

are inaudible with 100 dB. of amplification. In other words the best turntable, like any piece of high fidelity equipment, is one you cannot hear.

The test for gross faults in an older phonograph is listening for obvious sounds that, like the ticking of a timebomb, say something is amiss and may soon get out of hand. Merely turn off the rest of your stereo and listen carefully to the spinning turntable. Any noise besides a faint hum from the motor — grinding, rasping or clicking — is too much.

Such noises indicate something is maladjusted or wearing out, like bearings in need of lubrication. That same mechanical noise easily finds its way through your amplifier to pollute whatever music you want to enjoy.

Although a good cleaning and lubrication can usually relieve such ailments, the doctor's bill from the repair shop may total \$25 to \$40, probably more than your little mechanical engineer's nightmare is worth.

The test is to listen through your complete system for the shortcomings of all record spinning devices, turntables and changers alike. These can be classified as either rumble, wow and flutter, or speed variations.

Essentially rumble is a minor earthquake, vertical movement of the record surface, arising from assorted sources.

An easy test can be conducted by switching your receiver to "mono" while listening to a good quality record pressing. When you flick the switch you cancel all vertical information your cartridge is picking up, including most rumble.

cated by merely guiding the arm with your finger across the arc it would trace on a record. Any resistance, particularly notchiness, is too much.

Arm geometry and mass problems can be found by ear. Since all tone arm deficiencies create tracking difficulties, they show up first as distortion on low frequency passages when using high compliance cartridges. If you don't know what to listen for, reduce tracking force below that which your cartridge's manufacturer recommends and play an unworn record. You should hear obvious mistracking and bass distortion. In quarter or half gram steps increase stylus pressure. As you do the problem should reduce. If it does not go away completely by the time you've reached the upper extent of the recommended tracking force, your cartridge/arm combination is far from optimum.

The best strategy is to replace the arm or arm/turntable combination because adding a lower compliance cartridge would be taking a big step backwards.

Judging the adequacy of a cartridge alone is a tricky business because there is no good home standard of comparison.

My recommended procedure begins by first checking your stylus for wear using the microscope most local hi-fi emporia reserve for that purpose.

Next, comparison shop for a cartridge with sound that pleases you. Try coercing your dealer into using the same model cartridge that you want to replace as the basis of the comparison. If you invade the store during a non-peak shopping hour (say 10 a.m.) you may be able to get a friendly salesman to mount your cartridge to use as the reference standard.

Then you can be absolutely sure of your comparison.

My listening test for tape units, be they open reel or cassette, is the simple A-B or source-to-tape comparison. If you hear any difference between a source and a recording of that source, your machine is simply not state of the art!

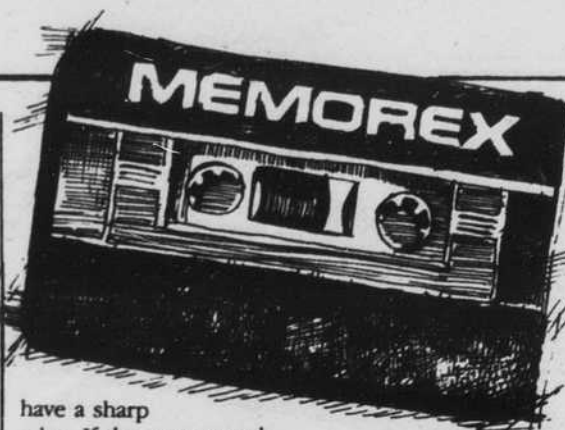
Although sorting a live performance from a tape may be an easy chore for anyone but Chuck Mangione and Ella Fitzgerald, most better cassette decks in top form make copies that are indistinguishable from an original broadcast or disc pressing at normal listening levels.

Make sure that your recorder is set up properly for the brand and type of tape you are using by adjusting the "bias" and "equalization" (or combined, all-in-one "tape") selector switches.

If you're too attached to deep-six your vintage recorder, you might boost its quality nearer acceptability by using premium "ferric" (low bias, 120 microsec.) tape.

Probably, though, an older machine is devoid of that high fidelity necessity, the ubiquitous Dolby (or other noise reduction system). When conducting the A-B comparison the need for Dolby becomes obvious because hiss is the primary pollution cassettes add to music. At moderate listening levels with Dolby on, you shouldn't hear any hissing tape noise—it should be as far or farther in the background as the background noises you expect from phonograph records.

Next in the comparison, concentrate on the sibilant in voices or cymbal crashes. In the original of what is being recorded, they will probably



have a sharp edge. If the copy sounds notably duller and distorted by a splashy, tearing sound, the tape is being saturated. Reduce the record level until the phenomenon goes away.

