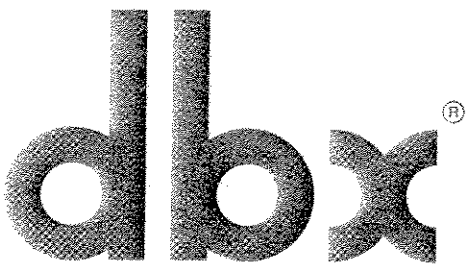
dbx Model 3BX

Series Two

3 band dynamic range enhancer

INSTRUCTION MANUAL

Preliminary



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WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

SECTION 1
OPERATING INSTRUCTIONS

Fig. 1 - 3BX Series Two Front Panel

A. POWER - Push this switch once (IN) to turn the 3BX ON; push again (OUT) for OFF.

B. EXPANSION - Adjust this slide control for the desired degree of expansion. A "1.4" setting means that an input signal with a 40dB dynamic range will be expanded to 56dB, or that an input signal with a 50dB dynamic range will be expanded to 70dB. A 1.2 setting would result in a 20% increase of dynamics; a 1.4 setting would result in a 40% increase of dynamics, etc.

C. GAIN CHANGE L.E.D.'S - These L.E.D.'s indicate the amount of gain change in each of the 3BX's three frequency bands. The red L.E.D.'s indicate upward expansion (volume increase), the yellow L.E.D.'s indicate downward expansion (volume decrease).

D. TRANSITION LEVEL - When an incoming signal is above the level set by this control, the 3BX expands upward; when an incoming signal is below the level set by this control, the 3BX expands downward. Set the control so that red GAIN CHANGE L.E.D.'s glow during loud portions of the music, and the yellow GAIN CHANGE L.E.D.'s glow during the quiet portions of the music. This adjustment is non-critical. It primarily controls the activity of the L.E.D. display.

E. PRE - Push this switch to expand a program before recording it.*

F. POST - Push this switch and the TAPE switch to expand a program played back from your tape recorder, or to place the 3BX in the signal path after other signal processing equipment connected to the 3BX's tape recorder connections.

G. BYP - Push this switch to bypass the 3BX and all of its functions.

H. SOURCE - Push this switch and the PRE switch to expand programs coming from your phonograph, FM tuner or other auxiliary equipment.

I. TAPE - Push this switch and the POST switch to expand programs coming from your tape recorder or to access other signal processing equipment connected to the 3BX tape record connections.

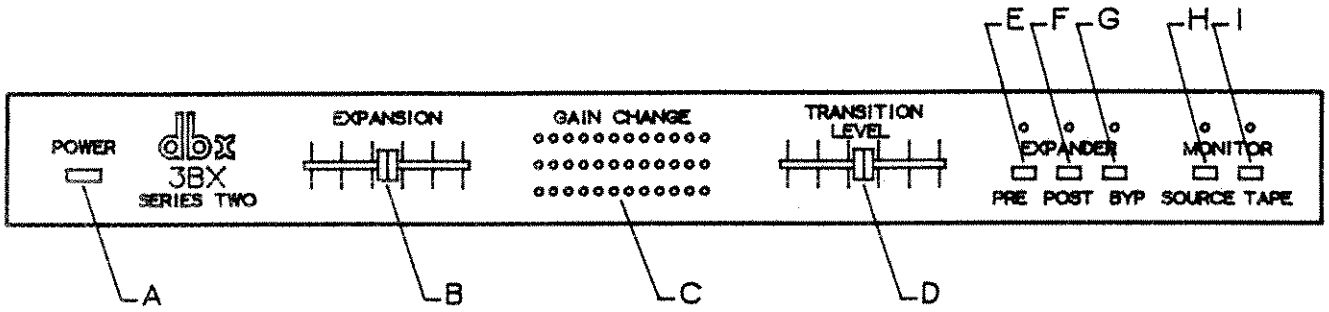
E
F
G
H
I
POWER
dbx
3BX
SERIES TWO
EXPANSION
GAIN CHANGE
TRANSITION
LEVEL
EXPANDER
PRE POST BYP
MONITOR
SOURCE TAPE
A
B
C
D

