AM660

USER'S MANUAL

ANAMOD

ANALOG MODELING

Problems?

If this manual does not answer all of your questions regarding installation and/or use of this product, technical assistance is available from:

Anamod LLC
PO Box 339, Gillette, NJ 07933
Tel: (201) 728-8490

info@anamodaudio.com

9:30 A.M. – 4:30 P.M. Monday-Friday EST

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ANAMOD LLC. ONE YEAR LIMITED WARRANTY

ANAMOD LLC. warrants this product to be free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY AND WHO IS PROTECTED
Labor (except removal and installation charges) and parts are warranted for one year. This warranty may be enforced only by the first consumer purchaser.

WHAT IS COVERED AND WHAT IS NOT COVERED
Except as specified below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not registered via a product registration card.
2. Any product on which the serial number has been defaced, modified or removed.
3. Damage, deterioration, or malfunction resulting from:
   a. Accident, misuse, abuse, neglect, fire, water (or other liquids), static electricity, lightning, or other acts of nature, or failure to follow instructions supplied with the product.
   b. Repair or attempted repair by anyone not authorized by AnaMod LLC.
   c. Any shipment of the product (claims must be presented to the carrier).
   d. Any cause which does not relate to a product defect.

LIMITATION OF IMPLIED WARRANTIES
ALL IMPLIED WARRANTIES, INCLUDING WARRANTIES OF MERCHANT ABILITY AND FITNESS FOR A PARTICULAR PURPOSE, ARE LIMITED IN DURATION TO THE LENGTH OF THIS WARRANTY.

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ANAMOD LLC'S LIABILITY FOR ANY DEFECTIVE PRODUCT IS LIMITED TO THE REPAIR OR REPLACEMENT OF THE PRODUCT AT OUR OPTION. ANAMOD LLC SHALL NOT BE LIABLE FOR:

1. DAMAGE TO OTHER PROPERTY CAUSED BY ANY DEFECTS IN THIS PRODUCT, DAMAGES BASED UPON INCONVENIENCE, LOSS OF USE OF THE PRODUCT, LOSS OF TIME, COMMERCIAL LOSS, OR,
2. ANY OTHER DAMAGES, WHETHER INCIDENTAL, CONSEQUENTIAL, OR OTHERWISE. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY LASTS AND/OR DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS AND EXCLUSIONS MAY NOT APPLY TO YOU.

HOW STATE LAW RELATES TO THE WARRANTY
This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

HOW YOU CAN GET WARRANTY SERVICE
To obtain warranty service on this product:

1. Take or ship the product to an authorized dealer or AnaMod LLC.
2. Do not ship the product to AnaMod LLC without prior authorization obtained via a phone call, letter, or email.
3. A dated sales receipt must be included as proof of warranty coverage.

Introduction

Fairchild 660 limiter is arguably one of the most famous and sought-after compressors ever made. The magical way it adds density and dimension to a track or a mix has been demonstrated on many of the best-sounding records made in the last 50 years.

The AM660 is a faithful recreation of the classic sound and compression profile of the 660, using the AnaMod™ process to model the complex tube circuitry of the 660 and implement it entirely in the analog domain. Unlike a digital plug-in or processor-based outboard gear, there is no latency, and no A/D or D/A conversions to compromise the sound.

The AM660 is designed for use in the API 500 series or equivalent rack.

Unpacking the AM660

Inside the AM660 carton you will find the following:

1. AM660 limiter
2. user's manual
3. warranty card (export units only)

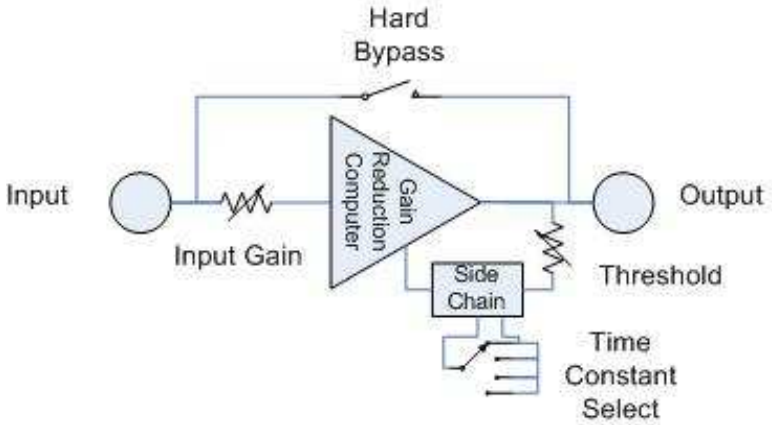
Please return the warranty card soon after your purchase. This card will allow AnaMod to keep you informed of updates and new products.

