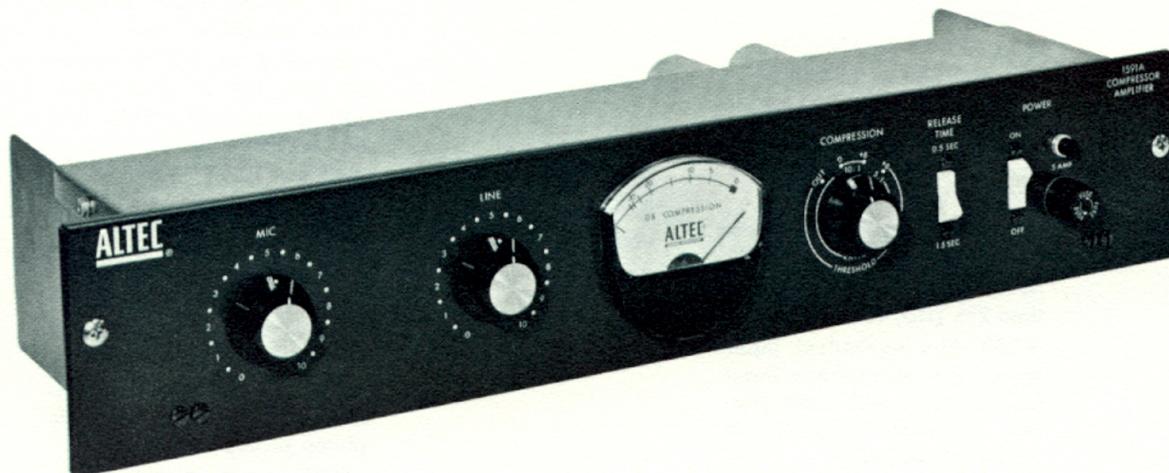


ALTEC 1591A Compressor Amplifier

1591A



Features

- All Solid-State Design;
Compact, Rugged Construction
- Compression and/or Mixing of
High or Low Level Inputs
with Separate Gain Controls
- Enables Announce-Mike Channel
to Override Program-Material
- Plug-In Accessories:
Microphone Preamplifier
Equalized Phono Preamplifier
Transformer-Isolated Preamplifier
- a-c or d-c (battery) powered
- Operates from Microphone Level
or Line Level Signal Sources
- Up to 35 dB
of Signal Compression
- Compression "Defeat" For
Linear Amplification
- Direct-Reading
Compression Meter
- Selectable Compression Ratios:
5 to 1 or 10 to 1
- Selectable Compression
Thresholds of Zero dBm
and +8 dBm

ENGINEERED FOR MIXING HIGH/LOW LEVEL INPUTS, COMPRESSION OR LINEAR AMPLIFICATION WITHOUT EXCEEDING DYNAMIC RANGES IN: RECORDING AND BROADCAST STUDIOS • THEATERS • STADIUMS • SCHOOLS • CHURCHES • HOTELS • ARENAS • CONVENTION CENTERS • MILITARY COMPLEXES • PUBLIC ADDRESS SYSTEMS

One of the most useful audio devices to emerge from ALTEC quality engineering in some time is to be found in the 1591A all Solid-State Compressor-Amplifier. This device is unexcelled in increasing average signal levels without exceeding equipment dynamic range limitations, and it controls the common problem of speech-level differences in individuals on public address systems, while concurrently providing a measure of automatic gain control. Its ability to amplify weak signal inputs and diminish signal inputs of excessive magnitudes provides speakers or lecturers with added freedom of movement in the vicinity of the microphone. Simple to install and simple to operate—this versatile signal-amplitude controlling/amplifying unit will add an indispensable touch of refinement to the most sophisticated of sound systems.

The new 1591A Compressor-Amplifier is designed to operate from microphone or line-level sources, providing outputs up to +18 dBm into 150 or 600 Ohm loads, and has a frequency response of ± 1.0 dB, 20-20,000 Hz. Another outstanding feature of the 1591A is its capability of simultaneously mixing high and low level signal sources—each having its own gain control.

Gain reduction of up to 35 dB is provided by the ALTEC 1591A, with compression ratios of 5 to 1 or 10 to 1, selectable by a front-panel switch. Compression thresholds are also selectable at 0 dBm and +8 dBm. Compressor action may be switched OFF when linear amplifier operation is desired. A fast release-time of 0.5 seconds is provided, in addition to a 1.5 second release-time—better suited to musical reproduction. Another invaluable front-panel convenience is the direct-reading meter which indicates amount of program-material compression.

