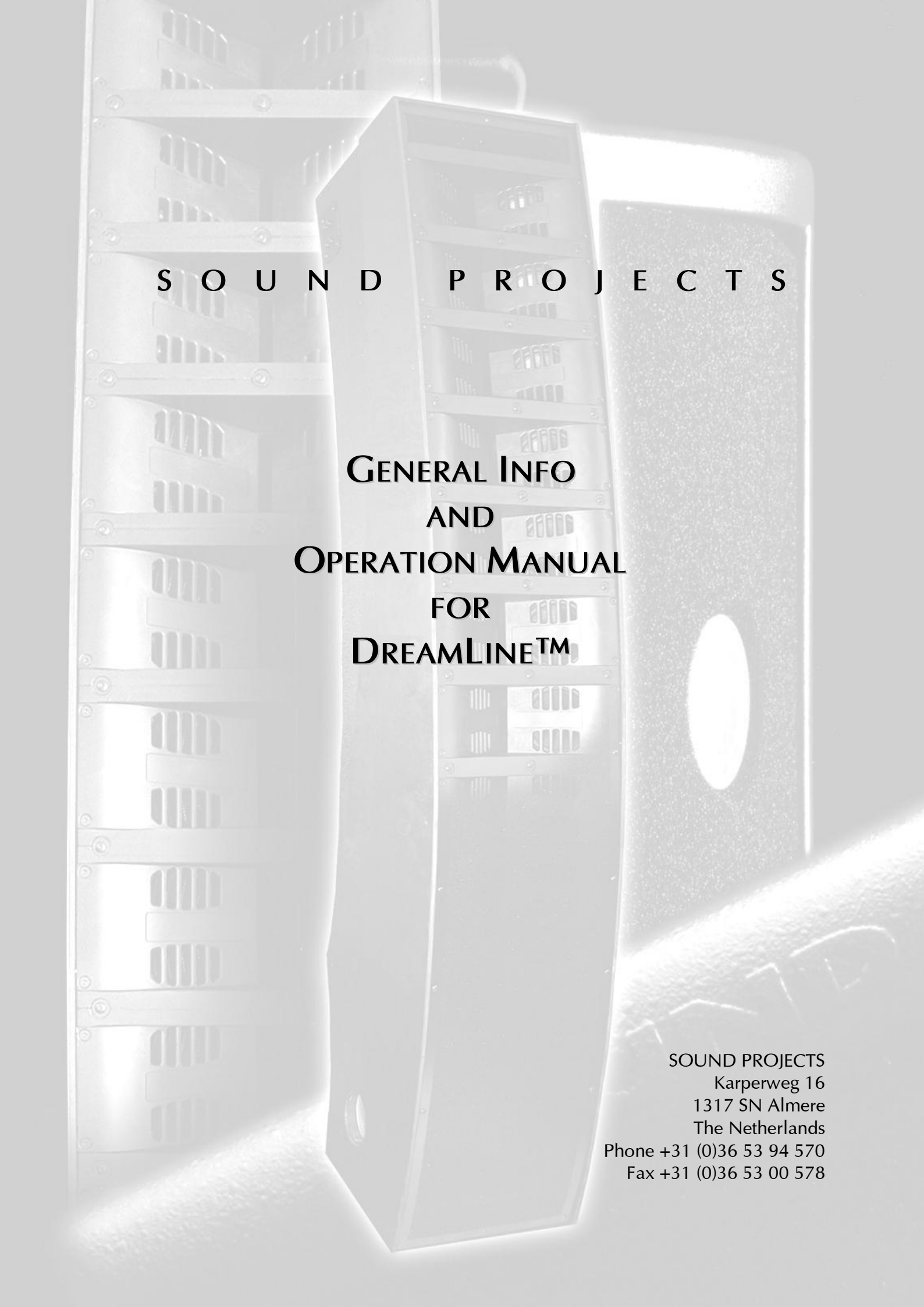

S O U N D P R O J E C T S

General Info and Operation Manual for DreamLine™

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Contents

All the important notes regarding proper operation of the product and potential danger or damage to either the user or the equipment, are highlighted in light grey!

