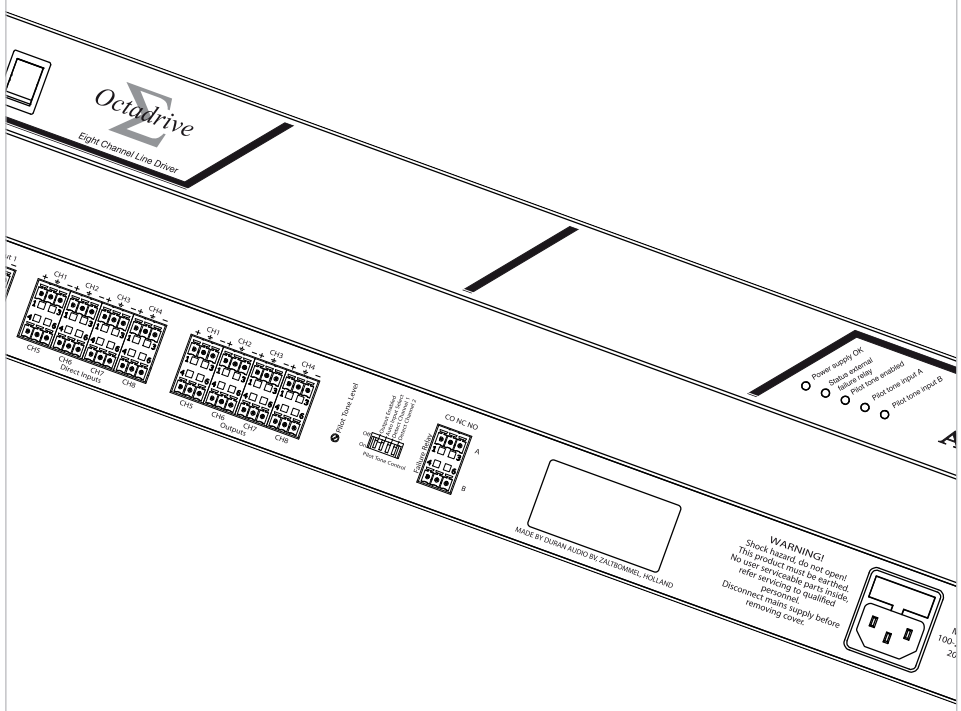
Installation and User Manual

AXYS® Octadrive



AXYS®

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This document confirms that products manufactured by Duran Audio bearing the CE label meet all the requirements in the EMC directive 2004/108/EC and LV directive 2006/95/EC laid down by the Member States Council for adjustment of legal requirements. Furthermore the products comply with the rules and regulations from 30 August 1995 referring to the electromagnetic compatibility of devices. Duran Audio products bearing the CE label comply with the following harmonised or national standards:

EMC:
EN 55103-1 :1996
EN 55103-2 :1996

Safety:
IEC 60065 :2002

Mains Harmonics:
EN 61000-3-2 :2001

Insulation:
Class1

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Zaltbommel, Jan 2010.

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1. IMPORTANT SAFETY INSTRUCTIONS

This symbol is intended to alert you to the presence of uninsulated dangerous voltages within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock.

This symbol is used throughout this manual and is intended to alert you to the presence of important instructions.

1) Read these instructions.

2) Keep these instructions.

3) Heed all warnings.

4) Follow all instructions.

5) Do not use this apparatus near water.

6) Clean only with dry cloth.

7) Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.

8) Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9) Do not defeat the safety purpose of the polarised or grounding-type plug. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10) Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11) Only use attachments/accessories specified by the manufacturer.

12) Unplug this apparatus during lightning storms or when unused for long periods of time.

13) Refer servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Warning -To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture and objects filled with liquids, such as vases, should not be placed on this apparatus.

Warning - To disconnect this apparatus from the mains power supply, turn off the power at the switch labelled Circuit Breaker on the front panel of the amplifier and remove the connector from the mains input socket labelled Mains on the rear panel.

2. INTRODUCTION

Thank you for purchasing this AXYS® Octadrive unit.

In order to get the best out of your Octadrive, please take the time to read through this manual before you install and use it for the first time.

