

DSP Setup for TDAI 2200



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On the TDAI 2200 it is possible to connect a PC (e.g. for equalization) and as soon as you do this, the 'Routing', 'Crossover freq', 'Filter Type' and 'Delay' menus can no longer be accessed from the menu system of the product.

If you want to access these menus directly on the TDAI 2200 again, just carry out a factory reset as described in the owners manual 'Factory Reset' chapter.

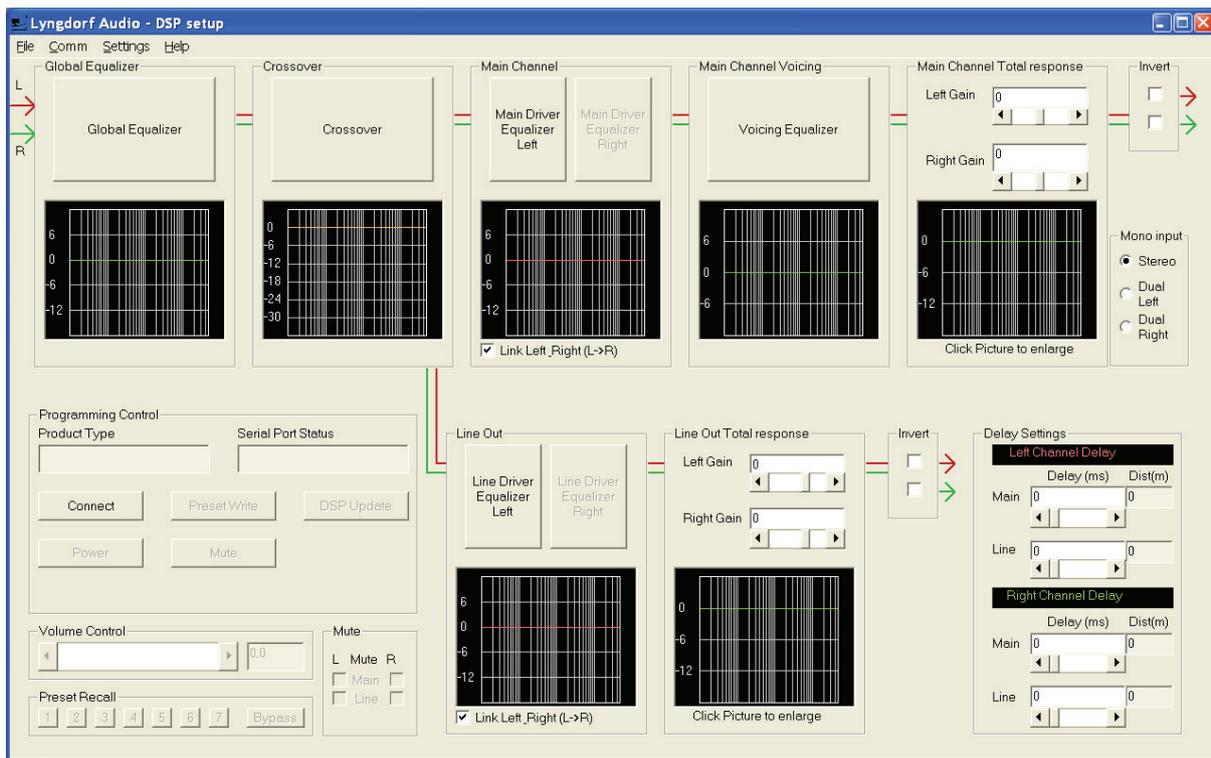


This is based on PC Pack 1.4, and will only cover the basic usage of the program. Because of the inherent complexity in making correct filters and equalization, it would be too extensive to describe how to make them in this paper. We recommend you study 3 party literature about the theory of these.

Introduction

The DSP software suite is the key to programming the presets of the TDAI 2200 thus taking advantage of the embedded DSP functionality. The powerful DSP functionality of the TDAI 2200 can be used for fitting main speakers to subwoofers or making active speaker systems.

