

REVIEWS

dbx 165 comp/limiter



MANUFACTURER'S SPECIFICATION

Compression ratio: variable according to compression control setting, threshold setting and signal level. Compression control determines maximum compression ratio, continuously variable from 1:1 to infinity to one.

Threshold: variable from -40 to +10dBm (7.8mV to 2.5V).

Attack: in manual mode the maximum attack rate is variable from 1 to 400dB/ms. In automatic mode the time for 63% reduction in dB signal level is 15ms for 10dB level change, 5ms for 20dB level change and 3ms for 30dB level change.

Release: in manual mode the maximum release rate is variable from 10 to 4000dB/s. In automatic mode 120dB/s. (Attack and release time constants measured in infinity compression region of 'over easy' curve.)

Output gain: variable from -20 to +20dB.

Metering: analogue meter range of -20 to +10dB. Switchable to read level at input, output or gain change. Meter zero adjust -10 to +10dBm.

Input impedance: signal input 22k Ω balanced or 11k Ω unbalanced. Detector input 620k Ω unbalanced or 310k Ω unbalanced.

Input level: +24dBm maximum.

Equivalent input noise: less than -90dBm, 20Hz to 20kHz.

Output impedance: less than 47 Ω (active low impedance output).

Output level: +23dBm into 600 Ω load.

Frequency response: +0, -1dB, 20Hz to 20kHz.

Distortion: second harmonic 0.05%, third harmonic 0.2% (auto or manual with attack and release controls centred). Note: figures are typical at infinite compression, 1kHz, 0dBm input and output. Second harmonic is relatively unaffected by compression ratio, time constants and frequency while third harmonic decreases with slower time constants, higher frequencies and lower compression ratio.

Controls: compression, threshold, attack, release, output gain, power, stereo coupler, auto/manual, meter selector (input, output, gain change), system bypass, meter zero adjust.

Indicators: below/above LED's (green, yellow, red), automode LED, power LED, slave LED, signal level/gain change meter.

Connectors: input/output Cinch-Jones type barrier terminal. Stereo coupler 12-pin Jones connector.

Case: black painted steel sides, extruded aluminium front and rear panels, vinyl-clad steel top and bottom covers.

Dimensions (hwd): 3 $\frac{1}{2}$ x 19 x 10 $\frac{1}{2}$ in (89 x 483 x 257mm).

Weight: 8lb (3.6kg).

Power line requirements: 117V ac \pm 10% 60Hz. 240V 50Hz version available.

Power consumption: 25W.

Price: £280.

Manufacturer: dbx Incorporated, 71 Chapel Street, Newton, Mass 02195, USA.

UK: Scenic Sounds Equipment, 97-99 Dean Street, London W1.

THE dbx 165 compressor/limiter is single channel but may be linked to another 165 for stereo use; it also has the unusual facility of being able to separate the audio and the control inputs so the control can be derived for a second source of audio. The 165, designed for mounting into a 19in rack, is constructed of alloy front and back panel extrusions, to which the sides with rack-mounting ears are screwed. The thin alloy top and bottom covers slide into the front and rear extrusions.

A single large glass fibre pcb in the base supports almost all the electronic components, except for one of the front panel pots which is bolted to the front panel.

The pcb is far from densely populated, but no component identification is provided for servicing, and there are eight preset controls on the board. However, all integrated circuits are socketed for ease of servicing and access to all components is excellent. The standard of component insertion left something to be desired, though.

On the rear panel the signal inputs to the

compressor and its control, are linked on a barrier strip which also provides for the single-ended output with, it is believed, the option of a floating output; both inputs are electronically balanced. A Jones connector enables linking of two units for stereo use. Mains power is supplied by only a short lead—1.4m long—but there is a properly identified Imperial size fuse. The remaining rear panel feature is a screw-driver-operated potentiometer for calibrating the front panel meter. This meter, which is scaled linearly from -20dB to +10dB, may be switched to read either the input level, the output level or the gain change in use by means of three interlocking pushbutton switches. Adjacent is a system bypass switch and a system gain potentiometer roughly calibrated from -20dB to +20dB which is the actual gain range available.

