

DSP.Net is a signal processing and networked control and monitoring companion card for the X-Pod range of amplifiers. Processing includes crossover filtering, equalisation, delay and limiting, in addition to comprehensive monitoring features. DSP.Net is the full networked controlled DSP solution for your X-Pod application. The card comes factory-fitted to your X-Pod amplifier.

- Two independent channels
- High quality 96kHz audio processing
- Separate OEM and User settings
- Temperature monitoring
- Driver impedance monitoring
- Abuse logging
- BvNET networking

Introduction / Key Features

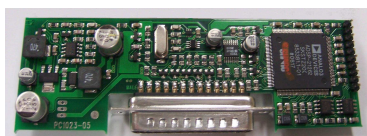
Linea's X-Pod range of amplifiers for use in active loudspeaker applications come factory-fitted with a choice of DSP option cards. The DSP.Net card provides Digital Signal Processing and BvNET networked setup, monitoring and control.

DSP.Net provides generous amounts of signal processing capability, with access to a wide variety of crossover shapes.

A simple user-interface may consist of some essential indicators and a switch arrangement which allows the user to select from a number of Voicings which you provide.

A multi-km network of devices may be monitored and controlled by the PodWare Windows application.

Protection of your settings is assured in an uncomplicated fashion by cleanly separating your OEM settings from those which the user has access to.



Sonic Purity

DSP.Net uses 96kHz sampling rate, Burr-Brown analogue-to-digital converter, the renowned Wolfson multi-bit digital-to-analogue converter, and a powerful 3rd generation Sharc Digital signal Processor (DSP) running audio processing algorithms borne of years of experience in high quality professional digital audio. All this adds up to deliver the ultimate in sonic transparency and a stunning open natural sound quality, fully living up to the very high sonic standards set in our amplifier products.

Branding

Each device is branded for the OEM customer so that PodWare reports the model name of your choice, with your colour scheme etc.

Crossover shapes

DSP.Net is capable of crossovers up to 8th order (48dB/Octave). In addition to the usual Butterworth, Linkwitz-Riley and Bessel filter shapes, DSP.Net provides access to Hardman crossover filtering, a technique we are proud to have introduced to the industry. Hardman filters produce much steeper cut-off slopes for a given order than conventional crossover alignments, without any additional group delay. This allows a lower order filter to be used without sacrificing cut-off characteristics, but with smoother group delay and less severe phase penalties, giving a more natural sound. Hardman filters also provide identical phase characteristics between adjacent bands (like Linkwitz-Riley), so the polar performance is rock steady.

We also employ phase matching on our Bessel filters, so adjacent bands are in-phase throughout the crossover region.

Our white-paper "Crossover Filter Shape Comparisons" provides more detail on this subject.

High-Pass Filtering

To avoid unnecessary inter-band phase shifts common in many competing products, we provide high-pass filtering on the inputs rather than forcing you to apply 'system' high-pass filtering on the low crossover bands.

Our white-paper "High-Pass Filtering in Two-Way Systems" explains why this is important.

Configuration

DSP.Net may be configured to provide processing for up to 2 audio inputs and up to two audio outputs.

The number of channels shown in PodWare is determined by the firmware model issued by Linea Research.

The standard model provides one input and two outputs for active 2-way applications.

Voices

DSP.Net allows four complete sets of parameters to be stored. Each set is called a *Voice*. Voices may be used, for example, to

select an alternative tuning as may be required if a speaker is used with or without a separate sub-bass unit. Voice settings are stored permanently inside DSP.Net and so will always be available even if DSP.Net is not being used with PodWare.

The voice selected depends on the condition of two 'switch' lines. Normally two latching switches would be used to determine which voice is selected. If no connections are made to either of the two voice select terminals, voice 1 will always be activated at power-on.

Indicators and Switches

Up to two LED indicators and up to two Switches may be used on your loudspeaker and wired into DSP.Net. The LEDs can be configured to show a range of things such as Signal Presence and Limiter action. The switches would normally be used to select Factory/User Voice and Factory A/Factory B Voice.

Temperature Sensing

DSP.Net monitors the temperature of the X-Pod amplifier, which is shown on the PodWare panel as a temperature bargraph. A temperature log will be maintained in DSP.Net and displayed in PodWare.

