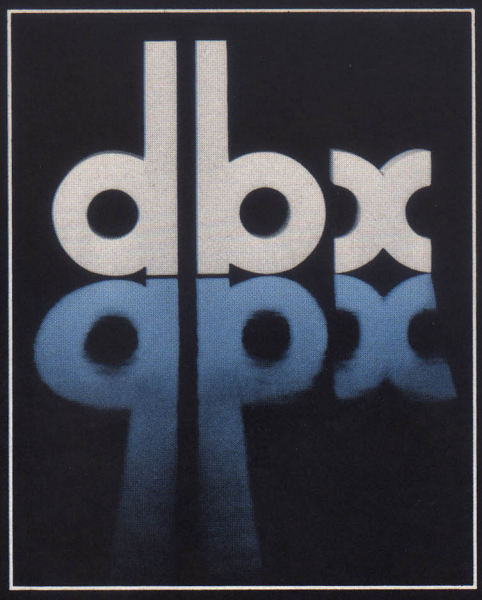
Dynamic Range Expanders, Tape Noise Reduction Systems
and Signal Enhancement Processors.



From its beginning in 1971, dbx made the commitment to develop the next generation of music reproduction technology. The founding inventors and engineers have continued to meet the challenge of this commitment, from the introduction of the first dbx consumer product, the 117 Dynamic Range Enhancer, through the current line of audio products and those on our drawing boards. dbx has consistently manufactured and marketed audio components which not only advance the state-of-the-art in their class, but also move high fidelity closer to its stated goal: to erase any perceivable difference between live and recorded music.

dbx makes products for the home and for the large and small recording studio. These include expanders, tape noise reduction systems, compressor/limiters, subharmonic synthesizers, decibel meters, voltage-controlled amplifiers, and accessories. Each dbx product passes individual quality control and testing procedures before it leaves the plant. More than 25 percent of dbx's production force is devoted to these quality assurance procedures. Independent testing organizations, as well as high fidelity critics and publications consistently award their highest ratings to dbx equipment.

dbx products are manufactured entirely in the United States from the highest quality components, inside – and out, where their matched, solid walnut sides and solid aluminum knobs give them their distinctive character. dbx products are available from better audio dealers throughout the United States, and all over the world.

dbx corporate headquarters and manufacturing facilities are located in the Boston, Massachusetts area.

The Live Concert.

Listening to a live musical performance is one of life's greatest experiences. Your ears hear the subtlest pianissimos, and the most thundering fortissimos. The difference in volume between these extremes is called dynamic range. It is measured in decibels or dB. The human ear can hear sounds ranging from 0 to 130 dB of sound pressure level. Any sound louder than that causes pain. The range between quiet and loud portions of live music can be up to 100dB. It is this dynamic range that gives us the contrast and startling intensity of a live concert, whether it's the intimacy of a string quartet, the power of a symphony orchestra, or the sheer energy of a good rock group.

The Dead Concert.

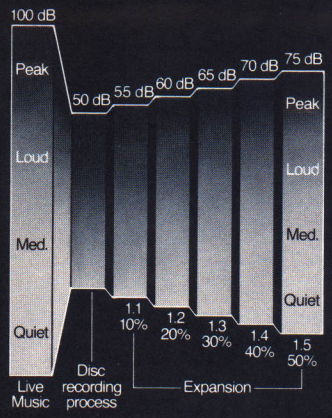
Unfortunately, that intensity is altered in the recording and broadcast process. Due to technical limitations of records and tapes, the dynamic range of sound you hear over your hi fi – no matter how good your hi fi – is typically 25-40 dB, and at very best, only 60 dB. What happens to the other 40-75 dB? It gets compressed, or chopped off altogether. So when you compare what you hear at a live concert to what you hear over your hi fi, you notice that the resulting music sounds as if it were flattened, or muffled in some way. It lacks the punch and definition of a live concert. Sounds are muddied, because the quiets are made louder, and the louds are made quieter. The loud and quiet sounds are all pushed towards the middle.

A Solution – Dynamic Range Expansion.

