

Library 1

A.P.I.

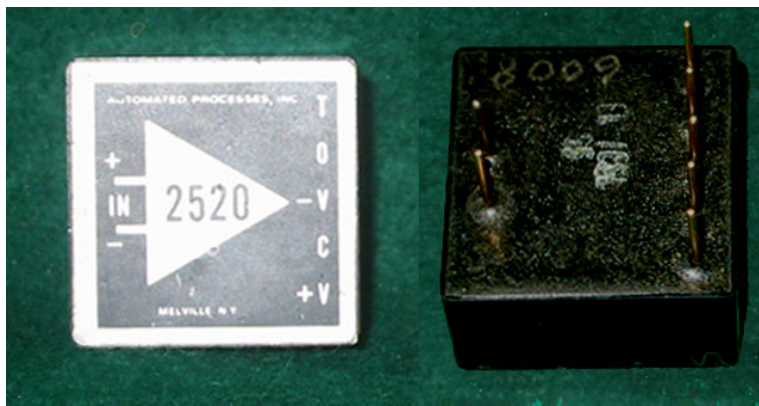


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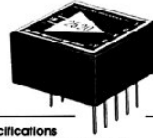
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A.P.I.2520



A.P.I.2520-1

Audio Operational Amplifier



- Features**
- Extremely low noise
 - High output power
 - Low quiescent current
 - Low distortion
 - Operation under a wide range of supply voltages
 - Wide power bandwidth
 - Standard OP-AMP connections (Plug-in or P.C. mount)
 - Stable operating characteristics
 - Electrostatically shielded
 - Short-Circuit and overload protected

- Applications**
- Microphone Preamplifiers
 - Line or Booster Amplifiers
 - Lossless Combining Amplifiers
 - Balanced Transformerless Amplifiers
 - Equalizers and Equalized Preamplifiers
 - Earphone or Small Speaker Drivers

The Model 2520 is a high gain, wide band, direct coupled amplifier with differential input, designed specifically for audio amplifier applications. Several Operational Amplifier circuits typical of those most often used in the audio field are shown on the following page, along with their characteristics. These circuits have been tested and the data shown has been validated in Automated Processes laboratories.

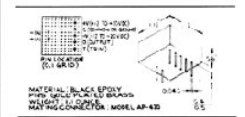
The virtually perfect performance of the Model 2520 in audio operational amplifier applications makes possible the design of complete systems utilizing this low cost device as the only active element.

Since Operational Amplifier circuits derive their characteristics almost entirely from the performance of the passive elements connected into the feedback loop, accurate, predictable, and stable performance is assured. The use of this single active plug-in element reduces maintenance and service costs to a minimum.

The specially formulated, thermally conductive epoxy in which this nine transistor amplifier is encapsulated, protects the internal circuitry against thermal shocks, vibration and humidity. Conservative design based upon "worst case analysis" plus thorough in-process inspection and performance test offer "burn-in" assure long life and reliable performance.

- Specifications**
- Gain: Greater than 110 dB, DC
 - Frequency Response: Small signal Gain Bandwidth Product ~50 MHz; Full Output Frequency ~40 kHz
 - Equivalent Input Noise: Less than 0.5 microvolts rms/Hz
 - Input Impedance: Greater than 10 megohms, DC
 - Input Current Offset: 25 nA Typ.; 75 nA Max.
 - Input Voltage Offset: 4mV Typ.; 10 mV Max.
 - Common Mode Input: ±12 Volts with ±15 VDC supply; ±15 Volts with ±20 VDC supply
 - Distortion: 0.2% THD, 20 to 20,000 Hz at rated output
 - Output Voltage: Greater than 7.75 volts RMS, ±15 VDC supply; Greater than 11 Volts RMS, ±20 VDC supply
 - Minimum Load Impedance: 75Ω for full output voltage
 - Continuous Power Output: (Minimum Load Impedance) 0.6 Watts RMS @ ±15 VDC supply; 1.5 Watts RMS @ ±20 VDC supply
 - Quiescent Current: 15 Milliamperes @ ±15 VDC supply; 20 Milliamperes @ ±20 VDC supply
 - Current at Rated Output 600 Ω Load: 15 Milliamperes @ ±15 VDC supply; 32 Milliamperes @ ±20 VDC supply
 - 75 Ω Load: 60 Milliamperes @ ±15 VDC supply; 85 Milliamperes @ ±20 VDC supply
 - Power Supply Voltage: B-polar, ±12 VDC to ±20 VDC

*Output offset may be nulled to zero by means of a 100k Ω trim pot between the + and - terminals. This is not a typical feature in Audio applications.



Our staff is fully equipped and stands ready to provide engineering services, from application assistance to complete system design and fabrication.

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A.P.I.2520-2

Typical Amplifier Circuits		Circuit Specifications	
<p>FIGURE 1</p> <p style="text-align: center;">MICROPHONE PREAMPLIFIER (GAIN: 58 dB)</p>	<p>GENERAL (Figures 1-5)</p> <p>Load Impedance: 600 Ω</p> <p>Frequency Response: ±3.25 dB, 20 to 20 kHz at rated output power</p> <p>Distortion: Less than 0.2% THD, 20 to 20 kHz at rated output power</p> <p>MICROPHONE PREAMPLIFIER (Figure 1)</p> <p>Gain: 58 dB</p> <p>Equivalent Input Noise: -129 dBm, 20 to 20 kHz, unweighted</p> <p>Input Impedance: Greater than 1500 Ω</p> <p>Output Impedance: Less than 5 Ω</p> <p>Power Output: +21 dBm, ±15 VDC supply +24 dBm, ±20 VDC supply</p>		
<p>FIGURE 2</p> <p style="text-align: center;">LINE AMPLIFIER (GAIN: 49 dB)</p>	<p>LINE AMPLIFIER (Figure 2)</p> <p>Gain: 49 dB</p> <p>Equivalent Input Noise: -125 dBm, 20 to 20 kHz, unweighted</p> <p>Input Impedance: Greater than 2 megohms</p> <p>Output Impedance: Less than 100 Ω</p> <p>Power Output: +28 dBm, ±15 VDC supply +30 dBm, ±20 VDC supply</p>		
<p>FIGURE 3</p> <p style="text-align: center;">LOSSLESS COMBINING AMPLIFIER (GAIN: 0 dB)</p>	<p>LOSSLESS COMBINING AMPLIFIER (Figure 3)</p> <p>Gain: 0 dB</p> <p>Maximum Crosstalk: -100 dB</p> <p>Maximum Gain: 20 dB for 10 inputs 10 dB for 32 inputs</p> <p>Equivalent Input Noise: -105 dBm for 10 inputs - 95 dBm for 32 inputs</p> <p>Input Impedance: 12k Ω</p> <p>Output Impedance: Less than 5 Ω</p> <p>Power Output: +21 dBm, ±15 VDC supply +24 dBm, ±20 VDC supply</p> <p><i>Note: This circuit produces a 180° phase reversal. An output transformer such as that shown in Figure 5 may be used to correct the phase, and can also provide additional gain.</i></p>		
<p>FIGURE 4</p> <p style="text-align: center;">BALANCED TRANSFORMERLESS AMPLIFIER (GAIN: 40 dB)</p>	<p>BALANCED TRANSFORMERLESS AMPLIFIER (Figure 4)</p> <p>Gain: 40 dB</p> <p>Equivalent Input Noise: -124 dBm, 20 to 20 kHz, unweighted</p> <p>Input Impedance: 600 Ω</p> <p>Common Mode: Greater than 90 dB (with matched resistors)</p> <p>Rejection: ±8 Volts peak</p> <p>Mode Voltage: Less than 2 V</p> <p>Power Output: +21 dBm, ±15 VDC supply +24 dBm, ±20 VDC supply</p>		
<p>FIGURE 5</p> <p style="text-align: center;">PHONO PREAMPLIFIER (GAIN: 54 dB)</p>	<p>PHONO PREAMPLIFIER (Figure 5)</p> <p>Equalization: RIAA</p> <p>Gain: 54 dB (2.5 mV at 1 kHz produces +4 dBm output)</p> <p>Input Impedance: 50k Ω</p> <p>Output Impedance: Less than 100 Ω</p> <p>Power Output: +25 dBm, ±15 VDC supply +28 dBm, ±20 VDC supply</p>		