FIG 1

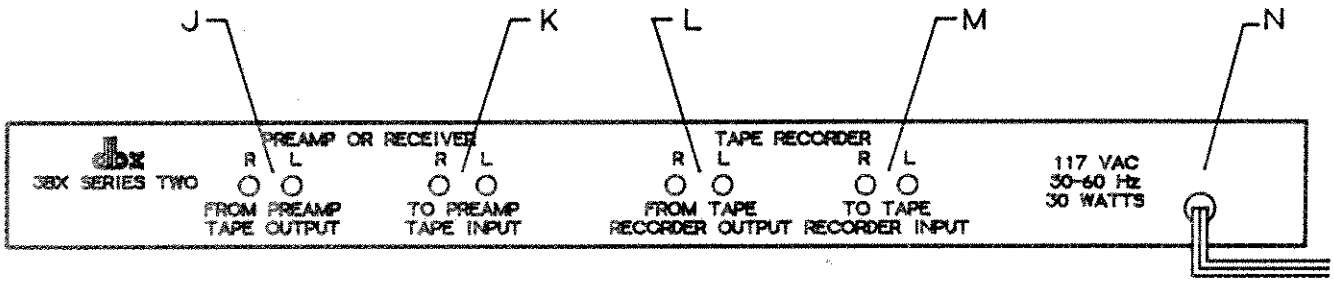
J
K
L
M
N
dbx
3BX SERIES TWO
PREAMP OR RECEIVER
R
L
FROM PREAMP
TAPE OUTPUT
TO PREAMP
TAPE INPUT
TAPE RECORDER
FROM TAPE
RECORDER OUTPUT
TO TAPE
RECORDER INPUT
117 VAC
50-60 Hz
30 WATTS

FIG 2

Fig. 2 - dbx Model 3BX Rear Panel

Notes: To avoid repetition, the word "preamp" is used to mean receiver, preamplifier, integrated amplifier/preamplifier, or the tape monitor loop of an equalizer, reverb unit or other device.

PREAMP OR RECEIVER CONNECTIONS

J. FROM PREAMP TAPE OUTPUT - Connect cables from your preamp's TAPE OUTPUTS (REC OUT of the Tape Monitor Loop) to these inputs.

K. TO PREAMP TAPE INPUT - Connect cables from these outputs to your preamp's TAPE INPUTS (PLAY IN of the Tape Monitor Loop).

TAPE RECORDER CONNECTIONS

L. FROM TAPE RECORDER OUTPUT - Connect cables from your tape recorder's LINE, PLAY or MONITOR outputs to these inputs. If you have a dbx noise reduction unit or other signal processing equipment see connection diagram in Section 3.

M. TO TAPE RECORDER INPUT - Connect cables from these outputs to the RECORD or LINE inputs of your tape recorder. If you have a dbx noise reduction unit or other signal processing equipment see connection diagram in Section 3.

AC MAINS CONNECTION

N. AC POWER CABLE - Connect this cable to a 117 V AC, 50 or 60 Hz AC power source only. Models for use with other power sources are available outside the continental United States. Contact the dbx factory for information.

* Expansion will, in most cases, increase the dynamic range of a program beyond the capabilities of your tape recorder. To expand a program and then record it, we recommend using any dbx tape noise reduction system. This allows you to reduce the noise and expand the dynamic range of the original program, and preserve this increased dynamic range on tape. If you do not have a dbx tape noise reduction system, we recommend expanding a program upon playback from your tape recorder (press the TAPE and the POST switch).

SUMMARY: The PRE switch expands the signal before the tape recorder input (PRE places the expander before the tape recorder input); the POST switch expands the signal from the tape recorder's output (POST places the expander after the tape recorder output).