The power on/off switch is on the left of the front panel with an adjacent red LED power indicator. Following this a stereo coupler pushbutton with a yellow warning LED and the threshold level potentiometer with a range of -40dB to +10dB. Above this control green, yellow and red LED indicators show if the audio signal is below, at or above the threshold.

The compression ratio is set by a larger potentiometer knob with calibration points at 1:1, 1.5:1, 2:1, 3:1, 4:1, 6:1, 10:1 and infinite compression.

Regarding compressor time constants, there

FIG. 1
dbx 165 OVERALL FREQUENCY RESPONSE

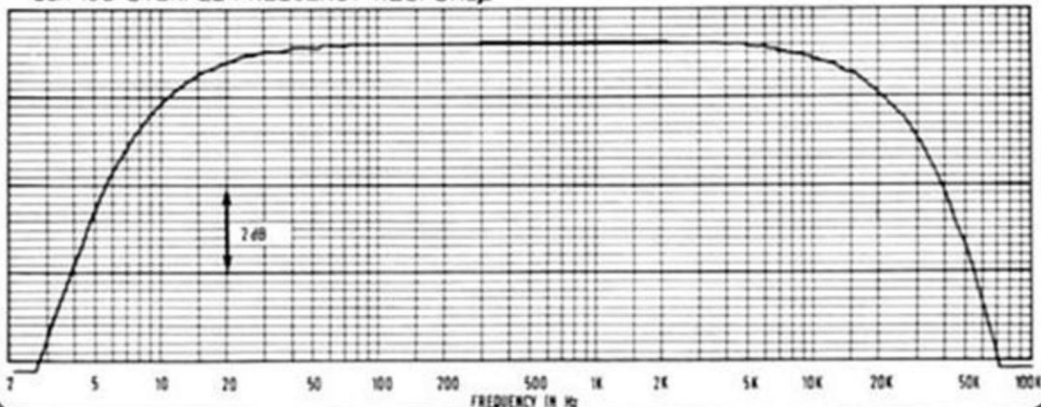
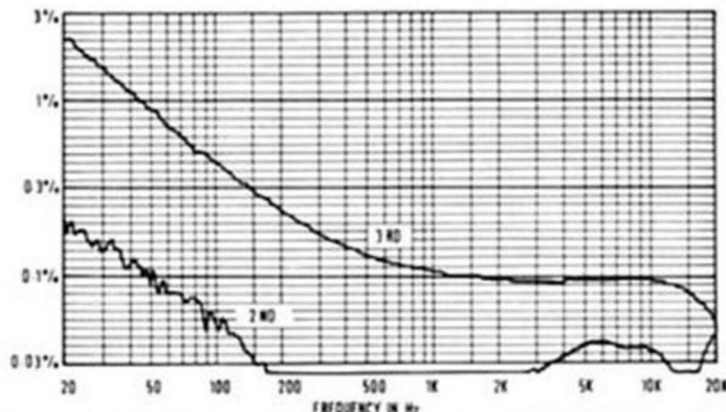


FIG. 2
dbx 165 HARMONIC DISTORTION, 10dB COMPRESSION, AUTO MODE



are two modes of operation set by a push-button switch with a yellow warning LED. In the automatic mode the compression time constants are such that the attack time varies with the amount of level change with a fast release time, while in the manual mode two potentiometers control the attack and release time constants with an attack time range, from nominally 1dB/ms to 400dB/ms and release times from 10dB/s to 4000dB/s.

All these controls are clearly identified in silver on a black front panel but the cursor lines on the knobs aren't at all easy to see; however, the control layout is uncluttered and easy to operate.

Frequency response and noise

The overall frequency response was the same at all input levels (fig 1). This shows that there is a slight high frequency roll-off, to the extent of 1.2dB at 20kHz above which the response falls fairly rapidly.

The metering's performance was satisfactory with the -1dB points occurring at 32Hz and 63kHz with the low end falling to -2dB at 22Hz.

