

# MARTIN AUDIO MLA MINI

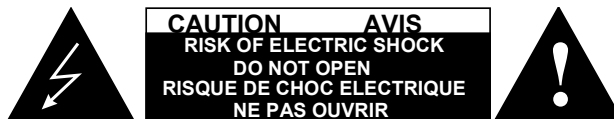
## MLA MINI USER GUIDE



# SAFETY INFORMATION

## IMPORTANT SAFETY INSTRUCTIONS

1. Read these Instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with dry cloth.
7. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
8. Do not defeat the safety purpose of the polarized or grounding type plug, a polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet consult an electrician for replacement of the obsolete outlet.
9. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit the apparatus.
10. Only use attachments and accessories specified by the manufacturer.
11. Use only with the 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
12. Unplug the apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as a power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. The means of disconnection from the mains is the appliance coupler or mains plug. One of these devices must remain accessible when the apparatus is in use.



### CAUTION

To reduce the risk of electric shock do not remove any covers. There are no user serviceable parts inside the units. Refer servicing to qualified service personnel only. Call Martin Audio Ltd on +44 (0) 1494 535312 or e-mail [info@martin-audio.com](mailto:info@martin-audio.com) for service.

**APPROVALS**



Safety: IEC60065:2002 + A1:2006

Environmental: IP25 when fitted with cowl assembly (Martin Audio Pt No ASF15027) and used with mains connectors/cords rated to at least IP25.  
IP2X when NOT fitted with cowl assembly or not used with mains connector/cords rated to at least IP25.

Country of origin: United Kingdom

EMC Emission: EN55103-1:2009

EMC Immunity: EN55103-2:2009

FCC: CFR47 Part 15B-2010

This is a class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.



Please think of our environment.

When the product has reached the end of its useful life, please dispose of it responsibly through a recycling centre.



## SAFETY RULES

- The MSX sub-bass/electronics unit must be powered exclusively by an earth connected mains socket in an electrical network compliant to IEC 364 or similar local rules. It is absolutely vital that the user verifies this fundamental safety requirement. If you are in any doubt, get the installation checked by qualified personnel before use.
- The means of disconnection from the mains is the mains plug. We strongly recommend that you power the MSX from a professionally installed mains supply with an easily accessible on/off switch or circuit breaker. A comprehensive mains distribution system with circuit breakers is available from Martin Audio.
- Before powering the MSX via the Neutrik® PowerCON TRUE1 connector, make sure that the unit is supplied with the correct mains operating voltage:
  - 100 – 240 V, 50 – 60 Hz
- The MSX power section is protected by four fuses:
  - F1, F2, F3: 3 x 3.15 A Type “T” (power amplifiers)
  - F4: 1 x 4 A Quick blow (aux power supply)
- Do not use this unit if the electrical power cord is frayed or broken
- Do not remove the cover. Removing the cover will expose you to potentially dangerous voltages.
- When not fitted with the optional rain cowl (Martin Audio Pt No ASF15027) or not used with mains connector/cords rated to at least IP25, the MSX must not be exposed to dripping, or splashing and no objects filled with liquids, such as vases should be placed on the apparatus.



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## INTRODUCTION

### **IMPORTANT:**

This document is the User Guide for the MLA Mini Loudspeaker Array system. It is an abridged and edited version of the MLA Mini Advanced Manual and describes how to set up a basic MLA Mini system in its most common configurations, using the internal factory presets.

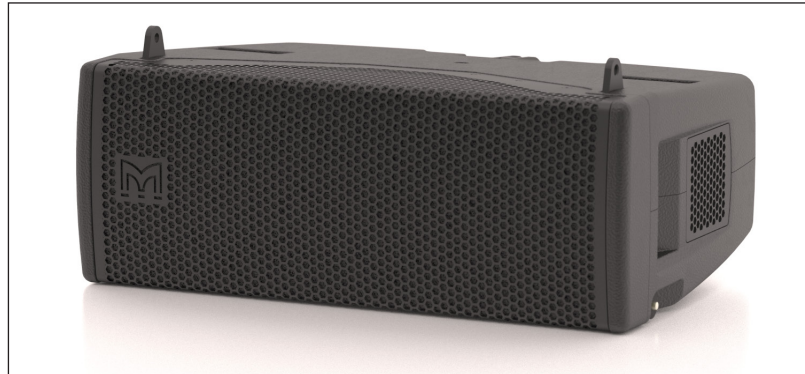
All system owners are recommended to download and retain a copy of the MLA Mini Advanced Manual from <http://www.martinaudio-mla.com/downloads/brochuredownloads>. The manual contains additional information on alternative rigging possibilities and the assembly of larger systems. It also contains further details of the MLA Mini's design philosophy.

### **UNPACKING THE UNITS**

After unpacking the units, please check them carefully for any damage. If any is found, immediately notify the carrier concerned - you, the consignee, must instigate any claim. Please retain all packaging in case you need to return any units.

## OVERVIEW

Like the MLA and MLA Compact systems from which it is derived, the MLA Mini is a precision multi-cellular loudspeaker array designed to accurately deliver a required SPL (acoustic loudness) within a defined area. Smaller and lighter than the MLA and MLA Compact systems, the MLA Mini will reproduce high quality sound in smaller venues, as either a fixed or portable installation.

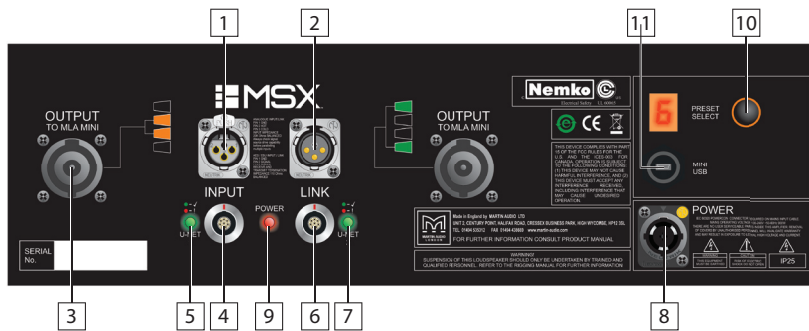


The basic MLA Mini system consists of 4 MLA Mini full-range cabinets (referred to throughout this User Guide simply as 'Minis'), used in conjunction with a single MSX sub-woofer. This is the minimum configuration in which the MLA Mini system can be used. The MSX incorporates all the power amplification and other electronics for the 4 Minis as well as the sub-woofer. (Note that the power amplification and electronics may be removed from the MSX cabinet for rack mounting elsewhere; please refer to the Advanced Manual for full details.)

Used in stereo pairs, this minimum configuration will be adequate for many outdoor and indoor venues with a capacity of up to approximately 250 people, and is the configuration described in this User Guide. Additional Minis can be added, in sets of four, to create more powerful systems. Please refer to the Advanced Manual for more details.

## MSX – REAR PANEL

All connections for a single system comprising 4 Minis plus one MSX are made to the electronics unit mounted in the rear of the MSX cabinet.