SECTION 2

WHY USE AN EXPANDER?

If you're a music lover or an audiophile (or both), you have probably noticed that much of the excitement of a live performance is missing in a recorded or broadcast performance. The primary reason for this loss in excitement is that the dynamic range of the recorded or broadcast performance has been purposely restricted to fit the dynamic range limitations of the recording or broadcast mediums.

The 3BX Series Two is a sophisticated, three band expander that can restore the dynamic range, and excitement, to a recording or radio broadcast, adding considerably to your listening enjoyment. By expanding dynamic range, the 3BX Series Two lowers the characteristic noise levels of a tape, phonograph record, or FM broadcast. It restores the "punch" of loud passages, and the whisper of quiet ones. It can add new life to an old record collection, and make FM broadcast worth listening to. The use of a 3BX Series Two with a dbx tape noise reduction system (such as our 222 or 224 series), lets you make tape copies of records, FM broadcasts or other tapes that actually sound better than the original. With these capabilities, the 3BX Series Two will become one of the most valued components in your home music system.

Dynamic Range

Dynamic Range is the difference in level between the loudest and the quietest portions of a program, expressed in dB*. Since the quietest parts of a recorded program are usually restricted by noise, the dynamic range of a recording is usually defined as the difference in level (in dB) between the loudest parts of the program and the noise level.

Restricting Dynamic Range

The loudest sounds in a live performance may reach 120 dB SPL. The quietest sounds, however will not be heard if

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* The "dB" or "decibel" is a unit of expression for sound level or intensity of sound. One decibel is usually described as the smallest detectable change in sound level. The threshold of human hearing (the faintest sound you can perceive at a midrange frequency of 1 kHz) is approximately "0dB SPL" (Sound Pressure Level) and the threshold of pain (the point at which you instinctively put your hands over your ears) is about 120dB SPL. Some people can tolerate 130 dB SPL, others leave the room when the sound level reaches 110dB. The difference between the "threshold of human hearing" and the "threshold of pain" is the dynamic range of human hearing (120dB).

they are much quieter than the ambient room noise (people coughing, air conditioning or other noises). The ambient room noise in a very quiet auditorium is somewhat over 30 dB SPL. The useable dynamic range of a live performance is therefore derived by subtracting the room noise (30 dB SPL) from our tolerance of extremely loud sounds (120 dB SPL), giving a maximum of about 90dB. Recording studios have less room noise and a dynamic range of over 100 dB can be realized.

The dynamic range of a recorded program is purposely restricted to far less than 100dB in order to fit within the dynamic range limitations of the recording or broadcast mediums. For example, the dynamic range of a studio quality tape recorder is about 65 dB. Tape noise restricts the quietest sounds that can be recorded, and tape saturation (distortion) restricts the loudest sounds that can be recorded. Home tape recorders, especially cassette and cartridge recorders, have an even more restricted dynamic range...often only 45dB. (dbx tape noise reduction systems can nearly double the dynamic range capabilities of any tape recorder.)

The maximum dynamic range of only the very best phonograph discs is about 65 dB* (and this is seldom achieved). The quietest sounds on a disc are restricted by the "grain" of the vinyl, and other surface irregularities that create noise; the loudest sounds are restricted by the maximum excursion of the groove. Loud levels are also restricted by the ability of the phonograph needle to "track" the record. To allow more playing time per side, the dynamic range of many records is often restricted to less than 50dB.

*By using dbxII noise reduction during the manufacture of phonograph discs, the dynamic range can be extended to 100dB. Surface noise is reduced to inaudibility and the full dynamics of a performance can be captured. dbx-encoded discs are commercially available, and can be decoded with any of the dbx Type II noise reduction systems.

DIGITAL MASTER RECORDING

The newer digital master recording formats allow about 90 dB dynamic range to be recorded on a studio master tape. However, the improvement made in the dynamic range capacity of the master recording is lost when the conversion to the standard format of the vinyl record or pre-recorded cassette is made, and these final products are necessarily no better than the conventionally mastered vinyl record or cassettes.

