



# DSF-2 MKII Broadcast Microphone System

## User Guide

Version 1.0

System comprises:

- DSF-2 MKII 1U Digital Microphone Controller
  - DSF-2 Microphone in Leather Case
  - 20m SoundField Microphone Cable
    - Shockmount
  - Mains Power Cable
  - Owners Manual

## CONTENTS

Safety Information	-	-	-	-	-	-	-	-	-	-	3
Getting Started	-	-	-	-	-	-	-	-	-	-	4-5
Controls	-	-	-	-	-	-	-	-	-	-	6-9
Rycote Assembly Instructions			-	-	-	-	-	-	-	-	10-12
A Practical Guide For Use on 5.1 Outside Broadcasts						-	-	-	-	-	13-15
Interfacing the DSF-2 with the DSF-3 for Live Surround Broadcast								-	-	-	16
Specification	-	-	-	-	-	-	-	-	-	-	17
Warranty	-	-	-	-	-	-	-	-	-	-	18
12 Pin Connector Wiring Details for SoundField Microphone Cables								-	-	-	19

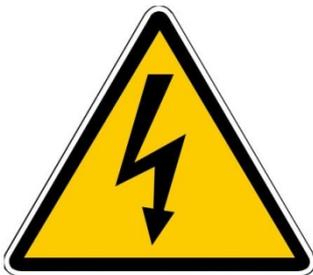
## SAFETY INFORMATION

- 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.

## GETTING STARTED

**WARNING:** The DSF-2 microphone is not compatible with other SoundField Control Units in the product range. SoundField Ltd will not accept any responsibility for damage caused by the interconnection of these units.

**WARNING:** The DSF-2 1U digital controller should be sited in a cool operational environment in a well ventilated rack with 1U free space above the unit.

### BEFORE USE

Before applying mains power to the DSF-2 system, connect the microphone to the controller with the interconnection cable provided. When connecting the microphone, make sure the red dot on the Lemo Female 12 Pin In-Line Connector is aligned with the red dot at the base of the microphone before insertion. To disconnect the cable push the disc forward on the base of the microphone and release the connector.



Push silver disc on microphone base at the 'red dot' position to release connector.

When connecting the microphone cable to the DSF-2 controller, ensure the red dot is facing upwards. To disconnect, pull back on the silver connector grip and release.

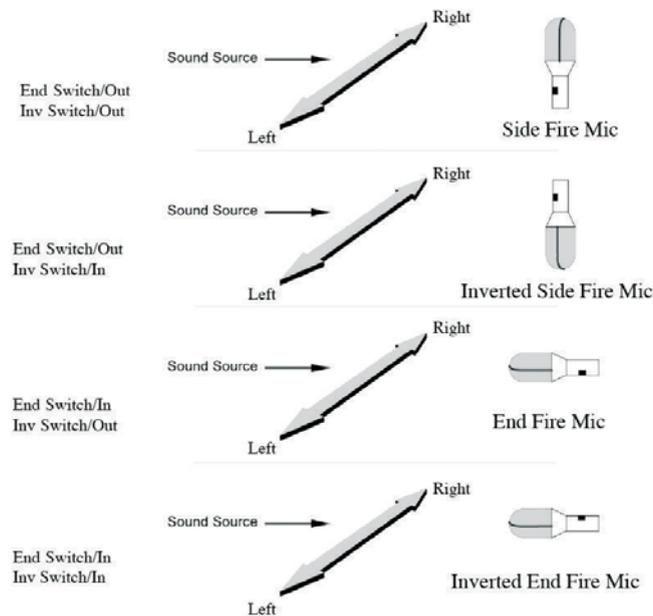
It is essential that the microphone be powered up a few minutes before use to allow the capsule charging process to stabilise. If the microphone has been used recently, the time taken to stabilise may be shorter, but turning the microphone on fifteen minutes or so before it is needed is a good habit to acquire.

In conditions where condensation is likely to be a problem, for example, when bringing the microphone from a cold vehicle to a warm venue, it is advisable to leave the microphone switched on for up to half an hour before use so that the internal heating system can clear the capsules of all condensation.

The DSF-2 system does not require Phantom Power (48V) if it is connected to a mixing console. Please ensure that the Phantom Power on the mixer input channels is turned off.

