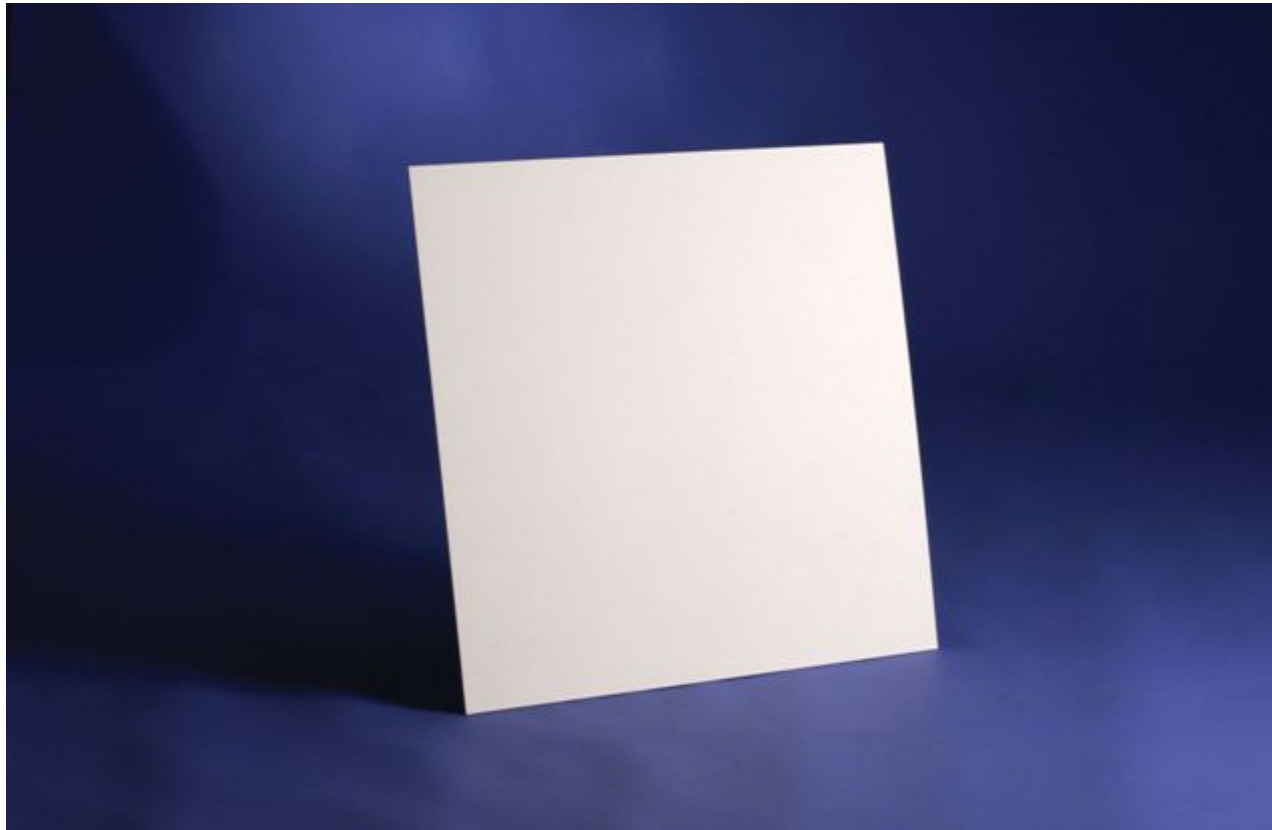
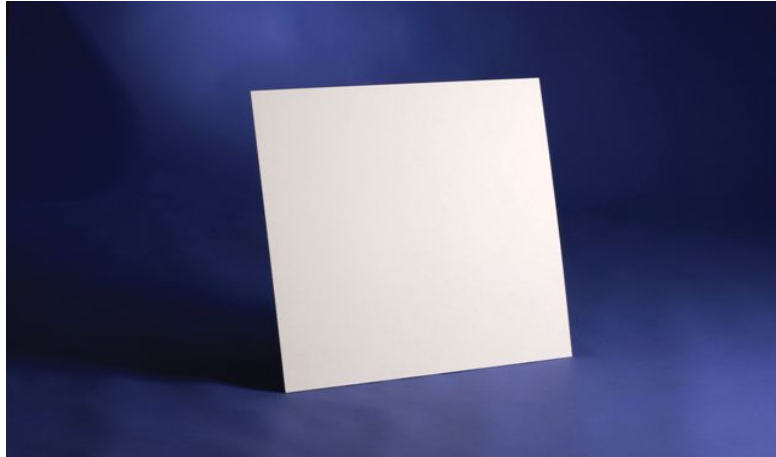


# FLATPHONE: The audio Tunnel !



# What is FLATPHONE



**Flatphone** is a unique electrostatic panel transducer technology

**Flatphone** comes in various custom sizes and shapes which allow to **propagate an highly directive and clear audio signal** for purposes like « on the spot communication » or specific area entertainment.

