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Find the *Curtiss-Wright / ACRA Control KAD/VDC/001/00* at our website: ***Click HERE***

KAD/VDC/001

Differential ended voice-to-digital converter (CVSD) - 2ch at 64kbps

CURTISSWRIGHTDS.COM



Key Features

- Two differential ended audio input channels
- Programmable sampling rates (8kbps to 64kbps)
- Fully IRIG-106 Chapter 5 compatible
- 500Hz tone output for link indication or calibration/verification
- Programmable word length, for example 16 bits @ 32kbps = 2k words per second

Applications

- Cockpit voice monitoring

Overview

The KAD/VDC/001 is a dual audio-to-digital converter module.

At the core of the module is a delta-modulator where the delta size depends on the rate of change. This is referred to as Continuously Variable Slope Delta (CVSD) modulation. This delta-modulator outputs a serial stream to a serial-to-parallel converter, the output of which is regularly read over the backplane. For a detailed description of this type of audio encoding, refer to the IRIG-106 standard, Chapter 5.

A tone output is also available that can be connected to a channel, for link indication or calibration/verification.

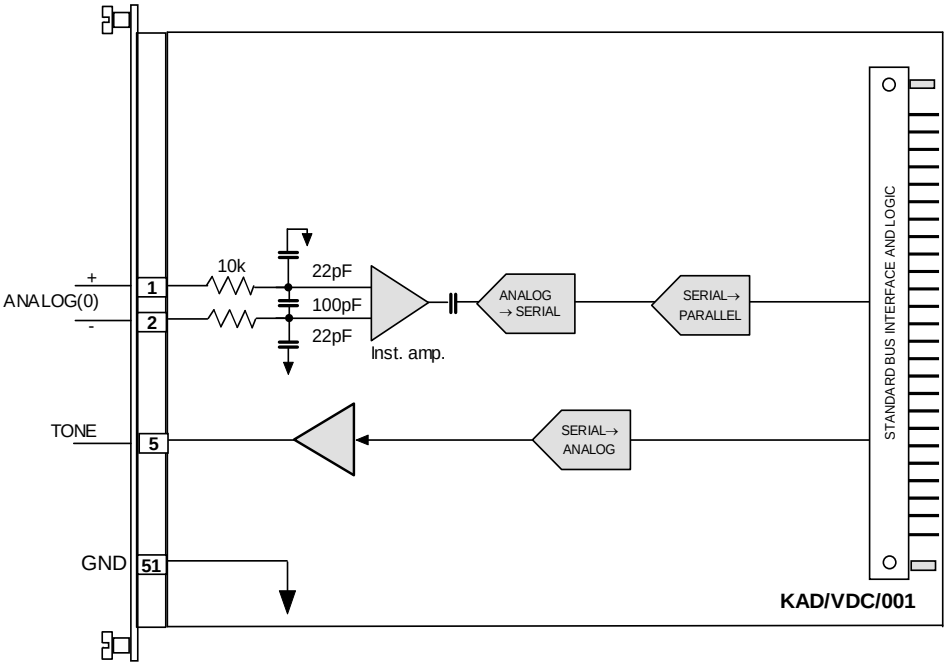


Figure 1: First of two independent audio channels and the tone output

Specifications

All values provided in the following specification tables are valid within the operating temperature range specified under "Environmental ratings" in the "General specifications" table.

TABLE 1	General specifications				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Slots	–	–	1	–	Can be placed in any user-slot in any combination.
Mass					
	–	65	–	g	
	–	2.29	–	oz	Design metric is grams.
Height above chassis					For recommended clearance requirements see the *CON/KAD/002/CP* data sheet.
bare connector	–	–	11	mm	
bare connector	–	–	0.43	in.	Design metric is millimeters.
Access rate	–	–	500	ksps	Maximum combined access rate for read and write.
Power consumption					
+5V	80	–	140	mA	
±7V	0	–	0	mA	
+12V	15	–	30	mA	Excludes current used by tone outputs.
-12V	10	–	20	mA	Excludes current used by tone outputs.
total power	0.7	–	1.3	W	Particular combinations of chassis and Acra KAM-500 modules may have power or current limitations. For details, see *TEC/NOT/016 - Power dissipation, TEC/NOT/049 - Power estimation*, and the relevant chassis data sheet.
Environmental ratings					See *Environmental Qualification Handbook*.
operating temperature	-40	–	85	°C	Chassis base/side plate temperature.
storage temperature	-55	–	105	°C	

TABLE 2	Differential ended audio inputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Inputs	–	–	2	–	
Sampling rate					While the sampling rate can be set individually, each must have a power of two times any other (¼, ½ ...2, 4).
ANALOG[1:0]	8	–	64	kbps	
Input voltage					
operating range (G_p = 1)	-30	–	8	dB	Primary gain = 1; 0dB = 489mV.
overvoltage protection	-40	–	40	V	Voltages outside of this range can damage input.
Analog filter					
passband	300		3400	Hz	
Input resistance					
between inputs	–	20	–	kΩ	Module powered off.
between inputs	–	10	–	MΩ	Module powered on.
each input to GND	–	10	–	kΩ	Module powered off.
each input to GND	–	10	–	MΩ	Module powered on.

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TABLE 3	Tone outputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Outputs	–	–	1	–	
Signaling rate					
TONE_O	495	–	505	Hz	
Output voltage					
operating range	1.27	1.41	1.55	V_{p-p}	
short circuit current	–	–	0	mA	Tone out is capacitively coupled to the output pin.
short circuit duration	∞	–	–	s	To GND.
Output impedance	–	320	–	Ω	Coupling capacitor impedance specified for 500Hz.

