

EPAK2500R User Guide



The Future of Sound. Made Perfectly Clear.

At KV2 Audio our vision is to constantly develop technologies that eliminate distortion and loss of information providing a true dynamic representation of the source.

Our aim is to create audio products that absorb you, place you within the performance and deliver a listening experience beyond expectations.

IMPORTANT SAFETY INSTRUCTIONS



IMPORTANT SAFETY INSTRUCTIONS

Before using your EPAK2500R, be sure to carefully read the applicable items of these operating instructions and the safety suggestions

- 1. Keep this manual for future reference.
- 2. Heed all warnings.
- 3. Follow all instructions.
- **4.** Do not use this unit near water. Do not spill water or other liquids into or on the unit. Do not operate the EPAK2500R while wet or standing in liquid.
- 5. Clean only with dry cloth.
- 6. Do not block the air intake or exhaust ports. Install the unit in accordance with the instructions.
- 7. Do not operate the EPAK2500R near heat producing devices such as radiators, heat registers, stoves or other apparatus that produce heat.
- 8. Always operate the unit with the chassis ground wire connected to the electrical safety earth. Do not defeat the safety purpose of a grounding-type plug. A grounding type plug has two pins and a third grounding prong. 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. Connect only to AC power outlets rated 115-250V, 50-60Hz.
- **10.** Do not use this EPAK2500R if the power cable is broken or frayed. Protect the power cable from being walked upon or pinched particularly at the plugs and the point where it exits from the apparatus.
- **11.** Only use accessories specified by the manufacturer.
- **12.** The unit is intended to be used in a 19" rack. Follow the mounting instructions. When a rack on wheels is used, use caution when moving the loaded rack to avoid injury from tipping over.
- **13.** Unplug this apparatus during lightning storms or when unused for long periods of time.
- 14. Do not connect an EPAK2500R output in parallel or series with any other EPAK2500R's output. Do not connect the EPAK2500R output to any other voltage source, such as battery, mains source, or power supply, regardless of whether the EPAK2500R is turned on or off.
- **15.** Do not run the output of any EPAK2500R back into another channel's input.
- **16.** Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way such as:
 - Power-supply cord or plug is damaged
 - · Liquid has been spilled into the unit
 - An object has fallen into the unit
 - The unit has been exposed to rain or moisture
 - The unit does not operate normally
 - The unit was dropped or the enclosure is damaged
- **17.** Do not remove top or bottom covers. Removal of the cover will expose hazardous voltages. There are no serviceable parts inside and removal may void the warranty.
- **18.** An experienced user shall always supervise this professional audio equipment, especially if inexperienced adults or minors are using the equipment.

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE THE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.

WARNING: To prevent fire or electric shock, do not expose this equipment to rain or moisture.

Contents · EPAK2500R

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EPAK2500R · Introduction





EPAK2500R - part number KVV 987 061 (230V) KVV 987 181 (250V) KVV 987 062 (115V)



Application

Specifically designed as the amplification and control elements for the ES loudspeaker systems in a full rack mount module

- Portable PA
- Fixed installations
- Bars and Nightclubs
- Houses of Worship

Introduction

Rack mount version of our popular EPAK2500 four-way, active control and amplification unit specifically designed for the ES Series modular loudspeaker system. Two shock mounted fans move air across the heatsinks which seal and protect the electronic components. This minimizes maintenance cycles and improves the components lifespan and reliability. Both the EPAK2500 and EPAK2500R utilize KV2's industry leading 20MHz sampling for on board time alignment and phase correction of all components in the ES system.

The amplifier compliment inside the EPAK2500R is as follows:

High Frequency - 100-watt, Class AB, push pull, low intermodulation design.

Mid Frequency - 200-watt, Class AB, push pull, low intermodulation design.

Mid Bass - 600-watt, high-efficiency, current-enhancing switch mode technology with Linear Active Filter.

Subwoofer - 1600-watt, high-efficiency, current-enhancing switch mode technology with Linear Active Filter.

The EPAK2500R is "Line Driver Ready" and has its own input impedance selector switch on the rear panel to accurately match up the input impedance to the output of any mixer used. In most cases it would be advisable to use a VHD LD4 line driver in addition at the mixer end to ensure that the line to the amplifier is driven correctly and the signal integrity maintained.

Although this unit is simple to operate improper use can be dangerous. This is a very high-powered device that can put out high voltages and sizeable currents. Always use safe operating techniques with the EPAK2500R.

FOR YOUR SAFETY, READ THE IMPORTANT PRECAUTIONS SECTION AS WELL AS THE INPUT, OUTPUT AND POWER CONNECTION SECTIONS OF THIS MANUAL.



Unpacking

Unpack the EPAK2500R and check to see if there is any damage to it. If you find any damage notify your supplier immediately. Only the consignee may institute a claim with the carrier for damage incurred during shipping. Be sure to save the carton and all packing materials for the carrier's inspection.