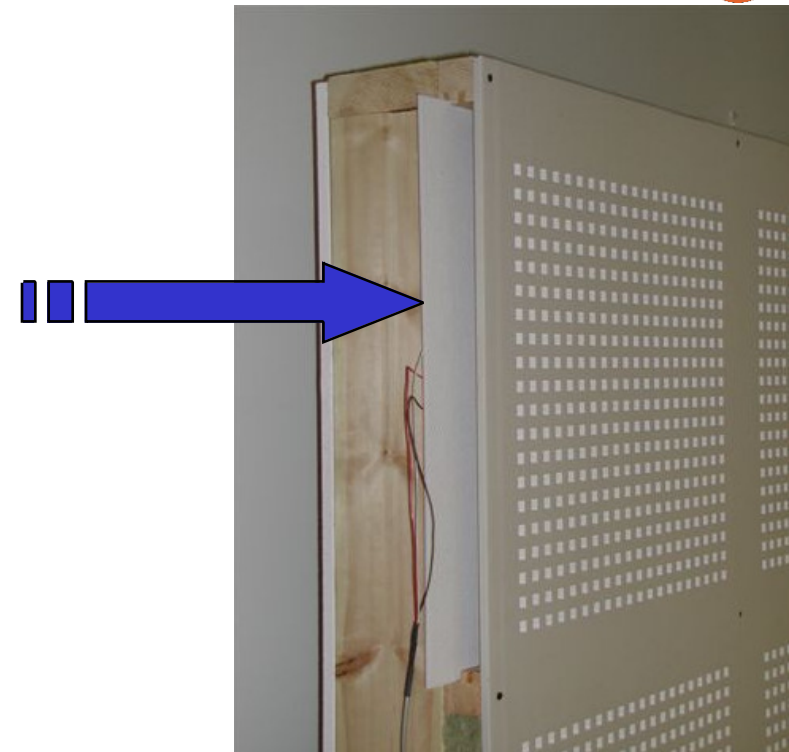
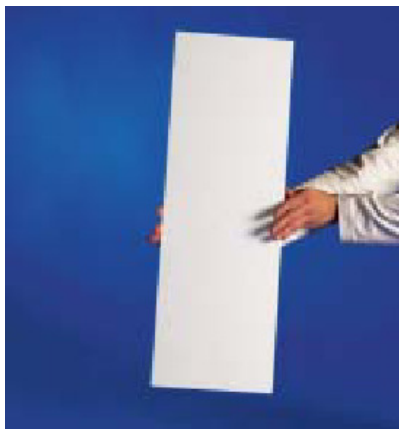
...Being flat, resizeable and flexible, it is **easy to integrate** in walls, roofs or other structures like shelves or booths,

**FLATPHONE** panels also **allow to visually communicate** as they look like a very common flat and flexible panel.

You can easily glue, paint, apply films in order to have your panel being a real « audio – visual » communication tool

# Basic description

- Flat panels which can be integrated in ceilings, walls or traditional existing sales furniture
- The panels are light, have no sound distortion and a very good audio quality enabling the emission of a clear and pure audio source on distances up to 35 m (message intelligibility limit) and 70 m (music)



- The panels can simultaneously be used for advertisement message display or electronic animated image display
- The panels can on demand be fully integrated in the needed environment.

# Single or Multi element



Multi element surface. You may build up as big audio surface you like. It is simple to build and even more simple to pack. Space requirement in storage extremely small and very light weight. The surface can be covered with perforated audio screens, large pictures, company logos etc. There is possibility to cover back side with dumping canvas to avoid dipole sound. Useful for software demonstrations etc.

# FLATPHONE's various applications

## Shop-in-Shop Ceiling

You may create a larger but still focused sound field above product introduction areas, exhibition booths, waiting areas etc...