Installing the AM660

Install the AM660 limiter into the 500 series rack by aligning the circuit card's edge with the connector in the rear of the rack. It's sometimes necessary to remove an adjacent module to verify that the AM660 is properly seated in the mating connector.

Once this is accomplished, align the two front panel mounting holes with the tapped holes of the chassis. Using the screws provided by the rack manufacturer, hand tighten the two front panel mounting screws.


ANAMOD AM660
vu
Gain Reduction Meter
INPUT GAIN
-15
+15
Input Gain
THRESHOLD
0
10
Threshold
TIME CONSTANT
1
2
2a
2b
3
4
5
6
Time Constant Select
IN
Hard Bypass


Hard Bypass
Input
Input Gain
Gain Reduction Computer
Output
Threshold
Side Chain
Time Constant Select

Front Panel

The AM660's front panel contains all of the necessary user controls. There is a VU meter that accurately indicates the amount of gain reduction in dB. This is unlike the original 660, whose meter represents an approximate amount of gain reduction. There are also two potentiometers that control the input gain (gain in to the module) and threshold, which effectively controls the gain to the sidechain portion of the limiter. Lastly, there are two switches, one rotary which sets the sidechain's preset time constants, and one push-on / push-off switch which is a hard audio bypass.

Referring to the diagram on page 3, you'll find the following:

1. GAIN REDUCTION METER – shows the actual amount of gain reduction in dB

2. INPUT GAIN – allows the user the to raise or lower the gain into the AM660 by 15 dB. The center position is unity gain.

3. THRESHOLD – allows the user the raise or lower the gain of the AM660's sidechain circuit. Full counter-clock-wise (CCW) sends no audio to the sidechain.

4. TIME CONSTANT – selects from 8 preset time constants, which are used by the sidechain to control the limiter's response.

5. IN – when latched in the IN position, the limiter is enabled and the meter dial is fully illuminated. In the OUT position, the audio output is connected directly to the audio input via a relay (hard bypass) and the meter dial is dimly illuminated.

Historical Information

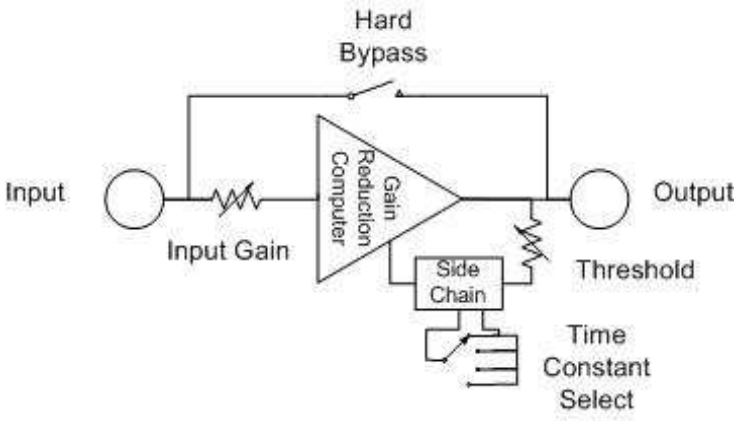
The original Fairchild 660 compressor was designed by Estonian-born Rein Narma. As a refugee from Soviet Russia during the post war years, Rein worked for the U.S. Army as a recording and broadcast engineer. He later joined Gotham Audio in New York as the head of their product development team.

During his tenure at Gotham he was sent to fix Les Paul's 8-track Ampex tape machine in New Jersey. He talked Les Paul into allowing him to build a mixing console and limiter for Les Paul's studio.

Apparently he did this with good results. Les Paul, being a friend of Sherman Fairchild, made the introduction of Rein Narma to Sherman Fairchild, who decided to license the limiter design from Narma. The rest is history.

Functional Description

The AM660 is a feedback compressor, meaning that a portion of the output signal is used to determine the amount the gain should be reduced in the stage previous to the output. Referring to the diagram (below) it can be seen that the control path is from the output backwards (feedback) and that the amount of signal in the control path is set by the threshold control.



AM660 Signal Flow

The sidechain block consists of a full-wave rectifier and time constant circuitry. The Time Constant selection switch can choose 6 single slope attack and release time constants (see specifications later in this manual), or two multi-slope time constants. Position 5 is a dual slope time constant while position 6 is a triple slope constant.

