

Section 7.1:

Voice Alarm Design Guide

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7.1: VOICE ALARM DESIGN GUIDE

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The following is a guide for designers on VA / PA systems, and their use in conjunction with advanced fire detection systems, incorporating the requirements of BS 5839-8:1998. It will highlight some of the main difficulties in system design paying particular attention to intelligibility, which is the key differentiator between good and poor design.

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1 Background research: why Voice Alarm is the future for Fire Alarm systems

"It has often been observed that occupants – in the initial moments of a fire, upon smelling smoke or hearing the fire alarm – do not react; they deny there is danger or they ignore the situation. This seems especially true in public buildings where occupants do not want to be seen to overreact to a false alarm or to a situation that is already under control. Such avoidance behaviour in a dangerous situation often results in a delayed start to evacuating a building or taking protective action". This statement by Dr Guylène Proulx¹ was further illustrated by research carried out by Brian Piggott of the Fire Research Centre and published by David Canter of Surrey University² which showed that in the event of a fire:

- 13% of people reacted to bells
- 45% of people reacted to text
- 75% of people reacted to voice!

It was also made clear that in the event of an alarm people generally exit by the entrance they first used and need to be directed to the nearest escape route. A Voice Alarm system can be used to give people clear information about when to evacuate and what route to take and hence alleviate some of the problems highlighted above.

2 The difference between Public Address (PA) and Voice Alarm (VA)

Many people believe they can simply use their PA system to provide a voice message in the event of an emergency like a fire.

Unfortunately PA systems, whilst very good for providing music and messages, are not guaranteed to work when there is an emergency. This is where the British Standard BS 5839 - 8:1998 on Voice Alarm comes into use, as it clearly defines the requirements of a true VA system. A true VA system is a HIGHLY SECURE PUBLIC ADDRESS system which has the following features;

- All internal and external circuits are monitored for faults
- A minimum battery back up of 24 hours standby and 30 minutes alarm.
- A monitored secure link to a fire alarm panel
- A number of pre-recorded emergency messages
- Incorporates an emergency 'firemans' microphone

The use of speech sounders is not considered as a true VA system and the recommendations detailed within 'annexe E' of the standard should be consulted.

References

1: Guylène Proulx, Ph.D, 'Misconceptions about human behaviour in fire emergencies' published in Canadian Consulting Engineer, March 1997, pp36, 38.

2: David Canter, 'Studies of Human Behaviour in Fire: Empirical results and their implications for education and design.' Published by BRE, July 1985

3 BS 5839 - 8 :1998 Fire detection and alarm systems for buildings

There is no substitute for reading the standard, this section only deals with the most obvious or possibly contentious issues facing the designer.

Copies of this standard can be obtained from: British Standards Institute (BSI) at www.bsi-online.com

We also suggest reference is made to BS 5839 - 1:2002.

The standard is split into various sections, the following looks at the key points for designers in each section.

3.1 Section 1 General

The key part of this section for a new design is the need to exchange information with interested parties, as it is likely that the information gathered here will form the basis of the design. An understanding needs to be gained of what messages are to be played in the event of a fire or other emergencies as well as what the system may be asked to do in addition, ie music and/or paging.

This section also provides a full planning schedule as a check list which is well worth following, especially for anyone who is embarking on a design for the first time.

The designers check list is as follows :

- Survey of the site and/or a detailed examination of site drawings including an acoustic assessment
 - Assessment of usage of the building including;
 - Periods of non occupation
 - Areas with high noise levels
 - Personnel including those hard of hearing
 - Actions that take place in the event of a fire
- Liaison with all manufacturers to ensure compatibility between the fire and voice alarm systems
- A system specification and requirements for estimation purposes
- Tendering and quotation
- Consideration of proposals
- Consideration of servicing requirements
- Agreement on proposals and confirmation of 'Fire plan'
- Agreement on the 'controls' ie microphones etc
- Detailed system design
- Ordering
- Agreement on final specification including any variations
- Production, pre-delivery acceptance certificate and delivery
- Installation and testing phase
- Commissioning
- System documentation and user training
- Acceptance by client
- Handover of system
- Service agreement



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It goes on to suggest that for large sites considerations be included for:

- Understanding the stages of a 'critical path' chart
- Siting and accommodation of the control equipment
- On site work not conflicting with other services
- Temporary physical protection to avoid deterioration of equipment due to damp, dust etc
- Ensuring final commissioning of the VA system is carried out when all parties can witness the results under various occupation levels – it may be necessary to consider partial occupation and soak testing to ensure all parties are ultimately satisfied with the final result



3.2 Section 2 Design consideration

Like all the Fire application standards this section is by far the largest and additional training on this section is advised for anyone heavily involved in VA design.

Some of the KEY issues the designer should consider are:

The Distribution of the speaker circuits

Consideration should be given to the degree of monitoring required, particularly for the speaker circuits. In certain circumstances it is recommended that they are interleaved to ensure the voice message is delivered throughout a zone, irrespective of whether one of the two circuits have failed.

The Choice and siting of the speakers

Loudspeakers should be positioned to achieve the correct sound pressure (dB) level and good intelligibility, with an STI (speech transmission index) of 0.5 considered to be acceptable.

Speaker selection should not be a simple matter of aesthetics and it is often advisable to carry out an acoustic survey to establish the best solution for a particular application.

The Link between the Fire and VA control panels

The link between the fire control panel and the Voice alarm control unit needs to be secure, that is monitored for open and short circuits and wired in recognised fire resistant cables to avoid failure, as the VA may be the only means of warning people there is a fire.

In complex buildings where activation of the Evacuate and Alert signal can be manually overridden it should be clearly indicated on the control panel which area is receiving which message.

Combined use of Fire Sounders with VA system

In certain circumstances a site may require VA in public areas whereas sounders can be used in staff only areas.

- In such cases the operation of the sounders should not affect the intelligibility of the VA system
- The sounder tone should be the same as the 'attention drawing tone' used by the VA system
- The procedures for operating such systems should be simple to avoid confusion in the event of an emergency
- If it is necessary to silence the alarm sounders to enable a voice message to be broadcast then restarting of the sounders should be automatic. There should not be a silent period exceeding 10 seconds between broadcast and sounders



3.3 Section 3 Workmanship, installation & commissioning

The installation requirements follow closely the recommendations within BS5839-1:2002. However the crucial issue here is the commissioning stage especially checking of the sound pressure levels (dB's) and intelligibility.

Specialist equipment may be required to check the audibility and intelligibility. However the standard suggests that to check the sound pressure level, a standard sound level meter set to 'A' weighting and 'slow response' will give an approximate reading, as long as the speech is slow in delivery with virtually no gaps.

Intelligibility is a little more difficult and whilst a minimum STI of 0.5 is quoted it may be difficult or near impossible to measure under all circumstances. The standard suggests that a subjective assessment of intelligibility may be sufficient as long as all interested parties agree. In the case of dispute it is recommended that an appropriate method of measurement detailed within BS EN 60268-16 may be called into play.

3.4 Section 4 User responsibilities

The major issue for the user, besides ensuring the equipment is not showing any faults and is healthy at all times, is training of the operators.

This may be an ongoing requirement as personnel change and complex procedures for phased evacuation, which require manual intervention, may be in place.

