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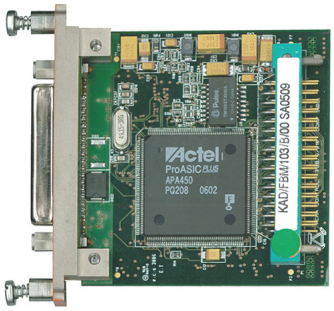
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Find the *Curtiss-Wright / ACRA Control KAD/FBM/103/B/00* at our website: *Click HERE*

KAD/FBM/103

FireWire S200b bus monitor parser - 1ch

CURTISSWRIGHTDS.COM



Key Features

- Monitors up to a single IEEE 1394b compatible bus at a signal rate of 200Mbps (S200b) using a transformer coupled interface
- Coherently parses isochronous and asynchronous stream packets and tags for up to 65 messages using the Channel ID/Message ID
- Maximum payload size of 2KB per packet
- Discards other asynchronous, bus configuration and PHY packets (except traffic with transaction code 0xA)

Applications

- FireWire beta mode bus monitoring

Overview

The KAD/FBM/103 monitors FireWire (IEEE 1394b) traffic. It acts as a leaf in the FireWire bus topology and to all other nodes on the bus, the link layer and transaction layer appear to be deactivated.

The KAD/FBM/103 parses isochronous or asynchronous stream packets. All other traffic is ignored (configuration traffic, PHY packets and asynchronous transactions). Selected packets and associated tag information are stored in one of 65 triple-buffered parser slots. Each parser slot contains up to 1036 16-bit words: 1,030 words of packet content; three words of timestamp information; one word containing the transaction number; one word containing the packet size; and one word containing buffer information.

FireWire packets are parsed in two stages. First, packets are filtered to accept only isochronous and asynchronous stream packets (traffic with transaction code A_{16}). Then the channel ID and message ID (third quadlet in the FireWire packet) are used to classify the packet and determine which of the 65 parser slots the packet is written to. Unique channel ID and message ID combinations can be targeted to any of the 64 available parser slots.

Parser slot 0 may be configured to operate as a catchall slot where any channel and message IDs not mapped to specific parser slots are routed.

The KAD/FBM/103 also provides transaction counters and error detection.

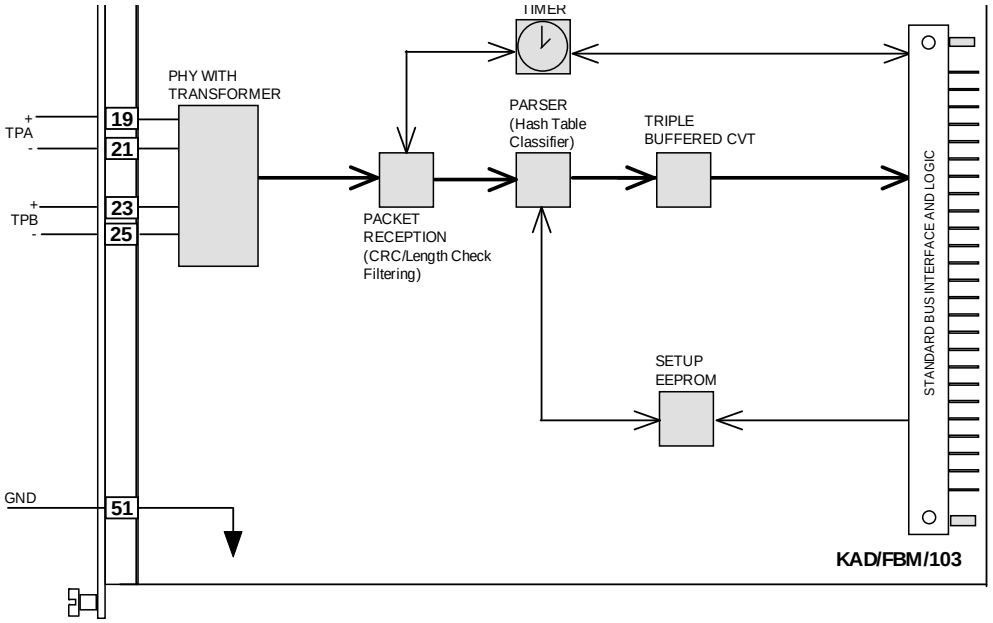


Figure 1: Filtering and parsing in the KAD/FBM/103

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					
	–	74	–	g	
	–	2.61	–	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	–	–	2	Msps	Maximum combined access rate for read and write.
Power consumption					
+5V	195	–	324	mA	
total power	0.972	–	1.62	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 Qualifications Handbook*.
operating temperature	-40	–	85	°C	Chassis base/side plate temperature.
storage temperature	-55	–	105	°C	