Setting up the KAD/VDC/001

Setting up parameters

For channels Analog(0) to Analog(1)

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	No limit to characters	MySignal	Serial output of CVSD modulator in parallel form. This is converted from serial to parallel at the start of an acquisition cycle and at equal intervals of time thereafter.
Base Unit	Unitless	Unitless	
gain	1	1	
Data Format	Offset binary	Offset binary	
Size In Bits	8 to 16	16	The rate at which data is clocked from the modulator depends on the bits per word and the words per acquisition cycle. The KAD/VDC/001 places the CVSD data in the most significant bits of the 16-bit KAD/VDC/001 parameter. The least significant bits are set to zero. For example, if a 12-bit CVSD is selected, bit 15 to bit 4 of the KAD/VDC/001 parameter contains the audio data, where bit 15 is the oldest bit; and bits 3 to 0 contain zeros.

Setting up instrumentation

This module uses the X-Module-Analog-In XidML schema. (See http://www.xidml.org).

For channels Analog(0) to Analog(7)

SET-UP DATA	CHOICES	DEFAULT	NOTES
Manufacturer			
name	ACRA CONTROL	ACRA CONTROL	
part reference	KAD/VDC/001	KAD/VDC/001	ACRA CONTROL part number.
serial number	Fixed 6 characters	FE1234	Unique number for each module.
Sub location	1 to 80 characters	MyDAU	Name of DAU.
slot	3 to N	3	The DAU slot the module fits into. First user-module goes into slot 3, where N is the number of user-slots + 2 in the DAU.

NOTE: It is recommended that names are less than 20 characters, have no white space or contain any of the following five characters "/><\.

Getting the most from the KAD/VDC/001

Audio quality can be improved by increasing the sampling rate. If the data is to be embedded in a PCM stream, it is recommended that the words be evenly commutated as this simplifies ground station demodulator design. For more information concerning ground station demodulator design contact Curtiss-Wright support (acra-support@curtisswright.com).

The rate at which the card must be read depends on the word length and the sampling rate of the modulator. Some popular choices are shown in the following table.

CVSD MODULATOR BIT-RATE	AUDIO QUALITY	WORD RATE (ksps)			
		8 BITS	10 BITS	12 BITS	16 BITS
32kbps	Very good	4.0	3.2	≈2.7	2.0
16kbps	Good	2.0	1.6	≈1.3	1.0
8kbps	Public address system	1.0	0.8	≈0.7	0.5

Connector pinout of the KAD/VDC/001

PIN	NAME	SEE SPECIFICATIONS TABLE	COMMENT
1	ANALOG(0)+	Differential ended audio inputs	Voice channel
2	ANALOG(0)-	Differential ended audio inputs	Voice channel
3	ANALOG(1)+	Differential ended audio inputs	Voice channel
4	ANALOG(1)-	Differential ended audio inputs	Voice channel
5	TONE	Tone outputs	500Hz sine wave; 500mV$_{rms}$ typical
6	GND	Internal ground	
7	DNC		Do not connect
8	GND	Internal ground	
9	DNC		Do not connect
10	DNC		Do not connect
11	DNC		Do not connect
12	DNC		Do not connect
13	DNC		Do not connect
14	DNC		Do not connect
15	DNC		Do not connect
16	DNC		Do not connect
17	DNC		Do not connect
18	DNC		Do not connect
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36	DNC		Do not connect
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38	DNC		Do not connect
39	DNC		Do not connect
40	DNC		Do not connect
41	DNC		Do not connect
42	DNC		Do not connect
43	DNC		Do not connect
44	DNC		Do not connect
45	DNC		Do not connect
46	DNC		Do not connect
47	DNC		Do not connect
48	DNC		Do not connect
49	DNC		Do not connect
50	DNC		Do not connect
51	GND	Internal ground	
52	CHASSIS	Chassis	Double-density connector only

Ordering information

PART NUMBER	DESCRIPTION
KAD/VDC/001	Differential ended voice-to-digital converter (CVSD) - 2ch at 64kbps (with 52-way connector)
KAM/VDC/001	Differential ended voice-to-digital converter (CVSD) - 2ch at 64kbps (with 51-way connector)

By default, the standard mating connector (CON/KAD/002/CP for KAD modules; or ACC/CON/008/04 for KAM modules), is included with each module in the shipment. Its part number will be added to the Confirmation of Order unless an alternative option is specified (see the *Cables* data sheet). In this data sheet, KAD/VDC/001 refers to both the KAD and KAM version of the module.

Revision history

REVISION	DIFFERENCES	STATUS
KAD/VDC/001	First release	Recommended for new programs

Supporting software

SOFTWARE	DETAILS
DAS Studio 3	User interface for setup and management of data acquisition, network switches, recorders and ground stations in an integrated environment
KSM-500	This module is supported by the KSM-500 suite of software tools

Related documentation

DOCUMENT	DETAILS
DOC/DBK/001	Acra KAM-500 Databook
DOC/HBK/002	Environmental Qualification Handbook
DOC/MAN/018	KSM-500 Databook
DOC/MAN/030	DAS Studio 3 User Manual
TEC/NOT/015	CVSD Modulation of Audio Signals
TEC/NOT/016	Power dissipation
TEC/NOT/049	Power estimation

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