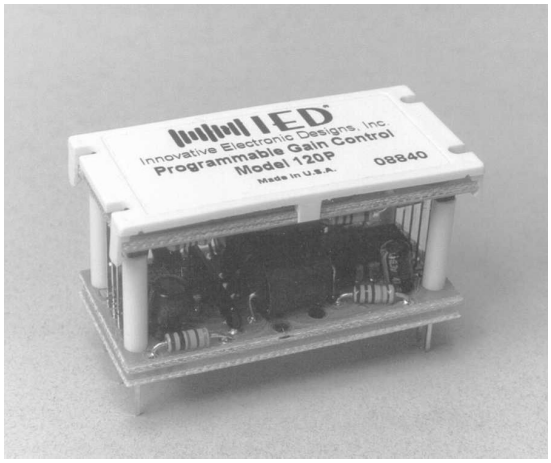
IED MODEL 120P

PROGRAMMABLE GAIN CONTROL

OVERVIEW



The 120P programmable gain control module is designed to provide automatic gain control for voice audio channels on many IED audio circuit cards. It provides the automatic level control on individual channels of the IED 4000 Series Automatic Mixer cards.

The 120P operates quite differently from many other commonly used circuits in that it holds the gain setting indefinitely when the signal level drops below the sampling threshold. The reaction time was chosen to have no effect on the sound quality of normal speech, yet it will readjust levels quickly at first, then gradually and smoothly bringing the output back to the original level over a range of about 40 dB.

The IED Model 120P is not a compressor. Compressors vary gain in a time frame comparable to the period of the low frequency end of the usable audio spectrum, and therefore inherently distort these frequencies. Also, when the signal stops, even temporarily between speech syllables, compressor gain returns to maximum. As a result, when the input signal returns, the initial output signal level is much higher than when the input stopped. When this condition occurs repeatedly the result, called “pumping’, is audible and objectionable.

The Model 120P varies gain slowly, in a time frame comparable to an operator at a console. Therefore, the changes are undetectable, and have no effect on distortion. Moreover, if the input cuts off (such as when a speaker pauses or yields to another speaker), just like the console operator the 120P holds the gain setting and does not change it until necessary, when an input is present at a different level.

FEATURES:

- Smooth Gain Correction
- Effectively Infinite Gain Hold Time
- Stops Feedback
- Like an Experienced Operator “Riding” Gain
- Superior Audio Performance
- Compact Size
- Cost Effective
- Provides a Constant, Average Output

IED®
Innovative Electronic Designs

APPLICATIONS INFORMATION:

The IED 120P Programmable Gain Control was designed for use in systems requiring hands-off operation in applications such as:

- Churches
- Convention Centers
- Meeting Rooms
- Courtrooms
- Schools
- Hotels/Motels
- Legislatures
- Auditoriums

Any location where a high quality properly adjusted sound system is desired, but an expert sound technician cannot be in attendance at all times is an application for the 120P. The Model 120P is not just another AGC or ALC. Its no-compromise performance will compensate for a wide range of input levels such as those resulting from such factors as loud or soft voice levels and varying distances from the microphone. Furthermore, the 1 20P stops feedback. If encountered, it will back off to just below the feedback level. Because of its virtually infinite release time it will hold that level without repeatedly going back into feedback as AGC or ALC circuits do. If the microphone is not used for a period of time (such as when, for example, one speaker yields to another using a different microphone), when used again, it will come back at essentially the same gain level rather than "wide open" as with other circuits. When the input signal drops below –36 dB, the sampling threshold, the gain set function is switched off and the gain is "frozen" and "remembered" for a very long period.

In the ON state for low signal levels up about –18 dB the gain is just under 20 dB. Above –18 dB the 120P goes smoothly into gain reduction, keeping the output between +2dBu and +7dBu.

The control pin provides for override of the automatic functions. A voltage between +3 and +15 V will put the 120P in an accurate fixed-gain mode of +20 dB.

SPECIFICATIONS:

ELECTRICAL at +1 5V, -1 5V, 25C (77F)

Gain, Forced Up	20 dB
Gain, at Maximum Input Level	–15 dB
Frequency Response 20 Hz - 20 kHz, +4 dBu	±1 dB
Maximum Input Level	+21 dBu
Maximum Output Level $R_L \geq 2$ kΩ	+21 dBu
Total Harmonic Distortion, THD. +4 dBu, 20 Hz - 20 kHz 10 Hz - 80 kHz filters	<0.05%
Intermodulation Distortion, IM +4 dBu, 60 Hz + 7 kHz	0 2%
Noise Referred to the Input, NRI 22 Hz - 22 kHz filters	–86 dBu
Sampling Threshold	–-36 dBu
Gain Reduction Threshold	–18 dBu

Innovative Electronic Designs, Inc. • 9701 Taylorsville Road • Louisville, Kentucky 40299 • USA
Phone: (502) 267-7436 • Fax: (502) 267-9070 • Internet: http://www.iedaudio.com

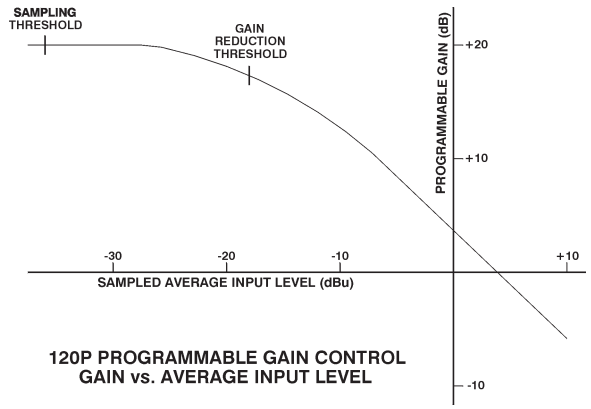
External Control Voltage
Normal Operation 0V
System Setup (gain forced up) . . . . . +3V to +15V
Input Impedance, Z_{IN} . . . . . 20 kΩ
Output Impedance, Z_{OUT} .5 L2
Power Supply
Supply Voltage Range . . . . . ±13.5V to ±16.5V
Supply Current +18 mA, –18 mA
V = +15V . . . . . 18 mA
V = –15 V . . . . . 18 mA

MECHANICAL

Size . . . . . 0.90” H X 0.95” W X 1.95” L
Weight . . . . . (23g)0.79 Oz.

PIN CONNECTIONS

PIN	FUNCTION	PIN	FUNCTION
1	Input +	8	+15 V
2	No Pin	9	–15 V
3	No Pin	10	No Pin
4	Ground	11	Ground
5	No Pin	12	No pin
6	No Pin	13	No Pin
7	Output +	14	Control



120P PROGRAMMABLE GAIN CONTROL
GAIN vs. AVERAGE INPUT LEVEL

IED Innovative Electronic Designs

This page left blank intentionally

Innovative Electronic Designs, Inc. • 9701 Taylorsville Road • Louisville, Kentucky 40299 • USA
Phone: (502) 267-7436 • Fax: (502) 267-9070 • Internet: http://www.iedaudio.com