Dynamic range expansion reverses the compression process that occurs in recording and broadcasting. It restores the space between quiet and loud. When you use an expander, louds get louder – just the way you hear them at a live concert – and quiets get quieter – just the way you hear them at a live concert. But some expanders operate only on a portion of the signal. This throws the music's balance out of proportion. These expanders caricature your music, instead of restoring its missing dynamic range.

The Solution – The dbx Linear Dynamic Range Expander.

Only dbx has solved this problem. We have developed the first linear expanders which expand all frequencies and all levels over the entire dynamic range, by the same proportion. That means expansion occurs not only at the louder levels, but also at the quieter levels, indeed, over the entire dynamic range. The keys to this expansion are two patented devices. The dbx rms detector, senses the entire dynamic content of the music. It then instructs the dbx voltage controlled amplifier to precisely increase or decrease level, instantly.



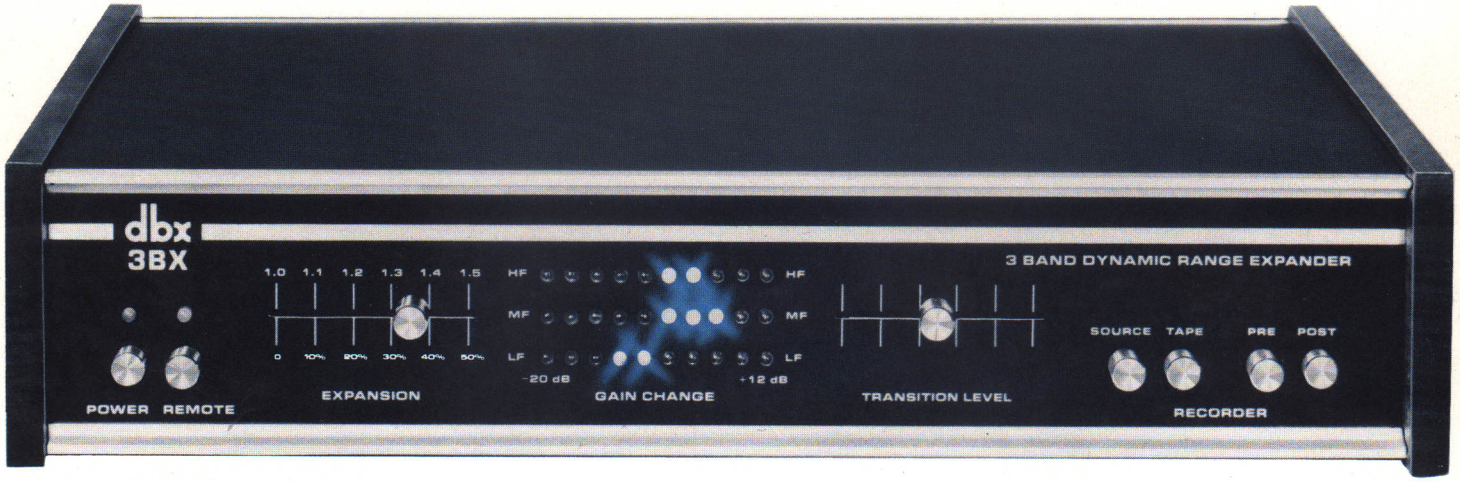
Dynamic range expansion makes loud sounds louder and quiet sounds quieter, just the way you hear them in a live concert.

Records, Cassettes, Broadcasts – All Sound Astonishingly Better Through Your Expensive or Inexpensive Hi-Fi.

No matter how great your system, you'll want to re-play all your tapes and records again through a dbx linear dynamic range expander. You'll hear things you never heard before...more music. And you won't hear things you did hear before... noise (a pleasing side effect of the dbx linear expanders). It will be like listening to your tapes and records for the first time. Only better. And, of course, it goes without saying that a more modest system will also be greatly improved. You'll hear the soft brushwork of a drummer and the loud crescendo of the kettle drums. Every nuance and texture of a symphony string section will have incredible presence. The sharp attack of a brass section jumps out of the speaker. Bass notes regain their punch and clarity. As a matter of fact, we'd like to offer you a friendly challenge. If you think your system can't be improved, drop in on your dbx dealer and listen to a similar system with a dbx linear expander. The difference will startle you. And that's a promise.

