

FR-DSS Flexrack Dual Silence Sensor Module

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1. Introduction

The FR-DSS module is a stereo/dual mono audio silence sensor for continuous monitoring of important or remote audio signals, capable of raising alarms directly or via a remote telemetry system and performing emergency signal changeover. False triggering is almost completely eliminated through the use of bandpass filters followed by separate dynamic range and static level detectors to discern between genuine valid audio and fault conditions such as white noise or 50/60Hz hum on a line.

Detector thresholds, the time delay before an alarm is raised and the period of valid audio required before alarms are cleared are all user adjustable. Instantaneous audio status and timeout alarms are available as floating transistors as well as front panel LEDs, and an additional multipole relay can be used for audio changeover or further alarm signalling.

Up to four function modules, which may be FR-DSSs, or others, can be accommodated in 1U in the Flexrack FR-RK1 chassis.

2. Compliance

Please read all of this manual and familiarise yourself with the module and its connections before attempting to use it. To ensure satisfactory operation it is the responsibility of the user to install and operate this equipment correctly and in accordance with the manufacturer's specifications. ProAVM accept no responsibility for damage caused to the FR-DSS, or to user equipment, through incorrect installation or usage of the module.

Do not expose this module to rain or any other sources of water.

Unauthorised adjustment, modification or repair of this equipment may invalidate any warranty and/or safety approvals that apply. In case of query please contact your local distributor, or ProAVM.

3. Unpacking

Unless the FR-DSS module has been supplied as part of a pre-configured system, this package should contain (in addition to this manual):

- 1x FR-DSS module
- 4x module fixing screws (non-countersunk)
- 4x panel fixing screws (countersunk)
- 1x power supply ribbon cable

If any items are missing or damaged please inform your supplier immediately.

4. General Theory of Operation

The FR-DSS module contains two entirely independent silence sensors. In each one, incoming audio is first filtered to reject inaudible frequencies and strong hum signals, then fed to separate static level and dynamic range detectors. The static level detector looks at the average signal level, whereas the dynamic range detector picks up short-term deviations from this average level. A speech or music signal will have both static level and dynamic range, whereas the majority of fault signals such as hum or broadband noise will possess static level but very little dynamic range. True silence, of course, has neither static level nor dynamic range! The outputs of both detectors are visible on front panel LEDs.

The outputs of the two detectors may be combined in several ways. One, either or both of the signal properties can be made necessary for the audio to be deemed valid (see below). Threshold levels for both detectors can be independently adjusted. Due to the huge variety of programme material and levels of processing applied to it, there is no single setup that will suit all applications so it is worth taking a little time to tailor the unit's response to the expected material. In general, requiring both static level AND dynamic range to be present for validity will detect the greatest proportion of fault conditions but is most intolerant of unusually quiet periods in the normal material.

The combined detector outputs form the instantaneous AUDIO STATUS signal, and this is available as an output for each channel. It is also applied to a digital timer which has user-programmable TIMEOUT and RECOVERY times. If no valid audio is detected for the TIMEOUT period, the TIMEOUT output changes state. Once this has happened, continuous valid audio has to return for the RECOVERY period before the TIMEOUT alarm is cancelled. An uncommitted DPCO relay changes over at the same time as the TIMEOUT output, and may be used for audio changeover or for extra logic signals.

The front panel TIMEOUT LEDs stay green as long as there is valid audio present. When it is not, they are extinguished, and if audio does not return they will light red when the TIMEOUT period has expired.

When using the FR-DSS with a stereo input signal, there is the choice of monitoring left and right channels separately, with independent status outputs, or linking the two channels such that a fault on one causes a fault to be flagged on the other (and for both relays to change over). This is accomplished with the MODE switch (see below) and gives flexibility in either "filling" a missing stereo channel or changing over to a completely separate stereo source.

5. Connections and Indicators

AUDIO input connector (9 way female D-type)

Pin:	Function:
1	left/A audio input +/-hot
6	left/A audio input screen
2	left/A audio input -/cold
7	right/B audio input +/-hot
3	right/B audio input screen
8	right/B audio input -/cold
4	NC
9	NC
5	NC

Front Panel Indicators

STATIC and DYNAMIC indicators (one each per channel)

These LEDs show the instantaneous outputs of the static level and dynamic range comparators. They illuminate green when the level/range exceeds the set threshold.