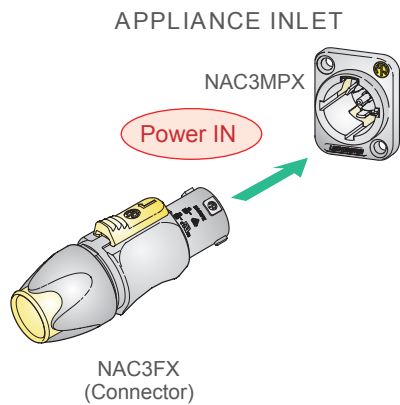


1. **INPUT** – a 3-pin female XLR audio input connector. The MLA Mini system can be fed with either balanced analogue audio or AES3 digital audio. The same connector is used for both formats, and the analogue/digital selection is made via VU-NET control software. **The default setting is analogue.** Please refer to the Advanced Manual for details about using the MLA Mini with digital audio.
2. **LINK** – a 3-pin male XLR connector in parallel with the INPUT XLR. This allows the audio input to be conveniently “daisy-chained” to further MLA Mini systems.
3. **OUTPUT** – two Neutrik® NL8 multi-pin connectors. Use the pre-made cable supplied with the system to connect each OUTPUT socket to two Minis. If a longer cable is required, please refer to the User Guide for assembly details and cable specifications. The diagrams on the panel show clearly which Minis should be wired to each connector. The system will not operate correctly if this wiring is not observed. See “Cabling, connecting up” on page 22.
4. **U-NET 1** – a LEMO-pattern K Series network connector. This can be used to connect the MSX to a computer running VU-NET control software. This allows the system to be tailored more precisely to suit the venue and application in situations where a configuration other than those provided by the internal presets is required. When using the internal presets, the U-NET connectors may be ignored. Please see the Advanced Manual for more details.
5. **U-NET 1** status – bi-colour LED indicating network status.
6. **U-NET 2** – a second network port for connection to additional MLA systems. VU-NET is able to determine the order in which cabinets are connected by analysing the inter-port latencies.
7. **U-NET 2** status
8. **POWER** connector – a Neutrik® powerCON TRUE1 connector for AC mains input. A mating connector is included. Pre-made power cables of various lengths are available from Martin Audio; alternatively, If making up your own power cables, please follow the Neutrik® assembly instructions on page 9 carefully. Please note that Neutrik tool Part No. HTAC is NOT supplied. Tightening the connector assembly with the tool to the specified torque is only necessary if the MSX is required to meet IP65 environmental protection conditions. If IP65 compliance is required, please contact Martin Audio for additional information and the necessary additional parts.
9. **POWER** LED – illuminates when AC power is applied to the MSX. Note that the MSX electronics unit has no power switch; it is operative as soon as power is applied.
10. **PRESET SELECT** – this push-button selects one of the factory-designed internal presets, optimising the MLA Mini system for a particular rigging configuration or required coverage area. See page 18 for full details of each preset. The adjacent numeric display confirms the currently loaded preset.
11. **MINI USB** – Type B USB port. Allows connection of a PC for system control and monitoring purposes. For simple set-ups using the internal presets, this connector may be ignored. Please refer to the Advanced Manual for more details.



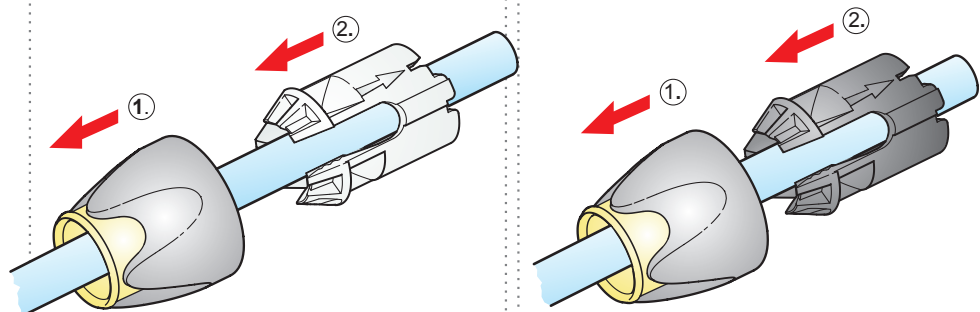
**Neutrik® powerCON TRUE1 connector assembly instructions**

The PowerCON TRUE1 system is certified as a connector with breaking capacity according to IEC60320 and VDE0625. It is intended for use as an appliance and interconnection coupler. It serves to supply power to an appliance. It should be installed by qualified personnel only.

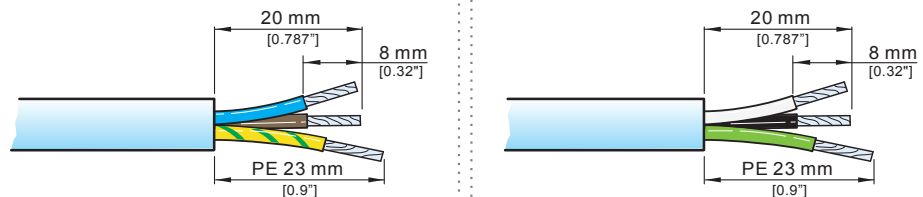


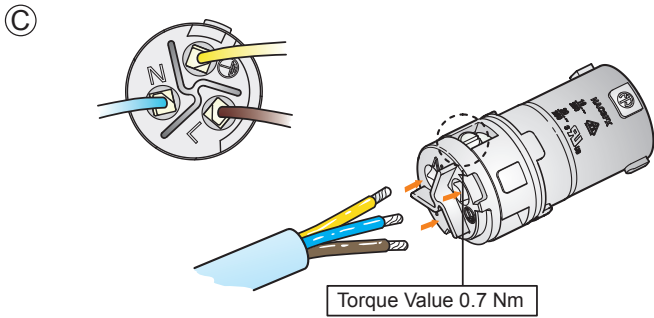
<b>Approval based:</b>	<b>VDE</b> EN 60320-1/EN60320-2-2	<b>UL</b> UL 498 / CSA C22.2 No. 182.3
<b>Rating:</b>	250 V ac / 16 A	250 V ac / 20 A
<b>Cable Type:</b>	H05VV-F3G 1.0 mm <sup>2</sup> , Length max. 2 m H05VV-F3G 1.5 - 2.5 mm <sup>2</sup>	SJT 3 x 12 AWG
<b>Strain Relief:</b>	White chuck	Black chuck
<b>Cable O.D.:</b>	6.3 - 11.4 mm	9.5 - 12.0 mm

**A** Place bushing and chuck over the cable.



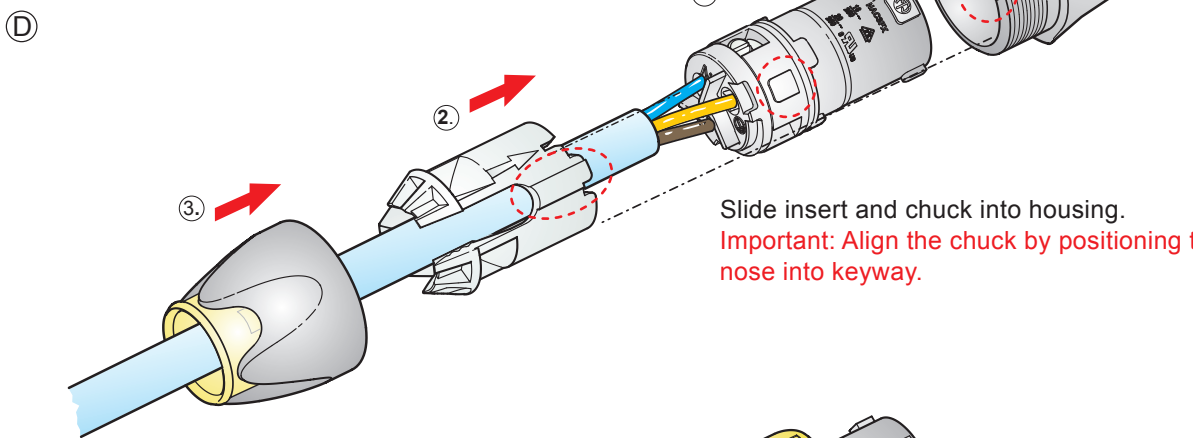
**B** Prepare cable as shown.



