XLogic Alpha-Link

AX / MADI-AX / MADI-SX

Installation and User Guide

XLogic Alpha-Link. This is SSL.

Solid State Logic

SOUND | | VISION

Contents

Safety and Installation Considerations

This section contains definitions, warnings, and practical information to ensure a safe working environment.

Please take time to read this section before installing or using this unit. Please do not dispose of these instructions.

General Safety

- Read these instructions.
- Keep these instructions.
- Heed all warnings.
- Follow all instructions.
- Do not use this apparatus near water.
- Do not expose this apparatus to rain or moisture.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves or other apparatus (including amplifiers) that produce heat.
- There are no user-adjustments, or user-serviceable items, inside this apparatus. Do not remove the covers of this apparatus; doing so will invalidate your warranty.
- Adjustments or alterations to this apparatus may affect the performance such that safety and/or international compliance standards may no longer be met.

Caution

- To reduce the risk of electric shock, do not perform any servicing other than that contained in these Installation Instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

Power Safety

- This apparatus is fitted with a universal power supply, approved and certified for operation in this apparatus. There are no user-replaceable fuses.
- A power cord is supplied with this unit. Alternative power cords may be used if rated 2.5A or above and fitted with a 3-pin IEC320 connector and a 3-core cable.
- This apparatus must be connected to an earthed mains outlet. The earth core of the power cord must always connect to the mains supply ground – the earth core forms the safety earth and should not be removed for any reason.
- If an extension power cable or adaptor is used, ensure that the total power rating of the power cable and/or adaptor is not exceeded.
- An external disconnect device is required for this apparatus; a detachable power cord – as used for this apparatus – is a suitable disconnect device.
- An external over-current protection device is required to protect the power wiring to this apparatus. In certain countries this function is supplied by use of a fused plug.
- All power wiring should be installed according to local wiring regulations.
- The mains outlet used for this apparatus should be located nearby and be easily accessible.
- Unplug this apparatus during an electrical storm or when unused for long periods of time.

Installation Notes

- When installing this apparatus, either fix it into a standard 19" rack or place the apparatus on a secure level surface.
- Ensure that no strain is placed on the cables connecting to this apparatus. Ensure also that such cables are not placed where they can be stepped on, pulled or tripped over.
- Do not operate this apparatus whilst it is covered or boxed in any way.
- Do not operate this unit with the covers removed.

1. Introduction

Congratulations on your purchase of this Solid State Logic Alpha-Link audio I/O solution. Please be assured that it will provide you with many years of reliable service while delivering the pristine audio quality you expect from any Solid State Logic product.

The Alpha-Link Audio I/O Product Range is a new collection of highly flexible and fully featured multi-channel audio converters for Studio, Live and Broadcast Applications with an incredible price/performance ratio. There are three Alpha-Link models, all featuring high quality 24-channel SSL enhanced AD/DA converter circuitry and offering a choice of digital audio format options. The Alpha Link MADI SX is a MADI & AES/EBU based converter, whilst the Alpha-Link AX and Alpha-Link MADI AX are ADAT based converters.

The XLogic Alpha-Link series of Audio Converters are stylishly designed, 2U-high rack-mountable units with deceptively simple front panel controls. Each unit offers a comprehensive input/output routing matrix which can be used to set up global connections between the various I/O connections that makes all combinations possible. There is also a handy front panel headphone connection plus a meter section for the analogue inputs and outputs with an AD/DA selection button, mode indicator LEDs and 24 tri-colour level LEDs.

All Alpha-Link units can be used as standalone format converters, but used in combination with an SSL or Soundscape Mixpander PCI card they provide a powerful, highly flexible IO solution for native PC-based audio workstations. When the unit is connected to a Mixpander card the inputs and outputs can be routed individually from the PC using the Soundscape Mixer software.

Designation of Supported Hardware

The information in this manual generally applies to all the models in the XLogic Alpha-Link range: Alpha-Link AX, Alpha-Link MADI-AX, Alpha-Link MADI-SX and in this manual they are collectively referred to as the "Alpha-Link". References to particular audio interfaces (MADI, ADAT, AES/EBU or analogue) apply only to the Alpha-Link models that support this interface.

IMPORTANT: Please register your XLogic Alpha-Link unit on our website. This will ensure that you receive notification of future updates and other important information, and that your guarantee is registered. Registration will also make you eligible for technical support.

The Solid State Logic home page is at: **http://www.solid-state-logic.com**

From there you can go to the Support page, which includes links to the Product Registration and Download pages. You can also visit the Frequently Asked Questions (FAQ) area for any questions you might have or to contact tech support.

2. Installation

The XLogic Alpha-Link AX/MADI-AX/MADI-SX package includes:

- The Alpha-Link unit
- One mains connection cable
- This manual

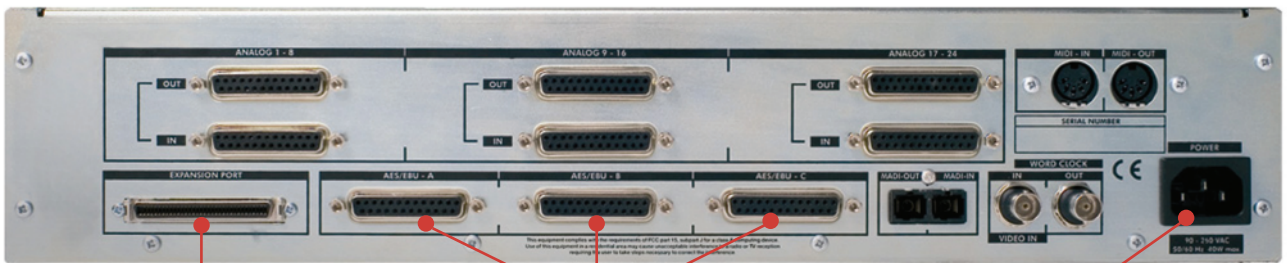
If required, the Alpha-Link unit can be rack mounted. It occupies 2U of rack space in a standard 19-inch rack.

