

S E R V O 1 2 0

S T U D I O
AMPLIFIER



OWNERS MANUAL

SAMSON®

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Introduction

Congratulations on purchasing the Samson Servo 120 Power Amplifier! Although designed for easy operation, we suggest you first take some time to go through these pages so you can fully understand how we've implemented a number of unique features.

The Servo 120 is a single rack-space stereo power amplifier which is optimized for use in both professional and project recording studio environments as well as for live performance. It delivers 60 watts of power per channel into 4 ohms (or, in Bridge mode, 120 watts into 8-ohms) over the full frequency spectrum, from 3 Hz to 65 kHz. Both balanced 1/4" TRS and unbalanced RCA-type input connectors are provided, along with push-spring terminal outputs. Front-panel controls and displays include a power switch, independent left- and right-channel input level controls, five-segment LED meters, a Protection LED, and a convenient headphone jack and speaker on/off switch for private cue monitoring. Suggested applications for the Servo120 include:

- *Amplification for nearfield monitors or cue headphones in both professional and project studios* - Its superb audio specs and whisper-quiet performance (its convection cooling design means there is no fan), along with its unique front-panel speaker on-off switch and dedicated headphone jack, make the Servo 120 the perfect complement to any recording studio.
- *Home Theatre applications* - The power and flexibility offered by the Servo 120 (it can be used either as a 60 watt stereo amplifier, or, in bridge mode, as a 120 watt monophonic amp) makes it the perfect addition to any home theatre, in conjunction with any DVD player or other surround sound system. For example, use it in stereo mode to drive your main front left/right speakers, using your home stereo to drive the satellite rear speakers—or use the Servo 120 in Bridge mode to drive your center channel or subwoofer with power galore.
- *As an extension to a home hi-fi system* - The Servo 120 boasts professional specs which far exceed that of most consumer products. For a real “studio” experience in your own home, try connecting your home hi-fi amplifier’s auxiliary outputs to the Servo 120’s inputs (thus using your hi-fi amp as a preamplifier) and then connect your existing speakers to the Servo 120’s outputs. If you fall in love with the sound (as we’re sure you will), you might want to substitute a professional pre-amplifier for your existing hi-fi amp—and, from there, you may well end up graduating to higher-level speakers. High quality sound is addicting—don’t say we didn’t warn you!
- *Powering public address systems in permanent installations* - The Servo 120 can be used to effectively drive PA speakers in installations such as classrooms and corporate conference rooms.
- *Onstage monitoring* - In small and medium-sized onstage areas (such as in clubs, lounges, etc.), the Servo 120 can be used to drive stage monitors, allowing the performers to hear themselves without having to rely on onstage equipment amplification.
- *MIDI rack monitoring* - Taking only a single rack space, MIDI musicians can easily incorporate the Servo 120 into their existing rack of gear. Combined with a pair of high quality stage or studio speakers, this makes for an excellent monitoring system that can accurately reproduce the broad range of frequencies typically output by devices such as synthesizers, samplers, and digital audio workstations.

In these pages, you'll find a detailed description of the many features of the Servo 120 Power Amplifier, as well as a guided tour through its front and rear panels, step-by-step instructions for its setup and use, reference appendices, and full specifications. You'll also find a warranty card enclosed—please don't forget to fill it out and mail it in so that you can receive online technical support and so we can send you updated information about these and other Samson products in the future.

SPECIAL NOTE: Should your unit ever require servicing, a *Return Authorization* number (RA) is necessary. Without this number, the unit will not be accepted. Please call Samson at 1-800-372-6766 for a Return Authorization number prior to shipping your unit. Please retain the original packing materials and, if possible, return the unit in its original carton and packing materials.

