

# Eventide

the next step

## OMNIPRESSOR



## INSTRUCTION MANUAL

\*OMNIPRESSOR is a registered trade mark of

EVENTIDE INC. • ONE ALSAN WAY • LITTLE FERRY, NEW JERSEY 07643 • 201-641-1200 • TWX: 710-991-8715



EVENTIDE CLOCKWORKS INC.

WARRANTY REGISTRATION FORM

MODEL 2830 OMNIPRESSOR®

SERIAL NUMBER \_\_\_\_\_ DATE PURCHASED \_\_\_\_\_

FROM WHOM PURCHASED \_\_\_\_\_

NAME OF PURCHASER \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

TELEPHONE \_\_\_\_\_

\* \* \* \* \*

UNIT CONFIGURATION: VOLTAGE 230 VOLTS/115 VOLTS TRANSFORMERS YES/NO

\* \* \* \* \*

From time to time, application notes and details of new Eventide products may be mailed out. To whom should this information be sent?

NAME \_\_\_\_\_ TITLE \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_

If you have time, please fill out the following:

NATURE OF YOUR BUSINESS \_\_\_\_\_

HOW DID YOU LEARN OF EVENTIDE EQUIPMENT? \_\_\_\_\_

\* \* \* \* \*

IMPORTANT:

To ensure warranty protection, this form must be mailed within ten days of purchase to EVENTIDE INC. • ONE ALSAN WAY • LITTLE FERRY, NEW JERSEY 07643 • 201-641-1200



**OMNIPRESSOR MODEL 2830**  
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## WARRANTY

THE EVENTIDE CLOCK WORKS, INC. MODEL 2830 OMNIPRESSOR is warranted against defects in material and workmanship for a period of one year from date of purchase from EVENTIDE or AUTHORIZED DEALER. In case of difficulty, contact Eventide or your dealer for repair or return instructions.

This warranty does not apply to mechanical defects caused by use or rough handling or to damage caused by improper operation not in accordance with this manual. Cause of defect is in the sole judgement of Eventide.

This warranty is voidable at Eventide's option under the following circumstances:

User makes unauthorized modifications (electrical or mechanical)

The unit is connected to an improper voltage supply.

Any other condition occurs which causes catastrophic failure or impairs Eventide's ability to render proper service.

If the unit is modified by the customer without permission, the customer agrees to pay for any time or parts necessary to remove the modification before repair.

EVENTIDE WILL NOT BE RESPONSIBLE FOR CONSEQUENTIAL DAMAGES caused by failure for whatever reason of equipments of its manufacture. Sole liability is for repair or replacement (at Eventide's option) of the defective equipment under the terms described above.

## DOMESTIC REPAIRS

Equipment to be repaired should be shipped prepaid to Eventide. Repaired equipment will be returned to the customer at Eventide's expense by U.P.S. When shipping by a premium method is requested by the customer, he will be billed for the difference.

## FOREIGN REPAIRS

Since Eventide's prices contain no export surcharge, the warranty does not cover excess charges necessitated by foreign shipping. All shipping and brokerage charges must be paid by the customer.

## EMERGENCY REPAIRS

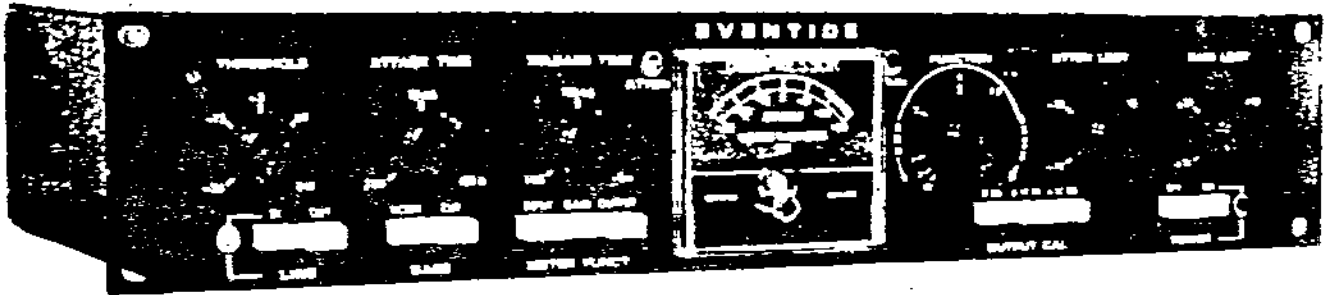
In an emergency, repairs can usually be effected within 24 hours, including shipping to any major airport city in the Continental United States. For more information, call 201-641-1200 during office hours.

## VERY IMPORTANT NOTICE

ANY PIECE OF EVENTIDE EQUIPMENT SHIPPED BACK TO EVENTIDE FOR REPAIR MUST HAVE WITH IT A COMPLETE AND DETAILED REPORT OF THE PROBLEM, INCLUDING CONTROL SETTINGS. FULL INFORMATION WILL ENABLE US TO REPAIR THE EQUIPMENT QUICKLY AND EFFICIENTLY.

# Eventide's omnipressor

The Eventide *Omnipressor* is a professional-quality dynamic modifier, combining the characteristics of a compressor, expander, noise gate, and limiter in one convenient package. Its dynamic reversal feature makes high level input signals lower than corresponding low level inputs. Musically, this reverses the attack-decay envelope of plucked string and similar instruments, and gives the effect of "talking backwards" when applied to a voice signal.

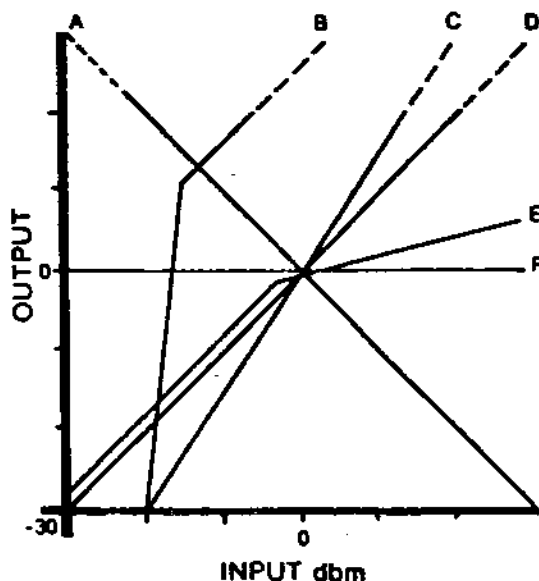


The *Omnipressor* provides an unusually wide range of controls, useful in all program-controlled gain changes. The continuously variable Expansion/Compression control goes from an expansion range of 10 to 1 (gate) to a compression range of -10:1 (abrupt reversal); attenuation and gain limit controls adjust the gain control range from a full 60 db to as little as plus and minus 1 db; and variable time constant controls adjust attack/decay times over an approximate 1000 to 1 ratio. The unit's bass cut switch limits low frequency response in the level detector.

