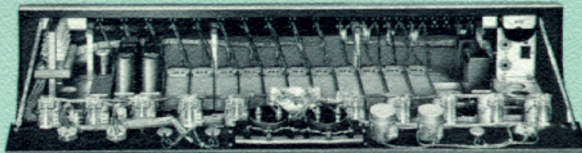


250 SU CONTROL CONSOLE

250SU

FOR ALL STEREO AND UNIVERSAL OPERATING FUNCTIONS



250 SU CONSOLE

The ultimate in product design and product usage is embodied in the new 250 SU Altec Control Console. This unit is the finest ever built for TV, AM, FM, Recording Studio or Sound System use. The 250 SU is a compact console providing the greatest flexibility attainable in mode of operation. This extreme flexibility is made possible by the use of newly designed miniature plug-in preamplifiers, program amplifiers, and utility input devices. The plug-in units are only $1\frac{5}{8}$ " wide, $3\frac{3}{4}$ " max. high and $9\frac{3}{4}$ " long, over handle. All units are the same in size to permit flexibility in the number and type of amplifiers used per console.

Single unit construction, namely amplifiers and controls in the same housing, is used because of simplified, less expensive installation. The power supply of any Control Console is always a potential source of undesirable hum inducing flux fields, and is, therefore, mounted external to the console. To keep the installation of the power supply simple, it is built into a separate housing, which may be mounted to the underside of a table, the table leg, or on an adjoining wall. A single screw frees the power supply unit from its mounting bracket for inspection. The model 535A Power Supply is furnished with a 4 foot interconnecting cable with plug for connection to the mating receptacles inside the console. The 250 SU Console requires no special table or mounting facilities as all leads terminate at "strips" located inside the console housing.

There are ten input positions and each is equipped with "bus" switches and mixer attenuators. Any input position may be used for EITHER high level or low level sources by inserting the proper input device. It is only necessary to order the number of microphone preamplifiers and/or utility input devices that is required for the particular installation. Mounting trays for the maximum of plug-in units are, however, installed and wired.

All output circuitry for single-channel, single-line, two-channel, two-line, dual stereo or three channel/two channel stereo is included and wired. It is only necessary to plug in the necessary number of amplifiers to provide the desired functions.

Three channel/two channel operation consists of using the center position of the "bus" selector key to feed a third or "center channel" mixing "bus." The output of the "bus" is amplified, then divided by means of a splitting pad and introduced into the left and right channels. For "stereo" use, this permits vocal or dialogue material to be picked up on a single microphone and evenly divided to the left and right channels without problems of balance, microphone matching, etc. In this case, the variable dialogue (speech) filter is connected in the center channel.

Splitting the center channel to left and right is also used in re-recording where the master tape is recorded full three channel then reduced to two channels for the release tape or disc.

Monitor amplifiers are not included as part of the console as small eight watt units frequently used for this purpose are inadequate with many current low efficiency speakers. Standard Altec amplifiers such as model 128B and 351B are recommended, mounted on a shelf or in a standard equipment cabinet.

A terminal strip has been provided in the console to which all major circuits connect. The purpose of this terminal is to allow these circuits to be "wired out" to an auxiliary equipment cabinet for the inclusion of jack strips, equalizers or other secondary equipment which may be required in the particular installation.

The center control panel contains a spare phone jack in addition to the two monitor jacks for use with an "intercom" system. This panel also contains a spare rotary selector switch. The panel marking process is such that additional characters for the spare selector and jack may be engraved with the desired designations and filled with "whiting" providing a proper match with the existing lettering.



A Division of *ESV* Ling Altec, Inc.

1515 S. Manchester Ave., Anaheim, Calif.

New York

RECORDING &

BROADCASTING

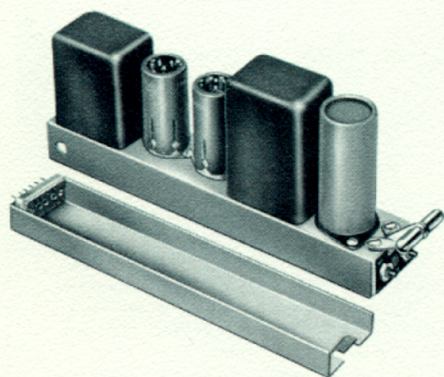
EQUIPMENT

Preamplifiers, program amplifiers, power supplies & accessories

Though designed primarily for use in the 250 SU Altec Control Console, these new miniature "plug-in" preamplifiers, program amplifiers, utility input device, power supply and meter assemblies are perfectly adaptable for rack mounting of speech input equipment for custom type installations. Rack mounting facilities are available for this use. These amplifiers will accept input level up to -15 dbm without exceeding 1% THD.

The dynamic range of 459A Program Amplifiers is equivalent to model 458A Preamplifier (see noise level specification) making it suitable for preamplifier use where added channel gain is required. Mounting tray assemblies and plug-in connections are identical on all input devices. Part of the Mounting Tray Assembly is a miniature receptacle to which all connections are made. This receptacle "mates" with the plug on the amplifier and utility input devices. This "plug-in" feature combined with the uncrowded positioning of all components leaves all parts readily accessible when removed from the mounting tray.

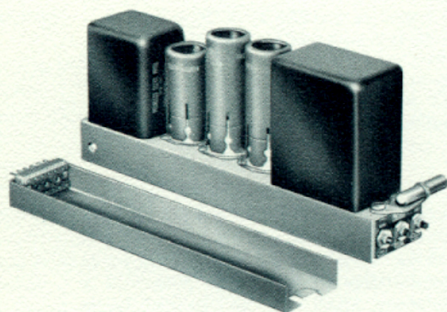
458A PREAMPLIFIER



SPECIFICATIONS:

Gain: 40 db unterminated input, 34 db terminated.
 Power Output: $+20$ dbm at less than .5% THD 50 to 15,000 cps.
 $+25$ dbm at less than 1% THD at 1 KC.
 Frequency Response: ± 1 db 20 to 20,000 cps.
 Source Impedance: 150 or 600 ohms (centertap available when connected for 600 ohms).
 Load Impedance: 150 to 600 ohms (centertap available when connected for 600 ohms).
 Output Impedance: Equal to load impedance.
 Noise Level: Equivalent input noise: -126 dbm (valid for unterminated input operation).
 Power Supply: 15ma at 275vdc and .7a at 6.3vdc.
 Tubes: 2—6072/12AY7.
 Dimensions: $1\frac{3}{4}$ " W x $3\frac{1}{8}$ " H and $9\frac{1}{16}$ " L when mounted in tray.
 Color: Cadmium plate with dichromate dip
 Weight: $3\frac{1}{2}$ lbs. (including tray).
 Special Features: Push buttons for individual tube test.
 40ma dc can be applied to input or output transformer center taps for simplexing use.
 Accessories: 13225 Rack Mounting Assembly (accommodates 9 units).
 13401 Mounting Tray Assembly.
 5981 Tube Test Meter.
 535A Power Supply.