OVERVIEW

The AXYS® Octadrive is essentially a special-purpose two input, eight output audio distribution amplifier. It has been specifically designed as a line driver, to allow high quality analogue audio to be sent over long cable runs. It incorporates a number of fail-safe features, making it very reliable and suitable for use in critical life-safety situations. As well as fixed installations, it has applications in broadcast (particularly OB) and live sound, where it is especially suited for driving stage-located amplifiers from the FOH mix position in large venues.

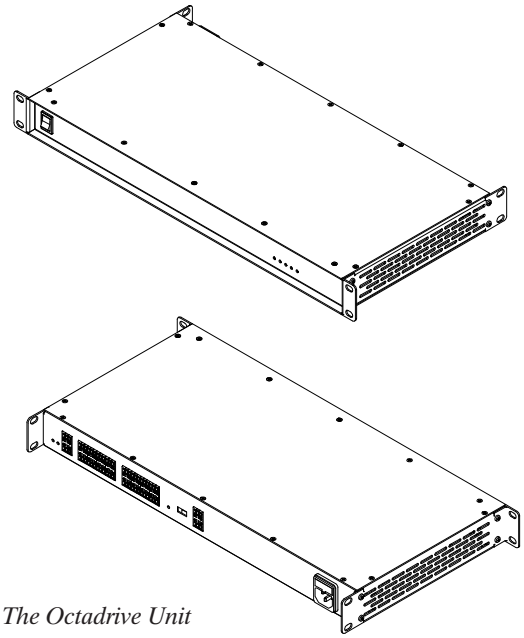
FEATURES

- Eight independent, low impedance transformer-balanced outputs
- Two transformer-balanced main inputs
- Eight additional direct inputs (impedance balanced), one per output
- +20 dBV headroom drive capability @ 0 dBV nominal
- Input pilot tone detection
- Internal pilot tone generator, routed to outputs
- Surveillance/failure relay
- Fail-safe hardware bypass function
- Universal power supply (100-240 VAC)

WHAT'S IN THE PACKAGING

In addition to the Octadrive itself, each unit is shipped with the following items:

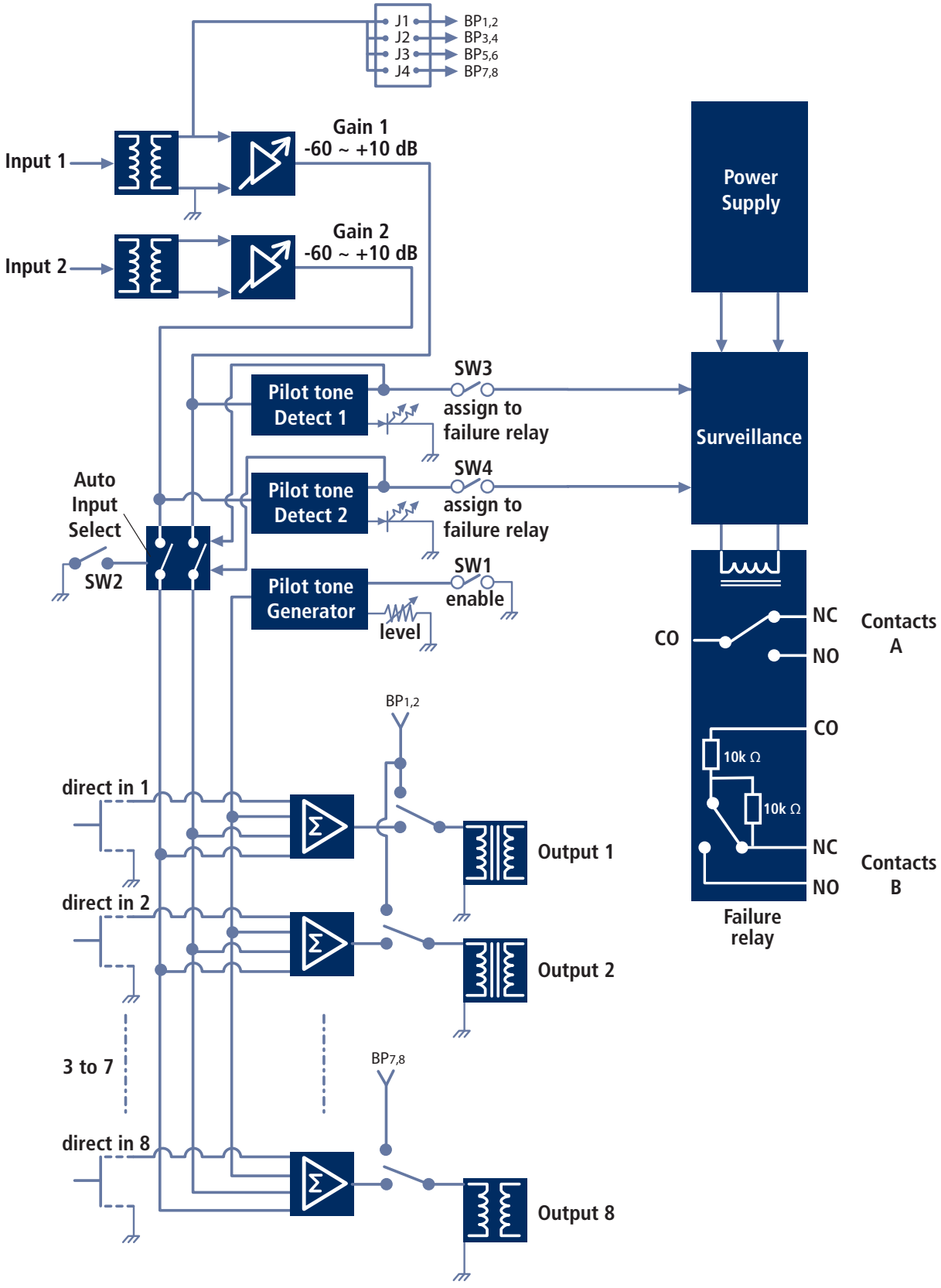
- Installation and User Manual (this document)
- AC power cable (2 m), fitted with an IEC connector and a European-style mains plug
- 20 x 3-pin 3.5 mm-pitch screw terminal connectors