The *Omnipressor's* unique metering system employs a logarithmic amplifier to generate information on Input, Output and Gain. When a return to normalcy is desired, the IN/OUT switch is used to bypass the *Omnipressor*.

Some of the unusual capabilities of the unit are illustrated on the graph below.

OMNIPRESSOR CAPABILITIES



- A: DYNAMIC REVERSAL An input level of +10 results in an output of -10. An input level of -10 results in an output of +10.
- B: GATE As the signal increases above -20, the device gain rapidly goes to maximum.
- C: EXPANSION A 40db input range results in a 60db output range.
- D: CONTROL CENTERED Input level equals output level.
- E: LIMITING Gain is unity until input is 0dbm, above 0dbm, a 30db change in input produces a 6db output change. (Line is offset for clarity)
- F: INFINITE COMPRESSION Output level remains unchanged regardless of input level.

# Eventide

the next step

# Eventide specifications:

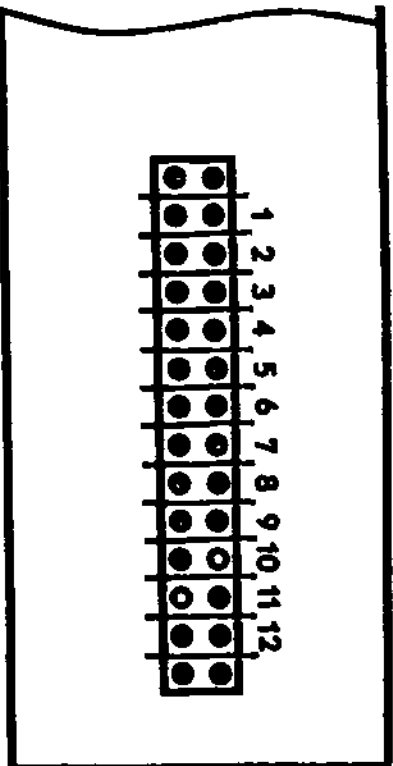
## MODEL 2830 OMNIPRESSOR

<b>INPUT LEVEL</b>	0 to +8dbm nominal level. Threshold control provided to center gain control operation over range of -25 to +15 dbm. Maximum level should not exceed +20dbm or clipping will occur.
<b>INPUT IMPEDANCE</b>	10K electronically balanced. 600 ohm xfmr available optionally.
<b>OUTPUT LEVEL</b>	0 to +8dbm nominal level. Maximum level before clipping is +18dbm. Calibrated +10 and +20 may be inserted to compensate for extremes of gain reduction.
<b>OUTPUT IMPEDANCE</b>	600 ohms nominal, single ended. 600 ohm transformer available.
<b>FREQUENCY RESPONSE</b>	+0, -½db 20Hz-16KHz; +0, -1db 15Hz-20KHz.
<b>GAIN</b>	AGC disabled: Unity, +10db, +20db depending upon OUTPUT CAL.
<b>COMPRESSION</b>	Continuously variable from 1:1 through ∞ through -10:1.
<b>EXPANSION</b>	Continuously variable from 1:1 through 10:1.
<b>GAIN LINEARITY</b>	Infinite compression setting gives constant output level ±1db for 60db change in input level.
<b>FUNCTION CONTROL</b>	Continuously variable function knob is used to set appropriate compression/expansion ratio. Control operates parabolically to give spread near center. Common settings are calibrated.
<b>LIMIT CONTROLS</b>	The ATTEN LIMIT and GAIN LIMIT controls serve to restrict the gain control range to any value between 0 and 30db in each direction.
<b>DISTORTION</b>	AGC DISABLED: .05% between 20Hz and 20KHz. Typ. .02% at 1KHz. -20db AGC, +20db output gain: Less than 1% above 100Hz, .5% at 1KHz.
<b>SIGNAL/NOISE</b>	At unity gain, output noise level is below -90dbm.
<b>METERING</b>	Front panel meter provided which measures either absolute input level, absolute output level, or gain on linear/log scale over 60db.
<b>TIME CONSTANT</b>	DEFINITION: Numbers refer to the time required for the Omnipressor to change gain by 10db in response to an input step change of 10db in infinite compression mode. ATTACK TIME: Continuously variable from 100µSec through 100mSec. RELEASE TIME: Continuously variable from 1mSec through 1 second.
<b>POWER REQUIRED</b>	115VAC, 50-60Hz ±12% or 230VAC, 50-60Hz ±12%; nominal 10 watts.
<b>DIMENSIONS</b>	48.26cm (19") wide; 8.89cm (3.5") high; 22.86cm (9") deep.
<b>APPEARANCE</b>	Black aluminum panel and chassis, white lettering. Red and green light emitting diode indicator lamps show power, in/out and gain/atten status.

# Eventide distributor:



# OMNIPRESSOR INTERFACE



REAR VIEW

Terminal #	Function
1	VC OUT HI
2	VC OUT LO
3	GND
4	VC IN HI
5	VC IN LO
6	GND
7	AUDIO IN HI
8	AUDIO IN LO
9	GND
10	AUDIO OUT HI
11	AUDIO OUT LO
12	GND

The Omnipressor inputs and outputs are unbalanced to ground. All "ground" and "return" terminals are common. However, it is advisable to use the terminals as suggested to avoid the possibility of ground loops. If option O3 is ordered (balanced in/out transformer coupling), the audio input and return are both isolated from ground.

Pin 1 is normally connected to Pin 4, and Pin 2 to Pin 5. To use the Omnipressor as a voltage-controlled amplifier, these jumpers must be removed. Refer to application note number 3 for voltage levels and requirements.

