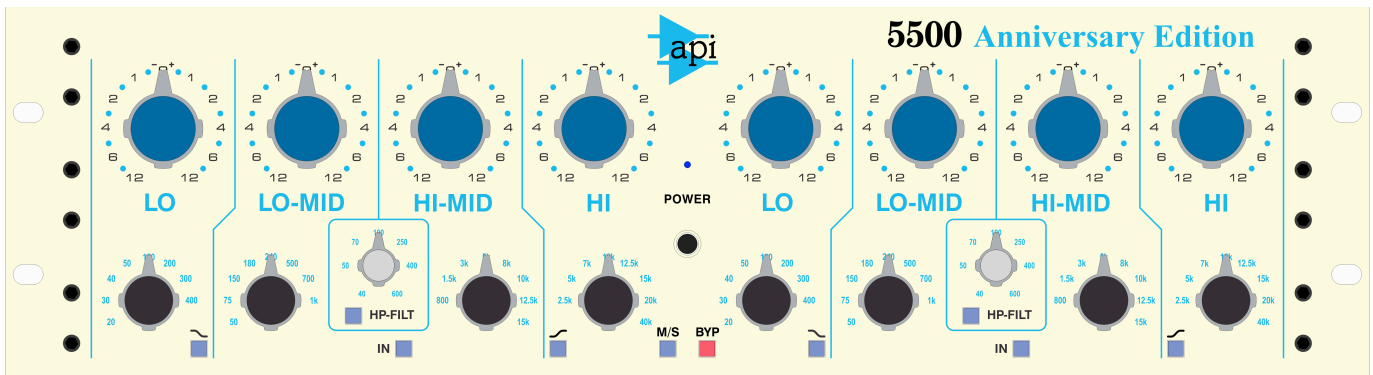




5500 Anniversary Edition Dual Equalizer



OPERATOR'S MANUAL

Created 2024-01-18

*Written for Automated Processes, Incorporated
by Daniel Pfeifer*



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As research and development is a continual process, API reserves the right to change the features and specifications described herein without notice or obligation. API cannot be held responsible for any loss or damage arising directly or indirectly from any error or omission in this manual.

PLEASE READ ALL INSTRUCTIONS, PAY SPECIAL HEED TO SAFETY WARNINGS.

Congratulations on your choice of the API 5500 Anniversary Edition Dual Channel Equalizer!

This limited release product represents 55 years of craft and talent that goes into engineering and building the finest audio equipment that we can.

API takes great pride - and great care - in the hand assembly of all our professional audio products. Above all, we appreciate our loyal users, who have made the Company what it is today.

Thank You!

A handwritten signature in black ink, appearing to read "Larry", written in a cursive style.

Larry Droppa
President

Table of Contents

About this Manual	4
Important Safety Instructions	5
1.0 Overview and Features	6
1.1 History of the API Equalizer	6
1.2 All-Discreet Design	6
1.3 Proportional Q Circuitry	6
1.4 Fully Reciprocal Operation	6
1.5 Power Mute and Bypass	7
1.6 Unique Features of the 5500 Anniversary Edition	7
1.7 High-Pass Filter	7
1.8 Mid-Side Processing	7
2.0 Front Panel Controls	8
2.1 Bypass	8
2.2 Mid-Side Processing	8
2.3 Channel Controls	8
2.3.1 IN.....	8
2.3.2 Four-Band Equalization.....	9
2.3.3 Frequency Selection.....	9
2.3.3.1 Peaking and Shelving.....	9
2.3.4 Boost and Cut.....	10
2.3.5 High-Pass Filter.....	11
3.0 Rear Panel Connections	12
3.1 Balanced INPUT and OUTPUT Connections	12
3.2 AC Power, Voltage Selection, and Grounding	12
Appendix	13
A1 5500 Anniversary Edition Technical Specifications	13
A2 5500 Anniversary Edition Block Diagram	14
A3 5500 Anniversary Edition Housekeeping	14
A4 5500 Anniversary Edition Recall Sheet	15
A5 API Limited Warranty and Service Information	16

About this Manual

This manual covers the user operation of the *API 5500 Anniversary Edition Dual Equalizer*.

Most sections are useful to all users and it's recommended that the manual be read thoroughly before purchase and delivery. Experienced engineers may get up and running quickly, but if you are new to API equalizers, it's recommended that you read the entire manual at least once and keep it handy while recording, editing, and mixing.

