

DeZorel

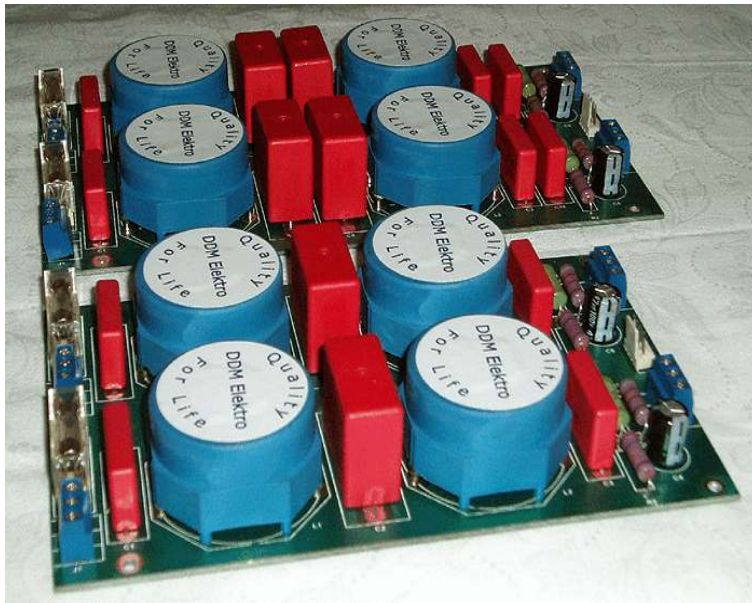
by DDM Elektro d.o.o.



DeZorel[®] Power Line Filters

- The Full Story -

Background



Our power line filters saw the light of day for the first time in 1975. That's when the very first filter was made, almost tailor-made, for very specific requirements of security and surveillance. The problem was too much noise on video and audio tracks, which were required to have tremendous sensitivity, which means a very high gain factor. At such levels, line noise becomes a very significant factor very fast.

For many years, this first original did its job in places where it was required, surveillance, telecommunications and A/V studios. Little work was done on them.

In the late 80-ies, when the old communist system began to fall apart, some of our design team members left their government jobs and went private. For a good while, as a matter of sheer survival, other fields were pursued, but the power line filter was always with us, a standard member of our team. Serbia went through a period of UN sanctions, 1992-2000, and consequently, our export capabilities were frozen still.

In 2000, the New Millennium, things changed in Serbia first, and then around. The UN sanctions were lifted, and we were once again free to pursue our export capabilities. Which we did with great vigor.

The time spent under the UN Sanctions was not time wasted. We used it to develop our full Mark 2 version, which had all the advantages of our initial design, but improved its filtering effects by an average of 12 dB (a ratio of 4:1) across the spectrum. No small feat.

In 2005, the original company, and more importantly, the original design team split up. One part wanted to keep things just as they are, no changes, while the second group wanted to continue developing the basic product line and expand with new products. This second group formed a new company, DDM Elektro d.o.o., and started its own manufacture of power line filters. With them, they took the copyright ownership to the trade mark “DeZorel” and is consequently the only legal owner and user of that trade mark. A picture of the original official certificate proving this is supplied in Appendix 1.

In the meanwhile, technology marched on, new parts and components appeared. This allowed us to produce our Mark 3 version of the filter, which brought very little benefits in terms of performance, but did wonders for the manufacturing cost by slashing it in half. This in turn enabled us to keep the price still reasonable, but offer one of our key advantages, full isolation, across the board, down to even our basic model. This had never been possible previously.



In 2006, we introduced our Mark 4 version of the filter with no great pomp and ceremony. We saw no need for it, because this was a normal development process of our products. This version allowed us improved filtering results by some 6 dB on average, yet the price remained the same because fortunately, in the meanwhile, the price of the components used dropped just enough to enable us to keep the prices constant.

We believe we are one of the very few manufacturers in the world today with their prices the same today as they were three years ago. Not a cent more. Which simply means we passed on the savings to our customers. Not many are even willing to try that.

