

# **MAXIMIZER III**

**THREE-BAND, STAND-ALONE  
AUDIO PROCESSOR/FM STEREO GENERATOR**

## **OPERATING MANUAL**

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# Energy-Onix

BROADCAST EQUIPMENT CO., INC.  
VALATIE, NEW YORK 12184

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P.O. Box 801

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1306 RIVER STREET

**Congratulations! Enclosed is your new Energy-Onix equipment.**

**In order to activate the Warranty on your new equipment, please take a few minutes to fill out the information requested below. Please mail or fax this information to us at the numbers below as soon as possible.**

**Station Call Letters** \_\_\_\_\_

**Contact Person & Title** \_\_\_\_\_

**Address** \_\_\_\_\_

**City, State** \_\_\_\_\_ **Zip** \_\_\_\_\_

**Phone No.** \_\_\_\_\_ **Fax No.** \_\_\_\_\_

**E-Mail Address** \_\_\_\_\_

**Name & Model No. of Equipment** \_\_\_\_\_

**Serial No.** \_\_\_\_\_

**If you have any questions concerning your new equipment, please call me.**

**Thank you for purchasing Energy-Onix equipment.**

**Bernard Wise, President  
Energy-Onix Broadcast Equipment Co., Inc.**

## **PRELIMINARY INSTRUCTIONS AND WARRANTY INFORMATION**

PLEASE OBSERVE SAFETY PRECAUTIONS WHEN HANDLING THIS UNIT. THIS EQUIPMENT CONTAINS DANGEROUS CURRENTS AND HIGH VOLTAGES.

THIS MANUAL IS WRITTEN AS A GENERAL GUIDE FOR THOSE HAVING PREVIOUS KNOWLEDGE AND EXPERIENCE WITH THIS KIND OF EQUIPMENT. IT IS NOT INTENDED TO CONTAIN A COMPLETE STATEMENT OF ALL SAFETY WARNINGS WHICH SHOULD BE OBSERVED BY PERSONNEL IN USING THIS OR OTHER ELECTRONIC EQUIPMENT.

ENERGY-ONIX DOESN'T ASSUME RESPONSIBILITY FOR INJURY OR DAMAGE RESULTING FROM IMPROPER PROCEDURES BY UNTRAINED/UNQUALIFIED PERSONNEL IN THE HANDLING OF THIS UNIT.

PLEASE OBSERVE ALL LOCAL CODES AND FIRE PROTECTION STANDARDS IN THE OPERATIONS OF THIS UNIT.

**CAUTION:** ALWAYS DISCONNECT POWER BEFORE OPENING COVERS OR REMOVING ANY PART OF THIS UNIT. USE APPROPRIATE GROUNDING PROCEDURES TO SHORT OUT CAPACITORS AND HIGH VOLTAGE POINTS BEFORE SERVICING.

ANY DAMAGE TO THE GOODS MUST BE REPORTED TO THE CARRIER IN WRITING ON THE SHIPMENT RECEIPT.

ANY DISCREPANCY OR DAMAGE DISCOVERED SUBSEQUENT TO DELIVERY, SHALL BE REPORTED TO ENERGY-ONIX WITHIN FIVE (5) DAYS FROM ITS RECEIPT.

### **WARRANTY**

ENERGY-ONIX SHALL NOT BE LIABLE FOR ANY DAMAGE REGARDLESS OF THE NATURE, ARISING OUT OF OR IN CONNECTION WITH THE PRODUCT OR ITS USE THEREOF.

ENERGY-ONIX'S WARRANTY SHALL NOT INCLUDE:

- 1) RE-SHIPMENT OF THE UNIT TO ENERGY-ONIX FOR REPAIR PURPOSES
- 2) ANY UNAUTHORIZED REPAIR/MODIFICATION
- 3) INCIDENTAL/CONSEQUENTIAL DAMAGES AS A RESULT OF ANY DEFECT
- 4) NOMINAL NON-INCIDENTAL DEFECTS
- 5) RE-SHIPMENT COSTS OR INSURANCE OF THE UNIT OR REPLACEMENT OF UNITS/PARTS.

