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Data Sheet **Rev. 2018-12-04**

A__ OnAir4	
4x Mic In, 4xLine In, 8x Line Out, 4x Phones, 1x S/PDIF/AES3 In, 1x S/PDIF/AES3 Out, 5x GPIO	
985/30	

- **High dynamic range** (DR 118dBA)
- **Ultralow distortions** (THD&N 0.0005% for analogue inputs and 0.0007% for analogue outputs)
- **Very low equivalent input noise** (EIN −127dBu@150Ω)

Revision History

Revision	Changes
2018-12-04	Numbers at GPIO connector added
2018-07-18	Delay data added
2017-04-07	Operating ambient temperature changed
2016-07-21	Humidity data added, usage of power supply connector clarified
2015-08-10	Connector specifications added
2015-07-13	Initial edition

General

T_A = 25°C. System sample frequency f_s=48kHz or f_s=44.1kHz unless otherwise noted.

Parameter	Conditions	Min.	Typ.	Max.	Unit
Audio Interface Format					
Analogue mic/line inputs	mono		4		#
Analogue line outputs	mono		8		#
Analogue phones	stereo		4		#
Digital S/PDIF / AES3 inputs	stereo		1		#
Digital S/PDIF / AES3 outputs	stereo		1		#
Digital RAVENNA I/O			1		#
Control Interface Format					
GPIO			5		#
Mode Of Operation					
Sample rates	f_s		44.1/48		kHz
Resolution	all audio channels		24		bit
Mechanical data					
Height			44		mm
Width	without optional ears		364		mm
Depth	incl. all buttons and connectors		268		mm
Weight			2.0		kg
Cooling					
Type			convection		
Filter			none		
Fans			none		
Ambient					
Operating ambient temperature	Revision 2.3, 3.1 and higher	0		+40	°C
	Revision 3.0, 2.2 and lower	+10		+40	°C
Operating humidity	no dewdrop	15		85	$\%_{RH}$
Storage temperature		0		+40	°C
Storage humidity	no dewdrop	10		85	$\%_{RH}$
Safety	build to meet	IEC 60065:2001+A1:2005+ A2:2010, modified EN 60065:2002+A1:2006+ Cor.:2007+A11:2008+ A2:2010+A12:2011			
Emissions	build to meet, contacted, radiated	EN55103-1:2009+A1:2012			
Immunity	build to meet, contacted, radiated	EN55103-2:2009			

Power Supply

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted

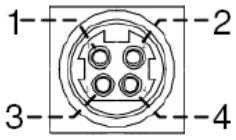
Parameter	Conditions	Min.	Typ.	Max.	Unit
Operating supply voltage	DC	10	12	14	V
	PoE Class 3	36	48	57	V
Nominal supply current	12VDC, line output load 2 kΩ, f_s=48kHz, P48 4x7mA, output level +15dBu sine or +24dBu program with a crest factor of 12dB		1.0		A
Nominal power consumption	12VDC, line output load 2 kΩ, f_s=48kHz, P48 4x7mA, output level +15dBu sine or +24dBu program with a crest factor of 12dB		12		W

Power Supply Connector

The DC voltage connector is a Kycon KPJX-4S-S

Under all circumstances ensure that the voltage at the Base Unit meets the recommended operating conditions, accounting for any voltage losses caused by the cable and the connectors even with the maximum current as specified.

Power Connector Kycon



PIN No:	FUNCTION
1	+ 12 VDC
3	+ 12 VDC
2	GND
4	GND

There are two contacts for each polarity. They may be used both or only one of them. If both are used, both cable lines have to be connected in parallel to the same power supply! This doubled cable cross-section may help to meet the maximum voltage loss specification. It is not allowed to use the doubled contacts for connecting two different power supplies at the same time! If redundancy is desired, DC and PoE supply has to be used.

Phantom Power

T_A = 25°C.

Parameter	Conditions	Min.	Typ.	Max.	Unit
Voltage	no load		48		V
Current	per channel			10	mA
	all four channels together			33	mA
Noise	22Hz..22kHz, RMS		50		µV

Analogue Mic/Line Inputs

T_A = 25°C. System sample frequency f_s=48kHz. Source impedance 200Ω unless otherwise noted.
If lowest gain is selected the highest possible input level at the jack connector (line input) is +24dBu, at the XLR (mic input) it is +4dBu.