## MICROPHONE ORIENTATION GUIDE

The illustrations below show the correct status of the End-Fire and Invert switches on the DSF-2 controller relative to the orientation of the microphone.



## KEYS TO PROPER PLACEMENT OF SOUNDFIELD MICROPHONES

Getting the mic in the right place is the first step in making a good recording. With SoundField microphones, it is too easy to be lulled into complacency by the excellent stereo and surround sound pick-up they provide. The temptation is to put it up, turn a few knobs, and go with it. However, with a little more attention to detail this “good” sound will always become even better.

Be sure to set the appropriate Orientation mode (Side Fire  or End Fire ) to tell the DSF-2 processor how the microphone is facing. Then, before ever opening the mic up to stereo, it is important to listen to the microphone as a monophonic pick-up. Set the Pattern control to Omni and the Width control to 0° and listen to the overall sound. Pay particular attention to the balance within the sound source - i.e. the balance among the performers, the relationship of direct-to-reverberant sound, extraneous noises, etc. If it doesn't sound right, move the microphone around until it does. At this point adjust the Pattern control to focus more on the sound source and less on the surrounding environment by utilising the cardioid and figure-of-eight patterns.

Remember that the essence of SoundField microphones is based on the Mid/Side technique, where the Mid microphone provides the basic sonic balance. Therefore, once it sounds good in mono, it always will sound great in stereo; the converse, however, is not necessarily true. Only after you are satisfied with the mono pick-up, should you open-up the microphone into stereo. Set the Pattern control to the polar pick-up you think will be a good starting point and adjust the Width control for your desired stereo image. You can adjust both controls to achieve exactly the right stereo perspective for your recording. Pay particular attention to the direct-to-reverberant sound. Remember that too much reverb makes a recording sound “mushy” and vague. The beauty of SoundField microphone systems is their unequalled clarity and articulation. Don't waste this by including too much extraneous sound - unless, of course, that is what you want to do! Also keep an eye on the level meters to be sure that you are not likely to overload the microphone's electronics.

## CONTROLS

**INPUT PAGE** - provides all parameters relating to mic-pre and the microphone orientation.



### 1. Gain

The Gain of the built-in mic-pre amplifiers is switched in 1dB steps and a total of 50dB of gain can be added.

To change the mic-pre gain press the “Gain” button - this will change the display to show the gain in the middle of the screen – and use the rotary controller to alter the gain.

To return back to the main screen either press the “Gain” button again or wait for the gain screen to automatically time out.

### 2. Limiter

A switchable fixed threshold soft limiter is provided to eliminate the possibility of ‘digital overload’ and any resulting distortion. It is recommended that the limiter is engaged at all times, particularly in wide dynamic range environments such as concert halls or sporting events where sudden crowd applause can create high sound pressure levels.

To enable the limiter press the “Limit” button - this will change the display to show the limit status in the middle of the screen – further presses of the “Limit” button will toggle the status of the limiter between on and off. A red lamp will light up on the display next to the limiter label to indicate limiter activity.

To return back to the main screen either press the “Limiter” button again or wait for the gain screen to automatically time out.

### 3. End Fire

The End Fire mode should be selected when the microphone is horizontally pointed (  ) at the sound source as you would with a flashlight. Selecting End Fire maintains the correct three-dimensional perspective in both surround and stereo when the mic is used in the horizontal position.

If you do not select this mode when the microphone is horizontal it will result in the Front/Back depth information and the Up/Down height information being reversed. This mode is particularly necessary when the microphone is mounted in a Rycote or on a fishpole and pointed directly at the sound source.

To enable End Fire press the “End Fire” button - this will change the display to show the End Fire status in the middle of the screen – further presses of the “End Fire” button will toggle the status of End Fire on and off.

To return back to the main screen either press the “End Fire” button again or wait for the gain screen to automatically time out.

### 4. Invert

The INVERT mode maintains the correct three-dimensional perspective in both surround and stereo when the microphone is suspended upside down above the sound source (  ). Not selecting this mode with the mic suspended will result in the Left/Right width information and Up/Down height information being reversed. It is important to document the status of the Invert switch when making B-Format recordings for later post production.