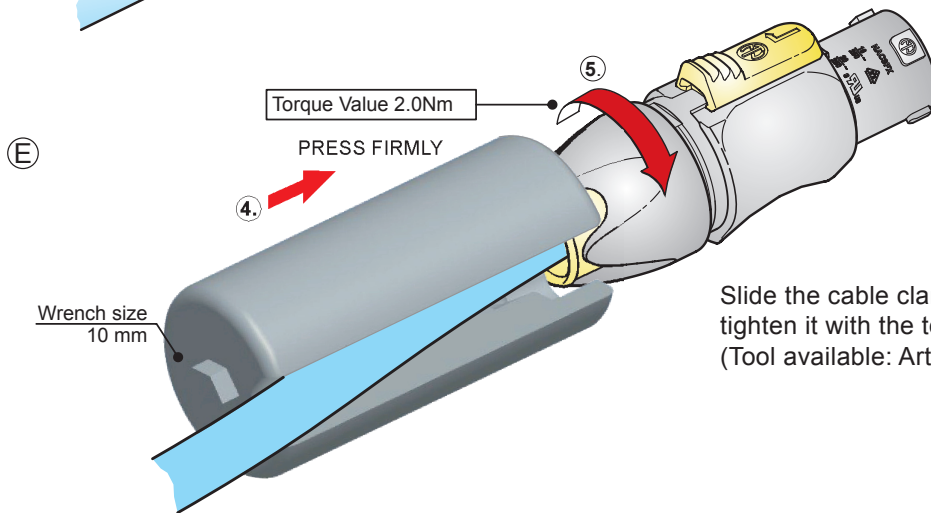


Slide the cable into the contacts and clamp with the screw.

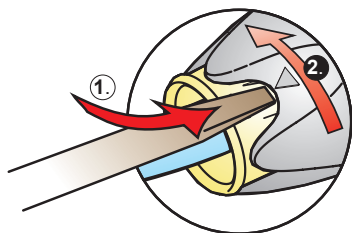
Wiring	VDE	UL
L	brown	black
N	blue	white
⊥	green/ yellow	green



Slide insert and chuck into housing.  
**Important: Align the chuck by positioning the nose into keyway.**



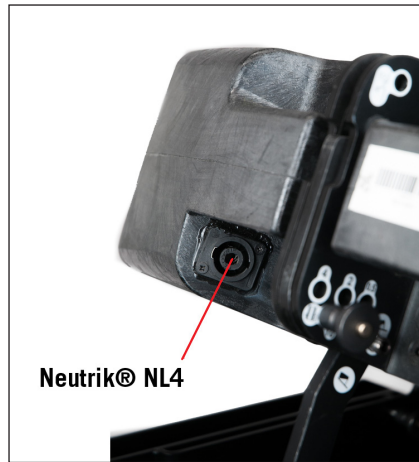
Slide the cable clamp bushing up the cable and tighten it with the tool as shown.  
 (Tool available: Art. No. HTAC)



Disassembly (open twist lock):

1. Press with screw driver to unlock (at ▼)
2. Turn bushing while still pressing locking.

## MLA MINI CONNECTION



The MLA Mini system only has one other connection. This is a Neutrik® NL4 on the Mini cabinets themselves. Connect the cables referred to in Item [3] above here, taking care to observe the colour coding of the connectors.

## INSTALLATION

### SYSTEM COMPONENTS

A range of rigging accessories is available for the MLA Mini system. The accessories required for each rigging configuration differ; depending on what was specified at the time of order, you may not have all the components shown below.

Before rigging the MLA Mini system for the first time in any configuration, you should first familiarise yourself with each of the various components and their purpose.

#### Flying Frame



This steel assembly is required when an MLA Mini system is to be flown using one or two chain hoists; it attaches either to the 4 x Mini array or to the MSX, depending whether the MSX is being flown as part of the array. It is also used to attach a 4 x Mini assembly to the MSX sub in a ground stack arrangement, or a 4 x Mini array directly to the Ground Stack Baseplate in a situation where the MSX sub is located separately.

#### Clinometer

A clinometer is available to check the angle at which the MLA Mini array is flown at (relative to the horizontal). It consists of a sensor (mounted within the Flying Frame) and a remote display unit. Interconnection is via a standard XLR mic cable. It is normally only supplied with the touring package.

#### Transition Frame



This is used in a flown arrangement to attach a 4 x Mini array to the underside of an MSX sub.

**Universal tilt bracket**



This can allow an array of 4 Minis to be fitted to the Variable Height Pole Mount at a range of tilt angles. The bracket's fixing is via a single 13 mm dia. hole, which is fitted with a boss to mate with the Pole Mount. By replacing the boss with a trigger clamp, the bracket can also be used inverted, to fly a single 4 x Mini array (without an MSX sub). The Flying Frame (see above) must be used to fly all other system configurations.

**Fixed Tilt Bracket**



This is a simpler alternative to the Universal Tilt Bracket, for use with the Vertical Height Pole Mount. It provides a single tilt angle (14.5°), which is correct for use with two of the presets most likely to be used with pole mount configurations.

**Variable Height Pole Mount**



This is used to elevate an array of 4 Minis above the MSX as a single assembly. The height of the array can be set to that required (either determined by the preset in use or according to the VU-NET specifications) by turning the handle, and then locked in position with the integral clamp.

**Ground Stack Baseplate**



This is normally fitted to the base of the MSX for configurations where the MSX is attached to the 4 x Mini array (either directly or with the Variable Height Pole Mount) to give greater stability. It can also be used with the 4 x Mini array alone, with the Flying Frame as an intermediate adaptor. The Ground Stack Baseplate is often referred to as an “Outrigger” or “Duck’s Foot”.

**Ground Stack Bars**



These precision alignment bars are used in conjunction with the Flying Frame to define the angle between the 4 x Mini array and the MSX sub when the system is configured for ground stacking. They will also be needed when the 4 x Mini array is to be ground stacked alone. Two versions are available, long and short; the two sizes allow different ranges of angles to be set.

**Flying Pins**



The pins are used to lock the individual Mini cabinets into position at the defined inter-cabinet angle, and also to lock the 4 x Mini array to the Transition Frame or Flying Frame at the required angle. The pins are supplied with the relevant components.

**19" rack mount kit**



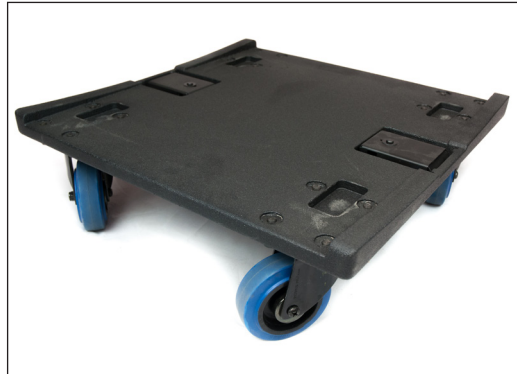
This option is required if the MSX electronics unit is to be mounted in a separate 19" equipment rack.

**Flight case for 4 Minis:**



An optional, dedicated flightcase is available for an array of 4 Mini cabinets. This will allow safe transportation and convenient rigging and de-rigging if your system is to be portable. Note that all rigging accessories (except the flying pins – but see below) should be removed before stowing the Minis in the flightcase for shipment.

## Wheelboard with castors



This is a wheeled base board which is fitted to the front of the MSX sub (for speaker protection) to allow easy attachment of the Ground Stack Baseplate, and also for convenient transportation. It does not form part of an assembled system.