Protection

Working in close harmony with the protection systems in the X-Pod amplifier itself, DSP.Net protects the amplifier from damage in cases of abuse (thermal and load). It will not attempt any protection unless this is strictly necessary to preserve the longevity of the amplifier, the aim being to 'keep the show going' if at all possible, without the need for any user intervention.

Impedance Monitoring

DSP.Net monitors the impedance of the connected driver(s). PodWare is then able to check that the driver impedance is within the limits determined by your OEM settings.

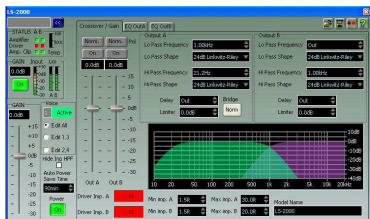
PodWare's MonIcon

The PodWare application uses a small panel called a *MonIcon* to display all the important status information about DSP.Net at a glance. From this small panel it is possible to see input signal activity, limiter activity, temperature, amplifier protection status, driver impedance status and amplifier clip indication, as well as being able to change the gain and mute the loudspeaker. The full control panel is only one click away from the MonIcon. You can also update the firmware in the unit via PodWare – even via the network.



OEM Settings

As the OEM, you have complete freedom to edit the crossover, driver equalisation and driver delay parameters. You can also apply a model name for the loudspeaker. Once a complete tuning has been prepared, PodWare allows you to save a Factory file which contains all these parameters. This file can then be used to load settings in production. Should you wish to change the OEM settings in the field, modified Factory files can be distributed and loaded by the user without disturbing the user-settings, and without the user being able to access the OEM settings. In OEM mode, the full DSP.Net control panel in PodWare looks like this:



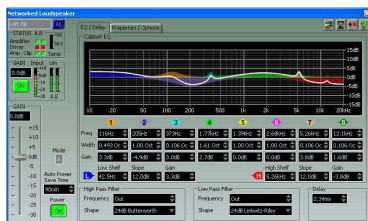
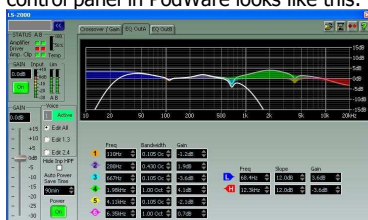
Hiding

By having a clean split between OEM and User processing, security is very simple: The user cannot access any of the parameters which are considered to be the responsibility of the OEM. Only with the OEM password (agreed with Linea Research) can PodWare be unlocked to gain access to the OEM parameters. However, the OEM can optionally hide the input High-Pass filters from the user in situations where these are required by the OEM for integrating the loudspeaker with a separate Sub-woofer.

User settings

The user cannot access your driver (output) settings since these are only accessible in OEM mode, which is password protected. The user can however apply input processing, which will effectively overlay your OEM settings.

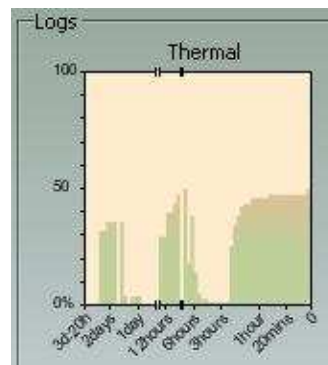
In normal User mode, the full DSP.Net control panel in PodWare looks like this:



Abuse Monitoring

DSP.Net continuously records logs against time for the temperature reading, and the state of amplifier protection for up to 3 days

into the past. These may be easily viewed at any time in PodWare. The data from them can even be exported to a spreadsheet for further analysis.



Obcom

An all-new, clean messaging system developed by Linea Research, called Obcom is at the heart of our software. Obcom is used throughout our application software, and across all communications media (such as BvNET). It is a thoroughly uniform standard that allows easy communication between different applications and different devices that support the Obcom standard. Obcom now has a large user base and is supported by many Pro Audio manufacturers.

Technical Specifications

- Input impedance: 5.5k Ohm unbalanced
11k balanced
- Max Input level: +10dBu
- Sample rate: 96kHz
- Frequency Resp: 20Hz - 20kHz +/- 0.5dB
10Hz - 40kHz +/- 1dB
- Dynamic range : 110dB A
(20Hz - 20kHz)
- THD (20Hz-20kHz): <0.01%
E&OE

Signal Processing Block Diagram

