

# KAD/FBM/102

FireWire bus monitor parser - 1ch

**CURTISS -  
WRIGHT**


## FEATURES

- IEEE 1394 compliant
- Monitors IEEE 1394a and 1394b at signaling rates of 100Mbps, 200Mbps and 400Mbps
- Coherent parsing of traffic
- Transaction level tagging (time, count, status, info)
- Maximum payload size of 2kByte per packet
- Triple buffering of parsed packets
- Discards bus configuration packets and PHY packets
- Provides transaction counters and error detection

## APPLICATIONS

- FireWire bus monitoring

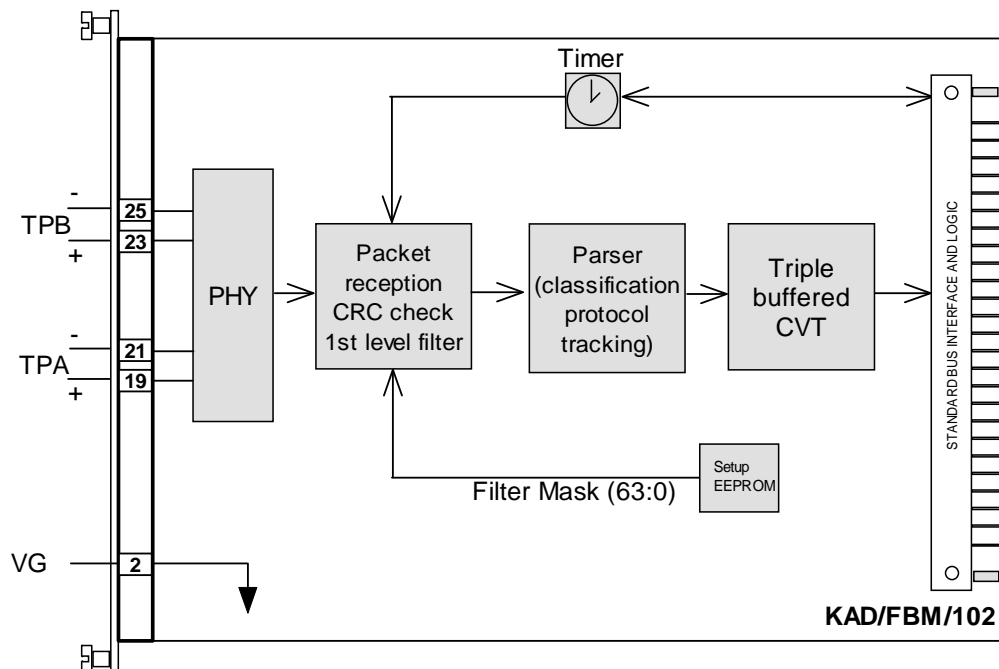
## DESCRIPTION

The KAD/FBM/102 is designed to monitor IEEE 1394 (FireWire) traffic, parse and tag packets, and distribute the monitored packet contents to other Acra KAM-500 modules. The KAD/FBM/102 acts as a leaf in the FireWire bus topology. To all other nodes on the bus the link layer and transaction layer appear to be deactivated.

The bus monitor triple buffers up to 64 isochronous channels or asynchronous stream packets, with associated tags, i.e. the attributes which the bus monitor associates with each parsed packet (time, count, status and information words).

Each buffer contains up to 1036 16-bit words, i.e. 1030 words of packet content, 3 words of timestamp, 1 word containing transaction number, 1 word containing information tag (INFO), and 1 word containing packet size. Triple buffering supports concurrent access to the packet being read, packet being received, and an interim packet. The INFO word tag associated with each packet is used to indicate whether the packet is stale (buffer has been read before) or skipped (buffer has been overwritten).

Data selection and content is based on a 64-bit filter mask, which allows the selection of each individual isochronous channel for parsing. Only traffic with transaction code 0xA is recognized. Bus configuration traffic, PHY packets, and asynchronous transactions are ignored. The KAD/FBM/102 is available only with a 52-way double density connector.



FireWire interface of the KAD/FBM/102

## Ordering Information

Part Number	Description
KAD/FBM/102	FireWire 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/102	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

## Specifications

<b>I/O considerations:</b>	Self-powered single IEEE 1394 bilingual port. Chassis and signal ground are fully isolated on this module (see IEEE Std 1384b-2002, 4.2.1B.5.1.).
<b>Sampling restrictions:</b>	Supports transfer rates up to 2Msps.

