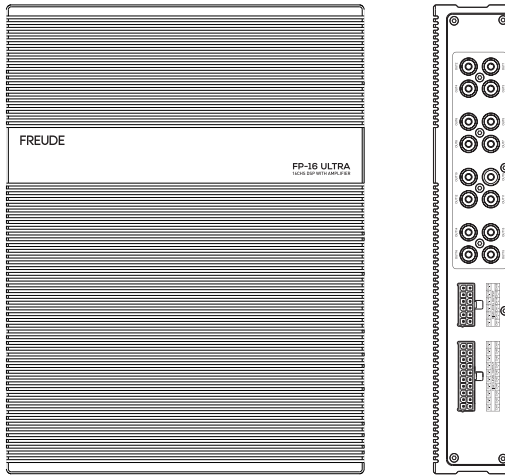


FREUDE

OWNER'S MANUAL

用户手册



FP-16 ULTRA

16 CHANNELS DSP + AMPLIFIER

16通道DSP带功放

⚠ WARNING / 注意

PLEASE READ CAREFULLY BEFORE INSTALLING OR OPERATING THIS UNIT!
使用本产品前，请仔细阅读说明书，并保存好说明书，以备查阅！

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To prevent short circuit, please keep the device away from water or wet places.

If water or any other liquid soak into the device, cut off the power immediately, and call our service engineer of inspection, in case of emergency.

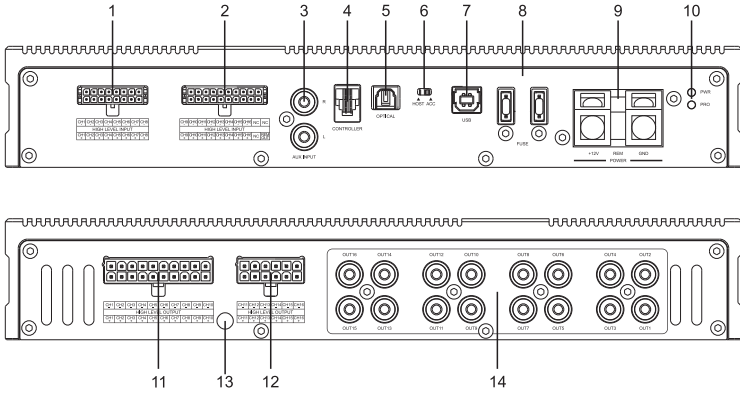
There is no repairing unit inside for user, please do not try to disassemble the bottom cover. Any problem please contact our service engineers in time.

1 Packing List

This following items should be placed in the gift box according to the model you purchased. If there is any missing, please inform the seller or manufacturer as soon as possible.

* FP-16ULTRA	1pc
* User Manual	1pc
* Power Supply Cable	1pc
* High Level Input Cable	2pc
* High Level Output Cable	2pc
* Installation Bracket	4pcs
* Tapping Screws	4pcs
* Machine Screws	8pcs

2 Hardware Interface



1. HI-Level Input Interface_1 Definition:

CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
HIGH LEVEL INPUT							
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
+	+	+	+	+	+	+	+

2. HI-Level Input Interface_2 Definition:

CH9	CH10	CH11	CH12	CH13	CH14	CH15	CH16	NC	NC
HIGH LEVEL INPUT									
CH9	CH10	CH11	CH12	CH13	CH14	CH15	CH16	NC	REM OUT
+	+	+	+	+	+	+	+	NC	

3. Low-Level Input Interface : Stereo L/R Inputs Available

4. Control Panel Interface: Support External Controller

5. Digital - Optical Fiber Input Interface: Capable of connecting 1 set of optical fiber inputs (stereo L/R).

6. The turn on/off method switch :

When the switch is turned to the "ACC" mode, the on and off of device are controlled by the ACC voltage of the vehicle. When switch to the "HOST" mode, the device is turn on by the DC signal input from high level In1+/. Note: Some vehicle models do not output a DC signal for the speaker level; in this case, "ACC" needs to be used to control this device. Additionally, there are also some vehicle models where the speaker is closed after the vehicle is turned off and the doors are locked, which requires a DC level signal.

7. USB TYPE B: connect to audio software which named tuning controlled by PC.

8. Fuse interface: Insert fuses (recommended 2*25A) to prevent the power amplifier from being damaged by overcurrent

9. Power Input Terminal:

10. Power Protection Indicator: Green light indicates Normal mode, and Red light indicates malfunction or system protection.

