

Universal Audio

TELETRONIX

products of



UNITED RECORDING ELECTRONICS INDUSTRIES

11922 VALERIO STREET, NO HOLLYWOOD, CALIFORNIA 91605 TEL (213) 764-1500

Universal Audio Products

SUGGESTED LIST PRICES

SCHEDULE A Effective, November 1, 1977

LIMITERS & COMPRESSORS

LA-3A Audio Leveler	\$ 396.00
T4B Electro-Optical Attenuator (replacement for LA3A & LA2A)	44.00
LA-4 Compressor/Limiter	396.00
DR-3A Double Rack Mount for Two LA-3's or LA-4's	13.60
SR-3A Single Rack Mount for One LA-3A or LA-4	15.60
LA-5 Audio Leveler	336.00
DR-21 Double Rack Mount for Two LA-5's	13.60
SR-21 Single Rack Mount for One LA-5	15.60
1176LN Peak Limiter	488.00
1176SA Stereo Adaptor	32.00
1176RFK Retrofit Kit	40.00
BL-40 Modulimiter	696.00
T4C Electro-Optical Attenuator (replacement for BL-40)	44.00

AMPLIFIERS

1109 Card Preamplifier	88.00
1109CC Card Cage with Connectors	76.00
27-0085 9C Connector	3.20
1122 Stereo Transcription Preamplifier	346.00

EQUALIZERS & FILTERS

527-A 1/3-Octave Graphic Equalizer	660.00
527SC Security Cover for 527-A	24.00
527K Knob kit (included on current 527-A's at no extra cost)	7.60
530 Dual Graphic Equalizer	424.00
530SC Security Cover for 530	24.00
532 Octave Graphic Equalizer (mono)	316.00
DR-21 Double Rack Mount for Two 532's	13.60
SR-21 Single Rack Mount for One 532	15.60
539 Room Equalizer	696.00
539SC Security Cover for 539	24.00
545 Parametric Equalizer	396.00
555 Variable Bandpass Filter (mono)	324.00
556 Variable Bandpass Filter (stereo)	416.00
DR-3A Double Rack Mount for Two 555's or 556's	13.60
SR-3A Single Rack Mount for One 555 or One 556	15.60
560 Feedback Suppressor	396.00
DR-60 Double Rack Mount for Two 560's	28.00
SR-60 Single Rack Mount for One 560	24.00
565T "Little Dipper" Filter Set	596.00

ELECTRONIC CROSSOVERS

518L Low Frequency Card 18db/octave	142.00
518H High Frequency Card 18db/octave	142.00
521L Low Frequency Card 12db/octave	126.00
521H High Frequency Card 12db/octave	126.00
521P Housing with power supply	160.00
DR-21 Double Rack Mount for Two 521P's	13.60
SR-21 Single Rack Mount for One 521P	15.60
1109CC Card Cage for 11 cards	76.00



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UREI SNVY TELEX 65-1389



TIME ALIGNED™ SPEAKERS and NETWORKS

813 Studio Monitor System (Complete, less grille)	\$1248.00
813G Grille (Optional Accessory)	38.00
800H High Frequency Custom Horn	38.00
800W Woofer	90.00
824 Two Way Network for Altec 604E	256.00
834 Three Way Network for Altec 604E & UREI 800W	324.00
828 Two Way Network for Altec 6048G	256.00
838 Three Way Network for Altec 6048G & UREI 800W	324.00

SPECIALTY ITEMS

100-A Sonipulse	1296.00
100-M AKG C451E/CK2 Condenser Microphone, Stand Adaptor and 25' Cable with Connectors. Includes calibration to 100-A	316.00
100G Graph Paper Pads for Sonipulse (50 sheets)	3.60
200 XY Recorder Main Frame	1226.00
2000 Frequency Response Plug-in Module	1226.00
2010 Level & Frequency Detector Plug-in Module	1226.00
20 Warble Generator (accessory for 2000)	96.00
200G K & E 46-6882 Graph Paper (50 sheets)	5.60
950 ANCA (Ambient Noise Controlled Amplifier)	976.00
964 Digital Metronome	446.00
DR-3A Double Rack Mount for Two 964's	13.60
SR-3A Single Rack Mount for One 964	15.60

ACCESSORIES

600T 600 ohm Bridged T Attenuator less knob	6.00
40-0022 2½" Modutec "A" Scale VU Meter w/Bezel	18.80
10-12171 Illumination Kit for VU Meter	4.80
12386 Head Cleaner, 1 Pt. (.473 liter)	3.60
PS24-2 Power Supply	176.00

LIMITED WARRANTY

ALL U.R.E.I. PRODUCTS ARE WARRANTED TO BE FREE FROM DEFECTS OF MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF DELIVERY TO THE ORIGINAL USER. WITHIN THAT PERIOD, REPAIR OR REPLACEMENT WILL BE MADE AT NO COST FOR MATERIAL OR LABOR TO THE POSSESSOR. THIS WARRANTY IS VOID IF THE PRODUCT HAS BEEN SUBJECTED TO ABUSE, UNAUTHORIZED MODIFICATION AND/OR REPAIR, OR IF IT HAS NOT BEEN OPERATED IN ACCORDANCE WITH INSTRUCTIONS.

IN-WARRANTY UNITS SHOULD BE RETURNED PREPAID TO U.R.E.I. AND U.R.E.I. WILL RETURN PREPAID TO CUSTOMER.

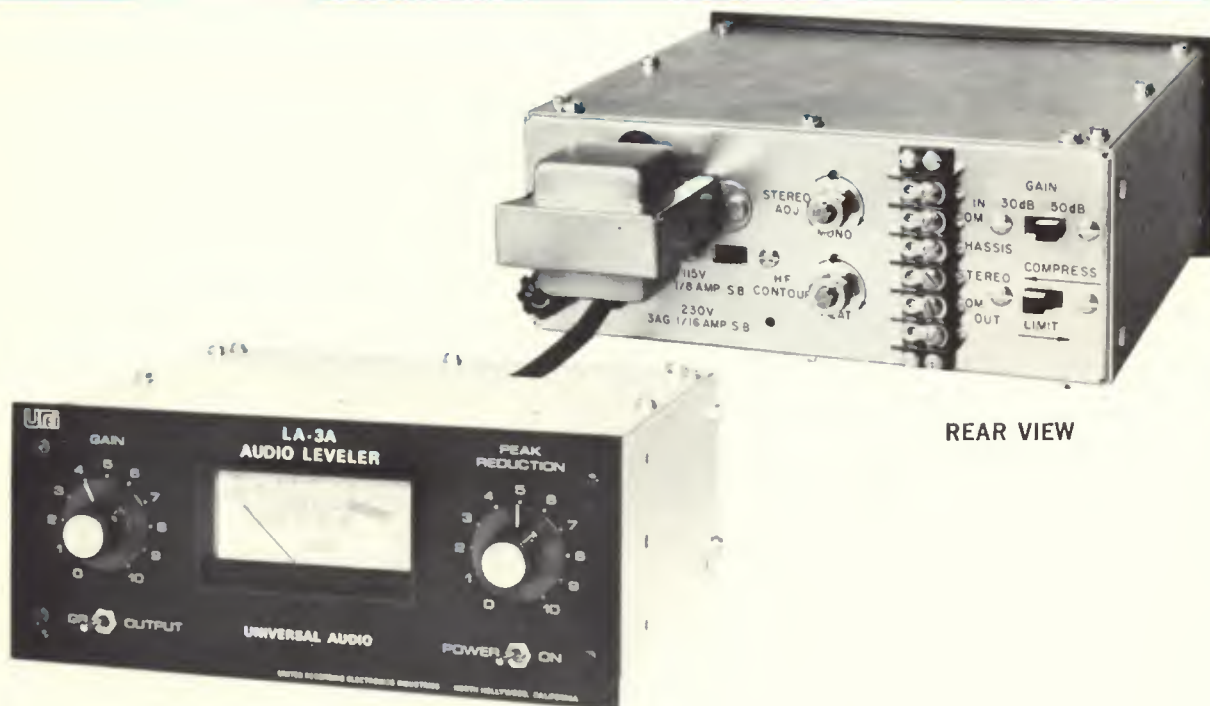
OUT-OF-WARRANTY REPAIRS – MINIMUM CHARGE \$15.00

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE

Universal Audio AUDIO LEVELER

MODEL
LA-3A

Covered by U.S. Patent Office No. 3,258,707



REAR VIEW

GENERAL

The LA-3A Solid State Audio Leveler is the solid state successor to the well known Teletronix LA-2A.

The unique characteristics of the T4A electro-optical attenuator have been maintained. It is these characteristics that have been greatly responsible for the acceptance and world wide popularity of LA-2A's.

Improvements in overload characteristics and signal to noise ratio add to the performance and utility of the LA-3A. The new 1/2 rack size allows installation of two LA-3A Audio Levelers in only 3 1/2 inches of rack space. Contemporary styling complements existing studio equipment.

SYSTEM CONFIGURATION

The LA-3A consists of a low noise, 30 or 50 dB gain solid state device capable of +24 dBm output level in normal application. The T4B electro-optical attenuator is used as a dynamically controlled attenuator ahead of the input stage of the Leveler. The gain reduction control and the gain control are independent, and provide for simple and convenient setting of the limiting or compressing action, and the system gain.

Limiting frequency response is adjustable to allow as much as 10 dB increase in gain reduction at 15 kHz compared to frequencies below 1 kHz. This is advantageous in FM and TV transmission where pre-emphasis is used.

A switch is provided to change the characteristics from those of a compressor (linear gain reduction) to those of a limiter (a compression ratio approaching 50:1 where the dynamic content of the program material necessitates a large amount of limiting).

The electro-optical attenuators of two LA-3A units may be connected in tandem for stereo operation.



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UREI company

MODEL
LA-3A

TECHNICAL SPECIFICATIONS

ELECTRICAL

INPUT IMPEDANCE	: 600 ohms, (floating).
MAXIMUM INPUT LEVEL	: +20 dBm (30 dB Gain Pos.) 0 dBm (50 dB Gain Pos.).
OUTPUT LOAD IMPEDANCE	: 600 ohms, (floating).
MAXIMUM OUTPUT LEVEL	: -24 dBm (+27 dBm on peaks).
GAIN	: 50 dB or 30 dB (± 1 dB) Switching at rear panel.
FREQUENCY RESPONSE	: 20 Hz to 20 kHz, ± 1 dB.
SIGNAL-TO-NOISE RATIO	: Greater than 80 dB at threshold of limiting (30 Hz to 15 kHz Bandwidth).
THRESHOLD OF LIMITING	: -10 dBm at 30 dB position, -30 dBm at 50 dB position.
DISTORTION	: Less than 0.5% THD from 30 Hz to 20 kHz.

Note: The low frequency Total Harmonic Distortion in a limiter is a function of release time. Under worst case conditions (a predominant low frequency energy envelope causing 15 dB of gain reduction) the 50 Hz THD will not exceed 0.7%. Typical THD over the program spectrum bandwidth, with 20 dB of gain reduction is less than 0.3%.

ATTACK TIME	: Less than 250 microseconds to 0.5 milliseconds depending on program material.
RELEASE TIME	: Varies from 500 milliseconds to 5.0 seconds depending on the duration of the peak causing the onset of limiting.
EXTERNAL CONNECTIONS	: Jones Barrier terminals at rear.
STEREO INTERCONNECTION	: Terminals at rear of chassis.
POWER REQUIREMENTS	: 110-125 VAC, 50/60 Hz, 6W. Switch provided for 220-250 VAC, 50/60 Hz.
ENVIRONMENTAL	: Max. ambient operating temperature 160°F (70°C).

PHYSICAL

DIMENSIONS	: 3½" vertical 8½" horizontal. Depth behind panel 9¼". (89 x 216 x 235 mm). (Rack mounting accessories available).
WEIGHT	: 6½ pounds, 2.95 kg.
SHIPPING WEIGHT	: 8 pounds, 3.63 kg.



SINGLE RACK MOUNTING — WITH ACCESSORY KIT SR-3A



DUAL RACK MOUNTING — WITH ACCESSORY KIT DR-3A

Universal Audio COMPRESSOR/LIMITER

Covered by U.S. Patent Office No. 3,258,707

MODEL
LA-4



The LA-4 Compressor/Limiter is another great performer in the continually expanding product line from UREI — the company which has built and sold more limiters and compressors throughout the world than any other manufacturer. Making use of patented Electro-Optical Attenuator technology owned by UREI, the LA-4 offers smooth, predictable performance coupled with ease of operation. It's electroluminescent light source is a light-emitting semiconductor, which will not change or deteriorate with age.

Compression is adjustable by an easily re-settable multi-position switch to allow ratios from a soft, smooth 2:1 compression through super tight-sounding 20:1 limiting. The gain reduction circuitry is RMS responding (like our ears) so there are no surprises in it's operation, as can happen with pure peak limiters.

The differential input and transformer isolated output assure trouble-free patching with freedom from grounding problems. The natural sounding gain control action of the LA-4 makes it an ideal tool for the professional recording studio, offering superior performance in all phases of recording and re-recording.

Because its gain reduction circuitry is RMS responding, the LA-4 is not recommended for overmodulation protection of broadcast transmitters, disc or optical recorders, unless followed by a peak limiter, such as the UREI 1176 LN.

FEATURES

- Long-life LED Optical Attenuator.
- Smooth, natural-sounding RMS action.
- Selectable compression ratios.
- Input overload indicator.
- Simple stereo coupling.
- True standard volume indicator (VU)
- Space-saving half rack size.
- UREI Quality, of course.



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MODEL
LA-4

TECHNICAL SPECIFICATIONS

ELECTRICAL

INPUT IMPEDANCE	: 40 kohm, used as a balanced differential input. 20 kohm, used as an unbalanced single-ended input.
OUTPUT LOAD	: 150 ohms to infinity.
EQUIVALENT INPUT NOISE	: -90 dBm (15.7 kHz bandwidth).
GAIN	: 40 dB maximum.
FREQUENCY RESPONSE	: 20-20,000 Hz, ± 0.5 dB
DISTORTION	: Less than 0.25% 30 Hz to 15 kHz.
ATTACK TIME	: 1 to 10 milliseconds for 63% correction depending on signal waveform.
RELEASE TIME	: 100 milliseconds to 1 second for 63% return depending on duration of limiting.
COMPRESSION RATIO	: 2:1, 4:1, 8:1, 12:1, 20:1 switch selectable from front panel.
THRESHOLD OF LIMITING	: -30 dBm to +20 dBm.
POWER OUTPUT	: +24 dBm into 600 ohm load +20 dBm into 150 ohm load.
EXTERNAL CONNECTIONS	: Barrier strip on rear.
STEREO INTERCONNECT	: Simple strapping between two units. Switch defeatable from front panel.
METERING	: Standard VU (0 Ref. = +4 or +8 dBm), Gain Reduction, LED indicator for input overload.
MAINS REQUIREMENT	: 100 — 125 VAC or 200 — 250 VAC 50/60Hz, switch selectable, less than 10 W.
ENVIRONMENT	: Operation +10°C to +50°C.

PHYSICAL:

DIMENSIONS	: 3½" high x 8½" wide x 8" deep. (89 x 216 x 203 mm).
FINISH	: Panel is 1/8" brushed black anodized aluminum. Chassis is cadmium plated steel.
WEIGHT	: 6½ pounds, 2.95 kg.
SHIPPING WEIGHT	: 8 pounds, 3.63 kg.
ACCESSORIES	: SR-3A Single Rack Mount Kit. DR-3A Double Rack Mount Kit.

Universal Audio AUDIO LEVELER

MODEL
LA-5

Covered by U.S. Patent Office No. 3,258,707



MODEL LA-5

FEATURES:

The LA-5 Audio Leveler has been developed by UREI to fill the needs of the sound reinforcement professional. Its characteristics have been optimized as the ideal combination for protection of amplifiers and speakers from power overload. Detection of the signal and control of the level, limit output power to a safe value preset by the operator or installer regardless of the input signal level.

The LA-5 removes much of the burden from the mixer who must compensate continually for poor microphone technique and large dynamic ranges during live performances. The patented type of detection and gain control used in the LA-5 are consistent with the way we perceive sound. This results in a smoothness of control unmatched by peak limiters of conventional design. Inputs and outputs are balanced, or may be used single ended. High input impedance and low output impedance allow maximum flexibility in patching and interface.

Because its gain reduction circuitry is RMS responding, the LA-5 is not recommended for overmodulation protection of broadcast transmitters, disc or optical recorders, unless followed by a peak limiter, such as the UREI 1176 LN.

- Long-life LED Optical Attenuator.
- Smooth, natural-sounding RMS action.
- Simple operation — set and forget.
- Input overload indicator.
- True standard volume indicator (VU).
- Space-saving half-rack size.
- Competitively priced.
- UREI quality, of course.



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TELEX 65-1389

MODEL
LA-5

TECHNICAL SPECIFICATIONS

ELECTRICAL

INPUT IMPEDANCE	:	20 k differential or single ended.
OUTPUT LOAD	:	150 ohms to infinity.
EQUIVALENT INPUT NOISE	:	-90 dBm (15.7 kHz bandwidth).
GAIN	:	40 dB maximum.
FREQUENCY RESPONSE	:	20-20,000 Hz, ± 0.5 dB
DISTORTION	:	Less than 0.25% 30 Hz to 15 kHz.
ATTACK TIME	:	1 to 10 milliseconds for 63% correction depending on signal waveform.
RELEASE TIME	:	100 milliseconds to 1 second for 63% return depending on duration of limiting.
COMPRESSION RATIO	:	20:1.
THRESHOLD OF LIMITING	:	-30 dBm to +20 dBm.
POWER OUTPUT	:	+24 dBm into 600 ohm load, +20 dBm into 150 ohm load.
EXTERNAL CONNECTIONS	:	Barrier strip and phone plugs on rear.
METERING	:	Standard VU (0 Ref. = +4 dBm), Gain Reduction, LED indicator for input overload.
MAINS REQUIREMENTS	:	100 — 125 VAC or 220 — 250 VAC 50/60 Hz switch selectable, less than 10 W.
ENVIRONMENT	:	Operation +10°C to +50°C.

PHYSICAL

DIMENSIONS	:	3½" high x 8½" wide x 8" deep. (89 x 216 x 203 mm).
FINISH	:	Panel is 1/8" brushed clear anodized aluminum. Chassis is cadmium plated steel.
WEIGHT	:	6½ pounds, 2.95 kg.
SHIPPING WEIGHT	:	8 pounds, 3.63 kg.
ACCESSORIES	:	SR-21 Single Rack Mount Kit. DR-21 Double Rack Mount Kit.

Universal Audio PEAK LIMITER

MODEL
1176LN



The Universal Audio 1176 was a major breakthrough in limiter technology. It brought to the professional audio industry for the first time a true peak limiter with all transistor circuitry and superior performance on all types of program material. The 1176LN retains all of the features of the 1176, but generates 6 dB less noise. In addition, a redistribution of noise spectrum leaves even less noise in the sensitive 500 Hz to 3 kHz range.

Since its introduction in 1968, the 1176 has become the industry leader. The 1176LN will carry on that tradition with the following plus features:

- FET Gain Reduction ahead of first stage. No tricky balancing required, ever. No distortion adding active element in gain reduction circuit.
- Pushbutton selection of four different compression ratios, to satisfy every program requirement.
- ULTRA FAST attack time . . . independent of peak duration or frequency. Adjustable from front panel during operation.
- Release time adjustable from front panel . . . independent of the degree of limiting.
- Extremely stable operation . . . no costly maintenance . . . no tubes to select or replace.
- Stereo operation of two units easily accommodated, so peak in one channel causes equal limiting in both.
- Contemporary styling . . . eye pleasing industrial design.

Limiting is accomplished in the 1176LN by utilizing an FET as a voltage variable resistor, ahead of the first stage of amplification. Unique circuitry permits severe limiting without added distortion, and no balancing is ever required. Attack time is adjustable from less than 20 microseconds to 800 microseconds. (This is the time in which complete recovery to the limited level is accomplished . . . there is no undershoot). Using the tone burst method, a 50 kHz peak is fully stabilized at the limited level within one cycle. Release time is also adjustable on the front panel from 50 ms to 1.1 seconds.

A feature of the 1176LN is the use of pushbutton switches to select compression ratios of 20:1, 12:1, 8:1 or 4:1. Another pushbutton switch assembly selects meter functions and applies power to the unit. Provision is made for remote metering.

The compact 1176LN requires only 3½" of vertical space in a 19" rack, with self-contained regulated power supplies, operable from either 110-125 VAC or 220-240 VAC, 50/60 Hz.



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Urei company

MODEL
1176LN

TECHNICAL SPECIFICATIONS

ELECTRICAL:

INPUT IMPEDANCE	:	600 ohms, bridged-T control (floating).
OUTPUT LOAD IMPEDANCE	:	600 ohms, floating.
EXTERNAL CONNECTIONS	:	Jones barrier terminals at rear.
FREQUENCY RESPONSE	:	20 Hz to 20 kHz, ± 1 dB.
GAIN	:	45 dB ± 1 dB.
DISTORTION	:	Less than 0.5% THD from 50 Hz to 15 kHz with limiting, at 1.1 seconds release setting (as with all limiting devices, distortion of low-frequency peaks increases as release time is shortened). Output capability is +24 dBm.
SIGNAL-TO-NOISE RATIO	:	Greater than 81 dB at threshold of limiting 30 Hz to 18 kHz.
ATTACK TIME	:	Less than 20 microseconds for 100% recovery. Adjustable to 800 microseconds with front panel control.
RELEASE TIME	:	50 ms minimum, 1.1 seconds maximum (for 63% recovery). Adjustable with front panel control.
THRESHOLD VS. OUTPUT LEVEL	:	(Sinewave signal).

<u>Compression Ratio Setting</u>	<u>Input Level at Minimum Limiting Threshold ± 2 dB</u>	<u>*Relative Output at Threshold</u>
20 to 1	-19 dBm	+12 dBm
12 to 1	-20 dBm	+11 dBm
8 to 1	-21 dBm	+10 dBm
4 to 1	-26 dBm	+9 dBm

*with output level interstage gain control set to provide a reserve of approximately 10 dB.