# CONTROL AND INDICATOR DESCRIPTION

## CONTROLS

- IN/OUT SWITCH** This control switches the Omnipressor in and out of an audio circuit. When the switch is in the OUT position, the unit is completely bypassed by a DC path and power need not be applied.
- INPUT THRESHOLD** This control determines the operating point of the Omnipressor. The threshold set on this control is the "crossover" point for the gain control voltage. For example, if the unit is set in a compression mode, an input signal below the threshold will have its amplitude increased, and an input signal above the threshold will have its amplitude reduced.
- BASS CUT/NOR** This switch determines the frequency response of the level detector circuit. In the NOR position, the level detector has the same frequency response as the gain control section. In the CUT position, bass signals are attenuated and have relatively less effect on the overall compression/expansion operation of the Omnipressor.
- ATTACK TIME** This control varies the time the Omnipressor requires to respond to a change in signal input level. Assuming a 10db step increment in input level, the attack time as set on the control is numerically equal to the time required for the level detector to reach its final state with respect to the new input level.
- RELEASE TIME** This control varies the time the Omnipressor requires to respond to a decrease in signal input level. Assuming a 10db step decrement, the release time as set on the control is numerically equal to the time required for the level detector to reach its final state with respect to the new input level.
- METER FUNCTION  
INPUT/GAIN/OUTPUT** This group of switches controls the function of the meter. It has no effect on the signal processing of the Omnipressor. In the INPUT position, the meter reads the input signal level applied to the unit. In the GAIN position, the meter reads the relative gain of the Omnipressor, and so gives an indication of the operation of the gain control function. In the OUTPUT position, the meter reads the output level of the Omnipressor. All level readings are in dbm referred to 600 ohms.
- FUNCTION  
(COMPRESS/EXPAND)** This is the main control on the Omnipressor. It determines the unit's basic mode of operation. Fully counterclockwise, the Omnipressor gain varies sharply from full attenuation to maximum gain as a threshold level is exceeded. As the control is rotated clockwise, this action becomes less sharp until the gain varies only a few db from no input to full input. At the center divider, the Omnipressor gain is constant regardless of input level. As the control is turned clockwise from the center divider, the gain begins decreasing with increasing input level. For small compression ratios, the gain will vary only a few db for large input changes. More rotation produces substantial compression, until the

point of infinite compression is reached and the gain decreases 1 db for each db of signal increase, thus keeping the output level constant regardless of input. Rotation past this point produces dynamic reversal, in which a high level input produces a lower level output than does a low level input. Fully clockwise rotation results in full output attenuation above a certain threshold input.

**OUTPUT CAL**  
NOR/+10db/+20db

This group of switches serves to increase the output level of the Omnipressor when such a function would be desirable. If the unit is being used in extreme modes of compression or dynamic reversal, the input signal will frequently be large enough to initiate large amounts of consistent gain reduction. Under these circumstances, OUTPUT CAL +10db increases the gain of the output stage by 10db, and OUTPUT CAL +20 db increases the gain of the output stage by 20 db. This control has no effect on compression ratio or other operating parameters. It is equivalent to adding a simple amplifier after the unit.

**ATTEN LIMIT**

This control limits the maximum attenuation of the Omnipressor. In its fully counterclockwise position, 30 db of gain reduction is available. Fully clockwise, maximum attenuation will be about 1 db. ATTEN LIMIT overrides the FUNCTION control.

**GAIN LIMIT**

This control limits the maximum gain of the Omnipressor. In its fully counterclockwise position, 30db of gain is available. Fully clockwise, maximum gain will be about 1 db. This control overrides the action of the FUNCTION control.

**POWER ON/OFF**

Applies power to the Omnipressor.

**INDICATORS**

**IN/OUT**  
(green LED)

Becomes illuminated when the IN switch is depressed, indicates that the Omnipressor is in-circuit.

**ATTEN**  
(green LED)

Shows that the Omnipressor is operating in the gain reduction mode. Relative brightness indicates amount of gain reduction. Operation is instantaneous, so that peak limiting is indicated even though the meter has no time to respond.

**GAIN**  
(red LED)

Shows that the Omnipressor is operating in the gain increase mode. Relative brightness indicates the amount of gain increase. Operation is instantaneous, so that short increases are indicated even though the meter has no time to respond.

**POWER**  
(red LED)

Becomes illuminated when the POWER/ON switch is depressed, indicating that the unit is operational.

**METER**

The METER is calibrated over a 60db range in a linear/logarithmic fashion, so that each 10db takes up an identical space on the scale. Center scale corresponds to an input level of 0dbm, a gain of unity, and an output level of 0dbm, depending upon the setting of the METER FUNCTION switch described earlier. The red arc occupying the upper 12db of the scale applies in the output metering function, at which time it serves to warn that the output amplifier is clipping.

## APPLICATIONS

**YOUR OMNIPRESSOR LOVES YOU AND WANTS TO BE YOUR FRIEND!** If you don't understand it, if you don't fondle its controls properly, it will cause you hours of confusion, and tempt you to dash it on the rocks or put it in a sack and drown it. PLEASE READ this applications section before blaming your Omnipressor for malfeasance or devilry.

The Omnipressor, like most Eventide equipment, is a signal processor with wide-ranging use. It is not the normal, tame limiter or compressor which only tries to keep signals within a certain range. It is not a simple noise gate which is either off, letting nothing through, or on, letting everything through at unity gain. Rather, it is a special effects unit, which, in addition to the above, can generate such effects as infinite compression, dynamic reversal, extreme expansion, etc. The Omnipressor has a 60 db control range in addition to a wide dynamic range at constant gain. Because of this wide range, it is possible to overload system components following the Omnipressor if it is used improperly. Note, for instance, that with the output control wide open, and with the gain reading +30 on the meter, it is possible to obtain up to 50db gain from the unit. If you connected an amplifier with 50db gain between your console out and your tape recorder in, you might reasonably expect some distortion, right? Right!

