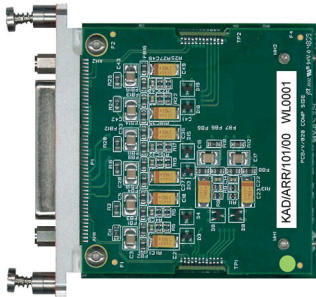


KAD/ARR/101

ARINC 664 Part 7 (A664P7) redundancy remover - 1ch



Key Features

- Single dual redundant A664P7 compatible interface using two IEEE 802.3u (100BaseTX) standard compatible Ethernet interfaces
- Supports up to 512 virtual links
- Filters redundant frames received within a 5ms window on the two A664P7 links; outputs exact copies of the non-redundant frames on the two output Ethernet interfaces
- Valid frame counters, error frame counters and discarded redundant frame counters
- Fixed latency through module

Applications

- Filtering of dually redundant A664P7 Ethernet network traffic

Overview

The KAD/ARR/101 is designed with two Ethernet network interfaces, which monitor network traffic on dually redundant A664P7 Ethernet links. The A664P7 redundancy remover captures frames on the two A664P7 links and performs error checking, such as Ethernet frame check sequence and the IP header checksum, on the received frames. Valid frames are buffered to facilitate filtering of redundant frames captured on the two A664P7 links.

Each A664P7 frame has a Virtual Link Identifier (VLID) in the destination field and a sequence number, which increments by one with each frame. The first A664P7 frame on a virtual link received after reset/startup is sent to the redundancy remover. That VLID and Sequence Number (SN) are stored and any subsequent frame on that virtual link, with a sequence number equal to SN+1 or SN+2, is passed to the redundancy remover, and the new sequence number is stored. For any frames received on that virtual link with a sequence number not equal to SN+1 or SN+2, the new sequence number is stored but the frame is discarded.

Redundant copies are identified by having the same VLID and SN. The first A664P7 frame with a unique VLID and SN is sent directly to the output Ethernet interfaces. If another A664P7 frame with the same VLID and SN is received less than 5ms later, it is considered redundant and is not output. Should a redundant copy arrive in this time frame it is removed. The filtered frames are then output unchanged on two Ethernet network interfaces after a fixed latency.

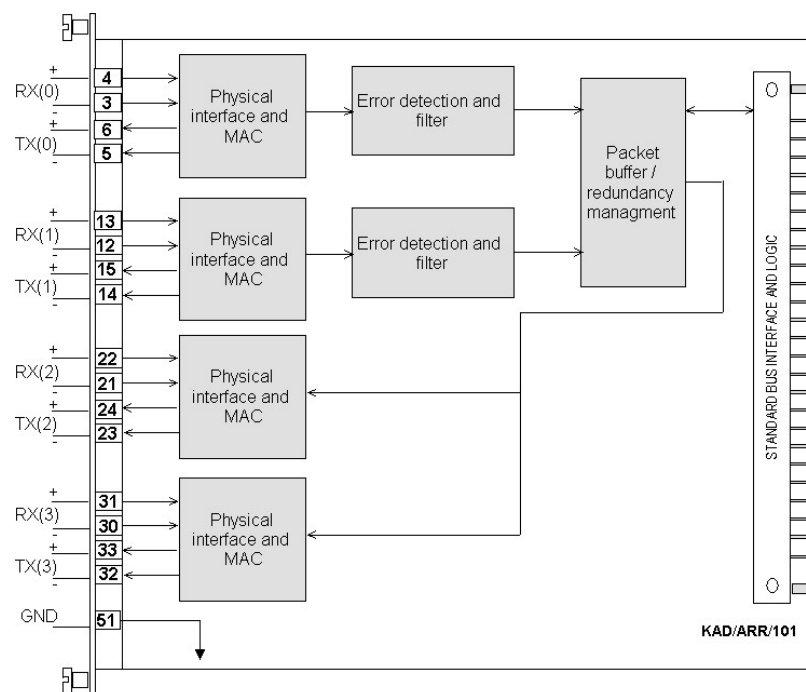


Figure 1: A664P7 redundancy remover

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		
	-	2.65	-	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	Mbps	Maximum combined access rate for read and write.	
Power consumption						
+5V	149	-	323	mA		
±7V	0	-	0	mA		
±12V	0	-	0	mA		
total power	0.74	-	1.62	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		Ethernet interface				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS	
Inputs/outputs	-	-	2	-	IEEE 802.3 compatible.	

