3.5 Annexes

The annexes A to E provide a designer with some useful data in respect of loudspeaker capabilities, typical noise levels in different buildings, a battery standby calculator, a model certificate and a guideline or recommendations for the use of voice sounders

4 Current solutions

There are three main methods of providing voice messages, these consist of;

- Stand alone voice sounders
- Central Rack amplifier systems
- Distributed amplifier systems

All these types have possible use dependent on the type and size of building where they are being installed.

4.1 Voice enhanced sounders

Although these devices can not be considered a true VA they do offer voice messages, with each device containing a 'memory' chip that has a number of pre-recorded standard messages, operated directly from the fire alarm control panel.

It is important that the control panel does have a 'synchronisation' capability so all the independent recorded messages are delivered at the same time.

This is particularly important when you have two or more alarm zones where different messages are required, i.e. an Evacuate and Alert message, as synchronisation and intelligibility may be affected.

Furthermore additional cables may be required to switch from one message to another.

It is therefore, suggested that these devices are generally used for the smaller properties where there is a 'one out - all out' evacuation required and no messaging or background music facility is needed.

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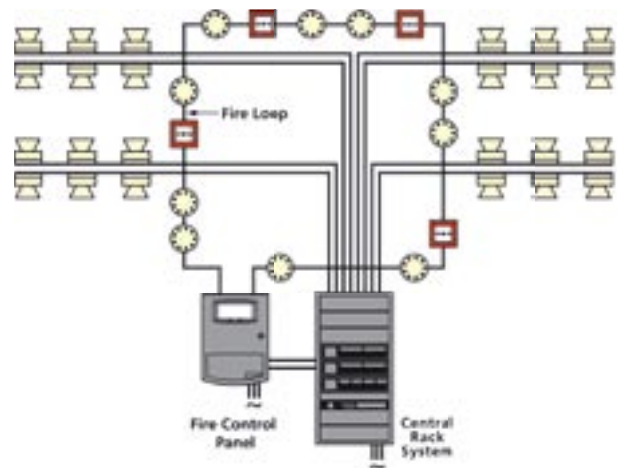
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4.2 Central Rack systems

Central Rack systems consist of a rack or racks of amplifiers that control all the speaker circuits, which are radially wired as shown. This rack may also contain facilities for zone selection, music input, emergency and general paging announcements.

The issues with this type of set up are:-

- To ensure the link between the fire control panel and the rack is fully protected and monitored
- The correct cables sizes, to allow for volt drop, are provided for the speaker circuits particularly if they extend across many floors
- The battery standby capacity has been properly calculated and there is some contingency to extend in the future



4.3 Distributed amplifiers

Distributed amplifiers (DAU) are the latest innovation allowing the speakers to be connected to local amplifiers, often on the fire system loop communication cables, as shown.

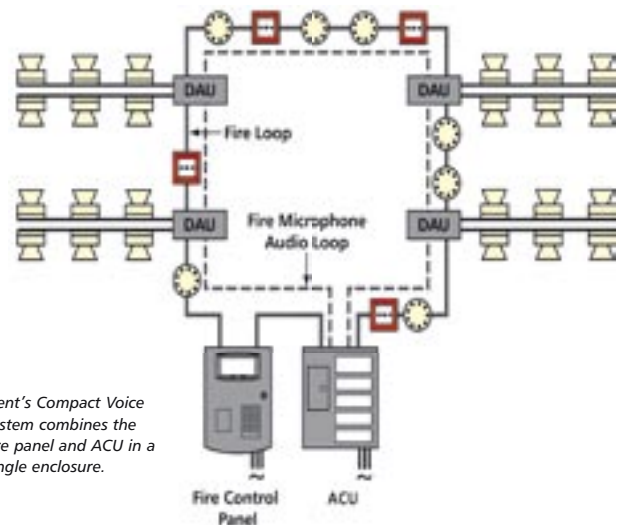
The benefits of this approach are:-

- There is a lot less cable needed for the speaker circuits
- The cables will often be smaller in size and therefore cost less
- The system can easily be extended at minimal cost as extra DAU's can be connected on the fire communication loops
- The central control unit (ACU) for the voice system is much smaller as it contains no amplifiers
- DAU's are easier to accommodate than central racks

The issues or options with this approach are:-

- There is a requirement to provide additional audio circuits between all the DAU's, shown on the diagram in a dashed line. These will be needed for synchronised voice messages and to provide an emergency 'firemans' speech facility.
- A choice is available whereby on some medium size buildings the DAU's can obtain their power direct from the fire communication loop cable

Distributed Amplifiers



5 Guideline for future designs

Finally, for anyone setting out to provide a VA system we would suggest the following guideline:-

- Obtain and read a copy of BS 5839-8:1998
- Consult all interested parties and agree the 'Fire Plan' and other uses for the system
- Agree Evacuation/Paging zones and the messages you require
- Involve someone who can assess the acoustics and calculate the loudspeaker types and requirements
- Decide which system to use
- Check the intelligibility after completion and obtain a certificate
- Ensure the End User is trained on its use and is aware of their responsibilities

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Notes

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Section 7.2:

Vigilon Compact Voice Alarm System



7.2: VIGILON COMPACT VOICE ALARM

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10 reasons to specify Vigilon Compact Voice

1 An industry first Combined FDA and VA/PA providing the highest levels of system integrity, with proven Vigilon technology including built-in isolators in all devices

2 Safe evacuation for everyone in the building High quality intelligible voice messages reduce confusion and panic

3 Savings on installation costs compared with conventional voice alarm systems Loop powered DAUs do not require secondary mains or battery supplies and reduce length of speaker circuits.

4 Reliable system compatibility Proven Vigilon system technology with speakers individually monitored and designed to meet the requirements of BS 5839-8.

5 Highly flexible software allows on-site configuration Additional DAUs can be easily accommodated with flexible message changes selected from the standard Audio Pack.

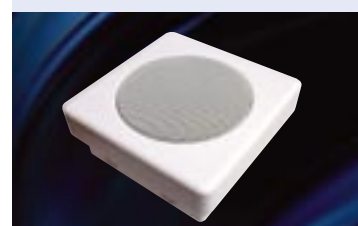
6 Reduction in on-going costs Innovative 'off the shelf' technology requiring only one person testing the system, which can also be maintained at standard competitive rates.