WARRANTY SHALL COME INTO FORCE FROM THE INVOICE DATE AND FOR THE PERIOD OF 12 MONTHS. A COPY OF THE ENERGY-ONIX WARRANTY IS INCLUDED ON THE FOLLOWING PAGE.

## ***Energy-Onix Warranty***

Seller guarantees at his option to either replace or repair any product or part found to be defective in material or workmanship under normal use within one (1) year from date of shipment, with the exception of tubes or moving parts (blowers) which will carry the original manufacturer's warranty only. Seller's obligation is limited to replacement or repair of such defective product or part, if delivered, transportation prepaid to seller's factory within thirty (30) days after return is authorized. Repaired or replacement parts will be sent freight collect.

This warranty is in lieu of all other warranties, expressed or implied, and there is specifically no warranty of merchantability of fitness for a particular use, purpose, or otherwise, unless expressly set forth to the contrary herein and no waiver, alteration or modification herein shall be valid unless in writing signed by the executive officer of seller. There is no warranty on merchandise or equipment which has been subjected to abuse, misuse, neglect, accident, improper installation, or application, negligence in use, storage, transportation or handling; nor is there any warranty as to merchandise which has been repaired or altered outside seller's factory.

## **RETURN AUTHORIZATION**

IF IT IS DEEMED NECESSARY TO RETURN EQUIPMENT FOR REPAIR, YOU WILL BE GIVEN A RETURN AUTHORIZATION NUMBER (RA).

WHEN YOU RECEIVE THE AUTHORIZATION, YOU CAN RETURN THE UNIT. PACK IT CAREFULLY FOR THE SHIPMENT, PREFERABLY USING THE ORIGINAL PACKING, AND SEAL THE PACKAGE PERFECTLY. THE CUSTOMER ALWAYS ASSUMES THE RISK OF LOSS (i.e., ENERGY-ONIX IS NEVER RESPONSIBLE FOR DAMAGE OR LOSS), UNTIL THE PACKAGE REACHES THE ENERGY-ONIX PREMISES. FOR THIS REASON, WE SUGGEST YOU TO INSURE THE GOODS FOR THE WHOLE VALUE. SHIPMENT MUST BE EFFECTED C.I.F. (PREPAID) TO THE ADDRESS SPECIFIED BY ENERGY-ONIX SERVICE MANAGER ON THE AUTHORIZATION.

**DO NOT RETURN UNITS WITHOUT AUTHORIZATION, AS THEY WILL BE REFUSED.**

BE SURE TO ENCLOSE A WRITTEN TECHNICAL REPORT, WHICH MENTIONS ALL THE PROBLEMS FOUND, AND A COPY OF YOUR ORIGINAL INVOICE ESTABLISHING THE STARTING DATE OF THE WARRANTY.

REPLACEMENT AND WARRANTY PARTS MAY BE ORDERED BY CALLING OR FAXING THE FACTORY. BE SURE TO HAVE THE EQUIPMENT MODEL AND SERIAL NUMBER AS WELL AS PART DESCRIPTION AND PART NUMBER ON ALL PART ORDERS.

ENERGY-ONIX RESERVES THE RIGHT TO MODIFY THE DESIGN AND SPECIFICATIONS OF THE EQUIPMENT IN THIS MANUAL WITHOUT PREVIOUS NOTICE.

### **TECHNICAL SUPPORT**

ENERGY-ONIX TECHNICAL STAFF IS AVAILABLE TO PROVIDE TECHNICAL CONSULTATION 24 HOURS A DAY TO TRAINED COMPETENT ENGINEERING PERSONNEL. MONDAY - FRIDAY, 8:00 AM TO 5:00 PM EST CALL THE FACTORY AT 518-758-1690. AFTER HOURS CALL OUR BEEPER AT 518-822-2644.