The Octadrive Unit

3. GENERAL DESCRIPTION

BLOCK DIAGRAM



SYSTEM DESCRIPTION

The block diagram on the previous page shows the unit's internal signal routing. Only outputs 1, 2 and 8 are shown; the others (3 to 7) are identical.

The unit has two main inputs, making it suitable for connection to primary and secondary audio sources in life-safety applications. The inputs are transformer-balanced and offer low noise and very high CMRR (Common-Mode Rejection Ratio). The input stage gain is user-adjustable over a range of 70 dB.

The eight outputs are also transformer-balanced, and have very low output impedance enabling high-capacitance loads (i.e. long cables) to be driven without perceptible signal degradation of any kind.

Both inputs are routed internally to the eight outputs. As well as the main inputs, eight direct inputs are provided, each routing only to the same-numbered output. Each input is also fed to a pilot tone detector so that continuous monitoring of the input connections may be made. The detector will, if enabled, switch from Input 1 to Input 2 if pilot tone on Input 1 is lost*.

The audio transformers fitted to the main inputs and all outputs are of professional grade and provide full galvanic isolation from source and destination equipment, eliminating the potential for ground loops to occur between items of equipment which may be running on very different AC supplies. The internal signal path accepts a signal level of +20 dBV throughout and the amplifier design has very low distortion and noise performance.

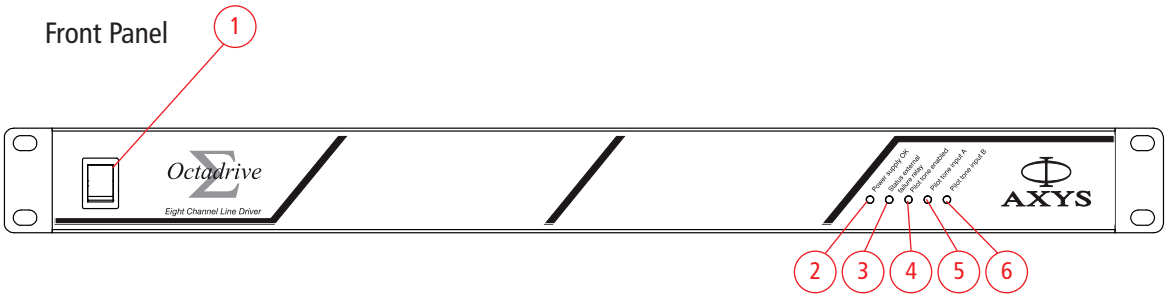
The Octadrive incorporates a surveillance function which activates externally-accessible failure relays in the event of a PSU malfunction or a loss of pilot tone at either of the main inputs.

