

VALLEY
PEOPLE's

dyna-mitetm

MULTI-FUNCTION DYNAMICS PROCESSORS
MODELS 410-1 Mono, 410-2 Stereo, 410-C Card Only

Features

- Multi-Use—Limiting, Expansion, De-Essing, Noise Gating, Ducking, Keying, Effects.
- On-Board FM Pre-Emphasis for Broadcast AGC/Limiting.
- Linear Integration Detection, Anticipatory Release Computer, EGC VCA...for Exceedingly Faithful Dynamic Integrity.
- Self-Contained and Powered...Converts for Rack Mount or for Battery Power.
- For the Recording Professional, Broadcast/Video, Sound Reinforcement, Performing Musician, etc.
- Configured Specially to Interface to Semi-Pro Equipment, as well as Pro.
- Highly Cost Effective.

Preface/Philosophy

We set out to find the answer to nearly every dynamics processing situation. But that's just the beginning of the DYNA-MITE story. The design criterion was not to simply produce a device which does a lot of things—that was the easy part. DYNA-MITE was designed to do all of its

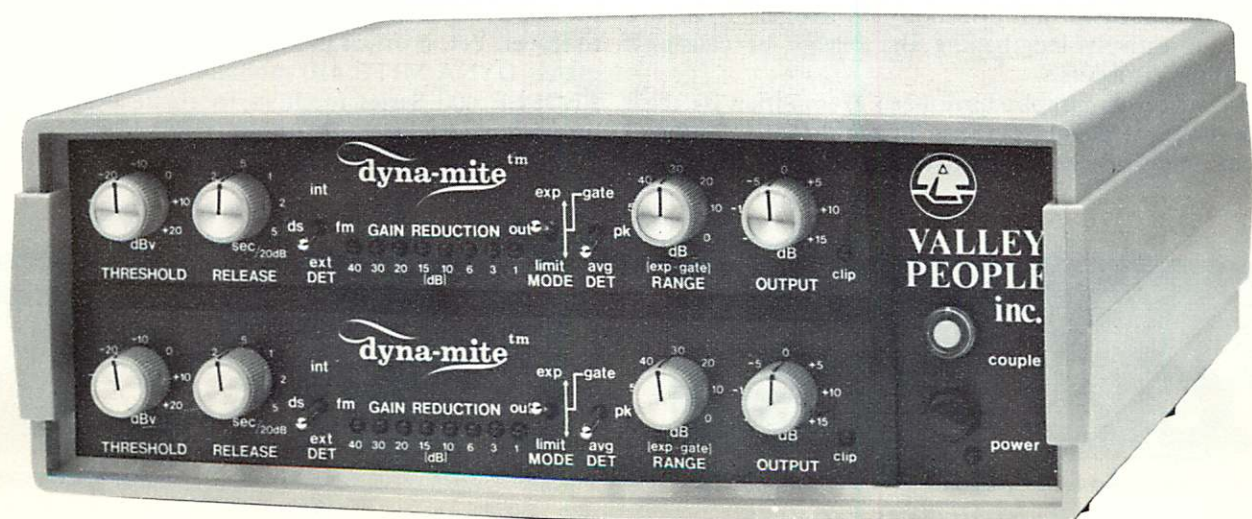
things exceeding well...to outperform the very best "dedicated purpose equipment".

We, at VALLEY PEOPLE, have done serious and extensive work in the physics and psycho-acoustics of dynamics manipulation. This work has resulted in some rather important and proprietary circuits whose purpose is to increase dynamic integrity—listenability. The user will quickly understand the importance of these circuits when comparing DYNA-MITE to more conventional devices.

When processing the human voice, for example, most conventional limiters, while performing well in sine wave tests, will completely misread the more complex voice waveforms. A falsetto voice passage may well peg the output meter, while a raspy scream is reduced to -5 or -7 VU.

Thus, while it is hoped that the voice will be limited to a consistently high output level, the actual result is as much as an 8 to 10dB variation in output, both in audible as well as VU meter terms. What is perhaps worse, is the fact that the types of waveforms which are discriminated against are the very ones that the performer intended to sound louder.

As one can readily see, this effect explains the "squashed" or "strained" audible effect often associated with the indiscriminate use of conventional limiters.



