

KAD/ABM/101

ARINC-429 bus monitor parser/snarfer - 8ch

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Overview

The KAD/ABM/101 is an ARINC-429 bus monitor, which combines the capabilities of a coherent message parser with the flexibility of an all-pass/selected-pass snarfer FIFO and an error-detection function, on a single module.

The parser parses up to 4,095 words and their associated time and status tags. Each message has a stale bit (word read before) and a skipped bit (buffer overwritten). Messages can be parsed based on their bus number, label, SDI, and/or SSM fields.

The snarfer stores selected traffic and tags in a FIFO, 64K words deep. Each word has 16 bits for traffic tag information and 7 bits for FIFO content identification. Data selection and content identification is based on the Bus (0 to 7), ARINC traffic, tag type (time high/low/micro and message count) and how full the FIFO is. For more information see "Getting the most from the KAD/ABM/101" on page 7.

The word count increments on receipt of a valid word. The report word has bits indicating the type of error caught and the bus it occurred on.

Key Features

- Monitors up to eight ARINC-429 busses
- Coherently parses traffic and tags for up to 4095 messages
- 64K deep selective FIFO for traffic and tags (snarfer)
- Detects six types of errors
- Word counter for each bus

Applications

- ARINC-429 monitoring and recording

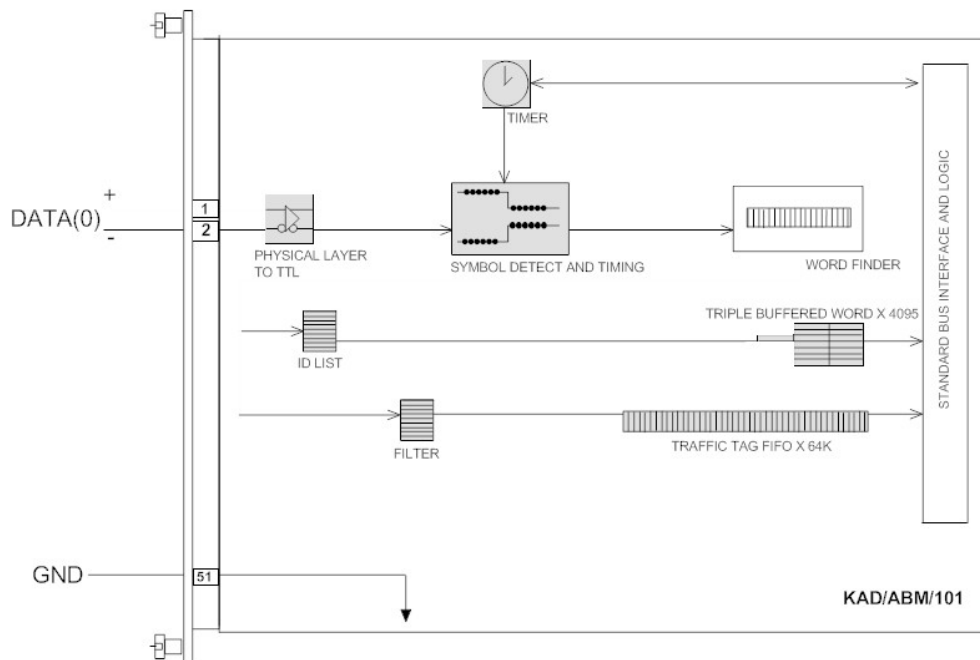


Figure 1: First of eight busses on the KAD/ABM/101

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						
	–	70	–	g		
	–	2.47	–	oz	Design metric is grams.	
Height above chassis					For recommended clearance requirements see the <i>CON/KAD/002/CP</i> data sheet.	
bare connector	–	–	11	mm		
bare connector	–	–	0.43	in.	Design metric is millimeters.	
Access rate	–	–	2	Msp/s	Maximum combined access rate for read and write.	
Power consumption						
+5V	75	–	95	mA		
±7V	0	–	0	mA		
±12V	0	–	0	mA		
total power	0.375	–	0.475	W	Particular combinations of chassis and Acra KAM-500 modules may have power or current limitations. For details, see <i>TEC/NOT/016 - Power dissipation</i> , <i>TEC/NOT/049 - Power estimation</i> , and the relevant chassis data sheet.	
Environmental ratings					See <i>Environmental Qualification Handbook</i> .	
operating temperature	-40	–	85	°C	Chassis base/side plate temperature.	
storage temperature	-55	–	105	°C		

TABLE 2		ARINC-429 inputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS	
Inputs	–	–	8	–	ARINC-429 compatible.	
Signaling rate						
DATA	12.5	–	100	kbps	Signaling rate is either 12.5, 50 or 100 kbps.	
Operating range						
Logic 0	-2.5	–	2.5	V		
Logic L	-13	–	-6.5	V		
Logic H	6.5	–	13	V		

Setting up the KAD/ABM/101

All module setup can be defined in XML using XidML® schemas (see <http://www.xidml.org>).

