



# SoundField UPM-1 Stereo to 5.1 Converter

User Guide  
Version 1.0



**CONTENTS:**

Safety Information	-	-	-	-	-	-	-	-	-	-	3
Introduction	-	-	-	-	-	-	-	-	-	-	4
Example Application: Stadium Sports				-	-	-	-	-	-	-	5-6
Controls	-	-	-	-	-	-	-	-	-	-	7-10
Audio Specification	-	-	-	-	-	-	-	-	-	-	11
Warranty	-	-	-	-	-	-	-	-	-	-	12
Shipping and Quality Assurance				-	-	-	-	-	-	-	13

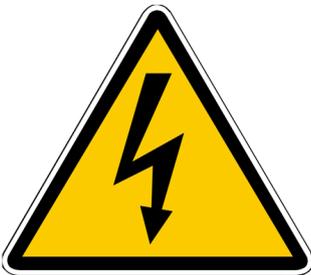
## SAFETY INFORMATION

- This equipment must be EARTHED.
- Only suitably trained personnel should service this equipment.
- Please read and take note of all warning and informative labels.
- Before starting any servicing operation, this equipment must be isolated from the AC supply (mains) by removing the incoming IEC mains connector.
- Fuses should only be replaced with ones of the same type and rating as that indicated.
- Operate only in a clean, dry and pollutant-free environment.
- Do not operate in an explosive atmosphere.
- Do not allow any liquid or solid objects to enter the equipment. Should this accidentally occur then immediately switch off the unit and contact your service agent.
- Do not allow ventilation slots to be blocked.

### Cleaning

For cleaning the front panels of the equipment we recommend anti-static screen cleaner sprayed onto a soft cloth to dampen it only.

### Explanation of Warning Symbols



The lightning flash with arrow head symbol within an equilateral triangle is intended to alert the user to the presence of dangerous voltages and energy levels within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock or injury.



The exclamation mark within an equilateral triangle is intended to prompt the user to refer to important operating or maintenance (servicing) instructions in the documentation supplied with the product.

## INTRODUCTION

### The UPM-1: What Is It?

The SoundField UPM-1 is a fully digital Stereo to 5.1 converter aimed at broadcast applications. The progression from standard definition (SD) to high definition (HD) broadcasting brings with it the requirement for a digital 5.1 audio stream. In many working environments broadcasters find themselves in situations where they need to introduce previously recorded stereo material into an HD 5.1 audio stream. A typical example would be in the coverage of major sporting tournaments where short extracts of archived material from previous years' winning performances need to be inserted. Folding the audio back down to stereo momentarily is unacceptable - the UPM-1 will take any digital stereo input signal and create a natural sounding 5.1 mix. No effects such as reverb are used and only the original components of the stereo source material will appear in the 5.1. The UPM-1 uses a unique algorithm which extracts the ambience from the direct sound and differentiates itself from other approaches to upmixing through its adaptive nature. The detailed real-time analysis of the stereo input material will determine how the upmix algorithm behaves at that instance in time.

The aim of the UPM-1 is to produce a very stable and natural sounding 5.1 without destroying the original stereo image. Key to achieving this are:

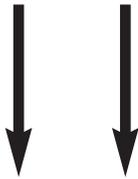
- Good extraction of mono sources to feed the centre channel - such as dialogue, commentary, etc.
- Maintaining the frontal stereo image by keeping the direct sound sources of the stereo mix at the front.
- Only the extracted natural ambience is fed to the rear surround sound channels.

The UPM-1 has two main modes of operation - Upmix mode and Matrix Decode mode. The main difference between these two modes is in how the surround channels are derived. In Upmix mode no direct sound is sent to the rear channels - only ambience. In Matrix Decode mode the UPM-1 will detect any stereo material which has been matrix encoded (Dolby® Pro Logic® etc) and any direct sound intended by the encoding process for the rear surround will be sent there. It is important to note that with non-matrix encoded material both modes will behave identically.

