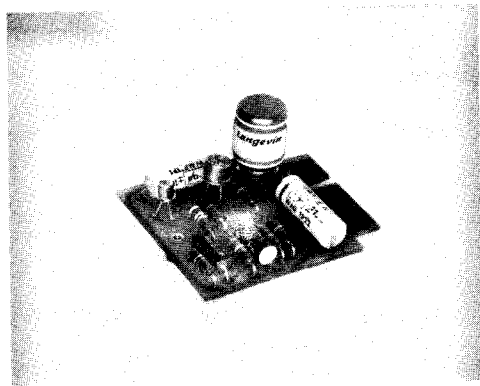


The Langevin 4000 series Sound Reinforcing Modules are basic solid state products designed for simplicity of assembly and operation yet represent a drastic improvement in quality and reliability over existing public address gear.

Engineering of the series comes from the same office that developed Langevins highly successful solid state broadcast and recording products.

Components for the 4000 series were selected to give long service with a minimum of maintenance.

Specifications of the products are the result of market surveys to the sound contractors and recommendations by leading sound consultants throughout the world.



AM4100 AMPLIFIER (Primarily for Preamplifier Service)

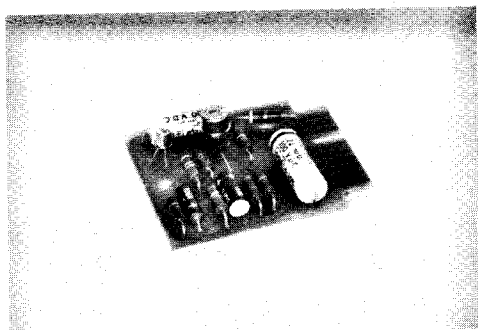
INPUT IMPEDANCE:	250 ohms nominal, approximately 1500 ohms actual. Equipped with input transformer.
GAIN:	—53 dbm input causes approximately 0.25 v. r.m.s. output signal. (See note at bottom of specifications list.)
FREQUENCY RESPONSE:	± 1.0 db from 30 cps to 15 Kcps.
OUTPUT IMPEDANCE:	To be loaded by 250 Kohm.
HARMONIC GENERATION:	At 5 v. r.m.s. out (into 250 Kohm), total harmonic generation will not exceed 0.25% at 1000 cps or 1.0% over the range 30 cps to 15 Kcps.
NOISE:	—116 dbm input equivalent, or better.
POWER REQUIREMENT:	Approximately 220 microamperes at 42 volts DC. NOTE: Do not supply from source over 50 volts.

Gain of this unit may be increased 10 db (for use with extremely low level devices). See instructions for AM4100. If it is desired that the increase in gain be variable (by screwdriver), use Modification Group MG4007.

AM4300 AMPLIFIER (Primarily for Preamplifier Service)

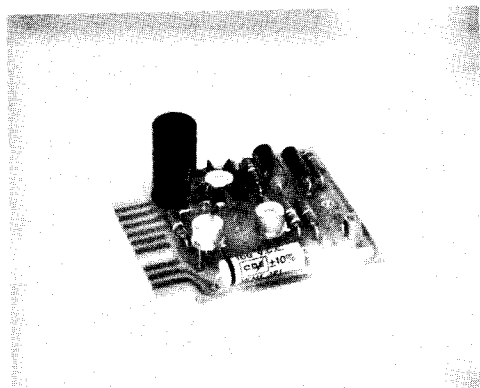
INPUT IMPEDANCE:	Over 250 Kohm. This device is meant to be driven from a high impedance microphone (or other transducer) or from a potentiometer (gain control) not over 250 Kohm.
GAIN:	25 millivolts causes approximately 0.25 v. output. (See note at bottom of specifications list.)
FREQUENCY RESPONSE:	± 0.2 db from 30 cps to 15 Kcps.
OUTPUT IMPEDANCE:	To be loaded by 250 Kohm.
HARMONIC GENERATION:	At 5 v. r.m.s. out (into 250 Kohm), total harmonic generation will not exceed 0.25% at 1000 cps or 1.0% over the range 30 cps to 15 Kcps.
NOISE:	—116 dbm input equivalent, or better.
POWER REQUIREMENT:	Approximately 220 microamperes at 42 volts DC. NOTE: Do not supply from source over 50 volts.

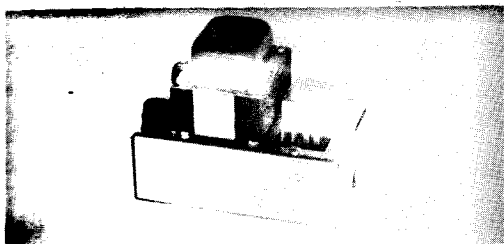
Gain of this unit may be increased 10 db. See instructions for AM4300. If it is desired that the increase in gain be variable (by screwdriver), use Modification Group MG4007. This amplifier may be given a phonograph (RIAA) frequency response characteristic by use of Modification Group MG4001.



AM4700 AMPLIFIER (Line Driver or Program Amplifier)

INPUT IMPEDANCE:	Over 250 Kohm.
GAIN:	50 millivolts causes output of +4 dbm.
FREQUENCY RESPONSE:	± 0.5 db from 30 cps to 15 Kcps.
OUTPUT IMPEDANCE:	600 ohms nominal, unbalanced.
OUTPUT POWER:	+18 dbm nominal.
HARMONIC GENERATION:	At +18 dbm into 600 ohms, total harmonic generation will not exceed 0.25% at 1000 cps or 0.8% over the range 30 cps to 15 Kcps.
NOISE:	Noise will be at least 60 db below an output level of +4 dbm.
POWER REQUIREMENT:	Approximately 36 milliamperes at 42 volts DC.





PS4900

Regulated supply 42 volts (nominal) at 250 MA. with less than one millivolt ripple, mains: 117 volt 60 cycle. Also contains second-filter 40 volts 5 MA.

SIZE: 5¼" long, 3" wide, 4" high.

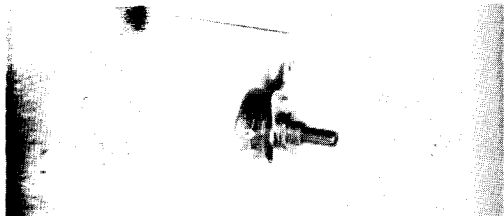
WEIGHT: 3½ pounds.

Will power 20 preamplifiers type AM4100 or AM4300 plus 4 line amplifiers type AM4700.



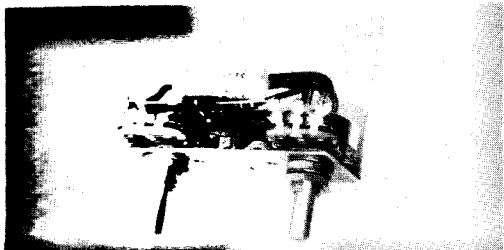
MG4001

Converts AM4100 to RIAA disc playback frequency response. Five millivolts RMS 1000 CPS input to AM4100 produces 0.25 volt equalized output. Mounts on mounting holes "A" on tray TRY4000.



MG4007

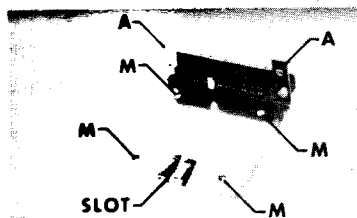
Gain control mounted on accessory bracket BKT4000.



EQ4008

Tone Control. Modification group will boost or attenuate approximately 10 db at 50 CPS and 15,000 CPS. Used with AM-4300 Amplifier, total gain will be unity. Replaces BKT4000 Bracket for panel-mounting.

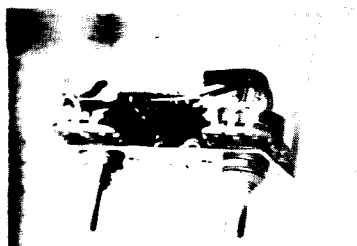
BUILDING BLOCK HARDWARE FOR 4000 SERIES, SIMPLIFIES SOUND SYSTEM CONSTRUCTION



TRAY TRY 4000 can be mounted by means of 4 holes "M". The amplifiers plug into TRY 4000. The stud on the circuit board fits into slot on TRY 4000 to assure retention. Modification groups are mounted on holes "A".