Servo 120 Features

The Samson Servo 120 Power Amplifier utilizes the latest technology in professional power amplifier design. Here are some of its main features:

- Power to spare - Each channel delivers 60 watts of power into 4 ohms (or, in Bridge mode, 120 watts into 8 ohms).
- Clean, crisp sound - Impressive audio specifications such as .01% THD, S/N of 105 dB, crosstalk of 75 dB, and frequency response of 3 Hz to 65 kHz guarantee ultra-clean sound quality in any live or recording environment.
- Independent input level controls for each channel with 41-position detents.
- Five-segment LED meters for each channel continuously display power output levels and allow you to correct for overloading (clipping) conditions.
- Front-panel Protection LED shows you at a glance overheating or faulty wiring conditions.
- Innovative front-panel Speaker on/off switch and dedicated headphone jack enables private cue monitoring of the input signal.
- Both electronically balanced 1/4" TRS and unbalanced RCA-type input connector jacks are provided, along with push-spring terminal output connectors.
- Convection cooling (no fan) makes for whisper-quiet operation even in critical listening environments such as recording studios.
- Unique bipolar circuit design that continuously keeps DC output during idling at or near 0 volts (thus keeping idle speakers at their 0 point). This serves to minimize heat overload problems by effectively preventing the Servo 120 from applying power when unnecessary.
- Protection relay circuitry (linked to the DC offset circuitry) that prevents "thumps" when powering on or off. This means that you can use the Servo 120 with a single power strip into which a mixer or other audio devices are connected, without danger of damage to connected speakers.
- Toroidal transformer power supply.
- Rugged construction (an all-steel chassis with a titanium finish and a lightweight anodized aluminum heat sink) makes the Servo 120 eminently roadworthy.
- Flexible design allows the Servo 120 to be used free-standing or, with the use of included rack ears, mounted in any standard 19" rack (taking just a single rack space).
- Three-year warranty.
- Last but certainly not least, value. The Samson Servo 120 has been designed from the ground up to deliver excellent yet affordable sound quality.

Guided Tour - Front Panel



1: Power switch - Use this to power the Servo120 on or off.

2: Power LED - Lit whenever the Servo 120 is powered on.

3: Channel input level controls - These 41-position detented knobs allow you to adjust the input level of the signal arriving at the rear-panel input jacks (see #4 and #5 on the following page). At their fully counterclockwise position (labeled “-70”), the signal is attenuated by 70 dB (essentially completely off). At their fully clockwise position (labeled “0 dB”), the signal is at unity gain (that is, no attenuation). When +4 dBu of signal arrives at the input jacks and the Channel input level controls are set to their fully clockwise “0 dB” position, the Servo 120 delivers full power output.

4: LED meters - These five-segment LED meters continuously monitor the power output level for the corresponding channel. For convenience, the segments are labeled as follows, from bottom to top: -16 dB / 15%, -10 dB / 30%, -6 dB / 50%, -3 dB / 70%, and 0 dB / 100%. When the bottom (-16 dB / 15%) segment is lit, the Servo 120 is operating at approximately 15% of its power capacity. When the top (0 dB / 100%) segment is lit, signal is being output at full strength. For the best signal-to-noise ratio, the top (0 dB / 100%) segment should light occasionally during peak levels; if it lights frequently, you may be overloading the Servo 120 and a distorted (“clipped”) signal is probably being output. If this occurs and backing off the Input Level control delivers too low an output level for your application, consider using Bridge mode (see the “Bridge Mode” section on page 7 in this manual for more information).

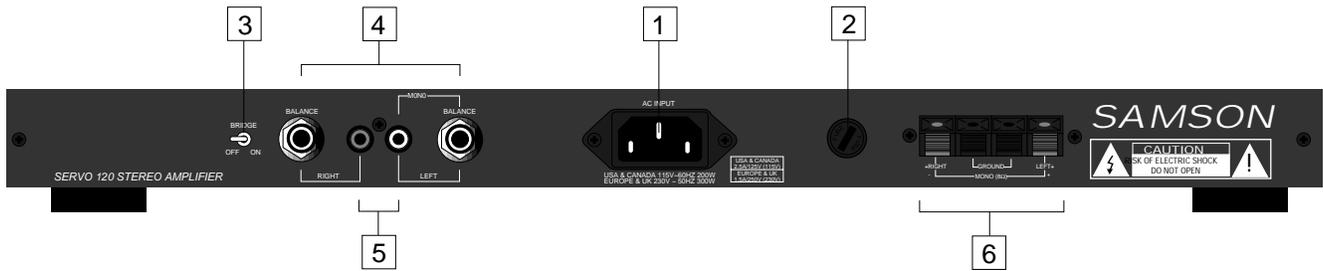
5: Protection LED - This goes on for approximately five seconds whenever the Servo120 is powered on and fades slowly when the amp is powered off. When lit, 0 volts DC are provided to all connected speakers, thus muting them and preventing any “thump” from occurring. For a complete description of the conditions under which this light goes on, see the section entitled “The Servo 120 Protection Circuitry” on page 6 of this manual.