A.P.I.2520-3

Audio Operational Amplifier

API MODEL 2520

FEATURES

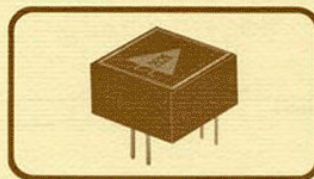
- Extremely low noise
- High output power
- Low quiescent current
- Low distortion
- Operation over a wide range of supply voltages
- Wide power bandwidth
- Standard OP-AMP connections (Plug-in or P.C. mount)
- Stable operating characteristics
- Electrostatically shielded
- Short-Circuit and overload protected

APPLICATIONS

- Microphone Preamplifiers
- Line or Booster Amplifiers
- Lossless Combining Amplifiers
- Balanced Transformerless Amplifiers
- Equalizers and Equalized Preamplifiers
- Earphone or Small Speaker Drivers

GENERAL DESCRIPTION

The Model 2520 is a high gain, wide band, direct coupled amplifier with differential input, designed specifically for audio amplifier applications. Several Operational Amplifier circuits typical of those most often used in the audio field are shown on the fol-



lowing page, along with their characteristics.

Since Operational Amplifier circuits derive their characteristics almost entirely from the performance of the passive elements connected into the feedback loop, accurate, predictable, and stable performance is assured. The use of this single active plug-in element reduces maintenance and service costs to a minimum.

The specially formulated, thermally conductive epoxy in which this 10 discrete transistor amplifier is encapsulated, protects the internal circuitry against thermal shock, vibration and humidity. Conservative design based upon "worst case analysis" plus thorough in-process inspection and performance test after "burn-in" assure long life and reliable performance.

Specifications

All measurements taken at 25°C and with ± 15VDC supply unless otherwise specified.

Input Offset Voltage: 4 mV typ., 10 mV max.

Input Bias Current: 200 nA typ.

Input Offset Current: 25 nA typ., 75 nA max.

Input Resistance: 10 megohms min.

Equivalent Input Noise: 4 nV $\sqrt{\text{Hz}}$ typ., 20Hz to 20 kHz

Common Mode Voltage: ± 12V min.; ± 15V min. with ± 20 V Supply

Common Mode Rejection: 80dB min.

Open Loop Gain (DC): 200 v/mV typ.

Distortion: .01% T.H.D. typ.; 20Hz to 20kHz at rated output

Slew Rate: 3 V/ μs typ.

Gain-Band Width Product: 50 MHz typ.

Operating Bandwidth: 40 kHz min. for full output

Output Voltage: ± 11V min.; ± 15V min. with ± 20V supply at rated load

Output Current Limit: 200 mA min.

Minimum Load Impedance: 75 Ω for full output voltage

Continuous Power Output: 1.5 watts RMS (75 load, ± 20V power supply)

Power Supply Voltage: Bipolar, ± 12 VDC to ± 20 VDC

Quiescent Supply Current: 15 mA typ., ± 15V supply; 26 mA typ., ± 20V supply

Current at Rated Output: 18 mA, + 20 dBm (600 Ω load); 60 mA, + 20 dBv (75 Ω load)

Operating Temperature: 0° C to 50° C without derating

*Output offset may be nulled to zero by means of a 100k Ω trim pot between the ± V and T terminals. This is normally not necessary in audio applications.

DATATRONIX INC.
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Automated Processes, Inc.

A.P.I.2520-4

Circuit Specifications

FIGURE 1

GAIN: $A = \frac{R_2 + R_1}{R_1} \times \text{XFMR. GAIN}$

MICROPHONE PREAMPLIFIER (GAIN: 60 dB)

MICROPHONE PREAMPLIFIER (Figure 1)

Gain: 58 dB
 Equivalent Input Noise: -129 dBm, 20 to 20 kHz, unweighted
 Input Impedance: Greater than 1500 Ω
 Output Impedance: Less than 2 Ω
 Power Output: + 21 dBm, \pm 15 VDC supply
 + 24 dBm, \pm 20 VDC supply

FIGURE 2

GAIN: $A = \frac{R_2 + R_1}{R_1} \times \text{XFMR. GAIN}$

LINE AMPLIFIER (GAIN: 49 dB)

LINE AMPLIFIER (Figure 2)

Gain: 49 dB
 Equivalent Input Noise: -125dBm, 20 to 20 kHz, unweighted
 Input Impedance: Greater than megohm
 Output Impedance: Less than 100 Ω
 Power Output: + 28 dBm, \pm 15 VDC supply
 + 30 dBm, \pm 20 VDC supply
 Frequency Response: + 0dB -0.5 dB, 30 Hz to 20 kHz
 Distortion: Less than .05% THD at + 18 dBm

FIGURE 3

GAIN: $-A = \frac{R_1}{R_2}$

LOSSLESS COMBINING AMPLIFIER (GAIN: 0 dB)

LOSSLESS COMBINING AMPLIFIER (Figure 3)

Gain: 0 dB
 Maximum Crosstalk: -90 dB
 Maximum Gain: 20 dB for 10 inputs
 10 dB for 32 inputs
 Equivalent Input Noise: -105 dBm for 10 inputs
 95 dBm for 32 inputs
 Power Output: + 21 dBm, \pm 15 VDC supply
 + 24 dBm, \pm 20 VDC supply
 Frequency Response: + 0dB -0.25 dB, 20 Hz to 20 kHz
 Distortion: Less than 0.01% THD at + 18 dBm
 Note: This Circuit produces a 180° phase reversal. An output transformer such as that shown in Figure 2 may be used to correct the phase, and can also provide additional gain.