Before using the Omnipressor in a session or in a performance, familiarize yourself with its operation. The ATTN and GAIN LIMIT controls serve to prevent uncontrolled operation by the novice user. Turn on the Omnipressor and turn the threshold control to zero. With no input, the level detector stage is producing the maximum possible control voltage. With no input, putting the FUNCTION knob in the expand section causes a great reduction in gain. As the input increases, the control voltage gets closer to 0, and the gain reduction decreases, until, at some point set by the threshold control, the gain starts increasing past unity (0db). This is expansion-increasing gain with increasing signal thus increasing dynamic range. Note how sharply the FUNCTION control varies the gain with no input signal. Also note that as the signal level approaches the threshold, the function control has a less pronounced effect, until, at the threshold, full rotation has almost no effect. Experiment with the two LIMIT controls. Again remove the input signal. Turn the two limit controls fully clockwise. Observe that the function control can only vary the meter by a few db, despite the fact that with no input, maximum expansion or compression should occur. Rotate the FUNCTION control to maximum expansion and vary the ATTN LIMIT control. Notice that the meter varies from negative full scale to almost center scale. Now, rotate the GAIN LIMIT control. Note that this control has no effect on the meter reading. Turn the FUNCTION control to maximum compression and repeat the experiment with the LIMIT controls. Note that now the GAIN LIMIT varies the meter reading from center to positive full scale, and the ATTN LIMIT control has no effect.

The LIMIT controls are very important in setting up the unit. They can prevent runaway gain, runaway attenuation, runaway engineer, and many other problems. For instance, if you wish to increase average program level by 10 db, but limit compression to a maximum of 15 db, set the GAIN LIMIT control with no input and the FUNCTION knob at full compress so that the meter reads +10 in the GAIN position. Now, turn the FUNCTION knob to full expand and set the meter at -5 with the ATTN LIMIT control. You are now free to set the compression ratio, threshold, and time constant for the most pleasing performance without worrying that you will get too much gain, too much attenuation, or uncontrolled operation, regardless of signal levels or peaks. This type of setability is perfect for sound reinforcement or broadcast use where unattended operation is the rule and wild effects are not desired. Controllable compression in sound reinforcement is particularly advantageous because feedback can be prevented conclusively while still permitting maximum output.

Another control not customarily found on dynamic modifiers is the BASS CUT/NOR switch. Unlike the LIMIT controls, it is not exceptionally useful. Its main application is to prevent large gain variations from being initiated by low frequency signals. A typical use would be in communications or advertising applications, where it is frequently desirable to give a signal as much "punch" as possible. Information in voice signals is generally carried in the range above 500Hz, although fundamentals are present below this frequency. By using a short time constant and cutting bass response, an improvement in intelligibility can be obtained in listening environments with less than optimum signal to noise ratios. Additional applications would be in processing signal tracks with leakage present. If, for instance, the bass drum leaked onto the voice track which you are limiting, the bass can be prevented from affecting the gain control operation. (Note that this does not reduce the amplitude of the leakage. Refer to the Noise Gate description for more information on reducing leakage.)

The model 2830 Omnipressor may be used as a fast peak limiter. By setting the ATTACK TIME constant control to 100 microseconds, the unit in effect no longer is an RMS responding detector, but rather follows peaks in the input signal. At this rate a single half cycle of 5KHz tone above the threshold is sufficient to reduce the Omnipressor gain by about 10db. Smaller peaks at even higher frequencies can be limited at this setting. Bear in mind that at very fast attack times, limiting is equivalent to clipping, and if the signal level is frequently above the threshold, harmonic distortion will be increased.

The above material gives general considerations for the operation of the Omnipressor. The remainder of this applications section is organized as a group of individual "application notes." This section will be added to periodically, and if you wish to obtain updates, please be sure to fill in the warranty card. If you have a specific application you wish to make known, send us a note. Unique ideas will be credited to their source.

## APPLICATION NOTE #1 "Your Backwards Omnipressor"

As we state in our promotional literature, one of the novel features of the Omnipressor is its ability to make signals sound backwards. This is a consequence of the Dynamic Reversal feature, which enables loud sounds to come out more softly than soft sounds. Speech waveforms, for instance, generally consist of loud peaks followed by trailing-off envelopes. By making these envelopes louder than the peaks, the illusion that the sound is coming out backwards is generated. Likewise, drum sounds consist of peaks roughly coincident with mechanical impact, followed by a decay envelope. The Omnipressor amplifies this envelope and "swallows" the impact.

The reversal effect is not limited to voice and drums. In general, any material with wide dynamic range can be "reversed". Plucked string instruments, virtually all percussion, and many natural sounds can be processed to good effect. Certain other material does not sound good in the reversal mode. Specifically, program material consisting of more than one type of sound will give inconsistent results at best. Trying to process an entire program source rather than individual tracks will generally meet with ignominious failure, although solos can be picked out and reversed on occasion.

### CONTROL SETTINGS

IN/OUT	IN
FUNCTION	=2 COMPRESS
ATTN/GAIN LIMIT	FULL CCW
TIME CONSTANT	ATTACK:5ms, RELEASE 100ms
THRESHOLD	0
OUTPUT	0
METER	GAIN


Experiment with the operational controls to obtain the most pleasing effect. It will probably be desirable to limit the maximum gain somewhat with the GAIN LIMIT control to prevent high noise levels with no signal. This applies particularly to taped material in which noise reduction was not employed.

### ADDITIONAL POSSIBILITIES


If you can make forward things sound backwards, you should be able to make backward things sound forwards! Play a vocal tape backwards and reverse the dynamics. The voice should come out sounding almost normal, but the words will be pure gibberish. NSA is considering this method of encrypting data. Be the first on your block..... If you want tremendous "punch" on recorded material, record it normally, and then play it backwards through the Omnipressor set barely into the reversal mode, and re-record it. Playing the second tape backwards (i. e., voice forward), should result in a signal almost completely devoid of dynamic range. Also, you can use the second recording as an opportunity to add some echo, which will then precede the signal in real time. The reason backwards compression is so effective is that the program material is devoid of sharp attack transients which tend to bring down the succeeding program material.

# INTRODUCING: THE AMAZING EVENTIDE OMNIPRESSOR®


## CHART OF FUNCTIONS




**THE INFINITE COMPRESSOR**




VARYING  
INPUT LEVELS,  
RESULT IN *UNIFORM*  
OUTPUT LEVEL!






**THE EXPANDER**



URNS A LIMITED  
INPUT-DYNAMIC-RANGE  
INTO A *W-I-D-E*  
OUTPUT-DYNAMIC-  
RANGE!






