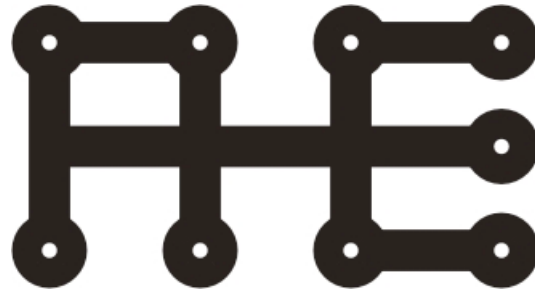


ALNER HAMBLIN ELECTRONICS LTD.



SA400 STEREO POWER AMPLIFIER

Owners Instruction Manual

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SA400 Semi-Digital POWER AMPLIFIER

Introduction

In 1999, we designed and built the first prototype of this amplifier using the original Tripath evaluation board. The intention then was to compare other emerging digital technologies to decide which was best. To ensure that the comparison was as valid as we could make it, we designed and used a much larger power supply than required and made the amplifier have sufficient gain to not need a preamp. The sound quality of that original prototype was so good that we built a further five for selected users to evaluate for an extended period in their own systems. After that successful evaluation, the amplifier was put into production.

The SA400 is the result of everything learnt in the subsequent years and uses a new board we designed to take the latest Tripath 105A chips and to incorporate extra facilities to lift the earth (to prevent earth loops) and be able to vary the amplifier gain to match other system sensitivities. The original massive power supply has worked so well in providing effortless sound reproduction that it has been retained without change. It uses twin transformers, which supply separate full wave positive and negative supply lines. The Zero volt reference is then made at D.C., not at A.C. via the usual centre tap on the transformer, together with a Bi-Phase Rectifier. This approach improves the stability of the Zero volt line by ensuring that each supply line is separate from the other during high load current demands. Other advantages include a reduction in the Power Supply Pumping Effect (common to All Switched Output stages, which use an Inductor for Digital to Analogue Reconstruction), and also helps to remove D.C. from the Transformer, which can be responsible for increased noise (hum) from the transformer especially at switch on.

We have also opted for a Linear Power Supply rather than an r.f. or Switched Power Supply because no matter how good the Switched Power Supply, extra noise (extending up to 100MHz) will be present, and hence the possibility of emission, (both Radiated and Conducted) into the Amplifier Itself, which in turn would produce more noise at the Output. Our objective was to produce an Amplifier with as wide a Dynamic range as possible.

A major benefit of the Tripath digital technology is the high efficiency in performing the amplification, around and above 90%. As a result, the power supply has even more headroom than if used in a conventional class A or AB design, and very little heat is generated. The amplifier barely gets warm at any power level, and ensures that components will not be subject to the heat that causes deterioration and earlier failure. The amplifier operates at its optimum all the time, no need to wait for it to come up to operating temperature.

The amplifier has been designed to drive loudspeakers available in the marketplace today, with impedance values that range from 3 to 9 ohms. The massive power supply ensures sufficient current is available at the lower impedance values. The amplifier normally operates as a stereo amplifier, but by flicking a switch on the back panel, it is converted into “bridge mode” where it then operates as a monoblock amplifier

delivering over 1000 watts into 8 ohms. Please ensure that the Amplifier is switched off before changing the bridge switch position.

Throughout the design, the component quality has been chosen to suit the job being performed (there has been no attempt to over specify components for marketing reasons), and ensure that the amplifier can be built at the lowest cost commensurate with the extremely high performance for which it was designed, and operate reliably over a long period. Please complete the registration card with your details and return the completed card to us in Bristol. In the unlikely event of a failure, we are here to rectify the fault and speedily return the amplifier after soak testing to you. Happy listening.

Instructions for use

Although the amplifier barely gets warm, it needs sufficient space around it for air to circulate and prevent a build up of heat. The amplifier heat sink is the central part of the rear panel between the speaker terminals, which you can readily feel for temperature.