STEREO INTERCONNECTION	:	Pin jacks at rear of chassis. Requires 1176 SA Network Accessory to couple two units.
POWER REQUIREMENTS	:	110-130 VAC 50/60 Hz, 6W. Strapping provided for 220-260 VAC, 50/60 Hz.
ENVIRONMENTAL	:	Max. ambient operating temperature 160°F (70°C).

PHYSICAL:

DIMENSIONS	:	3½ vertical, for mounting in standard 19" rack. Depth behind panel 8". (89 x 483 x 203 mm).
WEIGHT	:	11 pounds, 5.0 kg.
SHIPPING WEIGHT	:	14½ pounds, 6.6 kg.

Universal Audio MODULIMITER

MODEL
BL-40



The Universal Audio BL40 MODULIMITER is specifically designed for AM Broadcasting, but will also find wide application in TV and CCTV audio signal processing, background music systems and commercial sound systems.

For the AM broadcaster, MODULIMITER eliminates unwanted overmodulation without clipping. Independent adjustments are provided for RMS and peak limiting, and variable positive overmodulation up to 125%. This permits tailoring of the modulation envelope to any program format or transmitter characteristics: constant full modulation or a more conservative approach.

A proprietary "Phase Optimizer" circuit automatically maintains most favorable signal polarity, reversing phase whenever negative peaks exceed positive peaks by a preset amount. Its action is instantaneous and silent — no relays are used.

No matter what YOUR format, hard rock to classical, MODULIMITER can be readily adjusted to maximize transmitter efficiency and extend coverage.

The BL-40 employs UREI's patented Electro-Optical Attenuator for unobtrusive, smooth, true RMS limiting. Its

characteristics cannot be duplicated by any other compressor or limiter.

An ultra-fast FET peak limiting section assures absolute protection from unwanted overmodulation, with no peak clipping. Attack time is essentially instantaneous. Unique proprietary circuitry results in low distortion combined with fast recovery.

MODULIMITER features low noise, low distortion integrated circuitry, and occupies only 3½" of rack space. Three separate meters indicate RMS LIMITING, PEAK LIMITING and OUTPUT LEVEL simultaneously. The output meter can be adjusted to match the input level of any transmitter.

All critical adjustments are located behind a removable security panel.

BL-40 MODULIMITER is the result of extensive engineering research and comprehensive field testing for more than one year by the company which has produced and sold more limiters than any other.



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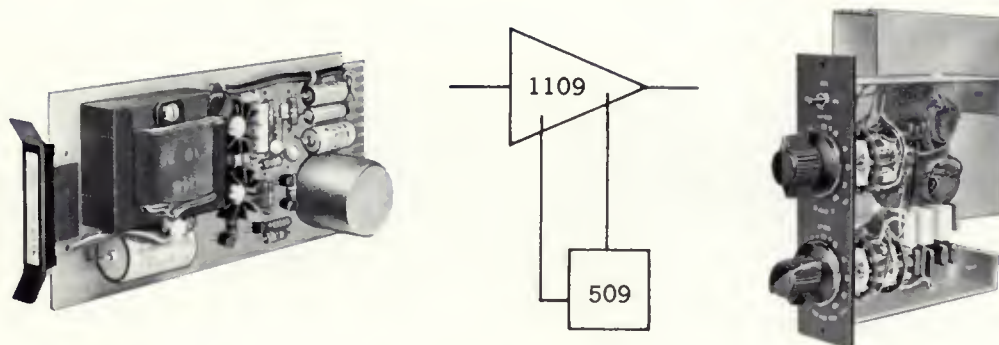
MODEL
BL-40

TECHNICAL SPECIFICATIONS

Input Impedance	: 600 ohms bridged-T input control. Floating, transformer isolated.
Output Load Impedance	: Designed to work into 600 ohm load. Output transformer isolated.
Monitor Output Impedance	: 600 ohms, unbalanced.
Input Level	: -25 dBm to + 5 dBm for 5 dB limiting.
Maximum Output Level	: +27 dBm.
Monitor Output Level	: 10 dBm below OUTPUT level.
Gain	: 70 dB with all controls at maximum.
Frequency Response	: 30 Hz - 15 kHz, +0 dB, -0.8 dB.
Distortion	: Less than 0.5% THD 30 Hz to 15 kHz, at +24 dBm output.
Signal-To-Noise Ratio	: Better than 70 dB at threshold of RMS limiting. Equivalent input noise less than -110 dBm.
Attack Time, RMS Section	: Signal dependent; 1 millisecond to 50 milliseconds for 63% correction.
Attack Time, Peak Section	: 5 micro-seconds for 10 dBm limiting.
Release Time, RMS Section	: Signal dependent; 50 milliseconds to 2 seconds for 63% return, depending on duration of compression.
Release Time, Peak Section	: 100 milliseconds.
Phase Optimizer	: Senses positive-negative imbalance and automatically changes signal polarity to guarantee maximum positive modulation.
Phase Indicator	: Front panel GREEN-RED LED indicates state of phase optimizer.
Metering	: 3 separate meters for: RMS limiting Peak limiting Output level
External Connections	: Barrier strip on rear.
Controls	: Input Level, Output Level, Output Meter Calibration, Peak Limiting, Asymmetrical Peak Limiting, Limit Bypass Switch, and Power Switch.
Power Requirements	: 100-120 VAC 50/60 Hz 10 W or 220-240 VAC 50/60 Hz 10 W.
Temperature	: Maximum ambient temperature +60°C (140°F).
RF Suppression	: Capable of operating in strong rf fields. (Field tested 150' from 50 kW array.)
Finish	: Clear anodized brushed aluminum front panel. Cadmium plated steel chassis.
Dimensions	: 19" x 3½" rack panel. Depth behind panel 8." (483 x 89 x 203 mm).
Weight	: 11 pounds, 5.0 kg.
Shipping Weight	: 16 pounds, 7.25 kg.

Universal Audio
SOLID STATE AMPLIFIER
 WITH ACCESSORY EQUALIZER

MODEL
 1109
 509



The 1109 Amplifier from U.R.E.I. is the latest of a very successful line of Universal Audio amplifiers, starting in 1957 with the Model 100, evolving through the well-known 1008 and 1016, the solid-state 1108, and now the all-new 1109. Preserving the ENVELOPMENTAL EQUALIZATION concept pioneered by Universal Audio, the 1109 combines newest state-of-the-art circuitry and packaging with the high reliability and performance always delivered by U.R.E.I. products.

Because the 1109 combines extreme low noise, (WITHIN 2 dB of the THEORETICAL LIMIT,) with high output capability (+30 dBm = A FULL WATT with 30 V supply) it can be used anywhere in the audio system, from microphone preamplifier through line amplifier. Input and output impedance matching, equalizer options, and gain adjustment are all accomplished on the mating edge connector. Therefore, all of the amplifiers in a system are completely interchangeable.

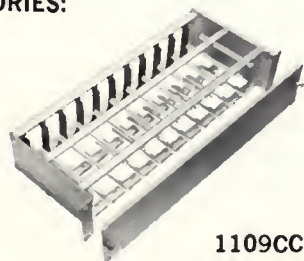
By changing one strap on the amplifier board, the 1109 may be powered optionally from dual polarity 15 VDC, or from single-polarity +24 to 30 VDC supply, without adding any components, and with no change in operating specifications.

ENVELOPMENTAL EQUALIZATION is achieved by electronically enclosing an external equalizer, the Universal Audio 509, within an active feedback loop of the amplifier, as shown in the block diagram above. The 1109/509 combination provides flexible equalization with no loss of gain. High frequency boost can be had at 2.5, 5, 7 or 10 kHz, and high frequency rolloff is at 10 kHz. Low frequency boosts are at 50, 70, 100 and 400 Hz, and low frequency rolloff is at 100 Hz.

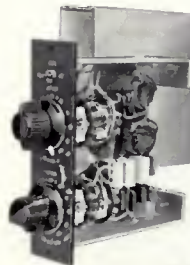
Detented switches provide boost or rolloff steps of 2, 4, 6, 9 and 12 dB for both high and low frequencies. An EQ IN/OUT switch is furnished to remove equalization completely without disturbing the settings. The 1109 Amplifier and 509 Equalizer may be separated by as much as 25 feet of single-pair shielded cable.

The 1109 Amplifier is a printed circuit card 2 $\frac{3}{4}$ " X 6". An accessory 1109CC Card Cage holds eleven 1109's in 3 $\frac{1}{2}$ " of rack space. The 509 Equalizer will mount on 1 $\frac{1}{2}$ " centers, and occupies 5 $\frac{1}{2}$ " of vertical panel space. Depth behind panel is 5 $\frac{1}{2}$ ".

ACCESSORIES:



1109CC
 CARD CAGE



509
 EQUALIZER



9C CONNECTOR



UNITED RECORDING ELECTRONICS INDUSTRIES

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TELEX 65-1389

MODEL
 1109
 509

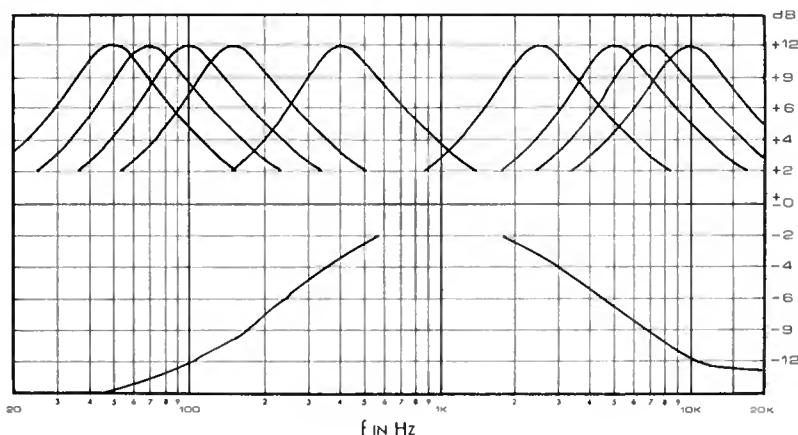
TECHNICAL SPECIFICATIONS

- VOLTAGE GAIN:**
- 600 ohms input strapping**—Adjustable 30 to 50 dB from terminated 600 ohm source; Adjustable 35 to 55 dB from unterminated 600 ohm source.
 - 150 ohms input strapping**—Adjustable 36 to 56 dB from terminated 150 ohm source; Adjustable 41 to 61 dB from unterminated 150 ohm source.
- POWER OUTPUT:** +30 dBm maximum, with 30 VDC supply. Nominally +27 dBm for single output, +24 dBm each for dual outputs, with less than 0.5% total harmonic distortion from 30 to 20,000 Hz. Typical midband distortion is less than 0.05%.
- FREQUENCY RESPONSE:** ±0.5 dB from 30 to 20,000 Hz.
- SOURCE IMPEDANCE:** 150 to 600 ohms. Strappable at external connector.
- INPUT IMPEDANCE:** Nominally five times rated source impedance (secondary of input transformer virtually unloaded).
- LOAD IMPEDANCE:** Two separate output transformer secondary windings, each designed for 600 ohm load; or both may be paralleled for 3 dB higher power capability.
- NOISE:**
(15.7 kHz equivalent bandwidth)
- Equivalent to an input signal of not more than:
- 132 dBv from 150 ohm source.
 - 126 dBv from 600 ohm source. (This is within approximately 2 dB of theoretical limits).
- THERMAL ENVIRONMENT:** Up to +150 degrees Fahrenheit without derating.
- POWER SUPPLY OPTIONS:** +24 to 30 VDC, or ±15 VDC (strappable—no added components needed).
- POWER CONSUMPTION:** No Signal—typically less than 10 mA. At +12 dBm output—typically less than 17 mA. At +27 dBm output—typically less than 60 mA.
- EQUALIZATION OPTION:** May be used with Universal Audio Environmental Equalizer Model 509, with no change in operating parameters except voltage gain is fixed at:
- 45 dB from terminated 600 ohm source.
 - 50 dB from unterminated 600 ohm source.
 - 51 dB from terminated 150 ohm source.
 - 56 dB from unterminated 150 ohm source.
- PHYSICAL:** 2³/₄" X 6" glass epoxy printed circuit card. Gold plated contacts to mate with standard 15-pin edge connector. (See accessory list below)

ACCESSORIES:

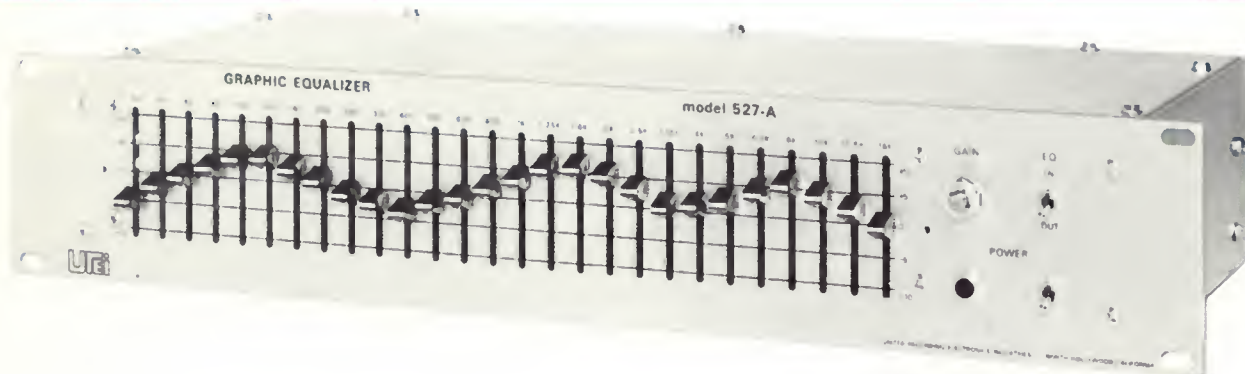
- 1109CC CARD CAGE** is designed to hold up to eleven 1109 amplifier cards. Supplied complete with edge connectors and front cover. Requires 3¹/₂" vertical space in standard 19" USASI rack enclosures.
- 509 EQUALIZER** for remote equalization of one 1109 amplifier. Requires only one two-conductor shielded pair for interconnection with amplifier. May be mounted on 1¹/₂" centers, to be compatible with contemporary vertical faders, etc. Panel size 1¹/₂" X 5¹/₂". Depth behind panel 5¹/₂ inches.
 High Frequency Attenuation: -2, -4, -6, -9, -12 dB at 10 kHz.
 High Frequency Peaking: +2, +4, +6, +9, +12 dB at 2500, 5000, 7000 and 10,000 Hz.
 Low Frequency Attenuation: -2, -4, -6, -9, -12 dB at 100 Hz.
 Low Frequency Peaking: +2, +4, +6, +9, +12 dB at 50, 70, 100, 400 Hz.
- 9C CONNECTOR.** Standard 15-pin edge connector to mate with 1109 Amplifier Card. (Not required when 1109CC card is used). Has gold bifurcated contacts.

MAXIMUM OBTAINABLE EQUALIZATION



Universal Audio 1/3 OCTAVE GRAPHIC EQUALIZER

MODEL
527-A
527 SC



FEATURES

The Model 527-A 1/3-octave Graphic Equalizer is a general purpose frequency-response shaping filter set. It features both boost and attenuation at 27 contiguous ISO center frequencies.

As a creative tool in sound recording and re-recording, the 527-A permits complete freedom in contouring response over the entire audio spectrum from 40 Hz to 16 kHz.

Each of the 27 equalizers provides boost or attenuation of up to 10 dB with stepless, noiseless vertical controls. The positions of the 27 control arms provide a graphic representation of the resulting response curve.

Equalization is accomplished with active LC filters. Gain is adjustable with a locking front panel control, and up to 10 dB of voltage gain may be obtained. Program levels from -20 dBm to +20 dBm are accommodated with excellent signal-to-noise and low distortion. An optional accessory, Model 527 SC Security Cover, may be installed over the front panel to provide protection against disturbance of the equalization controls in fixed installations.

Model 527-A is completely self-contained with built-in power supply, and operates from either 110-120 or 220-240 VAC, 50 or 60 Hz.

- 27 adjustable equalizers on 1/3-octave ISO center frequencies.
- 10 dB boost or 10 dB attenuation at any center frequency.
- Stepless, noiseless vertical controls, precision calibrated.
- State-of-the-art active filter circuitry.
- Low distortion, low noise.
- All solid-state.
- Zero insertion loss—up to 10 dB voltage gain.
- Standard rack mounting—only 3 1/2" high.
- Optional accessory front panel security cover.
- Competitive price.

ACCESSORY

527 SC SECURITY COVER



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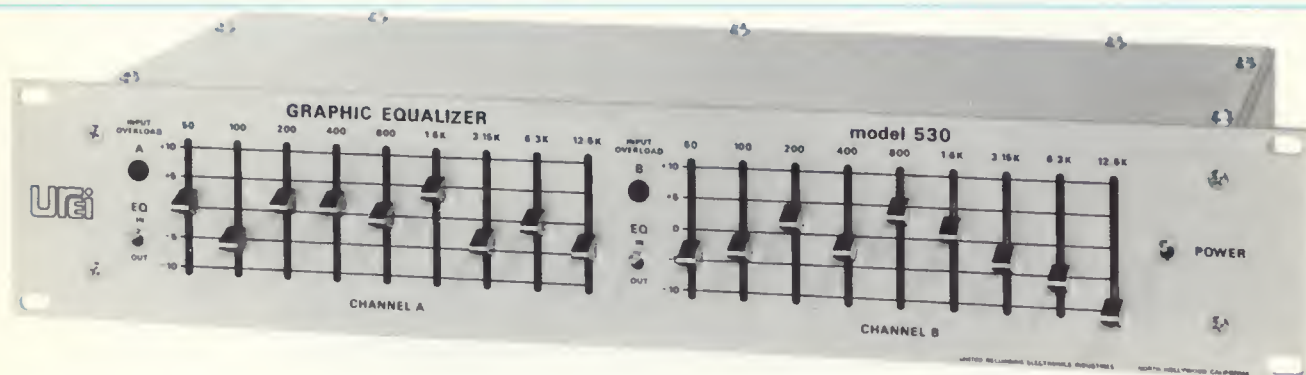
MODEL
527-A
527 SC

TECHNICAL SPECIFICATIONS

ELECTRICAL SPECIFICATIONS	:	
GAIN	:	Adjustable to +10 dB (with controls set flat or EQ switched OUT.)
DISTORTION	:	0.5% maximum at +24 dBm output.
FREQUENCY RESPONSE	:	20 Hz to 20 kHz, ± 1 dB (with no EQ).
CALIBRATION	:	Within 1 dB of indicated attenuator setting, up to 5 dB boost or cut; within 1.5 dB up to 10 dB boost or cut.
NOISE	:	Less than -90 dBm equivalent input noise in 0 dB input position; less than -70 dBm in +20 dB position. (EQ switched IN; 15.7 kHz noise bandwidth).
RATED LOAD	:	600 ohms resistive.
RATED OUTPUT	:	+24 dBm (+30 dBm clipping point).
INPUT IMPEDANCE	:	600 or 10 k ohms, unbalanced to ground.
OUTPUT CIRCUIT	:	Floating (transformer isolated).
EQ. CENTER FREQUENCIES	:	40, 50, 63, 80, 100, 125, 160, 200, 250, 315, 400, 500, 630, 800, 1000, 1250, 1600, 2000, 2500, 3150, 4000, 5000, 6300, 8000, 10000 12500, 16000 Hz.
FREQUENCY TOLERANCE	:	$\pm 3\%$ of center frequencies.
FILTER BANDWIDTH	:	1/3 octave at 3 dB points, with 6 dB boost or cut.
FILTER TYPE	:	LC active feedback type equalizers.
CONTROLS	:	
EQUALIZATION	:	27 vertical potentiometers, continuously variable ± 10 dB.
GAIN	:	Screwdriver adjustable control with lock nut.
EQ IN/OUT	:	Toggle switch.
POWER	:	Toggle switch and pilot light.
INPUT IMPEDANCE	:	Rear panel switch: 600 ohms or 10 k ohms.
INPUT LEVEL	:	Rear panel switch: 0 dBm or +20 dBm maximum.
MAINS VOLTAGE	:	Rear panel switch: 115/230 VAC.
TERMINATIONS	:	Rear panel barrier strip In/Out, 6' 3-wire power cable.
PHYSICAL	:	
SIZE	:	3½" x 19" rack panel. Depth behind panel 8". (89 x 483 x 203 mm).
WEIGHT	:	13 pounds, 5.9 kg.
FINISH	:	Front panel: Horizontally brushed clear anodized aluminum. Chassis: cadmium plated steel.
ACCESSORIES	:	527 SC Security cover.

DUAL GRAPHIC EQUALIZER

MODEL
530
530 SC



FEATURES:

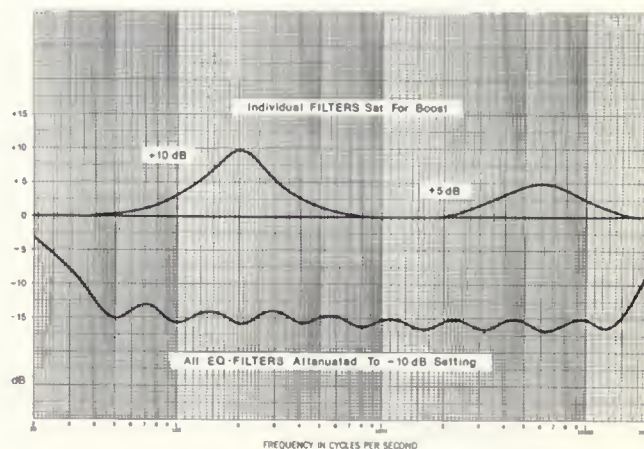
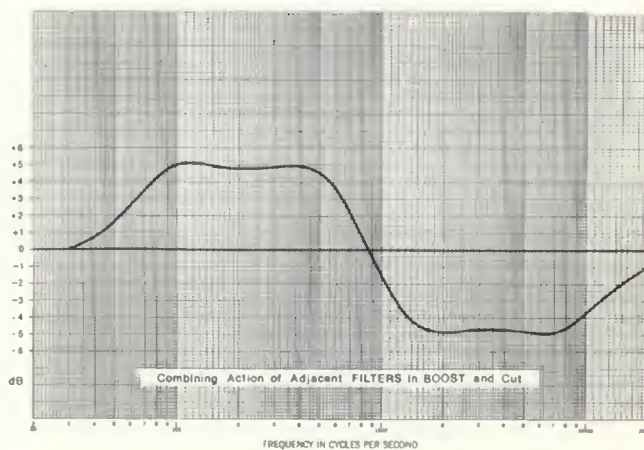
- Two Channels in one compact package.
- Nine equalizers per channel.
- Professional quality throughout.
- Balanced or unbalanced inputs and outputs.
- 115 or 230 VAC operation, 50/60 Hz.