As a basic overview the 'Lyngdorf Audio – DSP setup' reflects the block diagram of the internal signal path where the signal enters from the left side of the diagram and exits on the right. The 'Main Channel' is the main speaker outputs of the TDAI 2200, and the 'Line Channel' is the Digital output and the Analog line level output.



The Program is connected to the TDAI 2200 with the supplied RS232 Programming cable, so all changes can be tested immediately. If more than the simple functions are used it is highly recommended that an external measuring system is used for checking the loudspeaker response while equalising.

Basic Operation

Before starting the program it is recommended that the TDAI 2200 is turned on and connected to the PC's com port. The communication settings for the DSP setup programme can be altered in the Comm menu, where the active PC com port can be chosen and the Comm address can be set, default address is 1. The Comm address can be changed in the TDAI 2200 menu system under 'Comm Address'. The active PC com port must be free from other programs usage, e.g. resident programs for Palm cradles or modems, if not the TDAI 2200 DSP program can not open the port and an error message will be returned.

To establish contact to the TDAI 2200 a few basic settings needs to be synchronized between the PC software and the TDAI 2200. First of all the communication speed needs to be the same from the PC and the TDAI 2200 – per default the DSP setup programme is set to 9600 baud. The settings in the TDAI 2200 can be changed in the menu system under 'Comm Speed'.

Before all commands are active the Comm address – which is the TDAI 2200s network address – must be set correct in the DSP software. If unknown the item 'Show Address' in the settings menu can be used to show the actual address of the TDAI 2200. The address is shown in the Serial Port Status window.

The same address must be entered as network address in the com menu point of the DSP setup programme to activate all functions in the DSP control software. A brief check can be done by changing the volume control setting which should cause a volume change on the TDAI 2200.

Settings menu

Besides the 'Show address' item, the settings menu can also be used for setting the Network address of the TDAI 2200 once the communication is established. The 'Set Address' button can be used for changing the network address of the TDAI 2200 connected. When changing addresses the normal usage is:

Address	Functionality	Comment
0	Reserved	Normally not used
1	Master	Master
2-99	Slave	Slave

After changing address with success the Comm address in the DSP software is automatically changed to the new network address so the communication is maintained to the active TDAI 2200.

Further network functionality is the Set to master/slave items which is used for changing the status of a TDAI 2200 to be either a master amplifier or a slave amplifier. The difference is that when two or more TDAI 2200s are connected together the master amplifier will broadcast information about power status, volume, mute and preset changes to the slave amplifiers which in this way can be relay controlled by the master TDAI 2200.

Note: While working with the DSP setup programme it is recommended to set the TDAI in slave mode.

The latest software revision is checked by the 'Version Check' item which displays the active TDAI 2200s firmware revision in the serial port status window.

