

## Array Setup

The JBL VERTEC system was designed to be suspended, or “flown”. Since the flying hardware is integral to the box, and since the hinge bars travel with each box, nothing extra is needed, aside from the array frame. It doesn’t get much easier than this. Use the Line Array Calculator to determine the hanging angle for the array as well as hinge bar angles. Having done that, there are a couple of approaches to flying the array.

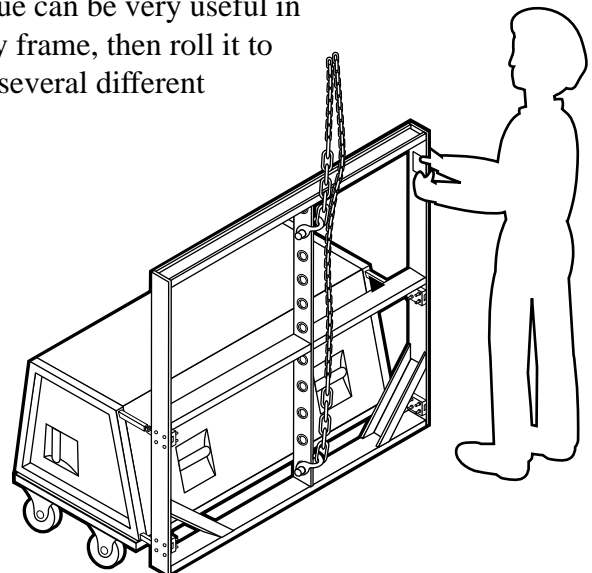
There are 3 basic elements in the array setup process:

- A responsible, trained technician
- An array frame
- Enclosures

The enclosure attaches to the array frame via the hinge bars. These are stored inside the rigging frames attached to each enclosure. The connector panels are oriented so that the words and the JBL Logo read correctly (right side up) when the enclosure is flown.

*For more information on chain motor hoists and hanging hardware, see “Suspension Systems:” chapter 6.*

You can pre-attach an array frame to a single box, then move it around while the box is still on its wheels. This technique can be very useful in many situations. Pre-position the array frame, then roll it to the chain motor hooks. This is one of several different ways a VERTEC array can be set up.





The VerTec array's lightweight enclosures and simple, secure integral rigging make it possible for a single person to set up an array if necessary. A better approach uses two persons: one rolling the boxes and fixing pins while the other handles the chain motor/hoist controls.

For rapid setup, a three-person crew makes short work of it: one on the motor control, and one person on each side of the array (positioned at opposite ends of the boxes) as the array goes together.

Sometimes when you have plenty of working space, it is best to begin array assembly by placing the array frame on the deck.



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Attach the chain motor hooks first, before hooking a box to the array frame. Start by pinning the shackle(s) in the selected hole(s). If you are using one motor, select a hole that allows the array frame to be balanced taking into account the center of gravity of the array. This varies with the number of boxes. Experience will show you what works best for arrays of different sizes.



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A typical hang uses two chain motors, allowing the angle of the array frame to be adjusted from the ground by motor control. Sometimes a single chain motor lifts the array, with the array frame angle set by the choice of shackle hole location.

A reliable technique is to first suspend the array frame, then attach the first (top) box by rolling the enclosure up to the array frame.



Connect the rear hinge bars to the rear receiver blocks on the frame using the long locking pin on the array frame. Using this method, the rear hinge bars will be connected first. The first box should be set so that its baffle is 90 degrees in relation to the array frame. This puts it in a 0° position.



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Next, tilt the array frame forward on the hinge bar pins until the leading edge of the array frame nearly touches the floor. Connect the front hinge bars to the front receiver blocks on the array frame.



Now line up the front pair of receiver blocks on the array frame with the front hinge bars on the enclosure. Lock the front hinge bars using the associated locking pins on the box rigging frames and on the main array frame.



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You are now ready to put tension on the chain motor hoists and begin to raise the array frame. Use the front chain hoist to raise the array frame back to horizontal. Take up the chain slack in the rear chain hoist. Now lift the array frame using both motors and prepare to lift the first box off the floor. It helps to have the remaining boxes in line here.



Pre-set the rear hinge bars to the desired angle. Then move the additional boxes into line. Next connect the rest of the boxes into a train so that all front hinge bars are linked. Pull the array up slightly, pinning the rear hinge bars one at a time, in sequence, as the array goes up. This is a good time to hook up the speaker cable loom which was secured to the array frame. (This is typically done with a spanset or a steel wire rope and shackles).



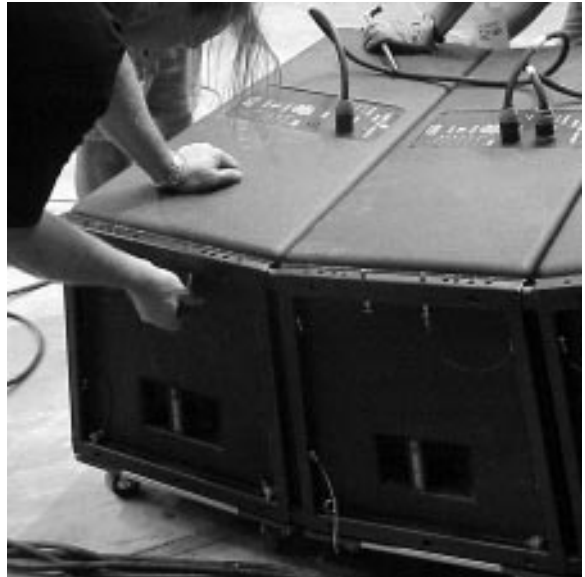
The preceding method usually works best on large stages and in spacious venues where there is enough room available to create a 'train' of speakers.