All the important notes regarding the immediate safety or injury of persons and/or damage to the product are highlighted in dark grey!

Like any high performance tool your Sound Projects system needs regular maintenance. Check all bolts and nuts of touring systems at least once a year! Clean foam-grille and cabinet openings with vacuum cleaner and compressed air to remove excessive dust.

Line-array basics

What is a line-array?

A line-array is a sound system made up out of a group of identical, omni-directional radiating elements oriented in a tightly spaced, straight line. If this line is long enough compared to the wavelength the elements behave acoustically as if it were a single source. The basics of this principle are employed in today's vertical line-array systems.
Because of the physical dimensions of conventional HF compression-drivers it is impossible to meet the criteria of tight spacing of the sources for the frequency bandwidth it operates. To solve this most line-array systems use waveguides to convert the circular wave front emerging from a HF drivers exit to a rectangular plane enabling multiple sources to be tightly spaced. Furthermore the wave front emerging from the waveguide should have tight vertical dispersion in order to avoid unwanted interference. The way this is achieved largely determines the vertical performance of the line-array system at the HF bandwidth.
Line-arrays behaviour differs in some respects remarkably from conventional systems. The greatest benefit of a line-array is that, when properly designed, the acoustical power of many cabinets can be combined without the unwanted interference that conventional systems show. Furthermore its vertical directivity can be adapted to closely fit the venue.

Vertical directivity of a line-array versus a conventional system

While conventional system will almost inevitably cause harmful interference when using more than one system, a well-designed line-array has the advantage of better acoustic energy distribution towards the projected area. Although it's a misconception that with a line-array no interference will occur, due to it's tight spacing of the omni-directional MF and LF sources most of the cancellations occur outside the projected area. In fact it is the 'wanted' interference that creates the 'bullet-shape' often seen in simulation software.
The vertical directivity of the MFs and LFs can be altered within limits by curving the shape of the array. Due to the HF waveguide's tight vertical dispersion, necessary for proper functioning of the array, curving the array is also bound to outer limits so it doesn't create harmful areas of hotspots and poor HF coverage. The angles of the HF-waveguides in the Dreamline™ have been configured for optimised performance in relation with the MF/LF-drivers.

Vertical directivity of low frequencies versus array size

The previously described 'bullet-shape', as a rule of thumb, applies for wavelengths equal to or smaller than the vertical array sizes. For a wavelength equal to the array length the vertical dispersion will approximately be 90-degrees. For the frequencies below this frequency, hence longer wavelengths, it will gradually turn into an omni-directional source. Therefore, vertical directivity control and maximum SPL of the low and low-mid frequencies greatly benefit from a larger array size.

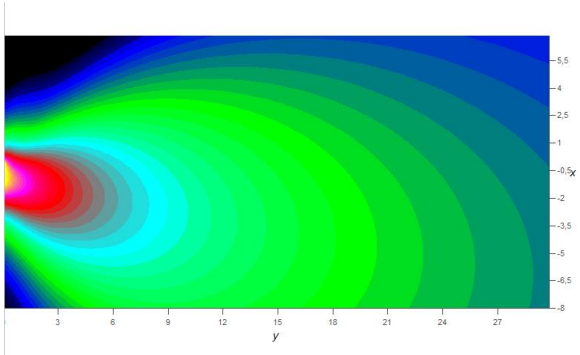


Fig.1 Typical characteristic of a 2 meter array at 170 Hz.

Basic set-up principles

With respect to the horizontal coverage characteristics a Dreamline™ is similar to a conventional constant directivity (CD) horn/system. When more horizontal coverage is needed than the horizontal dispersion of one line-array some basic rules apply explained later in this chapter. The main variable to which a line-array has to be adapted is the vertical coverage.

Establishing proper vertical coverage

The first step in the configuration process is to get the venue parameters and listeners positions right. It may seem logical but a good preparation is the main time-saver in setting up any audio-system. Once these parameters, such as distances to first and last listener positions and flying height, are known prediction software such as SPArC™ can easily be employed to configure the best flying position.

