



# DECIMATOR PRORACK



PROFESSIONAL  
NOISE  
REDUCTION

## DUAL DECIMATOR NOISE REDUCTION **OWNERS MANUAL**

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# INTRODUCTION

The Decimator™ ProRack noise reduction system defines a new standard for excellence in real time noise reduction performance. The Decimator ProRack was designed to provide the maximum possible performance in a rack mount dual channel noise reduction system. The Decimator ProRack has dual processing channels incorporating both low-level downward expansion and dynamically controlled low-pass filtering in a very easy to use single rack space unit. The Decimator ProRack is based on ISP Technologies patent pending "Time Vector Processing" which provides the most adaptively dynamic release response characteristics of any real time noise reduction system. The patent pending Time Vector Processing dynamic response circuit is used to control the release time constant of both the downward expander and dynamic filter.

Please read this manual carefully for a through explanation of the Decimator ProRack and its functions.

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## **IMPORTANT SAFETY INSTRUCTIONS!**

**NOTE: IT IS VERY IMPORTANT THAT YOU READ THIS SECTION TO PROVIDE YEARS OF TROUBLE FREE USE. THIS UNIT REQUIRES CAREFUL HANDLING.**

All warnings on this equipment and in the operation instructions should be adhered to and all operating instructions should be followed.

Do not use this equipment near water. Care should be taken so that objects do not fall onto and liquids are not spilled into the unit through any openings.

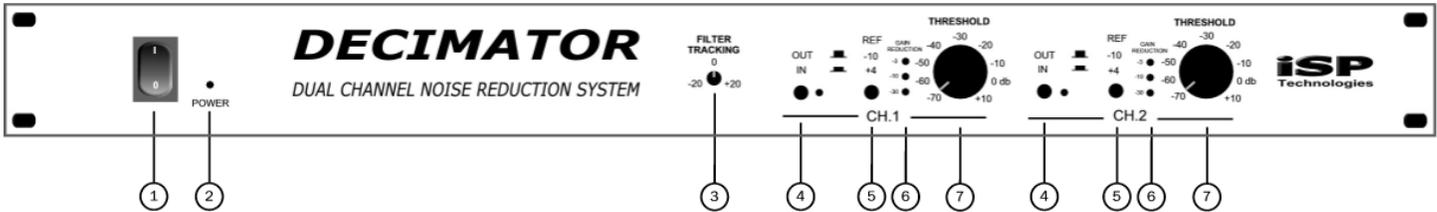
The power cord should be unplugged from the outlet when the unit is left unused for a long period of time.

DO NOT ATTEMPT TO SERVICE THIS EQUIPMENT. THIS EQUIPMENT SHOULD BE SERVICED BY QUALIFIED SERVICE PERSONNEL ONLY. DO NOT MAKE ANY INTERNAL ADJUSTMENTS OR ADDITIONS TO THIS EQUIPMENT AT ANY TIME. FAILURE TO FOLLOW THESE INSTRUCTIONS WILL VOID THE WARRANTY OF THIS EQUIPMENT, AND MAY CAUSE A SHOCK HAZARD.

## **POWER REQUIREMENTS**

This unit accepts power from the 9V AC power adaptor supplied with the unit. This 9V RMS AC voltage is internally processed by a voltage doubler, which generates a bi-polar + and - 15V power supply to maintain the headroom and sound quality of professional, studio quality equipment. Using an external power source minimizes excessive noise and hum problems often associated with internal transformers, providing optimal performance for the user.

# FRONT PANEL



## 1. POWER SWITCH

Switches the unit on and off.

## 2. POWER LED

Indicates when the power is on.

## 3. FILTER TRACKING CONTROL

This control adjusts the sensitivity of the filter threshold in relation to the downward expander threshold. Turning this control clockwise increases the level at which the dynamic filter opens. Turning this control counterclockwise decreases the level at which the dynamic filter opens.

## 4. CHANNEL IN/OUT SWITCH AND LED

This switch is used to switch each individual channel in or out of the circuit path. When the led is lit, the channel is active.