Now, contrast this to the action of DYNA-MITE while limiting in the generally used Linear Integration Detection Mode (Avg). If you set the Output Level for 0VU, you will find that, in fact, the output is 0VU, regardless of the type of complexity of the waveform, or the amount of limiting. Only on very short duration inputs will the VU meter fail to reach 0VU, because of the meter response time.

When you listen to program material, you should immediately notice the increase in naturalness and the lack of squashed and strained sounds, as well as the dramatic increase in apparent volume, when compared to conventional limiters.

You should also find that, perhaps for the first time, you can very successfully limit instruments which were previously difficult or nearly impossible to process without displeasing effects—i.e., horn sections, pianos, drums, etc.

To be sure, there is never an optimum setting of parameters which serves all purposes. On occasion, the user might be more concerned about the absolute peak electrical value of the output than about the audibility factors. Examples can be found in the direct feed to a transmitter or disc cutter—feeds which effectively have no “headroom”. For these uses, DYNA-MITE may be switched into the Peak Detector Mode, thus responding more conventionally...controlling electrical peaks. In the process, however, waveform discrimination effects re-enter the picture, and the use of the limiting function must be more judicious.

Fortunately, in the majority of modern limiter usage the device is feeding an input with sufficient headroom (such as a tape machine) to allow “limiting for sound” rather than for electrical excursion. Linear Integration Detection is designed for just that—making things sound right.

Another example of effective proprietary circuitry to be found in DYNA-MITE is the “Anticipatory Release Computer”. It is commonly known that the often desirable short release times are normally accompanied by excess pumping and modulation distortion effects. Many solutions have been tried, such as lengthening the release when limiting is caused by low frequencies. While these methods may work well on the test bench, they usually fall short when subjected to actual programs...often causing as many bothersome side-effects as they cure problems.

Anticipatory Release is unique in its ability to reduce fast modulation distortion effects by a factor of 10 to 1, without subjectively lengthening the release or causing other audible disorders.

While these paragraphs have been exemplified by the limiting usage, it should be born in mind that the other functions such as expansion, de-essing, etc., involve

the same physical manipulations to the signal and are equally benefitted.

Having qualified a couple of the circuit refinements which have gone into DYNA-MITE, let us say that every effort has been put forth to make DYNA-MITE live up to its name in each of its many operating modes, and for each of its many intended usages.

General Description

The VALLEY PEOPLE DYNA-MITE is a self-contained and self-powered multi-purpose processing device. In all, it is capable of operating in 18 specific modes, including the basic modes of Limiting, Expansion, De-essing, Noise Gating, Ducking, Keying, etc.

In the Limiting mode alone, there are a number of specific derivations, such as Peak Limiting, Linear Integration Limiting, FM Pre-emphasized Limiting and Side Chain Controlled Limiting.

Similar derivations are evident in the other basic operating modes.

The selection of operating modes is straightforward and understandable, as indicated by three front panel switches, each having three positions.

In each operating mode, full parametric control is afforded by four continuously variable controls. Thus, while being easy to operate, DYNA-MITE is capable of satisfying the most critical of demands for performance.

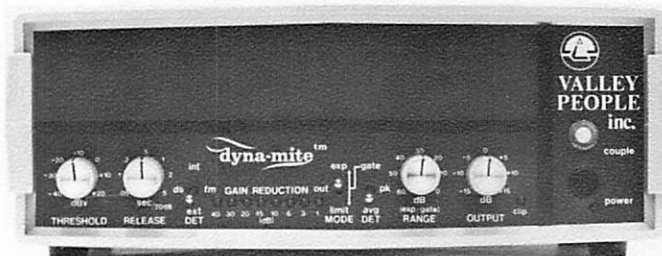
The device is fully metered, with an 8 element LED Gain Reduction Array plus clipping indicator.

Balanced input circuitry capable of +24dBv is employed to assure compatability with professional equipment, while the circuitry is structured to interface correctly to low level/high impedance semi-pro components. The output circuit can deliver a full +21dBm into 600 ohm loads or transformers, yet can feed -10dBv lines with excellent noise levels and compatability.

The circuitry employed represents the highest possible technology, for excellence of performance in any system.