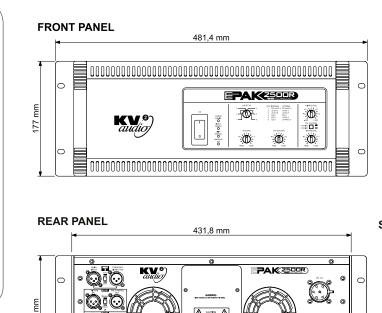
Should you ever need to ship the unit, only use the original factory packaging. If the shipping carton is unavailable, contact your supplier to obtain a replacement.

The EPAK2500R carton should contain:

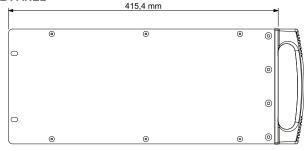
- EPAK2500R amplifier control unit
- User's manual
- PowerCon detachable power cable
- ES Cable Kit KVV987047 (contains 2pcs LF15, 1pc LF40, 1pc MH60 cables)

Rack Mounting

EPAK2500R's will mount in standard 19" rack systems. Integral rear mounting rack ears are also provided for additional support, do not rely on fixing and mounting the EPAK2500R using just the front panel as support. Use eight screws and washers to mount the amplifier to the equipment rack rails (four for the front and four for the rear). We recommend using a shock mounted rack for touring use to prolong the life of your EPAK2500R.



SIDE PANEL



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Cooling

The EPAK2500R has a comprehensive cooling system featuring chassis-sealed PCB board mounting and shock mounted, speed controlled fans. This means that the cooling system never drives air across PCB boards, connectors or components ensuring prolonged electronic component lifespan and minimizing maintenance cycles.

Air is drawn into the front of the amplifier by the two fans on the rear panel, this passes over the cooling fins of the heat sinks and exhausts through the rear. If the heat sink gets too hot, its sensing circuit will open the output relay, disconnecting the load.

It is important to have an adequate air supply at the front of the amplifier, and enough space around the rear of the amplifier to allow the cooling air to escape. If the unit is rack mounted, do not use doors or covers on the rear of the rack; the exhaust air must flow without restriction. If you are using racks with closed backs, use fans on the rear rack panel to ensure an ample air supply.

IMPORTANT! Please note that for correct full performance of the unit AND ANY WARRANTY COVER, it is important that regular maintenance of the front vents and filters as well as the rear panel fans be inspected and cleaned by removing any dust and debris build-up. Any product failure due to lack of attention in this matter will immediately void any current warranty. (Please refer to notes re ventilation procedures).

AC Requirements

A PowerCon cable is provided to connect the EPAK2500R to a suitable AC power supply.

The PowerCon is a connector without breaking capacity, i.e. the PowerCon should not be connected or disconnected under load or while it is live. Always isolate your AC supply before disconnecting the PowerCon connector.

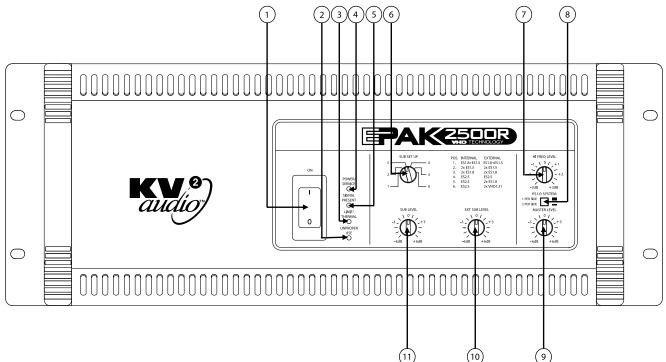
Your EPAK2500R will be supplied pre set to the voltage used in your area. The table below provides typical current draw figures for the EPAK2500R.

AC Input	Current draw with amplifier running at Average Power (Each Channel)	Current draw with amplifier running at Peak Power (Each Channel)
250V	8.25A	12.5A
230V	9A	14A
115V	18A	28A

EPAK2500R · Features · Front panel



Front panel



1) AC Mains Switch

The EPAK2500R has a combination AC Mains switch/ circuit breaker on the front panel. If the switch shuts off during normal use, push it back to the ON position once. If it will not stay on you should take the unit to qualified service personnel to have it serviced.

2) Unproper Use LED

If the EPAK2500R is connected improperly then this LED will light and the unit will shut down.

3) Limit / Thermal LED

This is a dual colour LED, when yellow it indicates that the audio limiter has been activated. When red it indicates that the thermal limit of the EPAK2500R has been exceeded and the unit has shut down because of this.

4) Power / Service LED

This is a dual colour LED, when green it indicates that the AC power is on. When red it indicates that there is a fault condition sensed within the EPAK2500R and that the unit needs servicing.