7 Free extras A fire alarm system offering VA/PA benefits or vice versa.

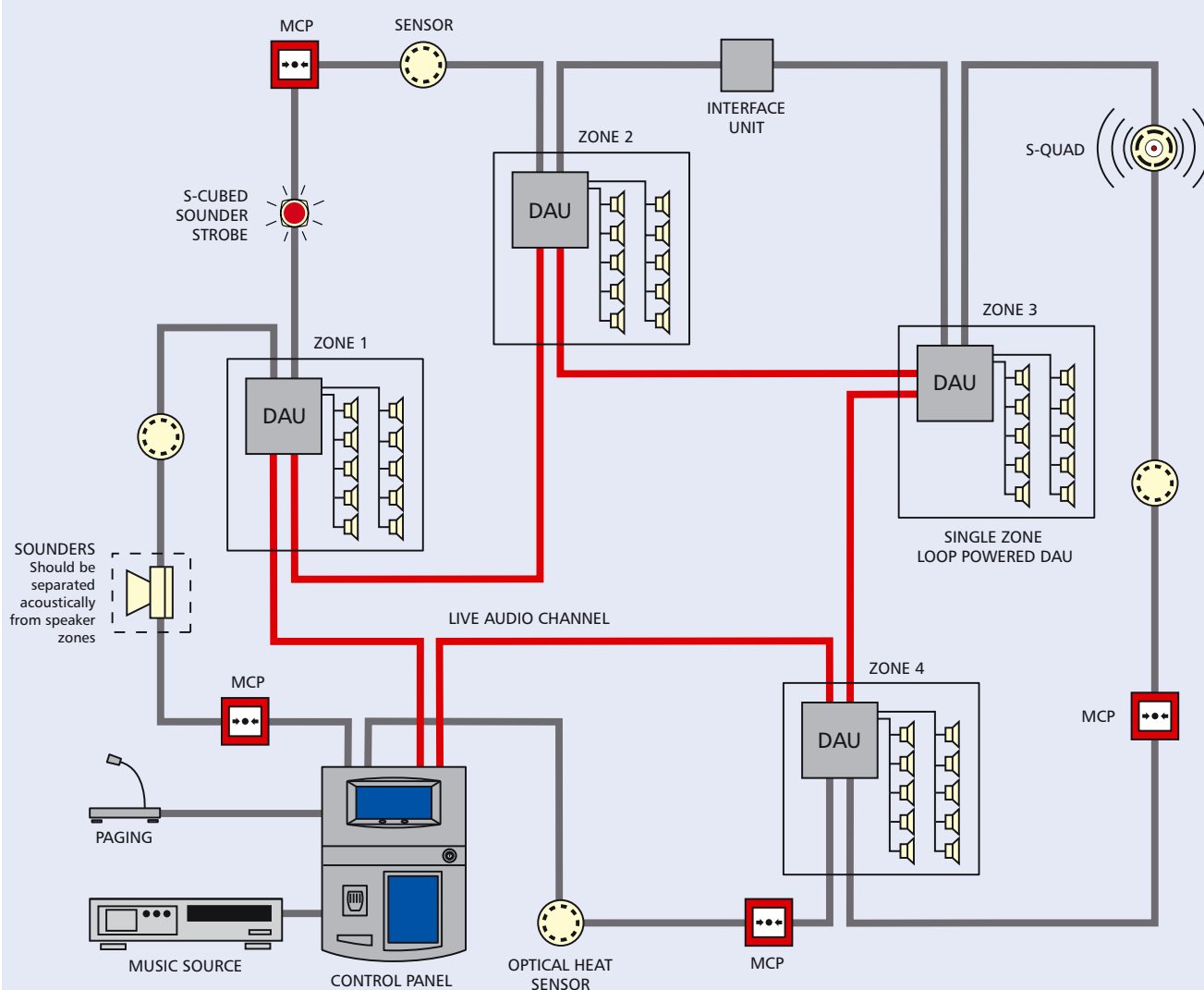
8 True analogue time comparison sensors for false alarm reduction The very latest S-Quad sensors are fully compatible with Vigilon Compact Voice for the ultimate system specification.

9 The reassurance of GENT support Designed and manufactured by the UK's life safety specialists with unrivalled expertise and technical support capabilities.

10 Fully compliant with relevant industry standards GENT are LPCB approved for both systems and products and Vigilon Compact Voice is designed to comply with BS/EN standards.



System Architecture



7.2: VIGILON COMPACT VOICE ALARM SYSTEM

Vigilon Compact Voice System

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An industry first

Vigilon Compact Voice is the new integrated fire detection, voice alarm and public address system from Gent – an innovation that combines the analogue addressable fire detection and alarm functionality of Gent's proven Vigilon Compact system with the very latest voice alarm and public address (VA/PA) technology.

The Vigilon Compact fire and voice alarm control panel drives one or two loops of fire detection and alarm devices and a number of loop powered distributed amplifier units (DAUs). A separate fault tolerant audio loop carries the live announcements for emergency situations and public address. The control panel has a built in emergency microphone and is able to accept inputs from a PA paging microphone and a background music source, e.g. CD player.

Life Safety First

- The Vigilon Compact Voice system delivers clear, intelligible voice alarm messages.
- Vigilon Compact Analogue Addressable fire detection and alarm technology ensures reliable and constant life safety protection for both people and property.
- Research* shows only 13% of people react to bells, whilst 70% react to a voice message.
- Orderly phased evacuation in the event of a fire or other hazards through loudspeaker messages in relevant zones and live emergency messages relayed via the panel's built in microphone.

Increased operational efficiency

- Routine paging functionality provides an effective public address system.
- An on board emergency microphone is fitted into the control panel.

Improved building comfort

- Enhances environments with CD quality background music around the building as required.

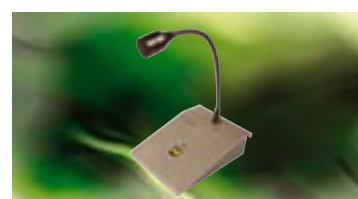
System integrity

- Control and indicating equipment designed to EN54-2 & 4 and BS5839-8
- All devices powered directly from the same two wires, including the DAUs.
- Only one panel required to control both fire and voice.
- Smallest DAU available in the marketplace.
- Delivers highest levels of system integrity and clear, high quality sound.

Fire and VA/PA System...at no extra cost!

- Paging capability.
- Plays music in selected areas.
- Provides emergency and non-emergency messages.
- Operates during mains failure.
- Live message facility, routine paging announcements and advertising background music enhances all environments.

* Sources: Brian Piggot (The Fire Research Station) and David Canter (Surrey University).



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7.2: VIGILON COMPACT VOICE ALARM SYSTEM

Vigilon Compact Voice System Features

DISPLAY KEYBOARD WITH
LED/LCD INDICATORS

8 LINE / 40 CHARACTER
LCD DISPLAY

LED ZONAL
DISPLAY
secret until lit

FUNCTION
KEYS

PRE-RECORDED
MESSAGES
SELECTABLE
FROM THE AUDIO
PACK

BUILT IN VU
METER

INTEGRAL EMERGENCY
MICROPHONE

AUDIO CONTROL PANEL
WITH EMERGENCY AND
AUXILIARY CONTROLS

- Each loop powered DAU can drive up to ten loudspeakers wired as A + B circuits – 5 per circuit
- Two detection loops with up to 10 DAUs driving a maximum of 100 speakers
- DAUs can be 'zoned' in software and isolators in every DAU protect against short circuits
- Speakers are individually monitored, including the wiring
- Volume level can be set via commissioning tool or by infra-red remote control key fob
- Integral power supply and battery backup
- Comprehensive fault management
- Built-in history log stores the last 200 events, which can be accessed via the integral keyboard and printed via an external printer
- External audio input facilities for PA and background music
- Configurable relay output at the DAU

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Vigilon Compact Voice Panel



Vigilon Compact Voice Panel

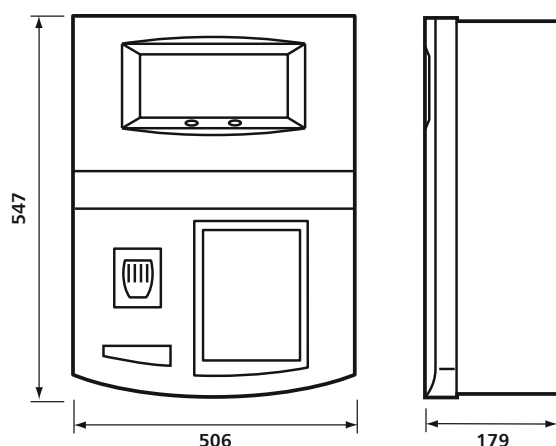
A one to two loop panel accommodating up to 200 devices per loop (see Vigilon section for device details). Each loop can drive up to 5 DAUs and 5 voice evacuation zones.