FIGURE 4

GAIN: $A = \frac{R_2}{R_1}$

BALANCED TRANSFORMERLESS AMPLIFIER (GAIN: 20 dB)

BALANCED TRANSFORMERLESS AMPLIFIER (Figure 4)

Gain: 20 dB
 Equivalent Input Noise: -124 dBm, 20 to 20 kHz, unweighted
 Input Impedance: 20 k Ω
 Common Mode Rejection: Greater than 90 dB (with matched resistors)
 Maximum Common Mode Voltage: \pm 18 Volts peak
 Power Output: + 21 dBm \pm 15 VDC supply
 + 24 dBm \pm 20 VDC supply
 Frequency Response: + 0dB -0.25 dB, DC to 20 kHz
 Distortion: Less than 0.01% THD at + 18 dBm

PIN LOCATION
(0.1 GRID)

BOTTOM VIEW

PINS PLATED BRASS
WEIGHT: 1.1 OUNCE

(Specifications may change as design improvements are introduced)

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2100 Reston Avenue, Reston, Virginia 22091
(703) 620-5300 TWX 710 833 0365

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A.P.I.2520-5

Notes

- Q1, Q2 HFE > 400, matched
- Variant:
- Add IN4727 series Q1 Q2 coil
- D1 = 2x IN4823 in series
- D2, D3 = IN4727
- C2, R16 gone
- C4 = 68p
- R3 = 25k
- R4 = 3k
- R5 = 15k
- R6 = 3k
- D7 = 3k
- R14 = 0 Ω
- R1 replaced with current source
- D16 tied from current source base
- Current source consists of:
- T1598 with 25k emitter resistor
- 2k Ω base resistor to minus supply
- tail of D16 connects to base of current source
- Q1, Q2 BC414C in yet another version

API 2520 OpAmp

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AUTOMATED PROCESSES, INC.

550A (2520X2) & 554 (2520X2)

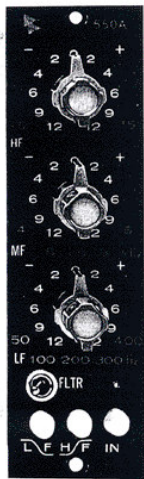
AUTOMATED PROCESSES, INC.
789 PARK AVENUE, HUNTINGTON, NEW YORK 11743 • 516-427-6024

Model 550A
Equalizer

AUTOMATED PROCESSES, INC.
789 PARK AVENUE, HUNTINGTON, NEW YORK 11743 • 516-427-6024

Model 554
Parametric Equalizer

Equalizer



- Three range—fifteen frequency boost or attenuation in steps to 12 dB
- Shelving or peaking curves independently selectable for upper and lower ranges
- Switchable audio band-pass filter
- Transformer coupled output to +28 dBm
- LED Indicator
- Low noise and distortion
- Panel mounting 1½" X 5½"
- Utilizes Automated Processes 2520 Op Amps

The Automated Processes Model 550A Equalizer provides reciprocal equalization of fifteen points in five steps of boost or attenuation to a maximum of 12 dB at each point. The In-Out indicator lamp is a light emitting diode providing almost unlimited indicator life. The fifteen frequency points are divided into three overlapping ranges with the upper and lower ranges individually selectable as either peaking or shelving. This combination of possibilities makes the 550A ideally suited for all types of music or voice enhancement and effects equalization. A band-pass filter (50 Hz to 15 kHz) may be inserted independent of all other selected equalization settings.

Ten controls are provided to accomplish the various functions. Three dual concentric rotary switches perform frequency selection and degree of equalization for the three ranges: the inner knob selects the desired frequency while the outer knob sets the degree of boost or cut from a mid position (reciprocal equalization) in steps of 2, 4, 6, 9 and 12 dB.

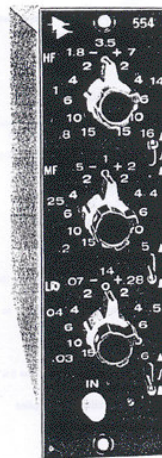
Two push buttons select either the bell-shaped peaking curves or shelving curves for the upper and lower frequency ranges. The five center frequencies in the mid-range are reciprocal bell-shaped peaking families. A small toggle switch is used to insert the band-pass filter into the equalizer.

A push button throws the equalizer networks in or out of the circuit while lighting a small LED tally light showing when equalization is "In". The switching is silent permitting use of this function during program.

In order to optimize signal to noise ratio over the widest possible range of operating conditions, two input/output connections are provided. The "High Level" connection is recommended for input levels between 0 dBm and +12 dBm and provides output capability to +30 dBm. The "Low Level" connection permits operation at levels

Available from:
General Office and Manufacturing Facility, Huntington, New York
A.P. Ltd., 17 Encroft Way, Twickenham, Middlesex TW1 1DA, England 01-891-2770 and
Respected Dealers Throughout the World.

Parametric Equalizer



- Variable boost and cut to ±15dB
- Bell shaped and notch filter modes
- High and low frequency shelving modes
- Unique input circuitry eliminates ground loops
- Three continuously variable frequency controls
- Silent electronic equalizer In/Out switching

The Model 554 Parametric Equalizer features wide dynamic range continuously variable overlapping non-interactive frequency controls. It provides flexibility and versatility consistent with the most advanced audio mixing systems.

Precision "state variable" filters are employed to achieve both bell shaped and high "Q" notch filter characteristics.

The 554 provides three overlapping ranges. The upper and lower ranges are provided with selectable shelving modes. Retrofitting into existing consoles is simplified since the unit is the same size as the Automated Processes Model 550A.

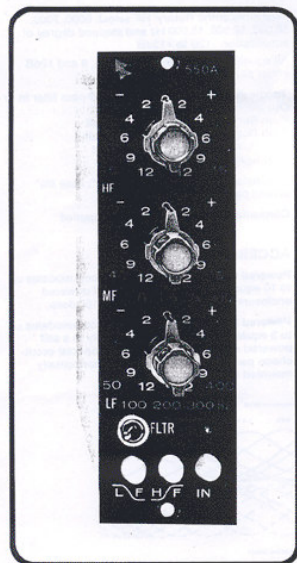
In addition to conventional response curve shaping for tonal effects, the Model 554 is ideal for bandpass, bandstop and notch filtering for the elimination of noise, sibilance, resonance, etc. Non-interactive circuitry prevents response curve anomalies when center frequencies are brought close or coincident. Consequently, peaks or notches of as much as 30dB can be achieved. Special effects can also be produced by varying or sweeping the filter frequencies during use.

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550A-1 (2520X1) & 550A (2520X2)

Equalizer

API MODEL 550A-1



FEATURES

- Three range—fifteen frequency, boost or attenuation in steps to 12dB
- Shelving or peaking curves independently selectable for upper and lower ranges
- Switchable audio band-pass filter
- Balanced differential input
- Transformer coupled output to +30dBm
- Low noise and distortion
- Utilizes Automated Processes 2520 Op Amp

GENERAL DESCRIPTION

The Automated Processes' Model 550A-1 Equalizer provides reciprocal equalization at fifteen points in five steps of boost or attenuation to a maximum of 12 dB at each point, while maintaining constant Q.