Parameter	Conditions			Min.	Typ.	Max.	Unit
Input Characteristic							
Electrical format				balanced, floating [2], galvanic separated, suitable for unbalanced use [3]			
Connector type	mic input			XLR (part of Combo)			
	line input			Jack (part of Combo)			
Input level for full scale	mic input			−55		+4	dBu
	line input			−35		+24	dBu
Input level tolerance	1kHz, min. gain	mic input, source imp. 200Ω			±0.1	±0.2	dB
		line input, source imp. 40Ω, P48 off			±0.1	±0.2	dB
Differential input impedance	1kHz	mic input	P48 off		2.7		kΩ
			P48 on		2.2		kΩ
		line input			10		kΩ
Common mode input impedance	1kHz, both legs in parallel		P48 off		8.3		kΩ
			P48 on		2.6		kΩ
Variance of input impedance	20Hz..20kHz	mic input	P48 off		9		%
			P48 on		5		%
		line input			13		%
Input common mode voltage	AC, distortions < 1%					+8	dBu
	DC			−0.5		+50	V

[2] For floating characteristics please refer to the max. common mode voltage and common mode impedance.
[3] Unbalanced sources can be handled up to +14dBu, higher levels break the maximum common mode voltage and lead to high distortions

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted. Source impedance 200Ω.
If lowest gain is selected the highest possible input level at the jack connector (line input) is +24dBu, at the XLR (mic input) it is +4dBu.

Parameter	Conditions		Min.	Typ.	Max.	Unit
General						
Gain range	gain range may be limited first by the control device and shift due to given reference level and headroom settings			59		dB
Frequency response	20Hz..20kHz			−0.03		dB
Frequency range	−3dB		1		23.8k	Hz
Common mode rejection ratio *CMRR*	lowest gain, input common mode voltage < +8 dBu	1kHz		> 70		dB
		20Hz..20kHz		> 57		dB
Crosstalk	between two channels, $gain_1$=$gain_2$=minimum gain	1kHz		−140		dB
		20Hz..20kHz		−125		dB
	between two channels, $gain_1$=$gain_2$=40dB	1kHz		−105		dB
		20Hz..20kHz		−102		dB
	between two channels, $gain_1$=40dB (measured channel), $gain_2$=min. gain (stimulated channel)	1kHz		−115		dB
		20Hz..20kHz		−105		dB
Subsonic filter	12dB/Octave, selectable			40/80/140		Hz

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted. Source impedance 200Ω. Measuring filters HP=22Hz/LP=20kHz. If lowest gain is selected the highest possible input level at the jack connector (line input) is +24dBu, at the XLR (mic input) it is +4dBu.

Parameter	Conditions		Min.	Typ.	Max.	Unit
Total harmonic distortions						
Total harmonic distortion & noise vs. level *THD&N*	997Hz, mic input, lowest gain	−1dBFS		−101		dB
		−3dBFS		−106		dB
				0.0005		%
		−20dBFS		−95		dB
		−60dBFS		−56		dB
	997Hz, line input, lowest gain	−1dBFS		−101		dB
		−3dBFS		−105		dB
		−20dBFS		−94		dB
		−60dBFS		−54		dB
Total harmonic distortion & noise vs. frequency *THD&N*	−1dBFS, 20Hz..10kHz	lowest gain	−90	−98		dB
		gain: −25dBu for full scale		−98		dB

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted. Source impedance 200Ω.
If lowest gain is selected the highest possible input level at the jack connector (line input) is +24dBu, at the XLR (mic input) it is +4dBu.

Parameter	Conditions		Min.	Typ.	Max.	Unit
Intermodulation distortions						
CIFF-AES17	BW=20kHz, lowest gain	−1dBFS		−107		dB
		−20dBFS		−104		dB
SMPTE-AES17	lowest gain	−1dBFS		−94		dB
		−20dBFS		−93		dB

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted. Source impedance 200Ω unless otherwise noted. Measuring filters HP=22Hz/LP=20kHz. If lowest gain is selected the highest possible input level at the jack connector (line input) is +24dBu, at the XLR (mic input) it is +4dBu. Phantom power off.