The Octadrive also includes a low noise pilot tone generator, which routes to all outputs. The level is user-adjustable.

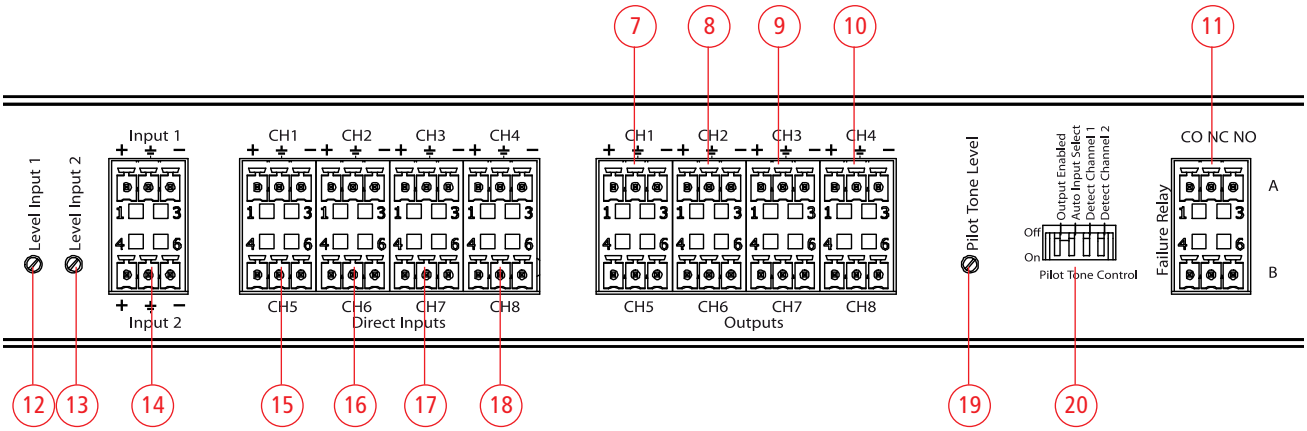
The power supply is conservatively-rated and operates on any AC supply voltage from 100 V to 240 V.

**This feature may not be available on Octadrive units with early serial numbers. Please contact your AXYS® dealer for more information.*

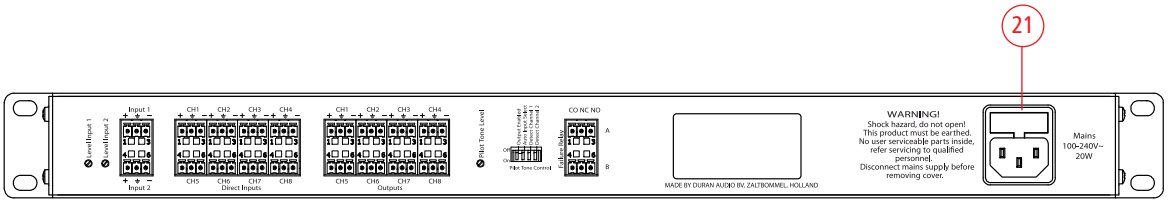
Front Panel



Detailed view of rear Input / Output panel



Rear Panel



1 Power switch with internal neon indicator (red)
2 Power supply LED (green)
3 Failure status LED (bi-colour, green/red)
4 Pilot tone generator LED (green)
5 Input A pilot tone LED (yellow)
6 Input B pilot tone LED (yellow)
7 Outputs 1 & 5
8 Outputs 2 & 6
9 Outputs 3 & 7
10 Outputs 4 & 8
11 Failure relay connectors
12 Input 1 level adjustment
13 Input 2 level adjustment
14 Main inputs 1 & 2
15 Direct inputs 1 & 5
16 Direct inputs 2 & 6
17 Direct inputs 3 & 7
18 Direct inputs 4 & 8
19 Pilot tone generator level adjustment
20 Pilot tone control DIP switches
21 IEC mains connector with integral fuseholder

4. INSTALLATION AND OPERATION

MECHANICAL INSTALLATION

The Octadrive is designed to be mounted in a standard 19" equipment rack. The front panel is fitted with rackmount ears for this purpose. The Octadrive requires 1U of vertical rack space. If the unit is being built into a flight case or will otherwise undergo regular transportation, the use of additional rear supports is strongly recommended. The rear of the unit has additional mounting points to facilitate this.

