

MEASURING TURNTABLES

By Gary Galo, Regular Contributor

KAB Speed Strobe Turntable Speed Tester

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List price: \$99.95

HIFI4Music DIGIS strobo Ultra Systems

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List price: \$159.95

DIGISTROBO

HIFI4Music is a small audio company based in Italy whose products are distributed in the US by Ultra Systems. DIGIS trobo is a hand-held device with a digital readout for measuring turntable speed (Photo 1). The DIGIS trobo measures turntable speed by reading the reflection off a piece of reflective tape once per revolution. The device is supplied with a 3½" disc with one piece of tape attached. You can also attach a short length of the tape to your own turntable platter—a 6" piece that you can cut to the desired length is also supplied.

To operate the DIGIS trobo, simply press the side button and point the red light beam at the revolving reflective tape. After reading multiple rotations, the memory switch on the side of the device will toggle the last speed measured, followed by the maximum and minimum speeds. The manufacturer claims that "This should give you

a sense of the wow and flutter you are experiencing."

I beg to disagree! Measuring wow and flutter is a far more complex process than measuring once-around variations in speed, as any turntable designer will tell you. The DIGIS trobo will give you an idea of once-around changes in speed over time, but it *will not* measure wow and flutter. Wow and flutter measurements require sophisticated test equipment costing far more than the DIGIS trobo.

In theory, digital readout would seem to be the best way to measure turntable speed. Unfortunately, the DIGIS trobo's resolution is only 0.1-rpm, which prevents it from accurately measuring two of the most common turntable speeds: 33.33 and 78.26-rpm. When I try to measure 33.33, the DIGIS trobo has a habit of wandering back and forth between 33.3 and 33.4. You also must hold the device absolutely still in order to obtain the most accurate readout. If you aren't steady, you'll have difficulty obtaining repeatable measurements. I disagree with the manufacturer's claim that "HIFI4Music's DIGIS trobo measures the actual speed of the platter at any moment in all its decimal variations."

I also find that a digital readout that makes only one measurement per revolution renders adjustment of turntable speed difficult and time consuming. That, combined with the fact that you never know exactly where you are between 33.3 and 33.4, or 78.2 and 78.3, means that you can never be sure of the exact speed of your turntable. The manual notes that "a variation of around 0.1%-0.5% is acceptable therefore a measurement fluctuating from 33.1 and 33.5 rpm (for example) would not indicate any problem" (sic). The manual is

describing these variations as "wow and flutter," but whether they really mean wow and flutter or steady-state errors, I again disagree.

A turntable operating at *steady-state speed* of 33.5-rpm is actually running 0.6% high. Ask any musically astute collector whether an error of 0.6% is of no consequence! A 78.26-rpm record being played 0.6% high is actually being played at nearly 79-rpm, which most pitch-sensitive collectors will find unacceptable. A once-around wow of 0.6% could make for less than pleasant listening.

KAB SPEEDSTROBE

KAB is a familiar company to *audioXpress* readers—I reviewed their excellent EQS MK12 Disc Remastering Preamplifier in the October 2002 issue. The EQS MK12 contains many interesting and unique design concepts, all the work of company owner and designer Kevin Barrett. The KAB SpeedStrobe is another unique product (Photo 2). Superficially, it looks like another strobe disc and AC



PHOTO 1: HIFI4Music's DIGIS trobo, distributed in the US by Ultra Systems. The device measures turntable speed by reading the reflection off a piece of reflective tape once per revolution. Unfortunately, the readout has only 0.1-rpm resolution, making precise reading of common speeds like 33.33 and 78.26-rpm impossible.

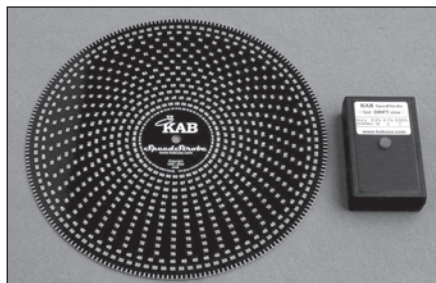


PHOTO 2: KAB's Speed Strobe takes old-fashioned strobe technology a step further by digitally generating a precise 60Hz light source independent of your power line frequency. The SpeedStrobe makes turntable adjustment extremely easy and accurate, and 78 collectors will find the 12 common "78-rpm" speeds extremely useful.

light source. But, Barrett has taken the concept a step beyond the typical turntable strobe.

The SpeedStrobe comes with a 10" PVC disc with circular markings for three standard turntable speeds—16.66, 33.33, and 45-rpm—plus a dozen for the most common “78-rpm” speeds. Most so-called “78s” were made at some speed in the ballpark of 78-rpm, and many discs made near the turn of the last century weren’t even close to the “nominal” speed. The twelve speeds chosen by KAB are 70.59, 72.00, 73.47, 75.00, 76.59, 78.26, 80.00, 81.82, 83.72, 85.71, 87.80, and 90.00-rpm. 76.60 and 75.00-rpm are the most common speeds for Victor acoustically recorded discs; Edison Diamond Discs were recorded at 80.00, as were many Columbia acoustics (Edison was much more conscientious about regulating recording speeds than Columbia).