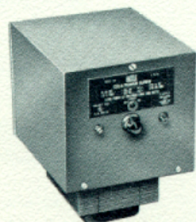
459A PROGRAM AMPLIFIER



SPECIFICATIONS:

Gain: 56 db unterminated input, 50 db terminated.
 Power Output: $+30$ dbm at less than .5% THD 30 to 20,000 cps.
 $+35$ dbm at less than 1% THD at 1 KC.
 Frequency Response: ± 1 db 20 to 20,000 cps.
 Source Impedance: 150 or 600 ohms (centertap available when connected for 600 ohms).
 Load Impedance: 150 or 600 ohms (centertap available when connected for 600 ohms).
 Noise Level: Equivalent input noise: -126 dbm (valid for unterminated input operation).
 Power Supply: 40ma at 275vdc and 1.6a at 6.3vdc.
 Tubes: 1—6072/12AY7, 2—12BH7.
 Dimensions: $1\frac{3}{4}$ " W x $3\frac{1}{8}$ " H x $9\frac{1}{16}$ " L when mounted in tray.
 Color: Cadmium plate with dichromate dip
 Weight: $3\frac{1}{2}$ lbs. (including tray).
 Special Features: Push buttons for individual tube test.
 40ma dc can be applied to input or output transformer centertaps for simplexing use.
 Accessories: 13225 Rack Mounting Assembly (accommodates 9 units).
 13401 Mounting Tray Assembly.
 5981 Tube Test Meter.
 535A Power Supply.

535A POWER SUPPLY



SPECIFICATIONS:

Power Output: 275vdc at 275ma.
 At 275ma ripple is .02v peak to peak max.
 6.3vdc at 13a.
 At 13a ripple is 1.5v peak to peak max.
 Power Input: 117v 50-60 cps 245 watts at full load.
 Rectifiers: Silicon.
 Controls: 1. Power Switch
 2. Circuit Breaker (Push to reset)
 3. 4 position tap switch (provides adjustment of voltage by autoformer action to accommodate 2 to 1 range of loads).
 Color: Dark Green.
 Weight: 16 pounds.
 Size and Mounting: $7\frac{3}{16}$ " W x $9\frac{5}{8}$ " H x 7" D overall.

planning information

By completing the form below, the purchaser is assured of ordering the full complement of components to provide all facilities for the particular console.

ITEM	QUANTITY
1. 250 SU Basic Altec Console	1
2. 535A Power Supply	1
3. 458A Preamplifiers	
(a) One for each microphone or low level input (10 max.)	
(b) One for each channel (3 max.)	
4. 459A Program Amplifier (2 max.)	
One for single line/single or dual channel operation. Two for "stereo" or two channel/two line operation.	
5. 13387 Utility Input Device	
One for each high level input. Sum of 3 (a) above and 5 cannot exceed 10.	
6. 7160 V.U. Meter	
For second channel. Add for "stereo" or two line operation.	
7. 5981 Tube Test Meter	
8. Altec Monitor Amplifier	
Use as separate accessory.	

Preamplifiers, program amplifiers, power supplies & accessories

The 7160 V. U. Meter is an exact duplicate of the meter furnished in the 250 SU Altec Control Console, and mounting space is adjacent to the meter furnished. Meter illuminating lamps and mounting facilities and pads are part of the 250 SU Console so no special tools are required for installation or connection of the meter. A second meter is required for "stereo" or two-channel/two-line operation.

The 13387 unit is a Utility Input Device for high level input sources. This is an isolation transformer built on a "plug-in" chassis of the same size and dimensions as the 458A Altec "Plug-in" Preamplifier, and is designed for insertion into the standard 13401 Mounting Tray Assembly. Type 13387 is for "bridging" a 150 or 600 ohm line or matching a 15,000 ohm line. The unit is cadmium plated with a dichromate dip and weighs 1 pound.

The 5981 Tube Test Meter is an accessory to the 250 SU Altec Control Console unit. It is used to visually test the tube condition of the tubes used in the "plug-in" amplifiers type 458A and 459A. Mounting provisions and wiring for the meter are inside the console, located in the right rear section. No special tools are required for mounting. When installed, the meter provides, in addition, an indication of heater voltage by means of a push button switch and suitable shunt which is a standard part of the console.

RACK MOUNTING FACILITIES

The 13225 is available for use in rack mounting of speech input equipment. The rack mounting assembly is drilled to accept nine type 13401 Mounting Tray Assemblies for use with Altec 458A and 459A "Plug-in" Amplifiers and Altec 13387 Utility Input Device.

The 13225 assembly is for standard 19" rack or equipment cabinet mounting and occupies only 5 1/4" of panel space. The assembly has a "Snap-in" removable front cover for instantaneous access to the units for test or service. The finish of the front cover is Dark Green, and the complete assembly weighs 4 pounds.

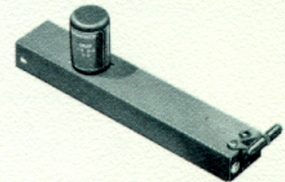
For rack mounting 535A Power Supply, 10440 10 1/2" Blank Panel may be used or Power Supply may be mounted on wall of equipment cabinet.

The 13401 is furnished as part of the 250 SU Altec Control Console, however, it is available separately to provide mounting and "plug-in" connection facilities for 458A and 459A Altec "Plug-In" Amplifiers or the 13387 Utility Input Device, when mounted in the 13225 Rack Mounting Assembly. The 13401 finish is cadmium plate with dichromate dip. The tray assembly is complete with "mating" female receptacle to accept the 458A, 459A and 13387 units. The tray measures 1 3/4" W x 7/8" H x 9" L (over terminals), and weighs 1/2 pound.