5) Signal Present

This green LED indicates when audio signal is present at the EPAK2500R's input.

6) Sub Set Up

This switch is set according to which combination of subwoofers is being used with the system. Refer to 'Using the System' for further information, the various combinations are listed in the table within this section.

7) Hi Freq Level

This controls the output level of the high frequency amplifier to enable you to adjust the high frequency component of the ES system to the desired level.

8) ES1.0 System

This switch sets the controller for use when either a single ES1.0 is being used or a double system using 2 ES1.0's are being used. In this mode another EPAK2500R would be required to power the second ES1.0 and both switches should be set to 'Double'.

9) Master Level

This is the master level control for the system and will affect both the ES1.0 and the subwoofer outputs.

10) Ext Sub Level

This is the level control for the External Sub output; it is 'post' the Master Level control.

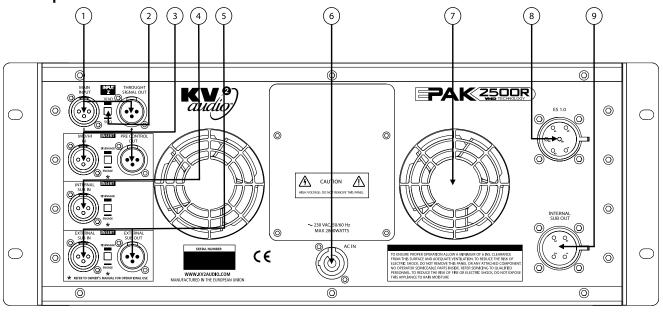
11) Sub Level

This is the level control for the Internal Sub output; it is 'post' the Master Level control.

EPAK2500R · Features · Rear panel



Rear panel



1) Main Input / Through Signal Out

This is the main system input connector with associated 'Through Signal Output' connector for sending unprocessed signal to other devices, such as more EPAK2500R's to power more ES1.0's in a system.

2) Input Z

This switch selects one of two input impedance settings for the EPAK2500R. The switch should be set to the 50 Ω setting when a single EPAK2500R is driven from a VHD LD4 line driver. Where an LD4 is not being used and the EPAK2500R is being driven from a standard mixing console output, then the 10k Ω setting should be used. If two EPAK2500R units are linked via their signal from a Line Driver, then only the last EPAK2500R in the signal chain should be set to 500hm.

3) Mid/High In / Pre Control Out

This is an insert point for the Mid/High section of the EPAK2500R, the signal sent to the ES1.0 cabinet. It enables you to 'insert' an external device (a delay line for example) into the signal that is being sent to the ES1.0. With the associated switch in the 'Engage' setting the Pre Control Out connector would send the signal to the external device, and its output would be returned into the Mid/High In connector.

4) Internal Sub In

This 'insert' point allows you to drive the internal subwoofer amplifier from an external source. The signal for the internal subwoofer amplifier is usually derived from the Main Input on the EPAK2500R but with this Sub In and associated switch the option is available to derive the signal input for the internal subwoofer section from a different source. For further information see 'Using the System'.

5) External Sub In, External Sub Out

Apart from providing signal processing and power amplification for driving the ES1.0 enclosure and ES subwoofers the EPAK2500R also provides processed outputs for feeding VHD3200 subwoofer amplifiers to drive various combinations of ES and VHD subwoofers. The signal for this is usually derived from the Main Input on the EPAK2500R but with these Sub In and Sub Out connectors and associated switch the option is available to derive the signal input for the external subwoofer section from a different source. For further information see 'Using the System'.

6) PowerCon Power Connector

Accepts a standard PowerCon terminated AC cable.

7) Fans

The cooling fans operate continuously while the EPAK2500R is on. An internal temperature sensor increases the speed of the fans during high temperature conditions. Air enters through the front grille and exits through the rear. Be sure to allow adequate air flow to the front of the rack in which the EPAK2500R is mounted.

8) ES1.0 AP6 Connector

Accepts a standard AP6 terminated loudspeaker cable for connecting up to a single ES1.0 cabinet. We recommend using 2.5 mm/core cables.

9) Internal Sub AP4 Connector

Accepts a standard AP4 terminated loudspeaker cable for connecting up to various ES series subwoofers. We recommend using 2.5 mm/core cables. *Minimum load impedance is* 4Ω !



Normal Set Up

The EPAK2500R is designed to actively power one ES1.0 cabinet and associated subwoofer systems. For Normal Mode operation signal is applied to the 'Main Input' connector and all the 'Insert' switches would be in the 'Disengage' position.

The Input Z switch should be set to match the output impedance of the device feeding the EPAK2500R. If you are using a VHD LD4 Line Driver then the Input Z switch on the EPAK2500R should be set to 50Ω . If when using the LD4 you are feeding more than one EPAK2500R then they should all be set to $10k\Omega$ with the last one in the signal chain set to 50Ω .