Now focus on the high end again. Note any change in its character between tape and original. There shouldn't be any.

Although open reel tape machines should easily pass the same no-difference A-B test that top-notch cassette recorders do, judging from the vast herd of 20-year old Webcor recorders I've encountered recently, most are unlikely to do so.

The big trouble with replacing your old receiver is disappointment. The quality of broadcasting does not match that of hi-fi gear (although there are a few superstations that justify having the best in home stereo).

While technology has improved so that now the average FM station can transmit tenths of a percent of distortion instead of the halves and full

points they did five years ago, that same technology has also pushed accuracy in the other direction. Stations can now broadcast with less dynamic range than ever before, they can distort frequency perspective with multiband processors so that every recording has essentially the same sound, and they can simply clip the hell out of the high end to squeeze the most and loudest signal under the 75 microsecond pre-emphasis curve.

Some improvements in receiver design can help, though, if you live in less than an optimum reception area. You can glom a larger chunk of the airwaves and find more listenable stations with the added sensitivity and selectivity of newer receivers. You can sort through multipath better with today's lower capture ratios. But don't expect miracles. The improvements on the order of a dB. or so may not be audible to you. In many cases a better antenna will be more effective than a new receiver in improving reception.

About the biggest advantage of a new receiver's radio section is improved tuning. Frequency synthesizer, crystal control, and phase-locked loop circuitry will eliminate distortion caused by improper dial adjusting.

The effects of the improved amplifier sections in new receivers is

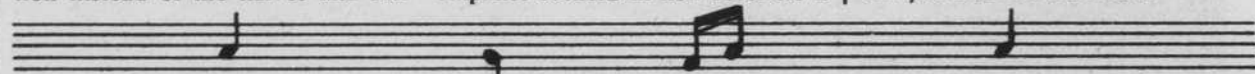
also a feast of subtleties. Most people will find that increased power (within reason) can do nought but help their stereo. But don't expect to blow down apartment walls with increased loudness. Twice the volume will take ten times the power—should your speakers even be able to handle it.

The biggest mistake most audiophiles make when considering the replacement of their speakers is listening to advice rather than the speakers. Every design variant sounds different. Your choice becomes an existential one, sorting between different realities.

The acoustic suspension speaker put high fidelity in a reasonable-sized box decades ago. Now mathematical formulae make what once was a mixture of art, black magic and luck into an entirely predictable affair, and our expectations have shrunk. In fact we now expect the tiniest boxes to give big bass.

Most old speakers don't wear out. Some may burn out, a few dry out and fall apart, but overall an old speaker is just as able a performer as it was when new. The time to change is when your taste and discernment changes and what you have begins to sound boomy, muffled, or just plain bad when compared to something you've heard elsewhere.

The most important question is the same one you should ask yourself when making any decision in stereo: Can you hear the difference?



The Big Beep

BY P. GREGORY SPRINGER

Since pre-Renaissance times, the wristwatch has been strapped onto arms to symbolize time, elegance, efficiency, gifts of adornment, and twenty years with the company. In the last half decade, modern technology has turned it into a whoopee gizmo.

The watch — and particularly my watch — now has a stopwatch to time yellow lights at the intersections, to notify me when I break jogging records, and most importantly has a miserable shrill beep which elevates me three feet in the air from the prone position every morning about 9 a.m. Other people's watches do even more musical things, like accidentally cranking out Brahms or "Love Story" at inopportune moments in the most artificial and nasal tones ever devised by man.

The singing watch tips the iceberg on a musical revolution which puts to shame the minor advances perpetrated by the recent so-called New Wave. Electronic musical instruments and compact recording and playback devices have already caused young ears to evolve in ways undreamed of in the Seventies. Our ears have accepted the beep replacing the electric buzz, the tone upsetting the tune, and synthetic sound squalling over any natural noise.

The Casio VL-Tone

The Casio VL-Tone VL-1 Electronic Musical Instrument and Calculator makes a kind of music which has been described as sounding like a frankfurter made of chicken parts. Yet, its capacity for creating songs reaches several sophisticated levels far beyond any other basic pseudo-instrument developed for non-musicians.

White, plastic, about a foot long and three inches high, the VL-Tone stuffs

into a vest pocket. Its keyboard of about 2-1/2 octaves has little plastic pegs of black and white, like any piano's, an L.E.D. read-out which flashes each note's numerical equivalent as it is played, ten special keys for the rhythm box, the tempo setting, the recording mode, reset, plus four switches to alter octaves, instrument sound, volume, and calculator function. The speaker is built right in.