Octal sockets are located on the unit's rear panel for ALTEC's 1578A or 1588A microphone preamplifier necessary for low-level inputs, and for the ALTEC 15095 transformer, required for isolation when the 1591A is operated from line-level sources.

The ALTEC 1579A Equalized Phono Amplifier may be substituted at the low-level input octal socket for magnetic phonograph pickup use.

The ALTEC 1591A Compressor-Amplifier may be operated from 120 or 240V ac, 50/60 Hz power, or from 12 or 24V dc sources. The dc source may be permanently connected in conjunction with the ac supply, so that in the event of ac power failure, immediate and silent transfer to the dc power source can be accomplished with no interruption in program material.

The extreme versatility and excellent performance of this solid-state ALTEC Compressor-Amplifier will lend that "final touch" to the finest audio reproduction equipments or installed sound systems.



A quality company of LTV Ling Altec, Inc.

1515 S. Manchester Ave., Anaheim, Calif. 92803

New York

SPECIFICATIONS

Model:	1591A	Controls:	Mic. gain, Line gain, release time, compression ratio and threshold, power switch
Type:	Compressor Amplifier		12V/24V dc power transfer switch on chassis rear
Gain:	Mic: 90 dB with 1588A plug-in preamplifier Line: 40 dB with 15095 transformer bridging 600Ω line		120/240V ac, 50/60 Hz at 10 watts 12V dc at 0.16A or 24V dc at 0.17A Batt. (—) side is ground
Frequency Response:	±1.0 dB, 20 to 20,000 Hz	Dimensions:	3½" H x 19" W x 5¾" D
Power Output:	+18 dBm as straight amplifier	Color:	Dark Green
Harmonic Distortion:	At +18 dBm, less than 0.5% THD, 30 to 20,000 Hz At 25 dB of compression, less than 1% THD, 40 to 20,000 Hz At 35 dB of compression, less than 2% THD, 40 to 20,000 Hz	Weight:	8 lbs. 5 oz.
Noise Level:	—120 dBm equivalent input noise from microphone input Output noise with gain controls at minimum is 70 dB below full output	Accessories:	1588A plug-in: transformer isolated microphone preamplifier 1578A plug-in: unbalanced input microphone preamplifier 1579A plug-in: RIAA equalized amplifier for magnetic phono pickup 15095 plug-in: transformer for line bridging 15356 plug-in: transformer for line matching
Source Impedance:	Mic: 150/250Ω with 1588A plug-in preamplifier Line: Up to 15,000Ω with 15095 transformer (Microphone input may use a 1579A Equalized amplifier for 47,000Ω magnetic phono pickup).	Ordering Information:	Order the following items: 1. 1591A basic amplifier 2. One 1588A or 1578A preamplifier for mic. input. (Use 1588A for balanced input and 1578A for unbalanced input) 3. One 1579A if magnetic phono pickup is used in lieu of microphone input 4. One 15095 transformer for line bridging input 5. One 15356 transformer for line matching input
Load Impedance:	150 and 600Ω (Transformer isolated output.)		
Maximum Compression:	35 dB		
Attack Time:	30 milliseconds (63%)		
Release Time:	Selectable, 0.5 or 1.5 seconds (63% recovery).		
Threshold:	Selectable, 0 dBm or +8 dBm output		
Compression Ratio:	Selectable, 10:1 at 0 dBm; 10:1 or 5:1 at +8 dBm		

ARCHITECTS AND ENGINEERS SPECIFICATIONS

The device shall be a Compressor-Amplifier, capable of maintaining magnitudes of audio-frequency voice, program or other signals at desired levels. It shall be capable of signal amplification, employing its compression feature, and further capable of direct, linear amplification, when required, by means of a front-panel control. The equipment's compression function shall be interpreted to convey that it is capable of rendering weak signal components stronger, that they may not be lost in background noise, and conversely, reducing loud program components to prevent overload to any part of the system. This action shall be achieved by making the effective gain vary automatically as a function of output signal magnitude. The device shall also be capable of simultaneously accepting dual (high and low level) inputs — mixing, compressing, and amplifying them, and each input shall have its separate gain control.

The Compressor-Amplifier shall employ the following controls and indicators on the front panel: (1) Switch for selection of compression ratios of 5 to 1 or 10 to 1, providing a gain reduction of up to 35 dB, and compression thresholds of 0 dBm and +8 dBm; (2) Gain and Mixing controls for high (line) and low (microphone) inputs; (3) Direct-reading meter for indication of amount of program-material compression being applied; (4) Release-Time switch for a fast release of 0.5 seconds or 1.5 seconds, more suitable for musical reproduction; (5) Power ON/OFF switch; (6) Fuse; (7) Indicator Light.

