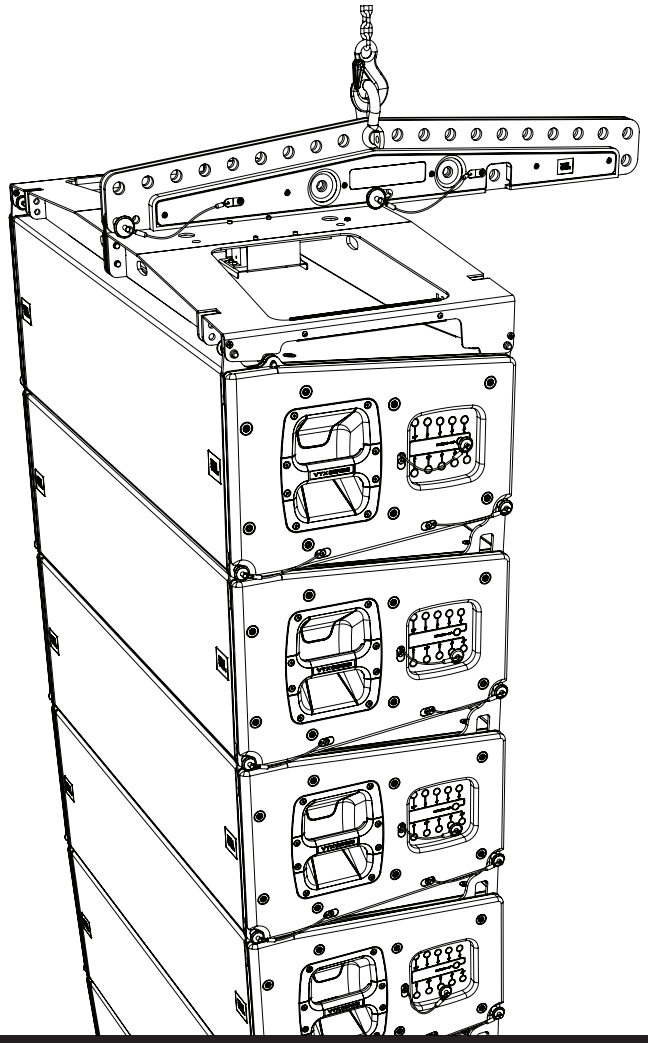
JBL PROFESSIONAL

VTX SERIES
SYSTEM SOLUTIONS

# VTX A12 | Rigging Manual



## GENERAL INFORMATION

VTX A12 - Rigging Manual

Document Number: 1000297495

Version: D - EN

Distribution Date: November 25, 2020



## JBL PROFESSIONAL

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USA

# Thank you for purchasing JBL VTX Series products

In more than 75 years of JBL innovations, the VTX Series stands apart as a milestone in the practical application of creative engineering. VTX products herald the next generation in line array loudspeaker systems: a new era in performance, system integration and user friendliness. VTX products draw on multiple JBL patents in driver, waveguide, and suspension technology, as well as custom amplification, DSP, control, and system management designs created in collaboration with HARMAN Professional sister companies.

VTX loudspeakers marry custom transducer design and in-house manufacture, breakthrough technologies, and a comprehensive system approach to deliver a premium experience for all who come into contact with it, from the FOH mixing engineer to the systems engineer, rigger, road crew, warehouse manager, and, of course, the audience. Designed for operators of portable and fixed systems alike, the VTX Series features JBL's legendary sound quality coupled with expert support and advanced tools that enable optimal specification, configuration, and operation of VTX systems in any venue, anywhere in the world. The VTX Series delivers a comprehensive solution: the finest sound quality available, plus efficient and intuitive setup, tuning, networking, and control.

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# 1 - DECLARATION OF CONFORMITY

**BRAND:** JBL Professional

**FAMILY NAME:** VTX A12 loudspeakers and suspension accessories

**MODEL NAMES:**

- **VTX A12**
- **VTX A12 AF**
- **VTX A12 AF EB**
- **VTX A12 SB**
- **VTX A12 VT GND**
- **VTX DELTA**
- **VTX A12W**
- **VTX A12 VT**
- **VTX A12 BP**

**We, HARMAN International,** declare under our sole responsibility that the product, to which this declaration relates, is in conformity with the following standards:

| STANDARD | DESCRIPTION | TEST AGENCY |
|---|---|---|
| 2006/42/EC<br>MACHINERY DIRECTIVE | Applies to machinery and lays down essential health and safety requirements.<br>ISO12100 | Tested at JBL Professional |
| 2014/35/EC<br>LOW VOLTAGE DIRECTIVE | Applies to loudspeaker and lays down essential health and safety requirements.<br>EN60065 | Tested at JBL Professional |

**Frank Lacelle**

Compliance Manager - Harman International

# 2 - SAFETY

## 2.1 SAFETY INSTRUCTIONS

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not expose the product to direct rain or sea spray.
6. Clean only with a dry cloth.
7. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
8. Only use attachments/accessories specified by the manufacturer.
9. Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
10. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as if liquid has been spilled or objects have fallen into the apparatus, or if the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
11. Contact JBL Professional for advanced servicing issues.
12. **CAUTION - DO NOT PERFORM ANY SERVICING UNLESS YOU ARE QUALIFIED TO DO SO.**
13. Prolonged exposure to excessive SPL can cause hearing damage. The loudspeaker is easily capable of generating sound pressure levels (SPL) sufficient to cause permanent hearing damage to performers, production crew, and audience members. Caution should be taken to avoid prolonged exposure to SPL in excess of 90 dB.
14. Read the System Rigging Manual before installation and use of the product.

## 2.2 GENERAL HARDWARE INFORMATION

Any hardware used in an overhead suspension application must be load rated for the intended use. Generally, this type of hardware is available from rigging supply houses, industrial supply catalogs, and specialized rigging distributors. Local hardware stores do not usually stock these products. Compliant hardware will be referenced with a working load limit (WLL) and a traceability code.

## 2.3 ATTACHMENT TO STRUCTURES

A licensed Professional Engineer must approve the placement and method of attachment to the structure prior to the installation of any overhead object. The following performance standards should be provided to the Professional Engineer for design purposes: Uniform Building Code as applicable, Municipal Building Code as applicable, and Seismic Code as applicable. The installation of the hardware and method of attachment must be carried out in the manner specified by the Professional Engineer. Improper installation may result in damage, injury, or death.

## 2.4 IMPORTANT SAFETY WARNING

The information in this section has been assembled from recognized engineering data and is intended for informational purposes only. None of the information in this section should be used without first obtaining competent advice with respect to applicability to a given circumstance. None of the information presented herein is intended as a representation or warranty on the part of JBL. Anyone making use of this information assumes all liability arising from such use.

All information presented herein is based upon materials and practices common to North America and may not directly apply to other countries because of differing material dimensions, specifications, and/or local regulations. Users in other countries should consult with appropriate engineering and regulatory authorities for specific guidelines.

Correct use of all included hardware is required for secure system suspension. Careful calculations should always be performed to ensure that all components are used within their working load limits before the array is suspended. Never exceed the maximum recommended load ratings.

Before suspending any speaker system, always inspect all components (enclosure, rigging frames, pins, eyebolts, track fittings, etc.) for cracks, deformations, corrosion, or missing/loose/damaged parts that could reduce strength and safety of the array. Do not suspend the speaker until the proper corrective action has been taken. Use only load-rated hardware when suspending JBL suspendable loudspeaker models.

## 2.5 ARE YOU NEW TO RIGGING?

**If you are new to rigging, you should:**

- Know the rules for safe rigging.
- Attend a safe rigging seminar.
- Meet and establish a relationship with a licensed mechanical or structural engineer. Get in the habit of asking them questions instead of assuming their answers. Learn from what they tell you.
- Research and understand the codes, practices and requirements of the venues where you intend to operate your sound system.

## 2.6 INSPECTION AND MAINTENANCE

Suspension systems are comprised of mechanical devices and, as such, require regular inspection and routine maintenance to ensure proper functionality. Before suspending or pole mounting any speaker system, always inspect all components (enclosure, suspension frames or brackets, pins, eyebolts, etc.) for cracks, deformations, corrosion, or missing/loose/damaged parts that could reduce strength and safety of the array. Do not suspend or pole mount a speaker until the proper corrective action has been taken.

Installed systems should be inspected at least once a year. The inspection must include a visual survey of all corners and load-bearing surfaces for signs of cracking, water damage, delamination, or any other condition that may decrease the strength of the loudspeaker enclosure.

Accessory suspension hardware provided with or for VTX systems must be inspected for fatigue at least once a year or as required by local ordinance. The inspection must include a visual survey of the material for signs of corrosion, bending, or any other condition that may decrease the strength of the fastener. Additionally, any eyebolts must be checked for possible spin-out of the enclosure.

For all other hardware and fittings, refer to the hardware manufacturer's inspection and maintenance guidelines for process.

JBL is not responsible for the application of its products for any purpose or the misuse of this information for any purpose. Furthermore, JBL is not responsible for the abuse of its products caused by avoiding compliance with inspection and maintenance procedures or any other abuse.

Prior to suspending the system, an expert, trained and experienced in suspending speaker systems, should inspect all parts and components.

## 2.7 SYMBOLS

The following symbols are used in this document:

**CAUTION:** This symbol gives notice of a potential risk of harm to the individual or the equipment. Instruction marked with this symbol must be strictly followed.

**TIP:** This symbol gives notice of helpful, relevant information about the topic.

**INSTRUCTIONS:** This symbol gives notice of instructions that must be followed for proper installation and use of the product.

**TOOLS REQUIRED:** This symbol gives notice of tools that must be used for proper installation and use of the product.

# 3 - MECHANICAL LIMITS

The VTX A12 suspension system and accessories comply with the 2006/42/EC Machinery Directive and have been designed following the guidelines of DGUV regulation 17 (BGV-C1) for a minimum safety factor of 4:1. Minimum safety factor requirements for suspended arrays are often set by local regulations. Use JBL Line Array Calculator 3™ software (LAC-3) to check mechanical limits and ensure compliance with local regulations. ANSI Standard E1.8 (Entertainment Technology Loudspeaker Enclosures Intended for Overhead Suspension), Section 5.3.4, specifies a minimum safety factor of 5:1. If compliance with the ANSI standard is needed, make sure that the array design produces a minimum safety factor of 5:1.

## 3.1 SUSPENDED ARRAY LIMITS

| ARRAY FRAME | NOTES | SAFE LIMIT | MAXIMUM LIMIT |
|---|---|---|---|
| VTX A12 AF | Extension Bar set to the rear position | (12) A12 | (24) A12 |
| VTX A12 AF | Extension Bar set to the front position | (8) A12 | (16) A12 |
| VTX A12 AF | Reverse Frame and Extension Bar set to the front position | (12) A12 | (24) A12 |
| VTX A12 SB | Suspension Bar used as an Array Frame | (18) A12 | (18) A12 |

## 3.2 GROUND STACK ARRAY LIMITS

| ARRAY FRAME | NOTES | SAFE LIMIT | MAXIMUM LIMIT |
|---|---|---|---|
| VTX A12 VT + GND | Using VTX A12 VT with VTX A12 VT GND outriggers | (4) A12 | (6) A12 |
| VTX A12 BP | Base plate for ground stacking A12 systems | (2) A12 | (6) A12 |

**TERMINOLOGY:**

**Safe Limit:** The safe limit provides the number of cabinets that can be used in an array while maintaining a safety factor of 4:1 or higher. The safety factor of an array is determined by the number of cabinets, the array shape, and the overall array angle. An array constructed within the safe limit will always yield a safety factor greater than 4:1 regardless of array parameters and conditions. Ground-stacked arrays within the safe limit are stable under normal conditions. Designs exceeding the safe limit and up to the maximum limit, are possible, but the Line Array Calculator 3™ software should be used to check mechanical safety for the given configuration.

**Maximum Limit:** Arrays larger than the maximum limit are not allowable under any conditions.

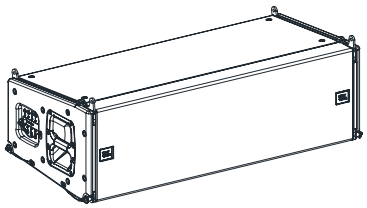
**NOTES:**

- When the safe limit and maximum limit are the same, the array always produces a safety factor of 4:1 or higher.
- Safe and maximum limits are only applicable to the specified accessory (i.e. base plate or array frame). When several accessories are combined (for example, ground-stacked arrays with a base plate and subwoofers underneath), the design should always be evaluated and checked with LAC-3.
- LAC-3 will not allow array designs below the 4:1 minimum safety factor.

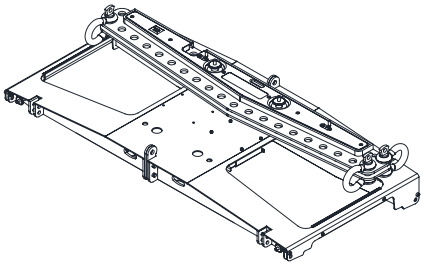
**TIPS:**

- The VTX A12 and VTX A12W share the same weight and physical size.
- The names “VTX A12” and “VTX A12W” are used interchangeably throughout this document.

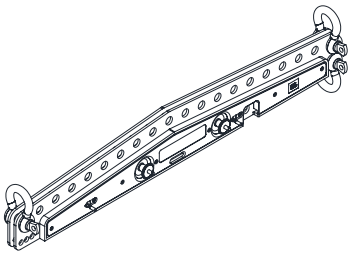
## 4 - SYSTEM COMPONENTS



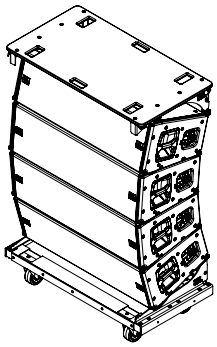
**VTX A12 / VTX A12W**



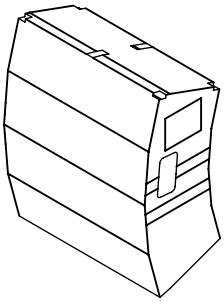
**VTX A12 AF |** Array Frame



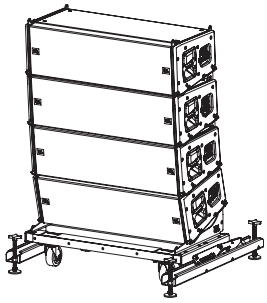
**VTX A12 AF EB |** Extension Bar



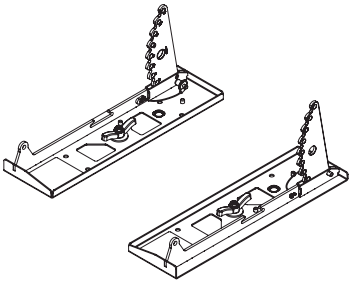
**VTX A12 VT |** Vertical Transporter



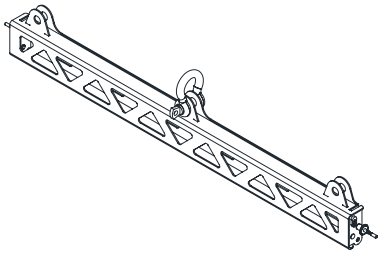
**VTX A12 VT CVR |** Cover



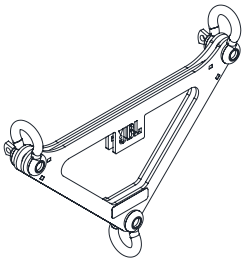
**VTX A12 VT GND |** Ground Stack



**VTX A12 BP |** Base Plate



**VTX A12 SB |** Suspension Bar



**VTX Delta |** Delta Plate

**CAUTION: Always use components and accessories specified and approved by JBL Professional. When a cart is used, use caution when moving the cart to avoid injury from tip-over.**

# 5 - SOFTWARE

## 5.1 LINE ARRAY CALCULATOR 3™

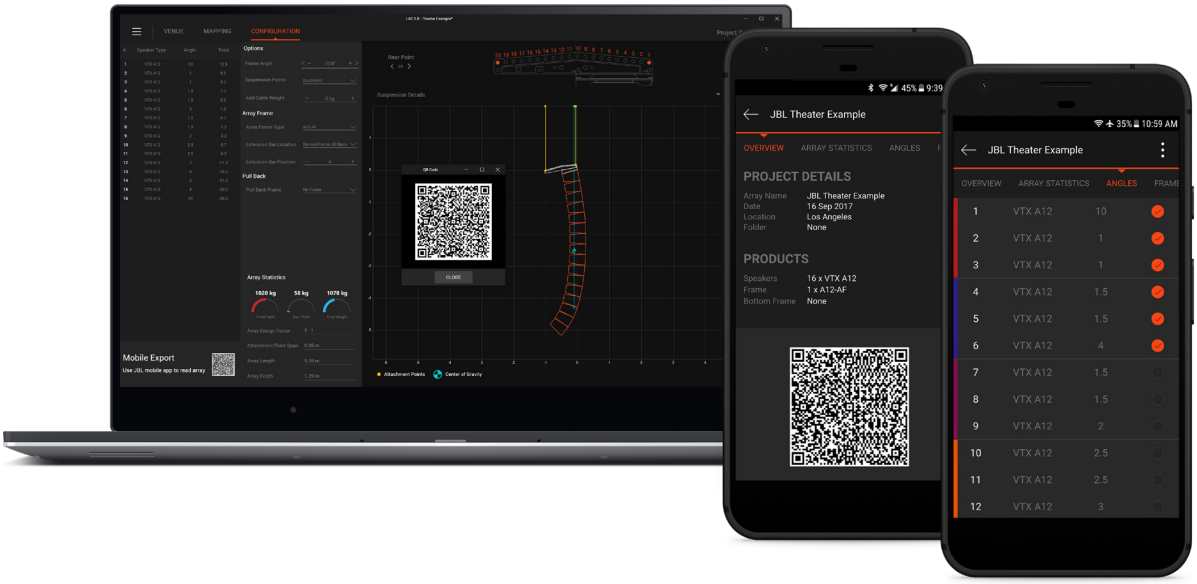
Line Array Calculator 3 acoustical prediction software is used for the design and mechanical validation of VTX Series line array systems. Using LAC-3 is a three-step process. First, venue dimensions are defined using either X/Y/Z coordinates or the fast distance/angle method. Second, array configurations are built from VTX loudspeaker models. Third, virtual measurement microphones and a suite of built-in DSP functions are applied to make predictions of the system's coverage and the linearity that will be delivered by the defined array configuration in the specified space. Loudspeaker quantities and models, splay angles, and array aiming can be modified until prediction shows that the desired coverage is attained throughout the venue. The built-in coverage-and-delay calculator determines subwoofer delay values for electronic delay steering (EDS) that achieve optimal low frequency coverage.


Beyond acoustical predictions, LAC-3 validates the mechanical properties of arrays and selected JBL accessories. Configuration limits are calculated in real time, for either suspended or ground-stacked arrays, based on array parameters such as the number of cabinets, cabinet-to-cabinet splay angles, overall array aiming, and selected accessories. In the case of suspended arrays, a safety factor is calculated to aid in designing systems that conform to local regulations. Warnings and error messages notify the user when an array or a specific accessory is outside safe working limits. For ground-stacked arrays, a tipping factor calculated from a complex set of variables suggests whether an array design is likely to be stable, potentially unstable, or unsafe. Array statistics like array size, depth, and weight are also calculated, and a PDF report facilitates system deployment. Mechanical data can be transferred to JBL's Array Link™ app running on an iOS® or Android™ mobile phone using a QR code, with no need for internet connectivity. All relevant rigging information and options are presented in an easy-to-understand layout.

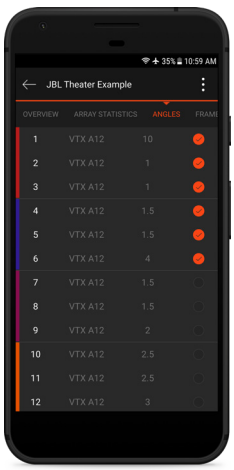
**CAUTION: All VTX systems should be designed and validated using the LAC-3 software application. This is the only way to ensure that safe mechanical conditions are met for any given configuration.**

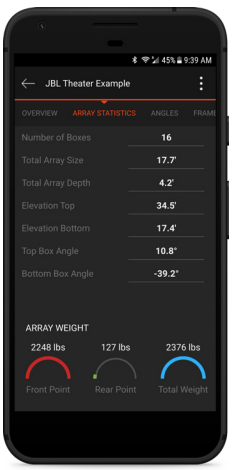
## 5.2 ARRAY LINK™

JBL Array Link is a mobile companion app that works with LAC-3 software to assist technicians deploying VTX Series systems in the field. Array Link uses a QR code to directly transfer mechanical data in real time from an array design created in LAC-3 to a mobile phone running iOS or Android. All relevant rigging information and options are presented in an easy-to-understand layout. The application can be downloaded free from the Apple App Store or Google Play Store.




Once the system designer or lead tech computes the angles for each hang in LAC-3, every member of the crew can get the correct information for angles, attachment points, trim height, etc., either by scanning the QR code from LAC-3 directly with their device, or getting the data from a copy shared on another user's device. When all users onsite have the configuration data, arrays can be deployed quickly and efficiently.



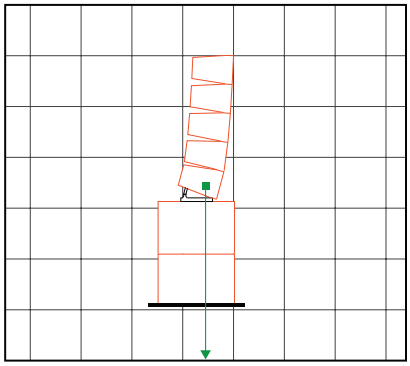




## 5.3 GROUND-STACKED ARRAYS IN LAC-3

Line Array Calculator version 3.5.0 or later includes mechanical safety checks for ground-stacked arrays. The software takes into consideration several variables that can affect the stability of an array, including outside factors such as someone pushing on an array. Based on this data, LAC-3 generates a safety assessment factor and notifies the user of potential mechanical or stability problems. Errors and warnings generated fall into one of the following categories:

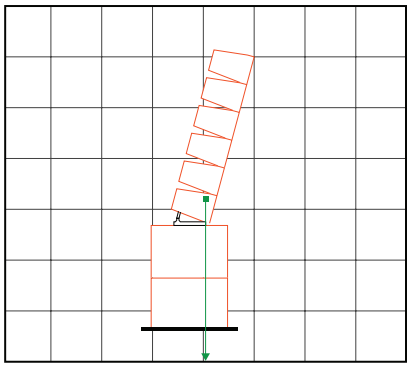
**No errors or messages**

In this case, the array is stable under normal conditions and can be used as is. The array also complies with the mechanical limits set by JBL for the speakers and selected accessories.



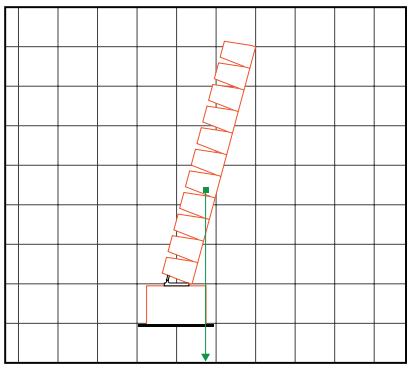
**WARNING: Stability Hazard! - Stack Could Become Unstable - Secure to Ground**

This message is an alert that the array is potentially unstable and a tipping hazard condition has been detected. The user is responsible for securing the array to the ground, stage, or other structure that can provide additional support and is rated for the weight of the array. This message may also be warning of external factors that can influence stability, such as someone accidentally pushing the array.



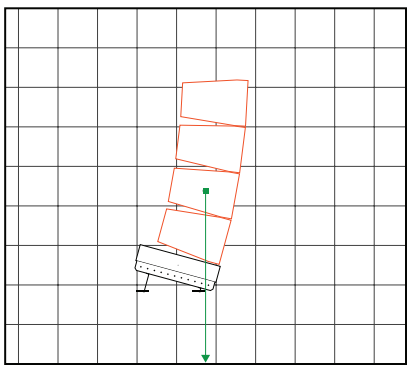
**Configuration exceeds the maximum number of boxes allowed**

This message is presented when the specified array design exceeds the mechanical limits set by the JBL team for the speakers or selected accessories. Array designs that trigger this message should not be used under any conditions, as they can lead to hardware damage and/or injury.



**Invalid CG Location**

This message is presented when the Center of Gravity of an array design exceeds the footprint of the selected accessory. Array designs that trigger this message should not be used under any conditions, as they can lead to hardware damage and/or injury.



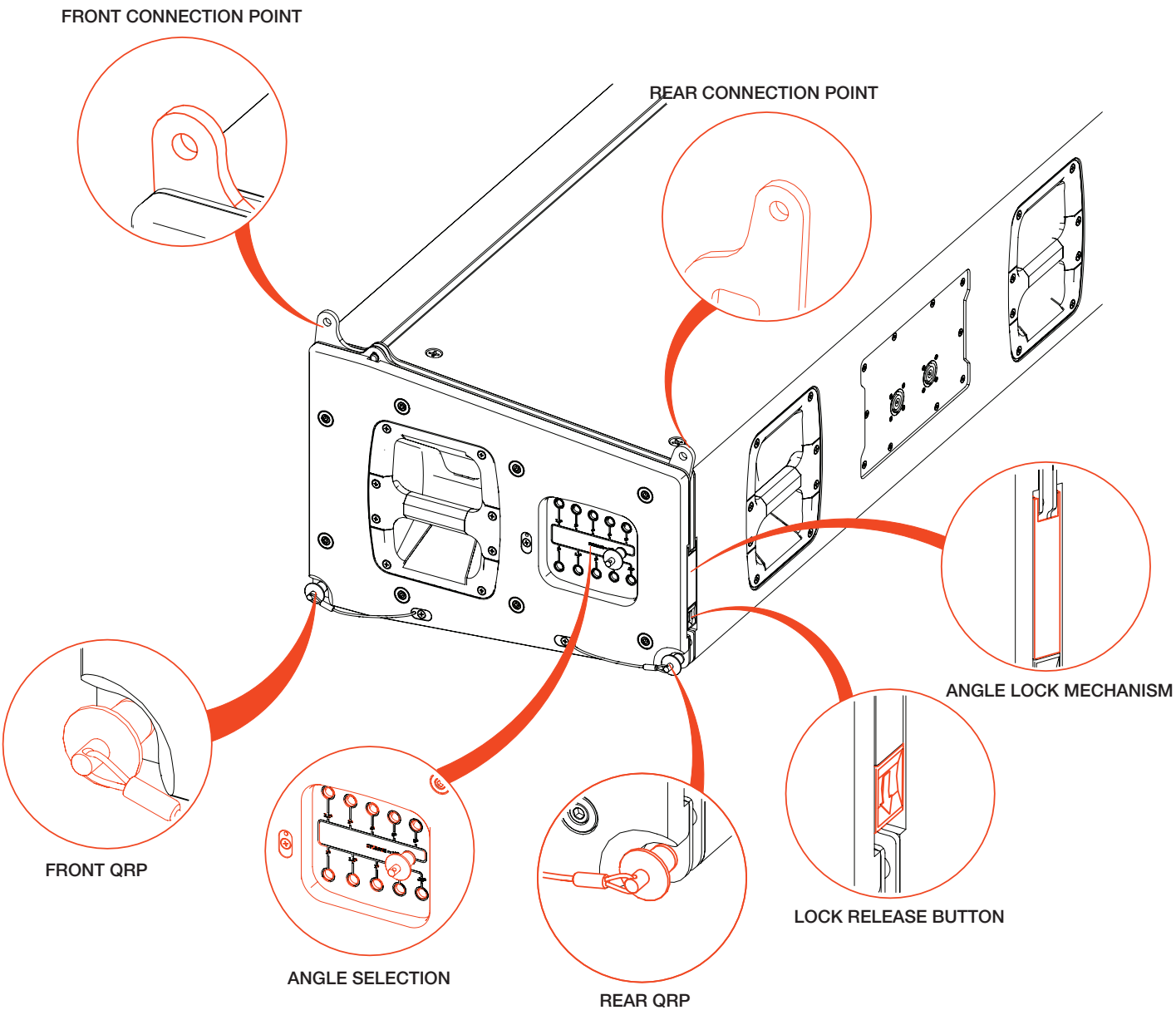
● Center of Gravity

## 6 - VTX A12 RIGGING SYSTEM OVERVIEW

VTX A12 cabinets include a next-generation rigging system that is easy to use, simple to understand, and highly accurate. VTX A12 enclosures are transported vertically on carts of four using the VTX A12 VT Vertical Transporter cart system accessory. During transportation, all four cabinets travel collapsed with their angles set to the 10-degree position. Cabinet-to-cabinet splay angle selection is done while the system is still on the ground, simply by moving the angle selection quick release pin (QRP) to the desired position. When speakers are lifted off a VTX A12 VT cart, an automatic Angle Lock mechanism engages to secure the cabinets to the selected position. The cabinets maintain their splay positions until the user releases the Angle Lock mechanism, at which point the cabinets can collapse again and be stored on the cart.

**NOTE: For the purpose of this manual, the names "A12" and "A12W" will be used interchangeably.**

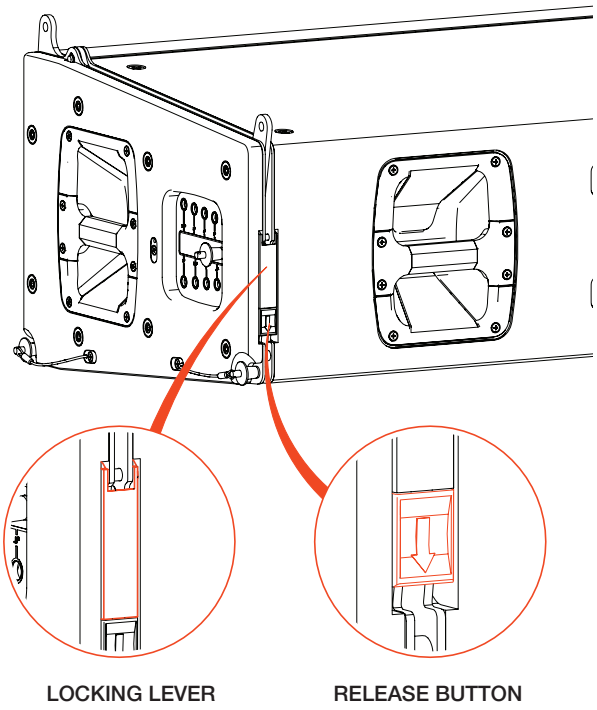
### 6.1 A12 RIGGING CLOSEUP



## 6.2 VTX A12 - ANGLE LOCK MECHANISM

The VTX A12 includes an innovative Angle Lock mechanism that automatically engages when the cabinets are suspended and reach their desired angle positions. The Angle Lock mechanism consists of two main parts, the red Locking lever and the black Lock Release button.

LOCKED POSITION

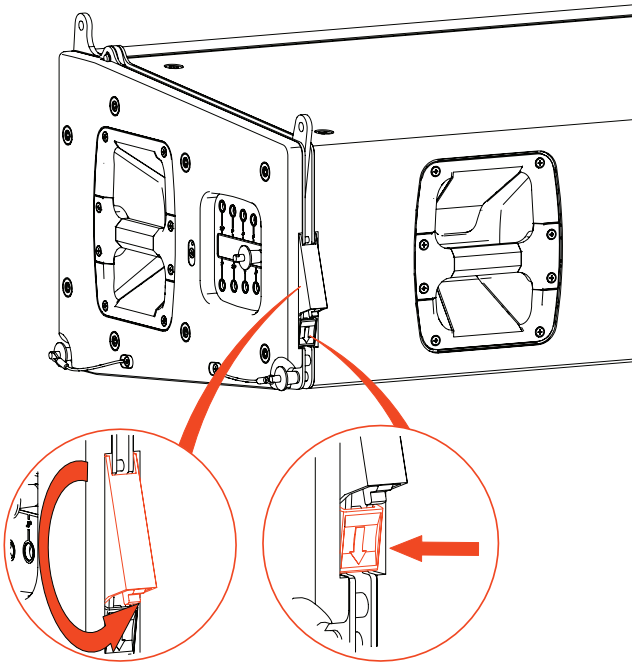



The system is locked when the red Locking lever is recessed into the cabinet. When the cabinets are suspended, a sequential locking sound is heard, indicating that the system has reached its final position and is locked. The system remains locked until the Angle Lock mechanism has been released.

To de-rig the system, the Angle Lock mechanism is released so that the cabinets can collapse again and be set on the VTX A12 VT at a 10-degree angle. Press the black Lock Release Button to unlock the mechanism.

When the black Lock Release button is pressed, the red Locking lever is released and moves to its unlocked position. The Locking lever is spring-loaded and maintains its position until the user manually changes the mode. The Angle Locks are set to their unlocked position until the cabinets are attached to the VTX A12 VT and collapsed all the way to 10 degrees.

UNLOCKED POSITION

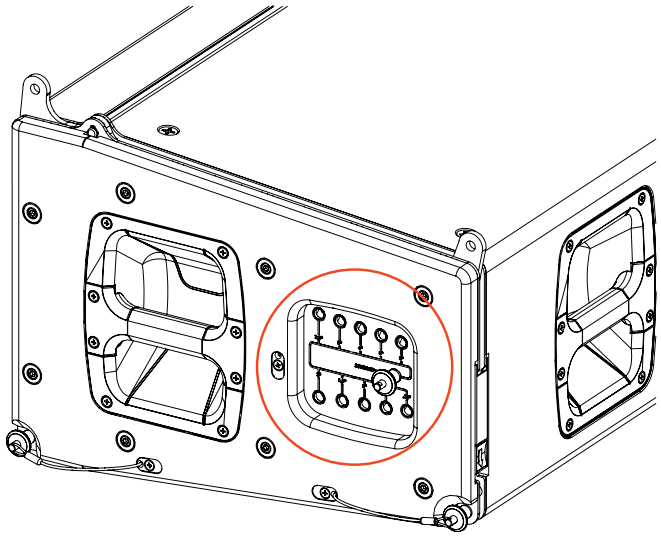


**NOTE:** The red Angle Lock levers are used to secure the angle position and prevent the cabinets from taking a different angle when cabinets are deployed in an array. The red Angle Lock lever is not load-bearing, and the system is safe even if they are accidentally left in the unlocked position.

## 6.3 VTX A12 - ANGLE SELECTION

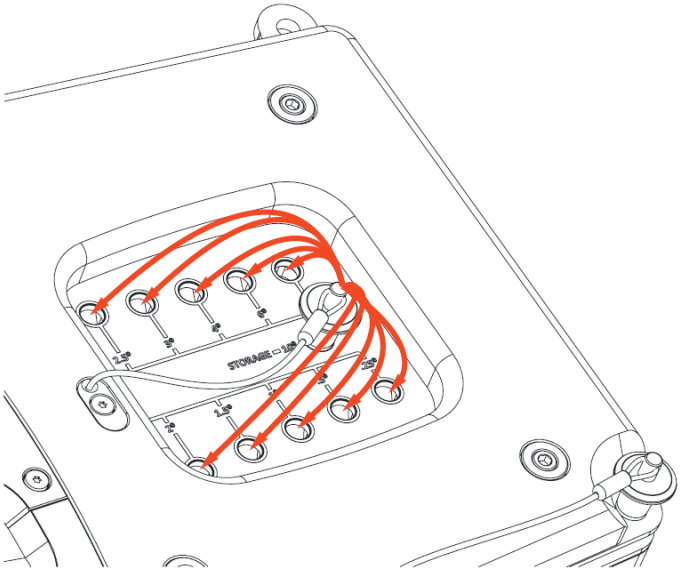
Each VTX A12 includes an Angle Selection panel on each side that is used for selecting the cabinet-to-cabinet splay angle. The options are marked in degrees and the panel allows for eleven unique positions ranging from 0.25 degrees to 10 degrees.

**VTX A12 ANGLE OPTIONS:** 0.25°, 0.5°, 1°, 1.5°, 2°, 2.5°, 3°, 4°, 6°, 8°, 10°



A dedicated quick release pin is used to select an angle. Angles are selected while the VTX A12 cabinets are on a VTX A12 VT resting on the ground. When the system is on the ground, the quick release pins are not under load and can be moved freely to a desired position.

During transportation, VTX A12 cabinets should always be set to 10 degrees. This ensures that the rigging system is locked, preventing any accidental movement or angle selection.



To select an angle, remove the quick release pins from the storage position (10°) and set them to the desired position. After the array has been lifted from the ground, the weight is shifted to the quick release pins and selecting an angle is no longer an option.

**CAUTION: Every quick release pin on a VTX A12 system must always be placed in a hole. Do not suspend a VTX A12 system if any pins are hanging freely.**

# 7 - A12 VT AND TRANSPORTATION

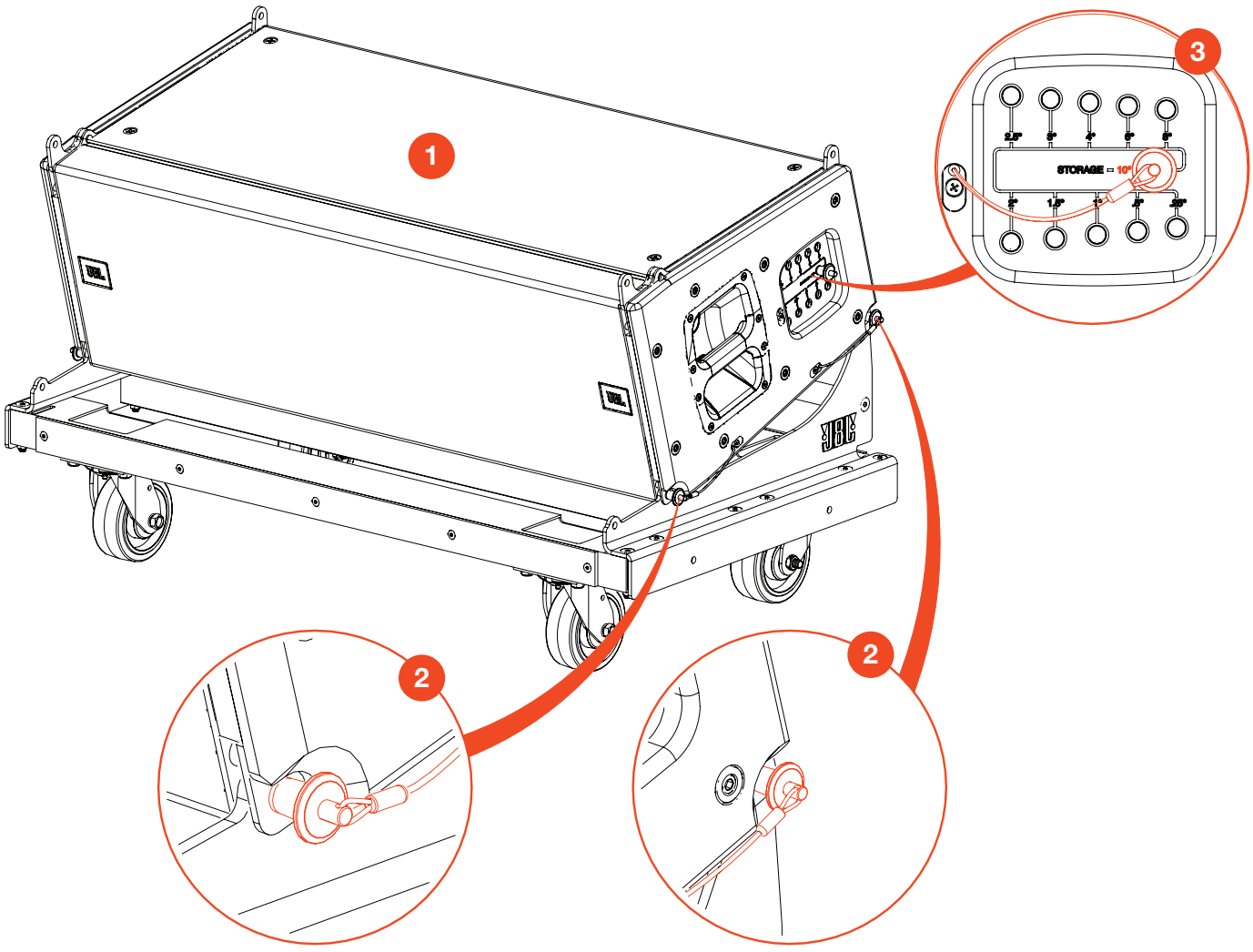
The VTX A12 VT Vertical Transporter is used to transport VTX A12 cabinets in groups of four. When stacked on the VTX A12 VT, all four cabinets are set to the 10-degree (STORAGE) position, which secures the rigging system for transportation. The optional VTX A12 VT CVR Cover can be used for additional protection.

