

TAKSTAR®

用户手册

User's Manual

HA-618

6通道耳机放大器

6-CHANNEL HEADPHONES AMPLIFIER

TAKSTAR®

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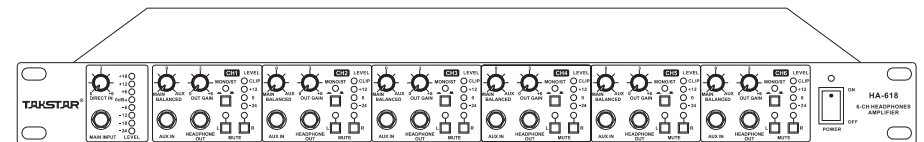
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内部高压，小心触电



机器重要操作和维护提示



保护接地端子
交流电流/电压



危险带电端



表示设备开启



表示设备关闭

警告

警示说明，需注意，
避免可能受伤或死亡的危险。



警告

警示说明，需注意以免造成产品
损坏。产品的报废处理不能混于
城市生活垃圾，需单独收集处理。

警告

电源在接通机器电源之前，确保主电
源电压与该机器所需电压一致，否则
将对机器造成损坏或可能危害用户安
全。机器长时间不用或打雷闪电时请
拔出电源插头，以避免触电或火灾危
险。

外部连接

使用专用电源线连接，以免免造成电
击/死亡或火灾危险。若不明白，请联
系技术人员处理。

不要拆除任何外盖

机器内部有高压区，为了避免触电危
险，在电源接通时不要拆除任何外盖
。如有必要，请联系技术人员处理。

内部为非用户维修部件

保险丝

为防止火灾及机器的损坏，确保使用
指定规格保险丝，禁止使用不同规格
保险丝。在换保险前，确保关闭机器
电源，拔出电源插头。

保护接地

开启机器前，确保与地连接，避免触
电危险。严禁切断内部或外部的保护
接地线或拔出保护接地端子。

操作说明

请根据制造商的指示说明安装机器。
为了避免触电和机器损坏，不要将机
器置于雨水或潮湿环境。切勿在积水
旁使用此机器。不要将机器安装于高
温源附近不要阻塞任何通风口，以免
引起火灾。机器远离明火。

重要安全说明

- 阅读安全说明
- 遵从安全说明
- 遵守安全说明
- 注意所有警示内容
- 只使用厂商指定配件

电源线和插头

不要踩踏电源线或插头。
不要断开保护接地连接。
若提供的插头与您的AC座不配套，请
联系技术人员更换电源插座。
电源线与插头不要被重物压到以免有
电击或火灾危险。