Modification groups mounted on screw holes "A" with wires to terminal side of receptacle. Wires are soldered to appropriate terminals on receptacle.



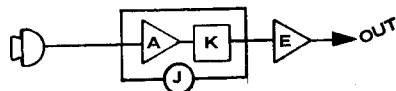
Equalization group EQ 4008 is mounted on a separate bracket that will accommodate the tray assembly. The assembly of equalization group, TRY 4000 with preamp or amplifier, may be panel mounted by means of the bushings on the equalizer controls.



Mounting bracket BKT 4000 is used wherever it is necessary to mount the TRY 4000 on a non-horizontal plane. The TRY 4000 may be mounted in any one of four attitudes, rear down, front down, either side down. In addition, one or two rotary controls may be mounted on BKT 4000 and the assembly may be mounted on the bushing of the controls. The BKT 4000 has an angle cut on one side to permit mounting near the bottom of a sloping panel.

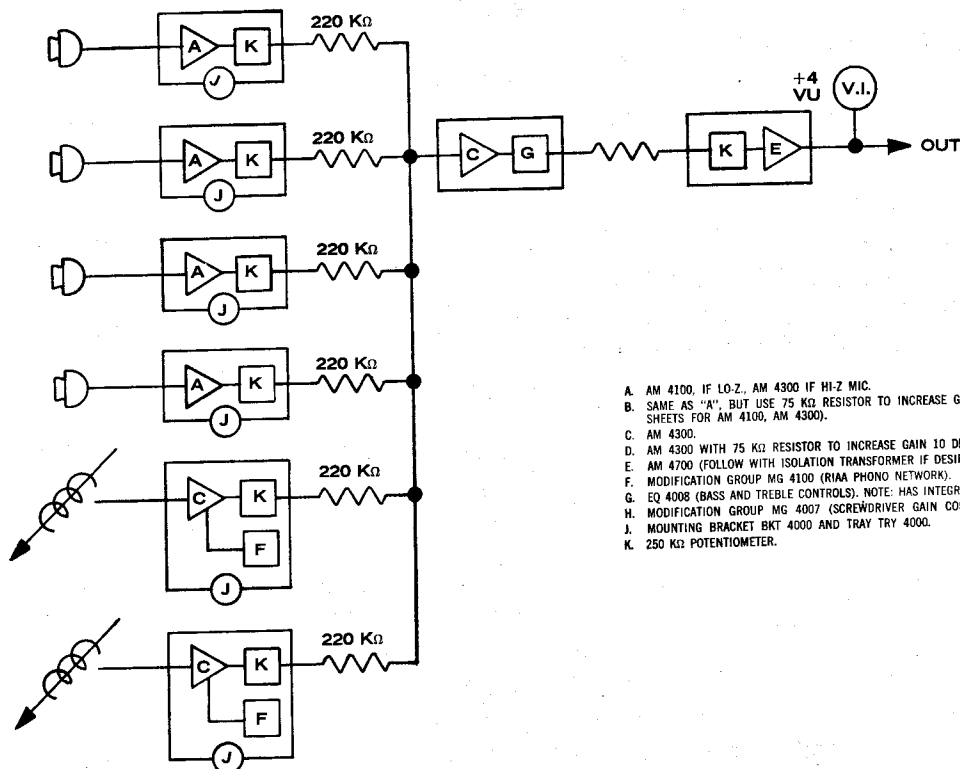
STAY

(4) **MONOPHONIC (Split) MICROPHONE AND STEREO PHONOGRAPH**
(With aux. input for stereo source such as output of tape playback unit.)

[illegible]

(NOTE: Undesired cross-channel signals will be more than 30 DB below program, under worst conditions. There will be no cross-channel with mic. gain closed).

(3) **FOUR MICROPHONES, TWO PHONO-
GRAPHS TO LINE. WITH BASS AND
TREBLE CONTROLS.**



- A. AM 4100, IF LO-Z, AM 4300 IF HI-Z MIC.
- B. SAME AS "A", BUT USE 75 K Ω RESISTOR TO INCREASE GAIN 10 DB. (SEE SPEC. SHEETS FOR AM 4100, AM 4300).
- C. AM 4300.
- D. AM 4300 WITH 75 K Ω RESISTOR TO INCREASE GAIN 10 DB.
- E. AM 4700 (FOLLOW WITH ISOLATION TRANSFORMER IF DESIRED).
- F. MODIFICATION GROUP MG 4100 (R1A PHONO NETWORK).
- G. MODIFICATION GROUP MG 4007 (SCREWDRIVER GAIN CONTROL).
- H. EQ 4008 (BASS AND TREBLE CONTROLS). NOTE: HAS INTEGRAL MOUNTING BRACKET.
- I. MODIFICATION GROUP MG 4007 (SCREWDRIVER GAIN CONTROL).
- J. MOUNTING BRACKET BKT 4000 AND TRAY TRY 4000.
- K. 250 K Ω POTENTIOMETER.

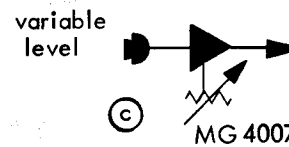
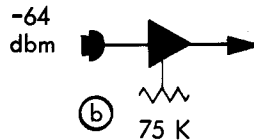
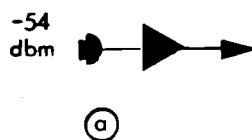
I. INPUT SERVICES

One preamplifier will be required for each low-level input. The AM4100 Amplifier is used for low-Z microphones. The AM4300 Amplifier is used for high-Z microphones and, when equipped with a MG4001 Modification Group, for magnetic phonograph cartridges.

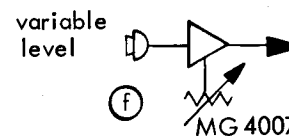
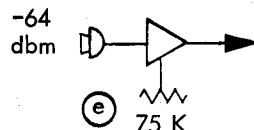
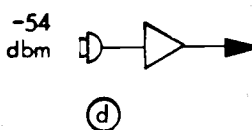
II. INPUT LEVELS

For the sake of simplicity of computation, it is assumed that all microphones produce a level of -54 dbm, all magnetic cartridges produce a level of 1.5 mv per cm, and all high-level sources are 0.25 volt rms. Thus, it can be assumed that there is 0.25 volt rms at the high side of each mixer attenuator control. A note of warning: It is possible to increase the gain of the preamplifiers to a considerable extent. (See individual specifications sheets for instructions on this.) Care must be taken that the gain is not raised to an extent such that loud microphone signals will "clip" (overload).

III. INPUT CIRCUIT BLOCK DIAGRAMS



LOW-Z MICROPHONE INPUTS, USING AM4100 AMPLIFIER

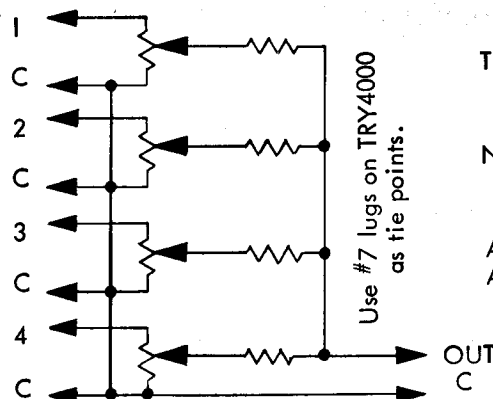


HIGH-Z MICROPHONE INPUTS, USING AM4300 AMPLIFIER

IV. MIXER CIRCUITS

The mixing scheme for the Series 4000 Units is quite simple. Each of the input circuits in paragraph III is followed by a 250,000 ohm potentiometer-type control (audio taper). This control, not supplied by Langevin, becomes the mixer attenuator. The output leg of each mixer control is followed by a 220,000 ohm fixed resistor (1/2 or 1/4 watt, composition). All these "build-out" resistors then connect together for the driving of the next unit in the system. Thus, a four-position mixer would appear as:

1, 2, 3, 4
receive signal
from any circuit
in paragraph III,
or from any
high-level
source.