Every effort has been put forth in the packaging of DYNA-MITE, to assure a simple, yet reliable interface: professional type ring/tip/sleeve jacks; 110/220VAC operation; adaptability to battery power and rack mounting. Stereo coupling is accomplished by pressing a front panel switch.

The case itself is unique. An injection-molded, high-impact-strength instrument case, with RFI shielding, ready to travel. Yet, it offers modular electronics—mix or match match DYNA-MITE 410 modules with future VALLEY PEOPLE 400 Series modules to create exactly the right processing package for your needs. All in all, it's DYNA-MITE!



Mono DYNA-MITE, Model #410-1



Stereo (2 channel) DYNA-MITE, Model #410-2

switching point for Gating, Ducking and Keying. Variable from -40dBv to $+20\text{dBv}$.

Release Time Control. Determines the rate at which gain is restored after Limiting or Ducking, as well as the rate at which gain is reduced after Gating, Keying or Expansion attacks. Variable from 50ms to $5\text{sec}/20\text{dB}$.

Output Level/Gain Control. Determines either the VCA nominal gain, or the device output level, dependent upon the modes selected. In the Limit and De-ess modes, the desired output level (in dBv) is dialed on this control. By means of coupling between the Threshold Control and the VCA, this predetermined output level is maintained regardless of the amount of limiting. The amount of limiting is determined solely by operating the Threshold. Thus, setting up for limiting becomes exceedingly simple:

Dial the desired output level (i.e., $+4\text{dBv}$ to feed a studio tape machine) then rotate the Threshold Control for a suitable amount of limiting. Once set, the Output Level need not be readjusted for different Thresholds.

In all other modes, the OUTPUT CONTROL becomes a simple gain control which establishes the nominal signal gain, at 0dB gain reduction.

It should be noted that an attribute of the EGC VCA lies in the relationship between gain and noise levels. In a conventional passive gain control, a 20dB increase in output gain causes a 20dB increase in output noise. With the VCA connection, a 20dB gain increase results in only a 10dB noise increase, thereby allowing a much wider latitude in the gain vs. noise relationship so very important to dynamics processing devices.