*Note, an 'array train' can be pre-assembled backstage or in the loading dock area and then rolled to the hoisting area using the array frame as a pushbar. (For more info on this method see Fig. 11-009, Chapter 9, 'Transport and Truck Pack').*



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With an array train lined up and all front hinge bars linked, set the rear hinge bars to the desired angles, one at a time in sequence. Start with the top box first. Bump up the chain hoist, putting a small amount of tension on the box you are working with. Slide the locking pin into the desired angle hole on the rear hinge bar.



***Note: On rough or uneven surfaces or when working over electrical feeder cables etc., use the box end handle to slightly lift and jiggle the enclosure so that the locking pin slides home easily. VERTEC boxes are lightweight enough that one person can do this process, using only one hand if required.***

Begin to hoist the array, adding additional boxes as the array goes up. Repeat the process of pinning first the front hinge bars (near the floor), then the rear hinge bars (at rear of the cabinet, currently facing up).



As you hoist the array, but before it reaches trim height, stop and check all of the fittings. Are all of the locking pins in place and secure? Are the hinge bars set at the desired angle? Are the hinge bars set the same on both sides? Now remove the dollies.

***Note: Use care when handling hinge bars and quick-release pins when chain motor hoists are in operation. Do not insert fingers or hands between enclosures when hoists are moving.***



As the array begins to go up, start removing dollies. The dolly is equipped with quick release latch and side handles. Take care to unhook both ends at nearly the same time; do not allow the weight of the dolly to hang only from one dolly mounting stud, or apply leverage against a stud. Misalignment or damage may result.

The dollies are designed to stack, 8 or more can be put in single pile and then rolled around. The wheels fit into a recess on the top surface to hold things together.

*For more information, see chapter 11, “Transport and Truck Pack”.*



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## Alternate Setup Method for Very Large Arrays

An alternative method that is good for very large arrays or when working in cramped spaces such as a narrow deck on a proscenium stage in older theatres, is: preset the array frame. Hook up and suspend the first box, then line up the remaining boxes one at a time directly beneath the suspended boxes, with the rear hinge bars already pre-set to the desired angle.

This can be done some distance away from the hoisting area; the boxes can then be rolled or lifted to the array setup area one at a time.

Here's another method: roll the boxes in place one at a time. Connect the first box to the array frame and hoist it slightly. Fit the rear hinge bar to the box that is hanging. Hoist slightly, then pivot the lower box up and connect its front hinge bars. Two people can easily do this. The side handles and low box weight make this process easy. Remove the dollies one at a time as the array goes up.



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## Setting the Array Frame Angle and Height

Once you have the array frame loaded with enclosures, you'll need to adjust its trim angle. For a small array, you can probably do this with a simple angle finder or protractor-type device. You can estimate array angle by eye, but ensuring optimum coverage of audience spaces requires precision adjustment.

A more elegant solution is an electronic inclinometer, like the Anglestar Protractor System. The Anglestar has two parts, connected with a three-conductor cable. One part has the angle sensor in it, the other has the readout. This system can be readily customized for use with array measurement. Snip the cable between the two boxes. Put XLR connectors on the ends. Find a long mic cable to reconnect the sensor with the readout box. Tape or otherwise secure the sensor to the array frame and raise the array to trim height. Read the array tilt angle from the readout. Adjust the trim height using the upstage and downstage chain motor controls.

### Sourcing Information:

Warren-Knight Instrument Company  
2045 Bennett Road  
Philadelphia, PA 19116

215-464-9300 voice  
215-464-9303 fax

<http://www.warrind.com>

A simple way to check and set the height of an array is to tape the leading end of a tape measure to the array frame. Pull the tape straight down as the array is hoisted up. Note the height from the floor, and stop the chain hoist process when the desired height is reached. Now gently tug on the measuring tape, and it will disconnect from the array frame and drop back to the floor or stage deck.



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## Ground-Stacking VERTEC Arrays

The VT4889-AF (Array Frame) and SF (Short Frame) are designed to support ground stacked arrays. An “AF” can stack up to 6; The “SF” readily holds up to 4. One suggestion is to use a trucking load-strap with ratchet to secure the frame to the subwoofer boxes or some other stable fixture.

When ground stacking, the words on the connector panel and the JBL logo on the front grilles will be upside down, unless you are equipped with an extra set of front hinge bars to use in this application. These would be set in place on the array frame and pinned to the first (bottom) box in the stack.

The baffle of the bottom box in a stacked array does not necessarily have to be parallel to the stage or the array frame. It can be positioned on its rear hinge bars to be tilted downward if desired. In this way arced arrays can be readily created from a ground stack position.



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The bottom box in a stacked array can be tilted forward if desired to obtain proper coverage patterns. Note how the front (short) hinge bar and rear (long) hinge bar work to support the rigging frame at a forward angle.



A typical application might be three boxes on an SF frame, set on top of 2 subwoofers. The picture below shows this setup at a hotel ballroom event.



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In summary, the VERTEC system is very flexible when it comes to array setup. There is more than one way to create and suspend arrays, and different options for ground stacking exist as well. The system is adaptable to many venue types - large, medium, and small. Work with it, learn what works best for you and understand the benefits of JBL's S.A.F.E. suspension system and the VERTEC system's integral rigging hardware.

*For more info on VT hanging hardware, see Chapter 6, "Suspension System"*



**The VERTEC array has been designed for the rapid, flexible setup of arrays. The rigid rigging system allows for the creation of radically-angled arrays. This enables various system designs to meet the needs of many different venue applications.**