The device shall have an attack time of 30 milliseconds or less. It shall be provided with sockets on the chassis for insertion of preamplifiers necessary to low-level inputs, for a phono-amplifier to be inserted for magnetic phonograph pickup use, and for an isolation-transformer, necessary for operation from line-level signal sources. The instrument shall be capable of temporary or permanent (in case of failure in the 120/240, 50/60 Hz ac supply) operation from a 12V or 24V dc power source — immediate and silent transfer being made to the dc supply, when both sources are connected. The Compressor-Amplifier shall measure no more than 3½" high x 19" wide x 5¾" deep, and weigh no more than 8 lb., 5 oz. Its color shall be dark green.

Any Compressor-Amplifier not meeting these requirements shall be deemed unacceptable under these specifications. The Compressor-Amplifier shall be ALTEC Model 1591A.

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.

ALTEC®

1591A COMPRESSOR AMPLIFIER



OPERATING INSTRUCTIONS

SPECIFICATIONS

Model:	1591A
Type:	Compressor Amplifier
Gain:	Mic: 90 dB with 1588A plug-in preamplifier Line: 40 dB with 15095 transformer bridging 600 ohm line
Frequency Response:	±1.0 dB, 20 to 20,000 Hz
Power Output:	+18 dBm as straight amplifier
Harmonic Distortion:	At +18 dBm, less than 0.5% THD, 30 to 20,000 Hz At 25 dB of compression, less than 1% THD, 40 to 20,000 Hz At 35 dB of compression, less than 2% THD, 40 to 20,000 Hz
Noise Level:	-120 dBm equivalent input noise from microphone input Output noise with gain controls at minimum is 70 dB below full output
Source Impedance:	Mic: 150/250 Ω with 1588A plug-in preamplifier Line: Up to 15,000 Ω with 15095 Transformer (Microphone input may use a 1579A Equalized Amplifier for 47,000 Ω magnetic phono pickup)
Load Impedance:	150 and 600 Ω (Transformer isolated output)
Maximum Compression:	35 dB
Attack Time:	30 milliseconds (63%)
Release Time:	Selectable, 0.5 or 1.5 seconds (63% recovery).
Threshold:	Selectable, 0 dBm or +8 dBm output

Compression Ratio:	Selectable, 10:1 at 0 dBm; 10:1 or 5:1 at +8 dBm
Controls:	Mic. gain, Line gain, release time, compression ratio and threshold, power switch 12V/24V dc power transfer switch on chassis rear
Power Supply:	120/240V ac, 50/60 Hz at 10 watts 12V dc at 0.16A or 24V dc at 0.17A Batt. (-) side is ground
Dimensions:	3-1/2" H x 19" W x 5-3/4" D
Color:	Dark green
Weight:	8 lbs. 5 oz.
Accessories:	1588A plug-in: transformer isolated microphone preamplifier 1578A plug-in: unbalanced input microphone preamplifier 1579A plug-in: RIAA equalized amplifier for magnetic phono pickup 15095 plug-in; transformer for line bridging 15356 plug-in: transformer for line matching
Ordering Information:	Order the following items: 1. 1591A basic Amplifier 2. One 1588A or 1578A Preamplifier for mic. input. (Use 1588A for balanced input and 1578A for unbalanced input) 3. One 1579A if magnetic phono pickup is used in lieu of microphone input 4. One 15095 Transformer for line bridging input 5. One 15356 Transformer for line matching input

DESCRIPTION

The new ALTEC 1591A solid state Compressor Amplifier is designed to operate from microphone or line-level sources. The amplifier will provide an output up to +18 dBm into a 150 or 600 ohm load, and has a frequency response of ±1.0 dB, 20 to 20,000 Hz. An outstanding feature of the 1591A Amplifier is

Specifications and components subject to change without notice. Overall performance will be maintained or improved.

ALTEC®

SOUND PRODUCTS DIVISION

1515 S. Manchester Ave., Anaheim, Calif. 92803

42-02-041315-06

Litho in USA CP-1273-1K

its capability of simultaneously mixing high and low level signal sources, each having its own gain control.

Gain reduction of up to 35 dB is provided by the ALTEC 1591A Amplifier, with compression ratios of 5 to 1 or 10 to 1, selectable by a switch on the front panel. Compression thresholds are also selectable at 0 dBm and +8 dBm. Compressor action may be switched OFF when linear amplifier operation is desired. A fast release time of 0.5 seconds is provided, in addition to a 1.5 second release time, which is better suited to musical reproduction. On the front panel is also located a direct reading meter which indicates the amount of program material compression.