In general, flying a system higher will bring a more even loudness throughout the audience, and flying at a lower position will get more loudness at the front listener positions. The highest horn unit in the Dreamline™ should be aimed at the furthest listening position. In many cases it might even be preferred to aim just a little above this position.
Since the configuration of the HF-units in the Dreamline™ is optimised for the 'bullet-shape' of the mid and low-mid frequencies, the vertical coverage is limited to 35 degrees downwards from the top panel and 5 degrees upwards from the top panel. Therefore it may not always be possible to aim the lowest array element to the front listener position. Additional front fill is then necessary. Another situation where front fill is preferred is when the array is flying relatively high to the first listeners position. In order to avoid 'elevator-music' coming from above, front fills placed at stage height will place the sound image downward for the front of the audience.
When a line array is ground stacked it is more logic to configure the array from bottom to top. Additional front fill can still be used, however often not necessary.

Horizontal coverage

In some cases it might be necessary to use more than one array per side in order to achieve more horizontal coverage or to be used as in-fills. An important rule applies when this situation occurs. Instead of placing an array directly besides the first one the proper approach would be to utilize a second array, which is focused on another portion of the audience and spaced at least 6-7 meters (approximately 20 ft) away from the first array.
Given this separation, interference only occurs in the low frequency range and there are no audible intelligibility losses for two reasons: the first main cancellation is shifted lower in frequency (example, 28 Hz for 2 arrays of the same size, spaced 6 metres) and tends to be masked or filled in by room reverberation; by focussing the arrays at different panning angles, comb filtering interaction is lessened since their overlap region is reduced. In addition, the ear cannot resolve tightly spaced comb filtering notches at higher frequencies throughout the overlap region.

Quick reference set-up guide

Carefully read this section before suspending the Dreamline™

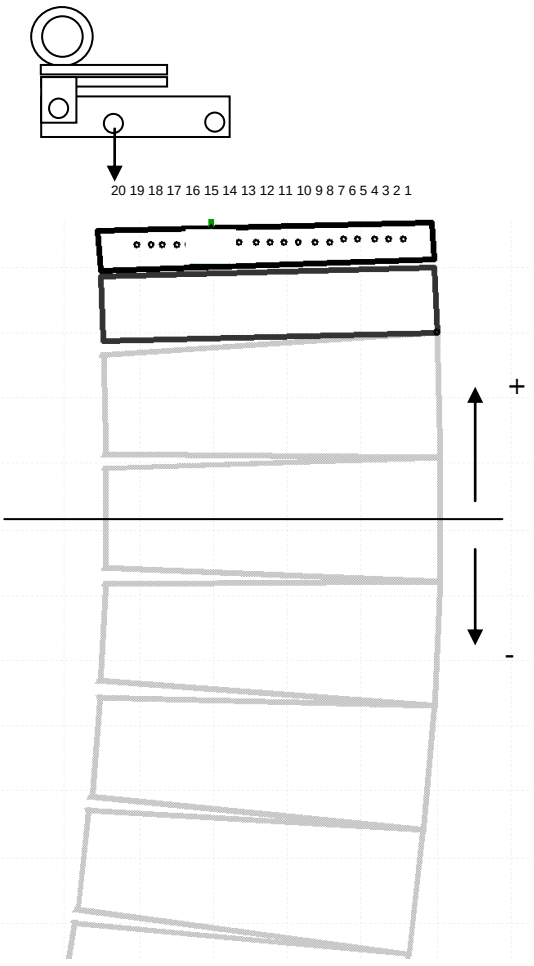
Note! The Dreamline™ flying system has been designed according to most international guidelines for overhead suspension. However, local safety legislation may be applicable and it is the responsibility of the installer to apply these safety guidelines.

Connection of flying point

You can either connect your flying point directly to the Dreamline™ by means of a 1T shackle or use a SOUND PROJECTS angle-adapter with two quick release pins.
The leveller bar mounted on top of each Dreamline™ cabinet has 20 flying positions. In the schedule below you'll find the corresponding vertical angle of the cabinet when attaching the flying point. Note that each hole-position has a different angle, depending on the method of connection: direct or with angle-adapter (see table 1).