DYNAMIC RANGE EXPANSION

3BX
Linear Dynamic Range Expander



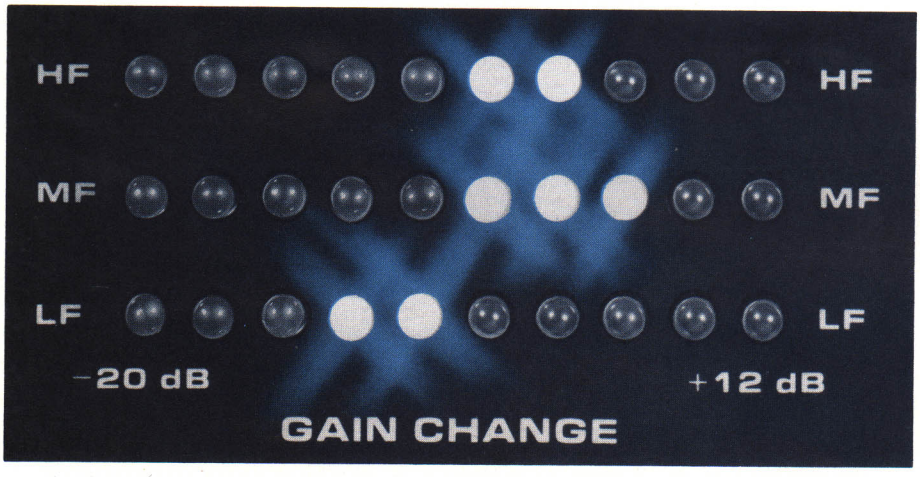
dbx has created the state-of-the-art in dynamic range expansion by dividing the audio spectrum into three separate frequency bands. The 3BX incorporates multiple true RMS detectors, and voltage controlled amplifiers. That means the bass, midrange, and treble portions of your music are linearly expanded individually. This achieves stunning results unobtainable from any other expander system.

Powerful, percussive bass notes will not artificially elevate midrange sounds. Midrange crescendos will not cause low level high frequency information to be brought unnaturally into the foreground. For the most complex musical material, it is the only solution when musical integrity must not be compromised.

Three rows of yellow and red LED's show how much expansion you're enjoying in each of the three frequency bands – up to 50% overall. The transition level slider sets the point below which the 3BX makes your music quieter and above which it makes your music louder.

The 3BX also features source/tape and pre/post switches, in case you wish to use it with a tape recorder. These controls permit you to switch the unit into the system either before or after your tape deck, allowing complete recording and playback flexibility, without touching the cables on the back.

The 3BX is the most sophisticated and satisfying way yet devised to restore the missing dynamic range of recorded music.