清洁

当机器需要清洁时，可用吹风机或干
净的布除去灰尘。
不要使用清洁剂，如不纯苯、酒精等。
为了安全，请保持机器干净。

机器的维修

所有维修事项请询求专业技术人员帮
助，非专业人员请不要擅自处理，以
免造成触电危险。

便携式推车
使用警告

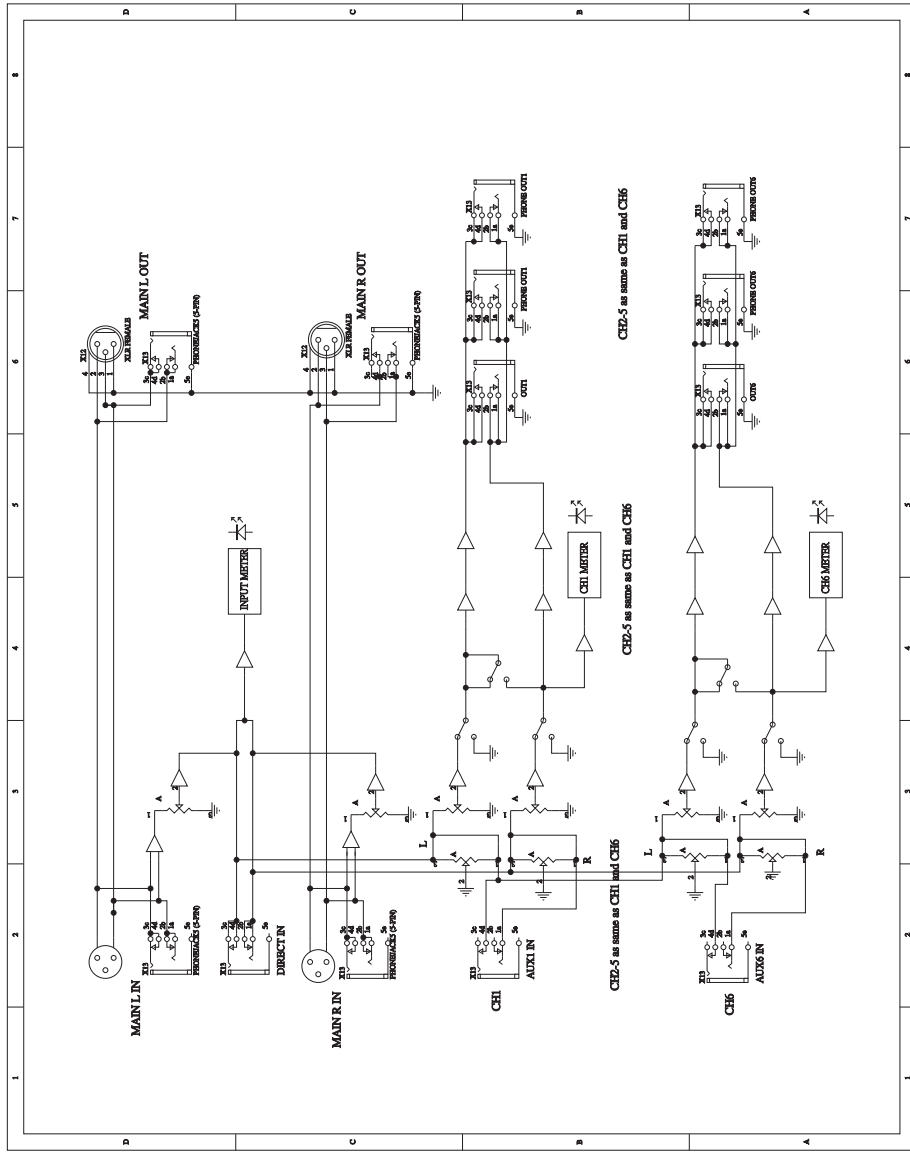


推车和支架--
只使用制造商推荐
的推车或支架。
小心使用，快速停止
用力过猛和地面不平
可能造成机器和推车
翻倒。

TECHNICAL SPECIFICATION

MAIN INPUT	Connectors	XLR and 1/4" jack
	Type	HF filtered, servo balanced input
	Impedance	50 kOhms balanced, 25 kOhms unbalanced
	Max.input level	+21 dBu balanced and unbalanced
AUX IN AND DIRECT IN INPUT	CMRR	typ.40 dB, >55 dB @ 1kHz
	Connectors	1/4" TRS (tip=left, ring=right, sleeve=ground)
	Type	Unbalanced
	Impedance	25 kOhms Unbalanced
OUTPUT	Max.input level	+21 dBu unbalanced
	CMRR	typ,40 dB, >55 dB @ 1 kHz
	Connectors	XLR and 1/4" Jack
	Type	Balanced /Unbalanced
SYSTEM SPECIFICATIONS	Impedance	Dependent on the input impedance
	Max. output level	+21 dBu Balanced and Unbalanced
	Frequency response	10 Hz to 50 kHz,+/-3 dB
	Noise	>90 dB, Unweighted, 22 Hz to 22 kHz(>95 dB@+4 dBu)
POWER AMPLIFIER	THD	0.005% typ.@+4 dBu, 1kHz, Gain 1
	Max.output power	+21 dBm
	Min.output impedance	8 Ohms
FUNCTION CONTROLS	MAX. Gain	+20dB
	Input level	Variable
	Balanced per channel	Mix between aux and main signal
FUNCTION SWITCHES	Output level per channel	Variable
	Left mute	Mute left signal of the respective channel
	Right mute	Mute right signal of the respective channel
INDICATORS	Mode	Switch channel to mono
	Input level	8-digit LED display:-24/-18/-12/-6/0/+6/+12/+18dBu
	Output level	4-digit LED display:-24/0/+12/CLIP
POWER SUPPLY	Mains voltage	USA/Canada: 120V~, 60Hz UK/Australia: 240V~,50Hz Europe: 230V~,50Hz
	Power consumption	40 W
	Mains connection	Standard IEC receptacle
	Fuse	110-120V T500mAL/220-240V T315mAL
	Dimension(WxDxH)	483x217x44mm(19"x8.84"x1.7")
PHYSICAL	Net weight	2.9kg/6.39 lbs

BLOCK DIAGRAM



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简介

非常感谢购买HA-618 6通道耳机放大器，本产品是录音、广播、现场演出的理想应用设备。操作灵活可达到6个音乐者同时使用个人耳机配音。

请仔细阅读此说明书，以便充分利用耳机放大器的各项功能特性。
再次感谢购买TAKSTAR音乐设备。

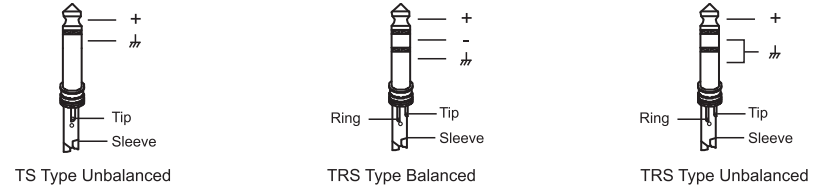
特性

- *可装于19"支架
- *6个单独的耳机通道
- *输入增益控制，单独输出增益控制
- *每通道达到3个耳机输出，总共18个耳机输出
- *面板上有直接输入(Direct In)与耳机输出(Headphone Output)，当设备安装在支架上时方便操作
- *输入与输出位准LED计量
- *平衡控制主输入(MAIN IN)与辅助输入(AUX IN)信号的混响
- *主输出用以连接额外耳机放大器
- *高音质(即使在高音量时)
- *异常坚固的结构使之经久耐用
- *通用&专业的耳机放大电路系统，便于录音与舞台使用
- *符合QS9000质量认证系统

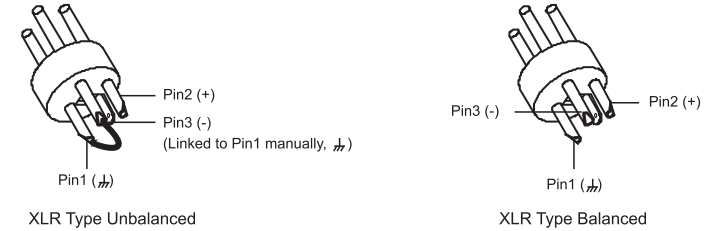
WIRE CONNECTIONS

Either the 1/4" TRS phone jack or XLR connector can be wired in balanced and unbalanced modes, which will be determined by the actual application status, please wire your system as the following wiring examples:

- For 1/4" Phone jack



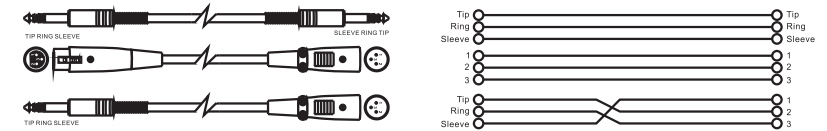
- For XLR Connector



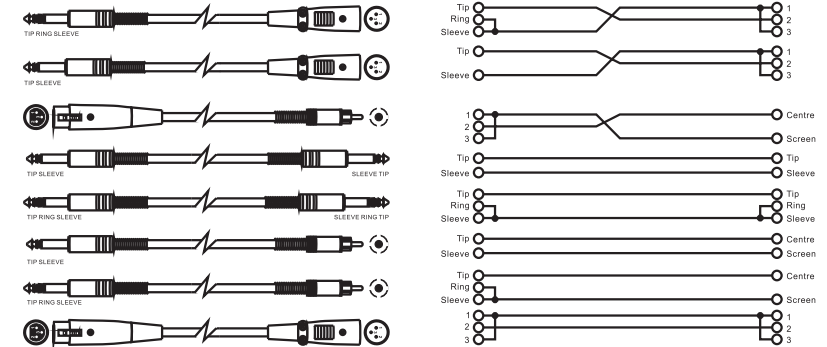
In-line Connection

For these applications the unit provides 1/4" TRS and XLR connectors to easily interface with most professional audio devices. Follow the configuration examples below for your particular connection.

- Balanced



- Unbalanced



INSTALLATION TIPS

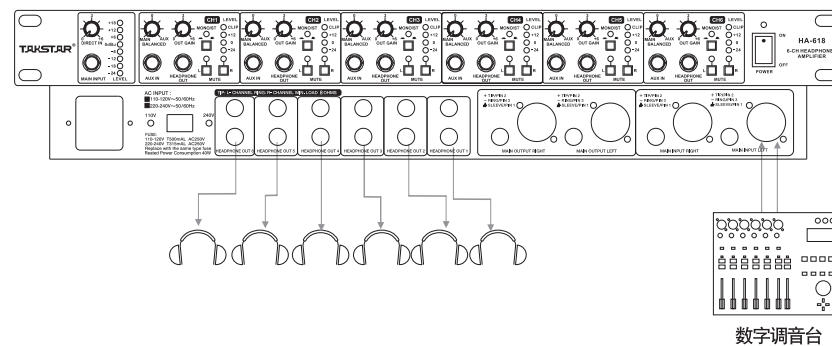
- 1- Speakers should be placed in a position that allows for unobstructed sound projection. In many instances is beneficial for speakers to be elevated on tripod stands to achieve maximum dispersion and reach.
- 2- Use professional advice or service when hanging and installing speakers. Please take precautions to secure them to prevent them from falling and hurting someone. Care should be taken as to not damage the cabinet or its components. Please comply with all pertinent Regulations.
- 3- Use quality cables. Using quality cables will ensure the best possible sound.
- 4- For best results match the speakers to a good amplifier that matches the wattage and impedance of your speakers. Proper amplification power results in good quality audio and longer component life. Check out the power requirement for your cabinet.
- 5- Avoid pointing a microphone directly at an amplified speaker doing so, could cause feedback possibly damaging speaker components and your hearing.

Enjoy the sound!

接线图

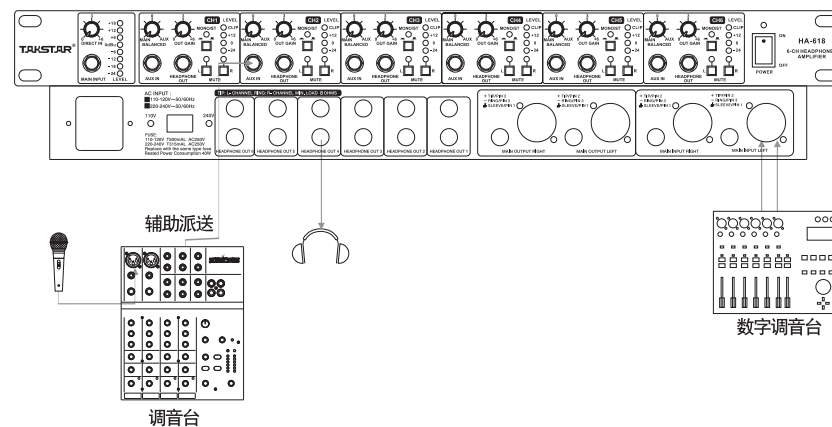
使用主输入连接座(MAIN IN)

首先，连接信号到后板上的主输入座，设置输入增益(主输入部分)与平衡控制(通道部分)在中间位置，在此阶段每一通道的输出增益必须调低，确认输入位准，以便获得最佳操作性能(如此说明书之前所述)，连接耳机，按想要的音量开始调高每一通道的输出增益，同时根据要求调整高音与低音控制。



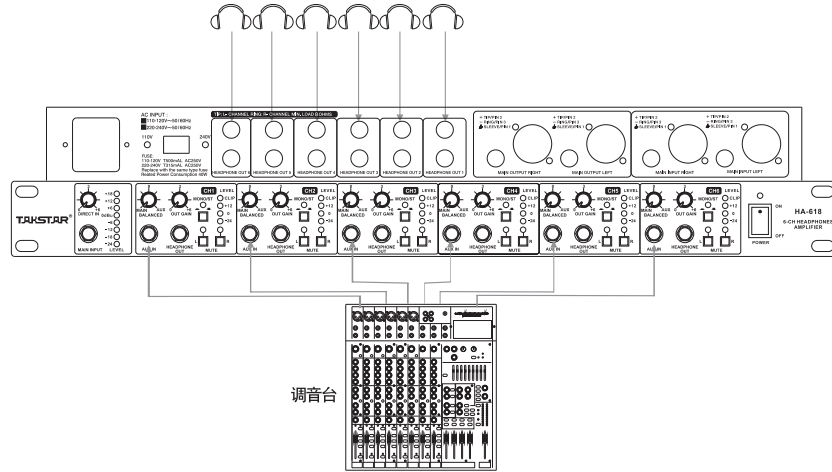
使用辅助输入接口(AUX IN)