There will be a small degree of interaction of controls.

No signal or channel switching is shown. Include as required.

All controls are 250,000 ohm potentiometers. All build-out resistors are 220,000 ohms.

The transmission of any one input channel through a mixer system will be approximately:

$$\frac{E_{in}}{E_{out}} = \frac{1}{N}$$

Where N is the total number of inputs.

In order to preserve a good signal-to-noise figure, the output signal from the mixer system must not fall below 10 mv rms. The following table shows the output levels to be expected from mixers, assuming that the controls are set at 10 db:

NUMBER OF INPUTS	LEVEL IN MV RMS
2	40
3	26
4	20
5	16
6	13
7	11
8	10

The output of the mixer system should immediately be followed by a "booster" AM4300 Amplifier. (Exception: The output of a 2-channel mixer can be followed by an AM4700 Amplifier, provided there is no "master gain" control present.) Do NOT follow any mixer with an EQ4008 Equalizer. The loss through the EQ4008 would seriously degrade the signal-to-noise characteristic of the system.

The AM4300 Amplifier used as a post-mix booster should be operated so that its output is 250 mv rms, or slightly higher. Raise the gain of the AM4300 (by provision of proper resistor between terminals 4 and 5 on its associated TRY4000 Tray) until this level is obtained. The following table will be found accurate enough for the usual applications:

NUMBER OF MIXER INPUTS	VALUE OF R
3	10 K
4	20 K
5	30 K
6	43 K
7	51 K
8	62 K

It will be noted that the values of R are at variance with the values shown on the individual specifications sheet for the AM4300. This is because the figures at the left take into consideration the loading effect that the amplifier has on the mixer network.

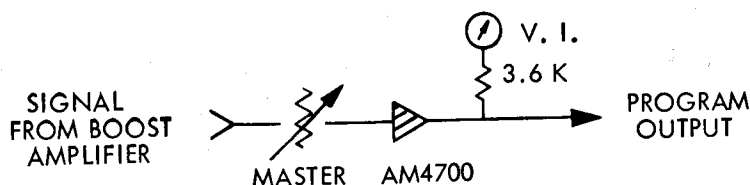
If it is desired to be able to "trim" the booster amplifier gain rather than use a fixed resistor as outlined above, fit the TRY4000 Tray associated with the AM4300 Amplifier with a MG4007 Modification Group.

V. MASTER GAIN CONTROL

The master gain control, if such is provided, should immediately follow the AM4300 booster. Normally it should be set to about 16 db attenuation. This control, like the mixer controls, should be a 250,000 ohm audio taper potentiometer. Please note that this control can be the "set level" control in an external power amplifier such as the Langevin AM50 Fifty-Watt Transistor-Type Power Amplifier.

VI. PROGRAM AMPLIFIER

The master gain control may be followed by an AM4700 Amplifier, whose output will then be +4 vu. Since the AM4700 has an output capability of +18 dbm into 600 ohms, the peak factor (top) will be 14 db. A standard vu meter may be used to monitor the program level at the output terminals of the AM4700.



The AM4700 Amplifier has an unbalanced output with one side returned to "ground". If a balanced output is required, follow the amplifier with a repeat coil (1:1 transformer) such as the United Transformer Company no. HA-108.

VII. EQUALIZATION

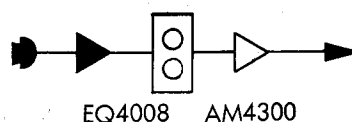
High and low frequency variable equalization is afforded by the EQ4008 Equalizer. It is normally used in conjunction with an AM4300 Amplifier, with which it forms a "unity gain" assembly. (Actually, there is considerable gain when the controls are in the "boost" positions.)

Equalization can be placed almost anywhere in the system. There are only a few precautions to be taken

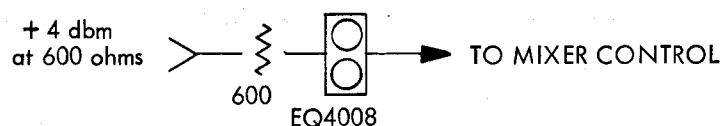
1. The EQ4008 Equalizer must be driven from a low-Z source such as the output of an amplifier. It can also be fed from a 600 ohm line, such as the output of a tape playback machine.
2. The output of an EQ4008 must feed into a high-Z load such as the input of an amplifier. It can also drive a 250,000 ohm gain control.
3. The EQ4008 cannot be driven from a low-level source such as the output of a mixer system, as its insertion loss would degrade the signal-to-noise characteristic of the overall system.

Individual input services can be equalized prior to mixing. This is useful in the compensation of signal sources that are subject to frequency response variations. In particular, voice reproduction often requires response modification for the sake of either clarity or pleasantness. Since the EQ4008-AM4300 combination has no loss or gain at midfrequencies, inclusion of such will not affect gain computations.

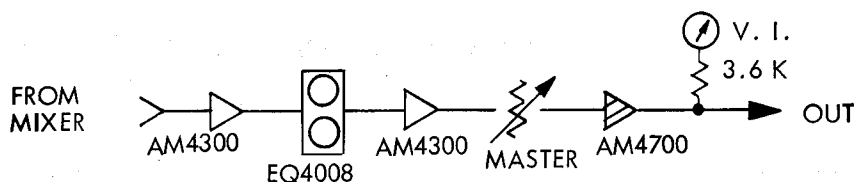
The block diagram below represents the input circuit of paragraph IIIa fitted with channel equalization:



An incoming low-Z high-level service can also be given channel equalization:



Any desired number of incoming services can be given individual channel equalization. On the other hand, if only an overall variable equalization is required, only one EQ4008-AM4300 combination will be needed. The best place to assign it in the average system is just after the booster amplifier and before the master gain control:



No matter where it is placed in the system, the EQ4008 Equalizer will provide approximately 10 db of attenuation or boost at the high-frequency and low-frequency ends of the audio spectrum.

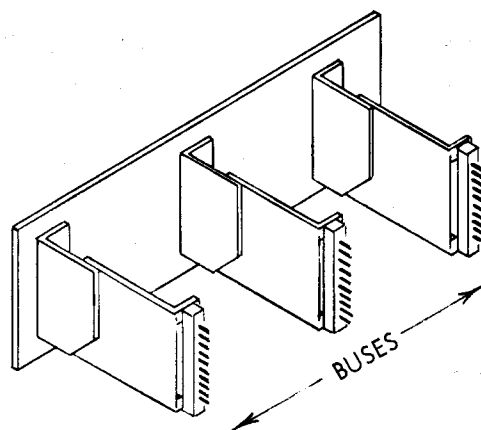
VIII. STEREOPHONIC OR MULTI-CHANNEL SYSTEMS

These systems are merely extensions of standard monophonic systems, but precautions must be taken to preserve channel balance and separation. Standard techniques of design apply, but channel switching may be added so that any given

microphone (for instance) may be assigned to aural left, right, or center (split). In the case of 2-channel tape or disc playback, it is often convenient for the operator of the equipment if the channel gain controls are ganged. In this case, the standard Series 4000 type BKT4000 Mounting Bracket may not be deep enough to accommodate the ganged control. Also, at the present time there is no 2-channel version of the EQ4008.