SPECIFICATIONS

Expansion ratio: **continuously adjustable to 1.5**

Dynamic range (peak signal to weighted background noise): **110 dB**

Input impedance: **50 K**

Input level (nominal): **300 mV**

Input level (maximum): **7 v RMS**

Output impedance (designed to drive 5 K ohms or greater): **100 ohms**

Output level (maximum, 20 Hz to 20 kHz): **7 v RMS**

Frequency response: **20Hz to 20 kHz ± .5 dB**

Input noise (unweighted, referenced to 1 v): **−85dBv**

Total harmonic distortion: **0.1% typical at 1.0 expansion, 20 Hz to 20 kHz**

I.M. distortion (SMPTE): **0.15% typical**

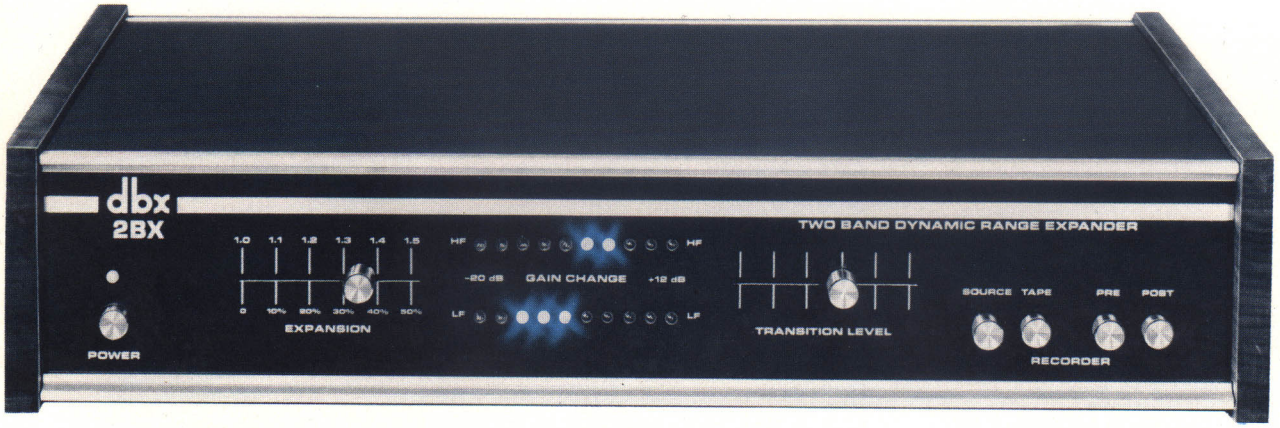
Power line requirement (100, 220, 240 optional for export markets): **117 VAC 50 to 60 Hz**

Power line consumption: **30 w**

Size: **3 3/4" (h) x 17 3/4" (w) x 10 1/4" (d) (mm: 95.25 x 450.85 x 260.35)**

Shipping weight: **12 lbs. (5.44 Kg.)**

1BX and 2BX
Linear Dynamic Range Expanders



Inspired by the success of the 3BX, dbx set out to make the audible benefits of linear expansion accessible to everyone. With the coming of the 1BX and the 2BX, there is now a dbx expander for every system and budget.

The 1BX is the most sophisticated one-band expander on the market. It provides as much as a 50% improvement in stereo dynamic range over a wide frequency spectrum. Its true RMS detector has an infrasonic filter – 10 dB/octave at 30 Hz – to prevent mistracking caused by vibration, turntable rumble or record warps. Its 10-LED display enables you to monitor the amount and the direction of gain change resulting from the expansion process.

The 2BX also provides up to a 50% increase in stereo dynamic range, but with one important difference. It divides the frequency spectrum into two bands, and treats each separately. That's especially important with music of a strongly percussive nature. By separating the lower frequencies, the 2BX doesn't allow the bass or kick drum to influence the vocals or midrange instruments.

The 2BX has two separate 10-LED displays – one for each band. Both the 1BX and the 2BX have a number of important features in common with the 3BX. Their release time is program-dependent, not fixed, resulting in smooth action that does not alter the character of the music as dynamics are expanded and noise is lowered. By reacting appropriately to different kinds of sounds, they preserve the "naturalness" of any given sound. They both are true stereo expanders that maintain rock-solid stereo imaging, unlike some other stereo expanders on the market. And all dbx linear expanders have a pleasant side benefit – up to 20 dB of noise reduction. There isn't a stereo system around that won't be improved by one of this family of dbx expanders.

SPECIFICATIONS

Expansion ratio: **1.0 to 1.5 (0 to 50% increase), linear in decibels**

Dynamic range (peak signal to weighted background noise): **110 dB**

Transition level range: **30 mV to 3 V (threshold)**

Attack and release rates: **Variable, determined by program loudness and rate of change**

Frequency response: **±0.5 dB, 20 Hz to 20 kHz at an expansion ratio of 1.0**

Total harmonic distortion: **0.1% typical at 1.0 expansion, 20 Hz to 20 kHz**

I.M. distortion (SMPTE): **0.15% typical**

Input impedance: **High (50 kohms)**

Output impedance: **Low (the 1BX is designed to feed tape monitor input or tape deck with long cables)**

Maximum output level: **6 volts RMS at 1 kHz**

Controls: **tape/source switch, pre/post switch, power ON/OFF, transition level, expansion**

Indicators: **1BX: power ON L.E.D., gain change (10 L.E.D.'s); 2BX: power ON L.E.D., gain change (10 L.E.D.'s for each of 2 bands)**

