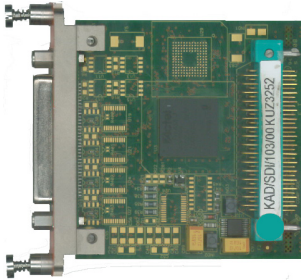


KAD/SDI/103

Serial data bus parser - 1ch

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Overview

The KAD/SDI/103 is used to read data serially from external devices and store the data in a coherent frame buffer.

Synchronization is done via a Data clock, a Word clock and a Frame clock.

Key Features

- Frame data is time-tagged using standard 3 x 16 timer to 1 μ s resolution
- Decommutates one serial stream in RS-422 format
- Accepts NRZ-L, Bit clock, Word clock and Frame clock
- 100kbps, 200kbps, 300kbps, 500kbps, 800kbps, 1Mbps baud rates supported
- Supports 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096 words per frame
- Programmable word length (12 or 16-bit)
- No supercommutation
- All inputs have option for termination
- NRZ-L and Bit clock can be triggered on rising or falling edge

Applications

- Data acquisition systems
- General purpose serial data read from external devices

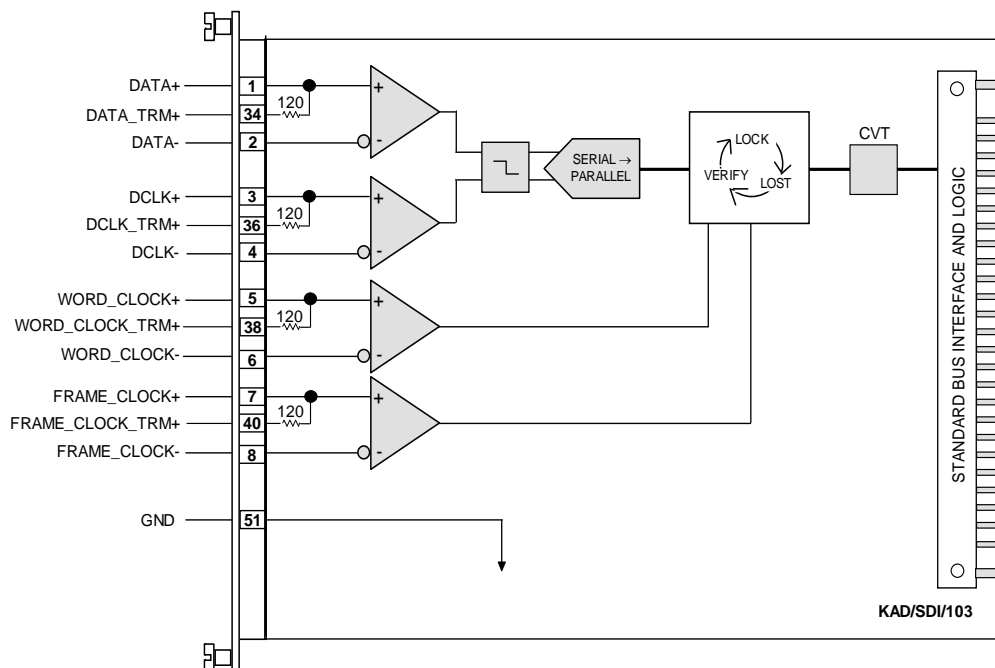


Figure 1: KAD/SDI/103 block diagram

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						
	–	64	–	g		
	–	2.25	–	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	80	–	105	mA		
±7V	0	–	0	mA		
±12V	0	–	0	mA		
total power	0.40	–	0.53	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 inputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS	
Inputs	-	-	4	-		
Signaling rate						
DATA	-	-	1	Mbps		
Input voltage						
operating range	-7	-	12	V	Do not exceed operating range.	
logic 0	-	-	0.2	V	$V_{IN+} - V_{IN-}$	
logic 1	0.2	-	-	V	$V_{IN+} - V_{IN-}$	
common mode voltage	-7	-	12	V		
overvoltage protection	-7.5	-	12.5	V	Voltages outside of this range can damage input.	
ESD protection	8	-	-	kV	Human Body Model.	
Input resistance						
between inputs	12	-	-	k Ω	Module powered on.	
between inputs	12	-	-	k Ω	Module powered off.	
between inputs	-	120	-	Ω	Module powered on and inputs terminated.	
between inputs	-	120	-	Ω	Module powered off and inputs terminated.	
each input to GND	6	-	-	k Ω	Module powered on.	
each input to GND	6	-	-	k Ω	Module powered off.	

