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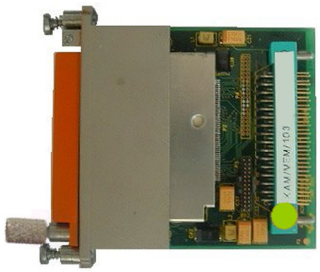
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Find the *Curtiss-Wright / ACRA Control KAM/MEM/103/B/00* at our website: *Click HERE*

# KAM/MEM/103

CompactFlash memory module

CURTISSWRIGHTDS.COM



## Key Features

- Supports removable solid-state memory cards
- Removable CompactFlash® media (supports Type I and II)
- CompactFlash media: can be read with USB card-reader or PCMCIA adapter
- Programmable event size
- Designed to support high-speed CompactFlash cards up to 128 GB
- Logs data at up to 2 Msps

## Applications

- Stand-alone data logging

## Overview

The KAM/MEM/103 is a memory card interface which supports logging to CompactFlash removable memory cards.

The KAM/MEM/103 is designed to be used with a wide range of CompactFlash cards. As higher density CompactFlash cards become available, they are approved by Curtiss-Wright for use with this module.

The KAM/MEM/103 can store data on a CompactFlash Card from any combination of data sources in an Acra KAM-500 system. Data storage can be triggered by a combination of discrete bits and analog signal levels. To read or erase the data, remove the card and read it using a standard off-the-shelf CompactFlash card reader. Software tools are available from Curtiss-Wright and third party vendors to read recorded data.

The KAM/MEM/103 is designed for applications where stand-alone logging of data is required, that is, without the need for a separate data recorder. A Status register is available to be transmitted via an output module, to monitor errors, logging conditions and capacity remaining. This can be useful as a pre-test checkout capability.

The KAM/MEM/103 has a knurled head captive screw for fastening/unfastening the data acquisition unit lid by hand or with tools.

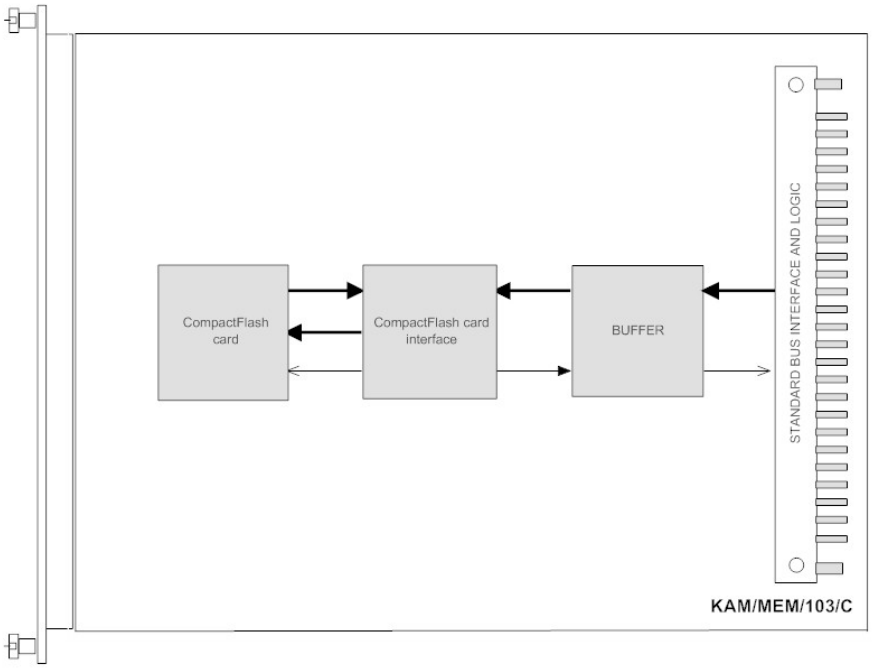



Figure 1: KAM/MEM/103 functional diagram

# 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 | – | Software supports only one KAM/MEM/103 card per chassis. Can be placed in any user-slot in any combination. |
| Mass | | | | | |
| | – | 90 | – | g | |
| | – | 3.17 | – | oz | Design metric is grams. |
| Height above chassis | | | | | For clearance requirements for the hinged lid, see measurements in Figure 2 on page 8. |
| 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 | 70 | – | 135 | mA | |
| ±7V | 0 | – | 0 | mA | |
| ±12V | 0 | – | 0 | mA | |
| total power | 0.35 | – | 0.675 | W | CompactFlash card fitted. 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 Qualification Handbook*. |
| operating temperature | -40 | – | 85 | °C | Chassis base/side plate temperature. |
| storage temperature | -55 | – | 105 | °C | |