IX. INTERWIRING OF UNITS

Perhaps the most convenient manner of interwiring the Series 4000 Units is by "busing" the wires. CAUTION: Read paragraph X, below, on the subject of "Power Cabling and Signal Returns". If the TRY4000 Trays are mounted on-edge with the connector ends away from the panel, the busing of wires will be facilitated:



X. POWER CABLING AND SIGNAL RETURNS

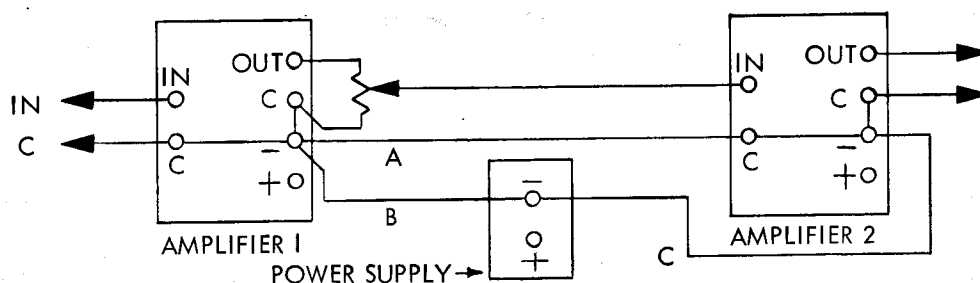
Improper power cabling and improper signal returns can seriously impair the performance of a system. It is usually the signal-to-noise characteristic that suffers the most. A systems designer should take the time to assign his cable runs prior to starting actual construction. Much will be gained as an end result.

There are two basic schools of thought on the subject of grounds and returns. One is the "ground-everything-to-everything" approach in which all the negative power leads and all signal returns are connected to the nearest part of the metallic structure. This simulates a condition of having a large plane ground surface. The other approach is to utilize wires to connect the various components of the system and then to ground this network of wires at one point AND AT ONE POINT ONLY. Either system is workable and can result in excellent performance from the equipment. But either system can get the designer into trouble unless he plans ahead. It is important to realize that the two systems cannot be used in any one installation, as they are mutually exclusive.

There is little to discuss about the "ground everything" method, except that ground leads should be short and of low resistance. A physical earth ground may be required.

The "single ground" method of wiring is less likely to need an earth ground, but more care must be taken to avoid "ground loops" and undesired "common signal returns".

A ground loop exists if the input to an amplifier contains hum due to transformer action or hum-voltage drop in a closed loop of cable. An example might be:



At first glance, it might appear that omitting wire B or wire C would be as equally effective in breaking the loop as the omitting of wire A. However, consider the possibility of capacitive or direct connection of the input of Amplifier no. 1 back to the negative side of the power supply. There would be a considerable common signal return in the circuit, and some portion of the output of Amplifier no. 2 would be fed back into the input of Amplifier no. 1. Whether this would cause trouble depends on the gain of the overall system, including the resistance of the common return. It is often the case that capacitive coupling from the input of Amplifier no. 1 to the power supply negative terminal will cause high-frequency instability.

Input circuits of preamplifiers are quite susceptible to hum pickup. Unless it is absolutely unavoidable, single-wire shielded cable should not be used for microphone runs. The shield (or the microphone stand connected to it) may become grounded at the far end, causing a loop.

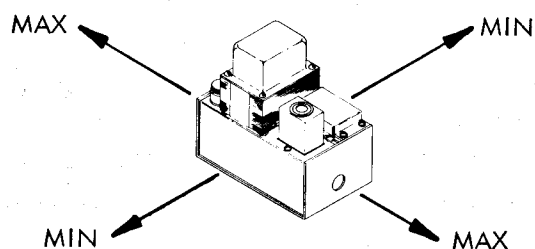
Power wires (whether negative or positive) leading to power amplifiers or to AM4700 Amplifiers used as program amplifiers should not be bused to preamplifiers. This is especially true if the power supply is located some distance away. The voltage drop in the power lines would be common to the high-level and the low-level amplifiers, and can cause a large amount of negative or positive feedback. Oscillation may result. It is better to run separate lines for the powering of units which have great level or gain differences. However, in order to avoid hum due to various power lines picking up varying amounts of stray field, run all power lines in the same physical cable.

XI. SHIELDING OF UNITS

The Series 4000 Units are openly constructed, and there is no electrostatic shielding that surrounds them. It is imperative that they be inclosed within a metal housing. If this housing has a detachable or hinged front panel, the panel must be well bonded to the chassis or cover which is behind it.

The shielding will not be effective if it is violated by a field which is introduced within its confines. Thus, it is wise to exclude AC mains power from the vicinity of the amplifiers.

Strong magnetic fields may introduce hum into input transformers or into input cabling. One source of such fields can be power supplies. Although the PS4900 Power Supply is equipped with a low-density core and in addition has a copper band to short out magnetic leakage, position it so that magnetic radiation toward preamplifiers is minimized. The drawing below shows the directions of maximum and minimum hum field for the PS4900.



POSITION THE POWER SUPPLY
SO THAT THE "MIN" LINES
PASS THRU THE PREAMPLIFIERS.

Television transmitters produce intense magnetic fields that often prove very troublesome. In particular, the vertical synchronization pulses can create quite an audible buzz. (The horizontal synch sometimes gets in also, but its 15.75 kHz signal is relatively inaudible.) If trouble from TV is noticed, please write detailed symptoms to Langevin.

In accord with procedure now employed by the United States Bureau of Standards, and by most nations, the terms "cycles per second" and "kilocycles" have been dropped by Langevin in favor of "Hz" and "kHz".

A FEW NOTES ON THE SERVICING OF TRANSISTOR-TYPE EQUIPMENT

Once one becomes accustomed to the techniques involved, repair of circuitry on printed boards is much easier than similar servicing of units which have point-to-point wiring. There is no wrapping of leads around terminals, and there is only one wire-lead connection per board point. (This is a great improvement over the older method where six or seven leads, all intertwined, may connect to one electrolytic capacitor lug.)

When releasing a component from a printed board, observe the following rules: 1. Always use a hot iron with a small tip (Weller no. TCP iron is excellent). 2. Do not maintain contact of iron with board for a protracted length of time, but DO release the part as soon as the solder has melted. 3. Never apply physical pressure to a printed line or pad in a direction that would tend to separate it from the substrate.

When handling small boards such as used in the Series 4000 Units, a "third hand" is needed. It is almost impossible to hold the board manually while also handling an iron and a long-nose pliers. Although a small bench vise will be found better than no clamping device at all, a better solution to the problem is the use of a clamp designed expressly for the purpose (Line-Master Work Positioner Model LM-201-116 or equivalent).

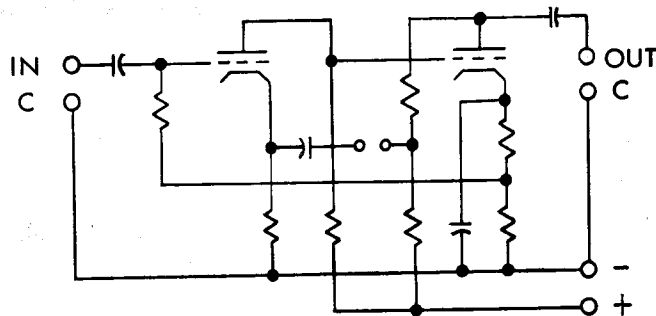
* * * * *

All small transistors used in the Series 4000 Units have lead configurations corresponding to standard TO-5 packages. This is true even if the transistors happen to be packaged in other than TO-5 cans. All transistors are silicon planar NPN. Looking at the printed side of the board, the connections are:

BASE
●
EMITTER ● ● COLLECTOR

TRANSISTOR CASE IS NOT
VISIBLE FROM THE PRINTED
SIDE OF THE BOARD.

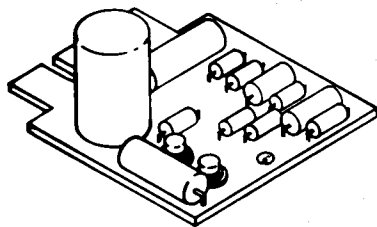
Although many technicians are quite familiar with solid-state techniques of circuit design, there are those who are more at home with electron-tube type circuits. For this reason, the Series 4000 Units have been made so that they may be understood by all. For instance, the electron-tube analogy for the AM4300 Amplifier would be:



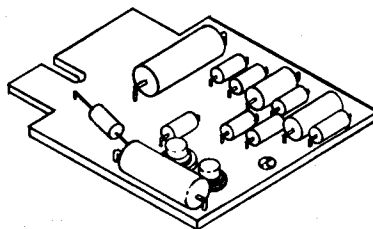
NOTE :
GRIDS BIASED POSITIVE.