TABLE 3		A664P7 interface ¹				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS	
Inputs/outputs	-	-	1	-	Dual redundant A664P7 compatible.	

1. The physical layer is two IEEE 802.3 redundant ports.

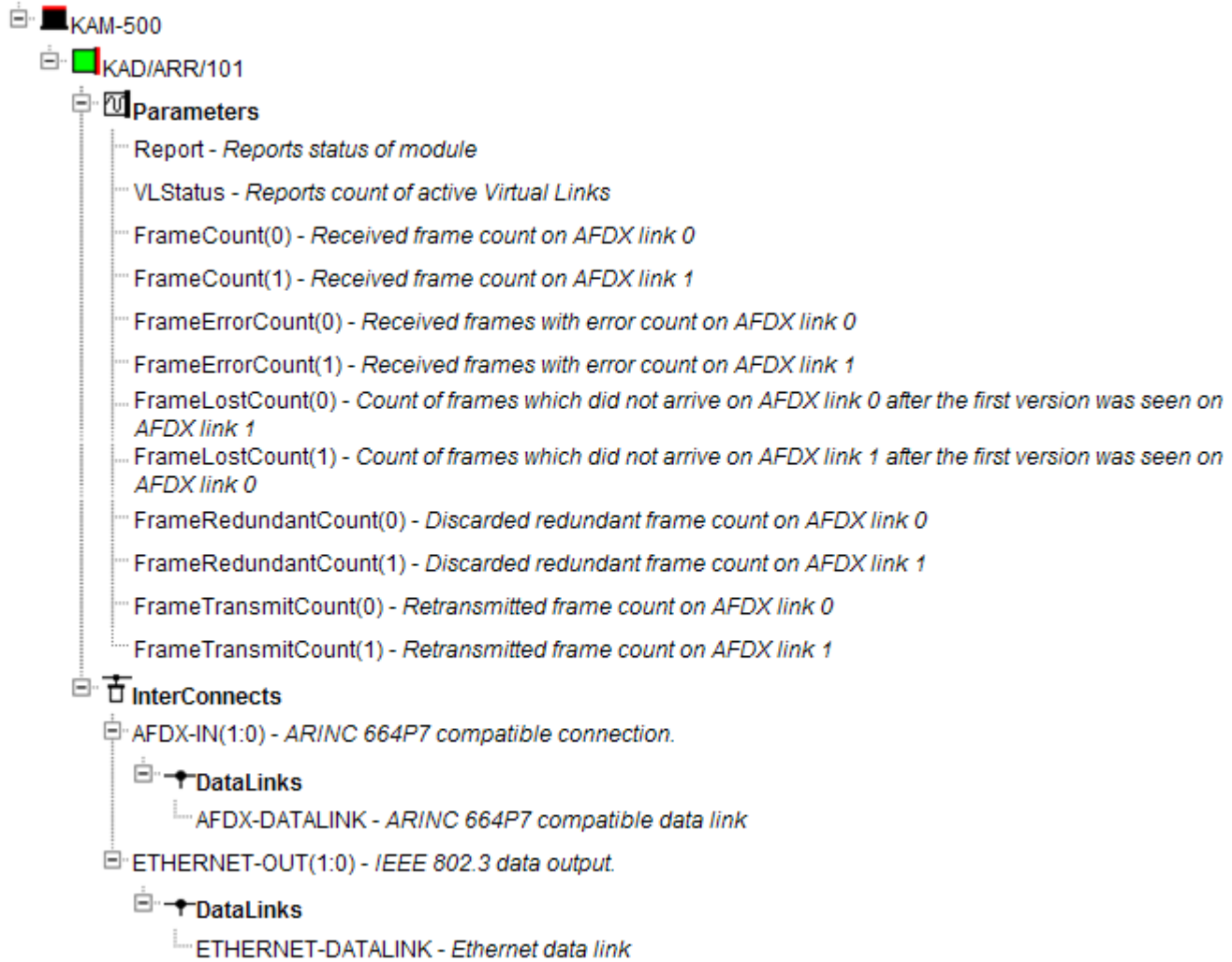
Setting up the KAD/ARR/101

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	
<ul style="list-style-type: none">  DAU: Data Acquisition Unit  PC: Personal Computer  Instrument: Any component or module used in a data acquisition system  DataLink: Connection for transmitting or receiving (defines both the data link and the physical layer)  Package: Used to describe how data is transmitted or stored  Parameter: Any register that can be read from an instrument  Algorithm: Defines processing to be performed on data  InterConnect: Represents a physical connection on an instrument  PCI card: Circuit board that plugs into the PCI bus on a PC 	<ul style="list-style-type: none">  Indicator: Indicates the firing of an event based on specific conditions  Parser slot: Area of memory reserved for storing parsed data  Snarfer: Captures all data transmitted on a bus and selectively stores it  Bridge: Electrical circuit usually used for measuring purposes  PCMCIA card: Peripheral interface device usually for use in laptop computers  Multiplexer: Selects one of many input signals and outputs that signal on a signal line  Channels: Defines settings for input or output channels on an instrument

Instrument Overview



Setting up the module

The following table lists the setup configurations available for the KAD/ARR/101.

SETUP DATA	CHOICE	DEFAULT	NOTES
Manufacturer	-	-	-
Name	ACRA CONTROL	ACRA CONTROL	Name of manufacturer.
PartReference	KAD/ARR/101	KAD/ARR/101	ACRA CONTROL part number.
SerialNumber	-	-	Unique name for each module.
InterConnects			
AFDX-IN(1:0)	No character limit	Not Specified	A664P7 compatible connection.
ETHERNET-OUT(1:0)	No character limit	Not Specified	IEEE 802.3 data output.

Setting up parameters

Parameter definitions

The following table lists all parameters that are available for the KAD/ARR/101.

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