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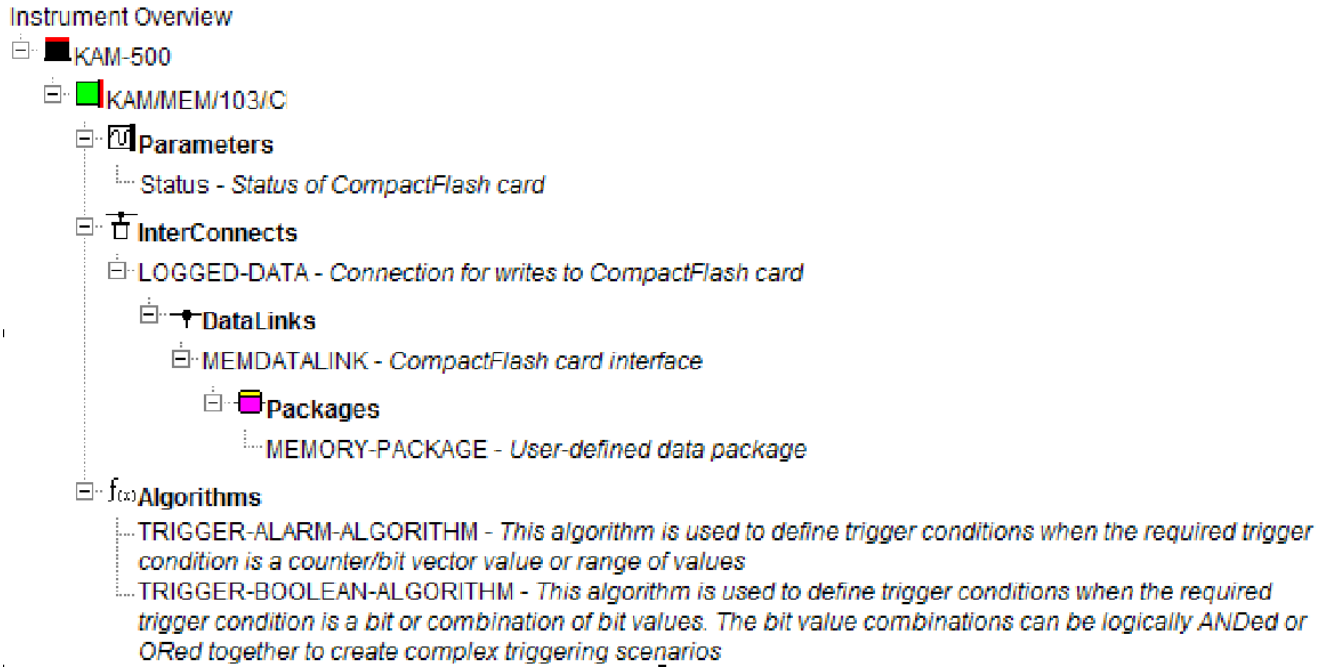
| TABLE 2 | CompactFlash interface | | | | |
|---|---|---|---|---|---|
| PARAMETER | MIN. | TYP. | MAX. | UNITS | CONDITION/DETAILS |
| Memory size | – | – | 32 | GB | Correct operation can only be guaranteed with CompactFlash cards validated and approved for use with the KAM/MEM/103. For details of approved CompactFlash cards, see the *CompactFlash cards* data sheet.<br>The KAM/MEM/103 has been designed to work with CompactFlash cards up to 128 GB in size; at the time of writing, the KAM/MEM/103 is compatible with CompactFlash cards of up to 32 GB in size. |
| Recording rate | – | – | 2 | Msps | The maximum sampling rate is not supported by all CompactFlash cards (see the *CompactFlash cards* data sheet). |
| EventLogSize | | | | | |
| 1 Msps and above | 8 | – | 16,384 | 32K blocks | Use eight or multiples of eight. |
| less than 1 Msps | 2 | – | 16,384 | 32K blocks | |
| Format select restrictions | – | – | – | – | The KAM/MEM/103 supports format select 0 only. |
| Tightening torque | – | – | – | – | 0.6 Nm for all captive screws on the product. |