6: Headphone jack - Connect any standard stereo headphones to this jack (via a standard 1/4" TRS plug) for private monitoring of the final output signal. NOTE: The Servo 120 speaker outputs are *not* automatically muted when headphones are inserted into the Headphone jack—to monitor incoming signal in privacy, press the Speaker on/off switch (see #7 below) so that it is out (in its “up” position)—the Speaker on/off LED will go off). The built-in Servo 120 headphone amplifier delivers 15 mW into 8 ohms.

7: Speaker on/off switch - When pressed in (the normal position), the Servo 120 delivers signal to its rear panel output terminals (see #6 on the following page). When this switch is out (in its “up” position), outgoing signal is muted, allowing personal monitoring of incoming signal through connected headphones (see #6 above).

8: Speaker on/off LED - Lights when the Speaker on/off switch (see #7 above) is pressed in and the Servo 120 is delivering signal to its rear panel output terminals (see #6 on the following page).

Guided Tour - Rear Panel



1: AC input - Connect the supplied standard 3-pin “IEC” plug here.

2: Fuse holder - Insert a 2.5 amp, 125 volt fuse here for 115 volt operation, or a 1.5 amp, 250 volt fuse for 230 volt operation. We recommend the use of normal (as opposed to slow-blow) fuses.

WARNING: Fuses should only be replaced with the power cord disconnected.

3: Bridge switch - For normal operation, place this switch at its left (“OFF”) position. When placed at its right (“ON”) position, the two amplifier sections (the left and right channels) are bridged, providing full 120 watt power output into a single output. For more information, see the “Bridge Mode” section on page 7 in this manual. **WARNING:** Due to the extremely high power output of the Servo 120 when used in Bridge mode, be sure to use only 8 ohm loudspeakers sufficiently rated to handle the resultant wattage.

4: Balanced Inputs* - Connect incoming signal to these electronically balanced 1/4" TRS (Tip/Ring/Sleeve) jacks, wired as follows: Tip hot, Ring cold, and Sleeve ground. Use balanced three-conductor cabling and TRS plugs wherever possible (unbalanced two-conductor plugs can also be inserted into these inputs, but you'll get better signal quality and less outside noise and hum if you use balanced lines). Stereo signals should be connected to both the left and right input jacks; when operating the Servo 120 in Bridge mode, use the left input jack only (see page 7 in this manual for more information). The Servo 120 accepts input levels of any strength but needs at least +4 dBu to achieve maximum power.

5: Unbalanced Inputs* - Connect incoming signal to these unbalanced RCA-type jacks. Stereo signals should be connected to both the left and right input jacks; when using the Servo 120 in Bridge mode, use the left input jack only (see page 7 in this manual for more information). The Servo 120 accepts input levels of any strength but needs at least +4 dBu to achieve maximum power.

6: Push-spring terminal output connectors - Use these to connect each channel of the Servo 120 to loudspeakers. Be sure to connect the loudspeaker correctly, with the red (+) terminal normally connected to the positive input of the speaker and the black (ground) terminal normally connected to the negative input of the speaker. See the “Bridge Mode” section on page 7 in this manual for speaker connection instructions when using the Servo 120 in Bridge mode.

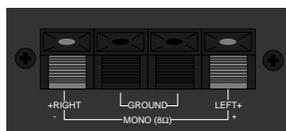
* If required, both the balanced and unbalanced inputs can be used simultaneously.

