

# The High Fidelity Museum

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suggestions? We would  
like to hear from you.  
[hifi\\_museum@yahoo.ca](mailto:hifi_museum@yahoo.ca)

Threshold Corporation has quickly commanded a reputation for design concepts and empirical performance that set new boundaries for the classification state-of-the-art. The model 400A class A power amplifier is the cornerstone for this reputation and embodies Threshold's direct solutions for those basic electronic anomalies to which the human ear is most sensitive.

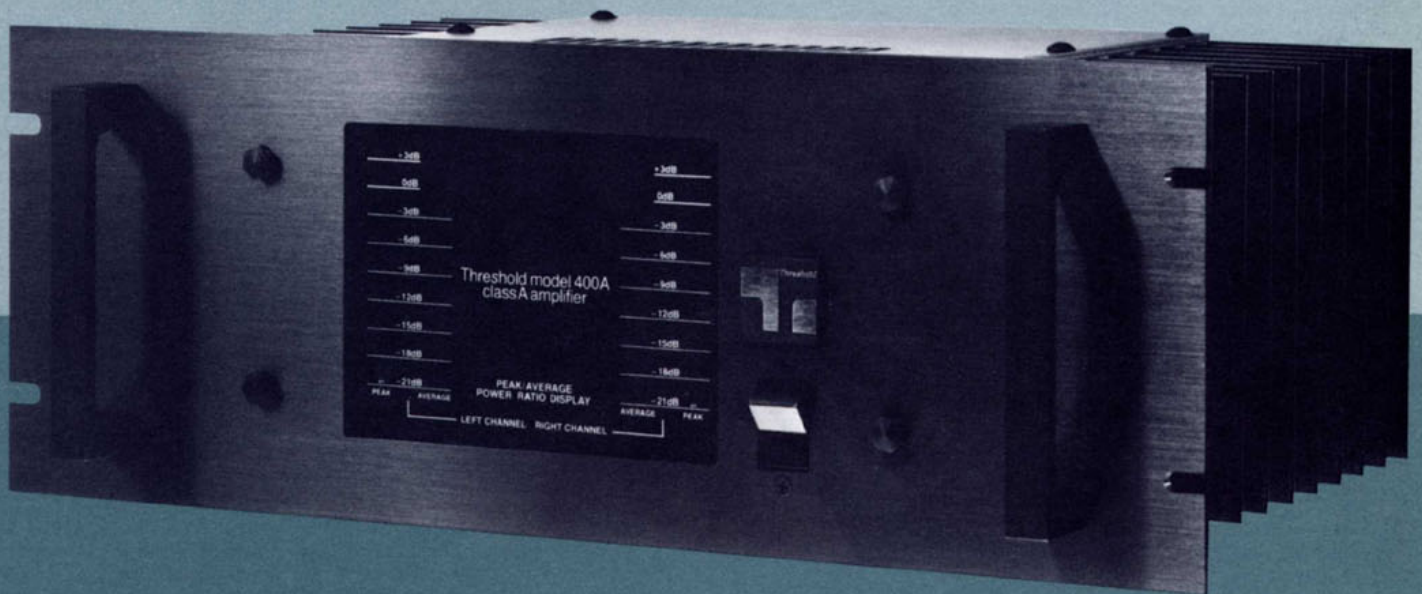
The Threshold model 400A achieves virtually perfect program signal processing insofar as aural perception is concerned through the use of an ingeniously simple circuit path and the operation of all gain devices in the class A mode at all times and under all signal conditions short of actual amplifier clipping. Class A amplification has long been recognized as the ideal in amplifier design since it yields the smoothest transfer functions, widest bandwidths, and significantly reduces the amount of feedback required. However, until now, its realization in solid-state technology has been unable to achieve the magnitude of power required in today's finest equipment.

The Threshold 400A is a completely new, patented class A design that utilizes a unique dynamic biasing circuit. This circuit senses the internal bias needs continuously and instantaneously adjusts the idle current to the levels required to maintain constant class A operation of all output transistors. Instead of

the fixed, maximum level biasing employed in conventional class A designs, the Threshold active bias configuration responds to the instantly varying needs of the amplifier's output stages. This allows the Threshold 400A to idle at one *fourth* the power of an equivalently rated conventional class A design, yet maintain class A operation, with its acknowledged superiority, over an enormous range of output power conditions.

Threshold's advanced concepts have made possible the unchallenged excellence of class A operation at power, reliability, size and cost levels competitive with conventional audio amplifiers. Class A operation of the Threshold 400A means distortion products resulting from transistor turn-on, turn-off delays are eliminated. Transient intermodulation effects are sharply reduced. Residual distortion is restricted to low-order harmonic and simple modulation components. Ultra-high slewing for both voltage and current is achieved with absolute stability.

