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Packburn Audio Noise-Reduction Devices

Transient and continuous noise suppressors. Dimensions: (Both models) 19"W by 6-3/4"H by 11"D, overall. Prices: Model 323 (Stereo/mono), \$2450; Model 103 (Stereo only), \$1800. MANUFACTURER: Packburn Electronics, PO Box 335, Dewitt, NY 13214.

The KLH TNE-7000A and DNF-1201A (both reviewed in recent issues) are probably, as of now, the Cadillacs of noise-reduction units. The Packburns are the Rolls Royces.

To a listener who is more into audio than music, it is pointless to explain why many record collectors (and music archives) treasure recordings that were made during the Paleozoic age of recording. Purist perfectionists may thus prefer to skip the rest of this report, because that's what it's all about: the gilding of sonic sow's ears. Readers with one foot in each camp -- audio and record collecting -- may skip this report only at the risk of passing up an opportunity of a lifetime: the opportunity to hear old discs the

way they could have sounded when brand-new, if not better.

Both of these devices use three kinds of noise reduction, which Packburn calls switching, blanking, and dynamic filtering. Dynamic filtering, used for the reduction of continuous high-frequency noise, employs a signal-controlled high-frequency cutoff to close down the treble range during quiet passages (when noise is most audible) and open it up during loud treble passages, when the signal tends to mask noise.

Packburn's dynamic noise filter differs from most in that it has two preset HF-cutoff controls: one determines the maximum bandwidth the system passes during the loudest passages, the other the minimum bandwidth it closes down to during the quietest passages. Both settings are made with continuously variable controls rather than switches, for precise adjustment. A front-panel switch also offers the option of a fixed high-end cutoff which can be preset to any frequency, from 3 kHz to wide open, by a separate continuous-range control.

And there's an additional feature. A knob marked "Control Dynamics" adjusts the speed with which the noise filter opens up in response to

between channels), the other continuously indicating the upper frequency limit of the dynamic noise filter.

Since the transient-noise-sensing circuits rely on ultrasonic energy, they are most effective when the input signal has no high-end rolloff. And since the Packburn has no phono preamp (designer Richard Burns feels others can design better phono preamps than he can), this means using a custom-modified preamp with no RIAA high-end rolloff. The requisite rolloff is then provided by the Packburn devices, one of which (the 103, stereo-only, model) has a two-position switch for Flat or RIAA, the other (the 323) having a 6-position switch to match most of the high-end rolloff characteristics that have ever been used.

You can modify your own preamp accordingly (or have someone else do it), or you can buy, through Packburn, a modified PS Audio Model IIA preamp which, besides the flat high end (switchable to RIAA rolloff if desired), also has a seven-position bass equalization switch that can EQ just about any recording's low-cut characteristic. (PS now has a much better preamp than the IIA -- the Model IV -- which we hope Packburn will adopt as their modified one.)

Actually, I'm not convinced that any solid-state preamp is the best choice for this application. There is so much completely spurious ultrasonic muck coming off old recordings

with the hiss from actual tapes and noisy FM broadcasts.

Of course, with all that going on, it MUST foul up the sound, right? Nope, it doesn't. It is possible to misadjust some of the Packburn's controls so as to produce some nasty effects, but correct adjustment eliminates this problem. With everything turned off but still in the signal path, there was a very, very slight loss of transparency and a slightly greater loss of depth, but complaining about that is rather like complaining about the scar after you're cured of skin cancer. No one in his right mind is going to use this for audiophile discs in good condition anyway. It's for those older or more brutalized discs whose surface condition makes them irritating or virtually impossible to listen to. It can, literally, give such discs a new lease on listening.

(most of their output above 8 kHz is garbage) that it would be better to use a preamp which rounds-off transients and produces minimal high-order harmonic distortion. This would imply a tubed preamp, and that is what I feel Packburn should have chosen. Nonetheless, the PS does a more-than-credible job.

So, how does it all work? Astonishingly well! The dynamic noise filter is even more effective (and unobtrusive in its action) than the KLH/Burwen DNF-1201 reviewed here by Bill Sommerwerck (Issue V-6). It removes virtually all hiss except the rushing variety which extends well down into the middle range, and has remarkably little detrimental effect on the signal. Like the KLH, it is most easily confused by material with strong transient attacks such as piano and harpsichord, whose attacks open up the high end and then die away almost instantly, exposing the hiss until such time as the filter clamps down again. This amount of time is perhaps 20 milliseconds; long enough to be noticeable, not long enough to be extremely irritating (though to some it might be).

But it's the Packburn's tick-suppressor that almost defies belief. Not only does it completely erase an estimated 95% of the small to medium sized surface ticks and pops, it also eradicates the most humongous bangs imaginable! As an experiment, we put on a cracked 78-rpm disc, put a book match under the trailing edge of the

We can understand why this device is so popular with recorded-music archivists. (Packburn will happily supply a list of professional users, for the edification of those who like to buy into esteemed company.) And while its price might seem to mark it as strictly professional, serious private record collectors might do well to ponder the present value of their record collection before dismissing something that will make practically all of those records a lot more enjoyable to listen to (and a lot more rewarding to copy on to tape).

Nothing can make a 1930's 78 sound like a Proprius, but if you're attracted by the idea of making those older recordings sound as good as they possibly can, there is no better choice at any price than a Packburn.

JGH

signal transients, to avoid dulling due to loss of transient attack. A front-panel LED flashes intermittently when that control is set so as to pass the transient information. Since the dynamic noise filter is located AFTER the transient noise suppressor, its transient "gate" cannot be triggered by disc-surface ticks and pops.