Six different combinations of subwoofers are accommodated for when using the EPAK2500R. **The combinations are as follows:**

EPAK2500R Setting	Internal	External
Setting 1	1 x ES1.8 + 2 x ES1.5 ¹	1 x ES1.8 + 2 x ES1.5 ¹
Setting 2	2 x ES1.5 ²	2 x ES1.5 ²
Setting 3	2 x ES1.8	2 x ES1.8
Setting 4	1 x ES2.5	1 x ES2.5
Setting 5	1 x ES2.5	2 x ES1.8
Setting 6 (5-way system)	1 x ES2.5	2 x VHD1.21 ³

Notes on Subwoofer Combinations

- 1. Setting 1 is set up for driving 1 x ES1.8 + 2 x ES1.5. It can also drive 1 x ES1.8 + 1 x ES1.5, in this mode the relevant Sub level control (either Internal or External) should be increased by up to +6dB.
- 2. Setting 2 is set up for driving 2 x ES1.5. It can also drive 3 x ES1.5, in this mode the relevant Sub level control (either Internal or External) should be decreased by -3dB. This setting can also drive just 1 x ES1.5 with the relevant Sub level control adjusted accordingly, dependent on the application.
- **3.** Setting 6 is a true 5-way setting. The ES2.5's are actively crossed over with the VHD1.21's.

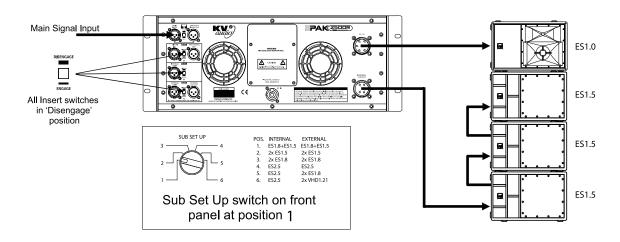
ES Subwoofers Impedances

Subwoofer	Impedance
ES1.5	16Ω
ES1.8	80
ES2.5	4Ω
ES2.6	80
VHD1.21	8Ω



Normal Set Up

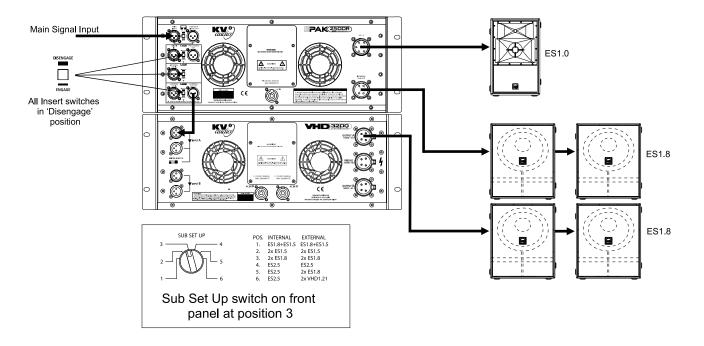
The EPAK 2500R is designed to actively power one ES1.0 cabinet and associated subwoofer systems. Subwoofers are connected in parallel, the total minimum impedance load should not be lover than 4Ω .



'Internal' denotes subwoofers powered by the internal subwoofer amplifier.

Normal Set Up With Additional Subwoofers

To power more subwoofers, use aditional subwoofer amplifier - VHD3200. Use External Sub Out signal output for feeding VHD3200 subwoofer amplifiers.



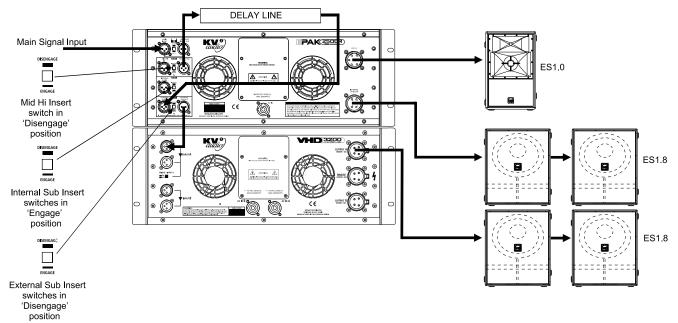
'Internal' denotes subwoofers powered by the internal subwoofer amplifier.

'External' denotes subwoofers powered by an external VHD3200 subwoofer amplifier, fed from the EPAK2500R's External Sub Out connector.