When troubleshooting a faulty transistor amplifier, treat it exactly as if it were an electron-tube amplifier and check voltages as shown on the schematic diagrams. However, transistors are subject to more variation in Beta than electron-tubes are in G_m or μ and the troubleshooter must assume that more variation from the published circuit voltages will exist. Also, transistors may fail due to short circuits of their silicon chips. This produces a condition rarely found in electron tubes, as tubes practically never short from plate to cathode, plate to grid, or grid to cathode. On the other hand, transistors do not age in the same manner as tubes. Operated within their ratings, transistors have no predictable life they will go on apparently forever. All transistors in the Series 4000 Units are used in a very conservative manner. In addition, they are pre-tested (before assembly onto the boards) under conditions far more demanding than they will ever encounter in service.

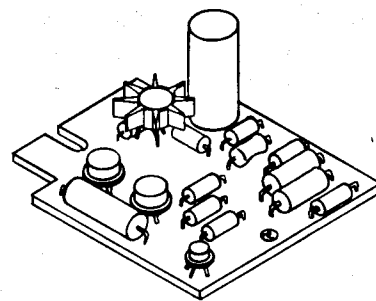
Although there is no reason to assume that "hot switching" any Series 4000 Unit will be harmful to it, a good operating practise is to remove power before plugging or unplugging the units.



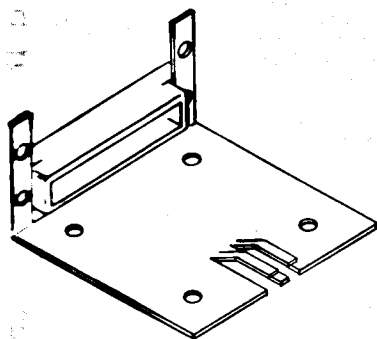
AM4100



AM4300

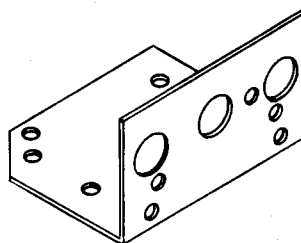


AM4700



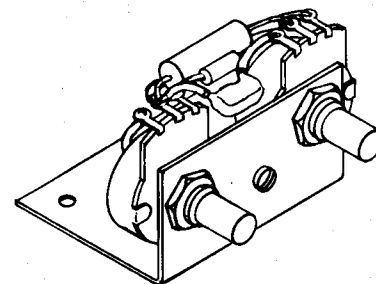
TRY4000

Mounting Centers:
1 5/8" x 1 5/8"



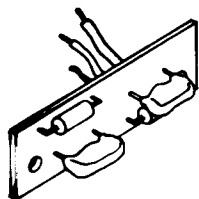
BKT4000

Holes for Controls:
7/8" Centers.

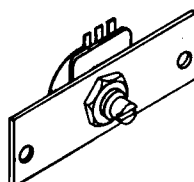


EQ4008

Control Shafts:
1 3/4" Centers.

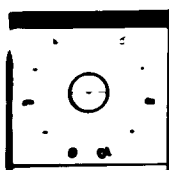


MG4001



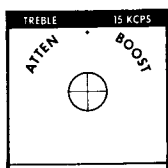
MG4007

ESCUTCHEON PLATES: (Black on Aluminum, 1 1/2" Square)



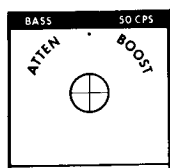
E4661

General
Purpose

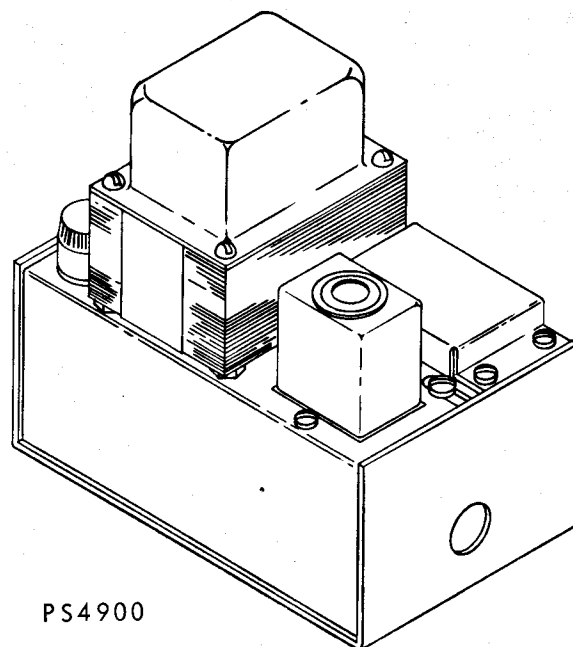


E4671

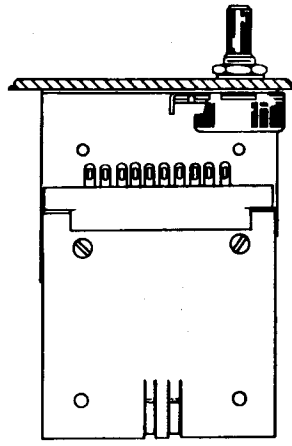
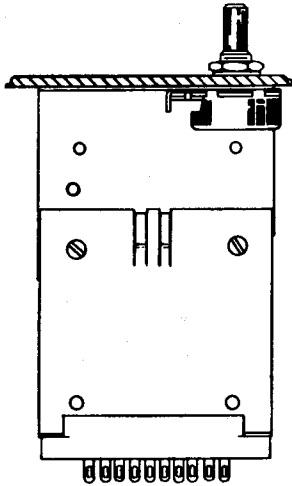
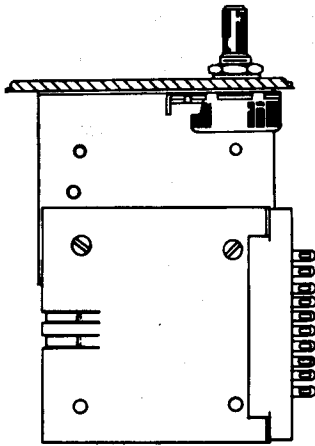
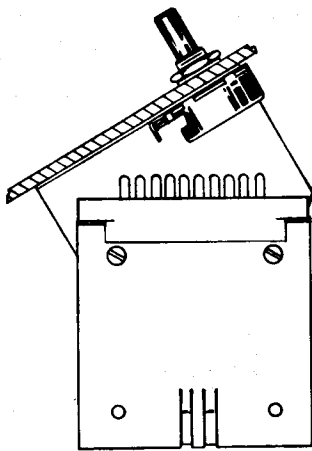
For Use with EQ4008
Equalizer.



