Langevin AUDIO EQUIPMENT SOLID STATE

QUALITY CONSTRUCTION

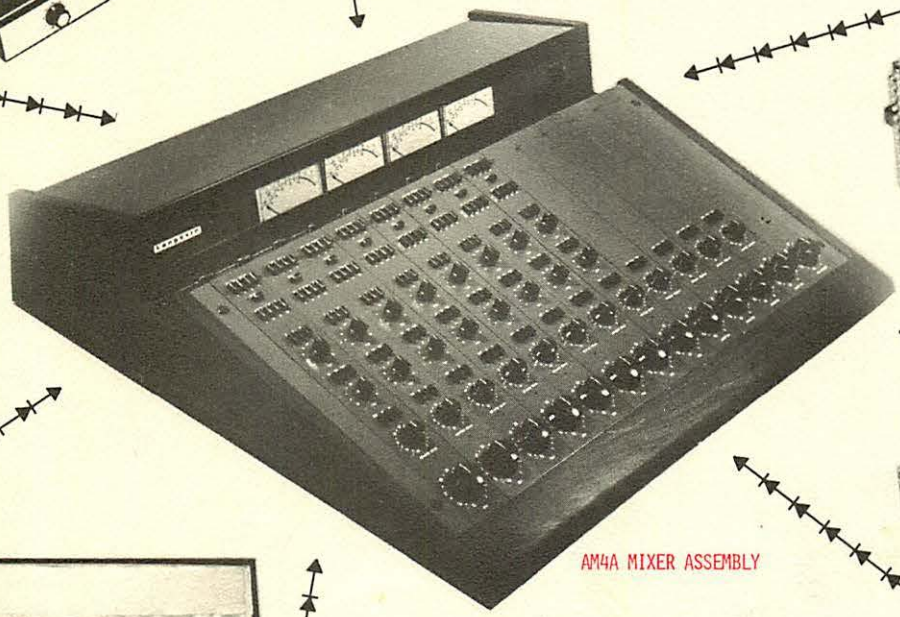
QUALITY PERFORMANCE

AM1A MIXER AMPLIFIER

AM50B POWER AMPLIFIER

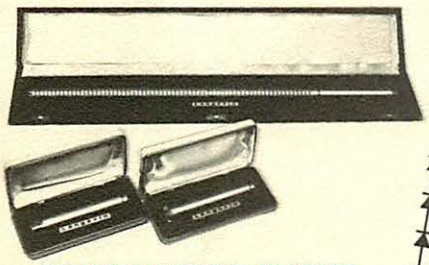
AM2A MIXER

PS222 POWER SUPPLY

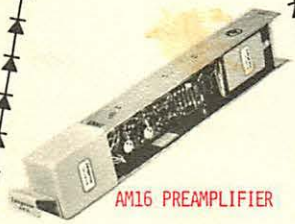


AM4A MIXER ASSEMBLY

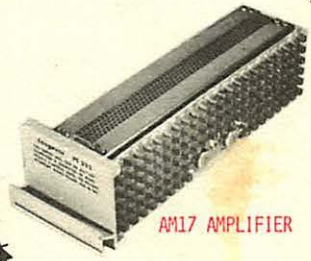
PS221 POWER SUPPLY



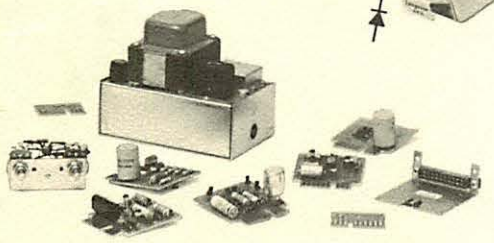
MICROPHONES-CONDENSER AND DYNAMIC



AM16 PREAMPLIFIER



AM17 AMPLIFIER



4000 SERIES MODULES

FOR COMPLETE INFORMATION WRITE OR PHONE:

LANGEVIN — 1801 E. Carnegie Ave., Santa Ana, Calif. Phone 714 - 546-8830

- Preamplifier, Booster Amplifier or Program Amplifier
- Very Low Noise Generation
- Extreme Dependability
- All Transistors are Silicon Planar NPN
- Low Heat Dissipation
- Connections are Plug-in Type

AM16
PLUG-IN PREAMPLIFIER TRANSISTOR TYPE

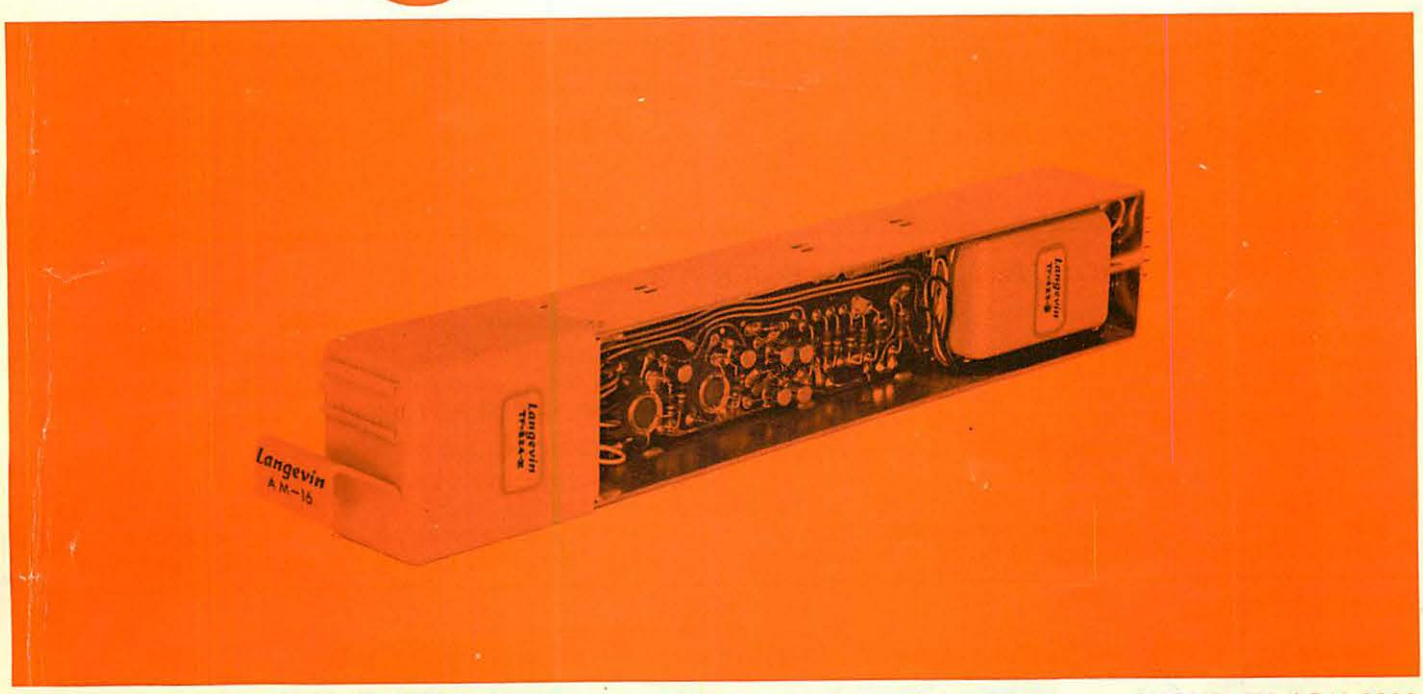
The AM16 is primarily a microphone pre-mixing amplifier. However, its performance also qualifies it for use as a post-mixing (booster) and as a low-level program amplifier. Of special note is the very LOW NOISE GENERATION figure (−127 dbm equivalent input, unweighted).

Extreme dependability has been stressed. All components are operated well within their ratings and no electrolytic capacitors or "chemical" parts have been used. All transistors are silicon planar NPN. The amplifier is not subject to damage from input or output overload or impedance mismatch.

Output power delivered to load is rated at +24 dbm, which may be reduced to +18 dbm by the omission of a strap connection. This lowers the supply current demanded from the external 24 v. DC source.

All conditional strapping of the amplifier . . . whether for input impedance, output impedance, or output capability . . . is performed on the mounting facility which receives it, and not on the amplifier proper. This allows complete interchangeability of all units within a given system without regard to their individual modes of employment.

Langevin AUDIO EQUIPMENT



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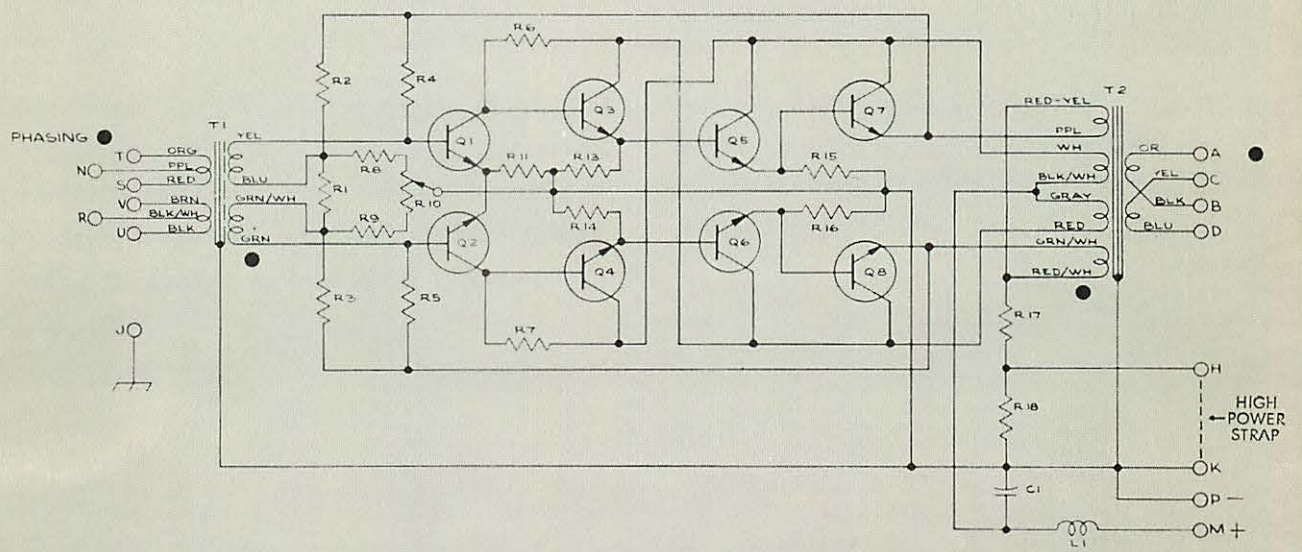
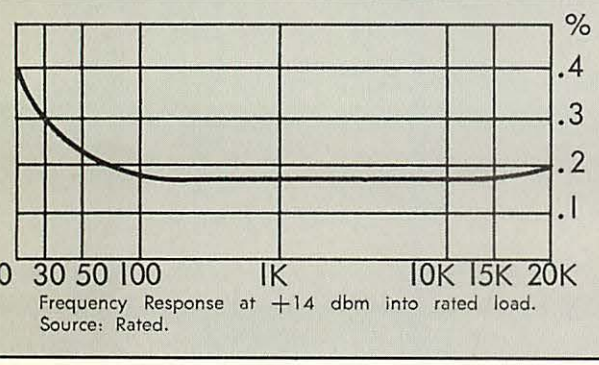
SPECIFICATIONS:

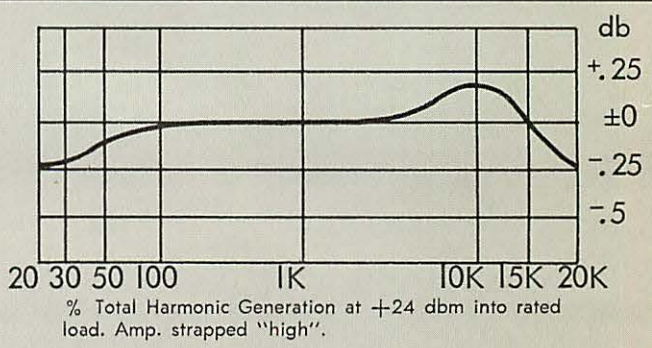
Performance Figures Listed Below Are GUARANTEED Values.

Gain:	45 ± 0.5 db
Input Z:	50, 150, 600 ohms
Load Z:	150, 600 ohms
Harmonic Generation: (Total)	Not over 0.5% from 30 cps to 20 Kcps @ +18 dbm (on "low-power").
	Not over 0.75% from 30 cps to 20 Kcps @ +24 dbm (on "high-power").
Noise Generation:	Not over an input—equivalent level of −127 dbm (measured over bandwidwidth 20 cps to 20 Kcps).
Frequency Response:	±0.5 db from 20 cps to 20 Kcps (measured at approx. +14 dbm output).
Size:	Approximately 1¾" high x 1½" wide x 10½" long (not including plug pins).
Power Requirement:	24 v. DC (with negative grounded). 110 ma when on "high-power". 55 ma on "low".
Environmental Requirement:	Temperature of mounting space must not exceed 65°C (145°F), including rise due to AM16/s. (Dissipation of each AM16 is approx. 2 watts on "high-power."





Frequency Response at +14 dbm into rated load. Source: Rated.