## 7.1 INSTALLING VTX A12 CABINETS ON A VTX A12 VT

VTX A12 cabinets should be installed on the VTX A12 VT one by one starting with the lowermost cabinets.

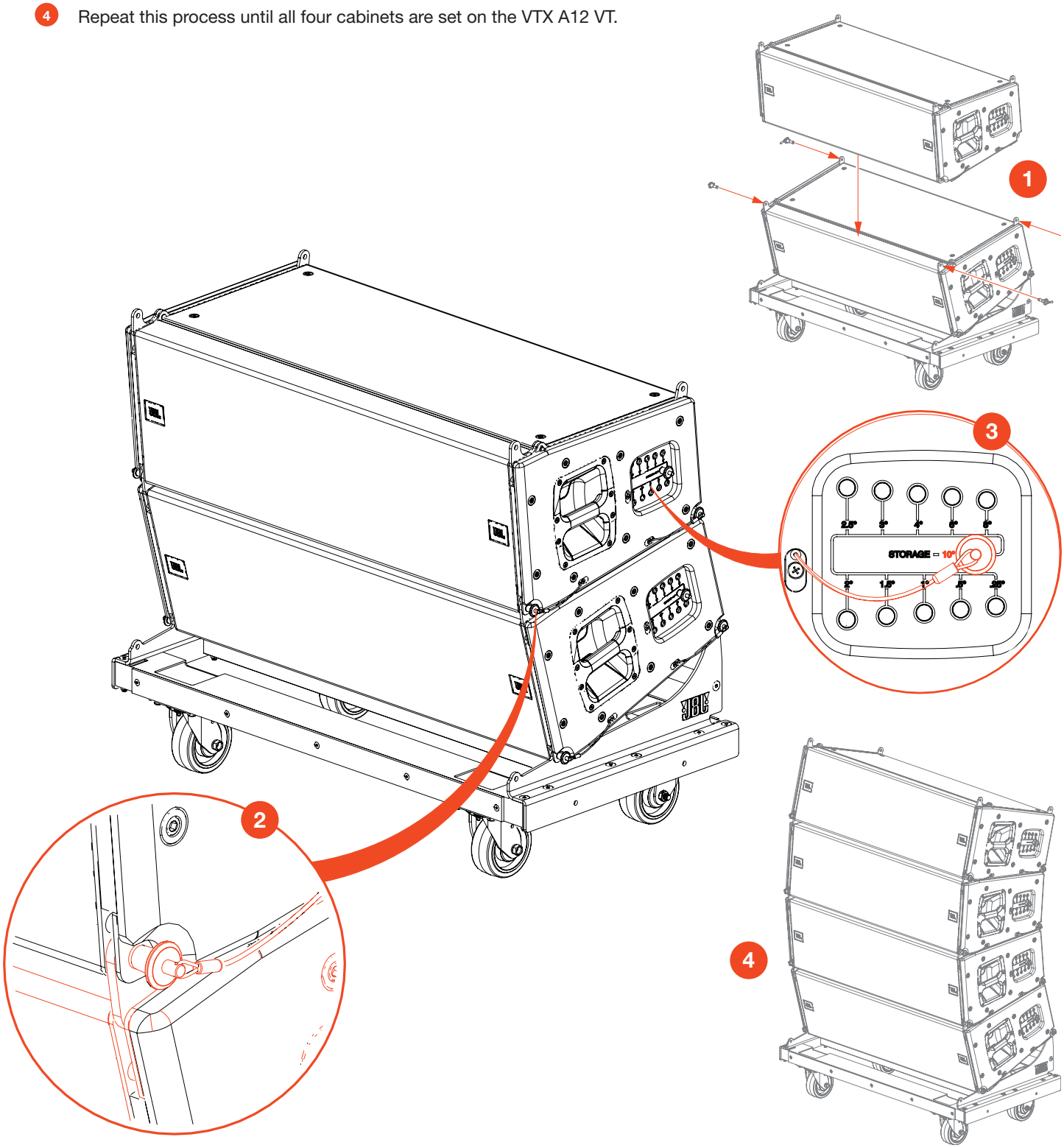
**STEPS:**

1. Start by installing the first VTX A12 cabinet onto the VTX A12 VT.
2. Use the four front and rear A12 quick release pins to secure the cabinet to the VT.
3. Set the A12 cabinet to the 10-degree (STORAGE) position and set the red Locking lever to the locked position.



**STEPS:**

1. Lower the next A12 cabinet on top of the first enclosure and make sure all four corners are aligned and the rigging arms are engaged.
2. Use the two quick release pins on each side of the A12 cabinet to secure it to the A12 below.
3. Set the cabinet side angle to the 10-degree (STORAGE) position and make sure the red Locking lever is in the locked position.
4. Repeat this process until all four cabinets are set on the VTX A12 VT.

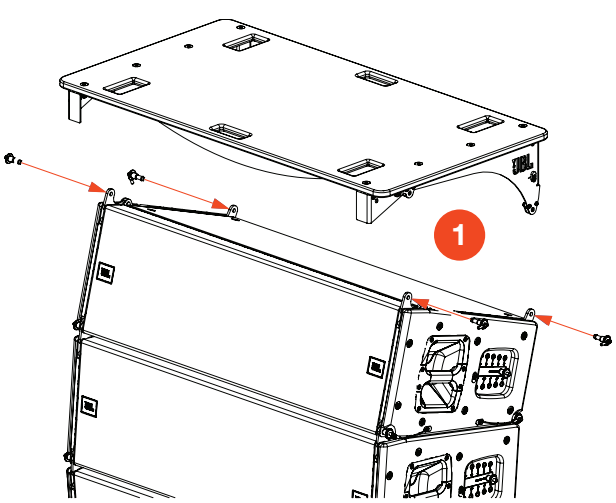


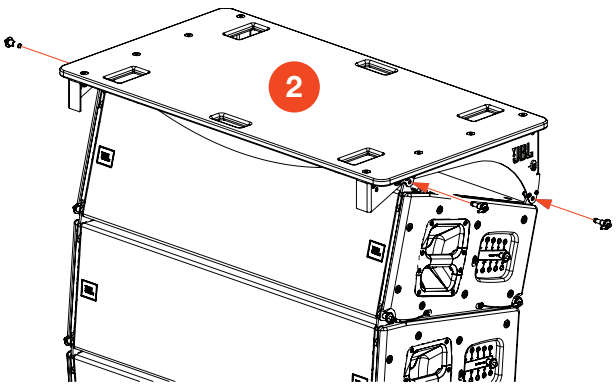
## 7.2 INSTALLING THE VT-TOP ON THE VTX A12 VT

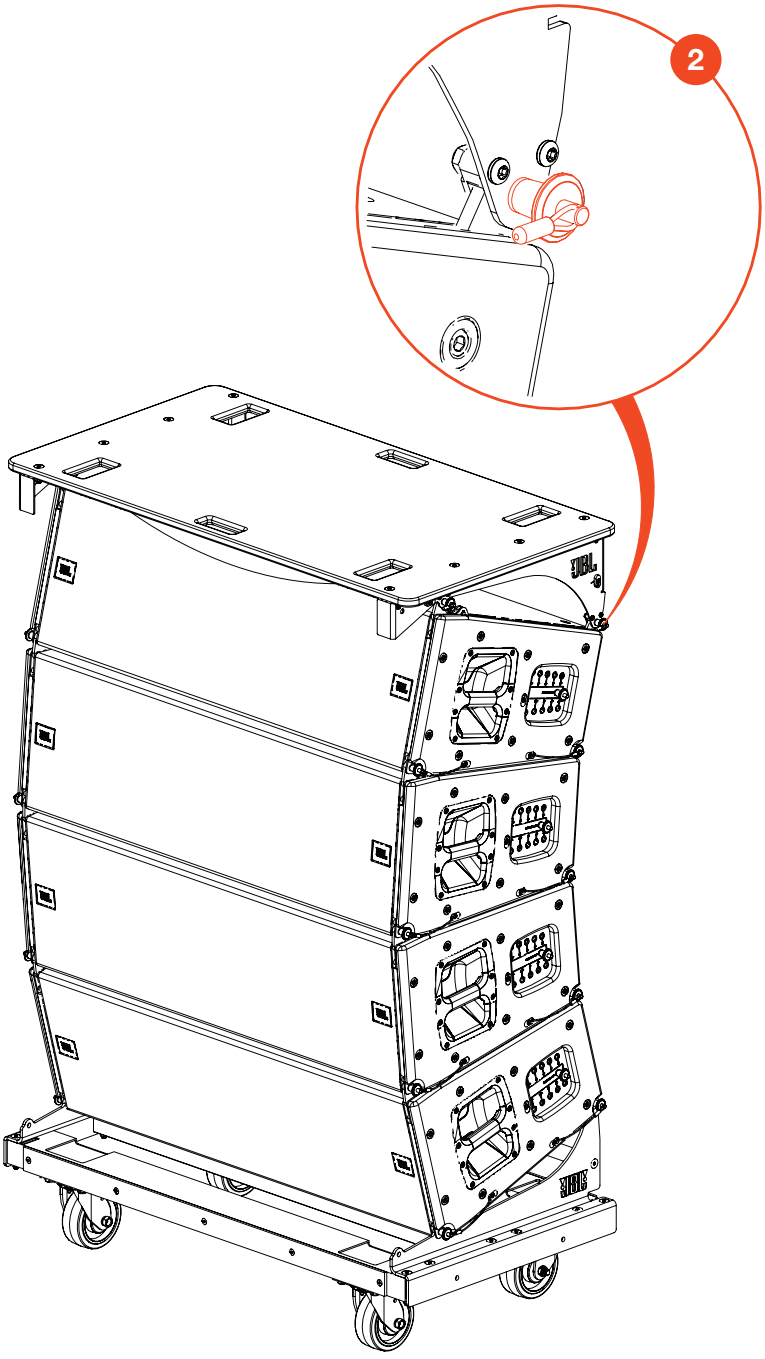
The VT-TOP connects to the top cabinet of an A12 stack to create a robust and defined footprint that stabilizes the carts during transportation. Because of its flat profile, other gear can be placed above VTX A12 carts for a more efficient truck pack.

**STEPS:**

1. Lower the VT-TOP on to the top VTX A12 cabinet. Make sure the VT-TOP engages with the rigging on all four corners of the A12 cabinet .
2. Secure the VT-TOP by installing the four quick release pins on to the top VTX A12 cabinet.



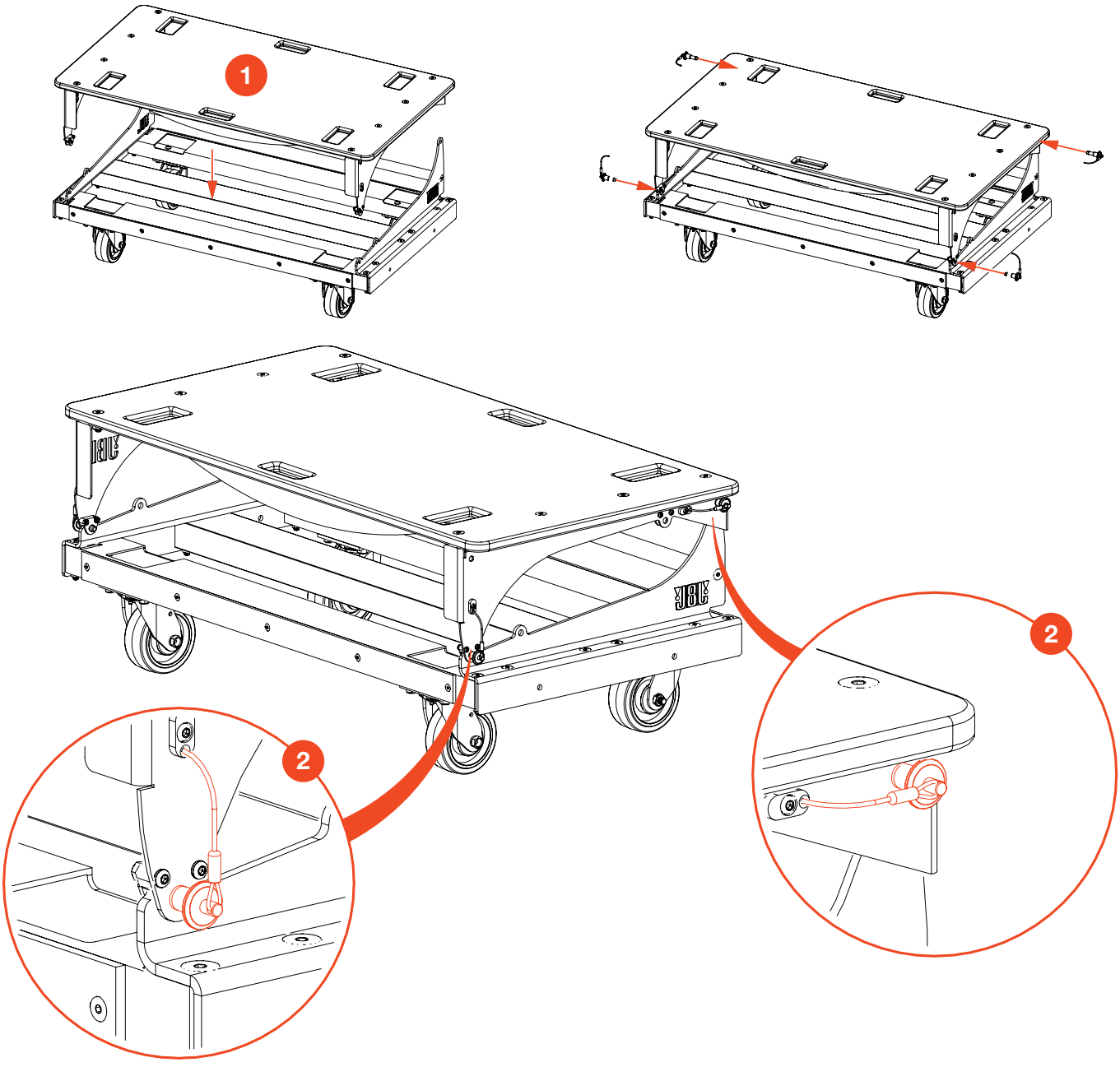



## 7.3 STORING THE VTX A12 VT

Once the system has been deployed, the VT-TOP can connect to the VTX A12 VT for storage. After the two are connected, several assemblies can be stacked together for storage.

**STEPS:**

1. Line up the corners of the VTX A12 VT and the VT-TOP. Lower the VT-TOP on to the VTX A12 VT until all four corner connection points engage.
2. Use the four quick release pins found on the VT-TOP to secure it to the VT.



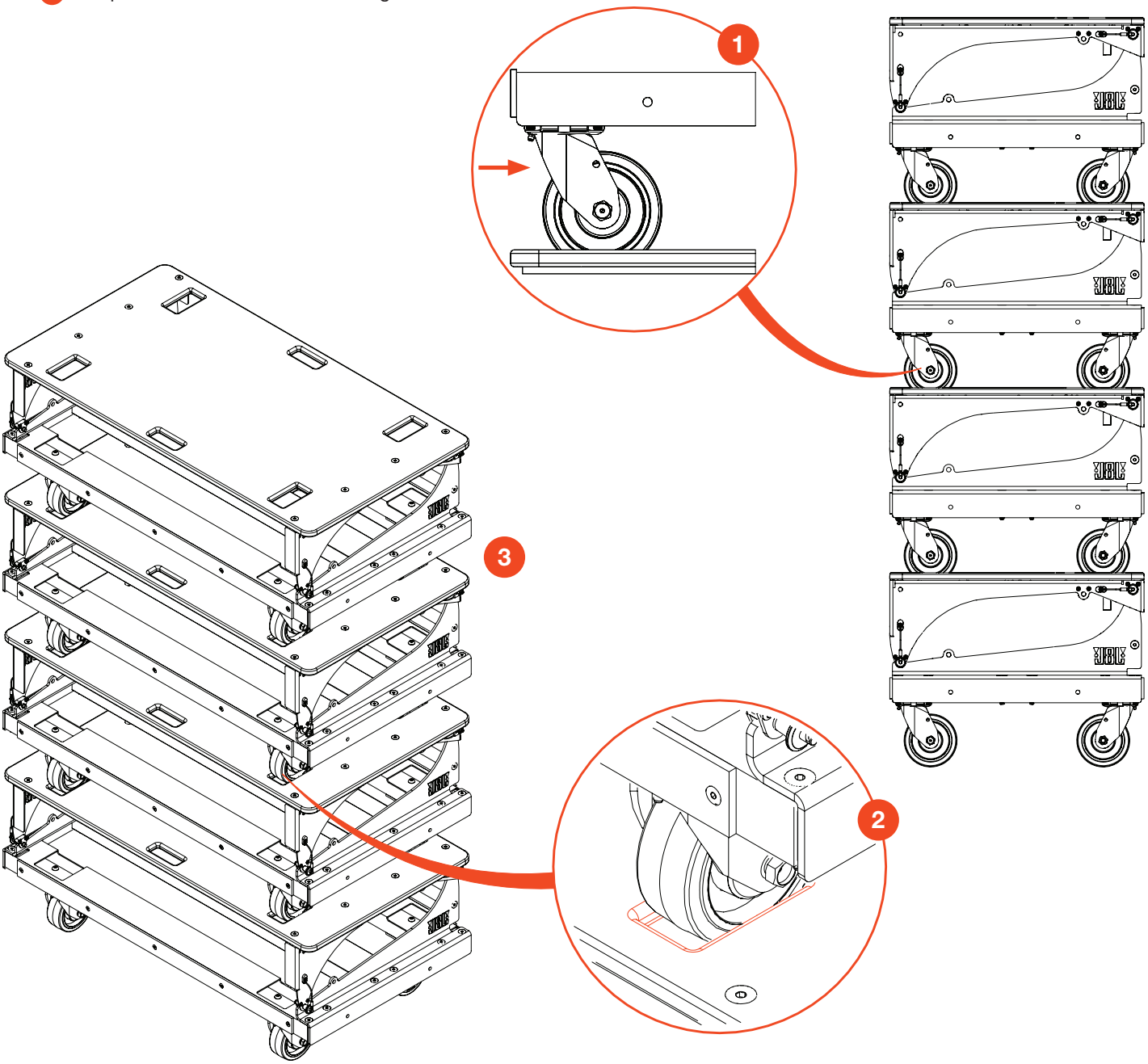

**TIP:** The VTX A12 VT CVR Cover can be stored in the empty space between the VT and VT-TOP. Fold the cover and place it in the VT before pinning the VT-TOP.

## 7.4 STACKING THE VTX A12 VT WITH THE VT-TOP

When the VTX A12 VT and VT-TOP are connected, several assemblies can be stacked together for storage.

**STEPS:**

1. Rotate the VT wheels so that the wheels are pointed to the inside of the VT.
2. Line up the wheels with the VT-TOP stacking cups and stack the two parts together.
3. Repeat until all VTs are stacked together.



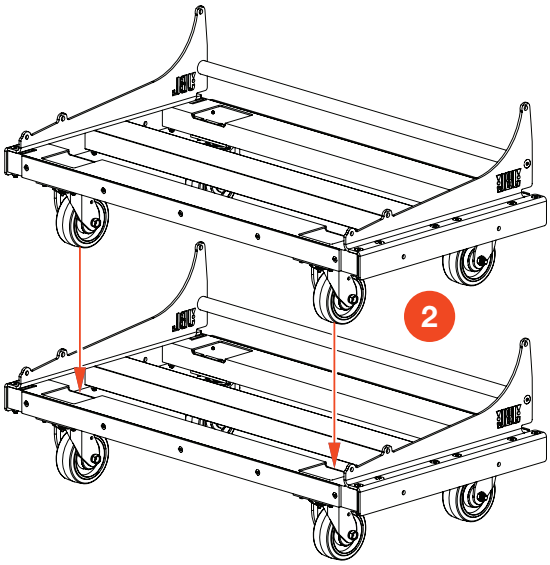

**CAUTION: Make sure the VT and VT-TOP are pinned together securely before stacking. No more than four VTs should be stacked together.**

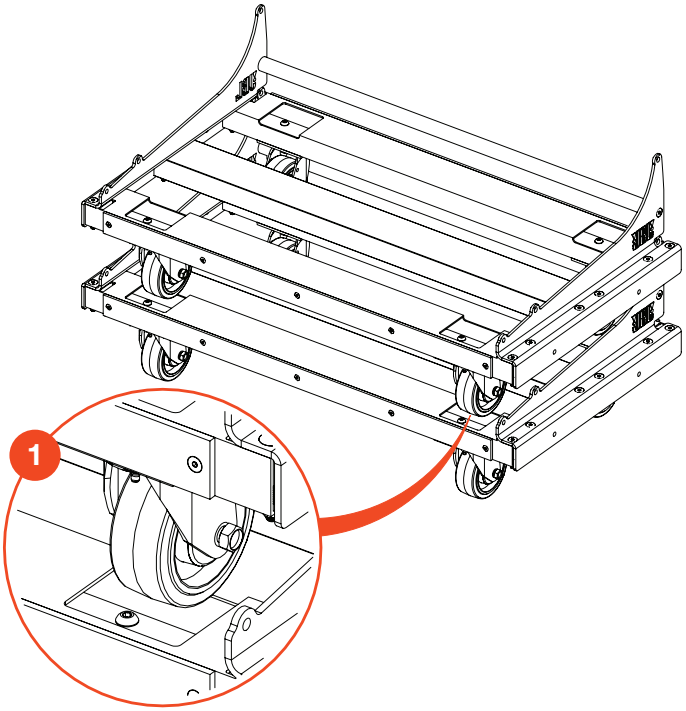
## 7.5 STACKING THE VTX A12 VT

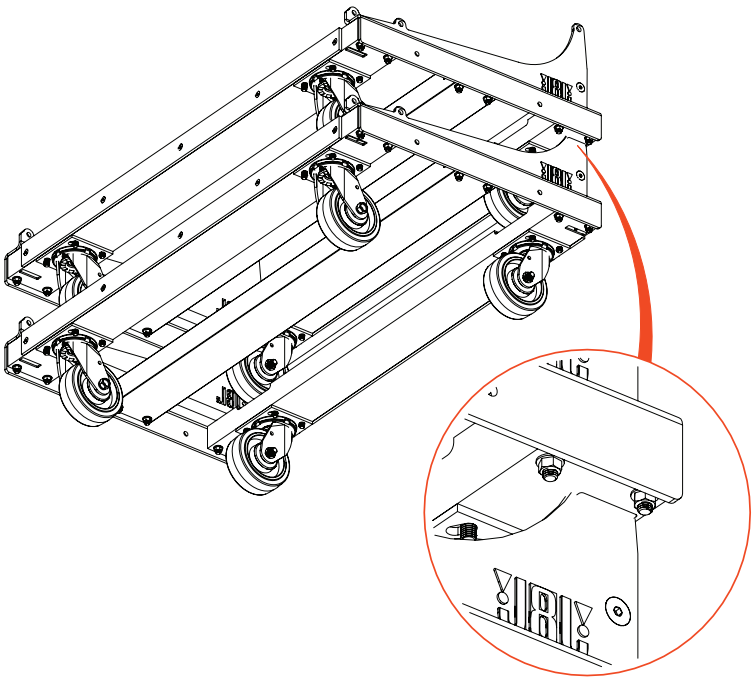
If necessary, the VTX A12 VT can be stacked for storage without the VT-TOP.

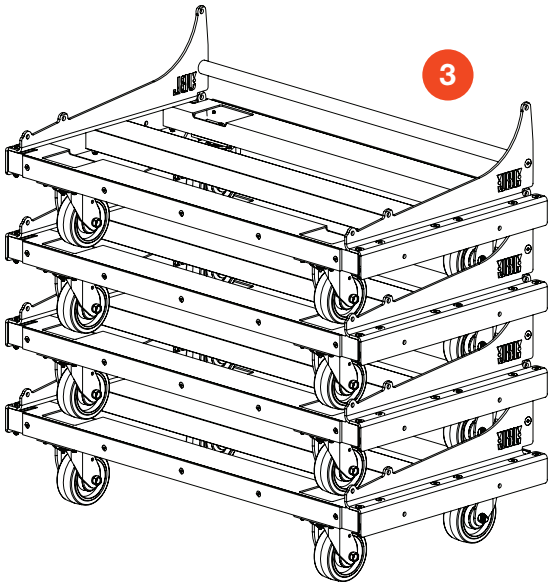
**STEPS:**

1. Rotate the VT wheels so they point to the inside of the VT.
2. Line up the wheels and stack the two carts together.
3. Repeat until all VTs are stacked.



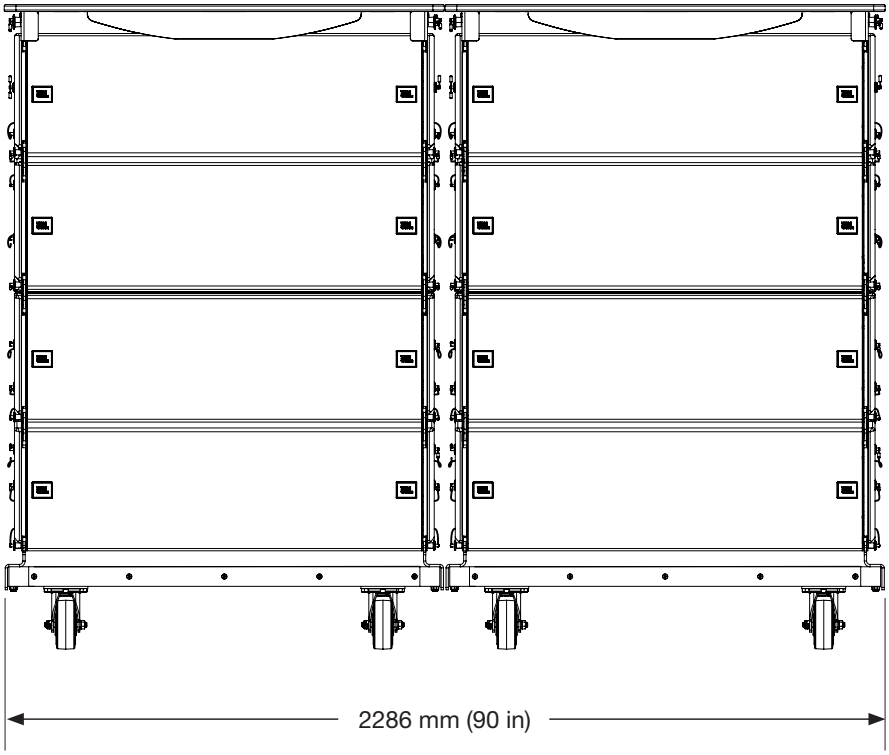



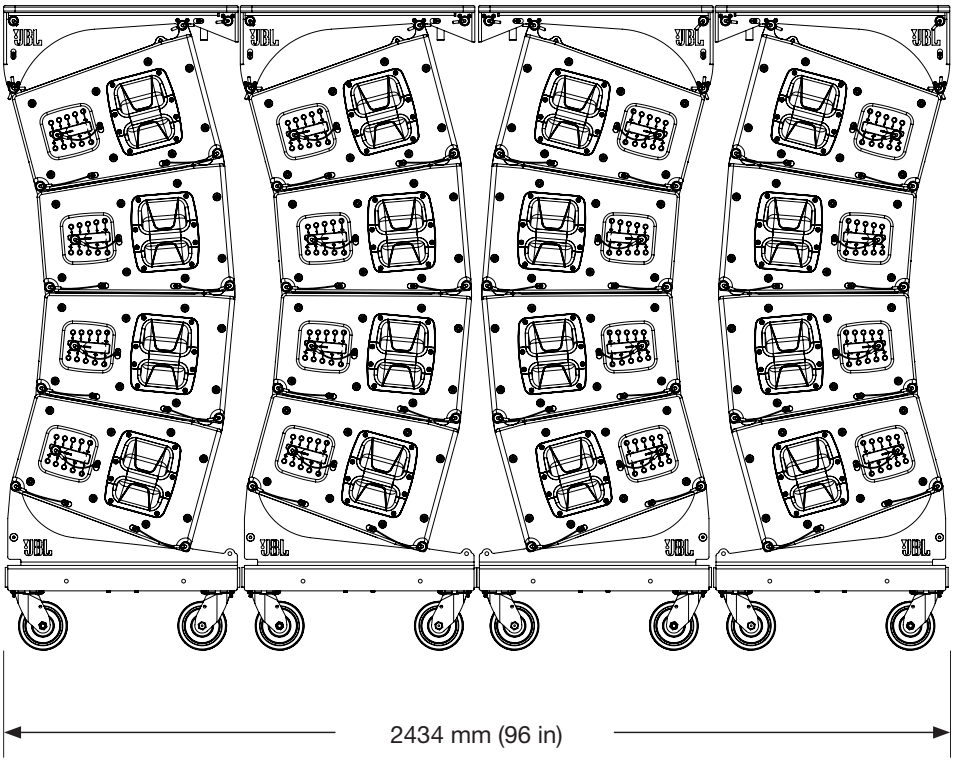






**CAUTION: To maintain stability, place no more than eight VTX A12 VTs in a stack.**

## 7.6 TRUCK PACKING DIMENSIONS



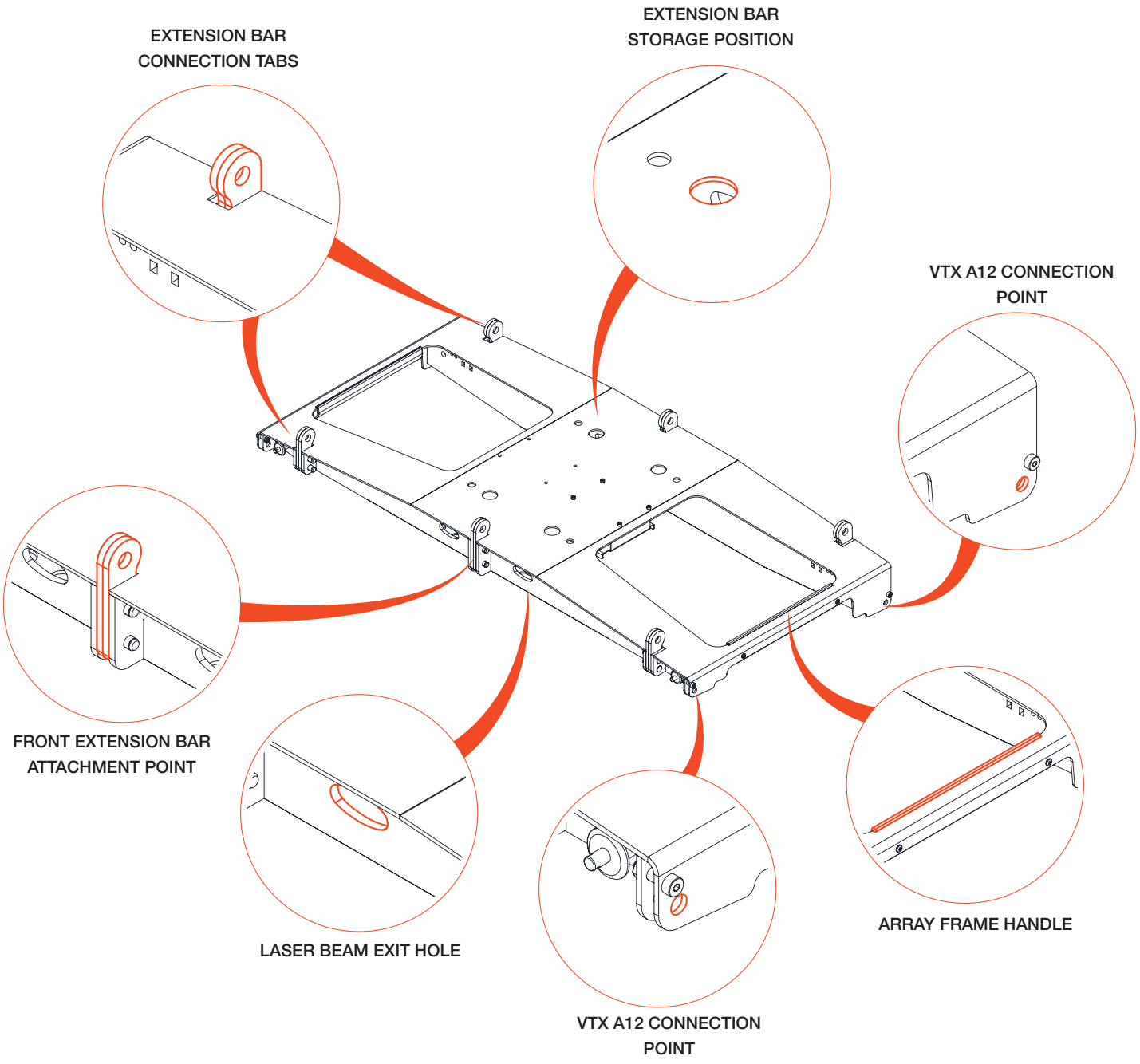



# 8 - VTX A12 AF ARRAY FRAME AND EB EXTENSION BAR

The VTX A12 AF is a lightweight Array Frame used for suspending VTX A12 enclosures. The frame was designed to operate in single-point, front-to-back, or side-by-side suspension modes using the VTX A12 AF EB Extension Bar. One Extension Bar is included with the frame and a second Extension Bar can be added to facilitate side-by-side suspension.

**TIP:** One VTX A12 AF Extension Bar is always required when using the VTX A12 AF.

## 8.1 ARRAY FRAME OVERVIEW

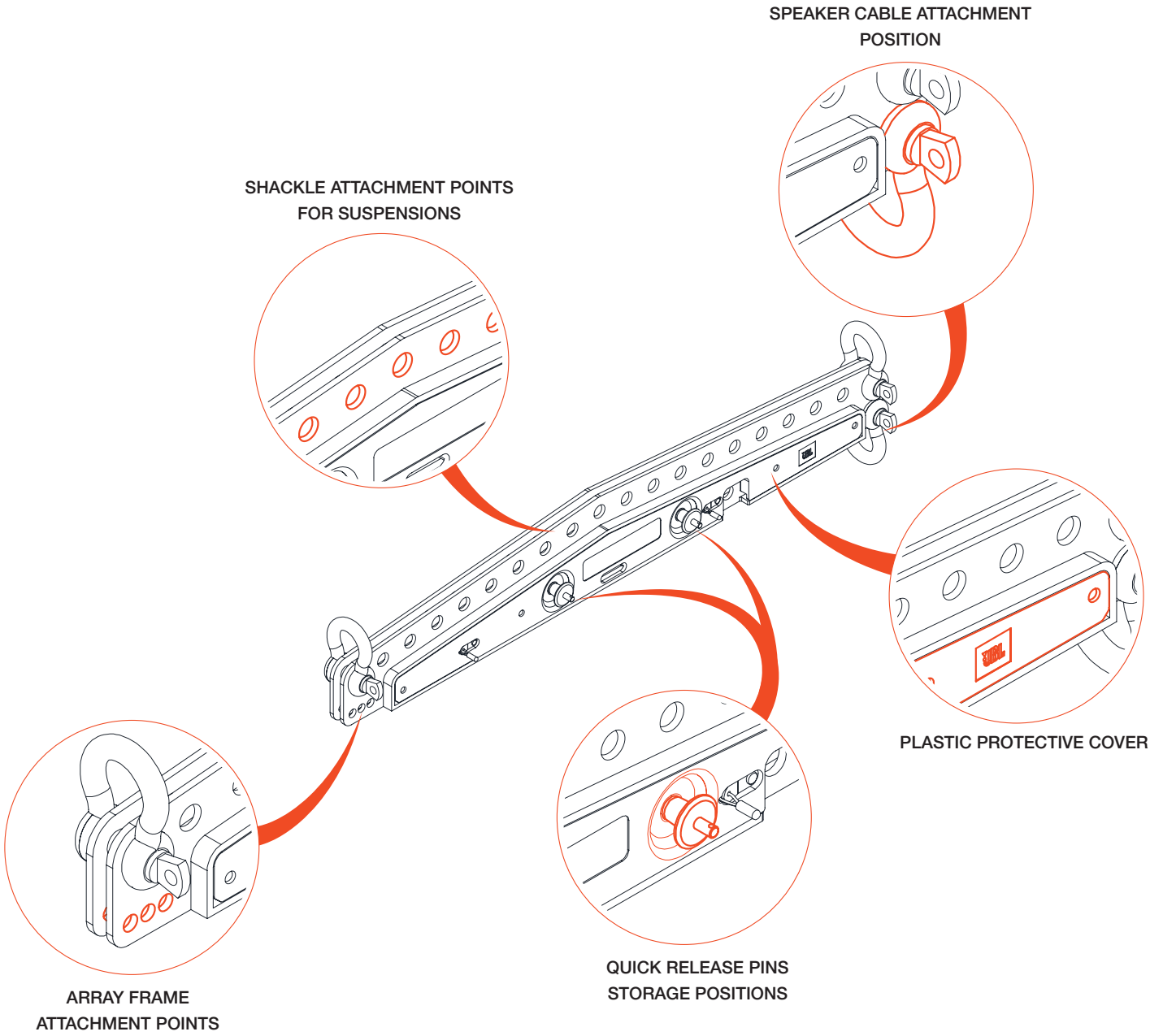


## 8.2 EXTENSION BAR OVERVIEW

The VTX 12 AF EB Array Frame Extension Bar is used to connect the Array Frame to the suspension points. One Extension Bar is included with the VTX A12 AF and additional Extension Bars can be purchased and used depending on the application. The extension is compatible with 5/8-inch shackles, three of which are included. Two shackles are used for suspension and one for cable relief. Two quick release pins are included for attaching the Extension Bar to the Array Frame.

**TIP:** The VTX A12 AF Extension Bar is only compatible with 5/8-inch shackles. Three 5/8-inch shackles are included with each Extension Bar and Array Frame.

