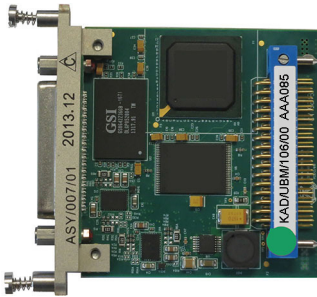


KAD/UBM/106

RS-232, RS-422 or RS-485 serial bus snarfer - 16ch

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Key Features

- Monitors up to 16 RS-422/485/232 busses
- 1 KB buffer per channel (snarfer)
- Bit-rates from 300 bps to 1,000,000 bps
- 7/8 bits per word with odd, even or no parity

Applications

- Interfacing with serial data links

Overview

The KAD/UBM/106 is used to monitor up to 16 RS-232/422/485 channels. The module can snarf (send all data to a FIFO) up to 16 RS-232/422/485 channels. The module is able to snarf each channel at the same time.

The signal type (RS-232/422/485), bits per word, and parity are programmable on a channel-by-channel basis.

The snarfer stores all data from each bus in a separate FIFO 1 KB deep. The FIFO is read via the Acra KAM-500 backplane. Each received data byte can be read once from the FIFO. If the FIFO contains data, a fresh data flag is set in the 16-bit word read from the snarfer. If the FIFO is empty, then the fresh data flag is cleared and the data bits are filled with zeros.

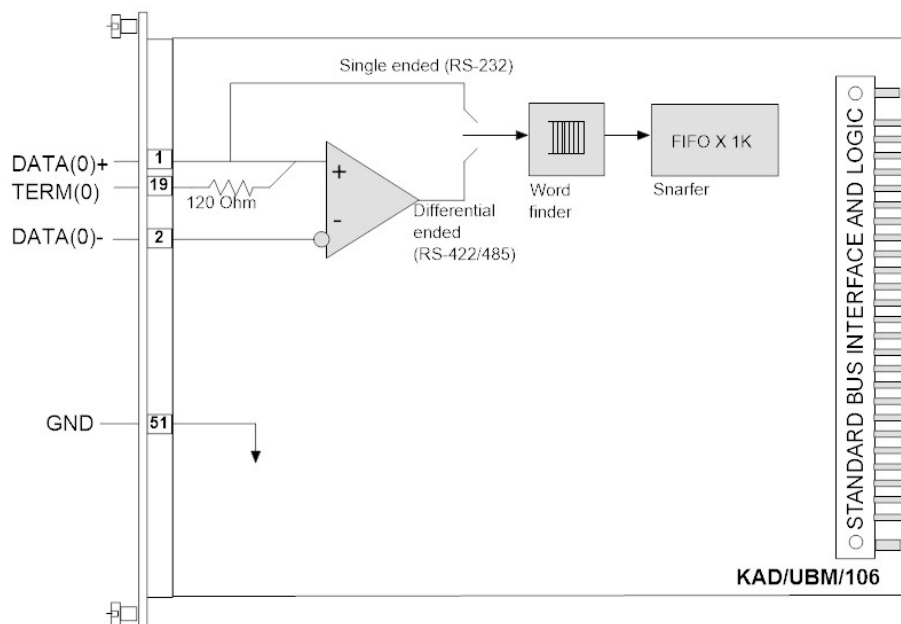


Figure 1: First of 16 channels of the KAD/UBM/106

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						
	–	75	–	g		
	–	2.64	–	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	–	230	260	mA		
±7V	–	0	0	mA		
±12V	–	0	0	mA		
total power	–	1.15	1.30	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 RS-422/RS-485 inputs

PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Inputs	-	-	16	-	
Signalling rate					
DATA	0.0003	-	1	Mbps	NRZ-L.
Input voltage					
operating range	-15	-	15	V	Do not exceed operating range.
logic 0	-	-	0.2	V	(190mV hysteresis) $V_{IN+} - V_{IN-}$.
logic 1	0.2	-	-	V	(190mV hysteresis) $V_{IN+} - V_{IN-}$.
common mode voltage	-7	-	12	V	
overvoltage protection	-15	-	15	V	Voltage in excess of these values can damage input.
ESD protection	-	16	-	kV	Human Body Model.
Input resistance					
between inputs	-	250	-	k Ω	Module powered up and no input termination.
between inputs	-	260	-	k Ω	Module powered down and no input termination.
between inputs	-	120	-	Ω	Module powered up and inputs terminated with external or internal termination resistor.
between inputs	-	120	-	Ω	Module powered down and inputs terminated with external termination resistor.

