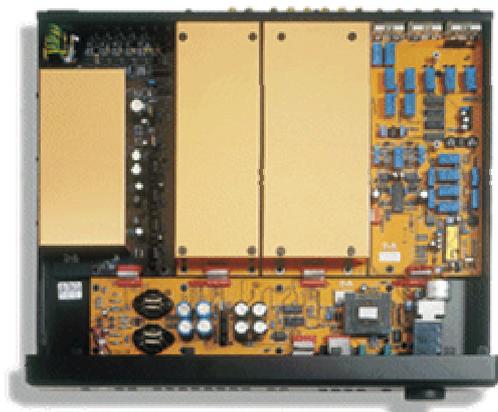


## Digital pre-amplifier - PULSAR PD 1200 R



The **PD 1200 R** is a digital pre-amplifier to which four digital and four analogue source devices can be connected. The unit's ability to accept two digital recording devices as well as an analogue recorder provides a convenient means of copying any digital and analogue recorded material. As an option the **PD 1200 R** can be fitted with a digital or an analogue output module. The digital output module is used to connect the **PD 1200 R** directly to digital loudspeakers, while the analogue output module is required if you wish to connect a power amplifier to it. In this configuration the **PD 1200 R** is capable of linearising the entire Hi-Fi chain in the listening room. The **PD 1200 R** is largely of modular construction; with an eye to maximum flexibility and a future-proof upgrade path, the input and output modules and even the control software are easily replaceable, giving the user an easy means of keeping up with future standards as they develop.



Internal view of the **PD 1200 R**

### Connection elements



<b>GND</b>	The ground lead from an analogue disc player is connected here in order to avoid hum.
<b>AUX 3 Analogeingang</b>	General-purpose pre-amplifier input with an input sensitivity of 250 mV / 20 kΩ. If an <b>MM</b> or <b>MC</b> phono module is fitted then <b>AUX 3</b> is the phono input.
<b>2 Analogeingänge</b>	Pre-amplifier input for connecting a high-level signal source e.g. video recorder and tuner.
<b>TAPE 1 Analog</b>	Pre-amplifier input and output for connection to a machine with analogue recording and playback facilities (e.g. cassette deck).
<b>REC-Out Analog</b>	Unregulated output for analogue connection to a digital recording machine (DAT, AUX/D).
<b>TAPE 2 Digital</b>	Digital input and output for connection to a DAT recorder.
	Input for connection to a digital signal source, e.g. digital

<b>AUX 1 Digital</b>	tuner.
<b>AUX 2 Digital</b>	Digital input and output for connection to a further digital machine with recording and playback facilities (e.g. DCC).
<b>CD</b>	Input for connection to the digital output of a CD mechanism.
<b>2 Digitalausgänge</b>	Digital output for connection to digital loudspeakers.
<b>2 Digital ST-LWL</b>	Optional optical digital output for <u>optical cable</u>
<b>CTRL</b>	Remote control output for digital loudspeakers which do not meet the <b>TA/DIF</b> norm.
<b>RC IN (E2000)</b>	Input socket for the <b>E 2000</b> remote control receiver.
<b>RC Out</b>	The remote control signals are transferred to the source devices via the remote control leads <b>RZ 001</b> , which are plugged into the <b>RC-OUT</b> sockets.
<b>Digital Link</b>	Optional optical digital input for optical cable

### ***Digital input moduls:***

The digital input module features four separate inputs, each of which takes the form of a 75 Ohm co-axial input and an additional TOSLINK optical cable input. One of the digital inputs can be converted into an input for high-quality mono-mode ST optical cable by fitting the ST optical cable module available as an accessory. The digital input data is re-synchronised in the **PD 1200 R** by means of a high-precision quartz PLL circuit. This eliminates timing inaccuracies (e.g. jitter) which can damage sound quality. If the timing pulse provided by the source device deviates significantly from the nominal value, a digital sample rate converter (SRC) is automatically switched in. This technology ensures that even low-quality digital signals with all manner of timing deviations and fluctuations can be brought up to the highest level of precision required for studio equipment (Level 1, high accuracy = 50 ppm timing accuracy). In this respect the **PD 1200 R** achieves superb values: absolute timing deviation < 10 ppm, jitter of the internal PLL < 20 pico-seconds. These values represent the limits of what is currently possible, and the **PD 1200 R** raises the reproduction quality of digital sources - the one crucial factor - to a level which cannot be exceeded at present. For comparison purposes: the norms state that the standard tolerance for digital machines is only +/- 1000 ppm. The signal from the selected digital input is passed to the two digital recording outputs (DAT Record Out, AUX/D Record Out) for transfer to DAT, DCC, CDR or MD.

### ***Analog input module:***

Up to four analogue source devices can be connected to the analogue input module. Where necessary an analogue input (AUX / A) can be converted into an input for MM or MC pick-up systems by fitting a plug-in phono pre-amplifier. The analogue sources are selected using high-quality gas-tight encapsulated gold-contact relays and then brought up to the optimum level for the professional studio A/D converter. The gain control is micro-processor based and is extremely accurate. Signal levels are also regulated using gold-contact relays instead of low-cost electronic adjustors.