The 530 Dual Graphic Equalizer is a studio quality product which has wide application in recording, sound reinforcement, radio and TV production, and high fidelity music systems.

Two completely independent Graphic Equalizers with a common power supply are attractively housed in the 530's 3 1/2" x 19" chassis. Each channel begins with a differential input stage, includes nine variable active equalizers centered at each octave from 50 Hz to 12.5 kHz, and ends in an output amplifier capable of delivering +20 dBm into a 600 ohm load. The inputs may be fed from balanced or unbalanced sources. The output amplifiers are transformer isolated, and will accommodate balanced or unbalanced loads. Signal-to-noise ratio at maximum output is an outstanding 110 dB, harmonic distortion below 0.5%.

State-of-the-art design techniques and components assure uncompromised performance at a reasonable price. UREI quality, of course.

TYPICAL CURVES:



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MODEL
530
530 SC

TECHNICAL SPECIFICATIONS

ELECTRICAL (EACH CHANNEL):

GAIN	:	Unity ± 1 dB.
FREQUENCY RESPONSE	:	20 Hz to 20 kHz, ± 1 dB, with EQ out.
OPERATING LEVEL (NOMINAL)	:	1.23 V (+4 dBm) for best signal to noise ratio with adequate headroom.
DISTORTION	:	$< 0.5\%$ THD at +20 dBm 30 Hz to 15 kHz.
INPUT IMPEDANCE	:	40 kohm, used as a balanced differential input. 20 kohm, used as an unbalanced single-ended input.
RATED LOAD	:	600 ohms resistive or higher.
RATED OUTPUT	:	+20 dBm into 600 ohms (7.75 V rms.)
OUTPUT CIRCUIT	:	Transformer isolated floating.
MAXIMUM INPUT LEVEL	:	+20 dBm (LED overload indicators).
EQUIVALENT INPUT NOISE	:	Below -90 dBm with EQ switched in. (15.7 kHz noise bandwidth, input and output terminated with 600 ohms).
EQUALIZATION FREQUENCIES	:	50, 100, 200, 400, 800, 1600, 3150, 6300, 12,500 Hz.
FILTER BANDWIDTH	:	1 octave at 8 dB Boost or Cut.
BOOST/CUT RANGE	:	± 10 dB at center frequencies.
FILTER TYPE	:	Synthesized LC.
CHANNEL SEPARATION	:	60 dB worst case at high frequencies. Typically better than 80 dB.
ENVIRONMENTAL REQUIREMENTS	:	Operation from 0°C to +50°C. Storage from -20 °C to +60°C.
POWER REQUIREMENTS (SWITCH SELECTABLE)	:	100 -- 125 VAC 50/60 Hz less than 10 W or 220 -- 250 VAC 50/60 Hz less than 10 W.
FUSES	:	1/4 A at 115 VAC 1/8 A at 230 VAC.

CONTROLS:

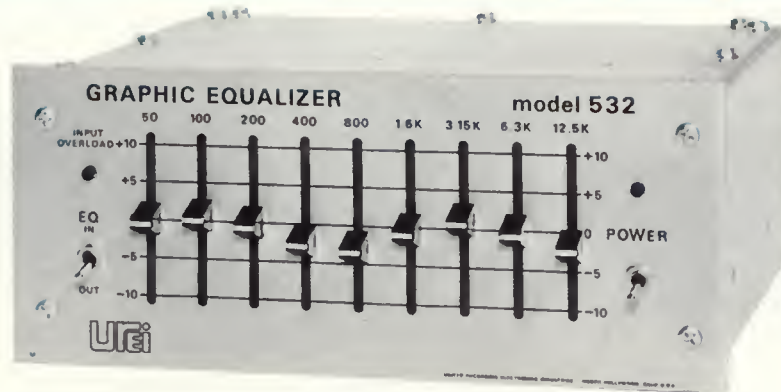
EQUALIZATION	:	9 vertical controls each channel. (Knobs included.)
EQ IN/OUT	:	Front panel toggle switch for each channel.
POWER	:	Toggle switch.
MAINS VOLTAGE	:	Rear panel slide switch.
TERMINATIONS	:	Rear panel barrier strips for inputs and outputs, 5' (1.5 m) 3-wire power cable.

PHYSICAL:

DIMENSIONS	:	19" X 3 1/2" X 8" (483 X 89 X 203 mm).
WEIGHT	:	9 pounds, 4.08 kg.
SHIPPING WEIGHT	:	13 pounds, 5.90 kg.
FINISH	:	Front panel horizontally brushed, clear anodized aluminum. Chassis cadmium plated steel.
ACCESSORY	:	Model 530 SC Security Cover. Smoke grey transparent plastic; covers all operating controls.

Universal Audio OCTAVE GRAPHIC EQUALIZER

MODEL
532



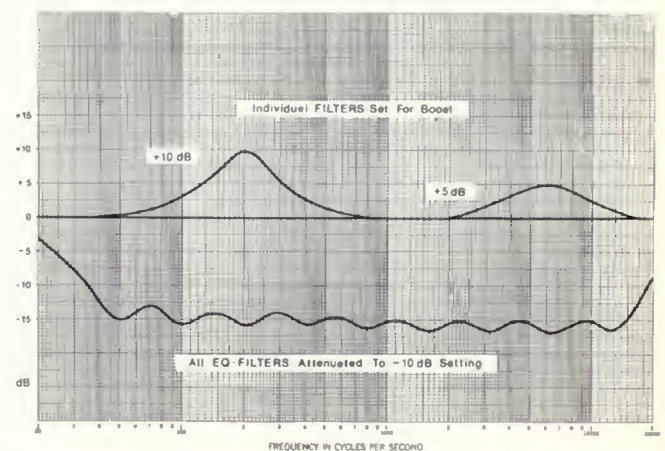
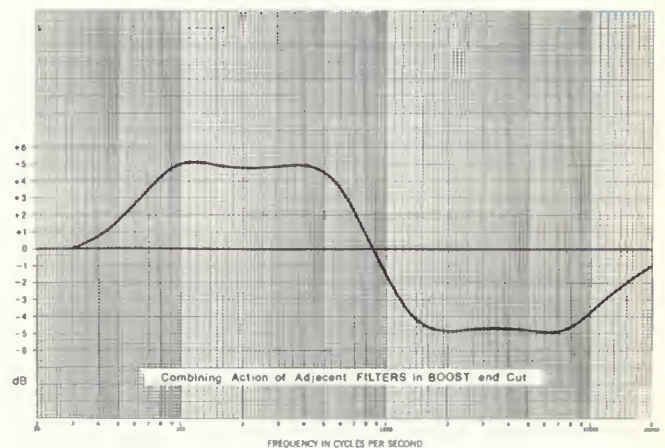
FEATURES:

- Nine equalizers on octave centers.
- Professional quality throughout.
- Balanced or unbalanced inputs and outputs.
- 115 or 230 VAC operation, 50/60 Hz.
- The 532 Octave Graphic Equalizer is a studio quality product which has wide application in recording, sound reinforcement, radio and TV production, and monophonic music systems.

The Model 532 is identical to one channel of the Model 530 Dual Graphic Equalizer, offering real economy where 2 channels are not required. The circuit begins with a differential input stage, includes nine variable active equalizers centered at each octave from 50 Hz to 12.5 kHz, and ends in an output amplifier capable of delivering +20 dBm into a 600 ohm load. The input may be fed from a balanced or unbalanced source. The output amplifier is transformer isolated, and will accommodate balanced or unbalanced loads. Signal-to-noise ratio at maximum output is an outstanding 110 dB, harmonic distortion below 0.5%.

State-of-the-art design techniques and components assure uncompromised performance at a reasonable price. UREI quality, of course.

TYPICAL CURVES:



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MODEL
532

TECHNICAL SPECIFICATIONS

ELECTRICAL:

GAIN	: Unity \pm 1 dB.
FREQUENCY RESPONSE	: 20 Hz to 20 kHz, \pm 1 dB with EQ out.
OPERATING LEVEL (NOMINAL)	: 1.23 V (+4 dBm) for best signal to noise ratio with adequate headroom.
DISTORTION	: 0.5% THD at +20 dBm, 30 Hz to 15 kHz.
INPUT IMPEDANCE	: 40 kohm, used as a balanced differential input. 20 kohm, used as an unbalanced single-ended input.
RATED LOAD	: 600 ohms resistive or higher.
RATED OUTPUT	: +20 dBm into 600 ohms (7.75 volts rms.)
OUTPUT CIRCUIT	: Transformer isolated; floating.
MAXIMUM INPUT LEVEL	: +20 dBm (LED overload indicator.)
EQUIVALENT INPUT NOISE	: Below -90 dBm with EQ switched in. (15.7 kHz noise bandwidth, input and output terminated with 600 ohms.)
EQUALIZATION FREQUENCIES	: 50, 100, 200, 400, 800, 1600, 3150, 6300, 12,500 Hz.
FILTER BANDWIDTH	: 1 octave at 8 dB Boost or Cut.
BOOST/CUT RANGE	: \pm 10 dB at center frequencies.
FILTER TYPE	: Synthesized LC.
ENVIRONMENTAL REQUIREMENTS	: Operation from 0°C to +50°C. Storage from -20°C to +60°C
MAINS REQUIREMENTS (SWITCH SELECTABLE)	: 100 - 125 VAC 50/60 Hz less than 10 watts or 220 - 250 VAC 50/60 Hz less than 10 watts.
FUSES	: 1/4 amp at 115 VAC 1/8 amp at 230 VAC, SLO-BLO.

CONTROLS:

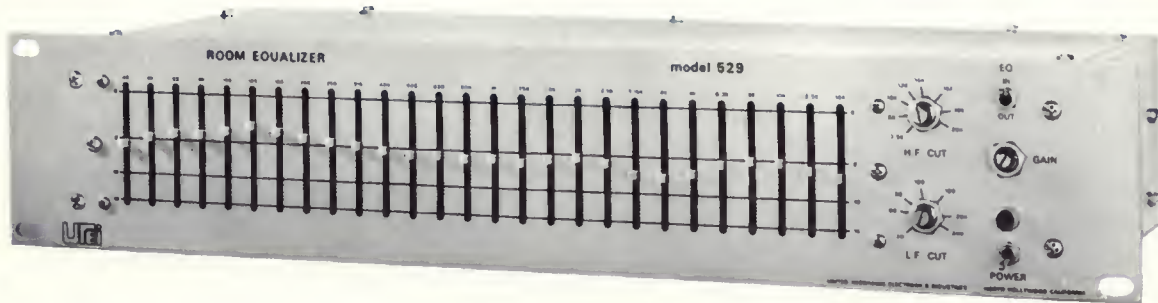
EQUALIZATION	: 9 vertical controls. (Knobs included.)
EQ IN/OUT	: Front panel toggle switch.
POWER	: Toggle switch.
MAINS VOLTAGE	: Rear panel slide switch.
TERMINATIONS	: Rear panel barrier strips for input and output, 5' (1.5 m) 3-wire power cable.

PHYSICAL:

DIMENSIONS	: 3½" high x 8½ wide x 8" deep. (89 x 216 x 203 mm).
WEIGHT	: 6½ pounds, 2.95 kg
SHIPPING WEIGHT	: 8 pounds, 3.63 kg
FINISH	: Front panel horizontally brushed, clear anodized aluminum. Chassis cadmium plated steel.
ACCESSORIES	: SR-21 Single Rack Mount Kit. DR-21 Double Rack Mount Kit.

ROOM EQUALIZATION FILTER SET

MODEL
529
529 SC

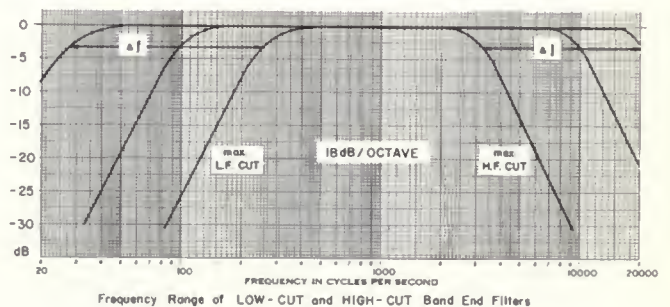
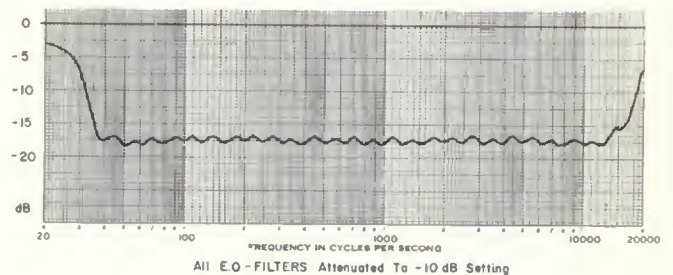
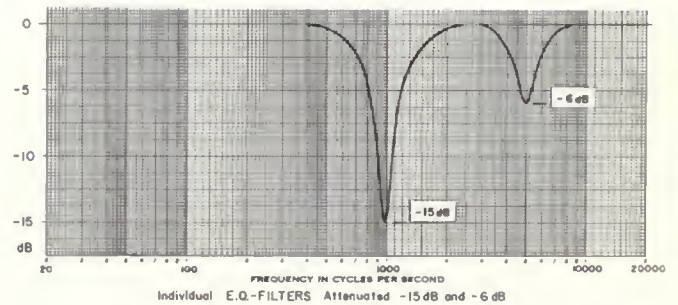


Model 529 is an active filter set specifically designed for room "equalization" or tuning. Unlike its companion UREI product, the highly popular 527-A $\frac{1}{3}$ -octave Graphic Equalizer, which permits both boost and attenuation, the 529 provides 0-15 dB of attenuation at each of its 27 frequencies, but does not boost. In addition, the 529 features tunable hi-pass and lo-pass "band end" filters with attenuation rates of 18 dB per octave.

The 27 vertical, stepless controls vary the depth of active filters which are centered on standard ISO $\frac{1}{3}$ -octave frequencies from 40 Hz to 16 kHz. Hi-pass and lo-pass filters are screwdriver adjustable from the front panel. The hi-pass (low cut) filter is continuously tunable from 30 Hz to 240 Hz; the lo-pass (high cut) filter tunes from 3.5 kHz to 20 kHz, (-3 dB points).

The 27 band-reject filters are active, minimum phase networks, whose skirts properly combine for minimum ripple and phase shift when used in combination. As in the 527-A, the gain structure may be altered by a rear chassis switch to accommodate program input levels from -20 dBm to +20 dBm with excellent signal-to-noise and low distortion. An adjustable front panel gain control provides up to 20 dB gain to make up attenuation of the equalization filters and to establish the maximum gain before feedback of the equalized system. A BYPASS switch permits switching the 529 out of the system, restoring unity gain. An optional accessory, Model 529 SC Security Cover, may be installed over the front panel to protect all operating controls against inadvertent disturbance or tampering in fixed installations.

Model 529 is completely self-contained with built-in regulated power supply, and operates from either 100-120 or 200-240 VAC, 50 or 60 Hz.



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MODEL
529
529 SC

TECHNICAL SPECIFICATIONS

ELECTRICAL:

- Input** : Balanced bridging differential amplifier.
- Input Impedance** : 40 kohms, used as balanced input.
20 kohms, used as unbalanced (single ended) input.
- Maximum Input Level** : +20 dBm (7.75 V RMS).
- Equivalent Input Noise** : Less than -90 dBm.
(15.7 kHz bandwidth) with all controls set flat, output terminated with 600 ohm load.
- Gain** : EQ out - unity, ± 1 dB;
EQ in - from unity to +20 dB.
- Frequency Response** : ± 1 dB, 20 Hz - 20 kHz, EQ out;
+1, -3 dB, 20 Hz - 20 kHz, EQ in.
- Output** : Floating, transformer isolated.
- Output Load** : 150 ohms or greater.
- Power Output** : +24 dBm into 600 ohm load
+20 dBm into 150 ohm load
- Distortion** : Less than 0.5% THD, 30 Hz - 15 kHz, at maximum rated output.
- Power Requirements** : 100 - 125 VAC, or 200 - 250 VAC, 50/60 Hz switch selectable less than 10W.
- Environment** : Operating 0°C to +50°C. Storage -20°C to +60°C.

FILTER CHARACTERISTICS:

- GRAPHIC Section** : 27 individual $\frac{1}{3}$ octave LC-type active filters, ($\frac{1}{3}$ octave at -3 dB points with 8 dB cut).
- Center Frequencies** : Standard ISO, (Hz)
40 50 63 80 125 160 200 250 315 400 500
630 800 1000 1.25k 1.6k 2k 2.5k 3.15k 4k 5k
6.3k 8k 10k 12.5k 16k.
- Frequency Accuracy** : $\pm 3\%$ of center frequency.
- Attenuation Range** : 0 to -15 dB, single filter section
- Attenuation Calibration** : Within 1 dB of indicated setting, 0 to -5 dB,
Within 1.5 dB of indicated setting, -5 to -15 dB, (single filter section).
- BAND LIMIT FILTERS** : Low Cut -12 dB/octave, Butterworth, -3 dB point continuously adjustable from 20 Hz to 250 Hz.
High Cut -6 dB or 12 dB/octave, switch selectable, Butterworth, -3 dB point continuously adjustable from 3.5 kHz to 20 kHz.

CONTROLS:

- Equalization** : 27 vertical slide controls, continuously variable 0 to -15 dB.
- L.F. Cut** : Screwdriver adjustable, 20 Hz - 250 Hz.
- H.F. Cut** : Screwdriver adjustable, 3.5 kHz to 20 kHz.
- H.F. Slope** : Toggle Switch selects 6 dB or 12 dB/octave below -3 dB point.
- Gain** : Screwdriver adjustable from unity to +20 dB (EQ in)
- EQ In/Out** : Front panel toggle switch.
- Power** : Front panel toggle switch.
- Indicators** : LED, power ON
LED, overload condition, level monitored at four critical points in the circuit.
- Mains Voltage Connections** : Rear panel slide switch, 115/230V
: Input and output, through rear chassis barrier strip;
power through 3-wire power cable.

PHYSICAL:

- Dimensions** : 483 x 89 mm rack panel, depth behind panel 203 mm, (19" x 3½" x 8").
- Finish** : Panel is 3.18 mm ($\frac{1}{8}$ ") brushed clear anodized aluminum. Chassis is cadmium plated steel.
- Weight** : 5.91 kg (13 pounds)
- Shipping Weight** : 7.71 kg (17 pounds)
- Accessory** : Model 539SC Security Cover; smoke gray transparent plastic; covers all operating controls.

Universal Audio PARAMETRIC EQUALIZER

MODEL
545



FEATURES

- Four sections of Parametric Equalization; each continuously variable in Bandwidth, Frequency, and Boost and Cut.
- Two end cut filters tunable over a wide range for bandwidth restriction.
- Large, easy-to-adjust controls.
- Multi-point overload detection circuit.
- Balanced or unbalanced bridging input.
- Transformer isolated output.
- Self contained with regulated power supply.
- UREI quality, of course.

The Model 545 is a true parametric Equalizer, in which all important filter parameters are continuously variable. It is an ideal tool for creative and corrective equalization in professional sound recording, broadcast production, sound reinforcement systems, motion picture and TV recording, and live performances.

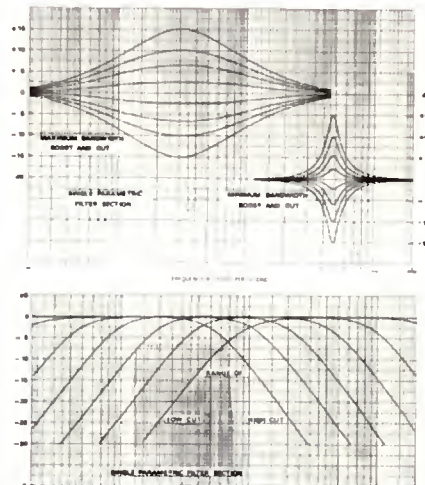
There are four parametric filter sections in the Model 545. Three filters cover overlapping ranges from 24 Hz to 12.5 kHz. The fourth filter, with a multiplier range switch, is tunable over the entire audio range from 15 Hz to 20 kHz. The characteristic of the filters is perfectly reciprocal in boost and cut, and they are continuously adjustable in boost and cut between plus and minus 15 dB, and in bandwidth between 1/4 and 2 octaves.

In addition a High Cut and a Low Cut filter section may be tuned to adjust the bandwidth of the equalizer. They are of the Butterworth type with an attenuation of 12 dB/octave beyond the -3 dB points.

While all filter sections are independently adjustable, they combine smoothly when tuned to nearly the same or the same frequency. This is especially useful when extreme filter characteristics and settings are desired.

Concentric controls, easy to read dials and markings, and accurate calibration aid in selecting and resetting any filter combination. Due to the uncluttered and logical arrangement of the Model 545 front panel its operation is simple.

An overload detection circuit monitors the signal throughout the unit. If the signal level in any part of the circuit approaches overload, a front panel LED flashes to warn the user. A bypass switch permits switching the equalizer section out of the system, restoring flat frequency response. All components are conservatively rated and of high quality. The built-in regulated power supply assures dependable operation from either 100 - 125 or 200 - 250 VAC, 50 or 60 Hz. The unit may be mounted in a standard 19" rack.