**CAUTION: Always use high-quality 5/8-inch rigging shackles made by reputable manufacturers. Always inspect all rigging components for potential defects before use.**

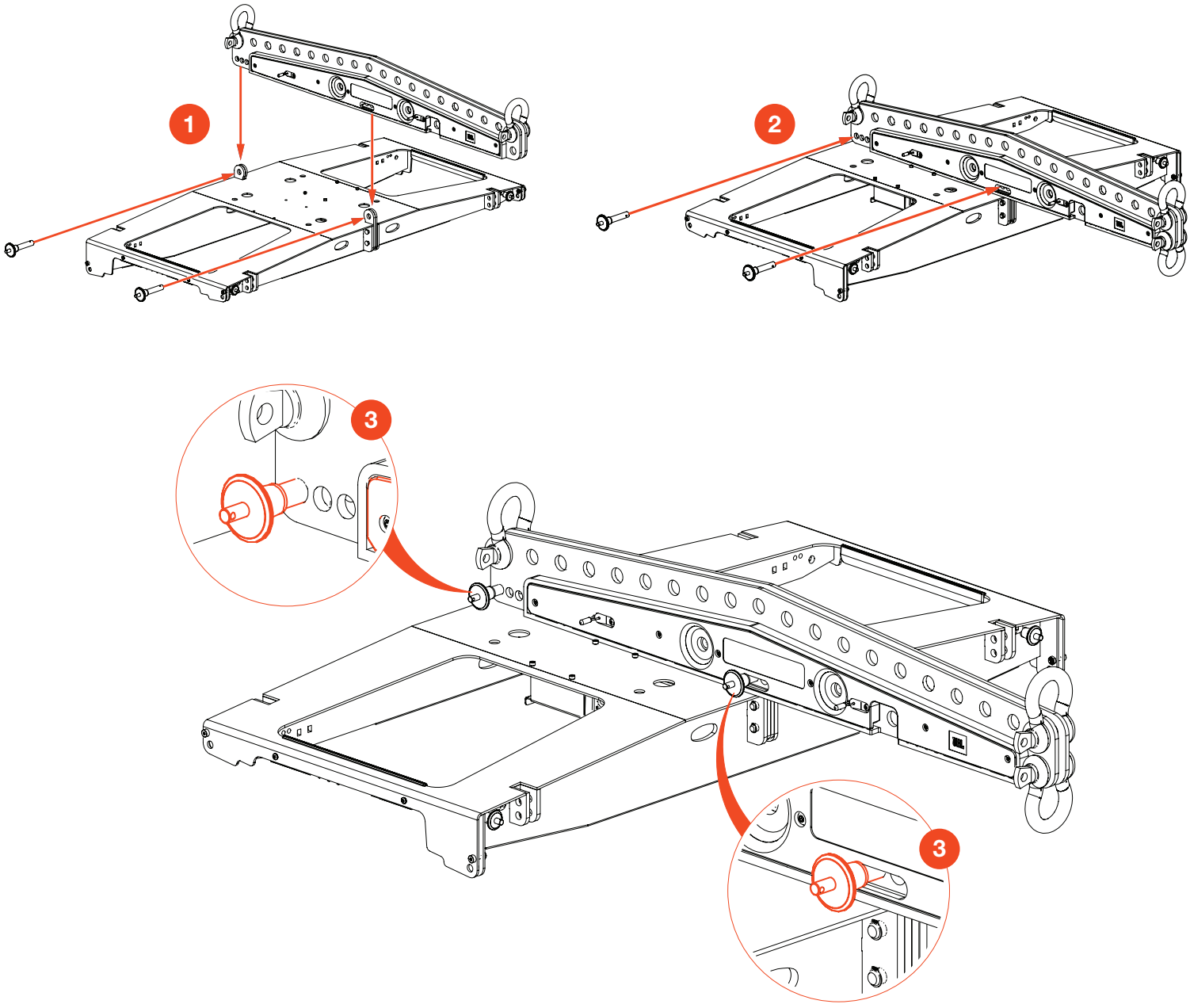


## 8.3 ATTACHING THE EXTENSION BAR

The Extension Bar includes two tab positions and two quick release pins for connecting to the Array Frame.

**STEPS:**

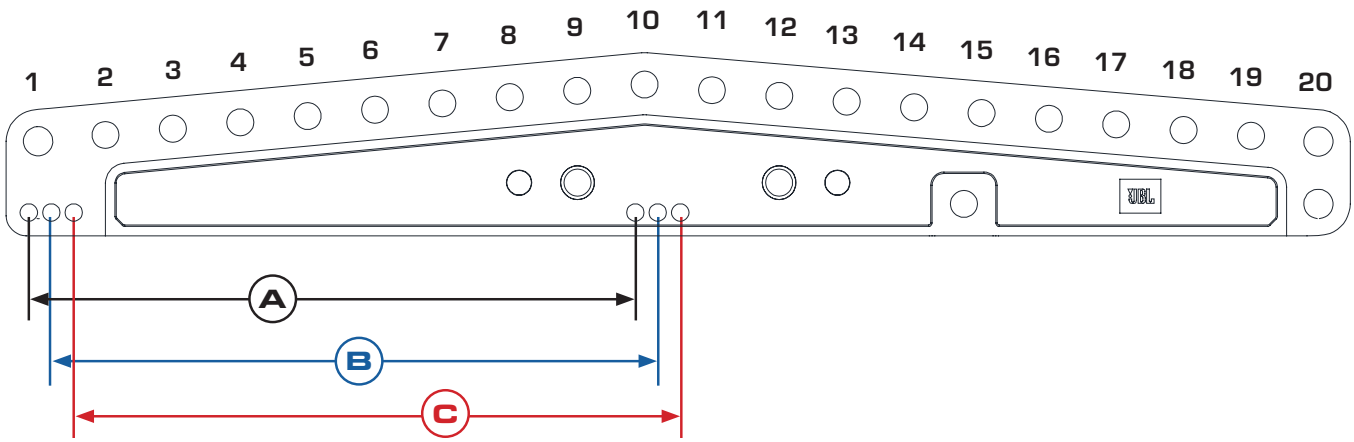
1. Line up the Extension Bar with the connection tabs on the Array Frame.
2. Lower the Extension Bar on to the Array Frame.
3. Use the two included quick release pins to secure the Extension Bar to the Array Frame.



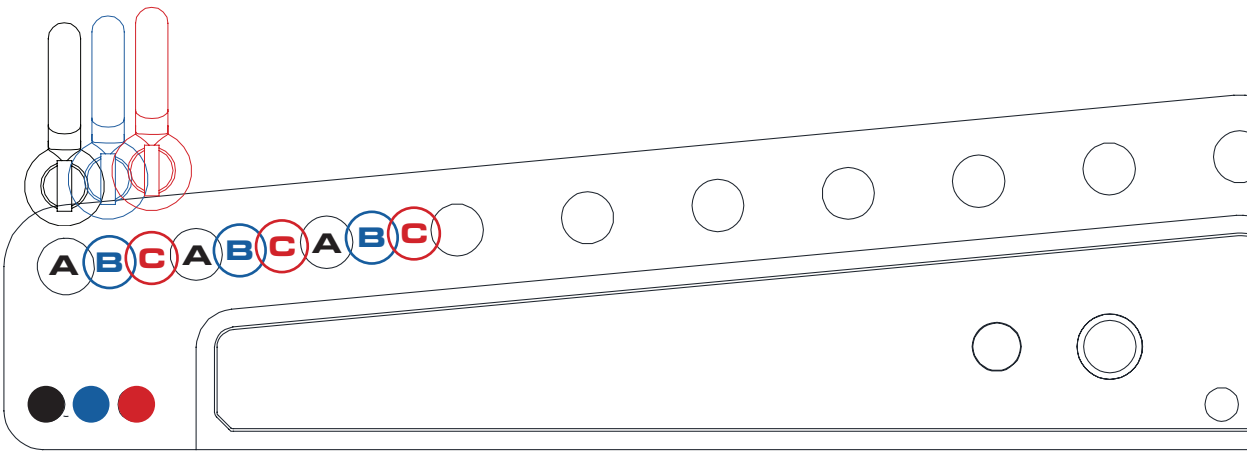

**CAUTION: Always use both included quick release pins to attach the Extension Bar to the Array Frame. Inspect both connection points before suspending an array.**

## 8.4 EXTENSION BAR ATTACHMENT OPTIONS

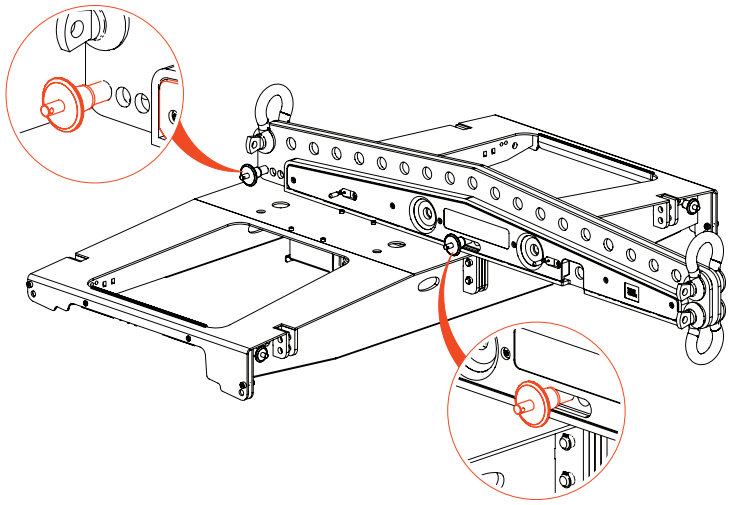
The VTX A12 AF EB Extension Bar includes three attachment positions for connecting to the Array Frame. The three positions allow for additional aiming resolution when an array is suspended from a single point. In single-point applications, the array aiming is determined by the shackle position on the Extension Bar. The Extension Bar includes 20 shackle positions, which are spaced 51 mm (2 in) apart to maintain the structural integrity of the bar. Even at 51 mm apart, the spacing is not fine enough for precise sub-degree aiming, so a shackle position is needed between two holes. The three attachment positions (A, B and C) allow for two additional shackle positions between holes, which increase the total number of shackle positions to 60.




The example below shows how the real and “virtual” positions are spaced across the extension bar.

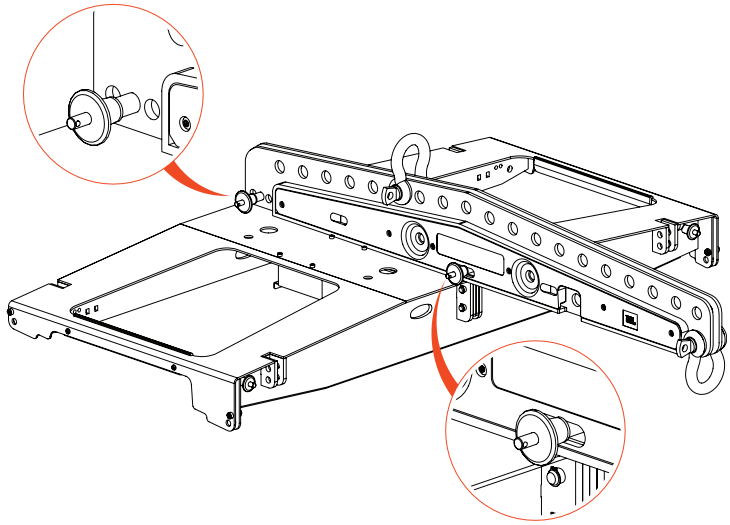



**TIP:** Refer to JBL Line Array Calculator 3 software to determine the best shackle position and attachment combination to achieve the required array angle.



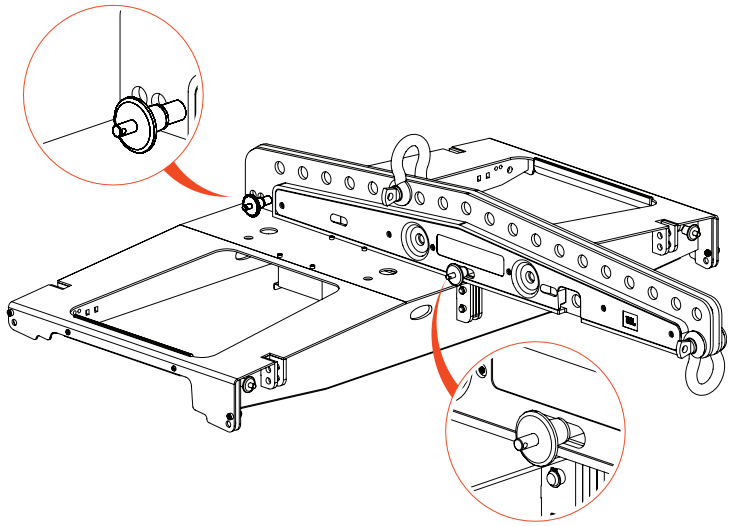
**POSITION A**

Position A is the first Extension Bar attachment position. This position is used when the array is suspended from two points (front and rear, or side-by-side), and can be used for single-point hangs if the prediction shows that a shackle can attach to a physical attachment point on the Extension Bar.



**POSITION B**

Position B is used when the LAC-3 prediction for suspension from a single point indicates that the desired array site angle cannot be achieved with a shackle hole in the A position. Sliding to the B position may better align the preferred shackle attachment point in the LAC-3 prediction with an available physical position on the extension bar, enabling a desired array site angle to be achieved.



**POSITION C**

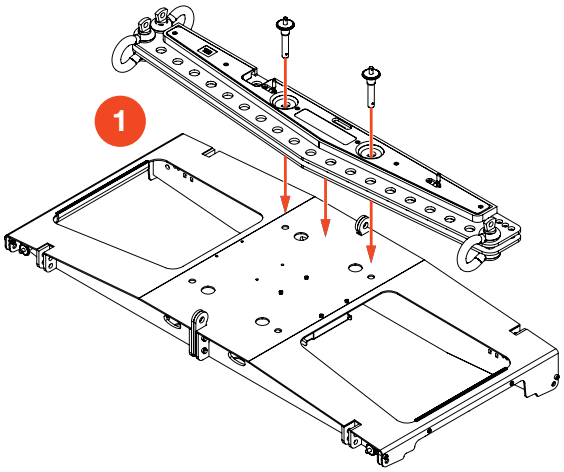
Position C is used similarly to position B, offering the same ability to increase the number of available physical positions for shackle attachment when an array is suspended from a single point. Sliding to the C position may better align the preferred shackle attachment point in the LAC-3 prediction with an available physical position on the Extension Bar, enabling a desired array site angle to be achieved.

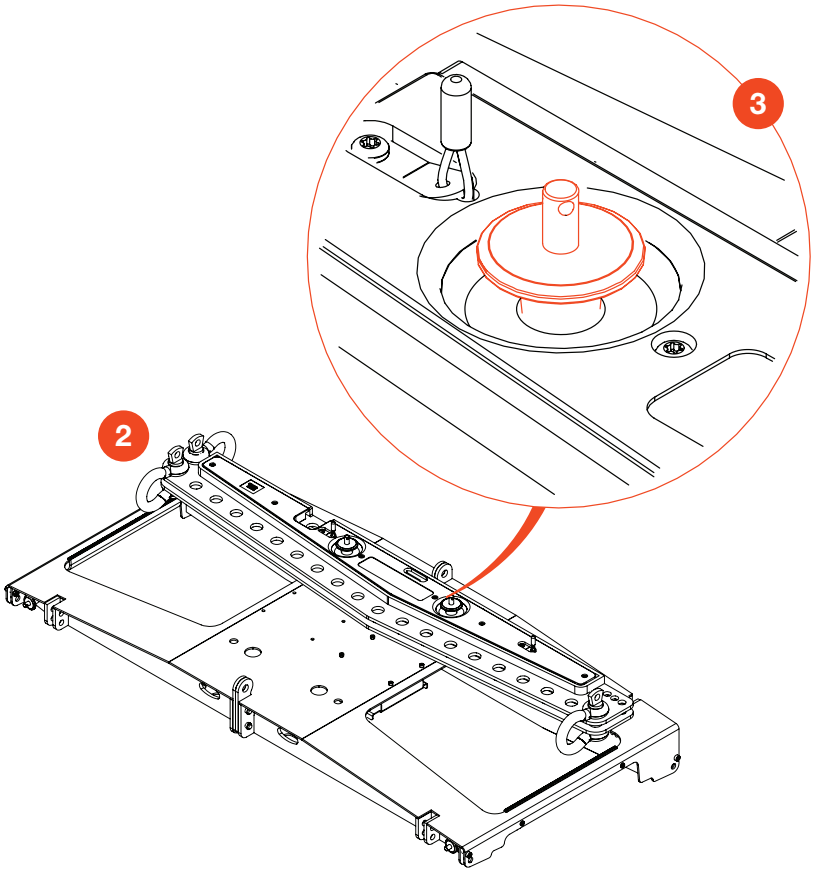
## 8.5 EXTENSION BAR STORAGE POSITIONS

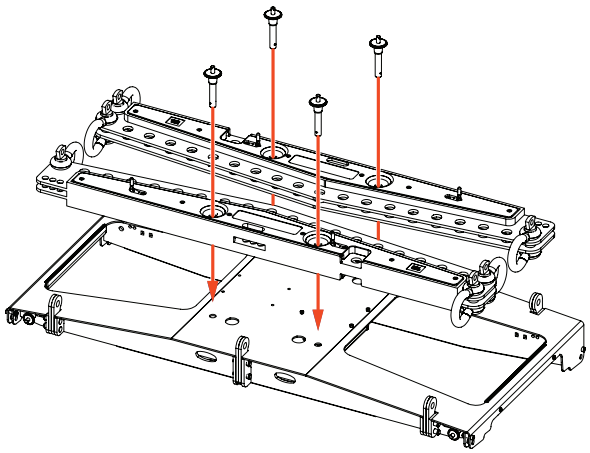
The Extension Bar can be secured to the top of the A12 Array Frame for transportation and storage when not in use. Guides have been built into the top of the A12 Array Frame and the storage position of the Extension Bar in order to facilitate quicker attachment, and once the Extension Bar is properly placed for storage, the attached quick release pins from the Extension Bar can be used to secure the two pieces together. Each A12 Array Frame can facilitate up to two A12 Extension Bars.

**STEPS:**

1. Place the Extension Bar across the top of the Array Frame, aligned lengthwise (left to right) with the label side facing up.
2. Slide the Extension Bar into place on top of the Array Frame, with the two alignment locators on the bottom of the Extension Bar fitted into the storage position alignment cutouts in the top of the Array Frame.
3. Use the two included quick release pins to secure the Extension Bar to the Array Frame.



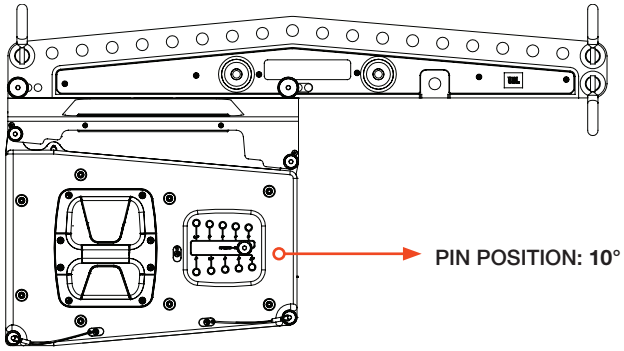



**DUAL EXTENSION BARS**

To store a second Extension Bar, repeat the above steps, securing the second Extension Bar parallel to the first on top of the Array Frame.

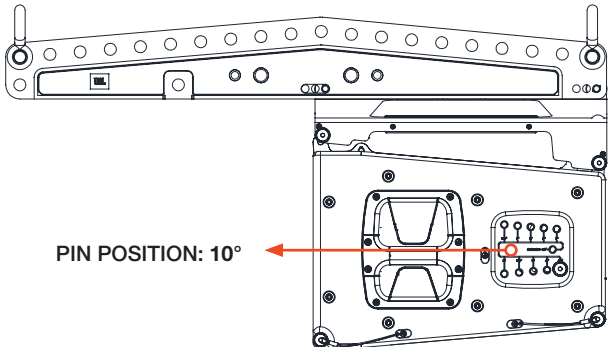
## 8.6 EXTENSION BAR AND FRAME ORIENTATION

There are three positions available for securing the Extension Bar to the Array Frame when preparing to suspend an array. Note that the choice of physical attachment position must come from correct selection of the attachment position in the LAC-3 prediction. The frame orientation dictates the angle to which the top enclosure of an array should be set to achieve the proper frame-to-cabinet connections.



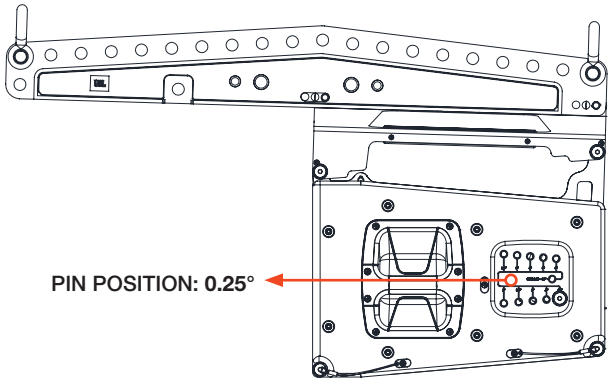

**NORMAL**

This is the standard attachment position for most suspended array configurations. When properly configured, this position allows for a small amount of uptilt and the greatest downtilt. The Extension Bar hangs off the back of the Array Frame; additional shackle points are available off the back of the array for cable strain relief.




**REVERSE EXTENSION BAR**

This attachment position can be used when the LAC-3 prediction indicates that more uptilt is needed to reach the desired array site angle. The Array Frame remains attached to the array in the standard position, but the Extension Bar is reversed. The A, B and C attachment positions can still be used if a single-point suspended array is necessary. This configuration provides additional uptilt for arrays having a limited number of cabinets.




**REVERSE EXTENSION BAR + REVERSE ARRAY FRAME**

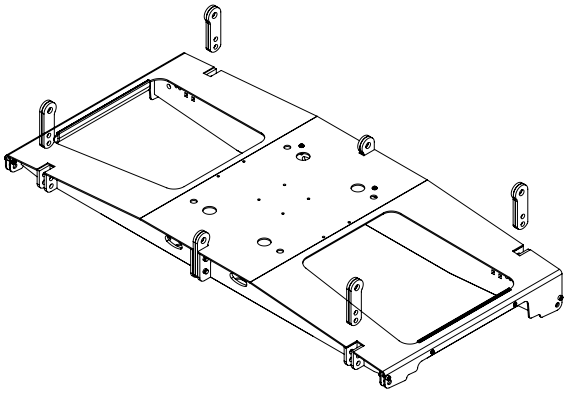
When both maximum uptilt and maximum array weight support is needed, the LAC-3 prediction may determine that this attachment configuration should be used. Reversing the Extension Bar enables maximum uptilt, while reversing the Array Frame allows the system to support greater weight off the front motor point. These attributes are needed for larger arrays that must be aimed substantially upwards, such as long side hangs for stadiums or main hangs for tall theaters.

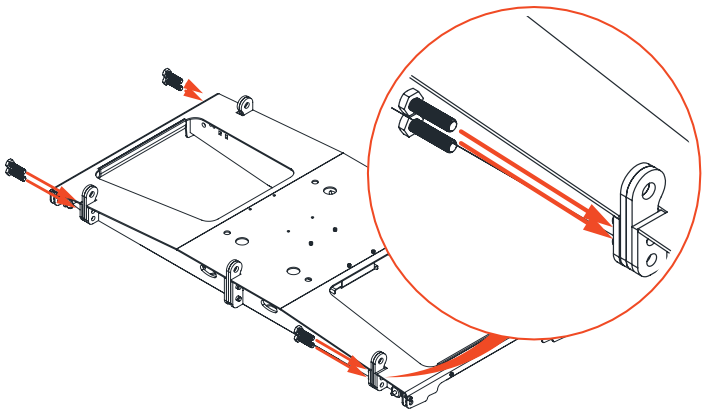
**CAUTION: Always refer to LAC-3 to determine safe Array Frame and Extension Bar orientations.**

## 8.7 USING DUAL EXTENSION BARS

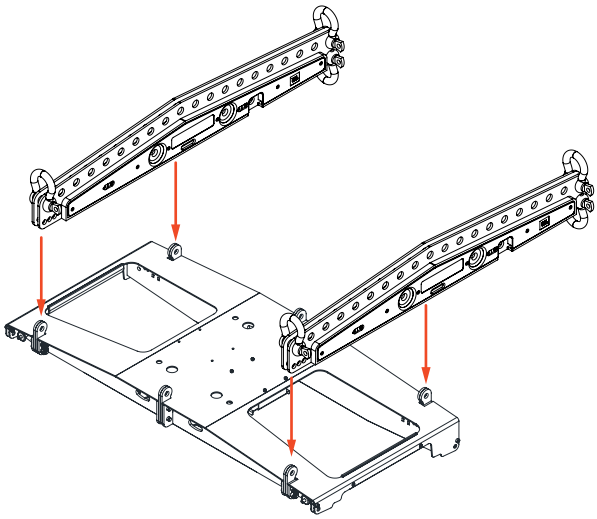
The VTX A12 Array Frame can be deployed with either one or two Extension Bars. The Array Frame ships from the factory with one Extension Bar. In cases where a VTX A12 array is to be suspended from side-by-side suspension points, a second Extension Bar can be used.

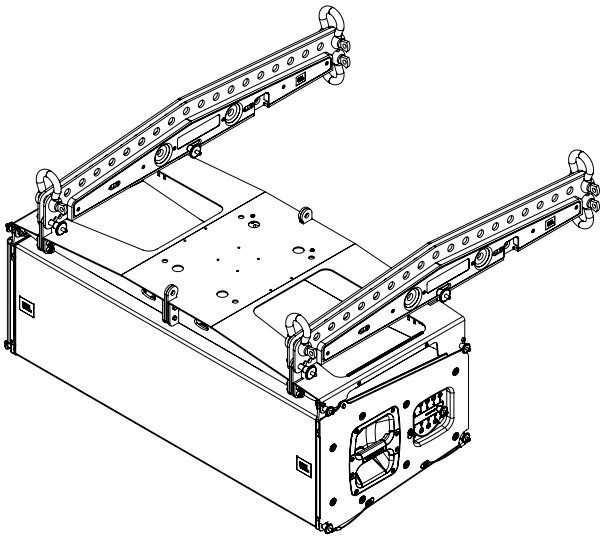
For support of side-by-side suspension points, an additional VTX A12 Extension Bar must be purchased. When purchased separately, the VTX A12 AF EB comes with one Extension Bar, two quick release pins, and two pairs of tabs for mounting Extension Bars near the left and right ends of the Array Frame. The tabs must be installed at these outer attachment locations using the manufacturer-supplied bolts and locking nuts before two Extension Bars can be used.





To attach two Extension Bars side-by-side, follow the instructions from section 8.3 Attaching the Extension Bar, mounting the Extension Bars to the tabs at the left and right Array Frame attachment locations.



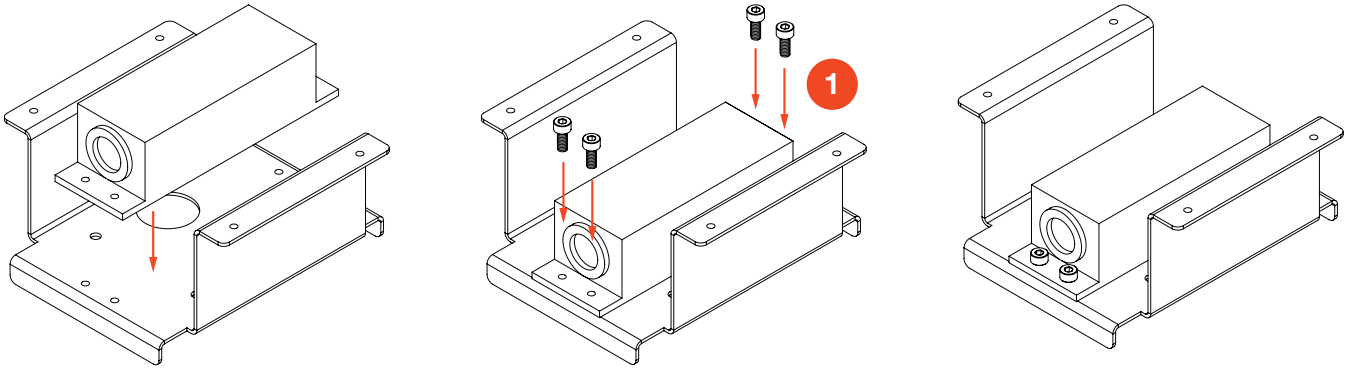


**TOOLS REQUIRED:** Attaching the Extension Bar connection tabs is a one-time operation. Some tools are required for proper installation. All necessary hardware is included with the VTX A12 AF EB.

**CAUTION: All quick release pins on a VTX A12 system must always be placed in an attachment location. Do not suspend a VTX A12 system if any pins are hanging free.**

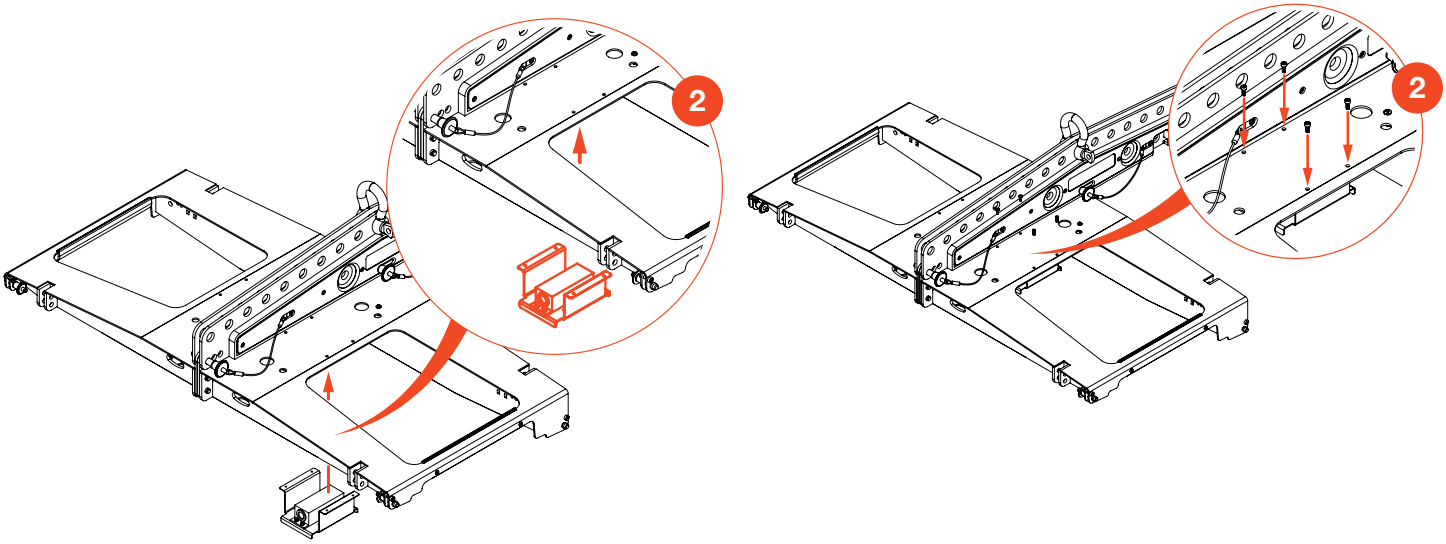
## 8.8 INSTALLING THE LASER BRACKET

A laser inclinometer can be installed onto the VTX A12 Array Frame using the included mounting bracket. The bracket is designed to work with the JBL VTX LZ laser unit, TEQSAS LAP-TEQ laser inclinometer, or RECLINE laser inclinometer. The Array Frame includes front and back exit holes to allow the laser light to shine through.




**STEPS:**

1. Use the included screws to secure the laser unit to the mounting bracket. Center the laser unit in the bracket and tighten the four hold-down screws.
2. Use the additional included fasteners to secure the laser bracket on to the Array Frame. The Array Frame's orientation determines whether the bracket should be installed facing forward or to the rear of the Array Frame.



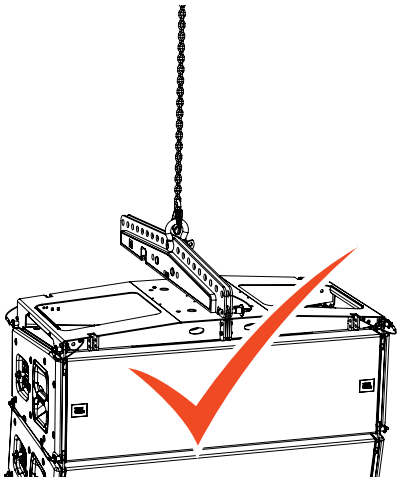

**TOOLS REQUIRED:** Some tools are required to attach the laser bracket. All necessary hardware is included with the VTX A12 AF.

**TIPS:**

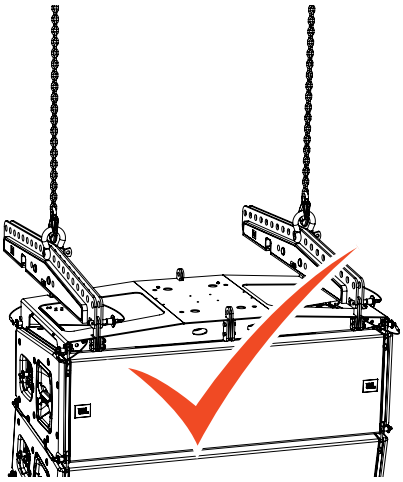
- Additional laser brackets can be purchased separately.
- Make sure to select the appropriate orientation for the laser bracket before installation.

## 8.9 EXTENSION BAR USE CASES

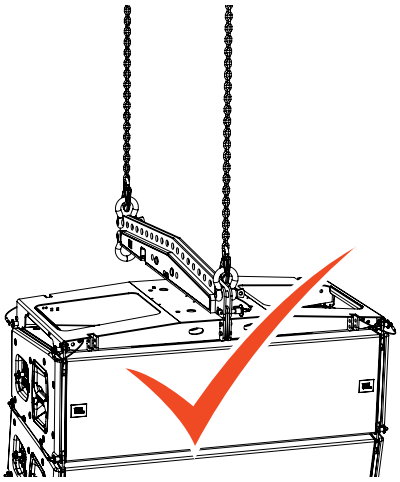
The VTX A12 Array Frame can be deployed in a number of configurations with one or two VTX A12 Extension Bars. It is important to note that only certain configurations are correct and safe for suspension of VTX A12 arrays. The images below illustrate proper configurations for attaching VTX A12 Extension Bars, and where suspension points should be attached to the Extension Bars. Suspension points should never be connected horizontally across two extension bars.



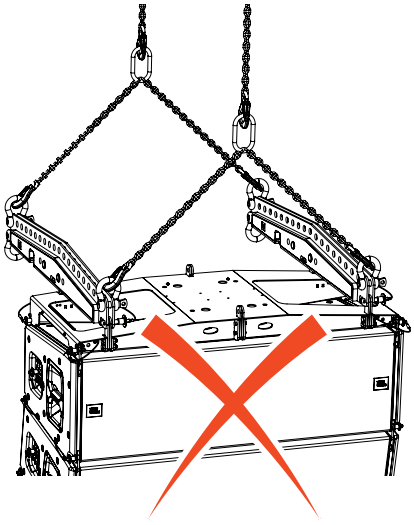
SINGLE POINT



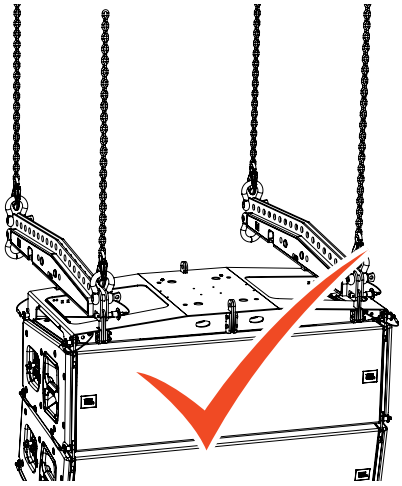
DUAL POINTS
SIDE-BY-SIDE



DUAL POINTS
FRONT-TO-BACK



DUAL POINTS USING BRIDALS
FRONT-TO-BACK



FOUR POINTS

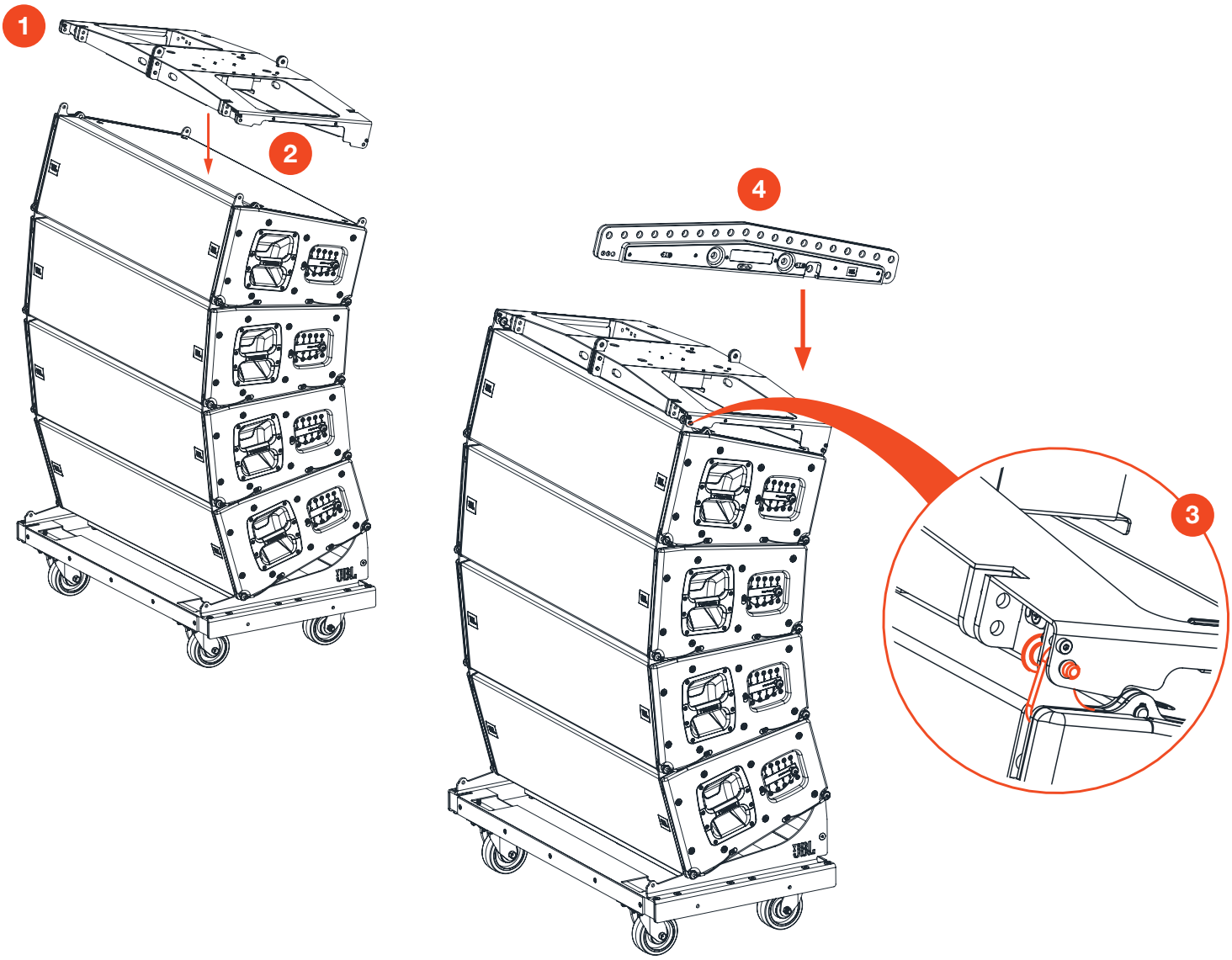
**CAUTION: When multiple suspension points are used, always make sure all suspension points are evenly or properly loaded.**

## 8.10 ATTACHING THE ARRAY FRAME

The VTX A12 Array Frame was designed to be both lightweight and easy to handle, whether it is transported mounted on an array or separately in a case. Since the Extension Bar was designed to travel attached to the Array Frame, these instructions assume this configuration. Although transportation together is recommended, it is not required.