7160
V.U. METER



13387
UTILITY
INPUT
DEVICE



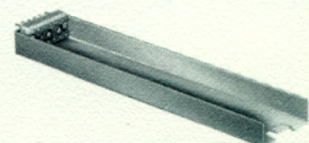
5981
TUBE TEST METER



13225
RACK MOUNTING ASSEMBLY



13401
MOUNTING
TRAY
ASSEMBLY

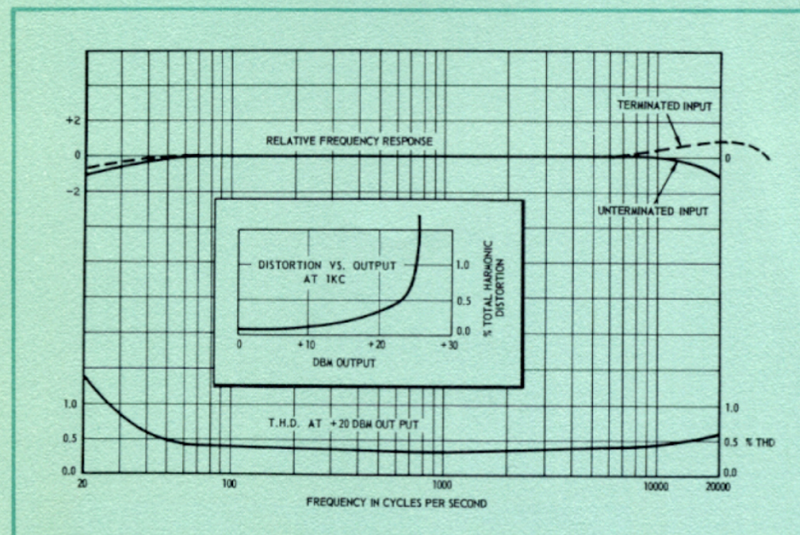


features 250SU

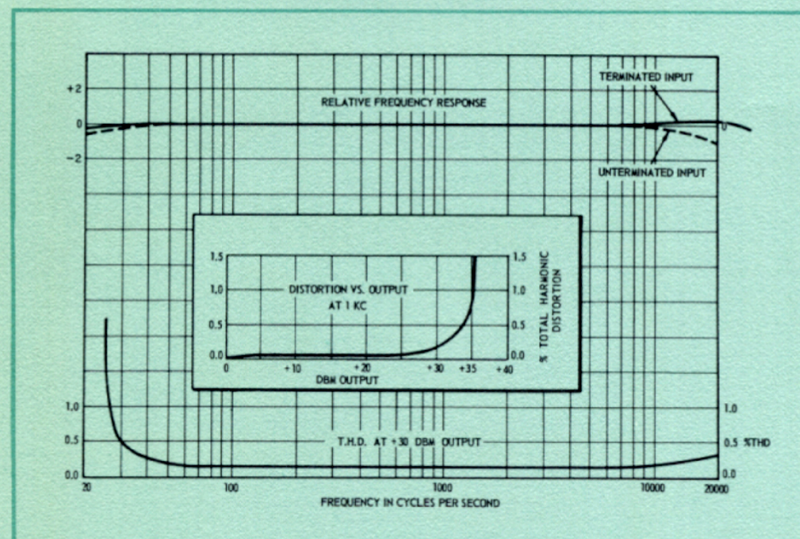
- EXCEEDS NAB, EIA, AND RECORDING REQUIREMENTS
- "PLUG-IN" AMPLIFIERS
- LOW IMPEDANCE MIXING
- SPEECH-MUSIC FILTER
- D.C. HEATER SUPPLY
- UNTERMINATED MICROPHONE INPUTS
- UTILITY INPUT DEVICES FOR TAPE—DISC—LINE—NETWORK—ETC.
- TUBE TESTING PROVISIONS
- EXPANDABLE TO JACK FIELDS, EQUALIZERS, ETC.
- SINGLE CHANNEL OPERATION
- TWO CHANNEL OPERATION
- TWO CHANNEL/THREE CHANNEL OPERATION
- "STEREO" OPERATION
- ILLUMINATED METERS
- COLOR CODED CONTROLS
- INPUT NOISE APPROACHING "THEORETICAL"
- CENTER TAP FOR SIMPLEXING INPUT SIGNALS
- 16 CONNECTED INPUTS
- MICROPHONE LEVEL OR "HIGH LEVEL" ON ANY INPUT

performance

458A PREAMPLIFIER

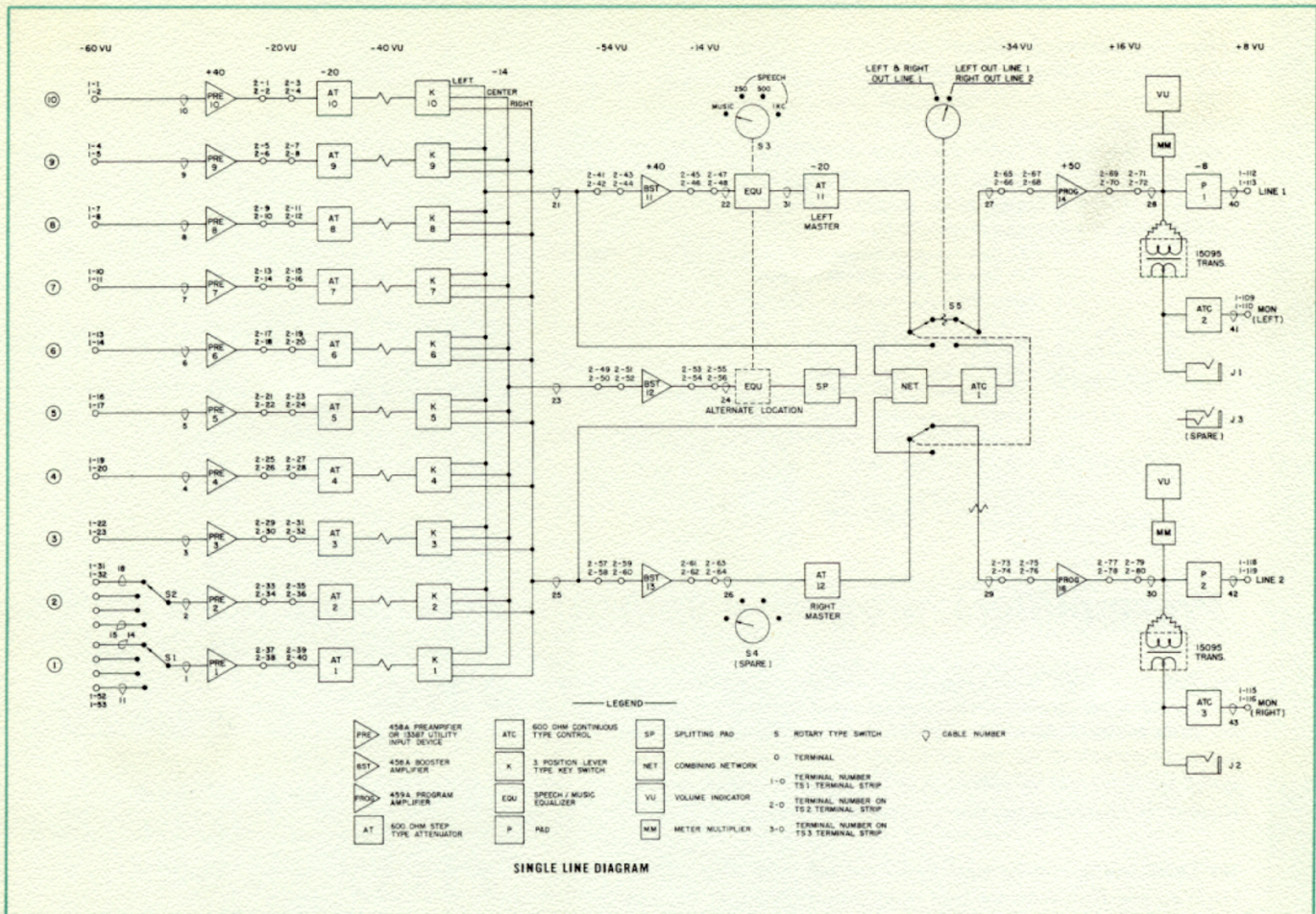


459A PROGRAM AMPLIFIER



PRODUCTS OF QUALITY

technical data 250 SU console



specifications

Microphone Input to Line Output

Gain: 98db (Includes 6 db line isolation pad)

Frequency Response: ± 1 db 30 to 15,000 cps.

Distortion: 0.5% 30 to 15,000 cps. at output level of +20dbm and less than 1% at +24 dbm.

Signal to Noise Ratio: 70 db (+18 dbm output with -50 dbm input)

High Level Channels

Gain: 41 db

Frequency Response: ± 1 db 30 to 15,000 cps.