Power is supplied to the amplifier via an IEC socket on the rear panel. There is a push button next to the IEC socket to turn the power on and off. When powered on, the amplifier can be put into “standby” using a cable from the matching Aler Hamblin SP400 preamp, which connects to the 2.5mm socket on the rear panel. In standby, the blue led on the front panel is dimmed.

The Amplifier has been designed with a defined power up sequence: -

- 1, At Switch On a Current Limiter is in circuit to reduce Inrush Current surges to prevent mains Line fuses blowing, and also reduce the audible “thung” noise in the transformer due to the Initial magnetizing current.
- 2, After approximately 2 seconds the Limiter is switched out of circuit, and the low voltage supplies are applied to the Amplifier, which enable the Input circuitry and Output stages. The Amplifier then enters a self-test routine, which checks the supply lines and various other circuit functions, e.g. Output offset voltage.
- 3, If all of the above tests pass then after a further 2 seconds the Amplifier is enabled, and full operation is possible.

The Amplifier has protection circuits, which shut down the Output stage if a short circuit or low Impedance is sensed on the Output terminals. Further, the Amplifier will shut down if there is an abnormally high level of High Frequencies present on the Output terminals, and also if the Amplifier is driven with high input levels with no load (Loudspeaker) connected.

To reset the Amplifier after a shutdown, turn the Amplifier off with the mains switch on the Rear panel, wait for approximately 4 seconds and then switch back on again. If the Amplifier repeatedly shuts down, ensure that the Input level is at a minimum and

that the Loudspeaker leads are not short circuit before contacting the Factory for advice.

For normal stereo operation, the switch on the rear panel should be in the “stereo” position and the input signal is fed into either the pair of phono sockets or the pair of adjacent XLR sockets. When the amplifier is used as a monoblock, the switch is moved to the “bridge” position and the upper “left” phono socket (or the left XLR socket) is used for the input. The two red speaker terminals are used to connect to the loudspeaker, with the one nearest the input sockets (left channel) being “positive”.

As supplied, the amplifier electronics zero volt line is lifted from system (mains) ground to prevent earth loops forming which cause an unpleasant constant hum to be generated. If required, the electronic zero volt line can be connected to system ground by changing the position of a jumper on the PCB (ask your dealer to do this for you or you will invalidate the guarantee).

The sensitivity of the amplifier can also be varied with jumpers on the PCB. There are 3 levels of sensitivity, high, medium and low. The high or medium level is selected when a passive preamp is used. The medium or low level is selected when a preamp with gain is used. The choice will depend mainly on both the input level and the efficiency of the speakers. The normal level when leaving the factory is the medium setting (again, your dealer will change this setting for you if required). These settings are elaborated in the section giving the amplifier specification.

Please Note: -

The SA400 is capable of VERY HIGH Power levels, as shown in the Specification. The reason for this High Power capability is NOT to provide high Volume levels but to obtain as high a dynamic range together with effortless Transient Power delivery.

If the SA400 is operated at high listening levels, costly damage to your Loudspeakers will result, together with possible damage to your hearing.

It should also be noted that to achieve these High Power Levels hazardous voltages will be present at the Output terminals. For this reason it is essential that the Terminal Covers supplied with the Amplifier be fitted after connecting the Loudspeaker leads.

Specification

Power Output (1% Distortion, 1kHz, Both Channels Driven, Continuous Average): -

8 Ohms	>300 Watts
4 Ohms	>540 Watts
8 Ohms Bridged	>1100 Watts
4 Ohms Bridged	>1350 Watts

Frequency Response (-3dB): - < 1Hz - >100kHz

Distortion (1kHz, 8Ohms, -1dB below full Power): - <0.02%

Input Sensitivity (100Watts, 8 Ohms, 1kHz): -

Internal Jumper Positions: - (Please see drawing)	1 (High)	0.5 Volts
	2 (Medium)	1.0 Volts
	3 (Low)	1.4 Volts