Manual Revision History: YYYY-MM-DD format

Original: 2024-01-18

**Dan Pfeifer is Professor Emeritus
of Recording Industry at
Middle Tennessee State University**

Important Safety Instructions

1. Please read these instructions
2. Keep this information in a safe place
3. Do not use this device near water
4. Clean only with a dry cloth
5. Do not block any ventilation openings
6. Do not install near any heat sources such as radiators, heat registers, stoves, or other devices that produce heat
7. Do not defeat the safety purpose of the polarized or grounding type AC plug
8. Protect the AC power cord from being walked on or pinched
9. Use only attachments/accessories specified by the manufacturer
10. Unplug this device during lightning storms or when unused for long periods of time
11. Refer all service to qualified personnel

ATTENTION: Exposure to extremely high noise levels may cause permanent hearing loss or damage. Individuals vary considerably in susceptibility to noise-induced hearing loss, but nearly everyone will lose some hearing if exposed to sufficiently intense noise (this may include music) for a period of time. Be safe.

WARNING – To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.

1.0 Overview and Features

1.1 History of the API Equalizer

The lineage of the 5500 circuit can be traced back to the original 550 equalizer designed by Saul Walker, the founder of Automated Processes, Inc. That three band EQ was originally used in the earliest API consoles built in the 1960s. Engineers were immediately captivated by its fully reciprocal boost/cut characteristic and its proportional Q design, one of API's many industry firsts.

The sound of the 550, 550A, and 550B console equalizers was so highly prized by engineers that many purchased API equalizers separately or took apart old consoles in order to install the equalizers into a hand-made chassis. This allowed them to have that same API console sound available no matter where they were working. Today, API manufactures the six and eight-space Lunchbox and the 10-space VPR rack, making it easier for engineers to bring the API sound to all of their recordings.

The 550 was designed as a console equalizer which, due to the architecture of the recording console, uses an unbalanced input. Also, the ergonomics of a console dictates that controls take up little space, sometimes limiting the number of functions that can be included in a design. The 5500 Anniversary Edition is specifically designed to continue the tradition of API's precision equalization. It features a balanced input, a true straight-wire bypass, an integrated power supply with noiseless muting, high-pass filters, and mid-side processing that expands its versatility to mastering applications.

1.2 All-Discreet Design

Like all API products, the 5500 Anniversary Edition contains no integrated circuits in its main signal path. The gain comes from two hand-built 2520 operational amplifiers in each channel and the balanced input is handled by a 2510 discrete operational amplifier. Besides being a key component of the API sound, the 2520 coupled with the API 2503 output transformer is capable of delivering +32dBu before clipping. With this much headroom, it is unlikely that the 5500 Anniversary Edition can be driven to distortion.

1.3 Proportional Q Circuitry

The Twin "T" topology is found in many equalizer circuits, but the legendary Saul Walker included a novel Proportional Q section that makes it truly musical. Proportional Q works by spreading the equalizer's action over a broad bandwidth at low degrees of boost or cut. This provides delicate shading and subtle coloring of the signal's tone, without leaving the impression that signal processing was applied. As the amplitude is advanced to more extreme settings, the equalizer's bandwidth narrows to provide the user with surgical precision. This allows the equalizer to be useful in removing undesirable noises or radically emphasizing an aspect of an instrument's character, such as its attack.

The additional circuitry necessary to provide proportional Q is not included in most other equalizers because it adds nothing to the spec sheet. Listening to musicality in the signal is the only way to appreciate the benefits of the added cost and complexity required for Proportional Q design.

1.4 Fully Reciprocal Operation

Before the 1960s, few equalizers had the same characteristics in boost mode as in cut mode. (In fact, many earlier designs did not have both boost and cut to begin with.) Today, it is common for equalizers to be reciprocal, but again, Saul Walker's design is special. When switching an API EQ from boost to cut, the exact same components are used, reorganized around the amplifier for the appropriate function. This guarantees 100% reciprocity. The

benefit becomes apparent when a track is re-equalized to remove the previously applied equalization. The engineer can be confident that, because of the 5500 Anniversary Edition's fully reciprocal design, a truly flat frequency response will be restored.

1.5 Power Mute and Bypass

The 5500 Anniversary Edition features a true hard-wire bypass. In this mode, the output connector is wired directly to the input. Shortly after power is first applied, or immediately after it is lost, a special circuit forces this mode, so signal is never lost and power thumps are never heard. The BYPASS button illuminates in red when the 5500 Anniversary Edition is in bypass mode.

