Solid State Logic

A-Series

Axiom – Axiom-MT – Aysis – Aysis Air – Avant

Performance Specification

Rev 2.0 17.12.98

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Solid State Logic
Corporate Profile

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Solid State Logic is the world's leading authority in the design and manufacture of audio mixing consoles and digital post production systems for the music, video, film and broadcast industries.

Founded in 1969, SSL has since expanded to its present 15 acre science park in Oxfordshire, England. SSL's unrivalled resources, including R&D, manufacturing, training, service and product support, operate in a unique high technology, customer oriented environment.

The company invents, designs and manufactures technology for the creative manipulation of sound. Users and industry experts from all over the world visit SSL's Oxford HQ to consult with SSL audio experts and evaluate SSL equipment.

SSL Around The World

Today, there are more than 2500 SSL systems in service around the world. Internationally famous classical musicians and popular artists such as Bryan Adams, Peter Gabriel, Whitney Houston, Blur and Sting, choose SSL equipment to extend their creativity and ensure the highest possible quality of their finished product. Small wonder that SSL recording consoles are the first choice of leading producers, and are found in the most prestigious recording studios around the world.

In the film industry, the speed and power of SSL consoles have been harnessed by major studios for both the recording and post production of countless box office successes. At home in Hollywood and around the world, SSL consoles are the first choice for studios who need to work in surround sound. Notable SSL users include Todd AO/Glen Glenn, Disney/MGM, 20th Century Fox, Universal City Studios and Warner Bros in the USA, and Pinewood Studios and Anvil Post Production in the UK.

Leading national and international broadcasters have similarly embraced the company's innovative technology to streamline operations and ensure high quality output. The client list reads like a who's who in Radio and Television. It includes BBC UK, NHK Japan, ABC USA, Fox USA, NBC USA, CBS USA, NDR Germany, Swedish Television, RAI Italy and NOB Netherlands.

Independent post production companies working for multinational advertising agencies use SSL equipment to produce global advertising campaigns for the world's leading commercial brands.

Dedicated Equipment. Dedicated Service.

SSL employs over 350 people worldwide. Home to the most sophisticated and comprehensive audio demonstration facilities in the world, SSL's Oxford headquarters also houses a purpose built training facility where future generations of operators are prepared to fully exploit the technological and creative advantages offered by SSL equipment.

SSL is characterised both by its substantial Research and Development resource and a global commitment to customer support and service. Such assurance is extended via SSL's regional offices in Los Angeles, Milan, New York, Toronto, Paris, Singapore and Tokyo, with additional support provided by an international network of qualified distributors.

The key to the company's success lies in its products; powerful and innovative proprietary technology is used to create dedicated solutions for the recording and manipulation of sound in highly demanding environments. In conditions where sonic purity cannot be compromised against the inevitable demands of high workloads, and where dauntingly inflexible deadlines are accepted as the norm, SSL equipment is synonymous with reliability and excellence.

Solid State Logic

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E & O. E.

System Outline

A-Series systems comprise the following key elements:

- The automated digital mixing system
- Computer controlled resource management system, which gives access to:
  - Hub Router
  - Comprehensive input/output options

The size of console, configuration of inputs and outputs may be specified in accordance with the application. The audio processing in all of the A-Series systems is identical, unless noted otherwise.

Axiom-MT

Axiom-MT is a new digital console, designed specifically for multitrack music recording and mixing applications. The all digital signal path guarantees signal integrity and resolution. Combined with an all digital control surface, the console offers unique control features, complete console reset and total dynamic automation.

Avant

The Avant system is designed specifically for film dubbing and re-recording, and large format video post production. It is based on the well proven Axiom/Aysis technology (see below), but incorporates significant changes to both the control surface and signal processing.

Axiom

Axiom is a highly configurable digital audio production system. Its flexible routing capabilities, comprehensive automation make it suitable for any high quality audio production task. Furthermore, Axiom systems can be configured precisely to meet the operational needs of a facility.

Aysis and Aysis Air

Aysis offers most of the features of Axiom, but in a more compact console profile, rendering it suitable for installation in smaller control rooms. Aysis Air is a variant of Aysis that is purpose designed for the broadcast production studio.

