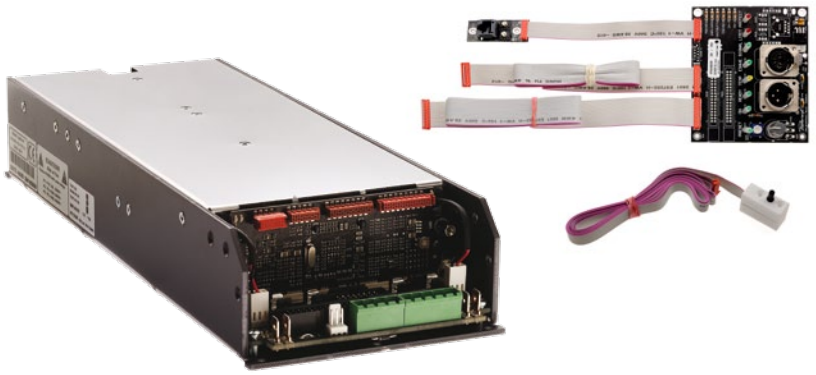
IpalMod

Amplifier Module with Differential Pressure Sensor and Zero Latency DSP

Despite the improvements made in design, materials and manufacturing process in the field of low frequency reproduction, the traditional technological approach leaves major issues unaddressed: transducers come with physical limitations and real loudspeakers introduce uncertainties caused by their intrinsically non linear behavior.

IPAL technology finally overcomes these limitations, setting a new standard in sub woofer applications. This innovative approach uses full boundary conditions processing to dramatically increase the "mains-input-to-acoustic-input" path efficiency. This can be used in a variety of low frequency applications.



PFC · ZERO LATENCY DSP · VIRTUAL SPEAKER · FIXED switching frequency · DPC® DIFFERENTIAL PRESSURE CONTROL PATENTED

- Very High Power and Afficient Subwoofers
- Very Low Distortion and High SPL Systems
- Steerable Low Frequency Line Arrays
- Low Frequency Noise and Standing Waves Removal Systems

IPAL – Integrated Powered Adaptive Loudspeaker

state-of-the-art sub woofer technology

- IPAL is a powerful and extremely flexible technology that can be implemented in a number of different design approaches resulting in:
- unprecedented acoustic quality thanks to complete control over the sonic performance of the whole system regardless of acoustic load;
- more than double output SPL capability for the same driver size with respect to any other conventional design;
- extreme overall efficiency of the amplifier-loudspeaker system.

- Patented Differential Pressure Control®: the core of IPAL control methods

DPC® DIFFERENTIAL PRESSURE CONTROL PATENTED

One of the greatest limits on achieving outstanding acoustical performance is the lack of a global amplifier-loudpseaker feedback system, linking the electrical and the acoustical signal directly. DPC® does exactly this: it allows a differential pressure signal, mechanically obtained from the two sides of the moving loudspeaker membrane, to be fed to the amplifier just as any other electrical feedback signal. This allows a complete real time characterization of the transducer and its acoustical load conditions, allowing for an input signal-to-SPL closed loop design.

- Patented Virtual Transducer® technology: build the loudspeaker you need

VIRTUAL SPEAKER

The Virtual Transducer® is an amazingly powerful tool, making the real loudspeaker behave according to any user-defined model. The speaker designer can synthesize any desired driver using a dashboard to set the Thiele-Small parameters, even when not physically achievable. The bottom line is: no alterations to performance due to aging, power compression or acoustic uncertainty. The behavior of the real amp-loudspeaker system is defined by the mathematical model built by the user.

- Patented Zero Latency® on board DSP for equalization, filtering, limiting, delay

ZERO LATENCY DSP

All control methods need a processing unit to correct and filter signals received from available sources. IPAL technology is based on a control method whose effectiveness strongly depends on how powerful and fast the signal processing is. That's why we specifically designed a DSP core with an astonishing 10 µs latency on the critical analog in-analog out feedback path, allowing real-time corrections mimicking the "analog" feedback approach.

- Complete set of protections

IpalMod is equipped with extensive protection circuitry: power limiters, thermal shutdown, short circuit and overload, clip limiter.

- Certification process made easy

Powersoft provides EMI/safety certifications, reports and documentation that will effectively cut certification costs on the final product.

CE · C SA US 235696 · CB CB Certification

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IpalMod

Amplifier Module with Differential Pressure Sensor and Zero Latency DSP

▶ How can I use IPAL technology?

An IPAL system is made up of four elements:

- ✓ a power amplifier module;
- ✓ a differential pressure sensing device;
- ✓ a “zero latency” DSP;
- ✓ a specifically designed high efficiency transducer.

▶ What is the IpalMod?

The IpalMod is three of these four elements: i.e. it is the hardware and the software needed to drive a properly designed woofer in order to implement an IPAL system. The IpalMod consists of:

- ✓ a powerful amp module capable of delivering 8500 W with an on board Zero Latency® DSP;
- ✓ a differential pressure sensor;
- ✓ an optional interface board with a serial networking connector (RS485);
- ✓ software for full remote programming, monitoring and diagnostic procedures.