Instead of the unlabeled circumferential markers found on most strobes, KAB prints the actual speeds (rounded off to whole numbers) on the strobe, in concentric circular rings, which makes identification of the speed you’re looking

for extremely easy. The only unmarked lines on the disc are for 16.66-rpm, but because they occupy the outer ring, they are easy to separate from the rest.

If KAB wanted to sell just another strobe, they could have stopped right there and let the user view the disc under any 60Hz AC light source. What makes the SpeedStrobe unique is its hand-held light source, a digitally generated, quartz-locked 60Hz oscillator accurate to 99.99% driving a bright red LED, powered by a standard 9V battery. The quartz-locked light source isn’t affected by variations in power line frequency, and will work anywhere, regardless of the turntable power source. There’s no need for separate 50Hz and 60Hz versions—the SpeedStrobe is a truly universal device.

As KAB points out, “Many Hi End turntables today still use hysteresis synchronous motors which rely on the line frequency to achieve accurate rotation. Using a conventional strobe to measure these turntables reveals a flaw: If the line frequency is low, the turntable will run slow, but so will the fluorescent light used to illuminate the strobe disc.

Result: the strobe may show the correct speed, even though it is wrong!” KAB is absolutely correct about this.

Operating the SpeedStrobe couldn’t be easier. Simply put the disc on the platter, power up your turntable, depress the red button on the hand-held light source, and point it toward the band that matches the desired speed. The large numbers on the disc and the bright LED make the SpeedStrobe extremely easy to read. In seconds you’ll know whether your turntable is running too fast (numbers moving slowly clockwise), too slow (numbers moving slowly counterclockwise), or dead on (numbers remaining stationary). You can tell how accurate your turntable speed is by timing the drift of the strobe display. If 10 digits pass a given point in 1 minute, the accuracy is 0.3%; 1 digit per minute is 0.03%. KAB correctly avoids calling this a “wow and flutter” measurement (in e-mail correspondence I had with Kevin Barrett, it was obvious that he has a well-grounded understanding of wow and flutter).

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The digital readout on the DIGIStrobo

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may be useful if you wish to know the exact speed of your turntable. Unfortunately, many nominal speeds require accuracy to 0.01-rpm, but the resolution of the DIGIS strobo is only 0.1-rpm. A serious 78-rpm collector must be able to measure speeds such as 78.26 and 76.59-rpm, which the DIGIS strobo can't do, and every LP collector needs to measure 33.33. In order to get a stable reading, you must hold the DIGIS strobo absolutely still. The SpeedStrobe isn't affected by movement of the light source.

I find it difficult to adjust turntable speed using the DIGIS strobo—the once-around measurement is too infrequent to allow quick adjustment of turntable speed, and the 0.1-rpm resolution is not sufficiently accurate. With the SpeedStrobe's continuous and easy-to-read display, you can adjust your turntable's speed very accurately in a matter of seconds. The DIGIS strobo won't measure wow and flutter, regardless of what the manufacturer tells you.

A digital readout of turntable speed may seem like the best approach. But sometimes the "old-fashioned way" still has its place. KAB has taken the "old-fashioned method" and laid it on a new ground by providing SpeedStrobe with an accurate, stable light source unaffected by changes in power line frequency. The KAB SpeedStrobe is my first choice—every collector of disc records should own one.

MANUFACTURER'S RESPONSE:

I'd like to thank Gary Galo and *aX* for reviewing the KAB SpeedStrobe turntable speed measuring product. All the main points were covered nicely. I would only add that one test that is easy to do and meaningful, if you have adjustable speed, is dialing in the effect of static stylus drag.

If the drive system lacks servo feedback, then any added drag will slow the table down. Some tables lose nearly 2% of free spinning speed the moment the needle touches the groove, only to recover full speed at the end of the record. So it behooves these owners to average the speed at the center of the disc. This can be done by placing a 45 rpm 7" disc on top of the KAB SpeedStrobe disc. Start the table and cue the needle into the start of the record.

Now set your speed. This will average the speed in the center so it will not be too slow at the beginning nor too fast at the end.

One correction in the text about the supplied strobe lamp. Strobe discs that rely on a fluorescent lamp are designed for 120Hz. That is because a gas lamp actually flashes on each half cycle. The KAB SpeedStrobe disc will not work under a fluorescent. I chose 60Hz illumination because it allowed for only half as many marks around the disc, and that freed up the space to use speed numbers instead of tick marks. Because of this we had to develop the dedicated illuminator.

The KAB SpeedStrobe is not new. It was introduced in 1994 and is very well known by audiophiles worldwide.

Kevin Barrett
President
KAB Electro-Acoustics

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