TIMEOUT indicators (one per channel)

These bi-colour LEDs show the overall audio status of each channel. They illuminate green in the presence of valid audio according to the current definition (see MODE). When no valid audio is present, the indicator will be extinguished either until valid audio returns or until the programmed TIMEOUT delay expires, in which case the indicator is illuminated red.

Connections

Audio Inputs

The audio inputs are electronically balanced and floating, with an input impedance of 100Kohms. They may be unbalanced without affecting level by tying the cold leg to the corresponding screen pin. To achieve specified performance, leads should be of quality screened cable.

AUDIO STATUS (one per channel)

These outputs carry the instantaneous audio status of each channel, i.e. whether valid audio is currently present. (The definition of valid audio is determined by the setting of the MODE switch). They take the form of floating opto-transistors, rated at 30V and 5mA, which conduct continuously while valid audio is present. Externally connecting the appropriate -/emitter terminal to ground creates a conventional "open-collector" output.

TIMEOUT (one per channel)

These outputs indicate when no valid audio has been detected for the programmed TIMEOUT period. They take the form of floating optotransistors, rated at 30V and 5mA, which conduct continuously under normal conditions but stop conducting after audio has failed for the programmed time. Externally connecting the appropriate -/emitter terminal to ground creates a conventional "open-collector" output.

Relay Outputs

Each channel is provided with a double pole changeover relay. All relay contacts are brought out to the INTERFACE connector, and may be used for audio changeover purposes or for generating additional logic signals. The relay is energised when audio has failed for the programmed time, i.e. at the same time as the TIMEOUT optotransistor stops conducting. Hence, if the relay is used for audio changeover and there is a power failure, the first choice audio source will remain selected.

Force TIMEOUT

This input is asserted by pulling the pin to ground (driving equipment must sink 0.5mA and block 5Vdc). When asserted, both channels are forced into TIMEOUT mode regardless of the true audio status. Apart from this, all other indicators and outputs behave as normal.

Force No TIMEOUT

This input is asserted by pulling the pin to ground (driving equipment must sink 0.5mA and block 5Vdc). When asserted, both channels are prevented from entering TIMEOUT mode regardless of the true audio status. Apart from this, all other indicators and outputs behave as normal. Force No TIMEOUT has priority over Force TIMEOUT.

Setting Up

TIMEOUT

This 16-position front panel control sets the time delay between the loss of valid audio and the TIMEOUT output changing state. Selected delay

INTERFACE connector (25 way male D-type)

Pin:	Function:
1	left/A channel C/O relay NC1
14	left/A channel C/O relay COM1
2	left/A channel C/O relay NO1
15	left/A channel C/O relay NC2
3	left/A channel C/O relay COM2
16	left/A channel C/O relay NO2
4	right/B channel C/O relay NC1
17	right/B channel C/O relay COM1
5	right/B channel C/O relay NO1
18	right/B channel C/O relay NC2
6	right/B channel C/O relay COM2
19	right/B channel C/O relay NO2
7	Force TIMEOUT input (pull to Ground to assert)
20	Force No TIMEOUT input (pull to Ground to assert)
8	Left/A channel TIMEOUT output -/emitter
21	Left/A channel TIMEOUT output +/collector
9	Left/A channel AUDIO STATUS output -/emitter
22	Left/A channel AUDIO STATUS output +/collector
10	Right/B channel TIMEOUT output -/emitter
23	Right/B channel TIMEOUT output +/collector
11	Right/B channel AUDIO STATUS output -/emitter
24	Right/B channel AUDIO STATUS output +/collector
12	Ground
25	+5V (with 47 ohm series resistor - max loading 20mA)
13	Ground

time equals the switch position multiplied by 15 seconds (with A to F representing the numbers 10 to 15), i.e. the range is 15-225 seconds. Selection of switch position 0 is equivalent to assertion of the Force TIMEOUT input - TIMEOUT will be indicated on both channels regardless of the true audio status.