11. HI-Level Output Interface_1 Definition:

CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10
HIGH LEVEL OUTPUT									
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10
+	+	+	+	+	+	+	+	+	+

12. HI-Level Output Interface_2 Definition:

CH11	CH12	CH13	CH14	CH15	CH16
HIGH LEVEL OUTPUT					
CH11	CH12	CH13	CH14	CH15	CH16
+	+	+	+	+	+

13. Bluetooth Antenna

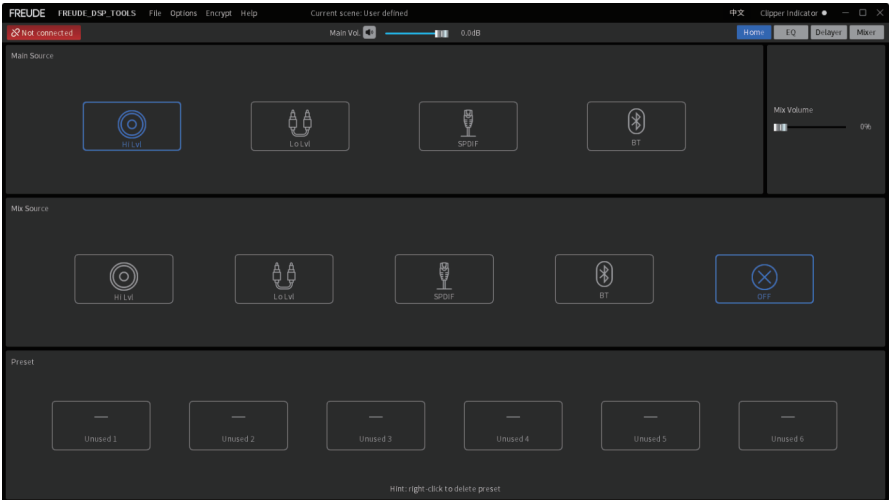
14. Low-Level Output Interface: 16 Channels Maximum.

3 DSP Software Function Description

PC Software Introduction:

Display resolution greater than 1366*768, otherwise the interface will not be fully displayed. Compatible with Windows operating systems on laptops, desktops, and tablets.

3.1 Home Page



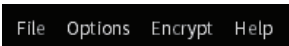
3.1.1 Title Bar and Main Menus

App logo and model name:



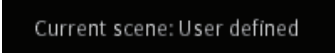
After connecting to a device, the text after the logo (which is displaying app name 'FREUDE_DSP_TOOLS' at the moment) will display the model name of that device.

Main Menus:



1. File: Load/Save single/all scenes
2. Options: Sensitivity setting, Loudness, High pass filter, Effect linking, Factory reset, Firmware update, X-Over data, Reset device parameters, Platform.
3. Encrypt/Decrypt Presets

Current scene name:



When save a scene to a scene slot, user can edit its name. This area displays the name of current preset.

Clipper Indicator:



When connecting to a device, DSP software will query clipping status periodically. When clipping happens, the indicator cycle will turn orange.

3.1.2 Navigation bar

Connect/disconnect Button:



Click this button to connect to / disconnect from device. When connecting, software will enumerating all serial port to find a valid device.

Main volume slider:



Click the button with a speaker on it can mute/un-mute globally.

Navigation tabs:



Click these navigation buttons to switch pages.

3.1.3 Source control panels



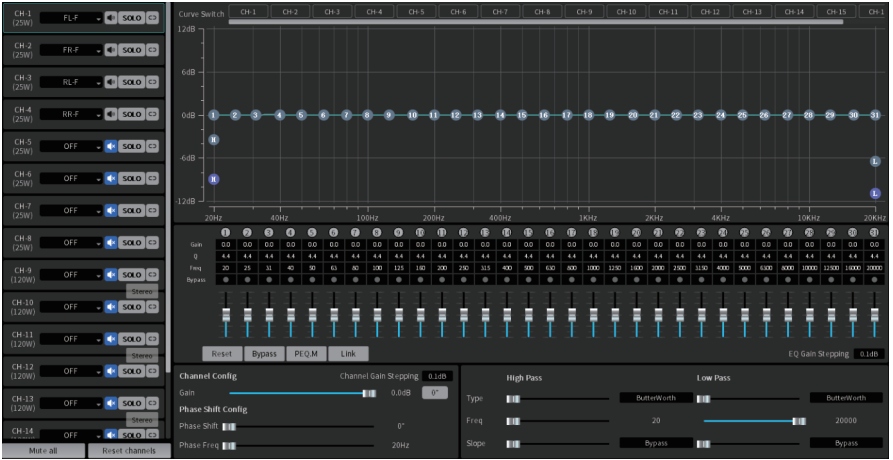
User can click toggle button to choose Mix source. and sliders on the right side panel can modify attenuation of Main source and volume of Mix source.

3.1.4 Presets management



Click scene operation buttons to load from or save to that scene slot, switch button on the top-right can change operation type.
Right click these buttons can delete scenes.