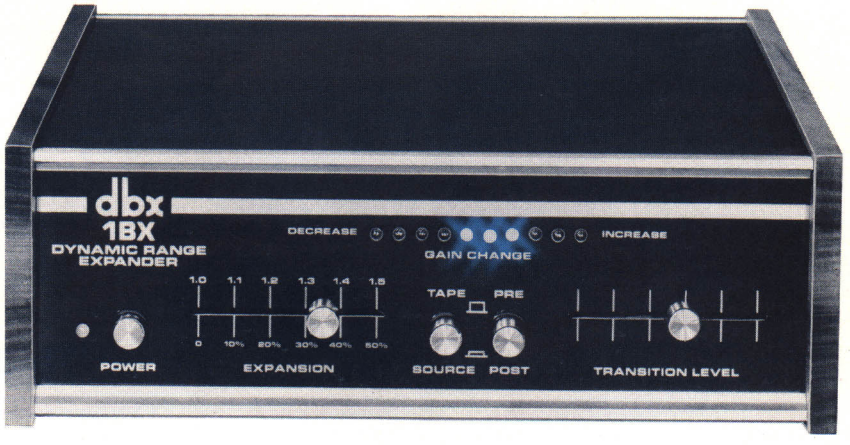
Connectors (phono jacks): **from preamp tape output (x2); to tape recorder auxiliary or line input (x2); from tape recorder output (x2); to preamp tape or monitor input (x2). (1BX also has a quad coupler)**

Power requirements: **117 V AC, 50 or 60 Hz**

Power consumption: **1BX: 10 watts maximum; 2BX: 20 watts maximum**

Dimensions: **1BX: 11" wide (27.8 cm) x 3 3/4" high (9.5 cm) x 10 1/2" deep (25.5 cm); 2BX: 17 3/4" wide (45.1 cm) x 3 3/4" high (9.5 cm) x 10 1/2" deep (25.5 cm)**

Weight: **1BX: 4 lbs., 8 oz. (2.0 kg); 2BX: 8 lbs., 5 oz. (3.8 kg)**



3BX-R
3BX Remote Control

The 3BX-R makes the 3BX more convenient, more flexible, and a lot more fun. Of course it allows you to adjust your 3BX from your favorite listening position. But it also gives you more control than ever before.

Besides Expansion and Transition Level controls, which are also found on the 3BX, the 3BX-R includes a Volume control, a Release Time control, a Fade switch, a Bypass switch and an LED display.

Now you can adjust the volume of your system without getting up and walking over to your preamp or receiver. Now you can tailor the reaction time of the 3BX to suit the demands of the music – fast, for uptempo, high energy rock; slow, for quiet symphonic adagios. Fade down or out, to take phone calls or hold conversations, and fade back up without disturbing your original settings. Switch to bypass for instant A-B comparisons, and monitor the 3BX-R's LED display when the front panel LED display of the 3BX is not visible.

Behind a rear cover are four more controls to further refine the operation of the 3BX, including a High Frequency Transition control to allow corrections of high frequency balance problems in the source material. The 3BX-R derives its power from the 3BX and plugs into the 12-pin socket on the rear panel. Simply plug in the 3BX-R, depress the "Remote" switch and you've got a whole new world of sound within your reach.

Tape Noise – Why Worry About it?

Maybe you've become accustomed to a little noise coming through your speakers. But why add to it when you do any live recording, or tape copying? Unless you record with a dbx II Tape Noise Reduction System, that's exactly what will happen. Your machine will add audible noise to your music.

Tape Noise – Why Do We Have It In the First Place?

Much as we'd like to get rid of it, tape noise is inherent – even with the best studio tape recorders. It's caused by the iron oxide particles on the tape passing over the record and playback heads.

More Noise Means Less Music

Recording engineers allow for tape noise by reducing the dynamic range (the space between loud and quiet portions of recorded music). And that means you hear less music. The music you do hear sounds squeezed, or compressed. This is done so that quiet sounds will not get buried in the noise, and loud sounds don't overload the tape. So the recording engineer makes the quiet sounds louder, and the loud sounds quieter. And that certainly is not what the composer had in mind when he wrote the music.