There is a built in emergency microphone for live emergency speech, which can be directed to any or multiple voice evacuation zones.

The panel has an 8-line by 40 character LCD display showing detailed fire and fault information, and 32 fire detection zonal LEDs.

TECHNICAL SPECIFICATION	
Max No of Loops	2
Loop Capacity	200
Ingress Protection	IP31
Approx Weight	28 Kg including batteries
Operating Temperature	0°C to +45°C
Relevant Standards	EN54: 2&4 BS 5839-8
Batteries	2 x 12V @ 12Ah
Battery Standby	24 hrs + 30 mins alarm
Supply Voltage	216V–253V 50-Hz
Power Consumption	75W
Cable Entry	Top and rear knock outs
Auxiliary Contacts	Programmable to activate on fire, fault or disablement (1 x SPCO 1 x DPCO)
Common – Fire Contacts	Voltage free 1 x SPCO
Sounder Circuits	2 circuits @250mA each
Monitored Input	1 input which is programmable to perform a logical action via a command build
Colour	Egg shell white (Dupont 7EPZ1172S) Back box – Graphite grey (RAL 7024)
Communication Ports	2 x RS485 1 x RS232 selectable functions

Dimensions (mm)



ORDER CODES

Compact Voice Panel

COMPACT-VA

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Each DAU can drive up to 10 64 Ohm high efficiency speakers on two circuits (5 speakers per circuit). The DAUs are wired in a fault tolerant ring configuration, and each DAU has an isolator to protect against short circuits on the analogue audio loop.

Local volume of voice alarm, PA and background music can be adjusted via an IR remote control.



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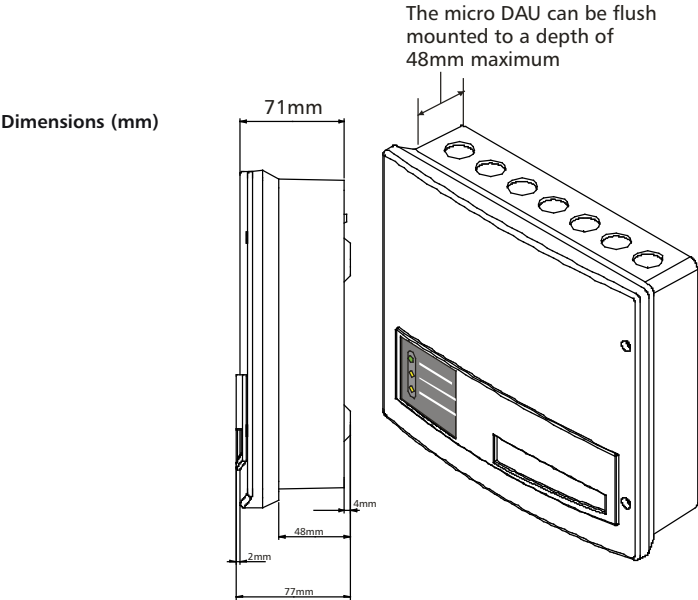
Loop Powered DAU COMPACT-DAU

7.2: VIGILON COMPACT VOICE ALARM SYSTEM

Loop Powered DAU



TECHNICAL SPECIFICATION	
Weight	2Kg
Mounting	Wall
Amplifier Load	2 x 12.8 Ohm 10V RMS Output (class D)
Microphone Input Sensitivity	5mV-22mV/10k Ohm (includes AGC)
Aux Input Sensitivity	775mV/600 Ohm (Balanced)
Signal to Noise Ratio	>80dB
Frequency Response	100Hz to 18kHz ± 3dB
Total Harmonic Distortion	<0.5% @ 1KHz
Power Supply	Loop powered
Auxiliary Relay	Two configurable voltage free contacts reated 1A @ 24Vdc
LED Indication	Audio status – Audio I/P present/power Circuit A Fault – wiring or AMP fault Circuit B fault – wiring or AMP fault



7.2: VIGILON COMPACT VOICE ALARM SYSTEM

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Loudspeakers



The system can support up to 100 64 Ohm low impedance loudspeakers

TECHNICAL SPECIFICATION – LOUDSPEAKERS			
Description	Wall Loudspeakers	Ceiling Loudspeakers	Bi-directional Wall Speakers
Impedance	64 Ohms	64 Ohms	64 Ohms
Material	Steel	Steel including Fire Dome	Steel
Sensitivity	>93dB(A) @ 1m (1kHz Tone)	>93dB(A) @1m (1kHz Tone)	>85dB(A) @1m (1kHz Tone)
Effective Frequency Response	85Hz – 18.5 kHz	85Hz – 18.5kHz	125Hz – 12kHz
Directivity Q factor, 1k Hz	2.1	2.1	0.6
Colour	White	White	White
Mounting	Surface	Flush	Surface
Dimensions (WxHxD) mm	190 x 190 x 75	239 x 110 dia	210 x 130 x 98

TECHNICAL SPECIFICATION – PUBLIC ADDRESS PAGING MICROPHONE	
Console	Stainless Steel
Mounting	Surface Desk Mount
Microphone Style	Gooseneck
Polar Response	Cardioid
Frequency Response	150Hz to 12kHz
Power Supply	Powered from control panel
Zone Control	Software programmable

ORDER CODES

Wall Loudspeakers	COMPACT CAB
Ceiling Loudspeakers	COMPACT RCS
Bi-directional Wall Speakers	COMPACT BDCAB
Public Address Paging Microphone	DPM-102

Audio Pack – messages and pre-tones.

The message card fitted in all factory supplied Vigilon Compact Voice alarm panels and DAUs contains an Audio Pack of messages and tones. During commissioning it is possible to re-configure this by selecting alternative centralised and distributed messages and pre tones for Alert, Evacuate, Bomb and Auxiliary 1, 2 and 3 controls.