Distortion: 0.5% 30 to 15,000 cps. at +20 dbm output and less than 1% at +24 dbm output.

Signal to Noise Ratio: 70 db (18 dbm output with -10 dbm input)

Source Impedances

Microphone Inputs: 150 or 600 ohms

Line or Utility Inputs: Up to 15,000 ohms

Load Impedances

Line Outputs: 600 ohms

Monitor Outputs: 600 ohms (Requires Separate Monitor Amplifiers)

Headphone Outputs: 600 ohms

Additional Specifications

VU Meters: One furnished complete with meter illuminating lamps, mounting facilities and pads. (A second meter is required for "stereo" or two-channel/two line operation. Available separately as an accessory.)

Cable

Terminations: Internally mounted WE Type L6A terminal board.

Patch Panel: All major circuits brought to jumpered terminals to provide means for wiring out jacks, if required.

Channels:

One, two or three divided to two for stereo use.

Attenuators:

Ten mixers. (All 600-ohm step type attenuators.) Two masters or two sub-masters and one board master. Two monitors.

Keys:

Ten three-position keys make each mixer attenuator selectable to three buses.

Rotary Switches:

Inputs 1 and 2 have switches providing choice of four program sources each, for utility use. (Total of 16 connected inputs.) Two-position line output switch. One additional spare provided but not wired.

Filters:

One four-position speech-music filter provided.

Headphone Jacks:

Three, two for channel monitoring. Third unwired to be used for intercom, etc.

Amplifiers:

Broadcast quality "plug-in" type. Input transformers 90 db magnetic shielding. Input and output 150 or 600 ohms balanced. Two amplifier types (Preamp & Program-amp), same physical size.

Power Supply:

Completely enclosed cube for external mounting (under table, wall, etc.) with interconnecting cable and connectors. Supplies B+ and 6.3v dc for heaters.

Panels:

Aluminum, standard Altec color with characters etched and filled. Panels may be engraved when additional markings are required.

Cabinet:

Hinged two-slope control panels painted Dark Green. Contains all equipment except power supply and monitor amplifier(s).

Dimensions:

9 1/2" H., 39 1/4" W., 16" D.

Mounting:

Table or desk, not supplied.

Accessories:

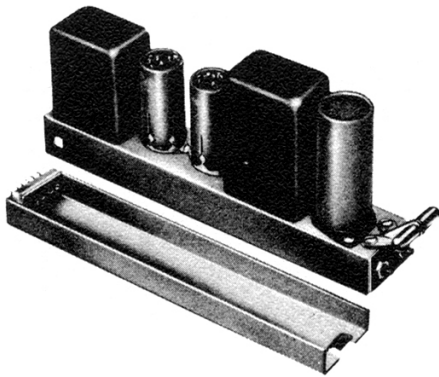
458A Plug-In Preamplifier and Booster Amplifier.
459A Plug-In Program Amplifier.
13387 Plug-In Utility Input Device for High Level Sources.
535A Power Supply.
7160 V.U. Meter for Second Channel.
5981 Tube Test Meter.

NOTICE
We recommend that you obtain your Altec products from factory trained authorized Altec Sound Contractors and Distributors. This will assure you of proper installation, a continuing source of knowledgeable advice, service, and quick warranty protection.



458A "PLUG-IN" PREAMPLIFIER

OPERATING INSTRUCTIONS



458A PREAMPLIFIER

SPECIFICATIONS

Gain:	40 db unterminated input, 34 db terminated.
Power Output:	+20 dbm at less than .5% THD 50 to 15,000 cps. +25 dbm at less than 1% THD at 1 KC.
Frequency Response:	±1 db 20 to 20,000 cps.
Source Impedance:	150 or 600 ohms (centertap available when connected for 600 ohms).
Load Impedance:	150 or 600 ohms (centertap available when connected for 600 ohms).
Output Impedance:	Equal to load impedance.
Noise Level:	Equivalent input noise: -126 dbm (valid for unterminated input operation).
Power Supply:	15ma at 275vdc and .7a at 6.3vdc.
Tubes:	2 - 6072/12AY7.
Dimensions:	1¾" W x 3¼" H and 9¼" L when mounted in tray. (See Fig. 1.)
Color:	Cad plate, dichromate dip.
Weight:	3½ lbs. (including tray).
Special Features:	Push buttons for individual tube test. 40ma dc can be applied to input or output transformer center taps for simplexing use.
Accessories:	13225 Rack Mounting Assembly (accommodates 9 units). 13401 Mounting Tray Assembly. 5981 Tube Test Meter. 535A Power Supply.

CIRCUIT DESCRIPTION

The 458A is an extremely simple, highly reliable, low noise pre-amplifier or booster amplifier. It consists of a single stage push-pull cross-neutralized vacuum tube circuit, transformer coupled to source and load. The absence of interstage coupling and feedback networks eliminates a source of noise and reduces the probability of failure by the marked reduction in number of components. This design is made possible through the use of specially designed input and output transformers having very accurate balance and a large ratio of primary inductance to leakage reactance.

RELIABILITY

Program transmission is not interrupted by failure of a single tube. Gain is merely reduced by approximately 3 db and the band-width narrowed by an octave at each frequency extreme, allowing continued operation and repair at a convenient time.

Premium quality tubes are employed which are controlled in characteristic and pre-aged to eliminate early failures. To further enhance tube life, heat reducing tube shields are employed to keep bulb temperatures to the lowest possible degree. This precaution inhibits "getter" migration and cathode evaporation, both of which tend to cause an increase in noise as tubes age.

RECEPTACLE CONNECTIONS (Mounting Tray)

Input	Connect to 2 and 8	Strap 4 to 6 for 600 ohms (4-6 is center tap). Strap 2 to 4 and 6 to 8 for 150 ohms.
Output	Connect to 1 and 7	Strap 3 to 5 for 600 ohms (3-5 is center tap). Strap 1 to 3 and 5 to 7 for 150 ohms.
B+	Connect to 12	(Requires grounding at single point.)
B-	Connect to 10	
Heater (6.3vdc)	Connect to 11 and 15	(One side requires grounding at single point.)
Meter+	Connect to 9	
Meter-	Connect to 10	
Chassis Ground	Connect to 13	



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1515 S. Manchester Ave., Anaheim, Calif.
New York

13402-1

Price \$.14

Litho in USA C/P

11/65

IMPEDANCE (Source and Load)

Both 150 and 600 ohm source and load impedances are available at the connector so that socket wiring changes, or strapping within the amplifier is not required. By this means, any amplifier is correctly matched when inserted into any tray properly wired for its particular function.

INTERNAL OUTPUT IMPEDANCE

The output impedance of the 458A is equal to the load impedance so that building-out resistors are unnecessary when feeding loads, such as equalizers, which may be sensitive or critical to terminating impedances.

INPUT TERMINATION

The 458A has an unterminated input transformer for use with microphones. When termination is required, a 150 or 600 ohm resistor is to be connected to the receptacle on the mounting tray. In this way all amplifiers are interchangeable in mounting trays regardless of termination. Under no circumstances should termination be attempted at the secondary of the input transformer.