E4672



PS4900



A

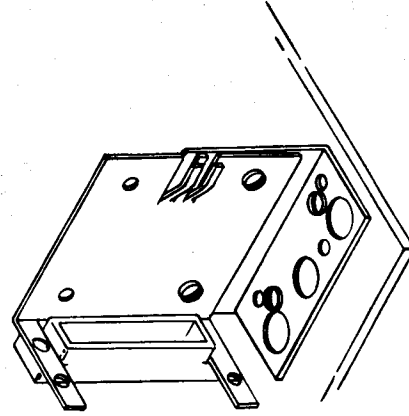
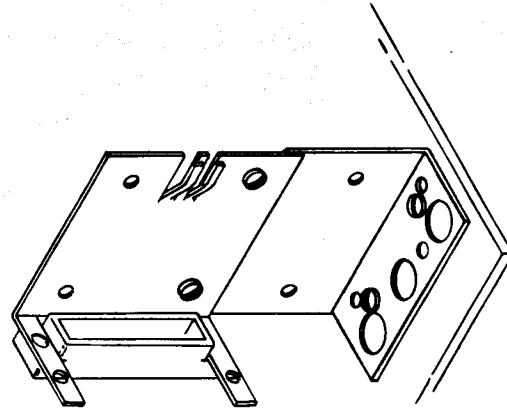
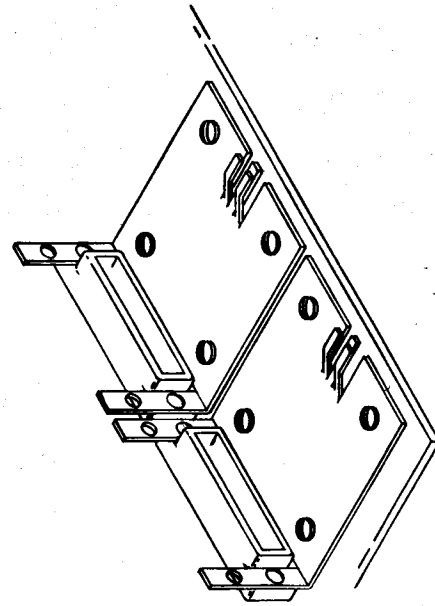
B

C

D

COMBINATIONS OF BKT4000 AND TRY4000 FOR PANEL - MOUNTING OF AMPLIFIERS.

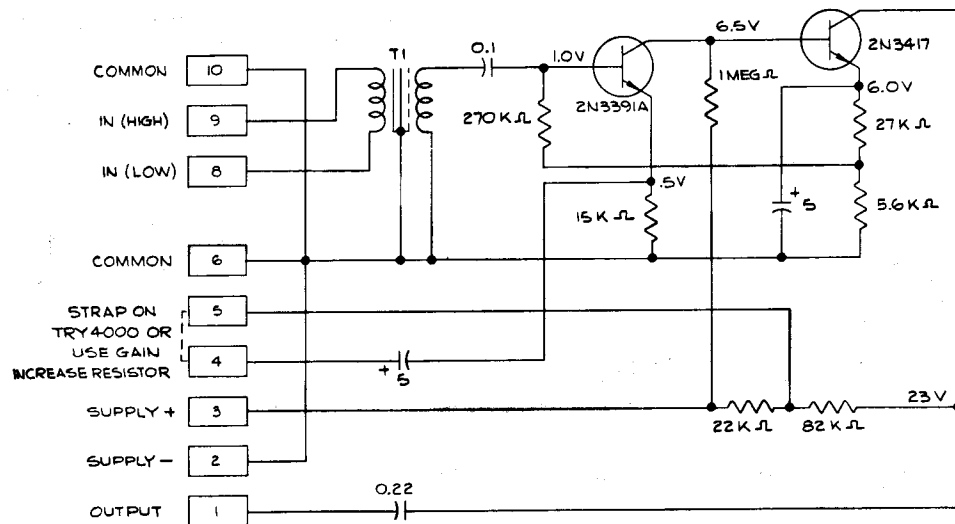
NOTE: Gain control (not supplied) may be positioned in center or toward top in views B, C, and D, but not A.



TWO TRY4000 TRAYS MOUNTED
FLAT, INSIDE CHASSIS.

TRY4000 TRAYS MOUNTED ON BKT4000 BRACKETS.
(HIGH AND LOW MOUNTING)

AM 4100 AMPLIFIER



THE AM4100 AMPLIFIER IS PRIMARILY INTENDED FOR USE AS A LOW-IMPEDANCE MICROPHONE PREAMPLIFIER. It is equipped with an input transformer whose primary winding is ungrounded, allowing balanced or unbalanced operation.

INPUT IMPEDANCE

To be driven from a source between 150 and 250 ohms. All data on this sheet were obtained with 250 ohm source. Actual input Z is over 1000 ohms, providing a virtual "bridge" of the source.

GAIN

-54 dbm input from 250 ohm source causes 0.25 v rms output (when strapping on tray is for lowest gain). Provision of a fixed resistor (or MG4007, which is variable) between terminals 4 and 5 on TRY4000 will raise gain per table below:

Increase, db	R, Kohm	Increase, db	R, Kohm
3	15	9	68
6	36	12	110

FREQUENCY RESPONSE

Uniform ± 1.0 db from 30 Hz to 15 kHz (with lowest gain strapping).
Uniform ± 2.0 db from 30 Hz to 15 kHz (with gain raised 12 db).

OUTPUT IMPEDANCE

To be loaded with 250,000 ohms or more. Actual dynamic output impedance is under 1000 ohms with low gain strapping and under 10,000 ohms with gain raised 12 db.

HARMONIC GENERATION (PER CENT)

At 5.0 v rms (1000 Hz): Total harmonic generation will not exceed 0.2 with unit strapped for low gain, 0.4 with gain raised 12 db. There is a slight rise in THG at low frequency end, caused primarily by the input transformer. This will not exceed 0.5 at 30 Hz, and is largely independent of gain strapping. There is a slight rise in THG at the high frequency end. This will not exceed 0.3 at 15 kHz with unit strapped for low gain, 1.0 with gain raised 12 db.

NOISE

Noise generation is lower than an equivalent input signal level of -116 dbm.

POWER REQUIREMENT

Demand from 42 v DC supply is approximately 220 microamperes. Do not power from a supply that is over 50 v DC. Supply must contain less than 1.0 millivolt total noise.

SIZE

Constructed on printed-wiring card whose overall dimensions are 2 1/4" wide x 2 1/2" long. ("Long" dimension includes printed-on plug terminals.) No part on the board extends more than 1 1/4" from its surface.

MOUNTING

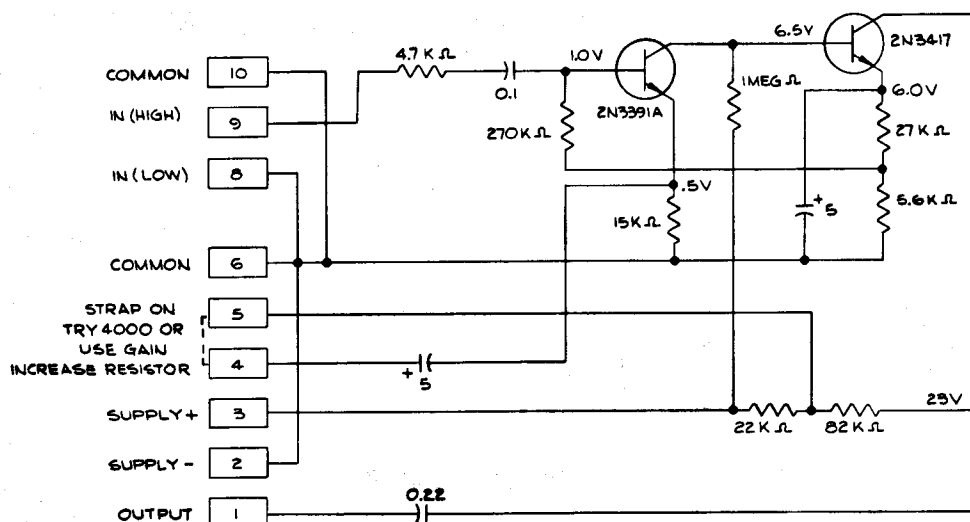
To be mounted in TRY4000 Tray. When seated in tray, maximum overall dimensions are: From flat side of tray to top of tallest part on AM4100, 1 5/8". Flat mounting area (length includes solder lugs on tray connector), 2 7/8" long x 2.450" wide.

When the TRY4000 (containing AM4100 Amplifier) is mounted to panel by means of the BKT 4000 Bracket and a gain control (not supplied), minimum mounting centers are 1 3/4".

* * * * *

Because of a policy of inaugurating changes in solid-state equipment at irregular intervals in order to maintain "state of the art" performance, Langevin reserves the right to modify design of this product without notification.