**STEPS:**

1. For easiest attachment, separate the Array Frame from the Extension Bar before attaching to the array.
2. Ensure that the top cabinet is set to the correct angle and the Array Frame is properly oriented. Lift the frame over the top A12 cabinet on the cart and rest it on the four QRP attachment points on the top of the cabinet.
3. Remove the quick release pins from their storage positions and place each one into its respective attachment position. The quick release pins should be attached from the inside of the Array Frame.
4. Once the Array Frame is secured to the top of the cabinet, the Extension Bar can be attached. Confirm its correct orientation by consulting LAC-3 and ensure that the correct A, B or C position is attached using both of the included large-gauge QRPs.



# 9 - DEPLOYING A12 SYSTEMS

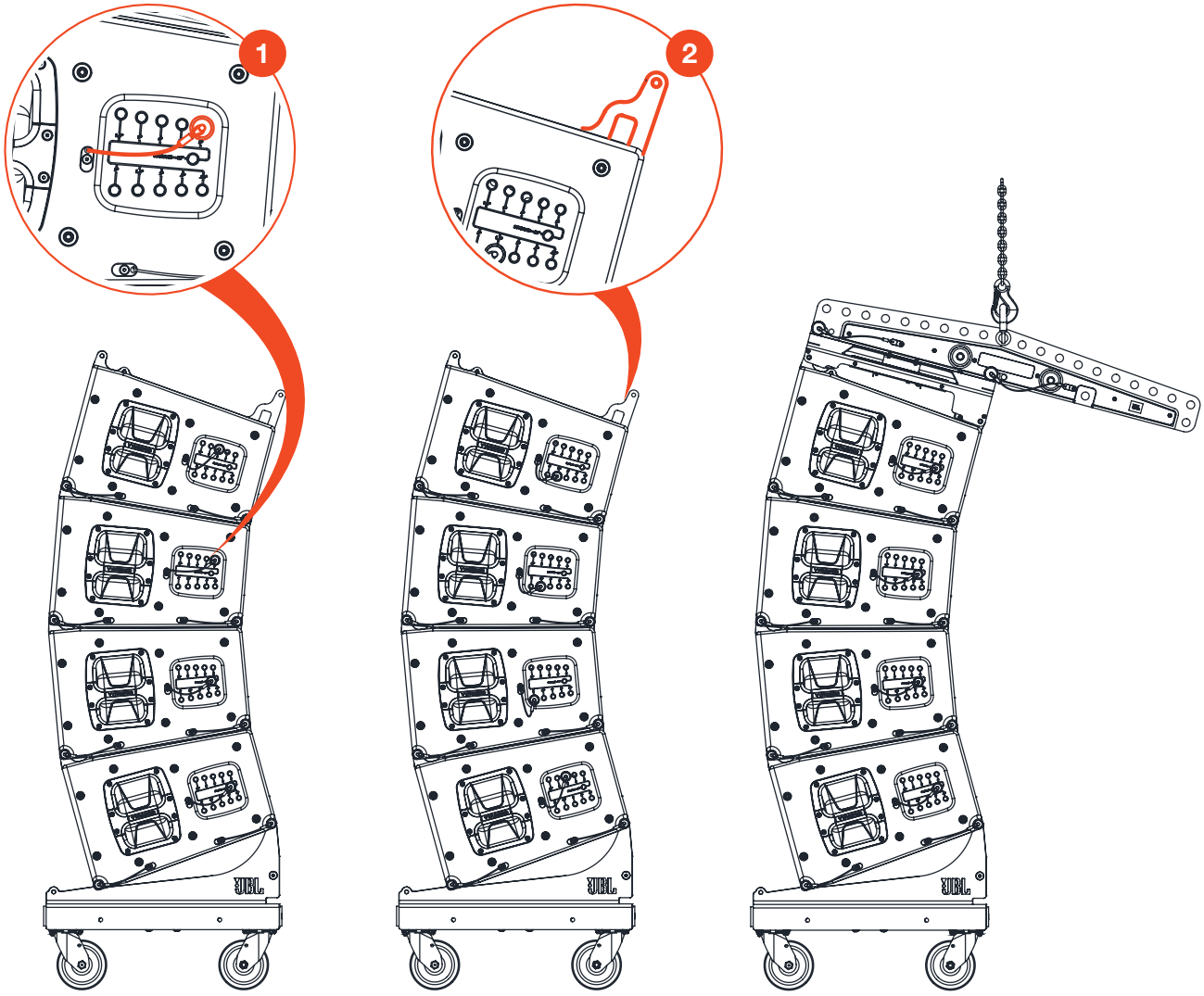
The suspension of a VTX A12 system by a trained technician should be a simple and straightforward process. Follow all steps below and the array will suspend safely and efficiently. Failure to follow the steps as outlined may damage equipment and/or result in a potentially hazardous condition.

## 9.1 PRESELECT THE ANGLES

Suspending a VTX A12 array is a simple and straightforward process. Carefully execute these steps to correctly and safely suspend an array.

**STEPS:**

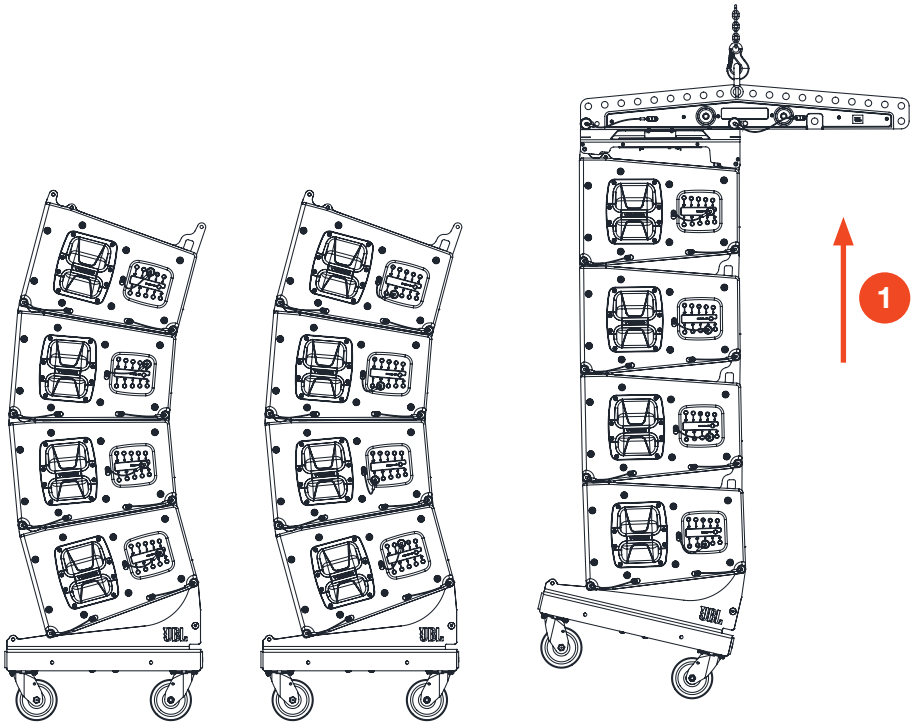
1. Using the quick release pins (QRPs) located on the Angle Selection Panel, select the desired inter-enclosure splay angles for all cabinets. Remove each QRP from its STORAGE position (10 degrees) and move it to the desired position, as indicated on the label. If the desired angle is 10 degrees, the QRP does not need to be moved.
2. Pull up the top rigging arms with your hands until they are fully engaged. This makes connecting stacks together much easier.



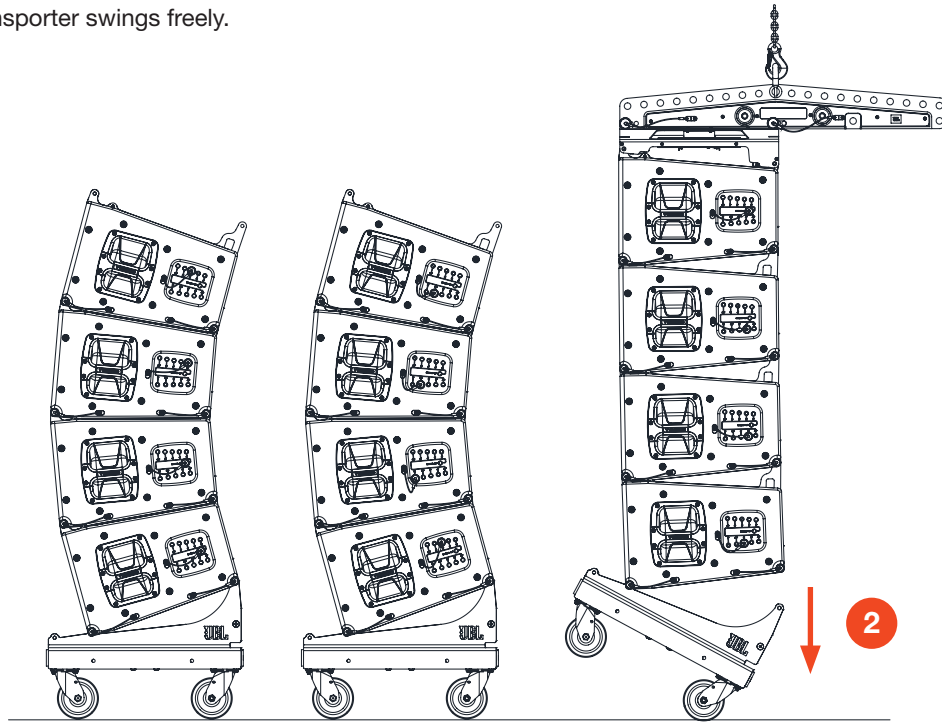
## 9.2 SUSPEND THE FIRST STACK

**STEPS:**

1. Ensure that all red Locking levers are in the locked position, then engage the hoist to lift the array off the ground. As the hoist lifts, each cabinet will expand to the correct inter-enclosure angle, and the sound of pins sliding past locking points will be heard. Each cabinet will stop expanding when it reaches the correct inter-enclosure angle.



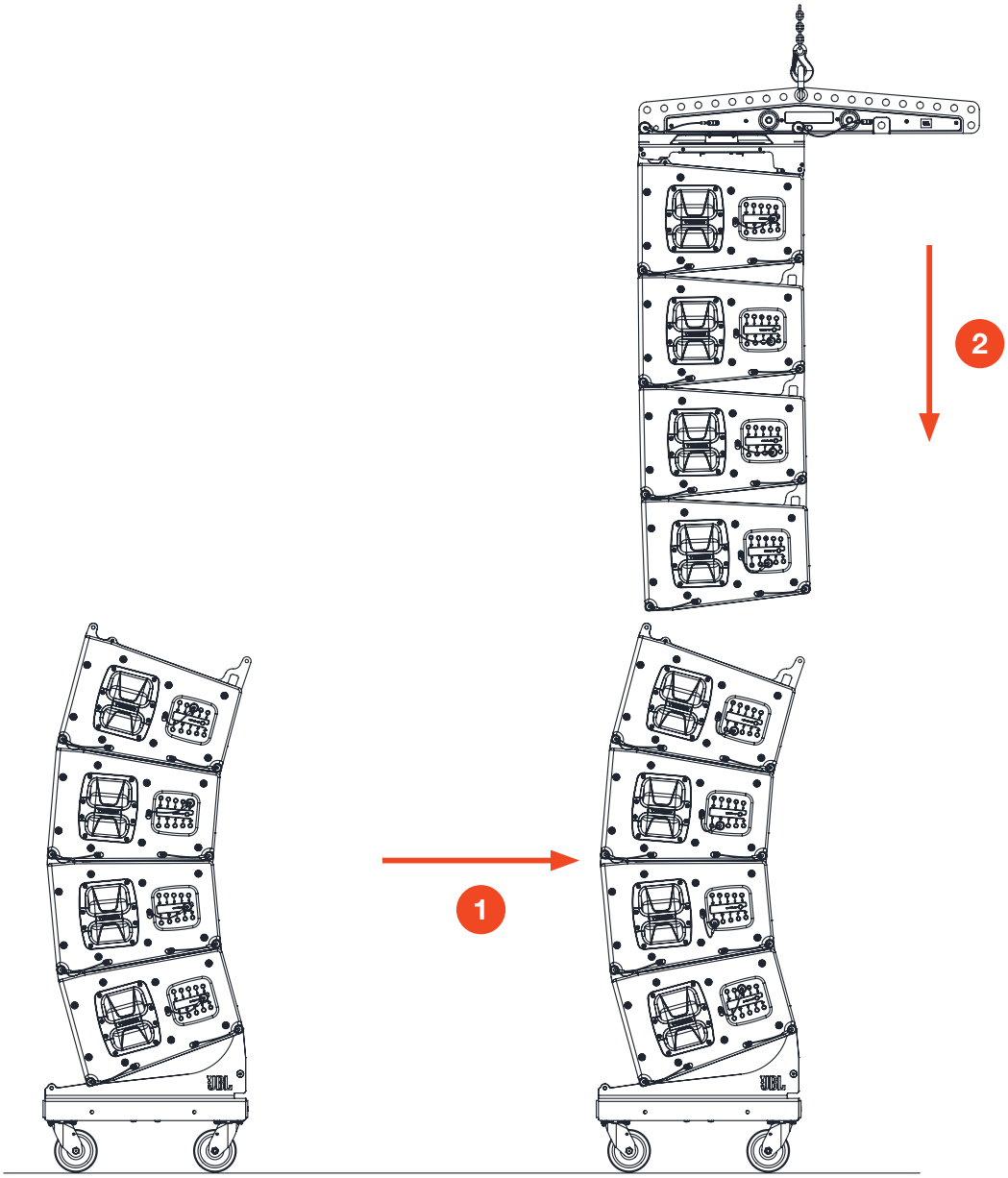

2. When all cabinet angles are set and the array is suspended a short distance off the ground, disconnect the Vertical Transporter (VT) by removing the two rear quick release pins, followed by the front pins. The array should not be so high in the air that the Vertical Transporter swings freely.



## 9.3 ATTACH THE NEXT STACK

**STEPS:**

1. Raise the suspended cluster of VTX A12 cabinets and align the next cart of VTX A12 cabinets below it.
2. Once the two clusters are aligned, carefully lower the suspended cluster until the front attachment points are nearly touching the front attachment points of the cluster on the cart. When the attachment points are aligned, lower the suspended cluster until the front attachment points come together. Insert the quick release pins to attach the suspended cluster to the stack on the cart at the front.

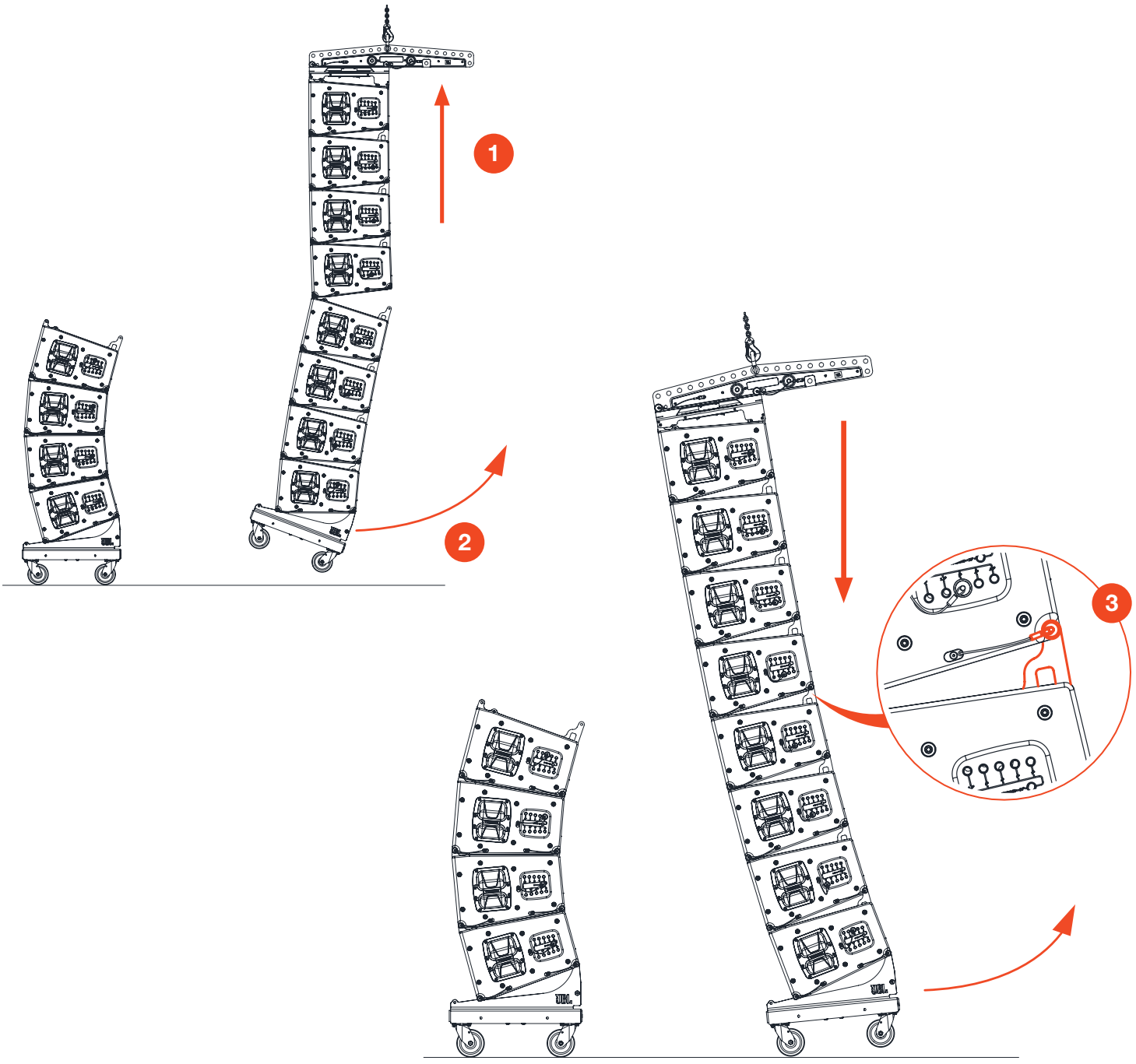



**CAUTION:**

- **Always check that each cabinet is pinned to the same angle on each side of the enclosure.**
- **The top cabinet in each array should be pinned in accordance with the positioning instructions in chapter 8 – VTX A12 AF Array Frame And EB Extension Bar.**

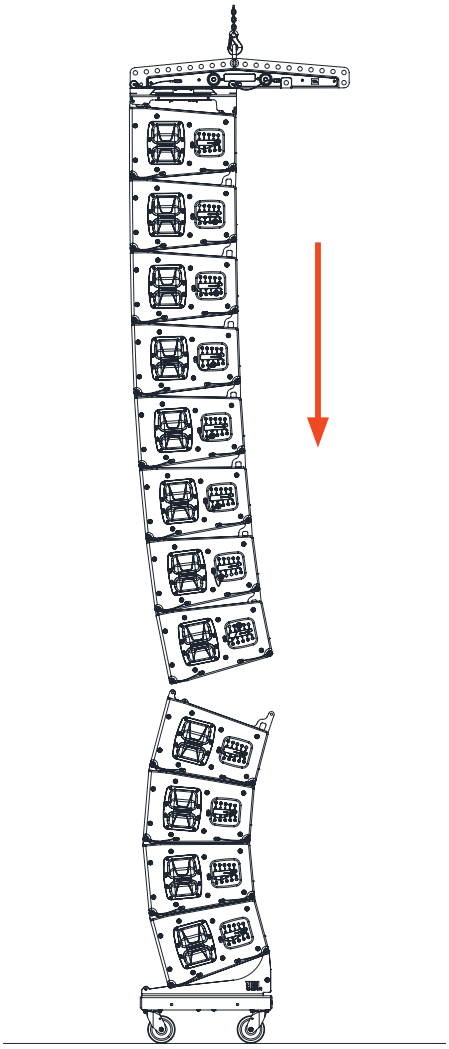
**STEPS:**

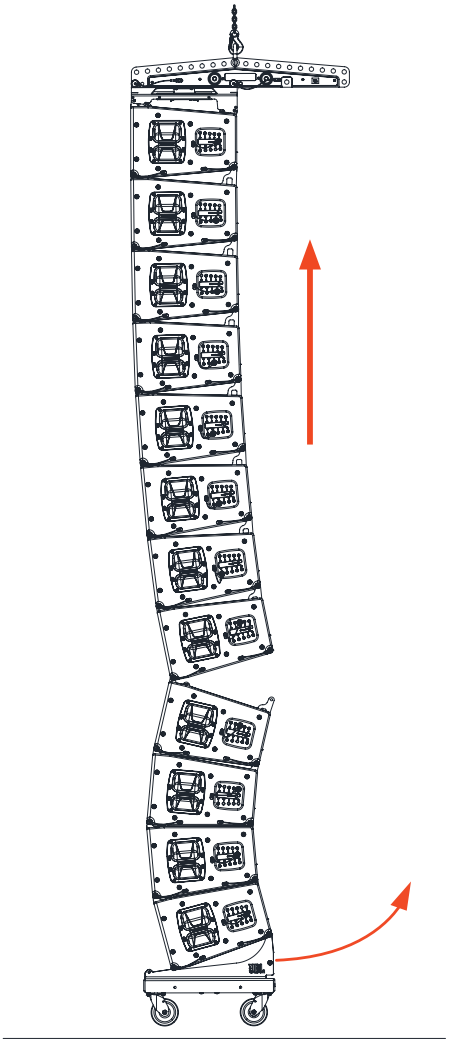
1. With the front quick release pins set, use the suspension hoist to raise the attached clusters. The second cluster may swing forward slightly as it lifts off the ground and the cabinets expand to their correct inter-enclosure angles. Be sure the Vertical Transporter is completely off the ground and the cluster is able to fully expand before proceeding to the next step.
2. When the second cluster is fully expanded, grab the cluster by the rear handlebar on the VT and gently pull back towards the rear of the array. While doing this, lower the array so that the front wheels of the Vertical Transporter touch the ground. Keep lowering the array until the rear attachment points engage with the rear attachment receptacles of the stack on the cart and the holes for the quick release pins align. Insert the quick release pins and attach the suspended cluster to the stack.
3. Once all four quick release pins have been secured, disconnect the Vertical Transporter (VT) by removing the two rear quick release pins,followed by the front pins, then continue adding speakers to the suspended array.

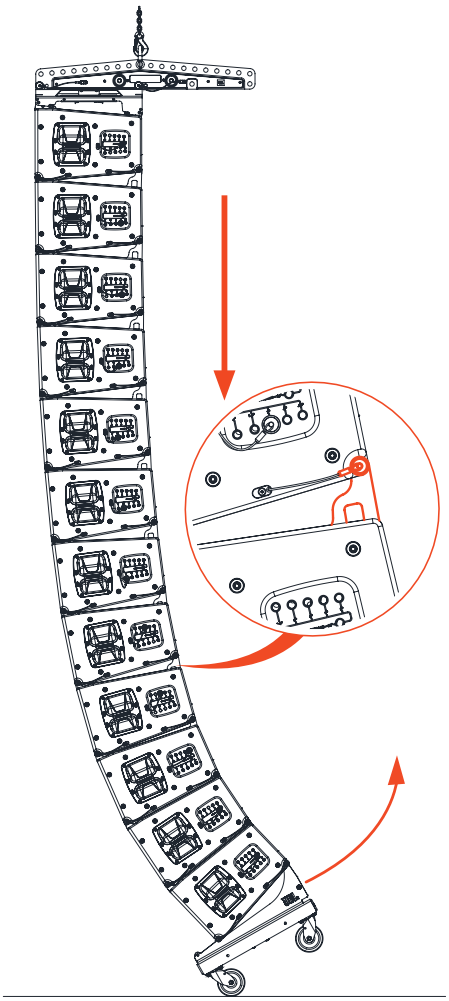


## 9.4 REPEAT UNTIL COMPLETED

Repeat the previous steps until the entire array has been assembled.







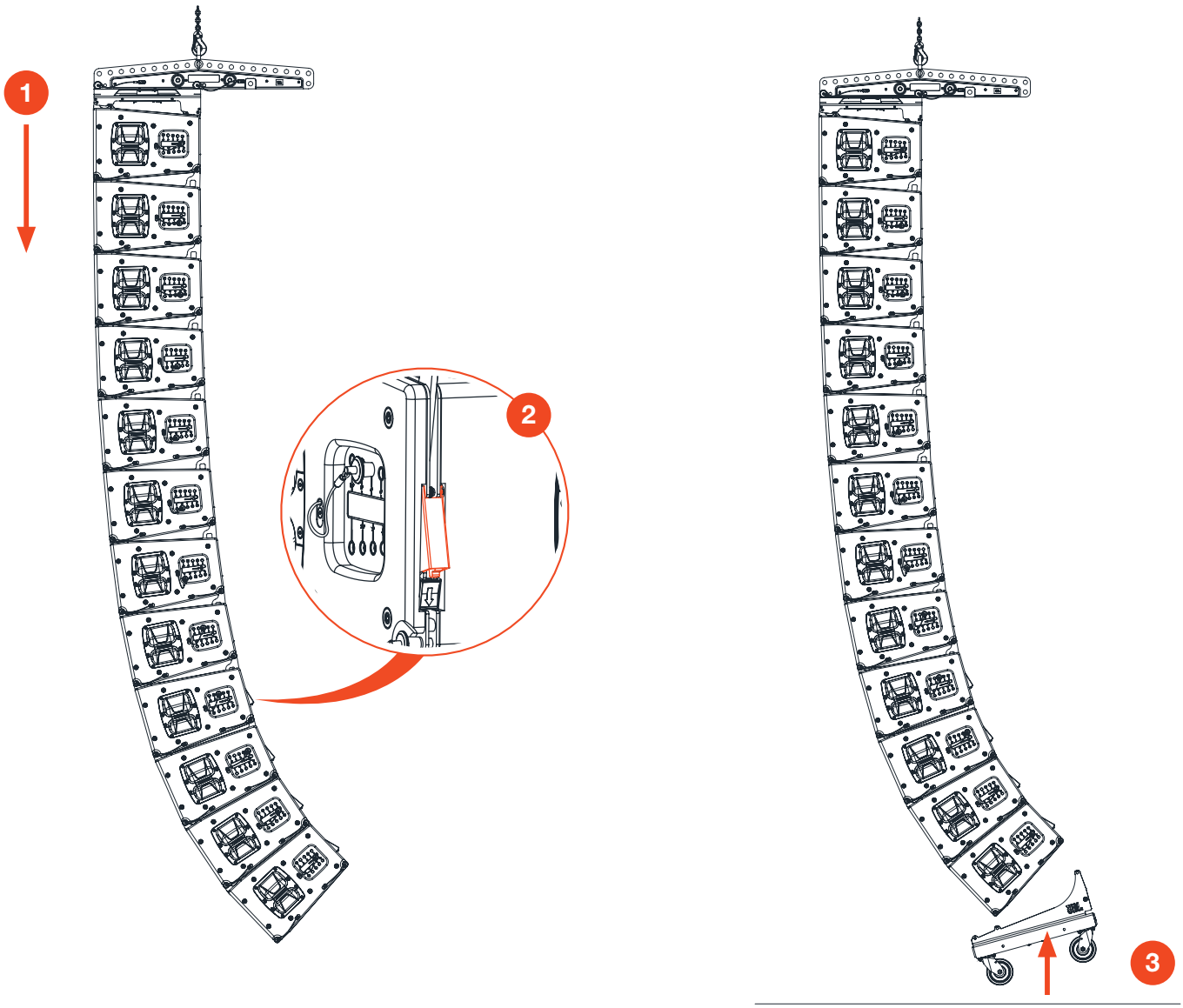
# 10 - DISASSEMBLING AN A12 ARRAY

Carefully follow the steps in this chapter to correctly and safely disassemble an array.

## 10.1 OPEN THE ANGLE LOCKS AND ATTACH THE VT

**STEPS:**

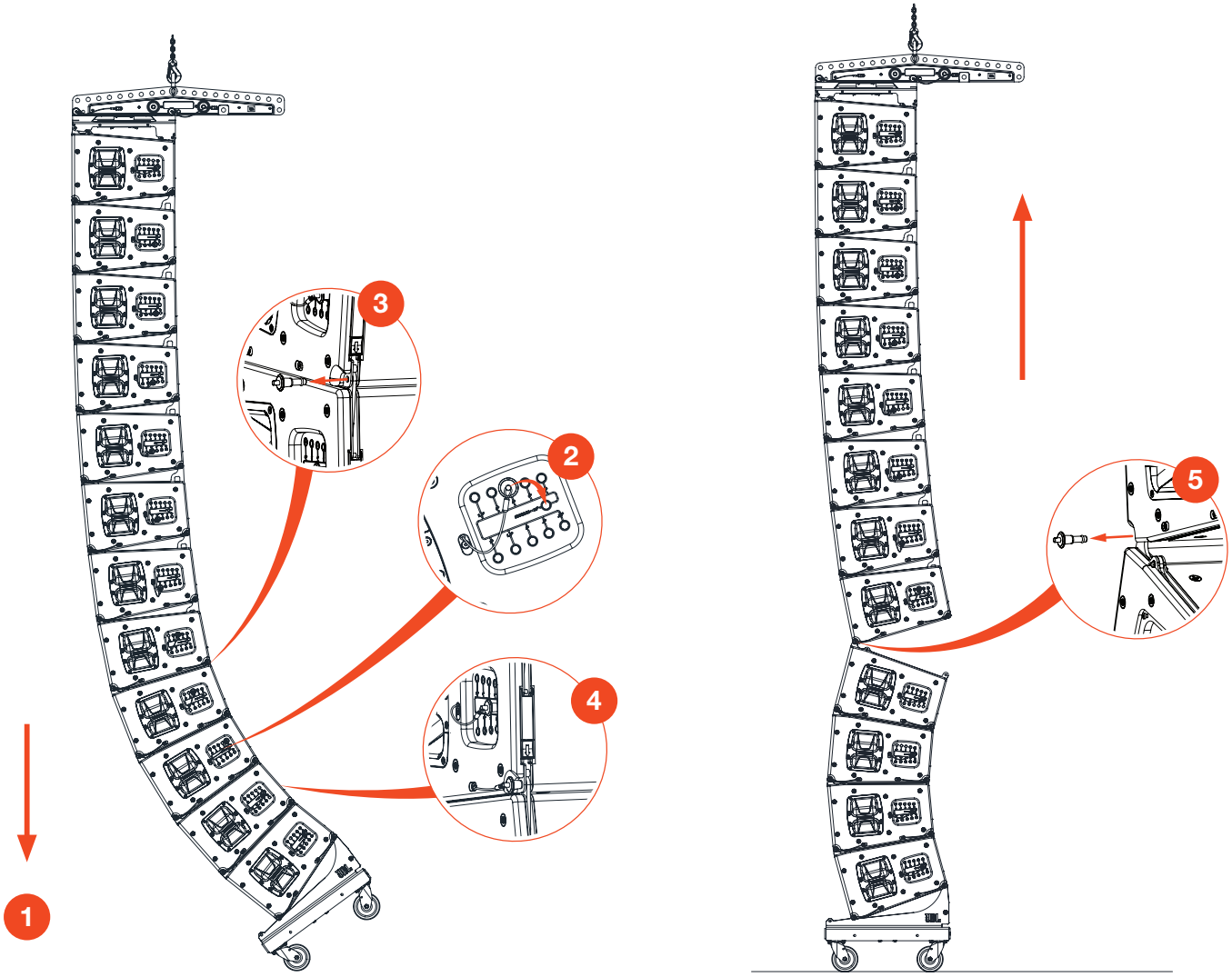
1. To desuspend an array of VTX A12 cabinets, begin by safely lowering the entire array to a working height.
2. Press the Release Buttons to open the red Angle Lock mechanisms for the lower four cabinets. This allows the bottom four VTX A12 cabinets to collapse back to the 10-degree position.
3. Attach the Vertical Transporter to the bottom cabinet. Lift the VT by the round bar at its rear and connect the rear attachment points with quick release pins, then lift the front of the VT and use QRPs to attach it at the front of the VTX A12 cabinet.



## 10.2 CLOSE THE ANGLE LOCKS AND MOVE PINS TO STORAGE

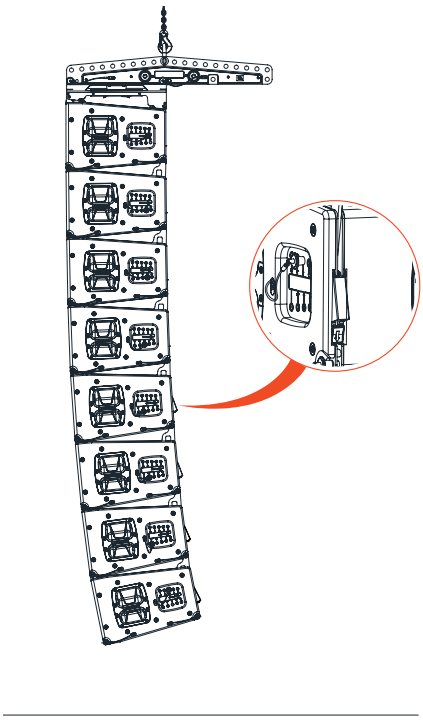
**STEPS:**

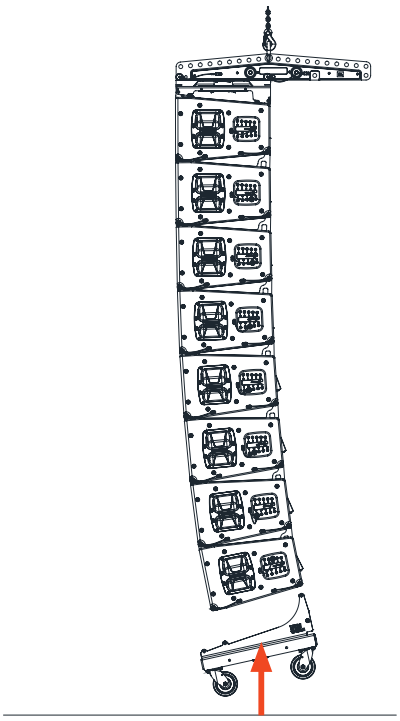
1. With the VTX A12 VT secured by all four quick release pins, lower the array until the VT's front wheels touch the ground. The array will roll backwards slightly and, as the array is lowered, the angles of the bottom four cabinets will close to the 10-degree position.
2. Once the bottom five cabinets close together, set the angle selection quick release pins on the bottom four VTX A12 cabinets to the 10-degree storage position.
3. Close all Locking levers by pressing each one forward until it clicks closed and is completely flush with the rear of the cabinet.
4. Remove the rear quick release pins between the fourth and fifth cabinets up from the ground. These quick release pins should move easily, as the weight of the array is being held by the front wheels of the Vertical Transporter resting on the ground.
5. Raise the array back up and allow the four VTX A12 cabinets on the Vertical Transporter to roll forward until the cart is resting safely on all four wheels. Stop lifting the array when the A12 cabinets on the VT reach this position. At this point, remove the front attachment quick release pins from the VTX A12 cabinets. They will slide out of their attachment receptacles easily, separating the suspended VTX A12 array from the stacked cabinets on the Vertical Transporter cart.

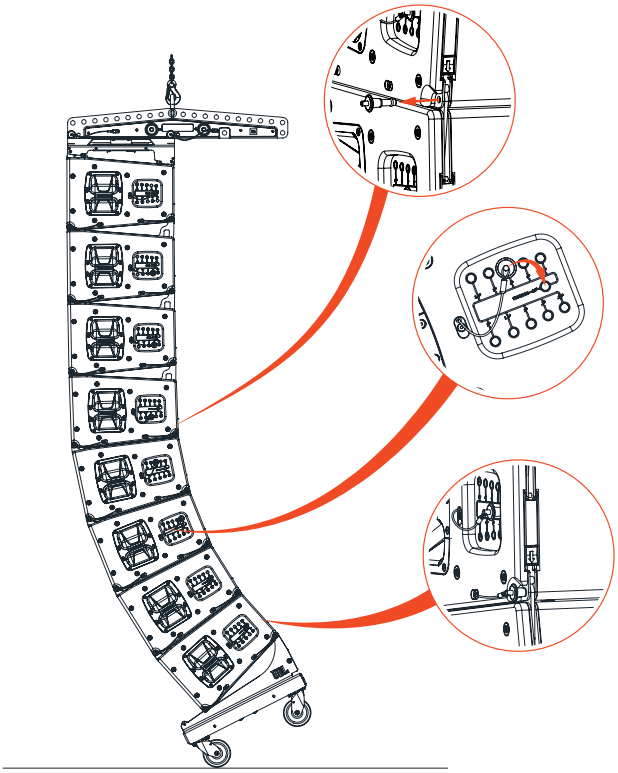


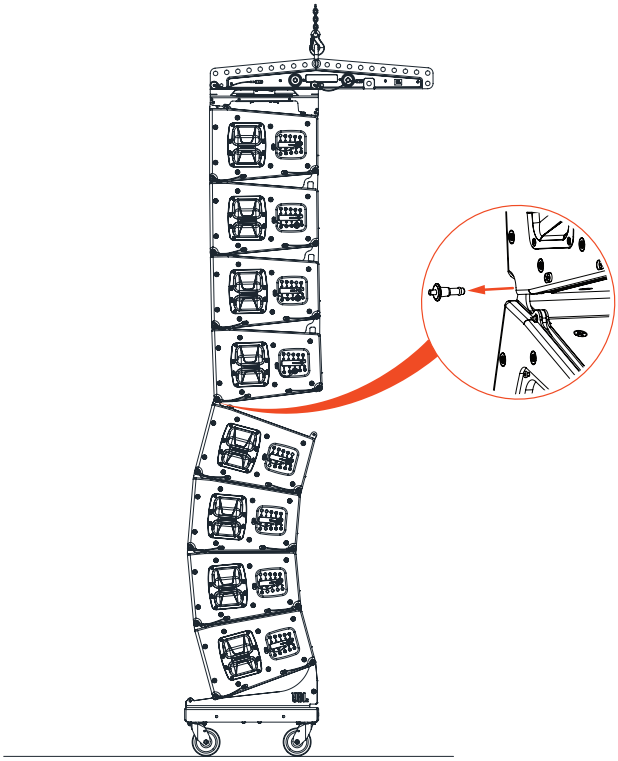
## 10.3 REPEAT STEPS TO DISCONNECT THE NEXT FOUR CABINETS

Repeat the previous steps to disconnect and store the next four cabinets of the array.