% Total Harmonic Generation at +24 dbm into rated load. Amp. strapped "high".

ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The amplifier shall be Langevin AM16. It shall be plug-in. It shall have magnetically and electrostatically shielded input and output transformers. Input impedances shall be 50, 150 and 600 ohms. Output impedances shall be 150 and 600 ohms. All strapping for impedance and "high-low-power" shall be on the tray or cabinet which receives the amplifier, and not on the amplifier proper. Noise level shall not exceed an equivalent input of −127 dbm, unweighted. Gain at 1 Kc shall be 45 ±0.5 db. When strapped for high power, harmonic generation at +24 dbm shall not exceed 0.75% from 30 cps to 20 Kc. When on low power, supply current demand shall be reduced, and harmonic generation at +18 dbm shall not exceed 0.5% from 30 cps to 20 Kc. Response at approx. +14 dbm shall be uniform ±0.5 db from 20 cps to 20 Kc. Amplifier shall employ only silicon transistors, and no electron tubes. It shall not contain any electrolytic capacitors, nor any part with known shelf or service life. Size shall be approx. 1¾" high, 1¼" wide, and 10½" long not including plug pins. Plug pins shall be gold-plated. Color scheme shall be gray and iridited cadmium plate.

ACCESSORIES:

Mounting Tray No. TRY6 (for installation of single AM16 Amplifier).
Rack Cabinet No. RC612 (for installation of as many as 12 AM16 Amplifiers in 1¾" of vertical space in standard rack).
Power Supply No. PS221 (10 amperes).
Power Supply No. PS222 (3 amperes).

- Program Amplifier or Monitor Amplifier
- Connections are Plug-in Type
- Extreme Dependability
- All Transistors are Silicon Planar NPN

AM17

PLUG-IN AMPLIFIER TRANSISTOR TYPE

GENERAL DESCRIPTION

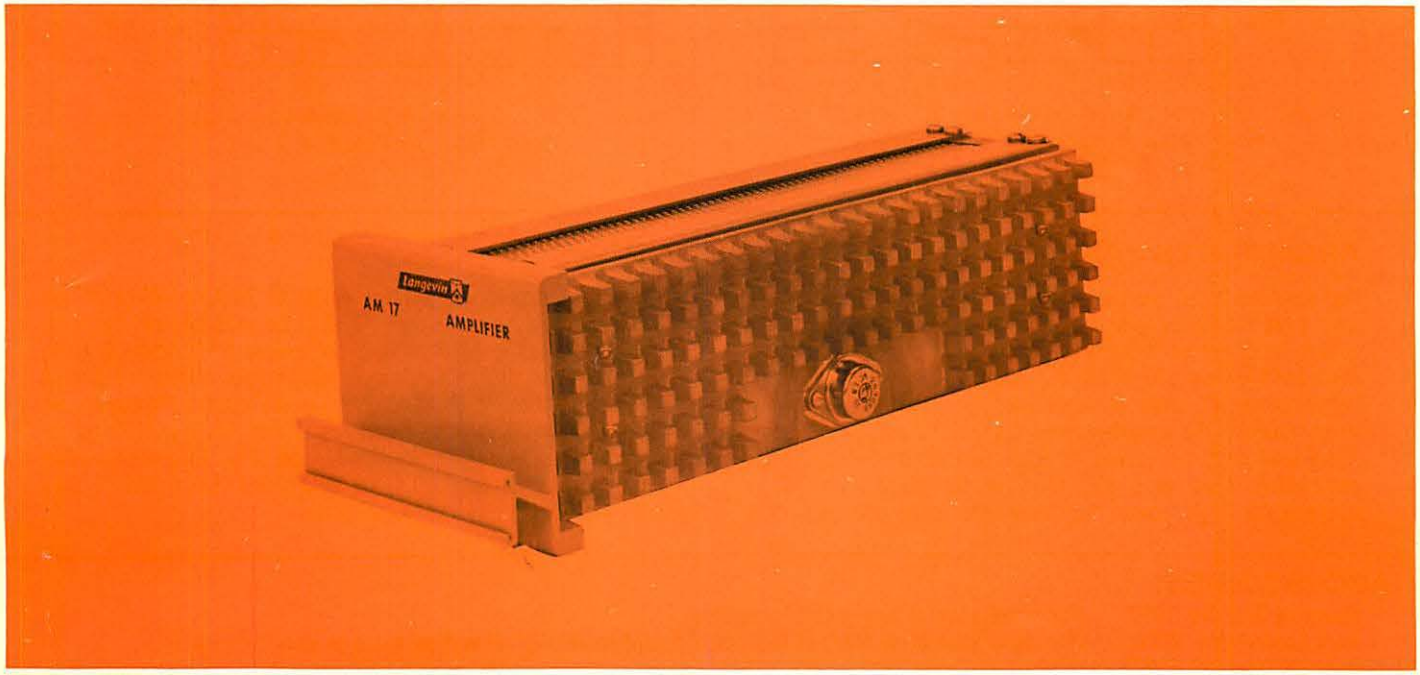
The AM17 may be used as a program amplifier or as a monitor amplifier. Output power delivered to load is rated at +39 dbm (eight watts), which may be reduced to +30 dbm (one watt) by the omission of a strap connection. This omission lowers the current demanded from the external 24 v. DC power supply.

All conditional strapping of the AM17 . . . whether for input impedance, output impedance, or output capability . . . is performed on the mounting facility which receives it, and not on the amplifier proper. This allows complete interchangeability of all units within a given system without regard to their individual modes of employment.

Extreme dependability has been stressed in the design of the AM17. All components are operated well within their ratings, and no electrolytic capacitors or "chemical" parts have been used. The amplifier is not subject to damage from input or output overload or impedance mismatch.

All transistors are silicon planar NPN. The output transistors (which are operated Class A) are adequately cooled by generously proportioned "waffle iron" heat sinks on either side of the chassis.

Langevin AUDIO EQUIPMENT



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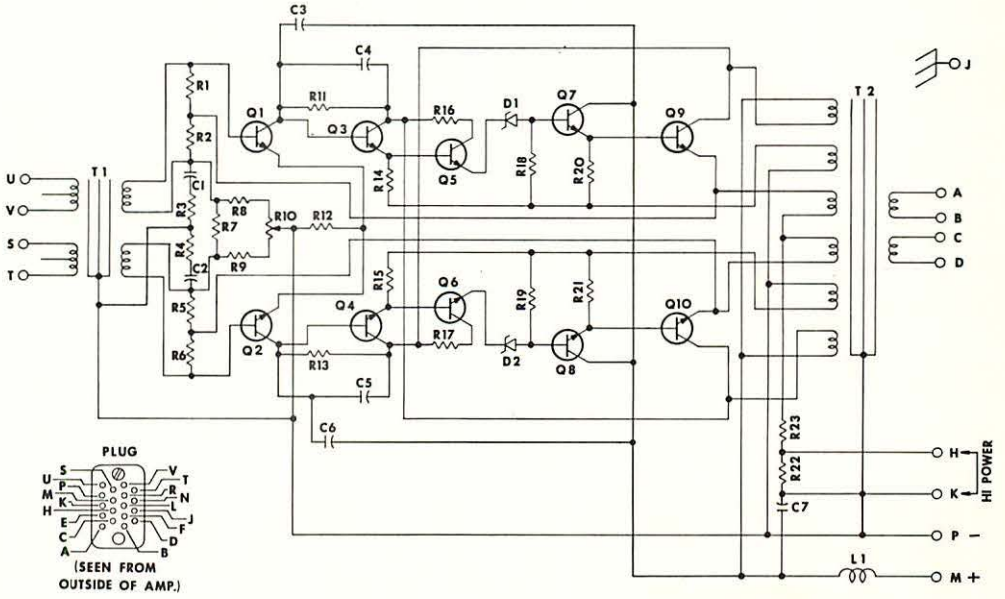
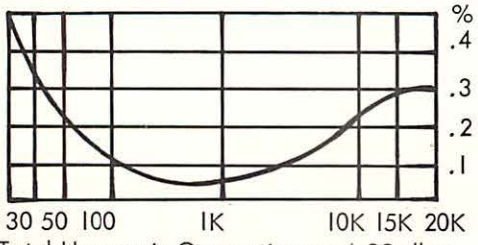
SPECIFICATIONS:

Performance Figures Listed Below Are GUARANTEED Values.

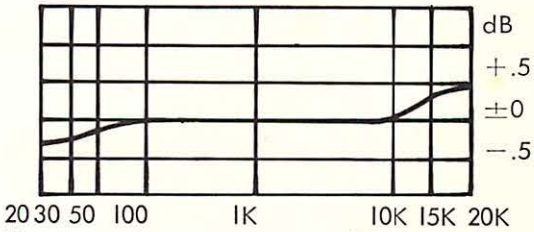
Gain:	57 ± 0.5 db
Input Z:	150, 600 ohms
Load Z:	150, 600 ohms
Harmonic Generation: (Total)	Not over 0.5% from 30 Hz to 20 KHz @ +30 dbm (on "low power") Not over 1.0% from 30 Hz to 20 KHz @ +39 dbm (on "high power")
Noise Generation:	Not over an input-equivalent level of −115 dbm (over bandwidth 20 Hz to 20 KHz).
Frequency Response:	±0.5 db from 20 Hz to 20 KHz (measured at approx. +24 dbm output).
Size:	Approximately 3⅜" high, 4¾₁₆" wide, 12⅝" long (not including plug pins).
Power Requirement:	24 v DC (with negative grounded). Approximately 2 amperes on "high power" and 1 ampere on "low power".
Environmental Requirement:	Temperature of mounting space must not exceed 65° C (145° F), including rise due to AM17/s. (dissipation of each AM17 is approximately 48 watts on "high power" and 24 watts on "low power".

DO NOT OBSTRUCT THE FLOW OF AIR AROUND THE SIDES OF THE CHASSIS.





% Total Harmonic Generation at +39 dbm into rated load. Amp. strapped "high".



Frequency Response at +24 dbm into rated load. Source: Rated.

ARCHITECTS' AND ENGINEERS SPECIFICATIONS

The amplifier shall be Langevin AM17. It shall be plug-in. It shall have magnetically and electrostatically shielded input and output transformers. Input impedances and output impedances shall be 150 and 600 ohms. All strapping for impedance and "high-low-power" shall be performed on the tray or cabinet which receives the amplifier, and not on the amplifier proper. Noise level shall not exceed an equivalent input of −115 dbm, unweighted. Gain at 1 KHz shall be 57 ± 0.5 db. When strapped for high power, harmonic generation at +24 dbm shall not exceed 1.0% from 30 Hz to 20 KHz. When on low power, supply current demand shall be reduced, and harmonic generation at +18 dbm shall not exceed 0.5% from 30 Hz to 20 KHz. Amplifier shall employ only silicon transistors, and no electron tubes. It shall not contain any electrolytic capacitors, nor any part with known shelf or service life. Size shall be approximately 1⅜" high, 4¾₁₆" wide, and 12⅝" long not including plug pins. Plug pins shall be gold-plated. Color scheme shall be grey and iridited cadmium plate.

ACCESSORIES:

Mounting Tray No. TRY7	(for installation of single AM17 Amplifier).
Rack Cabinet No. RC76	(for installation of as many as four AM17 Amplifiers in 5¼" of vertical space in standard rack
Power Supply No. PS221	(10 amperes).
Power Supply No. PS222	(3 amperes).

- Monitor Amplifier*
- Microphone Amplifier*
- Phonograph Amplifier*
- Self-Contained Power Supply
- Compact Fully-Professional Unit

**interchangeable input panels*

AM 2138 S
POWER AMPLIFIER TRANSISTOR TYPE

Although an excellent amplifier for use in new construction, the AM2138S was primarily designed as a modernizing replacement for the older (tube-type) AM138S.

