When calling any other master station, duplex hands-free loud-speaking communication shall be possible between the two stations.

D.   When calling an elevator car or other security substation, the press-to-talk button shall be used to control the conversation if needed for security purposes or privacy.

4.9.4   GROUP CALL FROM A CONTROL ROOM MASTER STATION

A.   A group call shall be initiated at a CRM station by dialling the number assigned to a pre-programmed group of stations or pressing the direct access key programmed for the actual group. This shall sound an alert tone and allow paging to all stations in the group.

B.   There shall be no limitation to the number of stations in a group.

C.   Group calls shall have priority over other conversations in progress.

4.9.5   PROGRAMMING BUTTONS ON THE CONTROL ROOM MASTER STATION

A.   Direct access buttons on the CRM station shall be easily programmed and changed by the station user.

B.   Once programmed, the button assignments shall remain in memory.

C.   This feature is valid if CRM is equipped with direct access button modules.

4.9.6   CONTROL DESK PC MANAGING PROGRAM

A.   It shall be possible to use a PC with installed control managing program like AlphaVision to manage all incoming call requests and outgoing calls by pointing and clicking on icons on the site map on the screen.

B.   The geographical location, call status and call priority of any station shall be clearly visible on the map on the screen.

C.   A call priority list and call log shall be available on the screen.

(Note to specifier: Describe other desired operations)

5 EQUIPMENT

5.1 STATIONS

5.1.1 STANDARD MASTER STATIONS

A. Master stations shall have access to all features in the exchange.

B. Master stations shall include the following controls:
- Dialling buttons 0-9 + # and *
- Manual "M" button for speech control and other functions
- Cancel "C" button
- Privacy slide switch
- Variable volume control.

C. Shall include 10 true direct access buttons; subsets or multiple keystrokes shall not be acceptable.

D. Shall include a red "Station-on" LED.

E. Shall include a 3", 1.6 watt speaker with 88 dB sensitivity, mounted in an acoustic baffle.

F. Shall include an electret microphone with 100/300 mV output and sensitivity of -65 dB @1 KHz.

G. Shall include a preamplifier with 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

H. Frequency response of input and output shall be 300 to 10,000 Hz.

I. Output power shall be 1 W.

J. Master stations shall be in a modern grey or black plastic housing, suitable for desk (or wall) mounting, and have a 2 m (6 foot) cord with plug.

K. Master stations may have a lightweight handset with coiled cord and magnetic hook-switch for confidential conversations.

L. Master stations may have a two-line, 16 character information LCD display.

STENTOFON

The following STENTOFON Standard Master Stations comply with the above specifications:

7036 210

Basic
168 x 75 x 176 mm /
6.6 x 2.9 x 6.9 inch

Desk or wall mount

7034 210

Handset
225 x 75 x 176 mm
8.9 x 2.9 x 6.9 inch

Desk or wall mount

7036 310

Display
168 x 75 x 176 mm
6.6 x 2.9 x 6.9 inch

Desk or wall mount

7034 310

Handset + Display
225 x 75 x 176 mm
8.9 x 2.9 x 6.9 inch

Desk or wall mount

7071 090

Display
168 x 75 x 176 mm
6.6 x 2.9 x 6.9 inch

Desk or wall mount

7072 090

Handset + Display
225 x 75 x 176 mm
8.9 x 2.9 x 6.9 inch

Desk or wall mount

7001 210

Handset
112 x 132 x 260 mm
4.4 x 5.2 x 10.2 inch

Desk mount

7001 310

Handset + Display
112 x 132 x 260 mm
4.4 x 5.2 x 10.2 inch

Desk mount

7070 090

Handset + Display
112 x 132 x 260 mm
4.4 x 5.2 x 10.2 inch

Desk mount

Note to specifier: Specify station type as desired

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5.1.2 DUAL DISPLAY MASTER STATION

A. Master station shall have full access to all features in the exchange.

B. Master station shall include the following controls:
   - Dialling buttons 0-9
   - Manual "M" button for speech control and other functions
   - Cancel "C" button
   - Privacy switch
   - Variable volume control.