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



## Setting up the module

The following table lists the setup configurations available for the KAM/MEM/103/C.

| SETUP DATA | CHOICE | DEFAULT | NOTES |
|---|---|---|---|
| Manufacturer | - | - | - |
| Name | ACRA CONTROL | ACRA CONTROL | Name of manufacturer. |
| PartReference | KAM/MEM/103/C | KAM/MEM/103/C | ACRA CONTROL part number. |
| SerialNumber | - | - | Unique name for each module. |
| InterConnects<br>LOGGED-DATA | No character limit | Not Specified | Connection for writes to CompactFlash card. |
| Settings | - | - | - |
| Module-Recorder-1.3 | - | - | - |
| EventLogSize_Bytes | 4294967296:131072 | 131072 | The number of bytes that must be logged when a logging event is triggered. This must be a minimum of 131072 and an integer multiple of 65536 bytes. |
| Triggers<br>Trigger(1:0) | - | - | - |
| TriggerAlgorithmReference | No character limit | Not Specified | - |
| Addendum | - | - | - |
| StrategyFile | - | - | - |
| URL | - | strategy.txt | StrategyFile defines the order in which samples are recorded on the CompactFlash card and is used by the KSM-500 suite of tools to extract data from the CompactFlash card. |
| AlwaysOverwrite | Yes<br>No | No | Indicates if the strategy file should be overwritten each time. |

## Setting up parameters

### Parameter definitions

The following table lists all parameters that are available for the KAM/MEM/103/C.

| NAME/DESCRIPTION | BASE UNIT | DATA FORMAT | BITS | REGISTER DEFINITION |
|---|---|---|---|---|
| Status<br>Status of CompactFlash card. | Unitless | BitVector | 16 | R[15:9] Binary 0 - 7F hex shows how full the CompactFlash card is.<br>R(8) 1 when card is full.<br>R(7) 1 while logging.<br>R(6) 1 if logging or logged at least once.<br>R[5:0] Error code. |

## 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 KAM/MEM/103/C.

### Non-programmable data links

| NAME | DESCRIPTION |
|---|---|
| LOGGED-DATA | CompactFlash card interface. |

## Setting up packages

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

### MEMORY-PACKAGE

User defined data package

| SETUP DATA | CHOICE | DEFAULT | NOTES |
|---|---|---|---|
| ReferencedToAbsoluteTime | Yes | Yes | - |
| PackageRate | - | 1 | - |
| DataLinkReference | No character limit | Not Specified | - |
| Properties | - | - | - |
| InitializationPattern | 0000<br>FFFF | 0000 | - |
| Header | - | - | - |
| Value | 0000<br>to<br>FFFF | 0000 | - |
| Content | - | - | - |
| Parameter | - | - | - |
| Location | - | - | - |
| Occurrences | - | - | - |
| Offset_Address | - | - | - |

## Setting up algorithms

An algorithm describes how data should be processed. The following are algorithms supported by the KAM/MEM/103/C.