3.2 EQ Page

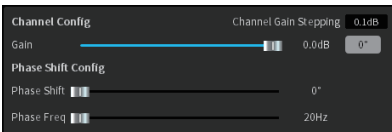


3.2.1 Channels Panel



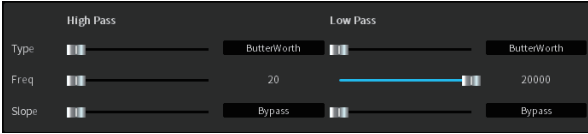
1. Channel definition Combo Box: Use the combo box to change position/type of the speaker
2. Mute/UnMute Button
3. Solo Button: enable solo will mute all other channels(speakers)
4. Link group Combo Box: grouped channels will change their gains synchronously.
5. Parallel mode button: The button between two channels. Toggle it the enable parallel mode.

3.2.2 Channel Config Panel



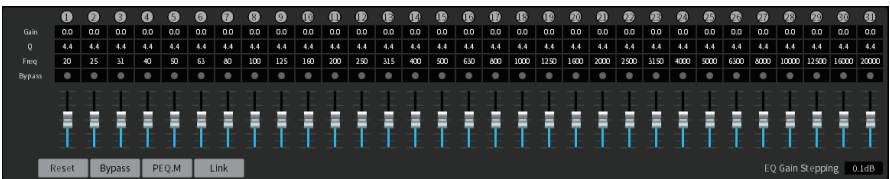
1. Channel Gain: -96~+3dB
2. Change step of gain slider
2. Phase Adjustment: Sets phase degree and frequency point.
4. In Phase or Out Phase (0~180°)

3.2.3 High/Low Pass Filter Panel



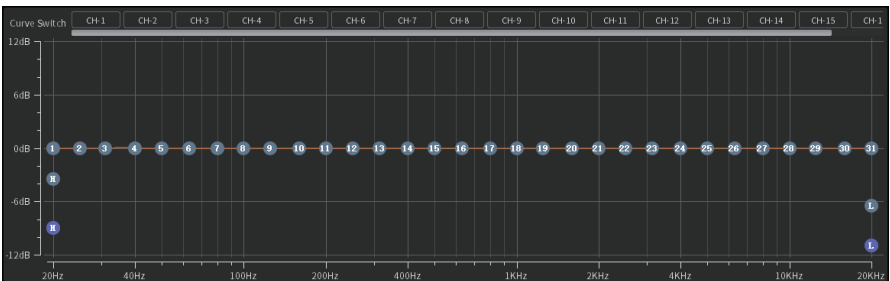
1. Slope: Selectable form 6dB/Oct to 48dB/Oct
2. Frequency range: 20Hz~20KHz
3. Filter Type: Linkwitz-Riley, Butterworth, or Bessel

3.2.4 Equalizer Panel



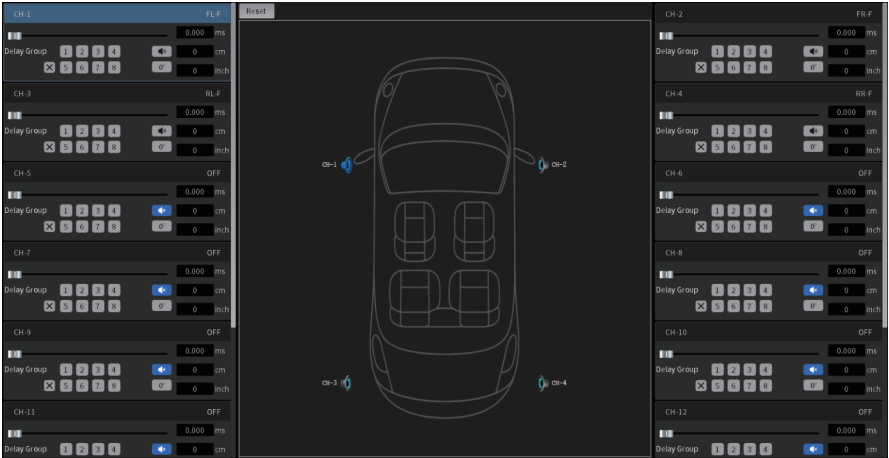
1. Gain Adjustment (-12dB to +12dB): Direct numeric input, keyboard arrows, or slider drag.
2. Q Value Adjustment (0.4~10): Direct numeric input or keyboard arrows.
3. Frequency Adjustment: Direct numeric input or keyboard arrows.
4. Click the bypass cell to make current equalizer bypass
5. Reset: Restore 31-band EQ parameters to factory defaults(frequency, Q, gain)
6. Bypass: Temporarily resets EQ gain, toggles on/off
7. PEQ.M: Switches between EQ parameter and gain adjustment modes
8. Link: Synchronizes EQ curves for left/right channels

3.2.5 Frequency Response Curve Panel



Adjust 31-band EQ by dragging the mouse vertically on the frequency points. Real-time gain values are displayed below each band.