C. Shall include up to 4x10 direct access keys with information text for each DAK on a 10 lines display.

D. The direct access keys and DAK display text shall be easily programmed from the station and changed at any time.

E. Status information, guidance and menus shall be shown on a large 4 lines graphic display.

F. Shall have 4 navigation keys for quick access to system menus and directory entries.

G. Shall include a red "Station-on" LED.

H. Shall include a 2", 1.6 watt speaker mounted in an acoustic baffle.

I. Shall include an electret microphone with 100/300 mV output and sensitivity -65dB @1KHz.

J. Shall include a preamplifier with 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

K. Frequency response of input and output shall be 300 to 7,000 Hz.

L. Output power shall be 1 W to internal loudspeaker.

M. Station shall be in a dark grey and black plastic housing suitable for desk mounting and have a 2 m (6 foot) cord and plug.

N. It shall be possible to equip the station with a noise cancelling gooseneck microphone.

The following STENTOFON Dual Display Stations comply with the above specifications:

7007 000

72 x 140 x 270 mm
2.8 x 5.5 x 10.6 inch

Desktop mount

7007 010

With gooseneck microphone
72 x 140 x 270 mm
2.8 x 5.5 x 10.6 inch

Desktop mount

5.1.3 WALL MOUNT STATIONS

MASTER STANDARD

A. Master station shall have access to all features in the exchange.

B. Master stations shall include the following controls:
   - Dialling buttons 0-9
   - Manual "M" button for speech control and other functions
   - Cancel "C" button
   - Privacy switch
   - Variable volume control.

C. Shall include a red "Station-on" LED.

D. Shall include a 3", 1.6 watt speaker with 88 dB sensitivity mounted in an acoustic baffle.

E. Shall include an electret microphone with 100/300 mV output and sensitivity -65dB @1 KHz.

F. Shall include a preamplifier with 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

G. Frequency response of input and output shall be 300 to 5,000 Hz.

H. Output power shall be 1 W.

I. Wall mount stations shall be in anodized aluminum, suitable for wall mounting in flush or surface mount back box.

J. Station may include 8 direct access keys (DAK).

K. Station may include a two lines, 16 character information LCD display.

L. Station may be equipped with a noise cancelling gooseneck microphone.

SUBSTATION WALL

A. Like Master Standard station without keyboard.

B. Shall have one "doorbell" button, pre-programmed for call to one master station.

C. Shall have internal preset volume control.

D. Shall be IP54 protected.

The following STENTOFON Wall Mount Stations comply with the above specifications:

| **7040 000**	**7042 000**	**7043 000**	**7046 000**
Master Standard	**Master Display** Display 8 DAK keys	**Master Console** Display 8 DAK keys Gooseneck mic.	**Substation Wall** 1 call button IP54 protected

Dimensions for all stations are (W x H x D) 125 x 280 x 53 mm / 4.9 x 10.9 x 2.1 inch
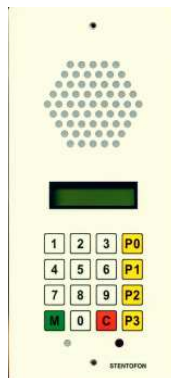Flush mount back box: **6020 000** - Surface mount back box: **6030 000**

5.1.4 OPERATING ROOM MASTER STATION

A. Master station shall have access to all features in the exchange.

B. Master stations shall include the following controls:
- Dialling buttons 0-9
- Manual "M" button for speech control and other functions
- Cancel "C" button

C. Shall have preset variable volume control inside station.

D. May include 4 direct access keys (DAK).

E. May include a two lines, 16 character information LCD display.

F. The display may have back-light powered from a separate supply.

G. Shall include a red "Station-on" LED.

H. Shall include a 3", 1.6 W speaker with 88 dB sensitivity mounted in an acoustic baffle.

I. Shall include an electret microphone with 100/300 mV output and sensitivity -65dB @1 KHz.

J. Shall include a preamplifier with 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

K. Frequency response of input and output shall be 300 to 5,000 Hz.

L. Output power shall be 1 W.

M. Shall have a Mylar covered aluminium front plate for wipe-down sterilisation.

N. Surface must be resistant to common washing and sterilisation detergents.

O. Must be wall mounted in flush or surface mount back box.

The following STENTOFON Operating Room Stations comply with the above specifications:
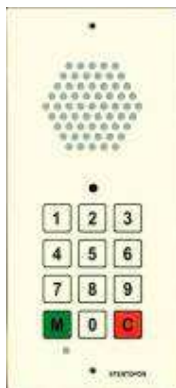
6036 600   **7036 600**