## 5. INPUT/OUTPUT REFERENCE LEVEL SWITCH

This switch changes the input and output operating reference level of each individual channel from  $-10\text{dbu}$  when switched out, to  $+4\text{dbu}$  when switched in.

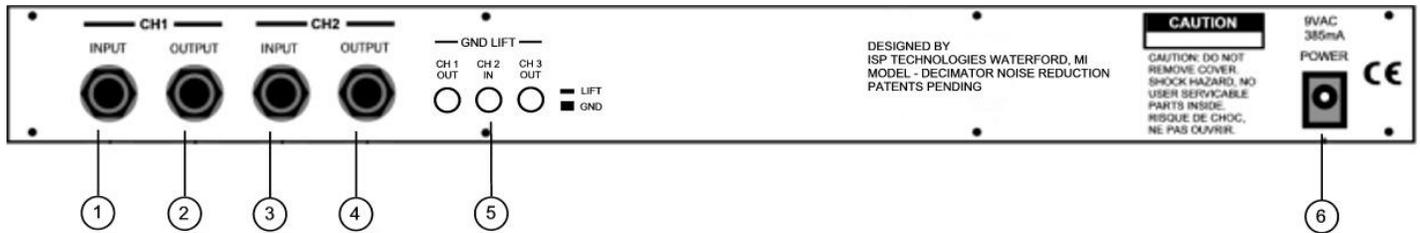
## 6. GAIN REDUCTION METER

This meter indicates the current amount of gain reduction (in decibels) taking place in each channel.

## 7. CHANNEL THRESHOLD

This is the master threshold for each individual channel. This control is used to adjust the threshold for both the dynamically controlled low pass filter and the low level downward expander. **NOTE:** Adjusting the *Filter Tracking* control will shift the sensitivity of the dynamic filter in relation to the sensitivity of the downward expander.

# REAR PANEL



## 1. CHANNEL 1 INPUT JACK

This ¼ inch mono jack provides the high impedance input for connection to your audio device.

## 2. CHANNEL 1 OUTPUT JACK

This ¼ inch mono jack provides the unbalanced output signal for channel 1.

## 3. CHANNEL 2 INPUT JACK

This ¼ inch mono jack provides a balanced input for the audio path channel 2.

## 4. CHANNEL 2 OUTPUT JACK

This ¼ inch mono jack provides the unbalanced output signal for channel 2.

## 5. GROUND LIFT SWITCHES\*

All switches eliminate the ground connection for the illustrated channel input or output.

## 6. POWER INPUT JACK

This jack connector accepts power from the 9V AC adaptor supplied with the unit.

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## OPERATION

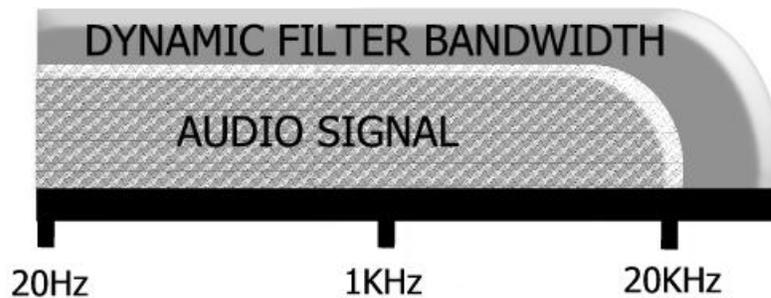
When properly used, the Decimator ProRack should be completely transparent; it should have no effect on the audio signal other than to remove the background noise. To maximize the performance of the Decimator, it is necessary to understand both the operation of the controls and the principles of how the internal circuit operates. After this understanding, it will be easier to set up the Decimator ProRack to suit any application.

