FOCUSLINE
SPEAKER SYSTEMS

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DIRECTED SOUND PROJECTIONS
with perfect intelligibility of speech even in highly reverberant environments. This is the latest sound projection technology for previously unachievable sound provisioning.

ITEC

CHARACTERISTICS

Large halls, churches and cathedrals are very reverberant because their ceiling, floor and walls reflect sound waves multiple times. Therefore, the sound energy is decomposed very slowly (reverberation or decay time). This is beneficial to church music and choir singing but is extremely problematic for maintaining intelligibility of speech. As changing room layout is rarely an option in such cases, a new sound projection solution had to be found. The solution is here, and it has a name: ITEC FOCUSLINE. It is a column speaker that can actuate each of its drivers with a separate signal. The result is a sound wave front that with very little vertical scatter, delivering focused sound over large distances even in very reverberant rooms.

FOCUSLINE – CONTROLLABLE COLUMN SPEAKERS

Column speakers are speaker systems that incorporate multiple identical drivers that are arranged on one vertical plane, one above the other. Such speaker systems have been used for sound reinforcement applications for decades. Many scientific papers have been written about their purpose, the underlying physics and possible design patterns. Manufacturers from all over the world have beaten one another with ever different and better theories and designs of how to improve the column speaker concept. The main problem always was the suboptimal projection of high frequency sound over large distances.

One possible attempt to resolve this problem is to equip column speakers with separate calotte or horn tweeters. However, highly reverberant environments where high delay times are present for sound waves below 1000Hz require that even low-frequency sound is projected (bundled vertically) rather than spread. To achieve this, it is necessary to increase the height of the column speakers because the overall height of the column speaker installation is proportional to the ability to bundle the sound waves. However, higher column speakers have worse radiation characteristics at high frequencies (unintended cancellations).

Using digital signal processing it is now possible for the first time to “twist” a column speaker virtually by adjusting the separate drivers individually in terms of frequency, phase and time (position). This allows the developing sound engineer to create new column speaker arrangements in the blink of an eye by adjusting the driver settings – which in turn makes highly effective sound projection systems delivering perfect intelligibility of speech even in acoustically problematic environments a reality.

THE DEVELOPMENT

During the development of our adjustable column speaker system FOCUSLINE, we encountered some unexpected problems: How do you measure the result of a speaker positioning and a digital configuration (filter settings, delays, phase settings) if you want measurement results as far away from the sound source as 60m? We could have set up open air testing, but such test runs can get very problematic. Physics and mathematics of such a speaker positioning and configuration is extremely complex as well. Furthermore, it is almost impossible to calculate the actual measurement result from a small set of known formulas. All this gave us quite a hard time, our heads were spinning. What we finally came up with was a brand new, self-made acoustic-simulation software. This software allows us for the first time to simulate and visualize the radiation of sound waves originating from any alignment of speakers at different frequencies, phases and delays. We used this great tool to create the first prototypes, which we in turn used to verify the previously simulated results – and those results did not only prove the accuracy of the algorithms of our simulation software, but also surpassed our expectations.

ITEC FOCUSLINE: ADVANTAGES COMPARED TO ACTIVE SYSTEMS

Multiple passive column speakers of the same type can be controlled by one central signal processing unit and powered by one central 4- or 8-channel power amplifier. Cabling is easy and secure using a 16 pin signal cable. The same cable can be used to connect additional speakers. Passive column speakers are price-efficient, maintenance-free and can be easily customized in design. Large-scale installations as done in airport- and railway station halls can thus be implemented very economically. Furthermore, speaker monitoring as used in evacuation systems can also be done centrally. Most importantly however, the adjustable column speaker system ITEC FOCUSLINE convinces through its unique characteristics: to adapt itself to virtually any acoustic circumstances and deliver constant and high performance anywhere, anytime.