Input Impedance: -

Phono	20k Ohms
XLR	10k Ohms per Leg

Damping Factor: -

8 Ohms	>100
4 Ohms	>50

S+N/N Ratio (IEC "A"): - >100dB

Absolute Phase: -

Phono	Zero Degrees
XLR	Zero Degrees, Pin 2 Hot

XLR CMRR (100Hz - 10kHz): - >60dB

Dimensions (Including Terminals): - D 330, H 95, W 445
mm

Weight: -

Net	16kg
Packed	18kg

E. & O.E. The policy of Alner Hamblin Electronics Ltd. is that of continuous design and development. We reserve the right to change specifications without prior notice.

Safety information

Fuse Rating: - T 5A H

Use on 50/60Hz 230v A.C. mains only.

The Unit must be earthed.

Disconnect the mains supply before making any connections.

Ensure adequate ventilation around the unit.

There are no user serviceable components inside the unit.

The covers supplied **MUST** be fitted to the Output Terminals.

Cleaning

Use a soft damp cloth to clean the unit.

Do not use cleaners or solvents.

Do not use an abrasive cloth.

Disconnect the unit from the mains supply while cleaning.

Guarantee Registration

Your **Alner Hamblin SA400 Amplifier** will be guaranteed free from defective parts and Labour costs for two years from the date of purchase. Return carriage will be chargeable.

Please complete the Guarantee Registration Form and return it to the address shown for Inclusion on our database where we document the complete Service/Repair history of your Amplifier. You will also be notified of any new products or upgrades that may become available.

Should your Amplifier require repair or service, please return to the address below in its original packaging. Amplifiers not returned in their original packaging will have a new set of packaging substituted, which will be chargeable.

This Guarantee does not affect your statutory rights.

Your personal details will not be released under any circumstances to a third party.

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E-mail.

alner@globalnet.co.uk

**Guarantee Registration For
Aler Hamblin Electronics Ltd.**

Name

Address

.....