播放信号时，可通过连接到辅助输入接口的麦克风与调音台/前级放大器来额外输入声乐，使用平衡控制钮来使声乐家在他的声音与播放信号之间达到一个完美混音，使用输出增益控制钮来调节整体所需音量。



接线图

通过辅助输入 (AUX IN)，可将6个通道单独分配到6个乐师所使用的不同调音台。直接连接辅助派送或子群输出到本机的辅助输入，需要一台有6个辅助派送或6个子群的调音台完成，旋转本机上的平衡控制钮完全至左位置，这种情况下，可排除主信号，只辅助信号传送到耳机。



附加说明

1. 支架安装

最稳固的方法是将设备安装在通用支架上，各支架制造厂或音乐产品经销商皆有出售。

6通道耳机放大器适合安装于标准19"的支架上.请对后板上的连接座至少保留额外4"的深度。

请确保设备周围空气通畅以便散热。

请不要将本产品置于高温设备上，如功率放大器，以避免设备过热。

2. 同一通道使用多个耳机

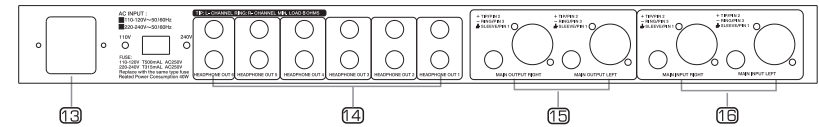
每一通道提供3个耳机输出，这些座子都是并接。

为了获得最佳性能，请注意如下阻抗信息：

1. 对于每通道连接1个耳机情况，耳机的最小阻抗需为8欧；
2. 对于每通道连接2个耳机情况，每一耳机的最小阻抗需为16欧；
3. 对于每通道连接3个耳机情况，每一耳机的最小阻抗需为24欧；

CONTROL ELEMENTS

Rear Panel



13- AC Inlet and Fuse Holder

This connector is used to connect the supplied power cord. Please check the Voltage accepted by the unit and the Voltage available from your AC sockets before connecting the unit to the Mains. If the fuse blows, replaced with a fuse of the correct type only.

14- HEADPHONE OUT (1 to 12)

These are 12 additional outputs for headphone (two for every channel) wired in parallel with the output available on the front channel.

15- Main Output Connectors

These connectors are used to output the stereo signal via the balanced 1/4" TRS phone jack or XLR connector. You can also use these connectors to link as many additional unit as you wish if you need to use many headphones channels.

16- MAIN INPUT LEFT & RIGHT

These connectors are used to input the stereo signal. You can input the main signal Via the balanced 1/4" TRS phone jack or XLR connector.

CONTROL ELEMENTS

6- MODE SWITCH

Depress the switch if you want to hear a stereo signal. Press it again if you want to hear a mono signal.

7- MONO Led:

When the MODE switch is engaged this Led will light up.

8- HEADPHONE OUT

This connector is wired in parallel with the correspondent output connector on the rear panel.

It is useful to connect headphones when your unit is installed into a rack.

9- BALANCE CONTROL

This knob has a double function. When the AUX IN input is not in use it will regulate the stereo imaging of the input signal. When a signal is fed into the AUX IN input, the balance control will regulate the ratio of MAIN IN (or DIRECT IN) and AUX IN input signals.

10- OUTPUT GAIN

This knob controls the output volume of the channel. Both right and left signals are regulated at the same time.

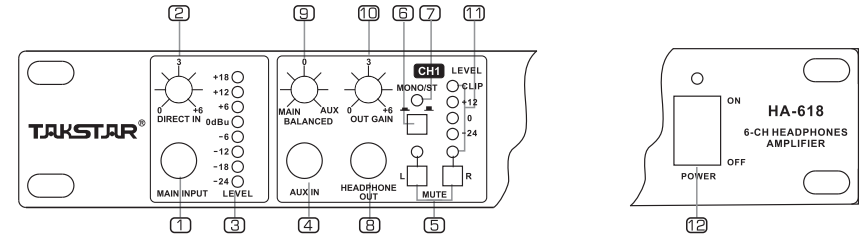
11- OUTPUT LEVEL

This 4-digit led meter tells you about the level of the output signal, and the range goes from -24 dBu to +12 dBu. When the Clip LED lights up, please turn down the Output Gain Control to avoid any distortion.

12- POWER SWITCH & LED

This switch is used to power on/off the unit. When the unit is powered on, the LED will light up.

控制功能



主输入部分

1- 主输入接口

可使用这个接口输入立体声信号到本产品，此接口为优先输入，意思是当你接入信号到此接口时，后板上的主输入信号将被断开。

2- 直接输入增益钮

此旋钮用以控制主输入或直接输入的信号位准。

3- 输入位准

此指示灯计量表可显示输入信号位准，范围为24dBu到+18dBu，当指示灯为+6dBu到+18dBu时，输入信号为最佳。削波指示灯(Clip)应该只是间或亮，若长亮，需通过输入增益控制钮降低输入位准，若只有-18和-12dBu指示灯亮，将会有个很差的信噪比，需调高输入位准。

通道部分

配有6个功能相同的通道。

4- 辅助输入接口

当想对主输入(MAIN IN)或直接输入(DIRECT IN)附加一个信号时，可通过此立体声输入接口完成，若为立体声信号，按下MONO开关，若为单声道信号，若想此类信号在耳机两边都出现，可按下MONO开关。