To enable Invert press the “Invert” button - this will change the display to show the Invert status in the middle of the screen – further presses of the “Invert” button will toggle the status of Invert on and off.

To return back to the main screen either press the “Invert” button again or wait for the gain screen to automatically time out.

### 5. High Pass Filter

The variable High-Pass filter – second order Butterworth – will filter the incoming microphone signals and will affect all output signals. Enabling the High-Pass filter is ideal for removing unwanted low frequency rumble such as wind noise, etc.

To enable the High Pass Filter press the “High Pass Filter” button - this will change the display to show the High Pass Filter status in the middle of the screen – further presses of the “High Pass Filter” button will toggle the status of Invert on and off and the rotary controller will alter the cut-off frequency.

To return back to the main screen either press the “High Pass Filter” button again or wait for the gain screen to automatically time out.

**STEREO CONTROL SCREEN** - the controls in the Stereo Section have no effect on the four B-Format output signals.



### 1. Width

This control varies the stereo image from zero degrees (mono) through 90 degrees (standard stereo coincident pair) to an extra wide stereo 180 degrees. The effect of the Angle control can be viewed on the screen.

To change the Width press the “Width” button and use the rotary controller to alter the gain.

### 2. Polar Pattern

The Polar Pattern control is continuously variable ranging from Omni through Sub-Cardioid, Cardioid, Hyper-Cardioid to Figure-of-eight and sets the polar patterns used for the stereo pair.

To change the Pattern press the “Pattern” button and use the rotary controller to alter the gain.

### 3. Mid/Side

The Mid/Side control switches the stereo outputs from L/R to M/S. When the Mid/Side button is enabled the stereo outputs will be M/S encoded. The Left output channel provides the Mid signal and the Right output channel provides the Side signal.

To enable the Mid/Side mode press the “Mid/Side” button, further presses will toggle the Mid/Side on and off. The Mid polar pattern can be altered by using the polar patter control as described above.

## REAR PANEL



1. MAINS POWER - IEC mains power inlet.
2. ETHERNET PORT - for future functionality
2. DIGITAL OUTPUT SECTION - the DSF-2 outputs digital stereo and B-Format simultaneously on 75 ohm AES 3-id via BNC connectors. The digital audio signals can be sent down up to one kilometer of coaxial cable (subject to correct cable specification) without loss of quality.
3. WORD CLOCK INPUT AND OUTPUT – 75Ohm wordclock I/O on BNC
4. STEREO OUTPUT - Left/Right stereo analogue balanced line outputs on XLR connectors. (Pin 1 = ground, Pin 2 = + (positive) and Pin3 = - (negative).
5. MIC INPUT - Lemo 12 pin female panel mount connector. The DSF-2 system will drive up to 250m of SoundField mic cable with no loss of quality or signal level.

## RYCOTE ASSEMBLY INSTRUCTIONS



- 1 DSF-2 Microphone and Rycote kit in flightcase.



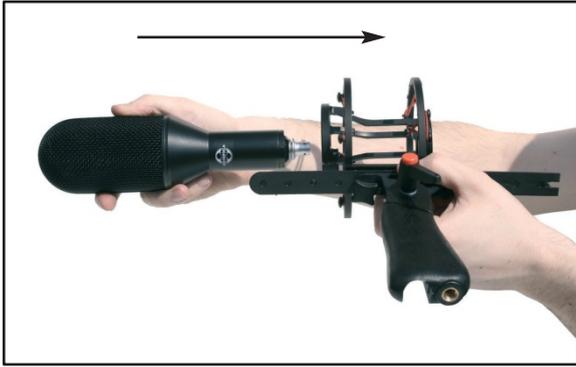
- 2 Remove end of Windshield by turning in an anti-clockwise direction.



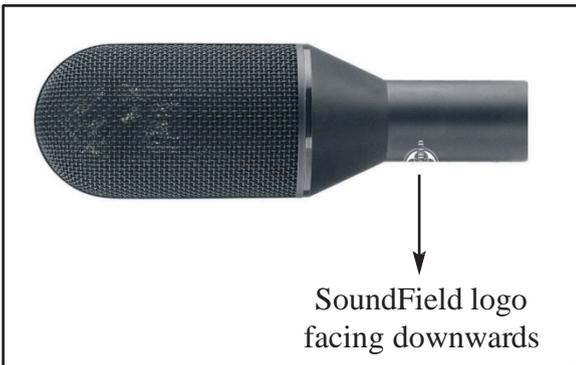
- 3 Loosen the two black plastic bolts situated on the Pistol Grip under the Windshield.



