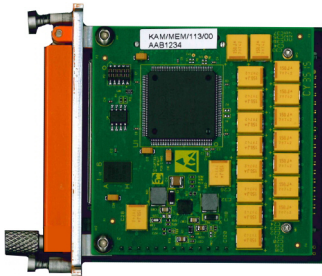


KAM/MEM/113

CompactFlash memory module with PCAP format

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Overview

The KAM/MEM/113 is a memory card interface which supports logging to CompactFlash removable memory cards.

The KAM/MEM/113 is designed to be used with a wide range of CompactFlash cards. The KAM/MEM/113 can store data in a CompactFlash card from any combination of data sources in an Aera KAM-500 system. Data storage can be triggered by a combination of discrete bits and analog signal levels.

Recorded data is written directly to files. The recorded files are formatted according to the PCAP file format so that they are viewable with network analysis tools such as Wireshark. Recorded data can be read directly from the CompactFlash card on a PC with any off-the-shelf card reader.

The KAM/MEM/113 is designed for applications where stand-alone logging of data is required, that is, without the need for a separate data recorder. Status and Report registers are available for transmission via an output module, to monitor errors, logging conditions, and capacity remaining. This can be useful as a pre-test checkout capability.

For asynchronous bus data, the KAM/MEM/113 supports aperiodic transmission for efficient bandwidth use, whereby a packet is not generated if no fresh data has been acquired from a packetizer user-module.

The KAM/MEM/113 has a knurled head captive screw for fastening/unfastening the data acquisition unit lid by hand or with tools.

Key Features

- Supports removable solid-state memory cards
- Removable CompactFlash® media (supports Type I & II)
- Uses FAT32 file system
- Stores Ethernet frames in industry standard Packet CAPture (PCAP) files, viewable using Wireshark® or another third party application
- Always Log or log when triggered
- Logs data at up to 2 Msps
- Records IENA and/or iNET-X packets

Applications

- Stand-alone data logging

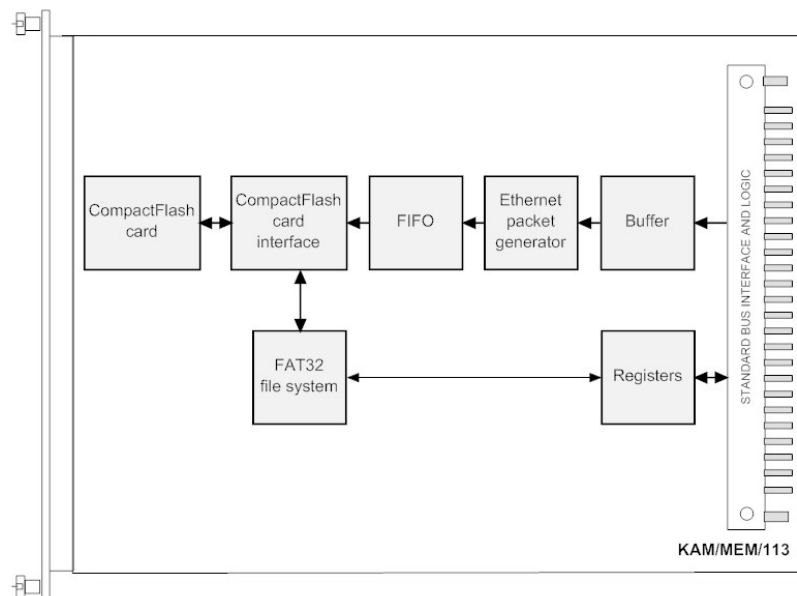


Figure 1: KAM/MEM/113 functional diagram

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						
	–	105	–	g		
	–	3.7	–	oz	Design metric is grams.	
Height above chassis					For clearance requirements for the hinged lid, see measurements in Figure 5 on page 9.	
bare connector	–	–	11	mm		
bare connector	–	–	0.43	in.	Design metric is millimeters.	
Access rate	–	–	4	MspS	Maximum combined access rate for read and write.	
Power consumption						
+5V	208	–	300	mA		
±7V	0	–	0	mA		
±12V	0	–	0	mA		
total power	1.04	–	1.5	W	CompactFlash card fitted. 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		CompactFlash interface				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS	
Memory size	–	–	128	GB	Correct operation can only be guaranteed with CompactFlash cards validated and approved for use with the KAM/MEM/113. For details of approved CompactFlash cards, see the <i>CompactFlash cards</i> data sheet.	
Recording rate	–	–	2	MspS	The KAM/MEM/113 supports sampling rates of up to 2 MspS.	
Format select restrictions	–	–	–	–	One format reserved for Idle Format; another format reserved for Erase Format. All formats except Erase Format and Idle Format can be used. Note, the data set recorded in each format is identical.	
Tightening torque	–	–	–	–	0.6 Nm for all captive screws on the product.	