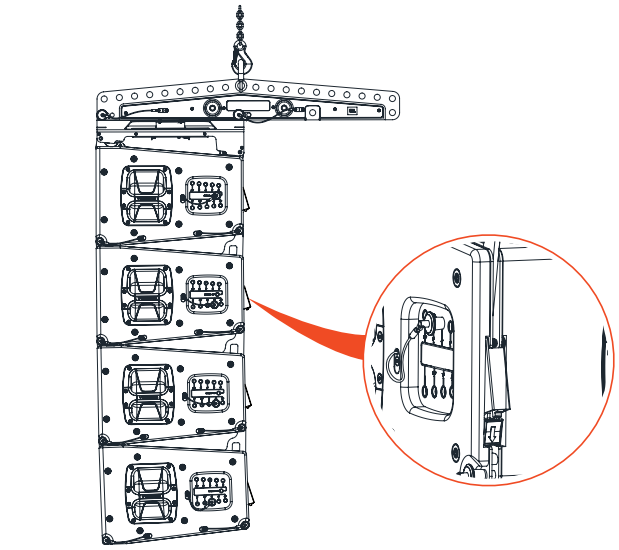


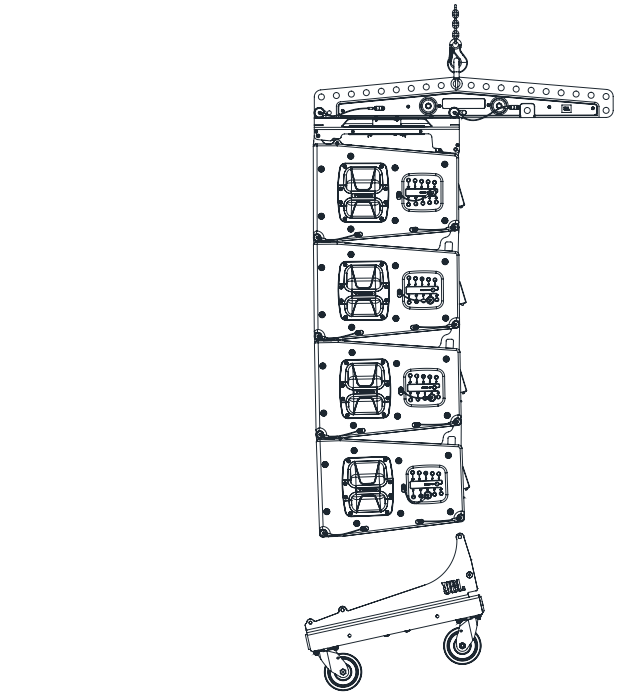


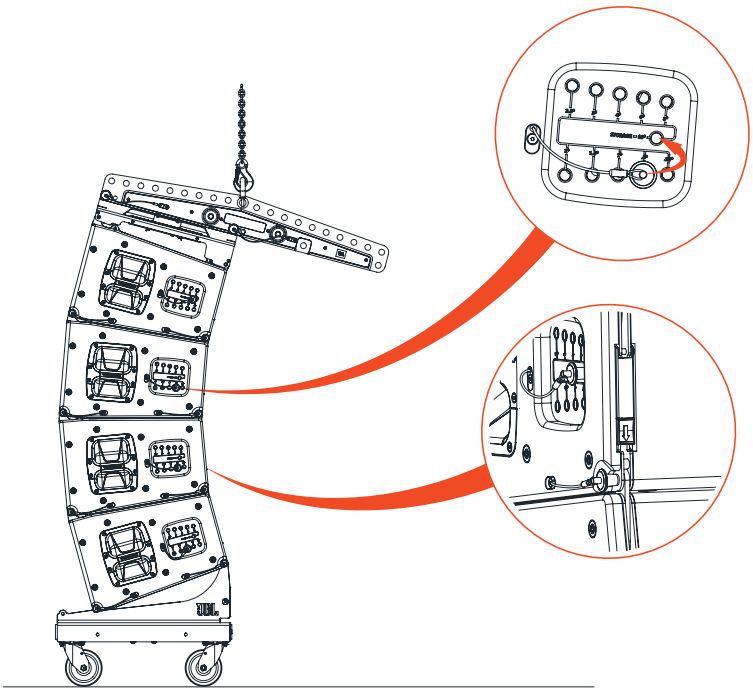


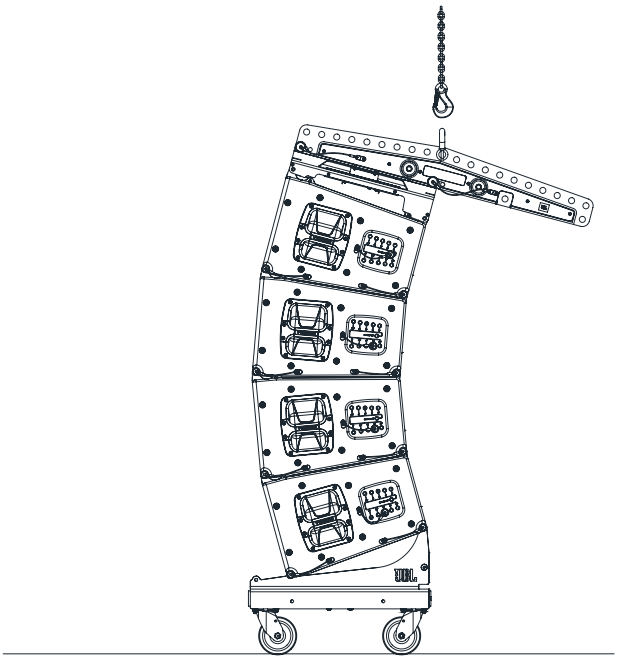


## 10.4 REPEAT STEPS TO DISASSEMBLE THE ARRAY





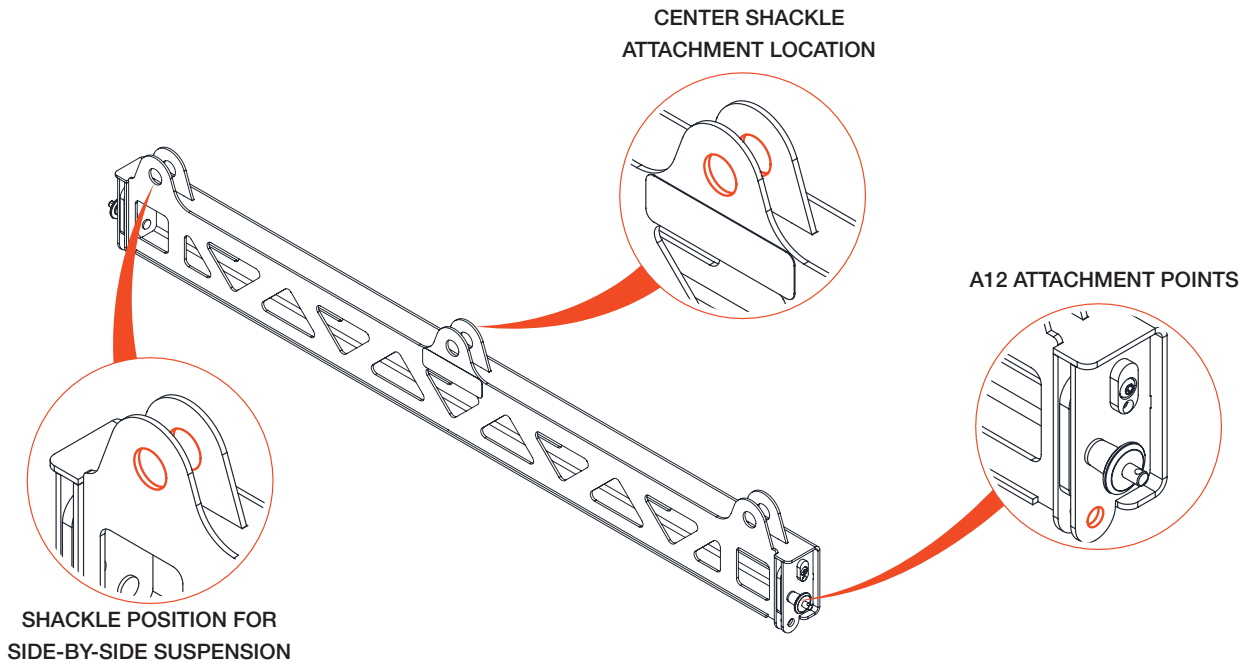




# 11 - THE VTX A12 SB SUSPENSION BAR

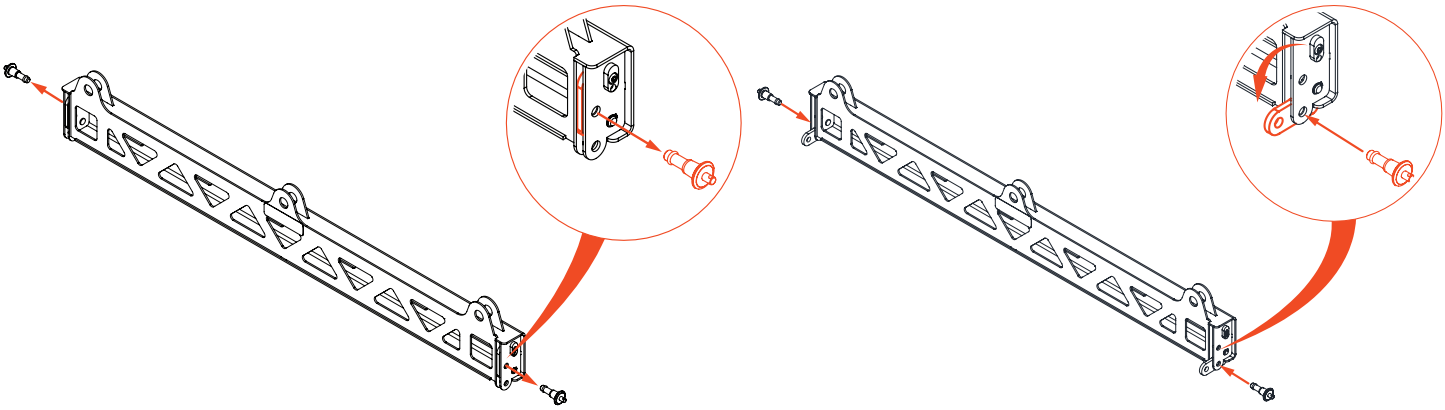
The VTX A12 SB is a lightweight suspension bar that can be used as an array frame or to implement pull-back of a VTX A12 array. When used for pull-back, the VTX A12 SB can be attached to the bottom cabinet of an array and connected to a rear suspension point to allow for greater downtilt than is possible using the VTX A12 AF alone. The VTX A12 SB can also attach to the top cabinet of an array and be used as a compact array frame. In this mode, the Suspension Bar connects to the top cabinet's rear rigging points and the downtilt angle is controlled by the number of cabinets and array geometry. Two VTX A12 SB Suspension Bars can be used for dual-point applications and added aiming flexibility, one at the top of the array and one at the bottom.

## 11.1 SUSPENSION BAR OVERVIEW




## 11.2 SUSPENSION BAR ATTACHMENT TABS

The Suspension Bar is designed to be connected either to the bottom or the top of a suspended array of VTX A12s. When connected at the bottom (lowest cabinet of an array), the array attachment tabs must be released from their storage positions in order to attach the SB to a VTX A12 cabinet. Remove the holding pins on either side of the SB and let the attachment tabs spring out and into place. The attachment tabs can then get pinned to the VTX A12 cabinet using the cabinet's quick release pins.

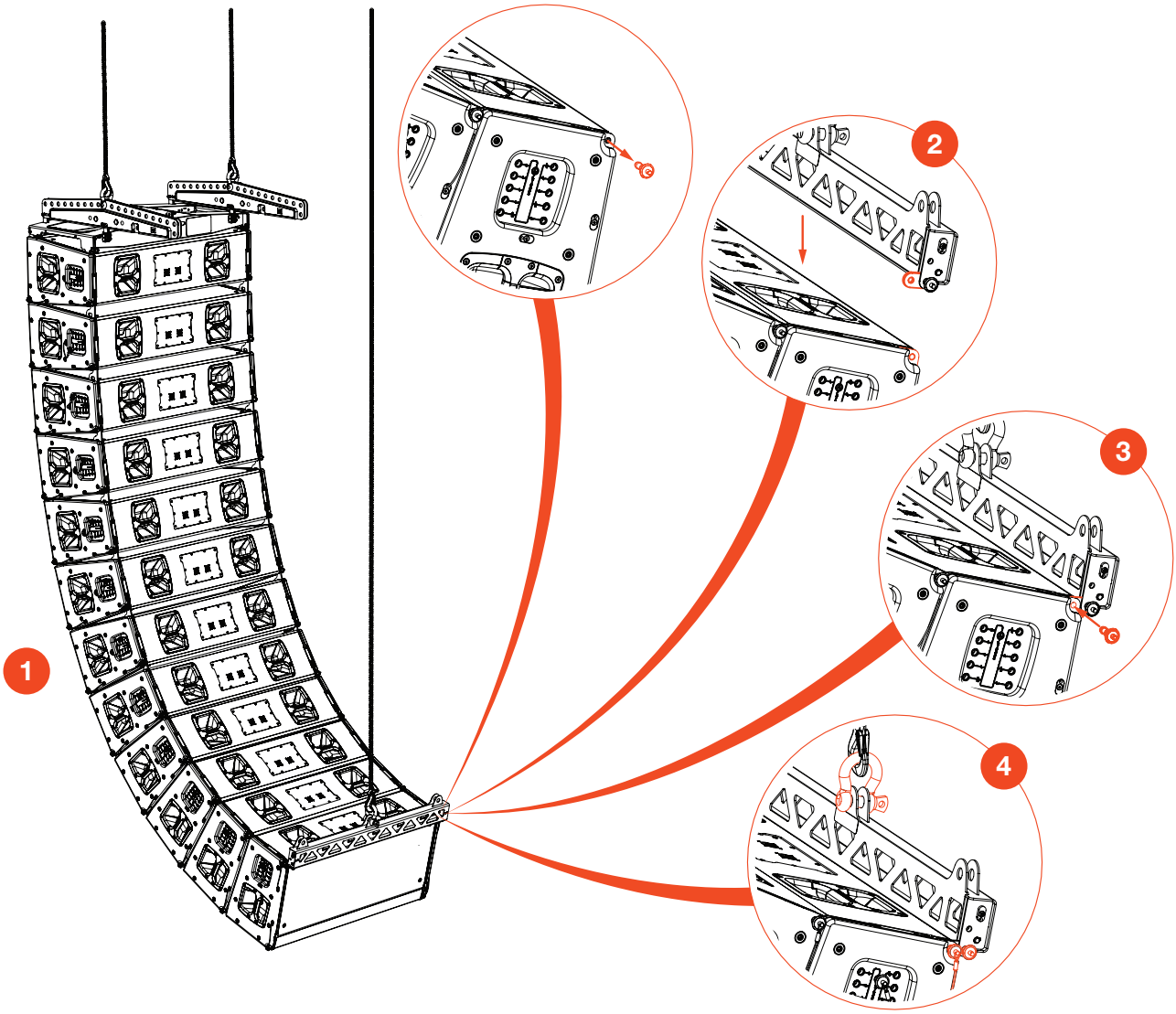


## 11.3 VTX A12 SB FOR PULL-BACK

The primary role of the Suspension Bar is as a pull-back attachment at the bottom of an array, to facilitate array configurations requiring a significant amount of downtilt. In this situation, the VTX A12 AF is used at the top of the array for the primary suspension point, with the VTX A12 SB attached to the bottom of the array and lifted by a second, rear motor point. The two motors are used to achieve the desired array downtilt.

**STEPS:**

1. Follow the steps in chapter 9 - Deploying A12 Systems to suspend the VTX A12 array using the hoist attached to the Array Frame.
2. Make sure the Suspension Bar attachment tabs have been extended to the outside position so the SB can connect to an A12 cabinet.
3. Use the VTX A12 quick release pins to attach the Suspension Bar to the lowest VTX A12 of the array.
4. Attach the hoist to the center shackle position of the Suspension Bar and lift the array.



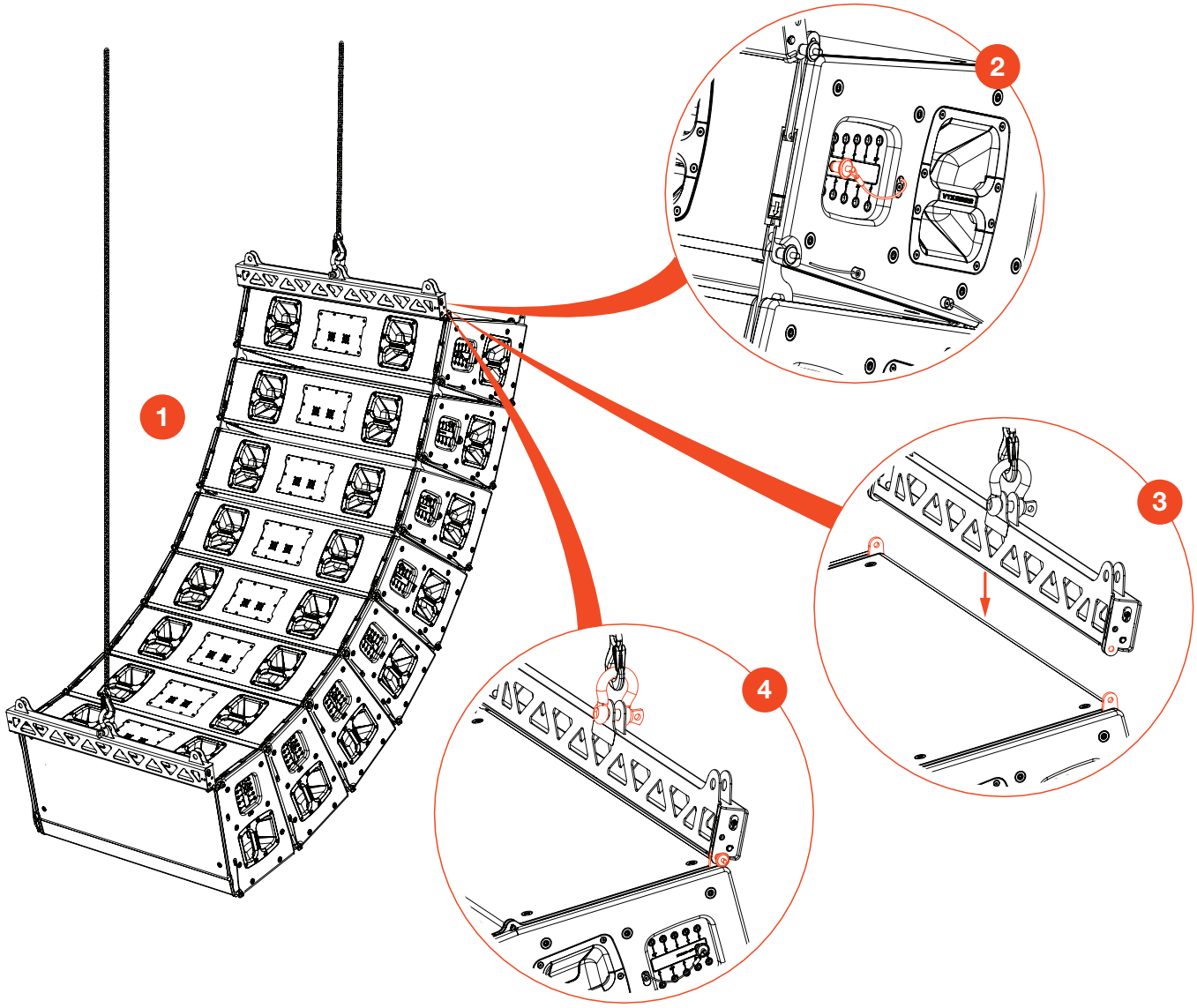

**TIP:** Use LAC-3 to determine the ideal spacing between the front and rear attachment points. Make sure the suspension points are parallel to each other.

## 11.4 VTX A12 SB AS A FRAME AND PULL-BACK

If two suspension hoists are available for front and back attachment, then Suspension Bars can be used for both the top and bottom frames on a VTX A12 array. This configuration can reduce both cost and the overall weight of an array when the flexibility of the main Array Frame is not needed. Permanent installations, in particular, can benefit from this arrangement. However, being less flexible, this method can take longer to assemble and install than the combination of an Array Frame and Suspension Bar.

**STEPS:**

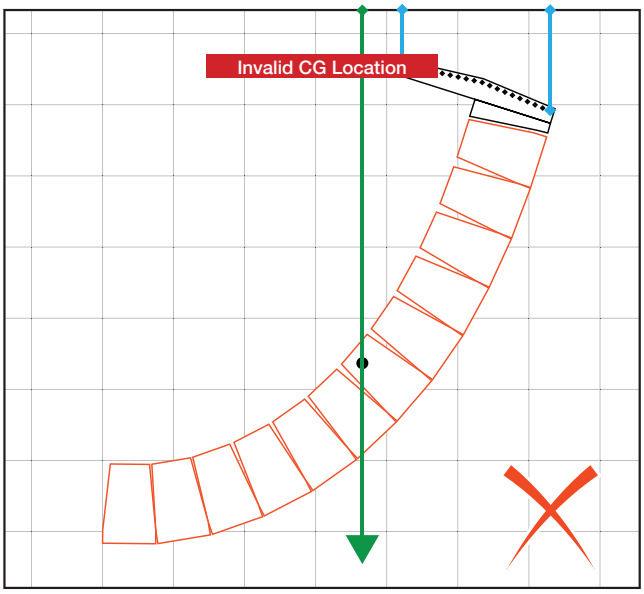
1. Follow the instructions in chapter 9 - Deploying A12 Systems to suspend the A12 array.
2. Set the top A12 cabinet (connected to the Suspension Bar) to the 10-degree position.
3. After the entire A12 array has been assembled, seat the second Suspension Bar onto the bottom cabinet in the array.
4. Use the VTX A12 quick release pins to secure the Suspension Bar to the bottom cabinet. Attach the hoist to the center shackle position of the Suspension Bar and lift the array.



## 11.5 WHEN DO I NEED A PULL-BACK?

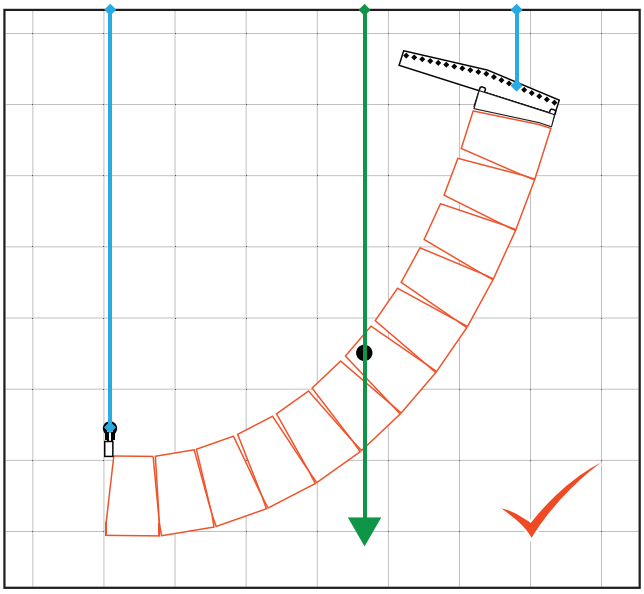
Pull-backs are best suited for when the center of gravity (CoG) of an array falls outside the footprint of the Array Frame. Long, curved arrays with a large down angle typically qualify. When LAC-3 detects this condition it displays an error to indicate that the array frame alone cannot achieve the down angle needed for the design (LAC - Example 1). Using an A12 Suspension Bar as a bottom frame can move the array CoG between the two suspension points, enabling almost any down angle to be achieved (LAC - Example 2).

LAC - Example 1




Center of Gravity  Suspension Points

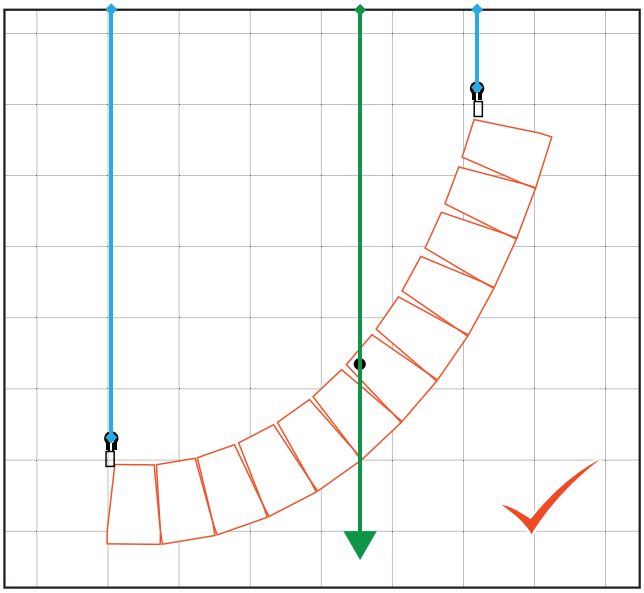
LAC - Example 2



Center of Gravity  Suspension Points

The two suspension points (motors) are used to adjust the array angle In this scenario, so the Array Frame's pick-point flexibility is not needed and a Suspension Bar can be used for the top frame, as well as on the bottom. This yields the same outcome with some weight and cost savings (LAC - Example 3).

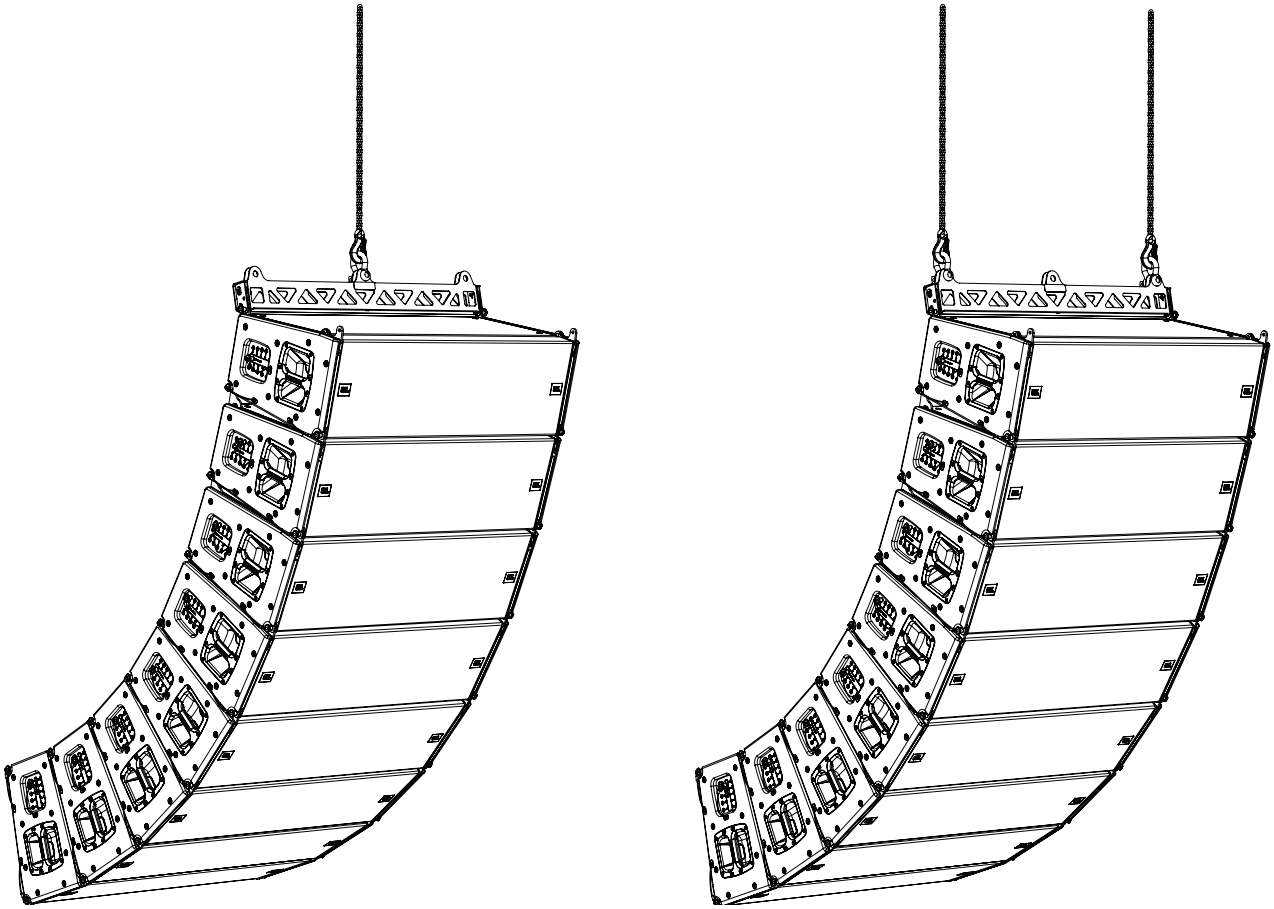
LAC - Example 3



Center of Gravity  Suspension Points

## 11.6 USING A SINGLE VTX A12 SB

The Suspension Bar can also be used as the main suspension frame. When the VTX A12 SB is used as a frame, it is simpler, lighter, and more cost effective than using a VTX A12 AF. The disadvantage of this configuration, however—and the main reason that this configuration is not recommended for regular use—is that the center of gravity (CoG) of the given array must perfectly line up with the shackle attachment position on the Suspension Bar. If the CoG is in front of or behind the Suspension Bar, the aiming of the array will be incorrect. LAC-3 is used to determine if a given array qualifies for this configuration.

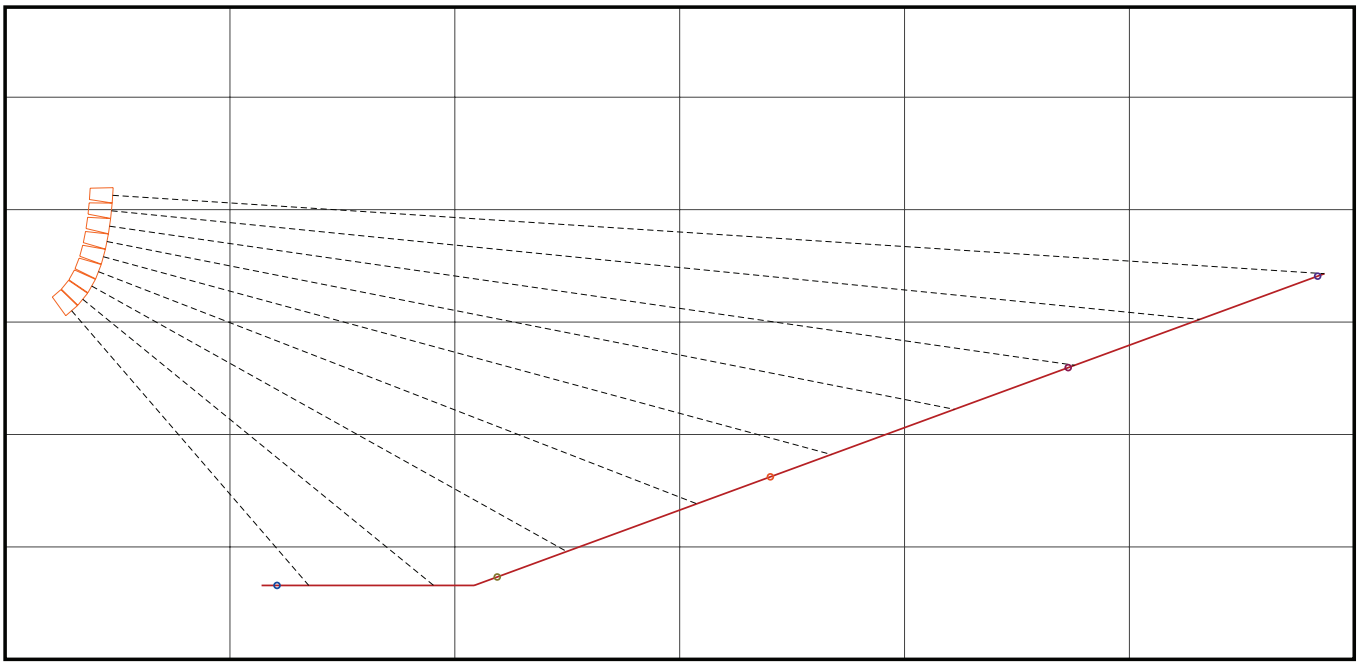


This configuration also supports side-by-side attachment for suspension hoists on the SB used as a top frame.

## 11.7 WHEN CAN I USE THE SB AS A FRAME?

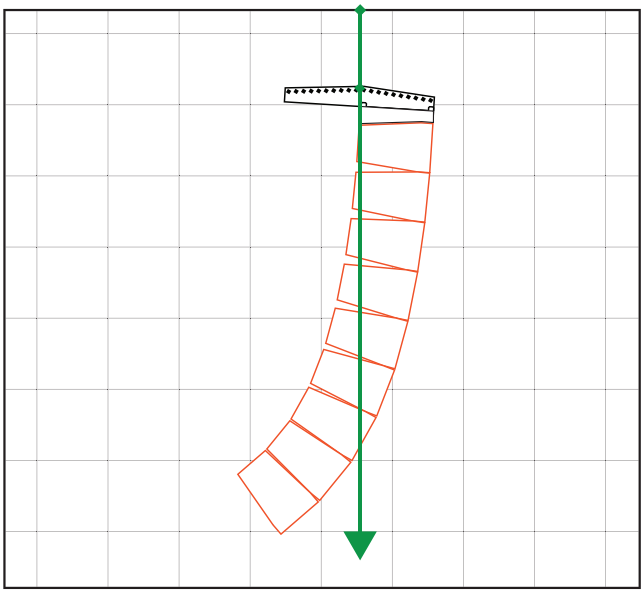
The LAC-3 example below illustrates a scenario where it is appropriate to use the VTX A12 SB as the main array frame.

**LAC Venue Example**



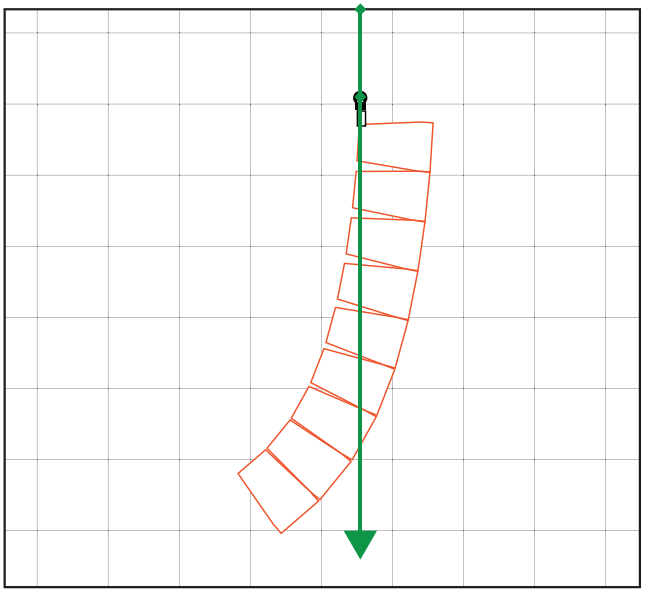
The venue geometry below calls for an array with its CoG perfectly lined up with the rear suspension point of the top A12 enclosure (LAC - Example 4). The flexibility of an Array Frame combined with an Extension Bar is not needed here, and a Suspension Bar can be used instead of an Array Frame (LAC - Example 5).

**LAC - Example 4 CoG at rear suspension point**



● Center of Gravity

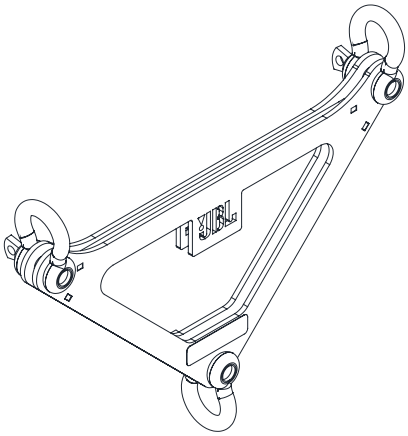
**LAC - Example 5 SB as top frame**

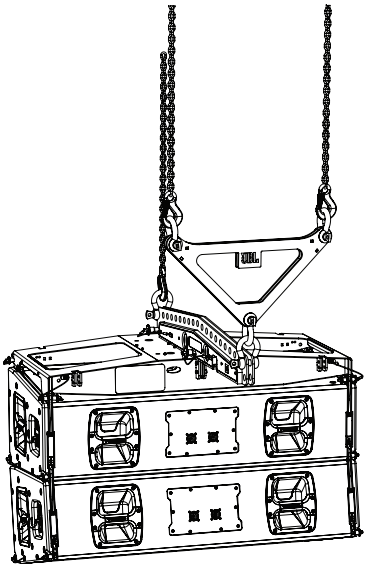


● Center of Gravity

## 12 - THE VTX DELTA PLATE

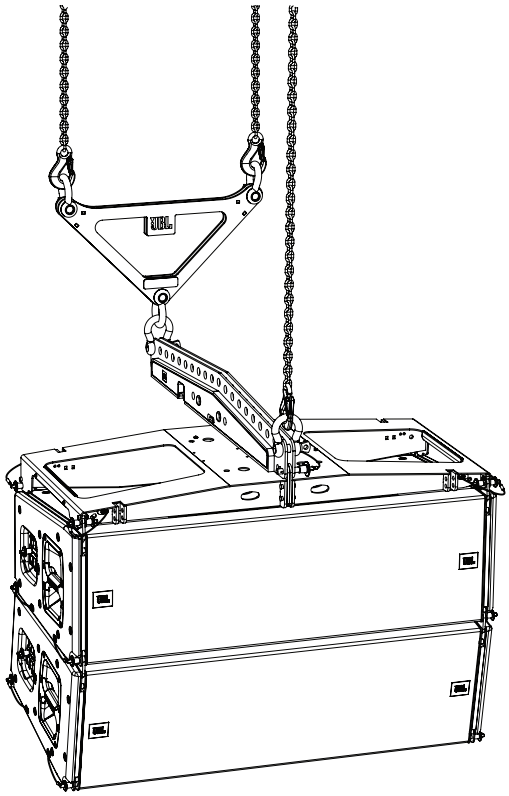
The VTX Delta Plate is a rigging accessory used for controlling the horizontal aiming of an array. Two chain motors are attached to the Delta Plate, allowing for adjustments of up to +/- 10 degrees. The VTX Delta Plate can also be used to distribute the weight of an array to two points.

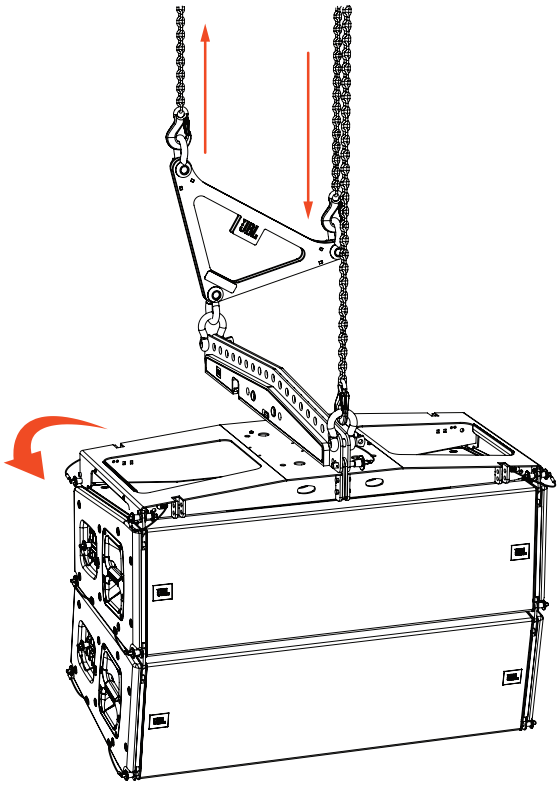




### 12.1 USING THE VTX DELTA PLATE

The VTX Delta Plate is typically positioned at the rear of an array and connected to the very last attachment hole of the Extension Bar. The included 5/8-inch shackles are used to connect the VTX Delta Plate to the Extension Bar. Two rear motors are connected to the VTX Delta Plate, and horizontal aiming of the array is achieved by adjusting the position of the rear motor points.