TABLE 2	FireWire bus interface				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Inputs	–	–	1	–	IEEE 1394b compatible.
Sampling rate					
TPA	–	–	2	Msps	
TPB	–	–	2	Msps	
Voltage	200	–	800	mV	1394b differential input voltage.
Data rate	–	–	200	Mbps	The KAD/FBM/103 operates at a fixed speed only (FireWire S200B); it cannot autonegotiate to other data rates.

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Setting up the KAD/FBM/103

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

Setting up parameters

For parameter Report

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	Report	FBM103_Report	Received transactions error report.
Base Unit	Unitless	Unitless	R(15) Error occurred since last read. R[14:4] Reserved for future use. R[3:0] Error code.
maximum	8008_{16}	8001_{16}	CRC error occurred since last read.
minimum	0001_{16}	$000F_{16}$	
Data Format	BitVector	BitVector	
Size In Bits	1 to 16	16	

For parameter Sts1394

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	Sts1394	FBM103_Sts_1394	IEEE 1394b port status.
Base Unit	Unitless	Unitless	R[15:8] Reserved for future use. R[7:2] PHY_ID. R(1) Reserved for future use. R(0) Link is connected.
maximum	$00FD_{16}$	0001_{16}	Link is connected. Node has an ID of 0.
minimum	0	0	Nothing is connected to the port.
Data Format	BitVector	BitVector	
Size In Bits	1 to 16	16	

For parameter TotalTrnCnt

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	TrnCnt	FBM103_Trns_Cnt	Transaction counter, counts all fully parsed transactions, counter can overflow.
Base Unit	Unitless	Unitless	
maximum	$FFFF_{16}$	0002_{16}	2 packets were parsed.
minimum	0	0	0 packets were parsed.
Data Format	Offset binary	Offset binary	
Size In Bits	1 to 16	16	

For parameter PackageData

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	PackageData	FBM103_TrnData	IEEE 1394b packet. Pkt_Data_0 is first word received. The first word received is the packet header. 16 MSB bits.
Base Unit	Unitless	Unitless	
maximum	$FFFF_{16}$	0002_{16}	

For parameter PackageData

SET-UP DATA	CHOICE	DEFAULT	NOTES
minimum	0	0	
Data Format	Offset binary	Offset binary	
Size In Bits	1 to 16	16	

For parameter TrnInfo

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	TrnInfo	FBM103_TrnInfo	Information tag for this parsed transaction. This is a non-zero value.
Base Unit	Unitless	Unitless	R(15) 1 indicates that there is no message stored (empty) R(14) 1 indicates this message was read before (stale) R(13) 1 indicates this message overwrote another (skipped) R[12:0] Reserved for future use, may be non-zero value.
maximum	8000_{16}	8000_{16}	Parser slot empty, nothing parsed since power-up.
minimum	0	0	New message parsed, no messages skipped.
Data Format	BitVector	BitVector	
Size In Bits	1 to 16	16	

For parameter TrnTimeHi

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	TrnTimeHi	FBM103_TrnTimeHi	Hours and minutes time of start of transaction.
Base Unit	Unitless	Unitless	[12:11] Tens of Hours D[10:7] Hours D[6:4] Tens of Minutes D[3:0] Minutes
maximum	$11D9_{16}$	0002_{16}	Message was received when TimeHi was 0 hours, 2 minutes.
minimum	0	0	
Data Format	BitVector	BitVector	
Size In Bits	1 to 16	16	