VLSI, Very Large Scale Integrated Circuit, allows the VL-Tone to hold so much within so little a space, but the tool (I hesitate to call it an instrument) lacks a cute nickname, like the ocarina had, which may inhibit high school band directors from giving it any widespread acceptance. The range of musics which can be created is nonetheless quite various. For example, by setting the rhythm box to "swing," "rock-1," or "rock-2" (of 7 others, "bossanova" is too complicated, "rhumba" too defined, and "march" clearly too stultifying), the program mode then can be activated to record up to 100 notes of, say, "96 Tears" and stored in memory. Plug the VL-Tone into your stereo amp, and play the whole thing back at full volume without touching a button. Your neighbors will think Question Mark has returned from the beyond. If you rather haltingly recorded the tune the first time around, a feature called "One Key Play" allows you to re-record the song at any speed and syncopation you choose by pushing just one button instead of misfiring on the keyboard.

One can understand why avant-garde violinist Laurie Anderson is keen to write music especially for an orchestra of the little monsters. It's like having Kraftwerk condensed into a squashed cube much simpler than Rubik's to conquer.

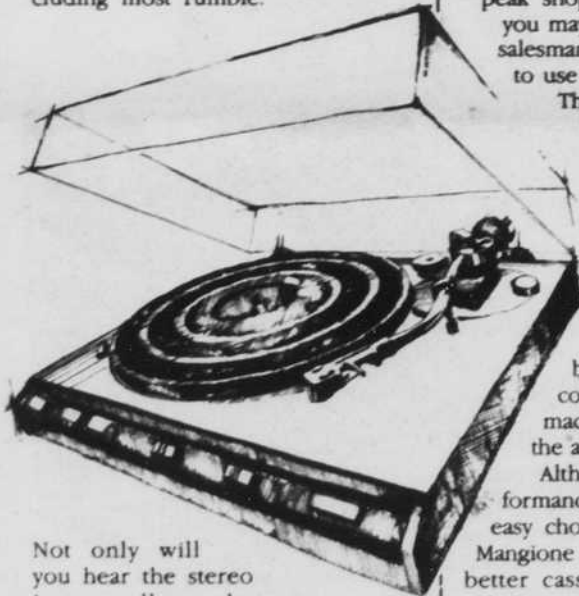
Beyond simple diddling-about possibilities, the VL-Tone drives relatives

crazy at family reunions. There are five instrument sound settings: piano plunk, fantasy (twilight zone synthesizer woo-woo), nose-hold violin, trilling flute, and amateur guitar. Aunt Hilda's proud rendition of "When the Saints..." can be played back in each sound, at any of nineteen different tempos. In addition, a feature called ADSR (Attack, Decay, Sustain, and Release) allows you to program the envelope of any sound so that one can actually create new possibilities for the electronic tone, no less than 80 million different ones. Then, "When the Saints..." comes out sounding like the wawa of Jimi Hendrix's ghost, or the piercing wail of a Haitian banshee, or a tuba, or whatever, all of course confined within the original chicken frankfurter quality sound.

The VL-Tone makes a superb toy, much advanced beyond the toy pianos of yesteryear. If all else fails, there's an orange emergency button on it which blurs out a "German Folk Tune," utilizing five different instrument sounds and four rhythms, making it appear that you can actually make the new technology work and have talent after all. They all laughed when you sat down to play the VL-Tone. Or, you can balance your bank book with the calculator.

The Realistic Synthesizer by Moog MG-1

For a few hundred dollars more, Radio Shack will give you all the authenticity of a funeral parlor organ right through your living room stereo. Unlike the VL-Tone, you must affix the MG-1 to your stereo or through your rock group's PA before any sounds come out of it. About the size of the Compact Edition of the Ox-



Not only will you hear the stereo image collapse, but you may hear a pervasive back ground sound vanish. (Should you use a mono record, if you can find one, the disappearance of rumble won't be confused by the change in stereo perspective.)

Wow and flutter are short term speed variations that are most apparent as changes in musical pitch or vibrato on sustained notes.

Any recording with an extended single note, such as the last sustained plunk of a piano piece, is an excellent flutter test. Pitch should be unwavering. Should you hear a tinge of vibrato, try another record to be sure.

Wow and long term speed variations, which sound similar to an off-center record, can be determined by the same test.

Of course the spinning platter is only part of the record playing system. Old tone arms not only impair fidelity, an inferior arm can also slowly ruin records. Typical aging tone arms may suffer from tight bearings, mechanical connections to trigger a trip cycle or just massive, battleship-style construction.

The grossest problems can be lo-