There are three controls central to the UPM-1's operation: Front Direct Sound, Front Ambient Sound and Rear Ambient Sound. By adjusting these three controls the user can create a desired balance between direct and ambient sound within the 5.1 surround. Two further controls, Width and Centre Divergence, provide the opportunity for further fine adjustment to imaging and centre channel content. The effect of all these controls is explained in greater detail in the next section: **EXAMPLE APPLICATION: STADIUM SPORTS.**

## EXAMPLE APPLICATION: STADIUM SPORTS

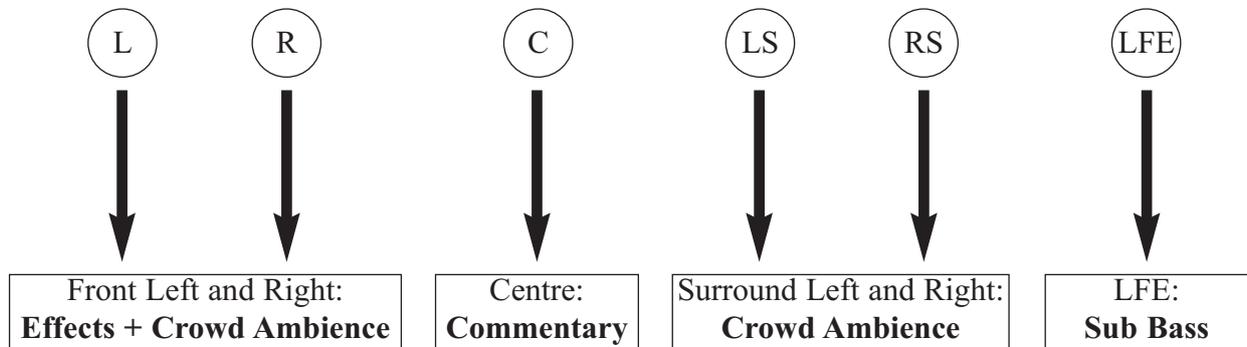
STEREO MIX INPUT made up of:



- **Commentary** - panned centre (phantom centre)
- **Effects** (such as ball kicks and sound effects) - stereo Left/Right
- **Crowd Ambience** - stereo Left/Right.



SURROUND 5.1 OUTPUT with all controls flat:



### Upmix Controls



1. The Front Direct Sound control will allow you to make the **Commentary and Effects** more or less prominent.
2. The Front Ambient Sound control will allow you to make the **Crowd ambience** more or less prominent in the front Left and Right channels.
3. The Rear Ambient Sound control will allow you to make the **Crowd ambience** more or less prominent in the rear surround channels.
4. The Width control will allow you to widen the image of the **Effects** and at its most extreme wrap them round to the rear.
5. The Centre Divergence control will allow you to diverge the **Commentary** ranging from Hard Centre with the control at 0 (**Commentary** in the centre speaker) to phantom centre with the control at  $\infty$  (**Commentary** equally in front Left/Right speakers) or anywhere in between.

## EXAMPLE APPLICATION: STADIUM SPORTS continued

### Suggested Settings



- Add a few dB of Direct Sound to bring forward the **Commentary and Effects** in the front channels.



- Cut a few dB of Front Ambient Sound to lower the level of the **Crowd Ambience** in the front Left and Right channels to give the **Commentary and Effects** more presence.



- Add a few dB of Rear Ambient Sound to boost the **Crowd Ambience** in the rear surround channels to create an enveloping feel.

## CONTROLS

### Input Section



### Word Clock INT/EXT

The UPM-1 can be either internally or externally clocked. The on-board sample rate converters will synchronise the incoming AES-3 streams to either the internal clock or an external word clock when available. The external wordclock input accepts a 48kHz clock signal only.