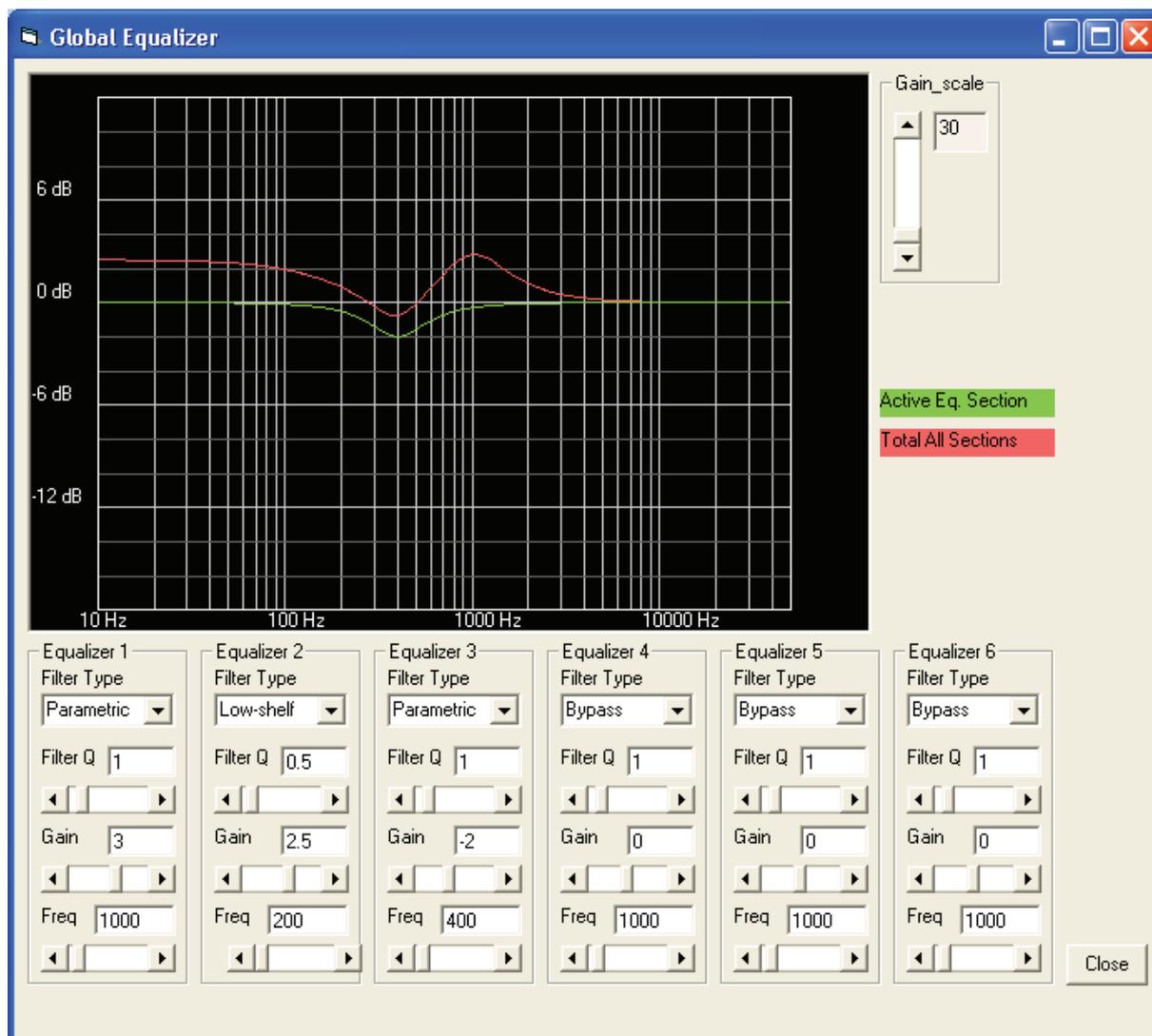
Read ATB item is a functionality which can read acoustic measurement files from the special Kirchner elektronik ATB Acoustic measurement system. The selected measurement can be shown in equalizer windows and the frequency response for the speaker system can be altered based on the measurement.

Global Equalizer

The Global Equalizer is used for global voicing of the signal to both the main speakers and the line outputs – this can e.g. be used for settings in the crossover region where the filter effect is wanted in both signal outputs. The global equalizer is implemented on both the left and right signal.

	All equalizer sections follow the same scheme so only the global equalizer is used as an example. Looking at the main page the signal flow is indicated with the green and read lines for left and right channel.
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Looking at the Global Equalizer screen the following settings can be seen:

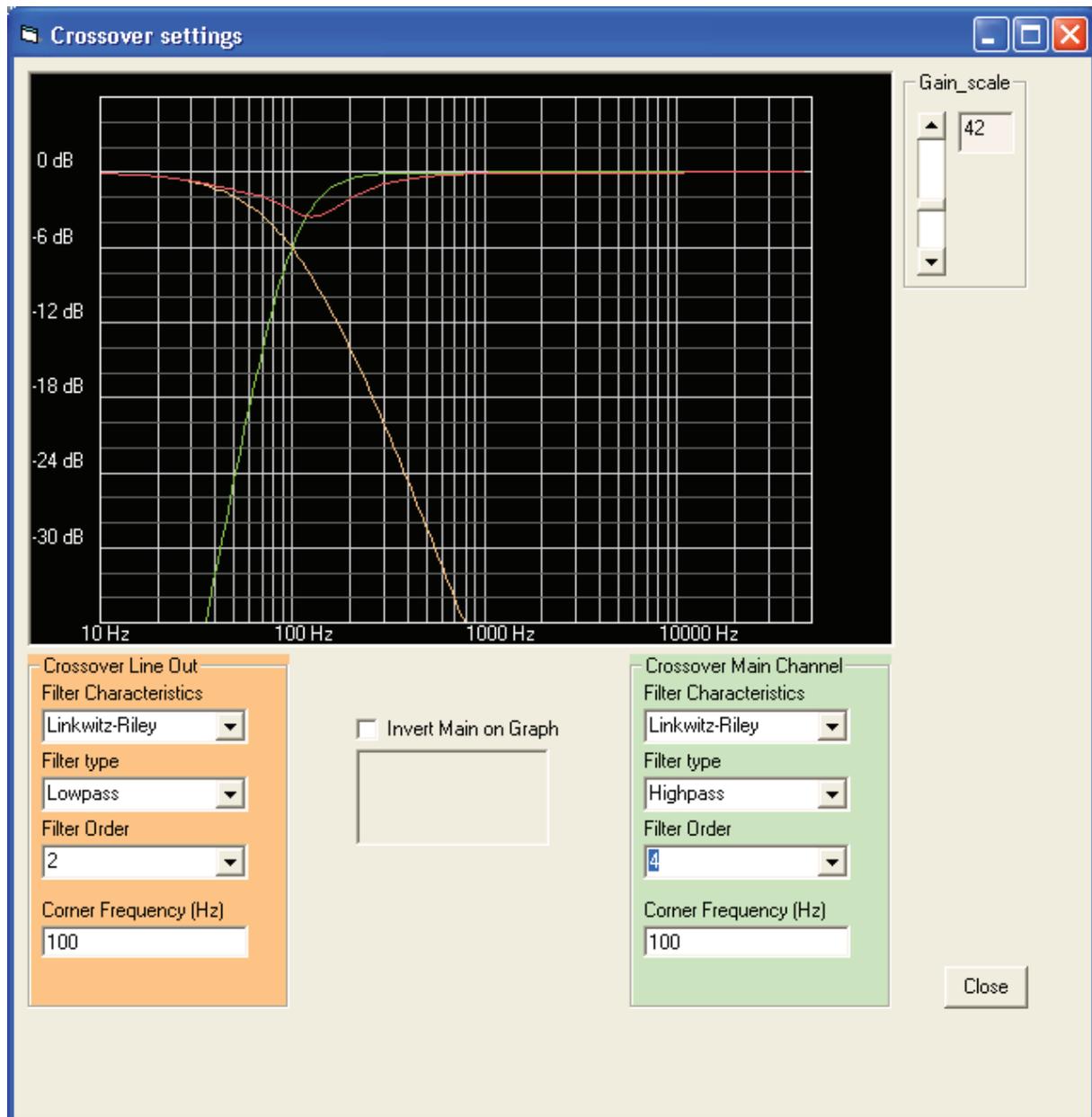


There are 6 global equalizer sections available, each implemented as a second order section referred to as a Biquad filter. The filter can be bypassed or used as a parametric equalizer section or as a high-shelf or low-shelf section. For each section the Q, gain and center frequency must be entered, and the active section response is shown in green in the graph and the total response in red.

	The filter settings are not implemented in the TDAI 2200 before the DSP's are updated with the 'DSP Update' or 'Preset Write' when reverted to the main page. Return to the main page can be done with either the Close button or with the normal 'X' close page button on the page frame.
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Crossovers

Clicking the crossover button or the graph opens the crossover window which sets the crossover between the main and line channels. For each of the channels there is a symmetric left/right side setting available with either bypass or different filter responses. For a short description of the different filters and selection of crossovers we refer to the 'Filter Type' chapter in the TDAI 2200 manual.