5- 左&右静音开关

通过这些开关，可对相应输入信号静音。

6- 模式开关

若想听到立体声信号，按下此开关，若想听到单声道信号，再次按下此开关。

7- 单声道指示灯

当模式开关起作用时，此指示灯亮。

控制功能

8- 耳机输出座

此座子与后板上对应的输出座并联。当本产品安装在支架上时，便于连接耳机。

9- 平衡控制钮

此旋钮有双重功能，当未使用辅助输入时，可调节输入信号的立体声效果；当对辅助输入提供信号时，平衡控制钮用以调节主输入接口信号(或直接输入接口信号)与辅助输入信号的比率。

10- 输出增益钮

此旋钮控制通道的输出音量，但左右的信号是同时被调整的。

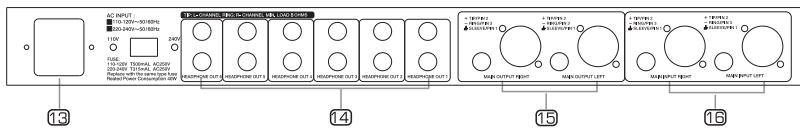
11- 输出位准

这4个数字计量指示灯将显示输出信号的位准，范围是从-24dBu到+12dBu。当削波(Clip)指示灯亮时，请通过输出增益控制钮调低输出信号以避免失真。

12- 电源开关&指示灯

此开关用以开/关电源。当设备开启时，此指示灯亮。

后板



13- AC电源输入插座与保险丝座

此座子用以连接电源线，在连接设备到电源前请确保设备可接受的电压与AC座上的电压一致。若保险丝烧断，只能用相同型号的保险丝更换。

14- 耳机输出(1到12)

后板额外有12个耳机输出(每通道2个)，与前板上的输出并联。

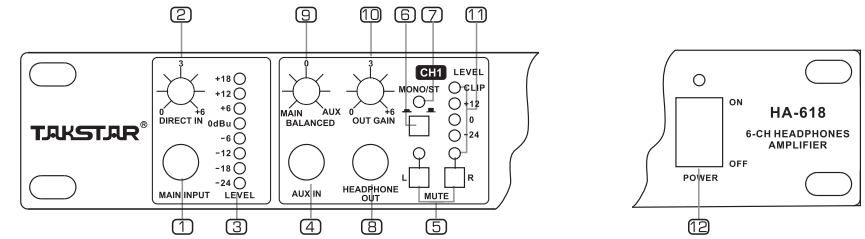
15- 主输出插座

通过平衡式1/4" TRS耳机插头与XLR座，使用这些座子来输出立体声信号。若需要用到多个麦克风通道也可使用这些座子额外连接所需数量的耳机放大器。

16- 主输入左&右(MAIN INPUT)

这些座子用以输入立体声信号。通过平衡式1/4" TRS耳机插头与XLR座，可输入主信号。

CONTROL ELEMENTS



MAIN SECTION:

1- MAIN INPUT

You can use this socket to feed an additional stereo signal into your unit.

This socket is in "priority". It means that when you insert the jack, the signal fed into the MAIN input on the rear panel will be disconnected.

2- DIRECT IN GAIN

This knob controls the level of the signal applied to the MAIN or DIRECT IN inputs.

3- INPUT LEVEL

This Led Meter informs you about the level of the input signal. The range goes from -24 dBu to +18 dBu. For the best quality of input signal the operating leds should be those from +6 to +18 dBu. The CLIP led should light up only occasionally. If CLIP led is always on, you must reduce the input level through the input gain control. If only -18 and -12 dBu leds are operating, you will experience a bad S/N ratio and increase the input level.

CHANNEL SECTION

There are 6 identical channels on your unit with identical functions and performance.

4- AUX IN

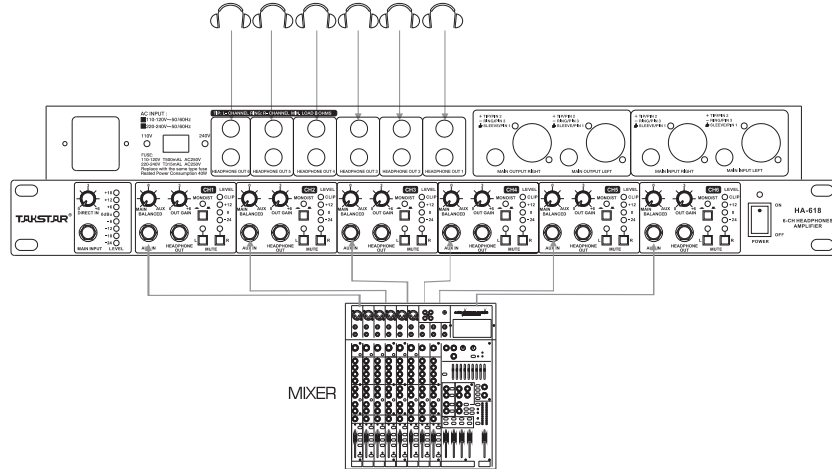
This stereo input is useful when you want to feed an additional signal with the signals applied to MAIN or DIRECT IN inputs. If you have a stereo signal depress the MONO switch. If you have a mono signal, press the MONO switch if you want such signal to appear on both ears.

5- L&R MUTE SWITCHES

Through these switches you can mute the respective input signals one at a time or both at the same time.

HOOKUP DIAGRAM

Through the AUX IN inputs you can also use the 6 channels of your unit independently to give individual mixers to 6 different musicians. Connect the Aux Sends or Subgroups outputs directly to the AUX IN input of your unit. You need a mixer with 6 Aux sends output or with 6 sub-groups. Now rotate the BALANCE control on your unit fully to the left. In this way you will exclude the MAIN signal and only the AUX IN signal will be sent to the headphones.