To use an Alpha-Link unit with an SSL or Soundscape Mixpander PCI audio card, connect the Expansion Bus port of the Alpha-Link unit to the Expansion Bus port of the Mixpander card using a Mixpander Expansion Bus cable.

WARNING !

Always switch the host computer and the Alpha-Link unit off before connecting or disconnecting the Mixpander Expansion Bus cable or damage may result.

Alpha-Link MADI-SX Rear Panel



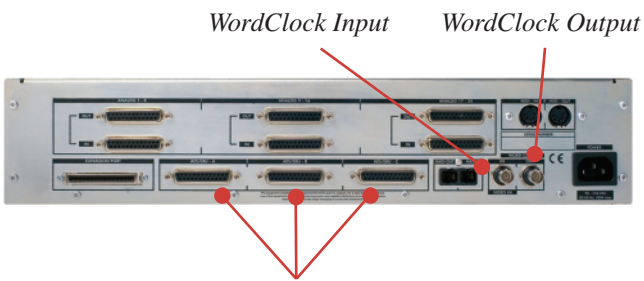
Expansion Bus Port *AES/EBU Ports A, B and C* *IEC Connector*

- Connect the mains cable to the IEC connector of the Alpha-Link unit.
- Audio sources and other devices may be connected now to the various inputs and outputs.
- *If connecting to a Mixpander card:*
  Power up the computer that hosts the Mixpander card and start the Soundscape Mixer software.
- Power up the Alpha-Link unit using the On/Off switch on the front panel.
- Select a Master Clock setting as described in the “Master Clock” section on page 7.

Master Clock

The Alpha-Link unit can operate as a Clock Master device (“Internal” mode), or as a Clock Slave device locked to a Master Clock signal received either via its WordClock input (“External” mode) or via a digital audio connection (“ADAT” or “AES/EBU” mode).

NOTE: At any given time, only one of the ADAT ports or one of the AES/EBU inputs (on port A) can be used to receive and lock to a Master Clock signal. The required ADAT port or AES/EBU input can be selected for that purpose from the front panel by following the procedure described in the “System Settings” chapter.



AES/EBU Ports A, B &C
(or location of ADAT ports, depending on model)

When the Alpha-Link unit is used as part of a Mixpander setup, the Master Clock mode *must* be selected in the Soundscape Mixer software. In other cases, pressing the front panel Clock button repeatedly will cycle through the available Master Clock modes.

The currently selected mode is indicated by illumination of the corresponding LED. Shown in the example below, the *AES mode* has been selected for an Alpha-Link MADI-SX.

A flashing LED indicates that the corresponding mode is selected but the Alpha-Link is not receiving a valid Master Clock signal via the selected port/input.

NOTE: The Mixpander card only operates as a Master Clock Slave. Therefore, if the Alpha-Link is used with a Mixpander connected to its Expansion Bus port, it must provide a Master Clock signal to the Mixpander. This may be the Alpha-Link's Internal Master Clock or a ADAT, AES/EBU or External Master Clock.

Once locked to an ADAT, AES/EBU, Internal or External Master Clock signal, the Alpha-Link distributes that signal through its ADAT, AES/EBU, WordClock output and Expansion Bus ports.

3. Audio Connectivity

Overview

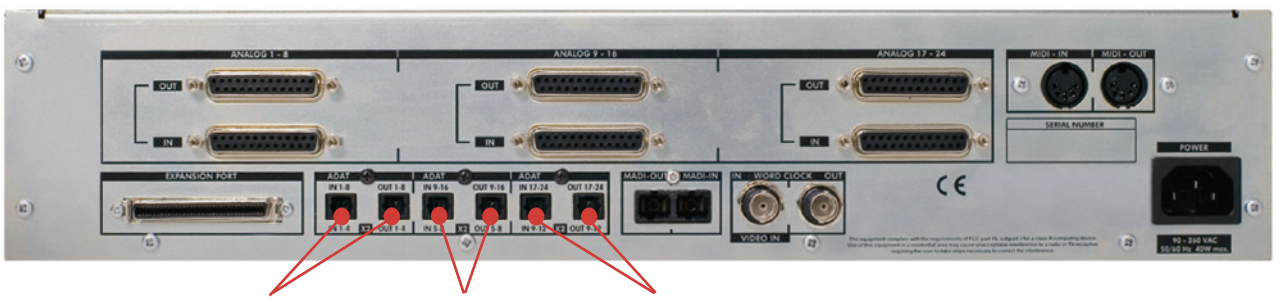
All Alpha-Link models feature 24 channels of SSL grade analogue I/O, an Expansion Bus port and a stereo headphone output.

- Alpha-Link MADI-SX converts analogue I/O to and from MADI & AES/EBU
- Alpha-Link MADI-AX converts analogue I/O to and from MADI & ADAT
- Alpha-Link AX converts he analogue I/O to and from ADAT

All the audio connectors are located on the rear panel of the unit, except for the headphone output which is on the front.

ADAT Inputs and Outputs

Each ADAT Lightpipe port provides an 8 channel bidirectional 24-bit digital connection between the Alpha-Link and any other ADAT compatible device. The ADAT ports use TOSLINK™ compatible, JIS F05 connectors.



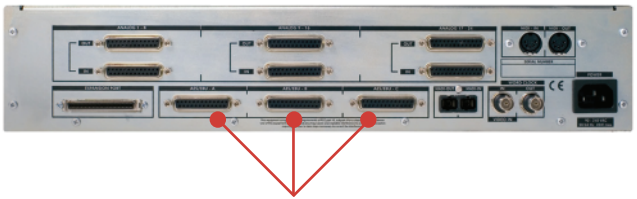
ADAT Inputs and Outputs 1 – 8

ADAT Inputs and Outputs 9 – 16

ADAT Inputs and Outputs 17 – 24

AES/EBU Inputs and Outputs

The AES/EBU inputs and outputs are available via three 25-pin 'D' type connectors wired according to the DB25 AES/EBU digital I/O specification. Each connector provides four stereo inputs and outputs (eight input channels and eight output channels).