- 4 Remove Windshield by gently sliding away from the Pistol Grip.



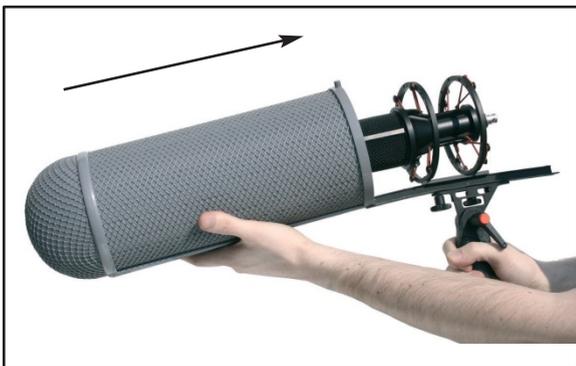
- 5) Insert microphone into the inner cradle.



- 6) IMPORTANT: WHEN THE MIC IS RIGGED IN ITS FINAL POSITION IN THE STADIUM FOR END-FIRE USE, THE SOUNDFIELD LOGO ON THE MIC BODY MUST BE FACING DOWNWARDS.



- 7) When microphone is fully inserted, tighten the two Allen bolts with the Allen key provided. Make sure the microphone is securely mounted in its inner cradle.



- 8) Partly replace Rycote Windshield over the DSF-2 microphone.



- 9 Connect microphone cable ensuring that the red dot on both the microphone and cable connector are lined up.



- 10 Insert the microphone cable into the groove provided on the underside of the Windshield before replacing end of Windshield. Ensure the Windshield end is securely located in its original position.



- 11 Insert Windshield into the Rycote Windjammer.



- 12 When the Windjammer completely covers the Windshield, secure its position by tightening the pull-strings and place excess string inside Windjammer.