## MSX Transit Cover



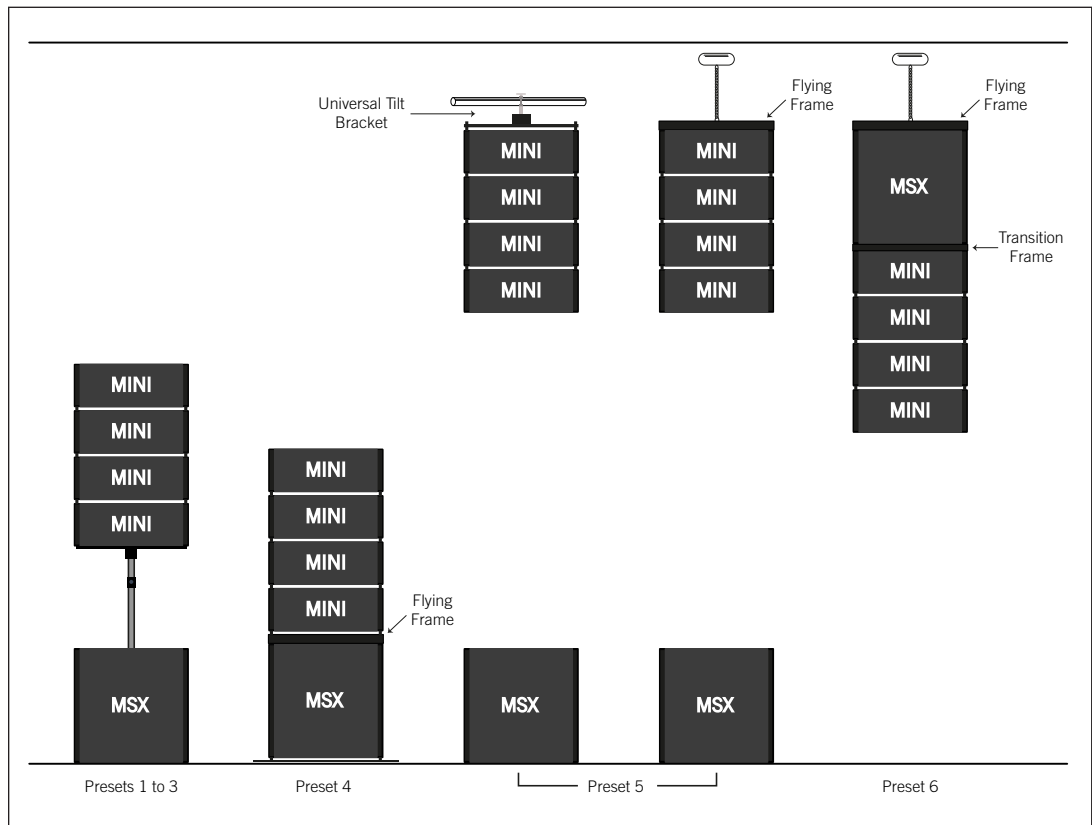
A tough flexible cover for the MSX with an integral plywood lid for shipping purposes.



### CONFIGURATION OPTIONS

4 MLA Minis and one MSX can be rigged in four basic arrangements: two ground stacked, and two flown. The option chosen for any particular situation will be largely determined by the physical arrangements of the venue. Whichever arrangement is used, at least one factory preset is available for optimising the system’s performance in that configuration.

The rigging possibilities are illustrated below; see page 24 for full details of how to perform the actual physical rigging for each.



## CHOOSING A PRESET

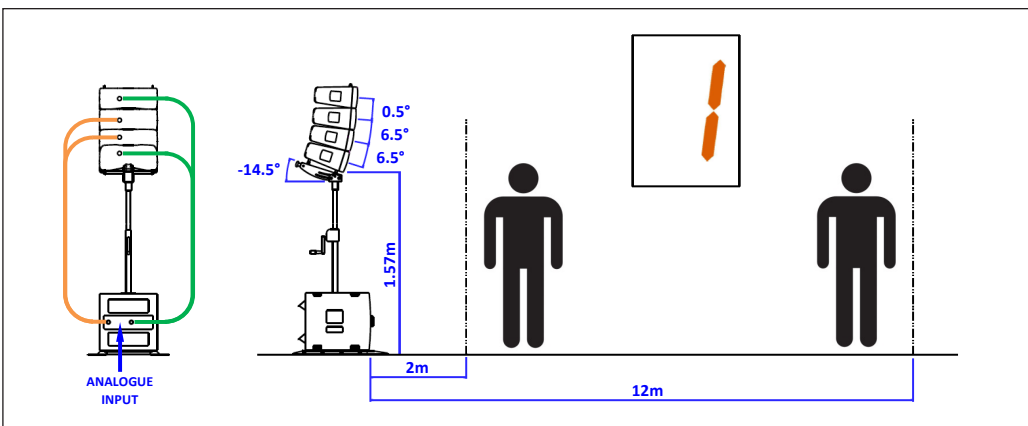
The MLA Mini system comes with six factory-designed presets which optimise the system for use in the most commonly-encountered rigging configurations. Presets are loaded by pressing the PRESET SELECT button on the MSX rear panel; press the button until the number of the required preset is displayed:



The diagrams below summarise the intended application for each preset. Note that the MSX-to-Mini cabling is the same for all presets, and the audio input is set to *analogue* in all cases.

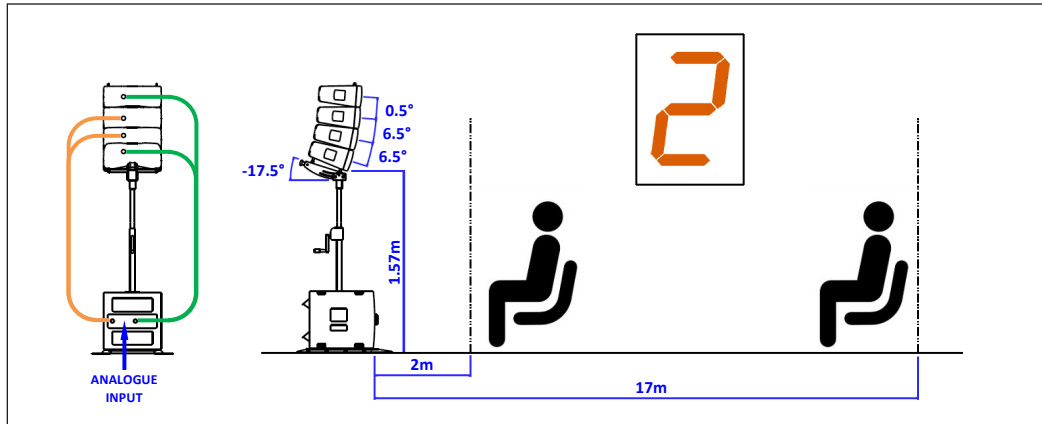
The diagrams indicate the various angles which will need to be set; these include the inter-cabinet angles and the angle between the mounting and the first Mini. The selected preset optimises the MLA Mini system for the dimensions and heights shown in the diagrams, but good performance will still be obtained if, for example, the room is a different size or if it necessary to use a different mounting height. Always use the preset which most closely represents the rigging configuration you are using.

### Preset 1



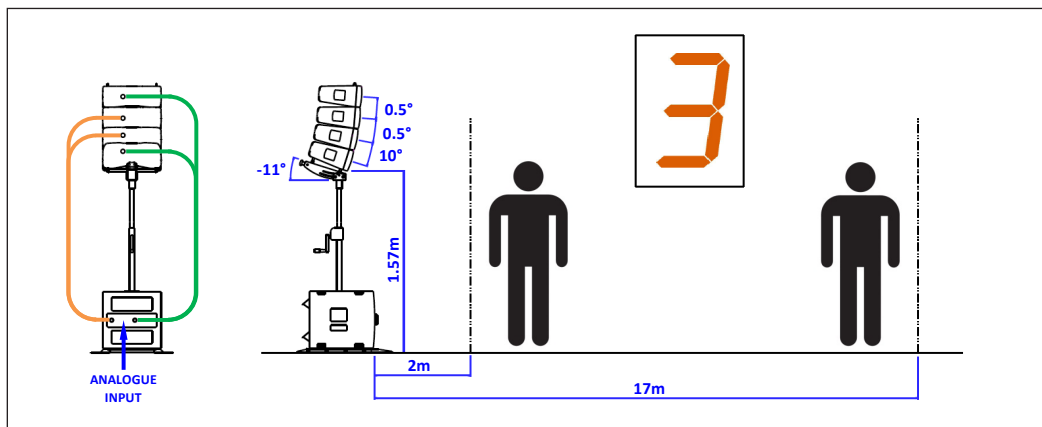
Preset 1 optimises the system for use with the 4 x Mini array attached to the MSX sub using the Variable Height Mount Pole. This will be an appropriate setup for venues where there is no stage; it is assumed that the standing audience will be on the same level as the MSX. The system will be able to provide effective coverage from 2 m to 12 m from the loudspeakers.