Instrument settings

SETUP DATA	CHOICE	DEFAULT	NOTES
Manufacturer	-	-	-
Name	ACRA CONTROL	ACRA CONTROL	Name of manufacturer.
PartReference	KAD/ABM/101	KAD/ABM/101	The instrument part reference.
SerialNumber	FA1234	FA1234	Unique name for each module.
Settings SnarferFilter	-	-	Specifies content written to the snarfer FIFO as it fills, depending on the % fill level.
Fifo Level-25	Traffic, Message-Count, IrigTime, Error Traffic, IrigTime, Error Traffic, IrigTime Traffic, Error Error None	Traffic, Message-Count, IrigTime, Error	Specifies the type of data that should be stored when the FIFO is less than or equal to 25% full.
Fifo Level-50	Traffic, Message-Count, IrigTime, Error Traffic, IrigTime, Error Traffic, IrigTime Traffic, Error Error None	Traffic, Message-Count, IrigTime, Error	Specifies the type of data that should be stored when the FIFO is less than or equal to 50% full.
Fifo Level-75	Traffic, Message-Count, IrigTime, Error Traffic, IrigTime, Error Traffic, IrigTime Traffic, Error Error None	Traffic, Message-Count, IrigTime, Error	Specifies the type of data that should be stored when the FIFO is less than or equal to 75% full.
Fifo Level-100	Traffic, Message-Count, IrigTime, Error Traffic, IrigTime, Error Traffic, IrigTime Traffic, Error Error None	Traffic, Message-Count, IrigTime, Error	Specifies the type of data that should be stored when the FIFO is less than or equal to 100% full.
Processes	-	-	-
Parser(4094:0)	-	-	Parser definitions.
Catchall-Parser	-	-	Parser definitions.
Channels	-	-	-
ARINC-429-In(7:0) ARINC-429 Input	-	-	Represents a typical ARINC-429 bus monitor channel configuration.
Settings	-	-	-
Check For Parity	True False	False	Indicates whether parity should be checked.

SETUP DATA	CHOICE	DEFAULT	NOTES
Bit Rate	100e3 50e3 12.5e3	12.5e3	Specifies the number of bits transmitted per second.

Parameter definitions

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
Global Parameters				
<p>Snarfer Message data, time tags, MessageCounts and errors are written to the snarfer, the content can be filtered depending on the fill level of the snarfer FIFO.</p>	BitVector	BitVector	32	R[31:0] R[31:29] Bus - The bus the message was received on. R(28) Reserved R[27:24] ContentIdentifier - Identifies the content of snarfer[15:0]. 0000: Error. 0001: SnarferFull. 0010: MessageCount. 0011: SSM[1:0], Data[18:5]. 0100: Data[4:0], SDI[1:0], Label[0:7], Reserved. 0101: IrigMessageTimeMicro. 0110: IrigMessageTimeLo. 0111: IrigMessageTimeHi. 1000: SnarferEmpty. R[23:16] Reserved R[15:0] Content - The meaning of these bits depends on ContentIdentifier.
<p>Report Reports the status of the module.</p>	BitVector	BitVector	16	R[15:0] R(15) FreshError - An error occurred since last read. R[14:7] Reserved R[6:4] Bus - Indicates the bus the error occurred on. R[3:0] ErrorCode - Indicates the error that occurred last. 0000: BadBit. 0001: NotEnoughBits. 0010: TooManyBits. 0011: Reserved for future use. 0100: ParityError. 0101: Invalid Label, SSM or SDI. 1000: Reset occurred since last read.
Parser(4094:0) Parameters				
<p>MessageCount A copy of WordCount when message was received.</p>	Count	OffsetBinary	16	R[15:0]
<p>MessageIrigTime48 48-bit wide IRIG time word.</p>	BitVector	BitVector	48	R[47:0]
<p>MessageTimeHi Hours and minutes time midway through first transmitted bit.</p>	BitVector	BitVector	16	R[47:32] R[15:13] Reserved - Reserved for future use. R[12:7] Hours - BCD Hours 0 to 23. R[6:0] Minutes - BCD Minutes 0 to 59.