The Octadrive is convection-cooled and generates little heat. Ventilation is via the slots located on the sides of the chassis. Ensure that the sides of the unit are kept clear and that the slots are not obstructed.

In 19" rack applications we do not recommend mounting the Octadrive immediately above or below an item of equipment generating a significant amount of heat (i.e., a power amplifier). Plain 1U blank panels should be used in such cases. Note that slotted ventilation panels should not be used, as these will reduce the effect of any forced-air cooling that the amplifiers may employ.

CONNECTOR AND WIRING DETAILS

AC Mains

AC power is via a rear panel IEC mains connector [21]*. An IEC mains cable (power cord) fitted with a European-style plug is supplied with the unit. If the standard AC outlets in the territory are of a different type, an IEC mains lead fitted with the correct style of plug should be sourced. Alternatively, fit the correct type of mains plug, carefully observing the following cable colour codes:

PIN	CONNECT	COLOUR (Europe)	COLOR (US)
L	Live	Brown	Black
N	Neutral	Blue	White
⏚	Earth (Ground)	Geen/Yellow	Green

The Octadrive incorporates a "universal" PSU, and will operate on all AC mains voltages from 100 V to 240 V.

The connector assembly has an integral fuse holder. Note the fuse specifications below:

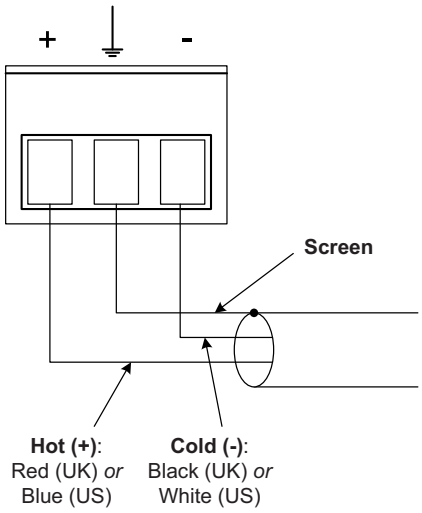
	230 V & 115 V
Type	T3.15A (slo-blo)
Size	20 x 5 mm
Rating	3.15 A

In the event of a blown fuse always first investigate why it blew. Only replace with a fuse with one of the type and rating specified. The fuse holder has space for storage of a spare fuse.

**Numbers in square brackets refer to the figs. on page.8.*

Audio Connections

All audio connections are on 3-pin 3.5 mm-pitch screw terminal connectors. Mating connectors are supplied with the unit. The connectors are grouped in pairs. All audio connections (both inputs and outputs) should be wired according to the diagram below:



To minimise hum and noise pickup, balanced interconnections between audio sources and the Octadrive should always be used wherever possible. If driving from an unbalanced source, use the same wiring as shown above at the Octadrive end, but connect the 'hot' core to the signal output and the 'cold' core to the ground terminal of that output; the cable's own screen should be connected at the Octadrive end only.

Unbalanced connection to the Octadrive's outputs defeats the unit's primary purpose and should never be used.

Main Inputs

The two transformer-balanced Main Inputs are on connector block [14], the upper connector being Input 1 and the lower Input 2.

When auto-input switching* is not enabled, both inputs route internally to all eight outputs. When auto-input switching is active, Input 1 is routed to all outputs as long as pilot-tone is present (at Input 1); if pilot-tone fails, Input 2 is used instead. See page 12 for more information on use of pilot-tone.

The inputs can accept levels up to +20 dBV.

Direct Inputs

The impedance balanced Direct Inputs to channels 1 to 8 are on connector blocks [15] to [18]. These inputs may be used when the Octadrive is used in a multichannel application. The direct inputs can also accept signals up to +20 dBV.