**Preset 2**



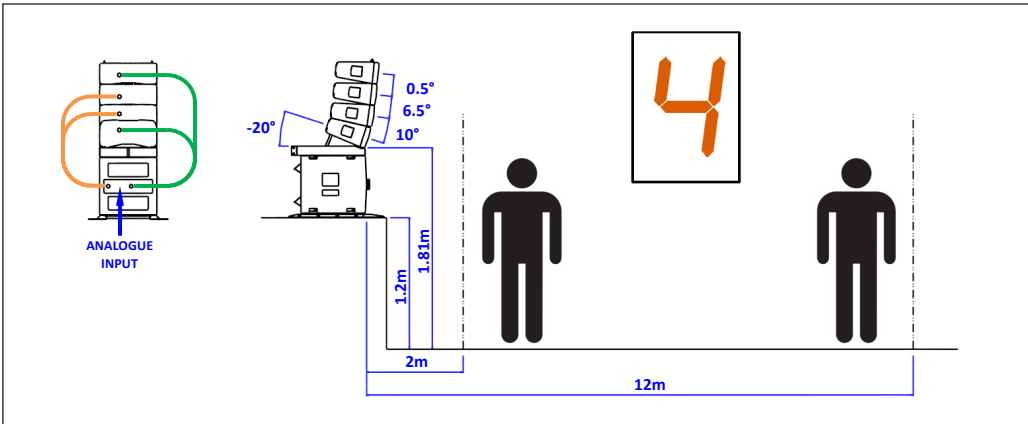
Preset 2 is similar to Preset 1, but is suited better for a seated audience over a larger area. Good coverage is provided between 2 m and 17 m from the loudspeakers. Note the array tilt angle differs from that used by Preset 1.

**Preset 3**



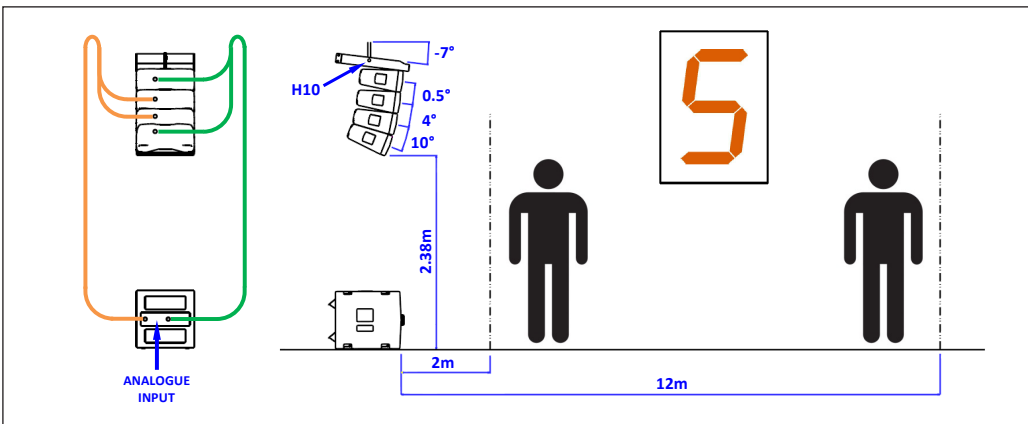
Preset 3 assumes the same size audience area as Preset 2, but is optimised for a standing audience. Note the array tilt and inter-cabinet angles differ again.

**Preset 4**



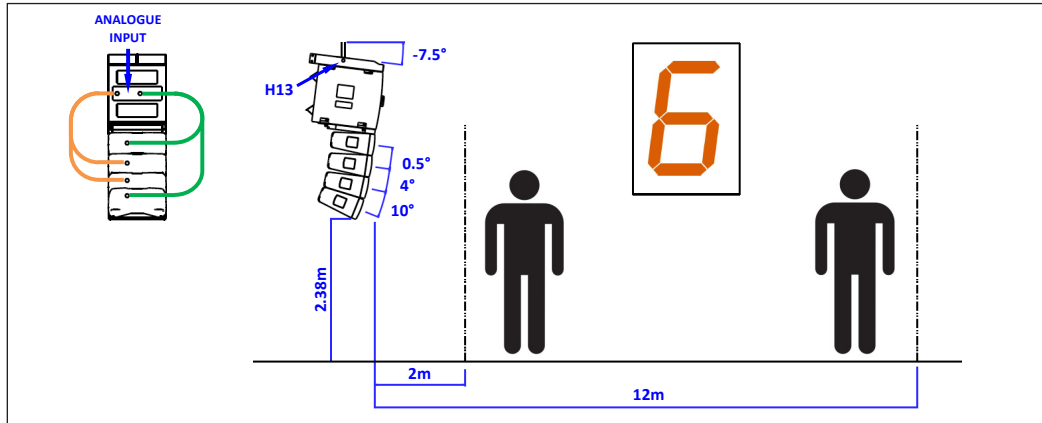
This preset is suitable for a ground stack system mounted on a stage approximately 1.2 m high. Here the 4 x Mini array is mounted on the MSX sub using the Flying Frame. The long Ground Stack Bar provides the overall array tilt angle. The system will provide coverage between 2 m and 12 m from the loudspeakers.

**Preset 5**



This preset should be used when the 4 x Mini array is flown, with the MSX sub remaining on the floor. The preset is most effective with the bottom array cabinet 2.38 m above floor level, and for a standing audience between 2 m and 12 m from the loudspeakers. The Flying Frame may be used to hang the array and define the basic tilt angle, or the Universal Tilt Bracket may be used if the 4 x Mini array is to be suspended from a rigging pole or truss. Note however that when using the Universal Tilt Bracket ONLY a single 4 x Mini array can be suspended. Do not use it to suspend Mini arrays in excess of four cabinets, nor for fully-flown configurations where the MSX sub is also flown (see Preset 6).

**Preset 6**



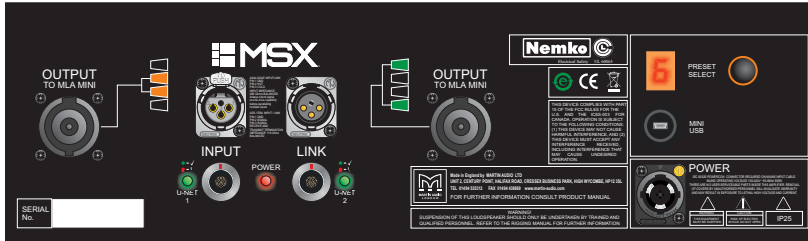
This preset applies to a fully-flown configuration; the ground stack configuration is effectively ‘inverted’, with the MSX sub at the top of the array. The Flying Frame and Transition Frame are both required to achieve this configuration. The audience coverage is the same as for Preset 5.

**Summary of Presets:**

Preset	Rigging	Location	Coverage	Audience
1	Pole mount	Floor-standing	2 – 12 m	Standing
2	Pole mount	Floor-standing	2 – 17 m	Seated
3	Pole mount	Floor-standing	2 - 17 m	Standing
4	Ground stack	On stage	2 – 12 m	Standing
5	Flown array	Sub on floor, array flown	2 – 12 m	Standing
6	Fully flown	Fully flown	2 – 12 m	Standing

## CABLING, CONNECTING UP

The electrical connections for a single 4 x Mini array plus an MSX sub are straightforward.