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
MessageTimeLo Seconds and Centiseconds time midway through first transmitted bit.	BitVector	BitVector	16	R[31:16] R(15) Reserved - Reserved for future use. R[14:8] Seconds - BCD Seconds 0 to 59. R[7:0] Centiseconds - BCD Centiseconds 0 to 99.
MessageTimeMicro Microsecond time midway through first transmitted bit.	Second	BCD	16	R[15:0] R[15:0] Microseconds - BCD Microseconds 0 to 9999.
Catchall-Parser Parameters				
MessageCount A copy of WordCount when message was received.	Count	OffsetBinary	16	R[15:0]
MessageDataStyleA SSM, data, SDI, parity and message information.	BitVector	BitVector	32	R[31:0] R[31:30] SSM - Sign/Status Matrix. R[29:11] Data - Data word. R[10:9] SDI - Source Destination Identifier. R(8) Empty - This parser slot has not been written to yet. R(7) Stale - This parser slot has been read before. R(6) Skipped - This parser slot has been overwritten. R[5:3] Bus - The bus the message was received on. R[2:1] Reserved R(0) Parity - The parity bit received.
MessageDataStyleB Parity, SSM, data, bus, SDI and message information.	BitVector	BitVector	32	R[31:0] R(31) Parity R[30:29] SSM - Sign/Status Matrix. R[28:20] Data[18:10] - Bits 18 to 10 of the data word. R[19:17] Bus - The bus the message was received on. R(16) Reserved R[15:6] Data[9:0] - Bits 9 to 0 of the data word. R[5:4] SDI - Source Destination Identifier. R(3) Empty - This parser slot has not been written to yet. R(2) Stale - This parser slot has been read before. R(1) Skipped - This parser slot has been overwritten. R(0) Reserved
MessageIrigTime48 48-bit wide IRIG time word.	BitVector	BitVector	48	R[47:0]
MessageTimeHi Hours and minutes time midway through first transmitted bit.	BitVector	BitVector	16	R[47:32] R[15:13] Reserved - Reserved for future use. R[12:7] Hours - BCD Hours 0 to 23. R[6:0] Minutes - BCD Minutes 0 to 59.
MessageTimeLo Seconds and Centiseconds time midway through first transmitted bit.	BitVector	BitVector	16	R[31:16] R(15) Reserved - Reserved for future use. R[14:8] Seconds - BCD Seconds 0 to 59. R[7:0] Centiseconds - BCD Centiseconds 0 to 99.
MessageTimeMicro Microsecond time midway through first transmitted bit.	Second	BCD	16	R[15:0] R[15:0] Microseconds - BCD Microseconds 0 to 9999.

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
ARINC-429-In(7:0) Parameters				
WordCount A count of valid ARINC-429 messages received on the bus.	Count	OffsetBinary	16	R[15:0]

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/ABM/101

The KAD/ABM/101 contains a 64K deep by 32-bit wide snarfer FIFO, which is shared between all eight busses. All ARINC-429 traffic received by the KAD/ABM/101 is tagged with the reception time (IrigTime) and word count, and is then written into the snarfer FIFO according to a set of filter rules.

The 32 bits of the snarfer word are broken down as shown in the following figure.