Outputs

The transformer-balanced, low impedance Outputs are on connector blocks [7] to [10]. The output stages are capable of driving long cable runs with minimal signal degradation. However, it should be noted that with very long runs (e.g. >500 m), the cable properties become significant and high frequencies may be attenuated. This may be an issue if the system uses an HF pilot-tone for fault reporting, and the cable used should be a type with low series resistance and capacitance.

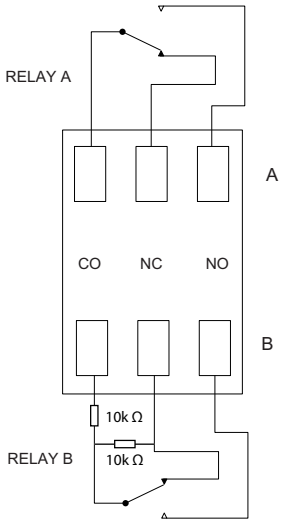
**This feature may not be available on Octadrive units with early serial numbers. Please contact your AXYS® dealer for more information.*

Failure Relay

The Octadrive's surveillance circuitry incorporates a relay with two sets of change-over contacts, which are available at the Failure Relay connector block [11]. The contacts are designated A and B. The surveillance circuits monitor both the unit's operating status and the presence of pilot-tone on the incoming audio lines. If a fault condition arises, the relay is de-activated. Contacts B have additional internal resistors to allow them to be connected directly to impedance-sensing line monitoring equipment such as the AXYS® Cerberus.

Refer to the diagram below. In normal operation CO (A) is connected to NC (A) when the Octadrive is operating normally, and to NO (A) in a fault state. At the same time, the impedance between CO (B) and NC (B) is 10k Ω and open-circuit between CO (B) and NO (B) in normal operation. When a fault condition occurs, the impedance between CO (B) and NC (B) rises to 20k Ω and that between CO (B) and NO (B) falls to 10k Ω*.

An AXYS® Cerberus or other impedance-sensing fault monitoring equipment may be connected to CO (B) and NO (B) or CO (B) and NC (B) as required. The contact wiring arrangement is shown in the diagram below:



The relay contacts have maximum current and voltage ratings of 100 mA and 24 V respectively.

The voltages of the Octadrive's internal DC power rails (±15 V, +5 V) are continually monitored. In the event of any voltages going outside a factory-defined tolerance the failure relay will be triggered to indicate a fault state. The failure relay will also be triggered in the event of loss of pilot tone, provided that SW3 and/or SW4 of the rear panel dipswitch are set On (see Pilot Tone detection below).

The failure relay connections are on 3-pin 3.5 mm-pitch screw terminal connectors. Mating connectors are supplied with the unit.

Audio Level Adjustment

The level at the Octadrive's outputs may differ from the input level if wished, with gain (or attenuation) being available at the input stage. Signals may need to be boosted to compensate for signal loss due to attenuation over long cable runs. The input stage gain is 10 dB and may be decreased by adjusting the the two 10-turn potentiometers accessible through holes [12] and [13] in the rear panel. The actual gain range is -60 dB to +10 dB.

Only use a trimming tool or jeweller's screwdriver gently to adjust these controls; do not attempt to force an oversize screwdriver through the hole. Maximum gain is with the control fully clockwise.

**Octadrive units with early serial numbers do not have the internal 10k Ω resistors. Please contact your AXYS® dealer for more information.*

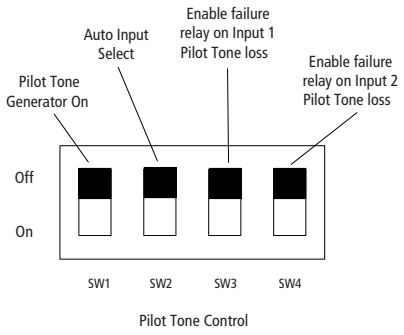
Pilot Tone

Many life-safety installed audio systems transmit a continuous low-level high-frequency signal (pilot tone) over the audio distribution network to allow the integrity of the system and cabling to be constantly monitored. The Octadrive is equipped with both pilot tone detection and an internal pilot tone generator.