## Sound Shower

Creating very focused sound fields in front of promoted products, plasma screens, paintings etc...  
Because of focused sound fields it will not disturb others near the field

# FLATPHONE's various applications



## **AUDIO BANNER:**

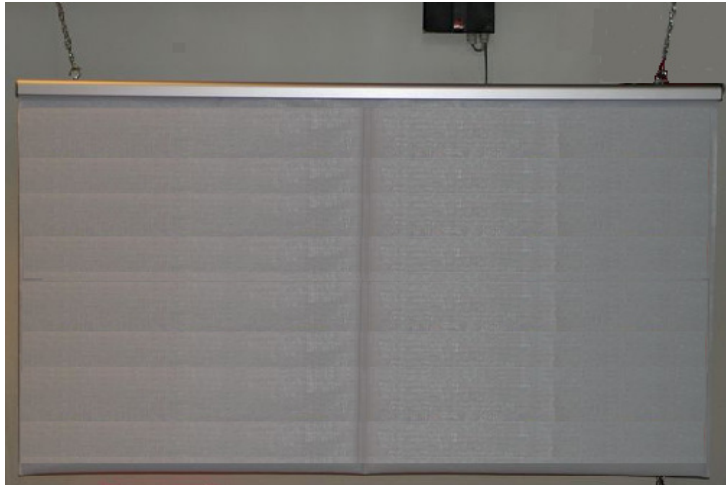
This banner includes six Flatphone audio element. You may wipe the walk way with even sound field up to 120 m both directions. Because of directivity, it will not disturb other stands around the walk way

Naturally Flatphone audio elements can be hidden as part of the construction

It would be a sign or an audio light...only the imagination is limiting the possibilities !



# FLATPHONE's various applications



**Audio Signs** are combined panels (two standard ones) on which a color printed visual material has been applied.

The design, material choice and printing for the visual layout can entirely be handled by the customer.

These panels truly enable dual communication (audio and visual).

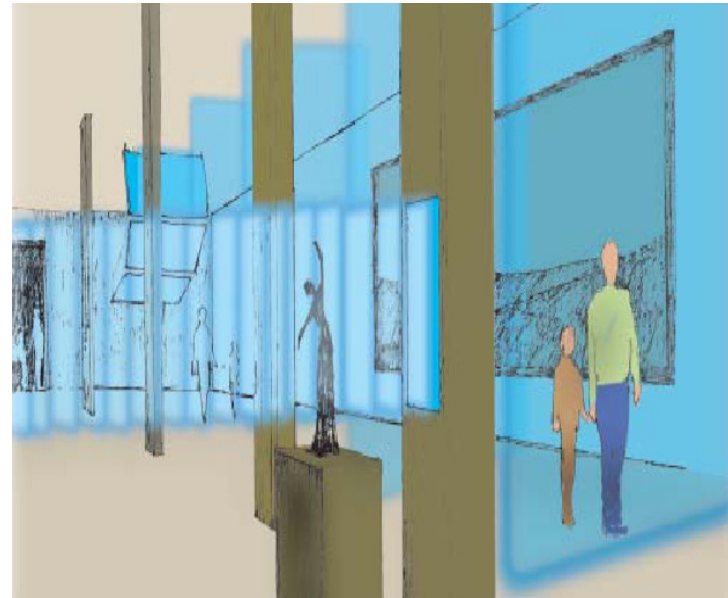


# FLATPHONE's various applications

## *Difficult acoustical situations*

Flatphone technology can easily be utilized in difficult acoustical environments.

**What happened until now:** With traditional technology and sometimes even with the line arrays (cylinder source) the audio signal is emitting from the source almost uncontrollably. **This causes unwanted reflections and thus makes speech intelligibility almost impossible.**



**Today with FLATPHONE technology:** The audio signal can be **shot / directed exactly to spots wanted**. This can be done **either directly or even by reflecting** the signal from other surfaces like ceilings, walls etc.

Also it is possible to camouflage the loudspeakers as part of the structure or the decoration. Furthermore the installation can be colored or it can be printed on to create more flavors.

# FLATPHONE's various applications



## *Audio screens*

No more too loud at the first row and no hearing at all on the last. This ensures the ultimate audio experience with high quality sound. Flatphone Audio Elements frequency range goes easily up to 20 000 Hz, which should fulfill even the requirements of the most demanding viewers.