Using the Internal Sub In Insert

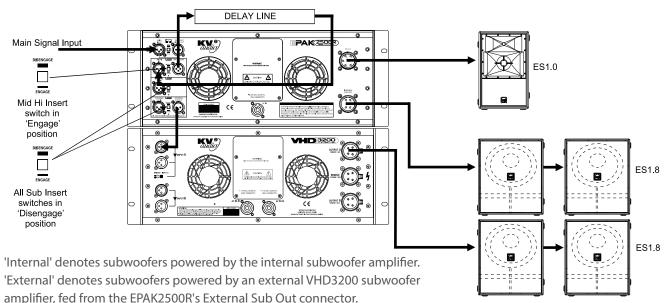
The Internal Sub Insert point gives you the ability to 'insert' a signal processing device into the ES Sub signal chain. For instance in some instances it may be necessary to 'delay' the signal going to the ES Sub using a delay line. The Main Input is used as the system input, as per Normal Mode, but the Internal Sub In insert switch is switched to 'Engage'. A feed is taken to the delay line from the 'Pre Control Out' connector and the return from the delay line is connected to the 'Internal Sub In' connector as per the diagram:



'Internal' denotes subwoofers powered by the internal subwoofer amplifier. 'External' denotes subwoofers powered by an external VHD3200 subwoofer amplifier, fed from the EPAK2500R's External Sub Out connector.

Using the Mid/Hi Insert

The Mid/Hi Insert point gives you the ability to 'insert' a signal processing device into the ES1.0 signal chain. For instance in some instances it may be necessary to 'delay' the signal going to the ES1.0 using a delay line. The Main Input is used as the system input, as per Normal Mode, but the Mid/Hi insert switch is switched to 'Engage'. A feed is taken to the delay line from the 'Pre Control Out' connector and the return from the delay line is connected to the 'Mid/ Hi In' connector as per the diagram:

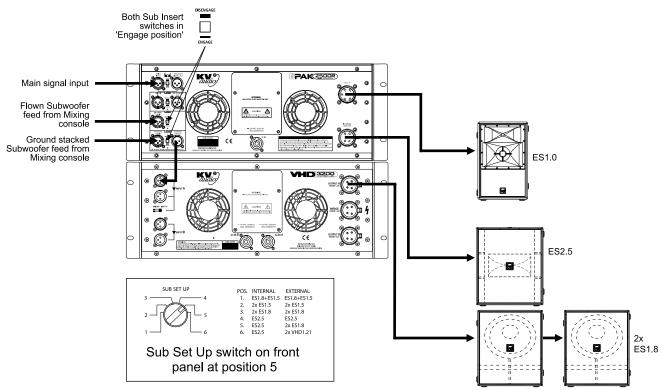


EPAK2500R · Using the System



Feeding the Subwoofers from another source

Taking the following diagram as an example, if the ES1.0 was flying you might want to fly one ES2.5 above it with the other two ES1.8's ground stacked beneath. In this instance it would be preferable to have both sets of subwoofers fed by separate feeds from the mixing console, to give you independent level control to each of the subwoofer types, and to have the ES1.0 fed by the main output from the mixing console:



'Internal' denotes subwoofers powered by the internal subwoofer amplifier. 'External' denotes subwoofers powered by an external VHD3200 subwoofer amplifier, fed from the EPAK2500R's External Sub Out connector.

The table below shows the various combinations of the Sub Insert switches and their effect on the signal routing in the EPAK2500R:

Internal Sub Insert Switch Position	External Sub Insert Switch Position	Internal Sub Signal derived from	External Sub Signal derived from
Disengage (Out)	Disengage	Main Input	Main Input
Engage (In)	Disengage	Internal Sub In	Internal Sub In
Engage	Engage	Internal Sub In	External Sub In
Disengage	Engage	Main Input	External Sub In