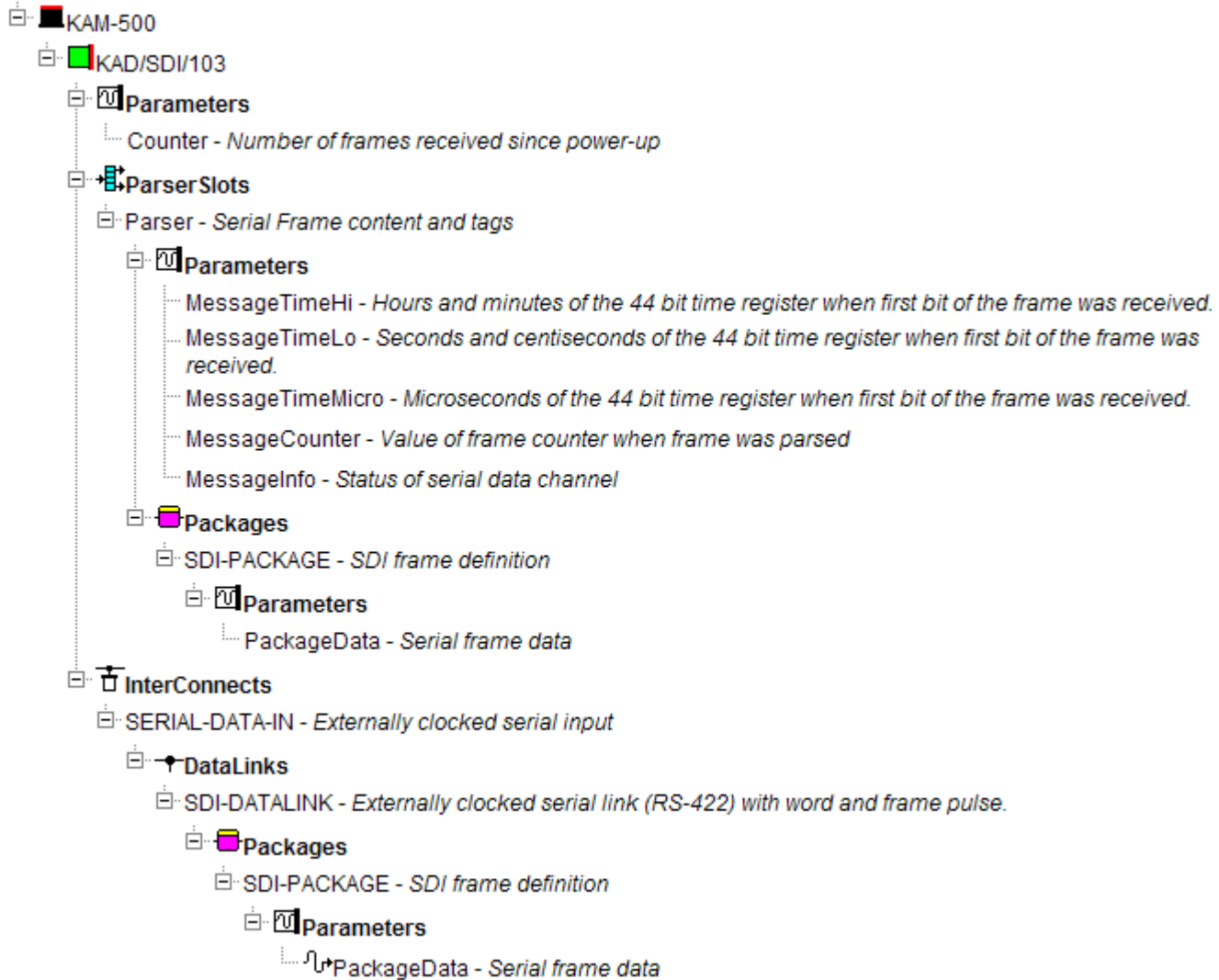
Setting up the KAD/SDI/103

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

The following treeview provides an overview of setup configurations available for this module:

Treeview icons legend	
<p> DAU: Data Acquisition Unit</p> <p> PC: Personal Computer</p> <p> Instrument: Any component or module used in a data acquisition system</p> <p> DataLink: Connection for transmitting or receiving (defines both the data link and the physical layer)</p> <p> Package: Used to describe how data is transmitted or stored</p> <p> Parameter: Any register that can be read from an instrument</p> <p> Algorithm: Defines processing to be performed on data</p> <p> InterConnect: Represents a physical connection on an instrument</p> <p> PCI card: Circuit board that plugs into the PCI bus on a PC</p>	<p> Indicator: Indicates the firing of an event based on specific conditions</p> <p> Parser slot: Area of memory reserved for storing parsed data</p> <p> Snarfer: Captures all data transmitted on a bus and selectively stores it</p> <p> Bridge: Electrical circuit usually used for measuring purposes</p> <p> PCMCIA card: Peripheral interface device usually for use in laptop computers</p> <p> Multiplexer: Selects one of many input signals and outputs that signal on a signal line</p> <p> Channels: Defines settings for input or output channels on an instrument</p>

Instrument Overview



Setting up the module

The following table lists the setup configurations available for the KAD/SDI/103.