Setting Up and Using the Servo 120 Power Amplifier

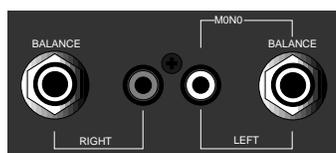
Setting up your Servo 120 is a simple procedure which takes only a few minutes:



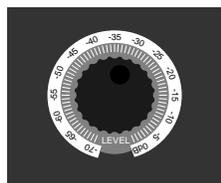
Bridge switch



Output connectors



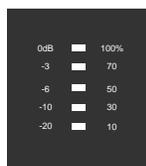
Input connectors



Channel Input control



Protection LED



Five-segment LED meters



Headphone jack and Speaker on/off switch

1. Remove all packing materials (save them in case of need for future service) and decide where the amplifier is to be physically placed—it can be used free-standing or mounted in a standard 19" rack, requiring only one rack space. When installed, make sure that there is good ventilation around the entire unit (we recommend using spacer panels, especially if multiple amplifiers are used in a rack. Before rack-mounting, use a Philips screwdriver to remove the Servo 120's feet and attach the included rack ears).
2. Set the rear panel Bridge switch as desired (see page 7 in this manual).
3. Make the speaker connections, using the push-spring terminal output connectors on the rear panel. It is never a good idea to power up any amplifier that is not connected to loudspeakers. In normal operation, any loudspeakers with a minimum impedance load of 4 ohms (that is, 4 ohms or greater) can be used; however, in Bridge mode, 8 ohm speakers **must** be used. Be sure to connect the loudspeaker correctly. In normal mode, connect them with the red (+) terminal connected to the positive input of the speaker and the black (ground) terminal connected to the negative input of the speaker. See page 7 in this manual for connection instructions when using the Servo 120 in Bridge mode.
4. Next, make the signal input connections, using the electronically balanced 1/4" and/or the unbalanced RCA-type input connectors on the rear panel (if operating the Servo 120 in Bridge mode, use the left input only—see page 7 in this manual). If your mixer or crossover network has balanced outputs, use the Servo 120's electronically balanced inputs (unbalanced two-conductor plugs can also be inserted into these inputs, but you'll get better signal quality and less outside noise and hum if you use balanced lines).
5. On the front panel of the Servo 120, turn both Channel input controls fully counterclockwise (to their "-70" setting). Then connect the supplied 3-pin "IEC" cable to the rear panel IEC connector and to any grounded AC socket. Because of the relay protection circuitry built into the Servo 120, you can even plug it into the same power strip that other audio devices (such as a mixing console) are connected to. You can then turn on all devices at once with the single power strip on-off switch, with no danger of damaging connected speakers by generating "thumps."
6. Press the front panel Speaker on/off switch (so that it is in, in its "down" position) and then press the front panel Power switch in order to turn on the Servo 120. The Power LED will light and the Protection LED will go on. After approximately five seconds, the Protection LED will go off and the Speaker LED (in the Speaker on/off switch) will light instead (you'll hear a click when this occurs).
7. Apply an input signal to the Servo 120 at or about +4 dBu (if sending signal from a mixer, drive the output meters at approximately 0 vu). While the input signal is present, slowly raise the Channel Input controls until the desired sound level is achieved. The five-segment LED meters next to each Channel input control will show you the continuous power output of the Servo 120 as signal is being passed. For the best signal-to-noise ratio, the Servo 120 should normally be run with the Channel Input controls at or near maximum (fully clockwise, at the "0 dB" position) and the right-most (0 dB / 100%) segment should light occasionally (but not frequently) during peak levels. If you are using a mixer that has a master output level control (sometimes called "control room level"), use it to attenuate the signal as necessary to achieve the desired speaker level.
8. You can monitor the input signal in privacy by connecting a pair of headphones to the front panel headphone jack and pressing the Speaker on/off switch so that it is out (in its "up" position), at which time the Speaker LED will go off.

WARNING: Because the Servo 120 is capable of generating extremely high headphone signal levels, always start with the Channel Input knobs turned down and then slowly raise them to the desired level.

