



## P 10-2 VALVE PRE-AMPLIFIER

The P 10-2 valve pre-amplifier is the most sophisticated unit in our series of high-end two-channel analogue equipment. Its no-compromise construction and the equally uncompromising sophistication of its circuit design elevate this pre-amplifier to the very highest level. Even from the outside, the arrangement of the valves clearly indicates the amplifier's totally symmetrical double mono layout. The signal paths are absolutely identical, as is the sound quality. The interior of the machine (see right page) confirms this beyond all doubt.

### ***Circuit concept***

The P 10-2's five valves per channel represent an extraordinary level of complexity. Why such complication? The answer is simple: we were not prepared to accept the quality of sound which was available in the 1950's. Modern high-resolution source devices, with their unprecedented bandwidth, dynamic characteristics and minimal harmonic distortion, are far more demanding than their predecessors. If we insist on maintaining the very highest standards in terms of sound quality and musicality, and if the pre-amplifier is not to become the limiting factor in the reproduction chain as far as sound quality is concerned, then simplistic electronic concepts are no longer acceptable. All the amplifying stages of the P 10-2 take the form of differential cascode amplifiers. This circuit design is responsible for the machine's extremely broad frequency bandwidth and excellent linearity. The amplifier valves are the "LPS" version (Long Plate / Spiral Filament) of the 12AX7, whose outstanding feature is particularly low distortion. The potential sound quality of these valves has already been proved in the D 10-2 and the front end of the V 10-2. In fact, the linearity and quality of the P 10-2's amplification stages are so high that we decided against including any form of negative feedback. Even though the classic negative feedback is entirely absent, the P 10-2's total harmonic distortion and frequency linearity values are excellent. The output stage is of fully symmetrical construction, and features both asymmetrical (Cinch) and symmetrical (XLR) signals. The excellent ECC99 high-current triode valve has proved its worth in the D 10-2, and we decided to use the same component for the P 10-2 as it enables us to achieve outstandingly low output impedances. The result is that it can drive active loudspeakers or output stages without any problem, even where long cables are required.

### ***Construction***

- Opto-electronic input select switch with magnetic detent.
- Two-stage volume control with ALPS precision quadruple potentiometer for minimum possible total harmonic distortion and optimum signal : to noise performance.

- Only the highest-quality components are used throughout, including mica capacitors, 1% metal film resistors and film capacitors.
- Socket for the superb PHE-MC and PHE-MM phono modules.
- Input stage with minimal-length signal paths and galvanic all-pole isolation of source devices.
- Low-impedance Cinch / RCA and XLR outputs for professional-standard connections, even with long cables.
- Case feet with integral shock absorbers.
- Compound case consisting of steel, machined aluminium and acrylic.

#### ***All-pole input section***

When the inputs are switched on the P 10-2, "all poles" are switched – i.e. the earth connection of the source device is switched in addition to the signal conductor. This is very complex to implement, but ensures that all source devices are galvanically isolated. At any one time only a single device – the one currently selected for listening – is connected to the amplifier. In conventional Hi-Fi systems earth currents are free to wander around between the individual components, and these can have a significant adverse effect on sound quality. The problem is solved completely by the allpole input selection system adopted for the T+A P 10-2. As with the V 10-2, the input switch is based on an extremely solid mechanical angular rotation device featuring a zero-wear opto-electronic sensor. This control, with its slop-free operation and accurate magnetic detents, gives a feeling of incredible solidity and precision.

#### ***Floating ground concept***

Balancing and interference currents, some of them significant, flow between the earth connections of Hi-Fi devices. These currents can result in unwanted dips in voltage at the connecting leads, and interference potential at the amplifier's input, either of which can have a perceptible adverse effect on the sound. We were determined to eliminate these unwanted effects in the P 10-2, and have adopted a solution which is entirely new in the field of audio equipment. The low-impedance earth connection can be isolated at the amplifier's inputs, and we employ differential amplifiers in the P 10-2's input instead of a conventional earth-related amplification circuit. This technology is used in ultra-sensitive laboratory measuring equipment, where it is known as a "floating ground" circuit. The important factor with this type of circuit is that the input stage must be able to cope well with high common mode voltages. However, this is precisely the point where, by their very nature, valves have an advantage over semi-conductors. Valves operate at high voltages – more than ten times higher than those used with transistors – and this makes them ideally suited to this purpose. Since this advantage applies to any source device, i.e. including those which do not feature XLR outputs, we consider this concept to be more flexible than the use of XLR inputs.

#### ***Mains power supplies, voltage supply***

Valve amplifiers place much more exacting demands on the mains power supply than conventional transistor units. The anodes of valves require high operating voltages – in our case more than 350 V – as well as high-current heating voltages. These requirements are very divergent, and for this reason the P 10-2 is fitted with separate, specialised mains sections. A shared basic feature of both mains power supplies is their layout as high-frequency flyback converters. This type of circuit effectively eliminates the low-frequency hum interference which is unavoidable with conventional mains transformers. For the heating circuit we use a D.C. voltage which is stabilised extremely accurately, and also features a “soft-start”. This feature also prevents feedback hum, and avoids premature valve failure, as they are heated gently and always operate at the optimum heating voltage, regardless of fluctuations in the mains voltage. The overall result is an extended effective life of the delicate amplifier valves. A micro-processor constantly monitors the entire system. The anode voltage is also stabilised electronically with great accuracy. The slightest residual interference to the anode voltages is eliminated by the use of separate passive filter circuits for each channel, and reservoir capacitors of extreme dimensions (20000 F/450 V).



### ***Specifications***

	Double-mono valve pre-amplifier of fully symmetrical construction
<i>Frequency response :</i>	0,1 Hz – 250 kHz (+0/-3dB)
<i>Total harmonic distortion</i>	< 0,01 %
<i>Amplification</i>	3,5 times
<i>Volume control range</i>	0 ... 90 dB
<i>max. channel deviation at -60 dB</i>	< 0,2 dB
<i>Volume control</i>	4-fach ALPS-precision potentiometer RS 232 control interface, TASI surround interface
<i>High-level-inputs</i>	
<i>Input impedance</i>	20 kOhms
<i>Max input voltage</i>	6 eff AUX1, AUX2, AUX/PH, TUNER, DISC, RECORDER IN AUX/PH can be upgraded with the PHE MM or PHE MC phono module; switchable "floating ground"
<i>Outputs</i>	
<i>Output impedance</i>	< 150 Ohms
<i>Balanced</i>	

<i>Unbalanced</i>	Four-pin XLR with control voltage (three-pin optional)
<i>Headphones</i>	Cinch, Tape out 32 - 600 Ohms
<i>Valves per channel</i>	1 x 12AX7 LPS (double triode) 2 x 12AT7 (double triode) 2 x ECC 99 (double triode) mounted in ceramic sockets
<i>Control interface</i>	R-Link
<i>Remote control handset</i>	F 10 included
<i>Dimensions (H x W x D)</i>	17 x 44 x 39 cm
<i>Weigh:</i>	10 kg
<i>Finishes</i>	Silver aluminium, Titanium acrylic glass alternatively in grey or blue
<i>Technical modifications reserved</i>	

center