### Principles of the Decimator ProRack operation:

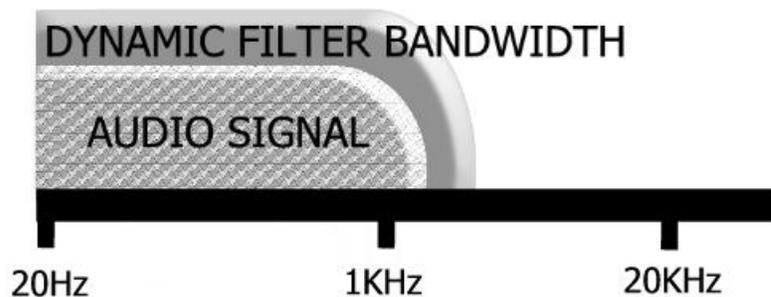
The Decimator achieves noise reduction by employing two individual noise reduction processes, which work cohesively together to attain superior results. These two processes are:

1. Dynamic Low Pass Filtering
2. Low Level Downward Expansion

**Dynamic Low Pass Filtering** is done by use of a high quality voltage controlled sliding filter. A frequency sensitive audio level detection circuit incorporating ISP Technologies patent pending Time Vector Processing circuit controls the dynamic filter. When the audio input signal contains high frequency information the dynamic filter increases in bandwidth to allow the audio signal to pass unaltered and shown in the simplified graph below.



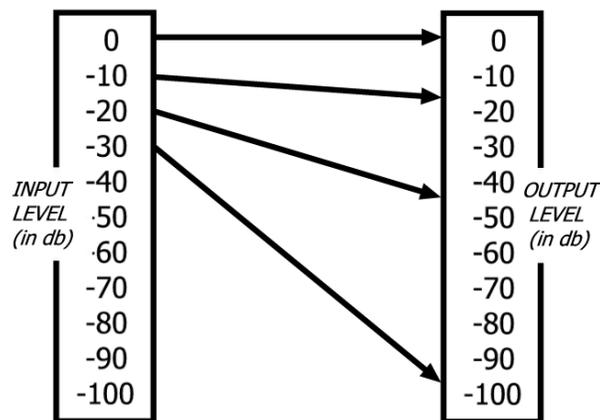
When the high frequency information in the input signal decreases the dynamic filter bandwidth will track the decrease in high frequency and eliminate high frequency noise that remains in the input signal. The simplified graph below shows the dynamic filter response when there is no high frequency audio above 1KHz.



The release time of the dynamic filter is controlled by the Time Vector Processing circuit, which determines the release characteristics of the input signal and automatically varies the release response of the dynamic filter.

**Low Level Downward Expansion** is performed by use of a high quality voltage controlled amplifier controlled by an RMS based audio level detection circuit. A second Time Vector Processing circuit that varies the release response over a 1000 to 1 ratio controls the release response of the Downward Expander. The release response will be extremely fast, on the order of 2 milliseconds, if the input signal has a fast decaying envelope and upwards of 2 seconds if the input signal has a slow decaying signal. Downward Expansion takes place when the input signal level drops below the preset threshold. For example: if the threshold is set for 0db and input signal of 0db will produce no expansion. As the input signal drops below 0db downward expansion starts and increases exponentially the farther the input signal drops below the threshold point. The graph below shows the response of the Expander with a 0db threshold.

### TYPICAL EXPANSION RATIO with a threshold setting of 0db.

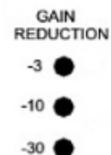


*As the input signal level decreases at the input below the threshold*

*This output signal level will decrease exponentially*

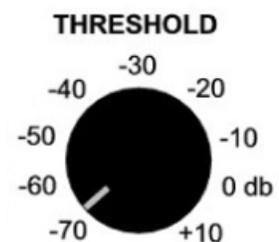
To set up the Decimator ProRack for proper operation first determine the reference level of the system that the Decimator will be connected to. Most professional products operate at a +4dbu reference level. Music equipment typically operates at -10dbu. Once the proper reference level is determined set the reference level switch on both channels accordingly.

**The GAIN REDUCTION meter on each channel indicates the amount of gain reduction in decibels that the downward expander is providing at any time.**



### SETTING THE DECIMATOR THRESHOLD

The **THRESHOLD** control adjusts both the expander and dynamic filter sensitivity. Start by setting both the Threshold and Filter Tracking for minimum, full counterclockwise. Turn the Threshold control clockwise until the desired effect of the downward expander is achieved. The expander should start to operate when there are gaps in the audio or as the input signal gets close to the noise floor. **NOTE:** Setting this control to high will cause the expander to start to cut off the input signal to soon.



