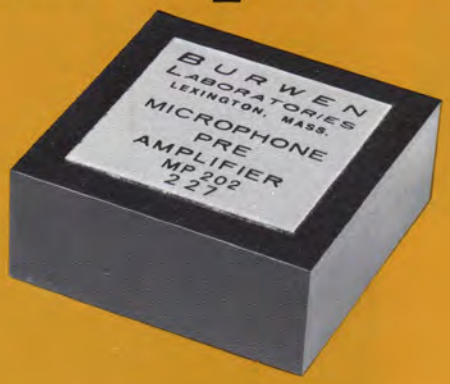
Microphone Preamplifier
Model MP202



A Differential Input AC Amplifier That Rejects Common Mode Noise

DESCRIPTION

The Model MP202 Microphone Preamplifier is a differential input ac amplifier which performs with far greater accuracy the functions of an audio input transformer and amplifier. It is ideally suited for use with center powered capacitor microphones, as a line input audio amplifier, or as a line driver. The Model MP202 provides voltage gains from 0 to 40 dB and its output is dc coupled to the load. Input coupling capacitors built into the module permit its use with microphone power supply voltages up to +80 V and only two external resistors are required for center powering.

Noise is below the noise generated in a capacitor microphone but is above the noise level of a dynamic microphone. Consequently, the Model MP202 can be used for either distant or close miking with capacitor microphones but only for close miking with dynamic microphones.

In addition to providing a well protected common mode noise rejecting input, the Model MP202 functions as a general purpose line driving amplifier capable of considerable output current. It can deliver +18 dBm into 600 ohms or +16 dBm into 150 ohms and is practically unaffected by load capacitances up to 5,000 pF. Clipping in the overload region is sharp and symmetrical with fast recovery for momentary overloads.

The normal voltage gain is 15 dB when the gain terminal is connected directly to the output. The gain can be increased up to 40 dB in 5 dB steps by means of the gain switch shown in Figure 1. Alternatively, a fixed 2k divider or potentiometer can be used. Microphone power can be supplied from a low noise power supply through a pair of equal resistors R connected to the positive and negative inputs.

For reduced gain, as in the case of a line input amplifier, Figure 2, two equal resistors are added in series with the inputs. This circuit can also be used for adding two signals together out of phase.

APPLICATIONS

Center Powered Capacitor Microphone
Audio Transmission
Line Driver
Headphone Driver
Signal Matrixing

FEATURES

CMRR—50 DB Min.
Voltage Gain—0 to 40 DB
Output—DC Coupled
Distortion—.02% at 18 DBM into 600 Ohms
Noise—2.4 UV, 20 CPS to 20 KC
Input Coupling Capacitors
Insensitive to Magnetic Fields
Power Supply Bypass Capacitors
Input Overvoltage Protection
Output Short-circuit Protection
Guaranteed for Two Years

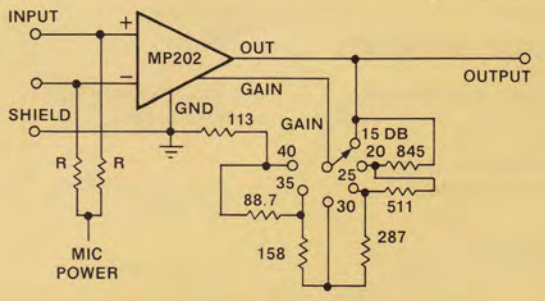


FIGURE 1 CENTER POWERED CAPACITOR MICROPHONE PREAMPLIFIER

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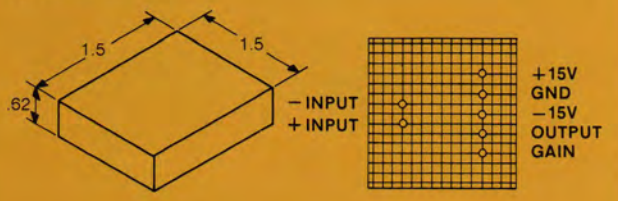
Microphone Preamplifier Model MP202



SPECIFICATIONS

Specifications are typical @25°C, ± 15 V dc, and 10K load unless otherwise noted.