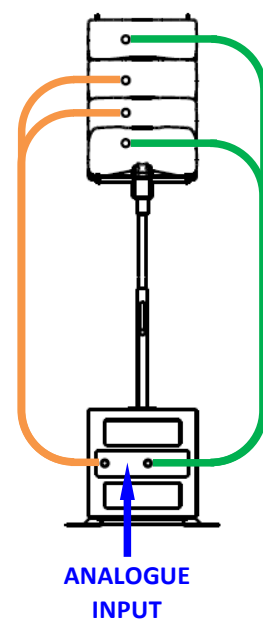
1. AC Mains – connect the power supply cable to the Neutrik® PowerCON TRUE1 connector on the rear panel of the MSX sub. Do not connect the other end of the cable to a live AC supply at this stage.
2. Connect the amplifier outputs to the MLA Mini cabinets using the pre-made cable assembly supplied (if length permits - configuration-dependent. Some configurations will require longer cables). Note the colour-coding (orange and green); also note the wiring diagram on the MSX rear panel adjacent to each of the OUTPUT connectors.

Plug the orange NL8 connector into the left-hand OUTPUT socket. Plug the green NL8 connector into the right-hand OUTPUT socket. Note that the other ends of the cable have different lengths of 'tail'. This is to identify which cable connects to which cabinet.

**IMPORTANT:** The wiring instructions differ between ground stack configurations and flown configurations. Use the correct set of instructions for the arrangement you are using.

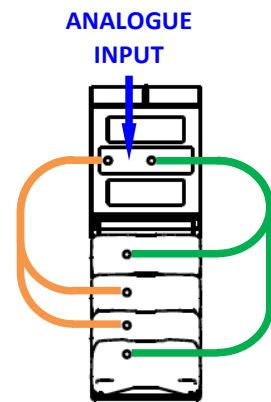
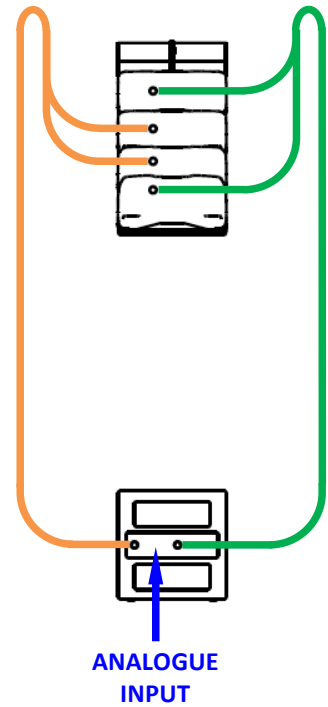
### Ground stack configurations:

- Plug the orange-coded NL4 with the shorter tail into Cabinet 2 (the second cabinet from the bottom of the array)
- Plug the orange-coded NL4 with the longer tail into Cabinet 3 (the third cabinet from the bottom of the array)
- Plug the green-coded NL4 with the shorter tail into Cabinet 1 (the bottom cabinet in the array)
- Plug the green-coded NL4 with the longer tail into Cabinet 4 (the top cabinet in the array)



## Flown configurations:

- Plug the orange-coded NL4 with the shorter tail into Cabinet 2 (the second cabinet from the top of the array)
  - Plug the orange-coded NL4 with the longer tail into Cabinet 3 (the third cabinet from the top of the array)
  - Plug the green-coded NL4 with the shorter tail into Cabinet 1 (the top cabinet in the array)
  - Plug the green-coded NL4 with the longer tail into Cabinet 4 (the bottom cabinet in the array)
3. Connect the audio source (mixing console output) to the INPUT connector. Ensure that the mixing console main output is muted or faded down.
  4. Apply power to the MSX electronics rack; check that the POWER LED is illuminated.
  5. Select the preset to be used using the PRESET SELECT button.
  6. Gradually raise the output level of the mixing console.





## RIGGING

This section of the User Guide covers the mechanical aspects of assembling the various components of the MLA Mini system into the configuration required.

The rigging details here are limited to those required to achieve the arrangements necessary for correct operation of the system using the six factory presets. Please refer to the Advanced Manual for full details of other rigging possibilities, including all MLA Mini system configurations which use more than 4 Minis and one MSX sub.

The six presets cover four possible rigging arrangements for 4 MLA Mini cabinets and one MSX sub; the components required for each are summarised in the table below. Note that the component count applies to a single system; for stereo, the quantities should be doubled.

	Component	Pole Mount	Universal Tilt Bracket	Fixed Tilt Bracket	Ground Stack Baseplate	Ground Stack Bar (long)	Transition Frame	Flying Frame	Flying Pins Required
Preset	Configuration								
1&2	Pole Mount	1	1		1				21
3	Pole Mount	1	1	1	1				21
4	Ground stack				1	1		1	25
5*	Flown array (Flying Frame)/ Floor sub							1	17
	Flown array (Universal Tilt Bracket)/Floor sub		1						17
6	Fully flown						1	1	24

\*The configuration for Preset 5 can be flown either using the Flying Frame or the Universal Tilt Bracket inverted.



**PRESET 1: POLE MOUNT WITH UNIVERSAL OR FIXED TILT BRACKET**



Shown using the Fixed Tilt Bracket

**Step 1:** Start with the MSX sub face down on its wheelboard. Rotate the four dropdown brackets located in the base of the MSX so they are protruding outwards. Attach the Ground Stack Baseplate to the bottom of the MSX cabinet by mating these dropdown brackets with the holes in the baseplate box sections as shown. Use the front location as indicated on the baseplate membrane for this configuration (the rear location is only needed for larger configurations). With the MSX on its wheelboard and the front edge of the Baseplate on the floor, the dropdown brackets should align with the correct holes. Secure all four dropdown brackets with Flying Pins.




**Step 2:** Rotate the MSX and Ground Stack Baseplate through 90° so that the assembly is standing on the Baseplate. Remove the wheelboard. Take the Pole Mount and ensure that the pole is fully retracted. Screw the pole securely into the threaded plate on the top of the MSX.




**Step 3:** As the Bracket Tilt Angle for Preset 1 is 14.5°, either the Universal Tilt Bracket or the Fixed Tilt Bracket may be used. Attach the chosen bracket to the top of the telescopic pole and secure by tightening the boss onto the pole using the knob.



**Step 4a (with Universal Tilt Bracket):** Lift the first MLA Mini cabinet onto the Universal Tilt Bracket. The lugs on the ends of the main cross-arm should mate with the slots in the front corners of the cabinet. Secure these points with flying pins. Attach the rear lug of the bracket to the Ground Stack hole (marked with a ) in the cabinet's rear mounting plate. Secure with a Flying Pin. Using the rear adjustment knob, set the tilt angle to 14.5°; the angle can be seen by observing the calibration hole at the right-hand side.



**Step 4b (with Fixed Tilt Bracket):** Lift the first MLA Mini cabinet onto the bracket. The lugs on the ends of the main cross-arm should mate with the slots in the front corners of the cabinet. Secure these points with Flying Pins. Attach the Tilt Bracket Swing Arm to the rear of the tilt bracket in the Ground Stack hole (marked with a ) and secure with the Flying Pin supplied. Ensure the swing arm is pointed upwards as shown.



**Step 5:** Lift the next cabinet on top of the previous one and secure both the front corners with further Flying Pins. At the rear, remove the Flying Pin used to stow the rear mounting plate so that it drops down and engages with the slot in the lower cabinet's bracket. Secure this with the Flying Pin. Raise the upper cabinet to set the angle between the cabinets by fitting a Flying Pin in the hole marked "6.5" on the rear bracket. This gives the correct inter-cabinet angle required by Preset 1.