Typically, the screen application consists of multiple Flatphone audio elements side by side. The elements can be used as building blocks for screens of all sizes. It is also possible to use fewer elements behind the surface canvas. This is especially so with the larger surfaces depending the intended usage at hand. Again, depending on the final usage situation the elements can be used as they are as projection surface. For more demanding applications a separate covering projection canvas might be needed. If needed, the elements can be treated with various surface materials.



16:9 three channel video screen for 5.1 systems.

1.8 m x 1.m x 0.025 m (thickness)

Weight 4.8 kg

# FLATPHONE's various applications

## *Screens*

Modern communications technology requires interactive multimedia devices that can combine audio and video. Flatphone technology provides a cost-effective new solution for these applications as it integrates sound, picture and even sensors.

The Multimedia Screen combines sound and picture. The elements can create an ideal screen which is clearly visible from a wide viewing angle. Each element can be driven by a separate sound source, allowing true multi-channel sound.

Flatphone technology is ideal in the screen applications. It is light structured, slim and modular. The directivity of the elements can be controlled thus also controlling the sound dispersion of the screen surface. This way it is possible to optimize the video/audio screen to fit into the space in optimal way. Also, since the SPL level does not attenuate proportionally one can achieve even sound levels to the whole audience.

4:3 mono screens for conference rooms  
1.8 m x 1.36 m x 0.025 m (thickness)  
Weight 5.2 kg

# FLATPHONE's various applications



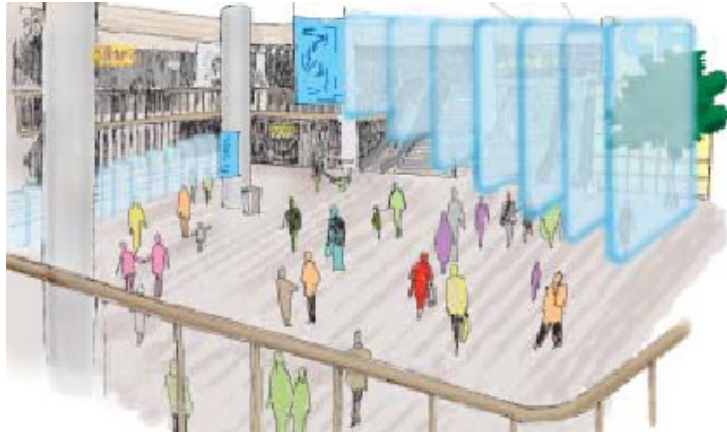
## *Video Conference Systems*

Videoconferencing has been a frustration to many. Very often this is due to the poor sound quality with feedback problems and too small and unclear picture quality. It is also very awkward to speak at other direction and look to your counterpart through the small TV picture at the end of the conference table.

With **Flatphone technology** the microphones, loudspeakers and viewing device are combined as one: *Video Conference Screen*. You are able to view your counterpart in natural size, he will speak directly to you (the sound comes directly from the screen!) and further more: you participate to the dialogue from your sitting place as naturally as you would be in the same room.

In the videoconference application one element or even a part of it functions as sensor. The high sensitivity of the element enables to convey speech clearly through the system. Videoconference screen is a comprehensive solution that opens door to a wide range of innovative solutions. Like projection screens, *video screen* applications also consist of multiple Flatphone audio elements side by side. The elements can be used as the building blocks for picture screens of all sizes. On top of this, special electronics are needed for combining the simultaneous microphone function into the audio element.

# FLATPHONE and Advertisement

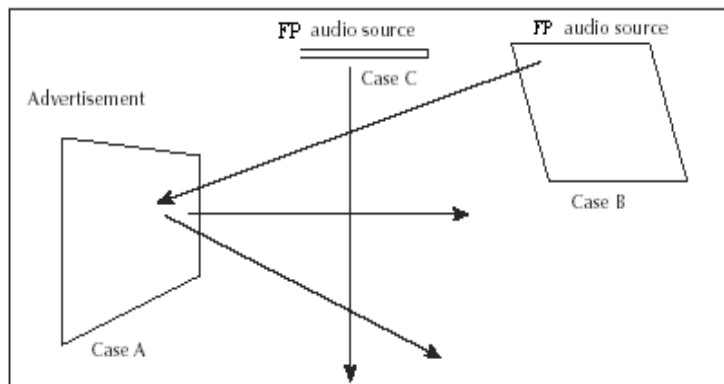


Flatphone technology can be easily used in combination with advertisements. The ideal installation place would be in-house advertisement spaces. Places like malls, stations, corridors, halls, ice-hockey rinks etc.