Flush mount back box **0602 000**
Surface mount back box **0603 000**

Dimensions: (W x H x D) 125 x 280 x 66 mm / 4.9 x 10.9 x 2.6 inch

5.1.5   INDUSTRIAL MASTER STATIONS

LIGHT INDUSTRIAL MASTER STATION

A.   Shall have access to all features in the exchange.

B.   The light industrial master station shall be splash proof and designed for humid, dirty and outdoor conditions.

C.   The exterior casing shall be comprised of a flame and chip resistant Bayblend plastic with a UV cured, chemical resistant PVC front panel.

D.   The stations shall include a keyboard foil with:
- dialling buttons 0-9
- manual "M" button for speech control and other functions
- cancel "C" button.

E.   There shall be preset volume control and "always privacy" switch inside the station.

F.   The station shall have a red LED indicator for incoming calls and station in use indication.

G.   The station shall have an IP54 classification.

H.   Temperature and humidity range must be: 0°- +50 °C /+32°- +122°F and 10% - 85% RH.

I.   Shall include a 3", 1.6 W loudspeaker

J.   Shall include an electret microphone with 100/300 mV output and sensitivity -65dB @1 KHz.

K.   Shall include a preamplifier with 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

L.   Output power shall be 1 W to internal loudspeaker, sound pressure at 1 m from internal speaker should be 66 db.

M.   Output power to external 20-70 Ohm loudspeaker shall be 1.5 W.

N.   Output power from built-in VOX operated power amplifier shall be 10 W in 8-20 Ohm (separate 12 VAC/2 A power supply required).

O.   Frequency response of input and output shall be 500-5,000 Hz.

P.   Shall have connections for optional handset with microphone impedance 200-600 Ohm.

Q.   Shall include 1 x PG9 and 1 x PG11 glands.

The following STENTOFON Light Industrial Maser Station complies with the above specifications:

7080 000

Dimensions: (W x D x H) 124 x 344 x 63 mm / 4.9 x 9.5 x 2.5 inch.

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NOISE CANCELLING INDUSTRIAL MASTER STATION

A.   Shall have access to all features in the exchange.

B.   This industrial master station shall be weather resistant and designed for humid, dirty and outdoor conditions.

C.   The exterior casing shall be comprised of a chip-resistant orange Macrolon with foil keyboard.

D.   The stations shall include a keyboard foil with:
- dialling buttons 0-9
- manual "M" button for speech control and other functions
- cancel "C" button.

E.   There shall be preset volume control and "always privacy" switch inside the station.

F.   The station shall have a red LED indicator for incoming calls and station in use indication.

G.   The station shall have an IP65 classification.

H.   Temperature and humidity range must be: -20°- +50°C / -4°- +122°F and 10% - 85% RH.

I.   Shall include a noise cancelling microphone.

J.   Shall include a preamplifier with 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

K.   Output power to external 20-70 Ohm loudspeaker shall be 1.5 W.

L.   Output power from built-in VOX operated power amplifier shall be 10 W in 8-20 Ohm (separate 12 VAC/2 A power supply required).

M.   Frequency response of input and output shall be 500-5,000 Hz.

N.   Shall have connections for optional handset with microphone impedance 200-600 Ohm.

O.   Shall include 2 x PG9 glands.

The following STENTOFON Light Industrial Maser Station complies with the above specifications:

7082 000

Dimensions: (W x D x H) 160 x 240 x 137 mm / 6.3 x 9.5 x 5.4 inch.

HEAVY DUTY INDUSTIAL MASTER STATION

A.   Shall have access to all features in the exchange.

B.   This industrial master station shall be water- and dust-proof and designed for humid, dirty and outdoor conditions.

C.   The exterior casing shall be comprised of orange silumin with brushed aluminium front.

D.   The stations shall include a keyboard with large rubber buttons for:
- dialling buttons 0-9
- manual "M" button for speech control and other functions
- cancel "C" button
- 4 direct access keys (DAK).