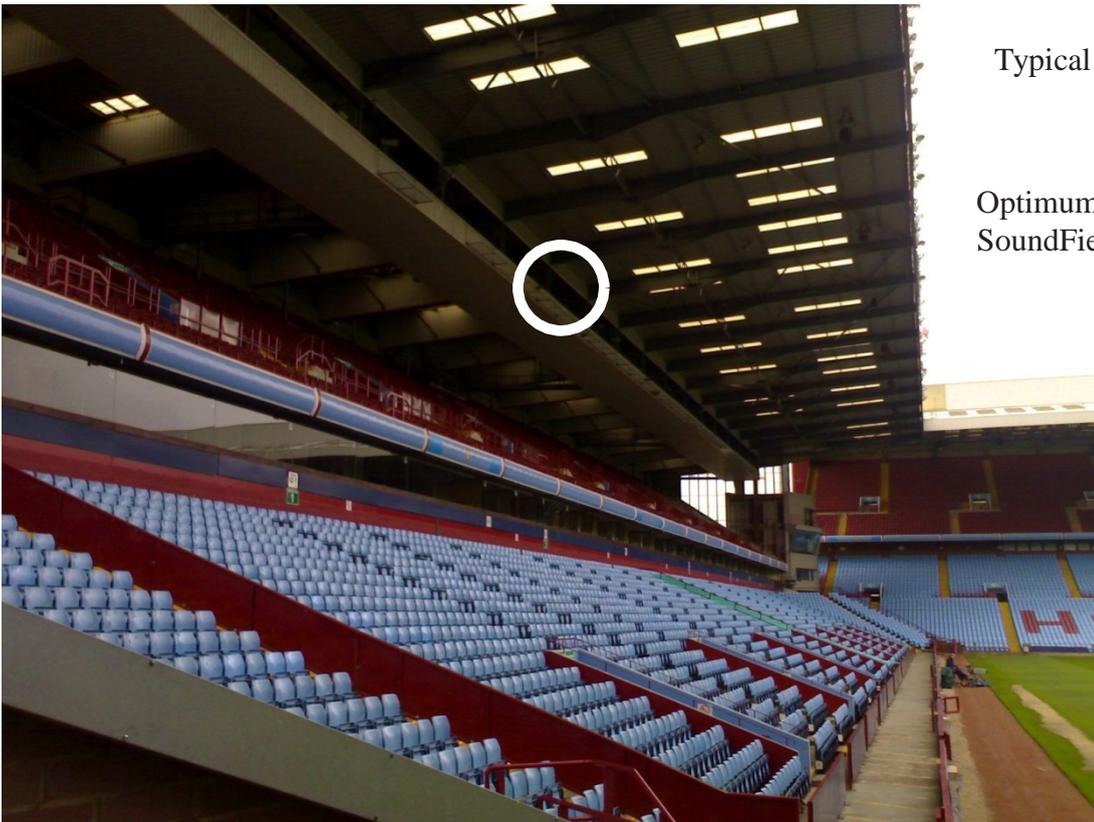
## A PRACTICAL GUIDE FOR USE ON 5.1 OUTSIDE BROADCASTS

by Robert Edwards, VSS Ltd.

Only now have the true benefits of SoundField microphones become apparent to the sound mixers in the live television community who are now being asked to deliver 5.1 audio and more, to accompany live High Definition Broadcasts. Many such HDTV Broadcasts are for sporting events where there is no rehearsal and a limited amount of set-up time.

Where should the microphone go in the stadium? The microphone is simplicity itself to rig and is very tolerant of positioning. It has been said that as long as the microphone is in the same stadium as the event, the ambience captured will be very enjoyable! However, there are some basic rules that should be followed...

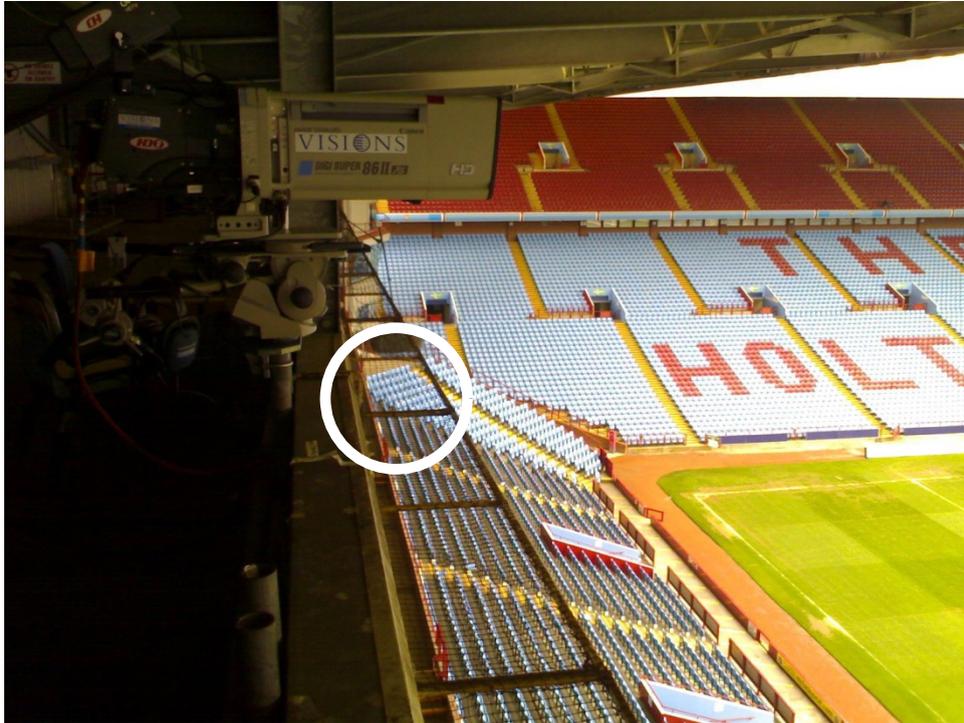
The microphone must be placed at least five metres from any individual crowd members, and in such a position so as not to be physically disturbed. Individual claps or voices that are too close to the microphone will result in making the rest of the ambience difficult to control. The microphone must be securely mounted, generally clamped to a stadium structure, protected from the elements (direct wind and rain) with suitable wind and rumble isolation. Generally, the higher and more centrally-placed above the main crowd or audience, the better the overall sound experience will be.