Report Reports status of module.	Unitless	BitVector	16	R[15:2] Reserved for future use. R(1) Error Code: 0 = no frames received on link 1 1 = no error R(0) Error Code: 0 = no frames received on link 0 1 = no error
VLStatus Reports count of active virtual links.	Unitless	BitVector	16	R(15) VL overflow: 0 = Normal operation, (count is valid) 1 = more than 512 unique virtual link IDs found since tracking started; redundancy removal not operational on additional virtual links. R[14:10] Reserved for future use. R[9:0] Count of virtual links being tracked (range 0-512 inclusive).
FrameCount(0) Received frame count on AFDX link 0.	Count	OffsetBinary	16	R[15:0] 0000:FFFF (hex)
FrameCount(1) Received frame count on AFDX link 1.	Count	OffsetBinary	16	R[15:0] 0000:FFFF (hex)
FrameErrorCount(0) Received frames with error count on AFDX link 0.	Count	OffsetBinary	16	R[15:0] 0000:FFFF (hex)
FrameErrorCount(1) Received frames with error count on AFDX link 1.	Count	OffsetBinary	16	R[15:0] 0000:FFFF (hex)
FrameLostCount(0) Count of frames which did not arrive on AFDX link 0 after the first version was seen on AFDX link 1.	Count	OffsetBinary	16	R[15:0] 0000:FFFF (hex)
FrameLostCount(1) Count of frames which did not arrive on AFDX link 1 after the first version was seen on AFDX link 0.	Count	OffsetBinary	16	R[15:0] 0000:FFFF (hex)
FrameRedundantCount(0) Discarded redundant frame count on AFDX link 0.	Count	OffsetBinary	16	R[15:0] 0000:FFFF (hex)
FrameRedundantCount(1) Discarded redundant frame count on AFDX link 1.	Count	OffsetBinary	16	R[15:0] 0000:FFFF (hex)
FrameTransmitCount(0) Retransmitted frame count on AFDX link 0.	Count	OffsetBinary	16	R[15:0] 0000:FFFF (hex)
FrameTransmitCount(1) Retransmitted frame count on AFDX link 1.	Count	OffsetBinary	16	R[15:0] 0000:FFFF (hex)

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/ARR/101.

Non-programmable data links

NAME	DESCRIPTION
AFDX-IN(1:0)	A664P7 compatible data link
ETHERNET-OUT(1:0)	Ethernet data link

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/ARR/101

100BaseTX physical layer medium is defined as 100Ω Category 5 UTP cable.

Monitoring network traffic as an end system

The KAD/ARR/101 monitors true full-duplex traffic per link, in real-time. It receives only data sent from the A664P7 switches.

