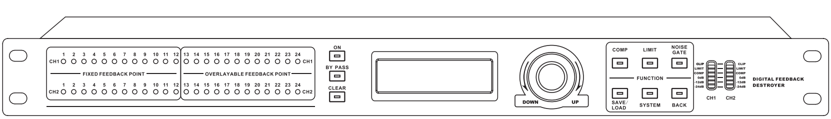
OPERATING INSTRUCTION

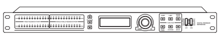
TS-224



Digital Feedback Supressor

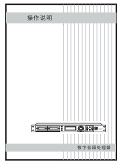
Packing list

Make sure all the items are in the package



Device

Quantity: 1



Operating Instruction

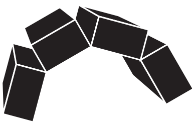
Quantity: 1

Power line

Quantity: 1

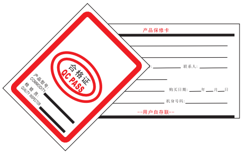
Fuse
(Size: F1A L250V)

Quantity: 1



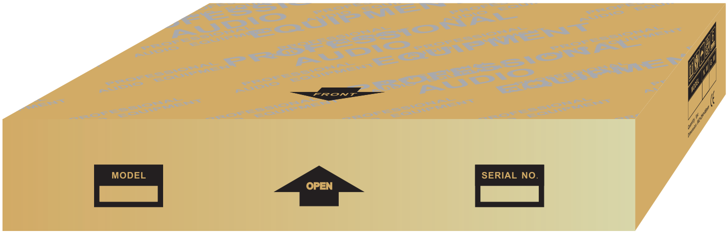
Device feet

Quantity: 4



Warranty card
and certificate

Quantity: 2



DIRECTORY

Thanks for choosing our feedback supressor, which has the features of full digital processing and can automatically the destroy feedback point .

For your better understanding and use of this product, please read this manual carefully .

Part 1. Precaution notice

Warning: To prevent the short circuit ,keep off any place of humidity .
Power off the device immediately in case of water damage and find the right technician for reparation.Don't open the device by yourself unless by the authorized technician.

When flashes the exclamation mark, the device is also with high voltage and the alert should be on. When flashes the arrowhead signal, the device is with high voltage. Please do not touch the device for any reason.

Part 2. Features

- 96KHz sampling frequency, 32-bit DSP processor, 24-bit A/D and D/A converter.
- Work mode is switchable to bypass or suppress by button bypass/on.
- Feedback suppression of full automatic narrowband trap type .
- Independent 12 fixed filters and 12 dynamic filters of each channel , can set the amount of fixed/dynamic filter via button "system".
- 48 feedback point indicator light to indicate the amount of feedback point .
- With the functions of compression, limiter and noise gate.
- Providing 30 groups of device data storage to store the parameters of compression, limiter and noise gate. The current status of feedback suppression could be stored after power off the device.
- Setting the password to lock all/part of functions via button"system"of the panel.
- Adopting LCD and 6-band LED to show the precise digital level-meter of output.
- Providing analogy input & output or digital AES3, optical, coaxial input &output.

Part 3. Technical parameters

Technical parameters

Model	TS-224
Input channel & socket	2 CHs female XLR,1 CH digital XLR, optical, coaxial input
Output channel & socket	2 CHs male XLR,1 CH digital XLR, optical, coaxial input
Input impedance	20 KΩ
Output impedance	100Ω
CMRR	>70dB(1KHz)
Input range	≤+ 25d B u
Frequency response	20Hz-20KHz(-0.5dB)
S/N Ratio	>110dB
THD+N	<0.01% OUTPUT=0dBu/1KHz
Crosstalk of channels	> 110dB(1KHz)
Feedback detect and reduction	Detect and eliminate feedback automatically by notch filters
Signal input frequency response	20Hz-20kHz ±0.5dB
Filters	Each channel is adjustable separately and up to 24 pieces , default value is 12 fixed points and 12 dynamic points
Min bandwidth	1/27th Octave
Max bandwidth	1/14th Octave
Resolution	0.5 Hz
Time required to find and eliminate feedback	0.1--0.5S
FFT length	2048
Audio gain	6--10 dB
Gain	0dB
Compression	Threshold: -40dBu-+20dBu, Step is 0.1dBu, Compression ratio: 1.0：1 - 20.0：1, Step is 0.2, Response time: 10ms-200ms,Step is 1ms, Release time : 50ms-5000ms , Step is 1ms.
Limiter	Threshold: -40dBu-+20dBu, Step is 0.1dBu, Response time: 10ms-200ms,Step is 1ms, Release time: 50ms-5000ms,Step is 1ms.
Noise gate	Threshold: -120dBu- -40dBu , Step is 1dBu
0dBFS reference level	Adjustable parameter of analog level: 6dBu-24dBu, Step is 1 dBu.
Processors	96KHz sampling frequency, 32-bitDSP processor, 24-bitA/D and D/A converter
Power supply	AC110V/220V 50Hz/60Hz
Power consumption	<15W
The height of unit	1U
Product dimension (W×D×H)	482×190×44mm
Net weight	3.6kg
Shipping dimension (W×D×H)	1PC:562×294×98mm/0.0160m³ 6PCS:576×308×612mm/0.1123m³
Gross weight	1PC:5.6(kg) 6PCS:33.6(kg)