The fifteen frequency points are divided into three overlapping ranges with the upper and lower ranges individually selectable as either peaking or shelving. This combination of possibilities makes the 550A-1 ideally suited for all types of music or voice enhancement and effects equalization. A band-pass filter (50 Hz to 15 kHz) may be inserted independent of all other selected equalization settings.

Three dual concentric rotary switches perform frequency selection and degree of equalization for the three ranges. The inner knob selects the desired frequency and the outer knob sets the degree of boost or cut in steps of 2, 4, 6, 9 and 12 dB.

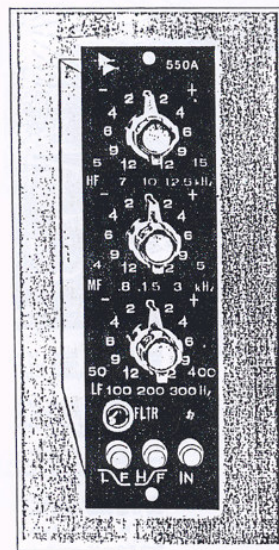
Two push buttons select either the bell-shaped peaking curves or shelving curves for the upper and lower frequency ranges.

An additional push button silently switches the equalizer networks in or out of the circuit while lighting a small LED tally light showing when equalization is "In".

In order to optimize signal to noise ratio over the widest possible range of operating conditions, two input/output connections are provided. The "High Level" connection is recommended for input levels between 0dBm and +12 dBm and provides output capability to +30 dBm. The "Low Level" connection permits operation at levels between -15dBm and 0dBm without encountering the usual increase in relative noise level. The maximum output capability in this connection is equivalently reduced to +22dBm.

The Model 550A-1 Equalizer makes use of the API Model 2520 operational amplifier and exhibits the reliability, long life and uniformity which are characteristic of this device.

The Model 550A-1 operates from a bipolar power supply of from ±15 to ±18 volts permitting latitude in system design and assurance of stability under normal operating conditions. It is reverse polarity protected and will withstand 150% transients reducing the likelihood of damage from power line surges and power supply malfunctions. Power decoupling is also provided to minimize signal coupling in the power supply lines.



Features

- Three range—fifteen frequency boost or attenuation in steps to 12 dB
- Shelving or peaking curves independently selectable for upper and lower ranges
- Switchable audio band-pass filter
- Transformer coupled output to +28 dBm
- LED indicator

Equalizer MODEL 550A

- Low noise and distortion
- Panel mounting 1 1/2" x 5 1/2"
- Utilizes Automated Processes 2520 Op Amps

Description

The Automated Processes Model 550A Equalizer embodies improvements and changes to the well known Model 550, further increasing its versatility, performance and reliability. The Model 550A provides reciprocal equalization at fifteen points in five steps of boost or attenuation to a maximum of 12dB at each point. Force has been reduced 5dB. The In-Out indicator lamp has been changed to a light emitting diode reducing current requirements and providing almost unlimited indicator life.

The fifteen frequency points are divided into three overlapping ranges with the upper and lower ranges individually selectable as either peaking or shelving. This combination of possibilities makes the 550A ideally suited for all types of music or voice enhancement and effects equalization. A band-pass filter (50 Hz to 15 kHz) may be inserted independent of all other selected equalization settings.

Ten controls are provided to accomplish the various functions. Three dual concentric rotary switches perform frequency selection and degree of equalization for the three ranges; the inner knob selects the desired frequency while the outer knob sets the degree of boost or cut from a mid position (reciprocal equalization) in steps of 2, 4, 6, 9 and 12 dB.

Two push buttons select either the bell-shaped peaking curves or shelving curves for the upper and lower frequency ranges. The five center frequencies in the mid-range are reciprocal bell-shaped peaking curves. A small toggle switch is used to insert the band-pass filter into the equalizer.

A push button throws the equalizer networks in or out of the circuit while lighting a small LED tally light showing when equalization is "In". The switching is silent permitting use of this function during programs.

In order to optimize signal to noise ratio over the widest possible range of operating conditions, two input/output connections are provided. The "High Level" connection is recommended for input levels between 0 dBm and +12 dBm and provides output capability to +28 dBm. The "Low Level" connection permits operation at levels between -15 dBm and 0 dBm without encountering the usual increase in relative noise level. The maximum output capability in this connection is equivalently reduced to +20 dBm.

The Model 550A Equalizer makes use of Automated Processes 2520 operational amplifiers and therefore exhibits the reliability, long life and uniformity which are characteristic of this device.

The Model 550A operates from a bipolar power supply of from ±15 to ±18 volts permitting latitude in system design and assurance of stability under normal operating conditions. It is reverse polarity protected and will withstand 150% transients reducing the likelihood of damage from power line surges and power supply malfunctions. Power decoupling is also provided to minimize signal coupling in the power supply lines.



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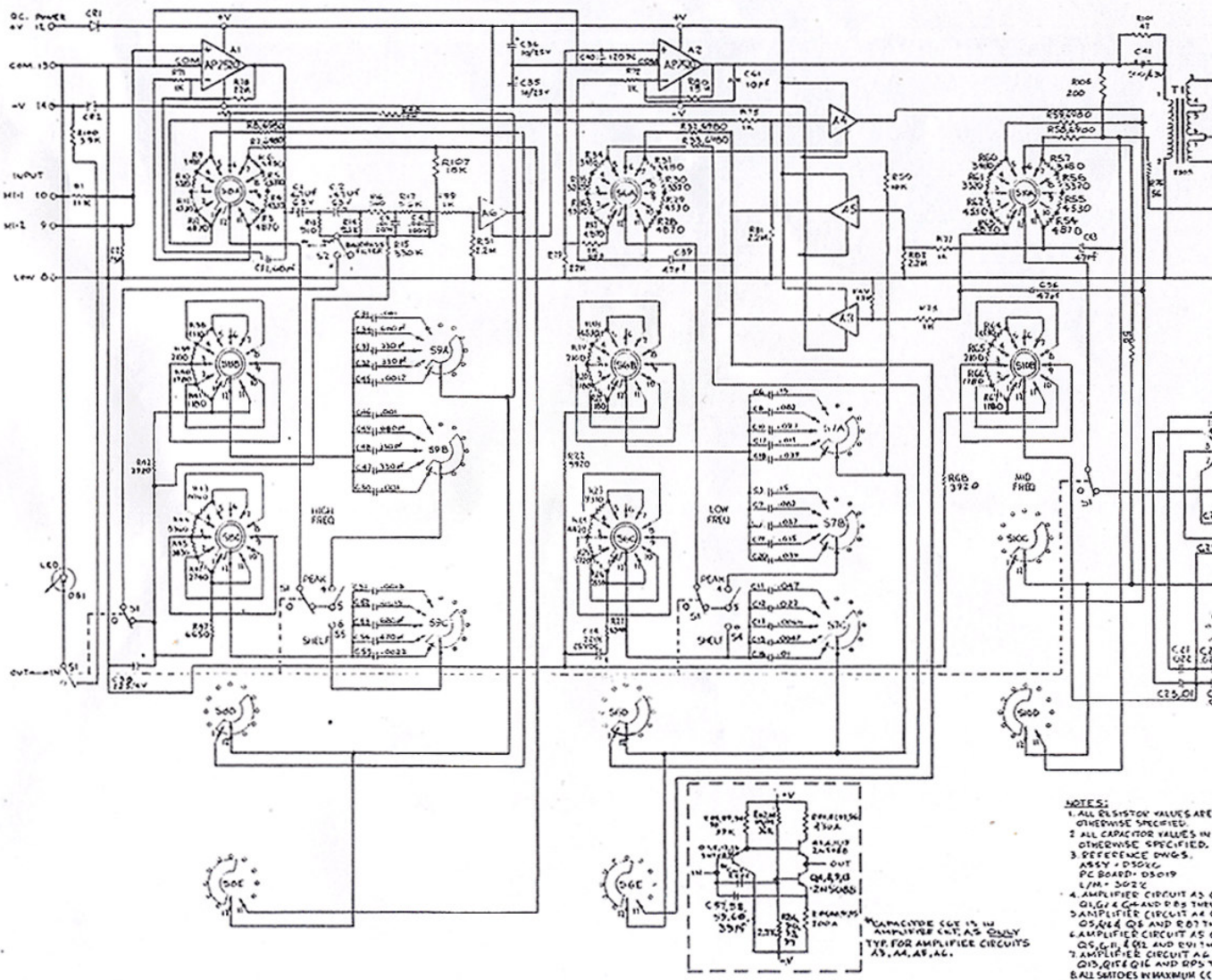