METERING

Push-button switches are provided on the amplifier and wired to the plug for use with an external meter. Connector pin 9 is multiplied to any number of amplifiers and to the meter + terminal. B- (pin 10) is connected to the meter - terminal. Pressing buttons on any amplifier will give an indication of tube space current. Average reading is 67% of full scale on a 0 to 200 microampere meter having an internal resistance of approximately 1000 ohms. The ALTEC 5981 meter is recommended and suitably marked for this use.

POWER REQUIREMENTS

The 458A ratings are based upon a B supply of 275 volts at 15 ma. However, the exact value is not critical. With a 250 volt supply, the unit draws 12.6 ma, has .2 db less gain and at +20 dbm output at 1 KC, develops .44% total harmonic distortion.

The amplifier is designed to operate from 6.3 volt .7 amp dc heater supply. If for any reason an ac supply must be used, it will be necessary to twist and re-route the heater leads within the amplifier as well as exercising extreme care in wiring the receptacles on the mounting trays. Because of push-pull circuitry, 458A's fed from a common power supply may be cascaded without danger of coupling through the power supply.

SERVICING

Maintenance should consist solely of replacing tubes when the cathode current shows a significant drop. Severe unbalance between tubes will cause a loss of 20 cycle response. High frequency response is controlled by neutralizing capacitors C_1 and C_2 which under no circumstances should be changed.

Cathode bias resistors R_1 and R_2 are precision wire wound units selected to withstand overload current without resistance change in event of tube failure, etc. The 20 mfd section of C_3 with resistor R_3 form a "hash" filter for the "B" supply line. Because of their tight fit, tube shields must be removed with care to avoid bending the tube pins. Do not relieve the tube shield fit as it will impair its effectiveness in reducing bulb temperature.

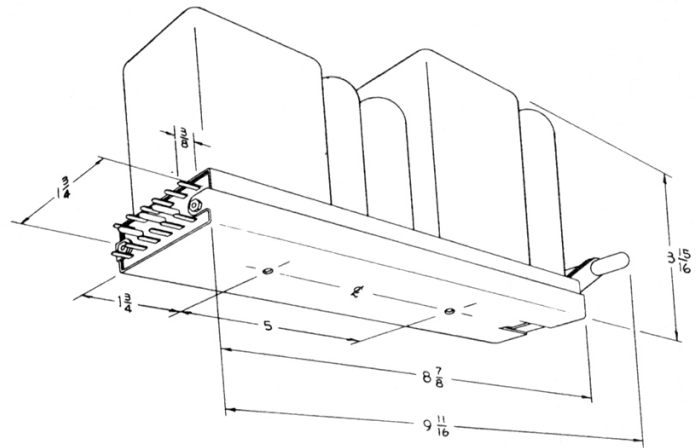
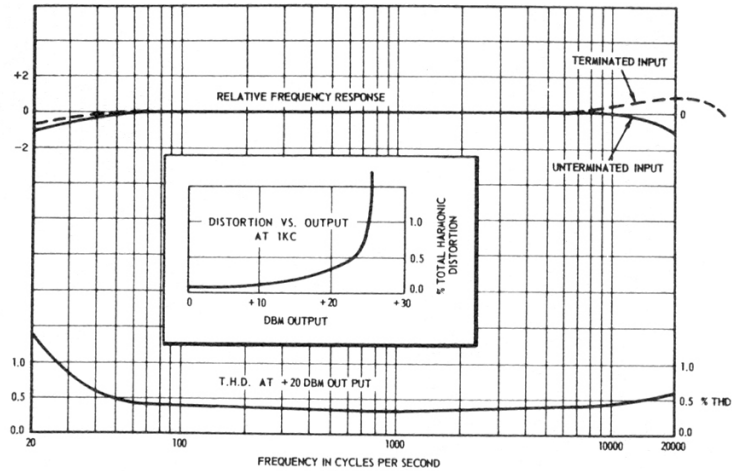


FIGURE 1.

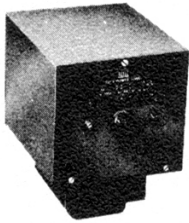
PERFORMANCE

458A PREAMPLIFIER



ACCESSORIES

535A POWER SUPPLY



Power Output: 275vdc at 275 ma.
At 275ma ripple is .02v peak to peak max.
6.3vdc at 13a.
At 13a ripple is 1.5v peak to peak max.

Power Input: 117v 50-60 cps 245 watts at full load.

Rectifiers: Silicon.

Controls:

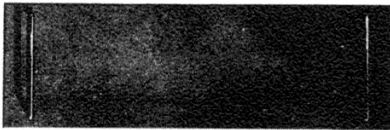
1. Power Switch
2. Circuit Breaker (Push to reset).
3. 4 Position tap switch (provides adjustment of voltage by autoformer action to accommodate 2 to 1 range of loads).

Color: Dark Green.

Weight: 16 pounds.

Size and Mounting: 7 $\frac{3}{16}$ " W x 9 $\frac{5}{8}$ " H x 7" D overall.