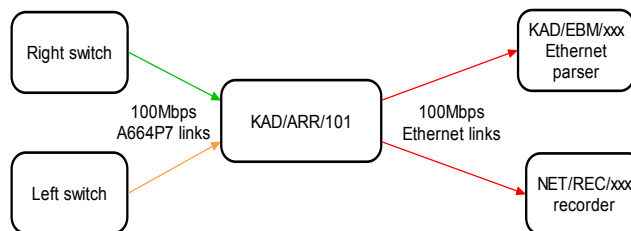


Figure 2: Ethernet monitoring as an end system

Monitoring network traffic via a hub

The KAD/ARR/101 can monitor traffic through a hub installed in one (or both) A664P7 links.

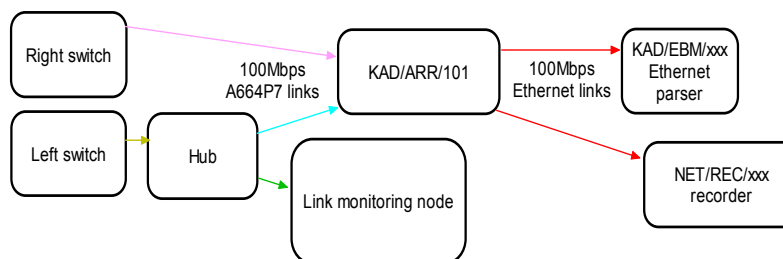


Figure 3: Ethernet monitoring via hub

KAD/ARR/101 limitations

The following is a summary of the KAD/ARR/101 module limitations:

- The module does not respond to Address Resolution Protocol (ARP) or PING on the two A664P7 links.
- The module does not respond to ARP or PING on the two Ethernet links.
- The two output Ethernet links should be connected directly to a KAD/EBM/xxx module and/or a NET/REC/xxx recorder. If a switch is used, it must be a NET/SWI/xxx or a KAD/SWI/xxx, and be configured for fixed 100Mbps operation. The module removes redundancy from the first 512 virtual links it detects. All frames from virtual links detected after the 512th virtual link are passed through. No redundancy removal is performed on frames from virtual links detected after the 512th virtual link.
- A combination of high data rate, a time skew between the input A664P7 links, and frame loss may cause non fixed latency through the module. In particular, where frames that should both be transmitted are received simultaneously on both input links, the first arriving packet is delayed by the fixed latency and the later packet is output immediately afterwards, respecting the inter-frame gap period.

Connector pinout of the KAD/ARR/101

PIN	NAME	SEE SPECIFICATIONS TABLE	COMMENT
1	DNC		Do not connect
2	DNC		Do not connect
3	RX(0)-	A664P7 interface	Connection to A664P7 Network A
4	RX(0)+	A664P7 interface	Connection to A664P7 Network A
5	TX(0)-	A664P7 interface	Connection to A664P7 Network A
6	TX(0)+	A664P7 interface	Connection to A664P7 Network A
7	DNC		Do not connect
8	DNC		Do not connect
9	CHASSIS	Chassis	
10	DNC		Do not connect
11	DNC		Do not connect
12	RX(1)-	A664P7 interface	Connection to A664P7 Network B
13	RX(1)+	A664P7 interface	Connection to A664P7 Network B
14	TX(1)-	A664P7 interface	Connection to A664P7 Network B
15	TX(1)+	A664P7 interface	Connection to A664P7 Network B
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	RX(2)-	Ethernet interface	Ethernet output 1
22	RX(2)+	Ethernet interface	Ethernet output 1
23	TX(2)-	Ethernet interface	Ethernet output 1
24	TX(2)+	Ethernet interface	Ethernet output 1
25	DNC		Do not connect
26	DNC		Do not connect
27	CHASSIS	Chassis	
28	DNC		Do not connect
29	DNC		Do not connect
30	RX(3)-	Ethernet interface	Duplicate of Ethernet output 1
31	RX(3)+	Ethernet interface	Duplicate of Ethernet output 1
32	TX(3)-	Ethernet interface	Duplicate of Ethernet output 1
33	TX(3)+	Ethernet interface	Duplicate of Ethernet output 1
34	DNC		Do not connect
35	DNC		Do not connect
36	CHASSIS	Chassis	
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		Not connected
48	DNC		Do not connect
49	DNC		Do not connect
50	CHASSIS	Chassis	
51	GND	Internal ground	
52	CHASSIS	Chassis	

Ordering information

PART NUMBER	DESCRIPTION
KAD/ARR/101	ARINC 664 Part 7 (A664P7) redundancy remover - 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/ARR/101	First release	Recommended for new programs

Supporting software

REVISION	DIFFERENCES
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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