

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

**SASY-RIG™**  
**RIGGING ACCESSORIES**  
**SP20-S**



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## SASY-RIG™ FLYING SYSTEM

This document explains the general rigging applications for SOUND PROJECTS  $\Sigma$ asy-rig™ flying system for SP20-S line-array loudspeaker system. For  $\Sigma$ asy-rig™ set-up with SP20-Linex please refer to the corresponding manual [ $\Sigma$ asy-rig™ for SP20-Linex] available from the website.

The  $\Sigma$ asy-rig™ flying system has been designed to set up acoustic vertical line-arrays in an easy, fast and flexible way.

All the necessary rigging hardware is stored within the SP20- $\Sigma$  cabinet. Additional requirements include an  $\Sigma$ asy-rig™ flying frame for each array, motor hoists, transport flight cases and qualified rigging personnel.



### SAFETY GUIDELINES

The work load limits (WLL) as specified in this manual of SOUND PROJECTS rigging accessories have been designed with a 10:1 safety factor. This is well above the European guidelines for lifting machinery.

Other safety guidelines are given throughout this paper.

*Note: It's the users responsibility that all safety precautions have been taken when using flying hardware equipment.*

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Easy-rig™ flying frame with 3 SP20- $\Sigma$  cabinets with  $\Sigma$ asy-rig™ rigging accessories.

## SYSTEM COMPONENTS

### Integrated flying hardware

The integrated  $\Sigma$ asy-rig™ rigging hardware comprises front and rear connecting bars designed for fast and easy connection of cabinets and the  $\Sigma$ asy-rig™ flying frame.

At the front of the cabinet a (retractable) connecting bar serves as a fixed rotation point (that can be stored inside the aluminum rigging profile during transport).

At the rear of the cabinet a connecting/slide bar adjusts the angle settings and simply slides into the enclosure hardware for easy transport and storage.

Always use the supplied quick release pins to fixate the  $\Sigma$ asy-rig™ connecting bars.



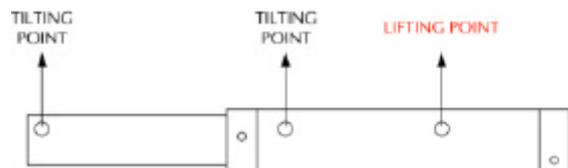
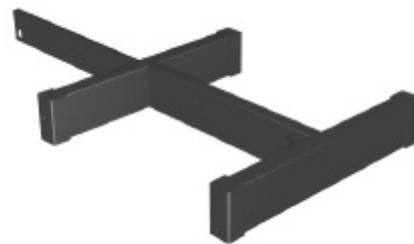
*SP20-S enclosure with integrated flying hardware*

### Flying Frame

The  $\Sigma$ asy-rig™ flying frame is designed to fly up to 24 SP20- $\Sigma$  enclosures in a 'dead-hang' set-up. SPArC™, specially designed line-array software, automatically calculates the corresponding maximum number of cabinets for each situation submitted in the program and signals when weight load limits are exceeded.

Depending on the desired setup the flying frame can be lifted with 1 hoist at the lifting point or 2 hoists, one at the lifting point and one at either of the tilting points.

The  $\Sigma$ asy-rig™ flying frame can also serve as a stand for ground-stacking the SP20- $\Sigma$  system.



*Sasy-rig™ flying frame*

*Note: Always use the lifting point at the front of the frame to lift the array. When the array is at the anticipated height the array can be tilted at either one of the tilting points.*

### Quick release pins

Each SP20- $\Sigma$  enclosure holds 6 quick release pins fixed to the enclosure-rigging. The provided pins have a work load limit of 0,5T (S.F.10) per pin.



*Quick Release Pins*

### Sasy-rig™ transport flight cases

SP20-Σ enclosures are transported by means of custom designed flight-cases. Each flight-case holds one or two clusters of 3 cabinets, depending on transport preferences.

The flight cases have truck-pack measurements of 1.20m x 0.70m (height depending on the amount of layers).