Detection

The two main inputs [14] feed a pilot tone detector circuit. Presence of valid pilot tone on the inputs is indicated by the yellow status LEDs [5] and [6] on the front panel. For detection, the pilot tone must be in the frequency range 20 to 28 kHz, and be at least -30 dBV in amplitude. Any pilot tone present at an input is passed through the unit transparently and thus is also present at the outputs (to allow the amplifiers being driven to monitor pilot tone, if so equipped).

The 4-pole DIP switch [20] on the rear panel allows the Octadrive's Pilot Tone operation to be configured.



Pilot Tone Control

When SW3 is set On, loss of pilot tone at Input 1 will activate the failure relay. SW4 performs the same function for Input 2.

Additionally, if SW2 is set On, loss of pilot tone at Input 1 will change the main input source from Input 1 to Input 2. See section below on Auto-Input switching for more information.

Generator

It may be desirable to add a pilot tone to the Octadrive's outputs so that equipment further downstream can verify the cable runs. This will be the case when the input audio does not carry a pilot tone. The Octadrive incorporates a pilot tone generator, whose output is routed internally to all eight outputs. The pilot tone frequency is (nominally) 27 kHz.

The generator runs continuously, but is only routed to the outputs when SW1 of the rear panel DIP switch [20] is set On. (See diagram opposite). The level of the pilot tone is adjustable from -80 dBV to -15 dBV by the 10-turn potentiometer Pilot Tone Level, accessible through a hole [19] on the rear panel. Minimum level is with the control fully anti-clockwise. Only use a trimming tool or jeweller's screwdriver gently to adjust this control; do not attempt to force an oversize screwdriver through the hole.

Auto-Input switching

The Octadrive incorporates an input change-over switching circuit which, when enabled, is automatically activated by the pilot tone detector. SW2 on the rear panel DIP switch is used to enable this action.

When SW2 is Off, the Octadrive's eight outputs are fed simultaneously with a sum of the signals at Inputs 1 and 2. When SW2 is On, only Input 1 feeds the outputs, and is monitored continuously for pilot tone. Input 2 is effectively muted. If a loss of pilot-tone is detected on Input 1, the outputs are automatically switched to be fed by Input 2.

Status LEDs

The front panel carries a set of five LEDs showing the status of various Octadrive functions. From left to right:

Power supply OK (green) [2];
illuminates when the Octadrive is switched on and the PSU is functioning normally.

Status external failure relay (bi-colour) [3];
normally green, indicating no fault state exists; turns red to indicate that a fault condition has de-energised the failure relay. This may be due to a PSU fault, or to loss of pilot tone at one of the main inputs (if the DIP switches SW3/SW4 have been set accordingly).

Pilot tone enabled (green) [4];
illuminates to confirm that the internal pilot tone generator is routed to the outputs.

Pilot tone input A (yellow) [5];
illuminates when a pilot tone is detected at main input 1.

Pilot tone input B (yellow) [6];
illuminates when a pilot tone is detected at main input 2.

Note that the two Pilot tone input LEDs [5] and [6] operate always, regardless of the setting of the rear DIP switches.

