

Pro C 28

Digital FIR Controller



The Pro C 28 digital stereo 4-way controller was developed especially as a **studio controller**. It is superbly flexible, and features audio technology of the highest standard. The equipment's overall concept, featuring FIR filter technology for phase frequency equalization and distortion correction, allows for perfectly linear phase reproduction in the listening environment. Its excellent audio qualities make the Pro C 28 an exceptional universal EQ and delay, for use in, for example, mastering purposes.

- Two-channel 4-way digital loudspeaker controller
- FIR filters for independent amplitude and phase equalization
- 10 full parametric stereo EQ bands with IIR digital filter section
- Room EQ with IIR filter technology
- 32 separate limiters for peak, RMS, thermo and excursion control
- 19" 2U rack mount unit
- Important settings are set automatically using stored parameter setup
- All settings, including parameter setup, can be stored

Wide range of applications:

Studio controller with speaker-specific parameter setups

- Upgrade for analog Klein + Hummel monitors (e.g. O 300 D)
- "Speaker specific": parameter setup is individually optimized for each monitor
- Previously unattainable loudspeaker equalization
- Room and positioning equalization can also be incorporated
- Simple connection between monitors using multicore cables (CMK 5)
- System extension with additional subwoofer(s)
- Subwoofer incorporated into parameter setup
- Comfortable setting options for delay and phase alignment

Room equalization

- Simple linearization of magnitude response using parametric IIR-EQ

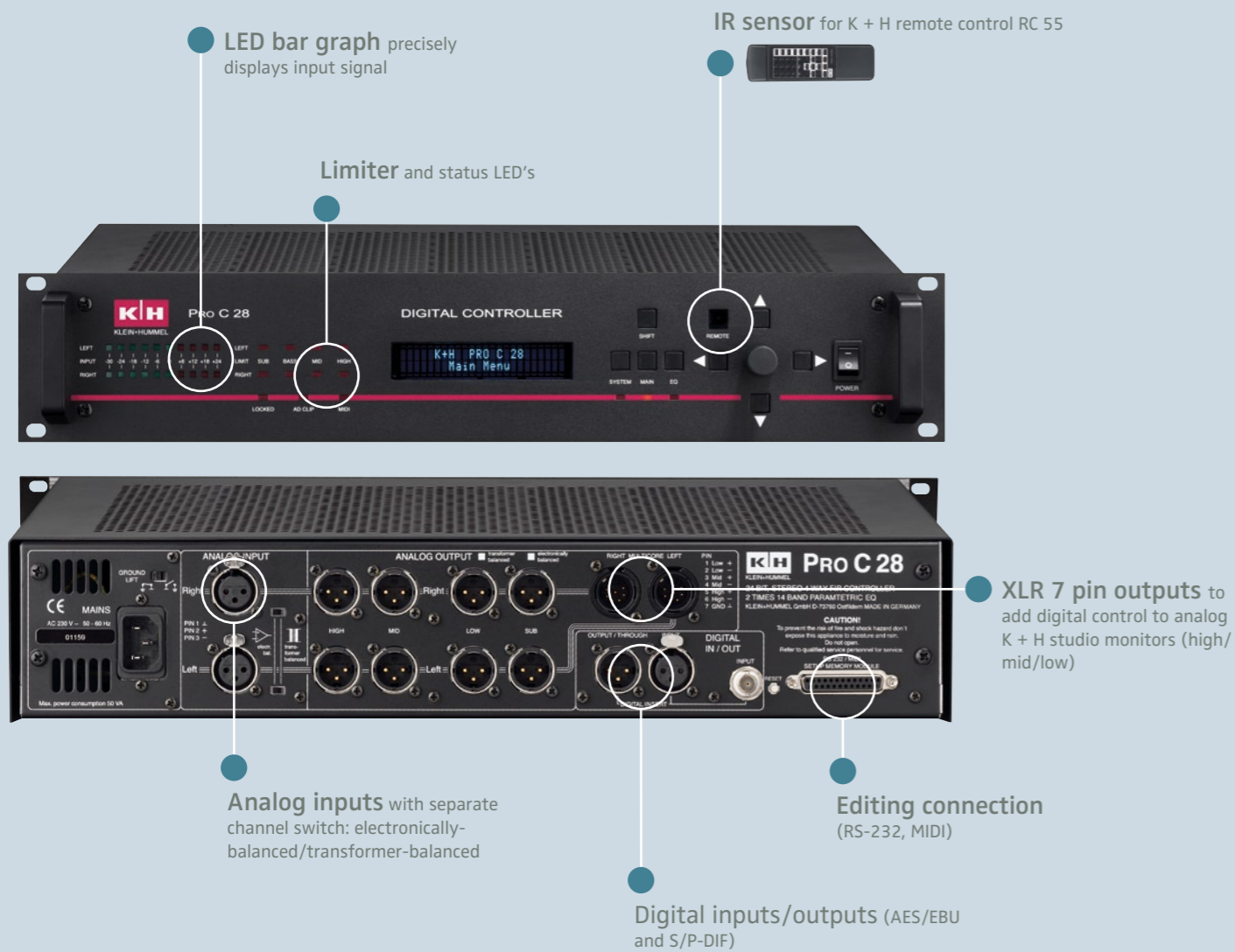
One-way full range operation

- High-end digital EQ with delay and limiters in one unit
 - ▶ Equalization of non Klein + Hummel monitors
 - ▶ Linear-phased equalization using FIR filter