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*This manual is written for the use of both experienced broadcast technical folks, as well as the less technically inclined. With this in mind, we have attempted to make it as easy and painless as possible to install your Maximizer III.*

*Accordingly, you will find we are long on "How-To" and short on theory. This is intentional. We invite you to relax, have fun, and "Maximize".*

*"The Transmitter People"  
at Energy-Onix*

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**MAXIMIZER III**  
**TECHNICAL SPECIFICATIONS**

<b>Frequency Response:</b>	± 0.5 dB or better of pre-emphasis curve, 30 Hz – 15 KHz
<b>Noise:</b>	Better than –80 dB, (de-emphasized)
<b>Stereo Separation:</b>	Better than 60 dB (70 dB typical @ 1 KHz)
<b>Distortion:</b>	Less than .3% (THD)
<b>Crosstalk:</b>	Better than –60 dB, Main to sub, or sub to main
<b>Pre-emphasis:</b>	75 µS or 50 µS, selectable
<b>De-emphasis:</b>	Selectable (for discrete audio outputs)
<b>Stereo Pilot:</b>	19 KHz, ±1 Hz 4% to 12% adjustable injection
<b>MPX Output:</b>	2 to 10 V, Pk-to-Pk BNC (floating), 50Ω source
<b>Pilot Reference Output:</b>	1 V, Pk-to-Pk, square wave
<b>Audio Inputs:</b>	10 KΩ or 600 Ω, active balanced Accepts –20 to +10 dBm
<b>Audio Outputs:</b>	Discrete left and right, 100 Ω source, Active balanced, outputs 0 to +12 dBm
<b>SCA Input:</b>	BNC (floating) accepts –14 to +6 dBm For 10% injection
<b>RDS Input:</b>	BNC (floating) accepts –24 to 0 dBm For 2 KHz deviation
<b>AC Power Input:</b>	87 to 265 VAC, 50/60 Hz

## **TECHNICAL SPECIFICATIONS (cont'd)**

<b>Power Consumption:</b>	8 VA
<b>Dimensions:</b>	1 ¾" H x 19" W x 9 ½" D (4.4 cm x 48.3 cm x 24 cm) 1 rack unit
<b>Weight:</b>	8 ½ lbs. (3.8 kg)
<b>Operating Temperature:</b>	32 to 120° F (0 to 50° C)

## **OVERVIEW**

The MAXIMIZER III is a complete, stand-alone audio processor/stereo generator that interfaces directly to FM exciter or composite STL transmitter. Designed to accommodate virtually any type of audio source, the MAXIMIZER III is the only equipment required for most stations to achieve the elusive combination of total control of modulation with the precise, customized signature "sound" desired.

**Please refer to the last pages of this manual for diagrams illustrating the text, and a brief description of individual controls.**

## **INSTALLATION**

The MAXIMIZER III should be mounted in a standard 19" (grounded) rack, as close as possible to the exciter or STL. Up to 30' of (RG58A/U) coax may be used between composite output jack ("MPX OUT") and exciter/STL input. (Use as short a run as practical.)

Audio input XLR-type connectors can be configured for either balanced or unbalanced operation, depending upon type of audio source in use. For unbalanced operation, jumper Pin 3 (return) to Pin 1 (ground) at connector. Audio input impedance is switchable at rear panel DIP Switch **#1** and **#8** ("up" for 10K ohms, "down" for 600 ohms). Generally, the 10K "up" position is used (bridging), unless the audio source has output transformers that like to see a 600 ohm termination.

The MAXIMIZER III has XLR-type audio outputs on the rear panel. Trim pots controlling output levels are located adjacent to the audio output jacks. (Note that these trim pots do not affect the front panel "output" LED bar indicators.) The connectors may be wired for balanced or unbalanced operation in the same fashion as the input connectors. DIP Switch **#2** enables de-emphasis circuits ("down" position) for the audio outputs. Note that this switch does not affect composite output. In

most installations, the audio outputs are not used. If (non – pre-emphasized) processed audio output is required, the de-emphasis should be enabled to restore flat audio response.

Connections for SCA and/or RDS subcarriers should be made to the appropriate BNC jacks on the rear panel.