Typical Crowd Stand

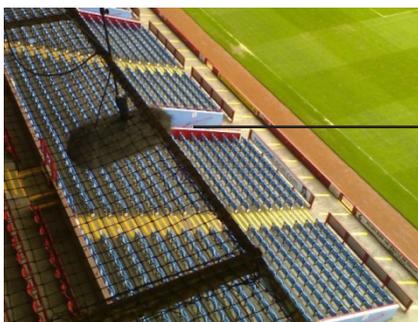
Optimum position for  
SoundField Microphone

The main wide-shot camera position for any event should be used as the reference position for the SoundField, although this camera position may sometimes not be placed where the main crowd reactions occur. If the microphone has good free space around it, then the aural image will be impressive.



SoundField Microphone position near Main Camera Platform

The microphone itself is housed in a Rycote-type windshield. The body of the microphone lays flat in the mounting clips with the SoundField badge on the microphone downwards. The multi-pin connector is mated with the microphone and sealed inside the Rycote basket. The microphone, inside this windshield is then pointed at the main on-field action. In this position the microphone is said to be in “End-fire” mode, and the “End-fire” switch on the Control Unit should be selected. If the microphone is rigged so that the SoundField badge is upward, then the “Invert” switch must be selected. The multi-pin cable is connected from the microphone to the Control Unit. This outputs four channels of SoundField “B-Format” signals which are algebraic vectors W, X, Y and Z that are derived from the capsules. The Control Unit is where the gain and orientation of the microphone is adjusted. The SoundField microphone has a small heating element inside the body, which keeps the capsules warm and dry. It is therefore essential that the microphone is powered-up well before use when conditions are humid.



Close-up of optimum position of SoundField Microphone in full Rycote kit



SoundField Microphone before Rycote Windshield and Windjammer are fitted

The SoundField has a very low noise-floor and can cope with a wide dynamic range. This is good, since the crowd reactions of sporting events also tend to have a wide dynamic range. The gain is best set while the stadium is performing tests on the PA system for safety announcements, as these are generally very loud and offer a guide to the high SPL achieved in the stadium.

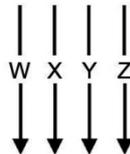


SoundField DSF-2 Microphone in Rycote as seen from Crowd Stand

## INTERFACING THE DSF-2 WITH THE DSF-3 DIGITAL SURROUND PROCESSOR FOR LIVE SURROUND BROADCAST



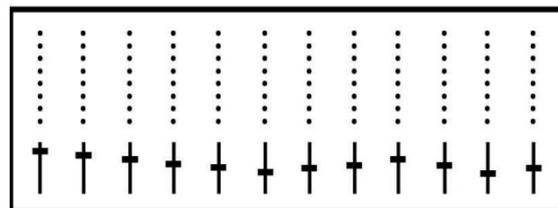
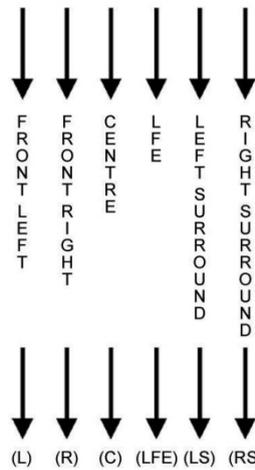
DSF-2 Digital B-Format Outputs



DSF-3 Digital B-Format Inputs



DSF-3 Digital 5.1 Outputs



Surround Mixing Console

In this configuration the DSF-2/DSF-3 combination will deliver six discrete channels of digital 5.1 surround sound. It is a very quick and effective way to record surround. After some practice and once you know how to get the best from your system, it will yield consistent results. Although not vital, it is a big advantage to be able to monitor in full surround when choosing your mic position. If monitoring in full surround is not possible during set-up, engaging the Rotate control at 180° with the Pattern control set to Cardioid and the Angle control set to 90° will provide a representation of the rear sound field (Surround Left, Surround Right).

NOTE: Any use of the DSF-2's Rotate control during a live broadcast or recording will be embedded in the 5.1 audio.