References

Unless otherwise specified the references used in this specification are as follows:

Impedance

Source Impedance for Analogue Sources:	150Ω
Analogue Input Impedance of test set:	100kΩ

Digital Levels

Digital levels are expressed in dBfs, where 0dBfs is digital full-scale.

Audio Levels

Tests are valid for standard calibration where:

Digital Alignment level (per EBU R68-1992):	-18dBfs
Analogue Alignment level:	0dBu
Reference Frequency, unless otherwise stated:	1kHz

Limits

Unless otherwise quoted all figures will have a tolerance of:	±0.5dB

Noise

Unweighted Analogue Measurements apply to Frequency Range 22Hz - 22kHz
Unweighted signal and noise levels are expressed in units of dBu,
where 0dBu = 0.775V into any load.
Weighted Analogue Measurements are measured in accordance with CCIR recommendation 468, and are expressed in units of dBqps.

Distortion

The analogue THD+N measurements are specified with 36dB/Oct filters at 20Hz and 80kHz.

Software Revisions *(as at date of publication)*

Axiom-MT	V1.2/9
Aysis Air:	V2.0/3
Avant:	V2.0/10
Axiom/Aysis:	V2.3/62

SSL reserves the right to alter facilities and specifications and to give notice of such at its discretion. E. & O. E.

Analogue Interface Measurements

Remote Microphone Amplifiers (Mic Amp Model 73663583)

Note: Measurements taken with signal input to Mic Amp input and measured at AES/EBU output. Signal Path measured is microphone preamplifier and A/D converter.

Input Impedance :	8.4kΩ typical, remotely switchable to 1.2kΩ
Phantom Power :	+48V selectable individually and remotely for each Mic Input
Maximum Input Level :	+33dBu with 20dB pad +13dBu without pad
Dynamic Range :	measured at unity gain with input terminated in 150R > 102dB unweighted > 92dBqps weighted
Equivalent Input Noise :	measured with input terminated in 150R typically -126dBfs
THD + N :	measured with +10dBu input signal with unity gain, no pad < 0.002% measured at 1kHz < 0.005% from 20Hz to 20kHz
Frequency Response :	± 0.1dB from 20Hz to 20kHz
Input Range :	-57dBu to +13dBu = 0dBfs with no Pad -37dBu to +33dBu = 0dBfs with 20dB Pad
Resolution :	20-bit
Sampling Frequency :	48kHz

626234 ADC/DAC Card

The 626234 ADC/DAC Card is fitted as standard in the Axiom-MT, Avant, and Aysis Air Processor Racks, and may be optionally specified for Axiom and Aysis.

626234 ADC/DAC Card Analogue Inputs

Note: Measurements taken with signal input to Analogue input and measured at AES/EBU output. Therefore Signal Path measured is only A/D converter and digital signal path.

Input Impedance :	> 10 kΩ
Maximum Input Level :	+24dBu at onset of clipping (< 0.1%THD+N)
Input Trim :	Variable from +9dBu to +24dBu
Nominal Input Level :	+18dBu = 0dBfs
Dynamic Range :	> 101dB unweighted
Minimum Resolvable Signal :	> -128dBfs
THD + N :	measured with a -1dBfs input signal. < 0.002% measured at 1kHz < 0.005% measured at 10kHz < 0.005% from 20Hz to 20kHz
Frequency Response :	+0.1dB/-0.1dB from 20Hz to 20kHz
Crosstalk :	< -90dB (±0.5dB) from 20Hz to 20kHz between a pair of inputs
CMRR :	> 50dB from 20Hz to 20kHz.
Resolution :	20-bit
Sampling Frequency :	48kHz

626234 ADC/DAC Card Analogue Outputs

Note: Measurements taken with signal input to AES/EBU input and measured at DAC output. Therefore signal path measured is D/A converter and digital signal path.