Setting up the KAM/MEM/113

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	KAM/MEM/113	KAM/MEM/113	The instrument part reference.
SerialNumber	AB1234	AB1234	Unique name for each module.
Settings Time	-	-	Settings relating to synchronization and time conversions.
PTP Leap Seconds	0 to 127	36	Current Leap Second count. Offset between PTP time and UTC time.
Current Year	2000 to 2100	2015	This Current Year value is used as the year in any timestamp values. However, if the unit synchronizes to a time source that specifies the year, this value is updated.
IENA Only	True False	False	When True, the module generates all time stamps using the DOY value and Current Year. When False, the module uses PTP time as the source.
Settings Recorder	-	-	Settings used by PCAP recorders.
Wrap Around	True False	False	Specifies whether logging stops when the CompactFlash card is full or whether logging wraps back around to the start of the CompactFlash card.
Log Condition	Triggered Always Log Triggered Until Full Never Log	Always Log	Specifies whether logging is Triggered, Triggered Until Full, Always On, or Off.
Trigger Truth Table	Trigger A Trigger B Trigger A or B Trigger A and B	Trigger A	Specifies how to form the trigger condition (if Log Condition is Triggered).
Settings Packet Generation	-	-	Defines packets logged to the CompactFlash card.
Dummy IP Address	0.0.0.0 to 255.255.255.255	192.168.28.1	IP address of module, required to generate Ethernet packets for logging on CompactFlash card. A dummy address is used as there is no external Ethernet interface.
Dummy MAC Address	00-00-00-00-00-00 to FF-FF-FF-FF-FF-FF	00-0C-4D-00-03-10	Ethernet address of module, required to generate Ethernet packets for logging on CompactFlash card. A dummy address is used as there is no external Ethernet interface.
Settings Factory	-	-	-
Allow Erase	True False	False	Allows the CF card to be erased when the chassis is switched to the Erase Format select.

SETUP DATA	CHOICE	DEFAULT	NOTES
Idle Format	0 to 14	4	FMT value of Idle Format. When the chassis is in this format, the card is in idle mode (no logging will be started; any active logging will be stopped).
Erase Format	0 to 14	8	FMT value of Erase Format. When the chassis is in this format, the File Table on the card is erased (if Allow Erase is set to True).
Channels	-	-	-
FlashCard FlashCard Output	-	-	Represents a typical CompactFlash card channel on an instrument.
Processes	-	-	-
TriggerA	-	-	An algorithm placed in this process is used to generate the Trigger A (via LookUp).
Settings	-	-	-
Trigger Condition	Algorithm Reference Boolean-Simple Window-Function-Alarm	MyTriggerCon- dition	A reference to an algorithm that defines the trigger condition.
Sample Rate	1 to 100000	1	Number of times to check the event per second (Hz)
TriggerB	-	-	An algorithm placed in this process is used to generate the Trigger B (via LookUp).
Settings	-	-	-
Trigger Condition	Algorithm Reference Boolean-Simple Window-Function-Alarm	MyTriggerCon- dition	A reference to an algorithm that defines the trigger condition.
Sample Rate	1 to 100000	1	Number of times to check the event per second (Hz)

Parameter definitions

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
Global Parameters				
Status Status of CompactFlash card	BitVector	BitVector	16	R[15:0] R[15:8] CompactFlashLevel - 0 - 100 (64h) shows how full the CompactFlash card is as percentage (during formatting, shows percent completed). Set to x"FF" when not applicable. R[7:6] Reserved - Reserved R(5) CardValid - 1 when card available for use. R(4) CardPresent - 1 when card detected. R(3) Filled/Wrapped - 1 when CompactFlash card filled / wrapped-around since power-on. R(2) Formatting - 1 while formatting. R(1) DataLogged - 1 if data logged since power-on. R(0) DataLogging - 1 if logging active.