TABLE 3 RS-232 inputs

PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Inputs	-	-	16	-	
Signaling rate					
DATA[15:0]	0.0003	-	1	Mbps	
Input voltage					
operating range	-15	-	15	V	Do not exceed operating range.
logic 0	-	-	0.6	V	
logic 1	2.5	-	-	V	
overvoltage protection	-15	-	15	V	Voltages outside of this range can damage input.
ESD protection	16	-	16	kV	Human Body Model.
Input resistance					
each input to GND	-	5	-	k Ω	Module powered up.
each input to GND	-	130	-	k Ω	Module powered down.

Setting up the KAD/UBM/106

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/UBM/106	KAD/UBM/106	The instrument part reference.
SerialNumber	AAE1234	AAE1234	Unique name for each module.
Settings	-	-	-
Fill Value	0000 to FFFF	0000	Value used to fill empty snarfer data (8 least significant bits of Fill Value only).
Channels	-	-	-
Serial-In(15:0) <i>Serial Input</i>	-	-	Connection between the module channel and RS-232/422/485 data bus.
Settings <i>Serial Interface</i>	-	-	-
Signal Type	RS-232 RS-422 RS-485	RS-422	Type of data stream.
Baud Rate	300 to 1000000	9600	Specifies the number of symbols transmitted per second.
Data Bits Per Word	7 8	8	Bits per incoming data word. Two incoming words are packed into a single 16-bit output word.
Parity	No Parity Even Parity Odd Parity	No Parity	Configure whether parity bit is present in incoming data.
Programmable Termination	Disabled Enabled	Disabled	Enable internal 120-ohm termination resistance. (Note: not active when power is disabled. Use wiring selectable termination instead if termination is required at all times.)
MSB First	True False	False	LSB of each character is usually transmitted first. Enable this setting if the MSB is transmitted first.

Parameter definitions

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
Global Parameters				
Report Indicates the status of the monitor.	BitVector	BitVector	16	R[15:0] R(15) ErrorIndicator - 1 indicates an error occurred since last read. R[14:11] BusNumber - The bus the error occurred on. R[10:4] Reserved - Reserved for future use. R[3:0] ErrorCodes - Each bit set indicates that a particular error occurred since report word last read. After the report word has been read, further reads return the last non-zero error code with the ErrorIndicator bit not set. 0001: Parity error. 0010: Bad stop bit. Other: Reserved for future use.

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
<i>Serial-In(15:0) Parameters</i>				
ChannelByteCount Count of bytes received on this bus.	Count	OffsetBinary	16	R[15:0]
ChannelErrCount Count of errors detected on this bus.	BitVector	BitVector	16	R[15:0]
Snarfer Snarfer Register	BitVector	BitVector	16	R[15:0] R[15:8] FifoData - The 8/7 bits received. R(15) is the First Bit Transmitted if MSB First setting is true, R(8) is the First Bit Transmitted if MSB First setting is false. R(7) FifoFresh - 1 indicates the FIFO data is a new value R(6) FifoWasFull - 1 indicates the FIFO was full R[5:0] Reserved - Reserved for future use

NOTE: It is recommended that names do not contain any of the following five characters "/><\.

Getting the most from the KAD/UBM/106

Each of the 16 bus connections can be independently selected as RS-232, RS-422 or RS-485. For RS-232 (single ended), use a DATA(x)+ pin and leave the corresponding DATA(x)- pin unconnected. Both data pins are required when a differential mode is selected (RS-422 or RS-485).

The following figure shows how to optionally terminate the RS-422 and RS-485 receivers by using the internal termination resistor provided on the module (TERM[x] pin). It is important to ground each source of RS-232, RS-422 or RS-485. Star grounding provides optimal noise rejection. For details on grounding, see *TEC/NOT/063 - Grounding and shielding of the Acra KAM-500*.