**THE NOISE GATE**




SET A THRESHOLD  
LEVEL! ANYTIME  
THE SIGNAL FALLS  
BELOW THAT, THE  
PESTY BUSS GO IN  
DA' GARBAGE!






**THE LIMITER**



UNITY GAIN TO  
PRESET LEVEL; ABOVE  
THIS LEVEL, BIG INPUT  
CHANGE PRODUCES ONLY  
A *WEE-LITTLE* OUTPUT  
CHANGE!





**THE DYNAMIC REVERSER**

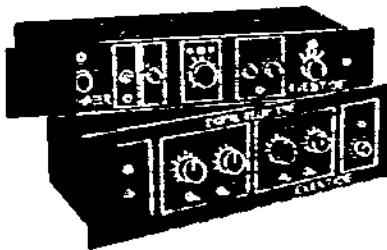


MAKES  
LITTLE  
SIGNALS  
BIG AND  
BIG ONES  
LITTLE!

MAKES  
DRUMS SOUND  
BACKWARD!







THE OMNIPRESSOR® \$600 FROM  
THOSE WONDERFUL FOLKS WHO  
BROUGHT YOU THE INSTANT PHASER™  
AND DIGITAL DELAY LINE

**Eventide**  
the next step

CALL OR WRITE FOR SPECS & NAME OF  
DISTRIBUTOR NEAREST YOU-----

EVENTIDE INC.  
ONE ALSAN WAY  
LITTLE FERRY, N.J. 07643  
201-641-1200





APPLICATION NOTE #2

Our advertisement opposite depicts in cartoon form and text the various standard operating modes of the Omnipressor. This note gives the initial control settings to achieve the effects depicted. The following settings apply to all modes:

IN/OUT.....IN                      BASS CUT/NOR.....NOR  
TIME CONSTANT....ATTACK 5ms, RELEASE 100ms (except in GATE and LIMITER)  
INPUT SIGNAL should be available 10-20 db over THRESHOLD setting.

---

ATTN/GAIN LIMIT                      INFINITE COMPRESSOR  
METER                                  FULL CCW  
FUNCTION                                OUTPUT  
    ∞. Apply signal from oscillator and vary input amplitude.  
Adjust FUNCTION control slightly until varying input has  
no effect on output level.

---

ATTN/GAIN LIMIT                      EXPANDER  
METER                                  FULL CCW  
FUNCTION                                GAIN  
    AS DESIRED between 1 and 2. Use GAIN LIMIT if needed  
for wide expansion range.

---

ATTN LIMIT                              NOISE GATE  
GAIN LIMIT                              CCW  
METER                                    FULL CW  
FUNCTION                                GAIN  
    10 EXPAND  
ATTACK TIME                            100µSec.  
RELEASE TIME                           AS DESIRED  
THRESHOLD                              ADJUST FOR DESIRED GATING ACTION.

---

ATTN LIMIT                              LIMITER  
GAIN LIMIT                              CCW  
METER                                    FULL CW  
FUNCTION                                GAIN  
    ∞.  
THRESHOLD                              ADJUST FOR LEVEL AT WHICH LIMITING IS DESIRED.

---

ATTN LIMIT                              DYNAMIC REVERSER  
GAIN LIMIT                              CCW  
METER                                    CCW  
FUNCTION                                GAIN  
    -1  
Best settings of all controls will greatly depend upon  
program material.



## APPLICATION NOTE #3

### VOLTAGE CONTROLLED AMPLIFIER

The Omnipressor may be used as a high quality voltage controlled amplifier for modulation, electronic music, channel gain variation, amplitude scaling, filter generation, or, in fact, any application in which a fader or potentiometer is used. Characteristics in the voltage control mode include accurate voltage vs. amplitude curve, good tracking, low distortion regardless of signal level (below clipping level), and wide control range.

The gain control section of the Omnipressor has a linear control voltage vs. decibel output characteristic. This is equivalent to a logarithmic control voltage vs. output voltage curve. This makes it especially useful for audio and musical applications in which logarithmic response and logarithmic signal decay envelopes are prevalent. The control range available is 60 db. Gain is decreased with a positive control voltage and increased with a negative control voltage.

To operate the Omnipressor in the VCA mode, remove the factory-installed jumpers on the rear panel. (These jumpers go from VC OUT HI to VC IN HI, and from VC OUT LO to VC IN LO). The control signal should be applied to VC IN HI, the control signal return to VC IN LO, and chassis ground to the associated GND. Characteristics of the VCA section are as follows:

Input impedance nominal 18K ohms  
Input voltage range +12 to -12 VDC  
Control characteristic .4volts per decibel.  
Linearity +1db  
Center: no input signal gives 0 gain + 1 db  
Frequency response essentially flat to 10KHz  
Gain slew rate approx. 1db per microsecond

In the voltage control mode, the FUNCTION control and GAIN LIMIT and ATTEN LIMIT controls are disabled, as are the time constant controls and the BASS CUT/NOR. The OUTPUT GAIN switch group remains functional, and the METER and indicator lights operate.

The audio signal in the Omnipressor is theoretically "modulated" by the control voltage. However, due to the logarithmic characteristic of the control, and the unipolar nature of the control (reversing control polarity does not reverse output phase), it is recommended that the Omnipressor NOT be used as a balanced modulator (multiplicative mixer) except on an experimental basis.

## APPLICATION NOTE #4

### OMNIPRESSOR TRACKING AND PANNING

One Omnipressor can be used to control the gain of several by appropriate connection of control inputs and outputs. Applications include stereo and quad strapping to prevent image shift in multichannel systems. A method of connection using minimal external circuitry is presented.

Omnipressors in the voltage control mode can also be used for stereo and quad panning. A sample connection circuit is shown.

The principles of voltage control as applied to the Omnipressor are discussed in Application Note # 3. Figure 1 shows how it is possible to interconnect an indefinite number of Omnipressors as stereo, quad, or what-have-you program limiters. The voltage outputs are half-wave rectified so that only positive excursions (gain reduction) are accepted. The outputs of the rectifiers go to what is in effect a linear OR gate. Whichever Omnipressor is compressing the most has its control voltage applied to the other Omnipressors. Thus the level of all channels is controlled, and the gain of each element in the system remains fixed with respect to the others.