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
Report Report error conditions	BitVector	BitVector	16	R[15:0] R(15) ReportEvent - 1 if new event reported since last read. R(6) FMT Changed - 1 when FMT has been changed. R(5) Reserved - Reserved R(4) FE Reset - 1 when internal Framing Engine resets. R(3) PBIT Fault - 1 when Power On Self test reports a fault. R(2) SRAM Fault - 1 when SRAM is reporting a fault. R(1) FlashCardFault - 1 when CompactFlash card fault. R(0) LoggingError - 1 when FIFO overflow / logging too fast.
ErrorCount Increments each time an fresh error (as per Report) is detected.	BitVector	BitVector	16	R[15:0]

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 KAM/MEM/113

Any subset of the parameters available over the backplane can be stored in the KAM/MEM/113. Up to two parameters can be used to specify the start (trigger) conditions. For example, an analog signal is within a certain window and certain discrete bits in another parameter can be set.

The status word indicates overflow (logging too fast). Overflow occurs when the CompactFlash card cannot log continuously at the configured sampling rate.

When logging data from analog modules with digital filtering (for example, KAD/ADC/014) after power-on, the digital filtering must be given time to settle before data is logged to the KAM/MEM/113. In this case it is recommended to use time or discrete data as the B trigger input, with the A trigger as the selected analog parameter value range.

When logging at low sample rates (1000 sps) it can take several minutes for the data to be written into the CompactFlash card. Successful writing of the first samples to the CompactFlash card is indicated by the logged bit in the status word. The KAM/MEM/113 supports formatting of the CompactFlash card by switching to the dedicated Erase format; the Status word indicates formatting progress. To prevent unintended formatting of the card, this feature is disabled by default. Data is extracted using an off-the-shelf CompactFlash reader to view the file system under Windows®, and using the Wireshark tool to open the PCAP files.

When a full CompactFlash card is inserted in a KAM/MEM/113, this information is indicated by R[15:8] of the status word being set to 64_{16} (= 100%).

The KAM/MEM/113 stops recording when the media is full, however a wrap-around-when-full setting allows recording to continue after deleting the oldest file.

NOTE: The logging bit D(0) in the status word indicates if the CompactFlash card has triggered; this will remain set even when the CompactFlash card is full.

Idle Format

Idle Format is used to suspend logging while maintenance is being carried out on the system or to remove a CompactFlash card safely.

NOTE: If the CompactFlash card is ejected during logging without being stopped (by either removing a trigger or using Idle Format) data may be lost.

Ensuring data integrity during loss of power

The KAM/MEM/113 has a capacitor bank, which allows the module to save data that is currently being recorded during a loss of power by updating the directory. In the unlikely event that the directory is corrupted as a result of this loss of power, data can be retrieved by post processing the PCAP file.

Avoiding data loss

To avoid data loss or corruption of the most recent data file, we recommend setting Log Condition to either Triggered or Triggered Until Full.

If using the Log Condition setting Always Log, ensure the module is switched to the correct Idle Format value prior to ejecting the CompactFlash card. Switching to the Idle Format value ensures logging stops cleanly.

NOTE: If the chassis is being programmed and the module is triggered, it can result in some short session files being recorded during programming. After programming is finished, normal recording operation resumes.

File format

Ethernet packets are stored in a FAT32 volume using the Wireshark PCAP file format (on condition that the CompactFlash card is not full).

The following figure displays examples of PCAP files stored on the CompactFlash card.