NUMBER	TYPE OF MESSAGE	VOICE	MESSAGE
1	DAU Test	Male	The voice alarm volumes are being adjusted – there is no need to take any action.
2	Alert (default – Emergency 1)	Female	Your attention please, the fire alarm has been activated in another area, please remain where you are and await further instructions.
3	Evacuate (default – Emergency 2)	Male	Attention please, attention please, this is an emergency. Please leave the building by the nearest available exit. Do not use the lifts or escalators.
4	Bomb (default – Emergency 3)	Female	May I have your attention please, an incident has been reported in the area. As a precaution, please move away from the windows. I repeat, please move away from all windows, further information will follow shortly.
5	Alert (alternative)	Female	May I have your attention please, may I have your attention please, an incident has been reported in the building. While this report is being investigated, please remain at your workplace.
6	Evacuate (alternative)	Male	Ladies and gentlemen, due to unforeseen circumstances we are required to evacuate the building. Please leave the building immediately by the nearest available exit.
7	Gas Carbon Monoxide	Male	May I have your attention please, may I have your attention please, excessive carbon monoxide levels have been detected, please leave the area immediately by the nearest available exit.
8	Gas Fixed Extinguishant	Male	May I have your attention please, may I have your attention please, extinguishant gas release imminent, please evacuate the area immediately by the nearest available exit.
9	Fire alarm test end (default – Auxiliary 1)	Female	Attention please, attention please, this is a test of the fire and voice alarm system, there is no need to take any action.
10	Fire alarm test end (default – Auxiliary 2)	Female	The test of the fire and voice alarm system has now been completed (default – Auxiliary 2)
11	Coded message	Female	Would Mr. Sands please report to reception.
12	Class change	Female	Class change.
13	Gent Limited (advertisement)	Female	Ladies and gentlemen this speech message is produced by Gent Limited's Vigilon Compact Voice alarm system. This product integrates voice alarm functions into an analogue fire alarm system ideal for small to medium sized buildings.
14	Stand down (default – Auxiliary 3)	Female	May I have your attention please, the cause of the alarm has been investigated and the system reset. There is no cause for concern. Thank you.
15	Special tone 1	–	Beep beep beep (950Hz 80ms beep every 420ms)
16	Special tone 2	–	Beep beep beep (950Hz 50ms beep every 80ms)
17	Factory test	–	Frequency sweep (300Hz to 10KHz in 3s)
18	Nursery rhyme 1	Tune	'Boys and Girls Come Out to Play'
19	Nursery rhyme 2	Tune	'Twinkle Twinkle Little Star'

ATTENTION TONE			
Number	Description of tone	Number	Description of tone
1	Nee Naw x 8	6	Pulse
2	Two tone (ding dong)	7	Continuous
3	Four tones – ascending	8	Dong
4	Four tones – descending	9	Chopin
5	Bell	10	'Sleigh Bells'

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Section 7.3:

Vigilon Voice Alarm System



7.3: VIGILON VOICE ALARM SYSTEM

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10 Reasons to specify Vigilon Voice

1 Safe evacuation High quality intelligible voice messages reduce confusion and panic.

2 State of the art technology High quality audio with full digital signal processing, continuous audio path surveillance and DVA message monitoring.

3 Save on space Fully featured wall mounted control panel, easier to accommodate than conventional rack systems.

4 Simple configuration and upgrades All functions software configurable with no hardware links etc to set. Configuration can be readily archived and restored. Functionality upgrades involve only software not hardware.

5 Full compliance with relevant standards Complies fully with BS 5839-8, which is widely called for in project specifications.

6 Ideal for large Multi-storey premises System can be networked, with a central Audio Control Unit (ACU) controlling up to 30 Distributed Amplifier Units (DAU).

7 System reliability The network is tolerant to open or short circuit faults between any two units on data or audio busses, automatically recovering and pinpointing the location of the fault. Even if all the processors in the system fail, an All-Call announcement is still possible from the ACU Emergency Microphone.

8 Site wide audio synchronisation 3 audio channels plus data, allows simultaneous distribution of Alert and Evacuation messages to allow site wide audio synchronisation in addition to Emergency Microphone audio. When no emergency audio is present these channels may support routine paging or background music functions.

9 No data degradation Data is re-clocked at each DAU to ensure there is no data degradation as the size of the system increases.

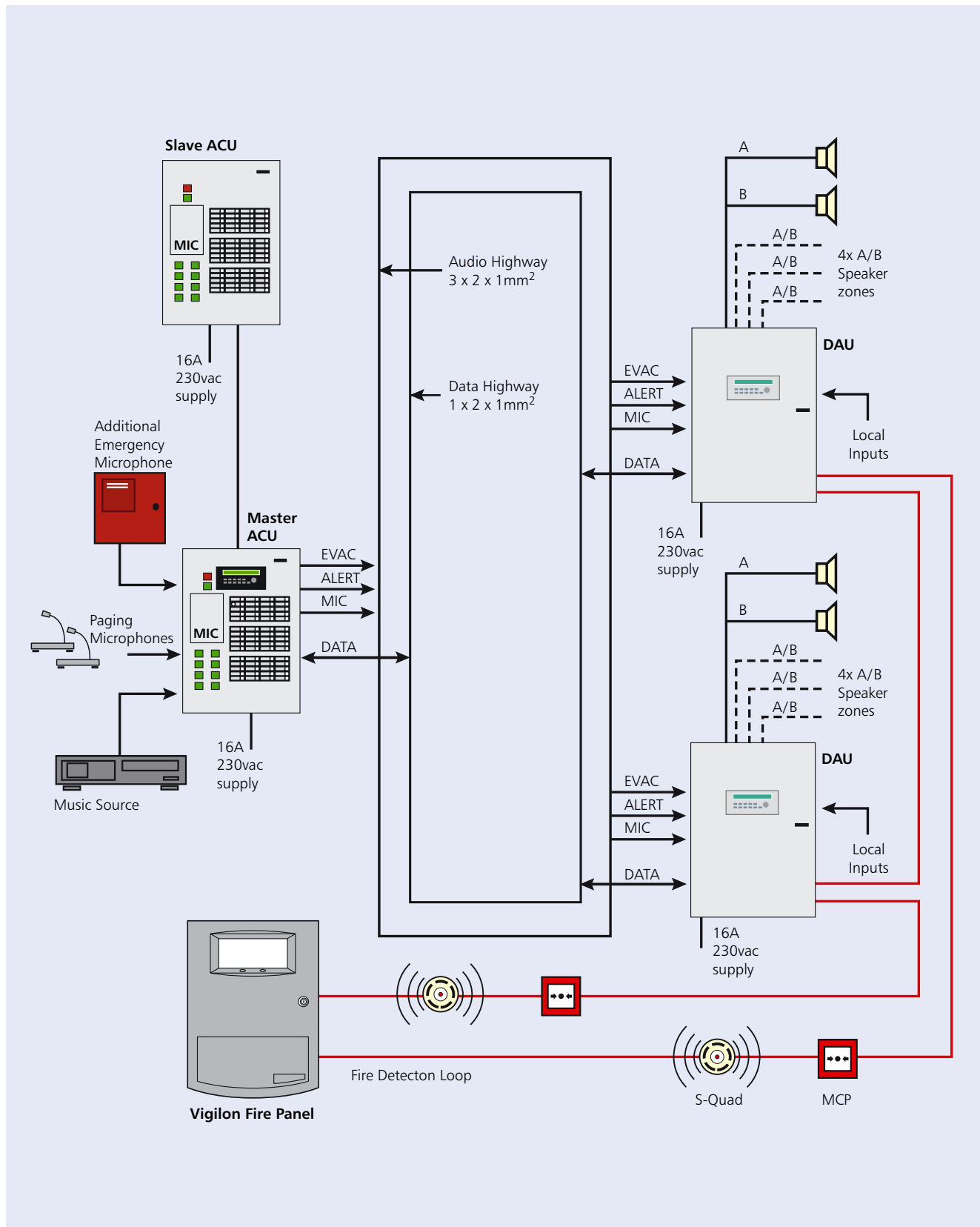
10 Easy to maintain Detailed full system fault status can be viewed at the central ACU, meaning that remote units do not need to be inspected to diagnose the exact fault.