Without a valid external wordclock present the unit will be clocked internally, in this case the amber INT LED will be illuminated. When a valid 48kHz external clock is present this will be automatically detected and the unit will switch over to the external clock, illuminating the amber EXT LED.

### Locked Status LED

The Locked LED shows the status of the two digital AES-3 inputs. When both inputs are locked and functioning correctly the green LED will be illuminated, when one of the two inputs is unlocked the LED will flash on and off, when neither input is locked the LED will not be illuminated. The digital inputs will accept and lock to any incoming sample rate in the range of 32kHz to 192kHz.

### Gain

This control adjusts the input level of the incoming stereo signal and is variable from full attenuation to a gain of +10dB. Normally this control should be used at or close to its 0dB position. Two 5-segment bargraph level meters are provided to display the levels of the stereo input signals.

### L/R Balance

The L/R Balance trim allows the user to alter the Left/Right balance of the incoming stereo signal. Since the 5.1 output of the UPM-1 is entirely based on the stereo input signal it is important to make sure that the stereo signal image is correctly balanced before upmixing it to 5.1.

### L/R Swap

The L/R Swap button allows the user to swap the Left and Right input signals before upmixing to 5.1. An amber status LED indicates when this mode is selected.

## Upmix Controls



### Upmix/Matrix Decode Select

The UPM-1 has two modes of operation, Upmix and Matrix Decode - the mode of choice can be selected by pressing the Upmix/Matrix Decode select button. A green status LED confirms that Upmix mode is selected and an amber status LED indicates Matrix Decode mode is active.

#### • Upmix Mode

Upmix mode should be selected when processing standard non-matrix encoded stereo material. In Upmix mode the UPM-1 sends only ambient sounds to the rear surround channels. The only exception to this is when the Width control is enabled to the point where a 'wrap around' effect is created by feeding varying degrees of front direct sound to the rear channels.

#### • Matrix Decode Mode

Matrix Decode mode should be selected when processing matrix encoded stereo material (Dolby® Pro Logic® etc). In this mode the UPM-1 will detect any stereo material that has been matrix encoded and any direct sound intended by the encoding process for the rear surround channels will be sent there.

### Direct Sound

The Direct Sound control increases or decreases the level of direct sound by + or - 6dB. In most applications direct sound is only present in the front three channels.

### Front Ambient Sound

The Front Ambient Sound control increases or decreases the level of ambient sound in the front Left and Right channels by + or - 6dB.

### Rear Ambient Sound

The Rear Ambient Sound control increases or decreases the level of ambient sound in the rear Left and Right surround channels by + or - 6dB.

### Width

The Width control enables the Direct Sound in the original stereo image to be made wider - at its most extreme the Direct Sound will be in the rear channels. An 'active' button with status LED is provided for instant A/B comparison.

*Dolby is a registered trademark of Dolby Laboratories.  
Pro Logic is a registered trademark of Dolby Laboratories.*

## Centre Divergence

The Centre Divergence control takes the centre channel and diverges it to front Left and Right by the amount set on the control. When no divergence is set all mono material will appear exclusively in the centre channel (hard centre). When divergence is set to full, all mono material will be sent to the front Left and Right channels equally and the centre channel will be muted (phantom centre). Any other divergence setting will create a mix between hard and phantom centre.

## 5.1 Output Levels



Although in many broadcast situations the UPM-1's 5.1 outputs will be inserted into the digital mixing console and operated on faders the following front panel level controls are provided:

### L/R

The L/R output control simultaneously increases or decreases the level of both the front Left/Right channels by + or - 10dB. A green 'signal present' and red clip LED are provided to display output levels.

### Centre

The Centre output control increases the level of the Centre channel by + or - 10dB. A green 'signal present' and red clip LED are provided to display the output level.

### LFE

The LFE output control increases the level of the LFE channel by + or - 10dB. A green 'signal present' and red clip LED are provided to display the output level.

### LS/RS

The LS/RS output control simultaneously increases the level of both the rear LS/RS channels by + or - 10dB. A green 'signal present' and red clip LED are provided to display output levels.