Part 4 . Schematic diagram of front panel

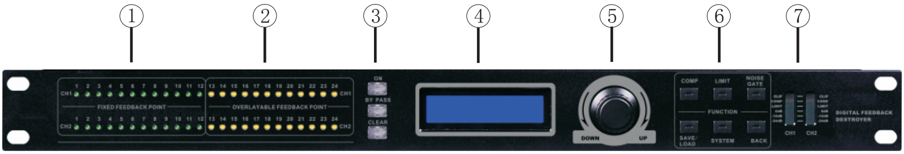


Diagram of front panel

1. Fixed filter indicator
Fixed filter indicator(green light)

2. Dynamic filter indicator
Dynamic filter indicator(yellow light)

3. feedback button
(1)ON : open the feedback reduction function(light the green lamp while switch on)
(2)BYPASS : close feedback reduction function (light the red lamp while bypass)
(3)CLEAR : clear the feedback points which have been detected(light the red lamp after long press and finish clearing until the red light go out)

4. Liquid Crystal Display
LCD screen resolution 144*32, real-time indicate the operation interface and menu.

5. Coder
（1） Turn clockwise: parameters increasing, move the menu to the right or down
（2） Turn anticlockwise: parameters decreasing,move the menu to the left or up
（3） Short press: press the button “Enter” to enter or confirm
（4） Long press: special confirmation

6. Function options / auxiliary edit as follows:

(1)COMP: compression	(2)LIMIT: limiter	(3)NOISE GATE: noise gate
(4)SAVE/LOAD: save/load	(5)SYSTEM: system	(6)BACK: back or delete

7. LED Indicator:
6-band LED shows the precise digital level-meter of output:
(1)CLIP(clip), lighting shows the signal distortion (red light);
(2)LIMIT(limiter) lighting shows the signal value exceeds the users setting value(orange light);
(3)COMP(compression),lighting shows the signal value exceeds the users setting value(yellow light);
(4) -24dB-0dB 3-band LED level indicator (green light)

Part 5. Schematic diagram of rear panel

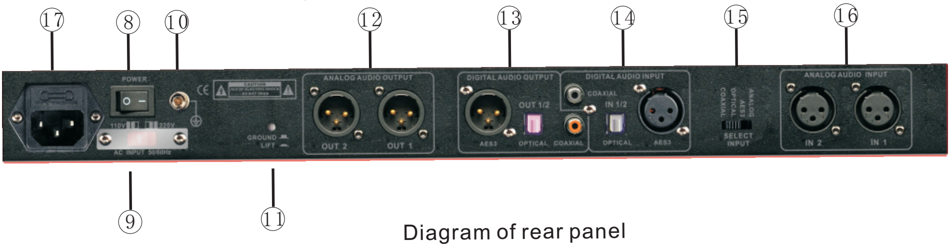


Diagram of rear panel

8. Power switch
Turn on the power according to the switch input voltage on the panel and press the switch , then it can work normally.

9. Voltage switch
Select the matched input voltage level(110V/220V) according to the AC input voltage.
Warning: Please select the matched input voltage level(110V/220V) according to the AC input voltage, otherwise the device may be damaged .