AES/EBU Connections

Shown Right:

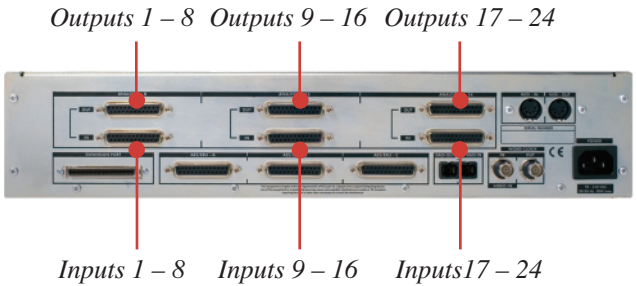
AES/EBU Connections I/O 1 – 8 *
Location: Rear Panel
Connector Type: 25-pin 'D' Type Female

** I/O 9 – 16 and I/O 17 – 24 similar*

Pin		*Description*
1		Channel 1&2 IN (+ve)
	14	Channel 1&2 IN (–ve)
2		Channel 3&4 IN (+ve)
	15	Channel 3&4 IN (–ve)
3		Channel 5&6 IN (+ve)
	16	Channel 5&6 IN (–ve)
4		Channel 7&8 IN (+ve)
	17	Channel 7&8 IN (–ve)
5		Channel 1&2 OUT (+ve)
	18	Channel 1&2 OUT (–ve)
6		Channel 3&4 OUT (+ve)
	19	Channel 3&4 OUT (–ve)
7		Channel 5&6 OUT (+ve)
	20	Channel 5&6 OUT (–ve)
8		Channel 7&8 OUT (+ve)
	21	Channel 7&8 OUT (–ve)
9		n/c
	22	0V
10		0V
	23	n/c
11		n/c
	24	0V
12		0V
	25	0V
13		0V

Analogue Inputs and Outputs

The analogue inputs and outputs are available via six 25-pin ‘D’ type connectors wired according to the Tascam DB25 I/O specification. Each connector provides eight inputs or outputs.



Shown Right:

Analogue Connections I/O 1 – 8 *
Location: Rear Panel
Connector Type: 25-pin ‘D’ Type Female

** I/O 9 – 16 and I/O 17 – 24 similar*

Pin		*Description*
1		Channel 8 (+ve)
	14	Channel 8 (–ve)
2		0V
	15	Channel 7 (+ve)
3		Channel 7 (–ve)
	16	0V
4		Channel 6 (+ve)
	17	Channel 6 (–ve)
5		0V
	18	Channel 5 (+ve)
6		Channel 5 (-ve)
	19	0V
7		Channel 4 (+ve)
	20	Channel 4 (–ve)
8		0V
	21	Channel 3 (+ve)
9		Channel 3 (-ve)
	22	0V
10		Channel 2 (+ve)
	23	Channel 2 (-ve)
11		0V
	24	Channel 1 (+ve)
12		Channel 1 (-ve)
	25	0V
13		n/c

MADI Ports

Expansion Bus Port *MADI Output Port* *MADI Input Port*

The MADI interface supports both the “legacy frame pattern” and “96kHz frame pattern” when operating at double speed (96kHz). Please refer to the AES10-2003 document for details. The legacy frame pattern should be viewed as an SMUX2 signal (*refer to the Appendix for further details*).

Expansion Bus Port

The Expansion Bus port can be used to connect the Alpha-Link to an SSL or Soundscape Mixpander PCI audio card. It provides a high-speed bidirectional 64-channel connection between the Alpha-Link and the Mixpander card.

The Soundscape Expansion Bus is proprietary and the connection between the Mixpander card and Alpha-Link must be made using an Expansion Bus cable supplied by Solid State Logic. The cables supplied by Solid State Logic are made to the maximum length allowing proper operation.

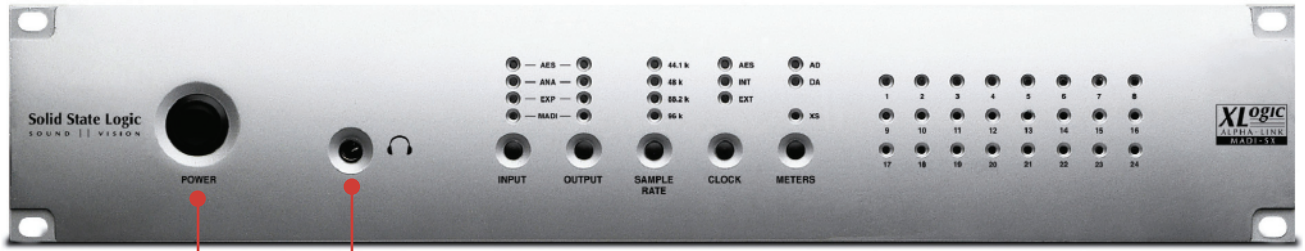
MIDI Connectivity

All Alpha-Link models feature MIDI input and output ports. At the time of writing, the functionality of these ports has not been implemented, but future software updates might add specific MIDI functionality.

4. Front Panel

Power Switch

This switch is used to power the Alpha-Link up or down.



Power switch *Headphone socket*

NOTE: The current front panel settings are stored in non-volatile memory when the unit is switched off, and recalled the next time it is switched on. When the Alpha-Link is used in combination with an SSL or Soundscape Mixpander card, if this unit is switched off while the Soundscape Mixer software is running, the settings defined in the software are restored as soon as the unit is powered up again.

