

DP1

DYNAMIC PROCESSOR MODULE

OPERATING INSTRUCTIONS and trouble-shooting guide

LECTROSONICS, INC.
Rio Rancho, NM

INTRODUCTION

The DP1 Dynamic Processor Module provides complete dynamic control of signals in a sound system. The DP1 incorporates three separate subsystems designed to control, interactively, long term average levels, short term average levels, and peak levels. In addition, the DP1 has an adjustable dynamic pop suppression circuit. This circuit consists of a signal dependant high-pass filter, which detects the presence of excessive low frequency energy and attenuates it. This circuit is effective not only on low frequency transients (such as pops), but also helps minimize proximity effects when using cardioid microphones. Because the pop suppression circuit is dynamic, normal frequency response is not effected.

TABLE OF CONTENTS

INTRODUCTION	1
TABLE OF CONTENTS	1
GENERAL TECHNICAL DESCRIPTION	2
INSTALLATION	3
FRONT PANEL DESCRIPTION	4
REAR PANEL DESCRIPTION	4
OPERATING INSTRUCTIONS	5
SERVICE AND REPAIR	6
RETURNING UNITS FOR REPAIR	6
SPECIFICATIONS	7
WARRANTY	Back cover

GENERAL TECHNICAL DESCRIPTION

The DP1 is a sophisticated multi-function gain control device. Because of this, before covering the specifics of the circuit functioning, a short discussion of the two main modes of operation will be given.

Since the DP1 is capable of adding as much as 40dB of gain (with both the Input and Output Level controls at Max), care must be exercised in the initial setup of the device to prevent the possibility of feedback.

The DP1 may be used in (at least) two ways - either as simply a limiter for high signal levels, or a full gain control which will both attenuate louder signals and bring up weaker signals. Which way to use the DP1 will be dictated largely by the amount of gain before feedback available from the sound system.

In systems which have little gain margin (i.e. the amount in Db that system gain may be increased before the onset of ringing and feedback), the DP1 may be used very effectively to limit high level signals. This provides protection not only for the sound system, but also the listeners. For sound systems with more than 6-10dB of gain margin, it is possible to configure the DP1 so that there exists 5-8dB of gain reduction in the system for "average" talkers. This allows weaker talkers to be boosted by as much as the amount of average gain reduction. In this way the sound system signal level will be much more uniform, regardless of the strength or weakness of different talkers.

The input of the DP1 is electronically balanced and RF filtered.

The DP1 consists of three interactive gain control circuits, as well as a dynamic pop suppressor. Control of gain and dynamics is accomplished on a long and short term average basis, as well as a peak basis. Input and output level controls are provided to allow proper interface with the rest of the sound system.

The leveler portion of the DP1 is the long term average gain controller. This function is analogous to an operator increasing or decreasing system gain in response to a talker who is either softer or louder than average. Gain changes are made at 6-10dB/second to avoid any abrupt changes in average level.