How to Throw Out The Noise Without Throwing Out The Music

I. DOLBY® "B"*, OR GETTING RID OF SOME OF THE NOISE

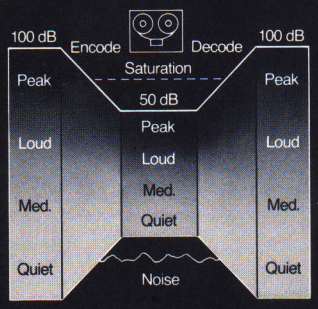
The Dolby "B" noise reduction system reduces high frequency tape noise by approximately 7 to 10 dB. That's not bad. But while it reduces high frequency noise in quiet passages, it leaves low frequency noise right where it was. In your ear.

II. dbx II, OR, GETTING RID OF ALL OF THE NOISE

The dbx II Tape Noise Reduction System reduces tape background noise by 30 dB at all frequencies. And that's more than just OK. That's better than any other system. dbx II also increases tape headroom by some 10 dB, and significantly reduces the risk of tape overload (putting sounds on tape which distort because they are too loud). In playback, you'll get a mirror image indistinguishable from the original music source – with absolutely no audible noise added by the tape recording process.

Why dbx II Is Better Than Dolby "B"

The Dolby "B" system is inherently non-linear, operating only below a certain threshold which must be level matched during recording and playback. This step is difficult at best, so nobody seems to bother. And most tape decks with built-in Dolby don't even have accurate level matching capability. The dbx II Tape Noise Reduction System, on the other hand, operates linearly at all frequencies and over the entire dynamic range. That means level matching procedures are unnecessary. Moreover, you will hear a vast amount of noise reduction over the entire dynamic range, and at all frequencies, and not just at low level signals at high frequencies.



dbx II tape noise reduction uses 1:2 compression to enable you to fit your music onto tape above the noise level, and below saturation; it then uses 2:1 expansion to restore dynamic range, with no audible tape noise added by the recording process.

How the dbx II System Works

You might want to add a new word to your vocabulary. Compander. It describes how a dbx II works (compression and expansion). First, during recording, all levels are linearly compressed by one half over the entire audio spectrum. It then becomes an easy matter to place the signal on the tape comfortably above the noise level, and below the point of tape saturation. Then, upon playback, the signal goes into the unit's expander section, which linearly expands and restores the dynamic range to exactly what it was on the original. The key is a true rms detector, an ingenious device which precisely and instantly measures the dynamic content of the music. The patented dbx voltage controlled amplifier answers the rms detector's commands to precisely increase or decrease level during recording and playback. The end result is an exact, mirror image reconstruction of the original music, with no audible noise added, and fully preserved dynamics.

Listen To It. Just Listen To It.

You'll be amazed at what you don't hear.

*'Dolby' is a trademark of Dolby® Laboratories Inc.

TAPE NOISE REDUCTION

122 and 124 dbx II
Tape Noise Reduction Systems

The only consumer tape noise reduction system available which allows you to make tape copies that sound exactly the same as the original is the dbx II. It assures that no audible tape noise is added by the tape recording process. Only noise present in the original source will survive the dbx II system.

The 122 is a two-channel system, and the 124 a four-channel system, (both models switchable to record or play). However, the 124, if used for stereo, allows you to simultaneously monitor the noise-reduced signal off tape as you record. You can use both to record live, tape to tape, record to tape, and also for dubbing and taping off radio.

Complex level matching and alignment procedures are unnecessary, since these systems operate linearly, using the dbx patented true rms detectors and voltage controlled amplifiers. This is not the case with competitive systems, such as Dolby® "B". Moreover, Dolby "B" gives you only 7 to 10 dB of high frequency noise reduction, vs. an astounding 30 dB reduction of tape background noise at all frequencies with the dbx II system. Other features include a bypass switch, power on/off plus a dbx disc playback button. The latter is to be used only to decode commercially available dbx encoded discs, which provide totally noise-free, full dynamic range music reproduction. A playback level control is provided for your convenience.