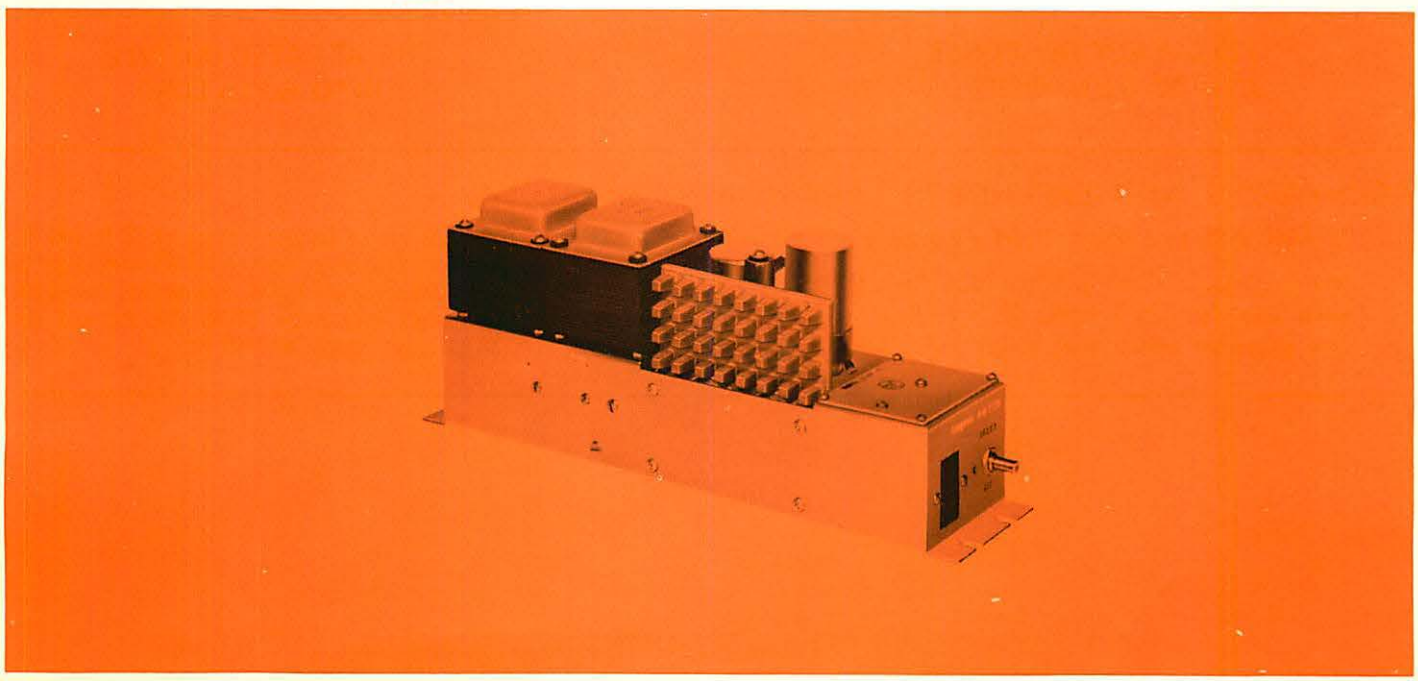
The interchangeable input panels allow considerable flexibility of application.

Small and compact, the amplifier may be mounted within a speaker housing. Or as many as four can be accommodated by a single Langevin MF10B Mounting Frame. As compared to the electron-tube model, it generates very little heat.

Both the guaranteed and the typical specifications are shown on the obverse of this page. By comparison of the two, it will be seen that the guaranteed figures are quite conservative.

The amplifier cannot be damaged by overload and/or short-circuited operation.

Langevin AUDIO EQUIPMENT



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SPECIFICATIONS: *(Basic amplifier without input panel.)*

Input Sensitivity: Approx. 105 mV to 250 KΩ control for full output.

Frequency Response: ±0.5 dB from 50 Hz to 20 K.

Noise: At least 75 dB below full output.

Output Impedance: Strappable 4, 8, 16 and 600Ω load. (600Ω output is also used for feeding 70 V lines.)

Maximum Output Level: +40 dBm (10 Watts).

Distortion: Total harmonic generation will not exceed 0.5% over the range 50 Hz to 20 K, nor 0.1% at 1000 Hz at rated output power.

Mains Requirement: 120 V 50/60 Hz. Demands approximately 40 VA at rated output power level.

Size: Designed to be physical replacement for AM138, as well as electrical. 12¾" long, 3¼" wide, 5¼ high.

ACCESSORY ITEMS:

The following are shipped with the unit . . .

Jones connector P-308-CCT (input)

Jones connector P-304-CCT (output)

General Electric connector GE-4317-11 (power)

The following is not shipped with the unit:

Langevin Mounting Frame MF10B.

Input panels will be shipped with the unit if ordered simultaneously.

INPUT PANELS:

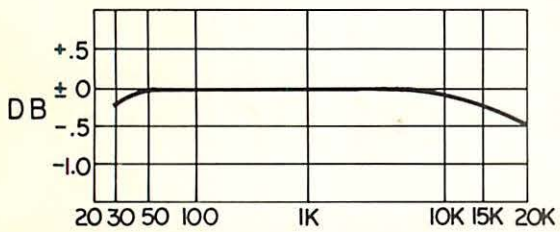
Low-Z Microphone Panel type GT. Available microphone input impedances 30, 150, 250 and 600Ω.

High-Z Microphone Panel type LT.

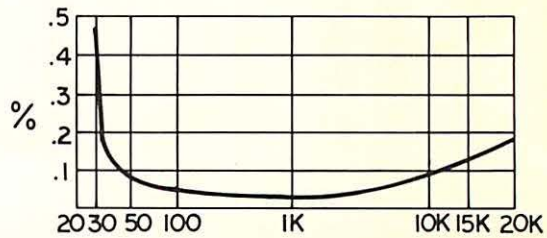
Line Matching/Bridging Panel type MT. Available input impedances 150, 600, 5000, 20,000Ω

Phonograph Input Panel type KT. RIAA equalization for magnetic cartridges.

If you order your input panel at the same time as the basic amplifier, the two will be factory-assembled and tested.



FREQUENCY RESPONSE
AT +30 DBM OUTPUT



THG AT RATED OUTPUT
INTO 600Ω LOAD.

ARCHITECTS AND ENGINEERS SPECIFICATIONS:

Amplifier shall be Langevin Model AM2138S with Langevin type _____ input panel. It shall have self-contained power supply for 120 V mains, 50 or 60 Hz. Amplifier shall have continuous output rating of ten watts, +40 dBm, into 4, 8, 16, 600 ohms over a frequency range of 30 to 20K Hz. Frequency response shall be uniform ±0.5 dB over range 50 to 15K Hz. Total harmonic generation shall be less than 0.5% at full power output over range 50 to 15K Hz, and less than 0.1% at full power output at 1000 Hz.

- Rated for Continuous (sine-wave) Duty
- Overload and Short Circuit Protected
- Wide Choice of Input Modules
- Self Contained Power Supply

AM50B
SOLID STATE POWER AMPLIFIER

GENERAL

The AM50B is a general purpose, solid state power amplifier designed for monitoring, recording and sound re-inforcement applications. It is rated for continuous operation and is inherently protected against damage from accident or mis-application by its circuitry design.

The amplifier is designed to be compatible with the Langevin Model AM1A Mixer-Amplifier. Signal levels are compatible. The AM50B is single channel input.
Harmonic generation in the AM50B does not exceed 0.25% over the 20 Hz to 20 kHz range at rated power output. Its frequency response is within 1 db of the 1 kHz figure over the range of 20 Hz to 20 kHz with roll-off filter incorporated.
Provision is made to incorporate various modules of the AM4000 series to provide several types of input circuitry.

The AM50B is stocked less output transformer, providing a nominal 8 ohm output impedance, or as the AM50BT including output transformer. With output transformer various impedances from 4 to 128 ohms are available.
With BR4402 bridging input module substituted for SC4401 strapping card (standard equipment) several AM50B amplifiers may be bridged either locally or remotely across the 600 ohm output of the AM1A or type AM4101 or AM4300B input modules may be employed in place of SC4401 to provide a single, low or high impedance, low level microphone input.
The styling and construction of the AM50 is compatible and complementary to the AM1A-AM2A series of Langevin equipment. Its power supply is self contained and the amplifier operates from nominal 117 volts, 50/60 Hz mains. The AM50B and AM50BT are both 5 7/32" high x 17" wide x 10" deep. Width increases to 19" with optional rack mounting brackets fitted.

Langevin AUDIO EQUIPMENT

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SPECIFICATIONS:

The electrical performance of the AM50B will largely depend upon the AM4000 series input module used in it. The following data applies to the AM50B when equipped with SC4401 strapping card which is supplied as "standard" equipment.

Input Sensitivity: An input of approximately 220 mV rms will produce full rated output.

Actual Input Z: With SC4401, over 100 kOhms. (Other input module choices will change this figure — See 4000 series module data sheets as listed below.)

Nominal Load Z: AM50B (less output transformer): Full power will be delivered into a load of from 4 to 8 ohms.

AM50BT (with output transformer): Full power into various loads of from 4 to 125 ohms (100 ohms equals 70 volt line at this power level.)

Harmonic Generation (AM50B): Not over 0.25% from 20 Hz to 20 kHz at full rated output.

Noise Generation: 86 dB below rated output level.

Frequency Response: With output filter, response is within 1 dB from 20 Hz to 20 kHz.

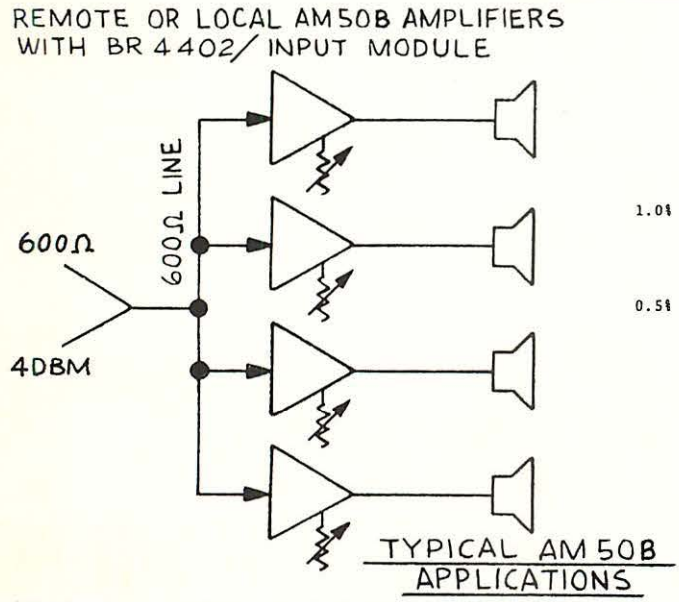
Rated Power Output: 50 watts continuous sine-wave into nominal load Z over frequency band 20 Hz to 15 kHz. AM50BT: Frequency band 30 Hz to 15 kHz.

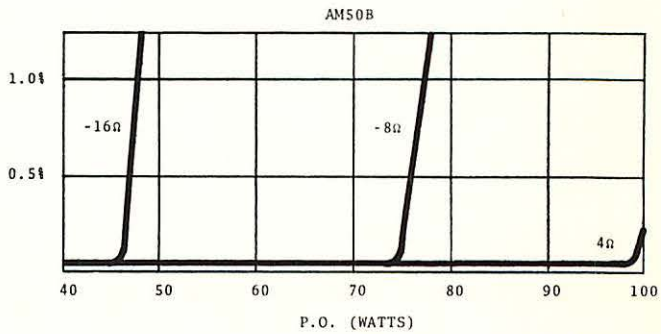
Size: Approximately 5 $\frac{7}{32}$" high and 17" wide x 10" deep. Addition of optional rack mounting brackets (shipped with unit) increases width to 19" for standard rack mounting.

Mains Requirement: 117 V (nominal) 50/60 Hz. Current demand is 2 Amperes, maximum.

Environmental Requirement: Temperature of mounting space must not exceed 65° C (145° F) including rise due to AM50 (s).

DO NOT OBSTRUCT THE FLOW OF AIR AROUND SIDES OF CHASSIS.





ARCHITECTS AND ENGINEERS SPECIFICATIONS:

The amplifier shall be Langevin AM50B ((AM50BT). It shall be of all solid-state construction. The continuous duty power output rating shall be 50 watts sine-wave into nominal load. Its nominal load impedance without output transformer shall be 8 ohms. (Nominal load impedances of from 4 to 128 ohms available on Model AM50BT only). The amplifier shall utilize "plug-in" input modules of the Langevin 4000 series to provide a selection of input impedances and gain. With Langevin SC4401 input module (supplied) sensitivity shall be such that approximately 220 mV rms across the 100 kOhm input impedance of this module will produce full rated output power. Harmonic generation shall not exceed 0.25% from 20 Hz to 20 kHz at rated power output.

Frequency response shall be within ± 1 db of the 1 kHz response from 20 Hz to 20 kHz with standard output filter incorporated.

Amplifier shall be powered from nominal 117V, 50/60 Hz, single phase mains. Signal input circuit shall be a terminal strip. Master gain control shall be provided on AM50. The amplifier shall occupy 5¼" of standard 19" rack space when fitted with rack mounting brackets which are included. Unit is 10" deep x 5¼" high by 17" wide less brackets.

ACCESSORIES:

AM4500	RIAA pre-amplifier module
AM4101	Low Z, low level input module
BR4402	Bridging input module
AM4300B	High Z, low level input module
AM1A	6 channel mixer-amplifier
TF389	Output Transformer

- PLUG-IN CONSTRUCTION
- 24-VOLT
- 10-AMPERE
- "REMOTE" SENSING OF OUTPUT VOLTAGE
- OVERLOAD PROTECTION

PS221
POWER SUPPLY
TRANSISTOR TYPE

GENERAL DESCRIPTION

The PS221 Power Supply is a solid-state regulated unit primarily intended for the powering of transistor-type audio amplifiers. Output is 24 volts at a maximum current of 10 amperes. The full-load ripple output is less than 1×10^{-3} V rms.

The power mains which feed the PS221 may be either 105-125 volts or 210-250 volts. Power mains frequency may range from 50 Hz to 400 Hz.