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Postcode

E-mail Address

Telephone No

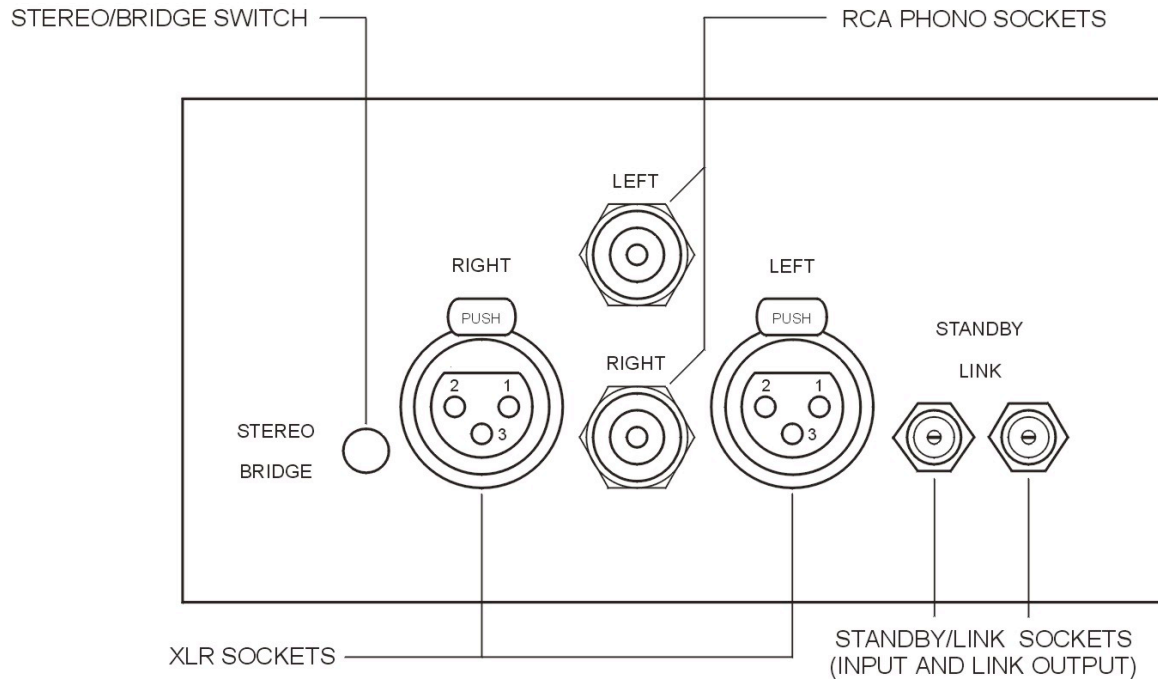
Where Purchased

Purchase date

Model

Serial No

SA400 Input Sockets and Bridge Switch



STEREO/BRIDGE SWITCH :- Stereo position for normal Stereo Operation.

Bridge position for Mono Operation :-

Connect Input Signal (Phono or XLR) to Left Channel Input.
 Connect Output (Loudspeaker) to Output Terminals.
 Loudspeaker +ve to Left hand channel Red Terminal.
 Loudspeaker -ve to Right hand channel Red Terminal.

RCA PHONO SOCKETS :- Unbalanced Input.

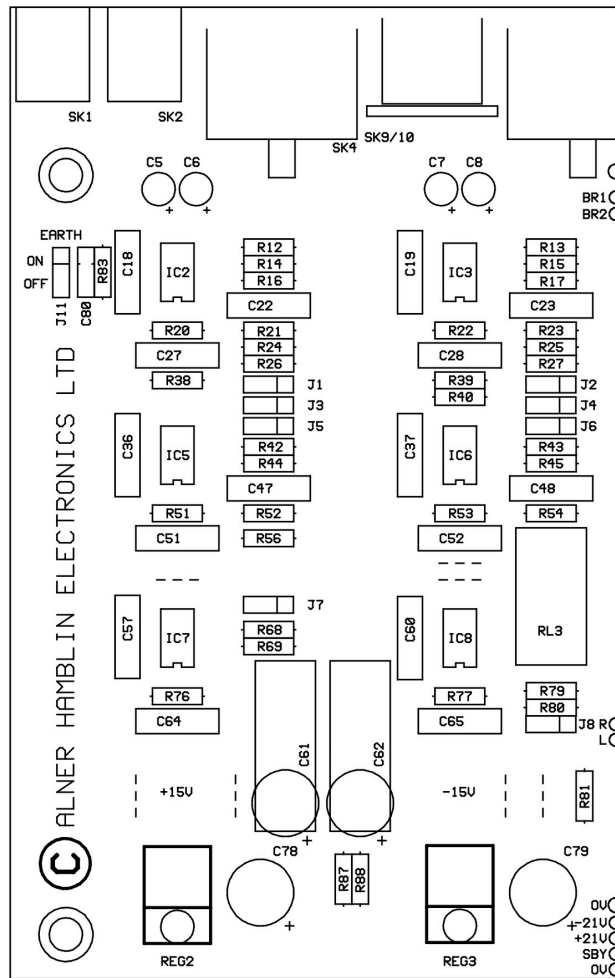
XLR SOCKETS :- Differential (Balanced) Input.

Pin 1 - Screen, 0v
 Pin 2 - Hot, +ve, In Phase
 Pin 3 - Cold, -ve, Out of Phase

STANDBY/LINK SOCKETS :- External Standby Signal for Amplifier.