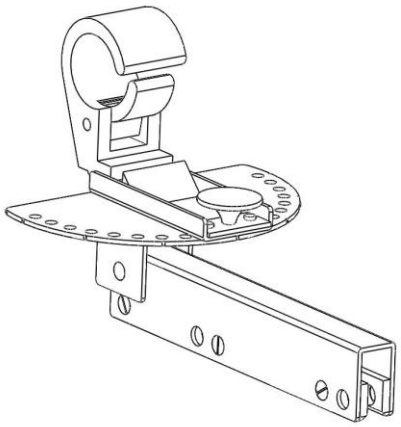
Position	Direct to leveller (1T shackle)	With angle-adapter
	angle (deg.)	angle (deg.)
1	16	---
2	15	---
3	14	---
4	13	---
5	12	---
6	11	---
7	10	---
8	9	---
9	8	4
10	7	3
11	6	2
12	5	1
13	4	0
14	3	-1
15	2	-2
16	1	-3
17	0	-4
18	-1	-5
19	-2	-6
20	-3	-7

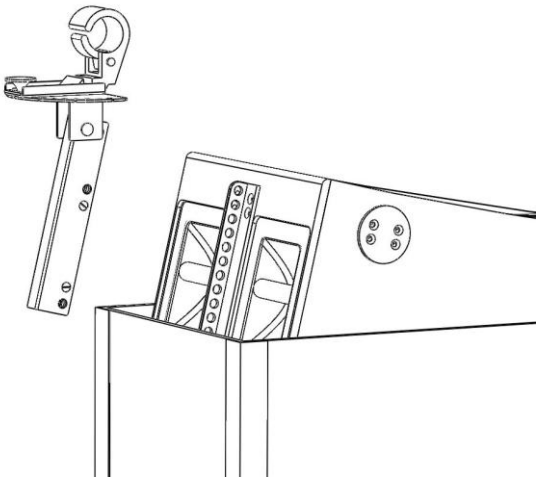
Table 1.



5 steps to rig your Dreamline™

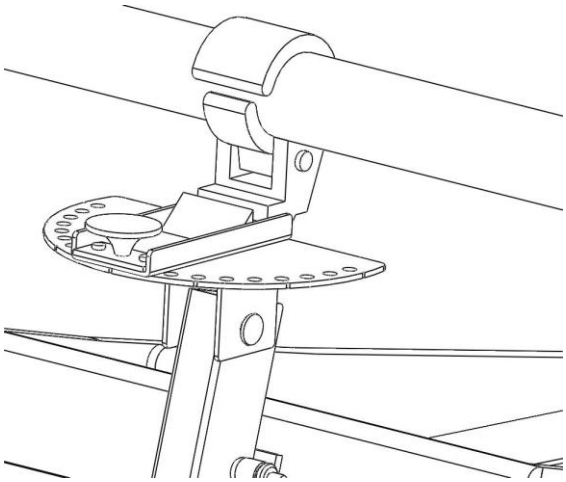
Safety Note:
When using the angle-adapter ALWAYS use two (2) fixing points at the leveller. AND make sure the angle-adapter is at the neutral (0 degree) position before any lifting or descending is done.





Step 1

Place the Dreamline™ flight case close to the lifting position and take off the lid, while on the castors. While still in the flight case connect the flying point (either directly or with angle adapter) at the preferred position of the leveller.

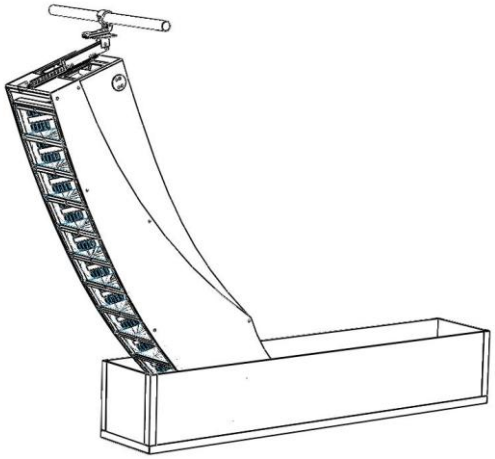


Step 2

Attach the clamp to the truss bar, the angle-disc to be positioned horizontally. Close the clamp.