Parameter	Conditions			Min.	Typ.	Max.	Unit
Noise							
Dynamic range *DR*	−60dBFS, lowest gain	mic	RMS, 22Hz..20kHz		116		dB
			RMS, A-weighted		**118**		dB(A)
		line	RMS, 22Hz..20kHz		114		dB
			RMS, A-weighted		117		dB(A)
Idle noise	lowest gain, mic input	22Hz..20kHz	RMS, unweighted		−116		dBFS
			RMS, A-weighted		−118		dBFS
			Q-Peak, unweighted		−112		dBFS
			Q-Peak, ITU-R 468		−105		dBFS
			Q-Peak, C-weighted		−122		dBFS
	lowest gain, line input	22Hz..20kHz	RMS, unweighted		−114		dBFS
			RMS, A-weighted		−117		dBFS
			Q-Peak, unweighted		−110		dBFS
			Q-Peak, ITU-R 468		−103		dBFS
			Q-Peak, C-weighted		−121		dBFS
Equivalent input noise *EIN*	22Hz..20kHz, gain setting +70dB, RMS, unweighted		source impedance 150Ω		**−127**		dBu
			source impedance 0Ω		−130		dBu
	22Hz..20kHz, gain setting +70dB		RMS, unweighted		−126		dBu
			Q-Peak, unweighted		−122		dBq
			Q-Peak, ITU-R 468	−114	−115		dBqp
			Q-Peak, C-weighted		−132		dBqp
	22Hz..20kHz, gain setting +40dB (−25dBu for full scale, equivalent to IRT settings)		RMS, unweighted		−126		dBu
			Q-Peak, unweighted		−122		dBq
			Q-Peak, ITU-R 468	−114	−115		dBqp
			Q-Peak, C-weighted		−132		dBqp
HF vulnerability	measurement method according to IRT 3/5, *) 500kHz..100MHz, noise increase typ. < 10dB			build to meet IRT3/5 *)			

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted.

Parameter	Conditions	Min.	Typ.	Max.	Unit
Analogue/Digital Conversion					
Conversion		Delta-Sigma			
Resolution		24			Bit
Dynamic range	unweighted, 22Hz..20kHz		117		dB
Delay	from analogue input to S/PDIF output		0.53		ms
Linearity	200Hz, 0..−100dBFS		±0.01		dB
Aliasing reduction	−1dBFS, from 27.9kHz @ f_s=48kHz or from 55.9kHz @ f_s=96kHz	80			dB
Phase distortion	deviation from a linear response, 20Hz..20kHz		±0.1		°

Parameter	Conditions	Min.	Typ.	Max.	Unit
Auxiliary Data of Inputs					
Channel status data		defaults [5]			
User data bit		always low			
Invalid data bit		always valid			

[5] Professional; f_s = system f_s; 2 Channel; 24bit Audio; CRC correct; all others 0

Analogue Line Outputs

T_A = 25°C. System sample frequency f_s=48kHz.

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Characteristic					
Electrical format		balanced, floating[6], suitable for unbalanced use			
Connector type		2x XLR, 2x Jack			
Output level at full scale	switchable, resolution 1dB	+12		+24	dBu
Output level tolerance	1kHz, no load		±0.1	±0.2	dB
Differential output impedance	1kHz		54		Ω
Common mode output impedance	1kHz, both legs in parallel to ground		2.2		kΩ
Variance of output impedance	20Hz..20kHz		18		%
Load impedance		600			Ω
Differential output offset			0		mV
Common mode output offset			0		mV
Max. common mode level				+12	dBu
DC common mode voltage limit	output level setting +12dBu..+15dBu	−6		+35	V
	output level setting +16dBu..+19dBu	−8		+37	V
	output level setting +20dBu..+22dBu	−10		+39	V
	output level setting +23dBu..+24dBu	−12		+41	V

[6] For floating characteristics please refer to the common mode voltages and common mode impedance.

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted. Load impedance 100kΩ unless otherwise noted. Measuring filters HP=22Hz/LP=22kHz. Output level setting +24dBu.

Parameter	Conditions		Min.	Typ.	Max.	Unit
General						
Frequency response	load 2kΩ..100kΩ, 20Hz..20kHz			±0.1		dB
Frequency range	−3dB		3		22.8K	Hz
Common mode rejection ratio *CMRR*	common mode voltage << common mode voltage limit	20Hz..20kHz	46	60		dB
Signal balance error *SBR*		20Hz..20kHz	35	47		dB
Crosstalk	between two channels	1kHz		−132		dB
		20Hz..20kHz		−120		dB

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted. Load impedance 100kΩ unless otherwise noted. Measuring filters HP=22Hz/LP=22kHz. Output level setting +24dBu.