E.   There shall be preset volume control and "always privacy" switch inside the station.

F.   The station shall have a large red indicator light for incoming calls and station in use indication.

G.   The station shall have an IP65 classification.

H.   Temperature and humidity range must be: -20°- +50°C / -4°- +122°F and 10% - 85% RH.

I.   Shall include an electret microphone with 100/300 mV output and sensitivity -65dB @1 KHz.

J.   Shall include a preamplifier with 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

K.   Output power to external 20-70 Ohm loudspeaker shall be 1.5 W.

L.   Output power from built-in VOX operated power amplifier shall be 10 W in 8-20 Ohm (separate 12 VAC/2 A power supply required).

M.   Frequency response of input and output shall be 500-5,000 Hz.

N.   Shall have connections for optional handset with microphone impedance 200-600 Ohm.

O.   Shall include 2 x PG7 and 2 x PG9 glands.

The following STENTOFON Heavy Duty Industrial Maser Station complies with the above specifications:

7086 000

Dimensions: (W x D x H) 160 x 260 x 100 mm / 6.3 x 10.2 x 3.9 inch.

5.1.6 INDUSTRIAL SUBSTATIONS

HEAVY DUTY INDUSTRIAL SUBSTATIONS, ONE OR THREE BUTTONS

A. This industrial substation shall be weather resistant and designed for humid, dirty and outdoor conditions.

B. The exterior casing shall be comprised of a chip-resistant orange silumin.

C. The stations shall include:
   - one large programmable call button

D. In addition, the station may include an "M" button for speech control and other functions and a cancel "C" button.

E. There shall be preset volume control and "always privacy" switch inside the station.

F. The station shall have a red LED indicator for incoming calls and station in use indication.

G. The station shall have an IP65 classification.

H. Temperature and humidity range must be: -20° - +50°C / -4° - +122°F and 10% - 85% RH.

I. Shall include a noise cancelling microphone.

J. Shall include a preamplifier with 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

K. Shall include a 1.5 W built-in loudspeaker.

L. Output power to external 20-70 Ohm speaker shall be 1.5 W.

M. Output power from built-in VOX operated power amplifier shall be 10 W in 8-20 Ohm (separate 12 VAC/2 A power supply required).

N. Frequency response of input and output shall be 500-5,000 Hz.

O. Shall have connections for optional handset with microphone impedance 200-600 Ohm.

P. Shall include 3 x PG9 glands

The following STENTOFON Industrial Sub Stations comply with the above specifications:

7083 000

3 buttons

7085 000

1 button

Dimensions: (W x D x H) 160 x 260 x 92 mm / 6.3 x 10.1 x 3.6 inch.

5.1.7 CONTROL ROOM MASTER STATION

A. The Control Room Master station shall be a compact desktop console with 1-4 modules.
- Control Room Master Station unit, CRM (always required)
- Handset unit
- DAK unit (1 or 2)

CRM UNIT

A. Master station shall have access to all features in the STENTOFON AlphaCom exchange.

B. Shall include the following controls:
- Dialling buttons 0-9
- Manual "M" button for speech control and other functions
- Cancel "C" button
- Privacy switch
- Variable volume control.

C. Shall include 4 direct access keys (DAK), each containing two programmable LEDs.

D. Shall include a red "Station-on" LED.

E. Shall include a 4 line 20 character alphanumeric LCD display with backlight.

F. Shall include a 3", 1.6 watt speaker with 88 dB sensitivity mounted in an acoustic baffle.

G. Shall include a gooseneck microphone.

H. Shall include a preamplifier with automatic sensitivity adjustment, 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

I. Frequency response of input and output shall be 300 to 5,000 Hz.

J. Output power shall be 1 W.

K. Shall allow up to (100) call requests in queue with (256) priority levels and allow multiple parallel masters with transfer of command.

L. Front plate shall be in anodized aluminum, suitable for flush mounting or desktop mount in back box.

HANDSET UNIT

A. Shall be lightweight handset with coiled cord and magnetic hook-switch for confidential conversations.

B. The handset should be mounted on an anodized aluminium plate suitable for flush mounting or desktop mount in back box.