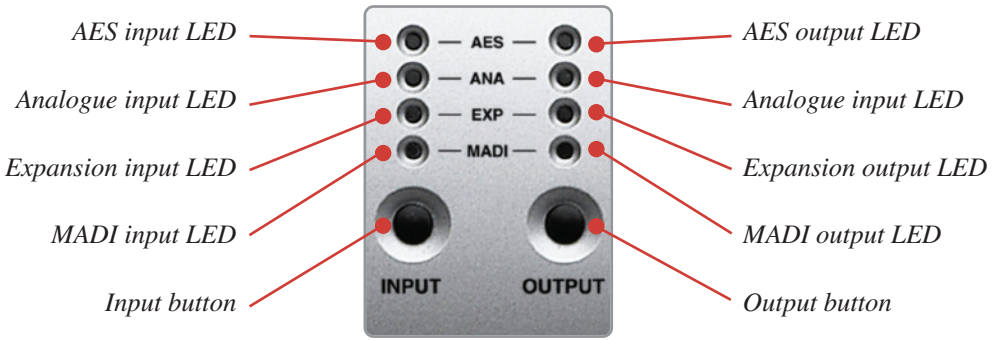
Headphone Socket

The Headphone socket is a female stereo jack connector. It provides a stereo signal derived from analogue output channels 23 (Left) and 24 (Right). The signal level is fixed and can only be controlled in the digital domain (ie., from within the Soundscape Mixer software).

Routing Matrix

The Alpha-Link unit can be used as a standalone format converter for any piece of equipment that supports one of its formats.

The Alpha-Link routing matrix includes one Input button and one Output button, four Input indicator LEDs and four Output indicator LEDs. It can be used to connect any input group (ie., the ADAT, AES/EBU, Analogue, Expansion Bus or MADI inputs) to any output group. The picture below shows the routing matrix for an Alpha-Link MADI-SX:



Alternatively, the Alpha-Link can be connected to an SSL or Soundscape Mixpander/9 or Mixpander/5 via its Expansion Bus port. In that case it can act as multi-channel bidirectional format converter between the MADI, ADAT, AES/EBU or analogue inputs and outputs and the Expansion Bus (depending on model). The routing is determined in the Soundscape Mixer software and the front panel routing matrix is deactivated.

The routing connections are 24-bit digital switches that do not affect the quality of the signal or the integrity of the audio data in any way.

Pressing the Output button repeatedly will cycle through the available output groups. The currently selected output group is indicated by illumination of the corresponding LED. The LEDs of the input column will indicate which input group(s) are connected to the selected output group.

In order to change the input group(s) connected to a given output group, press the Output button and hold it down when the required output group is selected. Pressing the Input button repeatedly while the Output button is held down will cycle through the input groups available for that output. Releasing the Output button when the input LEDs indicate the required Input group selection will store and activate that selection.

NOTE: Pressing the Input button alone has no effect. The Input button only works in combination with the Output button.

In the example right, the Analogue inputs are connected to the AES outputs while the AES inputs are connected to the Analogue outputs.

Where there is capacity available, two input groups may be assigned to one output group (eg. the AES and analogue input groups of an Alpha-Link MADI-SX can both connect to the MADI output group). The order in which input channels are assigned to output channels is determined by the 'Connection Mode' described in the Option Switches section (page 19 onwards).

NOTE: Channels will be routed in order, hence the 'lower' input or output group will be filled before the routing spills over to the 'higher' group. Where this split occurs will depend on the sample rate and channel count.

In the example left, the AES and Analogue input groups are both connected to the Expansion Bus output group – the manner in which the AES/EBU and analogue channels are split across the Expansion bus being determined by the setting of the 'connection mode' option switch.

NOTE: The Alpha-Link unit has no internal digital mixing facilities; therefore two inputs cannot be connected to the same output. However, any input can be connected to more than one output. If an input connection is selected for the current output when that output is already connected to another input, the new setting overrides the previous one.

Sample Rate Button and Sample Rate Indicator LEDs

When the Alpha-Link is used in combination with a Mixpander card the Sample Rate button is deactivated. The Sample Rate indicator LEDs reflect the settings made in the Soundscape Mixer software.

In all other cases, when the Clock source is set to Internal (as described in the 'Master Clock' section on page 7), pressing the Sample Rate button repeatedly will cycle through the available Sample Rates: 44.1kHz, 48kHz, 88.2kHz and 96kHz. The current sample rate selection is indicated by illumination of the corresponding LED.

When the Master Clock source is ADAT, AES/EBU or External, the illuminated LED indicates the received Sample Rate. If there is an error or the received Sample Rate does not fall within the tolerances that are normally expected, all the LEDs will be off.

Sample Rate button

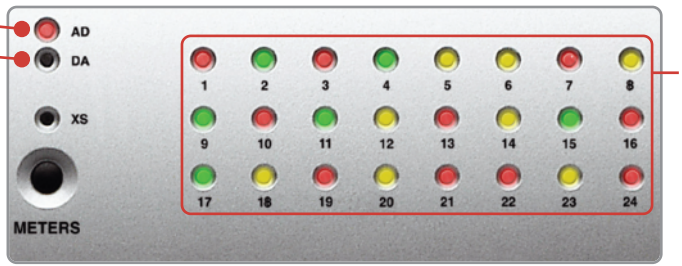
If pressing the Sample Rate button has no effect, check that the Master Clock is set to Internal, as described in the 'Master Clock' section on page 7.

Meter Section

The meter section includes the Meters button, the AD and DA indicator LEDs and twenty four metering LEDs. For Alpha-Link units that have analogue connectivity, it allows the level of the signals received via the analogue inputs or transmitted via the analogue ouputs to be monitored.

AD Indicator LED
DA Indicator LED

NOTE: While the XS LED is located in the same area of the front panel, it is not used for metering. Its function is described in the "System Settings" chapter.



Metering LEDs. Channel 13 is clipping in this example and would be indicated by a red LED.