AM 4300 AMPLIFIER



THE AM4300 AMPLIFIER IS PRIMARILY INTENDED FOR USE AS A HIGH-IMPEDANCE MICROPHONE PREAMPLIFIER, but may also be used as a post-mixing amplifier, a post-equalization amplifier, etc. When equipped with Modification Group MG4001, it becomes a phonograph preamplifier with RIAA characteristic.

INPUT IMPEDANCE Approximately 250,000 ohms. All data on this sheet were obtained with 100,000 ohm source. Use of source lower than 100,000 ohms will not materially affect performance.

GAIN Voltage gain is approx. 10x when strapping on tray is for lowest gain. Provision of a fixed resistor (or MG4007, which is variable) between terminals 4 and 5 on TRY4000 will raise gain per table below:

Increase, db	R, Kohm	Increase, db	R, Kohm
3	15	9	68
6	36	12	110

FREQUENCY RESPONSE Uniform ± 0.2 db from 30 Hz to 15 kHz (with lowest gain strapping).
Uniform ± 0.5 db from 30 Hz to 15 kHz (with gain raised 12 db).

OUTPUT IMPEDANCE To be loaded with 250,000 ohms or more. Actual dynamic output impedance is under 1000 ohms with low gain strapping and under 10,000 ohms with gain raised 12 db.

HARMONIC GENERATION (PER CENT) At 5.0 v rms (1000 Hz): Total harmonic generation will not exceed 0.2 with unit strapped for low gain, 0.4 with gain raised 12 db. THG will not exceed 0.25 (low gain) or 0.3 (gain raised 12 db) at 30 Hz. THG will not exceed 0.3 (low gain) or 1.0 (gain raised 12 db) at 15 kHz.

NOISE Noise generation is lower than an equivalent input signal level of -116 dbm.

POWER REQUIREMENT Demand from 42 v DC supply is approximately 220 microamperes. Do not power from a supply that is over 50 v DC. Supply must contain less than 1.0 millivolt total noise.

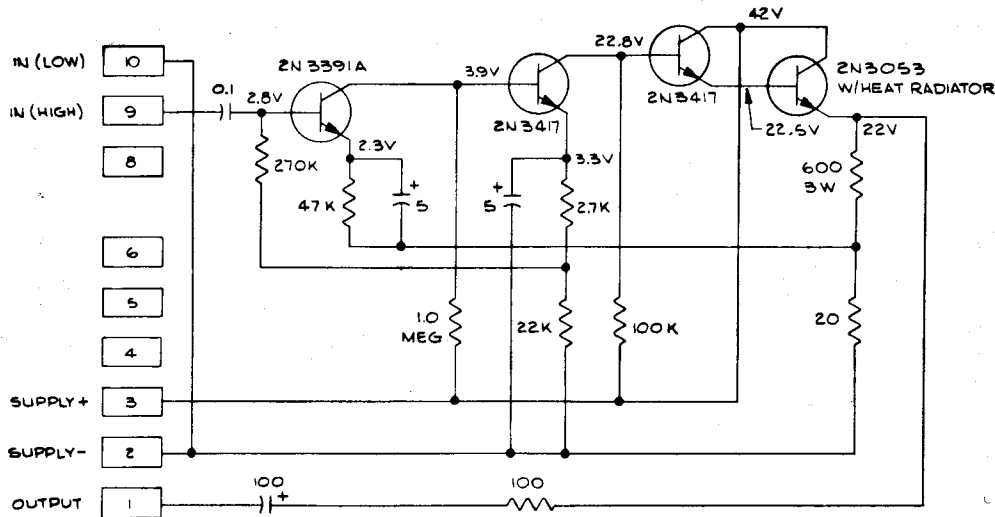
SIZE Constructed on printed-wiring card whose overall dimensions are 2 1/4" wide x 2 1/2" long. "Long" dimension includes printed-on plug terminals. No part on the board extends more than 1/2" from its surface.

MOUNTING To be mounted in TRY4000 Tray. When seated in tray, maximum overall dimensions are: From flat side of tray to top of tallest part on AM4300, 7/8". Flat mounting area (length includes solder lugs on tray connector), 2 7/8" long x 2.45" wide.

When the TRY4000 (containing AM4300 Amplifier) is mounted to panel by means of the BKT4000 Bracket and a gain control (not supplied), minimum mounting centers are 1 1/8".

Because of a policy of inaugurating changes in solid-state equipment at irregular intervals in order to maintain "state of the art" performance, Langevin reserves the right to modify design of this product without notification.

AM 4700 AMPLIFIER



THE AM4700 AMPLIFIER IS PRIMARILY INTENDED AS A "PROGRAM" AMPLIFIER.

INPUT IMPEDANCE Approximately 250,000 ohms. All data on this sheet were obtained with a source of 100,000 ohms.

GAIN Input of approximately 40 mv rms will cause output of plus four dbm into 600 ohm load.

FREQ. RESPONSE Uniform within 0.25 db over range 30 Hz to 15 kHz.

OUTPUT Z 600 ohms nominal. Actual dynamic output impedance is approximately 110 ohms.

HARMONIC GENERATION, % At plus eighteen dbm output into 600 ohms, total harmonic generation will be under 0.2 at 1000 Hz, and under 0.5 over the range 30 Hz to 15 kHz.

NOISE Noise generation is at least 60 db lower than an output level of plus four dbm.

POWER REQUIREMENT Demand from 42 v DC supply is approximately 40 milliamperes. Do not power from a supply that is over 50 v DC. Supply must contain less than 1.0 millivolt total noise.

SIZE Constructed on printed-wiring card whose overall dimensions are 2 1/4" wide x 2 1/2" long. "Long" dimension includes printed-on plug terminals. No part on the board extends over 1/8" from surface.

MOUNTING To be mounted in TRY4000. When seated in tray, maximum overall dimensions are:
From flat side of tray to top of tallest part on AM4700, 1 1/2". Flat mounting area
(length includes solder lugs on tray connector), 2 7/8" long x 2.450" wide.

When the TRY4000 (containing AM4700 Amplifier) is mounted to panel by means of the BKT4000 Bracket and a gain control (not supplied), minimum mounting centers are 1 5/8".

* * * * *

Because of a policy of inaugurating changes in solid-state equipment at irregular intervals in order to maintain "state of the art" performance, Langevin reserves the right to modify design of this product without notification.

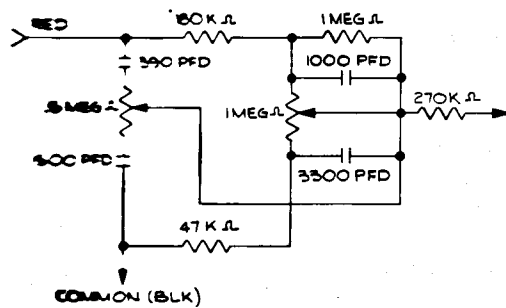
THE UNIVERSITY OF CHICAGO



NOTE : There is a "decoupling section" of filter in the PS4900. This is connected to terminals 6 (minus) and 8 (plus). Extremely low level preamplifiers (types AM4100 and AM4300) should be powered from this section.

Terminals 3 and 4 are for connection of external 6.3 v AC pilot light. Do not demand more than 0.170 ampere.

EQ 4008 EQUALIZER



zation of individual service channels. Drive INPUT, red wire, from low-Z source such as the output of an amplifier. Connect OUTPUT, 270,000 ohm resistor, to high-Z load such as the input of the AM4300 or the AM4700 or to the high side of a 250,000 ohm control.

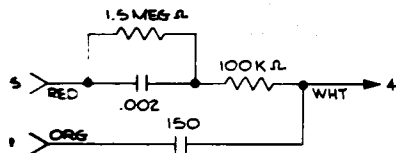
Provides approx. 10 db of attenuation or boost (max. settings of controls) at 15 kHz and 30 Hz. "Flat" positions of controls are at center of rotation. When used in conjunction with the AM4300 Amplifier, the combination has unity gain at midfrequencies.