### TRIGGER-ALARM-ALGORITHM

This algorithm is used to define trigger conditions when the required trigger condition is a counter/bit vector value or range of values.

| SETUP DATA | CHOICE | DEFAULT | NOTES |
|---|---|---|---|
| Window | | - | - |
| OKMaximum | 0 to 65535 | Not Specified | - |
| OKMinimum | 0 to 65535 | Not Specified | - |

### TRIGGER-BOOLEAN-ALGORITHM

This algorithm is used to define trigger conditions when the required trigger condition is a bit or combination of bit values. The bit value combinations can be logically ANDed or ORed together to create complex triggering scenarios.

| SETUP DATA | CHOICE | DEFAULT | NOTES |
|---|---|---|---|
| OR | - | - | - |
| Input | | - | - |
| BitIndex | 15:0 | Not Specified | - |
| Invert | Yes<br>No | No | - |
| AND | - | - | - |
| Input | | - | - |
| BitIndex | 15:0 | Not Specified | - |
| Invert | Yes<br>No | No | - |

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

# Error codes for the KAM/MEM/103

| CODE[1] | DESCRIPTION |
|---|---|
| $00_{16}$ | Log mode + ok |
| $01_{16}$ | Reserved for future use |
| $02_{16}$ | Reserved for future use |
| $03_{16}$ | Logging too fast |
| $04_{16}$ | CompactFlash memory card fault or no CompactFlash card present |
| $05_{16}$ | Reserved for future use |
| $06_{16}$-3E 16 | Reserved for future use |
| $3F_{16}$ | CompactFlash card detected and initialization complete |

1. Error codes are hexadecimal.

# Getting the most from the KAM/MEM/103

## Logging



Any subset of the parameters available over the backplane can be stored in the KAM/MEM/103. 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.

Event sizes are specified ultimately in terms of acquisition cycles, but they are presented via the graphical user interface in terms of seconds.

The Status register can indicate overflow, that is, logging too fast (for more information, see “Error codes for the KAM/MEM/103” on page 7). Overflow occurs when the CompactFlash card fitted/installed cannot log continuously at the configured sampling rate. This status information is also recorded with the logged data.

When logging at low sample rates (1,000 sps) it can take several minutes for the data to be written to the CompactFlash card. Successful writing of the first samples to the CompactFlash card is indicated by the Status register error code changing from $3F_{16}$ to $00_{16}$. When a full CompactFlash card is fitted in a KAM/MEM/103, this information is indicated by R(8) of the Status register being set to 1. R[15:9] indicates 0016. R(8) has precedence over R[15:9].

## Triggers

The minimum number of blocks to be logged for a given trigger condition can be configured. This is the minimum number of blocks that are recorded for an event where the trigger conditions are met for a single sample. This condition can be met when both trigger (A trigger and B trigger) conditions have been met, even if one is valid for a single sample. The maximum number of blocks that can be recorded from this type of event is 65,536 blocks, the minimum is two blocks. If the trigger is maintained for more than the specified minimum number of blocks to log, data is logged until the trigger condition is removed, so if the trigger is maintained valid for a sufficient number of acquisition cycles the CompactFlash card can be filled with data from a single event.

When logging data from analog modules with digital filtering (for example, KAD/ADC/014) after power-on, digital filtering must be given time to settle before data is logged to the KAM/MEM/103. In this scenario, we recommend using time or discrete data as the B trigger input, and the selected analog parameter value range as the A trigger input.

## EventLogSize

The KAM/MEM/103 logs data at a sustained rate of 2 Msps, however CompactFlash cards of varying capacity may not be fast enough to work at this rate.

Tests prove that when logging above 1 Msps and using event-driven triggers, best results are obtained when the minimum EventLogSize is set to eight or a multiple of eight 32K blocks. When logging below 1 Msps, a minimum EventLogSize setting is not critical.

## Samples per acquisition cycle

The KAM/MEM103 is limited to 16,376 samples per acquisition cycle. The KAM/MEM/103 requires at least two acquisition cycles stored in one block, that is, the number of samples per acquisition cycle to be stored is limited to 16384 (32,768 / 2). Eight words of header are equal to 16,376 samples per acquisition cycle. If kSetup or DAS Studio 3 displays an error stating that you cannot store more than 16,376 words per acquisition cycle, you must increase the acquisition cycle rate.

## Storage media

Use only those CompactFlash cards validated and approved for use with the KAM/MEM/103. For details of approved cards, see the *CompactFlash cards* data sheet.