Pressing the Meters button switches the monitoring mode between AD (monitoring the level of the signal received via the analogue inputs) and DA (showing the level of the signal transmitted via the analogue outputs). For each analogue input or output channel, the signal level is represented by the state of the LED with the corresponding number. The LEDs respond to the signal level in the digital domain as follows:

- Below –30dB FS (< –8dBu applied to an analogue input): the LED is OFF.
- Above –30dB FS (> –8dBu applied to an analogue input): the LED is GREEN.
- Above –3.0dB FS (> +19dBu applied to an analogue input): the LED is AMBER.
- Above –0.1dB FS (> +22dBu applied to an analogue input): the LED is RED.

5. System Settings and Diagnostic Mode

Overview

Two virtual 8-way Option Switches allow global system parameters to be set as required. These switches are controlled from the front panel when the Alpha-Link is in Diagnostic mode; holding the Sample Rate and Clock buttons for at least 1.5 seconds during power up will cause the Alpha-Link to start in this mode which will be indicated by a flashing XS LED (see over leaf).

Selecting a Virtual 8-way Option Switch

When the Alpha-Link is in diagnostic mode, pressing the Meters button toggles between Option Switch 1 (indicated by a lit amber channel 17 LED) and Option Switch 2 (indicated by a lit amber channel 18 LED).

Selecting an Option

When an Option Switch is selected, pressing the Output button cycles between up to eight options available for that switch. The current option selection is indicated by a lit red LED in the second row of metering LEDs. A lit channel 9 LED indicates that option 1 is selected; a lit channel 10 LED indicates that option 2 is selected, and so on.

Setting an Option

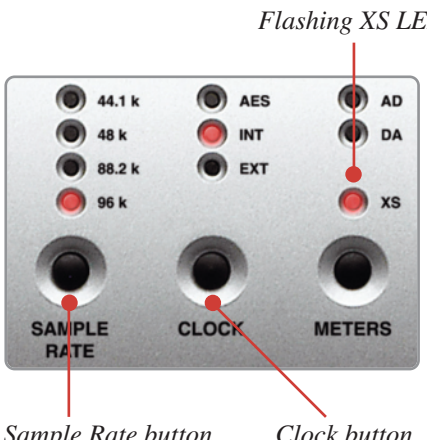
When an option is selected, pressing the Input button toggles it between two possible settings. The current setting is indicated by the on/off status of the corresponding LED in the first row of metering LEDs. The setting of option 1 is indicated by the on/off status of the channel 1 LED, the setting of option 2 is indicated by the on/off status of the channel 2 LED, and so on.

Please refer to the following ‘Option Switch 1’ and ‘Option Switch 2’ tables for details of the available options and settings. Note also that different tables are provided for ADAT compatible and AES/EBU compatible Alpha-Link units.

5.1 Firmware Version

Firmware Version Number

If the Alpha-Link unit is started in Diagnostic mode, the firmware varsion can be checked:



Pressing the Sample Rate and Clock buttons simultaneously will cause the Alpha-Link to display its firmware version number using the top row of meter LEDs until the buttons are released. The unit then returns to normal operation.

The firmware version number is expressed in binary. Each LED can represent a “0” (LED off) or a “1” (LED on). LEDs 1 to 4 represent the first nibble (the number before the point) and LEDs 5 to 8 represent the second nibble (the number after the point).

The table below describes the relationship between the binary code and the firmware version numbers.

Version number (first part)	**LEDs 1 to 4 status** (0 = Off, 1 = On)	**Version number** (second part)	**LEDs 5 to 8 status** (0 = Off, 1 = On)
0.x	0 0 0 0	x.0	0 0 0 0
1.x	0 0 0 1	x.1	0 0 0 1
2.x	0 0 1 0	x.2	0 0 1 0
3.x	0 0 1 1	x.3	0 0 1 1
4.x	0 1 0 0	x.4	0 1 0 0
5.x	0 1 0 1	x.5	0 1 0 1
6.x	0 1 1 0	x.6	0 1 1 0
7.x	0 1 1 1	x.7	0 1 1 1
8.x	1 0 0 0	x.8	1 0 0 0
9.x	1 0 0 1	x.9	1 0 0 1

Examples:

Channel 4 meter LED indicates Firmware Version 1.0

Channel 4 and channel 8 meter LEDs indicate Firmware Version 1.1

5.2 ADAT Compatible Alpha-Link Units

Option Switch 1

Option Switch 1 (Indicated by a lit amber Channel 17 LED) (Default settings in **bold**)			
LED number	**Option**	**Setting**	**LED status**
1	MADI – number of channels	64(32)	Off
		56(28)	**On**
2	MADI – 96kHz mode[*3]	Non-SMUX2	Off
		SMUX2	**On**
3	ADAT – 96kHz mode[*3]	Non-SMUX2	Off
		SMUX2	**On**
4	Analogue or ADAT connection mode[*1]	ANA lowest	Off
		ADAT lowest	**On**
5	ADAT – Channel Status[*2]	**Use**	**Off**
		Ignore	On
6	WordClock IN – 96kHz mode[*3]	**WordClock**	**Off**
		FrameClock	On
7	WordClock OUT – 96kHz mode[*4]	**WordClock**	**Off**
		FrameClock	On
8	FrameClock OUT – Phase Angle[*5]	**0°**	**Off**
		90°	On

[*1] **Analogue or ADAT connection mode:** When the analogue and ADAT input groups are both connected to the MADI output group, this option determines which input group feeds the MADI output group first and hence affects the order in which input channels are assigned to channels in the MADI stream. Similarly, when the MADI input group is routed to both the analogue and ADAT output groups, this switch also determines the order in which the MADI channels are split across the selected output groups.

[*2] **ADAT Channel Status:** Newer ADAT interfaces can identify the sample rate range (eg. as used in the Alesis HD24).

[*3] **SMUX2/non-SMUX2:** With an SMUX2 data-format, the Sample Rate cannot be predicted. These option switches therefore serve a double purpose:

- If the unit has to lock from the ADAT/MADI, these option switches set how the interface-embedded WordClock is interpreted when this clock is below 57kHz.

