Equipment profiles

Lirpa Model 5 Kg Tonearm and Cartridge

Manufacturer's Specifications
Tonearm
Length: 15 in.
Mass: 11 lbs.
Resonance: –20 Hz (hill-and-dale recording, nonexistent on others).
Tracking Force Range: 500 to 2000 g, 501 to 2001 with anti-skating compensator (simplistically known as a penny).
Cueing: If the spirit moves you.
Damping: One Gabriel shock.

Cartridge
Type: Moving mica.
Frequency Response: Some.
S/N: Infinite.
THD: Do bees buzz?
How Much: Enough.
CD-4: No.
Stereo: No.
Mono: Only up to five playings.
Stylus Shape: Quite pointy.
Price: Best offer.

At a point when most cartridge and tonearm manufacturers are trying to cut down on tracking weight, Lirpa Labs (made famous by its fight for the mono reproduction) has taken a radically different approach and introduced a combo that tracks between 0.5 and 2 kilo (that's right, kilo) grams.

Prof. I. Lirpa's thinking (questionable thinking, I might add) behind this is that recording velocities will eventually exceed the vertical tracking force of today's super-light tracking tonearms and cartridges. To prevent such a catastrophe the Lirpa engineers have designed a tonearm and cartridge combination that tracks at a level far greater than the velocities of even the most heavily modulated direct-to-disc recordings.

Aside from being a radical departure from the usual tracking force settings, the Lirpa Model 5 Kg is unlike any other modern tonearm (that we know of) in appearance. The tonearm itself is basically a long, bending, tapering cylinder. At its base it is slightly more than two inches in diameter. About one-and-a-half inches up it bends at a sharp 90-degree angle to form the actual "arm." This horizontal section of the tonearm continues for approximately five inches, bends to a 45-degree angle, and then continues for another one-and-a-half inches. By this point the arm has tapered to less than one inch in diameter.

The cartridge fitting is one of the most fascinating aspects of the unit. Instead of the almost ubiquitous sockets and electrical contacts, the Lirpa Model 5 Kg merely has a hole (honest). No contacts, no nothing.

The unusual cartridge fitting could be for two reasons. First, the Lirpa engineers may have discovered a more accurate way of transmitting the output of the cartridge, although this reviewer has doubts about this possibility. When one considers the track record of Lirpa Labs (none whatsoever) and the unusual exploits of Prof. I. Lirpa (i.e. returning to mono), one can begin to understand my conviction. I believe that the Lirpa engineers simply wanted to make the Model 5 Kg incompatible with all present systems. Needless to say, they succeeded.

Probably far more unusual than any of the above mentioned peculiarities is what seems to have grown out of the back of this tonearm. It closely resembles the proverbial horn-of-plenty except it has a hole at the base. When we opened the carton in which the tonearm was shipped, we were tempted to discard the horn thinking it was a promois placed in the parity bit (similarly for odd parity). One thus must add one extra bit to the code (this means using up more space, getting less out of the space you have); for our earlier example of a six-bit code to represent 33, we would have to accept 7-bit code.

For example, suppose the data were 111001, then the code with detection capabilities is 1110010; if the data were 111000, then we have 1110001. (Note that the parity bit is the last bit; this bit must not be considered when we use the 2^n expansion described above). The detection would work as follows. Assume that the stylus of a fully digital audio system (as the one to be introduced by Philips) picked up the sequence 1110000 and passed it along to a CPU for conversion, etc. But the computer, on checking the parity bit (adding up all the 1s in the word) would have noticed that an intrinsic error existed since in even parity the sum of 1s must always be even. Thus the CPU could instruct a re-read, etc.

The 1-bit parity approach allows the detection of only 1-bit flip, or 3-bit flips, etc., but could not guard against 2-bit flips. Assume that the original word was 1100110, then if the CPU sees 0100110, it knows we have an error (1 flip). If it sees 0010110, it reaches the same conclusion (3 flips). But if it sees 0000110, it can't tell. This is not a flaw in the system, it is only the degree of checking you get for the price (of adding a single bit). If we assume statistical independence among the bits (this is not always a good assumption), the probability that this technique will fail to detect an error is better than one in 10 million. For its simplicity, this scheme produces remarkably good results, and this is why it is frequently used.

Figure 10 also depicts block parity bits; this is obtained by calling n words a block (n = 4 in this case) and then counting the number of 1s vertically and horizontally; this is why these schemes are also called horizontal and vertical parity checks.

This scheme also allows the correction part (if only one bit becomes corrupted). Assume that the bit marked * had flipped but we didn't know it yet. The third horizontal check indicates an error somewhere in the third word; the second vertical check indicates an error in the second column; it is now possible to achieve the correction.

In general, one can obtain any degree of protection by paying the appropriate price in bits. For example, we can leave two bits of the end of each word and obtain the sum of 1s modulo 3; this is either 0, 1, or 2 (thus two bits since 2 = 10). Here we have more protection.

Next month we'll start with a look at signal processing techniques and how they have been applied to speech for telephone transmission.

References

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