How to GAIN·BRAIN™ in 20 Minutes!

A Handy Guide to Level Control

by

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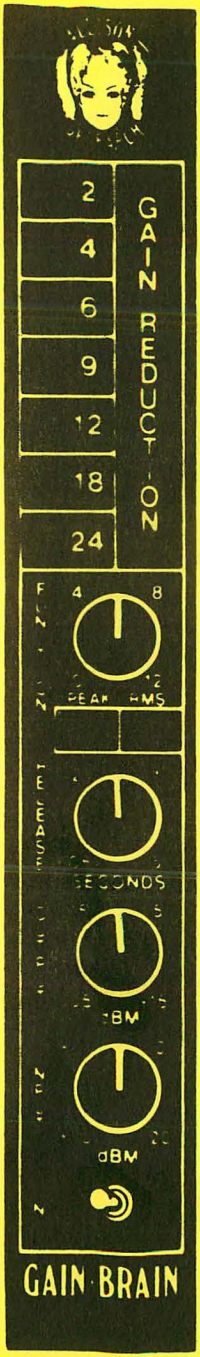
FRONT PANEL CONTROLS...



METER - Indicates the amount of gain reduction and is calibrated in dB.

FUNCTION - Controls the relative action of the PEAK and RMS thresholds and is adjusted to give the desired "sound" for a given program material. In PEAK (full CCW) position, GAIN BRAIN functions as a peak limiter, in RMS (full CW) position as a quasi-RMS limiter.

PEAK/RMS INDICATORS - Indicates when and what kind of limiting is happening.

RELEASE - Adjusts recovery characteristics to suit the application. The panel calibrations apply to PEAK activated limiting. As the FUNCTION control is rotated toward RMS position, the actual release time will become longer than indicated. This effect is most apparent at fast release times and prevents low frequency sustained waveforms from causing excessive distortion.

OUTPUT - Controls output level.

INPUT - Controls input gain and establishes the threshold of limiting.

IN/OUT SWITCH - Removes limiting networks from operation. Input and output level controls are still operative.

. . .AND HOW TO USE THEM

Once the GAIN BRAIN has been mounted and provided with power (see inside pages), operation is simple and straight-forward as follows:

1. The program source to be processed should be connected to the input and should appear at a level between -20dBm and +20dBm.

2. With the IN/OUT switch in the IN position, adjust the INPUT control to achieve the desired amount of limiting. The amount of limiting may be read on the METER.