If you encounter difficulty with any aspect of setting up or using your Servo 120, you can call Samson Technical Support (1-800-372-6766) between 9 AM and 5 PM EST.

The Servo 120 Protection Circuitry

As noted in the “Guided Tour” section of this manual, the Servo 120's front panel Protection LED indicates the activity of the relay speaker connection circuitry. When the Protection LED is lit, this circuitry is inactive, and all connected speakers are muted (provided with 0 volts DC), thus protecting them and preventing any audible “thump” from occurring.



The following conditions will cause the Protection LED to go on:

- *Initial power-up:* For approximately five seconds after initial power-up, the relay speaker connection circuitry is deactivated and the speaker output is muted. If everything is operating normally, you will hear an audible click at the conclusion of this brief period, as the circuitry is activated and the Servo 120 begins delivering signal to connected speakers (at which point the Speaker LED will light if the Speaker on/off switch is in its “in” position). It is normal for the Protection LED to fade gradually after the amplifier is powered off.



WARNING: If the Protection LED fails to go out (and you fail to hear the accompanying audible click) approximately five seconds after power-up, turn the Servo 120 off *immediately* and check all external devices and wiring for possible shorts or other defects.

- *Overheating:* A temperature sensing device in the Servo 120 will cause the relay speaker connection circuitry to be deactivated (and the Protection LED to go on) whenever the operating temperature of the unit rises above a safe level. To guard against this problem, make sure the Servo 120 receives adequate ventilation on all sides (see page 5 for more information); in extreme environmental conditions, you may also want to consider the use of cooling fans.
- *Severe overcurrent conditions:* This occurs whenever the signal being input to the Servo 120 rises to a level above 20% THD (Total Harmonic Distortion).
- *Shorted speaker cables:* This will occur if, due to faulty wiring, the hot and ground signals being output by the Servo 120 short one another.
- *Output impedance drops below 2 ohms:* This can occur if the Servo 120 is connected to inappropriate speaker systems (see the “Setting Up and Using the Servo 120” section in this manual for more information).
- *DC voltage detected at speaker output:* The most likely cause of this is an internal failure.

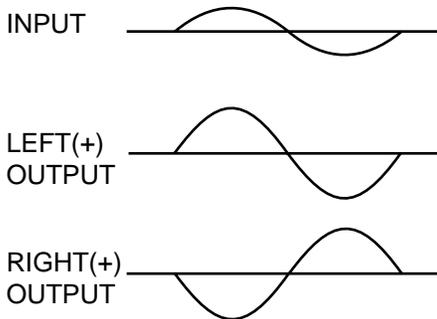
In general, any time the Protection LED lights up (other than during the approximately five seconds following initial power-up), there is reason to be concerned. If this occurs, turn the Servo 120 off immediately and carefully check all wiring and external devices in order to locate and correct the condition that caused the LED to light up in the first place.

Bridge Mode



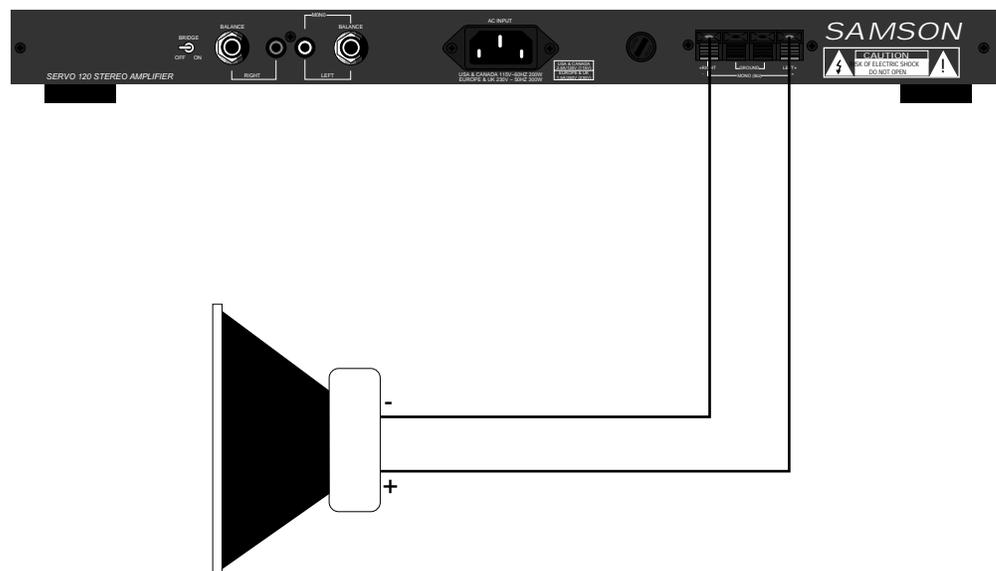
The Servo 120 provides a rear-panel switch that allows it to be used in a *Bridge* mode. When this switch is placed in the “Off” (left) position, the Servo 120 functions as a true stereo amplifier, where both of the two independent amplifier channels (left and right) can receive different input signals and produce independent output signals. However, when the switch is placed in the “On” (right) position, both amplifier channels process only the signal present at the left input, thus producing a single output signal with a true 120 watt output (into 8 ohms).