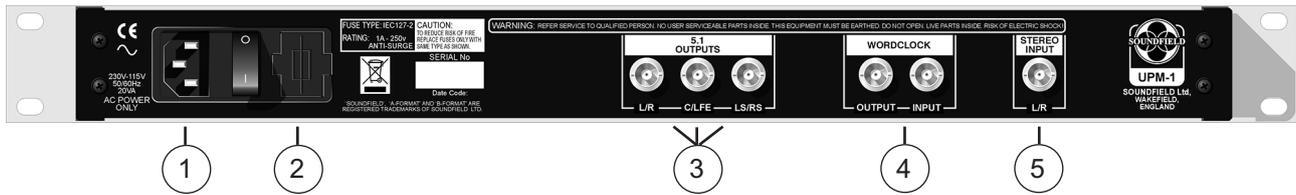
### System Bypass

The system bypass button when enabled switches the output back to the original stereo for direct comparison between the original stereo and the created 5.1.

### USB

A front panel USB connection is provided to accommodate future software updates.

## REAR PANEL



1. **MAINS POWER** - ON/OFF mains power switch / IEC mains power inlet
2. **FUSE HOLDER** - Fuse type IEC127-2 (1A - 250V anti-surge)
3. **DIGITAL 5.1 SURROUND OUTPUTS** - 75Ω Coax (AES3id) - BNC connectors
4. **WORD CLOCK INPUT/OUTPUT** - BNC 75Ω, 48kHz only
5. **DIGITAL STEREO INPUT** - 75Ω Coax (AES3id) - BNC connector

## AUDIO SPECIFICATION

Digital Input	75 $\Omega$ Coax (AES3id)
Supported Input Sample Rates	32kHz - 192kHz
Supported Input Bit Rates	16 & 24 bit
Sample Rate Converter	AD1896 (128dB SNR)

Digital Outputs	75 $\Omega$ Coax (AES3id)
Output Sample Rate	48kHz
Output Bit Rate	24 bit

Bandwidth	20Hz - 24kHz
-----------	--------------

## MAINS REQUIREMENTS

AC Input	100V - 240V AC 50/60Hz
Power Consumption	<20W
Fuse Rating	IEC127-2 (1A - 250V anti-surge)
Case Size	482mm (w) x 44mm (h) x 295mm (d)
Weight	2.5 KGS