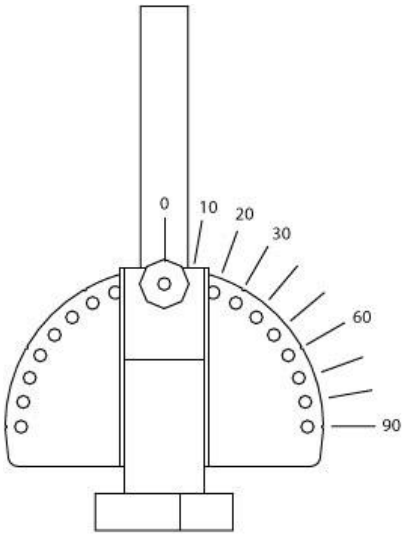
Step 3

Slowly lift the Dreamline™ out of its flightcase till it is fully free from the case. It will gradually get in position at the horizontal angle corresponding the affixed hole-position.



Step 4

If necessary, adjust the vertical angle with the angle disc. Release the pin to unlock the disc from its neutral position. Each step on the disc is a 10 degree angle shift.



Step 5

Connect audio and power cables and lift the Dreamline™ to the desired height. Guide the cables and fix them to avoid extensive pulling forces at the connectors.

Additional Safety Guidelines

Before suspending the Dreamline™ system be sure you apply the following general safety guidelines.

* Standards for flying and rigging are local not universal, therefore it is important for the user to contact appropriate regulatory agencies concerning relevant standards for specific applications.
* Before suspending any system, always inspect all components of the rigging system for deformation, corrosion, and damaged or missing parts that could reduce strength and safety of the rigging system.
* Use only load rated hardware.
* Never exceed maximum load ratings at any time.
* Consult a licensed physical engineer if you are unsure how to proceed.
* It is advisable to consult and engage a qualified rigger when making decisions related to purchase, set-up and use of any equipment and technique that will be used to suspend any temporary loudspeaker system above areas that will be occupied by persons.
* Never tilt the array by pushing or pulling the array at the enclosures itself!

Maintenance

Our minimum required recommendations:
* Control all rigging hardware on deformations, irregularities and missing or loose parts before every use. (User)
* Inspect all items at least once a year. (Qualified rigging personnel)
* Approval testing by Certified Body every two years. (Official agency)

Declaration of Conformity

Hilversum, 1 October 2006

DECLARATION OF CONFORMITY

SOUND PROJECTS, hereafter referred to as the manufacturer, declares that the Dreamline™ rigging system and its rigging hardware as supplied by the manufacturer are produced and, when provided with certificate, tested conform CE norms as described in the Guidelines for Machinery appendix 2A.

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EDITORIAL

Line-arrays have become a common solution for sound reinforcement during the last years. Easy to understand because a correctly built line-array of sufficient length gives the best possible additive coupling of multiple loudspeakers.
Hence ideal for any large event where the desired SPL can only be achieved by stacking and/or flying a number of boxes. For these events, the first generations of line-array boxes unquestionably proved the better solution. These heavy, big boxes (100-200 kg), each contained an identical, complete and high power, full range PA system and had a complex rigging system. So each line-array MODULE (box) could be placed anywhere in the array.
This interchangeability resulted in complex and expensive products; an accepted and unavoidable consequence for larger events (where enormous SPLs are needed).
Later generations of "small" line-array boxes came available as the solution for the smaller or average theatre or indoor events. However, these small line array systems are, more often than not, unnecessary expensive and rather labor-intensive for the intended purpose.

Sound Projects president Jan Slooter says: "we have been rethinking the line array merits again and again and did our utmost to separate end and means. For any sound engineer the main issue is, or should be, to get the best possible sound. Of course most users may have a professional interested in features. However, features easily distract attention from the core issue so we focused on those ingredients of a line array that determine sound quality and omitted all redundant parts.