In the graph each crossover filter response is shown for the main and line output and as an indication of how the filter responses will add up electrically. The sum is shown in red. Please note how e.g. Butterworth filters of odd order adds to perfect reconstruction as with Linkwitz-Riley filters where as even order Butterworth filters do not reconstruct directly to a flat response For a short description of the different filters and selection of crossovers please refer to the 'Filter Type' chapter of this manual.



The filter settings are not implemented in the TDAI 2200 before the DSP's are updated with the 'DSP update' or 'Preset Write' when reverted to the main page. Return to the main page can be done with either the Close button or with the normal 'X' close page button on the page frame.

Main Channel and Line Out

The 'Main Channel' and 'Line Out' equalizers are intended for equalization of each channel independently. The left and right side can be either linked for symmetric speaker setup or adjusted individually by un-checking the link flag in the main window.

Main Channel Voicing

The Voicing Equalizer is intended for use on the main speaker output only as a tone control to adjust the personal taste of the main speakers.

Main Channel Total response

In the main page the total response frame shows the individual channels relative gain which can be used for fine tuning of sensitivity for each output relative to the volume control setting. A click on the total response graph shows the total response of the output in a large single screen.

Invert Panels

The invert panels are used to invert the polarity of a channel.



This setting is part of the DSP settings in a preset, so the channel is not inverted in the TDAI 2200 before the DSP's are updated with the 'DSP update' or 'Preset write'.

Mono input

If you use a TDAI 2200 for vertical bi-amping, i.e. only using it for a speaker/drive units on the left or right side, press the 'Dual left' or 'Dual right' button.

Programming Control

The programming control panel is the most essential panel when working with the TDAI 2200.

The 'Preset Write' and 'DSP Update' buttons are used for writing all current DSP information on filters, delays etc. to the TDAI 2200 but in two different ways:

1. The Preset Write feature writes the current setting to the chosen preset thus overwriting the settings in the amplifier without notice, after successful writing of the preset it is activated. The preset write is slower than the DSP update because of the dual operation – writing to memory and transfer to DSP's.

The preset setting can be stored on - or recalled from your PC with the file utilities one at a time which is highly recommended as backup of the settings as e.g. a version change in the TDAI 2200 firmware will reset all parameters stored. Also, you will always be able to recall the presets to see exactly which adjustments and settings you used.

2. The DSP Update writes all changes directly to the DSP's in the TDAI 2200 thus changing the settings fast and efficient on line without storing anything. This feature is used during tuning or development of a setup because it is faster and it does not spoil any current preset settings.



This feature changes filter coefficients on the fly – so the amplifier can send out clicks and noise during the process, so do not exceed volume settings of 60.

Volume Control

The volume control slider is used for changing the volume control of the TDAI 2200. The active change in the TDAI 2200 is implemented as a running change from the old to the new setting to avoid fast changes that may harm the speakers or the TDAI 2200.

Mute

The mute panel is used for muting the channels one by one during development by ticking a channel it will be muted instantly.

Preset Recall

The presets stored in the TDAI 2200 can be recalled for AB tests by pressing the 1-7 but only the parameters in the TDAI 2200 are changed, the parameters (eq, crossover and voicing curves) will not be visible in the DSP program - the recall panel only affects the settings in the TDAI 2200. Default preset settings are 0 dB bypass through all channels with no delay. A total of 7 presets can be stored, a linear setting can always be assured with a press on the 'Bypass' button or '8' or '0' on the remote control.

Delay settings

The delay of all 4 channels, 2 main and 2 line channels can be set individually. There is though a limitation on the settings for left and right channel which will be explained in the following.

The internal memory of the DSP section allow for a total of approx 19.5 ms delay per side – so right side main and line channel share the memory and the total delay of the right side can not exceed this maximum. So if a delay of 15 ms is chosen for the main right channel, and a 10 ms delay is chosen for the right line channel the following error will show:



And the main channel will be reduced to the remaining 9.5 ms.

	<p>The delay settings are part of the preset settings and are not updated in the TDAI 2200 before the DSP's are updated with the 'DSP update' or 'Preset write'.</p>
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