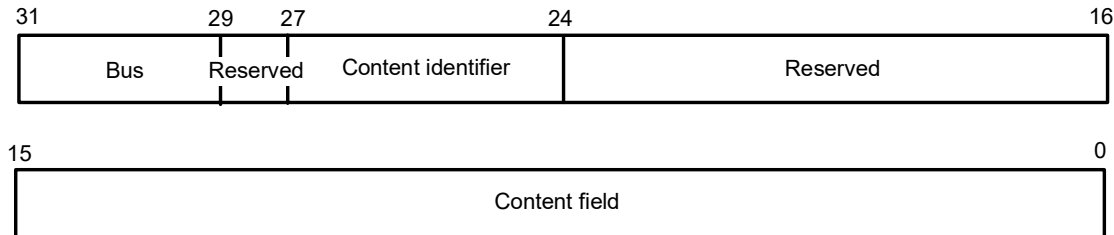


Figure 2: Snarfer word structure

- Bits 31 to 29 are used to identify the bus that the current traffic associates with.
- Bits 27 to 24 contain the content identifier for the content field (bits 15 to 0) of the snarfer word. These are as follows:
 - + 0000 - Error
 - + 0001 - Snarfer Full
 - + 0010 - Word Count
 - + 0011 - SSM[1:0], Data[18:5]
 - + 0100 - Data[4:0], SDI[1:0], Label[0:7], Reserved
 - + 0101 - Time Hi
 - + 0110 - Time Lo
 - + 0111 - Time Micro
 - + 1000 - Snarfer Empty
- Bit 28 and bits 23 to 16 are reserved for future use.
- Bits 15 to 0 (content field) contain either the ARINC-429 traffic or additional tags. These additional tags generate extra data; snarfer filtering can be employed to reduce the amount of data written into the snarfer FIFO.

Snarfer filtering rules can be applied depending on how full the FIFO is (0-25%, 25-50%, 50-75%, 75-100% full). At each level you can apply a rule where the following is captured:

Traffic, MessageCount, IrigTime, Error
 Traffic, IrigTime, Error
 Traffic, IrigTime
 Traffic, Error
 Error
 None

The snarfer sample rate must be set based on the combined bus bit rates, bus utilization, and the amount of additional tag information.

When the FIFO is full, additional data is lost and the content identifier indicating Snarfer Full is set; then the content field is set to 0xAAAA. When the snarfer is empty, the content identifier field is set to Snarfer Empty and the content field is set to 0x5555.

Even if the snarfer is not required for traffic and tags, consider setting the snarfer filter to Error Only. This ensures all errors can be logged and timestamped when they occur.

Connector pinout of the KAD/ABM/101

PIN	NAME	SEE SPECIFICATIONS TABLE	COMMENT
1	DATA(0)+	ARINC-429 inputs	ARINC-429 bus
2	DATA(0)-	ARINC-429 inputs	ARINC-429 bus
3	DATA(1)+	ARINC-429 inputs	ARINC-429 bus
4	DATA(1)-	ARINC-429 inputs	ARINC-429 bus
5	DATA(2)+	ARINC-429 inputs	ARINC-429 bus
6	DATA(2)-	ARINC-429 inputs	ARINC-429 bus
7	DATA(3)+	ARINC-429 inputs	ARINC-429 bus
8	DATA(3)-	ARINC-429 inputs	ARINC-429 bus
9	DATA(4)+	ARINC-429 inputs	ARINC-429 bus
10	DATA(4)-	ARINC-429 inputs	ARINC-429 bus
11	DATA(5)+	ARINC-429 inputs	ARINC-429 bus
12	DATA(5)-	ARINC-429 inputs	ARINC-429 bus
13	DATA(6)+	ARINC-429 inputs	ARINC-429 bus
14	DATA(6)-	ARINC-429 inputs	ARINC-429 bus
15	DATA(7)+	ARINC-429 inputs	ARINC-429 bus
16	DATA(7)-	ARINC-429 inputs	ARINC-429 bus
17	DNC		Do not connect
18	DNC		Do not connect
19	DNC		Do not connect
20	DNC		Do not connect
21	DNC		Do not connect
22	DNC		Do not connect
23	DNC		Do not connect
24	DNC		Do not connect
25	DNC		Do not connect
26	DNC		Do not connect
27	DNC		Do not connect
28	DNC		Do not connect
29	DNC		Do not connect
30	DNC		Do not connect
31	DNC		Do not connect
32	DNC		Do not connect
33	GND	Internal ground	
34	GND	Internal ground	
35	GND	Internal ground	
36	GND	Internal ground	
37	GND	Internal ground	
38	GND	Internal ground	
39	GND	Internal ground	
40	GND	Internal ground	
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/ABM/101	ARINC-429 bus monitor parser/snarfer - 8ch (with 52-way double-density connector)
KAM/ABM/101	ARINC-429 bus monitor parser/snarfer - 8ch (with 51-way micro-miniature 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/ABM/101 refers to both the KAD and KAM version of the module.

Revision history

REVISION	DIFFERENCES	STATUS
KAD/ABM/101	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/MAN/018	KSM-500 Databook
DOC/GBK/002	Environmental Qualification Handbook
DOC/MAN/030	DAS Studio 3 User Manual
TEC/NOT/006	ARINC-429
TEC/NOT/016	Power dissipation
TEC/NOT/049	Power estimation

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