GAIN	
Voltage gain	15 dB ± .2 dB
Set by external resistor	15 to 40 dB
With series input resistors	0 to 30 dB
Stability	.1%/yr.
Temperature coefficient	.01%/ C
INPUT	
Differential	10 V rms max.
DC common mode	0 to +80 V
Common mode rejection @ ± 10 V	50 dB min. @60 cps
With 100 ohm unbalanced source	40 dB min., 10 cps to 10 kc
Differential impedance	10k
Common mode impedance	32k each side to ground
OUTPUT	
10k load	+ 20 dB, ± 11 V peak
600 ohm load	+ 18 dBm, ±9 V peak
150 ohm load	+16 dBm, ±3.4 V peak
Maximum capacitance load	5,000 pF
Output impedance, 15 dB gain	< .5 ohms dc to 100 cps 10 ohms @20 kc
DC offset, 15 dB gain	±1 mV
FREQUENCY RESPONSE	
Small signal	± .1 dB, 10 cps to 30 kc –3 dB @ 300 kc
40 dB gain	± .2 dB, 10 cps to 20 kc –3 dB @100 kc
Square wave response, 15 dB gain	Rise time: 1.1 μsec Overshoot: None
Full power response, min.	20 kc
Slewing rate	2 V/μsec
HARMONIC DISTORTION	
15 dB gain	
+18 dBm into 600 ohms	.02%, 20 cps to 1 kc 0.5% @ 10 kc
40 dB gain	
+18 dB into 5k load plus 2k attenuator	.07%, 10 cps to 1 kc .3% @ 10 kc
INPUT NOISE	
Voltage, 20 cps to 20 kc	3.5 μV rms max.
POWER SUPPLY	
Voltage, rated specification	± 15 V
Voltage, derated specification	± 10 to ± 18 V
Current, quiescent max.	± 2.5 A
TEMPERATURE RANGE	
Operating, best performance	0 to 70° C
Derated operation and storage	–55 to +125° C
MECHANICAL	
Size	1.5 x 1.5 x .62"
Mating test socket	AC1010

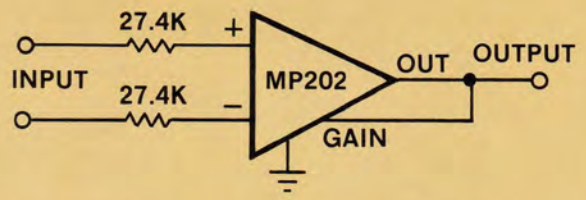


FIGURE 2 LINE INPUT AMPLIFIER ODB GAIN

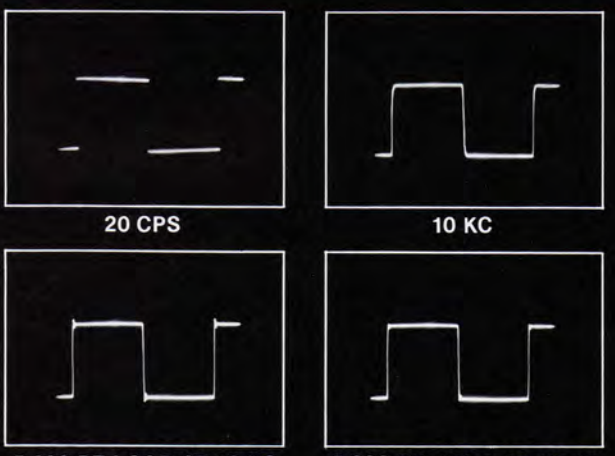


FIGURE 3 SQUARE WAVES VS LOAD

REJECTING NOISE

When transmitting signals from one chassis or source to another the common mode noise between them should always be minimized by connecting the outer shield of the cable to each chassis to short out the noise voltage. The remaining noise voltage developed across the shield impedance may be anywhere from microvolts to millivolts consisting generally of 60 cps and harmonics. By connecting the microphone preamplifier as shown in either Figure 4A or 4B it can sense the differential source voltage. The triaxial cable method with a grounded source provides superior noise rejection but the shielded twisted pair is adequate in nearly all cases.