api audio products, Inc.
MADE IN USA

NOTE: This equalizer is being built to the ORIGINAL design used by API in the 70's. The ONLY changes are to the way the switches connect to the IC board and the location of the transformer leads. It uses 10 IC's.

550A (2520X2)

MODEL 550A EQUALIZER SCHEMATIC

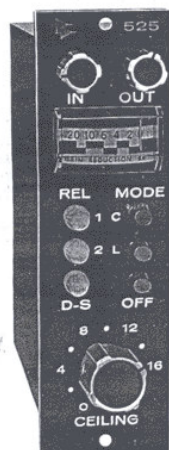


A.P.I.525C Compressor-Limiter (1)

AUTOMATED PROCESSES, INC.
790 PARK AVENUE, HUNTINGTON, NEW YORK 11743 • 516-427-6024

Model 525
Compressor-Limiter

Compressor-Limiter



- Switchable Compression and Limiting functions
- Ceiling control for 20 dB of compression or limiting
- De-Ess (Anti Sibilant)
- Four selectable Release times
- Fast attack time
- Integral Illuminated meter
- Threshold and Output level controls
- In-Out switch
- Two range, frequency dependent release time
- Transformer coupled output to +24 dBm
- Flat Frequency Response
- Low distortion, less than 0.5% 30 to 20,000 Hz
- Low noise
- Stereo Interconnect
- Utilizes Automated Processes 2520 Op Amps

The Automated Processes Model 525 Compressor-Limiter is ideal for the reduction of distortion due to overload or overmodulation of program peaks in recording or broadcast applications.

The Model 525 is designed for individual channel use, however its extreme flexibility, repeatable settings and stereo interconnect features make it ideal for all studio applications. Virtually any type of program material can be dynamically controlled by the 525 without annoying side effects through the use of its various features.

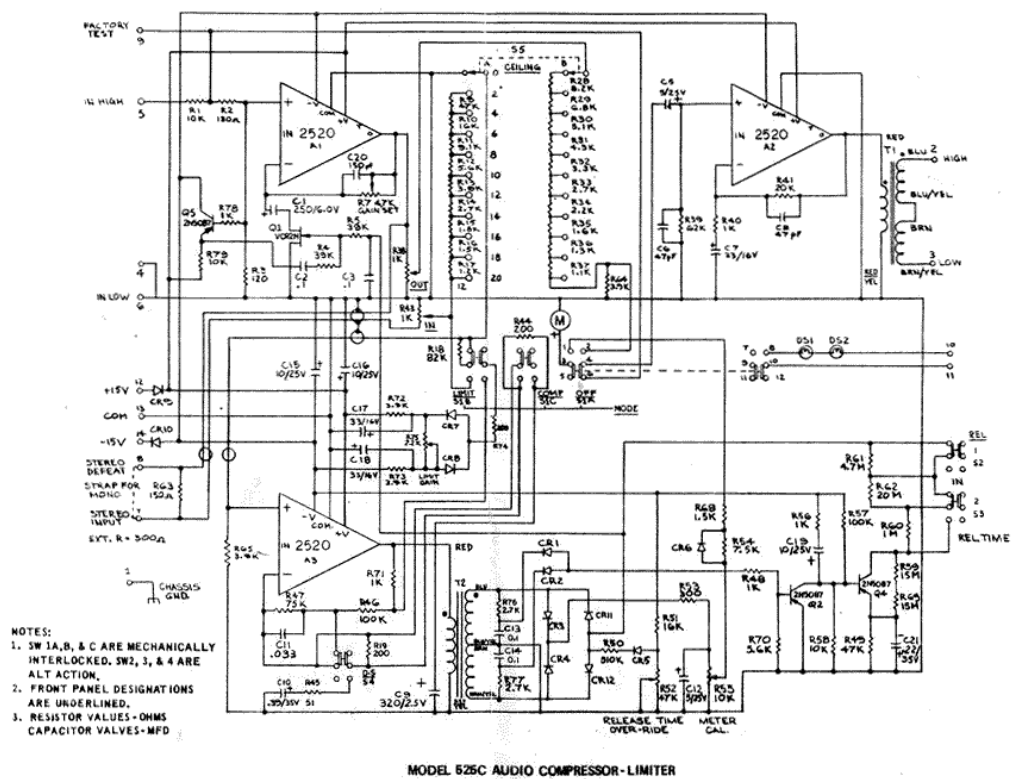
The unique Ceiling Control permits extreme ease of operation by providing up to 20 dB of compression or limiting in 2 dB steps while maintaining a constant peak output level.

Two small rotary controls set the initial operating parameters of threshold and output level. Full range of operation is achieved with signal input levels from -15 dBm to +20 dBm and output capability is +24 dBm through an integral output transformer.

The six remaining controls are push buttons that select the various methods of operation. One interlocked group of three buttons sets the basic mode of operation of the 525: Compression (C), Limiting (L), or as a unity gain.