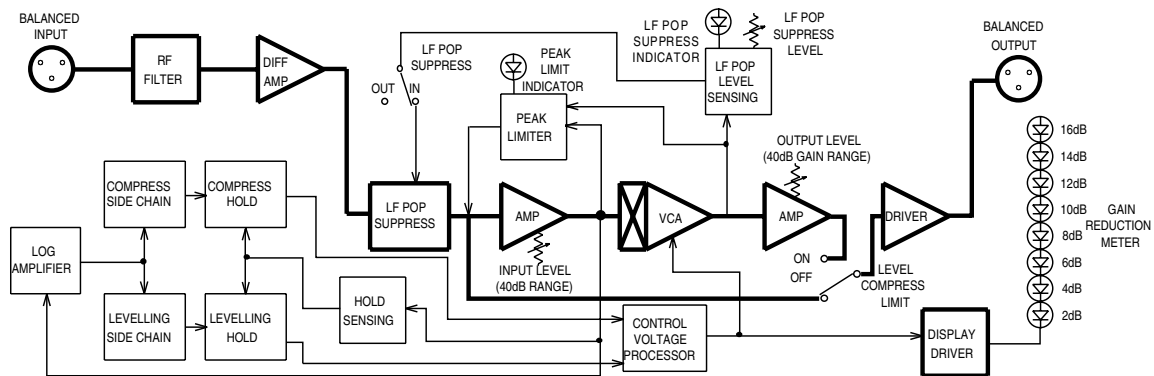


Figure 1 - DP1 Block Diagram

The compressor portion of the DP1 controls the short term average gain. As talkers move quickly toward or away from a microphone, the compressor function serves to counteract level changes in the system output. Compressor attack and release times are optimized for natural control of short term average level deviations. The leveler and compressor both contribute simultaneously to the system gain reduction. For a static signal and a given amount of gain reduction, the compressor and leveler each provide half of the total gain reduction.

The peak limiter portion of the DP1 sets an absolute ceiling on the output level of the system. The peak limiter has very fast attack and release times, and is only engaged when the peak signal level exceeds the average level by 15dB.

In conjunction with the compressor and leveler circuits, a signal dependent "hold" circuit senses both momentary pauses in speech and longer term silence. During these periods, all gain change is inhibited. This function eliminates breathing, pumping, and any increase in background hiss in the absence of signal.

The dynamic pop suppressor portion of the DP1 senses the level of all signals below 200Hz, and acts as a dynamic high-pass filter to limit low frequency energy. The setting of the Pop Suppress Level control determines the extent of the pop suppression action.

The output circuit is an electronically balanced and floating type, which is also RF filtered

INSTALLATION

The DP1 module is installed from the rear of the Modular Audio Processor mainframe. The printed circuit board fits into one of the ten sets of card guides provided in the mainframe. The module is then slid forward in the mainframe until the female connector on the board is firmly seated on the male pins of the bus board. Care should be taken when inserting the female connector onto the pins to be sure there is correct alignment. Four #4 machine screws are provided to fasten the rear panel to the top and bottom rear rails of the Modular Audio Processor mainframe. In addition, four #4 countersink machine screws are provided to secure the cover panel, also provided, on the front of the Modular Audio Processor mainframe after system adjustment is complete.

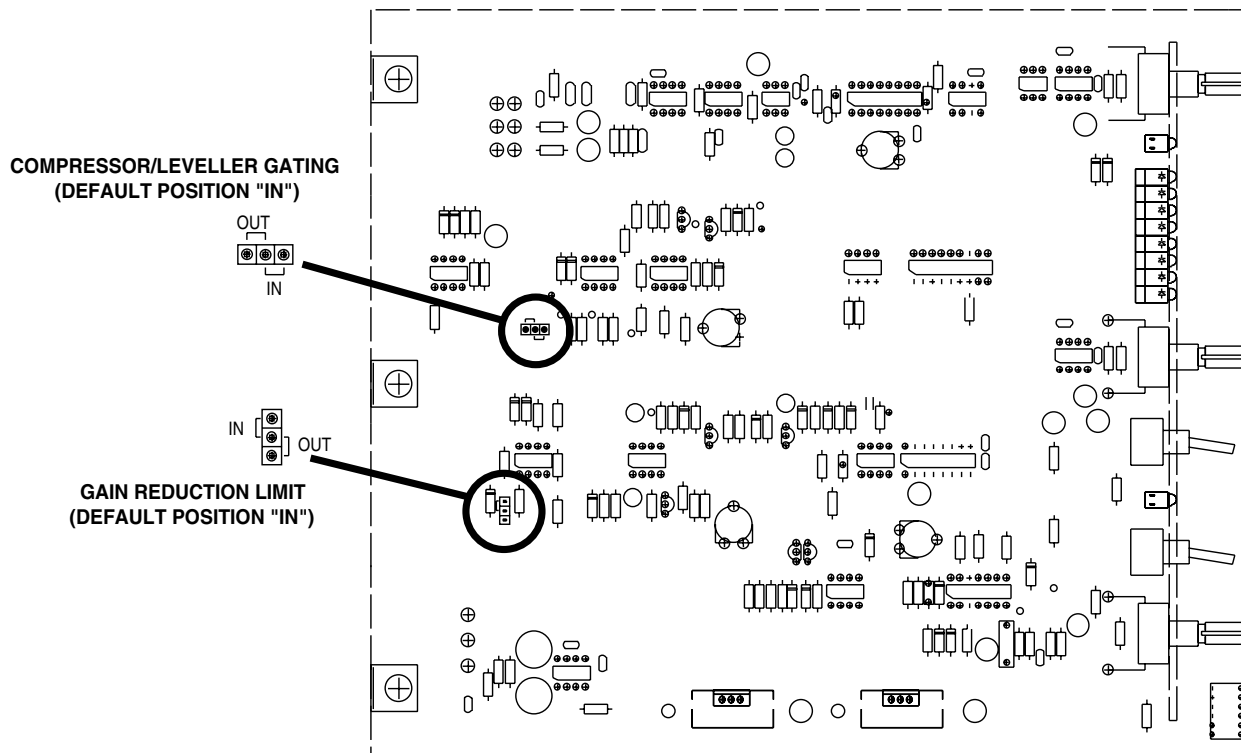
Check the positions of the following jumpers and set as necessary.