The transient noise suppression requires a stereo input signal, even from mono discs, because the switching process requires that each groove wall be separately examined for its noise content so that the device can choose for reproduction, on a moment-to-moment basis, the quieter of the two groove walls or the sum of the two. Thus, a stereo read-out of the mono record goes into the switcher and a mono signal emerges from it.

Noise transients common to both groove walls will not be suppressed by the switcher and, to cope with these, the signal output of the switcher is processed through a blanker, which clips the amplitude of each individual positive-going or negative-going pulsation of a noise transient whenever it exceeds a threshold value determined by the peak program level in the neighborhood of the transient.

The output of the blanker then goes to a treble equalization circuit and, finally, to the dynamic filter.

Model 103, designed for noise reduction from monophonic sources only, has one of each of the noise suppressors. In Model 323, which is for both mono and two-channel stereo, the switcher is bypassed when the MODE switch is in STEREO (as the switching process is not applicable to stereo records) and each channel is separately processed through its own blanker + treble equalizer + dynamic filter.

(With the permission of J. Gordon Holt, the above four paragraphs replace a portion of Stereophile's description of the principles of operation of the Packburn.)

NOTE: Regarding the cracked record test that Mr. Holt describes on the other side of this page: We make no claim that the Audio Noise Suppressor will *totally* eliminate *all* the noise caused by *every* crack, pit, gouge, dent or bump on a record. It depends largely on the width of the defect. The Audio Noise Suppressor *will* eliminate the high frequency content of such disturbances so that, although the crack, pit, gouge, dent or bump may still be audibly detectable, it will be as a low frequency thump which normally will not be painful to listen to. Those who are taping and seeking *total* elimination of such noises will still have to use the razor blade in such cases.

crack, to make it higher than the leading edge so that the stylus would encounter an upward step. We played it "straight," with the Packburn in-circuit but its suppressors switched out. Predictably, it produced the classic cracked-record bang with each revolution. Then we switched in

The cartridge must of course provide stereo outputs. (Otherwise, there can be no "difference" between left and right, and no vertical output when reproducing lateral modulation.) A front panel switch reverses the polarity (phase) of one input channel so that the device can be used with old vertically modulated discs.

The transient noise suppression is equally effective on mono or stereo discs. In mono, the two input channels from the cartridge are merely mixed together after the suppressor has done its thing, to further reduce surface noise and to minimize pinch-induced distortion.* In fact, the two Packburn models are essentially identical except that the stereo inputs are permanently combined in the model 103 and fed to a single dynamic-noise filter. The Model 323 has an extra Stereo position on the same switch that provides only lateral and vertical modes on the 103. Both units have three front-panel meters, two to monitor input signal level (which must be preset once and balanced

* Pinch effect was due to a narrowing of the groove whenever it curved sharply to one side or the other. The narrowing "pinched" the stylus tip between the groove walls, forcing it to ride upwards in the groove. This produces audible distortion from a vertically responsive cartridge (such as a stereo cartridge) unless the two channels are mixed (A + B) to eliminate the vertical output.

Pinch effect is of negligible importance with modern discs because of the narrower groove and because cutting styli are now shaped so as to minimize groove narrowing on sharp curves.

the tick suppression, and the noise was GONE! Every trace of it! Old discs whose surfaces sounded like frying bacon came out sounding like tape -- not particularly quiet tape, but tape nonetheless, rather than bacon. And the dynamic filter reduced even that to a much lower level, as

Phono Equipment for Old Records

Because 78-rpm discs are often severely warped, and rotate at high speed (increasing the frequency and intensity of warp signals), they are best played with a low-mass, moderate-compliance cartridge in a low-mass arm. If you care to optimize these parameters -- and you should take the trouble to -- the bass resonance should be set for around 30 Hz. (This is also ideal for mono LPs and most early stereo discs.)

A SMALL amount of tone-arm damping is also a help in preventing groove-hopping from warps. Anti-skate bias should also be available and easily adjustable in the arm, to help cope with those few discs which persist in skipping grooves (usually inwards). Outward skipping (repeating) can often be stopped by removing all bias (which exerts outward pull) and propping up the whole turntable at an angle so as to make the arm swing towards the spindle.

The amount of surface noise from any given old disc is often dramatically effected by the tip radius and shape of the stylus used. Pre-LP's, for example, were made for all sorts of different stylus sizes, and usually sound best with the proper stylus. Most microgroove discs do well with a 0.7-mil spherical, but worn discs of all speeds frequently benefit from the use of an "off-sized" stylus that may play a part of the

groove walls which somehow escaped destruction from early playings.

Because of the likely need for frequent stylus changes, it is recommended that the cartridge have a user-replaceable stylus assembly. It is also wise to avoid audiophile-type cartridges having strong high end response to beyond 20 kHz, as these will aggravate the spurious noise and distortion from old discs, while contributing nothing of value to the sound quality. I recommend a recent-model Shure or Stanton with a specified tracking-force range of from 2 to 5 grams. The old Shure M-44, very popular with collectors, is NOT recommended because its somewhat peaky high end will exaggerates the already-excessive surface noise from old discs.

Both Stanton (see the letter in this issue) and Shure Brothers in the US make 78-rpm styli for several of their cartridges. Shure offers a 0.7-mil, and Stanton a 1-mil and a 2.7-mil (for most latter-day European 78s). If you find the need for other sizes, or wish to use other cartridges, most collectors (and archivists) recommend as the best source for exotic styli an English company called Export Pickups, Ltd., at P.O. Box No. 3, Ashstead, Surrey, England KT21 2QD. Write to Mr. W.D. Hodgson, specify the cartridge you use, and either state your specific stylus-tip needs or, if not certain, ask for his recommendations for the discs you plan to be playing.

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