*Transport flight cases*

## SETTING UP A FLOWN LINE-ARRAY SYSTEM

### Set up

#### Preparing a set-up

The most important step in setting up a line-array rig fast and easy is (if possible) gathering all the relevant information of the venue ahead of time.

Use SPArC™, SOUND PROJECTS Line-Array Calculator, to determine the angle settings of each cabinet within the array.

An integrated whiteboard at the back of the cabinet can be used to number the position of each cabinet in the array, weather it's to be used in the left or right array and what the angle between the adjoining cabinets should be.

Connect the  $\Sigma$ asy-rig™ flying frame to the top cabinet of each array.

Store the enclosures in clusters of three in a flight-case and mark each flight-case with L for the left array and R for the right array plus the number of the cabinets in line.

#### Transport to venue

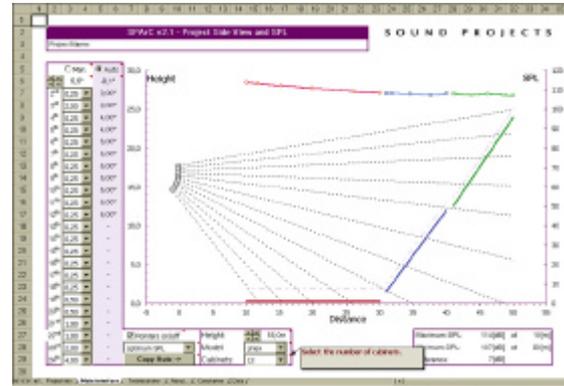
The SP20- $\Sigma$  transport flight case has truck-pack dimensions. Two flight cases (1.20m width) will tightly fit inside most trailers.

#### Connecting motor hoist to flying frame

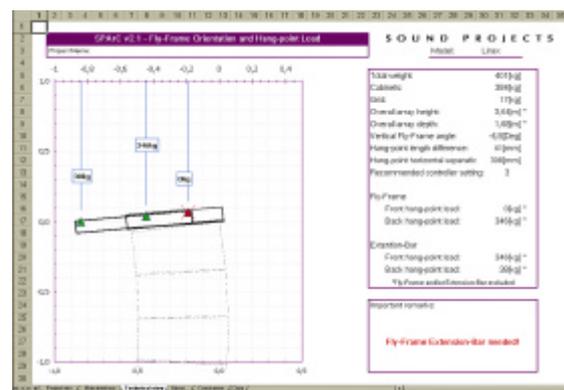
The  $\Sigma$ asy-rig™ flying frame comes with a lifting and a tilting point. Again, SPArC™ provides information on the loads on each of these points. During the rigging procedure only use the lifting point at the front of the frame to hoist the array. Once the full array is at the intended height it can be tilted to the right angle at the tilting point.

**IMPORTANT:** Make sure the shackles on the fly-frame are securely closed before any use of hoist motors!

*Note:* In the occasion that SPArC™ indicates that the full load is carried by the lifting point, the array can be lifted by a single hoist. A simple strap can be used to aim the array horizontally and keep the array from rotating.



SPArC™ can be a timesaving tool when preparing a system set-up.



SPArC™ technical data screen automatically shows the loads on each hoisting point.

### Lifting the first cluster of cabinets

Rigging an array of SP20-Σ can be significantly faster by lifting clusters of 3 cabinets at once for they are transported connected in the flight-case. Lift the flying frame at the lifting-point together with the first 3 cabinets out of the flight-case. Remove the flight-case and lower the array to set the angles at the back of the cabinets. The hole-pattern of the flying hardware allows angle-settings of 0, 0.5, 1.25, 2.5, 3.75 and 5 degrees. See indications at back of cabinet for the corresponding hole combinations.

### Connecting the next cluster of cabinets

The next cluster of 3 cabinets is moved under the array. Take the quick release pins out of the back slide-bar of the lower cabinet in the array. This allows the slide-bar to move vertically and compensate for height differences. To connect the backside of the enclosures remove the quick release pins at the rear of the enclosure. Lower the array till the slide-bars are just below the connecting holes of the upper cabinet of the next cluster. Connect the slide-bar with the pin. Place the angle setting pin at **any** angle to fix the slide-bar during lifting.