To sum up, we went from a top of the line model in 2000, which cost and index price of 1.00 euros and offered three parallel filters, to our top of the line model today, which costs an index price of 0.87 euros, but offers six parallel filters and monocrystal wiring inside.

Never before have we offered so much for so reasonable a price.

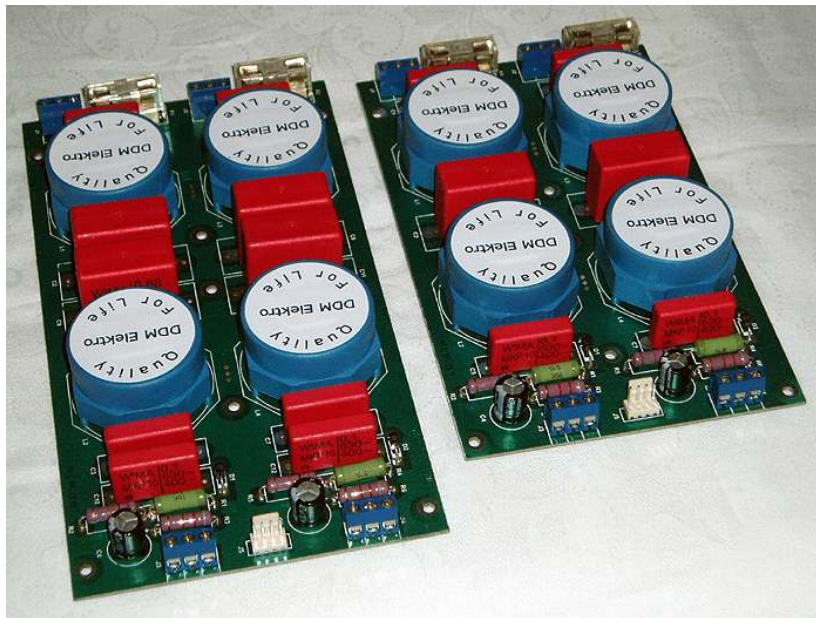
No-one else offers anywhere as much for anywhere near our prices.

Our price/performance ratio is second to none!

The Philosophy

There are many types of power line filters, or, as they are gloriously called these days “power conditioners”. While there are indeed several products on the world market which do merit the term “conditioners”, the vast majority are quite simply filters.

A broad division could be made between active and passive devices. Active devices are those which use up some energy in their operation as they employ one or another type of semiconductor. Passive devices are those which do not use any kind of semiconductor, and in fact use up extremely little power by themselves, quite normal since they use passive components only. By and large, active devices allow for much more tweaking of the effects and performance levels hard to achieve with passive devices, but they do so at a cost, both in complexity and extreme cost of the devices one requires. Furthermore, they cannot help but introduce problems of their own; while this could be said of any design, in case of active designs one has the added problem of active device tolerances, linearity, power handling and heat dissipation. Overall, not a very practical solution for most.



Passive devices are easier to work with, but the designer has less overall freedom to tweak the results. In return, these designs have far more reasonable costs, they lack all of the problems associated with active devices and can be rather compact. As you may have guessed by now, we use the passive approach.

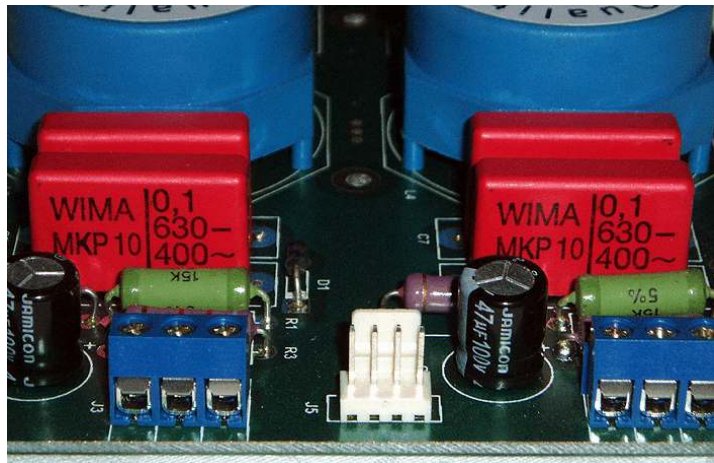
In very broad terms, all passive filters have some generic similarities, no matter what they are intended for. The key problem with passive filters is the ground. They operate by removing a part of the signal and shunt it to the ground. This will operate perfectly well if the ground adheres to some basic assumptions, these being that its potential is 0.8V or less and that its impedance is 100 Ohms or less.

