# CD-Player - PULSAR CD 1230 R



The sparkling new little brother to the CD 1240 R has everything that its sibling offers apart from the two-way converter, the co-ax output and the dual-transformer mains section. This gives us the chance to mention a few of this family's exemplary qualities:

- Two Sigma-Delta stereo converters operating in double differential mode for optimum performance in terms of noise, overload and dynamics
- T + A reverse clock process provides 192 kHz / 24-bit resolution and eliminates jitter, driving the performance of the system close to the physical limits.

As with our other CD players this unit employs a freely programmable signal processor (DSP). DSPs are not limited in the way they can process digital signals, and for this reason such a system ensures better oversampling than would be possible with standard conventional chips. Until now oversampling filters were designed to provide as smooth a frequency response as possible, but their timing characteristics (pre- and post-echo) have been neglected. The problem is long pre- and post-echo effects which can seriously distort the musical signal, especially with transients. A different type of filter is now available which exhibits perfect transient handling: these are known as polynomial filters, and unfortunately they are characterised by a slight treble fall-off at 20 kHz. In the CD 1230 R we employ a particular class of these filters which has been developed by T+A: BEZIER polynomial types. These are combined with an IIR filter in a three-stage oversampling process. The result is a filter which produces no pre-echos. The human ear is particularly sensitive to preechos for two reasons: on the one hand such an echo can never occur in the natural world, and on the other they are not concealed by the main signal, unlike post-echos. This new filter also boasts a frequency response which is considerably smoother than that of other polynomial filters (e.g. cubic spline types). Such sophisticated filters cannot be purchased ready-made, and that is why a digital signal processor is employed in the CD 1230 R. The freely programmable signal processor of the CD 1230 R is not tied to a single filter, and this makes it possible for the unit to provide five different filter types offering subtly different sound characteristics - from the classical long FIR filter via short FIR filters to the BEZIER filter. These filters can be selected by means of a button on the front panel of the unit.

## Connection elements

**Analog Out** The analogue output of the CD player supplies a fixed-level

> 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 input socket for connection to an "R"-series pre-amplifier, **RC IN** 

integrated amplifier or receiver.

T+A - Produktarchiv CD 1230 R

R-Link

Interface for future system expansions

### Standard-filter (long FIR-filter)

The <u>long **FIR**-filter</u> 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 <u>short FIR-filter</u> 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 <u>IIR-filter</u>. 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 <u>combination circuit</u> 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 <u>Bezier-filter</u> is the ideal filter in terms of transient response, virtually no pre- or postecho, linear phase, slight treble roll-off at 20 kHz. Advantages: Optimum transient response, linear phase, constant group delay.

## **Specifications**

Mechanism Professional, close-tolerance linear disc mechanism with triple-beam LDGU optics, 780

mm semi-conductor laser, 2 mW power

Wow and flutter Quartz-controlled, not measurable

Mechanical construction Rigid all-metal case, shielded sub-assemblies,

vibration de-coupled

Digital filters 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

D/A converter type Double differential mode. Two 1-bit Sigma-Delta

converters with 256-times oversampling

Analogue filter Phase-linear Bessel filter

3rd order with 60 kHz limit frequency

Frequency response 2 Hz – 20 kHz

Distortion / intermodulation < 0,002 %

T+A - Produktarchiv CD 1230 R

Effective system dynamics 97 dB

Signal: noise ratio (A-weighted) 109 dB Signal: noise ratio (unweighted) 106 dB

Channel separation 1 kHz / 10 kHz 106 / 100 dB

Digital output Data format SP-DIF

 $1 \times Opto = 660 \text{ nm} / -18 \text{ dBm}$ 

Analogue output nominal 2,6 V eff, 22 Ohm

Dimensions 7,5 x 44 x 39 cm

Weight 7 kg

Colours black (9005), alu silber, chrome (non-standard

version)

Remote control Via R system or as non-standard version

We reserve the right to alter technical specifications.