If it is desired to have the gain of one channel control the gain of all the others, a simpler connection is possible. Just connect VCIN of the controlled units to VCOU of the controlling unit. Since the output impedance of the Omnipressor is low (100ohms or less), adding a couple of loads will not cause too great an error. If it is desired to control a large number of channels from one unit, it would be a good idea to add a voltage follower buffer to the control output.

A voltage controlled "pan pot" (or quad panner) can be implemented with the Omnipressor. See figure 2 for details. In the diagram, the diodes limit the control voltage swing when the pot is turned all the way towards V+, so that at the center the channel gain is unity, and at V+, the variable R can be adjusted for a gain of +3 or +6 db, depending upon the style of panner you prefer. Then, V- and V+ should be adjusted so that when the pot is fully toward V-, the gain is -30 db.

The advantage of this system is that a stereo panner can be effected with a single, low quality linear pot, and a quad panner can be effected with a cheap joystick. Other methods of generating signal position information may also be used. For instance, a signal location may be determined with a light pen and a CRT readout interfaced to a digital mini computer, and the computer could generate the control voltage for the Omnipressors through a digital to analog interface.

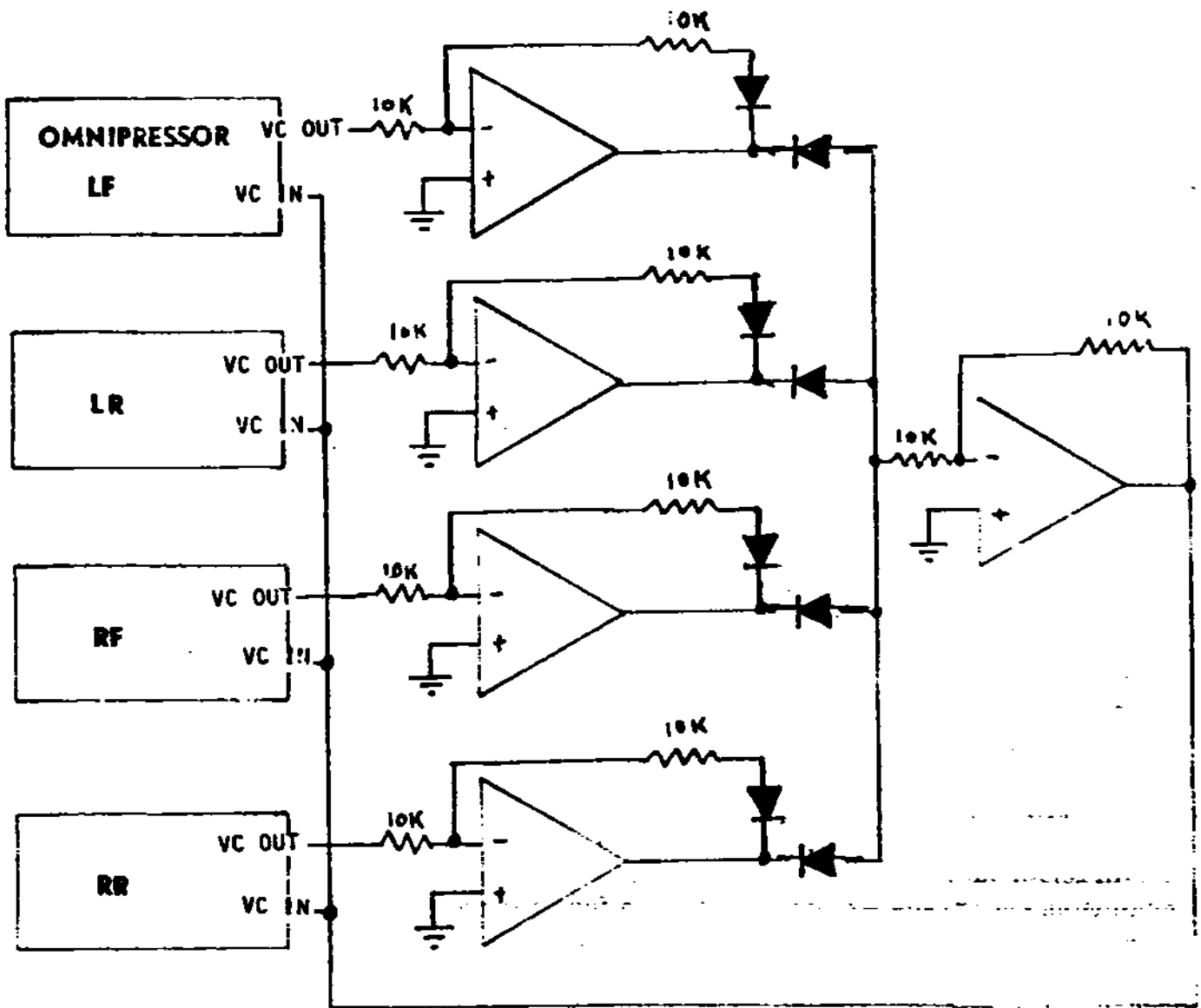


FIG 1

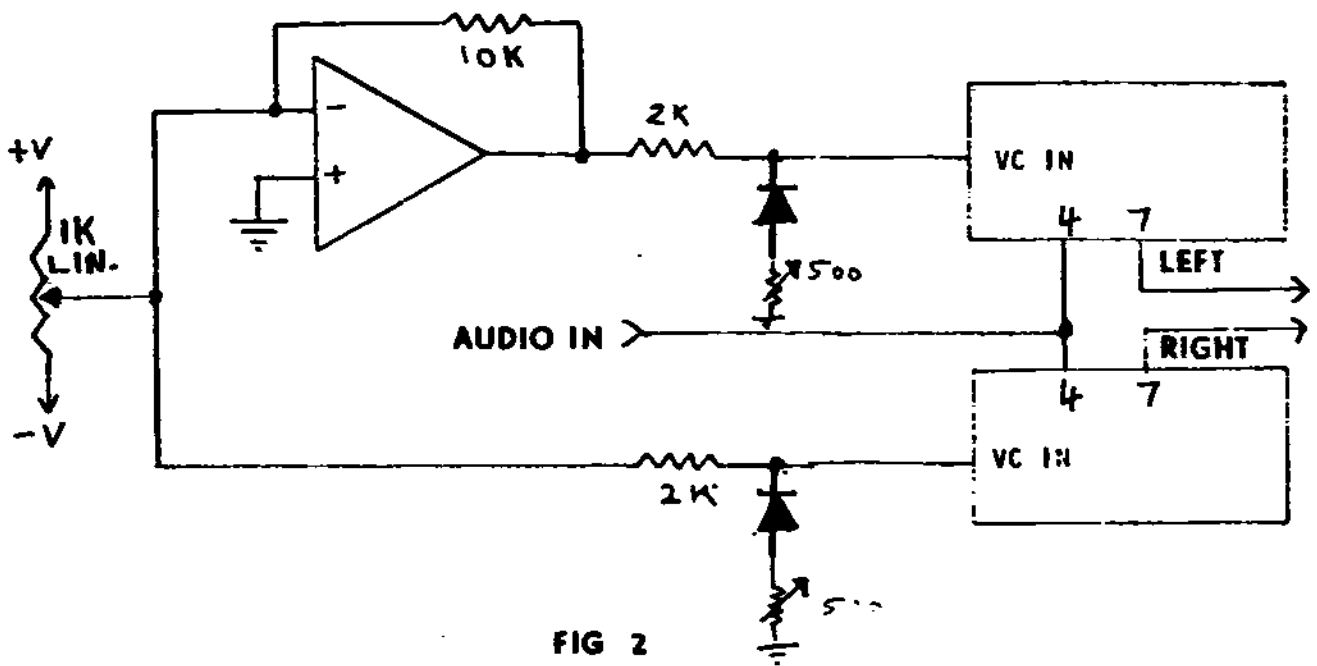
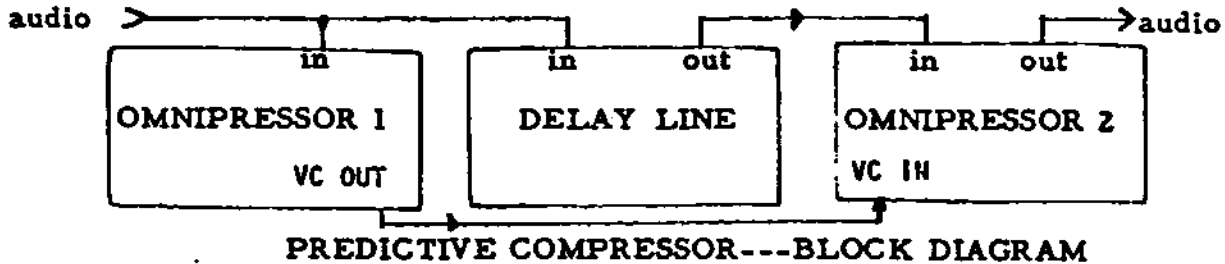


FIG 2

## APPLICATION NOTE #5 PREDICTIVE COMPRESSION

In a previous note, we discussed the possibility of compressing material in reverse order to eliminate the compressor's inherent problem with fast attack transients. In a limiter, fast transients are in effect eliminated by signal clipping before the system gain can adjust to the new level. In a normal compressor, short bursts of high level material can get through before the gain can adjust. The first method creates varying amounts of distortion. The second engenders such phenomena as "p popping". The unique ability of the Omnipressor to separate the gain control from the level detector enables one to build what is most conveniently termed a "predictive" compressor. Such a unit should go a long way towards eliminating the unavoidable imperfections standard units have.