Parameter	Conditions		Min.	Typ.	Max.	Unit
Total harmonic distortions						
Total harmonic distortion & noise vs. level *THD&N*	997Hz, load 600Ω..100kΩ	−1dBFS		−102		dB
		−6dBFS		-103		dB
				0.0007		%
		−20dBFS		−95		dB
		−60dBFS		−55		dB
Total harmonic distortion & noise vs. frequency *THD&N*	load 2kΩ..100kΩ, 20Hz..10kHz	−1dBFS		−96		dB
		−3dBFS		−99		dB
		−9dBFS		−100		dB
	load 600Ω, 40Hz..10kHz	−1dBFS		−94		dB
		−3dBFS		−95		dB
		−9dBFS		−98		dB

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted. Measuring filters HP=22Hz/LP=22kHz unless otherwise noted. Output level setting +24dBu.

Parameter	Conditions		Min.	Typ.	Max.	Unit
Intermodulation distortions						
CIFF-AES17 vs. level	load 600Ω, BW=20kHz	−1dBFS		−108		dB
		−3dBFS		−109		dB
		−20dBFS		−106		dB
CIFF-AES17 vs. frequency	0dBFS, load 600Ω, 5kHz..20kHz			−100		dB
SMPTE-AES17	load 600Ω	−1dBFS		−88		dB
		−3dBFS		−89		dB
		−20dBFS		−90		dB

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted. Load impedance 100kΩ unless otherwise noted. Measuring filters HP=22Hz/LP=22kHz. Output level setting +24dBu unless otherwise noted.

Parameter	Conditions			Min.	Typ.	Max.	Unit
Noise							
Dynamic range *DR*	load 600Ω, −60dBFS	output level setting +24dBu [7)]	RMS, 22Hz..22kHz		115		dB
			RMS, A-weighted		**118**		dB(A)
Idle noise	22Hz..22kHz		RMS, unweighted		−91		dBu
			RMS, A-weighted		−94		dBu
			Q-Peak, unweighted	−81	−87		dBu
			Q-Peak, ITU-R 468		−81		dBu
			RMS, CCIR-2K		−90		dBu
	<10Hz..>500kHz		RMS, unweighted		−71		dBu

[7)] Dynamic range scales linear down together with reduced output level setting between +24dBu and +12dBu.

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted.

Parameter	Conditions	Min.	Typ.	Max.	Unit
Digital/Analogue Conversion					
Conversion		Multi-Bit, Delta-Sigma			
Resolution		24			Bit
Dynamic range	unweighted, 22Hz..22kHz		117		dB
Delay	from S/PDIF input to analogue output	0.27			ms
Linearity	200Hz, 0..−100dBFS		±0.1		dB
Aliasing reduction	−1dBFS, > 27.9kHz	73			dB

T_A = 25°C.

Parameter	Conditions	Min.	Typ.	Max.	Unit
Auxiliary Data of Outputs					
Channel status data		ignored			
User data bit		ignored			
Invalid data bit		invalid = mute			

Headphone Outputs

T_A = 25°C. System sample frequency f_s=48kHz. Supply voltage 12V.

Parameter	Conditions		Min.	Typ.	Max.	Unit
Output Characteristic						
Electrical format				single ended, common ground		
Output impedance	1kHz			11		Ω
Phones impedance			8		600	Ω
Max. output power	1kHz, THD < 0.1%	load 50Ω		120		mW
		load 100Ω		90		mW
		load 200Ω		50		mW
Max. output level	1kHz, THD < 0.1%	no load		13.1		dBu
		load 200Ω		12.4		dBu
		load 100Ω		11.8		dBu
		load 50Ω		10.1		dBu

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted.

Parameter	Conditions		Min.	Typ.	Max.	Unit
General						
Frequency response	load 200Ω or 100Ω, 20Hz..20kHz			+0.1/−0.2		dB
	load 50Ω, 20Hz..20kHz			+0.1/−0.6		dB
Crosstalk	20Hz...20kHz, full power, between left and right	no load		−90		dB
		load 200Ω		–68		dB
		load 100Ω		−62		dB
		load 50Ω		–57		dB
Output offset				0		mV

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted. Termination impedance 50Ω..200Ω. Measuring filters HP=22Hz/LP=22kHz.