RECOVERY Time

This 16-position front panel control sets the time delay between the return of valid audio and deactivation of the TIMEOUT output. Delay time equals switch position multiplied by 1 second (with A to F representing the numbers 10 to 15), i.e. range is 1-15 seconds. Selection of switch position 0 is equivalent to assertion of the Force No TIMEOUT input - TIMEOUT will not be indicated on either channel regardless of the true audio status.

MODE

This front panel control sets the combination of static level and dynamic range used to define valid audio, and how TIMEOUT of one channel affects the other. Mode should be chosen according to the type of material to be monitored and whether it is desired to link the two channels.

- Mode 0: Audio deemed valid if either static level OR dynamic range present. TIMEOUT of one channel does not affect the other.
- Mode 1: Audio deemed valid if both static level AND dynamic range present. TIMEOUT of one channel does not affect the other.
- Mode 2: Audio deemed valid if static level present. Dynamic range ignored. TIMEOUT of one channel does not affect the other.
- Mode 3: Audio deemed valid if either static level OR dynamic range present. TIMEOUT of one channel forces TIMEOUT of the other.
- Mode 4: Audio deemed valid if both static level AND dynamic range present. TIMEOUT of one channel forces TIMEOUT of the other.
- Mode 5: Audio deemed valid if static level present. Dynamic range ignored. TIMEOUT of one channel forces TIMEOUT of the other.
- Modes 6-9, A-F: Reserved

Static Threshold

This multiturn control sets the reference level for the static level comparators and has an adjustment range of -30 to -6dBu for continuous 1kHz tone. To set, apply continuous tone at desired failure threshold level and adjust the control (clockwise to increase threshold) until the STATIC LEVEL LEDs just illuminate.

Dynamic Threshold

This multiturn control sets the reference level for the dynamic range comparators and has an adjustment range of 1.5 to 14dB dynamic range at 1kHz. The required setting depends heavily on programme material and how it has been processed. To set, apply typical programme material and adjust the control (clockwise to increase threshold) until the DYNAMIC RANGE LEDs flicker strongly.

6. Specifications

Inputs	Electronically balanced
Input impedance	100k ohms
Bandpass filters	-3dB at approx. 500Hz and 5kHz
Filter slope	18dB/octave (highpass), 12dB/octave (lowpass)
Static level threshold range	-30dB to -6dB
Dynamic range threshold range	1.5 to 15dB
TIMEOUT delay range	15 to 225 seconds
RECOVERY delay range	1 to 15 seconds
TIMEOUT and AUDIO STATUS outputs	Floating opto-transistor, max. ratings 30V 5mA
Relay outputs	1 x DPCO relay per channel, max. ratings 30V 300mA
Force inputs	Driving circuit must sink 0.5mA/block 5V
Power supply	Supplied by Flexrack chassis, FR-RK1 <6VA total
Size	210 x 88 x 44mm

7. How to Contact ProAVM

For all enquiries write to:-

ProAVM
61 Station Road
Irthlingborough
Northants
NN9 5QE
United Kingdom

Or telephone 01933 650 700 within the UK, +44 1933 650 700 from outside the UK.

Or fax 01933 650 726 within the UK, +44 1933 650 726 from outside the UK.

Or email sales@proavm.com for sales enquiries or technical.support@proavm.com for technical support.

Alternatively visit our web site: <http://www.proavm.com>

8. Declaration of Conformity

Name of Manufacturer: ProAVM
Address of Manufacturer: 61 Station Road
Irthlingborough
Northants
NN9 5QE

Product: FR-DSS Flexrack Dual Silence Sensor Module

Declaration: The product described above complies with the requirements of the Low Voltage Directive (73/23/EEC) and the protection requirements of the EMC Directive (89/336/EEC) issued by the Commission of the European Community.

Compliance with these directives implies conformity to the following European Standards:

EN 60065:1993	Safety requirements for mains operated electronic and related apparatus for household and similar general use
EN 55103-1:1997	Electromagnetic compatibility - Product family standard for audio, video, audiovisual and entertainment lighting control apparatus for professional use (emissions - environmental categories E1 to E5)
EN 55103-2:1997	Electromagnetic compatibility - Product family standard for audio, video, audiovisual and entertainment lighting control apparatus for professional use (immunity - environmental categories E1 to E5)

9. Warranty

This product is shipped with a 5 year return to base warranty. Please return the product to the company that you bought it from.

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