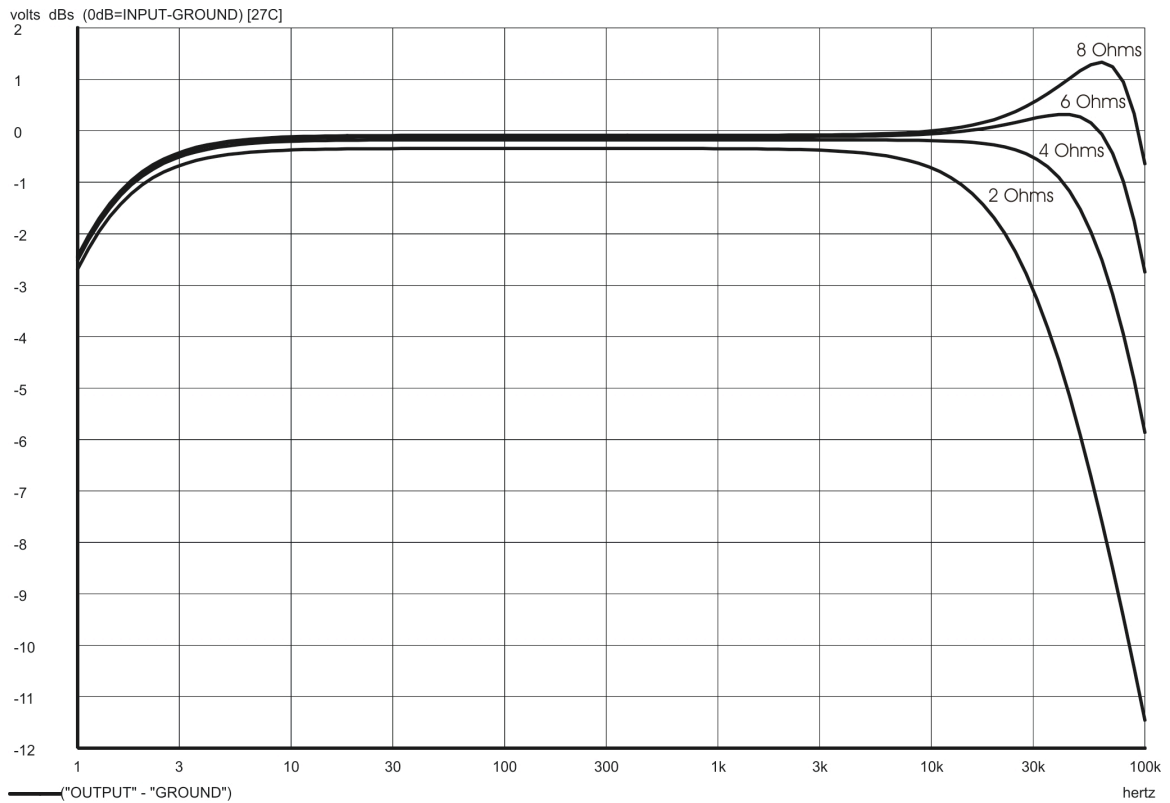
Connect Either socket to the SP400 Preamp Standby Socket.
 (Cable is supplied with the SP400).
 The remaining Socket may then be connected to Other Ainer Hamblin
 Equipment e.g. A Second Amplifier. Additional cables can be obtained
 from Ainer Hamblin Electronics Ltd.

SA400 Jumper Positions



- | | | | |
|---------|--|--------------|---|
| J1 & J2 | | 0.5 Volts | } Input Sensitivity for 100 Watts into 8 Ohms |
| J3 & J4 | | 1 Volt | |
| J5 & J6 | | 1.4 Volts | |
| J7 & J8 | | Normal (In) | Channel Phase |
| J11 | | Normal (Off) | Earth |

SA400 Frequency Response versus Load Resistance



The graph above shows the frequency response of the SA400 into various load Impedances.

The Amplifier has been optimised for a load Impedance of approximately 5.4 Ohms, which will give a flat frequency response to over 100kHz, while still allowing High Power delivery into 2 Ohms should your particular loudspeakers dip this low.

The frequency response with load Impedances from 3 Ohms to 10 Ohms is within +/- 1dB to over 25kHz.

The graph also shows the loss in output level due to the Output Impedance of the SA400 with the various Load Impedances, which is a direct measure of the Damping factor.