Parameter	Conditions		Min.	Typ.	Max.	Unit
Noise						
Dynamic range	−60dBFS	RMS, 22Hz..22kHz		98		dB
		RMS, A-weighted		103		dB(A)
Idle noise	22Hz..22kHz	RMS, unweighted		–82		dBu
		Q-Peak, unweighted		–78		dBu
		Q-Peak, CCIR-468-3		–75		dBu
		RMS, CCIR-2K		–81		dBu

T_A = 25°C. System sample frequency f_s=48kHz unless otherwise noted. Termination impedance 50Ω..200Ω unless otherwise noted.

Parameter	Conditions		Min.	Typ.	Max.	Unit
Total harmonic distortions						
Total harmonic distortion & noise vs. level	load 200Ω, 997Hz	−1dBFS		–80		dB
		–20dBFS		–74		dB
		–60dBFS		–38		dB
	load 100Ω, 997Hz	−3dBFS		–74		dB
		–20dBFS		–74		dB
		–60dBFS		–38		dB
	load 50Ω, 997Hz	−5dBFS		–69		dB
		–20dBFS		–74		dB
		–60dBFS		–38		dB
Total harmonic distortion & noise vs. frequency	–20dBFS, 20Hz..10kHz	load 200Ω		–72		dB
		load 100Ω		–74		dB
		load 50Ω		–74		dB

T_A = 25°C. System sample frequency f_s=48kHz.

Parameter	Conditions	Min.	Typ.	Max.	Unit
Digital/Analogue Conversion					
Conversion		Multi-Bit, Delta-Sigma			
Resolution		24			Bit
Delay	from S/PDIF input to phones output	0.62			ms
Linearity	200Hz, 0..−100 dBFS		±0.2		dB

Parameter	Conditions	Min.	Typ.	Max.	Unit
Auxiliary Data					
Channel status data		ignored			
User data bit		ignored			
Invalid data bit		invalid = mute			

S/PDIF / AES3 Input

T_A = 25°C. System sample frequency f_s=48 kHz unless otherwise noted. Source impedance 75Ω.

Parameter	Conditions	Min.	Typ.	Max.	Unit
General					
Electrical format		unbalanced			
Connector type		RCA			
Input impedance			75		Ω
Input voltage		0.2	0.5/1.0	7.5	V_{pp}
Equalization		none			
Phase tolerance	X preamble with respect to internal word clock	−252		+201	°
Jitter tolerance	Sinus jitter with the jitter template specified in AES3	Comply			
Delay	routing direct from S/PDIF input to S/PDIF output, SRC off		6	7	$1/f_s$
			125	146	µs
Double frequency mode		stereo mode only			

T_A = 25°C. Measuring range 10Hz..f_s/2. Input word length 24bit.

Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Sample Rate Converter					
Mode	software configuration	operation/bypass			
Resolution	internal signal processing resolution, at output the lower three bits are noise and have been truncated	24			bit
Input sample rate	f_{si}	28.4		100	kHz
Output sample rate	$f_{so}=f_s$	44.1/48			kHz
Dynamic range	997Hz, −60 dBFS, unweighted		125		dB
Total harmonic distortion & noise	1kHz, 0 dBFS, f_s=48kHz, f_{si}=32kHz		−121		dB
	1kHz, 0 dBFS, f_s=48kHz, f_{si}=44.1kHz		−122		dB
	1kHz, 0 dBFS, f_s=48kHz, f_{si}=48kHz		−124		dB
	1kHz, 0 dBFS, f_s=48kHz, f_{si}=96kHz		−125		dB
	1kHz, 0 dBFS, f_s=f_{si}=48kHz synchronous		−125		dB
Group delay	$\frac{16}{f_{si}}+\frac{32}{f_{si}}$ for $f_s > f_{si}$ $\frac{16}{f_{si}}+\frac{32}{f_{si}}*\frac{f_{si}}{f_s}$ for $f_s < f_{si}$	0.5		1.5	ms
	$f_{si}=f_s=48kHz$		1.0		ms
Stop band attenuation			125		dB