Specifications

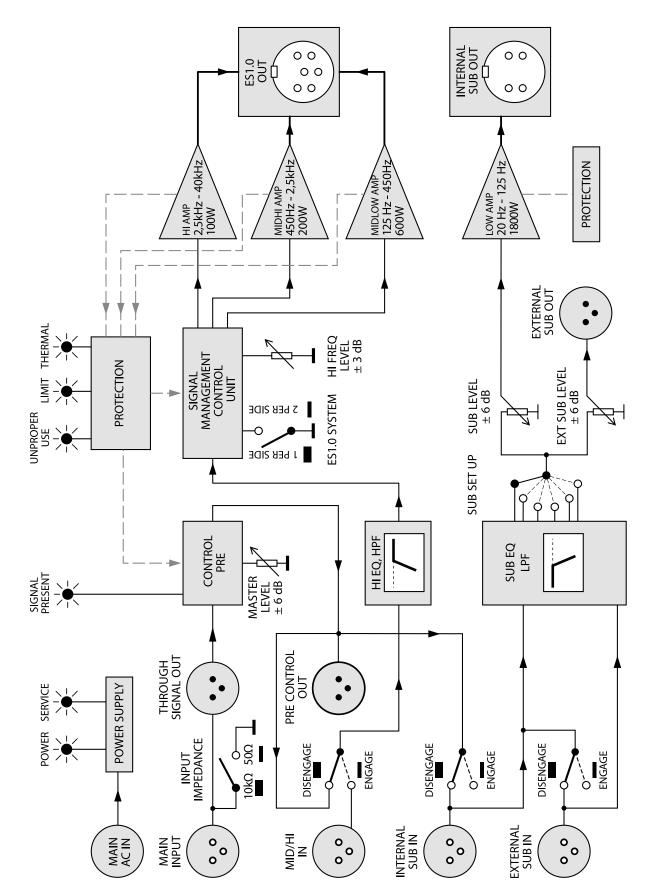
High Frequency Amplifier Specification

Туре	Class AB Push-Pull low inter-modulation Mosfet design with transformer balanced output
Rated Continuous Power	100W
Distortion	<0.05%
Operating Bandwidth	2.5kHz to 28kHz
Mid Frequency Amplifier Specification	
Туре	Class AB Push-Pull low inter-modulation Mosfet design with transformer balanced output
Rated Continuous Power	200W
Distortion	<0.05%
Operating Bandwidth	500Hz to 2.5kHz
Mid-Bass Frequency Amplifier Specification	
Туре	High efficiency, Current-Enhancing, Switched-Rail Amplifier
Rated Continuous Power	600W
Distortion	<0.05%
Operating Bandwidth	130Hz to 500Hz
Low Frequency Amplifier Specification	
Туре	High efficiency, Current-Enhancing, Switched-Rail Amplifier
Rated Continuous Power	1600W
Distortion	<0.05%
Operating Bandwidth	20Hz to 130Hz
Signal Input	
Input Sensitivity	1.0V RMS
Input Impedance	$20k\Omega$ (balanced) or 50Ω "Line Driver ready"
Speaker Output	
Speaker Output	AP6 (Mid-Hi), AP4 (Sub)
Power	
Power Connector	Neutrik PowerCon®
Operating Voltage Range	100 to 120V@60Hz 205 to 240V@50Hz 225 to 260V@50Hz
Recommended Amperage	20A 115V 10A 230V 10A 250V
Physical Dimensions	
Height	177 mm (6.96")
Width	481.4 mm (18.95")
Depth	415.4 mm (16.35")
Weight	30 kg (66lbs)

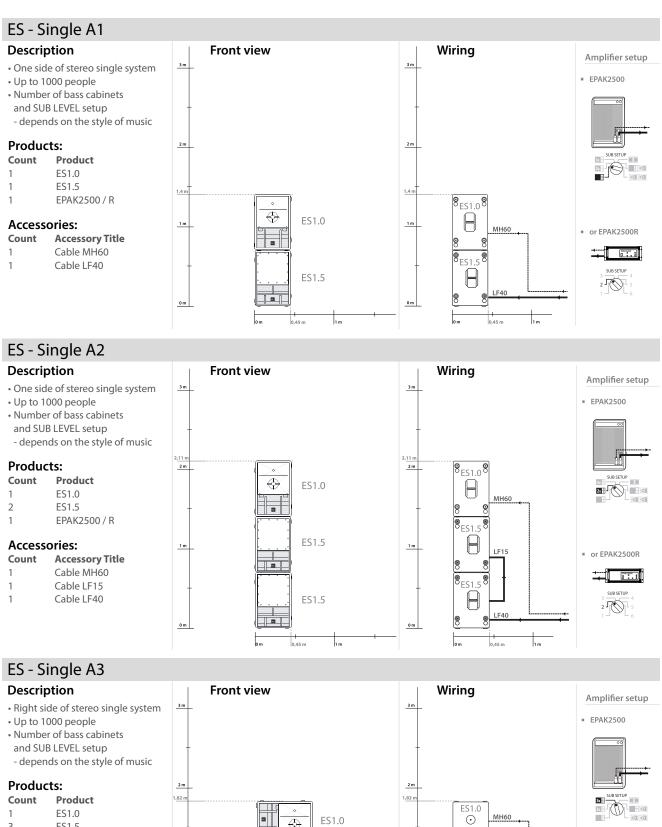
EPAK2500R · Block Diagram



Block Diagram







3 ES1.5 1 EPAK2500 / R

Accessories:

Count **Accessory Title**

1 m

0 m

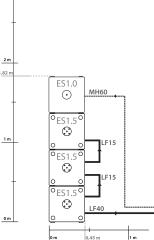
- Cable MH60 1
- 2 Cable LF15
- 1 Cable LF40