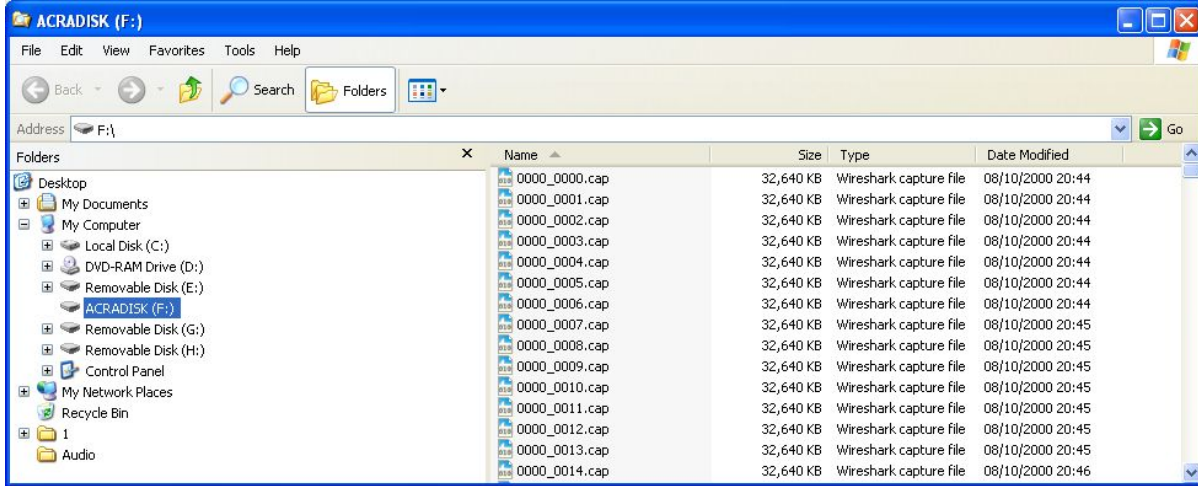


Figure 2: CompactFlash card content viewed in Windows Explorer

PCAP file size

The maximum PCAP file size is 32 MB regardless of the size of the CF card. This is hard-coded into the FPGA and is not configurable.

Storage media

Use only those CompactFlash cards validated and approved for use with the KAM/MEM/113. For details of approved cards, see the *CompactFlash cards* data sheet.

IP packets and how they are stored

PCAP files store packets contiguously (see the following figure).

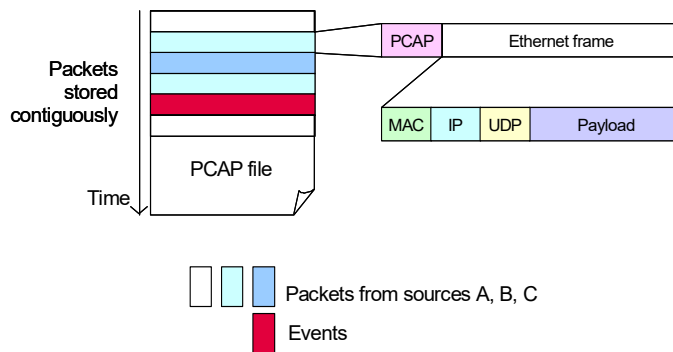


Figure 3: Files of packets

Automatic recording

You can trigger automatic recording on a memory module such as the KAM/MEM/113 by using a parameter or, a combination of two parameter values, from the logged list.

This automatic recording stops only when the trigger conditions, as stated above, are removed. Alternatively, the recording starts on a trigger (on the next acquisition cycle) and records until full. If the trigger condition is met, recording starts on a data

acquisition cycle boundary. Similarly, if the trigger is removed, recording stops on the next data acquisition cycle boundary.

The KAM/MEM/113 can also be configured to Always Log.

Formatting a CompactFlash card

Each CompactFlash card must first be formatted before it can be used in the KAM/MEM/113. One of the following methods can be used for formatting:

- Format a card using an SSR/CHS/001/B.
- Format a card using the erase format from the KAM/MEM/113.
- Format a card using a software utility to format the CompactFlash card on a PC. Note, this software utility can only be used if the card has already been formatted using one of the above two methods.

For more information on the software utilities used for formatting a card, contact Curtiss-Wright support (acra-support@curtisswright.com).

PTP Leap Seconds

When the chassis is synchronized through PTP, the time is already corrected for leap seconds by the BCU. In this situation the Leap Seconds setting on the KAM/MEM/113 is not used.

Difficulty inserting or removing KAM/MEM/113 module

It can sometimes prove difficult to insert and/or extract the KAM/MEM/113 module into a chassis when there is another module in the adjacent slot of the chassis. One of the components on the KAM/MEM/113/02 and /03 module is slightly taller and can potentially hinder the insertion of the KAM/MEM/113 module into the chassis. The KAM/MEM/113 module can still be inserted and extracted from the chassis successfully, however, sometimes, it may be necessary to firstly remove the module in the adjacent slot of the chassis. Then insert the KAM/MEM/113 module and reinsert the module in the adjacent slot.

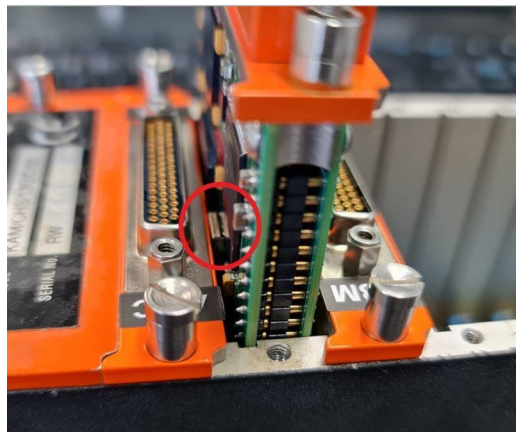


Figure 4: Inserting/extracting a KAM/MEM/113

It is recommended that care should be taken when attempting to insert/extract the KAM/MEM/113 module to/from the chassis slot.