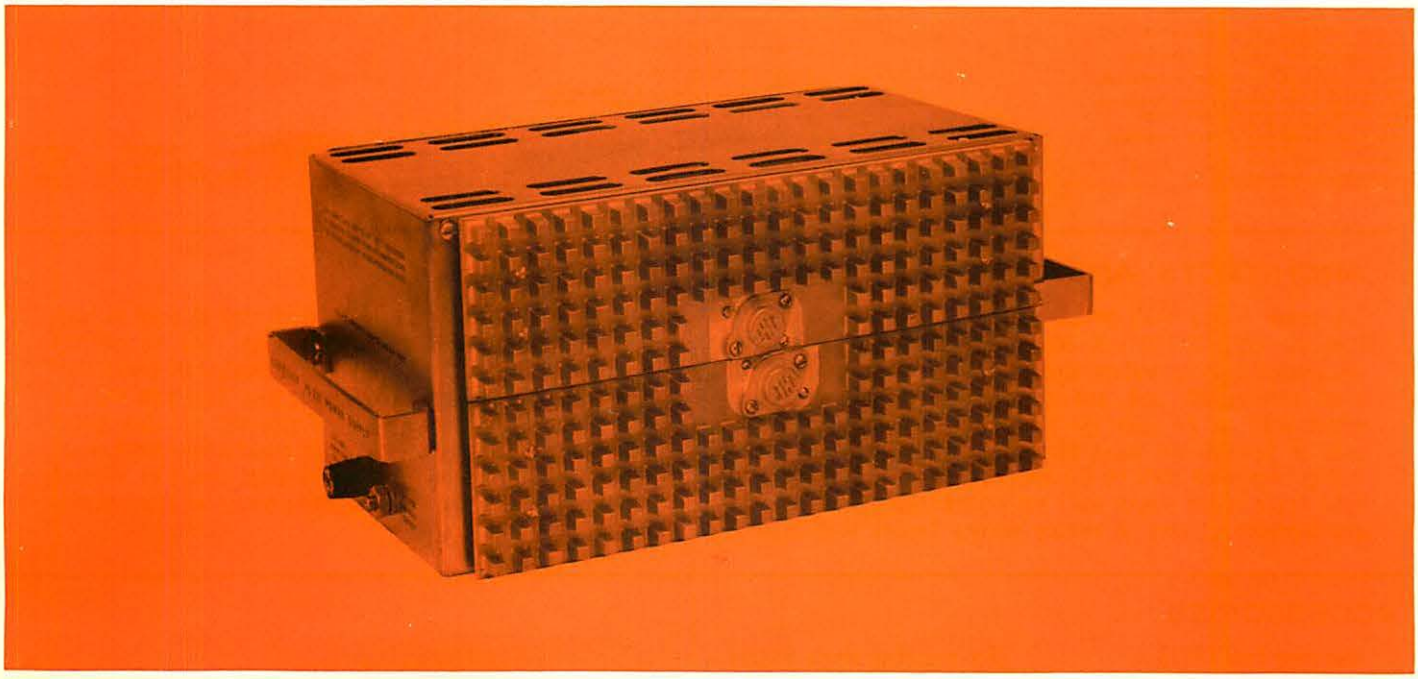
Dependability has been stressed in the design of the PS221. All components are operated below their ratings.

A protective circuit is incorporated in this unit which reduces output to zero in event of an overload or short-circuit, preventing any damage to supply or amplifiers.

Inductors are not used . . . ripple reduction and regulation of output are achieved by series-resistance transistors driven by error amplifiers.

The "remote sensing" feature allows the PS221 to correct for voltage error which may exist AT THE LOAD. This feature may be strapped out of the circuit if not required.

Langevin AUDIO EQUIPMENT



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SPECIFICATIONS:

Output Voltage: 24 volts. This may be adjusted to exactly 24 volts by use of a screwdriver-set control on end of chassis.

Output Current: 10 amperes, maximum

Regulation: Output voltage will not vary more than 0.1 volt from no load to full load.

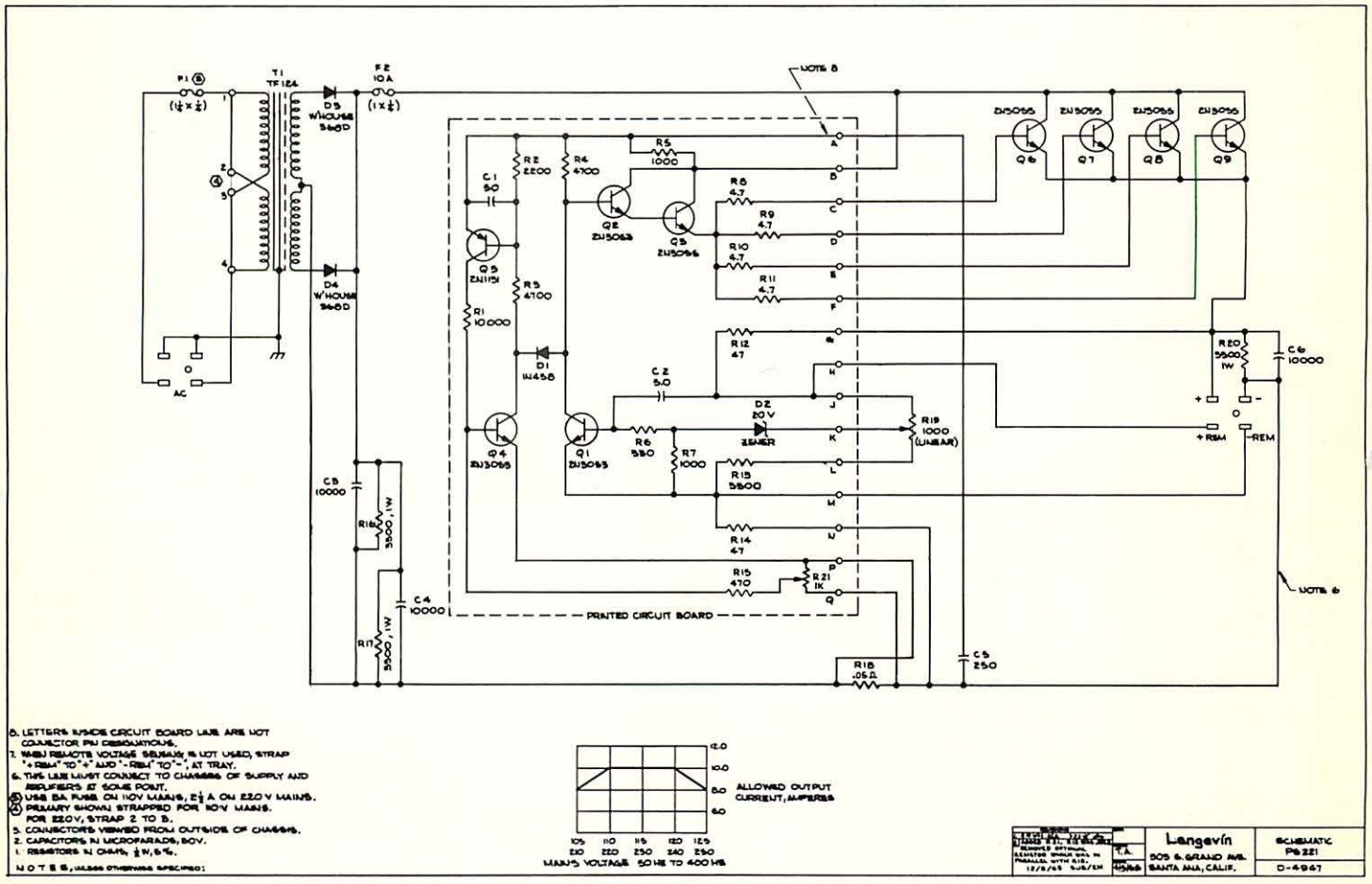
Overload Protection: Application of overload or short circuit will cause output voltage to drop to zero. Reset by removing mains power for approximately 15 seconds.

Ripple: AC components in output voltage will not exceed 0.001 volt rms at any load.

Mains: Mains voltage may be 105-125 volts or 210-250 volts, at user's option. Mains frequency may be 50 Hz to 400 Hz. Demand from mains is approximately 500 VA.

Size: Approximately 6" high x 7½" wide x 12⅝" long not including plug pins.

NOTE: The performance figures given above are the GUARANTEED FIGURES. A typical unit may be expected to have approximately 0.0003 volt rms ripple at full load and 0.00025 volt rms ripple at no load. Regulation for a no-load to a full-load condition is usually about 0.02 volt.



ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The power supply shall be Langevin PS221. It shall operate from 105-125/210-250 volt 50-400 Hz mains. Strapping for the remote sensing feature shall be on the tray or cabinet which received the unit, and not on the supply proper. DC output shall be 24 volts @ 10 amperes (maximum). There shall be fuses in the mains connection and in the DC output. Voltage regulation shall be 0.1 volt from full load to no load. Total ripple in the output shall not exceed 0.001 V rms under any condition of load. A remote sensing feature shall allow the voltage error correction to be referenced at point of load. All active components shall be solid-state, and no electron tubes shall be used. Size shall be approximately 6" high x 7½" wide x 12⅝" long not including plug pins. Plug pins shall be gold plated. Color scheme shall be grey and cadmium plated metal, iridited. Unit shall incorporate a protection circuit which will trip off the supply in event of short circuit or overload which may be reset by removing mains power for approximately 15 seconds.

ACCESSORIES

Mounting Tray TRY23 (For mounting single PS221)

Mounting Frame MF23 (To mount two TRY23)

- PLUG-IN CONSTRUCTION
- 24 VOLT
- 3 AMPERE
- "REMOTE" SENSING OF OUTPUT VOLTAGE
- OVERLOAD PROTECTION

PS222
POWER SUPPLY
TRANSISTOR TYPE

GENERAL DESCRIPTION

The PS222 Power Supply is a solid-state regulated unit primarily intended for the powering of transistor-type audio amplifiers. Output is 24 volts at a maximum current of 3 amperes. The full-load ripple output is less than 1×10^{-3} V rms.

The power mains which feed the PS222 may be either 105-125 volts or 210-250 volts. Power mains frequency may range from 50 Hz to 400 Hz.

Dependability has been stressed in the design of the PS222. All components are operated below their ratings.

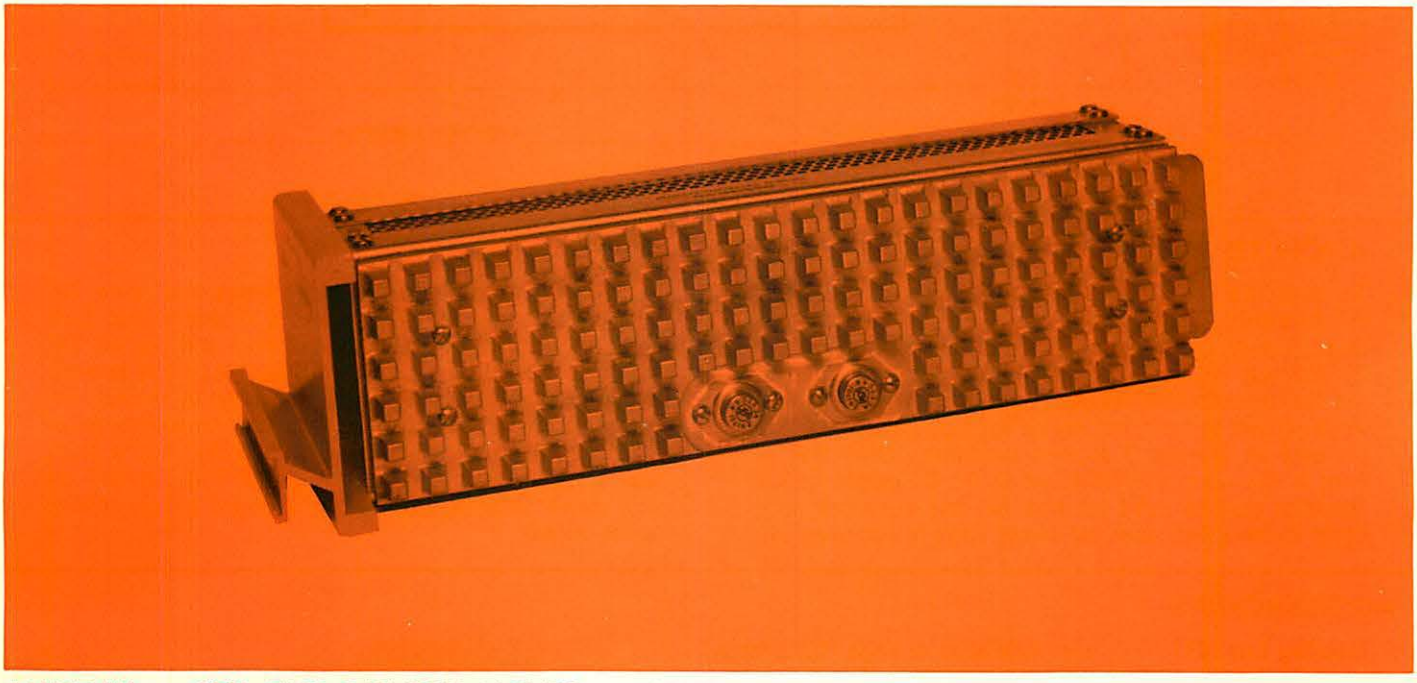
A protective circuit is incorporated in this unit which reduces output to zero in event of an overload or short circuit, preventing any damage to supply or amplifiers.