Octal sockets, appropriately labeled, are located on the rear panel of the unit, for the insertion of ALTEC's 1578A or 1588A Microphone Preamplifier, necessary for low-level inputs and also for the ALTEC 15095 Transformer required for isolation when the 1591A is operated from line-level sources. The ALTEC 1579A Equalized Phono Amplifier may be substituted at the low-level input octal socket for magnetic phonograph pickup use. See Figure 1.

The ALTEC 1591A Compressor Amplifier may be operated from 120 or 240V ac, 50/60 Hz power, or from 12 or 24V dc sources.

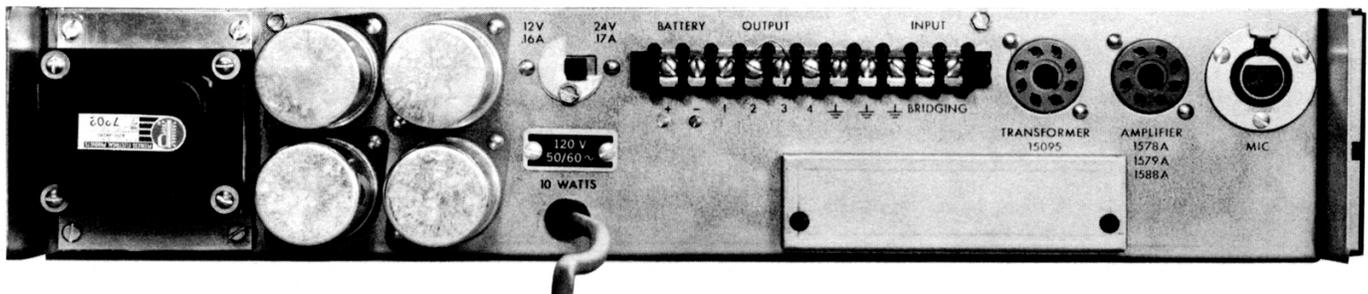


Figure 1. Rear View of 1591A Compressor Amplifier

INSTALLATION

The accompanying figures illustrate several system arrangements, using the 1591A Compressor Amplifier as a preamplifier/line amplifier and as a line amplifier only. The microphone input will accommodate a substantial range of microphone impedances.

By utilizing only the bridging input, the 1591A Compressor Amplifier may be connected into any high or low impedance, unbalanced line between preamplifiers and power amplifiers without the need for a build-out resistor, adapters, or other modification, and without the need to add an input gain control. See Figures 2, 3 and 4 for typical systems and input and output connections.

With high-impedance lines, as embodied in the ALTEC 1592A and similar preamplifier/mixer components, the bridging input of the 1591A Amplifier provides a suitable load into which these units may operate. The output of the 1591A Amplifier, when terminated with 600 ohm resistance, is of sufficient level to operate directly into the high impedance input of power amplifiers, such as the 1590A, 1593A, 1594A, 1595A, etc.

The output transformer of the 1591A Compressor Amplifier pro-

vides a balanced output for load impedances of 150 and 600 Ω . Because of the transformer configuration and the amplifier power capability, it is suitable for directly feeding transmission lines or combinations of one or more power amplifiers.

APPLICATIONS

The ALTEC 1591A Compressor Amplifier is intended for use in automatic level control applications, fulfilling the requirements of sound recording, radio and television broadcasting, and public address systems. Variations in output levels may be greatly minimized by using this compressor amplifier.

The bridging input permits the 1591A Compressor Amplifier to be employed to control differences in level between two or more program sources. In addition, the unit may be used to provide "automatic fading" for systems requiring voice-over-music announcements. The 1591A will prevent overloading in industrial applications, where sudden high level sounds may cause "blasting" with attendant danger to amplifiers and loudspeakers.

The 1591A Amplifier may be used as a "straight", high-quality line amplifier (or microphone preamplifier), without any compression action, by simply turning the compression switch to OFF.

vides a balanced output for load impedances of 150 and 600 Ω . Because of the transformer configuration and the amplifier power capability, it is suitable for directly feeding transmission lines or combinations of one or more power amplifiers.

Input-output characteristics are shown in more detail on the accompanying graph for three settings of the threshold control. See Figure 5.

NOTE

Since the outputs at high values of compression will overdrive most power amplifiers, it may be necessary to install a suitable loss pad at the input of those power amplifiers not equipped with an input gain control.

OPERATION AND USE OF CONTROLS

Input Gain Controls

These two controls, "MIC" and "LINE", located on the front panel, affect the levels of both channels (bridging and microphone inputs) and are used to adjust the input levels to provide

the desired average compression as indicated on the compression meter.