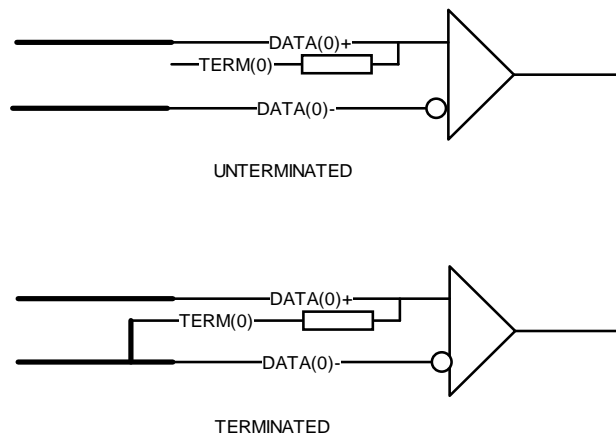


Figure 2: Optional RS-422/RS-485 third pin termination

Snarfer example

The KAD/UBM/106 snarfer is implemented in a 1 KB FIFO. The following example shows how data is set.

Settings are as follows:

- Transmitter 8 data bits with value 0xCB (1100 1011)
- MSB first set to False
- EVEN parity
- 1 stop bit

The following output on consecutive 10-bit PCM words from the relevant channel of the KAD/UBM/106.

>...| 0000 0000 00 | 1100 1011 10 | 0000 0000 00 | ...

>...| Before sample | byte sampled | After sample | ...

- Bits 15:8 – the byte on the serial line or 0x00 fill data if FIFO Fresh flag is cleared (this means the FIFO is empty)
- Bit 7 – FIFO Fresh bit flag indicator (high if byte is fresh – low if byte is a fill word due to empty FIFO)
- Bit 6 – FIFO Was Full bit flag (high if FIFO data is first fresh word after overflow)
- Bits 5:0 – don't care

Sampling requirements

In order to snarf 100% of the traffic in the serial bus and avoid a buffer overflow, a sampling frequency higher than the maximum incoming traffic is required. In order to calculate this rate, the incoming serial bit-rate, maximum expected burst of data (if known), buffer size (1 KB) and additional bits (parity/stop bits) need to be taken into account.

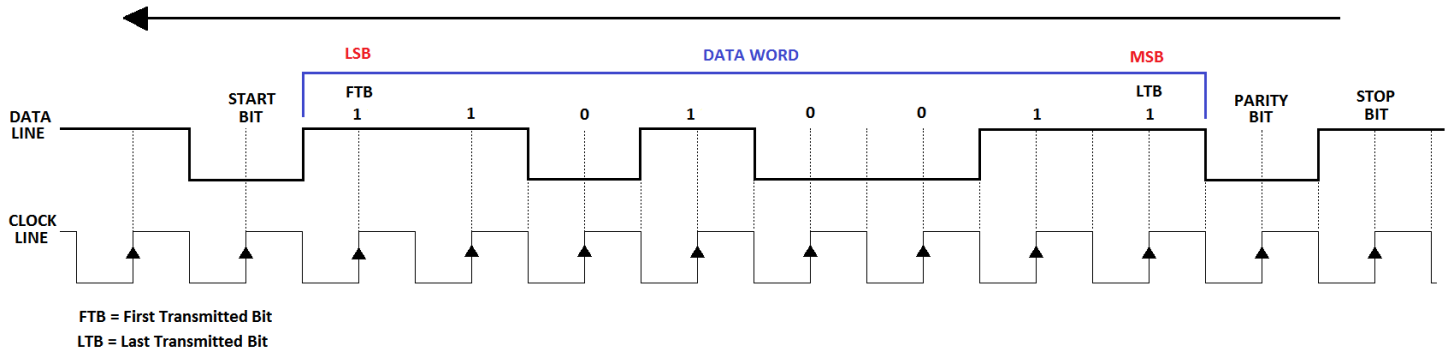


Figure 3: Example: sending 0xCB as 8-bit payload

Error codes

Code ¹	DESCRIPTION
1 ₁₆	Parity error.
2 ₁₆	Bad stop bit.
0 ₁₆ , 3 ₁₆ , 4 ₁₆ , 5 ₁₆ , 6 ₁₆ , 7 ₁₆	Reserved for future use.