3.3 Delayer Page



Supports synchronized delay adjustment across any channels. Channel mute function.

3.4 Mixer Page

Channel Define	FL F	FR F	RL F	RR F	CH-4	CH-5	CH-6	CH-7	CH-8	CH-9	CH-10	CH-11	CH-12	CH-13
HILV1	Normal	100	0	0	0	0	0	0	0	0	0	0	0	0
HILV2	Normal	0	100	0	0	0	0	0	0	0	0	0	0	0
HILV3	Normal	0	0	100	0	0	0	0	0	0	0	0	0	0
HILV4	Normal	0	0	0	100	0	0	0	0	0	0	0	0	0
HILV5	Normal	0	0	0	0	100	0	0	0	0	0	0	0	0
HILV6	Normal	0	0	0	0	0	100	0	0	0	0	0	0	0
HILV7	Normal	0	0	0	0	0	0	100	0	0	0	0	0	0
HILV8	Normal	0	0	0	0	0	0	0	100	0	0	0	0	0
HILV9	Normal	0	0	0	0	0	0	0	0	100	0	0	0	0
HILV10	Normal	0	0	0	0	0	0	0	0	0	100	0	0	0
HILV11	Normal	0	0	0	0	0	0	0	0	0	0	100	0	0
HILV12	Normal	0	0	0	0	0	0	0	0	0	0	0	100	0
HILV13	Normal	0	0	0	0	0	0	0	0	0	0	0	0	100
HILV14	Normal	0	0	0	0	0	0	0	0	0	0	0	0	0
HILV15	Normal	0	0	0	0	0	0	0	0	0	0	0	0	0
HILV16	Normal	0	0	0	0	0	0	0	0	0	0	0	0	0
LoLV L	100	0	100	0	100	0	100	0	100	0	100	0	100	0
LoLV R	0	100	0	100	0	100	0	100	0	100	0	100	0	100

Independent mixing controls for high-level, low-level, optical, and Bluetooth inputs. The phase column can toggle Normal/Invert of Inputs.

4 Product Specifications

4.1 Technical Specifications

· Dynamic Range:	· $\geq 110\text{dB}$
· S/N:	· $\geq 105\text{dB}$
· THD:	· $\leq 0.01\%$
· Frequency Response:	· 20Hz~20kHz
· Decoding Capability:	· 24bit/192kHz(Optical Fibre); 32Bit/96KHz(Digital BT)
· Input Impedance:	· Low Level input: 13.9K Ω , High Level input: 4.7 Ω
· Low Level Output Impedance:	· 75 Ω
· Output Max Power:	· 8x45W(CH1~8)+8x225W(CH9~16) @4 Ω 8x64W(CH1~8)+4x450W(CH9~16 PBTL) @2 Ω
· Output Rms Power:	· 8x25W(CH1~8)+8x120W(CH9~16) @4 Ω 8x44W(CH1~8)+4x240W(CH9~16 PBTL) @2 Ω
· Signal Input Range:	· RCA input: 0~2Vrms; High level input: 0~28Vpp / 0~50Vpp
· Signal Output Range:	· RCA output: 0~2Vrms; High Level CH1~8 Output: 0~9.5V High Level CH9~16 Output: 0~24V
· Working Temperature:	· -20~65 $^{\circ}\text{C}$
· Power:	· DC 9V~17V
· REM Input:	· High Level Input Signal or ACC control cable
· REM Output:	· DC +12V Start-up Voltage Output($\geq 100\text{mA}$)
· Standby Current:	· $\leq 1\text{mA}$
· Net Weight:	· 3.02KG
· Product Dimension:	· 295(L) x 225(W) x 48.5(H)mm