For parameter TrnTimeLo

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	TrnTimeLo	FBM103_TrnTimeLo	Seconds and centiseconds time of the start of transaction.
Base Unit	Second	Second	R[14:12] Tens of seconds R[11:8] Ones of seconds R[7:4] Tenths of seconds R[3:0] Hundredths of seconds
maximum	5999_{16}	0002_{16}	Message was received when TimeLo was 0.02 seconds.
minimum	0	0	
Data Format	BinaryCodedDecimal	BinaryCodedDecimal	
Size In Bits	1 to 16	16	

For parameter TrnTimeMicro

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	TrnMicroTime	FBM103_TrnMicroTime	Microsecond time of the start of the acquisition cycle.
Base Unit	Second	Second	
maximum	9999_{16}	0002_{16}	Message was received when TimeMicro was 2µs.
minimum	0	0	
Data Format	BinaryCodedDecimal	BinaryCodedDecimal	
Size In Bits	1 to 16	16	

For parameter TrnCnt

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	TrnCnt	FBM103_TrnCnt	Transaction number.
Base Unit	Unitless	Unitless	
maximum	$FFFF_{16}$	0002_{16}	Message was the 2nd parsed packet.
minimum	0	0	
Data Format	Offset binary	Offset binary	
Size In Bits	1 to 16	16	

For parameter TrnSize

SET-UP DATA	CHOICE	DEFAULT	NOTES
Name	TrnSize	FBM103_TrnSize	Packet size in quadlets, with header, header CRC, data, and data CRC.
Base Unit	Unitless	Unitless	
maximum	0203_{16}	0103_{16}	Message has a 1024B data payload (total packet size is 1036B).
minimum	4	4	Message has a 4B data payload (total packet size us 16B).
Data Format	Offset binary	Offset binary	
Size In Bits	1 to 16	16	

Setting up instrumentation

This module uses the X-Module-Firewire-Monitor-1.1 XidML schema. (See http://www.xidml.org).

For messages

SET-UP DATA	CHOICES	DEFAULT	NOTES
Manufacturer			
name	ACRA CONTROL	ACRA CONTROL	
part reference	KAD/FBM/103	KAD/FBM/103	ACRA CONTROL part number.
serial number	Fixed 6 characters	FE1234	Unique number for each module.
Settings			
MessageBuffer	Parser(0) to Parser (64)	Parser(0)	This element is used to store the name of messages that are buffered together.
Name	Message Name	Msg_0_J5_0	This element is used to store the name of a message.

For messages

SET-UP DATA	CHOICES	DEFAULT	NOTES
fill value	0 to $FFFF_{16}$	1023	Value used to fill empty parser slots. This is the default value for all parameters beginning with Trn, except TrnInfo which is 8000_{16} when nothing is parsed. Also all PackageData are filled with this value when nothing is parsed.

Setting up packages

This module uses the X-Firewire-1.1 XidML schema. (See http://www.xidml.org).

For transaction channels

SET-UP DATA	CHOICES	DEFAULT	NOTES
Synchronous	No	No	
Packages per acquisition cycle	1	1	
Properties			
number of words	0 to 1029	4	
HashBinaryValue	1,0,X Up to 32 bits	1,00000000000000000000000000000000	The channel, Message High and Message Low ID are stored in a hashbinary. If the OffsetIndex_Bits is 8, the value contains the channel. If the OffsetIndex_Bits is 64, the value is the Message High and Message Low ID's.
OffsetIndex_Bits		8, 64	Specifies the offset in bits of the location containing the specified value.
Content			
parameter	no character limit	P1	
offset words	0 to 1029	0	

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

Getting the most from the KAD/FBM/103/B

Triple buffering

Triple buffering supports concurrent access to the packet being read, packet being received, and an interim packet. The transaction information (TrnInfo) word associated with each packet is used to indicate whether the packet is stale (buffer has been read before) or skipped (buffer has been overwritten).

Packet classification

FireWire isochronous (or asynchronous stream) packets can be stored in one of 65 parser slots or dropped (not stored). The decision on which parser slot to store the packet or to drop the packet is based on three fields of information from each packet: the 6-bit Channel ID; the upper 16 bits of the Message ID; and the lower 16 bits of the Message ID (Message ID is the third quadlet in the packet). An explicit data value or a special wildcard value ALL can be specified for each of these fields. The combination of these three fields plus a destination parser slot is defined as a rule. Up to 255 rules can be specified. Rules can allow for multiple packets to be stored in a single parser slot. And rules may overlap. The compiler sorts and processes rules in a deterministic order.