The power transformer is of the balanced-coil "hum-bucking" type in order to minimize its radiated field. It is equipped with an electrostatic shield between primary and secondary windings. Insulation is Class S silicone.

Inductors are not used . . . ripple reduction and regulation of output are achieved by series-resistance transistors driven by error amplifiers.

The "remote sensing" feature allows the PS222 to correct for voltage error which may exist AT THE LOAD. This feature may be strapped out of the circuit if not required.

Langevin AUDIO EQUIPMENT



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DIVISION OF SCIENTIFIC INDUSTRIES INC.

SPECIFICATIONS

Output Voltage: 24 volts. This may be adjusted to exactly 24 volts by use of a screwdriver-set control on side of chassis.

Output Current: 3 amperes, maximum

Regulation: Output voltage will not vary more than 0.1 volt from no load to full load

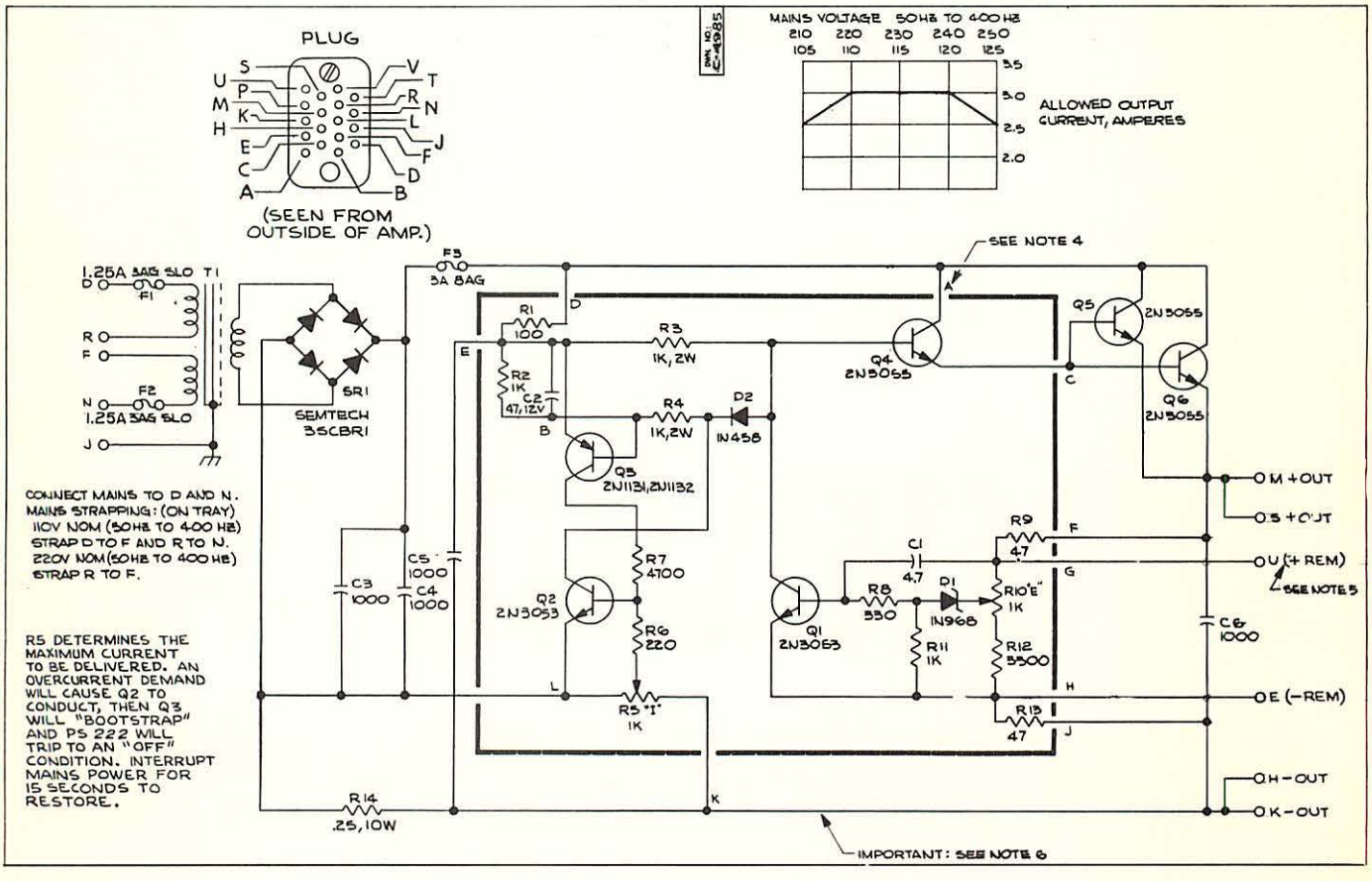
Overload Protection: Application of overload or short circuit will cause output voltage to drop to zero. Reset by removing mains power for approximately 15 seconds

Ripple: AC components in output voltage will not exceed 0.001 volt rms at any load

Mains: Mains voltage may be 105-125 volts or 210-250 volts, at user's option. Mains frequency may be 50 Hz to 400 Hz. Demand from mains is approximately 150 VA

Size: Approximately 3⅜" high x 4 3/16" wide x 12⅝" long not including plug pins

NOTE: The performance figures given above are the GUARANTEED figures. A typical unit may be expected to have approximately 0.0003 volt rms ripple at full load and 0.00025 volt rms ripple at no load. Regulation for a no-load to a full-load condition is usually about 0.02 volt.



ARCHITECTS' AND ENGINEERS' SPECIFICATIONS

The power supply shall be Langevin PS222. It shall have a two-coil balanced input transformer with electrostatic shielding between primary and secondary. It shall operate from 105-125/210-250 volt 50-400 Hz mains. Strapping for mains voltage and the remote sensing feature shall be on the tray or cabinet which receives the unit, and not on the supply proper. DC output shall be 24 volts, 3 amperes (maximum). There shall be fuses in the mains connection and in the DC output. Voltage regulation shall be ±0.1 volt from full load to no load. Total ripple in the output shall not exceed 0.001 V rms under any condition of load. A remote sensing feature shall allow the voltage error correction to be referenced at point of load. Unit shall incorporate a protection circuit which will trip off the supply in event of short circuit or overload which may be reset by removing mains power for approximately 15 seconds. All active components shall be solid-state, and no electron tubes shall be used. Size shall be approximately 3⅜" high x 4 3/16" wide x 12⅝" long not including plug pins. Plug pins shall be gold plated. Color scheme shall be grey and cadmium-plated metal, iridited.

ACCESSORIES

Mounting Tray TRY7 (For installation of single PS222 supply)

Rack Cabinet RC76 (For installation of as many as four PS222 supplies or four intermixed AM17 and PS222 units).

Langevin

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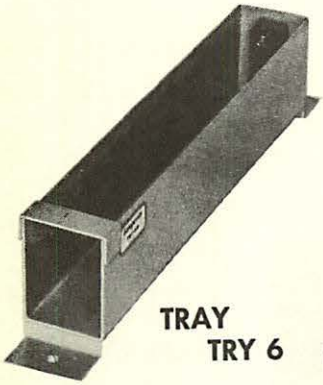
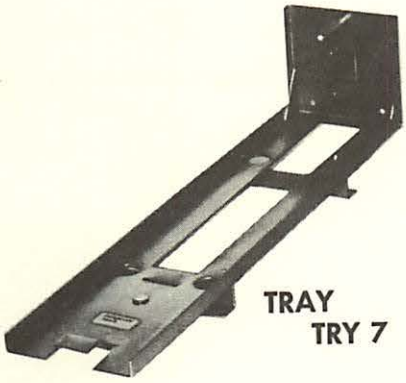
ACCESSORIES FOR

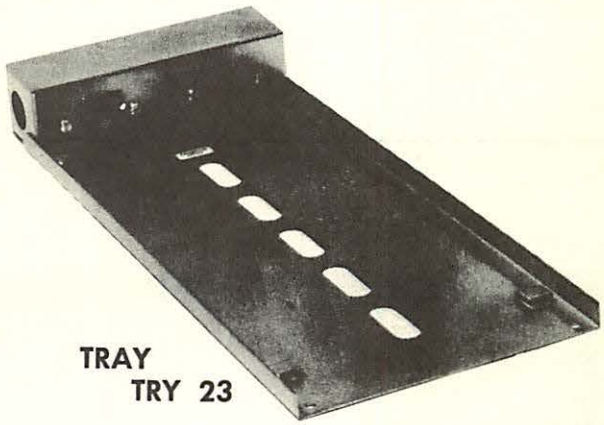
Langevin Solid State Broadcast and Recording Equipment



TRAY
TRY 6



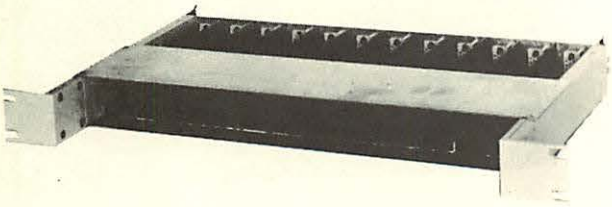
TRAY
TRY 7



TRAY
TRY 23

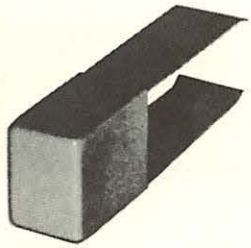
Finish is gold iridite

MODEL	USED WITH	APPROX. SIZE (d x w x h)	APPROX. SHIP WT.
TRY 6	AM15, AM16	9¾ x 1½ x 2"	1 lb.
TRY 7	AM17, PS222	12⅞ x 2¾ x 3⅛"	1½ lbs.
TRY 23	PS 221	15 x 6¼ x 1⅞"	6 lbs.



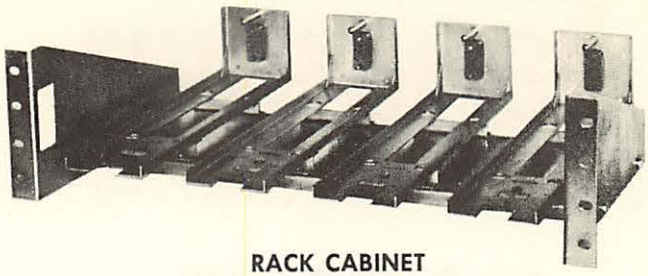
RACK CABINET
RC612

Mounts 12 AM16 amplifiers. Has integral trays and includes all plug receptacles. Finish is gold iridite except exposed surfaces which are langevin light gray baked-on enamel.
Size: 11" d. x 19" w. x 1 13/16" h.
Width of RC612 chassis 16".
Approx. shipping weight: 8 lbs.



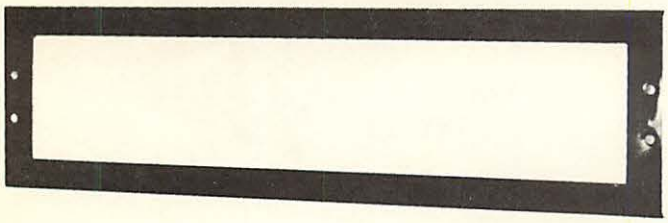
APPARATUS BLANK
AB16

Uses space of one AM16 amplifier in RC612 rack cabinet when full number of amplifiers is not installed. Finish is Langevin light gray baked-on enamel. Approx. shipping weight: ¾ lb.



RACK CABINET
RC76

Mounts any combination of up to 4 AM17 or PS222
Shipped in knocked-down form, complete with 4 TRY 7 TRAYS. Finish is gold iridite.
Approx. shipping weight: 10 lbs.

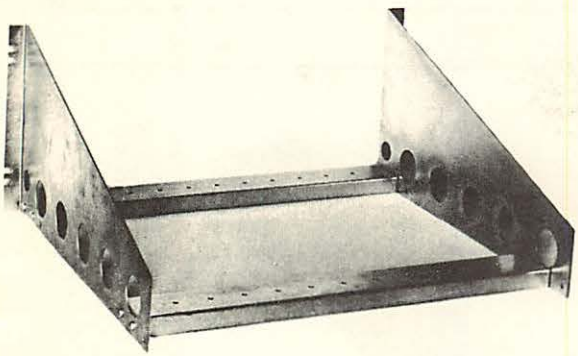


MAT PANEL
MP76 - MP23

MP76 covers front of RC-76.
Size: 19" wide x 5¼" high.
MP23 covers front of MF-23.
Size: 19" wide x 8¾" high.
Finish is Langevin dark grey baked enamel: shipping weight approx. 5 lbs.

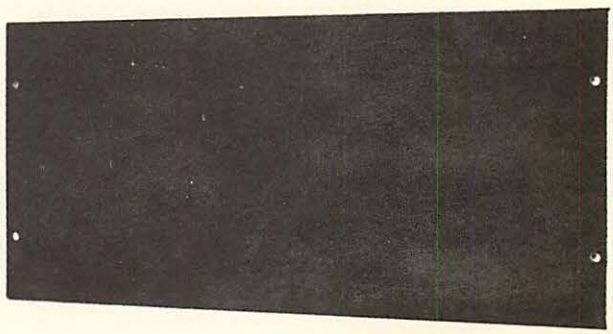
APPARATUS BLANK
AB17
AB23

AB-17 used to cover one empty space in RC76 rack cabinet. Fits over mat panel MP76. Finish is Langevin dark grey baked-on enamel.
AB23 used to cover empty space in MF23. Fits over mat panel MP23. Finish is Langevin dark grey baked-on enamel.
Approx. shipping weight: 1 lb. either piece.