The effective noise referred to the input, varied considerably with the output gain setting as shown in Table I.

TABLE I

Measurement method	Noise referred to the input		
	-20dB gain	unity gain	+20dB gain
Band limited 22Hz to 22kHz rms	-59.5dBm	-89dBm	-96dBm
A-weighted rms	-82dBm	-96dBm	-103dBm
CCIR-weighted rms ref 1kHz	-73.5dBm	-87dBm	-94dBm
CCIR-weighted quasi peak ref 1kHz	-69.5dBm	-83dBm	-90dBm

Referring to Table I the maximum input level capability of +25dBm gives a more than adequate dynamic range, but, clearly it is advisable to provide a large input signal if the unit is to be run at less than unity gain.

Distortion

Testing the review sample showed that the distortion varied widely between the manual and automatic modes irrespective of the attack and release time settings. Furthermore it appeared that the range of the attack and release time controls was incorrect. As a result, a second review sample was called for and very promptly supplied by Scenic Sounds Equipment.

This second sample gave a substantially better performance and I concluded that the alignment of the first sample was incorrect. Fig 2 shows the second and third harmonic distortion in the automatic mode with +10dBm input, 10dB compression and infinite compression ratio settings, while fig 3 shows the distortion under similar conditions in the manual mode. In this instance the attack rate was set to 40dB/ms and the release rate set to 400dB/s. These figures show a fairly large increase in third harmonic distortion but in the manual mode the difference depends as

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expected on the settings of the attack and release rates.

Measurement of total harmonic distortion under the conditions used for the manufacturer's specification—0dBm input at 1kHz at infinite compression ratio—gave 0.1% in the automatic mode and 0.15% in the manual mode; these satisfactory figures are within specification.

Twin-tone intermodulation distortion was substantially constant with frequency at 1% in the automatic mode. In the manual mode this varied widely with release rate settings and could be anywhere between 0.1% and 6%, using a 1kHz and 1.07kHz pair of tones.

The compression characteristics

With a threshold setting of -10dB, fig 4 shows the effect of varying the compression ratio from 1:1 to infinity to one and demonstrates the gradual entry into the desired compression ratio without any defined 'knee'—what dbx describe as their 'over easy' curve. Similarly fig 5 shows the effect of varying the threshold between +10dB, -10dB and -30dB with the compression ratio set to 2:1 again showing the gradual entry into the desired compression ratio.

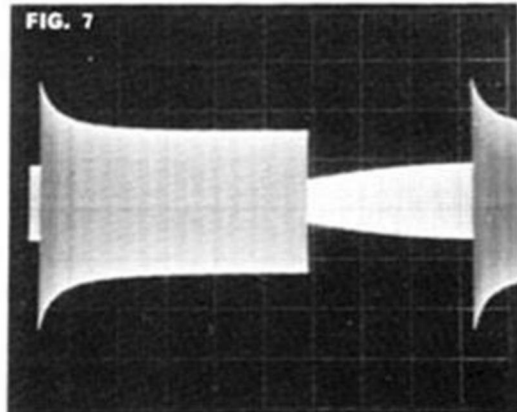
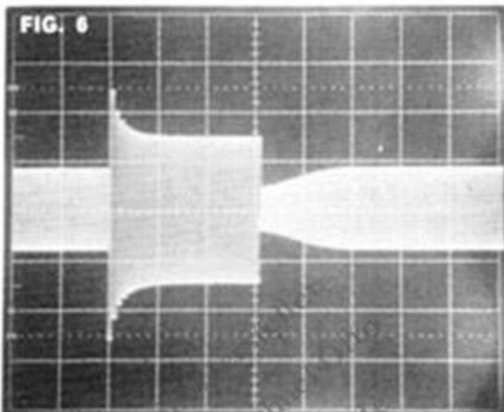
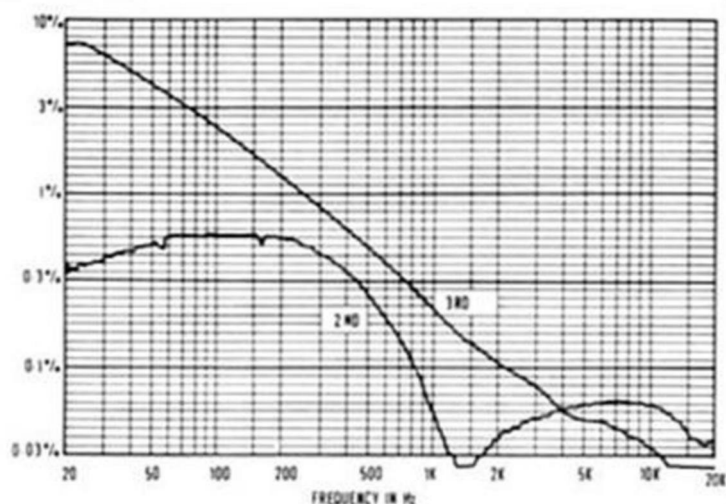
The application of tone bursts driving the unit into 10dB of compression, on top of a constant tone input, is shown in fig 6, for the fastest attack and release times in the manual mode, and in fig 7 for the automatic mode. In both cases the unit is not a hard limiter as is desired for some applications (for avoiding over modulation of radio transmitters) but a soft limiter.