UREI

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UREI company

MODEL
545

TECHNICAL SPECIFICATIONS

Electrical:

- Input** : Balanced bridging differential amplifier.
- Input Impedance** : 40 kohms, used as balanced input.
20 kohms, used as unbalanced (single-ended) input.
- Maximum Input Level** : +20 dBm (7.75 V RMS)
- Equivalent Input Noise** : Less than -85 dBm (15.7 kHz bandwidth) with all parametric controls at half rotation, and end cut filters set to maximum bandwidth.
- Gain** : Unity, ± 1 dB, with E.Q. out or boost - cut controls set to zero.
- Frequency Response** : ± 0.5 dB, 20 - 20,000 Hz (E.Q. out).
- Output** : Floating, transformer isolated.
- Output Load** : 150 ohms to infinity.
- Power Output** : +24 dBm into 600 ohm load.
+20 dBm into 150 ohm load.
- Distortion** : Less than 0.5% THD, 30 Hz to 15 kHz at maximum rated output.
- Parametric Equalizers** : Bandwidth continuously variable 1/4 to 2 octaves,
Boost - Cut continuously variable +15 to -15 dB,
Frequency ranges:
- | | |
|------------|-------------------|
| Low Band | 24 Hz - 310 Hz |
| Mid Band | 190 Hz - 2.24 kHz |
| High Band | 960 Hz - 12.5 kHz |
| Multi Band | 15 Hz - 200 Hz |
| | 150 Hz - 2 kHz |
| | 1.5 kHz - 20 kHz |
- Cutoff Filters** : Low cut: 16 Hz to 800 Hz, continuously tunable.
High cut: 500 Hz to 25 kHz, continuously tunable.
- Cutoff Filter Type** : Butterworth; attenuation 12 dB/octave beyond -3 dB points.
- Power Requirements** : 100 - 125 VAC, or 200 - 250 VAC 50/60 Hz, switch selectable, less than 10 W.
- Environment** : Operating 0°C to +50°C, storage -20°C to +60°C.

Physical:

- Dimensions** : 483 x 89 mm rack panel, Depth behind panel 203mm.
(19" x 3 1/2" x 8")
- Finish** : Panel is 3.18 mm (1/8") brushed black anodized aluminum.
Chassis is cadmium plated steel.
- Weight** : 4.09kg (9 pounds).
- Shipping Weight** : 5.91kg (13 pounds).

Universal Audio VARIABLE BANDPASS FILTERS

MODELS 555 (Mono)
556 (Stereo)



Models 555 and 556 filters are variable frequency cutoff filters designed to allow adjustment of the audio frequency bandwidth of program material. Applications include AM and FM broadcasting where band restriction can improve loudness; recording, hum and noise reduction, telephone simulation, disc-mastering, tape duplicating, re-recording, and driver protection in high power P.A. Systems. TRS jacks on the front panel normalled to barrier strips on the rear allow for easy connection and patching. LED indicators are provided to warn of input levels approaching overload.

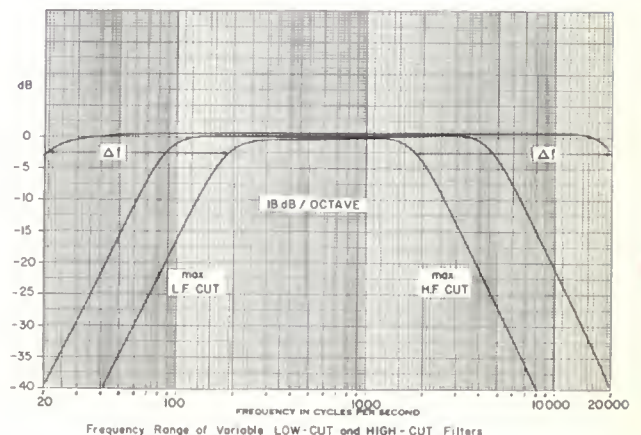
The filters are 18 dB/octave VCVS types designed for Butterworth response. The cutoff frequencies are continuously tunable, making possible fine adjustment to any desired frequency within their ranges.

The low end cutoff filter can be adjusted to any frequency from 20 Hz to 200 Hz. The high end cutoff filter may be set to any frequency from 2 kHz to 20 kHz. An in-out switch is provided for A - B comparisons.

The Model 556 is a stereo version with close channel to channel tracking and is therefore ideal for use in any stereo chain, or in disc mastering for equal filtering of program and preview channels.

FEATURES:

- 18 dB/octave slopes.
- Compact 1/2 rack size.
- State variable filters.
- Precise control of filter characteristics.
- Large, easy to read dials.
- 0 db insertion loss.
- LED overload indicators.
- Built in power supply.
- UREI quality, of course.



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TELEX 65-1389

MODELS
555
556

TECHNICAL SPECIFICATIONS

555 -- 556

ELECTRICAL:

GAIN	:	Unity (0 dB).
FILTER TYPE	:	3 pole Butterworth.
OPERATING LEVEL	:	Nominally +4 with 16 dB of headroom.
CALIBRATION	:	Within 10% of dial indications.
DISTORTION	:	Less than 0.25% THD at +14 dBm input, 30 Hz to 14 kHz.
NOISE	:	Typically less than -95 dBm at output terminals. Guaranteed less than -85 dBm. (15.7 kHz equivalent noise bandwidth).
FREQUENCY RESPONSE	:	Within ± 0.5 dB in passband, -3 dB at set frequencies, 18 dB/Octave out of passband.
TUNING RANGE	:	Low cut 20 Hz to 200 Hz. High cut 2 kHz to 20 kHz.
INPUT IMPEDANCE	:	20 kohms bridging.
OUTPUT IMPEDANCE	:	Designed for 600 ohm or greater load. Transformer coupled.
POWER OUTPUT	:	+20 dBm into 600 ohms.
MAINS REQUIREMENT	:	110 - 125 VAC or 220 - 250 VAC 50 - 60 Hz, 10 W maximum.
ENVIRONMENTAL CONDITIONS	:	Operation from 0°C to 50°C, Storage from -20°C to + 60°C.

PHYSICAL:

PANEL FINISH	:	Black anodized brushed aluminum.
DIMENSIONS	:	3½" High, 8½" Wide, 10" Deep. (89 X 216 X 254 mm).
WEIGHT	:	10 pounds, 4.5 kg.
SHIPPING WEIGHT	:	13 pounds, 5.9 kg.

CONTROLS AND TERMINATION:

INPUT-OUTPUT	:	TRS jacks on front panel normalled to barrier strip on rear panel.
IN-OUT SWITCH	:	Front panel in-out switch for A - B comparison.
ACCESSORIES	:	DR-3A Mounting Kit: For mounting two units (555 or 556) side by side in a 19" Rack. SR-3A Mounting Kit: For mounting one unit in a 19" Rack.

Universal Audio FEEDBACK SUPPRESSOR

MODEL
560
SR-60
DR-60



Experience with narrow band notch filters has demonstrated that in a typical single-microphone sound reinforcement system, gain before "howback" can be significantly increased and intelligibility improved by centering a narrow band-reject filter on three or four of the most prominent system resonant frequencies. The Universal Audio 560 Feedback Suppressor provides an inexpensive, convenient, compact way to achieve this result.

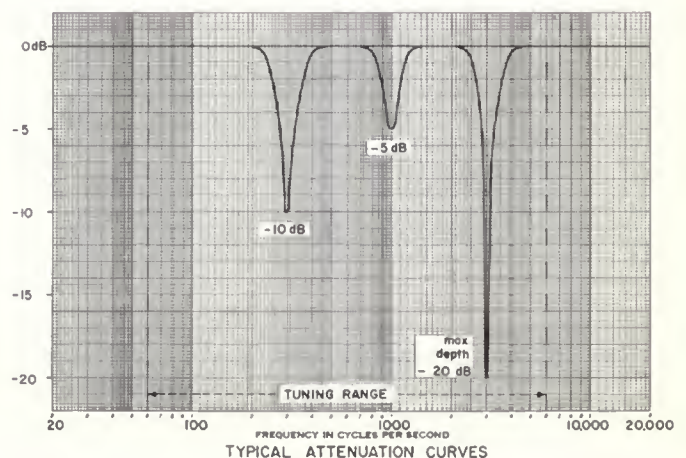
The 560 contains four active notch filters, each adjustable in notch depth from 0 to 20 dB, and adjustable in frequency from 60 Hz to 6000 Hz. Microphone preamplification is built in, permitting the 560 to be used at either microphone or line level. XLR-3 connectors allow simple connection between microphone and amplifier, and phone jacks are provided for line level input and output.

In using the 560, the system gain is slowly increased until the first feedback occurs and is sustained. One notch filter is then switched in and "tuned" until the feedback ceases. The gain is increased again, and the next resonance attenuated by the second filter. This procedure is repeated with filters 3 and 4. A typical result is an increase of 12 dB or more in actual system gain before feedback, and improved intelligibility. No undesirable changes in fidelity are produced. Used alone in this manner, the 560 will find wide application for both temporary and permanent installations in lecture halls, meeting rooms, schools and churches.

Many systems will benefit from more sophisticated broadband and/or $\frac{1}{3}$ -octave equalization, if budgets permit. The 560 can further improve these installations, providing final "tweaking" to reduce microphone proximity effects and troublesome residual resonances.

FEATURES

- Compact size: 2.5" x 8.5" x 10". Optional rack mounting.
- Four independently adjustable notch filters.
- Narrow notches minimize sound coloration.
- Microphone or line level inputs and outputs.
- XLR-3 and phone jacks for inputs and outputs.
- Input overload indicator.
- Built-in power supply.
- UREI Quality, of course.



UREI

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UREI SNVY TELEX 65-1389

MODEL
560
SR-60 DR-60

TECHNICAL SPECIFICATIONS

ELECTRICAL:

- MICROPHONE INPUT** : Bridges low impedance (150-250 ohms) microphones. Transformer isolated. XLR-3 female chassis connector.
- LINE INPUT** : 20 k ohms bridging. Floating, differential. (May be used from balanced or unbalanced sources). Phone jack connector.
- LOW LEVEL OUTPUT** : 150 ohms, transformer isolated. 54 dB below line level output. XLR-3 male chassis connector.
- LINE LEVEL OUTPUT** : To be loaded by 600 ohms or higher impedance. Transformer isolated. Phone jack connector.
- GAIN** : Microphone input, 20 to 50 dB, adjustable. Line input, 0 dB.
- FREQUENCY RESPONSE** : ± 0.5 dB, 20 Hz to 20 kHz (filters OFF).
- MAXIMUM OUTPUT** : 6.15V RMS (+ 18 dBm) into 600 ohm load
- DISTORTION** : Less than 0.5% at maximum output, 30 Hz to 15 kHz.
- EQUIV. INPUT NOISE** : Microphone input - 124 dBV or less.
Line input - 95 dBV or less.
- FILTERS TYPE (4)** : State variable.
- FILTER RANGES** : 60 to 6000 Hz in two ranges.
- CALIBRATION ACCURACY** : $\pm 10\%$ of indicated settings.
- FILTER BANDWIDTH** : Approx. 1/6 octave at 5 dB attenuation (3 dB points).
- FILTER ATTENUATION** : 0 to 20 dB, continuously variable.
- POWER REQUIREMENTS** : 120/230 VAC (strappable) @ 50-60 Hz. 7 watts maximum.

PHYSICAL:

- SIZE** : 2.5'' high, 8.5'' wide, 10'' deep overall. (63.5 x 216 x 254 mm).
- WEIGHT** : 7.5 pounds, 3.40 kg.
- SHIPPING WEIGHT** : 10 pounds, 4.54 kg.
- FINISH** : Front panel, horizontally brushed clear anodized aluminum. Chassis, cadmium plated steel. Cover, matte black painted steel.

- OPTIONAL ACCESSORIES:** SR-60 rack adaptor for single mounting (3.5'').
DR-60 rack adaptor for double mounting (3.5'').

Universal Audio LITTLE DIPPER FILTER SET

MODEL
565T



The Universal Audio Model 565T "Little Dipper" filter set combines computer aided active filter design with space-age integrated circuitry. Only 5 $\frac{1}{4}$ " high, the Model 565T provides FOUR separate, continuously tunable cascaded filters:

- An 18 dB per octave Low Cutoff Filter, tunable from 20 Hz to 200 Hz.
- **TWO** band reject (dip) filters, with 50 dB minimum rejection and variable notch-width to as sharp as 5% of center frequency; each continuously tunable from 20 Hz to 20 kHz. Or,
- Both band filters may be optionally switched to become band PASS filters—each continuously tunable 20Hz to 20 kHz.
- An 18 dB per octave High Cutoff Filter, tunable from 2 kHz to 20 kHz.

The 565T is completely self-contained (operates from 100-120 VAC or 220-240 VAC, 50/60 Hz and is designed for no-loss insertion in program circuits. A switch is provided to optimize performance in either -20 dBm or 0 dBm nominal level environments.

While the Little Dipper's versatility makes it an ideal tool for many signal processing tasks, its primary function is to remove undesirable "coherent" or "semi-coherent" noise components from audible range recorded tapes, film or records. For example, AC-hum oscillations, heterodyne "whistles," etc., can be rendered completely inaudible with no apparent effect on the sound quality of music or voice, because of the extreme sharpness of the band reject characteristic. Semi-coherent sounds, such as camera noise or fluorescent fixture "buzz" can be greatly reduced. Sounds of an incoherent nature such as jet aircraft, amplifier noise, and general background noise can be effectively reduced using the Low Cutoff and High Cutoff filters with or without the band reject filters. A silent-operating "bypass" switch is provided on the front panel to add or remove all filter action instantly at will.

- **SPECIAL EFFECTS:** The notch filters can be used to produce "Phasing" effects. A double phasing effect may be achieved by using both notch filters simultaneously.
- **ENHANCEMENT.** Extremely sharp enhancement of any frequency or any two frequencies in the audio spectrum is possible in this mode. Combinations of high cutoff, low cutoff, bandpass and notch with variable frequency can be used for imaginative creative effects.
- **HARMONIC DISTORTION FILTER.** The very low distortion of the Model 565T and its deep notch allows its use as a distortion measurement filter. The fundamental of any frequency from 20 Hz to 20 kHz may be removed for total harmonic measurement.
- **HARMONIC WAVE ANALYSIS.** The individual harmonics of complex audio waves may be selected using the bandpass filter, allowing exact harmonic structure analysis.

Urei

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UR company

MODEL
565T

GENERAL CHARACTERISTICS

LOW CUTOFF FILTER

SLOPE	: 18 dB per octave = 60 dB per decade.
FREQ. RANGE	: 3 dB point continuously tunable 20 Hz to 200 Hz.
CONTROLS	: Tuning dial.

HIGH CUTOFF FILTER

SLOPE	: 18 dB per octave = 60 dB per decade.
FREQ. RANGE	: 3 dB point continuously tunable 2 kHz to 20 kHz.
CONTROLS	: Tuning dial.

NOTCH FILTERS (two in set)

NOTCH DEPTH	: 50 dB minimum.
FREQ. RANGE	: Continuously tunable 20 Hz to 20 kHz.
NOTCH WIDTH	: Selectable 5%, 10%, or 50% of center frequency at 3 dB points.
CONTROLS	: Frequency dial, frequency decade multiplier, notch balance, fine frequency vernier, notch width, bypass (in/out) switch.

BANDPASS FILTERS

BANDPASS Q	: Switch selectable 1.2, 5 or 10.
BANDPASS GAIN	: Unity at peak frequency.
FREQ. RANGE	: Continuously tunable 20 Hz to 20 kHz.

SPECIFICATIONS

INPUT IMPEDANCE	: 10 kohms unbalanced (may bridge low imp. lines) or 600 ohms (term. switch on rear of chassis).
LOAD IMPEDANCE	: May be operated into any load 600 ohms or greater, (balanced output).
GAIN	: Unity (± 1 dB).
MAX. INPUT LEVEL	: +20 dBm or 0 dBm switch selectable.
HUM AND NOISE	: Equivalent to an input signal of: High Level input, -70 dBm, Low Level input, -90 dBm.
FREQ. RESPONSE	: 30 Hz to 15 kHz, ± 0.5 dB. (-3 dB at 20 Hz 20 kHz).
DISTORTION	: 0.5% maximum 20 Hz to 20 kHz at maximum input.
POWER SOURCE	: 100-120 VAC 50/60 Hz, or 220-240 VAC 50/60 Hz—rear panel switchable.
CONNECTORS	: Front panel TRS jacks, normalled to rear panel barrier strip.
FINISH	: Black anodized panel, horizontally brushed.
DIMENSIONS	: 19" standard rack width, 5 $\frac{1}{4}$ " high, 9" deep, (483 x 133 x 229 mm).
WEIGHT	: 13 pounds, 5.90 kg.
SHIPPING WEIGHT	: Approx. 17 pounds, 7.71 kg.

UNIVERSAL AUDIO ELECTRONIC CROSSOVER SYSTEMS

MODELS
521 L 521 H
518 L 518 H
521 P

APPLICATIONS:

- Bi-amplification of two-way speaker systems.
- Tri-amplification of three-way speaker systems.
- Employed ahead of power amplifiers. Increases efficiency and performance of loudspeaker systems.



521 P chassis with
4 crossover cards

The 521/518 series Electronic Crossover Systems from UREI are radically different in concept and design from previous "active crossover networks."

Main elements of the system are the L and H cards, which differ only in their tuning ranges. Crossover frequencies are continuously tunable: 200 Hz to 2 kHz in the L; 1 kHz to 10 kHz in the H. This eliminates any changing of fixed components to establish optimum crossover frequencies for any two-way or three-way speaker system. All inputs and outputs are transformer isolated to avoid grounding problems, although provision is made to bypass any transformer if desired.

Filter characteristic of the 521 cards is 2 pole Butterworth, yielding 12 dB per octave or 40 dB per decade attenuation rate with essentially perfect frequency flatness within the passband. Filter characteristic of the 518 is 3 pole Butterworth yielding 18 dB per octave or 60 dB per decade attenuation.

The 521P holds four crossover cards, and contains its own internal power supply. The unit may be rack mounted, using the SR-21 rack-mounting adaptor. Or, two units may be rack-mounted in one 3½" rack space by using the DR-21 rack mount hardware.

As shown on the inside pages, one 521P with four cards can be used for stereo 3-way (tri-amp) or Quad 2-way (bi-amp) applications.

Optionally, for large installations which may require more than eight cards, they may be installed in UREI 1109CC card cages, and an external power supply used. Eleven cards may be mounted in one 1109CC, occupying 3½" or rack space.



ONE 521-P IN ACCESSORY
SR-21 RACK MOUNT



TWO 521-P's IN ACCESSORY
DR-21 RACK MOUNT



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MODELS
518/521

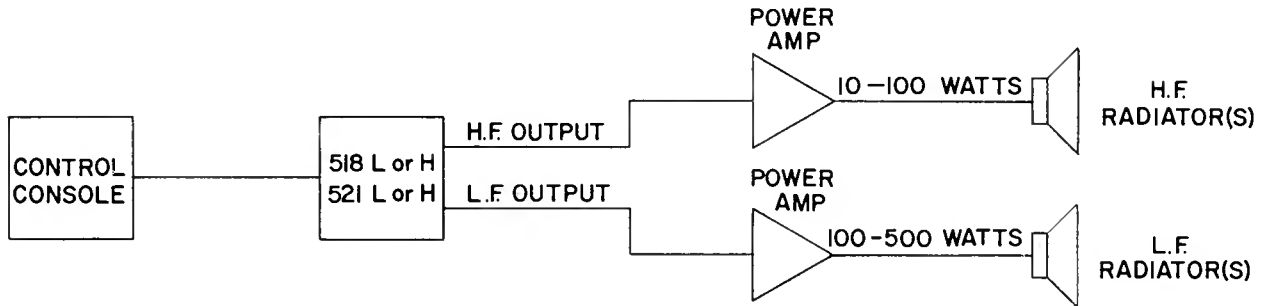
OPTIONS AND ORDERING INFORMATION:

518/521 L
or
518/521 H
Card

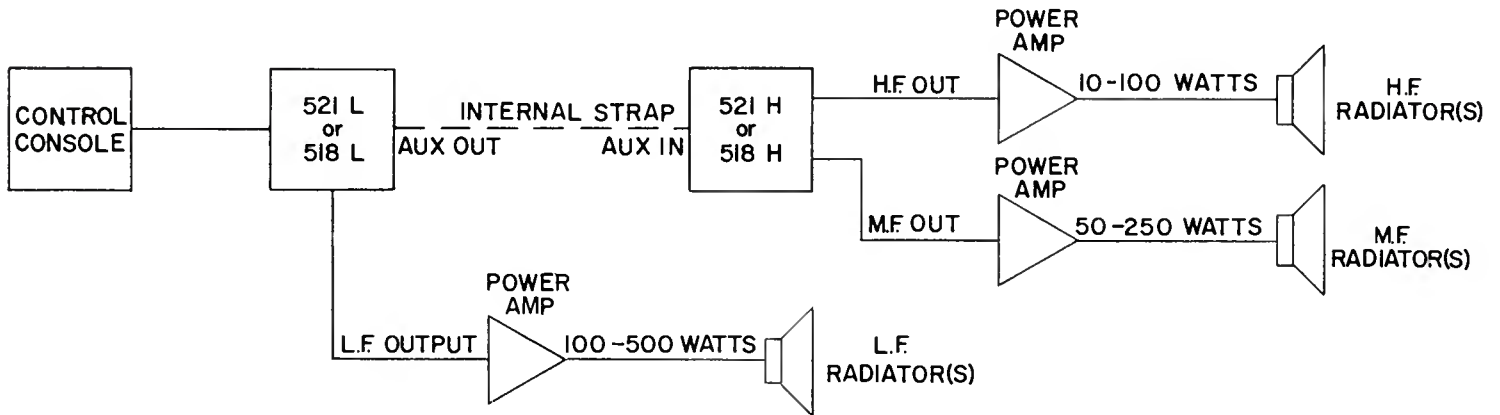


- 521-L For crossover frequencies from 200 Hz to 2 kHz in two-way systems, or for low-frequency crossover in three-way system; filter slope 12 dB per octave.
- 518-L Same as 521-L except 18 dB per octave.
- 521-H For crossover frequencies from 1 kHz to 10 kHz, or for high-frequency crossover in 3-way systems.
- 518-H Same as 521-L except 18 dB per octave.
- 521-P Mainframe for mounting 4 521 or 518 cards. Contains power supply to operate from 110/220 VAC, 50/60 Hz mains.
- DR-21 Rack mounting hardware for side-by-side mounting of two 521-P in standard R.E.T.M.A. rack.
- SR-21 Rackmounting hardware for single mounting one 521-P.
- 1109CC 3½" X 19" card cage with removable front cover, to hold up to 11 521 or 518 cards. Includes pre-mounted mating connectors.