1.6 Unique Features of the 5500 Anniversary Edition

To commemorate API's 55th year in the audio industry, API created the 5500 Anniversary Edition. Based on the best-selling 5500 Dual Equalizer described above, the new 5500 Anniversary Edition retains all the sonic and functional characteristics of the standard production 5500, while adding additional design parameters.

The 5500 Anniversary Edition is limited to just 55 production units and features the following:

- Classic API sound
- Commemorative look featuring a vintage-style cream color, worn by numerous iconic API consoles, including the highly-successful 1608-II Special Edition consoles released in 2023
- 3U rackmount chassis
- Expansion of the original 5500 Dual Equalizer's exceptionally nuanced boost and cut gain control, but now applied to each band individually instead of the full channel
- Each band has 21 steps of boost/cut ranging from +/- .5dB to +/- 12dB
- Expanded low-frequency ranges including 20Hz on the LO band and 50Hz on the LO-MID band
- Expanded high-frequency ranges including 15kHz on the HI-MID and 40kHz on the HI band
- Continuously variable high-pass filter on each channel, adjustable from 40 to 600 Hz
- Mid/Side decoding circuit to allow for separate EQ control of the separated Mid and Side signals, then recombined at the output

1.7 High-Pass Filter

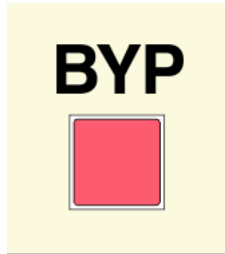
The 5500 Anniversary Edition features an extended-range high-pass filter on both channels that adds additional control over low-frequency and low-mid-frequency content. Each filter has a continuously variable cut-off frequency between 40Hz and 600Hz with a 12dB per octave slope. These are the same high-quality filter circuit API includes in the Legacy AXS and Vision consoles. These high-pass filters can be switched in and out of the audio path on each channel independently.

1.8 Mid-Side Processing

In addition to stereo and dual mono operation, the 5500 Anniversary Edition features mid-side processing capabilities. When the M/S switch is engaged, a M-S encoded stereo signal is separated into "mid" and "side" components after the audio input connectors. The "mid" signal is fed to the left channel (Channel 1) and the "side" signal is fed to the right channel (Channel 2). A mid-side combining circuit re-integrates the signals from each channel into a coherent M-S stereo signal before the audio output connectors.

2.0 Front Panel Controls

2.1 Bypass

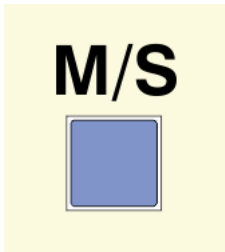


BYPASS: When BYPASS is engaged, the unit enters a true hard-wire bypass, the output is connected directly to the input.

- There are no electronics in the signal path when BYPASS is engaged
- Illuminates in red when engaged

2.2 Mid-Side Processing

The 5500 Anniversary Edition is equipped with input and output mid-side signal processing matrixes. When engaged, mid and side audio signals are separated, with the left side (Channel 1) processing "mid" content and the right side (Channel 2) processing the "side" content.



M/S (Mid/Side): When the M/S switch is engaged, the unit will be in "mid-side" mode.

- A M-S encoded stereo signal is separated into "mid" and "side" components after the audio input connectors
- The "mid" signal is fed to the left channel (1) and the "side" signal is fed to the right channel (2)
- A mid-side combining circuit re-integrates the signals from each channel into a coherent M-S stereo signal before the audio output connectors
- Illuminates in blue when engaged

Refer to the block diagram in Appendix A2 5500 Anniversary Edition Block Diagram for additional information.

2.3 Channel Controls

The 5500 Anniversary Edition is a two-channel unit that can be used as two separate mono EQs, in stereo, or in M/S mode as described above. Each channel has an identical set of controls, all of which will be outlined in the following sections.