Unfortunately, in real life, these requirements are hardly ever met. In fact, the only way for them to be truly met is for you to use a 2 by 1 meter pure copper plate completely dug into the plain earth in your say garden, and even then assuming there are no nearby underground power cables. Not very practical at all, is it? Especially when you happen to live in a condo on the seventh floor ...

The actual, real life potential of your ground is a fast moving target. In big cities of our world, you will see anything from 5V to as bad as 70V, as reported by one of our customers from Paris, France, who lives in a 110 year old house, with electrical installations about 75 or 80 years old! Imagine what happens when a classic passive filter, designed for 0.8V encounters 70V. Quite simply, its filtering function is reduced to a fraction of what it should be. Also imagine what happens to those nominal 0.8V when a filter suddenly shunts a large transient to the ground.

Our filters, on the other hand, do not need the ground for proper operation at all! Therefore, they cannot be influenced by the ground potential, nor can they influence the ground potential. They will work as designed no matter what. This all by itself makes them superior to most other products on the market.

Another not at all so fine a point is the fact that while filters may protect devices from incoming power aberrations, they do nothing for crosstalk among them AFTER filtering. In other words, all connected devices are free to exchange crosstalk among themselves. The only true way to prevent this from happening is to have a separate filter for each connected device - and this is exactly what we offer. Each and every device connected to our filters has its own, specific filter section. Thus, for any crosstalk to get from one device to another, it faces first its won filter, and then the other device's filter, effectively two filters in series. This yields a suppression ratio of -120 dB (one million to one) or better, reducing the real life effects to purely academic levels. Again, we know of no other manufacturer who offers this feature.



All this boils down a simple fact - we have done everything possible to isolate any device connected to any filter of our manufacture from both external incoming power and internal, after filtering crosstalk effects.

It simply doesn't get any better than that. Or does it?

The chief problem with filters, any filter, is that it is necessarily a compromise. It must choose between very high efficiency and consequent phase shifts. When voltage and current are perfectly synchronized, phase shift is said to be zero. When voltage leads over current, we say we have a positive phase shift and express it in so many degrees, and vice versa, when current leads over voltage, we say we have a negative phase shift of so many degrees.

While a phase shift of zero is a purely theoretical model, it's true that reducing it to numbers well below say 1 degree means you have practically eliminated the problem. In absolute terms, it's still there, but its effects are insignificant. This is true of all electronics, but in filters, it's a particularly nasty problem. And among filters, it's a particularly bad problem with passive filters, such as ours are.

This problem is further exacerbated by the fact that while a power line filter should, as its name implies, filter, it must not touch the 50 or 60 Hz wave which defines the AC source. Thus, it should not touch 50/60 Hz, but from there upwards the frequency scale, it should do its best to cut anything and everything, because nothing should be there. Thus it should be steep, but steep also means larger phase shifts. And therein lies the dilemma - and the little art of it.

Without getting too deep into technology and trade secrets, suffice it to say that we have over the years managed to produce filters with an exceptionally small phase shift in the critical midrange band. A part of it is making use of truly highest quality components, another aspect is using highly overrated components, and the rest is a small trade secret.

That we have done it is best seen from user comments we receive, which almost by default state that the midrange and treble of the audio spectrum have gained in perspective, have added details revealed and that the sense of space around the performers is greatly enhanced. Bass is usually not a problem, everybody manages that.