Compression Control

The output level, at which compression commences, together with the compression ratio, is adjustable by means of the COMPRESSION control located on the front panel of the 1591A Compressor Amplifier. Gain reduction of up to 35 dB is provided, with compression ratios of 5 to 1 or 10 to 1, selectable by the control. Compression thresholds may also be selected at 0 dBm and +8 dBm on the same control.

The higher threshold and flatter output characteristic may be more desirable in applications, such as the recording of sound, where the adjustment can be such that the majority of the material operates the amplifier in the linear transfer region and the occasional peak is compressed sufficiently (by the higher compression ratio) to prevent overmodulation of the recording mechanism. Conversely, for background music control, where the compressor function is to equalize differences in recording level and program dynamics, the zero level threshold is more desirable. In this application, "average" level material is used to set the compressor for 10 to 15 dB of compression; expansion or compression then results for material of lower or higher level than the standard "average".

Release Time Control

The time interval required to restore full gain, following a condition of compression, is adjustable in the range of 0.5 seconds to 1.5 seconds by means of this control switch located on the front panel of the 1591A Compressor Amplifier. In applications such as sound recording, where only an occasional peak actuates the compressor, the faster release times will be found desirable.

For public address usage, where the compressor is utilized as an averaging device to compensate for variations in microphones and speech levels, the longer release time will be found advantageous.

AC Power Switch

This rocker type power switch turns the compressor amplifier on and off, as indicated by the front panel light.

POWER CONNECTIONS

120 Volt, 50/60 Hz

Equipment supplied for domestic use will have the power transformer primary strapped for 120 volts, (terminals 1 to 2 and 3 to 4 on TB3). The power input nameplate on the chassis adjacent to the power cord will be mounted to show the appropriate side specifying the connections.

240 Volt, 50/60 Hz

Export equipment, specified, will have the power transformer primary strapped for 240 volts operation (terminals 3 to 4 on TB3). The power input nameplate on the chassis adjacent to the power cord will be mounted to show the appropriate side specifying the connections.

BATTERY POWER

When the battery source is connected to the terminals located on the back panel of the 1591A Amplifier, make certain that the battery slide switch, also located on the back panel, is secured into the proper position for the type of battery used. Failure to do so will result in serious damage to the equipment.

SERVICING

All circuit components are easily reached by opening the hinged front panel of the unit. Normal servicing may be done with a voltmeter. All pertinent information is shown on the schematic, Figure 6.

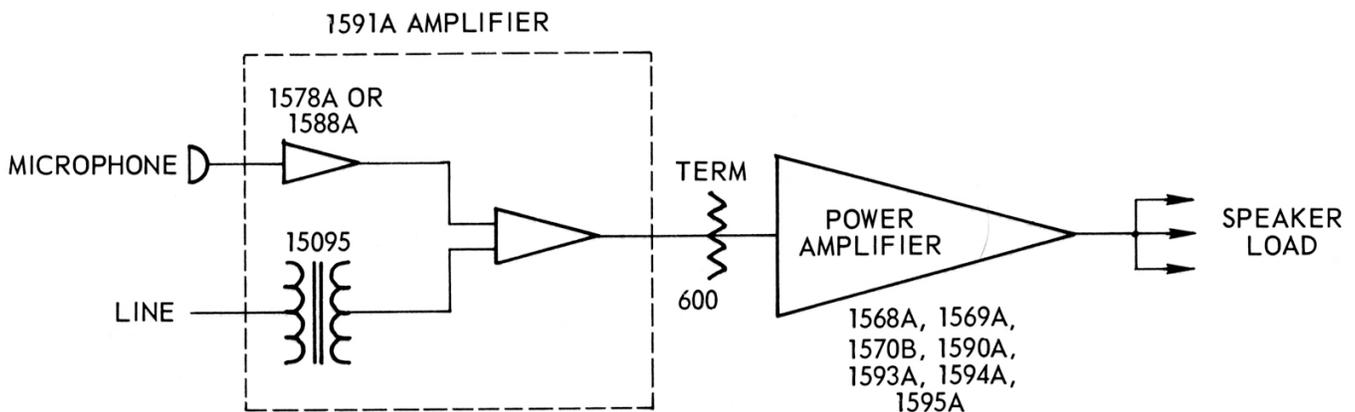


Figure 2. Typical system using microphone and line bridging inputs with the 1591A driving any ALTEC power amplifier without added transformer.