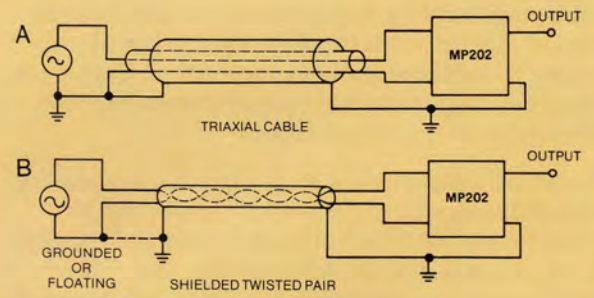


FIGURE 4

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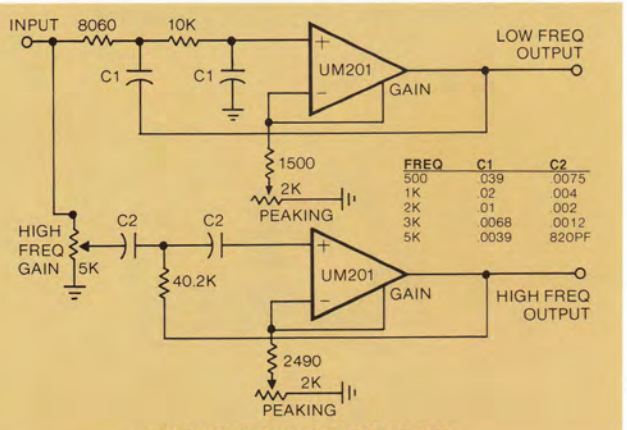
Universal Mixing Amplifier
Model UM201

DESCRIPTION

The Model UM201 Universal Mixing Amplifier is a high gain 7 mc gain-bandwidth operational amplifier equipped with networks that make it easy to use in audio applications. By including within the module input coupling capacitors, input overload protection, power supply bypass capacitors, a choice of feedback resistors, high frequency feedback bypass capacitors, output offset trimmed to 1 mV, and selection for low noise, the multitude of problems that beset the operational amplifier user have been eliminated. The module can be used in a wide variety of signal mixing, amplifying or filtering applications. Its dynamic range is 136 dB.

Nearly every function in a studio console can be performed with the aid of the Model UM201. In the inverting mode, signals can be summed at the minus input simply by adding a single resistor in series with each source. Either a 20k or a 2k internal feedback resistor can be selected by the appropriate pin connections. Because the output is dc coupled to the load, there is no loss of low frequency power output. Input coupling capacitors which permit unity dc gain, together with internal trimming, eliminate the output dc offset which would cause noise in any controls connected to the output.

Many operational amplifiers oscillate when their inputs or outputs are connected to shielded cables. The Model UM201 has been internally stabilized so that excellent high frequency performance is attained under a wide variety of loading conditions. It thereby saves many external components and a great deal of time and trouble.



12 DB/OCTAVE CROSSOVER

APPLICATIONS

Mixing Amplifier
Microphone Preamplifier
Line Amplifier
Tape Preamplifier
Phono Preamplifier
Equalizing Amplifier
Headphone Driver
AC Operational Amplifier
Signal Matrixing
Electronic Crossover

FEATURES

Fewer External Components
Coupling Capacitors Internal
Single Resistor Determines Gain
Voltage Gain —0 to 40 DB
Inverting or Noninverting
Output—DC Coupled
Internally Trimmed to 1 MV Offset
Distortion—.01% at 18 DBM Into 600 Ohms
Noise—1 UV, 20 CPS to 20 KC
Quiescent Drain Only 2.5 MA
Input Protection
Output Short-circuit Protection
Guaranteed for Two Years

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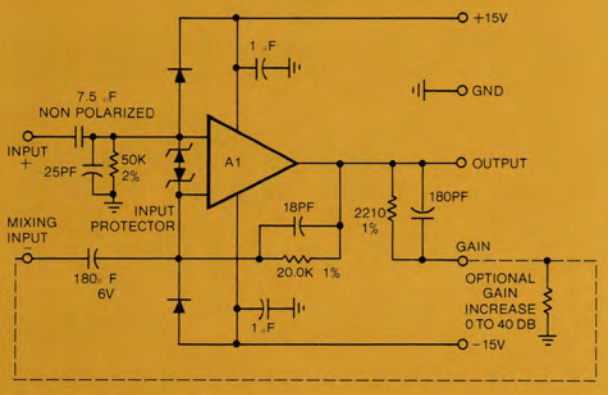
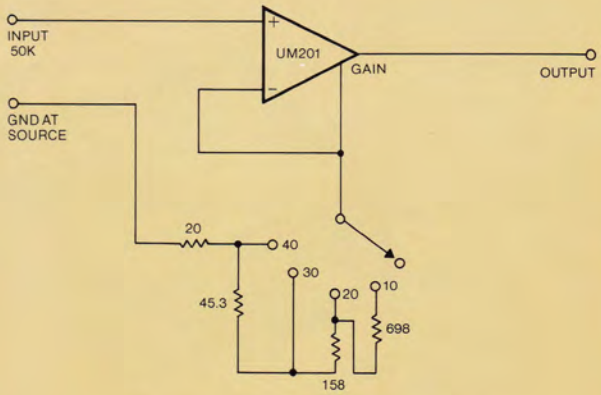