FOCUSLINE MODELS

EIGENSCHAFTEN

- Controllable Column Speaker
- High efficiency speaker that eliminates reverberation by using vertical sound projection
- Operating range of up to 50m
- Enormous sound pressure levels at great distance: up to 94 dB at 40m from the speaker!
- Reduced cabling effort (1-point sound provisioning)
- Superb intelligibility and still perfectly suited for music playback

MODELS

4 7 9

ITEC FOCUSLINE 4

Adjustable column speaker, 4-way, 12 full-range drivers (4 inch), 2 calotte tweeters (1 inch), 100V / 160W, 172 x 13 x 11 cm, 8-pin multi-pin connector, incl. mounting brackets (short)

ITEC FOCUSLINE 7

Adjustable column speaker, 7-way, 18 full-range drivers (4 inch), 2 calotte tweeters (1 inch), 100V / 240W, 252 x 13 x 11 cm, 14-pin multi-pin connector, incl. mounting brackets (short)

ITEC FOCUSLINE 9

Adjustable column speaker, 9-way, 24 full-range drivers (4 inch), 2 calotte tweeters (1 inch), 100V / 320W, 332 x 13 x 11 cm, 18-pin multi-pin connector, incl. mounting brackets (short)

Colours

☐ white ☐ ! custom colours

ACCESSORIES

Mounting brackets short (standard)
Dimensions: 9 x 6,5 cm

ITEC FOCUS-CONTROL 4/8 DIGITAL

The heart piece of the FOCUSLINE is the ITEC FOCUS-CONTROL. It provides for signal processing for all FOCUSLINE speakers and can be configured very easily using the provided configuration software FOCUSDESIGN. When going live, you have to configure only two parameters:
- Focal point (distance and sound projection angle)
- Angle of beam (a measure to the vertical height of projection)

SPECIFICATIONS

FOCUS-CONTROL	
Frequency Response	20Hz – 20KHz / -1dB
Harmonic Distorsion	<0,005%
Overall Dynamics	103dB
Power Supply	external power supply unit, input 115-230VAC
Inputs	4 x XLR, symmetrical, -60dB bis +20dB
Input Impedance	6,6 k Ohm
Phantom Power	12 Volt, switchable
Outputs	8 x XLR, symmetrical, +10dB
Equalizer	5 parametrical filter is disposable
Delay	0,023 – 500ms
Serial Interface	a RS-232 for programming and remote control
Ethernet Interface	optional
Dimensions (WxDxH)	482 (431) x 180 x 44mm ; 19 inch 1 U
Weight	2,40kg