ES1.0 \odot T ES1.5 ES1.5 ES1.5

1 m

0,7 m

0 m





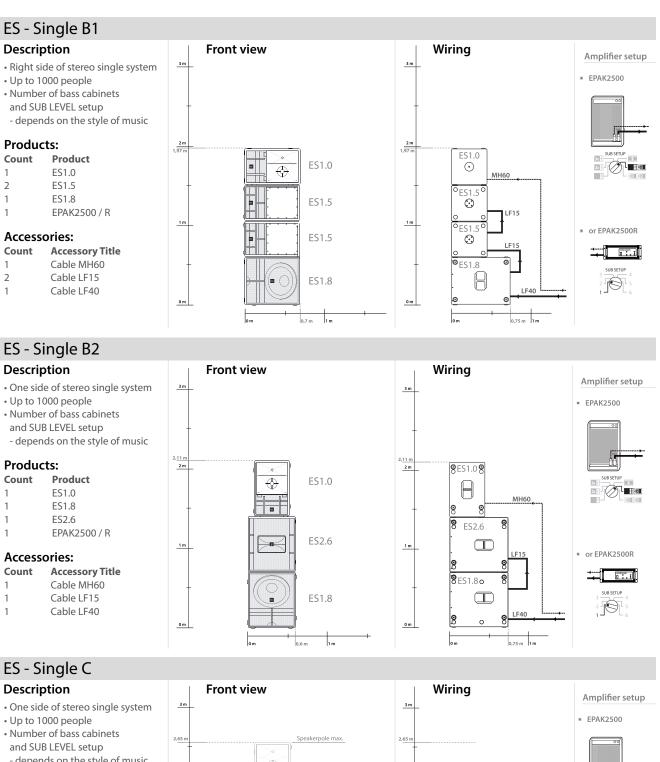






14



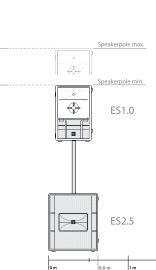


- depends on the style of music

Products:		
Count	Product	
1	ES1.0	
1	ES2.5	
1	EPAK2500 / R	

Accessories:

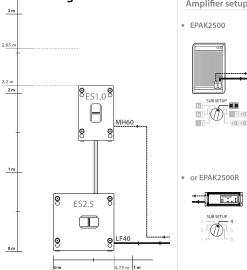
Count	Accessory Title
1	Cable MH60
1	Cable LF40
1	KV2-H
(1	ES1.0 Vertical Bracket)