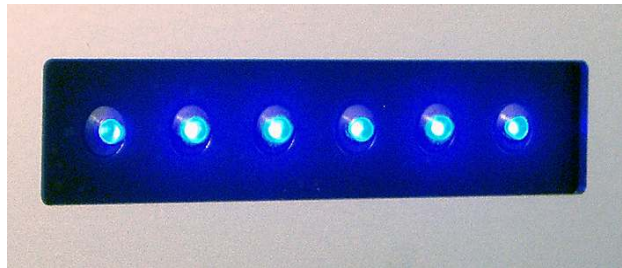


The Line

After years spent on the market, we have realized that customers do not want to be faced with a myriad of choices, most of which are hard to understand. Thus, we have simplified our product portfolio making choosing very simple and effective.

Our **Standard Line** includes three models, one with two, another with four and the last with six filters and as many outputs. The small model is packaged into our small case, simply our large case cut in half by width, but other than the size, it is still exactly the same as our large cases, we have avoided making any functional “savings”. Default case colour is black, but as an option, you can order your model with a bead blasted, high quality US made aluminium front plate (not available on the small case).

Our **Special Edition (SE)** line is exactly the same as our Standard Line, but the internal wiring is different. Instead of using OFC copper wiring, with a diameter of 1.5 mm, in this series we use Neotech[®] Monocrystal, silver plated OFC wiring, with a diameter of 2.2 mm. This is a very special wire indeed, and will produce audible effects on revealing audio systems.



Lastly, our **A/V Professional Line** mimics our standard line in all aspects, except for the fact that the filters have been especially tweaked for best results in video performance. It also offers three models, with two, four and six dedicated video filters.

As an extra, we can outfit an individual model with say six filters so that it has four filter sections for audio and two dedicated video filter sections. At request only.

We also offer, only to our customers (i.e. with our products only, not as a standalone item) our own take on the power input cable. This is an extremely high quality item, utilizing Neotech monocrystal, silver plated OFC cable, terminated on the input side with an European Schuko style gold plated plug and an international style IEC gold plated plug on the output side. Must be ordered separately.

DeZorel Duet

Our initial model. Offers two separate filter sections, both rated at 10 amps at 230 VAC, or 2,300 VA. Input power socket is IEC, output sockets are European Schuko style, or international IEC style. Case is 100% made of aluminium, painted in black EU recognized ecological paint from Italy. Filter status indicator blue LEDs on the front panel. Custom rubber compound feet.

DeZorel Quartet



Our middle-of-the-range model, offering four separate filter sections, two of which are rated at 10A each, and the other two at 6.3A each. Power input socket is IEC, output sockets are either European Schuko style, or international IEC style. Case is 100% made of aluminium, painted in black EU recognized ecological paint from Italy. There are four blue filter status LEDs on the front panel. Custom rubber compound feet.

Optionally, a bead blasted natural colour aluminium front plate can be added at additional cost.



DeZorel Sextet



Our top of the line model, offering six separate filter sections, two rated at 10A and four rated at 6.3A each. Input power socket is IEC, output sockets are either European style Schuko, or international style IEC. Case is 100% made of

aluminium, painted in black EU recognized ecological paint from Italy. Six filter status blue LEDs on the front panel. Custom rubber compound feet.

Optionally, a bead blasted natural colour aluminium front plate can be added at additional cost.