The input signal level can be adjusted separately for each source to ensure that each source device is perfectly matched to the A/D converter. The inputs are calibrated automatically, and the calibration procedure can be repeated at any time by pressing a button. The "margin" adjustor on the front panel provides a means of varying the overload

reserve (headroom) of the A/D converter within the range 10 ... 0 dB. This allows the user to fine-tune the converter to his or her personal preferences: for minimum residual hiss (margin = 0 dB / right-hand stop), to maximum overload headroom to cope with brief signal peaks (margin = 10 dB / left-hand stop) or any value between these two extremes. The input level is constantly monitored, and overload conditions are reliably detected and indicated. An analogue recording output (Tape Out) is provided to allow the recording of digital sources with analogue recorders. To ensure that analogue recordings of the best possible quality are obtained, a separate high-quality 20-bit Sigma/Delta D/A converter (DAC7) is used to provide the essential D/A conversion.

#### ***Digital output module:***

In the digital output module the audio data and the control data are processed together according to the TA/DIF norm (see glossary) and encoded with the help of a studio encoder. The data is re-synchronised with the high-purity master timing signal of the quartz PLL before it leaves the machine. The co-axial outputs are fed by a very fast counter-pulse control system using a ring core signal repeater; this technique ensures optimum cable matching and perfect square-wave output signals. In addition to the optical TOSLINK outputs provided as standard, one or two optional mono-mode ST optical cable outputs can be fitted at any time.

**Important note:** the outputs of the digital output module are designed to control digital loudspeakers corresponding to the TA/DIF norm (see glossary). This standard is largely compatible with the SP/DIF norm which is in widespread use. This means that virtually all digital audio units can be connected to the digital outputs without causing problems. However, the SCMS copy protect function - to prevent unauthorised digital copies - is not supported by the TA/DIF interface.

#### ***Analogue output module:***

The analogue output module is responsible for the actual digital signal processing, and the subsequent conversion of the digital signal into analogue form. The signal processing is carried out by a high-performance DSP (digital signal processor), which incorporates the digital tone control system and switchable oversampling filters. When the listening room calibration process has been completed, it is the DSP which carries out the sophisticated room correction. The digital signals are converted into analogue form in the following D/A converters. The converters used in this unit are professional studio converters working with a resolution of 24 bits and a frequency of 192 kHz. One stereo converter is used for each channel, and this feature together with the refined circuit design guarantees minimal noise and best possible sound. The volume control takes the form of a series of high-quality gold-contact relays which are encapsulated in a gas-tight shell, designed to avoid the usual drawbacks of digital volume controls such as dynamic losses, increased harmonic distortion etc.

## **Specifications**

### ***Analogue input module***

*Number analogue inputs (high-level)* 4, one high-level optionally available for

conversion to Phono MM or MC input

**A / D – converter**

<i>Type / resolution</i>	Sigma / Delta, 20-bit
<i>Sampling rate</i>	44,1 kHz or 48 kHz
<i>Frequency response</i>	2 Hz – 22 kHz
<i>Signal: noise ratio (A-weighted)</i>	> 108 dB / > 110 dB
<i>Total harmonic distortion</i>	< 0,002 %
<i>Record output (analogue)</i>	1 Veff / 100 Ohms
<i>Record D/A converter</i>	Sigma/Delta, 20-bit resolution

**Digital input module**

<i>Number digital inputs</i>	4, one digital input optionally convertible to optical input
<i>Dzsmfstf</i>	SP/DIF, co-axial and optical
<i>Record output (digital)</i>	SP/DIF, 2 x co-axial and optical
<i>Record output (analogue)</i>	1 Veff / 100 Ohms

**Digital output module**

<i>Co-axial</i>	<u>TA/DIF</u> , 0,5 V / 75 Ohms
<i>Optical</i>	<u>TA/DIF</u> , <u>TOS-Link</u> Peak output
<i>optical output</i>	Optional

**Analogue output module**

<i>D / A converter</i>	Double differential Sigma/Delta 24 Bit / 192 kHz
<i>Oversampling</i>	8-times with 2 selectable filters, can be updated
<i>Room correction processor</i>	56-bit signal processor
<i>Frequency response</i>	1 Hz – 22 kHz
<i>Signal: noise ratio (A-weighted)</i>	> 111 dB
<i>Signal: noise ratio (unweighted)</i>	> 106 dB
<i>Effective system dynamics</i>	> 100 dB
<i>Total harmonic distortion</i>	< 0,0015 %
<i>Channel separation</i>	> 106 dB
<i>Volume control</i>	Analogue, gold-contact relays
<i>Tone controls</i>	Fully digital
<i>Mains supply 110 V or 220/240 V / 50 Hz</i>	30 VA
<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

We reserve the right to alter technical specifications.