DAK UNIT

A. Shall be a module with 48 programmable direct access keys, each key containing two programmable LEDs.

B. One or two DAK units can be mounted in one console.

C. Front plate shall be anodized aluminum for flush mounting or desktop mount in back box.

The following STENTOFON Control Room Master Station complies with the above specifications:

DAK-48 unit	type **7006 110**
CRM-IV unit	type **7006 101**
Handset unit	type **7006 190**

125 x 280 x 30 mm / 4.9 x 10.9 x 1.2 inch

CRM BACK BOXES

    A.   Shall be used to mount 1-4 units to form one CRM-IV desktop console.

For STENTOFON CRM-IV Control Room Master Station:
- Single Back box   135 x 320 x 75 mm / 5.3 x 12.6 x 2.9 inch   type **7006 180**
- Double Back box   265 x 320 x 75 mm / 10.4 x 12.6 x 2.9 inch   type **7006 181**
- Two Housing Mounting Kit (single + double or double + double back boxes)   type **7006 182**

5.1.8 TAMPER RESISTANT STATIONS

HEAVY DUTY TAMPER RESISTANT SUBSTATIONS

    A.   Shall be used where vandalism is a threat to the equipment.

    B.   Shall have one or two large call-in buttons, pre-programmed for call request to master station or program distribution source.

    C.   Shall have internal preset volume control.

    D.   Shall include a red "Station-on" LED.

    E.   Shall include a 3", 1.6 W loudspeaker.

    F.   Shall include an electret microphone with 100/300 mV output and sensitivity -65dB @1 KHz.

    G.   Shall include a preamplifier with 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

    H.   Frequency response of input and output shall be 300 to 5,000 Hz.

    I.   Output power shall be 1.4 W.

    J.   Stations shall be in ¼" anodized aluminum, suitable for wall mounting in flush or surface mount back box with tamper proof screws.

    K.   Loudspeaker and microphone grille shall be protected with no-penetration barrier.

    L.   Temperature and humidity range shall be: +10° to +40℃ / +50° to +104℉; 10% - 85% RH.

The following STENTOFON Tamper Resistant Stations comply with the above specifications:

7060 1010

7060 1020

Dimensions: (W x H x D) 190 x 140 x 63 mm / 7.5 x 5.5 x 2.5 inch

Required back boxes, flush mount type **6297 00** or surface mount type **6298 00**

TAMPER AND VANDAL PROOF SUBSTATIONS

A. Shall be used where vandalism is a threat to the equipment and where advanced safety solutions are required.

B. Shall have one call-in button, pre-programmed for call request to a master station.

C. Shall have internal preset volume control.

D. Shall include a red "Station-on" LED.

E. The five-button version shall in addition have:
   - Cell light toggle button
   - Entertainment source selector in 8 steps
   - Entertainment program display
   - Entertainment volume up/down buttons

F. Shall have built-in tamper switch with tamper alarm and warning for station and line fault.

G. Shall be possible to arm for button-touch alarm, scream alarm and time-out alarm.

H. Shall include two programmable general purpose outputs and three inputs.

I. Shall include an electret microphone with 100/300 mV output and sensitivity -65dB @1 KHz.

J. Shall include a preamplifier with 1000 ohm output impedance and greater than 40 dB signal to noise ratio.

K. Frequency response of input and output shall be 200 to 10,000 Hz.

L. Output power shall be 1 W in a built-in loudspeaker.

M. Shall include outputs for redundant light signalling system.

N. Station front shall be in 2.5 mm stainless steel, suitable for wall mounting in flush mount back box with 6 tamper proof screws.

O. Buttons shall be vandal proof capacitive touch type with back-light.

P. Loudspeaker and microphone grille shall be protected with no-penetration barrier.

Q. The station shall have IP65 front access classification.

R. Temperature and humidity range shall be: 0° to + 40°C / +32° to +104°F; 10% - 85% RH

The following STENTOFON Tamper and Vandal Proof Stations comply with the above specifications:

7061 000   **7063 000**

Dimensions: (W x H x D) 128 x 264 x 51 mm / 5.0 x 10.4 x 2.4 inch

Required back box with anchors, flush mount type LBB 7073/76

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5.1.9 WEATHER AND VANDAL RESISTANT IP SUBSTATIONS

    A. Weather and Vandal Resistant IP substations shall be designed to deliver CCoIP® - Critical Communication over IP.

    B. The stations shall have a 2 mm stainless steel faceplate which can be fastened to a back box with four tamper proof screws.

    C. The loudspeaker and microphone are protected by a tamper and vandal proof grid.

    D. The stations have two RJ45 connectors with a 10/100 Mbps switch and can be configured with fixed or dynamic IP-addresses.