DeZorel Terms Of Trade

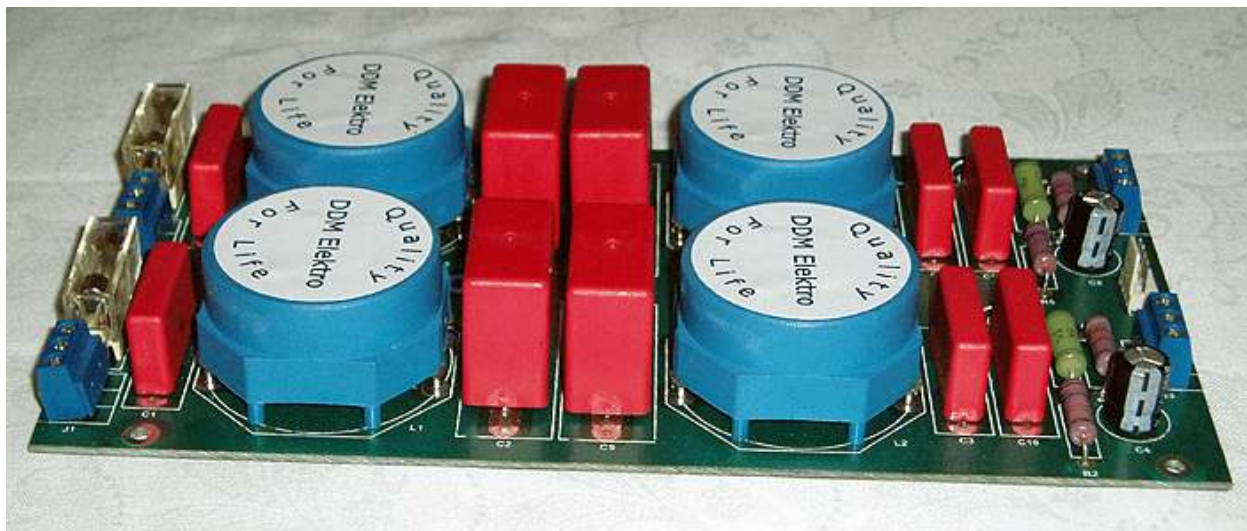
If we are not represented in your country, you can order direct from us; if we do have a representative in your country, please refer your requests to them, because we will not sell to you direct.

Ordering from us goes as follows. We send you a Pro Forma invoice for the product you want to buy. You effect a bank-to-bank transfer, from your bank account to ours; unfortunately, at this time, we have no other payment options, since Serbia has not yet embraced e-banking and e-transfers. So, you have a receipt clearly showing you have sent us money, which makes you very safe indeed, because if we cannot produce official papers showing we sent you the goods, according to current Serbian laws, we face a stiff fine, shutting down of our company and a jail term - all at once.

We undertake to inform you of your payment's arrival on the same day our bank notifies us, and thereafter we have 14 (fourteen) days to ship the goods. If we have them on stock, they will be shipped on the very first next business day after receiving your payment. As soon as the goods are shipped, we will send you via e-mail your UPS Tracking Number, so you can follow its progress to you. All goods we ship we insure and reinsure.

When we see that you have received your package, we automatically activate your warranty, no need to notify us.

Simple, smooth and time proven.



Plans & Upcoming Products

As every company, we also plan ahead. On our development list, there are quite a few products, all with our personal stamp firmly printed on them. We will be introducing them in the months and years ahead of us.

For the time being, two products are in their final development stages and will be introduced shortly.

One is a truly outstanding Phono/RIAA amplifier-equalizer. It will use true passive equalization, long recognized as the best sounding arrangement available so far. It will operate with both MM and MC cartridges.

The other are two dedicated headphone amplifiers, operating in true pure Class A. The more elaborate model will also use true dual mono fully regulated power supplies. Both use hand matched ON Semiconductor/Motorola 60W power devices in their Single Ended Push-Pull (SEPP) power stages, quite capable of powering smaller power amplifiers, if necessary. This, in combination with an outstanding damping factor, will give completely new meaning to your headphone listening. The question you will have to answer is - are your headphones good enough? Because not many are ...



Technical Specifications

All models, except where stated otherwise

Device

Passive high performance power line filter.

Electrical construction

Custom aluminium case housing the filter, fully grounded and protected. Double Faraday cage concept, using parallel filters for increased power handling and total isolation of connected devices after filtering.

Mechanical Construction

Frame beam case construction, using custom high pressure extruded and anodized profiled beams. Insets of painted aluminium plates. High torque screws.