SOME FINAL NOTES

1. RACK MOUNTING

The most secure mounting is on a universal 19" rack available from various rack manufacturers or your Dealer. The unit 6-Channel Headphone Amplifier fits into one standard 19" rack unit of space. Please allow at least an additional 4" depth for the connectors on the rear panel. Be sure that there is enough air space around the unit for sufficient ventilation and please do not place your unit the 6-Channel Headphone Amplifier close to high temperature devices such as power amplifiers etc. to avoid overheating.

2. USING MULTIPLE HEADPHONES ON THE SAME CHANNEL

Each channel provides 3 Headphone Outputs. These jacks are all parallel connected. For best results getting from the unit, please note the impedance information as following:

1. For each channel connecting with 1 headphone, the minimum impedance of the headphone should be 8 ohms.
2. For each channel connecting with 2 headphones, the minimum impedance of each headphone should be 16 ohms.
3. For each channel connecting with 3 headphones, the minimum impedance of each headphone should be 24 ohms.

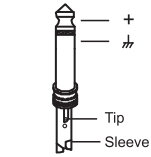
安装指示

- 1.喇叭的摆放位置需不会堵住声音出口，一般是将喇叭放于可升降的三脚架上，以便达到最大化散热且使用方便。
- 2.当悬挂或安装喇叭时，采用专业建议或服务来操作，请注意确保喇叭稳固以避免掉落并伤人,也需注意不要损坏喇叭箱体或其它部件，请遵从所有相关安装规定。
- 3.使用优质线材，确保最好的声音。
- 4.为了获得最佳效果，喇叭需配置一台好的放大器，即放大器匹配喇叭的瓦数与阻抗。合适的放大功率可获得高质量声音效果且延长元件使用寿命，确认好喇叭音箱的功率要求。
- 5.避免直接使麦克风对著喇叭，可能造成反馈杂音进而可能损坏喇叭元件或损伤听力。

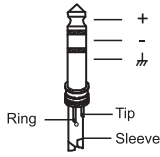
连接说明

1/4"TRS耳机座(Tip-Ring-Sleeve)或XLR座都可按平衡或非平衡模式连接, 根据实际使用情况决定, 请按如下举例连接您的系统:

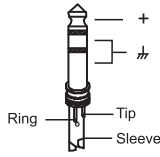
- 1/4" TRS插头



非平衡TS型

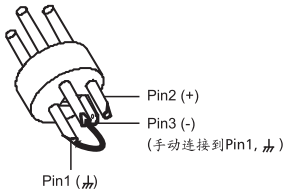


平衡TRS型

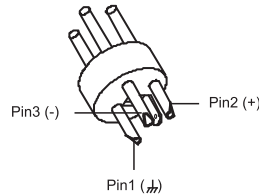


非平衡TRS型

- XLR座



非平衡XLR

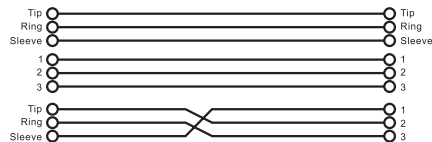
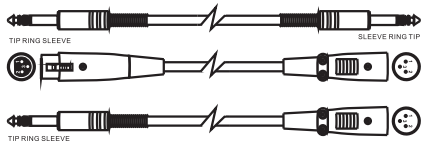


平衡XLR

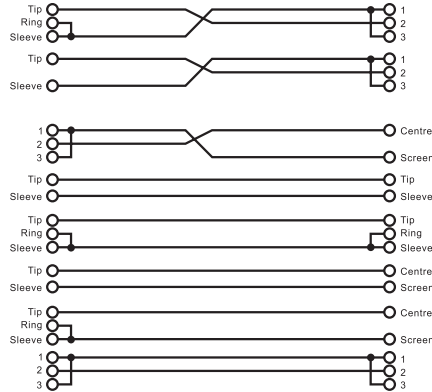
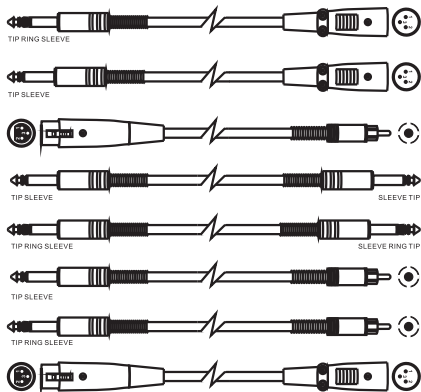
在线连接

对于这些应用, 本产品提供了1/4"TRS、XLR座, 便于与大部分专业音响设备连接, 您的特定连接按以下举例说明:

- 平衡式



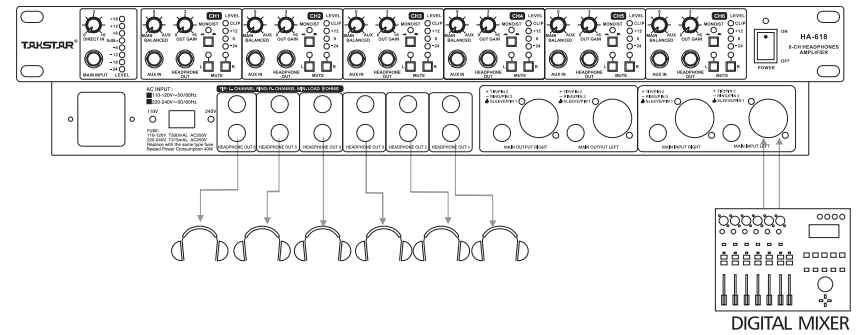
- 非平衡式



HOOKUP DIAGRAM

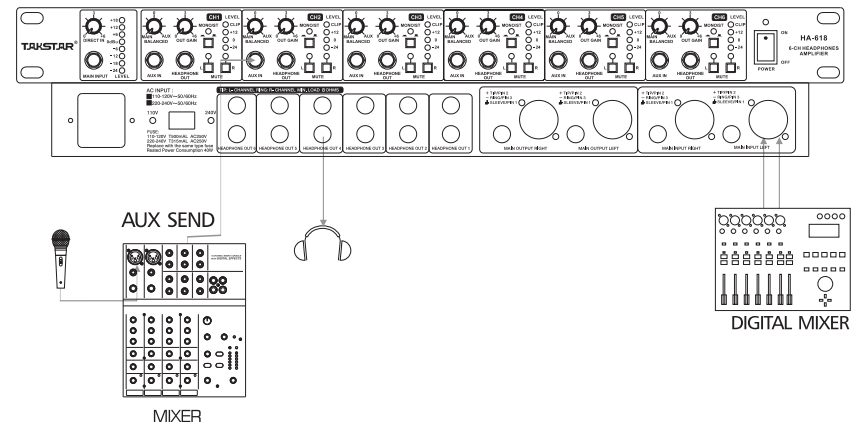
USING THE MAIN IN CONNECTORS

First, connect a signal source to the MAIN IN connectors on the rear panel of your unit. Set the Input Gain (Main section) and the Balance control (Channel section) on centre position. Output gain of each channel must be turned down at this stage. Check the input level Meter for optimal operation as described earlier in this Manual. Connect the headphones you want to use and start to raise the output gain of each channel for the desired listening volume. Adjust Bass and treble control as you wish.



USING THE AUX IN INPUTS

You can playback a signal and feed in additional vocals through a microphone and mixer/preamplifier connected into the AUX IN socket. Use the balance control to give the vocalist the desired mix in between his voice and the playback signal. Use the OUTPUT GAIN control to regulate the overall desired volume.



INTRODUCTION

Thank you for purchasing the HA-618 6-channel headphone amplifier. unit is really ideal for applications such as recording, broadcast and Live events. It is a very flexible tool allowing personal headphone mix for up to six musicians.

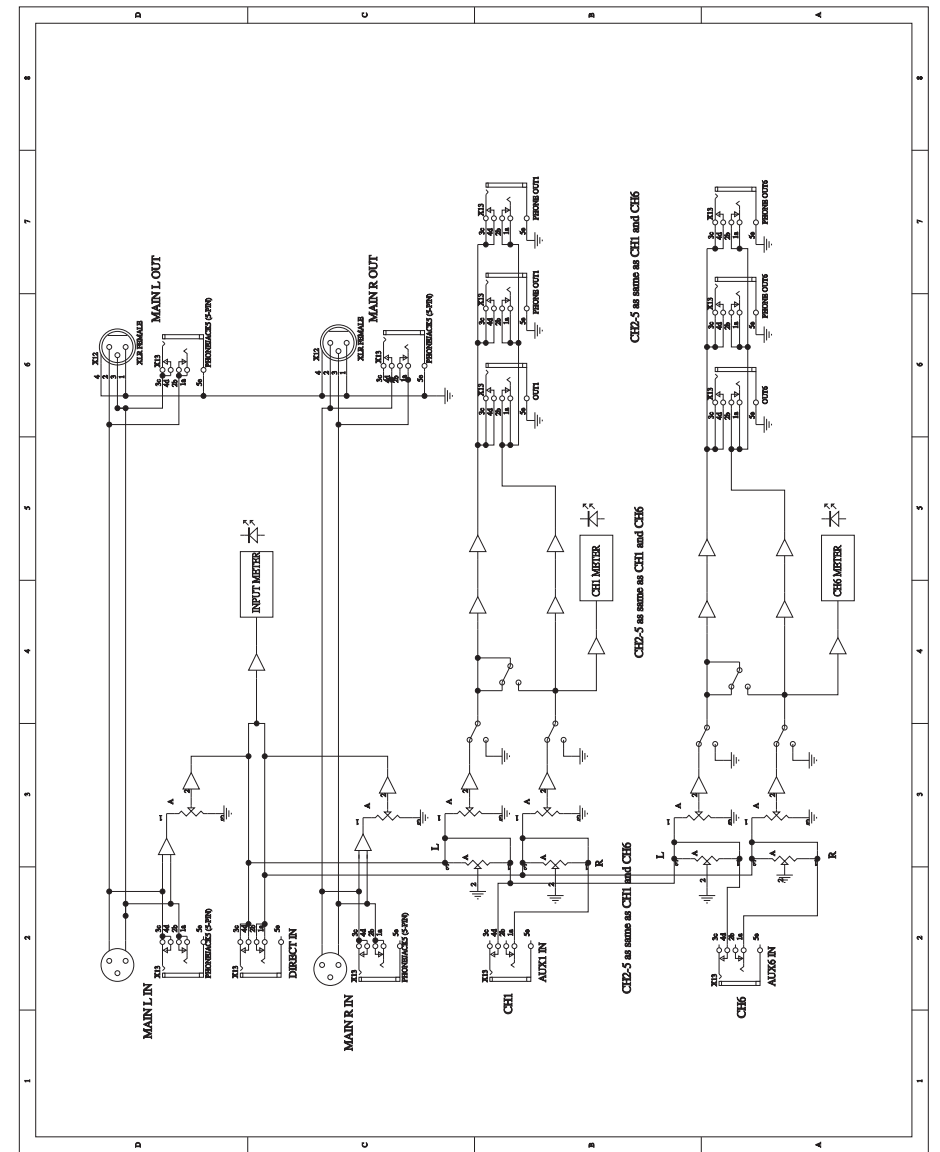
Please read this manual carefully so you can take advantages of all features of unit headphone amplifier.

Thank you again for making the right choice in purchasing the TAKSTAR MUSIC GEAR.