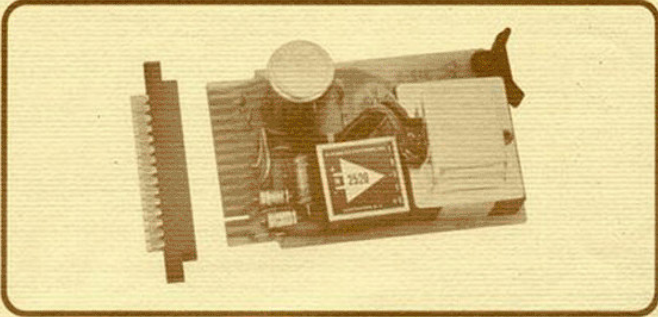
Available from:
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A.P.I. 525C Compressor-Limiter (2)



A.P.I.312 MIC PREAMP-1

Preamplifier
API MODEL 312



FEATURES

- Transformer coupled input - 150 ohm and 600 ohm bridging
- Two transformer coupled outputs
- Gain externally adjustable (15 to 65 dB)
- Low noise and distortion
- High output (+30 dBm)
- Reverse polarity and overload protected
- Small interchangeable plug-in card
- Utilizes the Model 2520 Audio Operational Amplifier

GENERAL DESCRIPTION

The Model 312 is a plug-in PC card preamplifier having extremely low noise and distortion characteristics. Its power handling capability insures freedom from overload with today's high output microphones. Because of the high input acceptance level, the unit is also ideal as a line or booster amplifier. The Model 312 makes use of the 2520 Operational Amplifier as its active element and therefore exhibits the reliability, long life and uniformity which are characteristic of this device.

Gain of the Model 312 may be accurately adjusted through a 40 dB range to a maximum of 65 dB by the use of an appropriate fixed resistor on the external connector, or made variable within this range by the use of a potentiometer. By means of transformer connections, gain may be reduced to 15 dB. Optimum signal to noise ratio and low distortion characteristics are maintained independent


of gain settings within the ratings of the amplifier. Since all input and output impedance connections as well as gain selection are accomplished on an external connector, all Model 312 amplifiers in a system are completely interchangeable.

The output transformer of the Model 312 is of unique design and contains two independent secondary windings. The first winding, which is centertapped, provides greater than +26 dBm into 600 ohms. An output in excess of +22 dBm is simultaneously available from the second winding. Continuous undistorted power output capability of +30 dBm into 600 ohms is provided by strapping both secondary windings in series at the connector. The unit is short circuit protected and cannot be damaged by input or output overloads.

The Model 312 operates from a bipolar power supply of from ± 12 to ± 20 volts permitting great latitude in system design and assurance of stability under normal operating conditions. It is reverse polarity protected and will withstand transients as high as ± 30 volts preventing damage from power line surges and power supply malfunctions. Tightly regulated supplies are therefore not required. Power decoupling is also provided to prevent signal coupling in the power supply lines.

A convenient accessory, the Model 300-PR Powered Rack accommodates up to 10 amplifier cards in a $3\frac{1}{2}'' \times 19''$ enclosure.

The Model 312 is supplied with mating connector and is equipped with a color coded card extractor handle.



DATATRONIX INC
A subsidiary of ATLANTIC RESEARCH CORPORATION

Formerly a product of
Automated Processes, Inc.

A.P.I.312 MIC PREAMP-2

Specifications

(600 ohm load unless otherwise specified)

Applications: Microphone Preamplifier, Line Amplifier, Booster Amplifier

Gain: Externally adjustable on mating connector from 15 dB to 65 dB

Frequency Response: ± 0.5 dB, 30 Hz to 20 kHz at rated output

Noise: Equivalent to an input of -129 dBm, 20 Hz to 20 kHz unweighted

Distortion ± 16 V Operation: 0.05% THD typical at +18 dBm output, 30 Hz to 20 kHz

Clipping Level (3% THD) ± 16 V Operation: +26 dBm (output 1 into 600 ohms); +30 dBm (both outputs in series)

Input: Bridging transformer*

Source Impedance: 150 ohms or 600 ohms

Input Level: Signal amplitude as high as -3 dBm will produce no more than 0.5% THD, 30 Hz to 20 kHz, within the output ratings of the amplifier

Input Impedance: 1 K ohm, typical

Output: 2 secondary windings which may be used in series or as 2 separate outputs

Output Impedance: Less than 45 ohms (output 1); less than 15 ohms (output 2); less than 85 ohms (2 windings in series)

Overload Protection: Current limited; protected against overload or short circuit under any output or input condition

Overload Recovery: Instantaneous

Power Requirements: ± 12 V to ± 20 V DC, Bipolar 20 mA at +4 dBm output 65 mA at +30 dBm output. Protected against polarity reversal.

Temperature of Environment: Up to 120° F without derating

Connector: Dual 15 pin connector supplied

Dimensions: 2-3/4" high, 4-1/4" deep, 1-7/16" wide

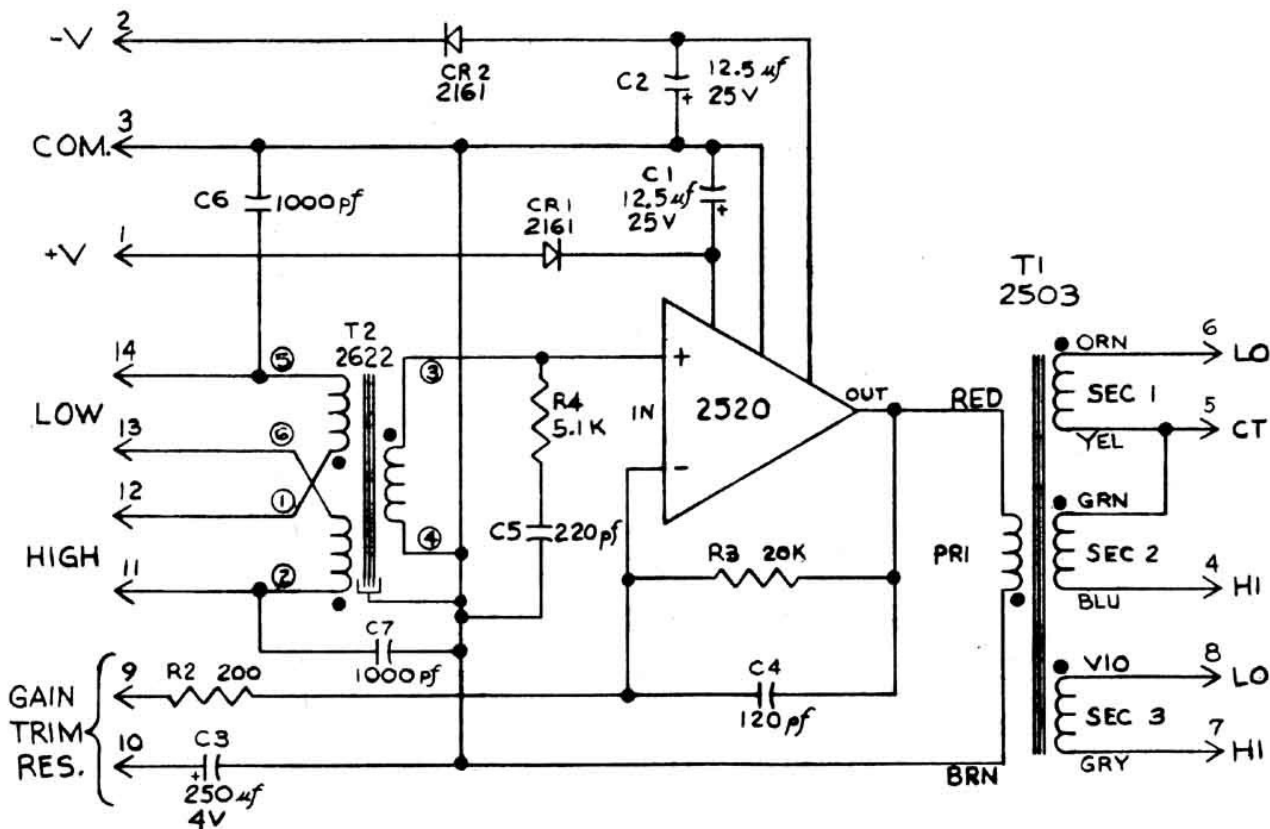
*Supplied standard with Jensen JE-6110K-APC transformer.