TYPICAL SINGLE-CHANNEL 2-WAY (BI-AMP) SYSTEM

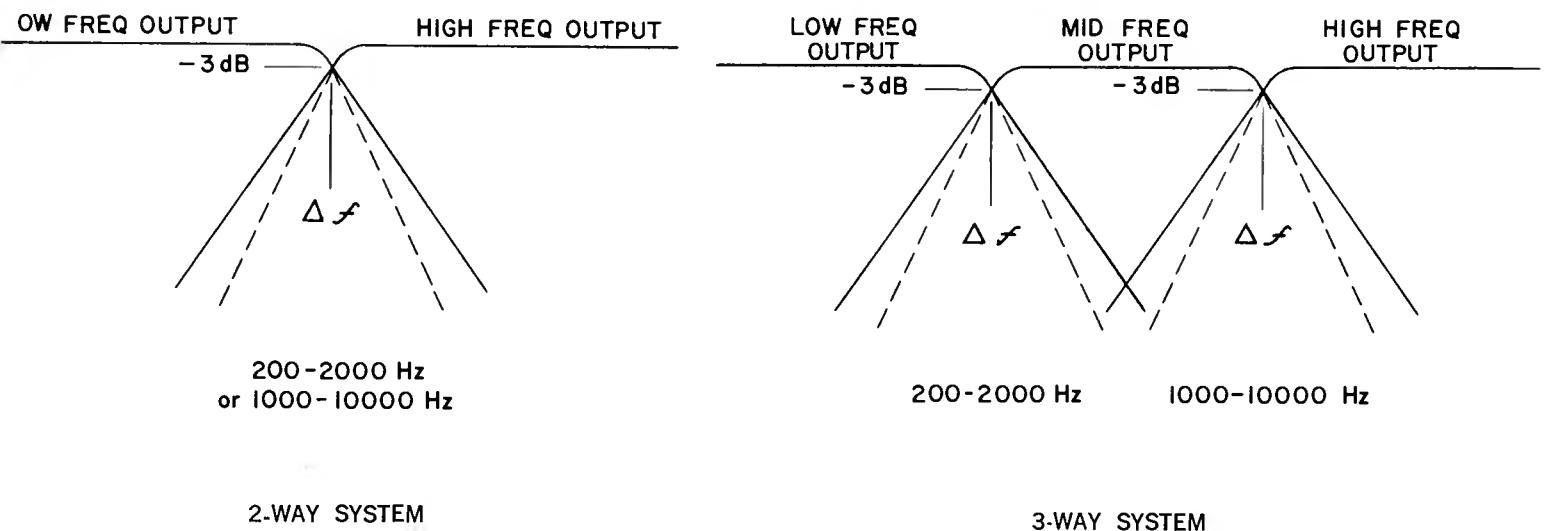


TYPICAL SINGLE-CHANNEL 3-WAY (TRI-AMP) SYSTEM



TYPICAL RESPONSE CURVES

SOLID LINE MODEL 521 (12 dB/OCTAVE)
 DOTTED " " 518 (18 dB/OCTAVE)



SPECIFICATIONS

Gain	:	Unity (0 dB) with individual output attenuators.
Operating Level	:	Nominally +4 with 16 dB of headroom.
Distortion	:	Less than 0.24% THD at +10 dBm input, 30 Hz to 15 kHz.
Noise	:	Typically less than -100 dBm at output terminals. Guaranteed less than -90 dBm. (15.7 kHz equivalent noise bandwidth).
Frequency Response	:	Within ± 0.5 dB in passband, -3 dB at crossover frequency. 521L & H 12 dB per octave out of passband; 518L & H 18 dB per octave out of passband.
Tuning Range	:	518L, 521L, 200 Hz to 2 kHz. 518H, 521H, 1 kHz to 10 kHz.
Input Impedance	:	600 ohms bridging (should be fed from 600 ohms or less).
Output Impedance	:	Nominally 1000 ohms (designed to be bridged).
Power Consumption	:	± 15 V, 15 mA per card. 521-P 110-125 VAC 1/8 A, or 220-250 VAC 1/16 A 50-60 Hz (with 4 cards).
Thermal Environment	:	Up to 130° F (+55°C) without derating.
External Connections	:	Barrier Strips on back panel (521-P).
Panel Finish	:	Clear anodized brushed aluminum.
Dimensions (521-P)	:	3½" High, 8½" Wide, 10" Deep (89 X 216 X 254 mm)
Weight (521-P)	:	7 pounds, 3.18 kg.
Shipping Weight (521-P)	:	10 pounds, 4.54 kg.

TIME ALIGNED™ STUDIO MONITOR SYSTEM

™ Licensed by E. M. Long Associates

MODEL
813

FEATURES:

- First TIME ALIGNED™ monitor system designed for the professional studio.
- Features UREI 800 series TA™ network (patent pending).
- 6048G duplex with UREI custom H.F. horn for extended and more uniform H.F. response.
- Second L.F. 15" direct radiating driver fed from 3-way TA network for extended L.F. response and higher power handling capability at low frequencies.
- >11.5 cu. ft. enclosure with pressure control aperture for excellent L.F. damping, good efficiency and low distortion.
- Unique enclosure damping method provides high efficiency conversion of low frequency sound pressure to adiabatic energy.

The 813 Studio Monitor System is the first generation product of a joint R & D effort of UREI and E.M. Long Associates. The TIME-ALIGN™ TECHNIQUE is a real-time design method, utilizing proprietary instrumentation developed by Long which allows the driver placements and network parameters to be adjusted simultaneously, achieving near perfect alignment of the frequency components of a complex transient waveform as heard by a listener.


The importance of time (phase) parameters of loudspeaker systems, in addition to smooth frequency response, has been postulated for many years. These group time delay anomalies may be severe in some multi transducer systems, although they may exhibit satisfactory or even excellent frequency response.

Within the last decade, many advocates have presented outstanding scientific papers on this subject. Richard C.



Heyser, among others, has contributed magnificent research dealing with the importance of time (phase) correlation.

Quoting from Heyser in Audio, June 1976: "We realize that the concept of time response of a speaker is a whole new ballgame to many people and is probably a bit confusing if all you ever considered before was steady state frequency measurements."

Edward M. Long presented a paper before the Audio Engineering Society in May of 1976, entitled "A Time Align Technique for Loudspeaker System Design." UREI is a licensee of E. M. Long Associates, for the instrumentation methods and the use of the Trademark ™.

The series 800 TA networks* with the 800H custom H. F. horn, are also available separately in two way and three way configuration for both the 6048G and the 604E. (*Patent Pending).



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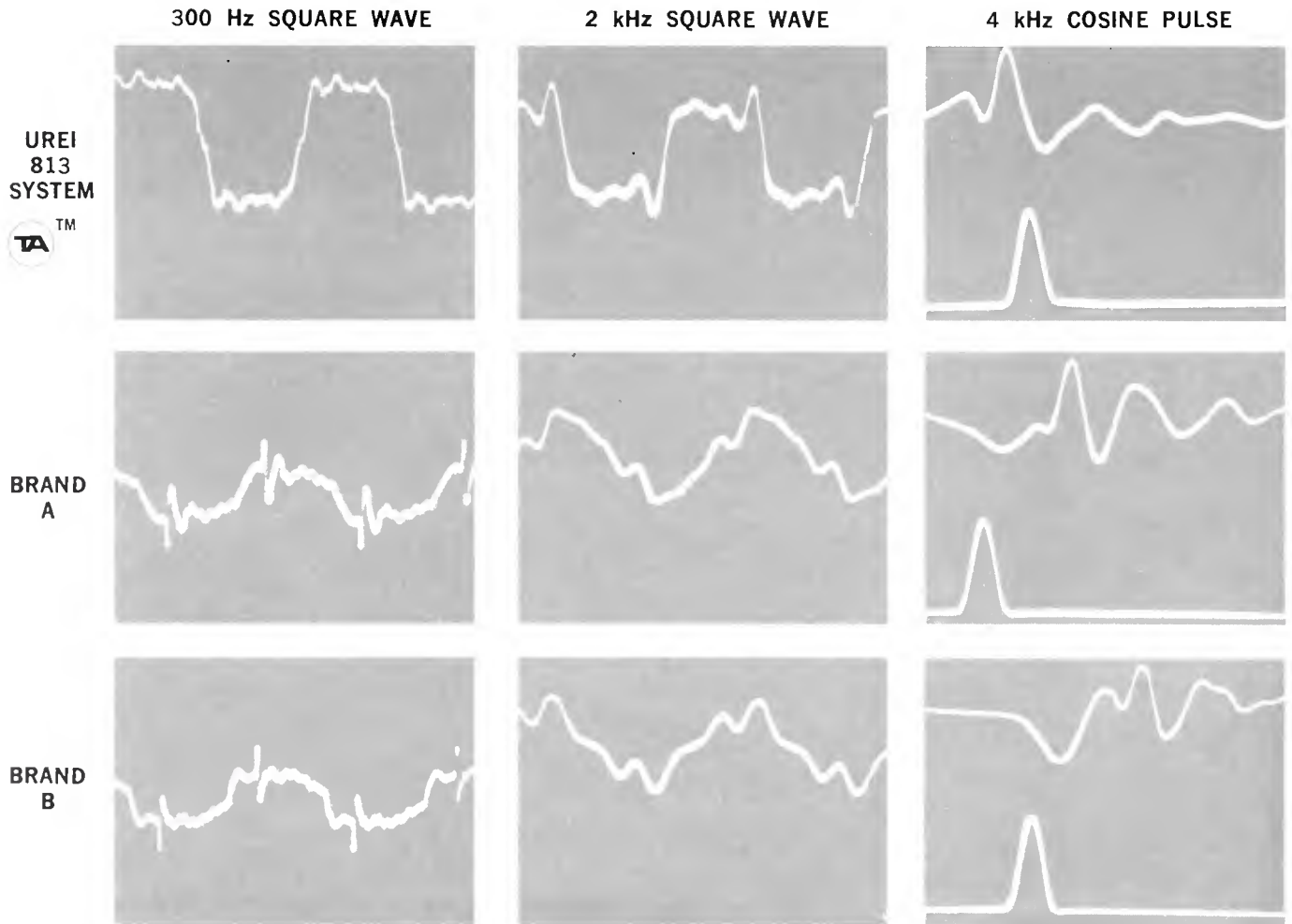
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MODEL
813

The excellent transient behavior of the 813 system compared to two other popular networks and systems designed for the 604 series duplex speakers is graphically demonstrated below. (Crossover controls adjusted per manufacturers' instructions for best frequency response.)



SPECIFICATIONS:

Type: Dual woofer coaxial with Model 838 three way TA network

Power Rating: 75 watts 40 Hz to 20 kHz, with pink noise

Frequency response: ± 3 dB, 40 Hz to 15 kHz measured "freespace"
 4π steradians (H=5M D=1M)

Sensitivity: 89 dB SPL/volt/meter

Impedance: 8 ohms, nominal (minimum impedance 3.7 ohms)

Network: UREI 838, 3-way

Cabinet: Utility flat black painted

Weight: 79.2kg (176 pounds)

Dimensions: H = .914 m (36")

W = .787 m (31")

D = .584 m (23") without grille
 .603 m (23¾") with grille



UREI 813 SYSTEM
 WITH ACCESSORY GRILLE

800 SERIES TIME-ALIGNED™ CROSSOVER NETWORKS* AND CUSTOM HIGH FREQUENCY HORN



Licensed by E. M. Long Associates

MODELS

824	834
828	838
	800H

*Patent pending

FEATURES:

- Four models of TIME ALIGNED™ networks for all 604 duplex speakers.
- Available in two way models for single 604's, or three way models for adding second TIME ALIGNED™ low frequency woofer.
- Separate high frequency, mid range and low frequency controls.
- Aircore optimum form factor inductors.
- Peak current lamp indicators, as well as fuses, provide overload protection.
- Packaged for convenient installation in existing systems.
- UREI custom 800H high frequency horn provides extended and more uniform high frequency response.

The 800 Series crossover TATM networks and 800H high frequency custom horn are a joint R&D effort of UREI and E. M. Long Associates, using real time design methods and proprietary instrumentation developed by Long, which allows driver placements and network parameters to be adjusted simultaneously, achieving near perfect alignment of the frequency components of a complex transient waveform as heard by a listener.

The importance of time (phase) parameters of loudspeaker systems, in addition to smooth frequency response, has been postulated for many years. These group time delay anomalies may be severe in some multi transducer systems although they may exhibit satisfactory or even excellent frequency response.

Within the last decade, many advocates have presented outstanding scientific papers on this subject. Richard C. Heyser, among others, has contributed magnificent research dealing with the importance of time (phase) correlation.

800 SERIES TIME-ALIGNED CROSSOVER NETWORKS



838
CONTROL PANEL

838
NETWORK



UREI 800H HORN

Quoting from Heyser in Audio, June 1976, "We realize that the concept of time response of a speaker is a whole new ballgame to many people and is probably a bit confusing if all you ever considered before was steady state frequency measurements."

Edward M. Long presented a paper before the Audio Engineering Society in May of 1976, entitled "A Time Align Technique for Loudspeaker System Design". UREI is a licensee of E. M. Long Associates, for the instrumentation methods and use of the Trademark TA™.



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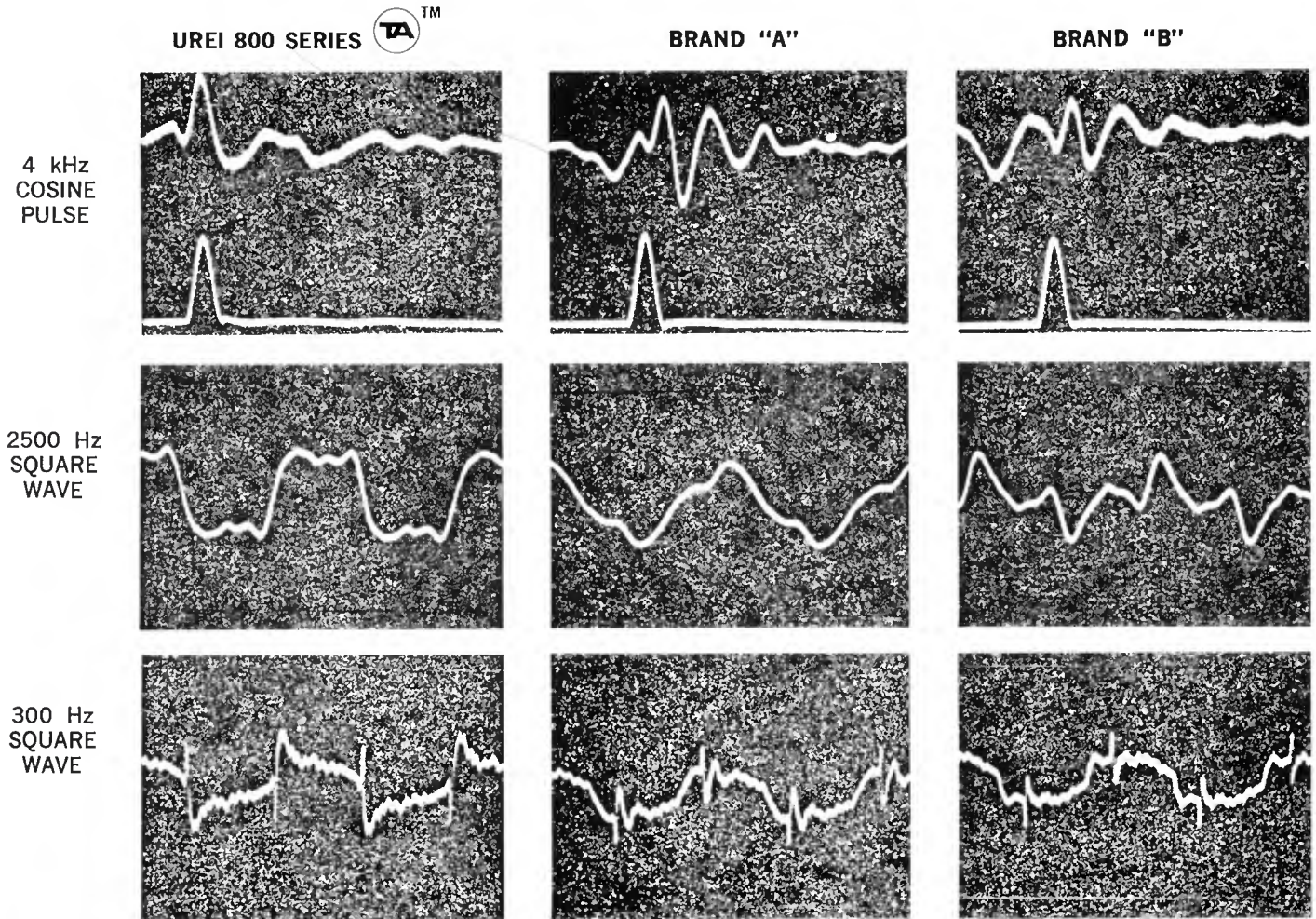
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800
SERIES

The excellent transient behavior of the 800 Series networks compared to two other popular networks and systems designed for the 604 Series duplex speaker is graphically demonstrated below. (Crossover controls adjusted per manufacturers' instructions for best frequency response.)



SPECIFICATIONS:

UREI 800F Custom H.F. Horn

Designed to retrofit 604E and 6048G compression drivers. Mouth opening 6.50" x 3.25", length 5.0" (Approx. 0.9" longer than standard sectorial horn)

UREI TIME ALIGN network and control panels:

- Model 824 for 604E two way network
- Model 834 for 604E three way network*
- Model 828 for 6048G two way network
- Model 838 for 6048G three way network*

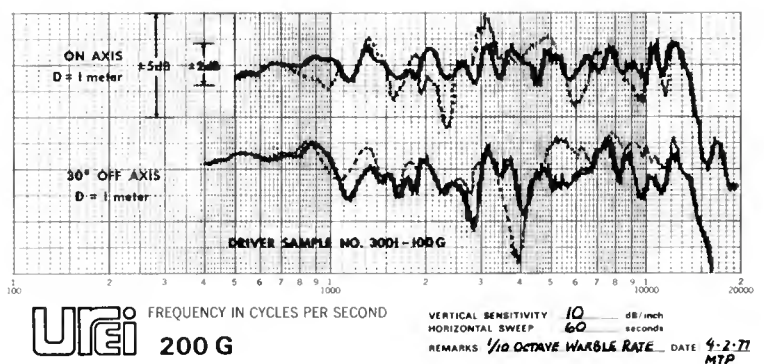
*For use with specified L.F. 15" drivers only.

DIMENSIONS AND WEIGHT:

Dimensions: Panel, 24.1 cm x 21.6 cm (9.5" x 8.5")
 Housing, 21.6 cm x 19 cm x 8.9 cm (8.5" x 7.5" x 3.5")
 Weight: 2.5 kg (5 lb., 10 oz.)

CONTROL PANEL & HOUSING:

Dimensions: Panel, H=19.7 cm x W=12.7 cm (7.75" x 5")
 Housing, H=19cm x W=12cm x 8.9cm (7.5" x 4.75" x 3.5")
 Weight: 1.35kg (3 pounds)



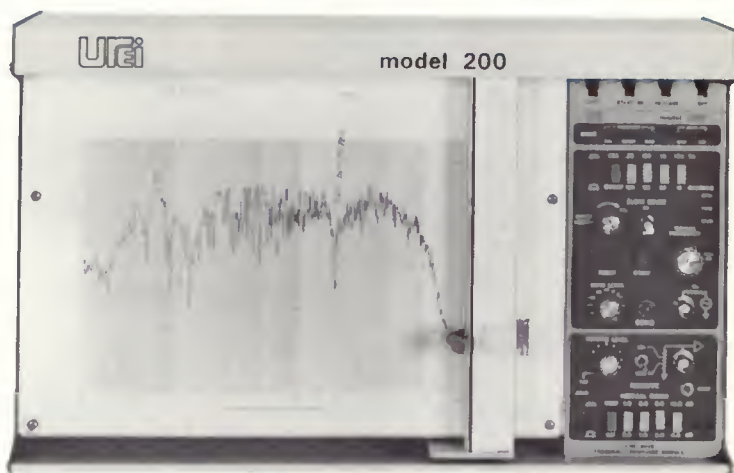
EFFECT OF UREI 800H HORN ON H.F. RESPONSE
 SOLID LINE: 8048G with 800H horn.
 DASHED LINE: 8048G standard model.

AUTOMATIC RESPONSE PLOTTING SYSTEM

**MODEL
200**
(with 2000 plug-in module)

APPLICATIONS:

- Equalizer and Filter Measurements.
- Tape Machine Response.
- Studio Maintenance.
- Sine Wave Loudspeaker & Microphone Response.
- Room Acoustics Analysis.
- Acoustic Transmission Measurements.
- Permanent Storage for EQ Settings.
- Telephone Line Measurements.



200 SYSTEM WITH PLUG-IN



2000 PLUG-IN MODULE

The Model 200 frequency response plotting system is a result of the cooperative effort of UREI and the Hewlett-Packard Co. A basic Hewlett-Packard X-Y plotter is modified by UREI to accept our audio analysis plug-in modules.