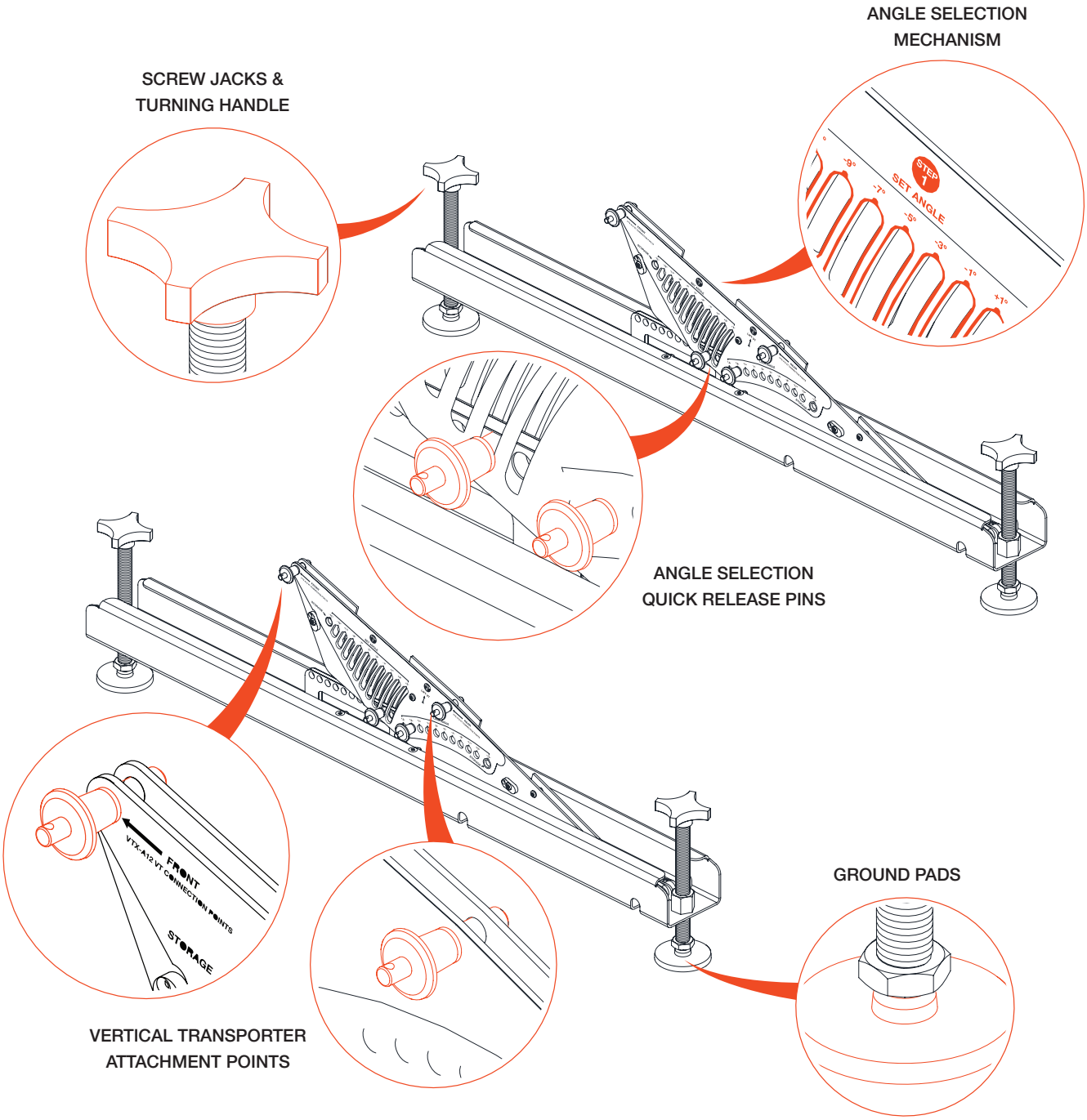




## 13 - GROUND STACKING THE VTX A12

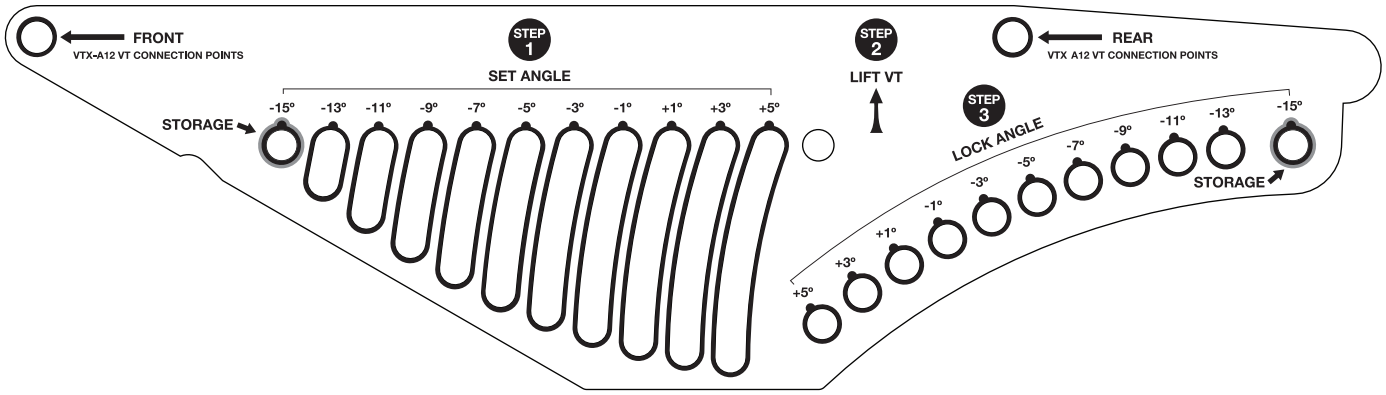
The VTX A12 VT GND outrigger system allows A12 enclosures to be ground stacked without removing them from the VTX A12 VT Vertical Transporter cart. The two outriggers extend in front of and behind the stack, and connect to the VT using the included quick release pins. Screw jacks are used to lift the stack off the ground, and the innovative, spring-based, angle set hinges are used to adjust overall aiming. The hinge mechanism uses gas springs, which allow adjustment of the overall stack angle without manually lifting the speakers or moving heavy parts. Depending on the array geometry, the VTX A12 VT GND can support the weight of up to six A12 cabinets and allows for angles ranging from -15 degrees to +5 degrees. LAC-3 software calculates ground stack parameters and mechanical safety.

### 13.1 VTX A12 VT GND OVERVIEW

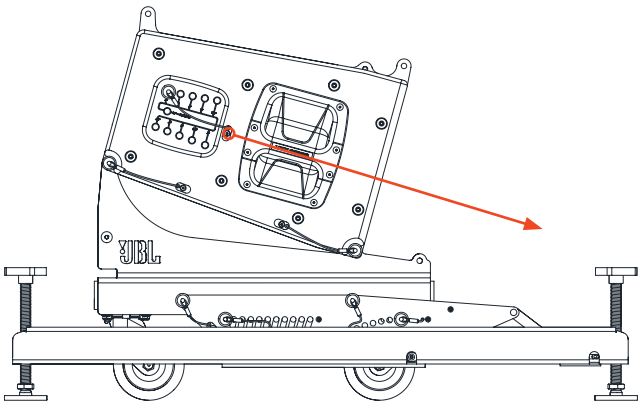


## 13.2 ANGLE SELECTION MECHANISM

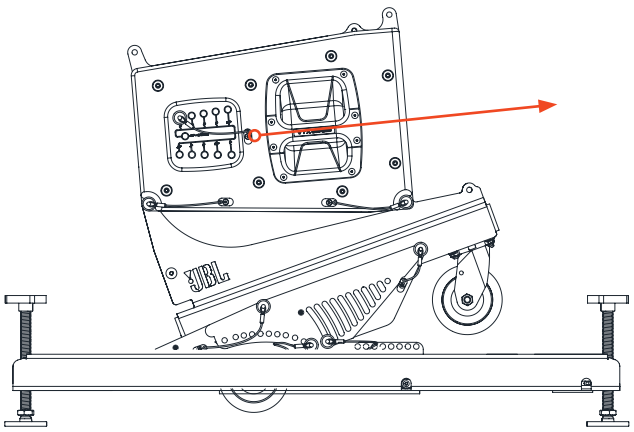
The Angle Selection mechanism sets the ground stack array angle. Two quick release pins select and secure the angles. One pin sets the angle (STEP 1 - SET ANGLE), while the other locks it when the desired angle is reached (STEP 3 - LOCK ANGLE). As the label indicates, the process for setting an angle is three steps: selecting the desired angle, lifting the array to reach the angle, and locking the angle. The included gas springs work against the weight of the array to make lifting it effortless. Note that both sides of the VTX A12 VT GND must be set and locked at the same time.




The Angle Selection mechanism settings correspond to the site angle of the VTX A12 enclosure connected to the GND (the bottom speaker of the array). For example, if -15° is selected on the GND, the bottom speaker of the array will point down at a 15-degree angle. If +5° is selected, the bottom speaker will point up at a 5-degree angle. These numbers are not related to the top enclosure of the array, and LAC-3 should be used to determine the overall angle of the ground stack.



GROUND STACK SET TO -15°

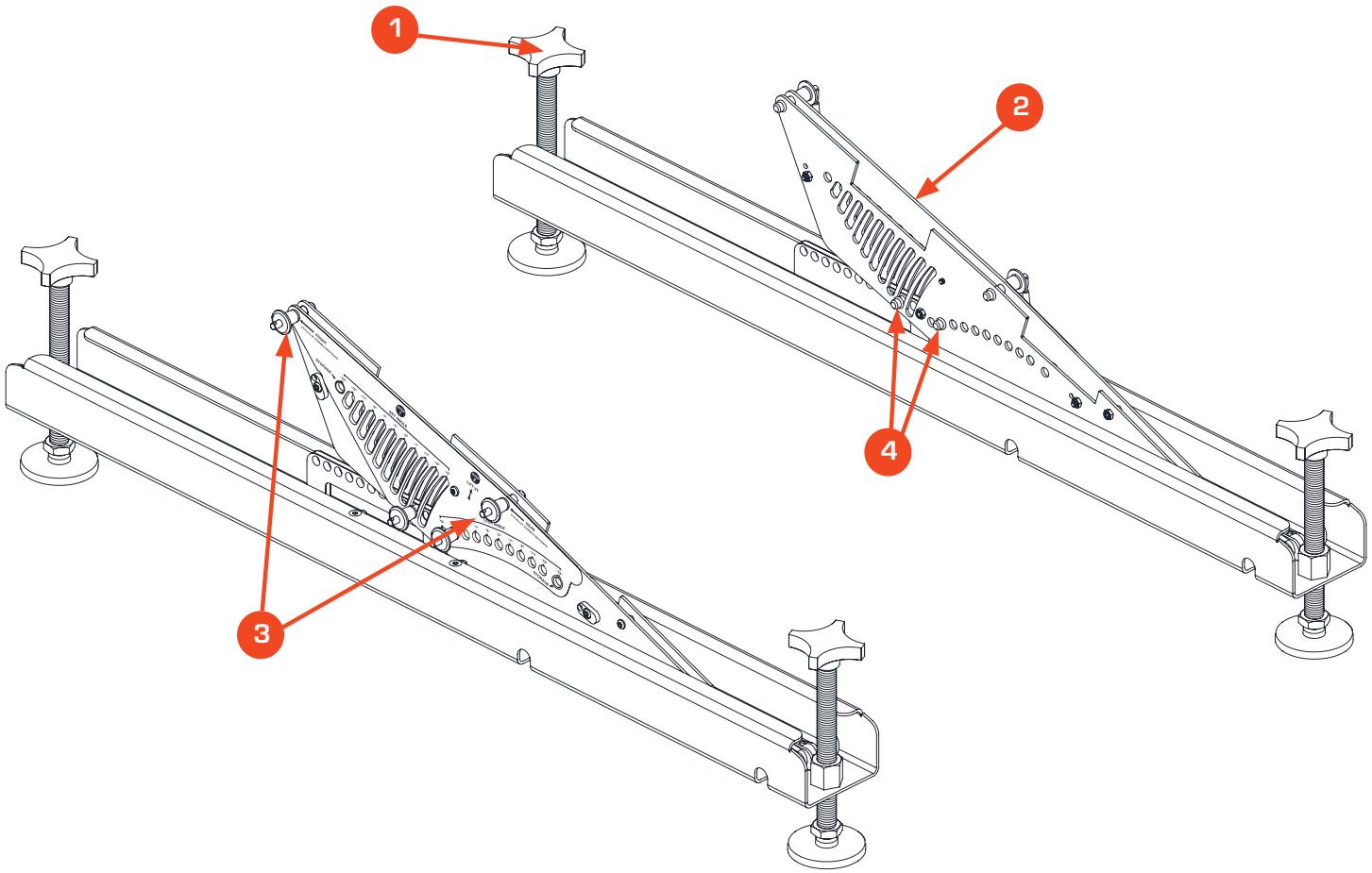


GROUND STACK SET TO +5°

CAUTION:

- **The quick release pins should always remain in their storage positions until the ground stack has been attached to an A12 array and the screw jacks used to lift the stack off the ground. Lifting the stack off the ground shifts the weight of the array to the gas springs, releasing the storage QRPs.**
- **Both SET ANGLE and LOCK ANGLE QRPs should be set to the same position. If the SET ANGLE QRP is set to the +3° position, the LOCK ANGLE QRP should also be set to the +3° position.**

## 13.3 VTX A12 VT GND PARTS




1. **Screw Jacks** - Two screw jacks are included with each VTX A12 VT GND outrigger. The screw jacks are used to lift the array stack off the ground and ensure that no weight is resting on the VT wheels. The screw jacks are not used for adjusting the array angle.

2. **Angle Selection Mechanism** - The Angle Selection Mechanism is used for selecting the array angle. Options range from -15 to +5 degrees in two-degree steps.

3. **VT Connection Points** - Two quick release pins, one for the front and one for the rear, are included on each skate for attaching the VTX A12 VT GND to the VTX A12 VT. Refer to the product labels on the GND for the correct orientation.

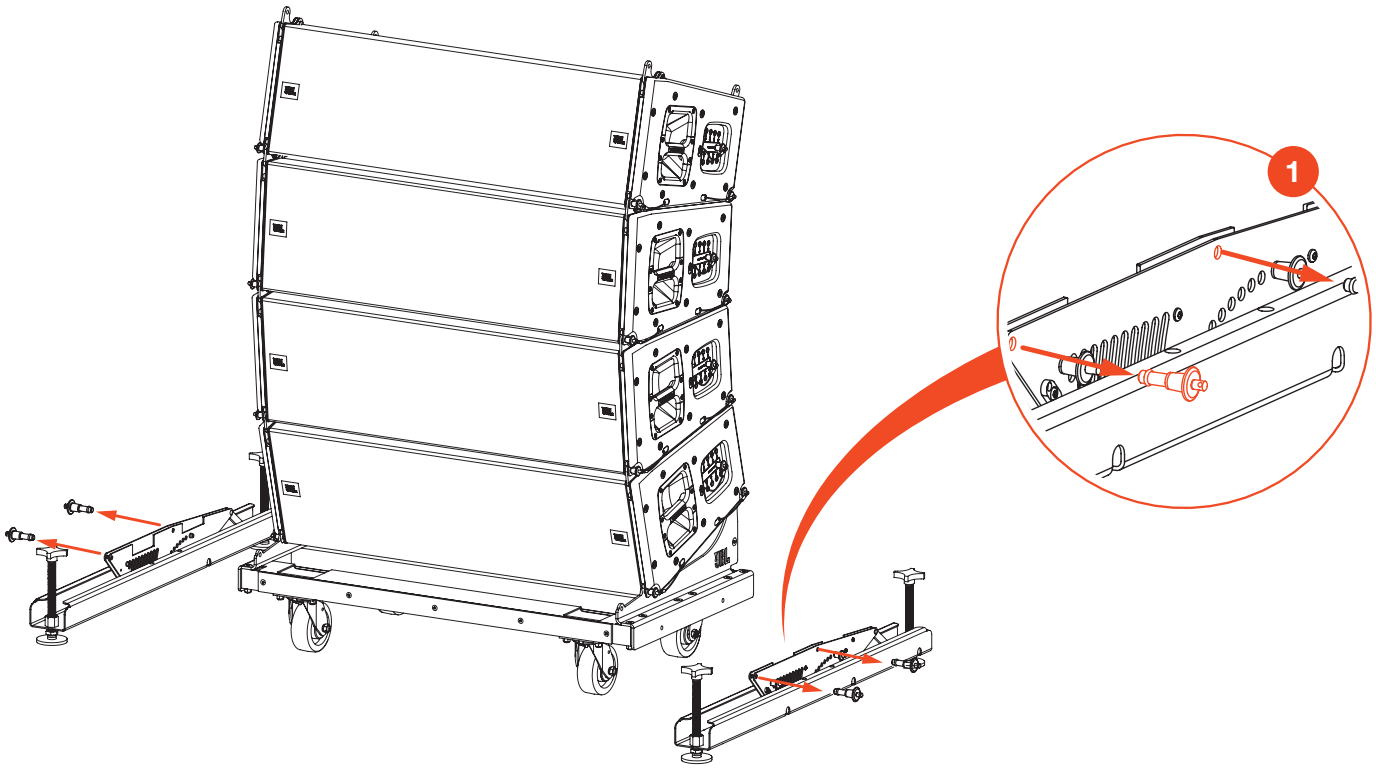
4. **Angle Selection QRPs** - Two quick release pins for selecting and locking the VTX A12 VT GND angle.

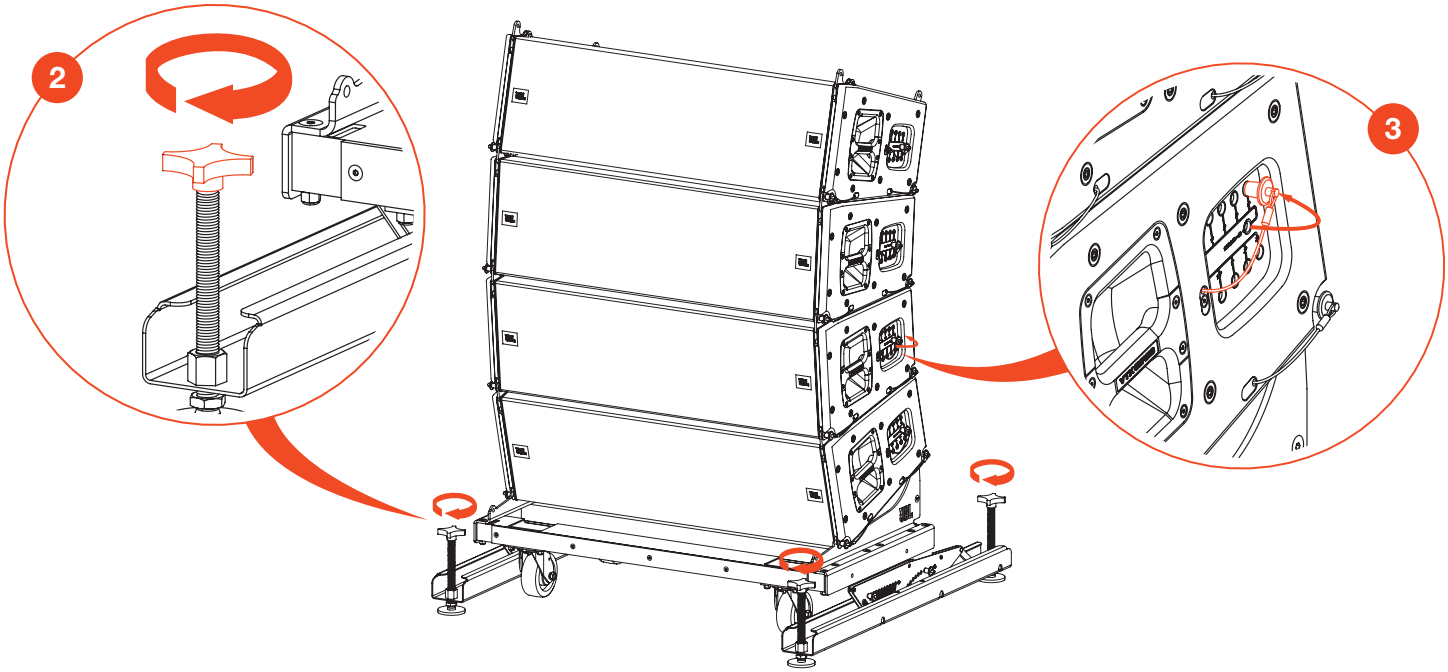
## 13.4 BUILDING A GROUND STACK

Follow the steps below to safely assemble a VTX A12 ground-stacked array using the VTX A12 VT GND accessory.

**STEPS:**

1. Connect the VTX A12 VT GND to the VTX A12 VT. First, remove the quick release pins from the FRONT and REAR positions
   - and slide the skates under the A12 stack. Align the front and rear connection points and insert the two QRPs to secure the ground stack onto the VT. Make sure the screw jacks are adjusted to the furthest counter-clockwise position to allow sufficient clearance for the GND to fit under the VT.
2. Use the four corner screw jacks to lift the VT off the ground. Rotate the screw jacks clockwise until all four red wheels are off the ground by approximately 38 mm (1.5 in).
3. Pin the A12 enclosures to their desired positions, for example, 2°, 4°, 8°. The top A12 enclosure can remain set to the STORAGE position, as it is not used.
4. With all A12 angles selected, lift the top cabinet in the array by its rear handle until the auto-locking mechanism engages at the chosen angle. Work your way down the array, lifting each cabinet to its angle. Once set, auto-lock holds the speakers at the selected positions.
5. Remove the two angle selection quick release pins on the VT GND from their storage positions. The stack is now free to move up and down. Use the SET ANGLE QRP to select the desired angle for the stack (for example, -7°). Both sides must be set to the same position.
6. Push the A12 stack upwards until it reaches the selected angle and stops moving. Insert the LOCK ANGLE quick release pins at the position on the VT GND matching the selected angle (in this example, -7°) to secure the stack.
7. If more than four A12 cabinets are used, add the rest of the A12 cabinets to the stack.

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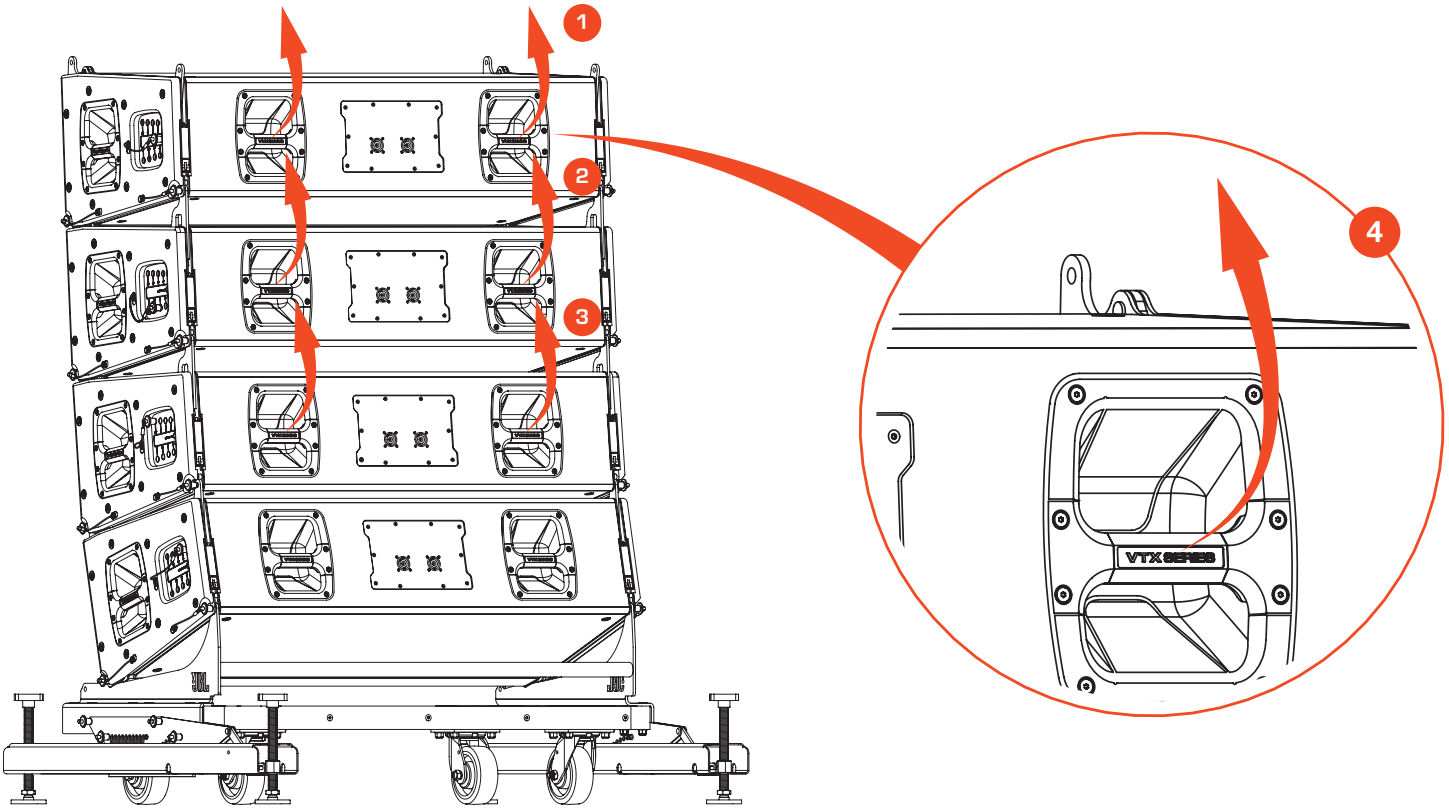
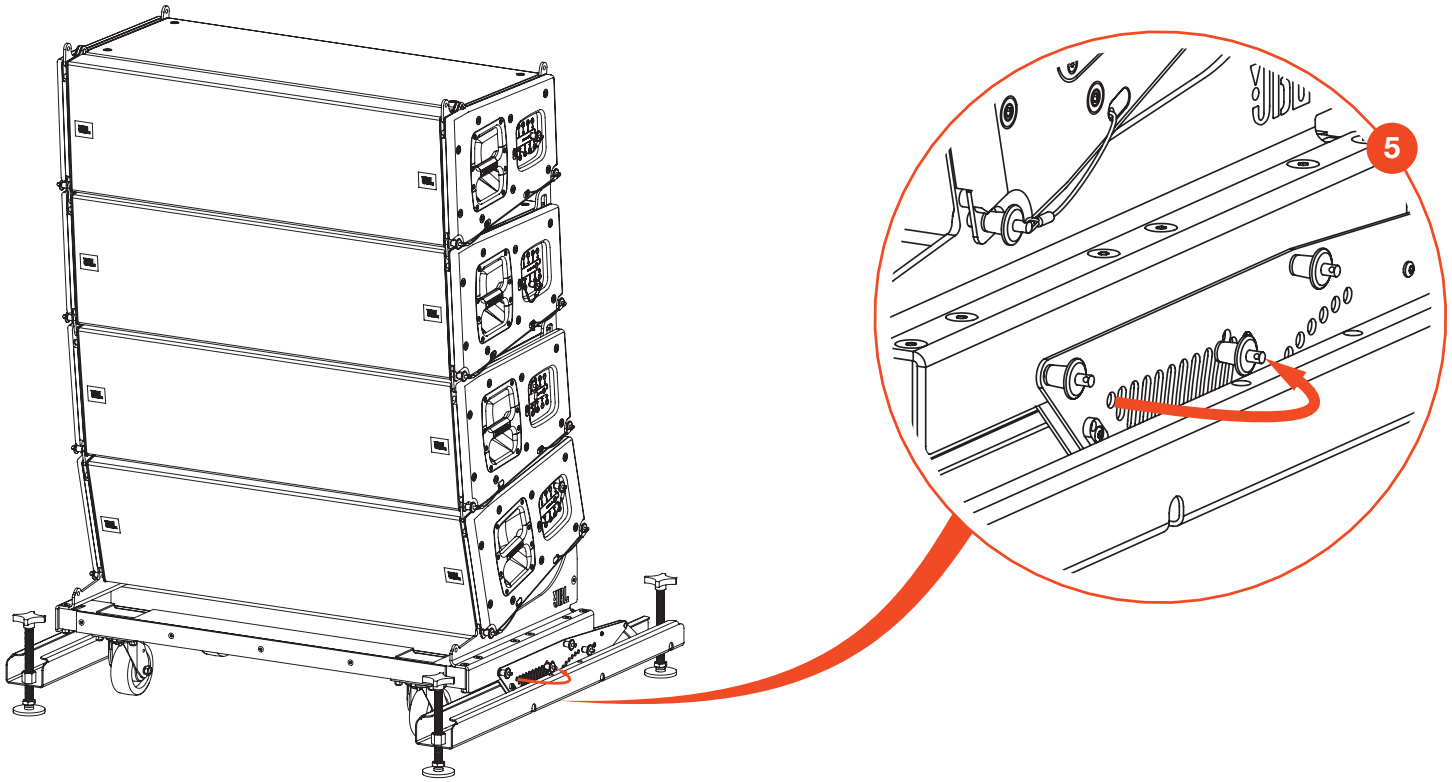
3


1
2
3
4
VTX SERIES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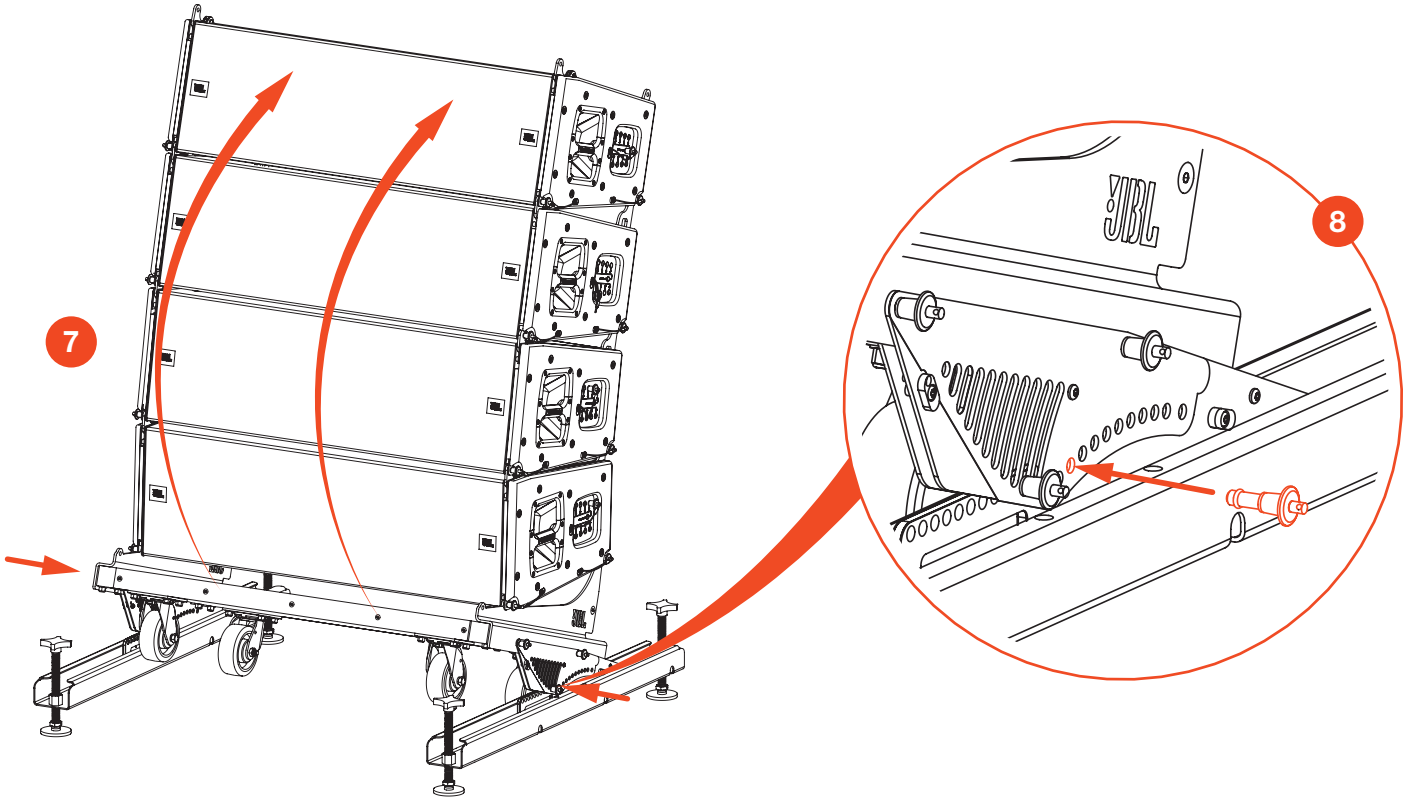
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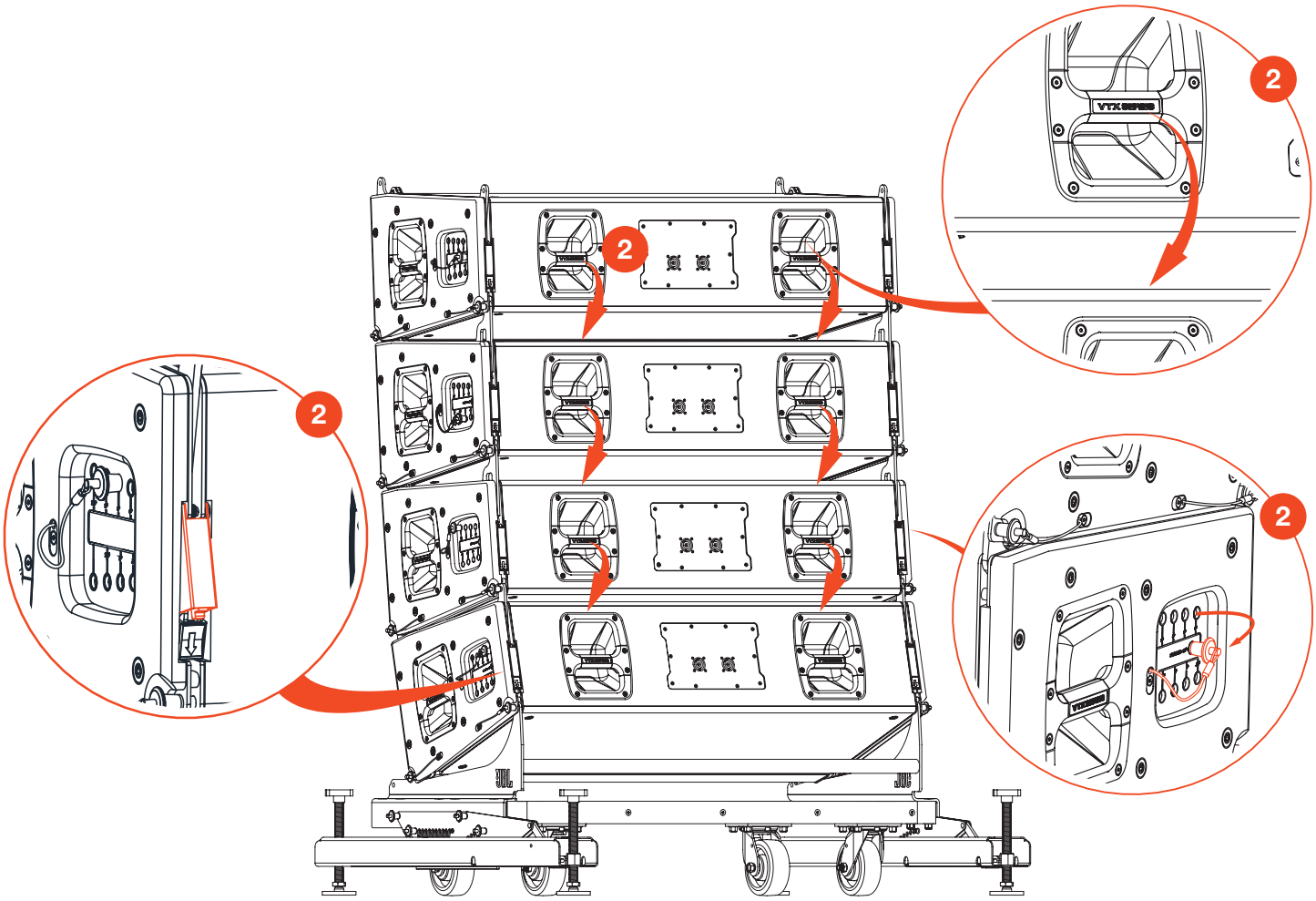
8

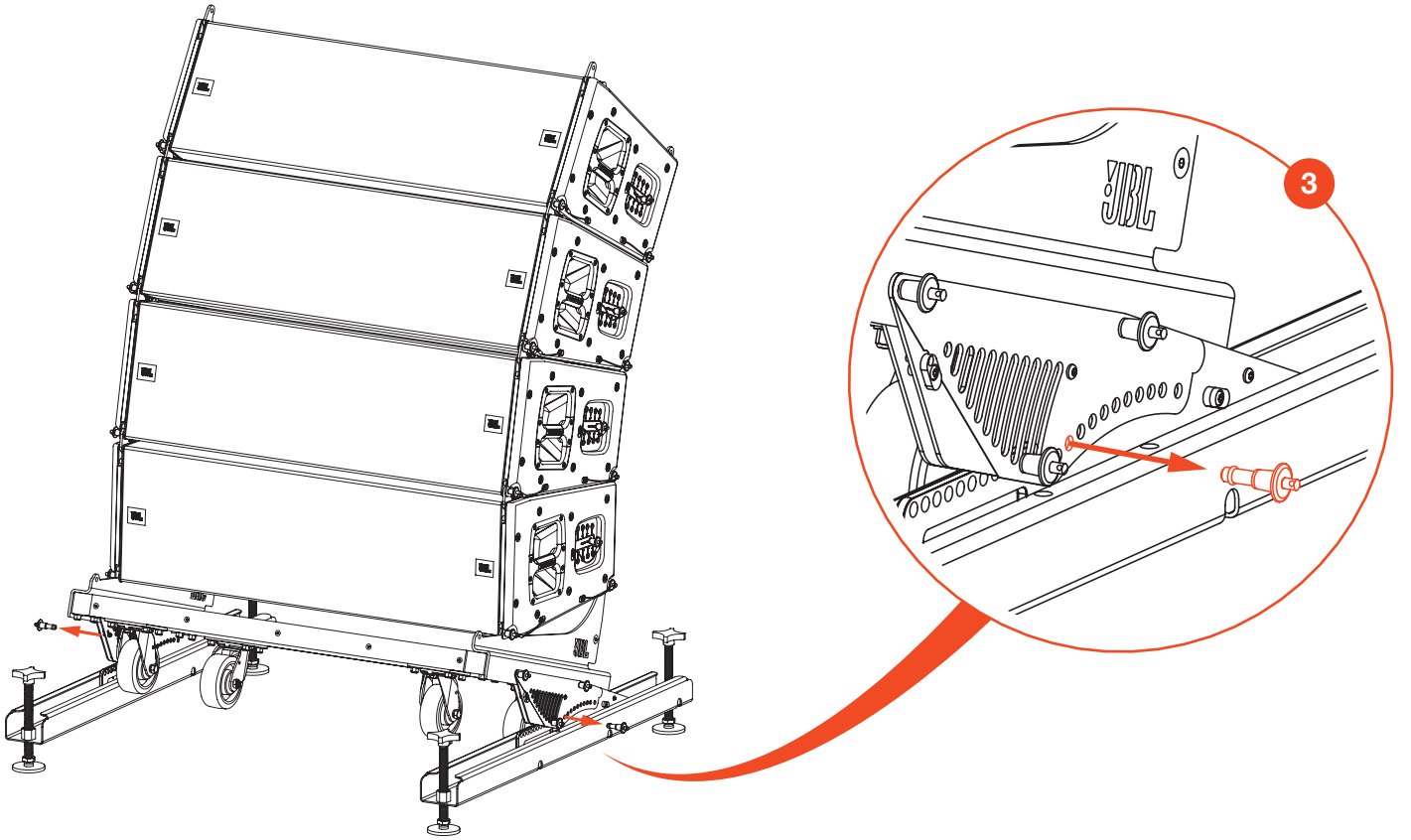
## 13.5 DISASSEMBLING THE GROUND STACK

Disassembling a ground-stacked A12 system is similar to assembling a stack, only in reverse. Follow the instructions below to safely disassemble the array.