WARNING: Bridge mode is to be used *only* when the Servo 120 is connected to an 8 ohm speaker load. Use of Bridge mode with speaker loads of 4 ohms or less can result in severe damage to the unit due to excessive heat and current limiting and will void your warranty!

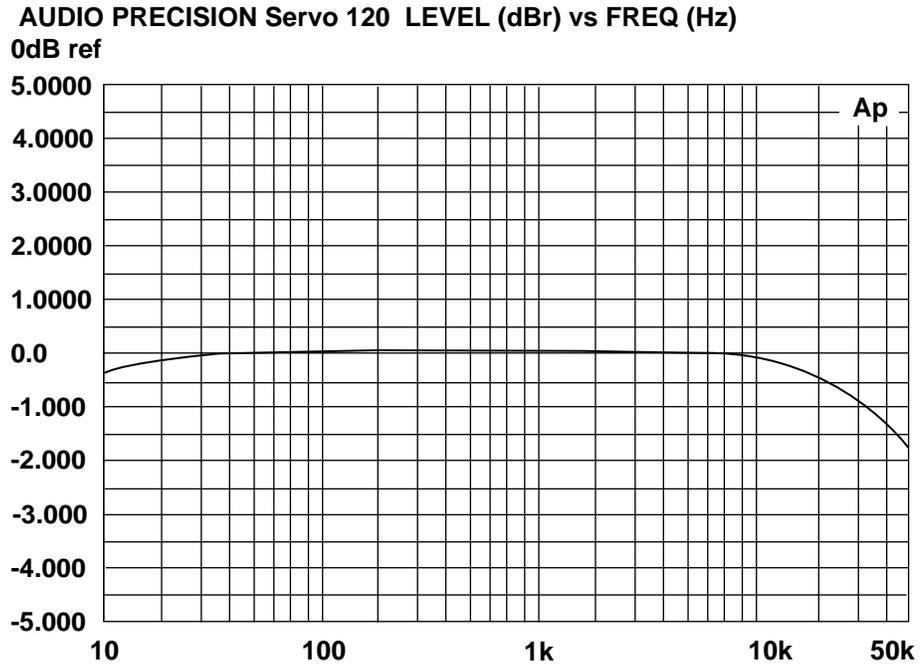


The illustration on the left shows how this works. In bridge mode, the polarity (phase) of the right output signal is reversed relative to that of the left output signal. Both channels then process the same signal, with the speaker load connected so that power is derived from both channels. The effective voltage swing seen by the load is thus doubled so that the power output is doubled.