Connect two Omnipressors and an Eventide Digital Delay Line together as shown above. Note that in one Omnipressor, only the gain control section is used, and in the other, only the level detector section is used. What you have just fabricated is a compressor that can read the future, or, in more common parlance, one which has a negative attack time. It works as follows: A signal comes into the level detector which reacts to it depending upon the settings of the controls. Simultaneously, the signal is fed into the delay line which delays it by one or more milliseconds. The signal is then fed to the gain control section of the second Omnipressor. During this delay interval, the level detector has reached the optimum output voltage for the input signal, and before the time the signal reaches the gain control module, the gain has adjusted to the level of the signal.

This predictive mode of operation requires some experimentation to match the signal delay time to the Omnipressor time constant, but when the system is properly adjusted, a very close approximation to the "ideal compressor" is realized.

### LIMITATIONS

This type of operation is particularly effective in applications in which only one signal must be processed. To maintain synchronism, a channel of delay is required for each channel of audio, whether or not that channel is to be otherwise processed. This would become cost prohibitive in any configuration exceeding stereo.

Equipment necessary to realize "predictive compression" has only recently become available. There is much room for experimentation. We would be pleased to know of your results and techniques.

## APPLICATION NOTE #6

### USE OF THE OMNIPRESSOR AS A NOISE REDUCTION UNIT

The Omnipressor makes a good compression/expansion noise reduction unit for enhancing the transmission capability of some medium such as tape, digital equipment, low grade phone lines, etc. While it will not replace a good noise reduction unit such as the DBX or the Dolby for tape (devices intended primarily for noise reduction applications have frequency response tailoring), it will serve in a pinch when one of these devices is not available.

If the Omnipressor is set up as a compressor on the input end (feeding the tape machine or phone line) and as an expander on the output end, then the input dynamic range is compressed during transmission and a medium with, say, forty db dynamic range can appear to have a much wider range. If the input is compressed by a two to one range, and the output is expanded by a factor of 2 to 1, an apparent 80 db range exists for the transmission channel. In practice, this does not precisely obtain, but a very substantial audible improvement is possible with such processing. Since identical circuitry with identical time constants is used to produce compression and expansion, perfect dynamic tracking is obtained. If compression and expansion ratios are set properly, the system should be transparent to the listener.