GAIN REDUCTION LIMIT JUMPER

Limits the maximum gain reduction possible to 20 dB. In the other position, virtually unlimited gain reduction is possible.

HOLD CIRCUIT DEFEAT JUMPER

This jumper defeats the automatic hold action in the compressor/leveler section. The factory default position enables the hold function.



FRONT PANEL DESCRIPTION

INPUT GAIN - Adjusts the input signal level to achieve the desired gain reduction under normal signal conditions. Gain is adjustable over a 40dB range, from -20dB to +20dB.

LIMITER LED - Indicates peak limiting is occurring. The limit level is fixed at 15dB above the average signal level.

GAIN REDUCTION METER - Indicates the total gain reduction of the DP1. Each of the 8 green LEDs represent 2dB increments to provide 16dB of gain reduction metering.

OUTPUT LEVEL - Adjusts the level of the output signal. Gain is adjustable over a 40dB range, from -20dB to +20dB. Adjustment of the Output Level has no effect on the amount of gain reduction or pop suppression.

DYNAMIC PROCESS - Enables or disables the compressor/leveler function. In the OFF position, both the Output and Input Level controls are bypassed. The Pop Suppression function is still operational if the Pop Suppress ON/OFF switch is in the In position.

LF POP SUPPRESS LED - Indicates the amount Pop Suppression. As more suppression action happens, the LED flashes more often. This LED may flash even when the associated toggle switch is OFF. In this case the LED indicates the amount of pop suppression that would take place if the circuit were enabled.

LF POP SUPPRESS ON/OFF - Enables or disables the pop suppression function. This switch has no effect on the compressor/leveler function.

SENSITIVITY - Adjusts the amount of pop suppression. As the control is rotated clockwise, low frequency transients at a progressively lower level will be limited by the circuit.