Output Impedance :	< 30Ω
Max. Output Level :	0dBfs = +24dBu
Output Trim :	Variable by 48dB from -24dBu to +24dBu
Nominal Output Level :	0dBfs = +18dBu
Dynamic Range :	> 106dB unweighted (minimum gain) > 113dB unweighted (maximum gain)
Minimum Resolvable Signal :	> -128dBfs
THD + N :	< 0.003% from 20Hz to 10kHz < 0.004% at 20kHz
Frequency Response :	+0.1dB/-0.2dB from 20Hz to 20kHz
Crosstalk :	measured by feeding signal into one channel and measuring output of adjacent channel (terminating unused inputs) < -95dB at 1kHz between a pair of outputs < -85dB from 20Hz to 20kHz between a pair of outputs
Output Symmetry :	> 50dB
Resolution :	Twin 20-bit DACs
Sampling Frequency :	48kHz

626224 ADC/DAC Card

The 626224 ADC/DAC Card is fitted as standard in the Axiom and Aysis Processor Racks.

626224 ADC/DAC Card Analogue Inputs

Note: Measurements taken with signal input to Analogue input and measured at AES/EBU output. Signal Path measured is A/D converter plus digital signal path.

Input Impedance :	> 10 kΩ
Maximum Input Level :	+24dBu at onset of clipping (0.1%THD+N)
Sensitivity :	Adjustable at a system level for 0dBfs = +8 to +24dBu in 1dB steps.
Nominal Input Level :	+18dBu = 0dBfs
Dynamic Range :	> 88 dB unweighted
THD + N :	measured with a -1dBfs input signal. < 0.006% measured at 20Hz < 0.005% from 50Hz to 5kHz < 0.009% @ 20kHz
Frequency Response :	20Hz to 20kHz ±0.2dB
Crosstalk :	< -90dB (±0.5dB) 20Hz to 20kHz between a pair of inputs
CMRR :	> 55dB from 20Hz to 2kHz

626224 ADC/DAC Card Analogue Outputs

Note: Measurements taken with signal input to AES/EBU input and measured at DAC output. Therefore Signal Path measured is D/A converter and digital signal path.

Output Impedance :	< 30Ω
Max. Output Level :	0dBfs = +26dBu
Sensitivity :	Adjustable at a system level for 0dBfs = +15 to 26dBu in 1dB steps.
Nominal Output Level :	0dBfs = +18dBu
Dynamic Range :	> 105 dB unweighted
THD + N :	all measurements taken with -1dBfs input signal < 0.005% from 20Hz to 1kHz < 0.01% @ 10kHz < 0.018% @ 20kHz
Frequency Response :	0dB ±0.2dB from 20Hz to 20kHz
Crosstalk :	measured by feeding signal into one channel and measuring output of adjacent channel (terminating unused inputs) < -95dB at 1kHz between a pair of outputs < -85dB from 20Hz to 20kHz between a pair of outputs
Output Symmetry :	> 50dB

Noise Measurements

Digital Outputs

Noise at Digital Outputs at 48kHz with signal routed from console channel Centre Programme output. All channel Pan Pots set to centre; all channels routed from muted Digital Inputs at 48kHz; Master Fader at unity gain:

All channel faders at - ∞ : > -138dBfs unweighted

48 Ch. faders at unity gain : > -138dBfs unweighted

Digital Interface Specification

626242 Sample Rate Converter Card

Each 626242 Sample Rate Converter Card has 12 input pairs with sample rate conversion, plus 12 output pairs with selectable sample frequency. One 626242 card is fitted as standard in the Axiom-MT, Avant, and Aysis Air Processor Racks.

Impedance :	110Ω (± 20%)
Input Sample Frequencies :	30kHz to 56kHz for each input pair
Input Resolution :	24-bit at 48kHz 20-bit at all other frequencies
Output Sample Frequencies :	Each pair selectable to: 32, 44.1 or 48kHz, system-derived, or option to lock to any AES/EBU input on the same card
Output Resolution :	24-bit at 48kHz 20-bit at 32kHz and 44.1kHz
Output Jitter:	< 10ns

626240 DigitalI/O Card

Each 626240 Digital I/O Card has 4 input pairs with sample rate conversion, 3 output pairs at 48 kHz., and 1 output pair whose sample rate is selectable between 32, 44.1, and 48 kHz. One 626240 card is fitted as standard in the Axiom and Aysis Processor Racks.

Impedance :	110Ω (± 20%)
Input Sample Frequencies :	30kHz to 56kHz for each input pair
Input Resolution :	20-bit at all frequencies
Output Sample Frequencies :	Three pairs at 48kHz. One pair selectable to 32, 44.1 or 48kHz, system-derived
Output Resolution :	20-bit at all frequencies
Output Jitter:	< 10ns

Fader Accuracy

The scribble strip indication of Large Fader gain is accurate to within ±0.25dB.