MOUNTING FRAME
MF23

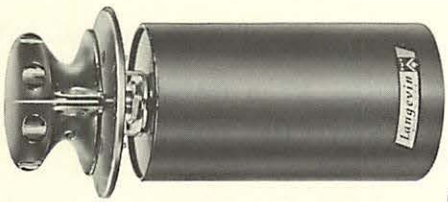
Used for rack mounting one or two TRY23. Shipped in knocked-down form. Finish is gold iridite.
Size: 16" d. x 19" w. x 8⅛" high.
Requires 8¾" panel space.



MAT PANEL
MP35A

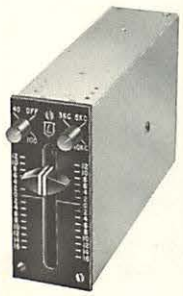
Used to cover rack installed, rear access TRY 23. Finish is Langevin dark grey baked-on enamel.
Size: 19" w. x 8¾" h.
Approx. shipping weight: 3½ lbs.

Langevin



Equalizers & Filters
Rotary, Straight Line & Fixed

GENERAL



- **L/C/R Passive Circuits**
  No power requirement
  Toroidal coils provide minimum hum pickup
  +14 dbm (maximum) line level input
- **Rotary & Straight Line Units**
  Silver brushes
  Contact noise virtually eliminated; extended life
  Printed contact boards heavily plated with silver
  Smooth operation — low drag
- **Straight Line Units**
  Carriage moves on precision ground stainless steel shaft
  Variable high-low equalization and attenuation
  Effective control at subjectively important points of audio range
- **Rotary Units**
  Permanently lubricated within dust-proof enclosure
  Stainless steel shaft
  Low friction
  Long life, non-seizing
- **Fixed Units**
  Conserve space — 1⅞" w. x 2½" h. x 1¾" d.
  Professional appearance in service and test

TYPES

Straight Line:

EQ251A	Program Equalizer
EQ252A, EQ270A	Graphic Equalizers

Rotary:

EQ255A, EQ255B, EQ259A	Sound Effects Filters

Fixed:

HP50, HP70, HP80	High Pass Filters
LP8, LP15	Low Pass Filters
EQ257A	RIAA Equalizer

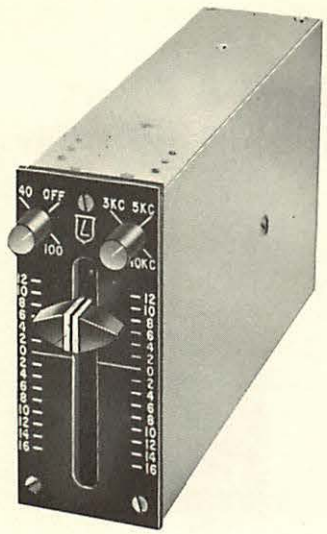
EQ260, EQ261, EQ262, EQ263, EQ265, EQ266	Rotary Equalizers
EQ258A	Program Equalizer

GENERAL NOTES:

(1.) UNITS ARE 600 OHMS IN AND OUT.

(2.) KNOBS, DIALS, ESCUTCHEONS, ETC., NORMALLY SUPPLIED WITH ROTARY AND STRAIGHT LINE UNITS, UNLESS CUSTOMER SPECIFIES OTHERWISE.

Langevin Straight Line Equalizers



EQ251A — PROGRAM EQUALIZER

- **VARIABLE EQUALIZATION AT 6 IMPORTANT POINTS**
- **TWO ROTATING CAM SWITCHES FOR HIGH AND LOW FREQUENCY SELECTION**
- **IDEAL FOR INSTALLATION ON COMPACT CONTROL PANELS**

BRIDGED T
14 DB INSERTION LOSS
ROTATING CAM SWITCHES, TWO, FOR SELECTION OF 40 OR 100 CPS AND CHOICE OF 3, 5, 10 OR 15 KCPS
12 DB MAXIMUM BOOST OR 16 DB MAXIMUM ATTENUATION (AT SPECIFIED FREQUENCIES) IN 2.0 DB STEPS
PLUG CONNECTOR (ON REAR)
BLACK MATTE ESCUTCHEON, ENGRAVED
REQUIRES ONLY 1½" x 3½" PANEL SPACE (5½" DEEP, NOT INCLUDING PLUG)

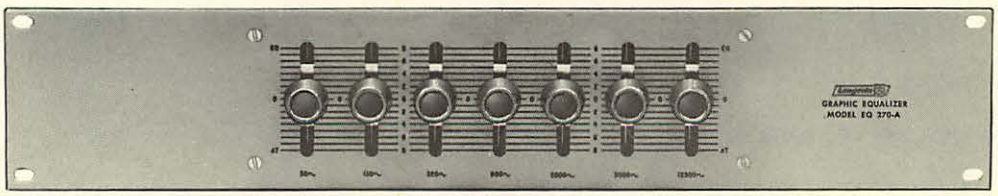
EQ252A — GRAPHIC EQUALIZER

- **VARIABLE EQUALIZATION AT 7 CENTER FREQUENCIES**
- **SMOOTH CURVE AT ANY SETTINGS OF LEVERS**

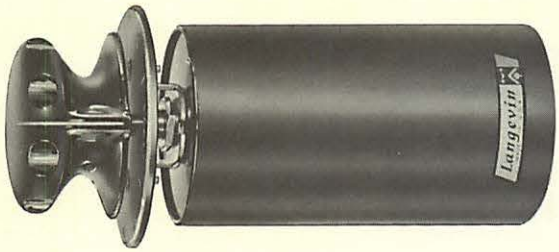
BRIDGED T
16 DB INSERTION LOSS
SEVEN VARIABLE SECTIONS: CENTER FREQUENCIES AT 50, 130, 320, 800, 2000, 5000 AND 12500 CPS
8 DB MAXIMUM BOOST OR 8 DB MAXIMUM ATTENUATION (AT SPECIFIED FREQUENCIES) IN 2.0 DB STEPS
TURRET-LUG TERMINALS
BLACK MATTE ESCUTCHEON, ENGRAVED
REQUIRES ONLY 3½" x 10" PANEL SPACE (5⅝" DEEP)

EQ270A — GRAPHIC EQUALIZER

SIMILAR TO EQ252A, BUT DESIGNED FOR RACK MOUNTING
LIGHT GRAY PANEL, ENGRAVED
REQUIRES 3½" x 19" PANEL SPACE (5⅝" DEEP)



Langevin Rotary Equalizers



2¼" DIAMETER x 4⅞" DEEP (MAXIMUM)

EQ261 DIALOGUE-MUSIC EQUALIZER

REDUCES LOW FREQUENCIES ON DIALOGUE; DIMINISHES "ROOM RUMBLE", HUM AND OTHER LOW FREQUENCY NOISE

ZERO INSERTION LOSS
20 DB MAXIMUM ATTENUATION, IN 5.0 DB STEPS AT 100 CPS
CLOCKWISE ROTATION INCREASES ATTENUATION

EQ260 3000 CYCLE VARIABLE EQUALIZER

PROVIDES ADDITIONAL RESPONSE IN THE 3000 CPS REGION; INCREASES INTELLIGIBILITY AND PROVIDES CORRECTIVE BALANCE WHERE LOWER FREQUENCIES ARE OVER-EMPHASIZED

8 DB INSERTION LOSS
8 DB MAXIMUM BOOST, IN 1.0 DB STEPS AT 3000 CPS
CLOCKWISE ROTATION INCREASES BOOST

EQ263 HIGH FREQUENCY VARIABLE EQUALIZER

REDUCES HIGH-FREQUENCY RESONANCES; CORRECTS EXCESSIVE SIBILANCE; ATTENUATES HIGH-FREQUENCY DISTORTION DUE TO OVERLOADING

ZERO INSERTION LOSS
16 DB MAXIMUM ATTENUATION, IN 2.0 DB STEPS AT 10 KCPS
CLOCKWISE ROTATION INCREASES ATTENUATION

EQ262 5000 CYCLE VARIABLE EQUALIZER

CORRECTS LOSSES IN THE 5000 CPS RANGE; INCREASES TONAL BALANCE AND SIBILANCE; PROVIDES "PRESENCE"

8 DB INSERTION LOSS
8 DB MAXIMUM BOOST, IN 1.0 DB STEPS AT 5000 CPS
CLOCKWISE ROTATION INCREASES BOOST

EQ266 HIGH FREQUENCY VARIABLE EQUALIZER

PROVIDES ADDITIONAL HIGH-FREQUENCY RESPONSE; COMPENSATES MANUALLY FOR DISC-RECORDER LOSSES DUE TO SMALL RECORDING-GROOVE DIAMETERS

14 DB INSERTION LOSS
12 DB MAXIMUM BOOST, IN 2.0 DB STEPS AT 10 KCPS
CLOCKWISE ROTATION INCREASES BOOST

EQ265 LOW FREQUENCY VARIABLE EQUALIZER

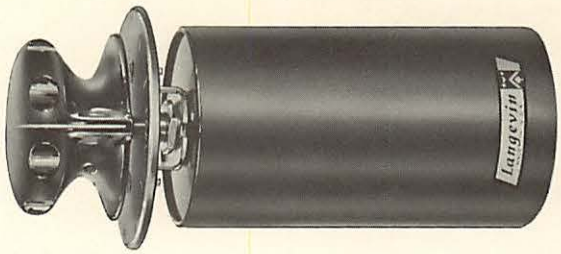
PROVIDES ADDITIONAL LOW-FREQUENCY RESPONSE; EXTENDS RANGE OF EQUIPMENT IN LOW-FREQUENCY REGION; EQUALIZES TONAL BALANCE OF "THIN" PROGRAM MATERIAL

14 DB INSERTION LOSS
12 DB MAXIMUM BOOST, IN 2.0 DB STEPS AT 100 CPS
CLOCKWISE ROTATION INCREASES BOOST

EQ258A PROGRAM EQUALIZER

SAME ELECTRICAL SPECIFICATIONS AS **EQ251A,** BUT DESIGNED FOR RACK MOUNTING
LIGHT GRAY PANEL, ENGRAVED
REQUIRES 3½" x 19" PANEL SPACE (5" DEEP)

Langevin Rotary Filters



EQ255A VARIABLE HIGH PASS FILTER
EQ255B VARIABLE LOW PASS FILTER

- INDEPENDENT HIGH AND LOW PASS UNITS
- EACH UNIT USES NO MORE SPACE THAN A ROTARY EQUALIZER
- OVERLAPPING CUT-OFF FREQUENCIES PROVIDE MAXIMUM FLEXIBILITY
- FLAT RESPONSE, EXCEPT AT CUT-OFF POINTS
- NO HUM OR EXTRANEOUS NOISE PICKUP

CONSTANT K
ZERO INSERTION LOSS
SOLDER-TERMINAL CONNECTIONS (ON REAR)
2 1/4" DIAMETER x 4 7/8" DEEP

EQ255A POSITIONS, ELEVEN: "OFF" (FULL FREQUENCY TRANSMISSION), CUT-OFF FREQUENCIES 70, 100, 250, 500, 1000, 2000, 3000, 4000, 5000, AND 7500 CPS

EQ255B POSITIONS, ELEVEN: "OFF" (FULL FREQUENCY TRANSMISSION), CUT-OFF FREQUENCIES 10000, 8000, 6000, 5000, 4000, 3000, 2000, 1000, 500 AND 250 CPS

EQ259A VARIABLE HIGH AND LOW PASS FILTER

COMBINES **EQ255A** AND **EQ255B** ON A SINGLE PANEL, FOR RACK MOUNTING
LIGHT GRAY PANEL, ENGRAVED
INCLUDES "IN" AND "OUT" KEY
REQUIRES 3 1/2" x 19" PANEL SPACE (5 5/8" DEEP)

Fixed Filters & Equalizers

- 3 DB DOWN AT CUT-OFF FREQUENCIES
- 1 7/8" w. x 2 1/2" h. x 1 3/4" d.