4.2 The Functions of DSP

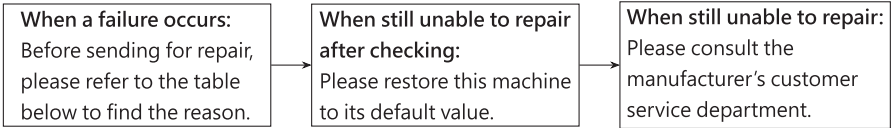
· Input Signal Type:	· 16 Channel High Level, 2 Channel Low Level, Digital Bluetooth, Optical Fibre
· Output Signal Type:	· 16 Channel Low Level Output, 16 Channel High Level Output
· Output Signal Gain:	· Gain Range: Mute, -96dB~6dB
· Output Signal EQ:	· 31 Levels EQ · 1.Frequency Range 20Hz~20kHz, 1Hz Accuracy · 2.Q Value(Slope) 0.1~10 · 3.Gain -12.0dB~+12.0dB, 0.1dB Accuracy
· Output Signal Crossover:	· Each channel is Equipped with a multi-order high-low pass independent filter. · 1.Professional filter type: Butterworth, Linkwitz-Riley, Bessel · 2.Filter Crossover Point: 20Hz~20kHz, Resolution 1Hz · 3.Filter Slope Setup: OFF, 6dB/Oct~48dB/Oct.
· Output Phase and Time Alignment:	· Phase and time alignment adjustable for every output channel. · Phase: In Phase or Out Phase (0° ~ 180°) · Time Alignment: 0.000 to 20.000ms, 0 to 680cm
· Presets:	· Save 6 presets into the device.

To continuously improve product performance, our company reserves the right to implement technical upgrades without prior notice. Specifications shown on packaging and user manuals may reflect earlier technical versions. In the event of any discrepancies in technical parameters or illustrations caused by typesetting or proofreading errors in printed materials, technical specifications are governed by the physical product.

5 Troubleshooting

Before powering on, you should carefully check whether the connection line is normal, and you must ensure that all interfaces are properly connected.

Common fault judgment and treatment flow:



Troubleshooting method:

No.	Malfunction	Reason and Solution
1	No Power	① Is the power connection properly connected? ② Is the connection method correct?
2	No Sound	① Has the mute operation been activated? ② Is the signal input channel selected correctly?
2	Use connection is not available	① Is the USB cable inserted in place? ② Is there any discovery in the ergonomic input device of the computer device manager named "HID-compliant device" equipment?

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注意事项

为了防止电气短路,请勿将设备置于有雨或潮湿的地方。

电器如遇水和其它液体进入机内,应立即切断电源,并请专业维修人员检查维修,以免发生意外。

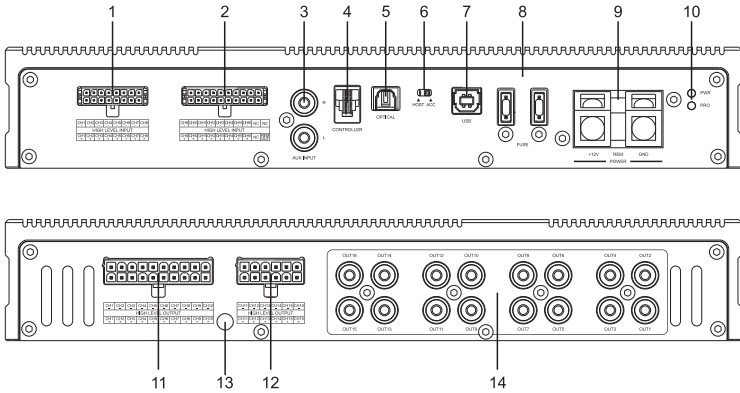
机内没有用户能自行维修的地方,请勿打开机盖,请找专业人员打开和维修。

1 包装清单

根据您购买的型号包装箱内应放置如下物件, 如有缺少, 请尽快通知销售商或厂家:

* FP-16 ULTRA 主机	1台
*用户手册	1本
*电源线束	1组
*高电平输入线束	2组
*高电平输出线束	2组
*安装支架	4个
*自攻扁头螺丝	4个
*机牙沉头螺丝	8个

2 机器接口简介



1、高电平输入连接器接口1:

CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
HIGH LEVEL INPUT							
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
+	+	+	+	+	+	+	+

2、高电平输入连接器接口2:

CH9	CH10	CH11	CH12	CH13	CH14	CH15	CH16	NC	NC
HIGH LEVEL INPUT									
CH9	CH10	CH11	CH12	CH13	CH14	CH15	CH16	NC	REM
+	+	+	+	+	+	+	+		OUT

3、低电平 (线路) 输入接口: 可接2路线路输入:

4、控制面板接口: 外接控制面板。

5、数字-光纤输入接口: 可接1组光纤输入 (两通道L/R)。

6、机器启动方式开关:

开关拨至“ACC”端时, 由车辆的ACC 电压控制本机的开与关, 拨至“HOST”端时, 由高电平IN 1+/- 输入的直流信号启动机器。

注意: 部分车型的喇叭电平是没有直流信号输出的, 此时需要使用“ACC”来控制本机; 同时, 也有部分车型的喇叭是在车辆熄火锁车门后才会关闭喇叭的直流电平信号。

7、USB TYPE B 接口: 连接至由PC控制的调音软件。

8、保险丝接口: 插入保险丝 (推荐2*25A) 防止功放过流损坏。

9、电源输入端子。

10、电源/保护指示灯: 正常工作绿灯亮, 遇到故障或者保护时候, 红灯亮。

11、高电平输出连接器接口1:

CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10
HIGH LEVEL OUTPUT									
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8	CH9	CH10
+	+	+	+	+	+	+	+	+	+

12、高电平输出连接器接口2:

CH11	CH12	CH13	CH14	CH15	CH16
HIGH LEVEL OUTPUT					
CH11	CH12	CH13	CH14	CH15	CH16
+	+	+	+	+	+

13、蓝牙天线。

14、低电平 (线路) 输出接口: 最多可16路线路输出。

3 控制软件简介

电脑运行要求:

显示器分辨率大于1366*768,否则不能完全显示界面,只适用于 Windows操作系统的手提电脑、台式电脑和平板电脑。

3.1 主页



3.1.1 标题栏与主菜单

应用图标与机型名:

FREUDE FREUDE_DSP_TOOLS

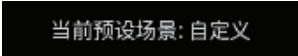
当连接至设备时,图标后的文字(现在显示为应用名称“REUDE_DSP_TOOLS”)将会显示对应的机型名称。

主菜单:

文件 选项 加密 帮助


- 1.文件操作: 加载/保存单个/所有场景
- 2.选项: 灵敏度设置、等响曲线、DSP高音保护、音效联动、恢复出厂设置、固件升级、X-Over分频数据、重置设备参数、语言切换
- 3.加密: 对前3个场景进行加/解密

当前场景名:



当将场景保存到对应的槽位中时, 用户需要提供场景的名称。此区域用于显示当前已经加载的场景的名称。若未加载场景, 则显示为“用户自定义”。

削波指示器:



当连接到设备后, 软件会周期性查询削波状态。当削波触发时, 该指示器会显示为橙色。

3.1.2 导航栏

连接/断开按钮



使用此按钮连接到设备, 或者断开与设备的连接。当执行连接时, 软件会扫描所有已连接到电脑的串口, 以发现有效的设备。

主音量滑块:



用于调节主音量, 范围-96~+6dB。按下其左侧的按钮可以触发全局的静音状态。

导航菜单



用于切换内容区域显示的页面。

3.1.3 音源控制面板



触发混音音源面板中的单选按钮,来切换或者关闭音源。右侧面板上的滑块可调节主音衰减、混音音量。

3.1.4 场景管理面板

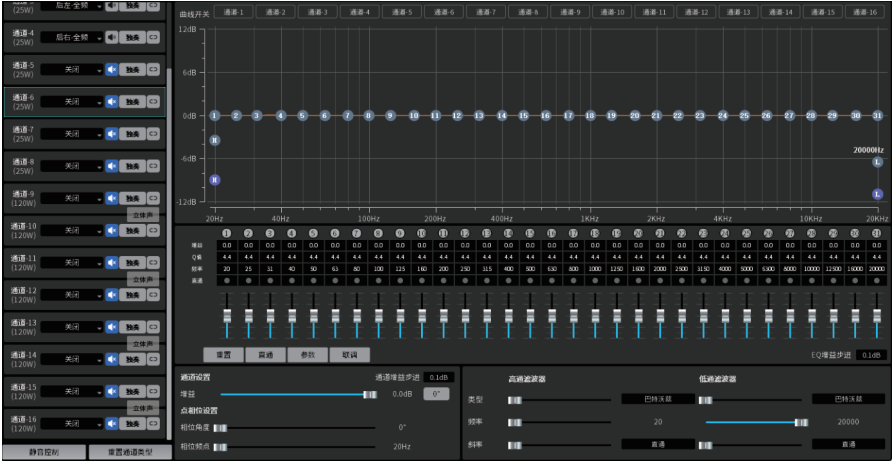


点击模式来切换“保存”/“加载”模式。

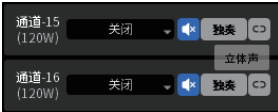
鼠标左键点击对应的按钮即可执行场景的保存或加载。支持6个场景槽位。

右键点击按钮可以删除对应场景槽位中保存的内容。

3.2 EQ 编辑页面

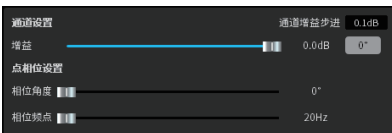


3.2.1 通道面板



- 1.更改通道定义/位置
- 2.启用/取消通道的静音状态
- 3.启用/取消独奏。独奏状态会自动将其其他通道设置为静音状态
- 4.可以将通道分入不同的Link组。同一组内的通道的增益等设置会同步修改。
- 5.并接模式：点击通道间的并接按钮，可触发并接模式