## WARRANTY

### Limited Liability

SOUNDFIELD LTD., HEREIN AFTER KNOWN AS THE MANUFACTURER, GUARANTEES THIS EQUIPMENT FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE AND SERVICE FOR A PERIOD OF ONE YEAR. THIS GUARANTEE EXTENDS TO THE ORIGINAL PURCHASER ONLY AND DOES NOT APPLY TO FUSES OR ANY PRODUCT OR PARTS SUBJECTED TO MISUSE, NEGLIGENCE, ACCIDENT OR ABNORMAL CONDITIONS OF OPERATION. THE GUARANTEE BEGINS ON THE DATE OF DELIVERY TO THE ACTUAL PURCHASER OR TO HIS AUTHORISED AGENT OR CARRIER. IN THE EVENT OF FAILURE OF A PRODUCT COVERED BY THIS GUARANTEE, THE MANUFACTURER OR THEIR CERTIFIED REPRESENTATIVES WILL REPAIR AND CALIBRATE EQUIPMENT RETURNED PREPAID TO AN AUTHORISED SERVICE FACILITY WITHIN ONE YEAR OF THE ORIGINAL PURCHASE AND PROVIDED THAT THE GUARANTORS EXAMINATION DISCLOSES TO ITS SATISFACTION THAT THE PRODUCT WAS DEFECTIVE, EQUIPMENT UNDER THIS GUARANTEE WILL BE REPAIRED OR REPLACED WITHOUT CHARGE. ANY FAULT THAT HAS BEEN CAUSED BY MISUSE, NEGLIGENCE, ACCIDENT, ACT OF GOD, WAR OR CIVIL INSURRECTION; ALTERATION OR REPAIR BY UNAUTHORISED PERSONAL; OPERATION FROM AN INCORRECT POWER SOURCE OR ABNORMAL CONDITIONS OF OPERATION, WILL NOT FALL UNDER THIS GUARANTEE. HOWEVER, AN ESTIMATE OF THE COST OF THE REPAIR WORK WILL BE SUBMITTED BEFORE WORK IS STARTED. THE MANUFACTURER SHALL NOT BE RESPONSIBLE FOR ANY LOSS OR DAMAGE, DIRECT OR CONSEQUENTIAL, RESULTING FROM MACHINE FAILURE OR THE INABILITY OF THE PRODUCT TO PERFORM. THE MANUFACTURER SHALL NOT BE RESPONSIBLE FOR ANY DAMAGE OR LOSS DURING SHIPMENT TO AND FROM THE FACTORY OR ITS DESIGNATED SERVICE FACILITY. THIS GUARANTEE IS IN LIEU OF ALL OTHER GUARANTEES, EXPRESSED OR IMPLIED, AND OF ANY OTHER LIABILITIES ON THE MANUFACTURERS PART. THE MANUFACTURER DOES NOT AUTHORISE ANYONE TO MAKE ANY GUARANTEE OR ASSUME ANY LIABILITY NOT STRICTLY IN ACCORDANCE WITH THE ABOVE. THE MANUFACTURER RESERVES THE RIGHT TO MAKE CHANGES OR IMPROVEMENT IN THE DESIGN AND CONSTRUCTION OF THIS UNIT WITHOUT OBLIGATION TO MAKE SUCH CHANGES OR IMPROVEMENTS IN THE PURCHASER'S UNIT. ANY DISPUTE ARISING FROM THIS WARRANTY SHALL BE SUBJECT TO THE LAWS OF ENGLAND.

### What to do if a fault is found

If a fault develops in the unit, notify SoundField Ltd. or their nearest service facility giving full details of the difficulty. On receipt of this information, service or shipping instructions will be forwarded to you. No equipment should be returned under the warranty without prior consent from SoundField Ltd. or their authorised representative.

## **SHIPPING AND QUALITY ASSURANCE**

Authorised returns should be prepaid and must be insured. All SoundField products are packaged in specially designed containers for the best possible protection. If the unit is returned the original container should be used. If this is not possible, a new container can be obtained from SoundField Ltd.; please specify the model number when requesting a new container. If the specially designed container is not used ensure that a suitable rigid container of adequate size is used, wrap the instrument in paper and surround it with a good thickness of shock absorbing material.

### **Claim for damage during transit**

The instrument should be thoroughly inspected immediately upon delivery to the purchaser. If the instrument is damaged in any way a claim should be filed with the carrier immediately. A quotation to repair shipment damage can be obtained from SoundField Ltd or their certified representative. Final claims and negotiations with the carrier must be completed by the customer.

### **Applications problems**

SoundField Ltd. will be happy to answer any applications questions to enhance your use of this equipment. Please address all correspondence to:

SoundField Ltd.  
Charlotte Street Business Centre  
Charlotte Street  
Wakefield  
West Yorkshire  
WF1 1UH  
ENGLAND  
Tel: +44 (0) 1924 201089  
Fax: +44 (0) 1924 290460  
email: [info@soundfield.com](mailto:info@soundfield.com)  
[www.soundfield.com](http://www.soundfield.com)

### **Quality Assurance and Service Policy**

Over the years SoundField products have gained an enviable reputation for their quality of design, performance and reliability, however, in the unlikely event that problems are encountered with this unit, please contact SoundField Service at the appropriate address above or alternatively inform one of our world wide network of distributors who will be able to assist with any of your queries.