Using similar tone bursts, the effect of the release rate control changed the recovery time from between 2ms and 700ms, and the attack rate control changes the reaction time from between 600µs and 12ms; all of which appears to correspond reasonably to the suggested performance in the case of the second review sample.

Input and output

Zero dB indication on the meter corresponded

FIG. 3
dbx 165 HARMONIC
DISTORTION, 10dB
COMPRESSION,
MANUAL MODE



to +4dBm in the standard settings which could be adjusted by the rear panel control; this is a true rms meter with a risetime of 80ms and a falltime of 250ms, thus giving a useful indication of programme level.

Summary

The second sample of the dbx 165 compressor/limiter gave a very good performance in the automatic mode with great flexibility in the manual mode. In the automatic mode there

was no sign of clicks or other nasty effects present in some units with any degree of compression. Although the first sample was defective in the manual mode, the second sample passed with flying colours and was a versatile and pleasant compressor.

The layout and range of the controls was excellent making the unit simple to use and the overall standard of construction was to a satisfactory standard, though not outstanding.

Hugh Ford

FIG. 4
dbx 165 INPUT/OUTPUT -V- COMPRESSION RATIO AT -10dB THRESHOLD

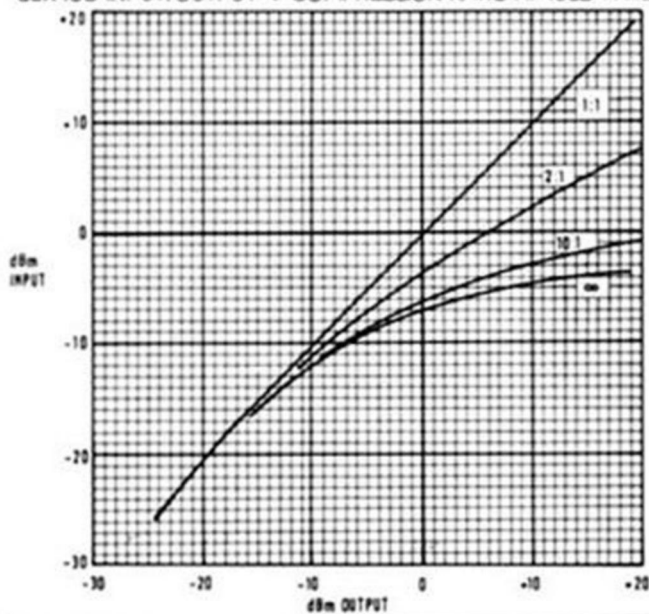


FIG. 5
dbx 165 INPUT/OUTPUT -V- THRESHOLD AT 2:1 COMPRESSION RATIO