## Module setup

### Setting up Parameters

```

<Parameters>
  <ParameterTypeSet>
    :
    <ParameterType Name="MyCounterType">
      <BaseUnit>Count</BaseUnit>
      <DataType>BinaryCodedDecimal</DataType>
    </ParameterType>
    :
  </ParameterTypeSet>
  <ParameterSet>
    :
    <Parameter Name="MyTransactionCounter">
      <ParameterProperties>
        <ParameterTypeReference>MyCounterType</ParameterTypeReference>
      </ParameterProperties>
      <Source>
        <Signal>
          <InstrumentReference>MyFBM102</InstrumentReference>
          <VendorMap>TRANSACTION_COUNT</VendorMap>
        </Signal>
      </Source>
    </Parameter>
    :
  </ParameterSet>
</Parameters>

```

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	Name	Type	Range	Default	Mandatory	Applies to	Description
①	InstrumentReference	Name	N/A	N/A	Yes	Each module	Name of module.
②	ParameterName	Name	N/A	N/A	No	Each parameter	The name assigned to this module.
③	VendorMap	Selection	N/A	N/A	Yes	Each parameter	Selection of registers (please see <i>Output Registers</i> for more details).

## Setting up Instrumentation

```

<Instrumentation>
  <InstrumentSet>
  :
    <X-DAU Name="MyDAU">
      <Manufacturer>
        <Name>ACRA CONTROL</Name>
        <PartReference>KAM/CHS/3U</PartReference>
      </Manufacturer>
    </X-DAU>
  :
    <X-Module-Firewire-Monitor-1.0 Name="MyFBM102">
      <Manufacturer>
        <Name>ACRA CONTROL</Name>
        <PartReference>KAD/FBM/102</PartReference>
      </Manufacturer>
      <Location>MyDAU</Location>
      <SubLocation>3</SubLocation>
      <Settings>
        <Module-Firewire-Monitor-1.0>
          <FillValue>1023</FillValue>
          <Channel Index="0">
            <Ignore>No</Ignore>
          </Channel>
        </Module-Firewire-Monitor-1.0>
      </Settings>
    </X-Module-Firewire-Monitor-1.0>
  :
</InstrumentSet>
:
</Instrumentation>

```

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- ⑦
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	Name	Type	Range	Default	Mandatory	Applies to	Description
④	Location	Name	N/A	N/A	Yes	Each DAU	Name of DAU.
⑤	ParameterName	Name	N/A	N/A	No	Each parameter	The name assigned to this module.
⑥	Ignore	Boolean	Yes, No	Yes	Yes	Each isochronous transaction channel	Ignores the selected isochronous transaction channel.
⑦	FillValue	16-bit value	0 to FFFF	1023	Yes	Each module	Value used to fill empty parser slot.

## Setting up Packages

```

<Packages>
  <PackageSet>
    :
    <X-Firewire-1.0 Name="MyFirewirePackage">
      <Synchronous>Yes</Synchronous>
      <PackagesPerAcquisitionCycle>2</PackagesPerAcquisitionCycle>
      <Source>
        <ChannelNumber>0</ChannelNumber>
      </Source>
      <Properties>
        <NumberOfWords>8</NumberOfWords>
      </Properties>
      <Content>
        <Parameter Name="P1">
          <Location>
            <Offset_Words>1</Offset_Words>
          </Location>
        </Parameter>
      </Content>
    </X-Firewire-1.0>
    :
  </PackageSet>
</Packages>

```

	Name	Type	Range	Default	Mandatory	Applies to	Description
⑧	PackageReference	Name	N/A	N/A	Yes	Each package	Reference to a named package definition.
⑨	ChannelNumber	Number	0 to 63	N/A	No	Each module	Firewire isochronous transaction channel.

## Output registers

The diagram shows the 64K registers that can be read from the KAD/FBM/102.