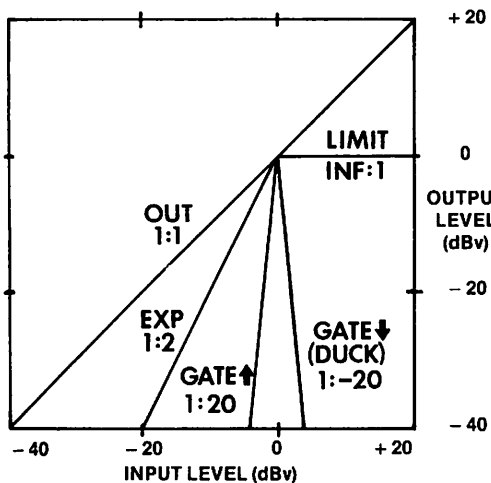


FIGURE 1
BASIC TRANSFER
CHARACTERISTICS
(INTERNAL DETECT MODE)
 THRESHOLD: 0dBv
 RANGE: 60dB
 OUTPUT: 0dB

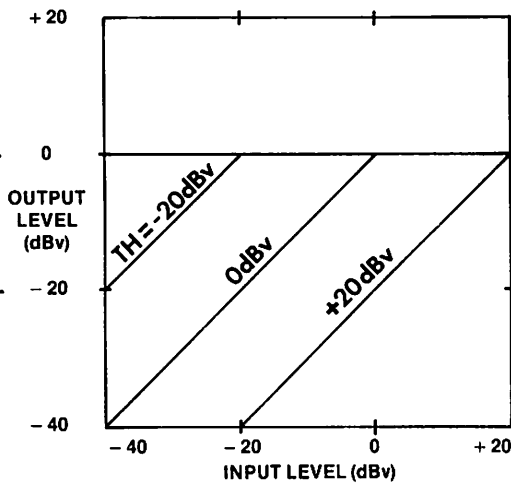


FIGURE 2
EFFECT OF THRESHOLD
IN LIMIT MODE
 DETECT MODE: INTERNAL
 OUTPUT: 0dB
 RANGE: NOT APPLICABLE

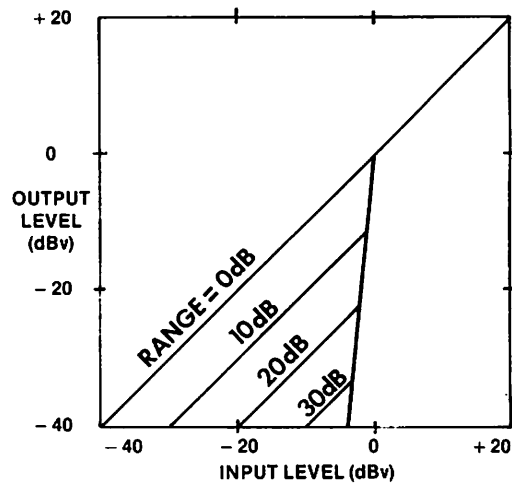


FIGURE 3
EFFECT OF EXP/GATE/DUCK
RANGE CONTROL
 DETECT MODE: INTERNAL
 OUTPUT: 0dB
 THRESHOLD: 0dBv
 (SHOWN IN GATE UP MODE)

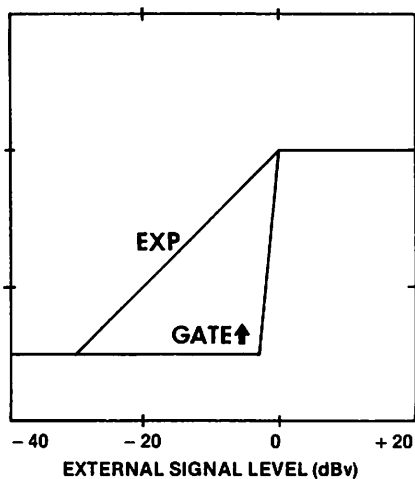


FIGURE 4
SIGNAL GAIN IN RESPONSE TO
EXTERNAL CONTROL SIGNAL
(EXT DETECT MODE)
 THRESHOLD: 0dBv
 RANGE: 30dB
 OUTPUT: 0dB

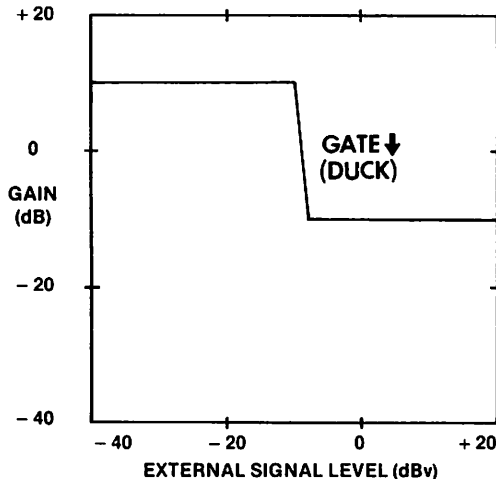


FIGURE 5
SIGNAL GAIN IN RESPONSE TO
EXTERNAL CONTROL SIGNAL
(EXT DETECT MODE)
 THRESHOLD: -10dBv
 RANGE: 20dB
 OUTPUT: $+10\text{dB}$

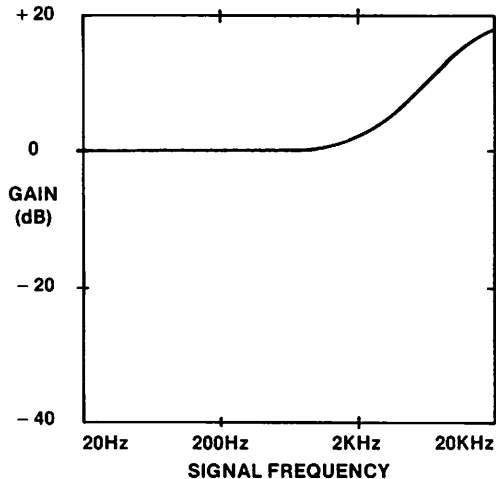


FIGURE 6
SIDE BAND EQUALIZATION
APPLIED TO INPUT SIGNAL
IN FM-DS MODE
 (ACTUAL OUTPUT SIGNAL IS NOT EQUALIZED)