If you do experience this issue and cannot place the module into the chassis safely, then contact support at acra-support@curtisswright.com.

Removing the CompactFlash card

To avoid data loss, ensure the chassis is powered off before removing the CompactFlash card.

To eject the CompactFlash card, unscrew the captive lid locking screw and hinge the lid away from the card (see the following figure). Press the eject button and remove the card. The hinged lid restrains the card while in use. The hinged lid opens out 95°, in an arc of radius 63 mm (2.5 inch).

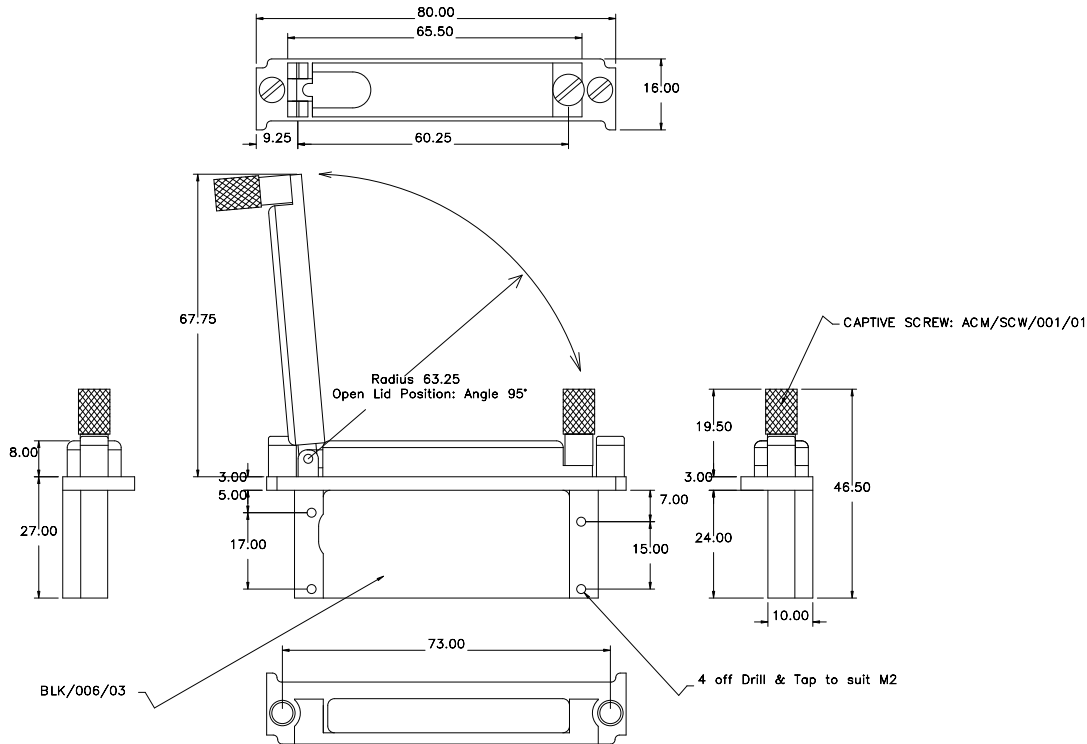


Figure 5: KAM/MEM/113 hinged lid

Connector pinout of the KAM/MEM/113

There is no connector pinout for the KAM/MEM/113.

Ordering information

PART NUMBER	DESCRIPTION
KAM/MEM/113	CompactFlash memory module with PCAP format

The KAM/MEM/113 does not require a connector. Additional items must be ordered separately; refer to Related products for options.

Revision history

REVISION	DIFFERENCES	STATUS
KAM/MEM/113	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 products

MODULE	DETAILS
CompactFlash cards	CompactFlash cards for use with Curtiss-Wright products

Related documentation

DOCUMENT	DETAILS
DOC/DBK/001	Acra KAM-500 Databook
DOC/MAN/018	KSM-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/051	Ethernet frames, Wireshark® and FAT32
TEC/NOT/083	Using the KAM/MEM/113