3.2.2 通道设置面板



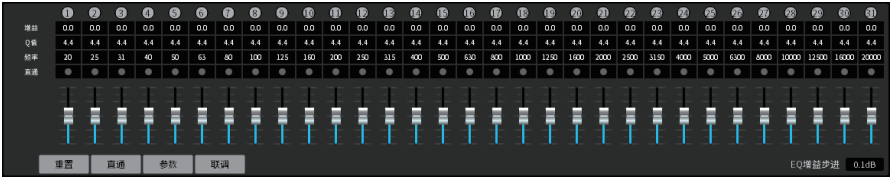
- 1.通道增益: -96~+6dB
- 2.可以更改通道增益的步进
- 2.相位设置:可设置相移及相位频点
- 4.通道正反向设置(0~180°)

3.2.3 高/低通滤波器面板



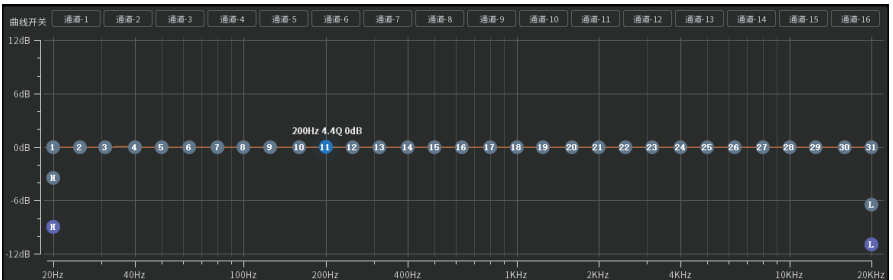
- 1.斜率: 6dB/Oct至48dB/Oct可调节
- 2.频率范围: 20Hz~20KHz
- 3.滤波器类型: 宁克-锐, 巴特沃兹, 贝塞尔

3.2.4 均衡器设置面板



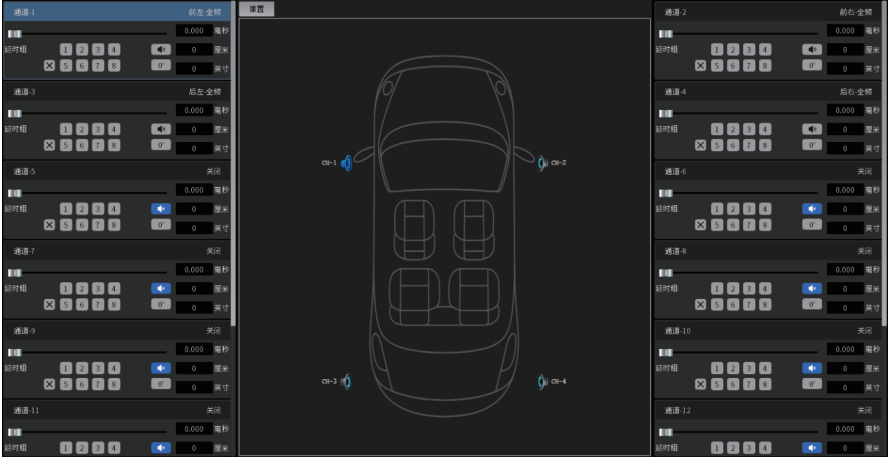
- 1.增益: 在编辑区中, 可通过直接输入数值、键盘上的上下键和直接拖动推子等方式来进行调节增益 (调节范围:-12dB~12dB)
- 2.Q值: 可通过直接输入数值、键盘上的上下键等方式来进行调节Q值 (可调节范围:0.4~10)
- 3.频率: 可直接输入数值、键盘上的上下键来进行调节频率。
- 4.直通: 可将当前频率设置为直通。
- 5.点击【重置】可将31段均衡器的参数恢复到原厂直通模式 (均衡器的频率、Q值和增益都恢复到初始值)
- 6.点击【直通】可将31段均衡器的增益暂时回到初始值, 再点击又会恢复;
- 7.点击【参数/增益】可在两者之间切换
- 8.点击【联调】可联调左右声道的EQ曲线

3.2.5 频响曲线面板



在输出信号通道图示频响曲线显示编辑区中有31段EQ可调节。当鼠标移至序号位置上时按下鼠标左键，上下拖动鼠标可调节均衡器增益；调节的同时都会在序号下方所对应编辑区中实时显示当前均衡器的增益。

