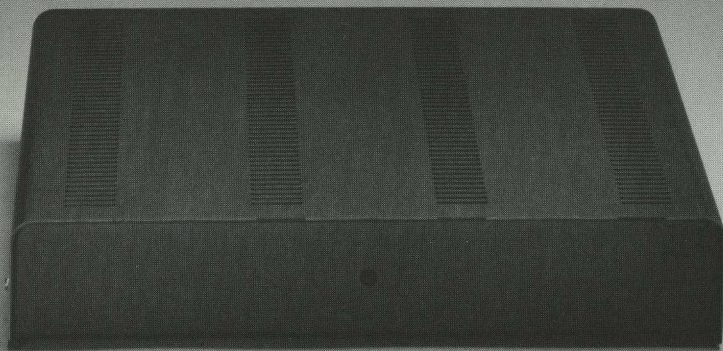




KRELL Digital SBP-64X Software-based Digital Signal Processor

Our SBP-64X digital processor provides a new listening experience — extremely high-resolution analog reproduction of digital recordings across the entire sound spectrum.



The sound quality achieved from analog recording has always been the standard by which all sound reproduction has been measured. However, compact discs have shown great potential in the storage and retrieval of digitized analog signals. Because of design compromises in both silicone-based processing and the analog output stage of processors available heretofore, this potential has not been fully realized.

Now the KRELL SBP-64X Software-Based Digital Processor (SBP-64X) offers effective solutions to the problems that spawned those compromises. The SBP-64X maximizes accurate information retrieval of the digital signal source without amplifying undesirable sound components. The result is a digital processor that works with any compact disc player to provide pure, uncolored sound that is faithful to the original recording. This, coupled with transient response unmatched by any available reproducing media, provides a spatial realism heretofore unattainable.

Four Motorola DSP-56001 Digital Signal Processors (two per channel) provide the more than sixty million computations per second necessary to execute KDI's proprietary software algorithms. These algorithms fully utilize the computational capability afforded by the DSP-56001's 24-bit wide data path and 56-bit accumulators to provide a true 18-bit, 64 times oversampling of the input digital data stream. The 24-bit coefficient data and 56-bit accumulator allow computational accuracy exceeding 300 db.

The accuracy afforded by the DSP-56001 allows computation to proceed with no intermediate scaling of results and without the requirement to artificially dither the signal in an effort to compensate for the decreased signal-to-noise ratio resulting from the scaling of partial results.

Synchronization of all events is provided by nine high-density Programmable Logic Devices (PLDs). These PLDs incorporate much of KDI's proprietary logic and provide complete control of the SBP-64X. By implementing this control in PLDs, upgradability to a full 24-bit system (as DAC technology advances) is facilitated.

The four DSP-56001s provide 18-bit data to Burr-Brown PCM-64 18-bit digital to analog converters (one per channel) at the rate of one sample per channel every 354 nanoseconds (354×10^{-9}). These time-synchronous data samples are converted by the PCM-64s to a current output which is then converted to an accurate voltage representation by KDI's discrete current-to-voltage converters. Following the current-to-voltage conversion, KDI's proprietary de-glitch circuit removes any PCM-64 glitch energy prior to supplying the voltage to KDI's discrete balanced output stage.

Modular System Design

The SBP-64X is completely modular in all aspects of its design.

Three completely separate toroidal power supplies provide the secondary voltages necessary for the SBP-64X's five double-regulated power supplies.

The power supplies provide individual power for the digital circuits, DAC circuits, and analog output stage. These supplies have been designed to provide a high degree of regulation while minimizing the noise that can be generated by regulated supplies. All power supplies are conservatively rated to provide efficient, reliable operation.

Two completely separate power cables are provided to power the main processor chassis. One cable transports the power for the analog and DAC circuits and the second cable transports the power for the digital circuits. The use of separate cables further reduces the chance of digital noise generated in the digital processing circuits being coupled over into the DAC and analog circuits.

The digital circuits are contained on their own separate six-layer, glass printed circuit board. This board has been designed to minimize the typical noise radiation that can be caused by digital circuits operating at high clock rates. The digital board has a separate power connector from the power supply. It connects to the analog board via custom DIN connectors that are sealed to provide long, trouble-free service. It is a simple matter to remove the board for service or for a factory update. Hand wiring and the use of connecting wire has been held to an absolute minimum. This helps insure that all interconnections will be as short and as controlled as possible.

The software on the digital board is contained in four (two per channel) socketed PROM chips. These PROMS can easily be changed by the user to facilitate easy software upgrades.

The digital circuits have been designed to eliminate the problems associated with the serial data stream as it comes off of the compact disc itself. The left and right signals are properly aligned so that the typical 11 microsecond delay usually encountered in most players is eliminated.

The analog board is a high quality glass printed circuit board. This board contains the DACs, current-to-voltage converters, de-emphasis and de-glitch circuits and the balanced output stages. All circuits in the signal path are discrete and proprietary to KRELL. Both single-ended and balanced analog outputs are low impedance and capable of driving long cables and the high level inputs of any preamp.

Sound Quality

The sound of digitally-stored music played through the SBP-64X can best be described in two words: addictive and seductive.

Digitally-stored music that in the past could not be played on even the finest systems now becomes listenable. All aberrations associated with both ends of the sonic spectrum disappear and the desire is present to listen to even more digitally-stored music. Over time and continued listening, the objections that music lovers have had to the digital medium become minimized.

The final result of these design features, and others not covered here, is a new standard of sonic quality for the playback of compact discs and other digitally-recorded music. The benefits extend to every important aspect of music reproduction. Most important, qualities thought to be missing completely from digitally-recorded music are now revealed to be intact: image resolution in all three dimensions, fine spatial detail between instruments, consistent tonal and spatial presentation at all signal levels, and natural tonal quality in all frequency ranges and at all signal levels. Ultimately, the SBP-64X delivers an accuracy that is not available by any other means. The SBP-64X represents the coming of age of digitally-recorded music as the new and future reference standard.



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