MODEL UM201 EQUIVALENT CIRCUIT

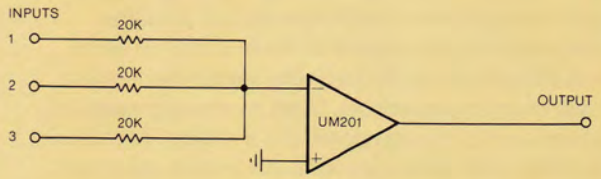
SPECIFICATIONS

Specifications are typical @ 25° C, ±15 V dc, and 10k load unless otherwise noted.

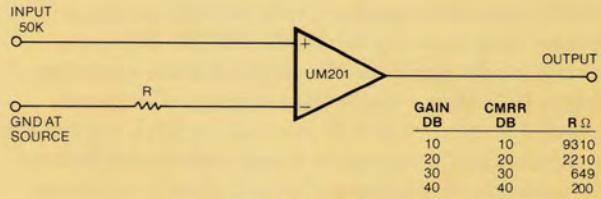
GAIN	
Voltage gain	0 dB, ±.01 dB
Set by external resistor	0 to 40 dB
Inverting feedback resistance	20k ±1% or 2k ±1.5% internal
Stability	.01 dB/yr
Temperature coefficient	50 ppm/° C
INPUT	
Unity gain follower	+20 dB, ±11 V peak
Noninverting, max dc	± 15 V
Inverting, max dc	+.5, −5 V
Noninverting input impedance	50k ±2% in parallel with 25 pF
OUTPUT	
10k load	+20 dBm, ±11 V peak
600 ohm load	+18 dBm, ±9 V peak
150 ohm load	+10 dBm, ±3.4 V peak
DC offset	±1 mV
Maximum capacitance load	5,000 pF
Output impedance, 0 dB gain	< .1 ohms dc to 100 cps 10 ohms @20 kc
FREQUENCY RESPONSE	
Small signal, unity gain, 2k feedback	−3 dB @ .5 cps and 3 mc
@ 40 dB gain	−3 dB @ 4.5 cps and 120 kc ±.2 dB, 20 cps to 20 kc
@ 20 dB gain	−3 dB @ 400 kc
Square wave response, unity gain, 2k feedback	Rise time: 80 ns Overshoot: 50%
Full power response, min.	20 kc
Slewing rate	2 V/μsec
HARMONIC DISTORTION	
0 dB gain	.01% dc to 1 kc
+18 dBm into 600 ohms	.01% dc to 1 kc .02% @ 10 kc
30 dB gain +18 dBm into 600 ohms, 20k feedback	Typical .03% dc to 1 kc .3% @ 10 kc
INPUT NOISE	
Voltage, 20 cps to 20 kc	1.5 μV rms max.
Inputs open	8 μV rms
POWER SUPPLY	
Voltage, rated specification	± 15 V
Voltage, derated specification	±10 to ±18 V
Current, quiescent	±3 mA max.
TEMPERATURE RANGE	
Operating, best performance	0 to 70° C
Derated operation and storage	−55 to +125° C
MECHANICAL	
Size	1.5 x 1.5 x .62"
Mating test socket	AC1010