    E. The codecs are either standard G.711 or the higher quality G.722.

    F. The unit can tag priorities (DiffServ, ToS) at the Ethernet packets, and it has acoustic echo cancellation and adaptive jitter buffer.

    G. The station can be supervised from the IP network, and it can be configured from a central exchange or by using the integrated web-server.

    H. The unit has one relay output.

    I. The station is delivered in two versions:
     - With one mushroom or stainless steel button, for mounting in flush mount 3-gang back box.
     - With one or two tamper proof stainless steel button(s), for mounting in flush mount back box #8098 100 or on-wall back box #8098 000.

The following STENTOFON Weather and Vandal Resistant IP Substations comply with the above specifications:

8041 100

8051 000

Dimensions 8041 100: (W x H x D) 92 x 180 x 54 mm / 3.6 x 7.1 x 2.1 inch

Dimensions 8051 000: (W x H x D) 114 x 160 x 63 mm / 4.5 x 6.3 x 2.5 inch

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5.2   OPTIONS

5.2.1   60 W AMPLIFIER

A.   The amplifier shall be used for distribution of audio for information calls, background music and evacuation messages.

B.   Audio input shall be an intercom exchange subscriber line and/or other audio sources.

C.   The intercom wire input shall have priority over the AUX input.

D.   The output shall be 60 W on a 100 V line.

E.   There shall be line monitoring on the loudspeaker output.

F.   Status indicators in the front shall show error type: line error, amplifier error, load error, overheating, GND fault and overload.

G.   Volume and bass/treble control shall be accessible in front.

H.   Shall have volume override facility.

I.   Shall go in standby mode to preserve power when no signals are present.

J.   Shall include set and reset keys for programming and service of the amplifier.

K.   Impedance level for line monitoring, time between tests and error detection limits shall be programmable.

L.   Shall include monitoring of amplifier and output for automatic change-over to standby amplifier.

M.   Shall be in closed housing complying with IP20 classification (finger-proof).

N.   Shall meet IEC65/EN60950 requirements.

O.   Up to 6 units shall be mounted in a 3U / 19" rack.

The STENTOFON InterGuard IG60 Amplifier type **9971 000** *complies with the above specifications.*


Dimensions: (W x H x D) 70 mm x 3U x 220 mm / 2.7 inch x 3U x 8.6 inch.

5.2.2   GENERAL PURPOSE AUDIO INTERFACE (AGA)

A.   Shall be used for feeding 16 audio program channels into and/or out of the intercom exchange under software control. One or two boards in one exchange.

B.   Shall be fed from any analogue audio program source.

C.   Shall be used to provide 8 channels for two-way speech communication between modules in a multi-module system. One, two or three boards in each module.

D.   Shall have galvanic isolated inputs/outputs via 600 Ohm 0 dB transformers.

E.   Shall have plug-in terminals on the board.

F.   Shall have individual adjustable sensitivity (100 mV - 1 V) controllers for all channels.

G.   Shall have a frequency range of 40 – 18.500 Hz.

H.   Shall contain a red/green/amber indicator LED.

I.   Shall have coded connector to ensure correct positioning in the module.

J.   Shall be a "Hot plug in / plug out" device.

*The STENTOFON AGA board for AlphaCom type **9303 001** complies with the above specifications.*
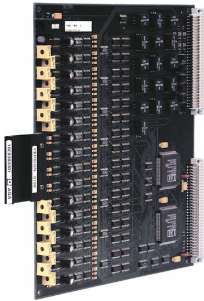
Dimensions are (W x H x D): 263 x 230 x 10 mm /10.3 x 9 x 0.4 inch.

5.2.3 STORED VOICE PLAYBACK BOARD (ASVP)

A. This board shall be used for pre-recorded voice messages in the intercom system.

B. English, French, German, Norwegian, Swedish, Danish and Finnish messages shall be available. Other languages shall be delivered on request.