*IMPORTANT: ALWAYS make sure the quick release pins are well in place and locked!*

Lift the array while guiding the cluster of cabinets until it's completely freed from the flight-case.

*IMPORTANT: Do not stand in front of the array when hoisting! When cabinets are freed from the ground they may cause the array to swing forward.*

### Connecting enclosure fronts

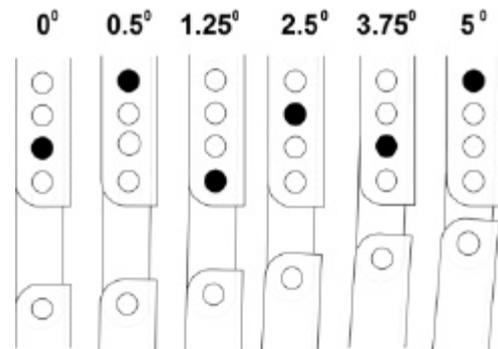
Although a single person can set-up an entire rig of SP20-Σ the fastest setup is achieved by two persons on either side of the array.

At the front of the enclosure two fixed connecting bars extend at the top. Remove the quick release pins at the front of the enclosure. Lift the front of the suspended cluster towards the bottom cabinet of the array and slide the front connector between the steel frontrigging. The front connector easily slides into the rigging profile of the cabinet in the array. Connect the cabinet fronts with the quick release pin.

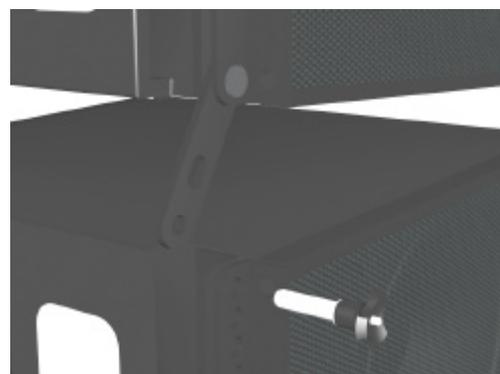
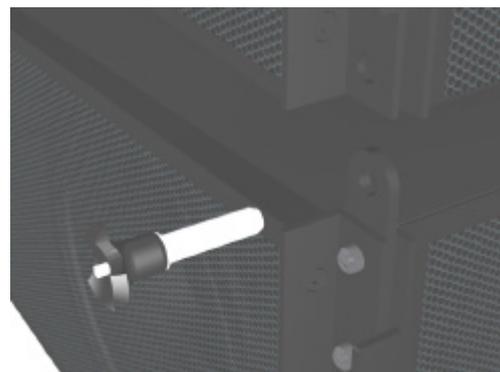
### Setting angles at the back of the cabinet

Now the angle setting pin at the back of the cabinet can be set to the desired angle. While lifting the cabinet back, remove the angle setting

pin. Place the pin at the right hole and move the cabinet back up or down to the correct angle. Once the corresponding holes are next to each other push in and lock the angle setting pin.



A combination of holes in the cabinet rigging and the slide-bar provide angle settings of small increments.



## SETTING UP A SYSTEM WITH LIMITED FLOOR-SPACE

In some occasions, i.e. limited space at lifting locations, one may decide to lift the array while cabinets are in an upright (vertical) position.

In this case, first connect the flying frame to the hoist and lift it above the truck pack of cabinets. Connect the backside flying hardware and lower the flying frame until the front side can be attached to the frame. Lift the array a bit of the ground and set the angles at the back of the cabinet.

Lift the cluster about 1.2 meter off the ground and place the next cluster of 3 cabinets below the array (use a trolley or the flight-case dolly). Gently lower the array on top of the cluster, while guiding the front connector in the front-rigging of the bottom cabinet of the array.