If post-production capability is required at a later date for the audio material it is essential to record the four B-Format signals. A live stereo feed is provided by the DSF-2 or the DSF-3 will provide a stereo feed in post-production.

## SPECIFICATION

### Audio Specification - Control Unit

Analogue Inputs: maximum input level 24dBu Analogue  
Limiter: when enabled threshold set to 22dBu Analogue  
Bandwidth: 10Hz – 20KHz +/- 0.1dB  
Analogue to Digital Converter: 2 x CS5381  
Supported Sample rates: 48K

### Audio Specification - Microphone

Frequency Response: 20H to20KHz, +/-3dB  
Capsule Sensitivity: 13mV/Pa  
Signal to Noise Ratio DIN/IEC: 81dB  
Equivalent Noise DIN/IEC: 13dB  
Maximum SPL: 145dB

### Word Clock I/O Specification

Word Clock input: 75Ohm BNC, 200mVpk-pk minimum input level  
Word Clock output: 75Ohm BNC, 4.5Vpk-pk into 75Ohm load

### Mains Requirements

AC Input: 95VAC or 245VAC 50/60Hz auto ranging

Power Consumption: ~20W

### Dimensions - Control Unit

Case Size: 482mm (w) x 44mm (h) x 259mm (d)

### Dimensions - Microphone

Microphone Size – 69mm (width at widest point) x 240mm (length without connector)  
Weight: 500g

All specifications are subject to change without notice.

## 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, neglect, 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, neglect, 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 or you need support

In the unlikely event that a fault develops with your product, please contact support as follows:

By email using [service@soundfield.com](mailto:service@soundfield.com)

### Claim for damage during transit

All products should be thoroughly inspected immediately upon delivery. If there is any damage to the product a claim should be filed with the carrier immediately. A quotation to repair shipment damage can be obtained from SoundField Ltd. Final claims and negotiations with the carrier are the responsibility of the customer.

### Repair process and how to return your goods

In the first instance you should contact support using the contact details above. In the event that your product needs to be returned, a unique return number will be provided which should be used for all further correspondence.

Repairs and returned goods are subject to the following conditions:

- No equipment should be returned without the prior consent of SoundField.
- Shipping/Insurance costs for returned items are the responsibility of the customer.
- All returned goods must be suitably packaged to avoid damage and preferably in the original purpose built SoundField packaging. If this is not possible, packaging may be available from SoundField.
- In the event of transit damage, you will be advised immediately and the repair of the unit may be subject to additional costs which will be quoted before repair work commences.
- Warranty repairs will be returned free of charge (subject to the limited liability terms detailed elsewhere in this document)
- Non - warranty repairs will be inspected and an estimated cost provided before work starts.
- If after initial inspection we find the product is beyond economic repair (BER) you will be notified and charged for inspection only.
- Non-warranty repairs will be subject to additional return shipping costs.

### Application support or help

SoundField Ltd will be happy to answer any applications questions to enhance your use of this equipment. Please contact support using the details provided above.

## 12 PIN CONNECTOR WIRING DETAILS FOR MICROPHONE CABLES

### 12 Pin Male

### 12 Pin Female

Pin 1	-	LB (+)	-	Pin 1
Pin 2	-	LB (-)	-	Pin 2
Pin 3	-	RB (+)	-	Pin 3
Pin 4	-	RB (-)	-	Pin 4
Pin 5	-	RF (+)	-	Pin 5
Pin 6	-	RF (-)	-	Pin 6
Pin 7	-	LF (+)	-	Pin 7
Pin 8	-	LF (-)	-	Pin 8
Pin 9	-	Voltage GND	-	Pin 9
Pin 10	-	-V	-	Pin 10
Pin 11	-	+V	-	Pin 11
Pin 12	-	Signal GND	-	Pin 12

### SOUNDFIELD COLOUR CODING

Pin 1	-	White
Pin 2	-	Purple
Pin 3	-	Grey
Pin 4	-	Pink
Pin 5	-	Green
Pin 6	-	Yellow
Pin 7	-	Red
Pin 8	-	Blue
Pin 9	-	Black
Pin 10	-	Brown
Pin 11	-	Orange
Pin 12	-	Screen (plus link to connector chassis)

Important Note: Use colour coding as above as some wires have a different number of strands.