**STEPS:**

1. If more than four A12 cabinets are used, disconnect and remove the additional A12 cabinets from the stack until only four A12 cabinets remain on the VT.
2. Reset all A12 cabinets to the 10° STORAGE position, working from the top cabinet in the array to the bottom on one side, then doing the same on the other side. Lift each cabinet by its rear handle, then press the Lock Release button to release the red Angle Lock mechanism and allow the cabinet to return to the STORAGE position.
3. Remove the LOCK ANGLE quick release pins on the A12 VT GND and carefully lower the A12 stack to the level, -15° position.
4. Move both the SET ANGLE and LOCK ANGLE quick release pins to the STORAGE positions.
5. Lower the stack to the ground by turning the four screw jacks counterclockwise until they reach their furthest position.
6. Remove the QRPs that connect the ground stack to the Vertical Transport cart. Remove the VT GND from under the Vertical Transport cart by sliding the skates to the side of the VT. Replace the two QRPs to the connecting positions.

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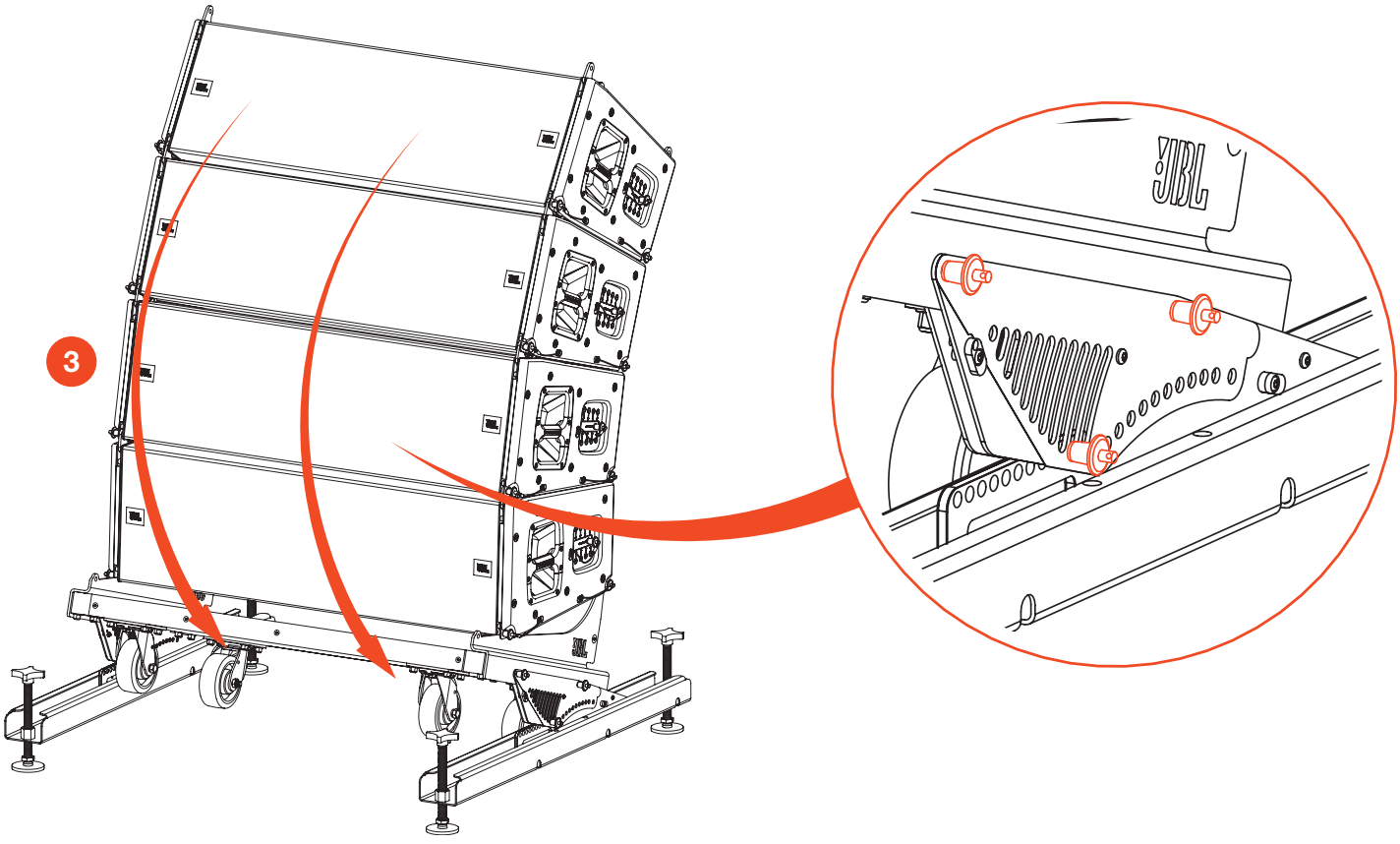
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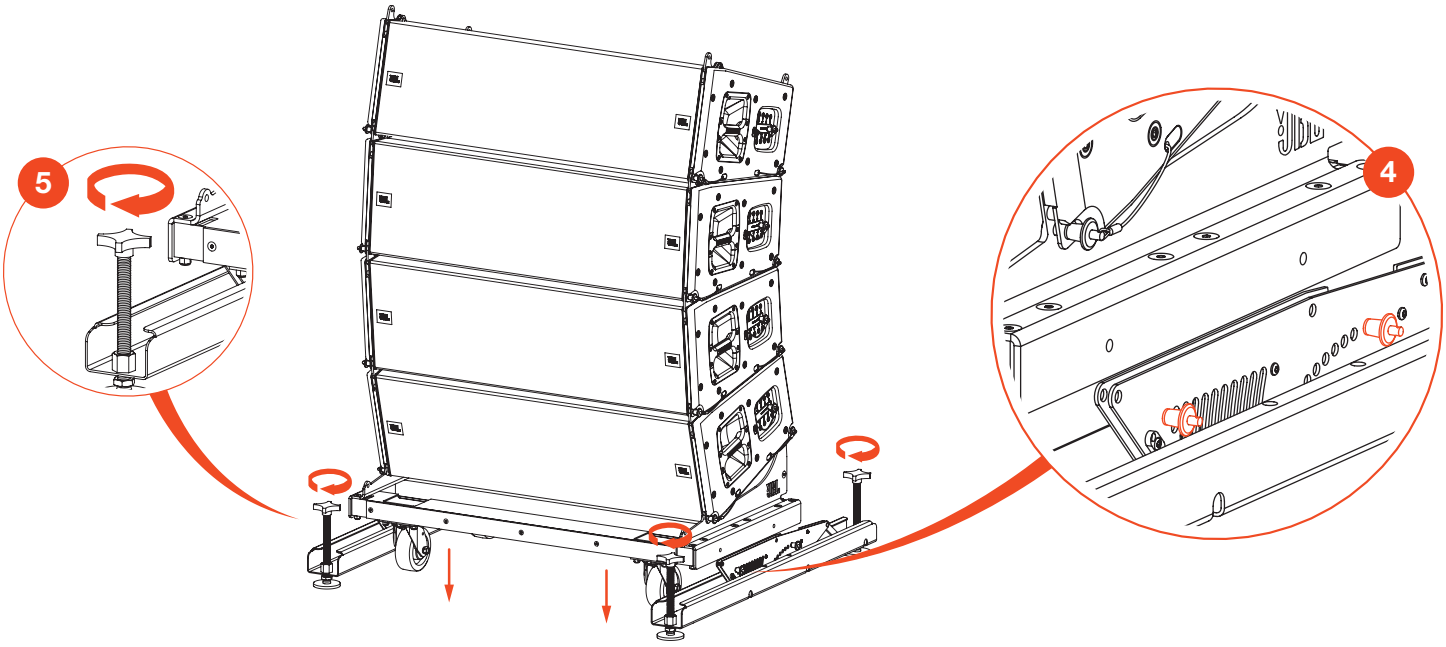
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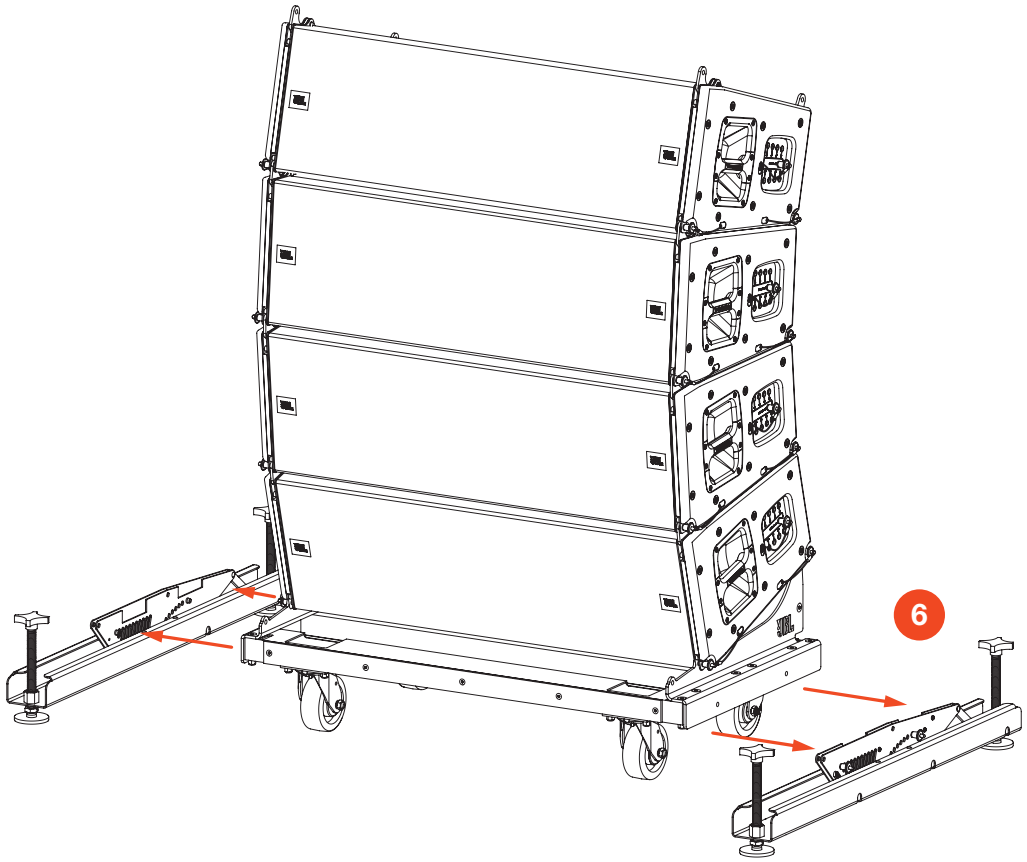
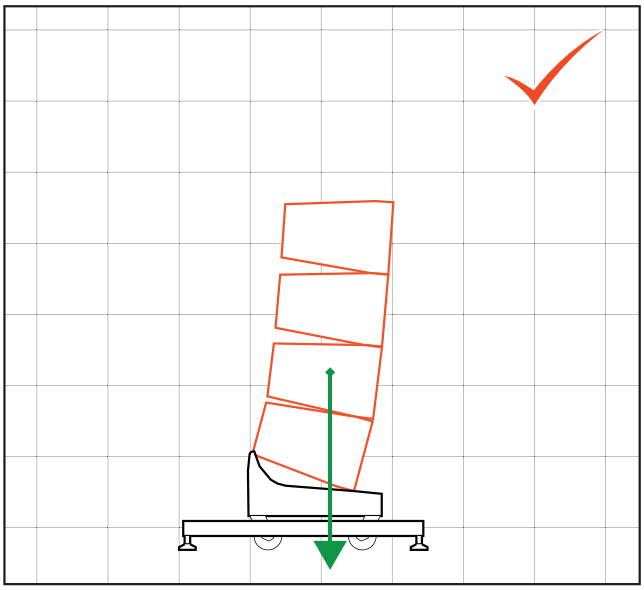

6

## 13.6 GROUND STACK LIMITS

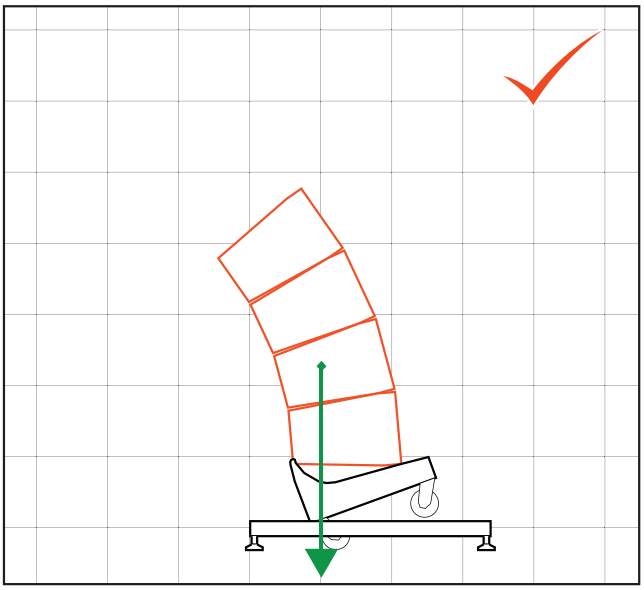
The VTX A12 VT GND ground stack accessory can safely support the weight of up to four VTX A12 enclosures under any array conditions. This includes setting all VTX A12 cabinets to the 10° position and the GND to +5°, which is the most extreme ground stack scenario. The VTX A12 VT GND can support the weight of up to six VTX A12 enclosures when the array's Center of Gravity (CoG) aligns sufficiently closely to the center of the GND as to not create a tipping hazard. In general, straight arrays of up to six A12 enclosures will work, but curved arrays tend to push the CoG towards the rear of the GND, which may limit the number of enclosures to four. JBL Line Array Calculator 3 software calculates these conditions in real time and should always be used to determine array parameters. If an array is unsafe, LAC-3 will display an error. Below are some valid and invalid examples, as shown in LAC:

**(4) VTX A12 - Straight Array**



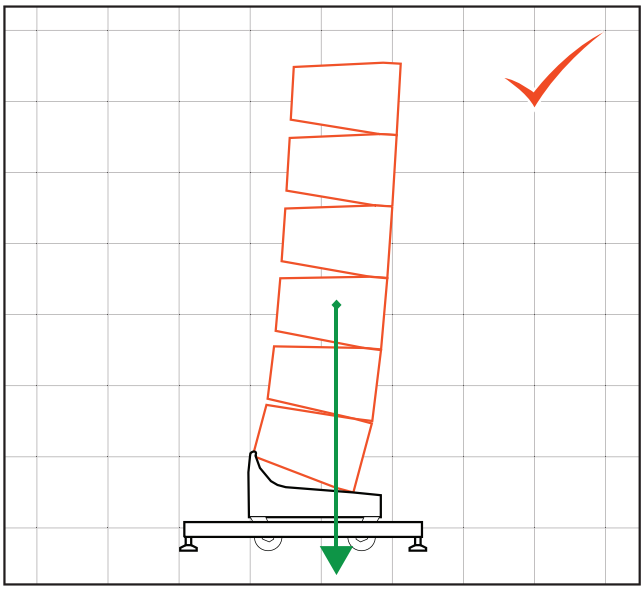
● Center of Gravity

**(4) VTX A12 - Curved Array**



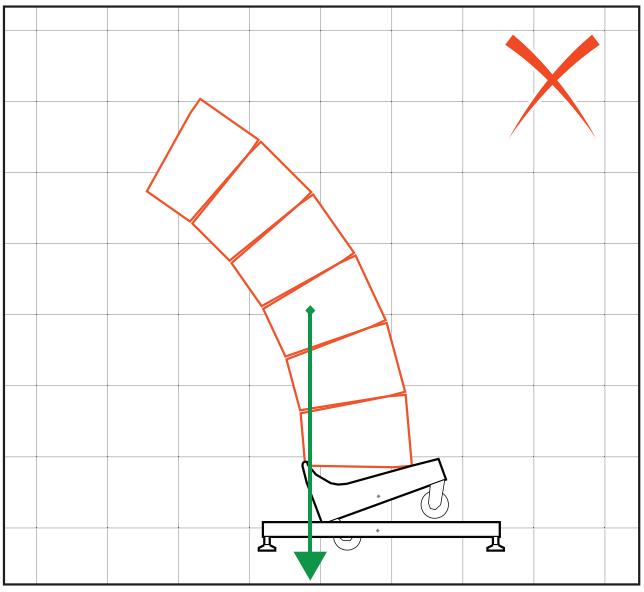
● Center of Gravity

**(6) VTX A12 - Straight Array**



● Center of Gravity

**(6) VTX A12 - Curved Array**

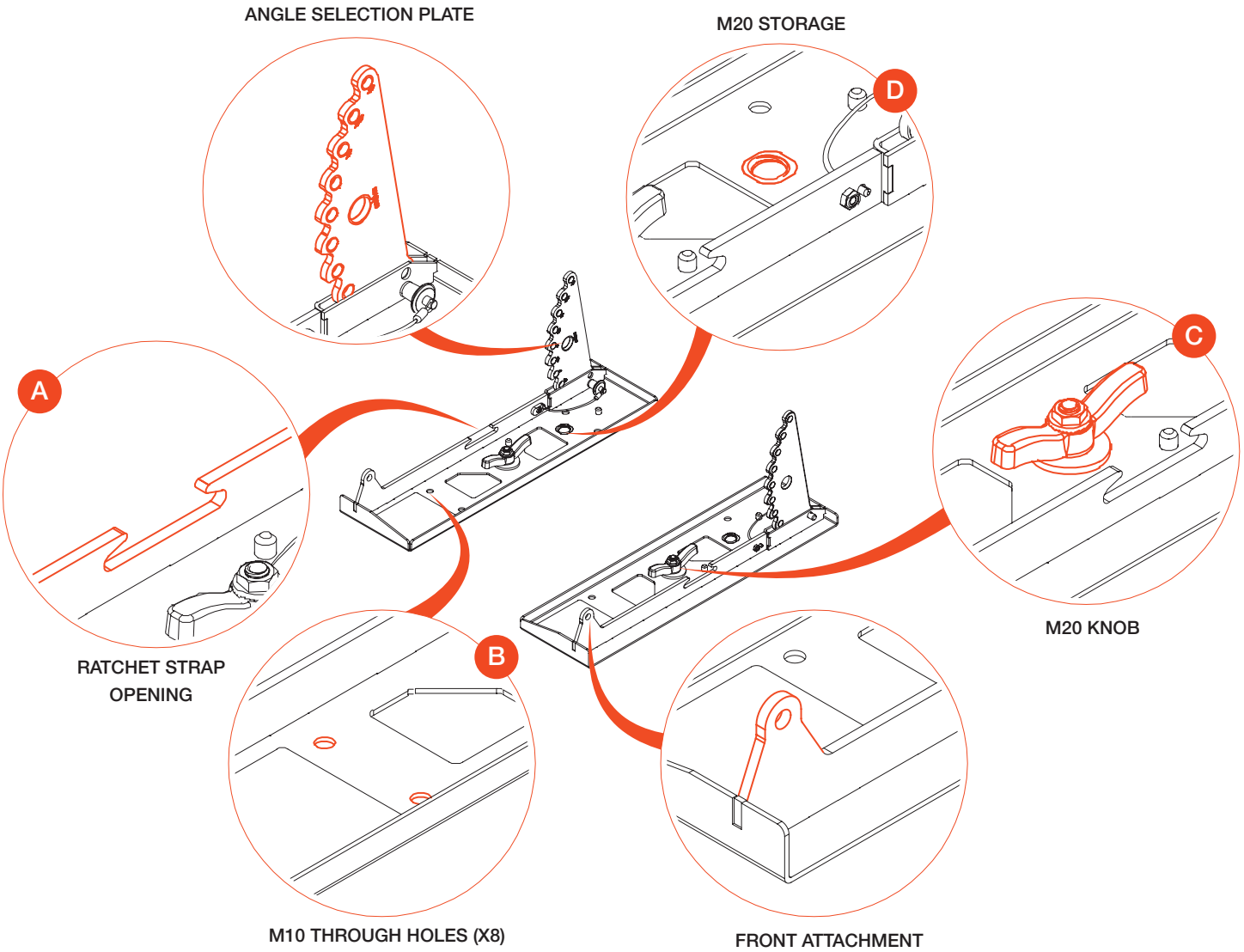


● Center of Gravity

## 14 - THE VTX A12 BASE PLATE

The VTX A12 BP Base Plate accessory is a universal adapter frame that enables VTX A12 arrays to be ground stacked on top of compatible subwoofers or support structures such as stages, scaffolding, or carts. Using the included M20 knob-screws, the VTX A12 BP attaches directly to the bottom of an A12 array, and then to M20 plates on the top of a VTX B28 subwoofer. The rear angle selection bar can be set for angles between -15 and +5 degrees. When not used with B28 subwoofers, the A12 BP's M10 through-holes can be used to permanently attach an A12 array to other support structures. Configurations and load conditions for using the VTX A12 BP can be obtained using JBL LAC-3 prediction software.

### 14.1 BASE PLATE OVERVIEW




**NOTES:**

A. The ratchet strap opening can be used to secure the ground-stacked array to a structure to prevent tipping.

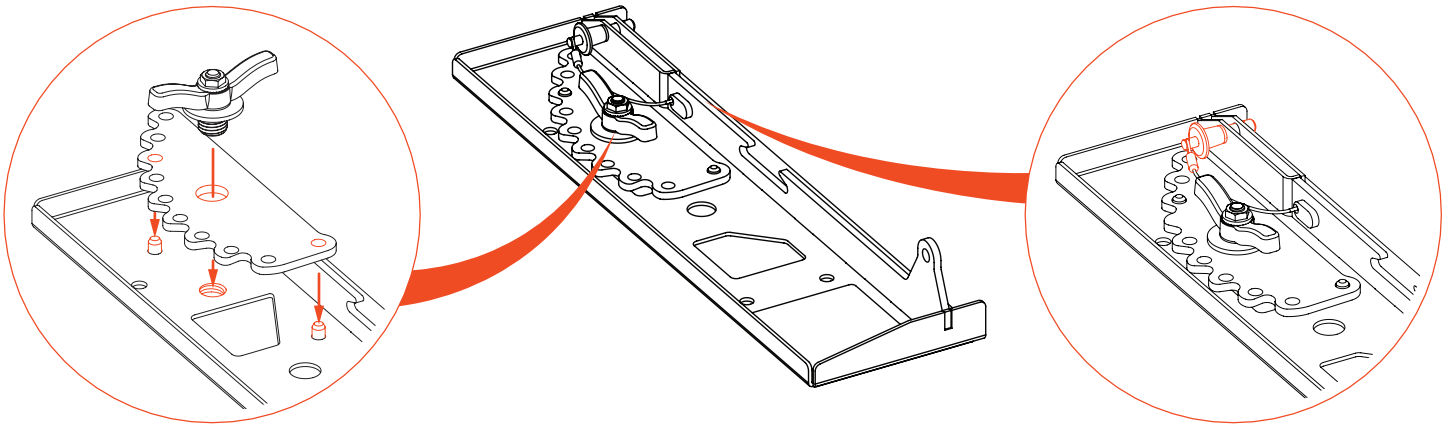
B. Four M10-sized screws can be used to secure the base plate onto a fixed structure (like a stage or a cart) for permanent installation.

C. An M20 knob and screw attach the base plate onto supported subwoofers like the VTX B28.

D. Storage position for the M20 knob.

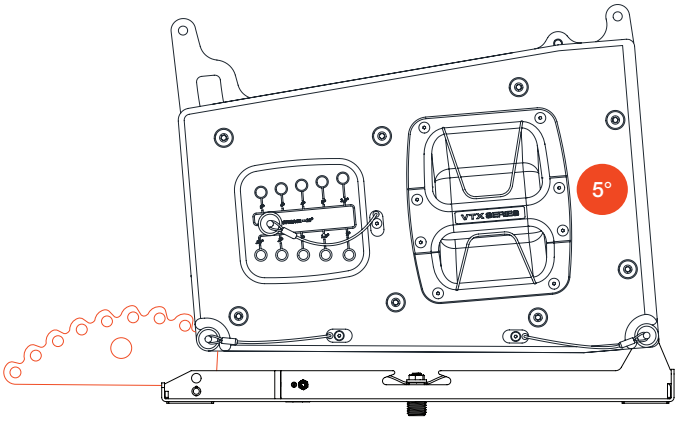
## 14.2 STORAGE CONFIGURATION

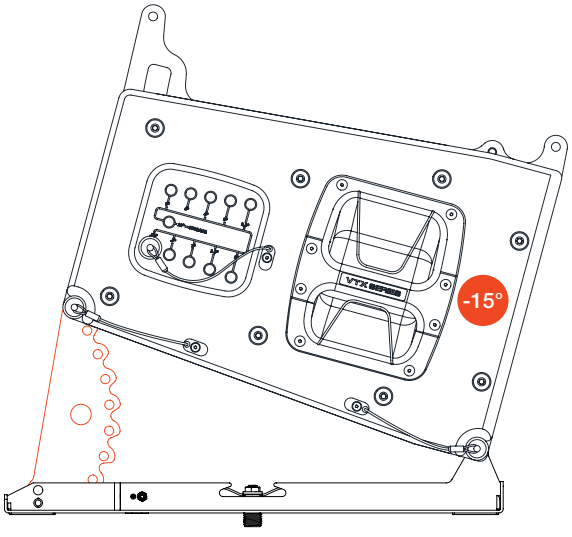
The two angle selection plates can be removed from their regular positions and secured horizontally for storage using the M20 knobs. Use the (S) marks on the angle plate labels for proper alignment.



## 14.3 ANGLE SELECTION PLATES

The Base Plate angle selection plates include nine pin positions, allowing for a range of angles from -15 degrees to +5 degrees in 2.5-degree steps. Line Array Calculator 3 software determines the most appropriate position to select to obtain the required down angle, and checks array safety.



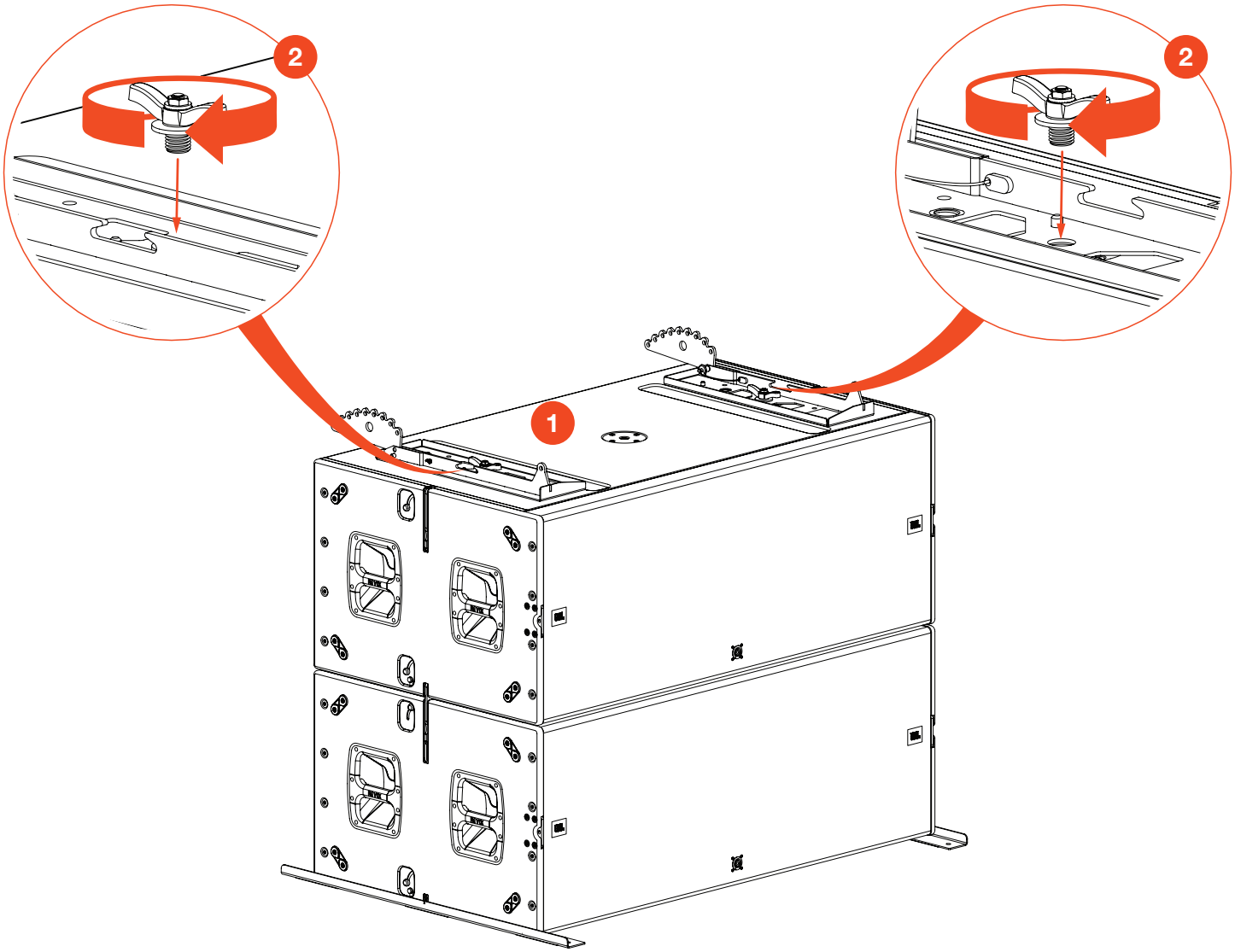




## 14.4 ASSEMBLING GROUND-STACKED ARRAYS

The Base Plate attaches to supported VTX subwoofers using their M20 pole mount adapter/plates. Before attaching the Base Plate, assemble and position the subwoofers at the desired location. For instructions on assembling and attaching the B28 GND or other sub-woofer-specific accessories, refer to the subwoofer rigging manuals. Follow the instructions below to assemble an A12 array.

STEPS:

1. Place the base plates onto the top subwoofer.
2. Attach the plates to the outer two M20 attachment points, using the included M20 knobs to secure them onto the subwoofer.

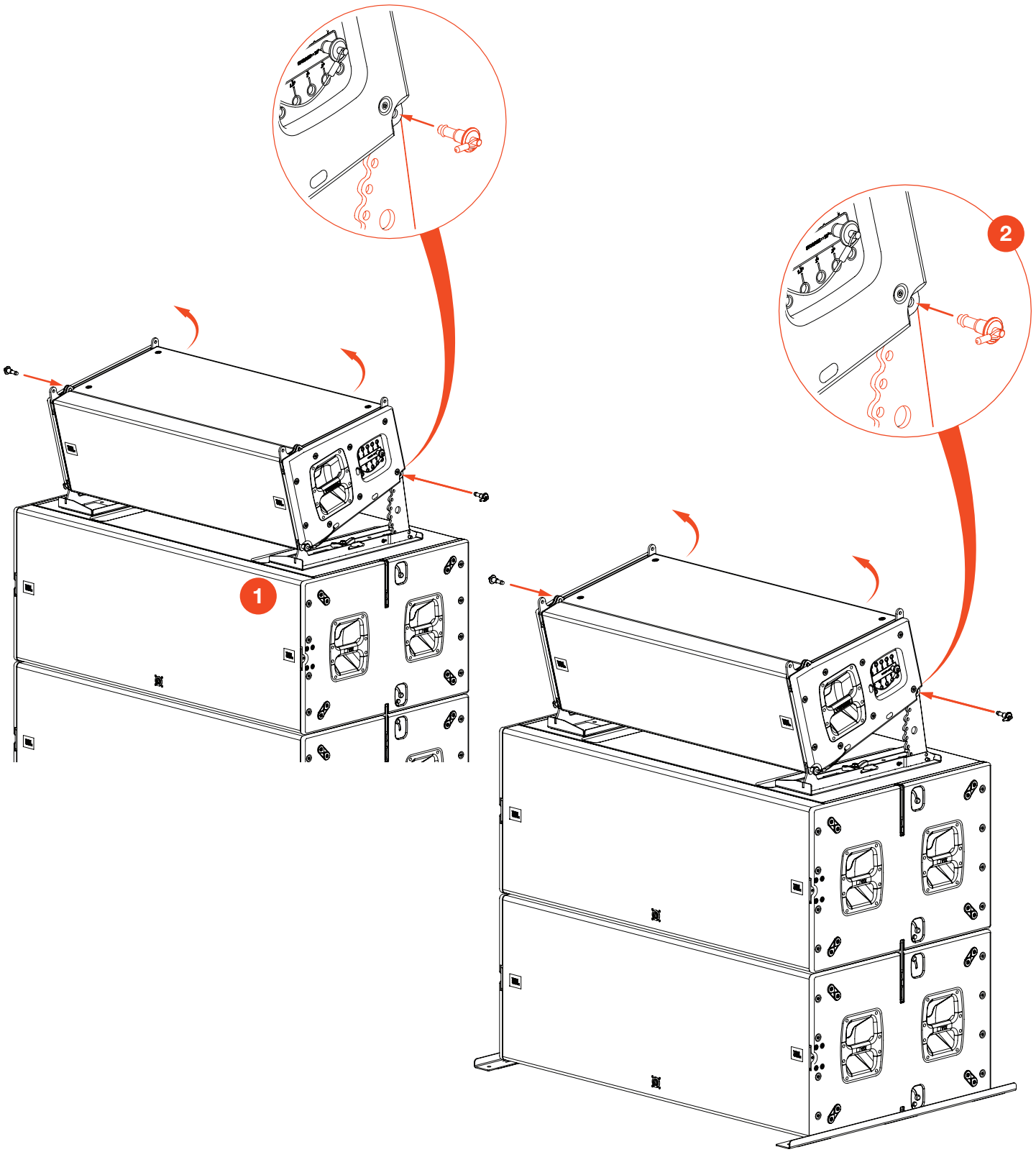



**CAUTION: Safe limits for ground-stacked arrays always assume that the stacking surface (floor or stage) is flat. To avoid tipping hazards, do not deploy ground-stacked arrays on non-flat surfaces.**

**CAUTION: Ground-stacked arrays should always be checked in LAC-3 for mechanical safety. Always secure a stacked system to the stacking platform or stacking surface to ensure stability and prevent tipping.**

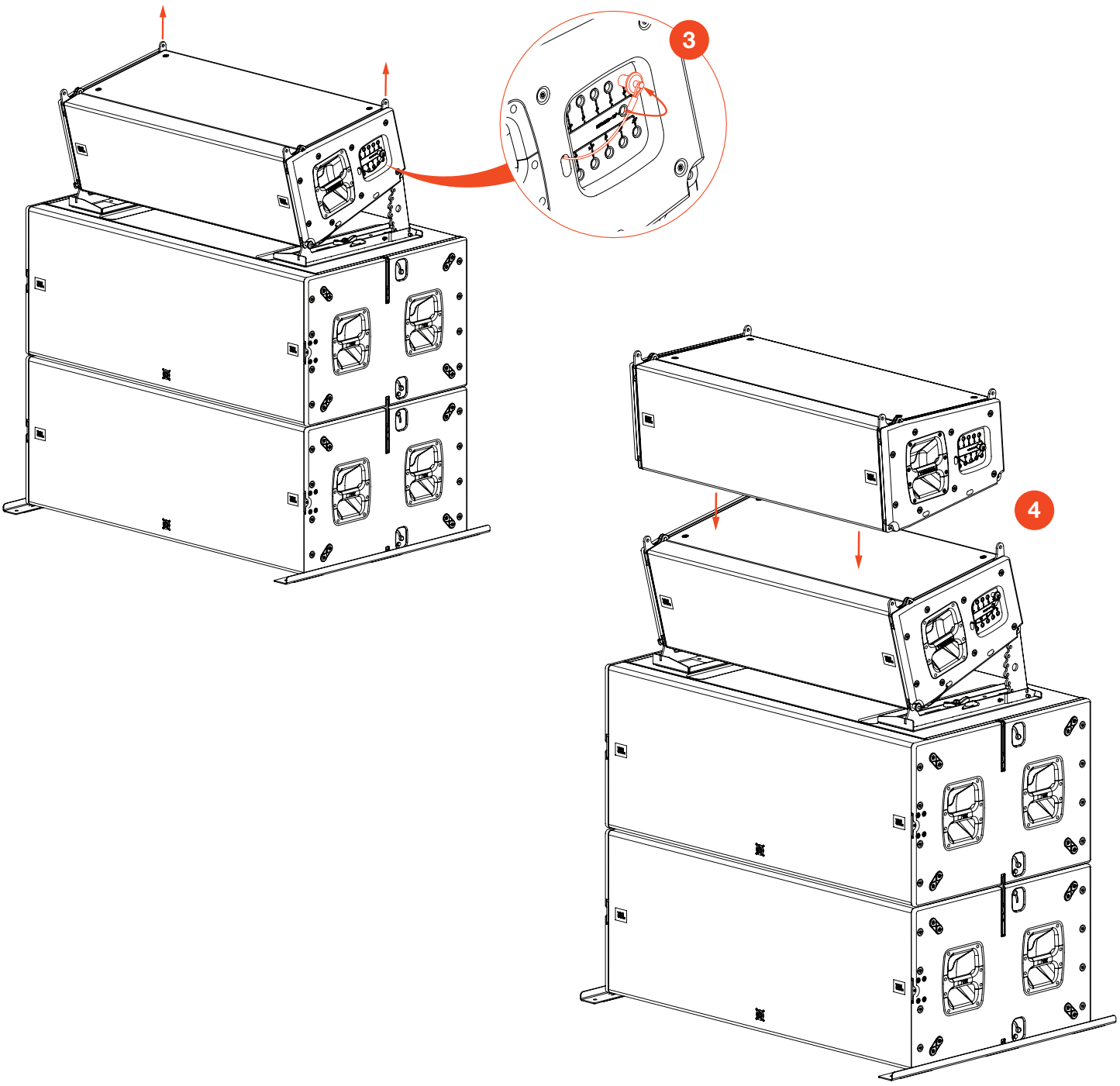
STEPS:

1. Place the first A12 onto the Base Plate and pin the front two corners.
2. Lift the rear of the A12 and position the angle selection plate at the desired location. Pin the rear two corners.