2.3.1 IN

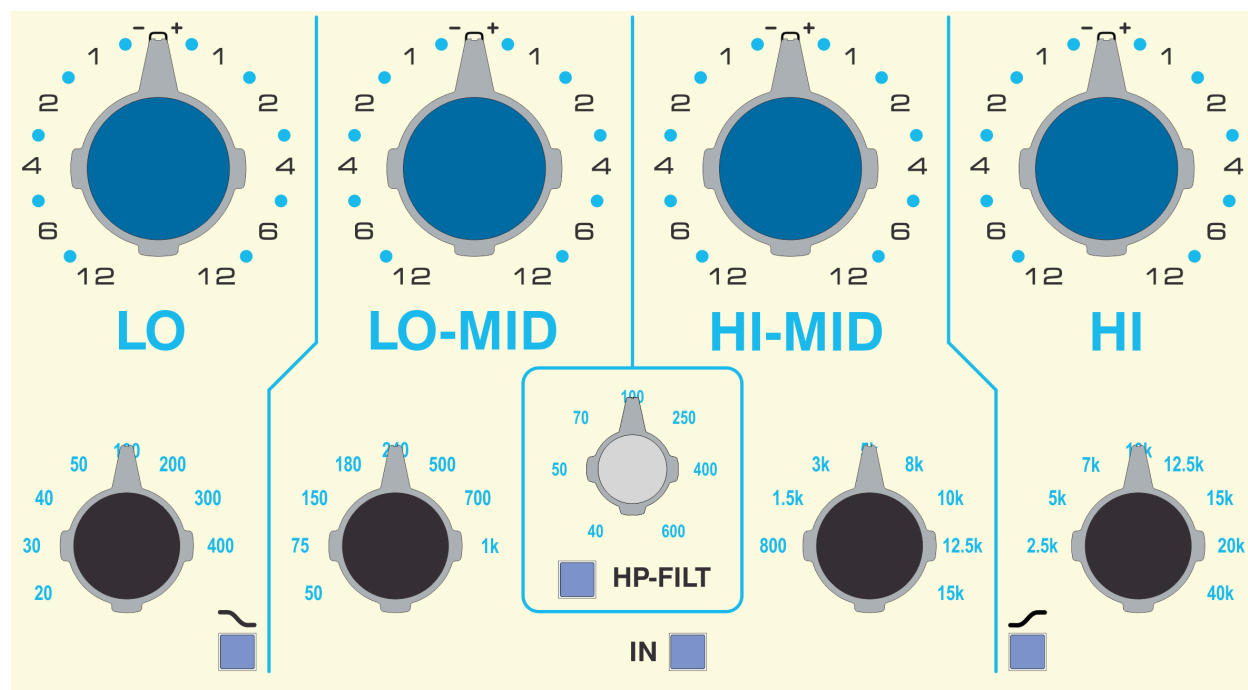


IN: When IN is engaged, the equalizer is fully operational.

- When it is "out" (not engaged) there is no equalization applied
- IN differs from BYPASS in that the electronics and output Transformer are still in the signal path
- Illuminates in blue when engaged

2.3.2 Four-Band Equalization

The 5500 Anniversary Edition offers four overlapping bands of equalization, LO, LO-MID, HI-MID, and HI, and a high-pass filter that enables exceptional control over tonal shaping.



2.3.3 Frequency Selection

Each band equipped with eight (8) fixed frequency selections:

LO: 20Hz, 30Hz, 40Hz, 50Hz, 100Hz, 200Hz, 300Hz, 400Hz

LO-MID: 50Hz, 75Hz, 150Hz, 180Hz, 240Hz, 500Hz, 700Hz, 1kHz

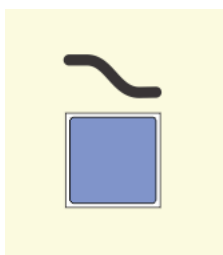
HI-MID: 800Hz, 1.5kHz, 3kHz, 5kHz, 8kHz, 10kHz, 12.5kHz, 15kHz

HI: 2.5kHz, 5kHz, 7kHz, 10kHz, 12.5kHz, 15kHz, 20kHz, 40kHz

2.3.3.1 Peaking and Shelving

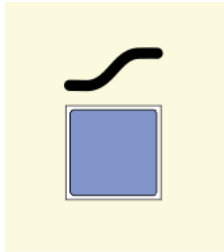
All equalizer sections have peaking (also called “bell” in the UK) response characteristics. While the central frequency of that boost (or cut) is the one engraved on the panel, there is of course amplitude variation that occurs to a lesser extent on nearby frequencies. This is termed the Q where higher Q’s have less effect on adjacent frequencies. As mentioned before, the API equalizers have a Proportional Q that gets larger as more amplitude change is selected.

On the LO and HI bands there is an option to select shelving response. When in shelving mode, the equalizer reaches the indicated amplitude at the indicated frequency and remains with that amplitude change for all frequencies to the edge of the audio spectrum.