  Non-SMUX2 = 'normal' sample frequency
  SMUX2 = 'double' sample frequency

- If the unit does not have to lock from the interface, these option switches set which data-format has to be used for the generation of the higher sample-rate-signal.

  Non-SMUX2 = 'High Speed' frame pattern
  SMUX2 = 'Legacy' frame pattern (ie. SMUX2)

[*4] **WordClock/FrameClock:**

Please see the "Interface FrameClock vs WordClock" topic in the Appendix for details.

[*5] **FrameClock Phase Angle:**

At the time of writing, only a fixed 90° angle is used.

Option Switch 2

NOTE: Option Switch 2 is used to determine which ADAT port is used as the ADAT Clock source when the ADAT Master Clock mode is selected. Since there are three possibilities (ADAT A, ADAT B or ADAT C), options 1 and 2 are combined to select a configuration. The status of the channel 1 and channel 2 metering LEDs indicates the current ADAT Clock input selection.

Option Switch 2 (Indicated by a lit amber Channel 18 LED)
(Default settings in **bold**)

LED number	Option	Setting	LED status
1	ADAT Clock input selection	**ADAT A**	**Off/Off**
2		ADAT B	On/Off
		ADAT C	Off/On
3	External Clock source selection[*1]	**WordClock**	**Off**
		MADI	On
4	Unused	n/a	n/a
		n/a	n/a
5	Unused	n/a	n/a
		n/a	n/a
6	Unused	n/a	n/a
		n/a	n/a
7	Unused	n/a	n/a
		n/a	n/a
8	Unused	n/a	n/a
		n/a	n/a

[*1] **External Clock source selection:** When External Master Clock mode is selected the WordClock (or FrameClock) is obtained from the MADI input, therefore a WordClock signal is not needed at the WordClock input connector.

5.3 AES/EBU Compatible Alpha-Link Units

Option Switch 1

Option Switch 1 (Indicated by a lit amber Channel 17 LED) (Default settings in **bold**)			
LED number	**Option**	**Setting**	**LED status**
1	MADI – number of channels	64 (32)	Off
		56 (28)	**On**
2	MADI – 96kHz mode*2	Non-SMUX	Off
		SMUX	**On**
3	AES/EBU – 96kHz mode*2	Non-SMUX	Off
		SMUX	**On**
4	Connection mode*1	Analogue lowest	Off
		AES/EBU lowest	**On**
5	AES/EBU Channel Status*5	**Use**	**Off**
		Ignore	On
6	WordClock IN – 96kHz mode*2	**WordClock**	**Off**
		FrameClock	On
7	WordClock OUT – 96kHz mode*3	**WordClock**	**Off**
		FrameClock	On
8	FrameClock OUT – Phase Angle*4	**0°**	**Off**
		90°	On

*1 **Connection mode:** When the analogue and AES/EBU input groups are both connected to the MADI output group, this option determines which input group feeds the MADI output group first and hence affects the order in which input channels are assigned to channels in the MADI stream. Similarly, when the MADI input group is routed to both the analogue and AES/EBU output groups, this switch also determines the order in which the MADI channels are split across the selected output groups.

*2 **SMUX2/non-SMUX2:** With an SMUX2 data-format, the sample rate cannot be predicted and only a properly implemented AES/EBU interface can identify itself by means of embedded channel status bits. These option switches therefore serve a double purpose:

- If the unit has to lock from the interface, these option switches set how the interface-embedded WordClock is interpreted when this clock is below 57kHz.

  Non-SMUX2 = 'normal' sample frequency
  SMUX2 = 'double' sample frequency

- If the unit does not have to lock from the interface, these option switches set which data-format has to be used for the generation of the higher sample-rate-signal.

  Non-SMUX2 = 'High Speed' frame pattern
  SMUX2 = 'Legacy' frame pattern (ie. SMUX2)

*3 **WordClock/FrameClock:**

Please see "Interface FrameClock vs WordClock" topic in the Appendix for details.

*4 **FrameClock Phase Angle:**

At the time of writing, only a fixed 90° angle is used.

*5 **AES/EBU Channel Status:**

It is possible to set the SMUX mode from the channel status bits of the AES/EBU port selected as the clock source (*see opposite*) if this stream conforms to AES3-1992-Amendment-1999. Alternatively the Alpha-Link can be set to the desired mode manually, ignoring the channel status bits.

Option Switch 2

NOTE: Option Switch 2 is used to determine which AES/EBU pair on port A is used as the AES/EBU Clock source when the AES/EBU Master Clock mode is selected. Since there are four possibilities (AES/EBU A 1/2, AES/EBU A 3/4, AES/EBU A 5/6 or AES/EBU A 7/8), options 1 and 2 are combined to select a configuration. The status of the channel 1 and channel 2 metering LEDs indicates the current AES/EBU Clock input selection.

Option Switch 2 (Indicated by a lit amber Channel 18 LED) (Default settings in **bold)**			
LED number	**Option**	**Setting**	**LED status**
1	AES/EBU Clock input selection	**AES/EBU A 1/2**	**Off/Off**
		AES/EBU A 3/4	On/Off
2		AES/EBU A 5/6	Off/On
		AES/EBU A 7/8	On/On
3	External Clock source selection[*1]	**WordClock**	**Off**
		MADI	On
4	AES/EBU A 1/2 Sample Rate Converter Bypass	AES/EBU A 1/2	**Off**/On
5	AES/EBU A 3/4 Sample Rate Converter Bypass	AES/EBU A 3/4	**Off**/On
6	AES/EBU A 5/6 Sample Rate Converter Bypass	AES/EBU A 5/6	**Off**/On
7	AES/EBU A 7/8 Sample Rate Converter Bypass	AES/EBU A 7/8	**Off**/On
8	Unused	n/a	n/a
		n/a	n/a

[*1] **External Clock source selection:** When an External Master Clock mode is selected, the WordClock (or FrameClock) can also be obtained from the MADI input, therefore a WordClock signal may not be required.