SETUP DATA	CHOICE	DEFAULT/EXAMPLE	NOTES
Manufacturer			
Name	ACRA CONTROL	ACRA CONTROL	Name of manufacturer.
PartReference	KAD/SDI/103	KAD/SDI/103	ACRA CONTROL part number.
SerialNumber	-	-	Unique number for each module.
InterConnects			
SERIAL-DATA-IN	No character limit	Not Specified	Externally clocked serial input.
Settings	-	-	-
Module-Parser-1.0	-	-	-
PackageBuffers	-	-	-
PackageBuffer			
Parser	-	-	Serial frame content and tags.
PackageReference	No character limit	MySDIFrame	-

Setting up parameters

Parameter definitions

The following table lists all parameters that are available for the KAD/SDI/103.

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
MessageTimeHi Hours and minutes of the 44-bit time register when first bit of the frame was received.	Unitless	BitVector	16	R[15:13] Reserved for future use. R[12:7] Time[43:38] BCD Hours 0 to 23. R[6:0] Time[37:31] BCD Minutes 0 to 59.
MessageTimeLo Seconds and centiseconds of the 44-bit time register when first bit of the frame was received.	Second	BCD	16	R(15) Reserved for future use. R[14:8] Time[30:24] Seconds 0 to 59. R[7:0] Time[23:16] Centiseconds 0 to 99.
MessageTimeMicro Microseconds of the 44-bit time register when first bit of the frame was received.	Second	BCD	16	R[15:0] Time[15:0] Microseconds 0 to 9999.
Counter Number of frames received since power-up	Count	OffsetBinary	16	R[15:0] 0000:FFFF.
MessageCounter Value of frame counter when frame was parsed	Count	OffsetBinary	16	R[15:0] 0000:FFFF.
MessageInfo Status of serial data channel	–	BitVector	16	R(15) Error received on the bus since last read. R[14:11] Reserved for future use. R(11) Buffer is empty. R(10) Data has been read before. R(9) Data has been overwritten. R[8:3] Reserved for future use. R(2) Frame clock error. R(1) Word clock error. R(0) Bit clock error.
PackageData Serial frame data	–	BitVector	12 16	12 R[11:0] is data, with R[15:12] = 0. 16 R[15:0].

Programmable elements

PackageData

SETUP DATA	CHOICE	DEFAULT/EXAMPLE	NOTES
SizeInBits	12 16	Not Specified	R[15:0].
ParameterTypeReference	–	–	–

Setting up data links

A data link is a connection for transmitting and receiving data. It defines both the data link and physical layers of the link. The following are data links supported by the KAD/SDI/103.

SERIAL-DATA-IN

Externally clocked serial link (RS-422) with word and frame pulse.

SETUP DATA	CHOICE	DEFAULT/EXAMPLE	NOTES
ProtocolProperties			
BitRate	1,000,000 800,000 500,000 300,000 200,000 100,000	Not Specified	-

Setting up packages

A package is a logical description of how data is transmitted or stored.

SDI-PACKAGE

SDI frame definition.

SETUP DATA	CHOICE	DEFAULT/EXAMPLE	NOTES
ReferencedToAbsoluteTime	No	No	Data can only be received asynchronously.
DataLinkReference	No character limit	Not Specified	-
Properties	-	-	-
MajorFrameProperties	-	-	-
BitsPerMinorFrame	65536:48	512	65536 when using a 16-bit word size and 4K words per frame.
MinorFramesPerMajorFrame	1	1	-
DefaultDataBitsPerWord	12 16	16	Bit per word.
DefaultMostSignificantBit	First	First	-
FillPattern	-	-	-
DefaultParity	None	None	-
SynchronizationStrategy			
SyncWord	-	-	-
SubframeSynchronizationStrategy	-	-	-
Modulation			
PCMCode	-	-	-
DclkPhase	0 180	0	-
PCMPolarity	True False	True	-
Content	-	-	-

SETUP DATA	CHOICE	DEFAULT/EXAMPLE	NOTES
Parameter	-	-	
NumberOfDataBits	12 16	Not Specified	-
MostSignificantBit	First	First	-
Location			
MinorFrameNumber	1	1	There can only ever be 1 minor frame per package.
Offset_Words	4096:1	1	-
Offset_Bits	65520:12	16	-
Occurrences	4096:1	1	Number of occurrences of this parameter per frame.