LO SHELVE: When LO SHELVE is engaged, the low-frequency band changes from a peaking to a shelving EQ

- Peaking is the default mode
- Illuminates in blue when engaged



HI SHELF: When HI SHELF is engaged, the high-frequency band changes from a peaking to a shelving EQ

- Peaking is the default mode
- Illuminates in blue when engaged

For frequencies towards the center of the spectrum the change is gradual, but the slope differs slightly from the peaking mode. This can have important effects on the midrange character of the sound, but that is not the typical reason to select shelving. The two principal reasons for using a shelving response is either to eliminate noises like rumble that are outside the frequency range of the desired sound, or to give a general “tilt” to the tonal balance towards treble or bass. The API 5500 Anniversary Edition accomplishes both of these tasks without sounding resonant.

2.3.4 Boost and Cut

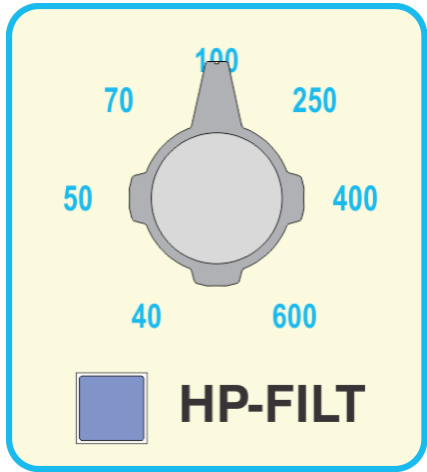
Each band equipped with twenty-one (21) fixed boost and cut selections:

- -12dB
- -9dB
- -6dB
- -5dB
- -4dB
- -3dB
- -2dB
- -1.5dB
- -1dB
- -.5dB
- 0dB
- +.5dB
- +1dB
- +1.5dB
- +2dB
- +3dB
- +4dB
- +5dB
- +6dB
- +9dB
- +12dB

Note that the first four boost (+) and cut (-) selections on each band are set in very fine .5dB increments: .5dB, 1dB, 1.5dB, 2dB. The next three boost (+) and cut (-) selections are in 1dB increments: 3dB, 4dB, and 5dB. This allows very subtle and nuanced tonal shaping in critical applications. +/- 6dB, 9dB, and 12dB selections are provided to retain the full boost/cut range of the original 5500 Dual Equalizer and allow for more aggressive timbral adjustments.

2.3.5 High-Pass Filter

Both channels of the 5500 Anniversary Edition feature an extended-range high-pass filter. This is the same high-quality filter circuit found in API Legacy AXS and Vision consoles.



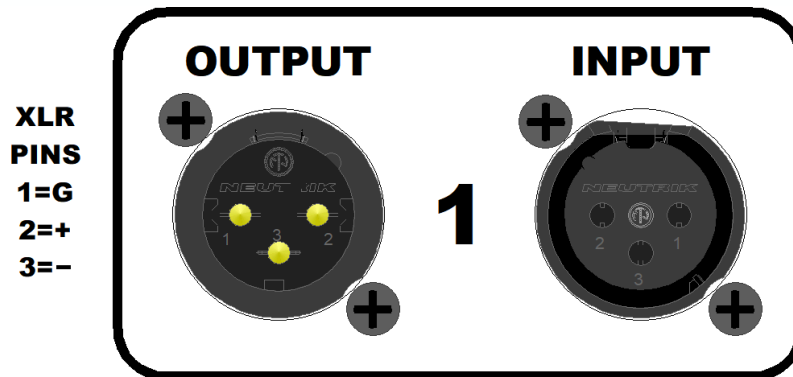
HP-FILT (High-Pass Filter): When the HP-FILT switch is engaged, the high-pass filter is inserted in the signal flow, ahead of the EQ.

- Continuously variable frequency selection between 40Hz and 600Hz
- Illuminates in blue when engaged

3.0 Rear Panel Connections

3.1 Balanced INPUT and OUTPUT Connections

Each channel is equipped with a set of balanced, line level audio input and output connectors.



The audio INPUT is a female, 3-pin, XLR connector that feeds an active balanced circuit.

The audio OUTPUT is a male, 3-pin, XLR connector and is driven from a transformer coupled output. The OUTPUT can drive any load from 600 ohms or greater to full output capability.

The polarity is such that there is no change from input to output, so it is suitable in studios using either pin 2 or pin 3 as the "hot" connection.