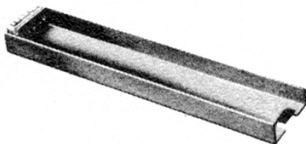
13225 RACK MOUNTING



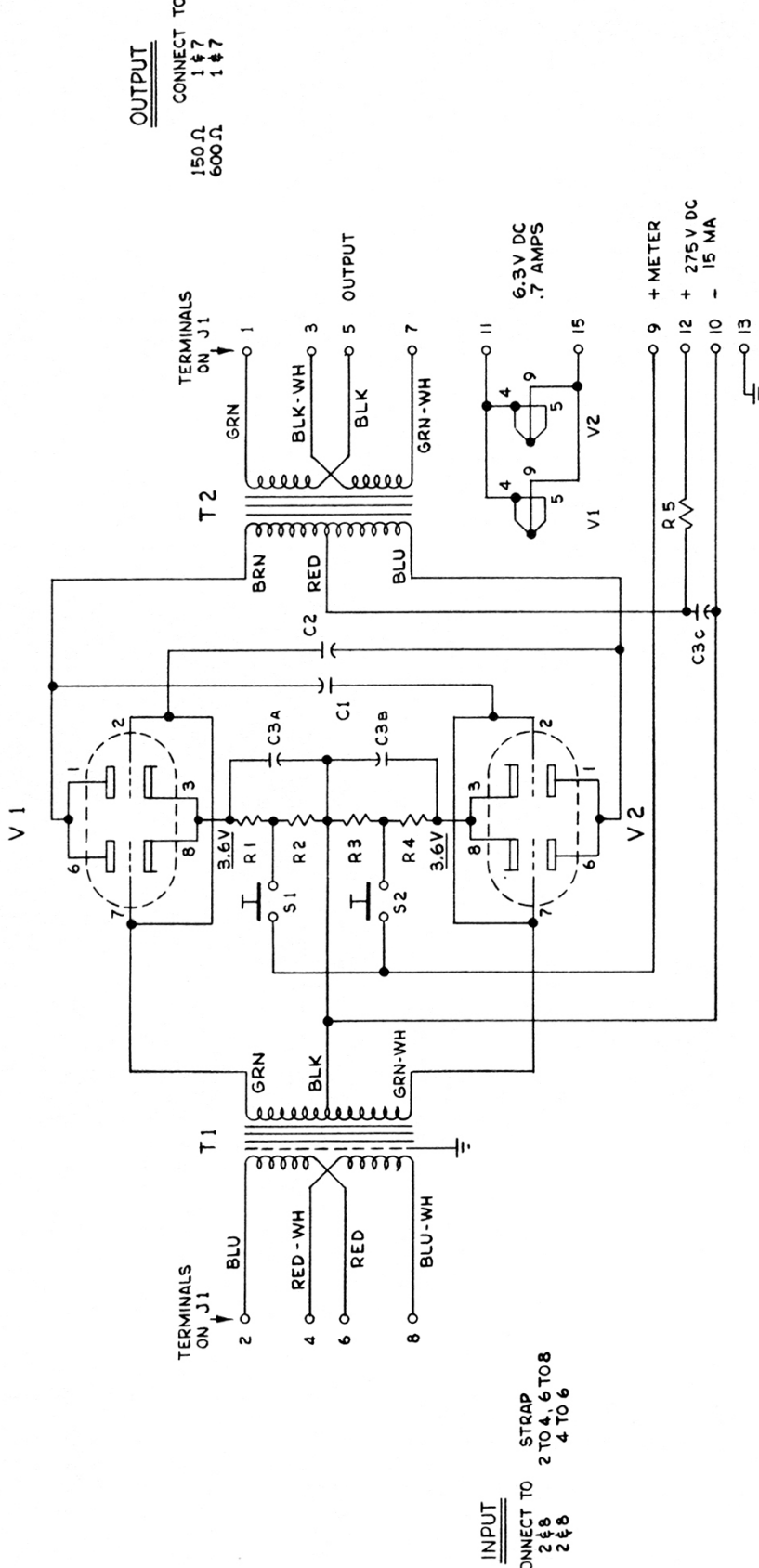
13225 Mounting is available for use in rack mounting of speech input equipment. The rack mounting assembly is drilled to accept nine type 13401 Mounting Tray Assemblies for use with Altec 458A and 459A "Plug-In" Amplifiers and Altec 13387 Utility Input Device. The 13225 assembly is for standard 19" rack or equipment cabinet mounting and occupies only 5 $\frac{1}{4}$ " of panel space. The assembly has a "Snap-in" removable front cover for instantaneous access to the units for test or service. The finish of the front cover is Dark Green, and the complete assembly weighs 4 pounds.

For rack mounting 535A Power Supply, 10440 10 $\frac{1}{2}$ " Blank Panel may be used or Power Supply may be mounted on wall of equipment cabinet.

13401 MOUNTING TRAY



13401 Mounting Tray is furnished as part of the 250 SU Altec Control Console, however, it is available separately to provide mounting and "plug-in" connection facilities for 458A and 459A Altec "Plug-In" Amplifiers or the 13387 Utility Input Device, when mounted in the 13225 Rack Mounting Assembly. The 13401 finish is cadmium plate with dichromate dip. The tray assembly is complete with "mating" female receptacle to accept the 458A, 459A and 13387 units. The tray measures 1 $\frac{3}{4}$ " W x $\frac{7}{8}$ " H x 9" L (over terminals), and weighs $\frac{1}{2}$ pound.



OUTPUT
 CONNECT TO STRAP
 150 Ω 1 TO 3, 5 TO 7
 600 Ω 1 TO 7

INPUT
 CONNECT TO STRAP
 150 Ω 2 TO 4, 6 TO 8
 600 Ω 2 TO 8

- T1 4745 TRANSFORMER
- T2 16526 TRANSFORMER
- V1-V2 6072/12AY7
- R1-R4 470 Ω 1% WW
- R5 18 Ω 1% DC
- C1-C2 470 Ω 10% AB
- C3 3 MMF ±.25 MMF
- J1 100-100-20 MFD
- S1-S2 12-12-350 V
- AMPHENOL 126-151
- GREYHILL 30-1

ALTEC LANSING
 458A AMPLIFIER

FIRST MADE FOR

TOLERANCES EXCEPT AS NOTED: FRACT. ± 1/64" DEC. ± .0008" HOLE SIZES 0 TO 1/8" ± .001 OVER 1/8" ± .0008 ANGULAR ± 1/2°

ISSUE	APPROVED DATE	CHANGE
1	3-22-56	
ALC 52		

ALTEC
 LANSING CORPORATION
 ANAHEIM, CALIFORNIA
 458A AMPLIFIER
 SCHEMATIC

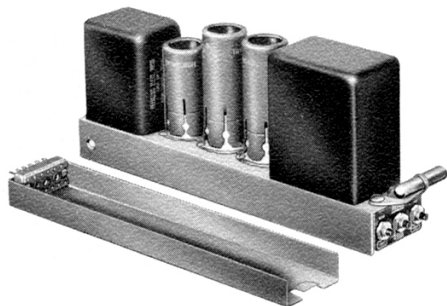
DR. BY FLG 7027



ALTEC
LANSING

459A "PLUG-IN" PROGRAM AMPLIFIER

OPERATING INSTRUCTIONS



459A PROGRAM AMPLIFIER

SPECIFICATIONS

- Gain: 56 db unterminated input, 50 db terminated.
- Power Output: +30 dbm at less than .5% THD 30 to 20,000 cps.
+35 dbm at less than 1% THD at 1 KC.
- Frequency Response: ±1 db. 20 to 20,000 cps.
- Source Impedance: 150 or 600 ohms (centertap available when connected for 600 ohms).
- Load Impedance: 150 or 600 ohms (centertap available when connected for 600 ohms).
- Noise Level: Equivalent input noise: -126 dbm (valid for unterminated input operation).
- Power Supply: 40ma at 275vdc and 1.6a at 6.3vdc.
- Tubes: 1—6072/12AY7, 2—12BH7.
- Dimensions: 1 3/4" W x 3 1/8" H x 9 1/8" L when mounted in tray. (See Fig. 1).
- Color: Cad plate, dichromate dip.
- Weight: 3 1/2 lbs. (including tray).
- Special Features: Push buttons for individual tube test.
40ma dc can be applied to input or output transformer center taps for simplexing use.
- Accessories: 13225 Rack Mounting Assembly (accommodates 9 units).
13401 Mounting Tray Assembly.
5981 Tube Test Meter.
535A Power Supply.

CIRCUIT DESCRIPTION

The 459A is a highly reliable, low noise program amplifier with an exceptionally large power capability. It consists of a two-stage, push-pull circuit having a balanced negative feedback loop. Push-pull operation of all stages provides reliability, interchangeability and power supply simplification as outlined below. Superior overall performance is made possible through the use of specially designed input and output transformers having very accurate balance and a large ratio of primary inductance to leakage reactance.

RELIABILITY

Program transmission is not interrupted by failure of either output tube. The single input tube is a premium quality type which has been pre-aged to eliminate early failures. It is a dual triode type which has parallel rather than series heater sections. Because of the push-pull connection and the heater arrangement, failure of either heater section will not cause program interruption. Such failures cause a minor loss of output and a narrowing of the band-width by about an octave at each frequency extreme, allowing continued operation and repair at a convenient time.