The first striking impression of your DreamLine is the size. A height of more than 2 meters. Isn't that a logistic nightmare?

"No, the opposite. Practically all rental companies are transported small boxes in multiples in flight cases. So after 4 years experience with SP 10, our concept small line array module, we concluded that promoting the use of small line array boxes is too much business for business sake. It is senseless to invest your limited resources into little boxes that are always transported and used in larger numbers and will virtually never be used as a "stand alone". A proper line array is preferably more than 2 meters long so there is also improved gain i.e. directional control over low mid frequencies as well as less erratic lobes firing up and downwards.
The most convenient line array imaginable simply should not consist of many wooden boxes and the unavoidable complex rigging. The number of wooden boxes does not improve sound quality or coverage but on the contrary mean additional work for all parties involved. From that mindset the concept of DreamLine was born. It should have similar acoustic properties as a 12 box SP 10 hang but all electronics should be on board with only one AC power connector and one XLR audio input. The first demonstrations and real world tests already indicated that the DreamLine could just as well be an ideal touring system. Although designed primarily for fixed installations. Flight case model, convenience of transport and ease of rigging were judged perfect and yet so simple. After some modifications to the rigging, the DreamLine can now be flown out of it' s transport case without even flexing a muscle.

But how can it be that angle and processing of the 12 independent line-array modules are fixed. Can I nevertheless use a DreamLine everywhere?

"In one word: yes! Explained in some more words, we found that the universal "80/20 rule" was easily applicable to line-arrays. This 80/20 rule holds that 80 times out of 100 less than 20 percent of the rigging- and angling possibilities are used. Based on our accumulated experience we even dare suggest that there is a common denominator for the shape of a line array that will cover virtually all venues.

Than how does one operate in the remaining venues?

"Don't forget that with every sound system there will invariably be unforeseen situations where some or several type of spot infills are deemed necessary. Or where physical dimension are too wide, too high or too heavy. But note that these shortcomings only become prohibitive when the system is used for touring. Having said that, most responsible engineers know way in advance the peculiarities of the locations where they will perform and hence take their precautions".

The DreamLine is self-powered and you emphasize this as an advantage. But in your modular Linex system you abandoned self-powered. Where is the logic here?

"Linex is, like the first generation of large line-array modules, designed for large events. This means much power handling, or put it another way much heat and also 3 different channels.
Here self-powered becomes a disadvantage. Although amplifiers can be made more efficient, loudspeakers are by nature very inefficient. To dissipate the additional heat from the amps while maintaining mechanical stability would virtually be impossible. Most of all we would sacrifice the exceptional low weight of a Linex module. (40 kg)
In DreamLine all 12 modules are fixed in one housing. Additionally powering is 2 way active so the amplifiers and drivers could be designed for maximum efficiency. The speaker management is set for optimum frequency compensation because, obviously, no variables have to be taken into account. These features or should I say "lack of features" contribute to the fantastic handling and flytime of approximately 5 minutes".

Why did you choose to employ 24 small woofers instead of a smaller number of the more common 12 and or 15 inch

"Low frequencies are predominantly a question of volume displacement. By using many 6,5 inch long excursion woofers we kill two birds with one stone. Because the close arrangement of the line array sources, we have optimized acoustic coupling. Besides, we achieve a controlled, symmetrical low-mid radiation since each line-array source has two 6,5 inches flanking the high-frequency Wave Shape Transformer. Last but not least the carefully selected small speakers deliver studio-monitor audio quality above 50 Hz by employing a light carbon-fiber cone and high damping rubber surround".

DreamLine™ facts and figures:

One cabinet
One ultra low-noise speaker management/controller
12 neodymium HF drivers loaded by our patented Wave-shape-transformer™
12 line-array modules
24 long-excursion neodymium 6.5-inch woofers
Powered 600W amplifiers
Integrated rigging hardware adapted to fly with one single G-hook
40 degrees vertical coverage with optimal line-array curve
100 degrees horizontal constant-directivity waveguide
50Hz-18kHz
39 cm wide
220 cm high
125 kg

More information about DreamLine™ can be found on our website: www.soundprojects.com