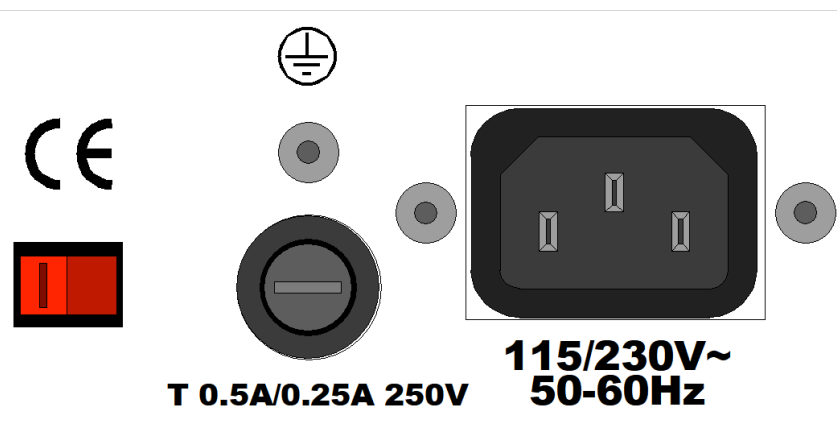
3.2 AC Power, Voltage Selection, and Grounding

For line voltages from 100v to 120v, set the switch to 115v. When set to the 115v position use a 500mA GMA fuse with Slo-Blo characteristics.

The 230v position is good for all line voltages from 200-240 volts. At the 230v setting use a 250mA Slo-Blo fuse.

IMPORTANT NOTE: It is necessary to change the fuse when changing the supply voltage.

A chassis ground connection is provided for technical grounding purposes.