To enhance tube life, heat-reducing tube shields are employed to keep bulb temperatures to the lowest possible degree. This precaution inhibits "getter" migration and cathode evaporation, both of which tend to cause an increase in noise as tubes age.

RECEPTACLE CONNECTIONS (Mounting Tray)

Input	Connect to 2 and 8	Strap 4 to 6 for 600 ohms (4-6 is center tap). Strap 2 to 4 and 6 to 8 for 150 ohms.
Output	Connect to 1 and 7	Strap 3 to 5 for 600 ohms (3-5 is center tap). Strap 1 to 3 and 5 to 7 for 150 ohms.
B+	Connect to 12	
B-	Connect to 10	(Requires grounding at single point.)
Heater (6.3vdc)	Connect to 11 and 15	(One side requires grounding at single point.)
Meter+	Connect to 9	
Meter-	Connect to 10	
Chassis Ground	Connect to 13	



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New York

13522-1 Price \$.14
Litho in U.S.A. C/P 2/65

INTERCHANGEABILITY

The 459A electrical connections, impedances and physical size are compatible with the 458A permitting substitution, assuming the power supply has the added current capability. This is of advantage when a channel containing a 458A requires additional gain. A boom-microphone channel of a speech input system, for instance, can realize a 16 db increase in gain in no more time than is required to unplug one and insert another amplifier in the mounting tray.

IMPEDANCE (Source and Load)

Both 150 and 600 ohm source and load impedances are available at the connector so that socket wiring changes, or strapping within the amplifier is not required. By this means, any amplifier is correctly matched when inserted into any tray properly wired for its particular function.

INTERNAL OUTPUT IMPEDANCE

Unlike the 458A, the 459A program amplifier has an internal impedance which is low compared to its nominal load impedance. This is an advantage in feeding long lines and provides additional isolation between outputs when used to feed branching networks.

INPUT TERMINATION

The 459A has an unterminated input transformer making it suitable for use with microphones. In its normal function as a line amplifier, however, it should be terminated. A 150 or 600 ohm resistor must be connected to the mounting-tray receptacle for this purpose. In this way, all amplifiers are interchangeable in mounting trays regardless of termination. Under no circumstances should termination be attempted at the secondary of the input transformer.

METERING

Push-button switches are provided on the amplifier and wired to the plug for use with an external meter. Connector pin 9 is multiplied to any number of amplifiers and to the meter + terminal. B - (pin 10) is connected to the meter - terminal. Pressing buttons on any amplifier will give an indication of tube space current. Average reading is 67% of full scale on a 0 to 200 microampere meter having an internal resistance of approximately 1000 ohms. The ALTEC 5981 meter is recommended and suitably marked for this use.

POWER REQUIREMENTS

The 459A ratings are based upon a "B" supply of 275 volts at 40 ma; however, the exact value is not critical. With a 225 volt supply the unit draws 34 ma and the distortion at 1 KC increases to .45% at +30 dbm. The amplifier is designed to operate from 6.3 volt, .7 amp DC heater supply. If for any reason an AC supply must be used in low noise applications, it will be necessary to twist and re-route the heater leads within the amplifier as well as exercising care in wiring the receptacles on the mounting trays.

Because of push-pull circuitry, 459A's and 458A's fed from a common power supply may be cascaded without danger of coupling through the power supply.

SERVICING

Maintenance should consist solely of replacing tubes when the cathode current shows a significant drop. Severe unbalance between V2 and V3 will cause an increase in distortion at full output in the 20 to 30 cycle region. Resistors used in critical locations are of precision types, having adequate power capability to withstand overloads caused by tube failure. The feedback network, composed of R2, R3 and R10, R11 is balanced and direct-coupled. Because of the direct-coupling, this network provides part of the bias potential for V1. If for any reason the feedback network is to be opened for measurement, resistors R2 and R10 must be removed from the plates of V2 and V3 and connected to B+ at the output transformer center tap. In this way, proper biases will be maintained. Because of their tight fit, tube shields must be removed with care to avoid bending the tube pins. Do not relieve the tube shield fit as it will impair its effectiveness in reducing bulb temperature.

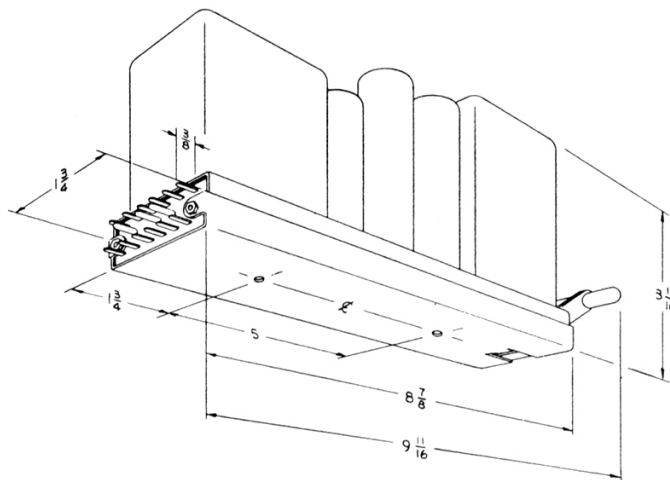
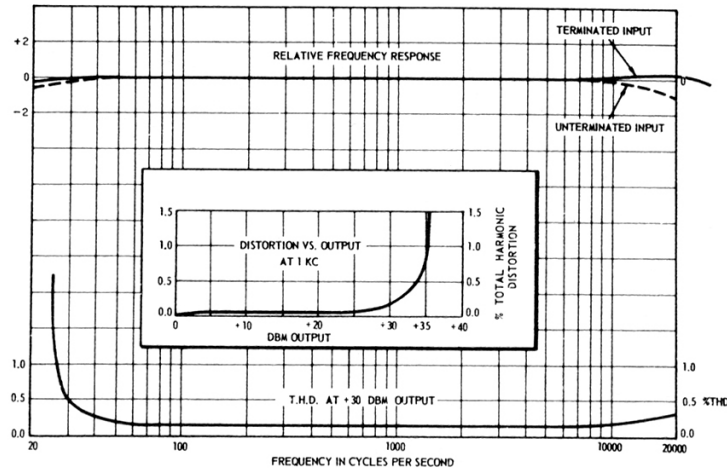


FIGURE 1.

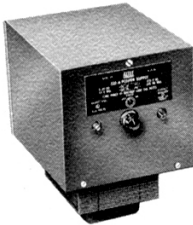
PERFORMANCE

459A PROGRAM AMPLIFIER



ACCESSORIES

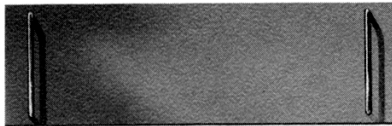
535A POWER SUPPLY



Power Output:	275vdc at 275 ma. At 275ma ripple is .02v peak to peak max. 6.3vdc at 13a. At 13a ripple is 1.5v peak to peak max.
Power Input:	117v 50-60 cps 245 watts at full load.
Rectifiers:	Silicon.
Controls:	1. Power Switch 2. Circuit Breaker (Push to reset). 3. 4 Position tap switch (provides adjustment of voltage by autoformer action to accommodate 2 to 1 range of loads).
Color:	Dark Green.
Weight:	16 pounds.
Size and Mounting:	7 $\frac{3}{16}$ " W x 9 $\frac{5}{8}$ " H x 7" D overall.