C. Standard alarm messages shall be available on the boards with English, Norwegian German and Swedish speech messages.

D. It shall be possible to store 9 different alarm messages.

E. It shall be possible to order custom specified messages or to customize messages with special programming tool.

F. Up to 30 minutes of digital speech shall be stored in FLASH memory.

G. It shall be possible to play back 8 channels simultaneously.

H. Speech coding shall be 64 kbit/sec. ADPCM.

I. Audio bandwidth shall be 300 – 6,800 Hz.

J. Sampling rate shall be 16 kHz.

K. Shall have LED at the front to indicate status.

L. Shall be mounted in an empty exchange card slot.

M. Shall be a "Hot plug in / plug out" device.

*The STENTOFON ASVP board for AlphaCom type **9304 0XX** complies with the above specifications.*
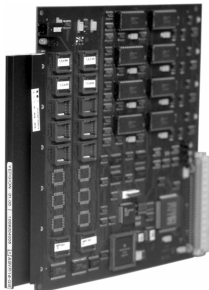
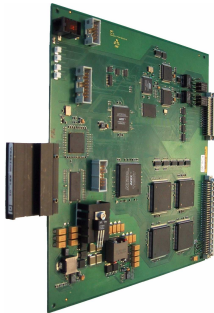Dimensions: (W x H x D) 10 x 230 x 263 mm / 0.4 x 9.0 x 10.3 inch.

Available languages, XX= Nor: 01 – Fin: 02 – Dan: 03 – Ger: 04 – Eng: 05 – Fre: 06 – Swe: 11

Programming tool: AlphaVoC.

5.2.4 DIGITAL NETWORK BOARD (AE1)

A. This board shall provide independent E1/T1 interfaces to intercom exchanges.

B. It shall be possible to use the board in different configurations to link modules and/or nodes via digital links.

C. The board shall match standard E1/T1 cables and CAT5 building cabling systems.

D. The board shall also provide fractional E1/T1 multiplexing capabilities.

E. The capacity shall be 2 E1/T1 links with 32 audio time slots, 7 RS232 ports for free use and 1 RS232 PC serial port.

F. Frequency range shall be 300-3 400 Hz, G.711 a-law or u-law coding.

G. Data on RS232 shall be 9 600 and 38 400 baud, speed E1/T1: 2 048/1 536 Mbit/sec.

H. Impedance shall be 120 Ohm on E1 (100 Ohm in CAT5 mode) and 100 Ohm on T1.

I. Shall include 2 red/green/amber LED indicators for board and link status.

*The STENTOFON AE1 board for AlphaCom type **9305 000** complies with the above specifications.*

Dimensions are (W x H x D) 10 x 230 x 263 mm / 0.4 x 9 x 10.3 inch.

5.2.5 POWER DISTRIBUTION BOARD (PDB)

A. The PDB board shall be used when it is necessary to supply additional equipment with power from the intercom exchange.

B. The power board shall provide +5 V, +15 V, +24 V and +32 V.

C. All power outputs shall be fuse-protected by 1 A.

D. Board shall be fastened to mounting rail in the intercom exchange.

*The STENTOFON PDB board for AlphaCom type **9971 000** complies with the above specifications.*

Dimensions: (W x H) 130 x 100 mm / 5.7 x 3.9 inch

NOTE: PDB can not be used in AlphaCom E7.

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5.2.6   RELAY BOARD (MRBD)

A.   Shall be used where relay control is needed to activate devices such as alarm bells, door locks and CCTV camera control from an intercom system.

B.   The board shall be equipped with 6 relays with dual change-over contacts.

C.   The relays shall be activated by programmed general output ports in the intercom exchange, by a RIO unit or other general outputs in the system.

D.   The RCOs shall be triggered on low or high level input, selected by switches.

E.   The relays shall be powered from +24 V on the Power Distribution Board (PDB).

F.   Current consumption shall not exceed 60 mA with all relays active.

G.   The board shall be fastened to mounting rail in the AlphaCom exchange.

*The STENTOFON MRBD board for AlphaCom type **9970 200** complies with the above specifications.*

Dimensions are (W x H x D) 100 x 100 mm / 3.9 x 3.9 inch

5.2.7   FILTER BOARD AND SPEECH ADAPTER WITH RELAY (FBSAR)

A.   This board shall include two audio channels to act as a galvanic interface between the intercom exchange and external PA- or non-selective radio systems.

B.   One channel shall be equipped with relays and opto-couplers for non-selective radio keying and control.

C.   Both channels shall have filter for the 40 kHz data carrier used in display stations that might cause amplifier overheating on common PA systems.

