

CD player - PULSAR CD 1210 R



The **CD 1210 R** employs a fully programmable signal processor (DSP) which can process digital signals in any conceivable way. For this reason it produces better oversampling characteristics than are possible otherwise using ready-made commercially available chips.

Commercial oversampling filters are invariably designed to produce as flat a frequency response as possible, without taking into account time-related characteristics, i.e. those concerning transient response. The inevitable result is long pre- and post-echoes which can seriously distort the listener's perception of the music - especially where peak signals are concerned.

Different types of filter - known as polynomial filters - are now available which exhibit perfect transient signal handling. Unfortunately these filters show a slight drop in treble response at 20 kHz. The **CD 1210 R** makes use of one class of these filters - **BEZIER** polynomial filters - combined with an **IIR** filter in a three-stage oversampling process.

The result is a filter which produces no pre-echoes. The human ear is particularly sensitive to pre-echoes for two reasons: on the one hand they never occur at all under natural conditions, and on the other they are not masked by the main signal - as is the case with post-echoes. This filter also has a flat frequency response, which is a considerable improvement over other polynomial filters (e.g. cubic splines).

Since filters of such refinement cannot be purchased ready-made, the **CD 1210 R** utilises a digital signal processor to fulfil this purpose.

Since the signal processor is completely programmable the **CD 1210 R** is not tied to a particular filter type. As a result we have been able to give the machine a total of five different filter types, each with a different sound character, ranging from the classic **long FIR** filter to the **BEZIER filter**, with **short FIR** filters between the two.

Each of these filters can be activated directly via its own button on the machine's front panel



Internal view of the **CD 1210 R**

Connection elements



	output signal. It is designed for connection to a pre-amplifier, integrated amplifier or receiver with its own volume control
Digital Out	Optical digital output for connection to an external digital/analogue converter. Optional co-axial digital output.
RC IN	RC input socket for connection to an "R"-series pre-amplifier, integrated amplifier or receiver.
R-Link	Interface for future system expansions

Standard-filter (long FIR-filter)

The long FIR-filter is the standard oversampling filter used in digital technology. Advantages: Extremely linear frequency response in the audible range, very high stop band attenuation, linear phase, constant group delay.

Filter 1 (short FIR-filter)

The short FIR-filter has similar characteristics to the long **FIR** filter, but very much lower coefficient (160) and consequently considerably lower pre- and post-echoes. Advantages: Extremely linear frequency response in the audible range, high stop band attenuation, linear phase, constant group delay.

Filter 2 (IIR-filter)

This filter is a classic 8th order IIR-filter. It exhibits absolutely no pre-echo effects, albeit a slight tendency to post-echo. This is also a feature of natural instruments, and in any case the post-echo is usually masked by the normal audible signal. Advantages: No pre-echo at all, no treble loss, very high stop band attenuation.

Filter 3 (Bezier- / IIR-filter)

This combination circuit consists of three cascaded filters: a Bezier filter, an IIR filter and a second Bezier filter. It represents a good compromise between transient response and frequency response. Advantages: Virtually no pre-echo, minimal post-echo (in masking range), relatively flat frequency response, no pronounced treble loss.

Filter 4 (Bezier filter)

The Bezier-filter is the ideal filter in terms of transient response, virtually no pre- or post-echo, linear phase, slight treble roll-off at 20 kHz. Advantages: Optimum transient response, linear phase, constant group delay.

Specifications

<i>Mechanism</i>	Professional, close-tolerance linear disc mechanism with triple-beam LDGU optics, 780 mm semi-conductor laser, 2 mW power
<i>Wow and flutter</i>	Quartz-controlled, not measurable
<i>Mechanical construction</i>	Rigid all-metal case, shielded sub-assemblies, vibration de-coupled
<i>Digital filters</i>	Freely programmable signal processor with four different filter types, 8-times oversampling and 56-bit resolution, FIR short, FIR lang, IIR Bezier, Bezier IIR filters
<i>D/A converter type</i>	Double differential mode. Two 1-bit Sigma-Delta

<i>Noise shaping</i>	4th order (ZSNS)
<i>Analogue filter</i>	Phase-linear Bessel filter 3rd order with 60 kHz limit frequency
<i>Frequency response</i>	2 Hz – 20 kHz
<i>Distortion / intermodulation</i>	< 0,002 %
<i>Effective system dynamics</i>	97 dB
<i>Signal: noise ratio (A-weighted)</i>	109 dB
<i>Signal: noise ratio (unweighted)</i>	106 dB
<i>Channel separation 1 kHz / 10 kHz</i>	106 / 100 dB
<i>Digital output</i>	Data format SP-DIF 1 x opto = 660 nm / -18 dBm optional: 1 x coax = 0,5 V / 75 Ohms
<i>Analogue output</i>	nominal 2,6 V eff, 22 Ohms
<i>Dimensions</i>	7,5 x 44 x 39 cm
<i>Weight</i>	8 kg
<i>Colours</i>	Black (9005), silver aluminium, Chrome (Non-standard version)
<i>Remote control</i>	Via R system or as non-standard version

We reserve the right to alter technical specifications.