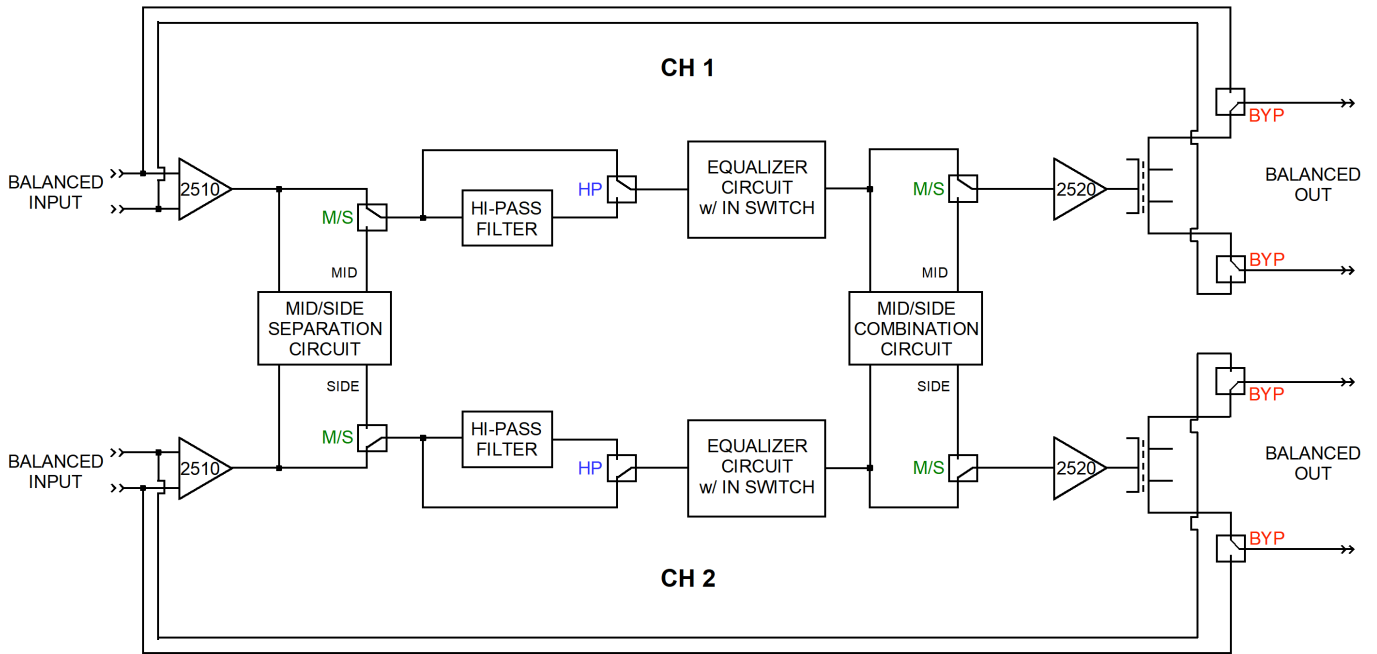


Appendix

A1 5500 Anniversary Edition Technical Specifications

Rear Connectors:	XLR Input and Output
Input Impedance:	20K Ohms, Balanced
Output Impedance:	75 Ohms, Transformer Coupled, Balanced
Maximum Input Level:	+32dBu
Maximum output Level:	+32dBu
Frequency Response:	+/- 0.5 dB from 20Hz to 50kHz
Signal to Noise Ratio:	-105dB
DC Power Draw:	+/-16V: 150mA, +24V: 40mA to 100mA Max
Power Requirement:	20 Watts
Size:	19" x 5.25" (3U) x 11.25" deep
Actual Weight:	16 lbs.
Filter Frequency Centers:	
LO:	20, 30, 40, 50, 100, 200, 300, 400Hz
LO-MID:	50, 75, 150, 180, 240, 500, 700, 1kHz
HI-MID:	800, 1.5k, 3k, 5k, 8k, 10k, 12.5k, 15kHz
HI:	2.5k, 5k, 7k, 10k, 12.5k, 15k, 20k, 40kHz
Filter Boost/Cut Steps:	+/- 0.5, 1, 1.5, 2, 3, 4, 5, 6, 9, 12 dB
Hi-Pass Filter Range:	40Hz to 600Hz, variable
Hi-Pass Filter Slope:	12dB per Octave

A2 5500 Anniversary Edition Block Diagram



A3 5500 Anniversary Edition Housekeeping

Here is a great place to write down the serial number of your 5500 and your purchase date, just in case you need that information someday in the future.

5500 Anniversary Edition serial number _____

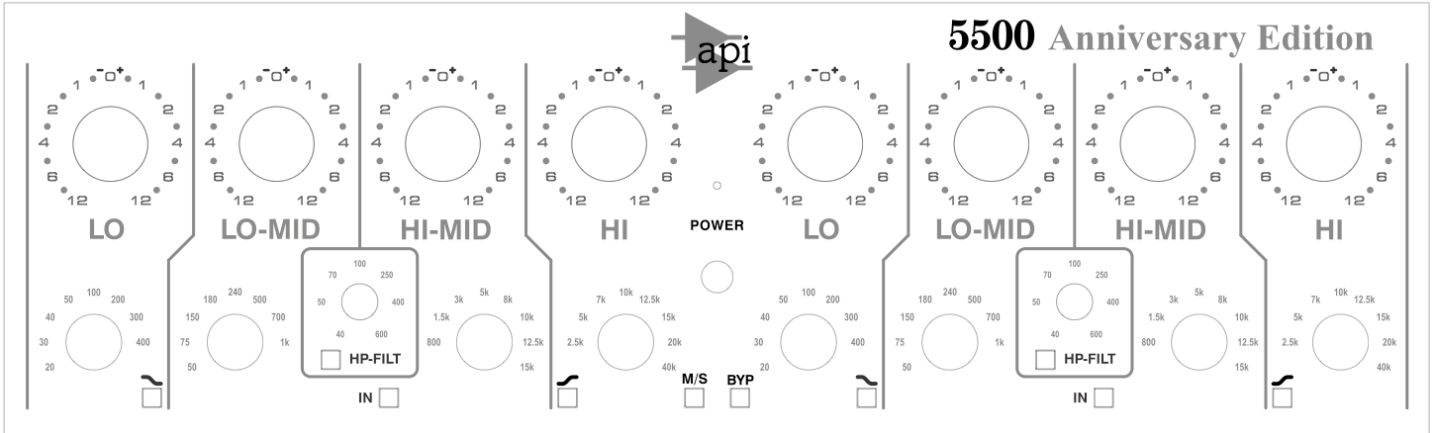
Purchase date: ____/____/____

A4 5500 Anniversary Edition Recall Sheet

ARTIST:
ENGINEER:
DATE:

NOTES:
DRAWN BY:
STUDIO:

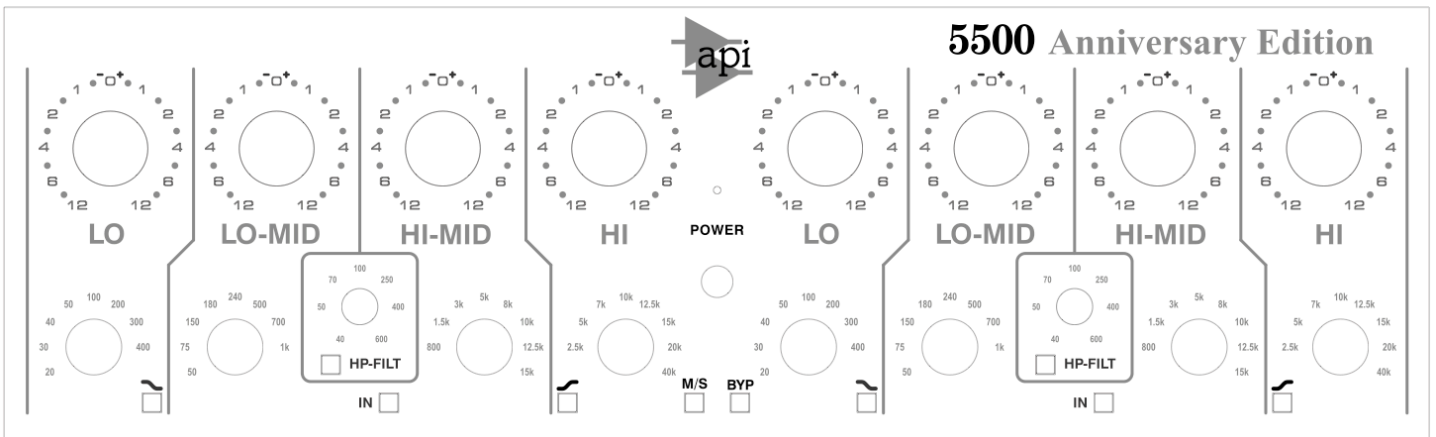
CHAN #	TITLE	NOTES
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ARTIST:
ENGINEER:
DATE:

NOTES:
DRAWN BY:
STUDIO:

CHAN #	TITLE	NOTES
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A5 API Limited Warranty and Service Information

- a) **Warranty Information:** API products carry a one year factory service and five year parts warranty from date of purchase. API (Automated Processes, Incorporated) does not cover claims for damage due to alteration and/or abuse. This warranty is limited to failures during normal use, which are due to defects in material or workmanship. If any defects are found in the materials or workmanship, or if the product fails to function properly during the applicable warranty period, API, at its option, will repair or replace the product.
- b) **PLEASE NOTE:** The design or quality of any non-authorized third party service or vendor is beyond the control of API. Therefore, service or modification of any API unit except by an authorized API representative may **VOID this warranty.**
- c) API reserves the right to inspect any products that may be the subject of any warranty claims before repair or replacement is carried out. Final determination of warranty coverage lies solely with API.
- d) This warranty is extended to the original purchaser and to anyone who may subsequently purchase this product within the applicable warranty period. Proof of purchase may be required.
- e) **For questions regarding operation, interfacing or service of your API product, please contact your API dealer from whom you purchased the unit. Many times, your authorized API dealer is the fastest and most cost-effective way to maintain and service your product.**
- f) The below steps are the best way to initiate the repair process or to submit a parts order request:
 - Repair procedure:**
 1. Fill out a Return Authorization (RA) form at service.apiaudio.com.
 2. Wait to receive an e-mail from API Audio with an RA#.
 3. Use the API original box to package the unit. Write the RA# large and legibly on the box (if the RA# is not clearly visible on the box, the unit may be rejected by our receiving department)
 4. Include copy of the RA form with the unit.
 5. Ship the product **freight prepaid** to:
API SERVICE DEPARTMENT
8301 Patuxent Range Road – Ste A1
Jessup, MD 20794
 - Parts Order procedure:**
 1. Fill out online PO form (for parts and parts numbers not listed online please fill out PO form with your name, e-mail, contact phone and shipping address and describe the part you need).
 2. Submit online PO form.
 3. API will e-mail you back with part numbers and procedure how to order/pay.
- g) This is your sole warranty. API does not authorize any third party, including any dealer or sales representative, to assume liability on behalf of API or to make any warranty for API.
- h) THE WARRANTY GIVEN ON THIS PAGE IS THE SOLE WARRANTY GIVEN BY API AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE WARRANTY GIVEN ON THIS PAGE SHALL BE STRICTLY LIMITED IN DURATION TO FIVE (5) YEARS FROM THE DATE OF THE ORIGINAL PURCHASE FROM API OR AN AUTHORIZED API DEALER. UPON EXPIRATION OF THE APPLICABLE WARRANTY PERIOD API SHALL HAVE NO FURTHER WARRANTY OBLIGATION OF ANY KIND. API SHALL NOT BE LIABLE FOR ANY INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES THAT MAY RESULT FROM ANY DEFECT IN THE API PRODUCT OR ANY WARRANTY CLAIM.
- i) This warranty provides specific legal rights and you may have other rights, which vary from state to state.



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