Specifications

Gain Reduction Range	Variable—60dB Max to 0dB Min
Maximum Input Level	+ 24dBv (Balanced - 30K)
Maximum Output Level	+ 21dBm - 600 ohms
Static Distortion	.04% THD Maximum @ 1KHz
Dynamic Distortion	Dependent on settings—Anticipatory Release Computation reduces dynamic distortion 10 to 1 over conventional devices
Signal/Noise Ratio	92dB @ +4dBv in and out @ +4dBv Threshold
Frequency Response	+ / - 1dB, 10Hz to 50KHz
Slew Rate	13V/ μ s (150KHz full power bandwidth)
Attack Time (Peak Detection)	100 μ s/20dB
(Linear Integration Detection)	20ms/20dB
Release Time	Variable, 50ms to 5sec/20dB
Threshold	Variable, -40dBv to +20dBv
Output Gain (Exp/Duck/Gate Modes)	Variable, + / - 15dB
Output Level (Limit/De-ess Modes)	Variable, -15dBv to +15dBv
Limiting Ratio	Infinity:1
Expansion Ratio	1:2
Gating Ratio	1:20
Ducking Ratio (Voice-over)	1: -20
Front Panel Switches (3)	Detector: Avg/Peak/Gate-Duck Detector: Internal/External/DS-FM Mode: Limit/Expand/Out (Bypass)
Front Panel Variable Controls (4)	Threshold Release Time Range (Exp-Gate-Duck) Output Gain/Level
Powering	110VAC/220VAC (5 watts) External Battery Requirements: Minimum of + / - 18VDC (72ma for mono unit; 144ma for stereo unit)
Packaging	3½" x 8½" x 9" Instrument Case holds 2 channels Rack mount adaptor mounts one or two units in 3½" x 19"
Metering	8 LED Gain Reduction Metering Array 1LED Overload Monitor
Rear Panel Connectors (4)	Signal Input Ext Input (Side Chain Input) Signal Output Control Voltage Out/In
Required Mating Plugs (Not Included)	¼" Diameter, 3 Conductor Commercial or Telephone/Mil. plugs (Examples: Mil. #PJ 051; Switchcraft #482 or equivalent; Switchcraft #260 or equivalent)

Note: Specifications subject to change without notice.

Areas of Use

Due to its diverse nature, fully professional performance, portability and cost effectiveness, DYNA-MITE enjoys excellent usability in all areas where audio is processed... from semi-pro to super-pro, broadcast and video, sound reinforcement, industrial sound and the performing or recording musician. It offers no excuses, simple sheer performance.

Ordering Information

DYNA-MITE may be ordered as a 1-channel, or Mono Unit—Model #410-1.

DYNA-MITE may be ordered as a 2-channel, or Stereo Unit—Model #410-2.

A single DYNA-MITE channel may be ordered to upgrade a mono unit to a stereo unit—Model #410-C.

A rack-mount "shelf" may be ordered as Model #400-R. It will mount one or two DYNA-MITE units.

For external powering, an external power connector is required and may be ordered as Model #400-EPC.



Two Stereo DYNA-MITE units mounted in a Model #400-R Rack Shelf. Note: A single unit may also be mounted alone.

The Controls

Limit/Out/Expand Switch. Establishes the most fundamental modes. LIMIT equates to gain reduction caused by signals increasing above Threshold, while in EXPAND, gain reduction occurs when signals decrease below Threshold. The Limiting Ratio or Expansion Ratio is determined by the...

Peak/Avg/Gate Switch. Besides establishing LIMIT/EXPAND RATIOS, this switch sets the detector to respond as a conventional fast peak detector, or as an averaging Linear Integration Detector. When set to either the PEAK or AVG positions, the LIMIT/EXPAND RATIOS are, respectively, Infinity:1 and 1:2. Thus, if the first switch were set to "LIMIT", while the second switch were set to "PEAK", a relatively conventional peak limiter would result, having a Limiting Ratio of Inf:1.

In the GATE position, fast peak detection is exhibited, but the LIMIT/EXPAND RATIOS are increased to 1:-20 (negative limiting or "ducking") and 1:20 (High ratio gating or "keying"). Example: If "EXPAND" and "GATE" were selected, a noise gate structure would result wherein signals 1dB below Threshold are attenuated by 20dB, etc.