SPECIFICATIONS

Compression ratio (fixed): **2:1**

Expansion ratio: (fixed): **1:2**

Dynamic range (peak signal to weighted background noise): **110 dB**

Input impedance: **50 K**

Input level (nominal): **300 mV**

Input level (maximum) **7 v RMS**

Output impedance (designed to drive 5 K ohms or greater): **470 ohms**

Output level (maximum, 20 Hz to 20 kHz): **7 v RMS**

Frequency response: **30 Hz to 20 kHz ± .5 dB**

Input noise (unweighted, referenced to 1 v): **−85 dBv**

Total harmonic distortion: **0.5% typical, 30 Hz to 15 kHz**

I.M. distortion (SMPTE): **0.15% typical**

Power line requirement (100, 220 and 240 optional for export markets): **117 VAC, 50 to 60 Hz**

Power line consumption: **5 w** (122); **7 w** (124)

Size: **3 3/4″ (h) x 11″ (w) x 10 1/4″ (d) (mm: 95.25 x 279.4 x 260.35)**

Shipping weight: **7 lbs. (3.17 Kg.)**

128 Linear Dynamic Range Enhancer Tape Noise Reduction System

How would you like to make copies of records that sound better than the original? With reduced noise, and with increased dynamic range? The one machine that can do all that is the dbx 128, which combines the dynamic range enhancement features of the 118 with the tape noise reduction features of the 122.

These two combined modes permit you to expand a recorded program, then dbx II encode the expanded material, so you can easily fit it onto tape. When played in decoded form, you'll hear what you didn't hear on the original – the realism of louder louds and quieter quiets. Moreover, you hear a lot less of something else you heard on the original – annoying surface noise. For example, suppose you expanded a 40 dB dynamic range program by a factor of 1.5, which would result in a dynamic range of 60dB. You could then process it through the dbx II tape noise reduction section of the 128, which would reduce the dynamic range to 30 dB. This allows you to place the program on tape above the noise level and below saturation. When decoded, the program would have a dynamic range of 60 dB, the same as the expanded original. The tape copy would have 50% more dynamic range than the record, plus the combined benefit of reduced surface noise from the original, due to expansion, with no audible noise added by the tape recording process.

Additional features include power on/off switch, pre/post switches so you can expand material either before or after your tape recorder, in addition to dbx encoded disc playback capability. This provides you with complete front panel flexibility.

SPECIFICATIONS

ENHANCEMENT SECTION ONLY

Compression ratio: **continuously variable to infinity**

Expansion ratio: **continuously variable to 2.0**

Input level (maximum): **30 v RMS**

Frequency response: **20 Hz to 20 kHz ± .5%**

Total harmonic distortion: **0.1% typical at 1.0 expansion, 20 Hz to 20 kHz**

TAPE NOISE REDUCTION SECTION ONLY

Compression ratio (fixed): **2:1**

Expansion ratio (fixed): **1:2**

Input level (maximum): **7 v RMS**

Frequency response: **30 Hz to 20 kHz ± .5 dB**

Total harmonic distortion: **0.5% typical, 30 Hz to 20 kHz**

BOTH SECTIONS

Dynamic range (peak signal to weighted background noise): **110 dB**

Input impedance: **50 K**

Input level (nominal): **300 mV**

Output impedance (designed to drive 5 K ohms or greater): **470 ohms**

Output level (maximum, 20 Hz to 20 kHz): **7 v RMS**

Input noise (unweighted, referenced to 1 v): **−85dBv**

I.M. distortion (SMPTE): **0.15% typical**

Power line requirement (100, 220, 240 optional for export markets): **117 VAC, 50 to 60 Hz**

Power line consumption: **10 w**

Size: **3 3/4" (h) x 11" (w) x 10 1/4" (d) (mm: 95.25 x 279.4 x 260.35)**

Shipping weight: **8 lbs. (3.62 Kg.)**

Signal Enhancement Processors:

118 Linear Dynamic Range Enhancer

The dbx 118 is the most versatile dynamic enhancer available today. It is a single band linear expander, a linear compressor, a limiter and a peak unlimiter.

Yet, its price is modest.

Notice the expansion/compression control. You can use it to set just the amount of dynamic range expansion you want. Where large level variations are undesirable, you can instead compress the entire dynamic range, bringing the quiet and loud portions of your music closer together.