FEATURES

- *Mountable in a 19" Rack Unit
- *6 individual headphone channels
- *Input gain control, and individual output gain control
- *Up to 3 headphone outputs per channel for a total of 18 headphones
- *Direct In and Headphone Output on the front panel for easy operation, when mounted in a rack
- *Input and Output Level Led Meter
- *Balance Control to mix up the Main In and the Aux In signal
- *Main Outputs for linking additional unit headphone amplifiers
- *High-end quality even at high volume levels
- *Exceptionally rugged construction ensures long life and durability
- *Universal and professional headphone amplification system for studio and stage application
- *Manufactured under QS9000 certified quality system

方块图



技术参数

主输入(MAIN IN)	连接座	XLR and 1/4" jack
	类型	高频滤波, 伺服平衡输入
	阻抗	50 kOhms 平衡式, 25 kOhms 非平衡式
	最大输入	+21 dBu 平衡与非平衡
辅助输入 (AUX IN) 与直接输入 (DIRECT IN)	共模抑制比(CMRR)	typ.40 dB, >55 dB @ 1kHz
	连接座	1/4" TRS (tip=左, ring=右, sleeve=接地)
	类型	非平衡式
	阻抗	25 kOhms 非平衡
输出	最大输入	+21 dBu 非平衡式
	共模抑制比(CMRR)	typ,40 dB, >55 dB @ 1 kHz
	连接座	XLR and 1/4" Jack
	类型	平衡与非平衡
系统规格	阻抗	取决于输入阻抗
	最大输出	+21 dBu 平衡与非平衡
	频率响应	10 Hz to 50 kHz,+/-3 dB
	噪音	>90 dB, Unweighted, 22 Hz to 22 kHz(>95 dB@+4 dBu)
功率放大器	总谐波失真	0.005% typ.@+4 dBu, 1kHz, Gain 1
	最大输出功率	+21 dBm
	最小输出阻抗	8 Ohms
功能控制钮	最大增益	+20dB
	输入	可变
	均衡	辅助信号与主信号混音
功能开关	输出	可变
	左边静音	对相应通道左边信号静音
	右边静音	对相应通道右边信号静音
指示灯	模式	将通道转为单声道
	输入	8位数字LED显示:-24/-18/-12/-6/0/+6/+12/+18dBu
	输出	4位数字LED显示:-24/0/+12/CLIP
电源	电源电压	美国/加拿大: 120V~, 60Hz 英国/澳大利亚: 240V~,50Hz 欧洲: 230V~,50Hz
	消耗功率	40 W
	电源连接	标准IEC座
	保险丝	110-120V T500mAL/220-240V T315mAL
	尺寸重量	483x217x44mm(19"x8.84"x1.7")
	净重	2.9kg/6.39 lbs

SAFETY RELATED SYMBOLS



This symbol, wherever used, alerts you to the presence of un-insulated and dangerous voltages within the product enclosure. These are voltages that may be sufficient to constitute the risk of electric shock or death.



This symbol, wherever used, alerts you to important operating and maintenance instructions. Please read.



Protective Ground Terminal



AC mains (Alternating Current)

AC mains (Alternating Current)

ON: Denotes the product is turned on.

OFF: Denotes the product is turned off.

WARNING

Describes precautions that should be observed to prevent the possibility of death or injury to the user.



CAUTION

Describes precautions that should be observed to prevent damage to the product.

Disposing of this product should not be placed in municipal waste but rather in a separate collection.

WARNING

Power Supply

Ensure that the mains source voltage (AC outlet) matches the voltage rating of the product. Failure to do so could result in damage to the product and possibly the user. Unplug the product before electrical storms occur and when unused for long periods of time to reduce the risk of electric shock or fire.

External Connection

Always use proper ready-made insulated mains cabling (power cord). Failure to do so could result in shock/death or fire. If in doubt, seek advice from a registered electrician.

Do Not Remove Any Covers

Within the product are areas where high voltages may present. To reduce the risk of electric shock do not remove any covers unless the AC mains power cord is removed. Covers should be removed by qualified service personnel only.

No user serviceable parts inside.

Fuse

To prevent fire and damage to the product, use only the recommended fuse type as indicated in this manual. Do not short-circuit the fuse holder. Before replacing the fuse, make sure that the product is OFF and disconnected from the AC outlet.

Protective Ground

Before turning the unit ON, make sure that it is connected to Ground. This is to prevent the risk of electric shock.

Never cut internal or external Ground wires. Likewise, never remove Ground wiring from the Protective Ground Terminal.

Operating Conditions

Always install in accordance with the manufacturer's instructions.

To avoid the risk of electric shock and damage, do not subject this product to any liquid/rain or moisture.

Do not use this product when in close proximity to water.

Do not install this product near any direct heat source. Do not block areas of ventilation. Failure to do so could result in fire.

Keep product away from naked flames.

IMPORTANT SAFETY INSTRUCTIONS

Read these instructions

Follow all instructions

Keep these instructions. Do not discard.

Heed all warnings.

Only use attachments / accessories specified by the manufacturer.

Power Cord and Plug

Do not tamper with the power cord or plug. These are designed for your safety.

Do not remove Ground connections!

If the plug does not fit your AC outlet seek advice from a qualified electrician.

Protect the power cord and plug from any physical stress to avoid risk of electric shock.

Do not place heavy objects on the power cord. This could cause electric shock or fire.

Cleaning

When required, either blow off dust from the product or use a dry cloth.

Do not use any solvents such as Benzol or Alcohol. For safety, keep product clean and free from dust.

Servicing

Refer all servicing to qualified service personnel only. Do not perform any servicing other than those instructions contained within the User's Manual.

The mains plug or an appliance coupler is used as the disconnect device, the disconnect device shall remain readily operable.

PORTABLE CART WARNING



Carts and stands - The component should be used only with a cart or stand that is recommended by the manufacturer. A component and cart combination should be moved with care. Quick stops, excessive force, and uneven surfaces may cause the component and cart combination to overturn.