When using the Servo 120 in Bridge mode, be sure to connect each loudspeaker as shown in the illustration below (and as silkscreened on the rear panel), with the red (+) terminal of the left channel connected to the positive input of the speaker and the red (+) terminal of the right channel connected to the negative input of the speaker. **Do not use the black ground-) output terminal of either channel (the speaker load must “float” away from the amplifier chassis).**

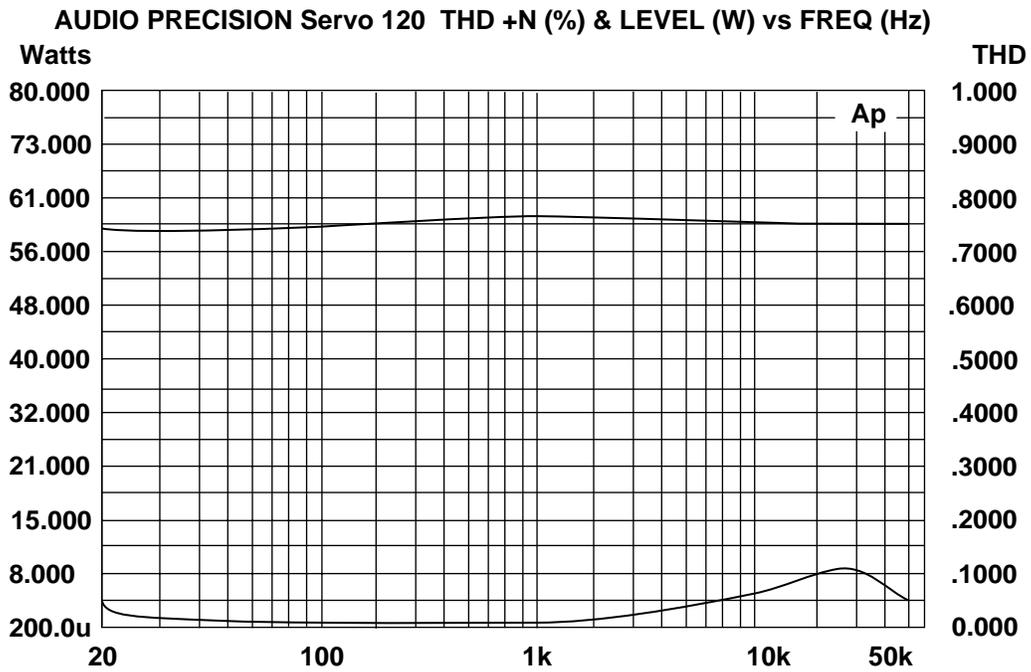


Appendix A: Linearity vs. Frequency Sweep



*Linearity (0 dB Ref) vs. frequency sweep
10 Hz - 50 kHz*

Appendix B: Power Output vs. THD



Power output (60 W) vs. Total Harmonic Distortion

- 1. Rated Output Power, per channel (@ 1 kHz)**
 - Stereo mode
 - 4 ohm, <.05% THD+N 60 W
 - 4 ohm, 1% THD+N 80 W
 - 8 ohm, <.05% THD+N 50 W
 - 8 ohm, 1% THD+N 55 W
 - Bridge mode
 - 8 ohm, <.05% THD+N 120 W
 - 8 ohm, 1% THD+N 150 W
- 2. Typical Distortion, per channel**
 - THD+N (80 kHz LPF @ 1 kHz, rated output power) .01%
 - IMD (SMPTE 4:1, 60 Hz & 7 kHz @ rated output power) .03%
- 3. Signal To Noise Ratio**
(22 Hz - 22 kHz bandwidth @ dB below rated output power) 105 dB
- 4. Frequency Response**
 - 10 Hz - 20 kHz +0, -0.5 dB
 - 3 Hz - 65 kHz, +0, -3.0 dB
- 5. Input Sensitivity** +4 dBu to achieve rated power
(Level control set to maximum)
- 6. Crosstalk** (adjacent channels) -75 dB, 1 kHz
- 7. Output DC Offset Voltage** ± 50 mV, DC Servo Controlled
- 8. Headphone Output Level** 15 mW (into 8 Ω @ 1% THD+N)
- 9. Dimensions** (without rack ears)
 - 17.5 in (w) x 11.5 (d) x 1.75 (h)
 - 444 mm (w) x 292 (d) x 44 (h)
- 10. Weight** 15.6 lbs • 7 kg

Produced by *On The Right Wavelength* for Samson Technologies Corp.

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Printed June, 1997

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