3.3 延时器页面



可进行任意通道延时联调、通道静音等；

3.4 混音器页面

通道定义	前左全频	前右全频	后左全频	后右全频	声道1	声道2	声道3	声道4	声道5	声道6	声道7	声道8	声道9	声道10	声道11	声道12	声道13
声道1	正相	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
声道2	反相	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0
声道3	正相	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
声道4	反相	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0	0
声道5	正相	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0	0
声道6	反相	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0	0
声道7	正相	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0	0
声道8	反相	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0	0
声道9	正相	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0	0
声道10	反相	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0	0
声道11	正相	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0
声道12	反相	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0	0
声道13	正相	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0	0
声道14	反相	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0	0
声道15	正相	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	0
声道16	反相	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100
低电平左	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0
低电平右	0	0	100	0	100	0	100	0	100	0	100	0	100	0	100	0	100

分别可进行高电平、低电平、光纤、蓝牙的混音；“相位”列按钮可以一键触发输入通道为反向。

4 产品规格

4.1 产品参数

· 动态范围:	· $\geq 110\text{dB}$
· 信噪比:	· $\geq 105\text{dB}$
· 总谐波失真:	· $\leq 0.01\%$
· 频率响应:	· 20Hz~20kHz
· 解码能力:	· 24bit/192kHz(光纤); 32Bit/96KHz(数字蓝牙)
· 输入阻抗:	· 低电平输入: 13.9K Ω , 高电平输入: 4.7 Ω
· 低电平输出阻抗:	· 75 Ω
· 峰值输出功率:	· 8x45W(CH1~8)+8x225W(CH9~16) @4 Ω 8x64W(CH1~8)+4x450W(CH9~16两两并接) @2 Ω
· 额定输出功率:	· 8x25W(CH1~8)+8x120W(CH9~16) @4 Ω 8x44W(CH1~8)+4x240W(CH9~16两两并接) @2 Ω
· 信号输入范围:	· RCA输入: 0~2Vrms; 高电平输入: 0~28Vpp / 0~50Vpp
· 信号输出范围:	· RCA输出: 0~2Vrms; 高电平输出: CH1~8: 0~9.5V, CH9~16: 0~24V
· 使用环境温度:	· -20~65 $^{\circ}\text{C}$
· 电源:	· DC 9V~17V
· 启动REM输入:	· 高电平启动、ACC启动可选
· 启动REM输出:	· DC +12V启动电压输出(100mA)
· 待机电流:	· $\leq 1\text{mA}$
· 净重:	· 约3.02KG(千克)
· 产品尺寸:	· 295(长) x 225(宽) x 48.5(高)mm

4.2 功能参数

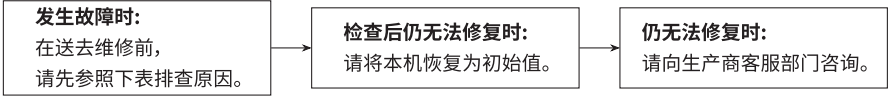
· 输入信号类型:	· 16通道高电平, 2通道低电平, 支持数字蓝牙, 光纤
· 输出定位:	· 16通道功放, 16通道低电平输出
· 输出信号增益:	· 增益范围: 增益范围: 静音, -96dB到6dB
· 输出信号均衡器:	· 31段均衡器引擎: 1、频率范围: 20Hz~20KHz, 分辨率1Hz 2、Q值(斜率或坡度): 0.1~10 3、增益: -12dB~+12dB, 分辨率: 0.1dB
· 输出信号分频器:	· 每路通道配有多阶高低通独立滤波器。 1、专业滤波类型: 巴特沃斯(Butterworth)、宁克-锐(Linkwitz-Riley)、贝塞尔(Bessel) 2、滤波分频点: 20Hz-20KHz 分辨率: 1Hz 3、滤波斜率(坡度)设置: OFF、6dB/Oct 至 48dB/Oct
· 输出相位和延时:	· 每路通道可进行相位和延时调整, 参数范围: · 相位: 同相或反相(0 $^{\circ}$ /180 $^{\circ}$) · 延时: 0.000至20.000毫秒, 0至680厘米
· 场景操作:	· 机器可保存6种预置音乐场景。

为持续提升产品性能, 我司有权在不提前通知的情况下对产品进行技术升级, 包装及说明书所示参数可能存在滞后性。印刷物料中涉及的技术参数、图示说明等若因排版校样原因产生误差, 应以产品实物规格为准。

5 常见故障解决方法

在通电前,应仔细查连接线是否正常,必须保证所有接口为正常连接。

一般故障处理流程:



故障排除方法:

序号	故障现象	原因及解决方法
1	不通电	①电源连接是否正确? ②启动方式是否正确?
2	无声音	①是否触发了静音模式? ②信号输入通道选择是否正确?
3	USB连接不上	①USB连接线有无插到位? ②电脑设备管理器的人体学输入设备内有无发现名为“HID-compliant device”的设备?

FREUDE

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