Audio is incorporated into the advertisement surface. This generates new innovative value proposal, where the sound is combined with the visual message.

Audio advertisement add one element more into the billboard media by securing that the people bypassing the billboard also look towards it.

Descriptions above represent generic technical cases how to use Flatphone technology in advertising industry. From the business perspective one can list generic arguments and ideas as an example:



- In a campaign use changing audio messages instead of changing pictures.
- Include several messages in one advertisement i.e. visual message and additional/ complementary audio message
- Change the message by time, theme or target group dynamically. Using for instance CRM data to broadcast the appropriate message to the appropriate type of customer.
- Enhance the visual message with the audio message

# FLATPHONE and « Shop In Shop »



What is the final touch in the every shopping center where you have multitude shops and brand island? - it is the audio. On top of the visual signals one needs something more to stand out from the brand names and products sitting on the next shelf. In this application it is possible to convey high quality audio to one place without disturbing the neighbors. The wide area of usage includes shop in shop islands, fair booths and all similar limited areas where there is a need for audio.

In practice these kind of ceiling or low ceiling installations work so that when a person walks under the area he starts to hear the music / or background media intended to this particular area only. **One of the major advantages the Flatphone technology conveys is the ability to use very low (read: convenient!) volume levels.**

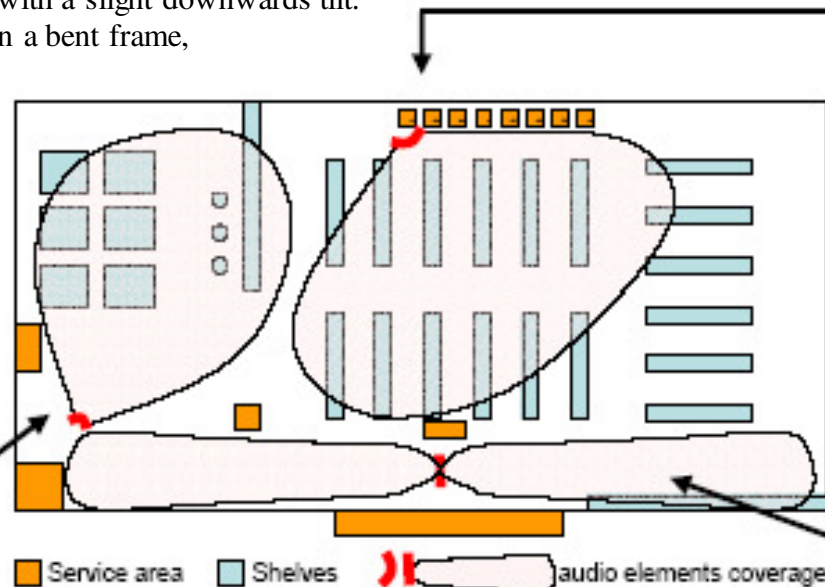
**This is due to the high directivity** of the audio elements and because of the extra high sound quality of the elements. The audio world you are creating does not spread out (in disturbing way) outside of the area you have intended to cover. Your neighbor can then easily have his own audio world...

This is especially beneficial in fairs or **supermarkets** where there are many listening points located in the same bigger space. **The audio can also be incorporated in other display structures.** Then the media would come directly from the display shelf, billboard, walls etc. The possibilities are countless.

Also, one of the remarkable properties of the technology is that the sound pressure level (how loud the sound is) does not attenuate as fast as other technologies when the distance between the speaker and the listener is increased. **Therefore it is possible to use very low audio volume levels and still the message will be heard loud and clear.** Furthermore, this is **very advantageous to the shopping mall because the overall noise level will remain very low.**

# One Supermarket application example

**Shelved area** in front of the cash registers is covered by two bent elements (R600). These are mounted almost at ceiling height in a column, with a slight downwards tilt. The elements are installed in a bent frame, which is boxed and filled with absorbing material thus the units are of monopole type and the cash register area is not disturbed by the audio information at all