Technical descriptions, however, only hint at the impressions which result from personal listening to a superior component recreating the finest program material. We invite you to compare any Threshold amplifier with any other amplifier at any price or any power rating under these meaningful conditions. We believe you will agree the Threshold 400A fully justifies our claim to designs that constitute the leading edge of the art.



data  
sheet  
400A



class A  
stereo  
power  
amplifier

# Threshold model 400A class A power amplifier

## description

Two channel audio power amplifier employing patented dynamic bias circuits that maintain the amplifier in class A operation to beyond 500 watt transient output levels per channel.

## rated power

100 watts per channel, both channels driven into 8 ohms, 20 through 20,000 Hz with uninterrupted FTC preconditioning.\*

## harmonic & intermodulation distortion

No greater than .1% total harmonic or intermodulation distortion at rated power, decreasing monotonically with lower power. Distortion virtually unmeasurable at small signal levels. Harmonic distortion components are dominated by second and third harmonics. Intermodulation sidebands are primarily first and second order. Distortion components of higher orders are negligible below 40,000 Hz.

## transient intermodulation distortion

Transient intermodulation distortion sidebands are at least 75 dB below a 10 watt output signal consisting of a 1.5 kHz square wave linearly mixed with a -20 dB 80 kHz sine wave. The sidebands are symmetric about the central frequency decreasing to approximately -90 dB by the seventh order.

## rise time

Leading and trailing edge: less than 1 microsecond.

## slew capabilities

Maximum voltage slewing rate each channel: 50 volts per microsecond.

Maximum current slewing rate each channel: 25 amps per microsecond.

## loop propagation time

Propagation delay appearing at the bases of the input differential transistors: 20 nanoseconds.

## current output capability

Maximum instantaneous output current capability: in excess of 20 amps per channel. Maximum continuous output current capability: 5 amps per channel.

## voltage output capability

Maximum voltage swing:  $\pm 50$  volts per channel

## frequency bandwidth

+0 -4 dB 1.5 Hz through 500,000 Hz at small signal levels.  $\pm 0$  dB 20 Hz through 20,000 Hz at 200 watts per channel.

## input impedance

23,000 ohms

## gain factor

23 dB

## damping factor

Constant 100 from dc through 20,000 Hz measured at the output terminals

## hum and noise

Below 2 millivolts at the outputs

## power consumption

Amplifier power draw at no signal: approximately 200 watts

## power requirements

120 volts; 50 - 60 Hz source

## protection circuits

Current limiters with analog controlled reaction times, thermal monitoring output fuses, resettable circuit breaker.

## displays

Individual and simultaneous peak vs. average output level readings for each channel.

## warranty

Limited three year warranty covering parts, labor, and shipping of defective modules to and from the factory through an Authorized Threshold Dealer.

## dimensions

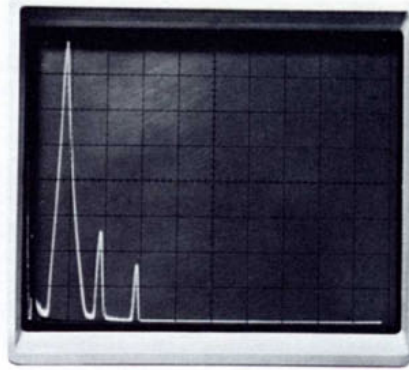
Faceplate: 19 inches wide by  $6\frac{15}{16}$  inches high, rack mount notched. Chassis:  $17\frac{9}{16}$  inches wide including heat sinks by  $6\frac{1}{4}$  inches high by 11 inches deep. Handle extension beyond faceplate: 1 inch. Height of supporting feet: 1 inch.

## shipping weight

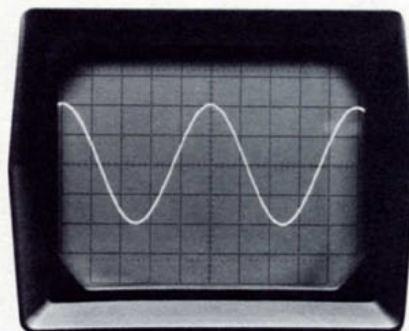
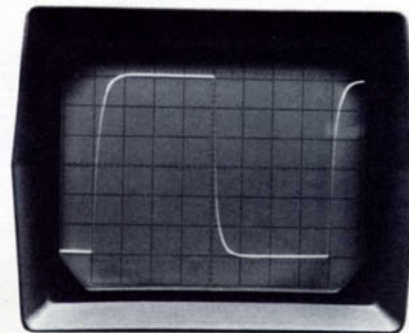
51.5 pounds

\*measured at a line source of 120 volts

Because Threshold is constantly researching new technology and materials, the option is reserved to incorporate design refinements and modifications into existing product lines without notice or obligation.