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7.3: VIGILON VOICE ALARM SYSTEM

System Architecture



7.3: VIGILON VOICE ALARM SYSTEM

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System Overview

Vigilon Voice is a voice alarm system, which supports the needs of large buildings and complex sites. The system enables a number of Distributed Amplifier Units (DAU's), to be controlled by Audio Control Units (ACU's).

A Master ACU allows additional Slave ACU's or microphone units to be supported. This Slave acts as a second VA control panel and mimics the controls of the Master. No keypad or LCD for programming is provided at the Slave

The Master ACU can be supplied as either a blank version or complete with a user interface and integral emergency microphone. A Master ACU is always required when more than one DAU is to be used on the same system.

The ACU enables paging announcements to be made to the distributed systems. An interface is provided to allow inputs from the Vigilon control panel(s) to control Digital Voice Announcements (DVA's) from the distributed systems.

Control Network Operation

The control network acts as a transparent transmission medium for the control protocol to be transmitted from the ACU to the DAU's.

The network is configured as a loop and is tolerant to open or short circuit cable faults between nodes of the loop. This is achieved by the network normally operating in a preferred

transmission direction, should a fault be detected, the originating node shall effectively transmit in both directions around the ring. Receiving DAU's are able to detect the new data direction.

Audio Distribution

Baseband Audio will require one copper pair per channel. Three audio channels are supported as a minimum to enable simultaneous 'Alert', 'Evacuate' and emergency microphone audio to be broadcast. In non-emergency conditions the audio channels may be used for background music and routine paging functions. The audio loops are fault-tolerant.

As well as distributing the audio, it is required that a master microphone, Press-to-talk, signal is also conveyed over the audio link. This is to fulfill the BS 5839-8 requirement that an "All-Call Fireman's Microphone" operation is supported even if control processors fail.

It is possible for multiple ACU microphones to contend for a single audio channel for emergency microphone announcements. A simple global priority is implemented between microphones for granting access.



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7.3: VIGILON VOICE ALARM SYSTEM

Master Audio Control Unit

The Master ACU takes the form of a wall-mounted box fulfilling the primary function of a Voice Alarm Control Panel.

The ACU features a keypad and LCD display for configuration and fault reporting, and can be supplied either blank, with no further control functions, or with an integral emergency microphone and a number of configurable front panel buttons for zone selection, and 8 push button selectors for DVA broadcasts.

The ACU is able to interface with the Vigilon fire alarm system to facilitate centralised control. It is possible to connect a PC via an RS232 interface for programming of the ACU itself, or any of the attached satellite DAU's.

The ACU will automatically display the status of all connected DAU's by means of the standard Fault LED/ Sounder arrangement and with a cycling display on a local (2x40) LCD.

If the blank version of the Master ACU is supplied, in order to provide the same functionality, an additional Desk Console or wall mounted Emergency microphone can be provided in place of the on-board Keypad.

ORDER CODES

ACU blank with network	VA-1311
ACU with 20 way keyboard and network	VA-1312
ACU Slave with 20 way keyboard	VA-1313
20 Way Expansion Keyboard	VA-1314
20 Way Desk Console and Emergency Microphone	VA-1315



TECHNICAL SPECIFICATION	
Capacity	30 DAUs
Messages	2 66 second and 2 50 second digital messages
Approx Weight (Inc batteries)	35Kg
Operating Temperature	-5°C to 50°C
Relevant Standard	BS 5839-8
Batteries	18 Ah Valve Regulated SLA
Battery Standby	24h + 0.5h alarm
Supply Voltage	230V +10%, -6% rms 50Hz AC
Power Consumption	2A at 230V ac 600VA
Dimension (mm)	700h x 510w x 156d

Microphone Inputs and Control panels

The ACU allows up to 4 microphone consoles to be supported with configurable buttons for paging or DVA messages. The microphone consoles buttons may be implemented in a number of ways:

- 1 Modular Microphone panels on the front panel of the ACU.
- 2 Custom Mic Boards to enable customer specific fire Microphone panels to be constructed.
- 3 Standard DMS Microphones for simple paging functions.

Additional Audio inputs

In addition to the four microphone-capable audio inputs, an additional 4 balanced audio inputs are provided. These may be used for background music and similar input sources.

The ACU supports 2 x 66 second emergency messages and 2 x 50 second auxiliary messages.

Audio Outputs

The ACU provides 4 analogue outputs that feed busses on the analogue network. Three channels will be used for the network audio, #1 Emergency Microphone; #2 Evacuate Message; #3 Alert Message.

7.3: VIGILON VOICE ALARM SYSTEM

GENT
by Honeywell

Distributed Amplifier Unit



The Vigilon Voice distributed amplifier unit (DAU) is a self-contained, wall mounted voice alarm system. The unit contains all audio processing, amplification and battery back up elements needed to provide a fully BS 5839-8 compliant system.

The DAU comprises:

- Zonal Power Amplification
- Surveillance
- Routing
- Power Supply and Battery Charger
- Control Interfaces
- Fault Display
- User Interface
- Network Interface
- Vigilon Loop Interface

TECHNICAL SPECIFICATION		
	200W DAU	400W DAU
Audio Amplification	4 50W amplifiers which may be paralleled to achieve 2x100W	4 100W amplifiers which may be paralleled to achieve 2x200W
Emergency microphone interfaces	2 sets of monitored PTT and 'Speak Now' interfaces to support emergency microphone operation on inputs 1 and 2 are provided	
Serial Communications	1 x RS232 and 1 x RS485	
Messages	2 x 66s and 2 x 50s messages	
Approx Weight (Inc batteries)	51Kg	70Kg
Operating Temperature	-5°C to 50°C	-5°C to 50°C
Relevant Standard	BS 5839-8	
Batteries	24 Ah valve regulated SLA	38 Ah valve regulated SLA
Battery Standby	24h +0.5h alarm	
Supply Voltage	230V +10, -6% rms 50Hz AC	
Power Consumption	600VA	800VA
Dimensions (mm)	700h x 510w x 156d	790h x 580w x 204d

Audio Inputs

- General purpose inputs – four inputs are provided. The first two inputs may be used as Fire Microphone inputs. The general-purpose inputs feature a serial interface for connection of Zoned Paging and Fire microphones.
- Two background music inputs are provided.
- Digital Messages – Two 66 second emergency messages and two 50 second Auxiliary Messages are provided.
- Audio Monitor Input – A connection is provided for an audio monitor bus from the amplifier system. This allows for audio monitoring of selected amplifier outputs under the control of the front panel.

ORDER CODES

200W DAU	VA-1321
400W DAU	VA-1322

GENT

by Honeywell

7.3: VIGILON VOICE ALARM SYSTEM

Ceiling Loudspeakers

This family of ceiling loudspeakers has been carefully designed to satisfy the most critical eye. The units are stylish yet unobtrusive and are supplied with a fire-dome.

The units are made from a pressed steel epoxy coated chassis incorporating a twin cone driver, which has a wider frequency range than the standard single cone alternative, making this range more suitable for use in applications where background music is a primary requirement.