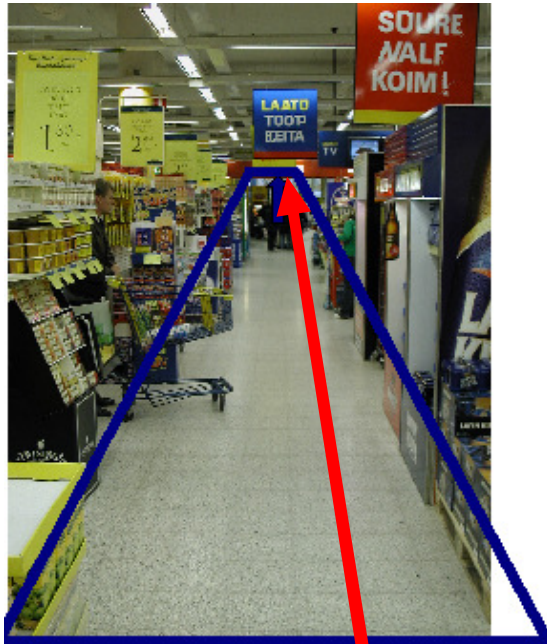


**Main aisle**, about 60 meters long, is swept with a dipole audio banner suspended in the middle of the aisle. The banner comprises a thin aluminium supporting beam and two standard Flatphone audio elements (60x60cm), wrapped in porous plastic film. The banner offers a free choice of print. In this case it is printed to promote the chain's bonus system.

The personal service at the meat counter (on the left in the picture) is not disturbed by the banner's audio information as the sound is directed strictly along the aisle.



# Creating Zones



both enable a **very targeted communication** i.e only **in the category** (special promotions, new product launch) and without annoying other segments of the store.

Even tighter zones can be created to aim at only one section of the shelves and therefore only one product of the range.