The first module in what will become a series is an automatic sweep frequency generator and receiver (Model 2000) using state-of-the-art circuitry to achieve accuracy, resolution and dollar value previously unobtainable. With features and performance not available at twice the cost, the 200 system is well within the reach of any laboratory, audio manufacturer or studio.

An important feature of the Model 2000 plug-in is automatic rate sensing and control, which insures accurate tracing of steep amplitude excursions without the necessity of using very slow sweep rates. This circuitry automatically slows the sweep rate when rapid amplitude changes are encountered, resuming normal sweep rate following such excursions. In this way, unsuspected sharp dips or peaks in response are never missed or minimized.

The 200 system with 2000 plug-in module produces hard copy frequency response plots with 0.05 dB resolution and more than 60 dB dynamic range. Standard 3 cycle semi-log paper, K & E audio paper and DIN standard paper are easily accommodated. Vertical scaling can be changed from centimeters to inches with a front panel selector switch. Light emitting diodes indicate scaling units and system mode. Frequency may be manually adjusted with the plotter engaged to allow quick "dry runs" before committing to paper.



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UREI SNVY TELEX 65-1389

MODEL
200
with 2000

FEATURES:

- Low Cost.
- Plug-in Versatility.
- Hard Copy Readout.
- Simple Operation.
- Internal Calibration Standards.
- Metric and English Scaling.
- Sweeps from 15 Seconds to 20 Minutes.
- Automatic Sweep Speed Control.
- Automatic or Manual Frequency Control.
- Electrostatic Paper Holddown.
- Automatic Pen Drop and Lift.
- Rack Mount or Desk Top.
- Uses Standard Felt Tip Pens.
- 0.05 dB Resolution.
- 64 dB Dynamic Range.
- 20 — 20,000 Hz Sweep Range.

SPECIFICATIONS — 200 MAIN FRAME

GENERAL:

Front Panel Controls	:	Power on/off, servo standby, chart hold, and pen lift switch.
Writing System	:	Disposable pens and a universal pen holder to hold most fiber tip pens.
Platen Size	:	Holds 8½ x 11 in. or DIN A4 size chart paper.
Dimensions	:	10 15/32 in. high, 17 - 1/16 in. wide, 5 - 5/16 in. deep (226 x 437 x 135mm). Provided with rack mounting kit for 19-inch or DIN size rack.
Power	:	Switch selectable for 100, 115, 200, 230, VAC, 47.5-440 Hz. Power consumption 70W maximum.
Weight	:	Net 16 lb. (7.2 kg); shipping, 22 lb. (10 kg).

PERFORMANCE SPECIFICATIONS:

Input Ranges	:	Vertical range 1 V/inch, horizontal range 0.1 V/inch.
Type of Input	:	Connectors to accept UREI plug-in modules.
Accuracy	:	±0.3% of full scale at 25°C (includes linearity and deadband). Temperature coefficient ±0.02%/°C.
Deadband	:	0.2% of full scale.
Overshoot	:	2% full scale maximum.
Slewing Speed	:	20 in./sec. (50 cm/sec) minimum.
Peak Acceleration	:	X-axis, 500 in./sec ² (1270 cm/sec ²) minimum. Y-axis, 1000 in./sec ² (2540 cm/sec ²) minimum.
Zero Conditions	:	Resolution — pen positioned within ±0.005 inch of any point on chart. Zero drift — pen will not move more than 0.1 in/day (2.5 mm/day) independent of temperature.
Environmental Conditions	:	+10°C to +40°C, 0 to 80% relative humidity.

TECHNICAL SPECIFICATIONS

2000 FREQUENCY RESPONSE PLUG-IN

ELECTRICAL

(Send Signal Section):

SIGNAL	:	Sine Wave.
FREQUENCY RANGE:	:	20 Hz to 20 kHz.
SIGNAL LEVEL	:	-50 dBm to +14 dBm.
DISTORTION	:	<0.5% THD at + 10 dBm, 1 kHz.
OUTPUT IMPEDANCE	:	10 ohms resistive.
OUTPUT FLATNESS	:	20 Hz to 20 kHz, ± 0.05 dB.
CALIBRATED DISCRETE FREQUENCIES	:	20 Hz, 100 Hz, 1 kHz, 10 kHz; $\pm 1\%$.
CALIBRATION STABILITY	:	$\pm 0.25\%$ /24 hours (after warm-up).
FREQUENCY CONTROL	:	Automatic Sweep or manually selected.
SWEEP TIME	:	15 sec, 30 sec, 1 min, 2 min; 20 Hz to 20 kHz.
SWEEP VERNIER	:	Continuously variable up to 10 times the selected sweep time.
START-RESET	:	Pushbutton controls.
SLOPE SENSE	:	Automatically adjusts sweep speed depending on vertical slope of response curve.

(Receive Section):

SENSITIVITY	:	50 mV for 0 dB reference at center of Y-axis.
INPUT IMPEDANCE	:	50 kohm or 600 ohm switch selectable.
INPUT ATTENUATOR RANGE	:	>60 dB, continuously variable.
DYNAMIC RANGE	:	64 dB (displayed).
VERTICAL RANGE	:	1 dB, 2 dB, 5 dB, 10 dB/INCH metric 0.5 dB, 1 dB, 2 dB, 4 dB/cm.
VERTICAL RANGE CHECK	:	Δ 10 dB, calibrated to ± 0.1 dB.
PEN LIFT	:	Automatic at frequencies < 20 Hz and > 20 kHz, automatic retrace blanking.

TECHNICAL SPECIFICATIONS

2000 FREQUENCY RESPONSE PLUG-IN

(Continued)

CONTROLS

SEND-RECEIVE SIGNAL	:	BNC-connectors.
PEN SWITCH	:	A two-position slide switch controls the lowering and raising of the pen.
SERVO SWITCH	:	A two position slide switch controls the servo actuation for both axes.
CHART SWITCH	:	A two position slide switch, RELEASE and HOLD, controls the chart holding function of the Autogrip table (electrostatic).
LINE SWITCH	:	A two-position slide switch applies the line voltage to the recorder.
CAL-SWEEP	:	Push-push button selecting either SWEEP function or CALIBRATION mode.
4 PUSHBUTTONS	:	Interlocked to select calibrated frequencies or calibrated sweep times.
SWEEP VERNIER	:	Continuous control extends the selected sweep time up to 10 times.
MANUAL FREQUENCY	:	When pulled this control selects any frequency from 20 Hz to 20 kHz.
SLOPE SENSE	:	Toggle switch that controls the automatic sweep speed circuit.
RESET	:	Momentary push-button returns the servo mechanism to left starting position and resets oscillator to < 20 Hz.
START	:	Momentary push-button starts frequency sweep.
SEND LEVEL	:	Adjusts level of send signal.
RECEIVE LEVEL	:	Adjusts input sensitivity.
50k/600 ohm	:	Toggle switch to select input load impedance.
Δ 10 dB	:	Momentary push-button to change the input sensitivity 10 dB to check receive range calibration.
inch/cm	:	Push-button to select inch or metric vertical scaling.
VERTICAL RANGE	:	4 interlocked pushbuttons to select calibrated vertical ranges.

LEVEL & FREQUENCY DETECTOR FOR MODEL 200 AUTOMATIC PLOTTING SYSTEM

MODEL
2010
PLUG-IN MODULE

The 2010 Level and Frequency Detector is one of a series of plug-in modules for UREI'S Model 200 X-Y plotter. The 2010 detects the frequency and relative level of pre-recorded or remote signal sources, such as test recordings, test tapes or any audio signal generator. It then provides DC analog voltages, proportional to the frequency and level values of the input signal, to drive the Model 200 X-Y plotter. Thus are produced hard copy amplitude vs. frequency plots on standard K & E or DIN graph paper of any coherent audio signal from 20 Hz to 20 kHz with previously unobtainable accuracy.

A unique feature of the Model 2010 plug-in is a "smart" frequency detection circuit, which is able to distinguish between coherent test signals and random (stochastic) signals such as voice announcements on records or tapes. During signal interruptions, the last measured frequency is stored in a memory which holds the Model 200 carriage arm at that position until the system is updated with a new frequency and level reading. Also, during interruptions or random signals (such as announcements) the pen is automatically lifted from the paper to prevent invalid markings on the response plot.

The frequency detection circuit may be synchronized from either the input signal or a different external source. This enables the user to plot channel separation, crosstalk between tape head sections, and similar parameters. The Model 2010/200 system surpasses any comparable production or laboratory equipment in its accuracy, stability and repeatability of measurements, and yet is simple to operate under widely varying environmental conditions.

The 200 system with Model 2010 Level & Frequency Detector plug-in is ideal for all phases of audio frequency equipment research and development, manufacturing, quality control, and maintenance.



2010 PLUG-IN MODULE

APPLICATIONS:

Audio response measurements of:

- Tape recorders/reproducers
- Phono cartridges
- Tone arm resonances
- Stylus wear
- Transmission lines
- Delay Lines
- Optical/magnetic sound heads
- Complete audio systems

FEATURES:

- Plug-in versatility
- Simple operation
- Built-in calibration standards
- Calibrated pilot tones
- Automatic rejection of spurious signals
- 64 dB dynamic range
- 0.05 dB resolution, 20 Hz to 20 kHz
- Metric and English scaling
- Automatic pen lift and drop



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MODEL
2010

TECHNICAL SPECIFICATIONS

ELECTRICAL

Receive Section

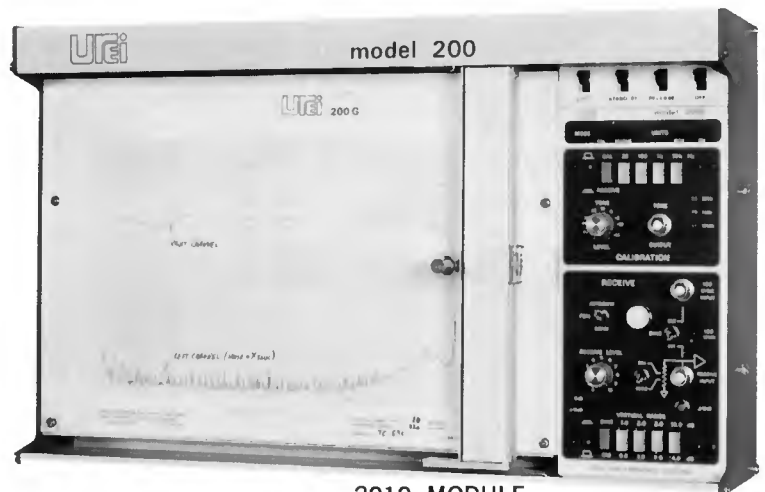
Sensitivity	: 50 mV RMS for 0 dB reference at center of Y axis.
Input Impedance	: 50 kohm or 600 ohm switch selectable
Input Attenuator Range	: >60 dB, continuously variable
Dynamic Range	: 64 dB (displayed)
Vertical Range	: 1 dB, 2 dB, 5 dB, 10 dB/inch, 0.5 dB, 1 dB, 2 dB, 4 dB/cm
Vertical Range Check	: Δ 10 dB, calibrated to \pm 0.1 dB
Display Accuracy	: \pm 0.1 dB, 20Hz to 20 kHz \pm 0.5 dB, L.F. Filter ON
Calibration Stability	: \pm 1% /24 hours (after warmup)
Signal Detection	: Any coherent signal with S/N ratio of: 30 dB.
Frequency Range	: 20 Hz to 20 kHz
Sweep Synchronization	: Internally from received signal, or externally from SYNC input
Sync Signal Input	: 20 mV to 1V RMS
Sync Input Impedance	: 10 kohm
LED	: Indicates that the signal level of the selected frequency reference is too low for reliable tracking.
L.F. Filter	: 12 dB/octave tracking filter to remove low frequency components from the signal

Calibration Section

Tone output	: Sine wave
Tone Level	: -50 dBm to +14 dBm, continuously variable
Output Impedance	: \leq 3 kohm
Calibrated Discrete Freq.	: 20 Hz, 100 Hz, 1 kHz, 10 kHz, \pm 1%
Amplitude Uniformity	: \pm 0.5 dB, 20 Hz to 10 kHz

CONTROLS

CAL-RECEIVE	: Push-push button to select either CAL or RECEIVE mode
4 PUSHBUTTONS	: Interlocked, to select precision internal oscillator frequencies for calibration of X-Y recorder
TONE LEVEL	: Adjusts level of calibration tone output
INPUTS, OUTPUT	: BNC connectors
RECEIVE LEVEL	: Adjusts input sensitivity
50 k/600 ohm	: Toggle switch to select input termination
Δ 10 dB	: Momentary pushbutton which changes the input sensitivity 10 dB to check vertical range calibration
INCH/CM	: Push-push button to select inch or metric vertical scaling
VERTICAL RANGE	: 4 interlocked pushbuttons to select calibrated vertical ranges
SYNC Switch	: Toggle switch selects either the received signal or the external SYNC Input as a frequency reference
L.F. Filter Switch	: Toggle switch. In the ON position the receive signal is filtered to remove unwanted low frequency components.
PEN Switch	: Toggle switch. In AUTOMATIC position the pen will lift in the absence of a valid coherent signal. In DOWN position, this function is disabled and the pen will remain in writing position.



2010 MODULE
IN MODEL 200 MAIN FRAME

WARBLE GENERATOR FOR MODEL 200 AUTOMATIC PLOTTING SYSTEM

MODEL
20

APPLICATIONS: (When used with Model 200/2000 Response Plotting System)

- Frequency response measurement of sound playback systems, loudspeakers, and sound reinforcement installations.
- Equalization of auditoriums, theatres and studios.
- Optimizing the location of microphones, monitors, and listening positions.
- Measurement of pressure response, and other acoustic qualities of rooms.
- Research and development, as well as manufacturing quality control of loudspeakers, microphones, and other electroacoustical devices.
- As T_{60} sound source when used with a suitable T_{60} display device.



The Model 20 is a 5 Hz sine wave generator. It is an accessory for the UREI Automatic Response Plotting System; specifically to be used with the Model 2000 plug-in to generate a warbled sweep for acoustic measurements.

The output signal of the Warble Generator is variable in amplitude from 0 to 5 V RMS. When connected to the sweep generator of the plotting system it frequency modulates the sweep signal producing what is generally known as "Warble Tone". The amount of warble, or the bandwidth, is adjustable from 0 to 0.5 octaves of the center frequency. An important feature of the system is that this bandwidth remains at a constant percentage of the send signal center frequency during the entire sweep.

Figure 1 shows two typical frequency response plots measured in the same room, maintaining fixed speaker and microphone positions. The upper trace is the response from a pure sine wave, while the lower trace is the same response with the sine wave warbled (frequency modulated) at 1/3 octave bandwidth. As can be seen, the second measurement shows reduction of the cluttering standing wave pattern, especially as the wave lengths become shorter. Averaged out are the very short and abrupt variations and anomalies, much as would be the case with a pink noise source, but with excellent repeatability.

FEATURES:

- Simple operation.
- Stable warble rate and amplitude.
- Warble bandwidth adjustable on calibrated dial.
- Self contained, battery operated.
- Built-in LED battery test.
- Interconnection with Model 200/2000 Response Plotting System through single RCA-type cable.
- Low cost.

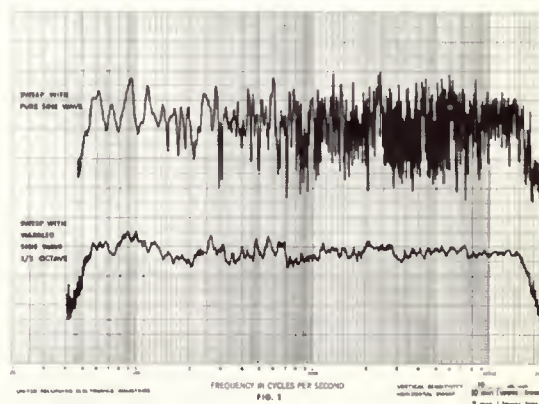


FIGURE 1



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MODEL
20

The reflections from the boundary surfaces cause unwanted variations in amplitude of two kinds: space interference, in which an interference pattern builds up during a continuous, steady-state tone, and time interference, which occurs when a tone begins or decays. Ideal measuring environment for transducers themselves is obviously in free space or an anechoic room.

In the typical room environment the warble tone introduces changing phase relationships of the direct versus the reflected sound waves. It is necessary however, that the frequency variations be at least large enough to cause a 180° phase shift at the microphone position for all possible reflections. This is achieved if the difference in distance traveled by the direct and reflected sound waves between the source and the measuring microphone, is sufficiently large.

The other parameter of importance is the bandwidth of the warble tone, or the ratio f/f_0 . An analogy for the effects of the warble would be a "low pass space filter" where the cut-off frequency is determined by the bandwidth. The larger the bandwidth, the lower the cut-off frequency and vice versa. It is convenient to express the amount of warble in fractions of octaves:

$$\Delta \text{ octaves} = \frac{\log \frac{f_1}{f_2}}{\log 2}$$

Experimentation for a particular measurement is necessary. However, the practical useful range has been determined to be from 0.1 to 0.5 octaves. Depending on how much detail is desired in the frequency plot, one simply adjusts the Model 20 Warble Generator for the proper bandwidth. For example:

If a sound reinforcement system is to be corrected with a 1/3 octave filter set, the frequency response plot of the system should be measured with the warble adjusted to 1/3 octave bandwidth. This method achieves results with repeatable accuracy, and the correlation with an acoustic analysis using pink noise or Sonipulse™ is excellent. An additional advantage of the warble tone is that it significantly reduces the time required for a hard-copy plot. While a sweep with a pure tone may need from 10 to 20 minutes, the warbled sweep accurately measures the response in much less time, depending on the ratio of direct to indirect sound and the room constant. (The same principles apply in taking data by other methods.)

Basic research with warble tones was conducted as early as 1930. Since then experiments and investigation have continued, and the results are firmly substantiated by mathematical analysis. Numerous papers have been published which describe the technique and the results of the method applied to different acoustical measurements. Heretofore, however, the technique was not widely used because of the high cost and complexity of instruments which could achieve a constant percentage frequency modulation during the entire 20 Hz to 20 kHz sweep. Now, UREI has eliminated this constraint with the introduction of this inexpensive, precision accessory to its Model 200/2000 Automatic Response Plotting System — the Model 20 Warble Generator.

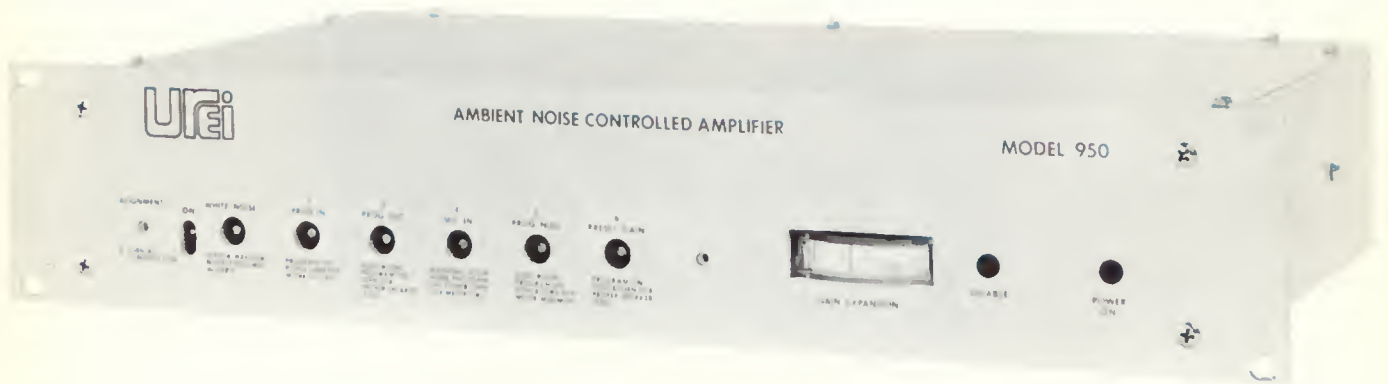
TECHNICAL SPECIFICATIONS:

- **Output Signal** : Sine Wave.
- **Output Level** : 0 to 5 V RMS: into ≥ 10 kohm load.
(1 V RMS = 0.1 octave Warble of Model 2000 Sweep Generator.)
- **Frequency** : 5 Hz, $\pm 10\%$ f_0 .
- **Output Connector** : RCA-type phono jack.
- **Battery** : 9 V "Transistor Radio" No. 216 or equiv.
2 batteries are needed, (current 1 ma).
- **Battery Test** : Push-button with LED indication.
- **Dimensions** : 4" wide x 2.1" deep x 2.4" high,
(102 x 53 x 61 mm), with control knob pulled to ON position.
- **Weight** : net 0.5 lb (0.23 kg), batteries included,
shipping 1.5 lb (0.68 kg).

ANCA

AMBIENT NOISE CONTROLLED AMPLIFIER

MODEL
950



The UREI Model 950 "ANCA" is the first device to bring true precision to automatic P.A. level control. It compensates precisely for changes in background noise even while an announcement is in progress. The ANCA is inserted into the system immediately ahead of the power amplifier and takes full control of the announcement level.

You need only provide 3½ inches of rack space and a room-noise sensing microphone. The ANCA continuously monitors the ambient noise, eliminating that portion related to the P.A. signal. As the noise exceeds a certain preset level, ANCA begins to raise the announcement level, dB for dB. Your announcements are consistently intelligible, yet never uncomfortably loud.

The ANCA is completely self-contained (operates from 110-120V AC or 220-240V AC, 50/60 Hz) and is designed for unity gain operation before expansion. Input and output level controls allow matching to virtually any P.A. equipment.

In RAILWAY STATIONS, AIRPORTS, and BUS DEPOTS, the ANCA controller is essential. Without automatic level control, announcements are either smothered in jet-blast, or drowned in their own echoes. ANCA permits every word to be heard at a comfortable, intelligible level.

For BACKGROUND MUSIC that must be soothingly present, yet always unobtrusive, ANCA provides the perfect 'gain-riding' control.