1. Error codes are in hexadecimal.

Connector pinout of the KAD/UBM/106

PIN	NAME	SEE SPECIFICATIONS TABLE	COMMENT
1	DATA(0)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
2	DATA(0)-	RS-422/RS-485 inputs	Data in; connect to pin 19 for 120Ω termination
3	DATA(1)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
4	DATA(1)-	RS-422/RS-485 inputs	Data in; connect to pin 21 for 120Ω termination
5	DATA(2)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
6	DATA(2)-	RS-422/RS-485 inputs	Data in; connect to pin 23 for 120Ω termination
7	DATA(3)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
8	DATA(3)-	RS-422/RS-485 inputs	Data in; connect to pin 25 for 120Ω termination
9	DATA(4)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
10	DATA(4)-	RS-422/RS-485 inputs	Data in; connect to pin 27 for 120Ω termination
11	DATA(5)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
12	DATA(5)-	RS-422/RS-485 inputs	Data in; connect to pin 29 for 120Ω termination
13	DATA(6)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
14	DATA(6)-	RS-422/RS-485 inputs	Data in; connect to pin 31 for 120Ω termination
15	TERM(7)	RS-422/RS-485 inputs	Connect to pin 16 for 120Ω termination
16	DATA(7)-	RS-422/RS-485 inputs	Data in; connect to pin 15 for 120Ω termination
17	DATA(8)-	RS-422/RS-485 inputs	Data in; connect to pin 34 for 120Ω termination
18	GND	Internal ground	
19	TERM(0)	RS-422/RS-485 inputs	Connect to pin 2 for 120Ω termination
20	TERM(9)	RS-422/RS-485 inputs	Connect to pin 38 for 120Ω termination
21	TERM(1)	RS-422/RS-485 inputs	Connect to pin 4 for 120Ω termination
22	TERM(10)	RS-422/RS-485 inputs	Connect to pin 40 for 120Ω termination
23	TERM(2)	RS-422/RS-485 inputs	Connect to pin 6 for 120Ω termination
24	TERM(11)	RS-422/RS-485 inputs	Connect to pin 42 for 120Ω termination
25	TERM(3)	RS-422/RS-485 inputs	Connect to pin 8 for 120Ω termination
26	TERM(12)	RS-422/RS-485 inputs	Connect to pin 44 for 120Ω termination
27	TERM(4)	RS-422/RS-485 inputs	Connect to pin 10 for 120Ω termination
28	TERM(13)	RS-422/RS-485 inputs	Connect to pin 46 for 120Ω termination
29	TERM(5)	RS-422/RS-485 inputs	Connect to pin 12 for 120Ω termination
30	TERM(14)	RS-422/RS-485 inputs	Connect to pin 48 for 120Ω termination
31	TERM(6)	RS-422/RS-485 inputs	Connect to pin 14 for 120Ω termination
32	TERM(15)	RS-422/RS-485 inputs	Connect to pin 50 for 120Ω termination
33	DATA(7)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
34	TERM(8)	RS-422/RS-485 inputs	Connect to pin 17 for 120Ω termination
35	DATA(8)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
36	GND	Internal ground	
37	DATA(9)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
38	DATA(9)-	RS-422/RS-485 inputs	Connect to pin 20 for 120Ω termination
39	DATA(10)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
40	DATA(10)-	RS-422/RS-485 inputs	Connect to pin 22 for 120Ω termination
41	DATA(11)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
42	DATA(11)-	RS-422/RS-485 inputs	Connect to pin 24 for 120Ω termination
43	DATA(12)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
44	DATA(12)-	RS-422/RS-485 inputs	Connect to pin 26 for 120Ω termination
45	DATA(13)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
46	DATA(13)-	RS-422/RS-485 inputs	Connect to pin 28 for 120Ω termination
47	DATA(14)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
48	DATA(14)-	RS-422/RS-485 inputs	Connect to pin 30 for 120Ω termination
49	DATA(15)+	RS-422/RS-485 inputs, RS-232 inputs	Data in
50	DATA(15)-	RS-422/RS-485 inputs	Connect to pin 32 for 120Ω termination
51	GND	Internal ground	
52	CHASSIS	Chassis	

Ordering information

PART NUMBER	DESCRIPTION
KAD/UBM/106	RS-232, RS-422 or RS-485 serial bus snarfer - 16ch

By default, the standard mating connector, CON/KAD/002/CP, 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).

Revision history

REVISION	DIFFERENCES	STATUS
KAD/UBM/106	First release	Recommended for new programs

Supporting software

SOFTWARE	DIFFERENCES
DAS Studio 3	User interface for setup and management of data acquisition, network switches, recorders and ground stations in an integrated environment

Related documentation

DOCUMENT	DETAILS
DOC/DBK/001	Acra KAM-500 Databook
DOC/HBK/002	Environmental Qualification Handbook
DOC/MAN/030	DAS Studio 3 User Manual
TEC/NOT/016	Power dissipation
TEC/NOT/049	Power estimation
TEC/NOT/063	Grounding and shielding of the Acra KAM-500

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