POWER AMPLIFIER ITEC MULTIPOWER 4X75

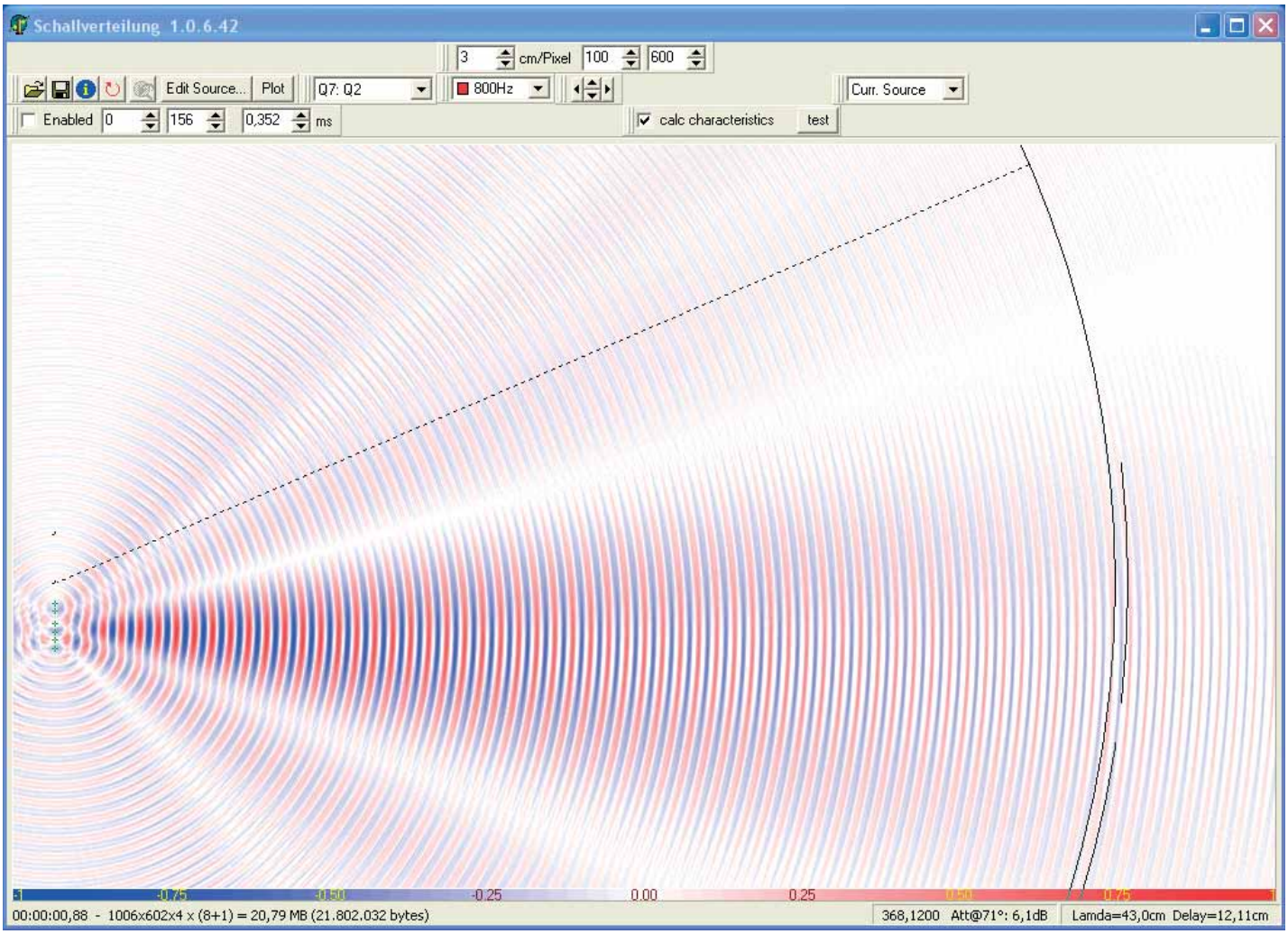
ITEC MULTIPOWER 4X75T

This new multi-channel power amplifier was developed specifically for the ITEC FOCUSLINE series. You can power up to 2 FOCUSLINE 4 speaker systems with one output stage. With 2 ITEC MULTIPOWER 4x75T you can power up to 2 FOCUSLINE 7 or FOCUSLINE 9 speaker systems.

SPECIFICATIONS

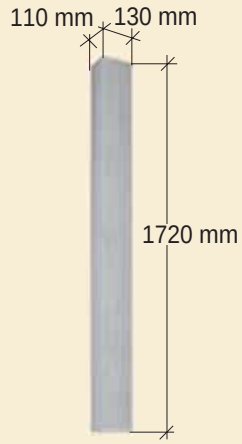
TYPE MULTI-POWER 4X75	
Pout 4 Ohm	4 x 75 Watt RMS
Pout 50/70/100Volt	4 x 75 Watt RMS
Frequency Response 4 Ohm	20 Hz - 20kHz
Frequency Response 100Volt	40 Hz - 20kHz
Audio-Input	4 x XLR, symmetrical, 0dB
Volume Control	4 x trim-pots on the back
Input Voltage	110 – 230 VAC
Max. Power Consumption	400 VA
Output Socket	connected 230V socket on the back
Dimensions (WxDxH)	482 (431) x 180 x 48mm ; 19 inch 2 U)
Weight	6,95kg

FOCUSLINE - SIMULATION



Simulation of a FOCUSLINE 7 at 800 Hz with an operation distance of 30m at a projection angle of -2°. (see figure ▲)

FOCUSLINE - SPECIFICATIONS



MODELS	FOCUSLINE 4	FOCUSLINE 7	FOCUSLINE 9
	11 full-range drivers 4” 4 x tweeters 1“ 4 x 100V/30 Watt	17 full-range drivers 4” 4 x tweeters 1“ 6 x 100V/30 Watt	23 full-range drivers 4” 4 x tweeters 1“ 8 x 100V/30 Watt
Load Rating W / RMS	120	180	240
Frequency Range	100 Hz - 12 kHz (-6dB)		
Max. Sound Pressure Level dB	95 dB at 25m distance	94 dB at 40m distance	92 dB at 50m distance
Radiation Angle	Horizontal: 180° - 500 Hz, 90° at 5 kHz		
	Vertical: Angels of bundling, tilting and radiation adjustable with ITEC FOCUS-CONTROL 4/8 digital		
Dimensions mm (WxHxD)	130 x 110 x 1720	130 x 110 x 2520	130 x 110 x 3320
Weight in kg	17	21	25
Standard colour	white, RAL 9010		
Provided Accessories	Mounting brackets, multi-pin connectors		

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