10. Grounding lift

11. Grounding lift switch
This switch controls the connect/cut between the device and signal.

12. Audio output
Analogy audio output CH1,CH2

13. Digital audio output
Digital AES3, optical, coaxial output

14. Digital audio input
Digital AES3, optical, coaxial input

15. Input signal switch
Available for choosing:Analog , digital AES3, optical, coaxial input

16. Analog input
Analog input CHA,CHB

17. AC power input socket
Connect the matched AC input voltage according to the power switch indicator.

Part 6 . Functions setting

1.Initial interface

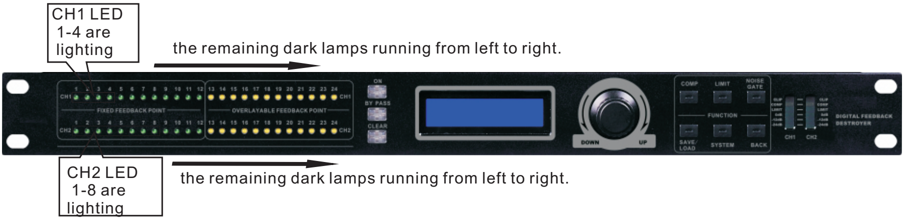
Connect the power and open the switch , the system initialization interface is the interface of dynamic running light as follows :

initialization interface

Enter the main interface after system initialization , and the system allows to operate.

Idle interface

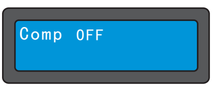
After the system initialization ,the feedback point lamp (area ①, ②of the front panel) will scan from left to right ,and then light the lamp from left to right after detecting the feedback frequency points.The picture as below shows the lighting status of feedback point light via the situations of CH1 detects 4 feedback frequency points and CH2 detects 8 feedback frequency points.



2. Input function setting

a. Compression setting

As the schematic diagram of panel buttons , press ⑥ “COMP”(compression) to enter “compression interface1”(as the picture below) and turn ⑤-Coder to enter “compression interface 2”. You can press the coder to switch the parameter options (Threshold Level/Start-up Time/Compression Ratio/Release Time. The parameter would twinkle while be switched.) and then turn the coder to adjust the parameter value (parameter range : Threshold Level: -40dB-20dB (20dB is close the compression), Start-up Time : 10ms-200ms, Compression Ratio: 1.0:1-20:1, Release Time: 50ms- 5s) .

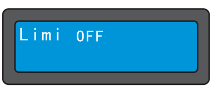


Compression interface 1

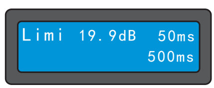
Compression interface 2

b. Limiter setting

As the schematic diagram of panel buttons , press ⑥“LIMIT”(limiter) to enter “limiter interface1”(as the picture below) and turn ⑤-Coder to enter “limiter interface 2”. You can press the coder to switch the parameter options (Threshold Level/Start-up Time/Compression Ratio/Release Time. The parameter would twinkle while be switched.) and then turn the coder to adjust the parameter value (parameter range : Threshold Level: -40dB-20dB (20dB is close the compression), Start-up Time : 10ms-200ms, Release Time: 50ms- 5s) .



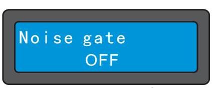
Limiter interface 1



Limiter interface 2

c. Noise gate setting

As the schematic diagram of panel buttons, press ⑥“NOISE GATE”(noise gate) to enter “noise gate interface”(as the picture below) and turn the coder to adjust the parameter value (parameter range: 120dB-40dB (-120dB is close the compression).



Noise gate interface

3. Program functions menu

As the schematic diagram of panel buttons , press ⑥"SAVE/LOAD"(save/load) to enter "save data"interface (as the picture below) and turn ⑤-Coder to select the functions of "load data" "delete data" ,operate by pressing the coder.

Save data

Load data

Delete data

a. Save data

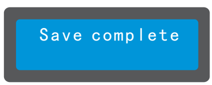
As the operation above , enter "save data" interface to save the parameters as following procedures:
Step 1 : Turn the coder to select the data group (select group 3 as the picture below)

Step 1

Step 2: Press the coder to enter "name data group" interface and then type the name of data group (naming data01 as the picture below)

Step 2

Step 3: Long press the coder to save the current data group 3 and the following prompt shows the saving is successful.



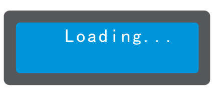
Step 3

b.Load data

As the operation above , enter "load data" interface to load the data as following procedures:
Step 1: Turn the coder to select the data group (select group 3 as the picture below)

Step 1

Step2: Press the coder to load the data group and the following interface shows the loading status. The success of loading will be prompted after successful operation.