Audio ZONE 1

Cash registers

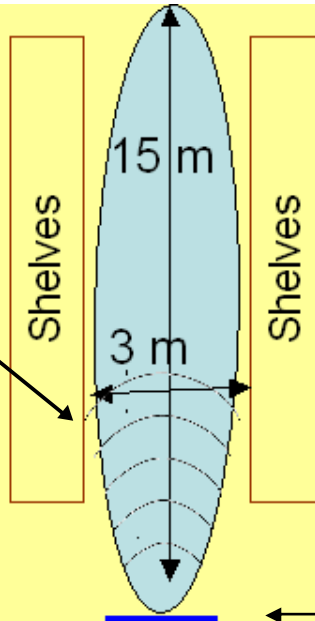
Cash registers

Cash registers

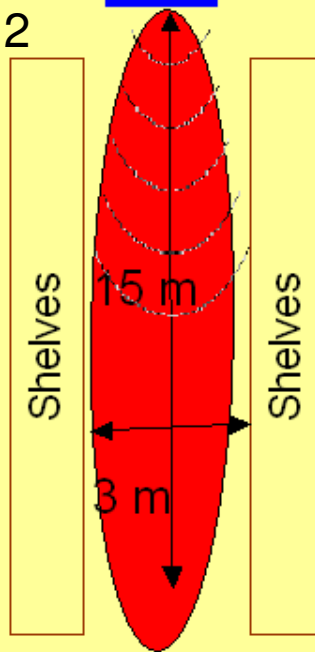
Cash registers

Cash registers

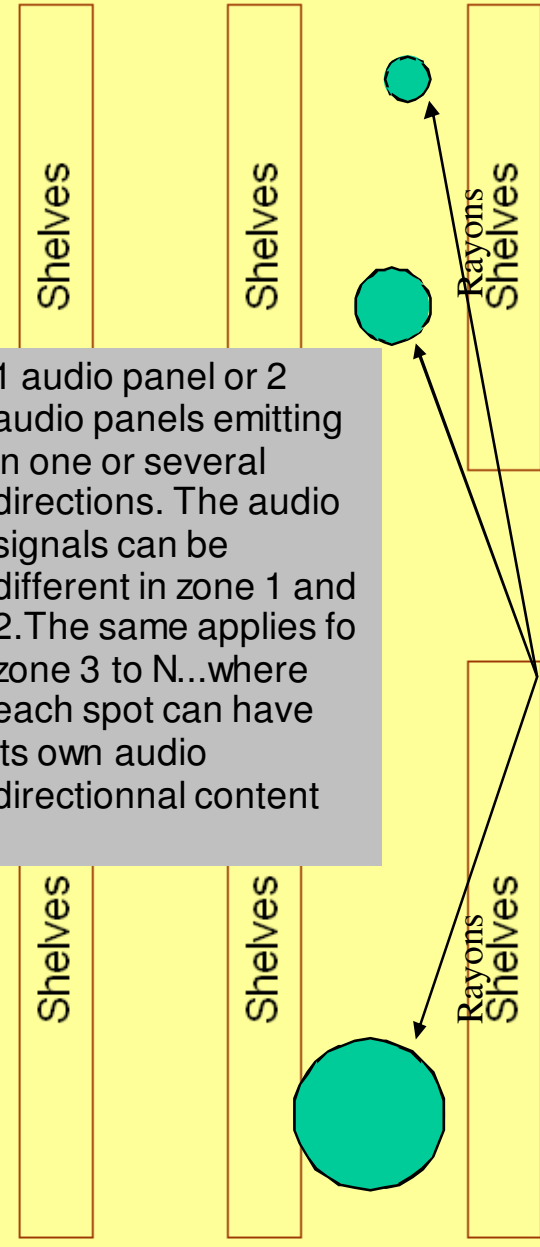
Cash registers



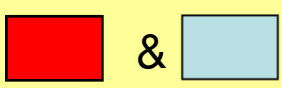
Audio ZONE 2



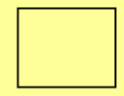
1 audio panel or 2 audio panels emitting in one or several directions. The audio signals can be different in zone 1 and 2. The same applies for zone 3 to N.. where each spot can have its own audio directionnal content



Audio ZONE 3 to N..



Sound with even pressure level and good speech intelligibility



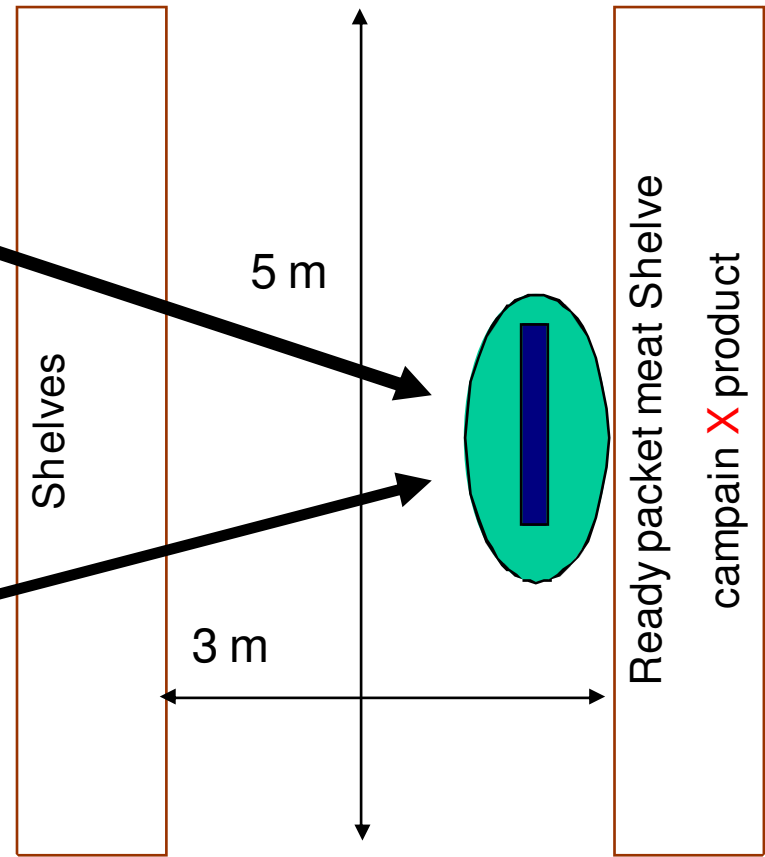
No sound

# Shower like zones

Fixed on an armed structures



Fixed on ceilings



Sound with even pressure level and good speech intelligibility



No sound

# A few technical indications

From the electronic point of view the Flatphone audio element is an electrostatic transducer. The way it is manufactured, however, will place it into different category compared to traditional electrostatic speaker elements. In its basic structural configuration, a membrane vibrates between two stator structures in coherence with the audio signal feed to the stators.

It has phase coherent wave front, and the whole audio frequency is produced on the same source without separate crossover filters.