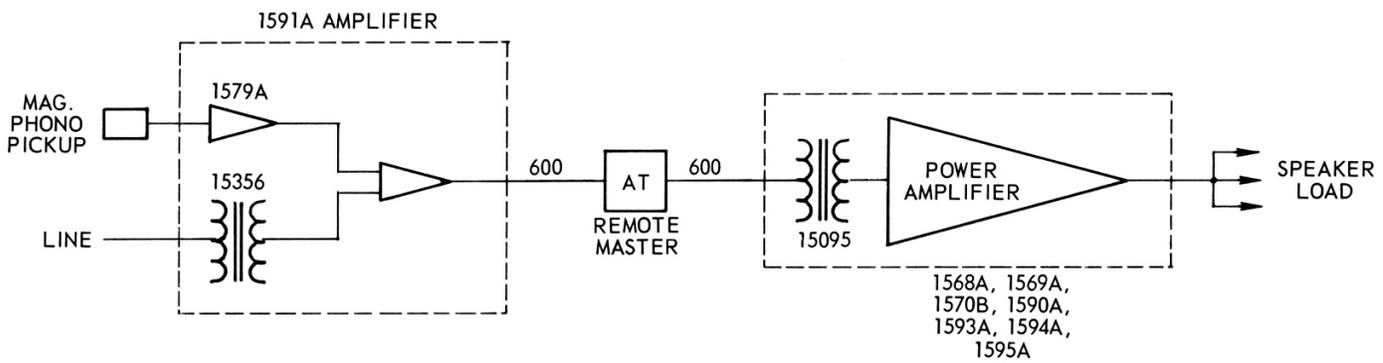


Figure 3. System using magnetic phono and line matching inputs with optional remote master. The 15356 Transformer provides approximately 12 dB additional gain on Line input if needed. The 15095 Transformer in the power amplifier, provides line isolation and added gain if needed. If the remote master is not desired, connect output of the 1591A to input of power amplifier.