SWITCHED GAIN PREAMPLIFIER
0 TO 40 DB IN10 DB STEPS

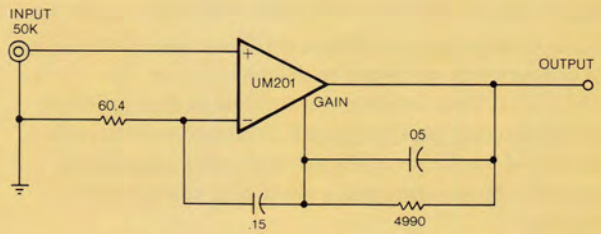


MIXING AMPLIFIER 0DB EACH INPUT



GAIN DB	CMRR DB	R Ω
10	10	9310
20	20	2210
30	30	649
40	40	200

LINE OR MIC AMPLIFIER



PHONO PREAMPLIFIER 30DB @1KC

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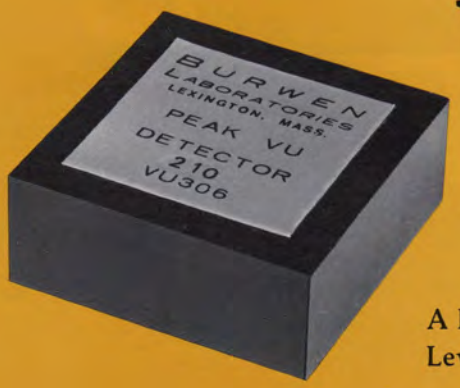
Peak VU Detector

Model VU306



A Full Wave Peak Rectifier For True Signal Level Indication Using a Standard VU Meter

DESCRIPTION

The Model VU306 Peak VU Detector converts a standard vu meter to instantaneous peak reading for true signal level indication. A full wave peak rectifier measures individual signal peaks as short as 5 microseconds and produces a steady dc output level lasting 2 seconds. This provides ample time to read the meter accurately after which the level changes rapidly to that of the next peak. If a higher peak occurs during any reading period the meter advances to that level and holds. Because much of the rapid variation in meter indication is eliminated, readings are far more accurate and less eye fatiguing.

Signal distortion due to nonlinear meter loading is eliminated and the frequency response is improved to within .1 dB from 10 cps to 30 kc. Alternatively, a preemphasis network built into the Model VU306 provides increased high frequency sensitivity for measuring fm transmitter or tape overload at 7-1/2 ips and slower speeds.

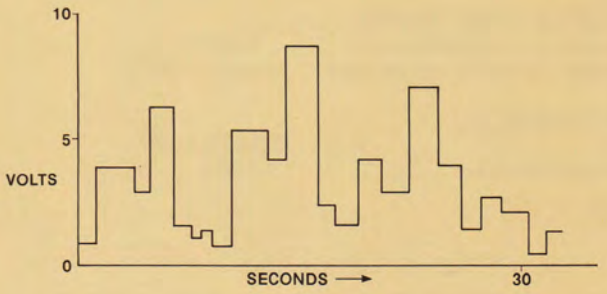
Typically the sensitivity of the VU306 is adjusted (Figure 3) so that 0 vu on the meter occurs at + 14 dBm or 10 dB above the normal 0 vu level. Peaks reaching this level generally produce 3 to 5% harmonic distortion in studio tape recording. In response to closely miked percussive sounds the peak vu meter may read as much as 25 dB higher than a conventional vu meter, thereby enabling the engineer to make adjustments in microphone placement and level for lower distortion.

APPLICATIONS

Tape Recording
Record Cutting
FM Broadcasting

FEATURES

Full Output from 5 Microsecond Pulse
Holds Reading for 2 Seconds
Optional High Frequency Preemphasis for
Use With Slow Speed Tapes and Records
Converts Standard VU Meter
10 V DC and Meter Outputs
Response —.1 dB 10 CPS to 30 KC
Eliminates Distortion Due to Nonlinear Loading
Easier to Read
Guaranteed for Two Years