## HOW TO DETERMINE THE MAXIMUM NUMBER OF CABINETS IN AN ARRAY

The allowed number of cabinets in an array is determined by the following factors:

1. The allowable loads on the supporting construction (e.g. roof, crane, trussing framework etc.).
2. The Weight Load Limit (WLL) of the hoisting motors.
3. The WLL of the flying frame
4. Local rigging legislation on safety factors etc.
5. The configuration of the array !

*Note: A chain is as strong as its weakest link! Therefore all of the above criteria should be determined and should NEVER be exceeded!*

### 1. Supporting construction

At public facilities the allowable loads on a roof construction or support is available at its authorized engineering office.

### 2. WLL of (motor)hoist

Refer to manual of the hoist manufacturer

### 3. Flying frame WLL

Never exceed the safe Work Load Limit indicated on the  $\Sigma$ asy-rig™ Flying frame or as indicated by the software SPArC™.

### 4. Local rigging legislation

All  $\Sigma$ asy-rig™ rigging hardware is designed with a safety factor 10. This is well above the European safety standards as stated in the Guidelines for Machines. Local laws, however, may enforce higher safety factors and/or restrictions or demand other safety precautions.

### 5. array configuration

The WLL of the flying frame and cabinet rigging is given for a straight 'dead-hang' array. The maximum number of cabinets allow in other situations is given by the SPArC™ software. For a few situations the following table will give the maximum number of cabinets.

Flying Frame angle = 0 degrees unless otherwise			
Max. no. of Cabinets			
Av. angle	J-shape*	Max. angle Flying Fr.	C-shape**
0	24	8 deg.	24
1	24	4 deg.	24
2		0 deg.	19
3			16
4			14
5			12
6			11

\* J-shape: the lower half of the array have a larger angle setting than the upper half. No angle of a cabinet is higher than a lower cabinet.  
 \*\* C-shape: all angle settings between cabinets in the array are the same.

## DISCONNECTING

Disconnecting the array after a job is just as easy as setting it up, and exactly in reverse.

Lower the array until the bottom cabinet is approximately just above the ground.

Set the angle of the lower 4 (!) cabinets to 0 degrees. Remove the angle setting pin at the back side of the cabinet between the 3<sup>rd</sup> and 4<sup>th</sup> cabinet of the array (6<sup>th</sup> and 7<sup>th</sup> in case of SP10- $\Sigma$ ).

Place the flight case trolley underneath the array. While lowering the array, push the three free hanging cabinets backwards on the trolley.

Unlock the rear connecting-bar between the cluster on the trolley and the array by removing the rear locking pins at the top of the stack.

Put the locking pins in place again so the cluster is ready for its next job.

## GROUND STACKING

If flying is not an option or you're in need of a floor-standing fill, you can also ground stack with the  $\Sigma$ asy-rig™ systems.

If the array actually stands on the floor, this is best achieved by mounting a fly-frame on a stack in transport-mode and tilting it up-side down.

If the stack needs to stand on a higher level (for example on a stack of sub enclosures), you can first place the fly-frame on that level and strap it to the sub-enclosures, attach the array enclosures one by one as previously described.

When ground-stacking it does not matter if the enclosures are positioned up-side down.

Also arcing the array backwards is still possible.

Never ground stack more than 8 SP20- $\Sigma$  enclosures on a fly frame!

## ADDITIONAL SAFETY GUIDELINES

Before mounting the SP10- $\Sigma$  or SP20- $\Sigma$  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 array, always inspect all components of the array for cracks, deformation, corrosion, and damaged or missing parts that could reduce strength and safety of the array.
- ⚠ 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 one of the enclosures itself!

## MAINTENANCE

Normal usage Regulations about the...

Our minimum required recommendations:  
Control all rigging items on deformations irregularities and missing or loose parts before every use. (by user)  
Inspect all items at least once a year. (by qualified rigging personnel)  
Approval testing by Certified Body every four years.

## DECLARATION OF CONFORMITY

Hilversum, 1 October 2004

# DECLARATION OF CONFORMITY

SOUND PROJECTS, hereafter referred to as the manufacturer, declares that the Easy-rig™ flying frame 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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