Ease of installation is a key feature of these units, incorporating a user-friendly spring release action providing quick and easy access to transformer tapings once installed



Ceiling Loudspeakers

TECHNICAL SPECIFICATION			
	5" 6W Round Loudspeaker	6" 6W Round Loudspeaker	20W Coaxial Loudspeaker
Rated power, watts	6	6	20
Transformer tapings 100 volt line, Watts	6/ 3/ 1.5/ 0.75/ 0.25	6/ 3/ 1.5/ 0.75/ 0.25	20/ 10/ 5/ 2.5
Transformer Impedance, Ohms	1.67k/ 3.33k/ 6.66k/ 13.3k/ 39.9k	1.67k/ 3.33k/ 6.66k/ 13.3k/ 39.9k	0.5K/ 1k/ 2k/ 4k
70.7 volt line, Watts	3/ 1.5/ 0.75/ 0.375/ 0.125	3/ 1.5/ 0.75/ 0.375/ 0.125	10/ 5/ 2.5/ 1.25
Driver impedance, Ohms	8	8	8
Effective frequency range, Hz	100 – 17,500	85-18500	50-2000
S.P.L. @ 1m, 1 watt, dB, Test Signal Bandwidth 100Hz-10 kHz	92	93	94
S.P.L. @ Full power Octave bandwidth, dB	95	97	107
Acoustic Power (dB-PWL@1 watt) 1KHz/2KHz, dB	92/93	88/90	88/89
Dispersion at 1KHz/2KHz,	180/120	180/180	160/90
Directivity Q factor, 1KHz/2KHz	1.9/6.6	2.1/6.5	5.5/8.6
Dimensions Diameter, mm	189	239	280
Net weight, Kg	1.5	1.90	2.93
Colour / Finish	White RAL9016	White RAL9016	White RAL9016
Material	Steel	Steel	Steel
Mounting	Torsion Springs	Torsion Spring	Torsion Springs

ORDER CODES

5" 6W Round Metal Ceiling Loudspeaker	13421-12-DC
6" 6W Round Metal Ceiling Loudspeaker	13421-14-DC
20W Coaxial Round Metal Ceiling Loudspeaker	13421-17-DC
5" 10W Coaxial Round Metal Ceiling Loudspeaker	13421-15-DC
6" 10W Coaxial Round Metal Ceiling Loudspeaker	13421-16-DC

Coaxial Range

The Coaxial range of ceiling loudspeakers employs a two-way speaker system comprising a bass mid-range driver and separate tweeter. The bass response has been extended to give depth and warmth to both music and vocals.

This range of Coaxial ceiling loudspeakers has all the aesthetic and installation advantages of our standard ceiling loudspeakers, with the addition of extended bass and top end performance. These units are ideally suited for applications that require a superior high quality performance such as shops, restaurants, hotels, pubs etc.

7.3: VIGILON VOICE ALARM SYSTEM

Cabinet Loudspeakers

GENT
by Honeywell



Moulded Cabinet Speaker

Our range of plastic moulded cabinet loudspeakers is both stylish and elegant, and offers a cost effective alternative to metal cabinets.

This 6 watt unit contains dual cone loudspeakers offering a wide frequency range suitable for both high quality speech and music application. This model is also available as a 10 watt co-axial unit and both versions incorporate ceramic terminal blocks and thermal fuses for compliance with BS 5839 Pt 8.

Our range of vandal-proof metal cabinet loudspeakers is constructed of high-grade steel, epoxy coated and can be installed on solid ceilings or walls. Although our standard finish is White, RAL9016, alternative finishes are available dependent upon your requirement.

TECHNICAL SPECIFICATION		
	Cabinet Speaker	Vandal-proof Cabinet Speaker
Rated power, watts	6	6
Transformer tapings 100 volt line, Watts	6/ 3/ 1.5/ 0.75/ 0.25	6 /3 /1.5 /0.75
Transformer Impedance, Ohms	1.67k/ 3.33k/ 6.66k/ 13.3k/ 39.9k	1.67K /3.33K /6.66K /13.3K
70.7 volt line, Watts	3/ 1.5/ 0.75/ 0.375/ 0.125	3 /1.5 /0.75 /0.375
Driver impedance, Ohms	8	8
Effective frequency range, Hz	160 – 18000	120 - 20,000
S.P.L. @ 1m, 1 watt, dB, Test Signal Bandwidth 100Hz-10 kHz	96	93
S.P.L. @ Full power Octave bandwidth, dB	107	101
Acoustic Power (dB-PWL@1 watt) 1KHz/2KHz, dB	94/95	
Dispersion at 1KHz/2KHz,	160/120	140
Directivity Q factor, 1KHz/2KHz	3.6/5.8	2.90
Dimensions Diameter, mm	330 x 240 x 90	190 x 190 x 75
Net weight, Kg	1.15	1.8
Colour / Finish	White	White, RAL9010
Material	ABS moulding with UV inhibitors	
Steel mesh	Steel	
Mounting	Keyhole and/or screws	Screw

ORDER CODES

6W Moulded Cabinet Speaker	13421-18-DC
Vandal-proof 6W Metal Cabinet Speaker	13421-21-DC
Flush Mounted Vandal-proof 6W Metal Cabinet Speaker	13421-25-DC
Bi-directional Vandal-proof 6W Metal Cabinet Speaker	13421-30-DC

GENT

by Honeywell

7.3: VIGILON VOICE ALARM SYSTEM

Weatherproof Speakers

Weatherproof Plastic Horns

This range of lightweight plastic weatherproof re-entrant horns has been designed for high quality sound re-enforcement. Offering clarity of speech and high efficiency these horns are suitable for communications or signal warnings.

Resistant to salt-laden air and non-corrosive, they are suitable for use indoors and out. They are ideal for marine and industrial applications as they are unaffected by most chemicals.

Weatherproof Sound Projectors

This range of weatherproof Sound Projectors offers a combination of style and performance. Manufactured from an ABS moulded compound with in-built UVL (ultra violet light) protection. The drive unit is a high quality, dual polypropylene cone.

Both units are supplied in the same stylish and compact enclosure, ideally suited for both speech and music reproduction. These units have the added advantage of being fully weatherproof and are ideal for use on railways, in car parks, shopping centres, sports grounds.



Weatherproof Plastic Horns

TECHNICAL SPECIFICATIONS				
	10W Weatherproof Horn	20W Weatherproof Horn	10W Weatherproof Projector	20W Weatherproof Projector
Rated power, Watts	10	20	10	20
Transformer tapplings 100 volt line, Watts	10 / 5 / 2.5 / 1.25	20/ 10 / 5 / 2.5	10/ 5/ 2.5/ 1.25	20/ 10/ 5/ 2.5
Transformer Impedance , Ohms	1K / 2K / 4K / 8K	500/ 1K / 2K / 4K	1k/ 2k/ 4k/ 8k	0.5k/ 1k/ 2k/ 4k c
70.7 volt line, Watts	5 / 2.5 / 1.25 / 0.625	10/ 5 / 2.5 / 1.25	5/ 2.5/ 1.25/ 0.375	10/ 5/ 2.5/ 1.25
Driver impedance, Ohms	20 or 8	20 or 8	8	8
Effective frequency range, Hz	400 - 8,000	350 - 8,000	120 - 18,000	110 - 18,000
S.P.L. ,@ 1m, 1watt, dB	106	108	91	92
S.P.L. ,@Full power/ 1m, dB	116	121	102	105
Dispersion at 1,000 Hz, Degrees	160	140	160	165
Directivity Q factor, 1k Hz	2.37	2.90	2.37	2.28
Dimensions front and depth, mm	f139 x 200	F203 x 254	f138 x 200	f138 x 200
Net weight, Kg	1.30	1.90	1.55	1.90
Colour / Finish	Cold grey	Cold grey	White	White
Material	ABS plastic housing	ABS plastic housing	Plastic & Stainless steel hardware	Plastic & Stainless steel hardware
Mounting	Stainless Steel U bracket & hardware	Stainless Steel U bracket & hardware	Aluminium U bracket	Aluminium U bracket