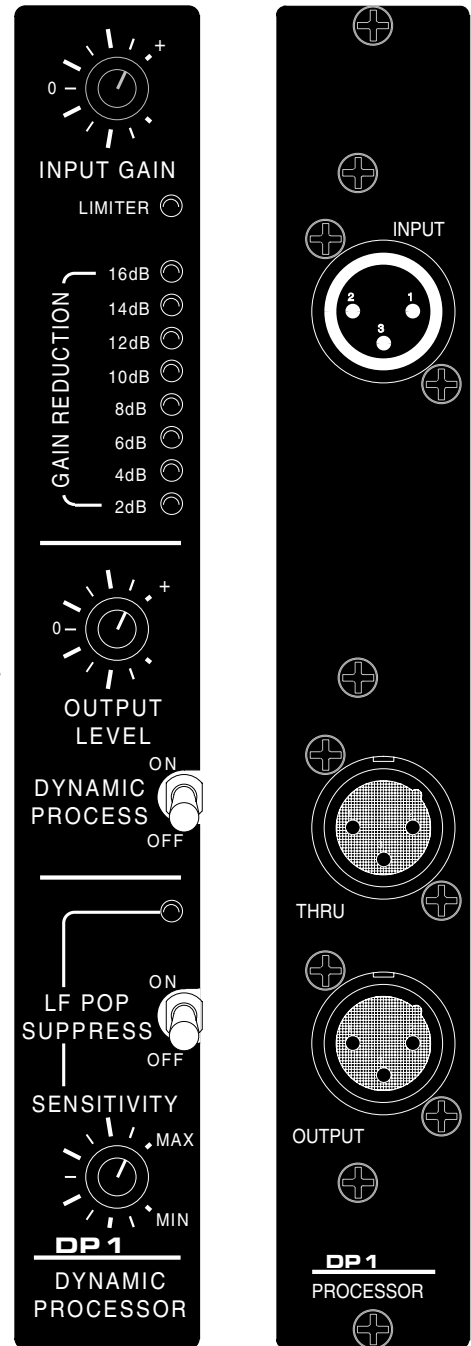
NOTE: The overall input/output level is at unity when the **INPUT GAIN** and **OUTPUT LEVEL** controls are at the 9:00 position (mid point).

REAR PANEL

INPUT - Accepts line level inputs. Electronically balanced and RF filtered signal input. Pin 2 is "+", pin 3 is "-", and pin 1 is ground.

THRU - Provides an output which is in parallel with the Input. Can be used if a signal is needed which is not passed through the DP1 internal circuitry.

OUTPUT - Provides a line level output. Electronically balanced and floating, and RF filtered. Pin 2 is "+", pin 3 is "-", and pin 1 is ground.



OPERATING INSTRUCTIONS

The following instructions assume a properly set up automatic or standard system.

- 1) If the system is an automatic system, place the microphone which will be most frequently used in the DIRECT position. This will guarantee that the automatic action does not interfere with the correct adjustment of the DP1. At the end of the procedure, return the mic channel MODE switch to the desired position.
- 2) Turn the DYNAMIC PROCESS switch on the DP1 off and set the INPUT GAIN and OUTPUT LEVEL controls for unity gain (9 o'clock position - see front panel description). Have someone speak into the open microphone and adjust the AC1 controller MAIN LEVEL control for the proper volume level in the sound system. Leave the AC1 output level set here for the remaining steps.
- 3) Switch the DYNAMIC PROCESS switch to the ON position. Set the OUTPUT LEVEL control to minimum (fully counterclockwise). With a talker speaking at a normal level into the microphone, adjust the INPUT GAIN control until one of the following conditions occurs:
 - A) 5-8dB of average gain reduction (as shown on the GAIN REDUCTION LED meter) is achieved, if the sound system has sufficient gain margin
 - B) Gain reduction is just beginning to occur on the talker's peaks.
- 4) Adjust the OUTPUT LEVEL control until sound system level is acceptable.
- 5) Have the talker lower his or her voice until the GAIN REDUCTION meter shows no gain reduction (i.e. no green LEDs are lit). If the sound system is stable, with no sign of ringing or feedback, proceed to step 5. If the sound system is ringing or feeding back, either reduce the OUTPUT LEVEL control, or reset the average gain reduction to a lower number of dB as in step 2-A.
- 6) If pop suppression is desired, set the LF POP SUPPRESS switch to the ON position. Have a talker speak into the microphone, and adjust the LF POP SUPPRESS SENSITIVITY control until low frequency transients are eliminated. Pop suppression is also useful to counteract proximity effects when using cardioid microphones.