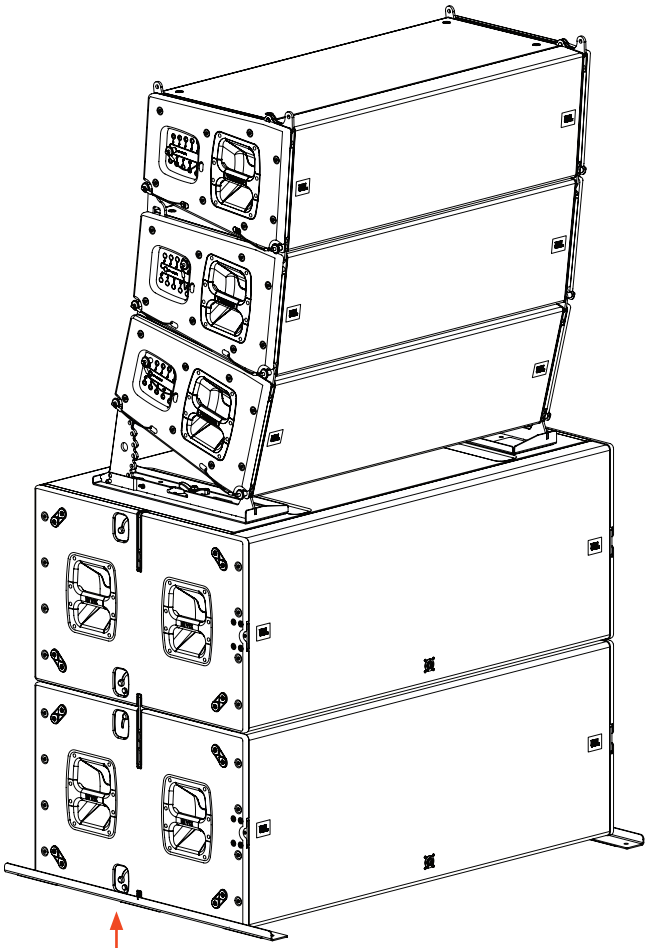
STEPS:

3. Select the inter-enclosure angle for the first A12 and extend the rigging arms to set the angle.
4. Stack the next A12, pin the cabinets together, and set the angle for the cabinet. Repeat steps 3 and 4 to add the remaining cabinets to the array.

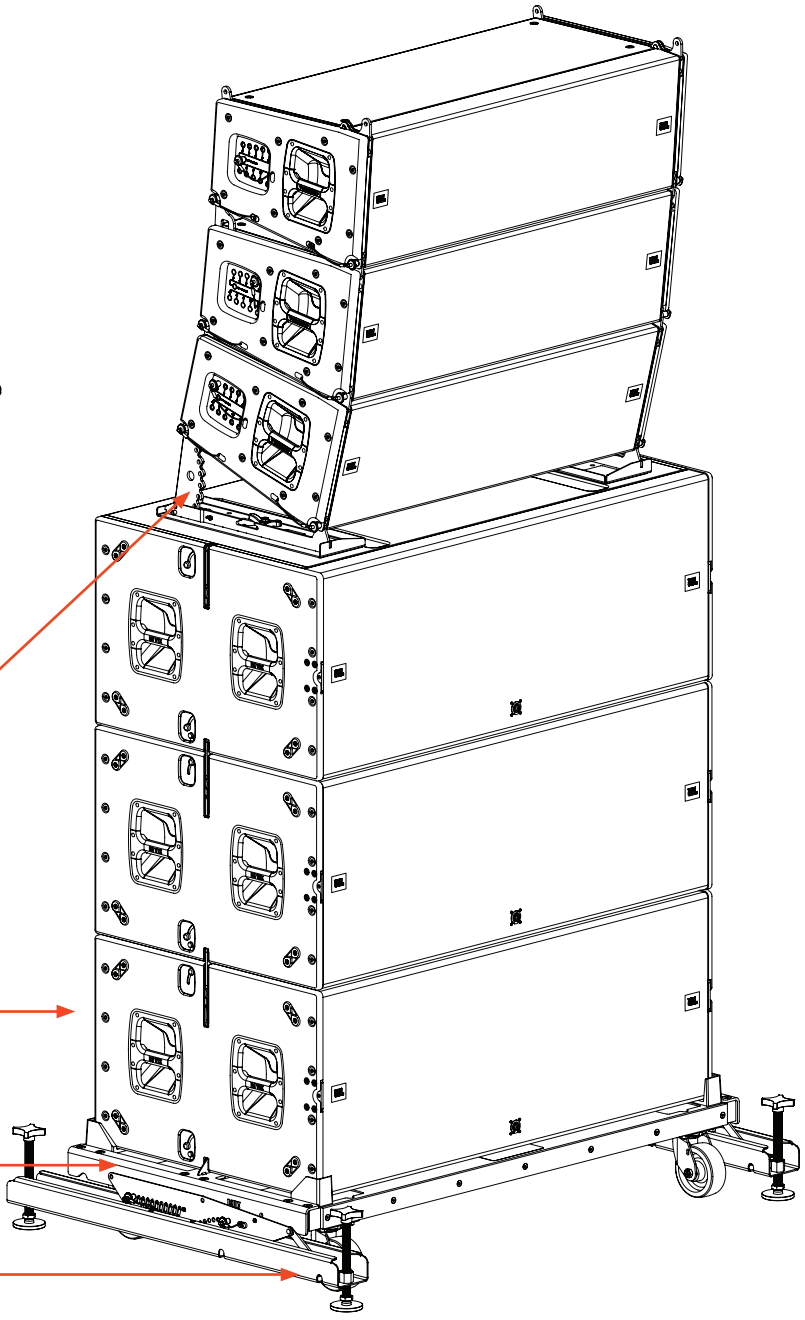



**TIP:** The very top cabinet does not require an angle when used in ground-stacked configurations. It's best to set the angle to the 10-degree position for the best appearance.

## 14.5 A12 BASE PLATE EXAMPLES

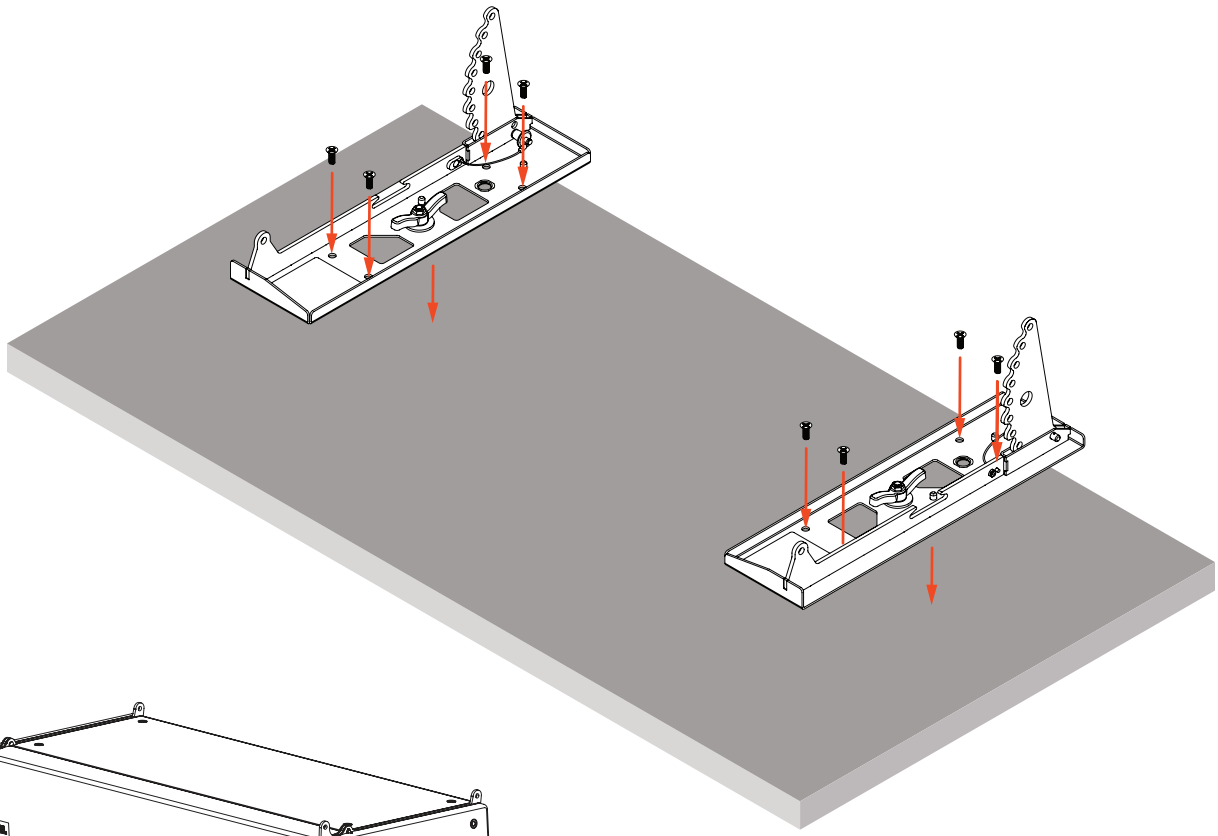


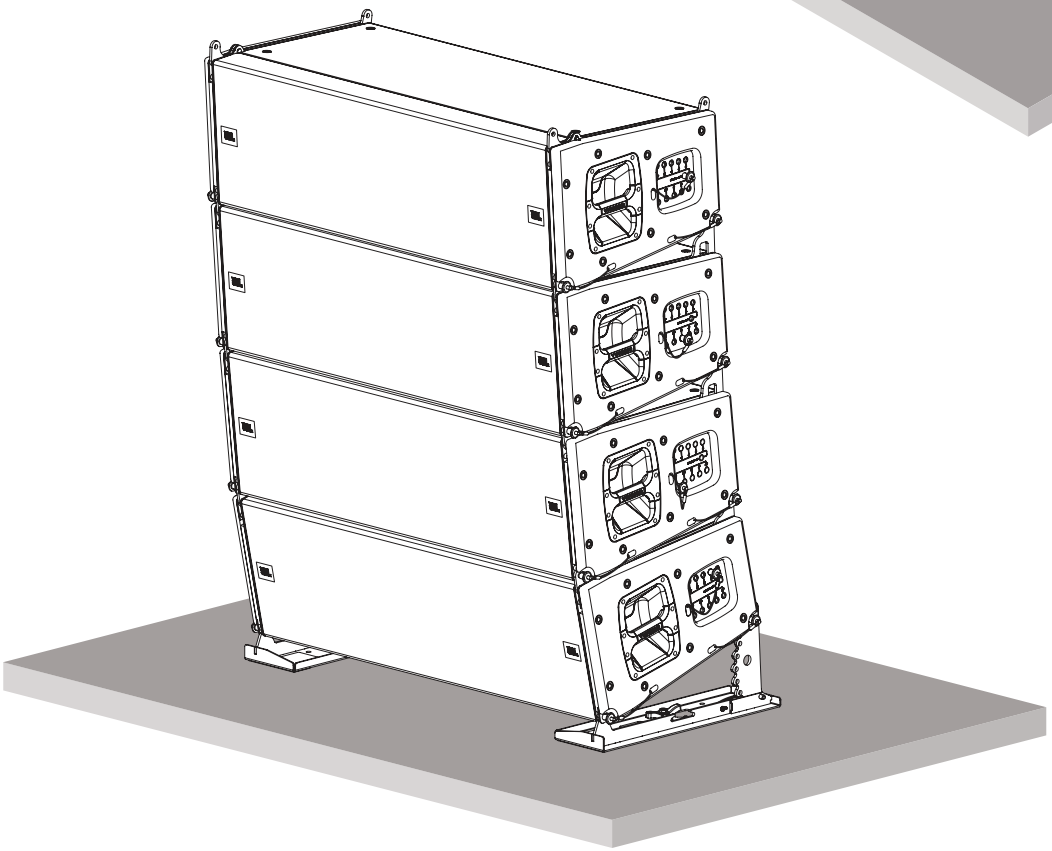
VTX B28 GND



## 14.6 ATTACHING THE BASE PLATE ONTO A STRUCTURE

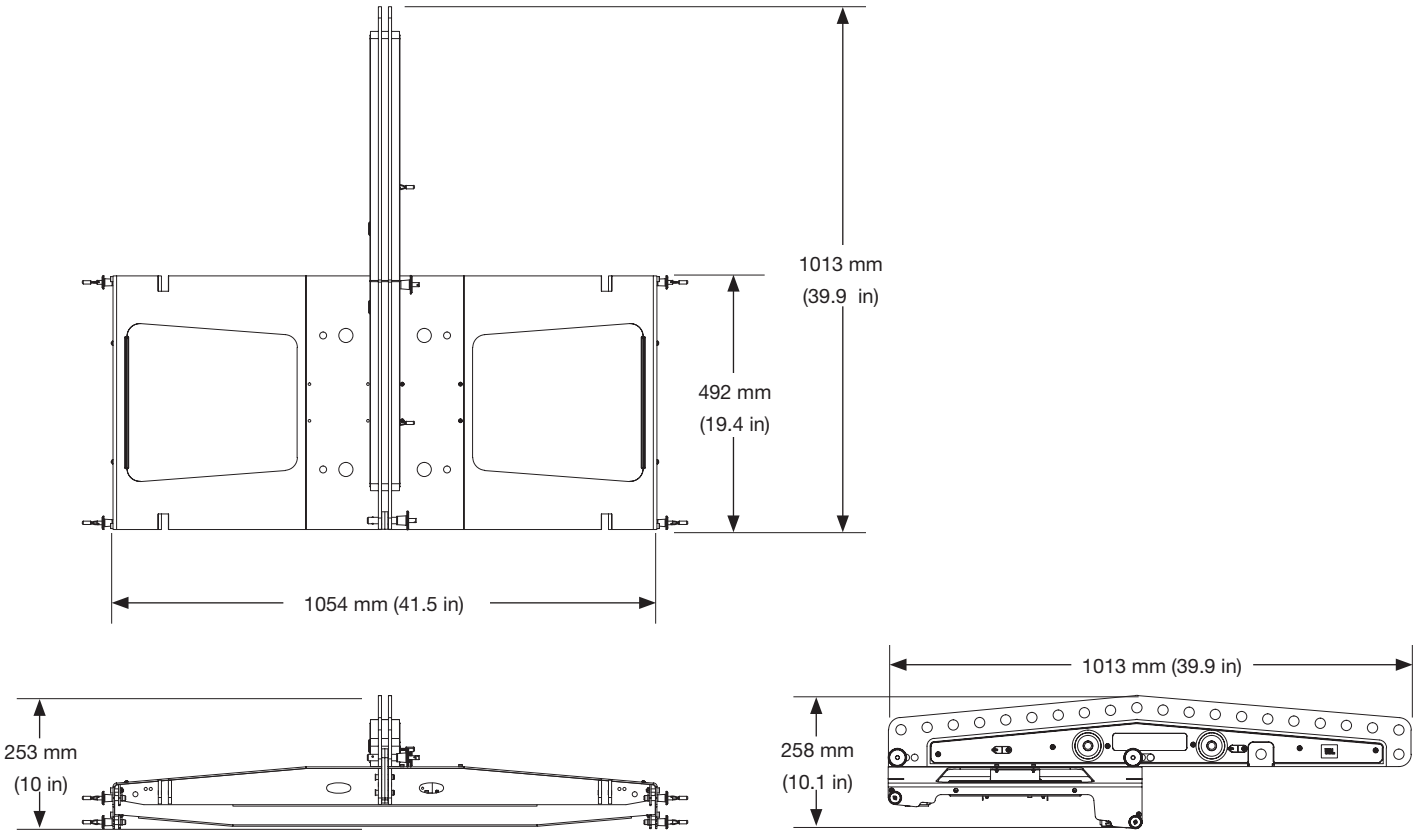
The base plate can be permanently attached to a structure like a stage or platform using its eight through-holes. This is especially useful for permanent installations or other fixed applications where a ground-stacked A12 system is needed, but not often moved. In such situations, the base plate is permanently attached to the structure and subwoofers are not used beneath the array. For detailed drawings of the A12 BP Base Plate, including the position and size of its holes, refer to the VTX A12 Customer Drawings.





# 15 - SPECIFICATIONS

## 15.1 VTX A12 AF

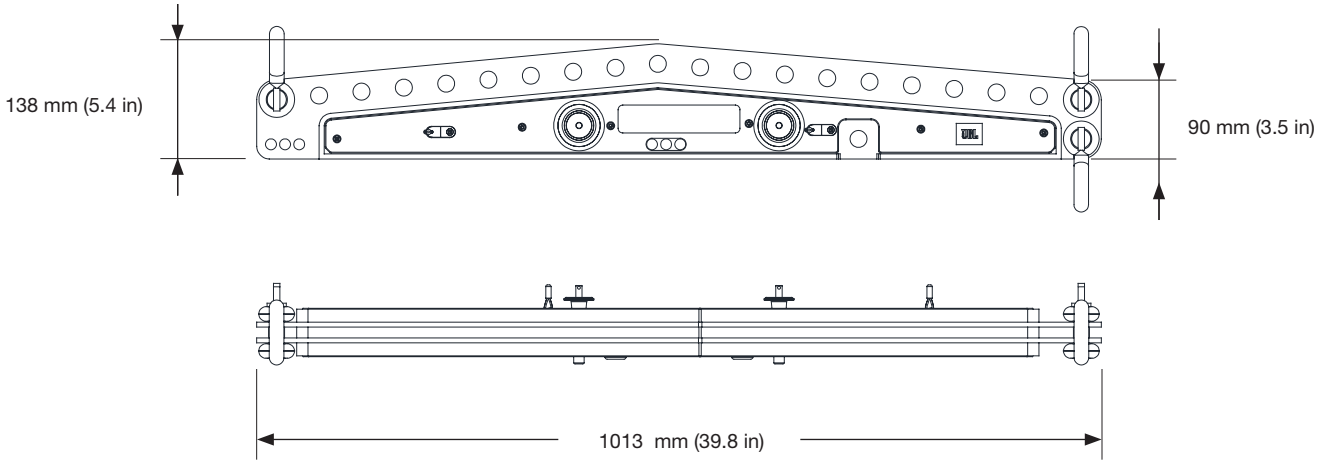


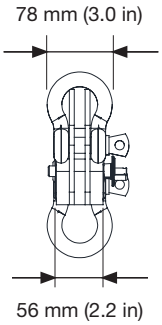

| | |
|---|---|
| **Construction:** | High-grade steel with anti-corrosion coating |
| **Finish:** | Black powder coat |
| **Compatible Shackle Size:** | 5/8-inch |
| **Supported Lasers:** | JBL VTX LZ, TEQ-SAS, Recline |
| **Mechanical Limits[1]** | |
| **Maximum:** | (24) VTX A12 |
| **Safe Limit:** | (12) VTX A12 |
| **Dimensions (H x W x D)[2]:** | 258 mm x 1054 mm x 492 mm<br>(10.1 in x 41.5 in x 39.9 in) |
| **Net Weight[3]:** | 41 kg (90 lbs) |

**Footnotes:**

1: For arrays larger than the safe limit always use the JBL Line Array Calculator 3 to determine mechanical safety.
2: Refer to the 2D and 3D Customer Drawings for more detailed dimensions.
3: Weight includes AF and EB. Shackles and other rigging parts not included.

## 15.2 VTX A12 AFEB



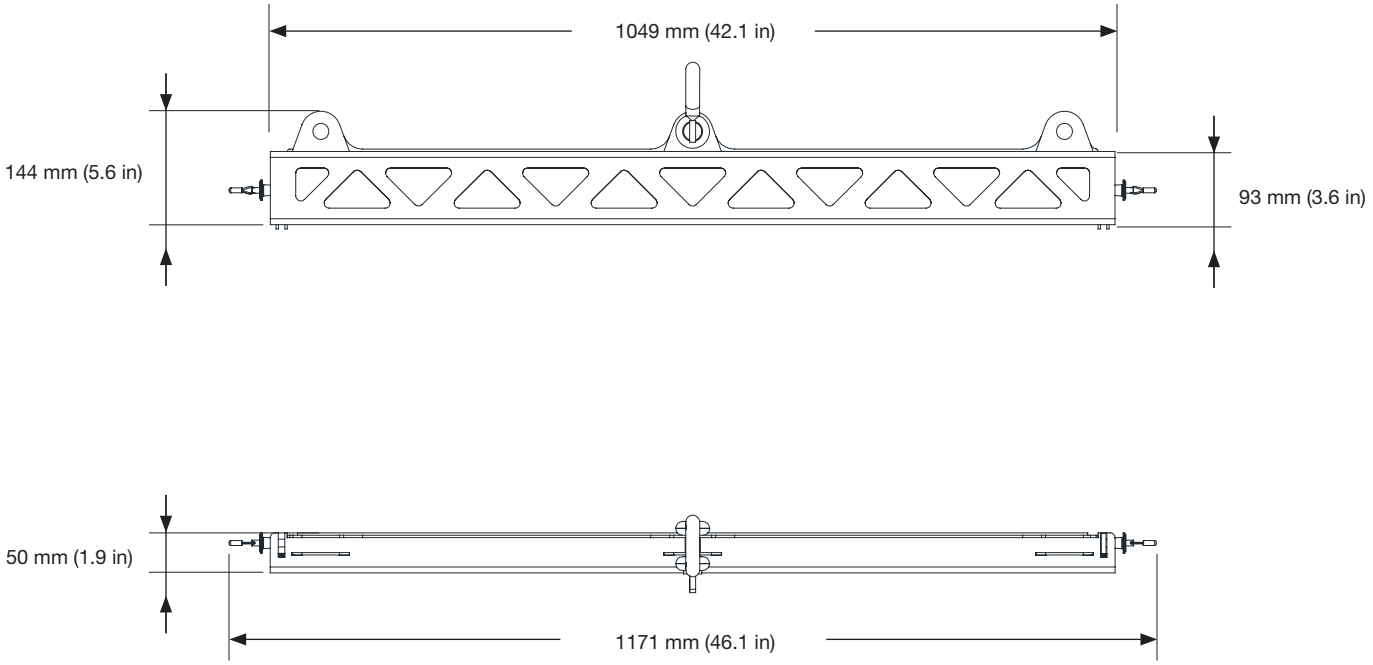




| | |
|---|---|
| **Construction:** | High-grade steel with anti-corrosion coating<br>Plastic side covers |
| **Finish:** | Black powder coat |
| **Compatible Shackle Size:** | 5/8-inch |
| **Supported Lasers:** | JBL VTX LZ, TEQ-SAS, Recline |
| **Mechanical Limits[1]**<br>**Maximum:**<br>**Safe Limit:** | <br>(24) VTX A12<br>(12) VTX A12 |
| **Dimensions (H x W x D)[2]:** | 138 mm x 1013 mm x 78 mm<br>(5.4 in x 39.8 in x 3.0 in) |
| **Net Weight[3]:** | 13.6 kg (30 lbs) |

**Footnotes:**

1: For arrays larger than the safe limit always use the JBL Line Array Calculator 3 to determine mechanical safety.
2: Refer to the 2D and 3D Customer Drawings for more detailed dimensions.
3: Array Frame, shackles and other rigging parts not included

## 15.3 VTX A12 SB

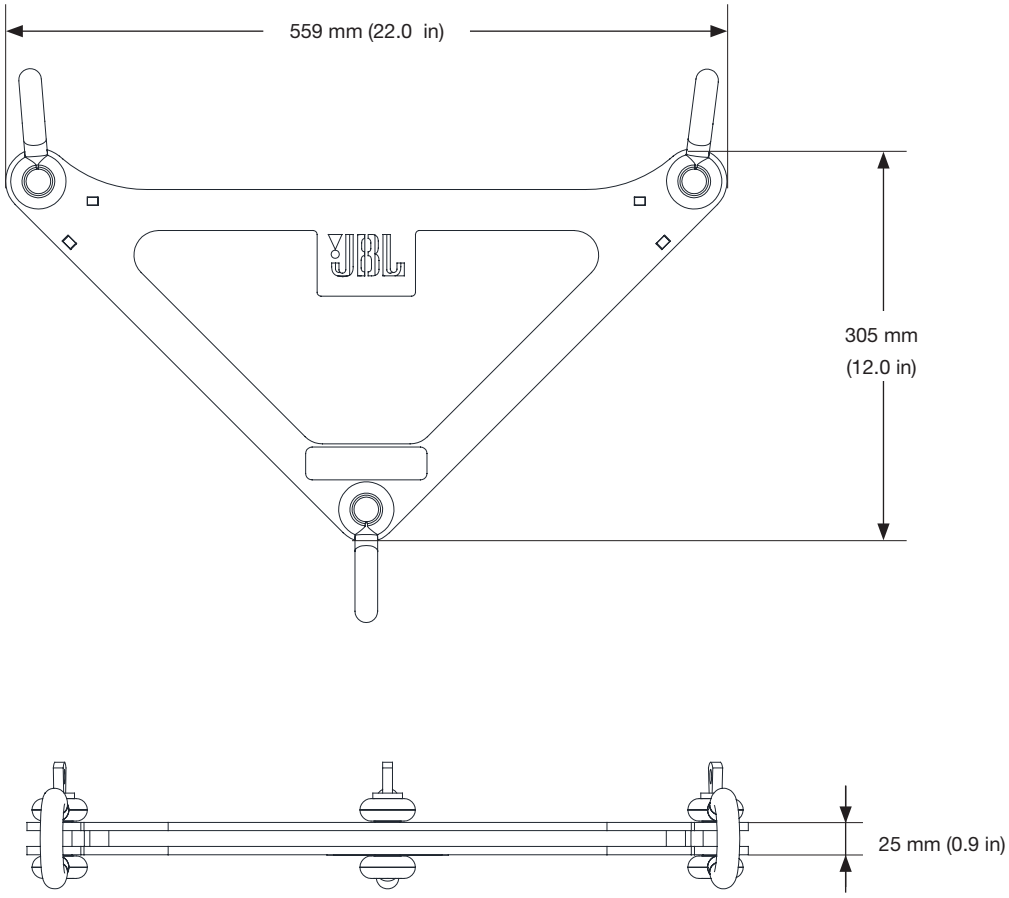



| | |
|---|---|
| **Construction:** | High-grade steel with anti-corrosion coating |
| **Finish:** | Black powder coat |
| **Compatible Shackle Size:** | 5/8-inch |
| **Mechanical Limits[1]** | |
| **Maximum:** | (18) VTX A12 |
| **Safe Limit:** | (18) VTX A12 |
| **Dimensions (H x W x D)[2]:** | 144 mm x 1049 mm x 50 mm<br>(5.6 in x 42.1 in x 1.9 in) |
| **Net Weight[3]:** | 6.4 kg (14 lbs) |

**Footnotes:**

1: For arrays larger than the safe limit always use the JBL Line Array Calculator 3 to determine mechanical safety.
2: Refer to the 2D and 3D Customer Drawings for more detailed dimensions.
3: Shackles and other rigging parts not included.

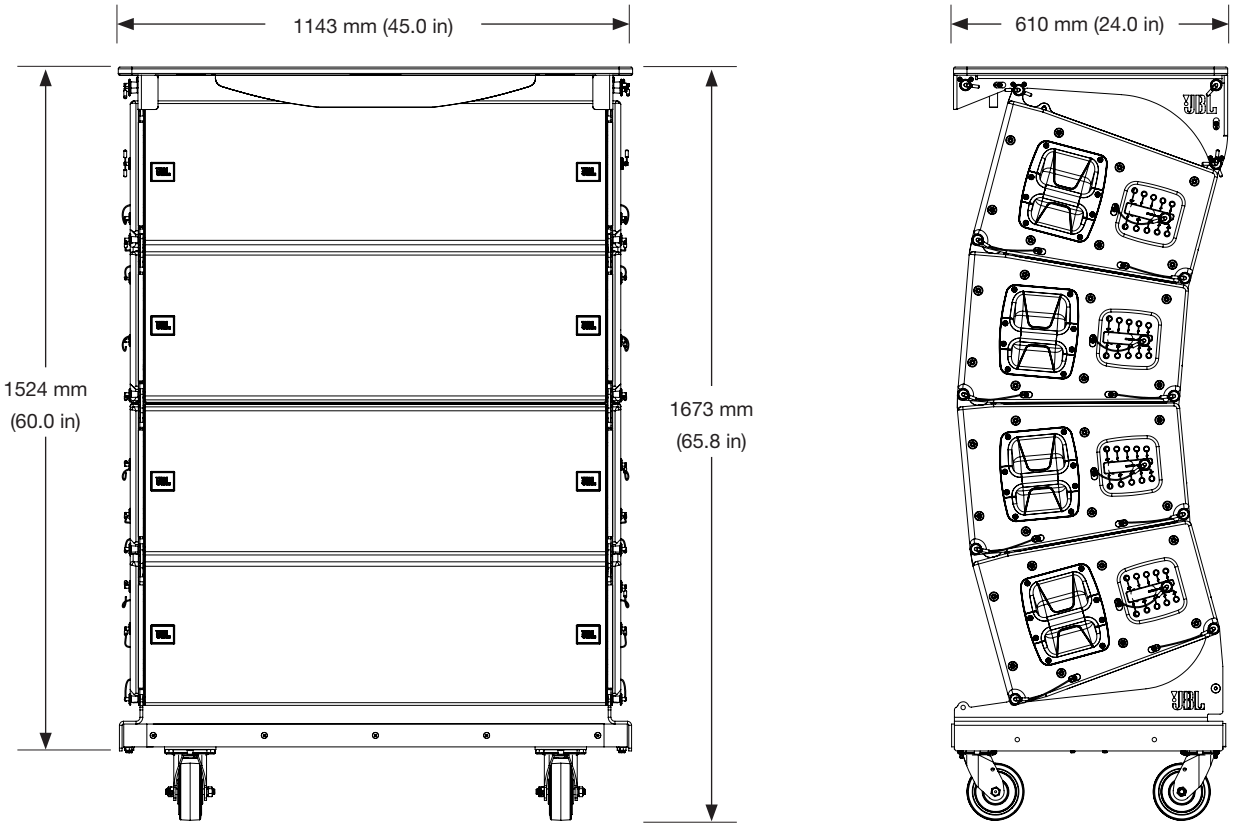
## 15.4 VTX DELTA




| | |
|---|---|
| **Construction:** | Steel with anti-corrosion coating |
| **Finish:** | Black powder coat |
| **Compatible Shackle Size:** | 5/8-inch |
| **Working Load Limit** | 2000 kg (4410 lbs) |
| **Dimensions (H x W x D)[2]:** | 305 mm x 559 mm x 25 mm<br>(12.0 in x 22.0 in x 0.9 in) |
| **Net Weight[3]:** | 5.2 kg (11.5 lbs) |

**Footnotes:**
1: Refer to the 2D and 3D Customer Drawings for more detailed dimensions
2: Shackles and other rigging parts not included

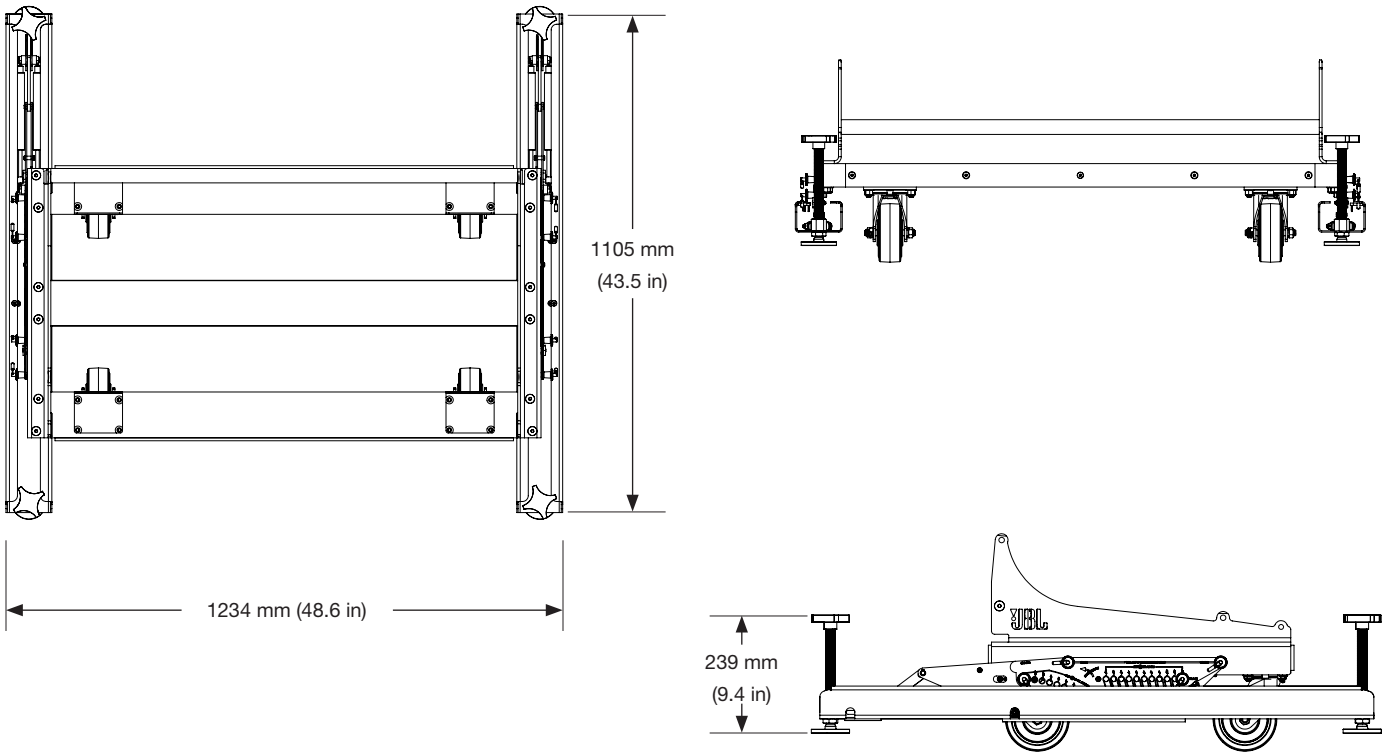
## 15.5 VTX A12 VT




| | |
|---|---|
| **Construction:** | High-grade steel with anti-corrosion coating, aluminum, 18 mm 11-ply Finnish birch plywood |
| **Finish:** | Black powder coat, black DuraFlex™ |
| **Mechanical Limits[1]** | |
| **Transportation:** | (4) VTX A12 |
| **Ground Stack:** | (6) VTX A12 |
| **Dimensions (H x W x D)[2]:** | 258 mm x 1054 mm x 492 mm<br>(10.1 in x 41.5 in x 39.9 in) |
| **Net Weight** | |
| **VTX A12 VT:** | 29.3 kg (64.5 lbs) |
| **VT-TOP:** | 13.2 kg (29 lbs) |
| **Complete Cart[3]:** | 285.7 kg (629.8 lbs) |

Footnotes:
1: Always use the VTX A12 VT GND outrigger accessory for ground stacking VTX A12 cabinets.
2: Refer to the 2D and 3D Customer Drawings for more detailed dimensions.
3: Weight includes (1) VTX A12 VT, (1) VTX A12 VT-TOP and (4) VTX A12.

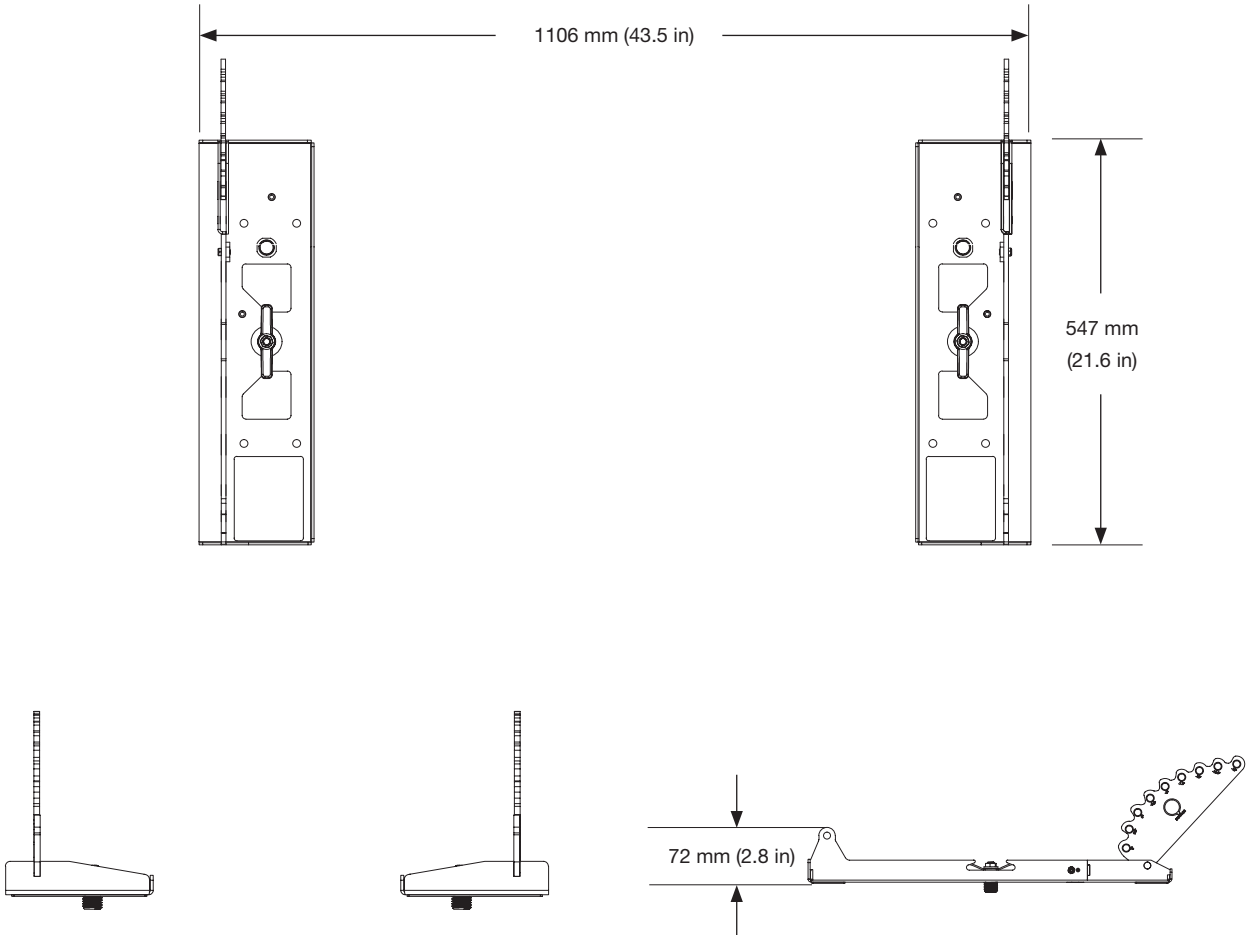
## 15.6 VTX A12 VT GND




| | |
|---|---|
| **Construction:** | High-grade steel with anti-corrosion coating |
| **Finish:** | Black powder coat |
| **Mechanical Limits[1]** | |
| **Maximum:** | (6) VTX A12 or (4) VTX B28 |
| **Safe Limit:** | (4) VTX A12 or (3) VTX B28 |
| **Dimensions (H x W x D)[2]:** | 239 mm x 1234 mm x 1105 mm<br>(9.4 in x 48.6 in x 43.5 in) |
| **Net Weight[3]:** | 12.8 kg (28 lbs) |

**Footnotes:**
1: For arrays larger than the safe limit always use JBL Line Array Calculator 3 software to determine mechanical safety.
2: Refer to 2D and 3D Customer Drawings for more detailed dimensions.
3: Net weight refers to one complete set of outriggers (left/right). VTX A12 VT not included.

## 15.7 VTX A12 BP




| | |
|---|---|
| **Construction:** | High-grade steel with anti-corrosion coating |
| **Finish:** | Black powder coat |
| **Mechanical Limits[1]** | |
| **Maximum:** | (6) VTX A12 |
| **Safe Limit:** | (2) VTX A12 |
| **Dimensions (H x W x D)[2]:** | 72 mm x 1106 mm x 547 mm<br>(2.8 in x 43.5 in x 21.6 in) |
| **Net Weight[3]:** | 7.4 kg (16.3 lbs) |

**Footnotes:**

1: Safe and maximum limits for ground-stacked arrays always assume that the stacking surface (floor and/or stage) is flat. Do not deploy ground-stacked arrays on non-flat surfaces. Always use JBL LAC-3 pre diction software to check mechanical safety when using the VTX A12 BP Base Plate.
2: Refer to 2D and 3D Customer Drawings for more detailed dimensions.
3: Weight includes VTX A12 BP only.

# 16 - CONTACT INFORMATION

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