It should be noted that in EXPAND the Attack is upward, in terms of gain, while the Release is downward. The converse is true in LIMIT. Thus, in noise gating use, the sudden application of a signal (such as a drum beat) essentially instantaneously turns the gain fully on, thus "catching" the instrument. When the signal ceases, the gain is reduced at a much slower rate, as governed by the Release Time.

Internal/DS-FM/External Switch. Determines the source of the signal which is fed to the detector. In INTERNAL position, the actual audio input signal is connected to the detector, thus forming the conventional connection for limiting or expanding... the signal controls itself.

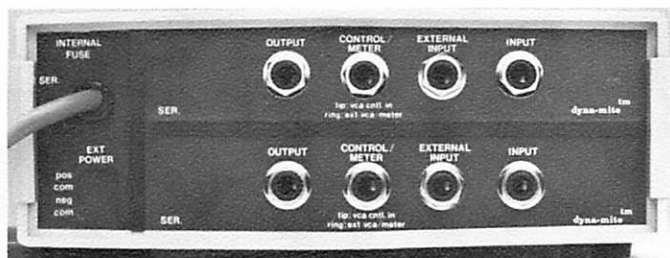
In the DS-FM position, the input signal is passed through an equalizer circuit having 6dB/octave boost above 2KHz (75 μ sec curve). Thus, the effective Threshold decreases (increased sensitivity) for the higher frequencies, even though the actual audio signal is passed through the VCA without equalization. Besides being a requisite to proper FM broadcast use, this characteristic produces excellent DE-essing action (particularly in conjunction with the AVG detector setting). It is also helpful in the Gating and Expanding modes when increased sensitivity to high frequencies is desirable.

In the EXTERNAL position, the detector is not connected to the input signal at all, but is routed to a rear panel jack marked EXT INPUT. Thus, gain control is not a function of the input signal passing through the VCA, but is determined by a second signal which may, or may not, be related to the input signal. This forms the basic connection for Keying and Ducking effects. As an example, assume that the three switches are set to "LIMIT", "GATE", and "EXT", and that music is applied to the SIGNAL INPUT, while narration is applied to the EXT INPUT. According to earlier statements, a "DUCKING" ratio of 1:-20 is established, but because of the EXT position of the last switch, this gain reduction will not be incurred by INPUT SIGNAL excursions (music) but, rather, will result from EXT SIGNAL excursions (narration).

Thus, whenever the narrator's voice level exceeds the Threshold setting, 20dB of gain reduction will result for each 1dB by which the narrator signal exceeds the Threshold setting. In effect, with proper setting of the Threshold, each time the narrator speaks, the gain (volume) of the music would be completely shut off, were it not for the...

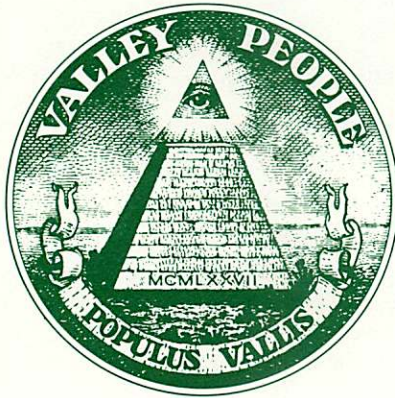
Range Control. This control places a limit upon the maximum gain reduction which can occur in the EXPAND, DUCK and GATE modes. It varies from 0dB (no gain reduction) to 60dB possible gain reduction. Were this control set to, say, 15dB in the above example, the music would be gain reduced or "ducked" by exactly 15dB each time the narrator spoke. Nominal gain would then be restored at a rate determined by the Release Time, when the narrator became silent. A similarly effective control over maximum gain reduction results when Gating, Keying and Expanding. (In order to clarify the terminology, the term "Gating" normally applies when the signal "turns itself on", as in "noise gating", while "keying" usually indicates that a second signal is being used to key the input signal on, via the EXT input.)

Threshold Control. Determines the signal level above which Limiting action commences, or below which Expanding action begins. Also serves as the effective



Rear view showing connections.

DYNA-MITE Is Manufactured By



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TELEX 558610 VAL PEOPLE NAS

a merger of Allison Research & Valley Audio

Warranty

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