LIGHT GRAY BAKED ENAMEL FINISH

LOW PASS FILTERS

ZERO INSERTION LOSS
ONE FULL SECTION CONSTANT K, AND TWO M-DERIVED HALF SECTIONS

MODEL	CUT-OFF FREQUENCY
LP8	8 KCPS
LP15	15 KCPS

HIGH PASS FILTERS

ZERO INSERTION LOSS
ONE FULL SECTION CONSTANT K

MODEL	CUT-OFF FREQUENCY
HP50	50 CPS
HP70	70 CPS
HP80	80 CPS

EQ257A RIAA EQUALIZER

- PRODUCES THE DESIRED RIAA CURVE CHARACTERISTICS
- USED FOR PLAYBACK OF PHONOGRAPH RECORDS

20 DB INSERTION LOSS
RIAA EQUALIZATION

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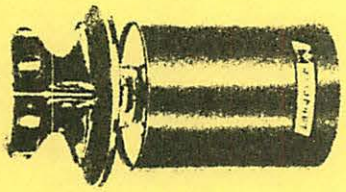
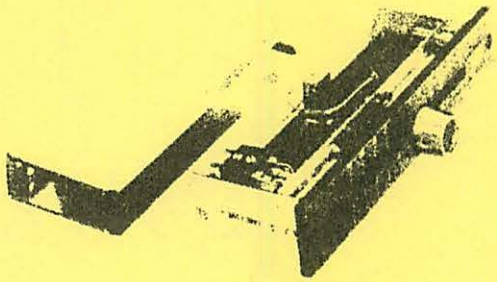


Rotary & Straight Line Mixers & Attenuators

GENERAL

- **Solid Silver Brush Contacts**
  Contact noise virtually eliminated
  Extended life
- **Printed Contact Boards Heavily Plated with Silver**
  Smooth operation
  Low drag
- **Rotary Units**
  Permanently lubricated within dust-proof enclosure
  Stainless steel shafts
  Long life, non-seizing
  Low friction
- **Straight Line Units**
  2-5/16 inches deep behind panel
  6-5/8 inches long
  Integral female connector
  (male connector supplied as an accessory)
  Removable slip cover for inspection and cleaning
  Adjustable for amount of force required to move slider
  (slide wire types only)
  Carriage moves on precision ground chrome plated shaft



DESIGNATION CODE

D.....Detent

E.....Escutcheon

Q.....Cue Position

RAT.....Rotary Attenuator (except "Mixer" types)

RATM.....Meter Range Extender
(formerly ATX)

RMX.....Rotary Mixer Attenuator
(formerly MX)

RPP.....Rotary Panoramic Divider (Pan Pot)

SMX.....Straight Line Mixer Attenuator

SPP.....Straight Line Panoramic Divider (Pan Pot)
(formerly SLPP)

V.....Last Step Infinity

HOW TO ORDER

S MX Q 111 / / /

STYLE:
R Rotary
S Straight Line

FUNCTION:
AT Attenuator (except "Mixer" type)
ATM VU Meter Range Extender
MX Attenuator, Mixer Type
PP Panoramic Divider (Pan Pot)

SPECIAL FEATURES:
D Detented (1)
Q Cue Position (1)
V Infinite Attenuation when fully CCW

TYPE:
See Catalog For Proper 3-Digit Listing. NOTE: Add "2" For Dual Unit, "3" For Triple, etc.,

INPUT IMPEDANCE:
In Ohms. Use "K" For Thousands of ohms.

OUTPUT IMPEDANCE:
In Ohms. Use "K" For Thousands of ohms.

EXAMPLES OF ORDERING:

S MX Q 1112 / 600 / 600

Straight Line — Mixer-Type Attenuator — With Cue Position — Type 111 (See Catalog) 2-Gang — Input Impedance (Ohms) — Output Impedance (Ohms)

R AT 616 / 150 / 250

Rotary — Attenuator — Type 616 (See Catalog) Single Gang — Input Impedance (Ohms) — Output Impedance (Ohms)

GENERAL NOTE:

(1) A CONTROL MAY BE DETENTED (CODE "D") OR IT MAY HAVE A CUE POSITION (CODE "Q"), BUT THE TWO ARE MUTUALLY EXCLUSIVE. THERE CAN BE NO "QD" CONTROL WHICH IS BOTH DETENTED AND WITH CUE.

UNBALANCED LADDER NETWORKS

RMX TYPE CONTROLS are generally tapered to infinity and do not provide detented positions. "Q" positions may usually be provided by adding the letter "Q" to the type code (RMXQ). Resistor Tolerance: ±5%

If a detented control is required, add letter "D" to the type code (RMXD). The "Q" and "D" configurations are mutually exclusive. A detented control can not be provided with a "Q".

RAT TYPE CONTROLS have linear attenuation and detented positions. Normally, these controls do not have an infinity position. However, this step can be provided in most attenuators by adding the letter "V" to the type code (RATV). Resistor Tolerance: ±1%

MULTI-GANG UNITS - Most attenuators can be fabricated with more than one control section coupled to the same shaft. Check tabulation below for availability.

Length of Controls: 1 Gang - 1 5/8" 3 Gang - 4"
2 Gang - 2 7/8" 4 Gang - 4"

Description	RMX TYPE Cat. No.	Max. DB	Q	GANG 2	3	4	DB/Step	RAT TYPE Cat. No.	Max. DB	V	GANG 2	3	4
20 Steps 15°/Step 300°Rota. 1½" dia.							1.5	RAT-618	30	●	●	●	●
	RMX-201	∞	●	●	●	●	2.0	RAT-631	40	●	●	●	●
30 Steps 11¼°/Step 337½°Rota. 1½" dia.	RMX-206	∞		●	●	●	1.5	RAT-634	45		●	●	●
	RMX-207	∞		●	●	●	2.0	RAT-635	60		●	●	●
32 Steps 10°/Step 320°Rota. 1½" dia.	RMX-203	∞	●	●	●	●	1.5						
44 Steps 7½°/Step 352½°Rota. 2¼" dia.	RMX-215	∞	●	●	●	●	1.0						
45 Steps 7½°/Step 337½°Rota. 2¼" dia.	RMX-205	∞		●	●	●	1.0	RAT-624	45		●	●	●

IMPEDANCE - The following terminal impedances are available as standard:
150/150 ohms 300/300 ohms 600/600 ohms 600/1200 ohms
Most other impedances are available upon request without additional charge.

BALANCED LADDER NETWORKS

RMX TYPE CONTROLS are generally tapered to infinity and do not provide detented positions. "Q" positions may usually be provided by adding the letter "Q" to the type code (RMXQ). Resistor Tolerance: ±5%

If a detented control is required, add letter "D" to the type code (RMXD). The "Q" and "D" configurations are mutually exclusive. A detented control can not be provided with a "Q".

RAT TYPE CONTROLS have linear attenuation and detented positions. Normally, these controls do not have an infinity position. However, this step can be provided in most attenuators by adding the letter "V" to the type code (RATV). Resistor Tolerance: ±1%

MULTI-GANG UNITS - Most attenuators can be fabricated with more than one control section coupled to the same shaft. Check tabulation below for availability.

Length of Controls: 1 Gang - 1 5/8" 3 Gang - 4"
2 Gang - 2 7/8" 4 Gang - 4"

Description	RMX TYPE Cat. No.	Max. DB	Q	GANG 2	3	4	DB/Step	RAT TYPE Cat. No.	Max. DB	V	GANG 2	3	4
20 Steps 15°/Step 300°Rota. 2¼" dia.							1.5	RAT-632	30	●	●	●	
	RMX-202	∞	●	●	●		2.0	RAT-633	40	●	●	●	
30 Steps 11¼°/Step 337½°Rota. 2¼" dia.	RMX-208	∞		●	●		1.5	RAT-638	45		●	●	
							2.0	RAT-639	60		●	●	
32 Steps 10°/Step 320°Rota. 2¼" dia.	RMX-204	∞	●	●	●		1.5						
44 Steps 7½°/Step 352½°Rota. 2¼" dia.	RMX-210	∞	●	●	●		1.0						
45 Steps 7½°/Step 337½°Rota. 2¼" dia.	RMX-209	∞		●	●		1.0	RAT-640	45	●	●	●	

IMPEDANCE - The following terminal impedances are available as standard:
150/150 ohms 300/300 ohms 600/600 ohms 600/1200 ohms
Most other impedances are available upon request without additional charge.

BRIDGED "T" NETWORKS

RMX TYPE CONTROLS are generally tapered to infinity and do not provide detented positions. "Q" positions may usually be provided by adding the letter "Q" to the type code (RMXQ). Resistor Tolerance: ±5%

If a detented control is required, add letter "D" to the type code (RMXD). The "Q" and "D" configurations are mutually exclusive. A detented control can not be provided with a "Q".

RAT TYPE CONTROLS have linear attenuation and detented positions. Normally, these controls do not have an infinity position. However, this step can be provided in most attenuators by adding the letter "V" to the type code (RATV). Resistor Tolerance: ±1%

MULTI-GANG UNITS - Most attenuators can be fabricated with more than one control section coupled to the same shaft.

Check tabulation on following page for availability.

BRIDGED T NETWORKS

Description	RMX TYPE Cat. No.	Max. DB	Q	GANG 2	3	4	DB/Step	RAT TYPE Cat. No.	Max. DB	V	GANG 2	3	4	
10 Steps 15°/Step 150°Rota. 1½" dia.							0.1	RAT-500	1.0		●	●	●	*
							0.1	RAT-612	1.0		●	●	●	
							0.5	RAT-613	5.0		●	●	●	
							0.5	RAT-654	5-0-5		●			
							1.0	RAT-505	10.0		●	●	●	*
							1.0	RAT-606	10.0		●	●	●	
							1.5	RAT-652	15.0		●	●	●	
							2.0	RAT-600	20.0		●	●	●	
							2.0	RAT-619	18/∞	●	●	●	●	
							10.0	RAT-510	100.0		●	●	●	*
20 Steps 15°/Step 300°Rota. 2¼" dia.							0.1	RAT-614	2.0	●	●	●	●	
							0.5	RAT-629	10.0	●	●	●	●	
							1.0	RAT-607	20.0		●	●	●	
							1.0	RAT-630	19/∞	●	●	●	●	
							1.5	RAT-641	30.0	●	●	●	●	
	RMX-601	∞	●	●	●	●	2.0	RAT-601	40.0		●	●	●	
							2.0	RAT-626	38/∞	●	●	●	●	
							3.0	RAT-642	60.0	●	●	●	●	
30 Steps 10°/Step 300°Rota. 2¼" dia.							0.1	RAT-615	3.0	●	●	●	●	
							0.5	RAT-623	15.0	●	●	●	●	
							1.0	RAT-608	30.0	●	●	●	●	
							1.5	RAT-645	45.0	●	●	●	●	
							2.0	RAT-602	60.0	●	●	●	●	
11¼°/Step 337½°Rota. 2¼" dia.	RMX-600	∞		●	●	●	1.5							
	RMX-603	∞		●	●	●	2.0	RAT-628	58/∞	●	●	●	●	
32 Steps 10°/Step 320°Rota. 2¼" dia.	RMX-602	∞	●	●	●	●	1.5							
45 Steps 7½°/Step 337½°Rota. 2¼" dia.	RMX-606	∞		●			0.5	RAT-636	22.5		●			**
	RMX-625	∞		●			1.0	RAT-637	45.0		●			**

IMPEDANCE - The following terminal impedances are available as standard:
150/150 ohms 300/300 ohms 600/600 ohms
Most other impedances are available upon request without additional charge.

*Type RAT 500 control are precision decade attenuators with a resistor tolerance of ±½%.

**Single-gang control are 2 7/8" long;2-gang controls are 4" long.

Length of Controls: 1 Gang - 1 5/8" 3 Gang - 4"
2 Gang - 2 7/8" 4 Gang - 4"

"H" NETWORKS

RMX TYPE CONTROLS are generally tapered to infinity and do not provide detented position. "Q" positions may usually be provided by adding the letter "Q" to the type code (RMXQ) Resistor Tolerance: ±5%

If a detented control is required, add letter "D" to the type code (RMXD). The "Q" and "D" configurations are mutually exclusive. A detented control can not be provided with a "Q".

RAT TYPE CONTROLS have linear attenuation and detented positions. Normally, these controls do not have an infinity position. However, this step can be provided in most attenuators by adding the letter "V" to the type code (RATV). Resistor Tolerance: ±1%

MULTI-GANG UNITS - Most attenuators can be fabricated with more than one control section coupled to the same shaft.

Check tabulation on following page for availability.

"H" NETWORKS

Description	RMX TYPE Cat. No.	Max. DB	Q	GANG 2	3	4	DB/Step	RAT TYPE Cat. No.	Max. DB	V	GANG 2	3	4	
10 Steps 15°/Step 150° Rota. 2¼" dia.							0.1	RAT-501	1.0		●	●		*
							0.1	RAT-616	1.0		●	●		
							0.5	RAT-617	5.0		●	●		
							1.0	RAT-506	10.0		●	●		*
							1.0	RAT-609	10.0		●	●		
							1.5	RAT-648	15.0		●	●		
							2.0	RAT-603	20.0		●	●		
							10.0	RAT-511	100.0		●	●		*
15 Steps 10°/Step 150° Rota. 2¼" dia.							1.0	RAT-621	15.0	●	●	●		
							2.0	RAT-622	30.0	●	●	●		
20 Steps 15°/Step 300° Rota. 2¼" dia.							0.1	RAT-625	2.0	●	●			**
							0.5	RAT-650	10.0	●	●			**
							1.0	RAT-610	20.0	●	●			**
							1.5	RAT-651	30.0	●	●			**
	RMX-604	∞	●	●			2.0	RAT-604	40.0	●	●			**
30 Steps 10°/Step 300° Rota. 2¼" dia.							0.1	RAT-653	3.0	●	●			**
							0.5	RAT-656	15.0	●	●			**
							1.0	RAT-611	30.0	●	●			**
							1.5	RAT-659	45.0	●	●			**
							2.0	RAT-605	60.0	●	●			**
32 Steps 10°/Step 320° Rota. 2¼" dia.	RMX-605	∞	●	●			1.5							**

IMPEDANCE - The following terminal impedances are available as standard:
150/150 ohms 300/300 ohms 600/600 ohms

Most other impedances are available upon request without additional charge.