Also available on the rear panel is a BNC jack output providing a square wave 19KHz (pilot) reference for external synchronization purposes.

## **SETUP**

At this point, the input and output connections should be in place. The rear panel DIP Switches should now be checked. **#1**, **#2** and **#8** have been addressed in the **Installation** section. **#3** selects the appropriate pre-emphasis/de-emphasis curve: **"Down"** for 75 $\mu$ S, **"Up"** for 50 $\mu$ S. The 75 $\mu$ S, **"DOWN"** position, is used in the United States (North America) and South America. **#4** enables the pre-emphasis circuits and is normally on, **"DOWN"** position. **#5** enables the 19KHz pilot and is normally on, **"UP"** position. **#6** is the stereo/mono switch, and is normally set to "Stereo", **"UP"** position. **#7** is not used.

The front panel operate/proof switch is normally in the "Operate" position. In the "Proof" position, all AGC functions are disabled. Pre-emphasis/de-emphasis, 15KHz low pass filtering, bass, presence, brilliance, and input/output level controls remain active.

## **OPERATION**

The Broadcaster can establish the front panel settings of the MAXIMIZER III by referring to the "Recommended Settings" charts described for four of the most popular program formats presently in use.

In the event that these settings do not provide the desired effects, the detailed information presented under "Detailed Operation" can be read, understood, and adjustments made accordingly.

## **RECOMMENDED SETTINGS FOR VARIOUS FORMATS**

### **Talk Format**

Gate	-10
AGC Drive	2
AGC Release	6
Bass	5
Presence	1
Brilliance	2
Density	2

### **Hi-Fi Format**

Gate	-20
AGC Drive	4
AGC Release	6
Bass	5
Presence	1.5
Brilliance	3
Density	4

### **Rock Format**

Gate	-20
AGC Drive	5
AGC Release	6
Bass	5
Presence	1.5
Brilliance	5
Density	6

### **Country Format**

Gate	-20
AGC Drive	4
AGC Release	4
Bass	5
Presence	2
Brilliance	4.5
Density	4

## **DETAILED OPERATION**

The most straightforward procedure for adjustment is with normal programming. Audio input levels are adjusted by trim pots adjacent to the input jacks on the rear panel. Apply normal programming to the MAXIMIZER III and adjust trim pots so that AGC LED bar averages 0 dB. At this point do not be concerned about channel balance, as long as trim pots are adjusted to roughly the same degree. Adjust "Gate Threshold" control fully counter clockwise.

The station modulation monitor will be used for keeping you legal, and your ears will be used for creating your signature "sound". With this in mind, a modest radio is often used (either alone, or in addition to a high fidelity system) as most listeners are not using sophisticated equipment. The idea is to adjust the sound to the way it will be heard by most listeners.

At the conclusion of the adjustment process:

- All front panel processing controls will be set.
  - AGC LED bar level will average 0 dB.
  - The station modulation monitor (total peak modulation position) will indicate the "occasional" 100% peak.
  - Modulation monitor (pilot position) will indicate pilot injection of 9%.
- Many adjustments are interactive, so take as much time as required, going back and forth between adjustments as necessary.

The GATE THRESHOLD control determines the minimum input audio level necessary for activating AGC (Automatic Gain Control). If the "Gate" LED is illuminated, AGC "Drive" and "Release" are disabled, so be sure "Gate" LED is off when making adjustments. The DRIVE control determines the speed at which the AGC "attacks" and the RELEASE control determines the release time. Note that at "slow" positions (counter clockwise) there is a time lag between adjustment and LED bar indication. Again, the aim is to adjust audio input levels so that AGC LED bar averages "0" at your chosen "drive" and "release" settings. The settings will depend upon your particular programming and preferences. Note that excessively fast (clockwise) settings may result in "pumping" effects, so use your ears. As a rule of thumb, the "release" control

sounds best at a setting equal to or somewhat faster than the "Drive" setting.