(Specifications may change as design improvements are introduced.)

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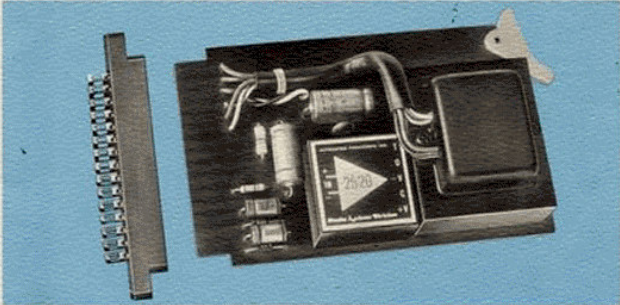
A.P.I.312 MIC PREAMP-3



MIC PREAMP SCHEMATIC

A.P.I.325 LINE AMP-1

Line, Booster, or Combining Amplifier MODEL 325



Features

- Bridging or combining function input.
- Three transformer coupled outputs.
- Gain externally adjustable.
- Low noise and distortion.
- High output (+30 dBm).
- Reverse polarity and overload protected.
- Small interchangeable plug-in card
- Utilizes the Model 2520 Audio Operational Amplifier.

Description

The Model 325 is unique in its design as a bridging amplifier and a differential active combining network with transformer coupled output.

All of the connections for the two modes of operation are accomplished at the external connecting socket. A companion terminal board containing a precision summing network is also available.

The Model 325 makes use of Automated Processes' 2520 operational amplifier as its active element and therefore exhibits the reliability, long life and uniformity which are characteristic of this device.

Gain of the Model 325 may be conveniently and accurately adjusted through a 40 dB range to a maximum of 49 dB by the use of an appropriate fixed resistor on the external connector, or made variable within this range by the use of a potentiometer. By means of transformer connections, gain may be reduced to unity. Optimum signal to noise ratio and low distortion characteristics

are maintained independent of gain settings within the ratings of the amplifier. Since mode of operation, choice of impedance, and gain selection are accomplished on an external connector, all Model 325 amplifiers in a system are completely interchangeable.

The output transformer of the Model 325 is of unique design and contains three independent secondary windings. Each winding is capable of simultaneous outputs in excess of +20 dBm into 600 ohms. Continuous undistorted power output of +30 dBm into 600 ohms is available by strapping all three secondary windings in series at the connector. The unit is short circuit protected and cannot be damaged by input overloads. The Model 425 companion Summing Network gives complete freedom of choice as to number of inputs to be summed up to 22, with gain set between unity and 20 dB.


The Model 325 operates from a bipolar power supply of from -12 to +20 volts permitting great latitude in system design and assurance of stability under normal operating conditions.

It is reverse polarity protected and will withstand transients as high as ±30 volts preventing damage from power line surges and power supply malfunctions. Tightly regulated supplies are therefore not required. Power decoupling is also provided to prevent signal coupling in the power supply lines.

Up to eleven amplifiers can be mounted in Model 411 Card Frame, which is 3½" high, 6" deep, and 19" wide. Five amplifiers can be mounted in Model 405 Card Frame, which is 3½" high, 6" deep and 10" wide.

The Model 425 Summing Network mounts between adjacent amplifiers in either card frame and therefore does not require additional space.

The Model 325 is supplied with mating connector and is equipped with a color coded card extractor handle.


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A.P.I.325

LINE AMP-2

Specifications (600 ohm load unless otherwise specified)

Applications:	Line Amplifier, Booster Amplifier, Lossless Combining Network, Differential Amplifier, Headphone or Cue Amplifier.	Input Impedance:	12,000 ohms
Gain:	Externally adjustable on mating connector from unity to 49 dB.	Output:	3 identical secondary windings which may be used as 3 separate outputs, or in any series or any parallel combination.
Frequency Response:	± 0.25 dB, 30 Hz to 20 KHz at rated output	Output Impedance:	Less than 15 ohms (each output) Less than 85 ohms (3 windings in series)
Distortion (Gain of 49 dB)		Overload Protection:	Current limited; protected against overload or short circuit under any output or input condition.
± 15 V Operation:	Less than 0.3% THD at +28 dBm output, 30 Hz to 20 KHz Less than 0.2% THD at -20 dBm output, 20 Hz to 30 KHz	Overload Recovery:	Instantaneous.
± 20 V Operation:	Less than 0.3% THD at +30 dBm output, 30 Hz to 20 KHz	Power Requirements:	± 12 V to ± 20 V DC Bipolar 20 ma at +4 dBm output 65 ma at +30 dBm output Protected against overvoltage (150%) and polarity reversal.
Noise:	Equivalent to an input of -125 dBm, 20 Hz to 20 KHz unweighted	Temperature of Environment:	Up to 150°F without derating
Power Output		Connector:	Dual 15 pin connector supplied (15 spare terminals)
± 15 V Operation:	+20 dBm (3 simultaneous outputs into 600 ohms) +28 dBm (3 outputs in series)	Dimensions:	2 1/4" high, 4 1/4" deep, 1 1/4" wide.
± 20 V Operation:	+30 dBm (3 outputs in series) 1.4W RMS (outputs in parallel, 50 ohm load)		