In SPORTS ARENA P.A. SYSTEMS, ANCA lets the fans get as excited as they want, but still keeps them informed.

FEATURES:

- Expander precisely tracks increases in room noise up to 20 dB past a preset minimum.
- Expander is continuously active. Even if a jet flies past in the middle of your announcement, the ANCA will make sure you are heard.
- Controlled response time catches major noise changes, yet avoids annoying "pumping" or "breathing."
- Front panel screwdriver adjustments make alignment easy. A security cover hides them from prying hands.
- An internal noise generator may be used for alignment.
- Gain expansion is displayed on the front panel meter, in dB (0-20).
- An external contact closure can disable the expander and substitute a front-panel control (preset). This defeats any regenerative feed-back which may occur in certain situations where a particular microphone is in the direct field of a speaker.
- Input and Output are transformer-isolated.
- Output driver will provide +30 dBm (1 watt) into 600 ohms, allowing even the most insensitive power amp to be driven to full expansion.

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MODEL
950

TECHNICAL SPECIFICATIONS

ELECTRICAL:

Input Impedance	: Greater than 40K ohms, balanced.
Load Impedance	: May be operated into any load 500 ohms or greater (balanced output).
Input Level	: 0 dBm for full output, adjustable, ± 20 dB from front panel.
Expansion	: Varies directly with ambient noise level greater than some preset minimum (front panel control). Maximum 20 dB.
Output Level (maximum)	: +30 dBm (600 ohm load).
Hum and Noise	: Better than -60 dBm at output, gain set for 0 dBm output, terminated, no expansion.
Frequency Response	: ± 1 dB, 50 Hz $-$ 20,000 Hz.
Distortion	: Less than 1%, 35 Hz to 20 kHz for any output 0 to +30 dBm.
Power Source	: 110 - 120V AC or 220 - 240V AC 50/60 Hz.

PHYSICAL:

Connectors	: Input/output, rear panel barrier strip; sensing microphone, XLR.
Finish	: Clear anodized aluminum panel, horizontally brushed.
Dimensions	: 483 mm standard rack x 89 mm high x 241 mm deep. (19" x 3 $\frac{1}{2}$ " x 9 $\frac{1}{2}$ ").
Weight	: 5.5 kg (12 lbs.) net.

Universal Audio DIGITAL METRONOME

"Quartz Controlled Model"

MODEL
964



The Universal Audio 964 Digital Metronome is a precision instrument which provides accurate tempo beats for use in producing live music scores for motion pictures. A fourth generation evolution from Universal Audio's original Model 960 developed in 1963, Model 964 combines newest integrated circuitry with Quartz Crystal clock precision. Model 964 produces accurate tempos independent of variations in power line frequency, and its cost is modest compared with its predecessor Model 963.

The tempo beats correspond to multiples of motion picture film frames, based on the standard sound speed of 24 frames per second. The Model 964 eliminates disadvantages associated with the various "click track" schemes of producing tempo beats. The beats may be synchronized with other equipment by using an externally generated start pulse or contact closure. Integrated circuits and a precision Quartz Crystal timing source assure accuracy, reliability and long equipment life. Because no motors, relays or other noise-producing moving parts are used, the Digital Metronome can be operated on the scoring stage or in the studio.

Three thumbwheel switches are used to select the tempo which may be set from 1 frame per beat to 40 frames per beat, in $\frac{1}{8}$ -frame steps ($\frac{1}{2}$ sprocket hole on 35mm film).

A volume control is provided to adjust output level. Ear-phones may be driven directly, or through an external amplifier. The 964 produces sharp, uniform audio "clicks" without distracting background noise.

Tempo beats are derived from a 786.432 kHz crystal oscillator, and remain stable over a wide range of power supply and environmental changes. Maximum tempo tolerance is $\pm 0.01\%$. Tempo beats are started by either depressing the front panel START button or by externally generating a start signal (e.g., a "bloop" on the film track). The latter can take the form of a momentary or continuous contact closure between the unit's SYNC and GND terminals, or by a positive pulse or DC-level change with a minimum rise time of 0.1 volts per millisecond. The minimum amplitude of this pulse or DC level should be +0.25 volts and the maximum +20 volts.

The Universal Audio 964 may be rack mounted using an SR-3A rack mounting accessory. Two 964's may be mounted side by side in a 19" rack using a DR-3A accessory, and occupy only $3\frac{1}{2}$ " of vertical rack space. Depth behind front panel is 8". Output can be taken from the tip/ring/sleeve phone jack on the front panel, or from a terminal strip on the rear of the chassis. The rear terminals are disconnected when a plug is inserted into the front panel jack.



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MODEL
964

TECHNICAL SPECIFICATIONS

- OUTPUT SIGNAL** : Pulse amplitude: 0-25 volts peak
(600 ohm load).
0-10 volts peak: (10 ohm load).

Pulse duration: 651 micro-seconds.

Output power: 15 W max. peak.
- NOISE** : At least 70 dB below pulse peaks.
- ACCURACY** : Crystal controlled $\pm 0.01\%$.
- TEMPO RANGE** : $\frac{1}{8}$ frame to $39\frac{1}{8}$ frames-per-beat,
in $\frac{1}{8}$ -frame steps. (Based on 24 frames-per-second).
- TRIGGER INPUT** : Momentary or continuous contact closure to ground,
or a +0.25 to +20 volt pulse into input impedance of 600 ohms.
(Rise time ≤ 0.1 volts per millisecond).
- CONTROLS** : 3-Section thumbwheel tempo switch.
START and STOP buttons.
VOLUME CONTROL
POWER SWITCH
- CONNECTORS** : TRS signal output front panel jack.
Terminal strip at rear of chassis for
signal output and trigger signal input.
- ENVIRONMENT** : Operating temperatures from 0°C to +55°C.
Storage temperature from -20°C to +60°C.
- POWER REQUIREMENTS** : 115/230 VAC, $\pm 15\%$, 50/60 Hz,
less than 10 W.
- DIMENSIONS** : $8\frac{1}{2}$ " x $3\frac{1}{2}$ " rack panel.
Depth behind panel 8".
(216 x 89 x 203 mm)
Weight: 6 lbs. (2.7 kg)
9 lbs (4.1 kg) shipping weight.
- OPTIONAL ACCESSORIES** : SR-3A Rack Mounting Kit for single
mounting in 19" rack.

DR-3A For side-by-side mounting of two
964's in 19" rack.

DIGITAL DELAY LINE

FOR SOUND SYSTEMS APPLICATIONS

MODEL
927



Model 927 Digital Delay Line is designed for use in sophisticated sound reinforcement systems where one or more delayed outputs are necessary. This device has one input and four outputs which are independently delay adjustable. Each output can be adjusted in 1 millisecond increments from 0 to 127 milliseconds with convenient binary weighted DIP switches.

The Delay Line permits proper acoustic synchronization of the direct sound and the sound from multiple loudspeakers in larger rooms by eliminating or minimizing differences in arrival time. This increases intelligibility and naturalness of the system, and avoids the shift of apparent sound localization away from the original sound source.

Although the model 927 is primarily intended for application in sound reinforcement systems, in auditoriums, theaters, churches, arenas, outdoor concerts, etc., it may be used to great advantage in the recording studio. In combination with a reverberation chamber (or other reverb device) early field effects are possible, simulating large reverberant spaces. Additional applications include special effects and research in the field of psychoacoustics.

Delay is achieved through the use of static random access memory, combined with a dedicated audio processor. A sophisticated real time floating point A to D and D to A conversion technique eliminates the need for troublesome analog signal processing used in some competitive products. Without audio compression and/or pre-emphasis and de-emphasis the 927 achieves a useful dynamic range of greater than 90 dB. As a result, a clean 93 dB signal to noise ratio is realized without objectionable gain pumping and transient clipping or degradation of full power bandwidth.

The addition of very sharp cut-off filters at the outputs eliminates any audible frequency beating which usually accompanies waveform sampling processes at program frequencies near the band limit. The controls for the four outputs are binary weighted in 8 sections, easily accessible behind the front security cover. To warn of any overload

conditions during setup or operation an array of 4 LED indicators monitors the program level in 8 dB increments, allowing establishment of optimum operating levels without accessory instruments.

FEATURES:

- 12 kHz bandwidth.
- 4 outputs with individually selectable delays.
- Simple front panel switching and set-up.
- Each output is independently adjustable in one millisecond increments over the entire range of the unit.
- High density IC (circuit) cards minimize size and weight.
- Instantaneous floating point A/D, D/A.
- LED array level indicators.
- 4k x 14 bit static memory.
- Reliable, trouble free interface through bridging input, and transformer isolated outputs.
- No pre-emphasis, de-emphasis necessary.
- No frequency response change at different delay settings.
- Large dynamic range of more than 90 dB.



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MODEL
927

TECHNICAL SPECIFICATIONS

ELECTRICAL:

Input	: Balanced bridging differential amplifier.
Input Impedance	: 40 kohms, used as balanced input. 20 kohms, used as unbalanced (single ended) input.
Maximum Input Level	: +20 dBm (7.75 V RMS).
Dynamic Range	: Greater than 90 dB.
Signal to Noise	: Better than 93 dB at full output, (15.7 kHz Bandwidth).
Gain	: Unity, ± 1 dB.
Frequency Response	: ± 0.5 dB, 20 Hz to 12 kHz.
Outputs	: Floating, transformer isolated.
Output Load	: 150 ohms or greater.
Power Output	: +20 dBm into 600 ohm load.
Distortion	: Less than 0.5% THD, 20 Hz to 12 kHz at maximum rated output.
Number of Inputs	: One
Number of Outputs	: Four
Time Delay	: 0 to 127 milliseconds in one millisecond steps.
Delay Accuracy	: ± 0.03 millisecond
Pre-emphasis/De-emphasis	: None
Filters	: 8 pole, 6 zero Cauer at input and each output.
Headroom Indicators	: 4 LED indicators showing 0, -8, -16, -24 dB relative to overload condition.
Controls	: Four groups of binary switches for independent delay selection. Input level control.
Power Requirements	: 100 - 125 VAC, or 200 - 250 VAC, 50/60 Hz switch selectable, less than 50W.
Environment	: Operating 0°C to +50°C; storage -20°C to +60°C

PHYSICAL:

Dimensions	: 483 x 89 mm rack panel, depth behind panel 305 mm. (19" x 3½" x 12")
Finish	: Panel is 3.18 mm (1/8") brushed clear anodized aluminum. Chassis is cadmium plated steel.
Weight	: 6.80 kg (15 pounds).
Shipping Weight	: 9.07 kg (20 pounds).

VIDIGRAF

BAR GRAPH DISPLAY GENERATOR

MODEL
970

FEATURES:

- 16 or 32 bar graphs replace the same number of VU meters in a single display.
- Standard VU ballistics, 0 dB reference adjustable.
- Dynamic display range of 30 dB.
- Monitors audio signals and/or automation control voltages.
- Real time frequency analysis of audio signal.
- Single module, or "split screen" dual module display.
- Modular design for maximum flexibility and later expansion.
- Versatile interface with consoles, automation, and tape machines.
- Built-in programmable alpha-numeric display labeling.

VIDIGRAF is a bar graph display generator which operates into any N.T.S.C. standard video monitor or (with an inexpensive accessory) black & white TV receiver. The system provides both VU level display and frequency spectrum level information. It is designed primarily for multi-track recording studio applications. However, its DC to 20 kHz input capability suggests its use for a wide range of DC or AC analog voltage measurements.

The 970 VIDIGRAF's modular construction provides the user complete flexibility to adapt the system to his specific needs. A maximum of four 16 channel input display modules may be installed for VU level, automation control voltages, or frequency spectrum viewing. Each module may be individually switched to the video generator in the single mode. In the dual display mode, the screen is split vertically to accommodate the information from any two input modules simultaneously. Instantaneous identification of the input channel sources and/or frequencies, as well as vertical scaling indices are automatically provided by the built-in programmable character generators. This eliminates any need for screen overlays or masks, and assures accurate positioning of the alpha-numeric information regardless of screen size or width and height adjustments.

Some typical displays are:

- 16 or 32 simultaneous VU channels.
- 16 or 2 x 16 bands of frequency spectrum (1 or 2 channels).
- 16 VU channels, plus 16 channels of automation control voltages.
- 16 VU channels, plus 15 bands of frequency spectrum and 1 composite level.



A single VU MODULE provides 16 bar graphs with standard VU ballistics over a display range of 30 dB. Each bar has two shades of gray, with the lighter shade above 0 dB reference. When a signal is applied to any of the 16 inputs, a bright bar moves up and down with the signal level, clearly visible against the background. The 0 dB reference point is continuously adjustable to any standard from 0 dB to +8 dB. The signal inputs accept 16 balanced or unbalanced sources, through the module's edge connector. The VU MODULE is user programmable to display a logarithmic scale from -20 to +3 dB when measuring audio signals, or to read linearly from 0 to 10 for display of AC or automation DC control voltages. Also user programmable is the nomenclature to be displayed beneath the bars, either 1 thru 16 or 17 thru 32.

The SPECTRUM module provides visual real-time display of VU level vs. frequency of an audio signal, as an aid to setting equalization and adjusting frequency balance. This module provides 16 bar graphs with visual characteristics similar to those of the VU MODULE. One bar is assigned to the full spectrum of the audio signal, while the other 15 channels display increments of the frequency spectrum, centered on standard ISO $\frac{2}{3}$ octave filter frequencies. Nomenclature and scales are user programmable. Additionally the display may be visually identified as "Channel A" or "Channel B". Two independent controls adjust the level of the full spectrum bar relative to the spectrum analysis bars.

A "REMOTE CONTROL CENTER" is available as an accessory. It duplicates all front panel operating controls of the VIDIGRAF for convenient operation at a recording console or other remote location.



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MODEL
970

TECHNICAL SPECIFICATIONS

ELECTRICAL:

Input	: Balanced bridging differential amplifier.
Input Impedance	: 40 kohms, used as balanced input. 20 kohms, used as unbalanced (single-ended) input.
Maximum Input Level	: +20 dBm (7.75 V RMS).
Frequency Response	: ± 0.5 dB, DC – 20 kHz.
Output	: Composite NTSC video.
Output Impedance	: 75 ohms.
Output Level	: 1.0 volt.
Power Requirements	: 100-125 VAC, or 200 -250 VAC, 50/60 Hz, switch selectable; less than 25W.
Environment	: Operating, 0°C to +50°C; storage, –20°C to 60°C.

VU MODULE

Display Range	: 30 dB.
Resolution	: 0.1 dB, about 0 dB reference point.
0 dB Reference	: 0 dB to +8 dB, continuously adjustable.
Ballistics	: Standard VU.
Number of Channels	: 16
Nomenclature	: User programmable, numbers 1 - 16 or 17 - 32.
Scale	: User programmable, –20 to +3 dB (Logarithmic), or numbers 0 to 10 (Linear).

SPECTRUM MODULE

Display Range	: 30 dB.
Resolution	: 0.1 dB, about 0 dB reference point.
Reference Level	: Independently adjustable for full spectrum and analyzer bands.
Ballistics	: Standard VU.
Number of Channels	: 16 (1 channel - full spectrum, 15 channels - analyzer bands).
Frequencies	: Standard ISO, $\frac{2}{3}$ octave intervals: 25, 40, 63, 100, 160, 250, 400, 630 Hz, 1k, 1.6k, 2.5k, 4k, 6.3k, 10k, 16 kHz.
Nomenclature	: User programmable, Channel A or Channel B.
Scale	: User Programmable, –20 to +3 dB (Logarithmic) or numbers 0 to 10 (Linear).

PHYSICAL

Dimensions	: 483 x 133 mm rack panel; depth behind panel 356 mm (19" x 5 $\frac{1}{4}$ " x 14").
Finish	: Panel is 3.18 mm ($\frac{1}{8}$ ") brushed black anodized aluminum. Chassis is cadmium plated steel.
Weight	: 11.34 kg (25 pounds).
Shipping Weight	: 13.61 kg (30 pounds).

MOD ONE

MODULAR BROADCAST AUDIO CONSOLES SUGGESTED LIST PRICES

SCHEDULE A

Effective, June 15, 1977

BASIC HOUSINGS: (Include meter panel, headphone panel & power supply)

MOH-110 mono	\$1462.00
MOH-210 stereo	1508.00
MOH-410 quad	1636.00

PLUG-IN AMPLIFIERS:

MOA-250 stereo line amplifier	136.00
MOA-150 mono line amplifier	82.00
MOA-260 stereo monitor booster	96.00
MOA-160 mono monitor booster	58.00
MOA-170 cue booster	76.00
MOA-280 stereo headset amplifier	66.00
MOA-180 mono headset amplifier	42.00

INPUT MODULES:

MOD-23220 dual input stereo microphone	298.00
MOD-13210 dual input mono microphone	232.00
MOD-13220 dual input mono microphone with stereo panpot	266.00
MOD-25320 triple-input stereo line	298.00
MOD-15310 triple-input mono line	248.00
MOD-24120 single-input stereo cartridge	288.00
MOD-14110 single-input mono cartridge	232.00

ACCESSORIES & SPARES:

MOD-00000 blank panel	18.00
PS24-2 Power supply (included in basic housing)	176.00



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U.R.E.I.

*Professional
user net prices*

FACTORY WARRANTY

ALL U.R.E.I. PRODUCTS ARE WARRANTED TO BE FREE FROM DEFECTS OF MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF DELIVERY TO THE ORIGINAL USER. WITHIN THAT PERIOD, REPAIR OR REPLACEMENT WILL BE MADE AT NO COST FOR MATERIAL OR LABOR TO THE POSSESSOR. THIS WARRANTY IS VOID IF THE PRODUCT HAS BEEN SUBJECTED TO ABUSE, UNAUTHORIZED MODIFICATION AND/OR REPAIR, OR IF IT HAS NOT BEEN OPERATED IN ACCORDANCE WITH INSTRUCTIONS.

IN-WARRANTY UNITS SHOULD BE RETURNED PREPAID TO U.R.E.I. AND U.R.E.I. WILL RETURN PREPAID TO CUSTOMER.

OUT-OF-WARRANTY REPAIRS – MINIMUM CHARGE \$15.00

PRICES SUBJECT TO CHANGE WITHOUT PRIOR NOTICE

MOD ONE

AM & FM BROADCAST CONSOLES

MODELS
110 MONO,
210 STEREO



Mod One is all that the name implies: The **one** MODERN, MODULAR broadcast audio console system. While utilizing design concepts developed for contemporary recording studio consoles, Mod One is specifically radio oriented — physically, electronically and humanly engineered for AM and FM broadcasting.

Modular, printed circuit board construction provides extreme flexibility at lowest cost. All solid-state-of-the-art, Mod One exceeds all FCC proof-of-performance requirements. Plug-in modules and

amplifiers make format changes simple — start with only the modules you need, and expand or change to meet new requirements.

Basic console housing and printed-circuit mother-board is identical for all configurations. A wide selection of input modules and plug-in amplifier cards permits customizing your Mod One to exactly suit your present or future requirements — AM or FM, monaural, stereo or quadrasonic.

Compare features — compare specifications — compare prices. Look into the future with Mod One!

Urei

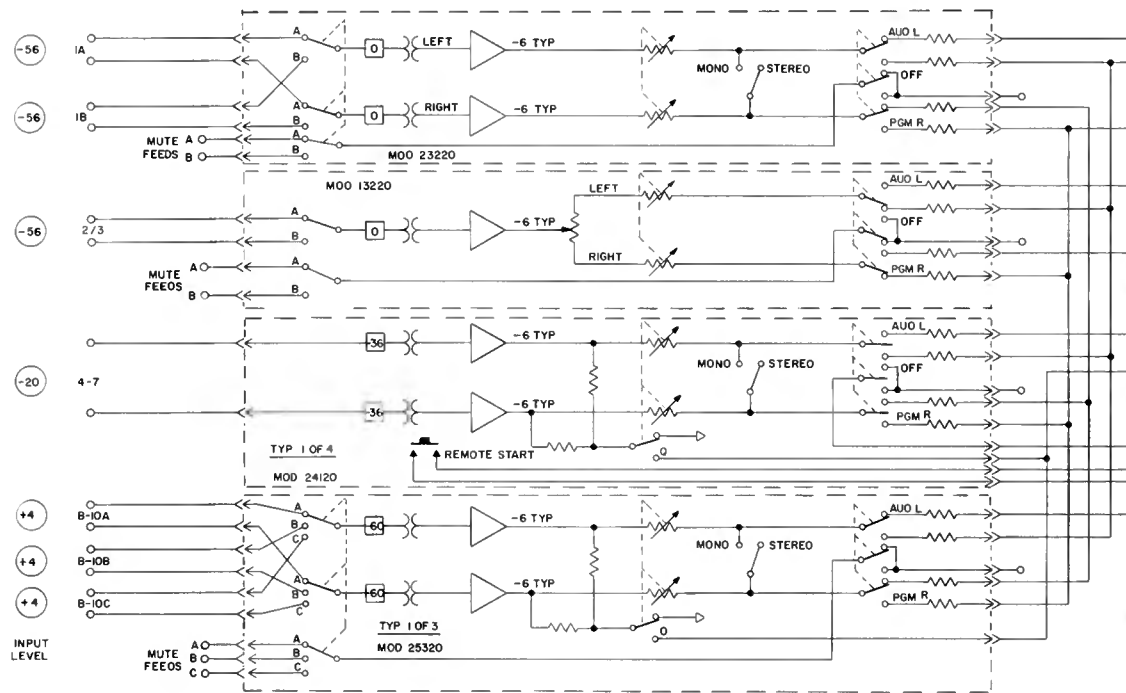
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MODELS
110 MONO,
210 STEREO



Above is a functional block diagram of a stereo configuration of the Mod One console, as pictured on the front of this brochure. Four different types of input modules are illustrated, and these are available in either monaural or stereo configuration. Any input module may be plugged into the housing in any of 10 positions — all interfacing between the module and the console housing is via a single printed circuit edge connector on the module which mates with any of 10 identical sockets on the console mother board. Program, audition, monitor booster, cue booster and headphone amplifiers are plug-in cards located under the hinged top of the meter panel.