The following table is an example set of rules that can be defined. Rules may be entered in any order. The compiler sorts the rules as shown in this table. Rules for a channel are grouped together and then within this group explicit rules are processed first, followed by wildcard rules.

TABLE 3 Example classification names

Rule	Parser Slot	Channel ID	Message Hi ID	Message Lo ID	Order Rules Processed	Description
0	1	1	ALL	ALL	1	All packets with a Channel ID of 1 are routed to parser slot 1.
1	2	2	ALL	CAFE	2	All packets with a Channel ID of 2 and the Message Lo ID of CAFE are routed to parser slot 2.
2	3	3	0	0	3	Packets with a Channel ID of 3, a Message Hi ID of 0 and a Message Lo ID of 0 are routed to parser slot 3.
3	4	3	0	ALL	4	Packets that match this pattern, excluding packets that match rule 2, are routed to parser slot 4.
4	5	3	ALL	0	5	Packets that match this pattern, excluding packets that match rule 2 and 3, are routed to parser slot 5.
5	6	3	ALL	ALL	6	Packets that match this pattern, excluding packets that match rule 2, 3, and 4, are routed to parser slot 6.
6	62	ALL	DEAD	DEAD	7	Packets that match this pattern are routed to parser slot 62. For Channel ID 1, this rule has no effect. For Channel ID 2, this rule affects all packets not covered by rule 1. For Channel ID 3, this rule has no effect. The reason is that rules 3-6 have higher priority than this rule.

TABLE 3	Example classification names (continued)					
Rule	Parser Slot	Channel ID	Message Hi ID	Message Lo ID	Order Rules Processed	Description
7	63	ALL	BODE	ALL	8	Packets that match this pattern are routed to parser slot 63. Rules 0 to 6 have higher priority than this rule.
8	64	ALL	ALL	ABBA	9	Packets that match this pattern are routed to parser slot 64. This rule has the lowest priority.

Error codes for the KAD/FBM/103

Code[1]	Description
0_{16}	Reserved for future use.
1_{16}	CRC error in header or payload was detected.
2_{16}	FIFO overflow. This indicates that the amount of incoming traffic that needs to be parsed exceeds the processing capability of the module. Filtering must be tightened.
3_{16}	Reserved for future use.
4_{16}	Length mismatch. The length defined in the header does not match the actual received amount of data.
5_{16}-7_{16}	Reserved for future use.
8_{16}	Packet too big. A packet was received that exceeds the maximum payload of 2048 bytes.
9_{16}-D_{16}	Reserved for future use.
E_{16}	Reserved for future use.
F_{16}	Default value after power up.

1. Error codes are in hexadecimal.

Connector pinout of the KAD/FBM/103

PIN	NAME	SEE SPECIFICATIONS TABLE	COMMENT
1	DNC		Do not connect
2	DNC		Do not connect
3	DNC		Do not connect
4	DNC		Do not connect
5	DNC		Do not connect
6	DNC		Do not connect
7	DNC		Do not connect
8	DNC		Do not connect
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
19	TPA+	FireWire bus interface	Receive Data+ (IEEE convention uses TPA)
20	DNC		Do not connect
21	TPA-	FireWire bus interface	Receive Data- (IEEE convention uses TPA*)
22	DNC		Do not connect
23	TPB+	FireWire bus interface	Transmit Data+ (IEEE convention uses TPB)
24	DNC		Do not connect
25	TPB-	FireWire bus interface	Transmit Data- (IEEE convention uses TPB*)
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	DNC		Do not connect
35	DNC		Do not connect
36	DNC		Do not connect
37	DNC		Do not connect
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	

Ordering information

PART NUMBER	DESCRIPTION
KAD/FBM/103/B	FireWire S200b bus monitor 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/FBM/103/B	Transformer coupled FireWire bus monitor with enhanced parsing	Recommended for new programs
KAD/FBM/103	First release	Not recommended for new programs

Supporting software

SOFTWARE	DETAILS
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 Qualifications Handbook
DOC/MAN/018	KSM-500 Databook
TEC/NOT/016	Power dissipation
TEC/NOT/049	Power estimation

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