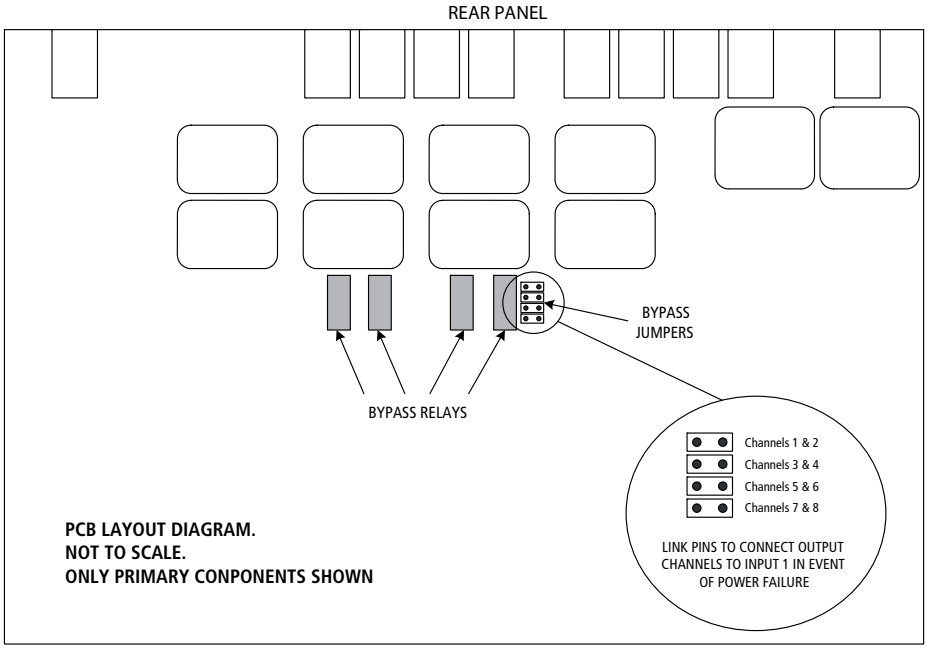
Hardware Bypass

The Octadrive is fitted with a set of relays which are energised in normal operation, but when de-energised as a result of power or system failure, connect Input 1 to any combination of pairs of outputs. This allows continued operation even in the event of a major PSU or similar failure.

The outputs which are connected in this way are determined by setting some internal pcb jumpers. The diagram below shows the location of the jumpers.

Each of the four jumpers routes Input A to a pair of outputs: 1 & 2, 3 & 4, 5 & 6 and 7 & 8. Any or all of the jumpers may be set.

In terms of the Octadrive's signal path, the hardware bypass relay is between the input transformer and the output transformers, thus full electrical isolation is maintained in the event of a failure. However, note that when in the bypass state, all equipment connected to the selected outputs will now directly load the source device and may reduce its output level. This reduction may be significant, and will be determined by factors such as the output impedance of the source device and cable type and length.



APPENDIX

TECHNICAL SPECIFICATION

Main Inputs 1 & 2	
Type	Transformer-balanced
Max input level	+20 dBV
CMRR	> 60 dB @ 1 kHz
Gain	Adjustable between -60 dB and +10 dB
Connector	Phoenix type MC 1,5/ 3-ST-3,81
Direct Inputs 1 - 8	
Type	Unbalanced / impedance balanced
Max input level	+20 dBV
CMRR	2 x 20 k Ω
Gain	0 dB
Connector	Phoenix type MC 1,5/ 3-ST-3,81
Outputs 1 – 8	
Type	Transformer-balanced
Max output level	+20 dBV
Output impedance	220 Ω typical
Connectors	Phoenix type MC 1,5/ 3-ST-3,81
Pilot Tone detection input 1 and 2	
Detection range	20k Hz to 28k Hz
Detection threshold	-30 dBV typical
Pilot Tone generator outputs 1 – 8	
Frequency	27k Hz typical
Level	-80 dBV to -15 dBV, adjustable
Overall audio specifications	
Residual output noise	< -100 dBV
THD	< 0.2% 30 Hz to 20k Hz
Frequency range	23 Hz to 70k Hz (-3 dB, 600 Ω load)
Mains Power Supply	
Power consumption	6 W typical, 10 VA
Mains operating voltage	100 VAC to 240 VAC, 50 to 60 Hz
Connector	IEC
Surveillance	
Power supply internal voltage rails	
Pilot tone detection input 1 and 2	
Surveillance output	2 x independent change-over contacts 100 mA/24 V
Connector	Phoenix type MC 1,5/ 3-ST-3,81
LED Indicators	
Power supply OK	Green
Failure relay status	Bi-colour (red/green)
Pilot tone generator	Green
Pilot tone detection input A	Yellow – monitors Input 1
Pilot tone detection input B	Yellow – monitors Input 2
Enclosure	
1U 19"rack enclosure	
Dimensions (WxDxH)	482 x 232 x 43.5 mm
Weight	3.8 kg

MAINTENANCE AND WARRANTY INFORMATION

Maintenance

Maintenance should only be performed by qualified service personnel. In case of doubt always contact your dealer.

For cleaning, use non-abrasive and non-aggressive household cleaning agents only.

Warranty Information

This Octadrive unit is covered by Duran Audio's standard product warranty, and is subject to the terms and conditions of the warranty. Please consult www.duran-audio.com for a full statement of warranty policy.

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