The scribble strip indication of Small Fader gain (Axiom-MT only) is accurate to within ±0.5dB.

The gain of the channel signal when coming off either fader endstop is < -80dB relative to its unity gain position.

Relative Delay and Phase

Relative Phase Response

ADC - DAC (direct-routed)	
22Hz - 20kHz :	0° ± 0.5°
ADC - Mix output (through processor, settings flat)	
22Hz - 20kHz :	0° ± 0.5°

I/O Delay

Any Local ADC routed to a Local DAC	< 1.5ms
Any Remote ADC routed to a Remote DAC	< 1.6ms
Any Local Digital In routed to a Local Digital Out @ 48kHz	83µs
Any Remote Digital In routed to a Remote Digital Out @ 48kHz	166µs

Processing Delay

Maximum Processing Delay	< 1.0ms

Processing is time-aligned such that any delay is identical for any similar processing path in the system.

System Reference

The system is designed to lock to a Composite Video Sync (H + V sync) reference signal of 2V pk/pk (± 6dB).

This can be one of the following Standard Video Frequencies : 25fps PAL
29.97fps NTSC

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Solid State Logic

Technology That Creates Industry Standards

Over the years, SSL has pioneered advances in console technology providing ever more intelligent and efficient means to assist the creative process, providing customers with a vital commercial advantage.

1977: The SL 4000 B integrated a studio computer system with an in-line audio console.

1981: The SL 4000 E was awarded the prestigious UK Design Council Award, having revolutionised studio management with Total Recall™. Later that same year, SSL received its first Queen's Award for Export Achievement. Through the 1980s SSL continued to expand its range of products, establishing itself as the premier expert in audio technology for the music, film and broadcast industries.

1989: ScreenSound pioneered non-linear audio for video. Quickly establishing a large number of international devotees in the post production and broadcast sector, ScreenSound was acclaimed for its speed, ease of use and creative flexibility. So successful was ScreenSound that in 1990 SSL introduced SoundNet – the world's first multi-use digital networking system.

1991: Ultimation™ - SSL's automated fader system was launched. In the same year, SSL solved 'multi-format' problems by introducing a highly flexible console, the SL 8000 G, which was designed to handle surround sound film formats, including Dolby SRD and SDDS as well as simple stereo mixes. This console was awarded the Professional Choice Award for Audio Technology and a TEC Award.

1992: Scenaria – a radical new audio post production tool was launched, uniquely combining a fully automated mixing system with an integrated random access digital recorder/editor and random access video.

1993: OmniMix – offering all the capabilities of Scenaria but with the addition of multi-format surround sound facilities and a host of advanced creative processing possibilities. SSL's pioneering work in the digital audio for post production domain was recognised by the awarding of the prestigious Queen's Award for Technological Achievement and the Television Broadcast award for Engineering Excellence.

1994: The milestone 1000th analogue console was installed at London's Town House Studios.

Not content with 'mere success', SSL then launched the SL 9000 J, an all new 'super' analogue mixing console with advanced automation and computer control facilities. Top studios around the world, from Ocean Way in Los Angeles to Nippon Columbia in Japan, quickly invested in this superb audio console.

1995: Axiom – the first product in a completely new range of totally digital audio post production and broadcast consoles. Axiom represents a fresh approach to digital audio production, providing knob-per-function ergonomics in a tapeless, dynamically automated environment.

1996: Next in the new 'A' Series was Aysis, a highly flexible, compact, all digital production system which proved immensely popular in limited space applications such as OB vehicles, and with post production houses specialising in long form television work.

1997: Avant extended the 'A' Series into digital film and post-production mixing, and Aysis Air into digital on-air broadcasting and production.

1998: Axiom MT combined the proven technology of the 'A' Series system with SSL's instantly familiar and world-wide accepted control surface to provide a digital multitrack console with an analogue-intuitive operator interface.

2000: And what of the future? SSL customers can face it with supreme confidence. Dedication to customer support and product innovation will ensure that SSL product owners continue to benefit from a wide range of new product developments, upgrade feature packages and unparalleled service levels.

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