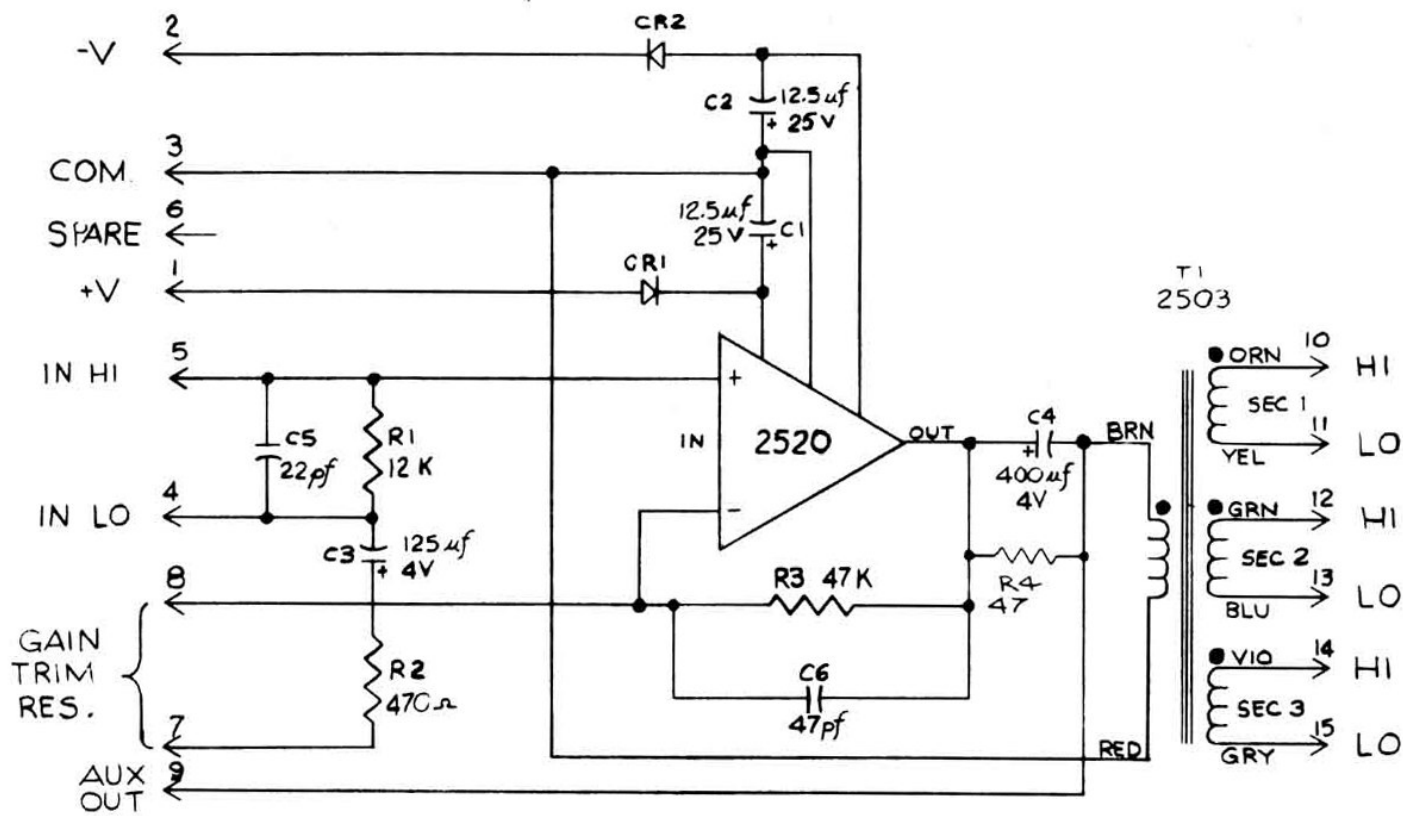
Our staff is fully equipped and stands ready to provide engineering services, from applications assistance to complete system design, and fabrication.

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A.P.I.325

LINE

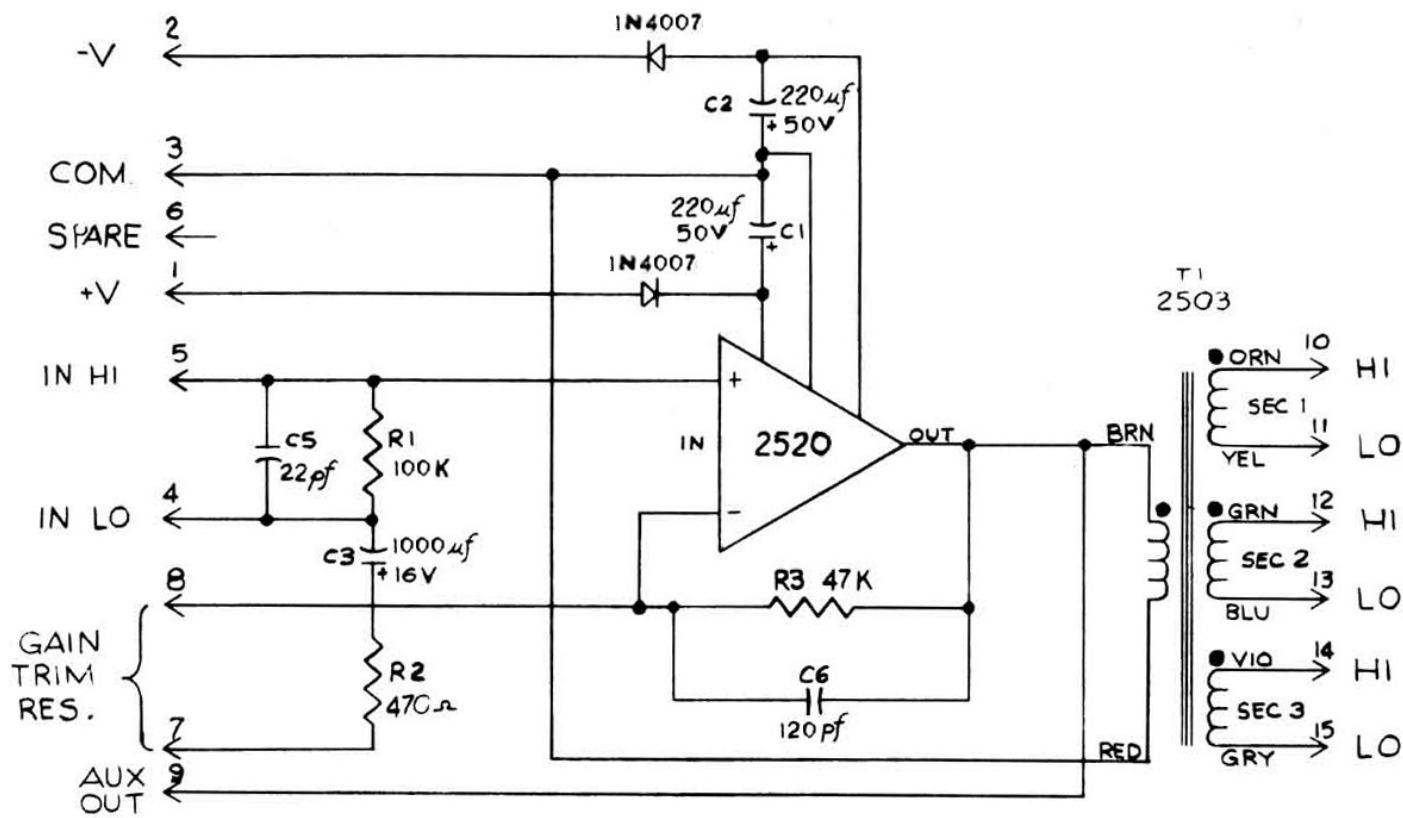
AMP-3



MODEL 325 LINE AMPLIFIER SCHEMATIC

modify a

design of
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LINE
AMP



MODEL 325 LINE AMPLIFIER SCHEMATIC MOD.

Menu