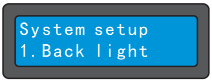
Step 2

c, Delete data

As the operation above, enter "delete data" interface to delete the data group as the procedures of loading data.

4. System menu

As the schematic diagram of panel buttons, press ⑥"SYSTEM" (system) to enter "system setting "interface (as the picture below) and turn ⑤-Coder to select the functions of "Backlight Settings" "Lock Panel" "View The Current Data" " Edit Standby Interface" " Software Version" " 0dBFS Reference Level" " Reset Feedback Point ",operate by pressing the coder.



1. Backlight Settings

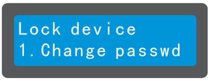
Select the backlight settings of LCD display to be "lighting constantly "or "go out after10s" , and then press the coder to finish the setting. Press ⑥ "BACK" to return the previous menu.

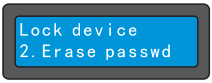
2. Lock the panel

a. Enter the "panel locking" and type 6-figure password on the following menu (turn the coder to change the words, short press the coder to type next figure of the password or long press to confirm the setting of password).

Following prompt interface when press other buttons after locking the panel

b. If the panel has been locked, please press ⑥"SYSTEM"(system) to enter "system setting" interface , turn ⑤-coder to choose "locking panel" and then type the password to unlock. "change password" and "password" is available (as the picture below).Change the password as the procedure of setting password and delete the password by pressing coder directly. Press ⑥"BACK" to return the previous menu.





3.Current data

You can view the currently loaded data group

4.Edit standby interface

No need for users to set this item

5.Software version

The version number is viewable as the picture below , press ⑥ "BACK" to return the previous menu.

6.0dBFS reference level

Set the analogy level (default value is 0dBFS correspond to 6dBu) which correspond to digital level 0dBFS , as the picture below, turn the coder to adjust the analogy level(the range is 6dBu-24dBu) which correspond to digital level 0dBFS.

Press ⑥ “BACK” to return the previous menu.

0dBFS Reference
6dBu

7.Reset the feedback points

Set the amount of fixed feedback point and dynamic feedback point (the default value of fixed feedback points and dynamic feedback points are 12 pieces separately)

Fixed point : 12
Dynamic point: 12

Attention: The detected feedback frequency points would be cleared after setting the amount of feedback frequency points successfully each time.

The setting procedures as follows:

Step 1: Enter the interface , turn the coder to adjust the amount of fixed feedback points , then press the coder to adjust the dynamic feedback points and turn the coder to adjust the amount . As the picture below :

Fixed point : 8
Dynamic point: 9

Step 2: After finishing step 1, press the coder to enter the interface as below , turn the coder to confirm the setting . "->" would point to the corresponding option when making option. If choose “NO”, then press the coder to give up this setting and return the previous menu

Confirm ?
->Yes NO

If choose “YES”, then press the coder to set the amount of feedback points as the picture below. The detected feedback frequency points would be cleared after successful setting, and the LED running lights would run from left to right between the fixed frequency points and dynamic frequency points which have been set. Go to standby interface after finishing the setting.

Setting...

Taking fixed feedback point is 7 and dynamic feedback point is 9 for example as below, illustrating the status of lighting the feedback point lamps(area①② of the front panel)

The LED lights run from 1 to 7 of fixed feedback point and then run from 13 to 21 of dynamic feedback point circulatly.

Part 7 . Applications

1.Insert the channel of microphone

This is the best method to eliminate the feedback of mixer microphone channels .

a. Connect the output of mixer channel insert points to the input end of feedback supressor.

b. Connect the output of feedback supressor to the backing insert points of mixer channels .

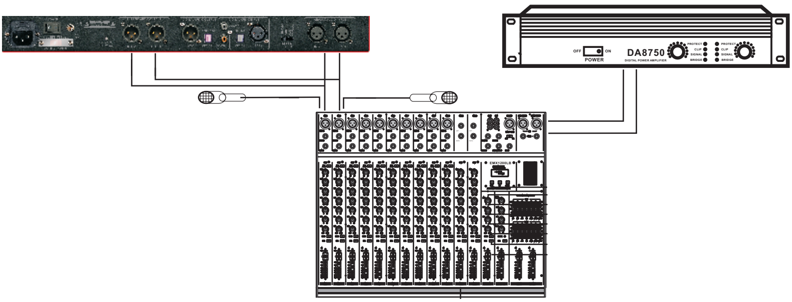


Figure 1 Insert the channel of microphone

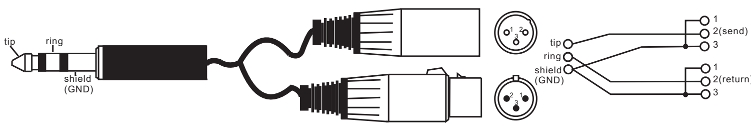


Figure 2 insert cable wiring diagram

2. Insert the auxiliary marshalling output of mixer

This application provides the auxiliary output of mixer with the function of feedback supressor .