The elements are extremely directive. The directivity is a function of the frequency but in general one can state that the Flatphone audio elements (600\*600mm size) have directivity of  $4^\circ \times 4^\circ$  when comparing to traditional dynamic loudspeaker elements. Because of the directivity the output SPL level is strong and smooth even to long distances.

Directivity can also be controlled. There are several ways to do this. The easiest way is to bend the element. Sometimes it is beneficial to maintain the flat structure of the element even in the final application. In these cases directivity can be controlled with electronics or during the manufacturing process.

The wide element (currently V1.21W) has an opening angle of 30 degrees horizontally and 4 degrees vertically. This is achieved by changing the Internal structure of the element during the manufacturing process. In practice the element is divided in several areas and the audio is distributed to these areas through x-over filters accordingly.

The element functions best from 300 Hertz upwards and the nominal intended operational frequency range for the element is 300 – 22.000 Hz for the 600 \* 600 mm elements. With the Flatphone technology it is easy to manufacture special elements even for higher frequencies. Ultrasonic applications are no hinder to the technology. For more information on these issues, please contact us.

All Flatphone audio elements have good quality of sound with very low distortion. The element has precise transfer function, enabling variety of applications and easy modifications to any specific use.

# FLATPHONE - Technical Specifications

## Audio

- FlatPhone Audio Element is a flat surface transducer. It has phase coherent wave front, and the whole audio frequency is produced on the same source without separate crossover filters.
- Extreme directivity. The FlatPhone Audio Element has opening angle of  $4^\circ \times 4^\circ$ , extremely narrow compared traditional dynamic element. Directivity can be controlled with electronics or by FlatPhone during the manufacturing process.
- Good quality of the sound.
- Because of the directivity, the SPL level is strong and smooth even to long distances
- The element has precise transfer function, enabling variety of applications and easy modifications to any specific use.
- Frequency response 300 – 22.000 Hz (600 \* 600 mm).
- For special applications the element can exceed 22 kHz and it can be used for higher frequencies.
- Sound pressure Level 92 dB @ 5 m continuous (peak 100dB@4kHz), without corrections or filters.

# FLATPHONE - Technical Specifications

## Electronics

- The element does not generate magnetic fields when in use.
- The element has capacitive load and operates with a special adapter or special amplifier only.
- The element can be used with normal amplifiers with passive adapter unit.
- Several elements can be used with a single amplifier with output suitable for capacitive load.
- Driving voltage 100 – 180 V RMS (max 500 V p-p)
- Element capacitance is 50nF.

Element impedance is function of the audio frequency.

Maximum input power 50 W

Nominal input audio voltage 20 V RMS, maximum 50 V RMS

Maximum output power 40 W

Maximum output voltage 500 V p-p.

Operating ambient temperature from 0 to 70 degrees Celsius.

Maximum relative humidity 70 per cent.

IP classification: IP 34

## Connections and wiring:

Input cables are connected to the audio amplifier loudspeakers output

Output connections: Black (Pin 9): AUDIO negative

Red (pin 6): AUDIO positive, max. level 500V p-p

White (pin 3): BIAS VOLTAGE - 350V DC, max 20 mA

Dimensions: 36mm x178mm x122mm

Weight: 975 g

# FLATPHONE - Technical Specifications

## Mechanical

Slim and light structure. Mechanical support / enclosure may be needed depending on the final application.

Dimensions: 600 \* 600 \* 5 mm

Weight 600 g

Custom sizes and shapes possible

## Environmental

IP 30 (for the element. The final IP class depends on the product/application construction)

Operating temperature +0 to +40 deg C (below zero temperatures are also possible in special applications)

Storage temperature +0 to +40 deg C

Operating humidity range 0 to 60% (non condensing)

Storage humidity range 0 to 60 % (non condensing)

## Other

Can be used as passive absorbent (10-20 dB)

Innovative product, structures and methods used in this system are patented under one or more European and global patents. Additional patents pending.

After operation, the bias voltage remains in the element for a period of 30 seconds. One should not remove connectors earlier for safety reasons.

The product FlatPhone Audio Element G1 V1.1 has been tested to be in conformity with the requirements of Low Voltage Directive (73/23/EEC), EMC Directive (89/336/EEC) or EN 60065 (1993) standard, as amended.

# What else can we offer?

- ISIM (In Store Interactive Media) Audio and video distribution networks within a facility, or throughout a country
- Voice, or musical Content providing.
- Installation and maintenance.
- Technical and Content consultancy.

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