**Step 6:** Repeat Step 5 twice to add the two remaining MLA Mini cabinets, while referring to the Preset diagrams starting on page 18 and the table below. Note that the inter-cabinet angles for cabinets 2 to 3 and 3 to 4 differ. Take care to set the correct angles.

**Step 7:** The connections to the 4 x Mini array (see page 22) are most conveniently made at this stage.

**Step 8:** Depress the safety catch to unlock the height adjustment, and turn the handle to raise the telescopic pole mount so that the front lower edge of the bottom Mini is approximately 1.57 m above the level that the MSX is standing on. Lock it in place by tightening the knob on the opposite side of the pole from the handle.



**Summary of angles (Presets 1):**

		<b>Preset 1</b>
Bracket tilt angle		14.5°
Inter-cabinet angles	Cabinets 1 & 2	6.5°
	Cabinets 2 & 3	6.5°
	Cabinets 3 & 4	0.5°

## PRESET 2: POLE MOUNT WITH UNIVERSAL TILT BRACKET

The rigging procedure for Preset 2 is very similar to that for Preset 1, with the exception that the Universal Tilt Bracket must be used, as the overall array tilt is 17.5°, an angle not achievable with the Fixed Tilt Bracket.




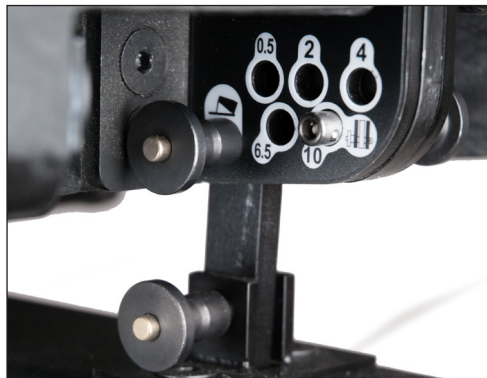
**Step 1:** As for Preset 1

**Step 2:** As for Preset 1

**Step 3:** As the Bracket Tilt Angle for Preset 2 is 17.5°, the Universal Tilt Bracket must be used. Attach the bracket to the top of the telescopic pole and secure by tightening the boss onto the pole using the knob. Assemble the Universal Bracket for pole mount operation as described in its accompanying assembly instructions.



**Step 4:** Lift the first MLA Mini cabinet onto the Universal Tilt Bracket. The lugs on the ends of the main cross-arm should mate with the slots in the front corners of the cabinet. Secure these points with flying pins. Attach the rear lug of the bracket to the Ground Stack hole (marked with a ) in the cabinet's rear mounting plate. Secure with a Flying Pin. Using the rear adjustment knob, set the tilt angle to 17.5°; the angle can be seen by observing the calibration hole at the right-hand side.





**Step 5:** As for Preset 1.

**Step 6:** Repeat Step 5 twice to add the two remaining MLA Mini cabinets, while referring to the Preset diagrams starting on page 18 and the table below. Note that the inter-cabinet angles for cabinets 2 to 3 and 3 to 4 differ. Take care to set the correct angles.

**Step 7:** The connections to the 4 x Mini array (see page 22) are most conveniently made at this stage.

**Step 8:** As for Preset 1.

**Summary of angles (Preset 2):**

		Preset 2
Bracket tilt angle		17.5°
Inter-cabinet angles	Cabinets 1 & 2	6.5°
	Cabinets 2 & 3	6.5°
	Cabinets 3 & 4	0.5°

**PRESET 3: POLE MOUNT WITH UNIVERSAL TILT BRACKET**

Steps 1 and 2 are as for Presets 1 and 2.

**Step 3:** As the Bracket Tilt Angle for preset 3 is 11°, the Universal Tilt Bracket must be fitted to the Pole Mount. Attach the Bracket to the top of the telescopic pole and secure by tightening the boss onto the pole using the knob.



**Step 4:** Proceed as Step 4a for Preset 1 above. For Preset 3, however, set the Bracket Tilt Angle to 11°.

**Steps 5 to 8:** Follow the corresponding instructions for Presets 1 and 2. However, note the different inter-cabinet angles, and fit the Flying Pins into the drop-down brackets accordingly to achieve the correct angles.

**Summary of angles (Preset 3):**

		Preset 3
Bracket tilt angle		11°
Inter-cabinet angles between:	Cabinets 1 & 2	10°
	Cabinets 2 & 3	0.5°
	Cabinets 3 & 4	0.5°



**PRESET 4: GROUND STACK OF MLA ARRAY ON MSX SUB**

**Step 1:** Start with the MSX sub face down on its wheelboard. Rotate the four dropdown brackets in the base of the MSX so they are protruding outwards. Attach the Ground Stack Baseplate to the bottom of the MSX cabinet by mating these dropdown brackets with the holes in the baseplate box sections as shown. Refer to the diagram on the base plate membrane; note there are two mounting positions for the MSX. In this case, the MSX’s front dropdowns should mate with the pair of slots nearer the front of the baseplate. With the MSX on its wheelboard and the front edge of the Baseplate on the floor, the dropdowns should align with the correct holes. Secure all four dropdown brackets with Flying Pins.



**Step 2:** Rotate the MSX and Ground Stack Baseplate through 90° so that the assembly is standing on the Baseplate. Remove the wheelboard. Place the Flying Frame on top of the MSX cabinet as shown and secure the dropdown brackets using four Flying Pins.




**Step 3:** For Preset 4 the required angle between the sub and the bottom Mini is 20°, so the Long Ground Stack Bar must be used between the cabinet and the Flying Frame. Fit the lower end of the bar into the Flying Frame at the 20° mark and secure with a Flying Pin.



**Step 4:** Next, raise the two front lugs of the Flying Frame to their upright position, and secure. These will mate with the front slots of the first Mini. Fit the first MLA Mini cabinet onto the Flying Frame, locking the two front slots into place with Flying Pins. Note that the front of the Flying Frame should be flush with the lower front edge of the cabinet.



**Step 5:** Lift the rear of the cabinet and attach the top end of the Ground Stack bar to the rear bracket by matching the Ground Stack symbol  on the bar to the Ground Stack symbol on the bracket. Secure with a Flying Pin.



**Step 6:** Lift the next cabinet on top of the previous one and secure both the front corners with further Flying Pins. At the rear, rotate the upper cabinet's flip-down bracket so that it engages with the slot in the lower cabinet, and set the angle between the first and second cabinets to 10° by fitting a Flying Pin in the hole marked "10" on the lower bracket. This gives the correct inter-cabinet angle required by Preset 4.



**Step 7:** Repeat Step 6 twice to add the two remaining MLA Mini cabinets, while referring to the Preset diagrams on page 20 and the table below. Take care to set the correct angles.

**Step 8:** The connections to the 4 x Mini array (see page 22) are most conveniently made at this stage.

**Summary of angles (Preset 4):**

		Preset 4
Bracket tilt angle		20°
Inter-cabinet angles between:	Cabinets 1 & 2	10°
	Cabinets 2 & 3	6.5°
	Cabinets 3 & 4	0.5°

## PRESET 5: FLOWN MINI ARRAY WITH SUB ON FLOOR

When the MSX sub is used in isolation, as with Preset 5, there is no necessity to fit the Ground Stack Baseplate to it.

There are two methods of suspending an array of 4 MLA Minis:

- with the Flying Frame and a chain hoist
- with the Universal Tilt Bracket and a scaffold clamp (or similar single-point fixing)

The Flying Frame allows the 4 x Mini array to be suspended using either one or two chain hoists. The Flying Frame may be fitted with a clinometer to allow the array tilt to be accurately measured.