Mounting bracket is an integral part of the EQ4008. Do not use BKT4000 to mount the amplifier with which it is physically associated. Cannot be angled for sloping panel in the same manner as the BKT4000.

Do not follow any low-level device, such as a mixer system, with the EQ4008, as the insertion loss would cause serious degradation of the signal-to-noise characteristic of the overall system.

The EQ4008 may be used for general equalization when placed at a point in the system past the mixer, or may be used for the equali-

MG 4001 MOD. GROUP



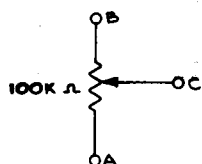
The MG4001 Modification Group mounts on the TRY4000, using the two holes directly above the connector. The three wires are then connected to the connector lugs, and the numbers shown on the above schematic correspond to the proper lug numbers.

* The MG4001 may also be used with the AM4100 Amplifier, if the phonograph cartridge is designed to operate into 150/250 ohms. The MG4001 cannot be used with the AM4700 Amplifier.

Provides the AM4300* Amplifier with an RIAA frequency response characteristic for the preamplification of a magnetic phonograph cartridge. The response from a perfect cartridge will be uniform within plus or minus one db over the range 15 kHz to 50 Hz, provided that the cartridge is terminated in its manufacturer's stated resistor load (to avoid a high-frequency peak).

When used with the AM4300 Amplifier, 10 mv rms from cartridge, at 1000 Hz, causes 0.25 v rms output. Gain of AM4300 cannot be raised.

MG 4007 MOD. GROUP



250,000
ohms

able to raise the amplifier gain over 15 db, as frequency response and linearity will suffer. The 15 db point will be found at approximately 70% rotation.

The MG4007 Modification Group plate mounts to the two hole directly above the connector on the TRY4000 Tray. The potentiometer mounts on the plate, and connections are made from it to appropriate points.

* Cannot be used in the feedback circuit of the AM4700 Amplifier.

Consists of a small potentiometer-type variable resistor (audio taper) and a flat plate for mounting.

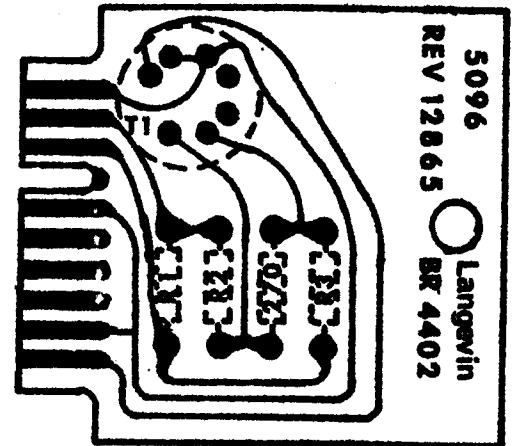
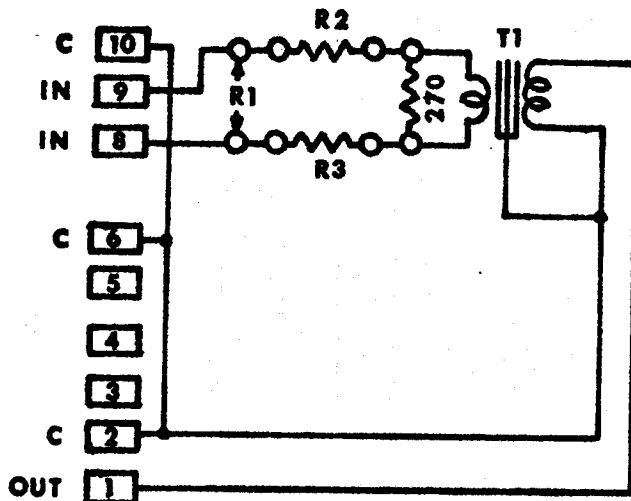
May be used as a semi-fixed screwdriver-set gain control at any point in the system, if wired as a conventional "pot". In this application, B is the "high" side, A is common, and C is output.

May also be used as a "gain trimmer" for the AM4100 Amplifier or the AM4300 Amplifier when placed in the feedback loop.* Connect A to pin 5 and C to pin 4 on the TRY4000 connector.

Do not connect to B. When used in this manner, it is not advis-

BR 4402

BRIDGING INPUT UNIT



This unit is used as an input module where it is desired to match or bridge a high-level audio line. Neither input terminal of the BR 4402 is returned to "ground", allowing balanced operation if desired.

NOTE: The BR 4402 is shipped without the matching resistor R-1. The illustration at the upper right shows the proper physical location of that resistor when added. Use 620 ohm $\frac{1}{2}$ watt resistor for terminating 600 ohm line, or other value required for other impedances.

R2 and R3 are 3K ohm resistors on the standard BR 4402. Other values are available. Indicate required resistor value after the type number. For use in the AM 50 amplifier BR 4402 (20 K) is recommended. (R2 and R3 are 10K ohm)

TRANSMISSION CHARACTERISTIC when bridging a 600 ohm line with program level of +4 vu is such that approximately 0.5 V will be produced at the output terminals "OUT" and "C".

MAXIMUM LEVEL is +8 vu or +18 DBM over the frequency range 50 Hz to 20 kHz.

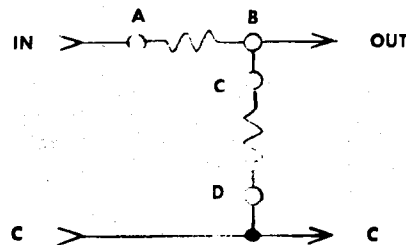
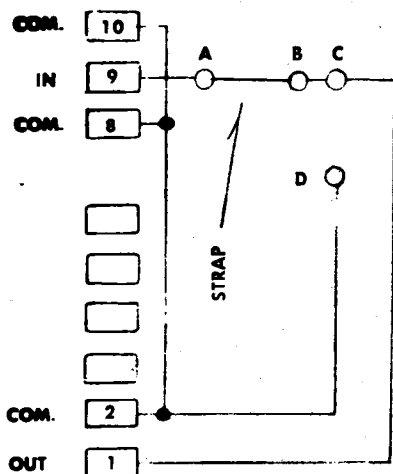
FREQUENCY RESPONSE is uniform plus or minus 1.0 DB over the range 30Hz to 20 kHz, referred to 1 kHz.

MOUNTING: To be mounted in TRY 4000. When seated in tray, maximum overall dimensions are: From flat side of tray to top of transformer, 1 5/8". Flat mounting area (length included solder lugs on connector), 2 7/8" long x 2.450" wide. When the TRY 4000 is mounted to panel by means of the BKT 4000 Bracket and a gain control (not supplied), minimum mounting centers are 1 3/4".

* * * * *

LANGEVIN RESERVES THE RIGHT TO MODIFY DESIGN OF THIS DEVICE
WITHOUT NOTIFICATION

SC 4401 STRAPPING CARD



Although the SC4401 Card is not supplied with resistors shown above, they may be installed if attenuation is required.

This unit is used as an input module when it is desired to "strap through" from a card receptacle to the input connector or service associated with the channel. User may remove strap from A to B and install attenuator as shown at upper right. (Points A, B, C and D are printed on the card.)

This is an addition to the Langevin "4000" series of modular cards. Please file this sheet with other data concerning that series, or with specifications sheets for:

Langevin 1A Mixer Amplifier
Langevin 2A Microphone Mixer

The SC 4401 is a small unit . . . not as wide nor as long as the other Series 4000 Modules. It has no retainer stud attached to the end of the card, but is held in place only by the contacts. Be sure that the "key" on the SC 4401 is positioned in Pin Position No. 7 on the connector into which it is inserted. If the connector has no blanking stud at Pin No. 7, insert the SC 4401 with the printed side of the board toward the tray.

* * * * *

Langevin reserves the right to modify design of this device without notification.