However, when the dbx Type II system is used to encode records or cassettes which have been made in the digital master recording format, the full dynamic range of that master recording will be preserved when played back through a dbx decoder.

SECTION 3

CONNECTIONS

Basic Signal Connections and Operation

CAUTION: Make sure that the power if OFF on all equipment when installing the dbx unit. As a further precaution, turn down your amplifier VOLUME control prior to switching on the dbx 3BX series two for the first time.

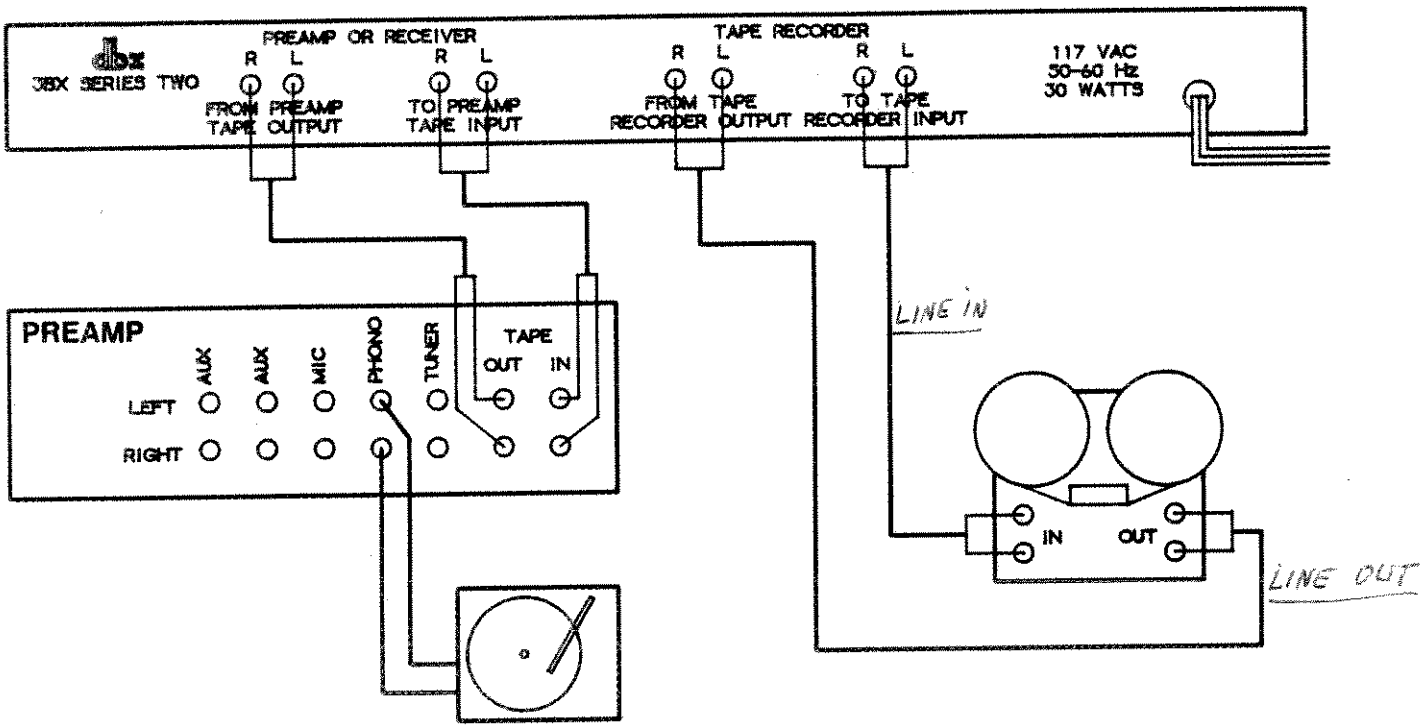
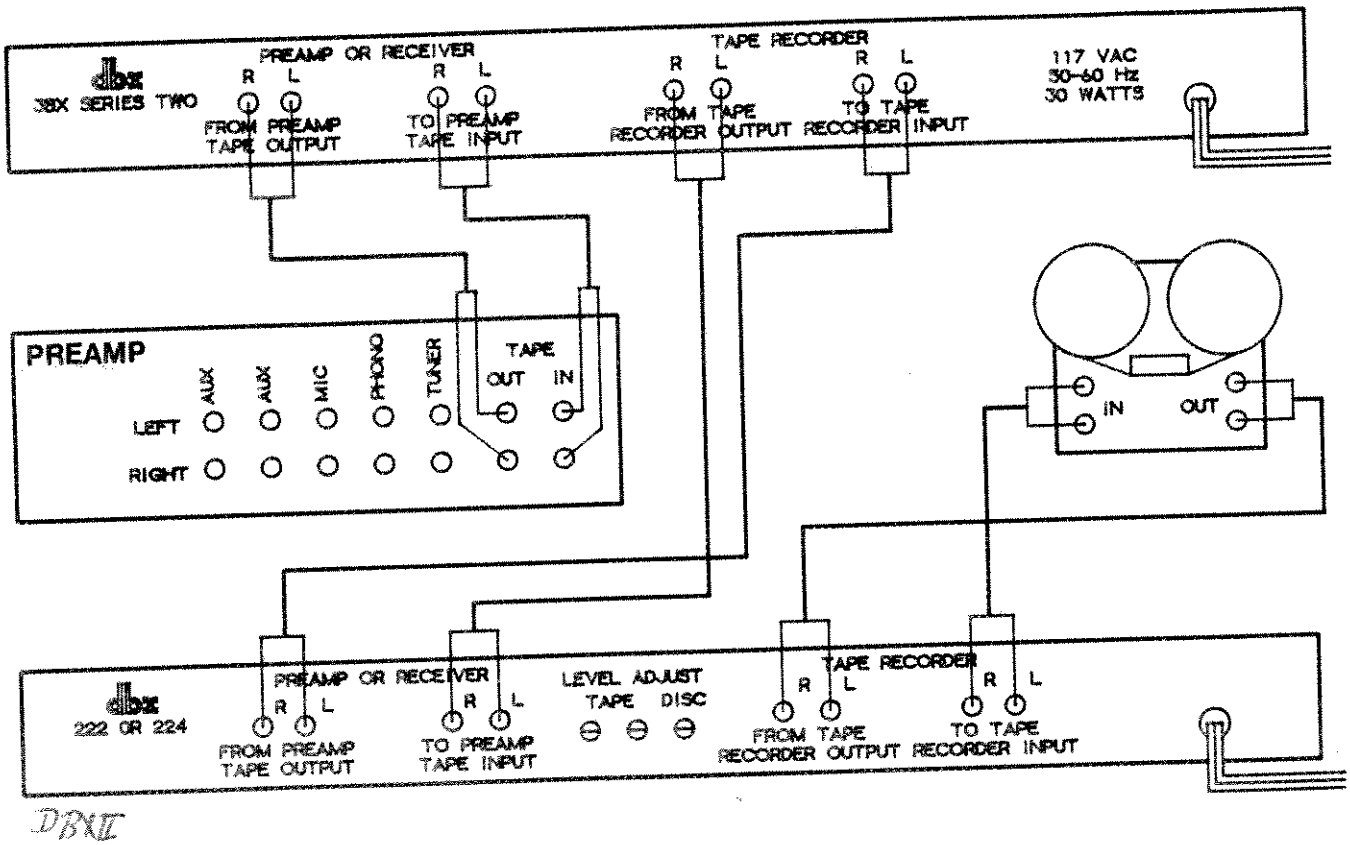


Fig. 3 - Basic signal connections to the dbx 3BX series two.