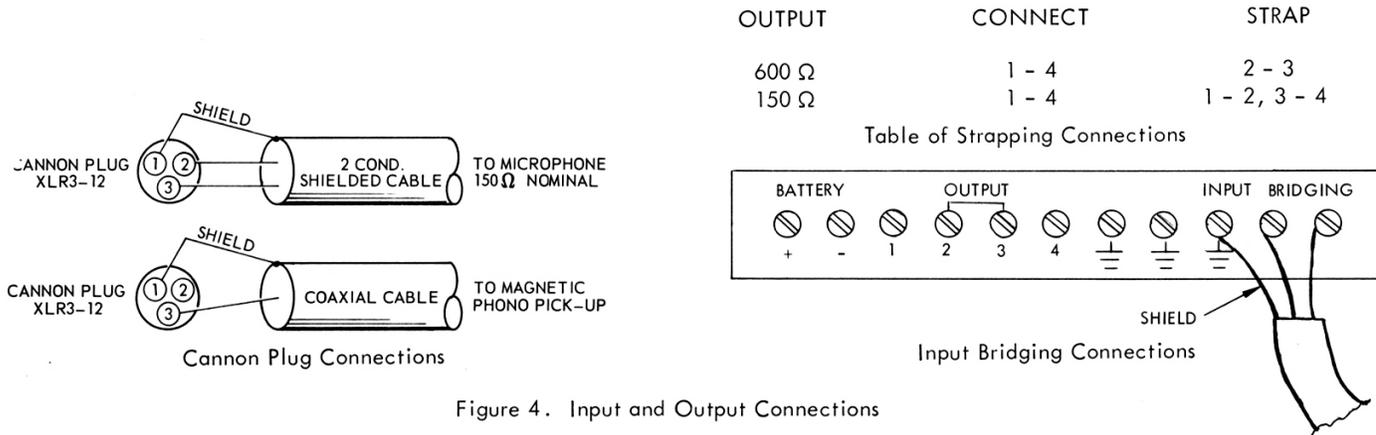


Figure 4. Input and Output Connections

PARTS LIST

MAIN CHASSIS

Reference Designator	Ordering Number	Name and Description	Reference Designator	Ordering Number	Name and Description
None	27-01-041757-02	PCB Assembly, amplifier	R1	47-01-102161-01	Res., 680Ω ±10%, 1/4W
None	21-02-100722-01	Receptacle, microphone	R2	47-01-102162-01	Res., 820Ω ±10%, 1/4W
ACC1,2	21-02-100973-01	Socket, octal	R14	47-01-102185-01	Res., 68KΩ ±10%, 1/4W
C18a,18b	15-01-100287-01	Cap., 1000-1000 μF, 15V	R42	47-01-102337-01	Res., 39Ω ±10%, 1/2W
C19	15-01-100289-01	Cap., 2000 μF, 15V	R45	47-01-100635-01	Res., 22Ω ±10%, 1W
C20,21	15-01-100284-01	Cap., 1000 μF, 35V	R46	47-01-100639-01	Res., 68Ω ±10%, 1W
CR3,4,5,13,14	48-02-042787-01	Diode, rectifier, 1A, 400V PIV	R47	47-01-100637-01	Res., 39Ω ±10%, 1W
CR12	48-01-100858-01	Diode, Zener, 12V ±5%	R48	47-02-100713-01	Res., 47Ω ±10%, 5W
F1,2	51-04-100463-01	Fuse, 0.5A, 3AG, 250V	R57	47-01-102190-01	Res., 180KΩ ±10%, 1/4W
M1	29-01-041316-02	Meter	S1	51-01-044024-01	Switch, rotary, single wafer
P1,2	47-06-013600-02	Pot., 750Ω ±20%	S2	51-02-100992-01	Switch, DPDT, slide
PL1	39-03-110005-01	Pilot lamp assembly, red	S3,4	51-02-100985-01	Switch, DPDT, rocker
			T2	56-08-007202-07	Transformer, power

AMPLIFIER PCB ASSEMBLY

C1,2	15-01-100155-01	Cap., 1 μF, 15V	CR1,2	48-02-042787-01	Diode, rectifier, 1A, 400V PIV
C3,6,16	15-01-100201-01	Cap., 10 μF, 15V	CR6	48-01-100850-01	Diode, Zener, 6.2V ±5%
C5	15-02-100305-01	Cap., 0.005 μF ±20%, 100V	CR7,8,9,10,11,15	48-01-107017-01	Diode, 1N456A, 25V, 100 mA
C7	15-02-100042-01	Cap., 0.001 μF ±10%, 500V	LP1	39-01-100532-01	Lamp, photo conductor
C8,11,12,14	15-01-100233-01	Cap., 50 μF, 15V	P3,4	47-05-014698-01	Pot., 5KΩ ±20%, 2W
C9	15-02-100307-01	Cap., 0.01 μF ±20%, 100V	Q1,2,3,4,5,6,7,12,13,14	48-03-101098-01	Transistor, NPN
C10,15	15-01-100183-01	Cap., 3 μF, 15V	Q8,9,15	48-03-101101-01	Transistor, NPN, 2N3053
C13	15-06-100137-01	Cap., 0.27 μF ±10%, 100V	Q10,11	48-03-041440-02	Transistor, PNP
C17	15-02-100080-01	Cap., 0.05 μF +80% -20%, 20V			
C22	15-02-100302-01	Cap., 470 pF ±10%, 100V			

PARTS LIST (continued)

AMPLIFIER PCB ASSEMBLY (continued)

Reference Designator	Ordering Number	Name and Description	Reference Designator	Ordering Number	Name and Description
R3,9,27	47-01-102179-01	Res., 22KΩ ±10%, 1/4W	R24	47-01-102338-01	Res., 47Ω ±10%, 1/2W
R5,6,7	47-01-102102-01	Res., 10KΩ ±5%, 1/4W	R25	47-01-102183-01	Res., 47KΩ ±10%, 1/4W
R8	47-01-102126-01	Res., 91KΩ ±5%, 1/4W	R26	47-01-102175-01	Res., 10KΩ ±10%, 1/4W
R10,12	47-01-102155-01	Res., 220Ω ±10%, 1/4W	R29,30	47-01-102163-01	Res., 1KΩ ±10%, 1/4W
R11	47-01-102189-01	Res., 150KΩ ±10%, 1/4W	R31,34	47-01-102160-01	Res., 560Ω ±10%, 1/4W
R13	47-01-102173-01	Res., 6.8KΩ ±10%, 1/4W	R35	47-01-102180-01	Res., 27KΩ ±10%, 1/4W
R15	47-01-102174-01	Res., 8.2KΩ ±10%, 1/4W	R36	47-01-100478-01	Res., 560KΩ ±10%, 1/4W
R16,32,33	47-01-102169-01	Res., 3.3KΩ ±10%, 1/4W	R37	47-01-102171-01	Res., 4.7KΩ ±10%, 1/4W
R17	47-01-102177-01	Res., 15KΩ ±10%, 1/4W	R38	47-01-102164-01	Res., 1.2KΩ ±10%, 1/4W
R18	47-01-102161-01	Res., 680Ω ±10%, 1/4W	R39	47-01-102145-01	Res., 33Ω ±10%, 1/4W
R19	47-01-102079-01	Res., 1.1KΩ ±5%, 1/4W	R40,41	47-01-102153-01	Res., 150Ω ±10%, 1/4W
R20	47-01-102162-01	Res., 820Ω ±10%, 1/4W	R43,44	47-01-102141-01	Res., 12Ω ±10%, 1/4W
R21,28	47-01-102157-01	Res., 330Ω ±10%, 1/4W	R54	47-01-102151-01	Res., 100Ω ±10%, 1/4W
R22,50	47-01-102167-01	Res., 2.2KΩ ±10%, 1/4W	T1	56-07-016681-06	Transformer, output
R23	47-01-102092-01	Res., 3.9KΩ ±5%, 1/4W			