SERVICE AND REPAIR

If your system malfunctions, you should attempt to correct or isolate the trouble before concluding that the equipment needs repair. Make sure you have followed the setup procedure and operating instructions. Check out the inter-connecting cords and then go through the TROUBLE SHOOTING section in the manual

We strongly recommend that you **do not** try to repair the equipment yourself and **do not** have the local repair shop attempt anything other than the simplest repair. If the repair is more complicated than a broken wire or loose connection, send the unit to the factory for repair and service. Don't attempt to adjust any controls inside the units. Once set at the factory, the various controls and trimmers do not drift with age or vibration and never require readjustment. **There are no adjustments inside that will make a malfunctioning unit start working.**

LECTROSONICS service department is equipped and staffed to quickly repair your equipment. In-warranty repairs are made at no charge in accordance with the terms of the warranty. Out of warranty repairs are charged at a modest flat rate plus parts and shipping. Since it takes almost as much time and effort to determine what is wrong as it does to make the repair, there is a charge for an exact quotation. We will be happy to quote approximate charges by phone for out of warranty repairs.

RETURNING UNITS FOR REPAIR

You will save yourself time and trouble if you will follow the steps below:

- A. DO NOT return equipment to the factory for repair without first contacting us by letter or by phone. We need to know the nature of the problem, the model number and the serial number of the equipment. We also need a phone number where you can be reached 8 am to 4 pm (Mountain Standard Time).
- B. After receiving your request, we will issue you a return authorization number (R.A.). This number will help speed your repair through our receiving and repair departments. The return authorization number must be clearly shown on the outside of the shipping container.
- C. Pack the equipment carefully and ship to us, shipping costs prepaid. If necessary, we can provide you with the proper packing materials. UPS is usually the best way to ship the units. Heavy units should be "double-boxed" for safe transport.
- D. We also strongly recommend that you insure the equipment, since we cannot be responsible for loss of or damage to equipment that you ship. Of course, we insure the equipment when we ship it back to you.

Mailing address:
Lectrosonics, Inc.
PO Box 15900
Rio Rancho, NM 87174
USA

Shipping address:
Lectrosonics, Inc.
581 Laser Rd.
Rio Rancho, NM 87124
USA

Telephones:
(505) 892-4501
(800) 821-1121
FAX: (505) 892-6243

World Wide Web: <http://www.lectrosonics.com>

email: sales@lectrosonics.com

SPECIFICATIONS

Input:

Type:	Balanced and RF filtered
Impedance:	20K balanced or unbalanced
Max input level:	+20dBu
Gain Range:	40dB (-20dB to +20dB)

Output:

Type:	Balanced, floating, and RF filtered
Impedance:	100 Ohms balanced, 50 Ohms unbalanced
Max output level:	+20dBu
Gain Range:	40dB (-20dB to +20dB)

THD @ 10dB Gain Reduction: < 0.05% @ 1kHz, <0.1% 20-20kHz

IMD @ 10dB Gain Reduction: < 0.1%
(60/7kHz mixed 4:1)

Noise (20-20kHz) 82dBu
(No gain reduction, all controls at unity)

Dynamic Parameters:

Limiter Attack Time:	1mS
Limiter Release Time:	50mS

Compressor Attack Time:	50mS
Compressor Release Time:	500mS

Leveller Rate: 6-10dB/second

LF Transient Suppression: 15dB max @100Hz

LIMITED ONE YEAR WARRANTY

The equipment is warranted for one year from date of purchase against defects in materials or workmanship provided it was purchased from an authorized dealer. This warranty does not cover equipment which has been abused or damaged by careless handling or shipping. This warranty does not apply to used or demonstrator equipment.

Should any defect develop, we will, at our option, repair or replace any defective parts without charge for either parts or labor. If we cannot correct the defect in your equipment, we will replace it at no charge with a similar new item. We will pay for the cost of returning your merchandise to you.

This warranty applies only to items returned to us, shipping costs prepaid, within one year from the date of purchase.

This warranty gives you specific legal rights. You may have additional legal rights which vary from state to state.

LECTROSONICS, INC.

581 LASER ROAD
RIO RANCHO, NM 87124 USA

March 10, 1994