Connections

European style Schuko or international style IEC Input via fused IEC socket.

Power handling

210...240 VAC, 50/60 Hz - 10 amperes per filter, 2.1...2.4 kVA per high power filter
210...240 VAC, 50/60 Hz – 6 amperes per filter, 1.26...1.44 kVA per low power filter

Insertion loss

Approximately 1 V (typically 0.7 V), 210...240 VAC 50/60 Hz

Energy storage

Approximately 0.04 joules

Fuses

210 ... 240 VAC, 50/60 Hz, Main Fuse (back of device) 10 A slow blow
210 ... 240 VAC, 50/60 Hz, high power filter (inside) 10 A slow blow
210 ... 240 VAC, 50/60 Hz, low power filter (inside) 6 A slow blow

Note: *The fuses have deliberately been selected to be slow blow. Therefore, transient switch-on surges are well accommodated for without any adverse effects.*

Filter section overload margin

Minimum 200% over nominal threshold before saturation (all protection short circuited).
Typically around 300% above nominal power handling before onset of saturation.

Minimum guaranteed specifications

All above figures were measured at 220 VAC, 50 Hz, at full rated power handling, i.e. at 9.9 amperes (0.1 A below nominal triggering point).

DeZorel series:

Frequency	Min. guaranteed	Typical
6 kHz	- 12 dB	- 15 dB
12 kHz	- 15 dB	- 18 dB
24 kHz	- 33 dB	- 37 dB
48 kHz	- 38 dB	- 42 dB
96 kHz	- 43 dB	- 48 dB
192 kHz	- 48 dB	- 54 dB
384 kHz	- 53 dB	- 59 dB
600+ kHz	- 62 dB	- 68 dB

DeZorel Monocrystal series:

Frequency	Min. guaranteed	Typical
6 kHz	- 15 dB	- 18 dB
12 kHz	- 18 dB	- 22 dB
24 kHz	- 36 dB	- 43 dB
48 kHz	- 42 dB	- 49 dB
96 kHz	- 48 dB	- 56 dB
192 kHz	- 54 dB	- 62 dB
384 kHz	- 60 dB	- 68 dB
600+ kHz	- 70 dB	- 78 dB

Crossfeed, filter to filter

Better than -120 dB (1 million to one), one device to any other

RF breakthrough

Below any publically available known standard, in -> out = out -> in

Operating temperature

-5...+50 degrees centigrade (9...122 degrees Fahrenheit) ambient

Generated temperature

Maximum +3 deg. Centigrade (+6 deg. Fahrenheit) at maximum ambient and full load

Operating humidity

10...85% air humidity (receptacle limited)

Operating altitude

0...10,000 m (0...33,500 ft) relative to sea level.

Internal wiring

Silicon insulated OFC multi strand wire on standard models, Neotech® Monocrystal OFC wire on Monocrystal series models.

IEC socket power input

Current rating 16 amps per UR, 10 amps per CE and IEC standards, multiple safety certificates on socket. Type 321 male.

Tolerances

0.1% symmetry deviation or better.

Operating mode

True balanced, fully floating mode. Completely symmetrical operation. Do not require grounding for full effect operation.

Duet, Duet Monocrystal, A/V Professional dimensions

220x380x95 mm (9.5x9.2x3.5 inches) WxDxH inc. protrusions

Mass app. 2.5 kg (app. 5.5 lbs) net

Gross shipping weight 3.5 kilos (8 lbs)

Quartet, Quartet Monocrystal dimensions

440x380x95 mm (17.3x15x3.8 inches) WxDxH inc. protrusions

Mass 5.1 kg (app. 12.7 lbs) net

Gross shipping weight 6 kg (13.5 lbs)

Sextet, Sextet Monocrystal dimensions

Dimensions 440x380x95 mm (17.3x15x3.8 inches)

Mass 5.3 kg (app. 11 lbs) net

Gross shipping weight 6 kg (13.5 lbs)

DeZorel®

by **DDM Elektro d.o.o.**

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