At this point, check modulation monitor and adjust composite output level control (trim pot to immediate left of rear panel "MPX out") for peaks of 100%. Take care not to mistake the "pilot phase" trim pot (second to the left of "MPX out") for the level trim pot. Remember to use ears, not eyes for the following processing adjustments. A modulation meter that is virtually frozen at 100% does not necessarily make for "loud". A drastic reduction of audio dynamic range is not a pleasing sound to most folks. (If "everything" is loud, then "nothing" is loud.)

The DENSITY control directly affects the dynamics of the entire audio frequency range. As the control is advanced, the dynamic range is reduced, making the sound "punchier" and more aggressive. Judicious use is effective, but like most things in life, too much can be detrimental.

The "Bass", "Presence", and "Brilliance" controls correspond to the low, midrange, and high audio frequencies, respectively. This tri-band approach allows an easily adjustable, flexible customization of sound quality. Adjustment is intuitive, have fun.

Now is the time to connect SCA and/or RDS subcarrier inputs, if used. These are connected to the appropriate rear panel BNC jacks, and the adjacent level trim pots are used to adjust injection level(s). (Nominal levels are usually  $\approx 10\%$  for SCA,  $\approx 5\%$  for RDS.) Make sure that you are confident of the legal rules if you intend to exceed 100% total modulation.

Now that you have produced the signature sound of your choice, recheck AGC LED bar and total modulation. Re-adjust audio input and composite output as required. Now set modulation monitor to read pilot injection. A 9% reading should be indicated; if not, adjust pilot injection trim pot (accessible through hole in top cover). Re-adjust "MPX out" level, if required. The next step is balancing left and right audio inputs. Connect equal (mono) inputs to left and right audio inputs. (One way of

accomplishing this is by connecting inputs in parallel, or by connecting one audio source to both audio inputs.) Set modulation monitor to read "L – R". Adjust left OR right audio input level trim pot for a minimum L – R indication (null).

Restore the normal programming to audio inputs. Finally, adjust "GATE THRESHOLD" control. When "GATE" LED is lit (gate closed), AGC is frozen to prevent noise present during low audio passages from becoming obtrusive. The "GATE THRESHOLD" determines the maximum audio input level at which the gate will close. Adjustment is not critical.

Installation is now complete. Give yourself a "thumbs up", sit back and enjoy.

### **F. Y. I.**

The MAXIMIZER III uses signal grounds which are separate from the chassis ground. In other words, the shells of the BNC jacks and Pin #1 of all XLR's are floating over chassis. (XLR shells are at chassis ground.)

While the Maximizer III is designed to operate in high RF fields, the usual precautions should be taken. Bad ground-loop buzzes can happen to good people. The time-tested cure is to experiment with lifting/adding ground connections to cable shields. With balanced connections, best results are usually obtained when grounding only one end of cable.

It's a good idea to power the unit from the same AC breaker as the exciter or STL. If you want to try using a grounding adapter to lift ground at power plug, be certain the chassis remains grounded through the (well-grounded) equipment rack.

What about.....pilot phase? If you are not completely confident of your expertise in the function and adjustment of the pilot phase trim pot, rear panel, it is best to let it be. This control is factory adjusted; if you are determined to correct for a transmission chain phase shift, be sure you have the expertise and proper equipment for the job.



## REAR PANEL CONTROLS

- L & R Audio Input Levels:** Adjusts program audio input level to center of AGC Range
- L & R Audio Output Levels:** Adjusts (discrete) audio outputs
- MPX Level:** Adjusts multiplex (composite) output level
- \*Pilot Phase:** Adjusts pilot phase to correct for phase shift in transmission chain
- RDS Level:** Adjusts RDS subcarrier input
- SCA Level:** Adjusts SCA subcarrier input
- \*Factory adjusted (not a routine user adjustment)

## TOP COVER CONTROLS

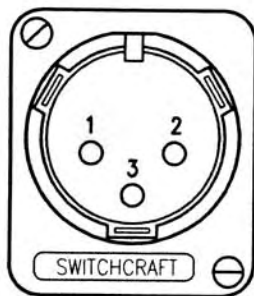
- Pilot Level:** Adjusts stereo pilot injection