DBX II

Fig. 4 - Combining the 3BX with a dbx Model 222 or 224 Tape Noise Reduction System.

SIMPLE PRECAUTIONS WHEN USING ANY PROGRAM EXPANDER

The 3BX (or any expander) places greater demands on your power amplifier and speakers. Whether or not a given amplifier is of adequate power rating is not always easy to determine; it depends partially on the sensitivity of the speakers, and partially on the distortion characteristics of the amplifier.

Set for 1:1.5 expansion, the 3BX will expand a good 60dB classical recording to about 90 dB of dynamic range. Full realization of the benefit of this dynamic range requires both a hefty power amplifier and speakers that can take the high power. If you have such equipment, the results will be breathtaking. Fortunately, such components are not mandatory for full enjoyment of the 3BX.

The most important point is this; if the speakers and amplifier cannot handle wide dynamic range, and if the expander "tries" to drive them to a wide dynamic range, excessive clipping distortion (overdrive) may occur. To avoid this unpleasant effect, use good speakers and a reasonably large amplifier. If distortion still occurs, it will probably be noticed only with programs that have a good dynamic range to begin with, and which do not need expansion to much greater dynamics. In such cases, a reduction in the expansion ratio setting will avoid distortion. A good expander can turn an old record collection into a treasure of new listening enjoyment, and it can turn a boring selection of compressed and limited FM broadcasts into an exciting new source of listening pleasure.

SECTION 4

SPECIFICATIONS

EXPANSION	1:1.5 maximum, each band
DYNAMIC RANGE	110dB (peak signal to weighted background noise ratio)
TRANSITION LEVEL RANGE (threshold)	30mV to 3V (mid-band)
ATTACK AND RELEASE RATES (response time)	Program dependent, optimized for each frequency band
FREQUENCY RESPONSE	±0.5dB, 20Hz to 20kHz at an expansion ratio of 1.0:1
HARMONIC DISTORTION	0.1% 20Hz to 20kHz at any expansion setting
INTERMODULATION DISTORTION	Less than or equal to 0.15% per SMPTE* method
INPUT NOISE	90dB below 1 volt "A" weighted
INPUT IMPEDANCE	50k-ohms
OUTPUT IMPEDANCE	The 3BX is designed to feed tape recorder inputs of 5k-ohms or greater
MAXIMUM OUTPUT LEVEL	7 volt RMS at 1kHz into a 5k-ohm load
OPTIONS	Walnut wood side kit WS-22 Consult your retailer
POWER REQUIREMENTS	117V AC, 50 or 60Hz, 30 Watts Maximum
DIMENSIONS	1 3/4"H x 17 5/16W x 7½"D
WEIGHT	

*SMPTE stands for the Society of Motion Picture and Television Engineers

Standard 19" rack mount hardware included.

Specifications subject to change without notice or obligation.

dbx PRODUCT WARRANTY

All dbx products are covered by a Limited Warranty. Consult your warranty card or your local dealer for full details.

FACTORY SERVICE

The dbx Customer Service Department is prepared to give additional assistance in the use of this product. All questions regarding interfacing dbx equipment with your system, service information or information on special applications will be answered. You may call during normal business hours - Telephone: 617-964-3210 or write to:

dbx, Inc.
71 Chapel St.
Box 100C
Newton, MA. 02195
ATTN: Customer Service Department

Should it become necessary to have your equipment factory serviced;

1. Please repack the unit including a note describing the problem along with the day, month and year of purchase.
2. Send the unit freight prepaid to:

   dbx, Inc.
   224 Calvary St.
   Waltham, MA. 02154
   ATTN: Repair Department
3. We recommend that you insure the package and send it via United Parcel Service wherever possible.
4. Please direct all inquiries to the dbx Customer Service Department.

Outside the United States - contact your nearest dbx dealer for the name of an authorized repair center.