a. Connect the auxiliary output of mixer to the input end of feedback supressor .

b. Connect the feedback supressor to the input end of mixer.

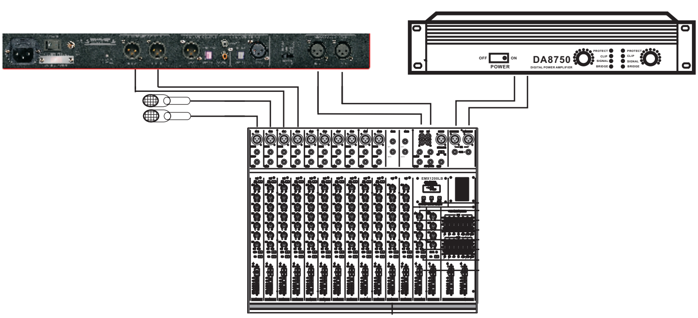


Figure 3 Insert the auxiliary marshalling output of mixer

3. Connect the main output of mixer

This application provides all output channels of mixer with the function of feedback supressor.

a. Connect the output of mixer to the input end of the feedback supressor .

b. Connect the output of feedback supressor to the amplifier .

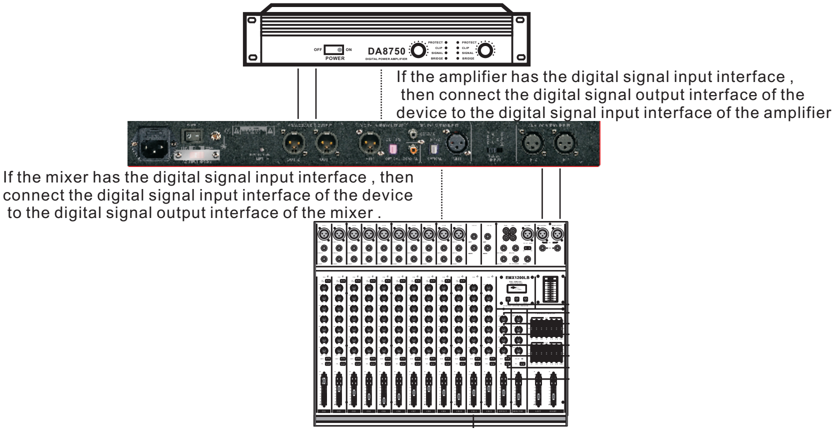
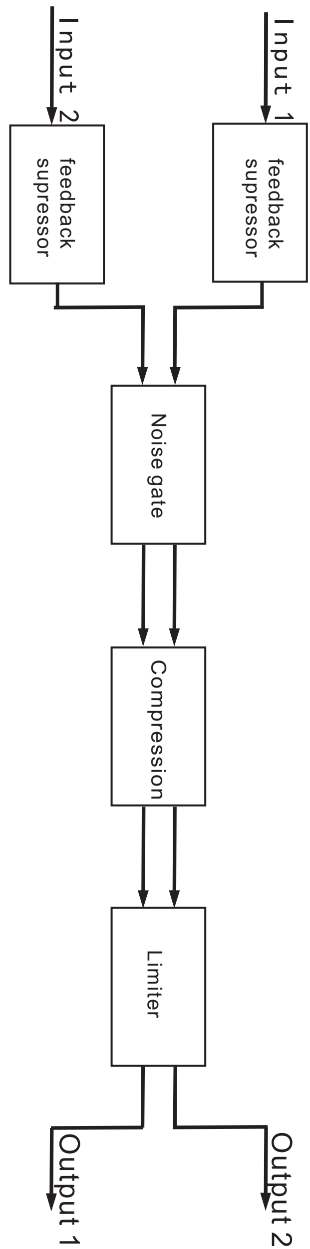


Figure 4 Connect the main output of mixer

Part 8. DSP signal block diagram



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