## FRONT PANEL CONTROLS

- Gate Threshold:** Adjusts the (audio) threshold at which the AGC activates from -10 dB to -20 dB below nominal ("0 dB" on AGC LED bar) audio input
- Drive:** Adjusts the AGC attack time from 0.5 dB/second (slow) to 8 dB/second (fast)
- Release:** Adjusts the AGC release time from 0.5 dB/second (slow) to 8 dB/second (fast)
- Bass:** Adjusts amount of gain (to +10 dB) applied to low frequency (65 Hz centered) audio
- Presence:** Adjusts amount of gain (to +6 dB) applied to midrange (300 - 3300 Hz) audio

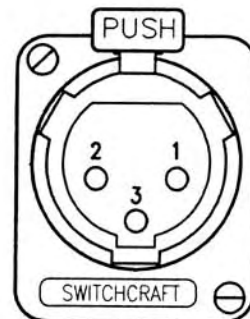
## **FRONT PANEL CONTROLS (cont'd)**

- Brilliance:** Adjusts amount of gain (to +6 dB) applied to high frequency (3300 – 15,000 Hz) audio
- Density:** Adjusts compression algorithm determining dynamic range over entire audio spectrum (30 – 15,000 Hz) from no change ("0" setting) to maximum dynamic range reduction ("10" setting)
- Operate/Proof Switch:** Enables/disables AGC and processing functions



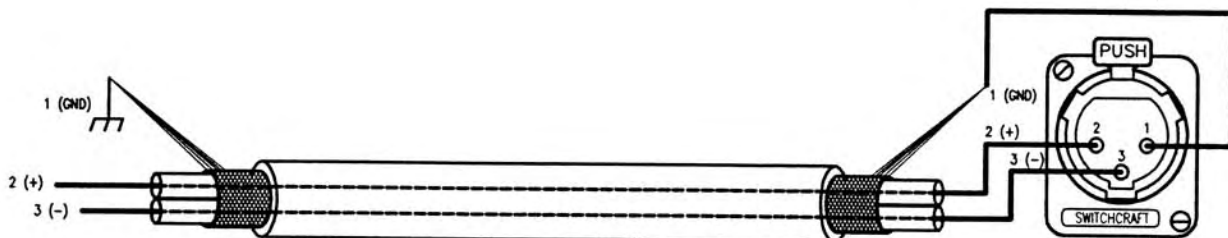
OUTPUT

- 1=GROUND
- 2=IN-PHASE (+)
- 3=RETURN (-)

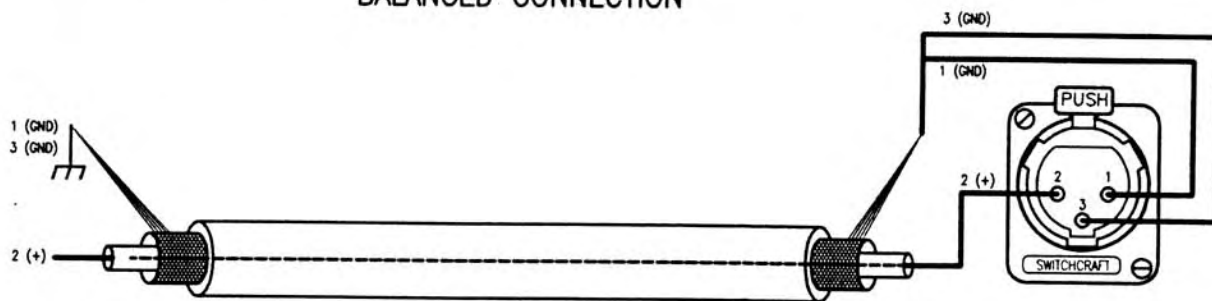


INPUT

- 1=GROUND
- 2=IN-PHASE (+)
- 3=RETURN (-)