## SETTING THE FILTER TRACKING CONTROL

The **FILTER TRACKING** control adjusts the relationship between the sensitivity of the Dynamic Filter and the Expander. Once the THRESHOLD control is set for proper operation of the downward expander increase the FILTER TRACKING control until the desired dynamic filter operation is achieved. Setting this control to high will cause the filter to not fully open when high frequency signals are present. Setting this control to low will not provide any high frequency noise reduction. The Filter Tracking adjusts the tracking for both channels.



Once the filter is set correctly the dynamic filter will provide high frequency noise reduction at all input signal levels. For example; if a high level input signal is present at the input that contains low and mid frequency information but little or no high frequency information the filter bandwidth will close to a point just above the highest input frequency. The instant the input signal contains a high frequency audio signal the bandwidth of the filter will open so as to allow the highs to pass unaltered. Since the ear cannot detect a low level signal in the presence of a higher level signal in the same frequency band the input signal will mask the audibility of the high frequency noise. As the high frequency information in the input signal decays the filter will close to reduce the audible level of the background noise. When set properly, the Decimator should virtually eliminate all background noise and should operate with total transparency.

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## SPECIFICATIONS

<b>Input Impedance</b>	<b>24K ohms</b>
<b>Maximum Input Level</b>	<b>+19dbu typical</b>
<b>Input / Output Jack</b>	<b>1/4 Balanced / 1/4 Unbalanced</b>
<b>Frequency Response</b>	<b>+.1,-.5db, 20Hz to 30KHz</b>
<b>Total Harmonic Distortion</b>	<b>Less than .02% Typical</b>
<b>Dynamic Range</b>	<b>115db, Peak to A weighted floor</b>
<b>Effective Noise Reduction</b>	<b>Greater than 60db</b>
<b>Dynamic Filter Attenuation Slope</b>	<b>6db per Octave</b>
<b>Noise Floor</b>	<b>-110 A weighted typical -10 ref</b>
<b>Power Requirements</b>	<b>9V AC 385ma</b>
<b>Dimensions</b>	<b>19" x 6" x 1 3/4"</b>

**NOTE: ODBU = .775V RMS**

**NOTE: This Product may be covered under one or more of the following patents or patents pending: 7,035,413; 6,944,305; 6,931,134; 6,831,514; 6,091,013**

# WARRANTY AND SERVICE

The Internal Circuitry is fully guaranteed to be free of defects under normal use and service for a period of three years from the date of purchase. Any damage resulting from the misuse or the failure to follow the precautions and instructions will void the warranty.

In the event that the unit needs to be repaired, please return the unit to ISP Technologies directly. Simply repack the unit, send a copy of the original receipt, a note stating the problem, and send it to:

ISP Technologies, LLC  
5479 Perry Drive Unit B  
Waterford, MI 48329  
Attn: Repair Dept.

All shipping charges must be fully prepaid.

ISP will not be responsible for any damages incurred in shipping of any unit. Any claim will need to be settled with the shipping company.

The warranty will be voided if the serial number has been tampered with in any way.

The warranty card must also be filled out and returned in order to activate the warranty.

**INTERNATIONAL CUSTOMERS PLEASE NOTE:** ISP Technologies' policy is to ship USA product to our USA retailers with 110VAC power supplies **only**, which function properly in the USA and Canada. Purchasing ISP Technologies product from a retailer or authorized ISP Technologies distributor within **your** own country guarantees receipt of the proper voltage power supply for operation in your country, as well as coverage and service under the ISP Technologies warranty policy. Should you purchase from a USA retailer, none of whom are authorized to sell out of the USA, you must rely on that *same* retailer for warranty coverage. If you cannot find a dealer in your country, contact ISP Technologies directly for assistance.

Should you have any questions for the repair department prior to returning the product please call 1-(248)-673-7790



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