#### INITIAL SET UP

IN/OUT	IN
THRESHOLD	-10
ATTACK TIME	5ms
RELEASE TIME	50 ms
BASS CUT/NOR	NOR
METER FUNCTION	GAIN
OUTPUT CAL	0
ATTEN LIMIT	CCW
GAIN LIMIT	CCW

Set the FUNCTION control to a compression ratio of 2 for tape recording or sending signals on a transmission channel. Set the FUNCTION control to an expansion ratio of 2 to decode the compressed signal. To go from record to playback with a single Omnipressor, adjusting the FUNCTION control is the only required adjustment. If simultaneous encode and decode is required, be sure that both Omnipressors have identical front panel adjustments,

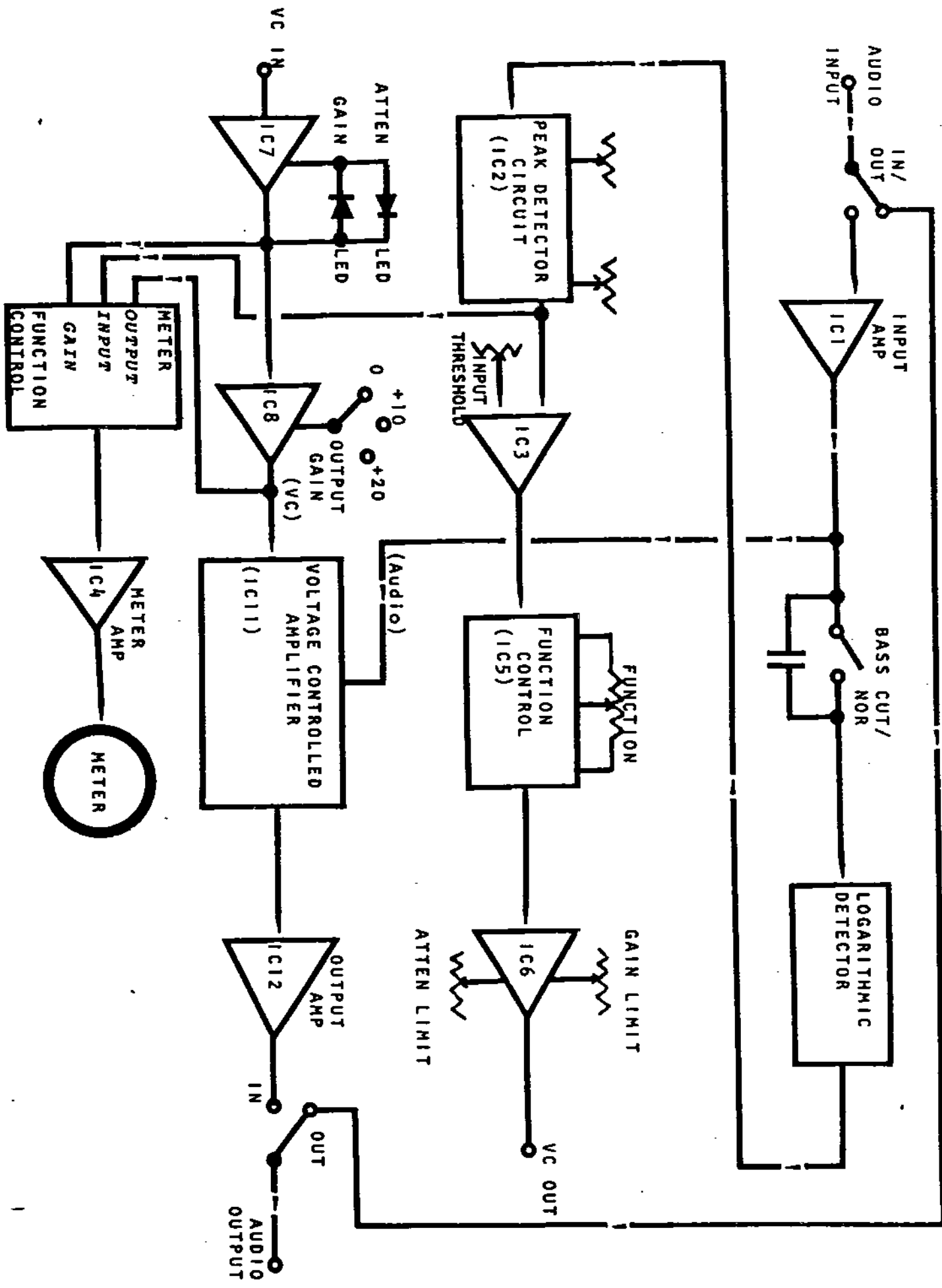
Only the basic set-up is given above. You might wish to experiment with compression/expansion ratios. Also, with certain types of signals, it might be desirable to put the BASS CUT/NOR switch on CUT. Remember that the set-up for encode and decode (compress and expand) should be identical except for the complementary setting of the FUNCTION control.





# **TECHNICAL DATA**

OMNIPRESSOR MODEL 2830 BLOCK DIAGRAM



## THEORY OF OPERATION

The unique features of the Omnipressor, Infinite Compression and Dynamic Reversal, are obtained by a process known as "open loop" operation. A standard, non-open loop compression amplifier operates as follows: the input signal goes through a gain control stage, after which the level is detected. If the output level is too high, a voltage is applied to the gain control stage to lower the output. Thus, the higher the compression ratio, the higher the gain of the amplifier necessary in the level detector to control the output level. Obtaining extremely high compression requires extremely high gain, which requires critical circuitry and can cause instability. This standard type of operation is referred to as "closed loop" because the processed signal level is used to determine further changes in its own amplitude.

Open loop processing, as employed by the Omnipressor, uses a completely independent level detector and gain control stage. The level detector produces a DC output proportional to the AC RMS input. This voltage is linear with respect to the input level variation in decibels. An input change from -30dbm to -10 dbm produces the same DC change as does an input change from +10 to +30 dbm, even though the actual input change measured in absolute terms is much greater. Likewise, the gain control module gives a fixed db change for a given control change in control voltage, regardless of whether the module gain is -30 db or +30 db.

Now, consider what happens when an input signal is applied to both the gain control module and the level detector module. We apply a 0 dbm signal and note that the level detector output is +1 volt. (All the numbers in this example are chosen for simplicity. Actual values will be different.) Now, we apply a +10 dbm signal and note that the level detector output is +2 volts. Assuming that the gain control module works on the same levels (.1 volt per decibel), we can take the DC output from the level detector, apply it to an inverting amplifier, and thence to the gain control module. Depending upon the gain of the inverting amplifier, various compression ratios are available.

INVERTING AMPLIFIER GAIN	INPUT LEVEL CHANGE	OUTPUT LEVEL CHANGE	COMPRESSION RATIO
.5	10db	5db	2
.75	10db	2.5 db	4
.90	10db	1db	10
.95	10db	.5db	20
.99	10db	.1db	100
1	10db	0	infinite
1.5	10db	-5db	-2
4	10db	-40db	-.25

# **Eventide**

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