BALANCED CONNECTION



UNBALANCED CONNECTION

NOTE:  
INPUT CONNECTOR SHOWN.  
CONNECTIONS APPLY TO BOTH  
INPUT AND OUTPUT CONNECTORS

# The MAXIMIZER III

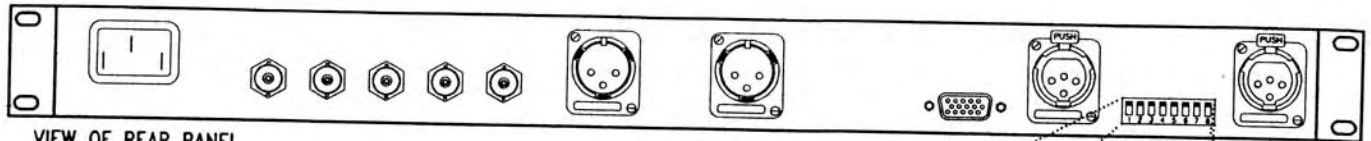
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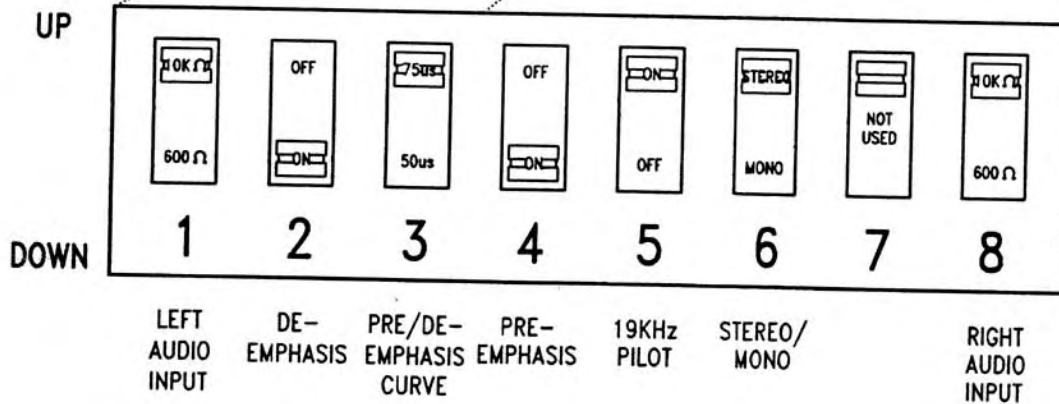
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N.T.S.  
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00-1798



VIEW OF REAR PANEL  
N.T.S.



### REAR PANEL DIP SWITCHES

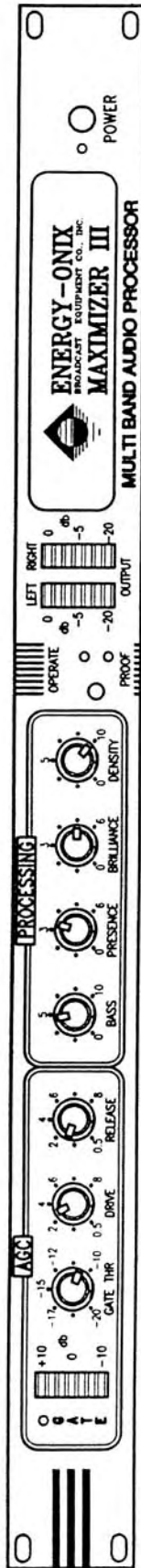
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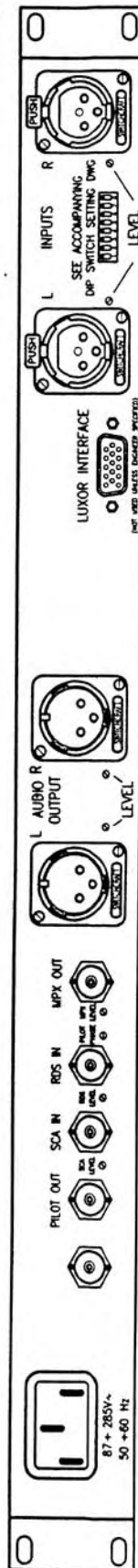


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FRONT VIEW  
N.T.S.



REAR VIEW  
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The **MAXIMIZER III** by

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