Other functions include an input gain control and hard bypass. As shown in the diagram (above), the input control has no effect when the unit is bypass.

Using The AM660

It's important to first connect the XLR cables to the slot holding the AM660 in the 500 series rack before proceeding with the next steps. It is also important to provide a program signal to the input, to be monitoring the output, and to have the 500 series rack powered on for the next steps.

To process audio using the AM660, press the IN button so it is latched in. The meter face will illuminate brightly indicating that the AM660 is actively processing audio. When the IN switch is released, the meter will appear dimly lit and the input signal will be connected to the output XLR via a relay.

With the Input Gain control set to the center (0 position) and the Threshold control set to 0, the AM660 will be processing audio roughly at unity gain. By rotating the threshold control clockwise, the AM660 may show that it is reducing the gain, as observed on the gain reduction meter, of the input signal if the input signal is sufficient. By adjusting both the Input Gain and Threshold controls, it is possible to set both the output level of the AM660 and the amount of desired limiting. It may take some practice to perform this operation quickly.

The AM660 limiter has many uses in recording and live sound applications. Some of the suggested uses include:

Vocal Compressor: The Fairchild 660 is usually the first choice for many professionals for limiting vocals. Time constant positions 2A and 2B provide an even more useful release time than position 2 for vocals.

Typical gain reduction experienced during the recording of vocals ranges from 3 dB to almost 10 dB. The AM660 will perform this limiting task very transparently.

Bass Limiter: Unfortunately, most bass guitars suffer from noticeable unevenness in their output level from string to string. This problem is typical and usually requires some sort of audio leveling. To use the AM660 with bass guitar, adjust the time constant to be anywhere between 1 and 2B. Position 3 may be too slow to catch the attack of the bass note, which may be desirable in some situations. The amount of gain reduction will be determined by the level of unevenness in the bass track.

Kick Drum Limiting: Some drummers don't control their kick drum level well. Use time constant 1 on the AM660 to limit the kick drum level. Set the gain reduction to only occur on the loud, problematic parts.

Drum Overhead Compressor: It has become popular to compress drum overhead mics to bring up the ambiance of the room sound. The AM660 can work well for this. Pick a time constant to suit the tempo of the drumming. Add an amount of gain reduction to taste.

Acoustic Guitar Compressor: Using the AM660 to compress acoustic guitar can really add "presence" to the track. Typically the vocal compression settings work well for transparent compression. For more extreme settings, try using the multi-slope time constants 5 or 6 with a fair amount of gain reduction or the faster time constants with a larger amount of gain reduction.

Piano Compressor: The effect of over-compressed piano is well known to anyone who has listened to piano on a Beatles recording. To obtain this sound, adjust the time constants to work for the tempo of the music and add a good amount of gain reduction. The multi-slope time constants 5 and 6 can also be useful in this application.

Buss Compression: The AM660 limiters track well in stereo due to their consistence of manufacture. A pair of AM660s may be used on the stereo buss of a mix with good results. Interesting time constants for leveling are the multi-slopes 5 and 6. Adjust the gain reduction for at least a few dB of limiting on the louder sections.

These are only suggestions… You should try all possible combinations to obtain your desired results.

SPECIFICATIONS

- **Input Impedance**: 20Kohms, balanced
- **Output Impedance**: less than 50 ohms
- **Max. Output Level**: +27dBu, balanced
- **Input Gain:** -20 to +20 dB
- **Frequency Response:** +/- 1 dB from 40Hz to 15kHz
- **Noise Level:** better than 73dB below +4dBu, 0-30kHz
- **Limiting Noises:** same level as a vintage 660 with GE five star 6386 tubes and properly balanced
- **Total Harmonic Distortion:** level- and compression-dependent
- **Compression Ratio:** Variable from 1: 1 to 20:1, level-dependent
- **Current Consumption:** 127 mA typical when engaged
- **Weight:** 1.3 lbs (0.6 kg.)
- **Time Constants:** 1-6 are the classic 660 time constants, 2a and 2b are variations on #2

Position	Attack Time	Release Time
1	0.2ms	0.3s
2	0.2ms	0.8s
2a	0.2ms	1s
2b	0.2ms	2s
3	0.4ms	2s
4	0.8ms	5s
5	0.4ms	Auto, as in 660 #5
6	0.2ms	Auto, as in 660 #6