*Type RATV 500 controls are precision decade attenuators with a resistor tolerance of $\pm\frac{1}{2}\%$.

**Single-gang controls are 2 7/8" long; two-gang controls are 4" long.

Length of Controls: 1 Gang - 1 5/8" 3 Gang - 4"
2 Gang - 2 7/8" 4 Gang - 4"

VU-METER RANGE EXTENDERS
(RATM)

VU Meters are adjusted to 3900 ohms. Rotary range extenders should be of the "T" configuration and 3900 ohms impedance. In order properly to read +4 VU a 3600 ohm series resistor is required. Most LANGEVIN Bridge "T" attenuators for such applications provide two fixed resistors in series, one of 3300 ohms and the other of 300 ohms, the terminals of which appear on the back plate of the VU Range Extender Attenuator. This permits the use of a Variable Wire-Wound Resistor for stereo balance or calibration by selecting the appropriate solder terminal.

All units are shipped complete with engraved dial and LANGEVIN Model K-108 RCA Type Knob. Resistor Accuracy - ±1%

Length - 1 Gang - 1 5/8" 3 Gang - 4"
2 Gang - 2 7/8"

Description	Cat. No.	Range	DB/Step	Impedance	Gang 2	Gang 3	Note
10 Steps 15°/Step 150° Rota. 1½" Dia.	RATM 300	+4/+14	1	7.5K/3.9K	●	●	1
	RATM 301	+4/+24	2	7.5K/3.9K	●	●	1
12 Steps 15°/Step 180° Rota. 2¼" Dia.	RATM 309	1 MW/+4/+24/OFF	2	7.1K/3.9K	●	●	2
	RATM 310	1 MW/+4/+24/OFF	2	7.5K/3.9K	●	●	1
	RATM 311	+4/+26/OFF	2	3.9K/3.9K	●	●	3
	RATM 312	+4/+26/OFF	2	7.1K/3.9K	●	●	2
	RATM 320	+4/+26/OFF	2	7.5K/3.9K	●	●	1
15 Steps 15°/Step 225° Rota. 2¼" Dia.	RATM 305	+4/+34	2	7.5K/3.9K	●	●	1
20 Steps 15°/Step 300° Rota. 2¼" Dia.	RATM 302	+4/+24	1	7.5K/3.9K	●	●	1
	RATM 303	+4/+44	2	7.5K/3.9K	●	●	1
	RATM 314	1 MW/+4/+40/OFF	2	7.1K/3.9K	●	●	2
	RATM 315	1 MW/+4/+40/OFF	2	7.5K/3.9K	●	●	1
	RATM 316	1 MW/+4/+40/OFF	2	6.9K/3.9K	●	●	2
	RATM 317	+4/+42/OFF	2	7.1K/3.9K	●	●	3
	RATM 318	+4/+42/OFF	2	3.9K/3.9K	●	●	3
	RATM 319	+4/+42/OFF	2	7.5K/3.9K	●	●	1
30 Steps 10°/Step 300° Rota. 2¼" Dia.	RATM 304	+4/+34	1	7.5K/3.9K	●	●	1

NOTE:
1. No zero adjust rheostat required.
2. Zero adjust rheostat required.
3. External 3600 ohm resistor required.

POTENTIOMETERS

RMX TYPE CONTROLS are generally tapered to infinity and do not provide detented positions.

"Q" positions on these controls are available, but the diameter of $1\frac{1}{2}$" controls will increase to $2\frac{1}{4}$". Controls with a basic diameter of $2\frac{1}{4}$" (RMX 641) will increase in length from 1 5/8" for the single-gang control to 2 7/8" if a "Q" position is provided. This increase in size is dictated by the potentiometer circuitry, which does not allow an integral "Q" position.

If a detented control is required, add letter "D" to the type code (RMXD). The "Q" and "D" configurations are mutually exclusive. A detented control can not be provided with a "Q". Resistor Tolerance: ±5%

RAT TYPE CONTROLS have linear attenuation and detented positions. Normally, these controls do not have an infinity position. However, this step can be provided in most attenuators by adding the letter "V" to the type code (RATV). Resistor Tolerance: ±1%

DUAL OR BALANCED CIRCUITS are not provided as standard units. Any standard 2-gang unit may be wired to obtain a balanced or dual potentiometer. This wiring should be done externally on the control terminal plate. The only precaution is to consider the desired terminal impedance for balanced potentiometers. For this application, order a 2-gang unit with $\frac{1}{2}$ the desired terminal impedance. If a 50K ohm balanced potentiometer is required, order a 2-gang; 25K ohm control and connect all common terminals to center/ground.

All 10° and 15° RAT Potentiometers can be supplied with 2-gangs on one deck. This affords considerable space saving behind the front panel of the console since a 2-gang control will be only 1 5/8" deep. The diameter of these controls will increase from $1\frac{1}{2}$" to $2\frac{1}{4}$". Please specify on your order "Short Form", otherwise standard length will be supplied. There is no extra charge for this configuration.

CHECK TABULATION ON FOLLOWING PAGE FOR AVAILABILITY.

POTENTIOMETERS

Description	RMX TYPE Cat. No.	Max. DB	Q	GANG 2	3	4	DB/Step	RAT TYPE Cat. No.	Max. DB	V	GANG 2	3	4	
10 Steps 15°/Step 150° Rota. 1½" Dia.							0.1	RAT-502	1.0		●	●	●	*
							1.0	RAT-507	10.0		●	●	●	*
							5.0	RAT-670	50.0	●	●	●	●	
							10.0	RAT-512	100.0		●			*
20 Steps 15°/Step 300° Rota. 1½" Dia.							1.5	RAT-671	30.0	●	●	●	●	
	RMX-612	∞		●	●	●	2.0	RAT-672	40.0	●	●	●	●	
							3.0	RAT-673	60.0	●	●	●	●	
							5.0	RAT-674	100.0	●	●			
30 Steps 10°/Step 300° Rota. 1½" Dia.							1.0	RAT-675	30.0	●	●	●	●	
	RMX-624	∞		●	●	●	1.5	RAT-676	45.0	●	●	●	●	
	RMX-632	∞		●	●	●	2.0	RAT-677	60.0	●	●	●	●	
32 Steps 10°/Step 320° Rota. 1½" Dia.	RMX-618	∞		●	●	●	1.5							
45 Steps 7.5°/Step 337.5° Rota. 2¼" Dia.	RMX641	∞		●	●	●	1.0	RAT-678	45		●	●	●	

IMPEDANCE - The following terminal impedances are available as standard:
25 K ohms - 50 K ohms - 100 K ohms - 250 K ohms

Most other impedances are available upon request without additional charge.

*Type RAT500 controls are precision decade potentiometers with a resistor tolerance of ±½%.

Length of Controls: 1 Gang - 1 5/8" 3 Gang - 4"
2 Gang - 2 7/8" 4 Gang - 4"

All grind controls Type "CG" are discontinued. Please use "RAT" or "RMX" controls, depending on whether a close tolerance linear control or a tapered mixer control is desired. The catalog page on potentiometers will identify the control characteristics of these devices.

The following is a tabulation of all CG-controls and their substitutes:

Cat. No.	Steps	DB/Step	Remarks
CG 300	32	1.5	Use RMX 618
CG 301	20	2	Use RAT 672
CG 302	20	2	" "
CG 303	20	2	" "
CG 304	20	2	" "
CG 305	32	1.5	NO DIRECT SUBSTITUTE (Similar to RMX 618)
CG 315	10	5(Dual)	Use RAT 6702
CG 319	15	5(Dual)	NO DIRECT SUBSTITUTE
CG 333	10	5	Use RAT 670
CG 334	15	5	NO DIRECT SUBSTITUTE
CG 335	20	2	Use RAT 672
CG 337	30	1	Use RAT 675
CG 338	30	2	Use RAT 677
CG 339	45	1	Use RAT 678
CG 347	30	2	Use RATV 677
CG 348	20	2 3	Use RATV 672
CG 349	20	1.5	Use RAT 671
CG 351	20	1.5(Dual)	Use RAT 6712
CG 355	20	2(Dual)	Use RAT 6722
CG 357	20	3	Use RAT 673
CG 359	20	3(Dual)	Use RAT 6732
CG 361	20	5	Use RAT 674
CG 363	20	5(Dual)	Use RAT 6742
CG 367	30	1(Dual)	Use RAT 6752
CG 369	30	1	Use RAT 675
CG 371	30	1(Dual)	Use RAT 6752
CG 373	30	1.5	Use RAT 676
CG 375	30	1.5(Dual)	Use RAT 6762
CG 377	30	1.5	Use RAT 676
CG 379	30	1.5(Dual)	Use RAT 6762
CG 383	30	2(Dual)	Use RAT 6772
CG 385	30	2	Use RAT 677
CG 387	30	2(Dual)	Use RAT 6772
CG 391	45	1(Dual)	Use RAT 6782

PANORAMIC ATTENUATORS

ROTARY PAN POT - RPP 701
(With K-108 Knob and special Dial)

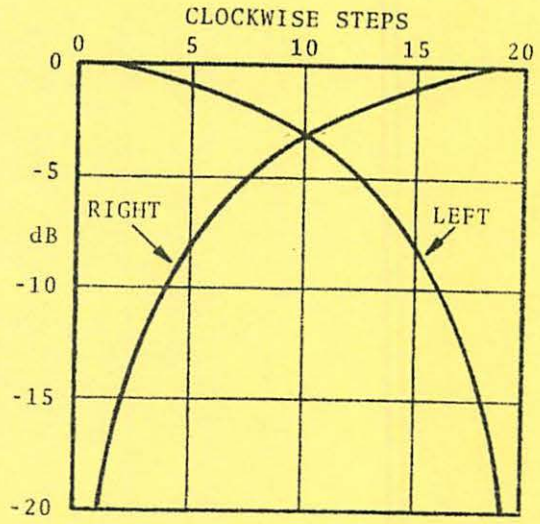
STRAIGHT LINE PAN POT - SPP 701
(With Knob but less Escutcheon)

These controls are designed to move a monophonic signal across a stereophonic field.

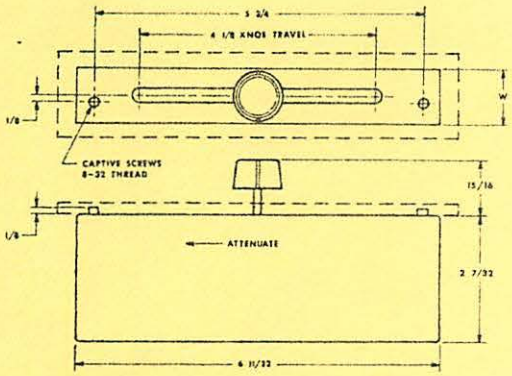
The combined power output of all channels remains constant as the control knob is moved.

SPECIFICATIONS:

Circuit:	Bridged "T"
Insertion Loss:	6 db per channel. At center position each output channel is down an additional 3 db (eff. insertion loss 9 db)
Impedance:	600 ohms "in" or "out"
Input Channel:	1
Output Channel:	2
Number of Steps:	20
Degrees per Step:	15°
Dial Marking:	L - C - R
Physical Size:	RPP 701 - 2 1/4" dia./ 2 7/8" long
	SPP 701 - 6 11/32 x 1 11/16 x 2 7/32



Langevin Straight Line Units



WIDTHS: SINGLE: 15/16"
2 GANG: 1 11/16"
3 GANG: 2 1/2"
4 GANG: 3 1/4"
6 GANG: 4 5/8"

STRAIGHT LINE ATTENUATORS
(With Last Step Infinity)

RESISTOR ACCURACY: 5% Single Units
2% Multiple Units

CAT. NO.	CIRCUIT	STEPS	DB/STEP	MAX. ATTEN.	
SMX 113	Unbalanced	32	0.5	∞	*
SMX 114	Bridged "T"	32	1.5	∞	*
SMX 115	Potentiometer	20	2.0	∞	
SMX 120	Potentiometer	32	1.5	∞	

STRAIGHT LINE LINEAR ATTENUATORS

CAT. NO.	CIRCUIT	STEPS	DB/STEP	MAX. ATTEN.
SAT 110	Bridged "T"	30	0.5	15 DB

STRAIGHT LINE SLIDE WIRE MIXER ATTENUATORS

CAT. NO.	CIRCUIT	DB/STEP	IMPEDANCE
SMX 111	Unbalanced Ladder	App. 0.1 DB	150 ohms or 600 ohms *

*Available with "Q" position

All Straight Line Attenuators are available in 2-gang; 3-gang; 4-gang; and 6-gang assemblies.

In controls with "Q" position the maximum is a 4-gang unit.

ESCUTCHEONS

SUFFIX		WIDTH
ES	Narrow Single	1 1/4"
EW	Wide Single	1 1/2"
E2	2 Gang	1 3/4"
E3	3 Gang	2 5/8"
E4	4 Gang	3 1/4"
E6	6 Gang	4 3/4"