3. Adjust the OUTPUT control to yield the desired maximum output level.

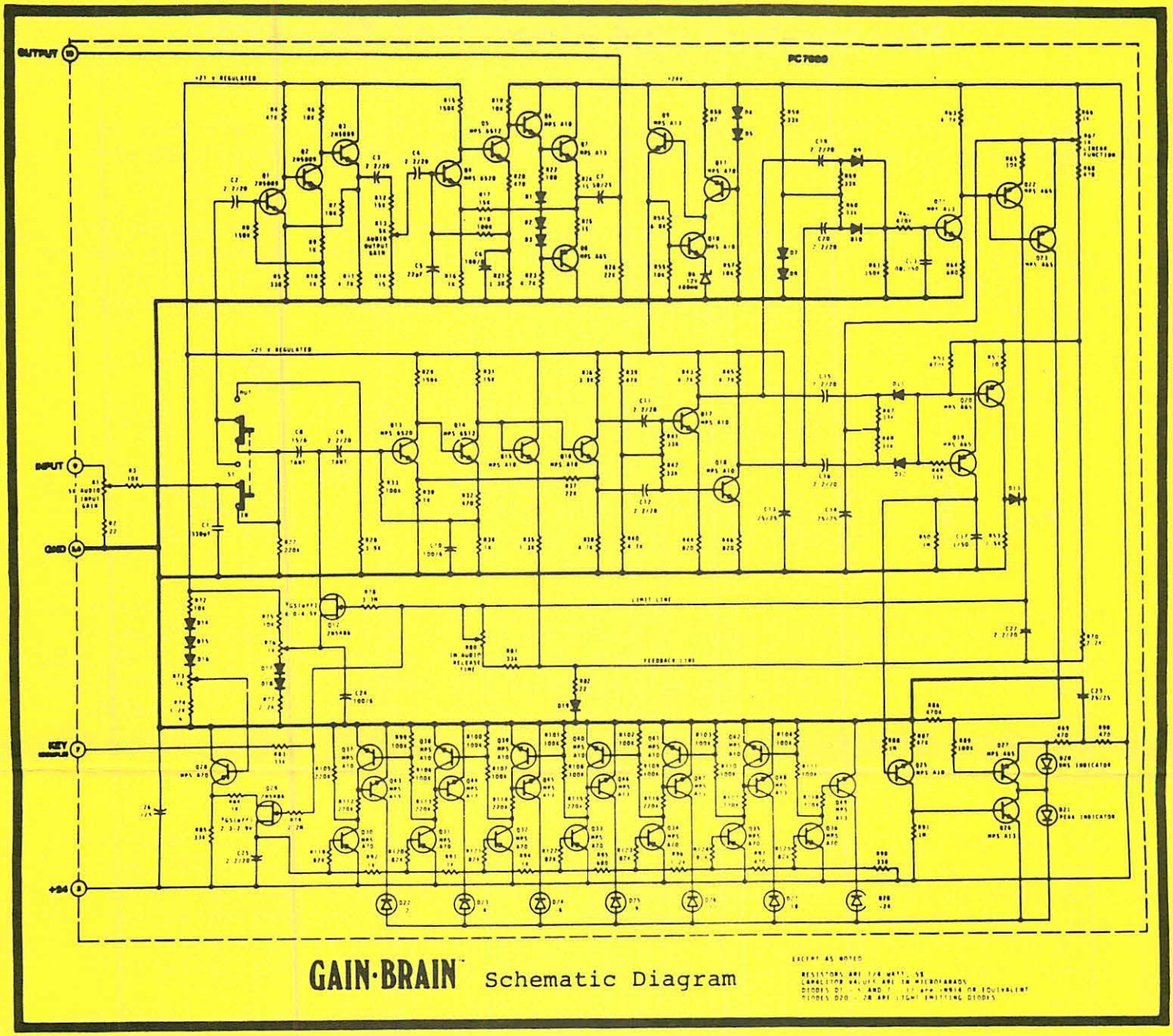
In most applications it will prove desireable to take advantage of GAIN BRAIN's unique dual threshold function by placing the FUNCTION control near its center position. When used in this manner, transients and complex waveforms will cause peak limiting action while sustained waveforms will limit in accordance with their apparent level energy.

In practice, it is suggested that the FUNCTION control be rotated to the position which gives the best audible result for each application.

The same is true for the RELEASE control. It should be noted that faster release times will yield a higher apparent level, while longer release times will produce a more natural dynamic range.

SPECIFICATIONS, GAIN BRAIN 700

GAIN REDUCTION RANGE	30dB
NOISE LEVEL (20Hz to 20kHz)	Minimum 80dB below threshold of peak limiting, typically 86dB in normal use.
DISTORTION	Less than 0.3% from 40Hz to 15kHz.
ATTACK TIME (Peak section)	Less than 1.5dB overshoot one microsecond after application of 50kHz tone burst exceeding the threshold of limiting by 15dB.
ATTACK TIME (RMS section)	7 to 40 milliseconds for 90% of ultimate gain reduction. Dependent on waveform complexity, amount of limiting, and position of FUNCTION control.
RELEASE TIME (Peak section) (for transients of less than 50 microseconds duration)	Less than one microsecond.
(for other peak signals)	Variable by means of RELEASE control, .05 to 5 seconds.
RELEASE TIME (RMS section)	Variable, .25 to 5 seconds.
LIMITING RATIO (Peak) (RMS)	Approximately 50 to 1. Approximately 40 to 1.
LIMITING THRESHOLDS	With FUNCTION control in PEAK position (CCW), all thresholds are at -20dBm with INPUT control at maximum.
SEPARATION BETWEEN THRESHOLDS	Rotating FUNCTION control from PEAK to RMS position raises peak threshold 8dB while lowering RMS threshold 4dB. This allows a separation of thresholds which is variable from 0dB (PEAK position) to 12dB (RMS position).
FREQUENCY RESPONSE	±1dB, 25Hz to 80kHz.
OUTPUT LEVEL	Up to +18dBm into 150 ohms or higher; +24dBm may be obtained by using a 150 ohm to 600 ohm output transformer.
MULTIPLE LIMITER COUPLING	Connection provided for tandem limiting.
POWER REQUIREMENTS	Regulated 24VDC to 28VDC negative ground @ 70mA.
	METERING SPECIFICATIONS
GAIN REDUCTION METER	7 increment sequential light emitting diode array indicates gain reduction from 2dB to 24dB.
ACCURACY	±1dB (2dB to 12dB gain reduction) ±2dB (18dB to 24dB gain reduction)
SPEED	Virtually instantaneous. Permits accurate reading of short duration fast release limiting.
PEAK LIMITING INDICATOR	Light emitting diode indicates when peak limiting is taking place.
RMS LIMITING INDICATOR	Light emitting diode indicates when RMS limiting is taking place.
	PHYSICAL SIZE
GAIN BRAIN 700 MODULE	Card form with high impact plastic panel, controls and metering. 1" wide, 7" high, 6 1/2" deep.