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/SDI/103

Serial lines waveform

The following diagram illustrates serial data timing. Word identification is done via a Data clock (DCLK) and a Word clock. The Frame clock occurrence can be identified by a unique flag or by a time word in the PCM frame. This is identified and checked against the expected frame sync. location as defined by the programmed baud rate, word length and frame length.

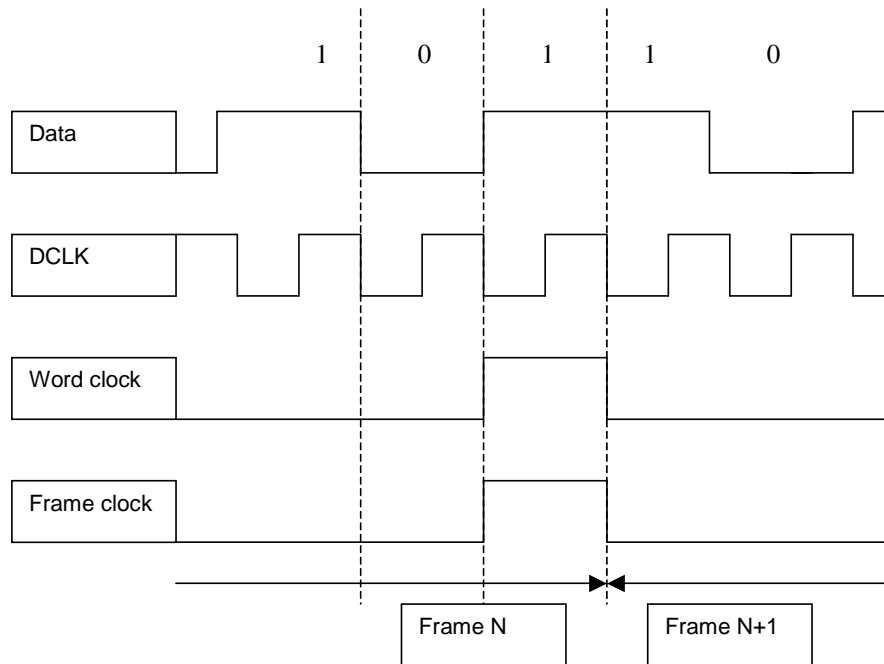


Figure 2: Serial data timing

Interpreting MessageInfo words

The MessageInfo word D(15) indicates when a new error is received. Although D(15) clears after it has been read, the lower three bits do not clear on read; these three bits toggle whenever a new error of that type is detected.

To determine which error was detected, compare the current MessageInfo word—which will have D(15) set—with the previous MessageInfo word.

The toggles of the lower MessageInfo bits indicate the error type.

Loss of frame sync

Data is assembled into frames using the Frame clock, and stored in a triple buffer. The frames can be read in received order. If data is read again before a new frame arrives, the stale flag is set; if data arrives and no buffer is available, the skipped flag is set.

Connector pinout of the KAD/SDI/103

PIN	NAME	SEE SPECIFICATIONS TABLE	COMMENT
1	DATA+	RS-422 inputs	Data input; not internally terminated
2	DATA-	RS-422 inputs	Data input; not internally terminated
3	DCLK+	RS-422 inputs	Data clock input; not internally terminated
4	DCLK-	RS-422 inputs	Data clock input; not internally terminated
5	WORD_CLOCK+	RS-422 inputs	Word pulse input; not internally terminated
6	WORD_CLOCK-	RS-422 inputs	Word pulse input; not internally terminated
7	FRAME_CLOCK+	RS-422 inputs	Frame pulse input; not internally terminated
8	FRAME_CLOCK-	RS-422 inputs	Frame pulse input; not internally terminated
9	DNC		Do not connect
10	DNC		Do not connect
11	GND	Internal ground	
12	GND	Internal ground	
13	GND	Internal ground	
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
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	DNC		Do not connect
34	DATA_TRM+	RS-422 inputs	
35	DNC		Do not connect
36	DCLK_TRM+	RS-422 inputs	
37	DNC		Do not connect
38	WORD_CLOCK_TRM+	RS-422 inputs	
39	DNC		Do not connect
40	FRAME_CLOCK_TR+	RS-422 inputs	
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	

Ordering information

PART NUMBER	DESCRIPTION
KAD/SDI/103	Serial data bus parser - 1ch

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/SDI/103	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/016	Power dissipation
TEC/NOT/049	Power estimation

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