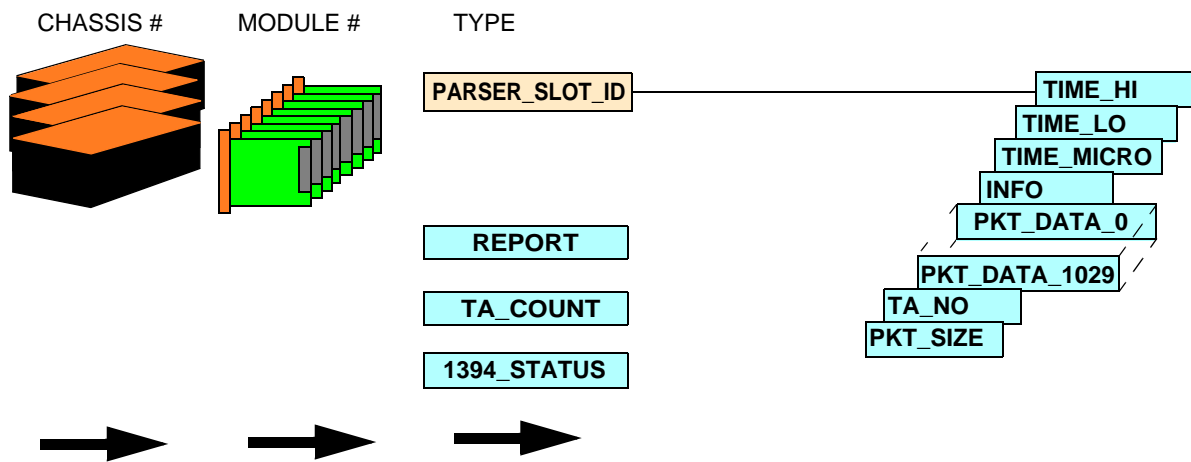


Figure 2: Choosing a parameter to be read from the KAD/FBM/102

Register	Bits	Description	MSB
<b>TIME_MICRO</b>		Microsecond time at start of first received bit	
	R[15:0]	BCD 0000-9999 microseconds	R(15)
<b>TIME_LO</b>		Seconds and centiseconds time at start of first received bit	
	R[15:0]	BCD 00.00-59.99 seconds	R(15)
<b>TIME_HI</b>		Hours and minutes time at start of first received bit	
	R[15:13]	Reserved for future use	R(15)
	R[12:7]	BCD 00-23 hours	R(12)
	R[6:0]	BCD 00-59 minutes	R(6)
<b>INFO</b>		Information tag for this parsed transaction	
	R(15)	Reserved for future use	
	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	R(12)
<b>PKT_DATA_</b>	R[15:0]	IEEE 1394 packet. PKT_DATA_0 is first word received.	R(15)
<b>TA_NO</b>	R[15:0]	Transaction number	R(15)
<b>REPORT</b>	R(15)	Error occurred since last read	
	R[14:4]	Reserved for future use	R(14)
	R[3:0]	Error code	R(3)
<b>TA_COUNT</b>	R[15:0]	Transaction counter, counts all fully parsed transactions	R(15)

Register	Bits	Description	MSB
1394_STATUS	R[15:8]	Reserved for future use	
	R[7:2]	PHY_ID	R(7)
	R(1)	Reserved for future use	R(1)
	R(0)	Link is connected	R(0)

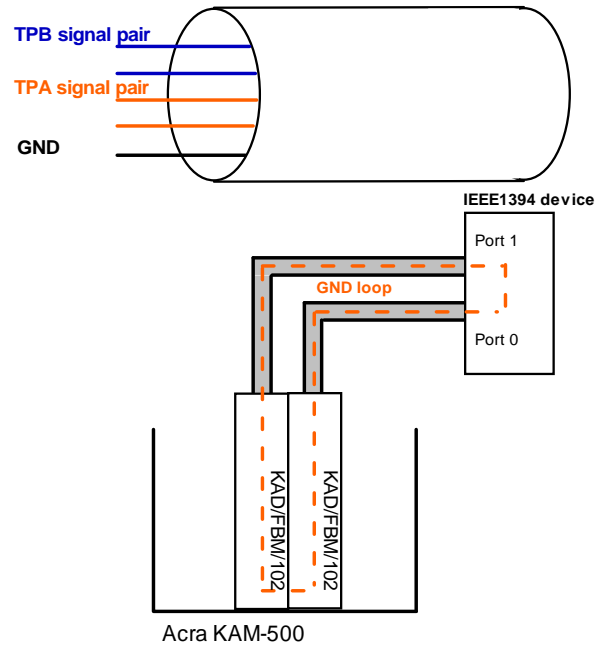
## Error codes for the KAD/FBM/102

Code <sup>1</sup>	Description
0 <sub>16</sub>	Reserved for future use
0xF	Default startup value; not an error
1 <sub>16</sub>	CRC error in header or payload was detected
2 <sub>16</sub>	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 <sub>16</sub>	Reserved for future use
4 <sub>16</sub>	Length mismatch. The in the header given payload does not match the actual received amount of data
5-7 <sub>16</sub>	Reserved for future use
8 <sub>16</sub>	Packet too big. a packet was received that exceeds the maximum payload of 2048 bytes
9-D <sub>16</sub>	Reserved for future use
E <sub>16</sub>	Reserved for future use

1. Error codes are in hexadecimal.

## Getting the most from the KAD/FBM/102

Ground loops can be encountered when a single Acra KAM-500 chassis is populated with two or more KAD/FBM/102s that monitor the same IEEE1394 bus, as standard FireWire cables carry signal ground either separately and/or through one or both of the inner shields. It is recommended that only one IEEE1394 bus ground be connected to the Acra KAM-500 chassis.





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## Connector pinout of KAD/FBM/102

Pin	Name	I/O	Description	Comment
1	DNC			Do not connect
2	VG		Cable ground	
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+	D/E signal	Data on receive, strobe on transmit (differential pair)	TPA in IEEE convention
20	DNC			Do not connect
21	TPA-	D/E signal	Data on receive, strobe on transmit (differential pair)	TPA* in IEEE convention
22	DNC			Do not connect
23	TPB+	D/E signal	Strobe on receive, data on transmit (differential pair)	TPB in IEEE convention
24	DNC			Do not connect
25	TPB-	D/E signal	Strobe on receive, data on transmit (differential pair)	TPB* in IEEE convention
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	TPA(R)		Twisted pair A ground reference	Isolates the TPA(R) from other GNDs as required when connecting to beta capable nodes
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	GND		Internal ground	
51	GND		Internal ground	
52	CHASSIS		Chassis	