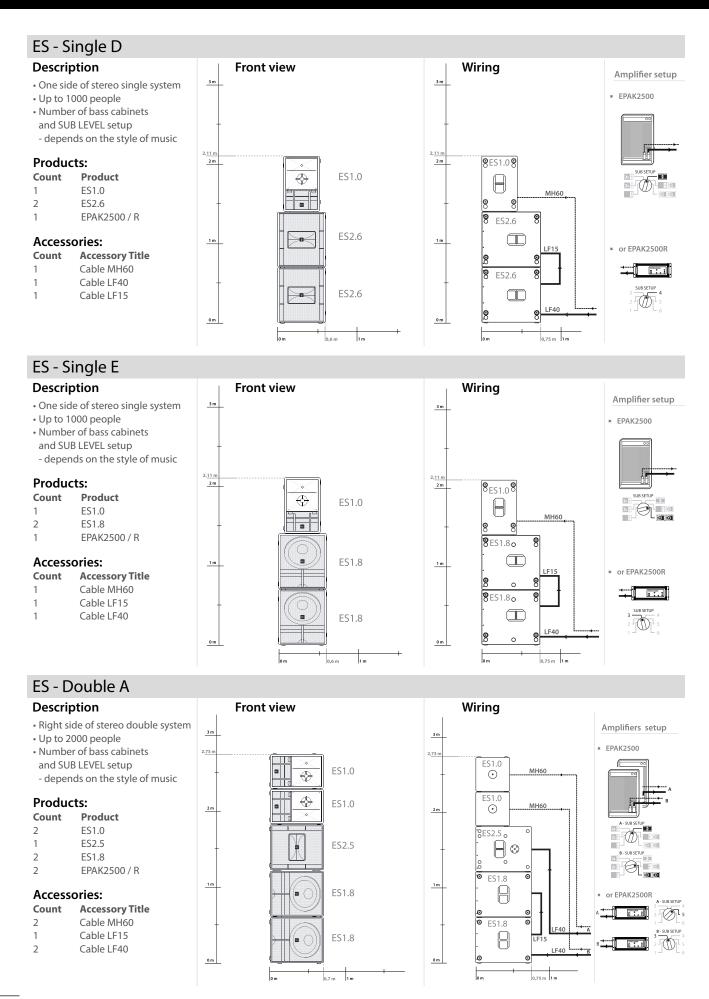
2,2 m

1 m

0 m

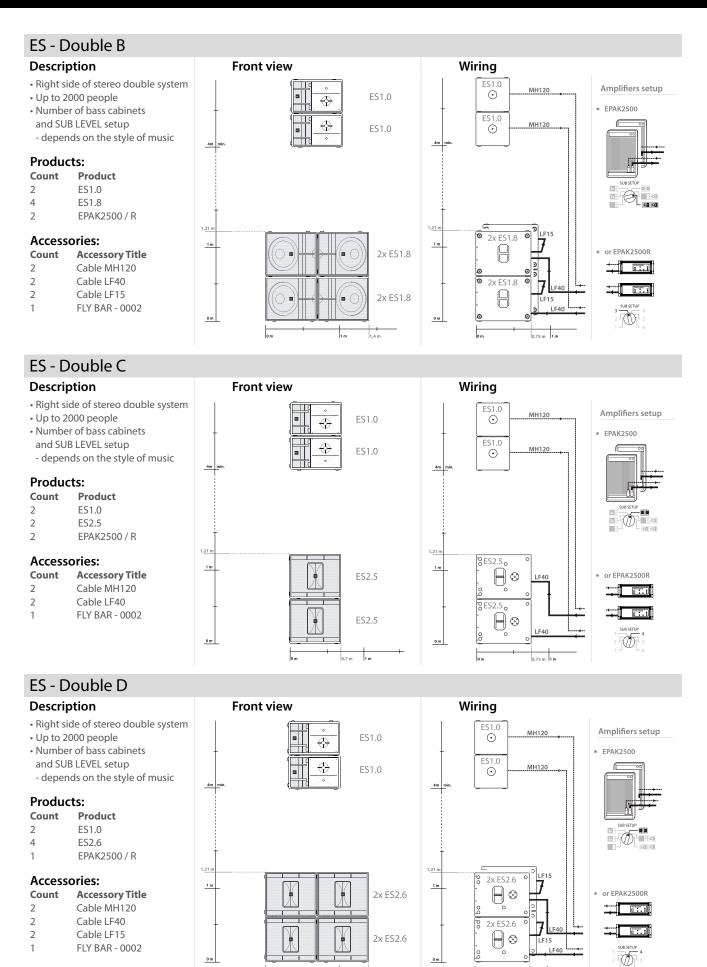






16





1 m

1,4 m

0 m

0,75 m 1 m

EPAK2500R · Accessories



ES Mid/Hi speaker cable MH15, AP6 connectors - 1,5 m part name: MH15 part number: KVV 987 147 - 1,5 m (5ft), Mid/Hi Module hook-up



Amphenol AP6 cable-mount female connector part name: AP-6-11 part number: KVV 987 050



ES Mid/Hi speaker cable MH60, AP6 connectors - 6 m part name: MH60 part number: KVV 987 125 - 6 m (20ft), Mid/Hi Module hook-up



Amphenol AP6 cable-mount male connector part name: AP-6-12 part number: KVV 987 051



ES Mid/Hi speaker cable MH120, AP6 connectors - 12 m part name: MH120 part number: KVV 987 126 - 12 m (40ft), Mid/Hi Module hook-up



Amphenol AP4 cable-mount female connector part name: AP-4-11 part number: KVV 987 048



ES Mid/Hi speaker cable MH180, AP6 connectors - 18 m part name: MH180 part number: KVV 987 127 - 18 m (60ft), Mid/Hi Module hook-up



Amphenol AP4 cable-mount male connector part name: AP-4-12 part number: KVV 987 049



ES Bass speaker cable LF15, AP4 connectors - 1,5 m part name: LF15 - 1,5 m (5ft)

part number: KVV 987 121 - for ES Bass Module daisy-chaining

ES Bass speaker cable LF40, AP4 connectors - 4 m part name: LF40 part number: KVV 987 122 - 4 m (13ft)

- for ES Bass Module hook-up



part name: CABLE-KIT part number: KVV 987 047 The ES Cable Pack consist of four high-quality Amphenol AP cable assemblies designed

ES Cable kit

for use with ES Series. - 2 pcs LF15 LF40 - 1pc MH60 - 1pc





ES Bass speaker cable LF100, AP4 connectors - 10 m part name: LF100 part number: KVV 987 123 - 10 m (33ft)

- for ES Bass Module hook-up



ES Bass speaker cable LF200, AP4 connectors - 20 m part name: LF200 part number: KVV 987 124 - 20m (66ft)

- for ES Bass Module hook-up



EPAK2500R · Warranty · Service



Warranty

Your EPAK2500R is covered against defects in material and workmanship.

Refer to your supplier for more details.

Service

In the unlikely event that your EPAK2500R develops a problem, it must be returned to an authorized distributor, service centre or shipped directly to our factory. Because of the complexity of the design and the risk of electrical shock, all repairs must be attempted only by qualified technical personnel.

If the unit needs to be shipped back to the factory, it must be sent in its original carton. If improperly packed, the unit may be damaged.

To obtain service, contact your nearest KV2 Audio Service Centre, Distributor or Dealer.





The Future of Sound. Made Perfectly Clear.

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KVV120030-00-09-0