The accuracy which can be achieved by operating an amplifier in the class A mode is clearly illustrated in the spectrum analysis above. The display shows the performance of the Threshold 400A output stage into a 2 microfarad load *without feedback correction*. Note that even without feedback correction distortion components are limited to second and third order harmonics only. The signal is a 10kHz sine wave at 1 watt output. The display is calibrated to 10dB per division.



The bandwidth capabilities of the Threshold 400A are revealed in the two oscilloscope traces above. The upper oscilloscope trace shows the output of the 400A at half power reproducing a 50 kHz square wave into a resistive load. The trace is calibrated to 10 volts per division. The lower oscilloscope trace shows the output of the 400A at half power reproducing a 200 kHz sine wave into a resistive load. The trace is calibrated to 15 volts per division.

# Threshold Corporation

1832 tribute road suite e sacramento california 95815

PRINTED IN U.S.A.



+3dB  
0dB  
-3dB  
-6dB  
-9dB  
-12dB  
-15dB  
-18dB  
-21dB

Threshold model 400A  
cascode/class A  
power amplifier

PEAK AVERAGE  
POWER RATIO DISPLAY

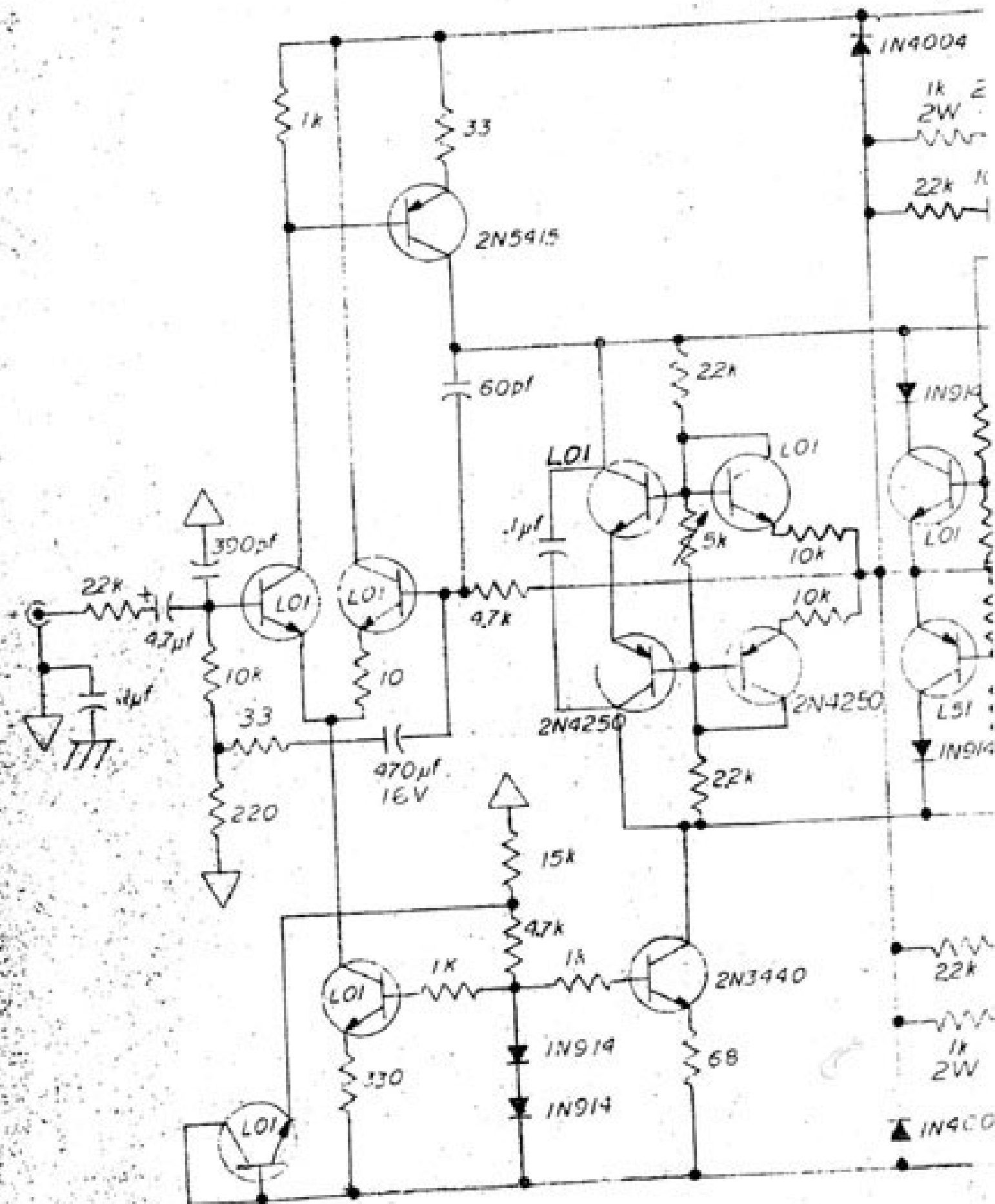
LEFT CHANNEL RIGHT CHANNEL

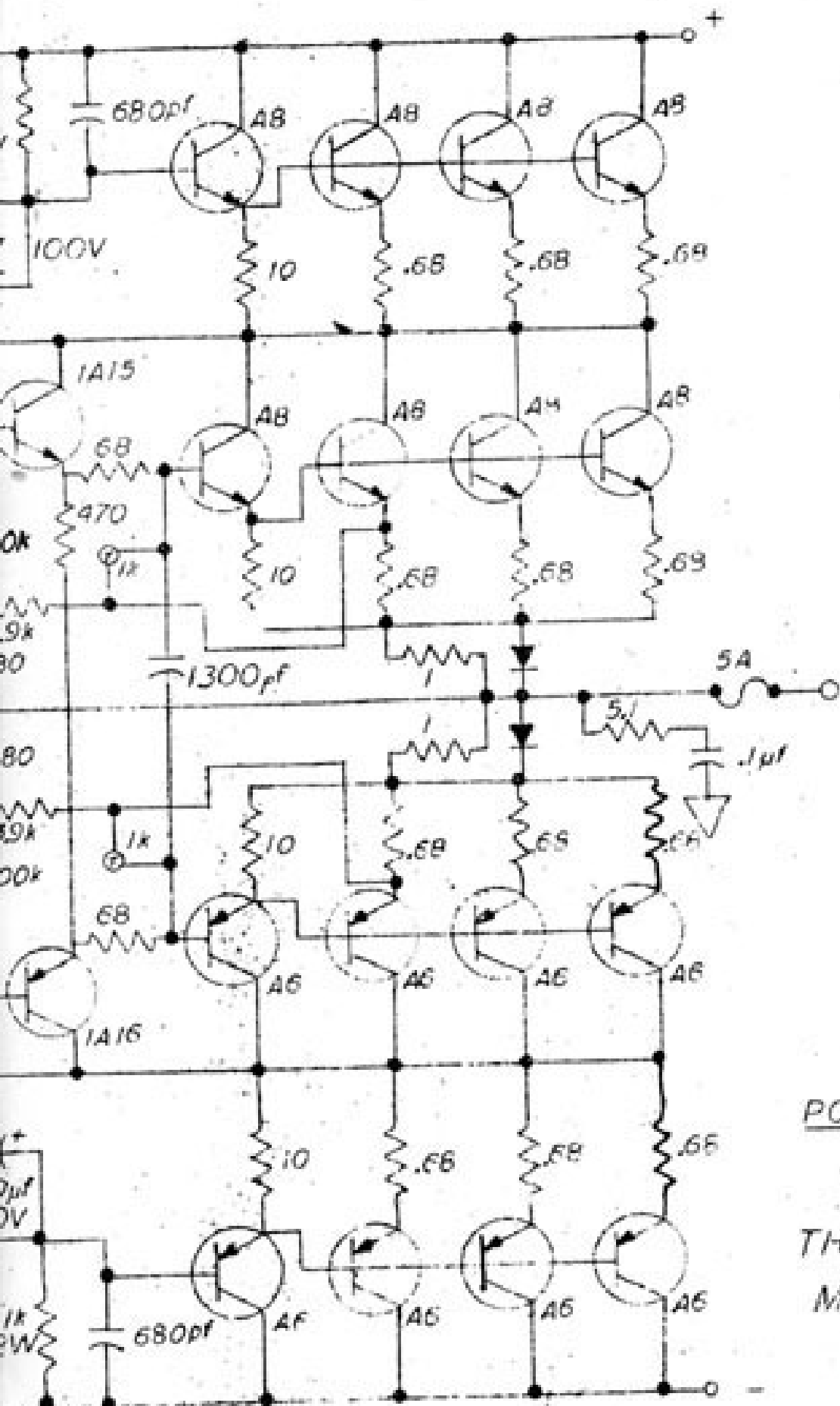
PEAK AVERAGE

PEAK AVERAGE

21dB

+3dB  
0dB  
-3dB  
-6dB  
-9dB  
-12dB  
-15dB  
-18dB





PC 400A 11-77

THRESHOLD  
MODEL 400A

11-16-76  
148-3400