Parameter	Conditions	Min.	Typ.	Max.	Unit
Input Auxiliary Data					
Channel status data	SRC off	384 bits transparent[1)]			
	SRC on	sample rate = f_s, word length = 24-bit others transparent, CRC correct			
	[1)] If input data are in consumer format, they will be converted to professional				
User data bit	SRC off	transparent			
	SRC on	always low			
Validity bit transfer	ignore valid bit = off	transparent, invalid if a receive error occurs			
	ignore valid bit = on	always valid, invalid if a receive error occurs			
Handling of invalid data		no mute			
Handling of parity error		unlock/mute			

S/PDIF / AES3 Output

T_A = 25°C. System sample frequency f_s=48 kHz unless otherwise noted. Termination impedance 75Ω.

Parameter	Conditions		Min.	Typ.	Max.	Unit
General						
Electrical format				unbalanced		
Connector type				RCA		
Output impedance				75		Ω
Output voltage	terminated	AES3 mode		1.0		V_{pp}
		S/PDIF mode		0.5		V_{pp}
Rise/fall time				5		ns
Phase	X preamble with respect to word clock			0		%
Intrinsic jitter	f_{so}, 700Hz..100kHz			0.003	0.025	UI
Double frequency mode				stereo mode only		

Parameter	Conditions	Min.	Typ.	Max.	Unit
Output Auxiliary Data					
Channel status data	input directly routed		384 bits transparent		
	in all other cases		defaults[1)]		
	[1)] Professional; f_s = system f_s; 2 Channel; 24bit Audio; CRC correct; all others 0				
User data bit			384 bits transparent		
Validity bit			transparent		
Parity bit			recalculation		
Handling of different status blocks for left and right channel			right status block is delayed to left status block, audio passes without additional delay		

GPIO Port

T_A = 25°C. Supply voltage DC 12V or PoE.

Parameter	Conditions	Min.	Typ.	Max.	Unit
GPI					
Input type		opto coupler			
Input voltage	DC	3.0		36	V
Input current	V_m=36V		8		mA
Reverse voltage				36	V
Impulse width	positive or negative impulse	5			ms
Cycle time between 2 successive events		30			ms
Allowable duration of contact bounce per event				40	ms

T_A = 25°C. Supply voltage DC 12V or PoE.

Parameter	Conditions	Min.	Typ.	Max.	Unit
GPO					
Output type		semiconductor relays			
Switching voltage	AC/DC			50	V
Switching current	AC			0.5	A
	DC			1	A

T_A = 25°C. Supply voltage DC 12V.

Parameter	Conditions		Min.	Typ.	Max.	Unit
Auxiliary voltage supply (not available with PoE supply)						
Output voltage	DC	no load		11.4		V
		load 0.1A		10.5		V
		load 0.2A		9.9		V
		load 0.3A		8.5		V
Output current	DC, foldback current limit				0.3	A

Ravenna Ports

T_A = 25°C. System sample frequency f_s= 48 kHz unless otherwise noted.

Parameter	Conditions	Min.	Typ.	Max.	Unit
Physical Layer Characteristics					
Ethernet streaming ports			1		#
Supported ethernet standards			1000BaseT		#
Link speed			1.0 full duplex		Gb/s
Cable type			CAT5 or better straight or crossed cable		
Connector			RJ45		
Link length			100		m

T_A = 25°C. System sample frequency f_s= 48 kHz unless otherwise noted.

Parameter	Conditions	Min.	Typ.	Max.	Unit
Auxiliary Data					
Channel status data	Ravenna input (Codec AM824) to digital outputs		transparent		
	digital input to Ravenna output				
	analogue inputs to Ravenna output		defaults [1)]		
User data	Ravenna input (Codec AM824) digital outputs		transparent		
	digital inputs to Ravenna output				
	analogue inputs to Ravenna output		always low		
Validity bit	Ravenna input (Codec AM824) to digital outputs		transparent		
	digital inputs to Ravenna output				
	analogue inputs to Ravenna output		always valid		
Parity bit			not supported		

[1)] Channel Status defaults: Professional; f_s = system f_s; 2 Channel; 24bit Audio; CRC correct; all others 0

Further Particulars/Explanatory Notes

Supported System Sampling Rates

The device supports the system sampling rates 44.1/48. Most parameters are specified and tested at sampling rate f_s = 48kHz only. Please note that the specification is also valid for f_s = 44.1kHz.
The manufacturer's tests are designed to cover all sampling rates.