GAIN·BRAIN Schematic Diagram

TRIM ADJUSTMENTS

Trimpots R73 and R76 serve to zero the meter circuit and trim the IN/OUT gain, respectively. An audio signal generator and an AC VTVM are required to perform these adjustments. For both adjustments connect the signal generator to the input of the GAIN BRAIN to be adjusted. Set the frequency to 1kHz and the input level to -10dBm. Place IN/OUT switch in OUT position. Set controls and proceed as follows:

IN/OUT GAIN ADJUST

1. FUNCTION - PEAK (full CCW)
2. RELEASE - .05 sec (full CCW)
3. OUTPUT - Maximum (full CW)
4. INPUT - Adjust to obtain +5dBm output.

Switch IN/OUT to IN position and adjust R76 to obtain +5dBm output. Properly adjusted, there should be no difference in output when in either the IN or OUT positions, when GAIN BRAIN is not limiting.

METER ZERO ADJUST

1. FUNCTION - PEAK (full CCW)
2. RELEASE - .05 sec (full CCW)
3. OUTPUT - Maximum (full CW)
4. INPUT - Increase INPUT control from minimum (full CCW) until output from GAIN BRAIN just stops increasing. At this point peak limiting is happening and the output level should be between +10dBm and +12dBm.
5. Decrease OUTPUT control to obtain 0dBm output.
6. Switch IN/OUT to OUT position.
7. Decrease INPUT control to obtain 0dBm output.
8. Switch IN/OUT to IN.
9. Connect VTVM to input of GAIN BRAIN and increase signal generator level 2dB (from -10dBm to -8dBm).
10. At this point the -2 meter lamp should light. If not, adjust R73 until it just comes on. The meter is now zeroed.

Mechanical and Electrical Hookup

GAIN BRAIN 700 modules are compatible with KEPEX 500 modules and may be mounted interchangeably with them in one of two Allison Research enclosures:

1. CM-001 - A single channel console mounting case which is suitable for mounting in control consoles and custom installations where only one or a few channels of GAIN BRAIN are required. It is fitted with a 10 terminal PC edge connector which carries input, output, and power supply connections.

An external power supply is required, delivering 24VDC at 70mA for each GAIN BRAIN module. The LX-100 power supply by Allison Research is recommended, which provides the necessary power to drive up to eight modules (and includes a 100VDC terminal required for KEPEX 500 modules). The power transformer may be strapped for 105-125 or 210-250VAC, 50-60Hz operation. Instructions are provided with each LX-100.

2. The RM-160 rack mounting card library accepts up to 16 GAIN BRAIN modules. It includes an integral power supply and a plug-in power switching card (JUICE). The power supply delivers 24VDC (regulated) at 2 amps and 100VDC (non-regulated, provided for KEPEX 500 modules which may also be used in RM-160 cases) at .75 amp, negative ground. The power transformer may be strapped for 105-125 or 210-250VAC, 50-60Hz operation.

The power switching (JUICE) card carries fuse protection for input power (with indicator lights for power ON and fuse BLOWN), and the 100VDC line. Fuse protection for the 24VDC line is accessible from the front between the fourth and fifth card connectors.

Audio connections are made via the 16 color-coded receptacles on the rear of the chassis. Mating plugs and a crimping tool are supplied with the RM-160. Audio inputs and outputs are unbalanced, and connections to the plugs are made as illustrated below.