Just to the left is a threshold control. When expanding, this can be used to set the point in your music's dynamic range below which music becomes quieter, and above which it becomes louder. If you place the button on the far left in the out position, the 118 becomes an above-threshold expander, or peak unlimiter. This means only loud portions of the dynamic range which exceed your pre-set threshold will be expanded, (made louder). Above threshold expansion is most useful for programs which were compressed only at high levels. If your 118 is in compression mode, the reverse is true – it becomes an above threshold compressor or limiter. That means signals rising above your threshold will be made more quiet.

The amber and red LEDs tell you when the signal is above or below threshold. They are your guide in setting threshold levels.

The 118 can be used with Dolby® "B" tape noise reduction, and will provide additional noise reduction. Two 118's can be coupled to track accurately in four channel applications.

SPECIFICATIONS

Compression ratio: **continuously variable to infinity**

Expansion ratio: **continuously variable to 2.0**

Dynamic range (peak signal to weighted background noise): **110 dB**

Input impedance: **50 K**

Input level (nominal): **300 mV**

Input level (maximum): **30 v RMS**

Output impedance (designed to drive 5 K ohms or greater): **470 ohms**

Output level (maximum, 20 Hz to 20 kHz): **7 v RMS**

Frequency response: **20 Hz to 20 kHz ± .5 dB**

Input noise (unweighted, referenced to 1v): **−85 dBv**

Total harmonic distortion: **0.1% typical at 1.0 expansion, 20 Hz to 20 kHz**

I.M. distortion (SMPTE): **0.15% typical**

Power line requirement (100, 220, and 240 optional for export markets): **117 VAC, 50 to 60 Hz**

Power line consumption: **5 w**

Size: **3 3/4" (h) x 7 5/16" (w) x 10 1/4" (d) (mm: 95.25 x 185.7 x 260.35)**

Shipping weight: **5 lbs. (2.26 Kg.)**

100 Subharmonic Synthesizer

In order to get as much music as possible on a record, recording engineers must limit the depth and excursion of record grooves. So in the recording process, the lower frequencies are often deliberately reduced or cut off altogether.

The dbx 100 recreates this lost portion of the audio spectrum by seizing information in the 50-100 Hz range, creating a signal one octave lower (25-50 Hz) and mixing this new signal back into the program.

By recreating the bottom octave with the dbx 100, you can hear heightened accuracy in the bass, and actually feel the power inherent in a bass note. The "solidness" and three-dimensionality of bass heard in a live performance – which can be physically experienced – are restored.

The dbx 100 can be enjoyed with almost any component system. It is easily inserted in the tape monitor circuit of your receiver or amplifier. There are just two controls. One is a Synthesizer control that sets the amount of recreated low frequencies you put into the system. The other is a Low Frequency Boost control specially contoured to produce a smooth blend of the synthesized notes into the music. As you regulate the Low Frequency Boost control, your ears will tell you when it is set "right."

The dbx 100 will intensify your listening experience, no matter what kind of music you listen to. If you like rock or jazz or disco, and you have a higher-powered system, the 100 is capable of creating a new dimension, where the physicality of the music will engulf you. If you like classical music, try listening to Tchaikovsky's 1812 Overture or Beethoven's Sixth Symphony with the 100. The attack of the tympani and the richness of massed double-basses produce a sensation unlike anything you have ever experienced from recorded music.

Your local dbx dealer will be happy to demonstrate the 100 for you. But be prepared for an experience that goes beyond listening.

SPECIFICATIONS

Dynamic range (peak signal to weighted background noise): **100 dB**

Input impedance: **47 K**

Input level (nominal): **300 mV**

Input level (maximum): **7 v RMS**

Output impedance (designed to drive 5 K ohms or greater): **470 ohms**

Output level (maximum, 20 Hz to 20 kHz): **7 v RMS**

Frequency response: **20 Hz to 20 kHz ± 1 dB**

Input Noise (unweighted, referenced to 1 v): **−85 dBv**

Total harmonic distortion: **0.1% typical, main signal channel**

I.M. distortion (SMPTE): **0.15%, main signal channel**

Power line requirement (100, 220, 240 optional for export markets): **117 VAC, 50 to 60 Hz**

Power line consumption: **10 w**

Size: **3 3/4″ (h) x 7 5/16″ (w) x 10 1/4″ (d) (mm: 95.25 x 185.7 x 260.35)**

Shipping weight: **5 lbs. (2.26 Kg.)**

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