Discrete Class-A Preamplifier

The microphone preamplifier is build as a modern discrete design with excellent performance. It features ultra low equivalent input noise even at moderate gains and also very low noise at low gains. Superb distortion performance and a flat frequency response are provided even at high gains.

Advanced Preamplifier Gain Structure

This variable gain amplifier is working with a full digital gain stage and two noise scaling amplifiers, one analogue one digital.
The analogue noise scaling amplifier together with its digital counterpart is used to run the analogue gain stage always with its best noise performance.
With this structure it is possible to change gain settings in the digital domain without any audible clicks.

Line device protection

There will not be 48V at the line input sockets, even if P48 is active at the corresponding mic input. So, there is no danger for a connected device to get damaged by an active P48. But take in mind that if the P48 is active there will be a reduced gain at the line input by about 1.5dB. So, to ensure the correct gain at the line input the P48 must be switched off.

Advanced Digital FIR Filter Design

Advanced digital filters within the A/D conversion feature a modified FIR filter architecture that minimizes latency while maintaining excellent linear phase response.

Analogue Output Stage

To facilitate a high common mode rejection ratio (CMRR) the common mode impedance should be as high as possible. Many electronically balanced output stages do not achieve this because they use simple voltage sources and as a result the common mode impedance is very low.
As a result high (common mode) noise currents may appear which may not fully attenuated by the common mode rejection of the devices.
Furthermore such output stages will drive excessive currents into unbalanced loads if the cold line is shorted to ground, as it would be the case in a common installation. Most likely this will degrade performance or even may destroy the output driver!

In this device Lawo uses tracked-current voltage sources in the output stages which guarantee nearly equal currents in both lines independent of the load. Due to the resulting high common mode output impedance these output stages are floating. This ensures good noise damping and high common mode rejection with all kinds of input stages, even unbalanced ones.
The latter needs one line shorted to ground (hot or cold) like a transformer-coupled output stage. The level will remain the same as with a balanced load. Due to the high common mode impedance no excessive currents will flow, which may degrade performance.

Input Sample Rate Converter (SRC)

The input SRC has a very high quality and therefore it is normally switched into the signal path. It offer its best quality especially with a 1:1 conversion where most other SRCs have its worst quality so it is not necessary to switch it out of the signal path even in fully synchronized systems.

Sample Rate Converter Bypass

Some applications do not tolerate the delay of about 1ms with a 1:1 conversion rate. Therefore, the SRC can be bypassed by configuration. The SRC will not be automatically switched on if the device is detecting an input sample rate which differs from the system sample rate and when it is bypassed by configuration. This feature is only available with some DALLIS AES3 devices.

Valid bit transfer modes

For S/PDIF / AES3 input the valid bit transfer mode can be selected by configuration.

If the "Ignore Valid Bit" function is inactive the valid bit will be transferred transparently. If it is active the valid bit will always mark valid data. Independent from the configuration, the valid bit will be set to invalid if a receiver error occurs.

This feature is not yet implemented. The valid bit is always 0 and so mark valid data.

Varispeed

It is not possible to use the S/PDIF / AES3-Input in varispeed applications. Please use the DALLIS AES3-I/O (943/55) device in instead.

Word length/dither

Audio data at the S/PDIF / AES3 input with less than 24 bit will be expanded to 24 bit if the SRC is active. If not, the word length will remain unchanged.

It is not possible to reduce the word length of the S/PDIF / AES3 output and therefore there is no dither function available.

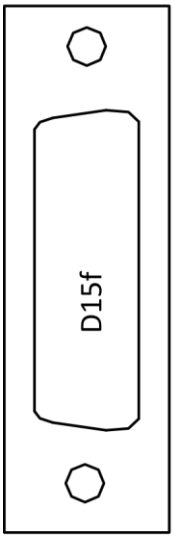
Signal processing bypass mode

Changing between normal operation and the signal processing bypass may cause a click noise.

CAT5 media streaming port

Connection to RAVENNA port partners can be established via standard CAT5 Ethernet cables. Crossed or straight cables can be used. Make sure not to exceed the maximum cable length of 100m.

Connector, General Purpose I/O



GPI 1...5

GPO 1...5