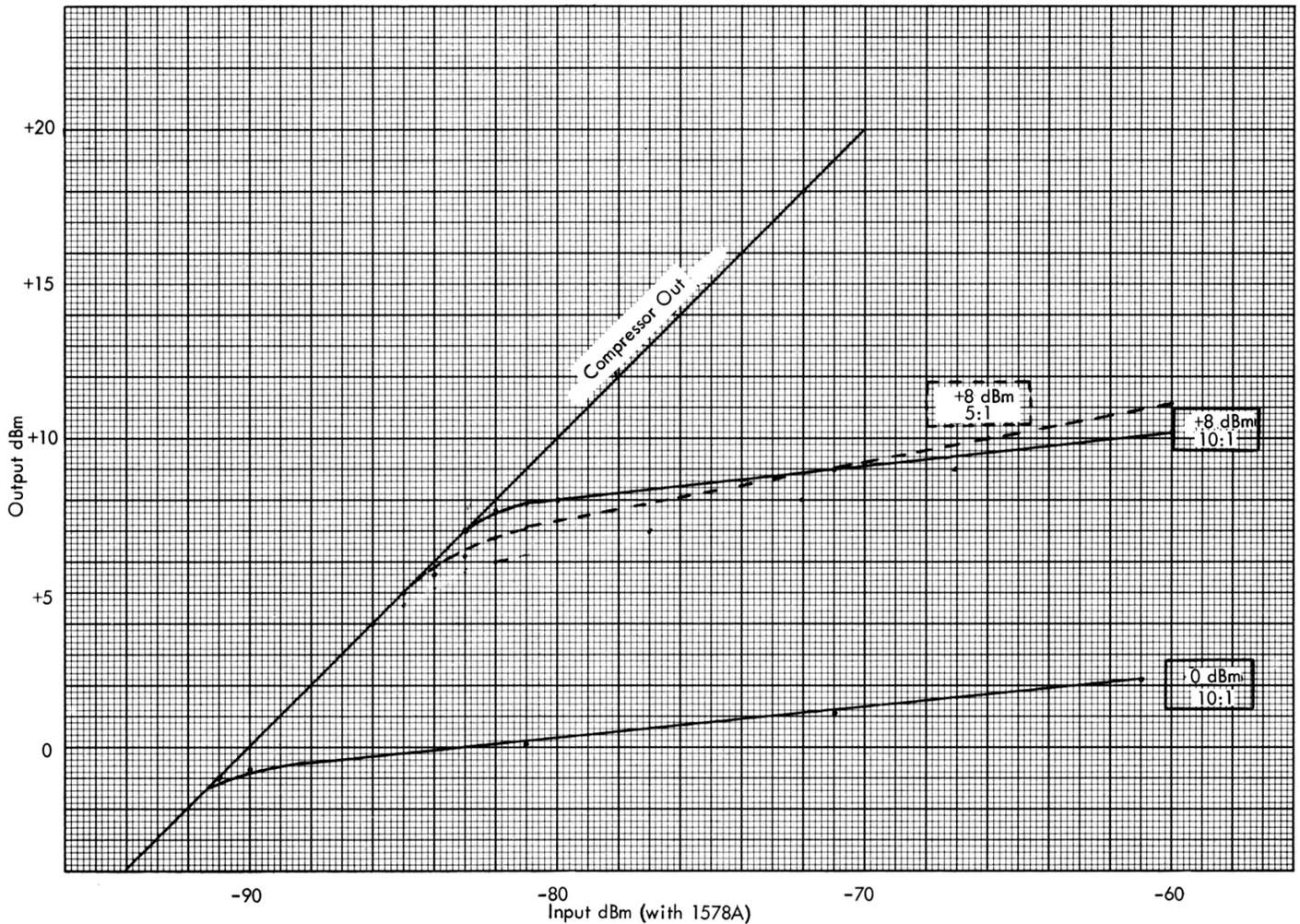


Figure 5. Typical Compressor Characteristics