Appendix A – AES/EBU Interface

Inputs with Sample Rate Conversion
The inputs of AES/EBU port A (Channels 1 through 8) have Sample Rate Converters available. These Sample Rate Converters combine a wide input-to-output sampling ratio with outstanding dynamic range and ultra low distortion, providing high quality even at a 1:1 conversion (where most other SRCs offer their lowest quality). It is not necessary to switch them out of the signal path, even in fully synchronized systems.

Sample Rate Converter Bypass
In some cases the Sample Rate Converters must be bypassed, eg. for the smallest possible delay, in which case any signals presented to these inputs *must* be synchronized to the system. The Sample Rate Converters can be bypassed in pairs (please refer to page 27).

Input Sample Rate and Auxiliary Data
The input Sample Rate is measured from the selected AES/EBU stereo pair on port A (*see page 27*), not extracted from the in-coming channel status bits. Information about Double Frequency mode may be extracted from the channel status bits if the in-coming stream contains this information but this should not be relied upon (*ref. page 26*).

Inputs without Sample Rate Conversion
The inputs of AES/EBU ports B and C (Channels 9 through 24) do not have Sample Rate Converters available, and therefore signals must be synchronized to the system.

Output Auxiliary Data
The following will be set in the auxillary data fields of all AES/EBU output streams:

- Channel Status Data — Indication of the selected sample rate and selected double frequency (SMUX) mode. All other channel status fields default to '1'.
- User Data Bit — Always set low ('0')
- Validity bit — Always set true (valid)
- Parity Bit — always recalculated

Appendix B – Interface FrameClock vs WordClock

What is an interface-frame?
An interface-frame is a structure which contains digital audio data of all channels of one sample taken. A signal which indicates the boundaries of such interface-frames is called the interface-FrameClock.

*NOTE: this "frame" has **nothing** to do with the familiar video-frame (eg. 24fps). To minimize confusion it is best linked with its corresponding interface type (eg. AES-frame…).*

What is SMUXn?
If a given interface is required to operate at a ***higher*** sample rate to that which was originally specified (eg. 48kHz → 96kHz), it will not be possible to maintain the same number of channels with the same audio-resolution (eg. 24-bit), without increasing the interface bandwidth – which may not be possible. A solution to this may be sample-multiplexing or 'SMUX', whereby the original channel count is sacrificed to provide space for a more samples.

- **SMUX2: Double Speed (eg. 96kHz):**
  Two (96kHz) samples of a certain channel are now distributed over two former (48kHz) channels (or two WordClock-ticks). The ***number of channels*** is therefore ***divided by two***.
- **SMUX4: Quadruple Speed (eg. 192kHz):**
  Four (192kHz) samples of a certain channel are now distributed over four former (48kHz) channels (or four WordClock-ticks). The ***number of channels*** is therefore ***divided by four***.

What is WordClock?
WordClock is a timing reference which indicates the rate at which audio has been sampled (ADC), or generated (DAC). This signal may be provided in two different forms:

A. Embedded WordClock:
Most interface standards carry some kind of embedded WordClock which clearly indicates the frame-boundaries of that interface. Some popular interfaces which contain an embedded WordClock are:

- **AES:** Embedded Wordclock by means of data-encoding violations. This data-encoding is done at an integer multiple of the sample rate (128 x LR), thus yielding an almost jitter-free WordClock. When operating in SMUX mode this signal becomes the AES-FrameClock.
- **ADAT:** Embedded Wordclock by means of data-encoding violations. This data-encoding is done at an integer multiple of the sample rate (256 x LR), thus yielding an almost jitter-free WordClock. When operating in SMUX mode this signal becomes the ADAT-FrameClock.
- **MADI:** Embedded Wordclock by means of a dedicated bit inside the structure. Because MADI uses symbols inside a *fixed* length (80ns) frame, a jittery WordClock is obtained. When operating in SMUX mode this signal becomes the MADI-FrameClock.

B. Dedicated WordClock:
A separate, dedicated WordClock connection is also usually found on the rear panel of professional digital audio equipment. The typical connector used for this is a 75ohm BNC socket, typically running at +5V pk-pk ('TTL' level). Note that when operating in an SMUX-mode, the WordClock may indicate the *base* sample rate (eg. 48kHz) rather than the *actual* sample rate. This signal is often used because it has the least jitter, however this signal is rarely phase-locked to the audio stream(s) with which it is associated and so can not be guaranteed to indicate frame-boundaries (see "What is SMUXn?" opposite) – problems can be expected…

Equipment Synchronization:
If a unit is operated at 48kHz, the whole of one frame will fit into one WordClock period, hence WordClock may be used to synchronize multiple units. If a unit is operated at a higher sample rate (eg. 96kHz) in an SMUX-mode, multiple frames will be distributed over a 'base rate' (48kHz) WordClock period and in such cases the interface-FrameClock must be used to synchronise multiple units – note that this would probably be the embedded FrameClock. If it is preferable to use a dedicated WordClock signal, it must be provided at the sample rate selected.

SMUXn and Sample Rate Prediction:
When an SMUX-mode is used, the Sample Rate can not be predicted in all cases. If one measures the embedded interface-FrameClock (eg. 32kHz), one cannot tell if the actual sample rate is two times higher (eg. 64kHz), or four times higher (eg. 128kHz). For automatic detection of the SMUX-mode used, this information must be embedded inside the data-frame by means of control bits, but not all interface types support this:

- **AES:**
  A correctly implemented AES interface can identify itself by means of embedded control signals inside a AES-frame. These bits reside inside the channel status word (192 bits). Please refer to the full AES-3 specification for further details.
- **ADAT:**
  ADAT has no means of identifying itself. Four user-bits are available inside a frame, but no standard exists.
- **MADI:**
  A correctly implemented MADI interface can identify itself by means of embedded control signals inside a MADI-frame. These bits reside inside the channel status word (192 bits). Please refer to the full AES-10 specification for further details.