The Universal Tilt Bracket may be used inverted (relative to its use with the Pole Mount), with a standard Trigger Clamp attached to its 13 mm fixing hole instead of the boss that secures it to the Pole Mount. This is the simpler method, and is ideal if a scaf pole or truss is available. Note that 4 x Minis is the ONLY MLA configuration that may be flown using this method; all other configurations MUST employ the Flying Frame.

Note that the order of cabinets in a flown array is effectively reversed relative to their order in a Pole Mount or Ground Stack configuration. Thus the top cabinet in the array is assembled first.

**Step 1:** Start with the four MLA Mini cabinets face down on their flightcase base. The cabinets should be locked together with Flying Pins at the front and rear, with the rear pins in the '0.5' position so that the four cabinets form a "flat" array. Attach the Flying Frame to the top cabinet, noting that the cabinet's top lugs mate with slots in the base of the Flying Frame. Use two Flying Pins to secure the front corners. Note that there are two available mounting positions on the frame; for this Preset, ensure that the front of the flying frame is flush with the bottom front edge of the cabinets. (The second mounting position is only used with larger arrays.)



**Step 2a (using Flying Frame):** Unlatch the rear dropdown bracket from the centre of the Flying Frame. Note that there are two of these; in this case, use the one which pivots at hoist point 13. This will mate with the upper section of the rear bracket of the first Mini. Secure with a Flying Pin.



**Step 2b (using Universal Tilt Bracket):** Remove the Pole Mount boss from the Universal Tilt Bracket (if one is attached). Attach a standard Trigger Clamp to the bracket's fixing hole with an M12 (1/2") nut and bolt.



Attach the Universal Tilt Bracket to the top of the first Mini. The lugs on the ends of the main cross-arm should mate with the slots in the front corners of the cabinet. Secure these points with flying pins. Attach the rear lug of the bracket to the Ground Stack hole in the cabinet's rear mounting plate. Secure with a Flying Pin. Using the rear adjustment knob, set the tilt angle to 7°; the angle can be seen by observing the calibration hole at the right-hand side.



**Step 3a (using Flying Frame):** Attach the chain hoist to the H10 suspension hole of the Flying Frame and begin to raise the array up off the flight case base. As the array rises, insert Flying Pins in the rear brackets to define the inter-cabinet angles according to the diagram on page 20 and the table below.



### Step 3b (using Universal Tilt Bracket):

Lift the array and suspend it from the truss or scaf pole by the trigger clamp. How this is best achieved will depend on the venue and other circumstances on the day. The easiest solution, wherever possible, is to lower the scaf pole or truss section from which the array is to be flown to a sensible working height, attach the array and raise the pole/truss back up to the height specified by the Preset (see table). If this option is not available, a mechanical hoist (e.g. Genie or picker) or adequate manpower can be employed. Ensure that the T-clamp is tightened. Set the Bracket Tilt Angle to 7°; the angle can be seen by observing the calibration hole at the right-hand side.



**Step 4:** If easy access is available to the array at its flown height, it is probably better to leave connecting the cabinets up (see page 22) until the array has been raised to height, as hanging cables may constitute a hazard. However, if it is easier to connect up at ground level, perform this step next. Note that the supplied NL8-to-NL4 cables will not be long enough for this configuration, and two standard NL8-to-NL8 cables of the appropriate length and NL8 couplers will need to be added.

**Step 5:** As the array is being raised, and as the cabinets reach a suitable height, set each of the inter-cabinet angles in turn. Refer to the Preset diagrams at page 20 and the table below.

**Step 6a (using Flying Frame):** Continue raising the array on the hoist until the lower edge of the bottom MLA Mini cabinet is approximately 2.38 m above floor level. If the Flying Frame tilt angle is fitted with a clinometer, the tilt can be checked with the clinometer display. With a single hoist attached as described in Step 3a, the array's centre of gravity should set the tilt at the correct angle. If using two hoists, adjust the rear relative to the front to set the back-to-front tilt to 7°.





**Summary of angles (Preset 5):**

		Preset 5
Flying Frame tilt angle		7°
Inter-cabinet angles between:	Cabinets 1 & 2	0.5°
	Cabinets 2 & 3	4°
	Cabinets 3 & 4	10°

## PRESET 6: FULLY-FLOWN SYSTEM

**Step 1:** With the MSX sub on its wheelboard, begin by attaching the Flying Frame to the cabinet. Extend the four dropdown brackets and engage them into the four slots in the top of the sub. The front edge of the Flying Frame should be aligned with the front face of the MSX. Secure the dropdown brackets in place with four Flying Pins.



**Step 2:** Attach the chain hoist to the H13 suspension hole of the Flying Frame and raise the MSX upwards. Remove the wheelboard when it is clear of the ground.



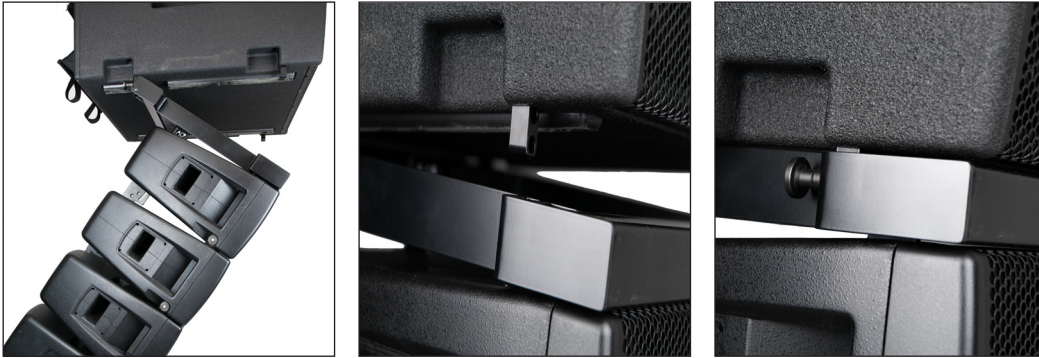
**Step 3:** Assemble the 4 x MLA Mini array face down on their flightcase base. Attach the Transition Frame to the upper MLA Mini cabinet with Flying Pins. The frame connects at three points: two are the cabinet's front location points, which engage with slots in the frame; the other is at the rear, where the swinging arm can mate with the upper section of the cabinet rear bracket in three positions to produce an angle between the Transition frame and the Mini of 0°, 2.5° or 5°; for Preset 6, it should be set at 0°



**Step 4:** Position the Transition Frame below the suspended MSX sub. Attach the Transition Frame to the two dropdown brackets on the bottom rear of the MSX cabinet. Secure with two Flying Pins.



**Step 5:** Gradually raise the chain hoist; this will swing the Mini array up and free of the flightcase base. Steady the assembly as this happens. When the array is completely free, push it forwards so that the front location points of the Transition Frame are able to engage with the front dropdowns of the MSX. Secure these points with two more Flying Pins.



**Step 6:** As the array is raised, set the inter-cabinet angles of the Minis according to the table below and the diagram at page 21. Remember that when flown, Cabinet 1 is at the top, nearest to the MSX sub; Cabinet 4 is the lowest.

**Step 7:** The connections between the MSX and the Minis (see page 22) are most conveniently made at this stage. In this case, the supplied cable can be used as the MSX is adjacent to the Minis. AC mains, the analogue audio input and any network in use should also be connected at this time.

**Step 8:** Continue raising the array on the chain hoist until the lower edge of the bottom Mini is approximately 2.38 m above floor level. If employing two hoists to fly the array, the tilt should now be adjusted to 7.5°. This can be checked by using the clinometer display if one is fitted.

**Summary of angles (Preset 6):**

		Preset 6
Flying Frame tilt angle		7.5°
Transition Frame angle		0°
Inter-cabinet angles between:	Cabinets 1 & 2	0.5°
	Cabinets 2 & 3	4°
	Cabinets 3 & 4	10°

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