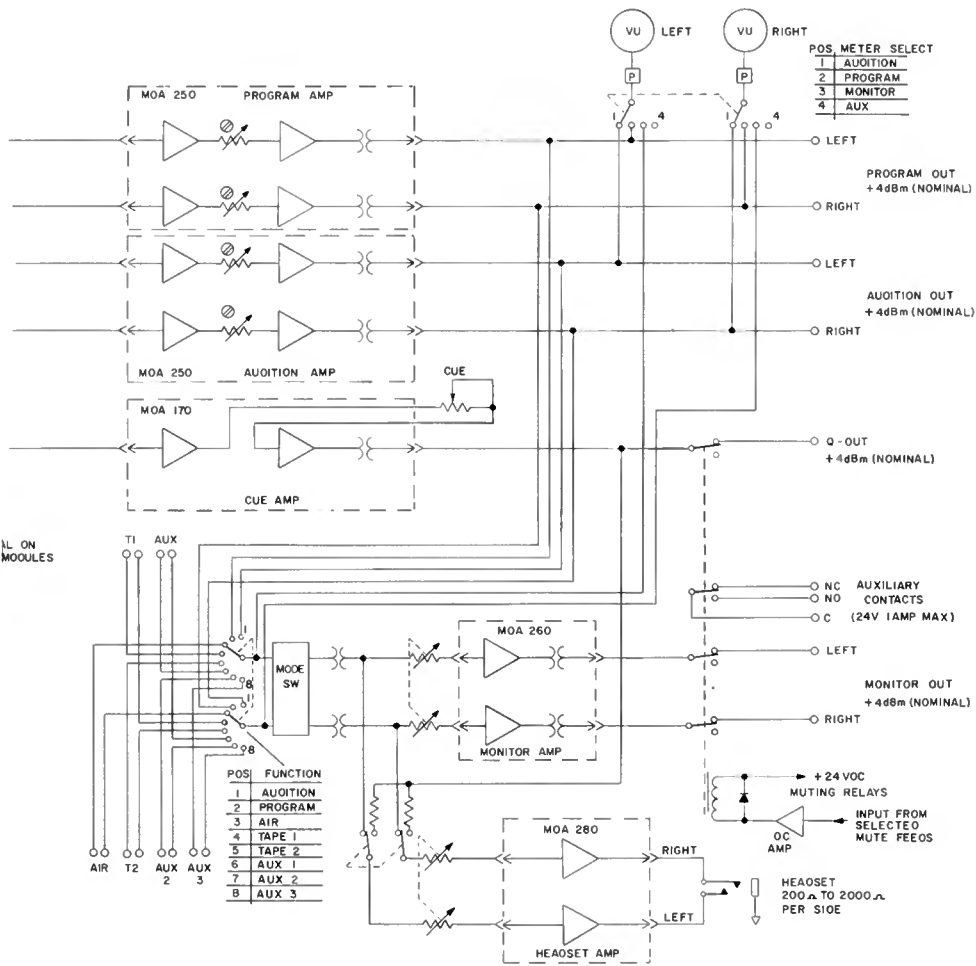
All input and output connections to the console are made to numbered solder terminals inside the rear of the cabinet. Convenient provision has been made for the installation of the input pads indicated on the block schematic. Two pairs of terminals (plus shield ground) are provided for each input of each module position. An external source is connected to one pair of terminals, and $\frac{1}{4}$ watt resistors are installed between terminals in accordance with a pad loss chart and instructions furnished with the console. Pads may subsequently

be changed, if desired, without disturbing the external wire pairs. For ease of wiring, the hinged top above the meter panel, and a portion of the rear cabinet and metal chassis may be removed in one piece by removing four machine screws.

The Mod One console is all steel, with solid walnut trim. When all module spaces are filled (either by input modules or blanks) complete RF shielding is effected. All inputs and outputs are balanced and transformer isolated for best hum and RFI rejection. External power supply is furnished, and DC connection is through a Jones-type plug in the rear of the console. Monitor and cue power amplifiers not included.

The Mod One may be installed on top of a 30" deep table top, leaving 10 inches of table space in front for log keeping and arm rest.

Module width is $2\frac{1}{8}$ ", and represents an optimum compromise between the usual $2\frac{1}{2}$ " to 3" spacing required on broadcast consoles using rotary attenuators, and the $1\frac{1}{2}$ " spacing which has become standard on recording consoles using vertical faders. Total console width is only $24\frac{3}{4}$ inches,



FEATURES:

- Up to 10 input modules. Will provide maximum of 30 inputs, high level or microphone, monaural or stereo.
- Silent action switches for all on-air functions. Illuminated PGM-OFF-AUDITION lever switches.
- Longlife conductive plastic vertical faders, with detented cue position (line & cartridge modules.)
- Automatic muting of monitor & cue speakers
- Monitor Select Switch with aux. & tape inputs.
- VU meter switching
- Built-in headphone amplifier
- Highest quality components throughout for troublefree service
- Easy installation — easily expandable.
- Modern, attractive styling.

permitting location of turntables or cartridge players within easy reach. Height is less than 10 inches, allowing a copy board to be placed comfortably without obscuring meters or controls.

Program and Audition outputs are identical in specification and levels, so that the "audition" channels may be used for tracks 3 and 4 in Quadraphonic broadcasting. (Special Quad meter panels with four meters are available on special order.)

Only the meter panel layout differs between the standard MOH 110 (monaural) and MOH 210 (stereo) console housings. In the MOH 110, the right-hand meter is always PROGRAM, and is not switchable. The left-hand meter is switchable between AUDITION and MON. and the MODE switch is omitted.

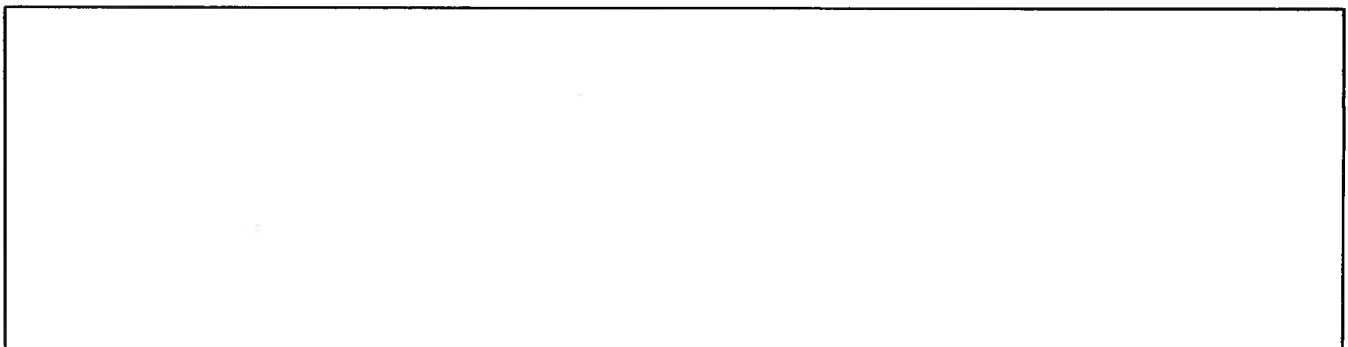
System electrical specifications are listed on Page 4, and represent worst-case condition, with all 10 input modules operative.

Details and specifications of the various optional input modules and plug-in amplifiers are on separate data sheets.

SPECIFICATIONS

Input Levels	:	--50 to +4 dBm (selectable by input pads at each input).
Nominal Gain	:	54 dB (allowing "normal" settings faders & submasters).
Maximum Gain	:	80 dB, (faders & submasters maximum).
Output Levels	:	All channels +4 dBm nominal (may be optionally +8).
Frequency Response	:	± 1 dB 30 Hz to 20 kHz.
Distortion (THD)	:	Less than 0.5%, +20 dBm, 30 Hz to 20 kHz.
Signal-to-noise ratio	:	Better than 70 dB (15.7 kHz Noise Bandwidth).
Cross Talk (stereo)	:	60 dBm (minimum) to 10 kHz, 50 dB to 20 kHz.
Power Supply	:	± 24 VDC (bi-polar) 1.5 A maximum (actual current depends on number and type of amplifiers and modules). Operates from 110-120 VAC mains, 50/60 Hz.
Dimensions	:	Width 24.75 inches. (63 cm). Depth 19.75 inches. (50 cm). Height 9.40 inches. (24 cm).

Option: On special order, at additional cost, meter panel is available with four meters. In this Quad configuration two meters are permanently assigned to PROGRAM outputs; the other two are switchable between AUDITION output and the remaining meter functions.



MOD ONE

PLUG-IN AMPLIFIER CARDS

Patents Pending

MOA -- SERIES
FOR MOH-110 AND
MOH-210 BROADCAST
CONSOLES

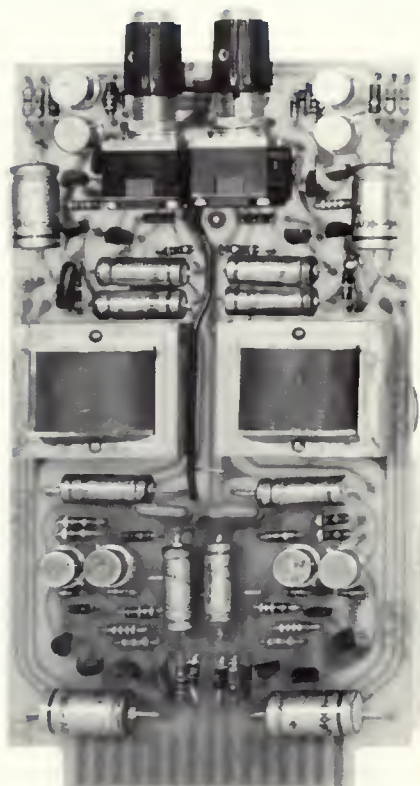
MOD ONE modular broadcast audio consoles from UREI employ all solid-state circuitry for ultimate reliability and performance. All active circuits are on plug-in printed circuit cards, or within the plug-in Input Modules — no active components are part of the console housing.

Various plug-in circuit cards are furnished with a Mod One console, or available as spares, or to modify your console for specific applications, whether Monaural, Stereo or Quadraphonic. Basic requirements for a complete MOH-110 (Monaural) or MOH-210 (Stereo) console are: 2 line amplifiers, 1 monitor booster amplifier, 1 cue amplifier and 1 headphone amplifier. Model numbers and specifications for each are listed below:

MOA-150 MONAURAL LINE AMPLIFIER

Used for Program and Audition output amplifiers in MOH-110 console (2 required). Sub-master gain control provided on card for establishing optimum console gain structure. Specifications:

Input Impedance:	Less than 10 ohms — designed as active summing amplifier, to operate from 10 k summing resistors.
Gain:	20 dB nominal, 36 dB maximum.
Frequency Response:	± 0.5 dB, 30 Hz to 20 kHz.
Noise Generation:	Less than -124 dBm equivalent input signal.
Distortion:	Less than 0.5% THD @ $+20$ dBm output, 30 Hz to 20 kHz.
Output Impedance:	Designed to work into 600 ohm load. Transformer isolated (floating).
Output Level:	$+4$ dBm, nominal.



MOA-250 STEREO LINE AMPLIFIER

Used for Program and Audition output amplifiers in MOH-210 Stereo console (2 required).

Specifications:

Same as MOA-150, except dual channels
Stereo separation: Better than 60 dB, to 20 kHz

MOA-170 MONAURAL CUE BOOSTER AMPLIFIER

Used for cue output of MOH-110 (Monaural) and MOH-210 (Stereo) consoles, to feed external cue speaker power amplifier, (1 required).

Specifications:

Same as MOA-150 Monaural Line Amplifier, except no internal gain control. Leads brought out through PC connector for Cue gain control in console front panel.



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FOR
MOH 110,
MOH 210

MOA-160 MONAURAL MONITOR BOOSTER

Used for monitor output of MOH-110 console (Monaural), to feed external speaker power amplifier (1 required).

Specifications:

Input Impedance : Designed to bridge 600 Ω source through 10K series resistor (unbalanced).

Voltage Gain: 26 dB (fixed).

Frequency Response: ± 0.5 dB, 30 Hz to 20 kHz.

Noise: At least 98 dB below +4 output.

Distortion: Less than 0.25% THD @ +20 dBm, 30 Hz to 20 kHz.

Output Impedance: Designed to work into 600 ohm load. Transformer isolated (floating).

Output Level: +4 dBm, nominal.

MOA-260 STEREO MONITOR BOOSTER

Used for monitor outputs of MOH-210 console (Stereo), to feed external speaker power amplifiers (1 required).

Specifications:

Same as MOA-160, except dual channels
Separation: Better than 60 dB to 20 kHz.

MOA-180 MONAURAL HEADPHONE AMPLIFIER

Used as headphone driver amplifier in MOH-110 (Monaural) console, (1 required).

Specifications:

Input Impedance : To bridge 600 ohm source (unbalanced).

Voltage Gain : 12 dB.

Frequency Response : ± 0.5 dB, 30 Hz to 20 kHz.

Signal-to-noise : Greater than 80 dB @ 1 watt output.

Output : 1 watt max. into 8 ohms, when bridging 600 ohm source @ +4 dBm.

Output Impedance : To work into 8 ohm to 600 ohm load.

MOA-280 STEREO HEADPHONE AMPLIFIER

Used as headphone drive amplifier in MOH-210 (Stereo) console, (1 required).

Specifications:

Same as MOA-180, except dual channels.
Separation: Greater than 60 dB to 20 kHz.

TYPICAL REQUIREMENTS AND ORDERING INFORMATION:

FOR MOH-110 CONSOLE (Monaural)

2 MOA-150 (Pgm., audition outputs)
1 MOA-160 (Monitor booster)
1 MOA-170 (Cue booster)
1 MOA-180 (Headphone amplifier)

FOR MOH-210 CONSOLE (Stereo)

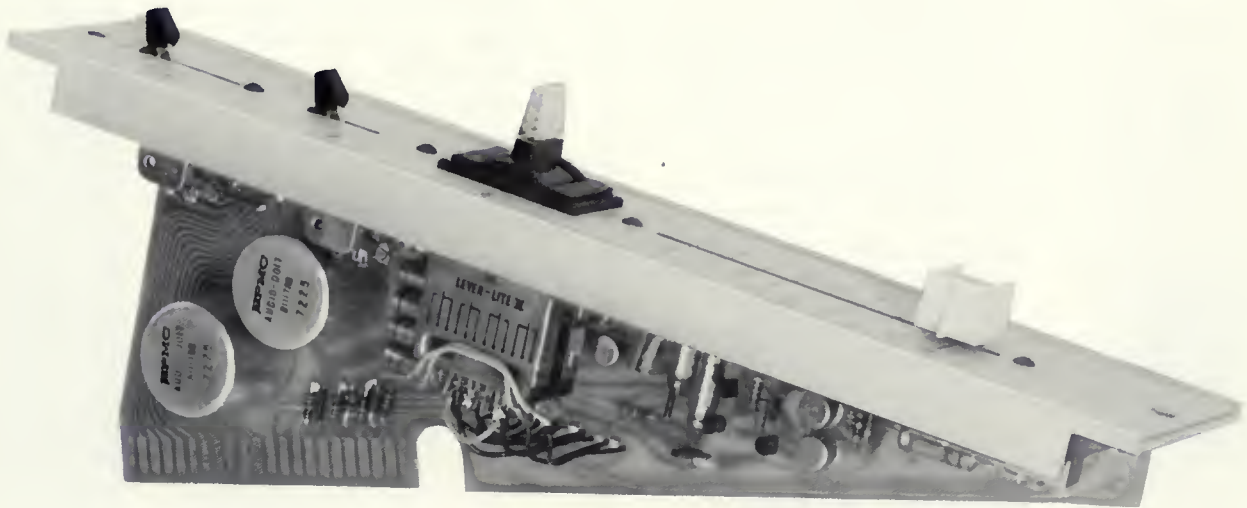
2 MOA-250 (Pgm and audition outputs)
1 MOA-170 (Cue booster)
1 MOA-260 (Monitor booster)
1 MOA-280 (Headphone amplifier)



MOD ONE

INPUT MODULES

FOR MOH 110, MOH 210
BROADCAST CONSOLES



The modern, modular design of UREI's Mod One broadcast consoles provides a wide choice of plug-in input modules to meet specific requirements in AM and FM broadcasting. All modules mate automatically in any of the 10 module positions of the MOH-110 or MOH-210 consoles, allowing optional organization of console functions with minimum installation labor. Blank modules may be installed in unused positions, and used for custom controls, etc., or future expansion.

All modules have a rugged extruded aluminum frame, overlaid with a pale green vinyl-clad steel faceplate. Designations are permanent black. Circuitry is on military-grade glass-epoxy printed cir-

cuit boards, with gold plated edge contacts which mate with a gold-plated connector on the console mother board. Two Allen-head screws attach the module to the chassis frame.

Switches are silent-action. PGM-OFF-AUD switches are illuminated Switchcraft Lever-Lite type. Vertical faders are long-life, smooth, conductive plastic, with cue switches (where applicable) operated when the fader is below the detented OFF position.

All modules have high quality input transformer isolation for balanced (floating) or unbalanced sources.



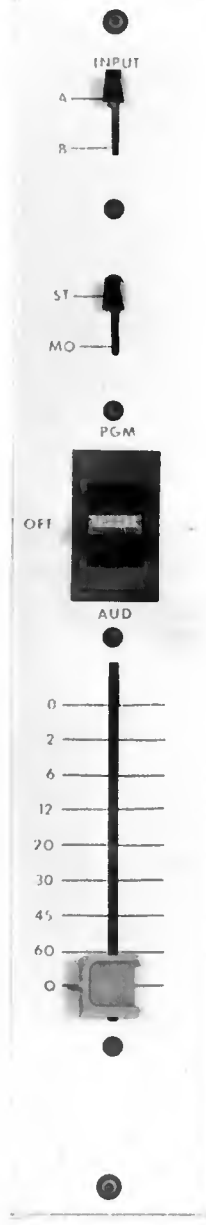
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FOR
MOH 110,
MOH 210



MOD 23220 — Stereo Microphone Module

- Input selector switch for two alternate stereo microphone pairs (dual). Both pairs may be padded at console input terminals for high output mikes, or line.
- PGM-OFF-AUD. Switch, with muting contacts brought out to console terminals. Can supply NO/NC contacts or 24 vdc for external relay.
- Floating transformer inputs.
- Vertical fader (no cue switch).
- MONO/STEREO switch. Feeds both inputs to both outputs for single microphones.

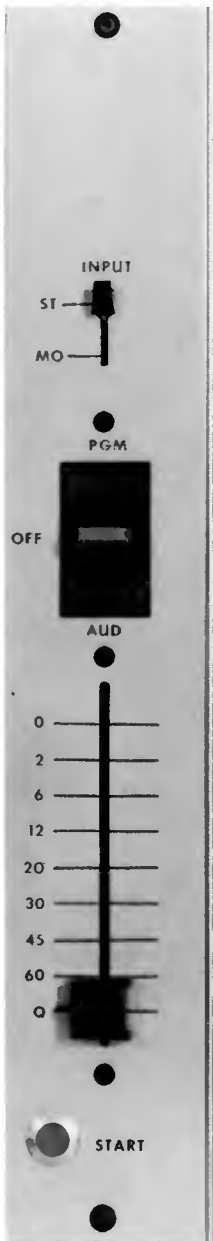
MOD 13210 — Monaural Microphone Module

- Same as 23220, except all functions monaural.
- No MONO/STEREO switch.

MOD 13220 — Monaural Microphone Module with Stereo Panpot

- Input selector switch for two monaural microphone inputs.
- Panpot — pans module output across two (stereo) buses. -3 dB on each bus at pot center, to full signal at either left or right.
- PGM-OFF-AUD switch. (Same as 23220)
- Floating transformer input.
- Vertical fader (no cue switch).
- No MONO/STEREO switch.





**MOD 24120 —
Stereo Cartridge Module**

- One stereo input only (no input switch). May be padded at console input terminals for any level -50 to $+4$ dBm, to terminate or bridge any stereo source.
- PGM-OFF-AUD switch, (Same as 23220)
- Floating transformer inputs.
- Vertical fader with cue switch.
- Momentary contact push button for remote start of source player. (N/O contacts brought out to console terminals.)
- MONO/STEREO switch (Same as 23220).

**MOD 14110 —
Monaural Cartridge Module**

- Same as 24120, but all functions monaural.
- No MONO/STEREO switch.

**MOD 25320 —
Stereo Triple-Line Module**

- Input selector switch for three stereo inputs. (All inputs may be padded at console input terminals for any level -50 to $+4$ dBm.)
- MONO/STEREO switch. (Same as 23220)
- PGM-OFF-AUD switch. (Same as 23220)
- Floating transformer inputs.
- Vertical fader with cue switch.

**MOD 15310 —
Monaural Triple-Line Module**

- Same as 25320 except all functions monaural.
- No MONO/STEREO switch.

MOD 00000 — Blank Module

- Occupies unused positions in MOH-110 or MOH-210 console housings.
- May be used for custom additions.



GENERAL ELECTRICAL SPECIFICATIONS

Source Impedance	:	150 ohms bridging.
Input Configuration	:	Balanced — transformer coupled.
Input Sensitivity	:	--54B — nominal (—64 dB maximum).
Frequency Response	:	± 1 dB, 30 Hz to 20 kHz.
Distortion	:	Less than 0.25%, 30 Hz to 20 kHz.
Noise Generation	:	—124 dBm equivalent input signal.
Power Required	:	± 24 VDC @ 80mA (Supplied by Console).

All modules have identical specifications, but different switching functions.

USER OPTIONS

All MOD input modules have identical gain structure. Any model may be used for various combinations of mic/line inputs. For example, MOD-15310 (monaural, triple-line) might be optionally used for one microphone and two line inputs, or vice-versa. "Microphone" modules may be ordered with cue switches, at extra cost, for optional line input usage.