Appendix C – Troubleshooting

Symptoms	Possible solutions
There is no sound. All the LEDs are off.	Check that the Alpha-Link unit is connected to the mains supply and that the Power switch is in the On position. Check the condition of the mains cable.
There is no sound. The ADAT, AES/EBU or External Master Clock indicator LED flashes. The Sample Rate LEDs are off.	Check that the device connected to the WordClock, MADI or ADAT or AES/EBU port is set to transmit a suitable Master Clock signal and operates at a supported Sample Rate.
The Input and Output buttons do not work. The Input and Output LEDs are off. The Clock button does not work. The Sample Rate button does not work.	Is the Alpha-Link unit being used together with a Mixpander card? If so, it is normal for these controls to be deactivated. Otherwise, please contact Solid State Logic's technical support.
When the Soundscape Mixer software is started, a dialog box states that the Alpha-Link firmware is not compatible.	The firmware needs to be updated. Please contact Solid State Logic's technical support.
The sound is distorted.	Use the front panel metering section to check the level of the audio signals.

Technical Support

To access the latest support information on Alpha-Link, please visit our online support site. The information there is kept up to date by our support staff to make sure all information is accurate. All information is available to you 24/7.

URL: http://solid-state-logic-en.custhelp.com

If you can't find your answer or a solution to your issue, you can submit a question on the site to our support staff for resolution.

Appendix D – Specifications

Physical *

Depth	310mm / 12.25"	*casing only*
Height	89mm / 3.5" (1 RU)	
Width	438mm / 17.25" 482mm / 19"	*casing only* *inc' rack ears*
Weight	6kg / 13.25 pounds	
Power	< 30 Watts	
Boxed size	500mm x 600mm x 220mm 20" x 24" x 9"	
Boxed weight	8kg / 18 pounds	

** All values are approximate*

Environmental

Temperature	Operating: Non-operating: Max. gradient:	+5 to 30 deg. C –20 to 50 deg. C 15 deg. C/hour
Relative Humidity	Operating: Non-operating: Max. wet bulb: (non-condensing)	20 to 80 % 5 to 90 % 29 deg. C
Vibration	Operating: Non-operating, power off:	< 0.2 G (3 – 100Hz) < 0.4 G (3 – 100Hz)
Shock	Operating: Non-operating:	< 2 G (10ms max.) < 10 G (10ms max.)
Altitude (above sea level)	Operating: Non-operating:	0 to 3000m 0 to 12000m

Connections

Power	IEC320 3-pin connector, 100 – 240 Vac, 50 – 60 Hz
Analogue I/O	6 of 25-pin 'D' sockets provide 24 input and 24 output channels (8 in or out per socket)
• Headphones	1 of ¼" stereo jack (located on front panel)
Digital I/O	
• ADAT	Tascam TOSLINK™ compatible, JIS F05 connector, 3 pairs provide 24 input and 24 output channels (8 in/out per pair)
• AES/EBU	3 of 25-pin 'D' socket, Zin/out = 110Ω, balanced and isolated providing 24 input / 24 output channels (8 in/out per socket)
• Expansion Bus	68-pin Hirose DXM series socket provides 64 channels
• MADI	Twin SC type chassis sockets, glass multimode fibre: 50/125μ, provides 64 channels @ 48kHz
Control	
• WordClock	75Ω BNC, Zin = 75Ω, 3V3/5V TTL compatible
• MIDI Ports	2 of 5-pin 180° DIN (1 in, 1 out)

Performance

Quantisation	24bit, fixed point	
Sample Rates	44.1kHz, 48kHz, 88.2kHz and 96kHz	
Sample Rate Converters (*AES port A input only*)	Conversion Range Dynamic Range (A-wtd): THD+N (1kHz @–60dB): Group Delay (@48kHz):	4kHz – 212kHz 128dB –125dB 36 samples
Analogue I/O Level	+22dBu ≈ 0dB FS	

Tested To Comply with FCC Standards

FOR HOME OR OFFICE USE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Instructions for Disposal of WEEE by Users in the European Union

The symbol shown here is on the product or on its packaging, which indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

Standards Conformance

This apparatus fully conforms with the current protection requirements of the European community council directives on EMC and LVD.

CE

Warranty

Pursuant to the Solid State Logic Terms and Conditions under European consumer law the purchaser has full statutory warranty rights for two years from the date of delivery of the product. The warranty is valid only in those Member States of the European Union (EU) who have adopted the applicable EU law into their national legislation. The applicable national legislation governing the sale of consumer goods is not affected by this warranty. Warranty claims will only be accepted if the purchased product has been used for its intended purpose. Any purchased product used for an unintended purpose will not be eligible for warranty protection. For all warranty inquiries or claims please address the claim to us if the purchase was directly from us or otherwise to the dealer from which you purchased the product within a period of two months from the date on which you detected its lack of conformity with the terms of the warranty. **Please include your original proof of purchase when initiating the claim.**

Out of Warranty Repairs

In the event of a fault arising after the warranty period has expired the unit should be returned to Solid State Logic either directly or via your local dealer. You will be charged for the time spent on the repair (at Solid State Logic's current repair rate) plus the cost of parts and shipping. Note that no units can be accepted for repair without prior arrangement (see below).

All Returns

- No unit will be accepted for repair by Solid State Logic unless accompanied by a valid RMA (Return Material Authorisation) number, obtainable from Solid State Logic prior to shipping.
- All units should be shipped to Solid State Logic in suitable rigid packaging – Solid State Logic cannot be held responsible for any damage caused by shipping units in other packaging. In such cases Solid State Logic will return the unit in a suitable box, which you will be charged for.
- Do not include the power cable, manual or any other items – Solid State Logic can not guarantee to return them to you.

Solid State Logic

SOUND || VISION

Visit SSL at URL: http://www.solid-state-logic.com

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