SPECIFICATIONS

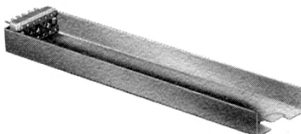
13225 RACK MOUNTING



13225 Mounting is available for use in rack mounting of speech input equipment. The rack mounting assembly is drilled to accept nine type 13401 Mounting Tray Assemblies for use with Altec 458A and 459A "Plug-In" Amplifiers and Altec 13387 Utility Input Device. The 13225 assembly is for standard 19" rack or equipment cabinet mounting and occupies only 5 $\frac{1}{4}$ " of panel space. The assembly has a "Snap-in" removable front cover for instantaneous access to the units for test or service. The finish of the front cover is Dark Green, and the complete assembly weighs 4 pounds.

For rack mounting 535A Power Supply, 10440 10 $\frac{1}{2}$ " Blank Panel may be used or Power Supply may be mounted on wall of equipment cabinet.

13401 MOUNTING TRAY



13401 Mounting Tray is furnished as part of the 250 SU Altec Control Console, however, it is available separately to provide mounting and "plug-in" connection facilities for 458A and 459A Altec "Plug-In" Amplifiers or the 13387 Utility Input Device, when mounted in the 13225 Rack Mounting Assembly. The 13401 finish is cadmium plate with dichromate dip. The tray assembly is complete with "mating" female receptacle to accept the 458A, 459A and 13387 units. The tray measures 1 $\frac{3}{4}$ " W x $\frac{7}{8}$ " H x 9" L (over terminals), and weighs $\frac{1}{2}$ pound.

150 Ω
600 Ω

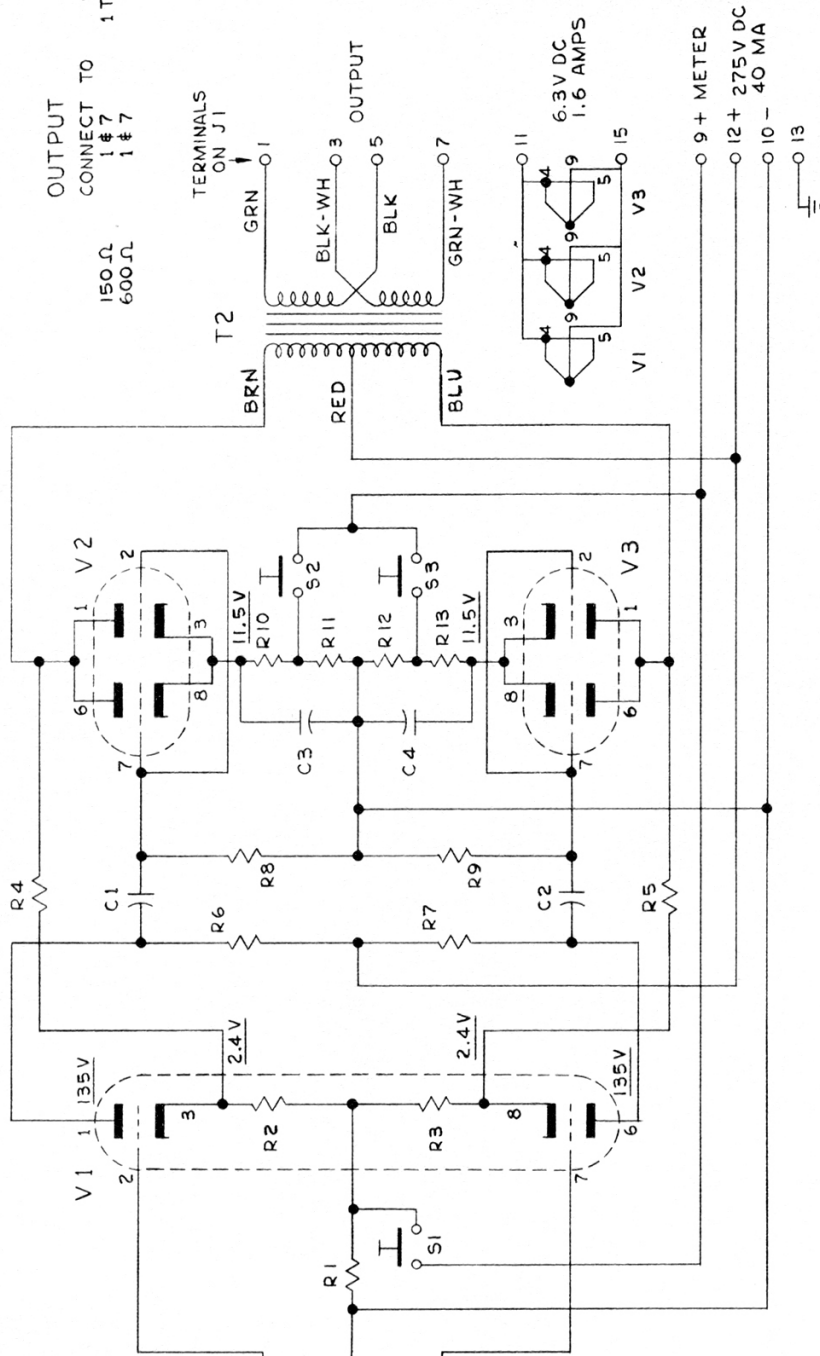
INPUT
CONNECT TO STRAP
2 TO 4, 6 TO 8
2 & 8

150 Ω
600 Ω

OUTPUT
CONNECT TO STRAP
1 TO 3, 5 TO 7
1 & 7

TERMINALS
ON J1

TERMINALS
ON J1



ALTEC LANSING
459A AMPLIFIER

- T1 4745 TRANSFORMER
- T2 16543 "
- V1 6072 VACUUM TUBE
- V2-V3 12 BH 7 "
- R1 33 Ω ¼ W 1% DC
- R2-R3 1000 Ω 1W 1%
- R4-R5 180000 Ω ¼ W 1% DC
- R6-R7 470000 Ω ½ W 1% AB
- R8-R9 600 Ω 1W 1%
- R10-R13 7.5 Ω 1W 3%
- C1-C2 .022 MFD 400V
- C3-C4 25 MFD 15V
- S1-S2-S3 GRAYHILL 30-1
- J1 AMPHENOL 126-151

FIRST MADE FOR

TOLERANCES EXCEPT AS NOTED: FRACT. ± 1/64" DEC. ± .005" HOLE SIZES 0 TO 1/8" ± .001 OVER 1/8" ± .005 ANGULAR ± 1/2°

ISSUE	APPRO'D	DATE	CHANGE
1		4-25-64	
2		6-24-64	REVERSED BLU-GRN, T2

ALTEC
LANSING CORPORATION

ANAHEIM, CALIFORNIA

459A AMPLIFIER
SCHEMATIC

DR. BY FLG 7030-2

ALC 52

459A SCHEMATIC