ORDER CODES

10W Weatherproof Plastic Horn 13421-42-DC

20W Weatherproof Plastic Horn 13421-43-DC

10W Weatherproof Plastic Projector 13421-73-DC

20W Weatherproof Plastic Projector 13421-74-DC

7.3: VIGILON VOICE ALARM SYSTEM

Loudspeakers

GENT
by Honeywell



Spherical Pendant Loudspeaker & Column Loudspeakers

Spherical Pendant Loudspeaker

This modern styled spherical loudspeaker is a true omni-directional device. It provides coverage angles of 360 degrees horizontally and 140~160 degrees vertically giving an even dispersion over the audio spectrum. The smooth frequency response, excellent dispersion and carefully controlled performance means that they are ideally suited for covering large open spaces such as warehouses, open plan retail complexes, concourses and factories, as well as being suitable for both speech and background music. The 13421-80-DC is supplied with a metal braided cable strong enough to carry ten times its own weight.

Metal Column Loudspeaker

The weather resistant metal column loudspeaker offers a combination of elegant styling, robust construction and high performance. The enclosure is tuned to give a wide frequency range not normally associated with column loudspeakers and as such produces high quality music and speech reproduction. Ideally suited for use in airports, churches, factories, sports and conference centres.

TECHNICAL SPECIFICATION				
	Spherical Pendant Loudspeaker	20W Column Loudspeaker	40W Column Loudspeaker	80W Column Loudspeaker
Rated power, Watts	20	20	40	80
Transformer tapplings 100 volt line, Watts	20/ 10/ 5/ 2.5	20/10/5/2.5	40/ 20/ 10/ 5	80/40/20/10
Transformer Impedance , Ohms	500/ 1k/ 2k/ 4k	500/1k/2k/4k	250/ 500/ 1k/ 2k	125/250/500/1k
70.7 volt line, Watts	10/ 5/ 2.5/ 1.25	10/ 5/ 2.5/ 1.25	20/10/5/2.5	40/20/10/5
Driver impedance, Ohms	8	8	8	4
Effective frequency range, Hz	80 - 18,000	170-17000	170-18000	180-18000
S.P.L. @ 1m, 1 watt, dB, Test Signal Bandwidth 100Hz- 10KHz	93	91	92	97
S.P.L. @ Full power, Octave Bandwidth, dB	107	104	108	115
Acoustic Power (dB – PWL@1 watt) 1 k/2kHz, dB	95/90	85/89	97/99	92/94
Dispersion at 1KHz/ 2KHz, Degrees	140/160(Vertical); 360/360(Horizontal)	180/140(Horizontal); 70/120(Vertical)	170/140(Horizontal); 60/55(Vertical)	180/140(Horizontal); 70/45(Vertical)
Directivity Q factor, 1KHz/2KHz	4.3/4.7	4.20/5.80	4.1/7.40	4.20/6.80
Dimensions, Diameter, mm	254	368 x 98 x 90	615 x 98 x 90	970 x 98 x 90
Approx. Weight, Kg	2.40	2.7	3.80	6
Colour / Finish	White	White RAL 9016	White RAL 9016	White RAL 9016
Material	ABS moulding with UV inhibitors	Aluminium	Aluminum	Aluminium
Mounting	Pendant hung	L Type Steel Bracket	L type Steel bracket	L type steel bracket
Ingress Protection			IP 55	

ORDER CODES

Spherical Pendant Loudspeaker 13421-80-DC

20W Metal Column Loudspeaker 13421-51-DC

40W Metal Column Loudspeaker 13421-52-DC

80W Metal Column Loudspeaker 13421-53-DC

GENT

by Honeywell

7.3: VIGILON VOICE ALARM SYSTEM

Specialist loudspeakers

Intellivox 4C Loudspeaker Array

The Intellivox-4c is a fully integrated digitally controlled loudspeaker array and has been serving a wide variety of applications since its introduction in 1996. It has proven to be a versatile and effective solution for vocal reinforcement within reverberant venues, offering excellent speech intelligibility even in demanding acoustical conditions. A single Intellivox-4c is capable of covering an area of up to 65m whilst maintaining an even sound pressure level. The seventeen, custom designed, 4" loudspeakers are driven by a sixteen channel class-D amplifier. The loudspeakers themselves are arranged in accordance with our patented algorithm. The increased lower frequency control offered by the array makes the Intellivox-4c suitable for easy and unobtrusive implementation in highly reverberant and architecturally sensitive environments.

The Intellivox units can be controlled using our proprietary WinControl software that offers user friendly control of the beam steering parameters, audio processing and surveillance features.

Intellivox 1B Loudspeaker Array

The Intellivox-1b is the smallest member of the Intellivox DDC range. Despite its modest dimensions, the Intellivox-1b still offers remarkably tight directivity control and is capable of covering an area of up to 15m whilst maintaining an even sound pressure over the audience area. The six, custom designed, 4" loudspeakers and two dome tweeters are driven by an eight channel class-D amplifier. Its compact array length makes the Intellivox-1b suitable for easy and unobtrusive implementation in even the most architecturally sensitive environment.

TECHNICAL SPECIFICATION		
	Intellivox 1c	Intellivox 4c
Frequency Range	130-20k Hz (+/- 3dB)	130-10k Hz (+/- 3dB)
Max SPL		
Continuous	92 dB A-weighted pink noise at 10m	91 dB A-weighted pink noise at 30m
Peak	96 dB at 10m	
Coverage		
Horizontal (Fixed)	150deg	150 deg
Vertical (adjustable)	15 to 40 deg	6 to 14 deg
Aiming Angle	-16 to 14 deg	-16 to 14 deg
Focus Distance	2 to 40m	5 to 100m
Typical Throw (may be increased with marginal losses)	15m	50m
Input		
Nominal level	0 dBu (line input)	0 dBu (line input)
Type	Transformer Balanced	Transformer Balanced
Impedance (balance)	6k8 (line input)	6k8 (line input)
Power Amps	8 x 40 Wrms (4_), PWM (class D)	16 x 40 Wrms (4_), PWM (class D)
Mains Voltage	230 or 115V (+5/-10%)	230 or 115V (+5/-10%)
Power Consumption	28 VA (idle) / 150 VA (full load)	84 VA (idle) / 750 VA (full load)
Operating Temperature	0 to +40°C	0 to +40°C
Transducers	6 x 4" full range, 2 x 10mm dome tweeter	17 x 4" full range
Dimensions (mm)	670h x 134w x 186d	4350h x 134w x 92d
Colour / Finish	RAL 9010 (white)	RAL 9010 (white)
Approx. Weight	16 Kg	46 Kg

ORDER CODES

Contact Gent for details