Surround miking techniques

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Opening

The goal for surround sound productions should in general be to envelop the listener and to intensify the music experience.

Classical music style (acoustic surround): Increase the feeling of presence in an acoustic sound environment.

Rhythmical music style (produced surround): Extension of the tools to create a ”produced reality”
Opening

"Increase the feeling of presence in an acoustic sound environment"

- Optimize imaging and image location
- Smooth and even distribution
- Cohesion of the front and back components
- Capture the **entire** acoustic sound field
- All microphones have to be of a neutral character
Microphone Arrangements

Coincident set-ups vs. Spaced set-ups

The Coincident techniques can create proper localisation accuracy, but lack envelopment and have a small sweet spot – in 2 dimensions!

The Spaced techniques in general give a nice and large sweet area and you sense the enlarged and enveloping sound stage in a larger listening field.
Microphone Arrangements

...recommended by DPA

1. Decca Front, ORTF Rear 3 x 4006-TL, 2 x 4021
2. 5 Omnis 5 x 4006-TL
3. Spaced Cardioids 3 x 4015-TL, 2 x 4011-TL
ITU 775 norm

for music production
The Decca Tree

= DPA 4006-TL Omni microphones
The Decca Tree

Advantages by choosing the Decca Tree as front array:

- A tighter timbre in the front speakers is desirable for surround, as the rear channels help serving the ambient part. The close sensation also suits multimedia productions well.
- More intense and detailed reproduction
- Dynamic, clarity and focusing is more vivid by a closer placement
- The timbre is very close to the conductor’s intention
- Mix options – mono to surround
- Larger time difference between L and R gives a more holographic image, while the center mic ensures a stable width perspective
- A Decca Tree operates reasonable in a Dolby Surround Matrix
DPA Decca Tree Mount

*New practical mounting mount*

- Flexible and adjustable, basis approx. 60 – 125 cm
- Ready for surround extension rear arm
- Fits all microphone types
- Lightweighted (<700 g), yet very strong and stable
- Elegant
- Integrated Cable option
- For stand or for hanging
- For fixed installations and for mobile set-ups
DPA Decca Tree Mount

New practical mounting mount
Decca Tree + ORTF

Sound Source

DPA 4006-TL Omnis

60-120 cm

8-10 m

DPA 4021/4011-TL backwards faced Cardioids in ORTF
Decca Tree + ORTF

- The Decca Tree advantages
- The excellent sound colour and authentic reproduction that is unique for omni microphones
- Full frequency range in front channels
- Relatively little content of direct signal in rear channels, avoiding the orchestra to "sit on your knees" or even behind you
5 Omnis

Sound Source

DPA 4006-TL Omnis

2m – 5m

DPA 4006-TL Omnis with Acoustic Modification Accessories

2m – 3m
Elev 4m-6m
5 Omnis

- The excellent sound colour from omni microphones
- 5 identical microphones
- Full frequency range in all channels
- Acoustic Modification Accessories
  - Acoustic Pressure Equalisers
    Increases focus
  - Omni Foam Discs
    Creates directionality
Acoustic Pressure Equalisers

- Diffraction elements mounted flush on the capsule
- Creates a pressure build-up
- On-axis presence lift
- Altered polar response
Spaced Cardioids

Sound Source

DPA 4015-TL
Wide Cardioids

DPA 4011-TL
Cardioids
Spaced Cardioids

- Ambience control
- Less room tone than with omnis
- Very stable front image
- Great localisation accuracy
- Tip: Mount the rear cardioids ceiling-faced to obtain height information and attenuate audience noise
- This tree was developed to prevent interchannel loudspeaker interference by using adequate spacing
Spaced Cardioids, variant

Sound Source

DPA 4041-SP
Omni

DPA 4015-TL
Wide Cardioids

DPA 4011-TL
Cardioids
Spaced Cardioids

variant

In some music pieces, certain instruments or instrument groups are intended to be particularly prominent and call for more attention to the microphone technique.

Improved focus in the center channel by replacing the center microphone is a powerful tool.
Double MS

- Sound Source
- DPA 4021 Compact Cardioids
- DPA 4060 Miniature Omni
- Separate Center Mic
Double MS

- 4 cardioids offers true and identical phase, impulse and frequency response in 360 degrees
- A matrix will process the outputs to Double MS by considering the two side cardioids as a figure-of-eight
- The Rear MS can be delayed to create a larger sensation
- The system is compact, hardly visible and mono compatible
- The omni mic ensures rich bass response
- The optional separate center mic can improve focus
Surround Matching

- A "Mean of Set" curve from a number of microphones - of the same type - is produced.
- For each specific microphone of this set a deviation curve from the mean curve is shown.
Surround Matching

On-axis Free Field Response

Matching Curve for Serial no. 1234567A vs. Mean of Set 1234567
Music Example, 1

Metropolitan Cathedral Boys Choir

Decca Tree + ORTF

5 omnis

Spaced Cardioids
Music Example, 2

String Quartet

Decca Tree + ORTF

5 omnis

Spaced Cardioids
Rhythmical music style (produced surround)

One of the biggest advantages of mixing rhythmical music in surround is the tendency to use less compression, because there are more space in the mix.
High Sampling and Resolution

The benefits of higher sampling rates are as much the improved time domain resolution as it is the expanded frequency range. This will indeed tell you the truth about the microphone’s transient response.

From Digital Audio Denmark
Conclusion

What the engineer should demand and expect from a high quality microphone manufacturer delivering equipment for surround sound and high definition recordings:

- The ability to produce authentic sounding microphones without colouration, also off-axis
- The ability to produce several identical microphones for Surround Matching and prove it
- Knowledge and craftsmanship for an utter professional microphone solution, including mounting
Visit the Microphone University at www.dpamicrophones.com

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