Extensive limiter concept with 32 limiters

- Digital peak limiter with look-ahead technology for each channel
 - ▶ Power amplifier clipping prevented
- Digital thermo-limiter with long attack time constant for each channel
 - ▶ Attack time adjusted to thermal conditions
 - ▶ Prevention of thermal loudspeaker damage

- Limiter settings are included in parameter setup



Pro C 28 Digital FIR-Controller

Cutting-edge audio technology

- Low distortion electronic or transformer balanced analog inputs
- 2 stacked Delta-Sigma A/D converters per channel providing more than 130 dB dynamic range
- 48-bit digital signal processing
- High-quality Delta-Sigma D/A converters
- Moderate low pass filtering after DA conversion guarantees a "musical" sound stage
- Comprehensive power supply with double voltage regulation for each channel
- Numerous connection options for analog and digital signals
- High-quality input channel can be switched to analog

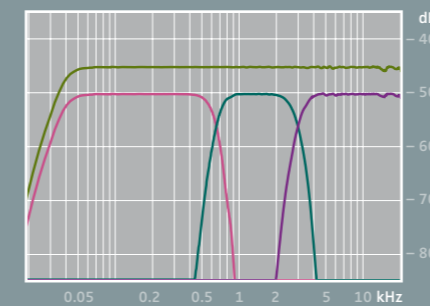
Comfortable operation

- Attractive Blue Vacuum Fluorescent Display (VFD) shows all settings
- Simple 3-level shallow menu structure accessible from the front panel
- Optional Klein + Hummel RC 55 remote control
- PC compatible RS-232 port
- Connection of several units for synchronized operation using internal MIDI port (in, out, thru)
- Internal memory can store over 70 different parameter setups
- Switch between parameter setups during use
- All settings can be stored inside the hardware memory
- Switching between setups possible using remote control

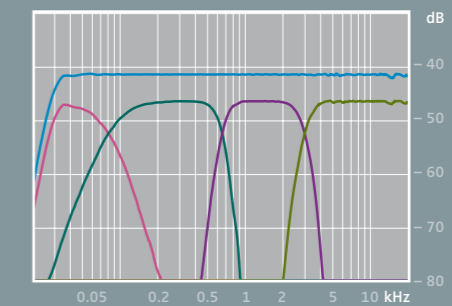
Distortion control using FIR filters offers numerous advantages compared to conventional analog and typical digital loudspeaker controllers. The Pro C 28 offers FIR filters that allow for the independent adjustment of the magnitude and phase of the loudspeaker's frequency response. This also permits crossover parameter adjustment which would otherwise be impossible to achieve without introducing significant distortions and phase shifts in the audio signal. In addition to conventional phase non-linear IIR filters, the Pro C 28 is equipped with phase linear FIR filter designs which correct the magnitude and phase of each driver signal. This provides a linear phase response throughout the entire signal chain, from the input signal to the acoustical reproduction.

The advantages of FIR filtering versus conventional systems:

- Significantly more precise and distortion-free frequency correction
 - ▶ Improved pair matching of stereo loudspeaker systems leading to vastly improved stereo imaging
- Improvement of phase response
- Excellent impulse reproduction with improved attack and decay time
- Significantly improved crossover slope, up to 92 dB/oct., leading to reduced driver interaction and lower distortion

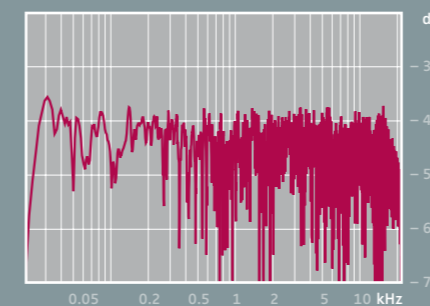


O 300 D equalized by Pro C 28:
Individual 3-way and combined responses

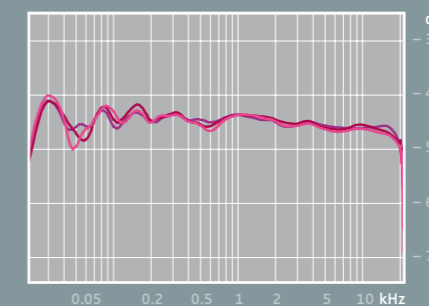


O 300 D + Subwoofer O 800 equalized by Pro C 28: Individual 3-way and combined responses

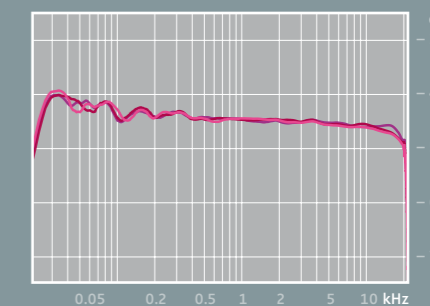
The Pro C 28 opens up totally new possibilities to adapt the loudspeaker system to its environment. In contrast to parametric or graphic equalizers, which lead to linear phasing irregularities, the installation of a Pro C 28 is a different process. After the loudspeaker system has been installed and connected in the listening room, measurements are taken at the console and around the listening area. This information is then processed to make a curve, which is used to design appropriate equalization. After this new "room-specific" setup is activated, the Pro C 28's FIR and IIR filters take over the loudspeaker's equalization.



Frequency response of a studio monitor at the console



Spatially averaged 3 front channel responses taken from 10 separate measurement points in the room



Frequency response of the 3 front monitors after activation of the room specific FIR filtering