TYPICAL DC OUTPUT

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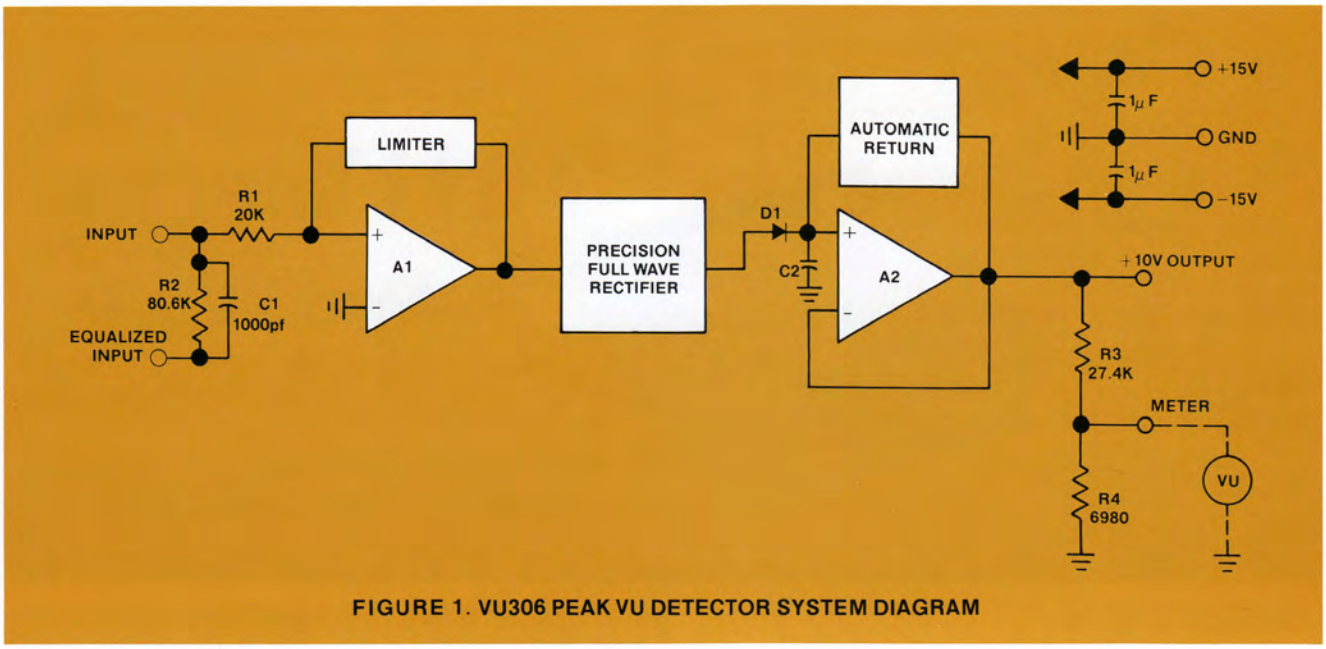


FIGURE 1. VU306 PEAK VU DETECTOR SYSTEM DIAGRAM

SPECIFICATIONS

OUTPUT

Voltage output @ +3 VU	0 to +10 V dc, 5 ma max.
Meter @ +3 VU	2.0 V in series with 5.6k

INPUT

At 0 VU output	−2.4 dB, .58 V rms
Impedance	20k
Equalized input	11.6 dB, 3.0 V rms

RESPONSE

Flat	±.1 dB 10 cps to 30 kc
Equalized	+3 dB @ 2.2 kc, +13 dB @ 20 kc

POWER SUPPLY

Voltage, rated specification	±15 V
Voltage, derated specification	±10 to ±18 V
Current, quiescent max.	8 mA

TEMPERATURE RANGE

Operating, best performance	0 to 70°C
Derated operation and storage	−55 to +125°C

MECHANICAL

Size	1.5 x 1.5 x .62"
Mating test socket	AC1010

VU306 APPLICATIONS

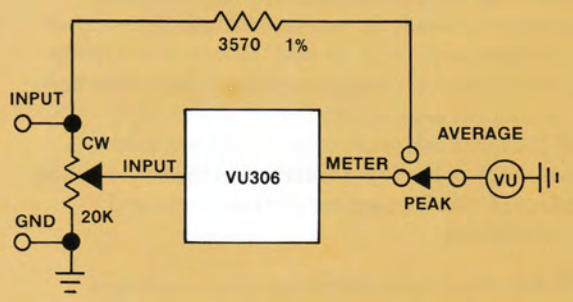


FIGURE 2. OVU = ODBM PEAK OR AVERAGE

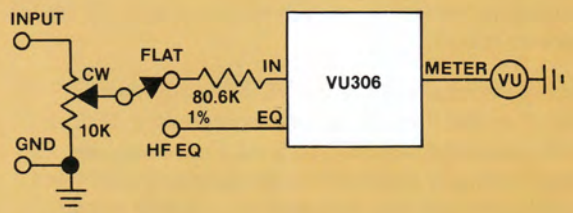
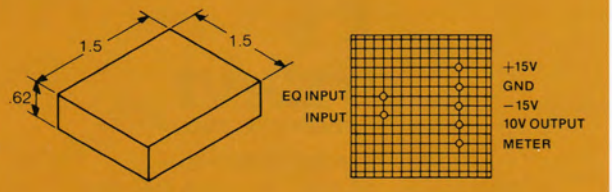


FIGURE 3.
OVU = 14DBM
SWITCHABLE HIGH FREQUENCY PREEMPHASIS

Peak VU Detector
Model VU 306



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