▶ What is an “IPAL compatible” loudspeaker?

The IpalMod can work with standard transducers, but maximum performance is obtained with specifically designed woofers.
Powersoft is cooperating with major loudspeaker manufacturers to develop IPAL integrated products which are already available.
A whole new generation of unique transducers and applications is born from the IPAL technology: Powersoft provides all tools and support needed to evaluate this systems and encourages you to design your own IPAL compatible loudspeaker.

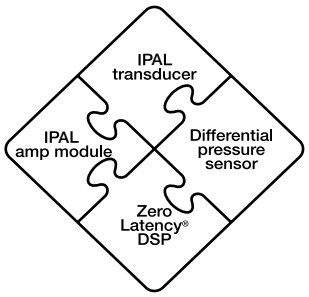
General	
Number of channels	1 in / 1 out
Output power	
Maximum output power @ 1 Ω load	8500 W
Max output voltage	180 V_{peak}
Max output current	110 A_{peak}

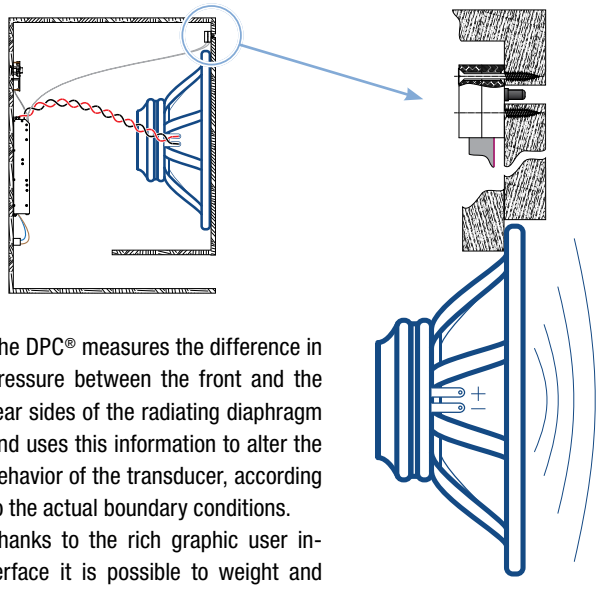
AC Mains Power	
Power supply	Universal, regulated switch mode with PFC (power factor correction)
Nominal power requirement	AC 100 V - 240 V, 50/60 Hz
Operating voltage	AC 90 - 264 V
Power factor	cosφ > 0.95 @ full power
Average power consumption	400 VA

Processing	
Equalizer	Parametric equalizers: peaking, hi/lo-shelving, all-pass, band-pass, band-stop, hi/lo-pass
Crossover	Butterworth, Linkwitz-Riley, Bessel: 6 dB/oct to 48 dB/oct (IIR)
Limiters and protections	Excursion limiter, current& power limiter, current clamp, clip limiter, Brownout limiter, thermal

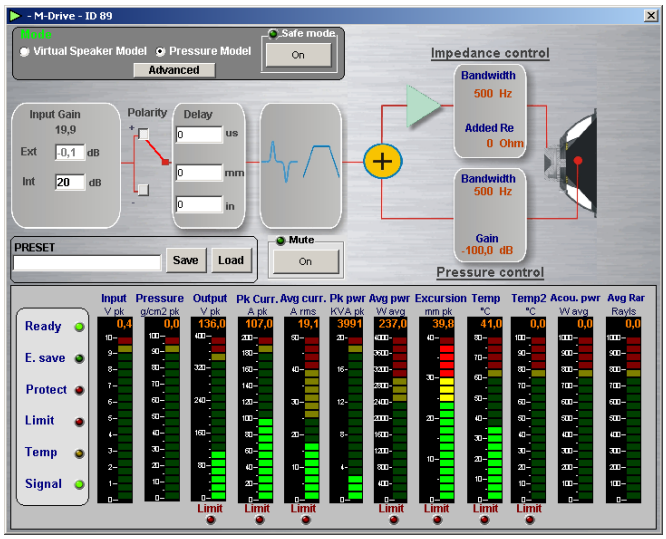
Virtual Speaker® Mode	
Thiele-Small paramters	Qes - Qms - Vas - Sd - Fs - Re
Electromechanical model parameters	Cms - Mms - Rms - Bl - Sd - Re

Differential Pressure Control® Mode	
Impedance control parameters	Bandwidth, added Re
Pressure control parameters	Bandwidth, slope, gain





The DPC® measures the difference in pressure between the front and the rear sides of the radiating diaphragm and uses this information to alter the behavior of the transducer, according to the actual boundary conditions.
Thanks to the rich graphic user interface it is possible to weight and customize the feedback between the electrical and the acoustic domains.



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