D.   Audio input level shall be 5 mV – 1.5 V.

E.   Audio output level shall be 0 – 7 V.

F.   Input and output impedance shall be 600 Ohm.

G.   Shall be powered from +24 V on the Power Distribution Board if relays are used.

H.   Current consumption shall not exceed 20 mA with both relays active.

I.   Board shall be fastened to mounting rail in the intercom exchange.

*The STENTOFON FBSAR board for AlphaCom type **9505 000** complies with the above specifications.*


Dimensions are (W x H) 100 x 100 mm / 3.9 x 3.9 inch

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5.2.8 MICROPHONE AMPLIFIER FOR DYNAMIC & ELECTRET MIC (MADER)

A.   This board shall be used for two way communication through external loudspeaker.

B.   It shall be possible to make announcements by use of a dynamic or electret microphone.

C.   It shall be possible to use the microphone's On/Off button to activate pre-programmed loudspeaker zones for announcement.

D.   The RCO input driver and relay must accept both high and low activation input, selected by a switch.

E.   The microphone level must be adjustable.

F.   It must be possible to select bass boost by a switch.

G.   Shall be powered from +24 V on the Power Distribution Board (PDB) if relay is used.

H.   Current consumption shall not exceed 30 mA when the relay is active.

I.   Board shall be fastened to mounting rail in the AlphaCom exchange.

*The STENTOFON MADER board for AlphaCom type **9960 100** complies with the above specifications.*
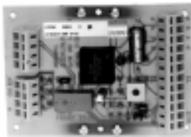
Dimensions: (W x H) 70 x 100 mm / 2.7 x 3.9 inch.

5.2.9 REMOTE IN/OUT CONTROL (RIO)

A.   The RIO unit shall be included where auxiliary devices need to be operated from the intercom system and/or where external alarm conditions need to be displayed as text or voice message given on intercom stations.

B.   Shall operate on point-to-point connections (RS232) or on a multi-drop bus (RS485).

C.   Each RIO unit shall have 8 inputs and 18 outputs.

D.   All inputs and outputs shall be programmable from the intercom programming tool.

E.   The outputs shall be connected to relay boards with 6 relays each.

F.   It shall be possible to connect up to 30 RIOs to one intercom exchange.

G.   It shall be possible to chain up to 10 units on one RS485 bus.

H.   It shall be possible to mount RIOs up to 1 km from the exchange when using RS485.

I.   There shall be status LED on the board and built-in error indication.

J.   The RIO units shall be monitored by the intercom exchange and error messages shall be displayed on the system station in case of device error.

*The STENTOFON RIO board for AlphaCom type **9970 500** complies with the above specifications.*
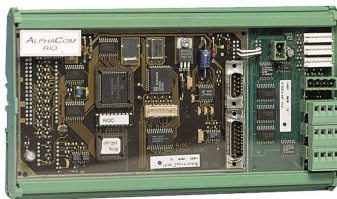
Dimensions: (W x H x D) 225 x 125 x 50 mm / 10.4 x 5.0 x 2.4 inch

6 ANNEX A

6.1 REFERENCES

Ref.1

Stentofon. Network Design Guide. 2006.

Ref. 2

Owen, D.D. and RS Means Engineering Staff. Building Security: Strategies & Costs. Reed Construction Data. Kingston, MA. 2003.

Ref. 3

Craighead, G. High-Rise Security and Fire Life Safety. Elsevier, Woburn, MA. 2003.

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6.2 STATION TABLE EXAMPLES

6.2.1 CONVENTIONAL (non IP) STATIONS

This table can be filled in to indicate station ID and relationship between stations, peripheral cabinets, system cabinets and network backbone.

	STATION			PATCH CABINET ID		SECURITY AUDIO AND BUILDING COMMUNICATION NODE ID		
	ID	Call no.	Location	1st level	2nd level	Node	Cabinet/Room	Network Segment/VLAN
1								
2								
3								
4								

6.2.2 IP STATIONS

This table can be filled in to indicate station ID and relationship between stations, cabinets and network backbone.

	STATION			PATCH CABINET ID		SECURITY AUDIO AND BUILDING COMMUNICATION NODE ID		
	ID	Call no.	Location	1st level	Network Segment/VLAN	Node	Cabinet/Room	Network Segment/VLAN
1								
2								
3								
4								

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