## Automatic recording

You can trigger automatic recording on a memory module such as the KAM/MEM/103 by using a parameter or, a combination of two parameter values, from the logged list. You can also trigger recording using a 5V signal from a pin on backplane controller (BCU) modules KAD/BCU/101 and KAD/BCU/105. For details on using triggers, see *TEC/NOT/064 - Using the KAM/MEM/103*.

This automatic recording stops only when the trigger conditions, as stated above, are removed and the “minimum number of blocks to be logged” are logged.

## Removing the CompactFlash card

To eject the CompactFlash card from the KAM/MEM/103, 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).

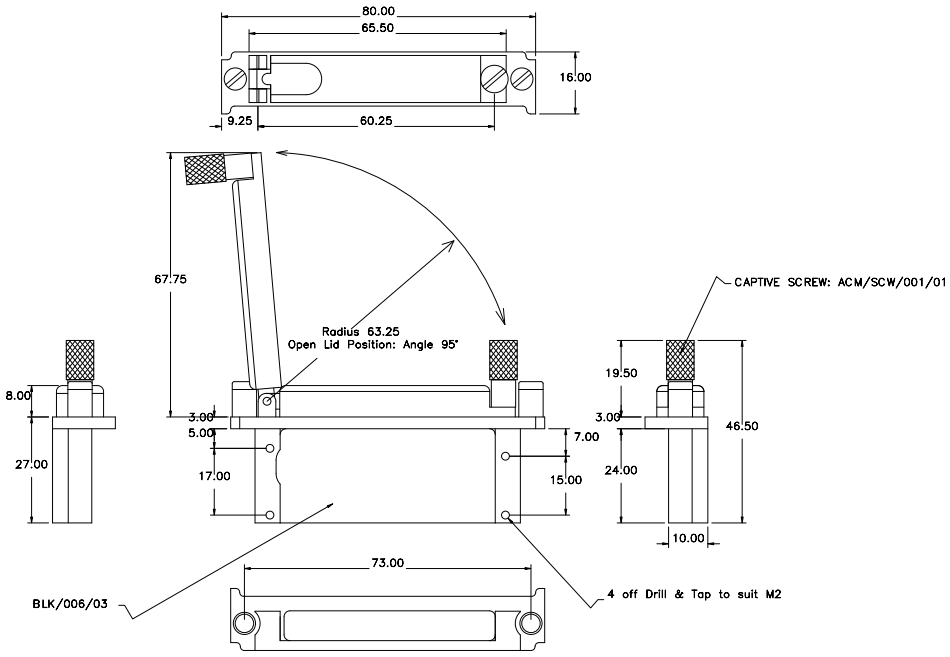



Figure 2: KAM/MEM/103 hinged lid

# Connector pinout of the KAM/MEM/103

There is no connector pinout for the KAM/MEM/103.

# Ordering information

| PART NUMBER | DESCRIPTION |
|---|---|
| KAM/MEM/103/C | CompactFlash memory module |

Only one KAM/MEM/103 can be installed in an Acra KAM-500 chassis.

# Revision history

| REVISION | DIFFERENCES | STATUS |
|---|---|---|
| KAM/MEM/103/C | Corrects an issue where the KAM/MEM/103 may fail to start logging correctly with a KAD/BCU/140/C (or previous revision) | Recommended for new programs |
| KAM/MEM/103/B | Corrects an issue where the KAM/MEM/103 fails to start logging correctly with a KAD/BCU/105 and fails in an X-SYNC slave chassis | Not recommended for new programs |
| KAM/MEM/103 | First release | Not 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 |
| kFlashcardXID | Initializes CompactFlash cards and extracts logged data |
| KSM-500 | This module is supported by the KSM-500 suite of software tools |

# Related documentation

| DOCUMENT | DETAILS |
|---|---|
| DST/Y/032 | CompactFlash cards data sheet |
| DST/Z/007 | kFlashcardXID 1.8 data sheet |
| 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 |
| TEC/NOT/64 | Using the KAM/MEM/103 |

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