Declaration of Design and Performance for Acra KAM-500 Products

Table of contents

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Introduction

This is the latest release of the *Declaration of Design and Performance for Acra KAM-500 Products* (DDP/0001 | 25 Jul. 2019). For details of changes since the previous release, see "Revision history" on page 21.

The Acra KAM-500 is a modular data acquisition system designed for aerospace applications where space is at a premium. The system is completely software programmable and contains no switches, potentiometers, bridges, relays or socketed ICs (such as programming EEPROM).

A wide range of user-modules is available for analog input/output, avionics bus monitoring, time-tagging, non-volatile (EEPROM) storage and (PCM) transmission.

Two types of distributed systems are supported. For PCM systems, a merger module is inserted in any user-slot for every additional pair of Acra KAM-500s. A single chassis can merge data from up to 26 PCM streams. Up to 16 chassis can be programmed via two twisted pairs. For Ethernet based distribution, two variants of rugged switch are provided: one is an Acra KAM-500 module, the other is housed in its own chassis (NET/SWI/XXX). The NET/SWI/XXX units are covered in the *DDP for Network Switch and Recorder Products.*

A feature of the Acra KAM-500 is that a parameter (for example, strain from channel 4 of the KAD/ADC/109 bridge module) can be sent to multiple modules. For example, a chassis can have multiple PCM streams of different codes, bit-rates, word lengths, words per minor frame and minor frames per major frame with some parameters going to all streams and some parameters going to one stream.

Design standard

The system-level configuration of the Acra KAM-500 product family consists of one of six chassis types (having either 3, 4, 6, 9, 12 or 13 user-slots) with selected user-modules, and accessories and one or more network switches in an Ethernet environment. "Appendix I - Product descriptions and physical properties" on page 11 lists the component specifications for the Acra KAM-500 product family components. Typical component weights are as shown in "Appendix II - Product weights" on page 17.

Certification

The product, to which this certificate applies, as defined in "Design standard" on page 1, complies with the product descriptions and specifications referenced in "Design standard" on page 1, subject to the exceptions stated in "Exceptions" on page 10, and any limitations in "Limitations" on page 10.

The product to which this certificate relates does not contain explosives, propellant or pyrotechnic materials or its means of initiation nor has it been designed to interface with such a material or its means of initiation.

Signed_____Date_____

Kaari Koehn, Reliability Engineer

Signed_____Date_____

David Buckley, Chief Architect

Environmental qualifications

The products listed in "Appendix II - Product weights" on page 17 are compliant with the standards/tests listed in the following tables. For a breakdown of products used in each test setup, see the Equipment under test section of the *Environmental Qualification Handbook*. The certificates and reports stated here are available on request.

MIL-STD-810F

Standard	Method	Test conditions	Test setup used
Temperature			
MIL-STD-810F	Methods 501.4 and 502.4, Procedure I and Procedure II	-55°C, at least 4 hours after stabilization of specimen temperature (non-operational) -40°C, at least 4 hours after stabilization of specimen temperature (operational) 85°C, at least 4 hours after stabilization of specimen temperature (operational) 105°C, at least 4 hours after stabilization of specimen temperature (non-operational)	**Test setup 1** Our certificate reference: 11610

Standard	Method	Test conditions	Test setup used
Altitude, rapid decompression, and explosive decompression			
MIL-STD-810F	Method 500.4, Procedure II	Procedure II (Altitude - Operation/Air Carriage) was carried out at maximum pressure of 115Kpa (1,150mbar) and a minimum pressure of 3.6Kpa (36mbar) corresponding to 22,860m (75,000ft). Altitude has been calculated using U.S. Standard Atmosphere Tables, 1976.	**Test setup 1** Our certificate reference: ETL01222
MIL-STD-810F	Method 500.4, Procedure III	Procedure III (Rapid Decompression) was carried out from room ambient to 3.6Kpa at a rate of 218Kpa/minute (2,180mbar/min).	**Test setup 1** Our certificate reference: ETL01222
MIL-STD-810F	Method 500.4, Procedure IV	Procedure IV (Explosive Decompression) was carried out with the unit powered off and a pressure change from 2,438m (80,00ft) to 12,192m (40,000ft) was achieved in 78.4ms.	**Test setup 8** Our certificate reference: ETL06081

Standard	Method	Test conditions	Test setup used
Shock			
MIL-STD-810F	Method 516.5 Procedure V - modified	Severity: 100g, 11ms, terminal peak sawtooth No. of shocks: 12 (two in each direction of three mutually perpendicular axes)	**Test setup 3** Our report reference: 3439/08

Standard	Method	Test conditions	Test setup used
Vibration			
Sinusoidal vibration			
MIL-STD-810F	Method 514.5, Procedure I	Sinusoidal frequency sweeps Frequency range: 10 to 2,000Hz Amplitude: 20mm peak to peak, from 10 to 16Hz; 10g peak from 16 to 2,000Hz Sweep rate: 1 octave per minute Duration: One upward sweep from 10 to 2,000Hz; One downward sweep from 2,000 to 10Hz	**Test setup 3** Our report reference: 3439/08 **Test setup 1** Our certificate reference: 11982
Random functional			
MIL-STD-810F	Method 514.5, Procedure I, Figure 514.5C-8	Frequency range: 15 to 2,000Hz Spectrum:$0.04g^2$/Hz from 15 to 89.2Hz 4dB/octave from 30 to 300Hz $0.2g^2$/Hz from 300 to 1,000Hz -6dB/octave from 1,000 to 2,000Hz Duration: 60 mins per axis	**Test setup 3** Our report reference: 3439/08 **Test setup 1** Our report reference: 2418-02
Random endurance			
MIL-STD-810F	Method 514.5, Procedure I, Figure 514.5C-8	Frequency range: 15 to 2,000Hz Spectrum:$0.04g^2$/Hz from 15 to 30.7Hz 4dB/octave from 30 to 300Hz $0.83g^2$/Hz from 300 to 1,000Hz -6dB/octave from 1,000 to 2,000Hz Duration: 10 mins per axis	**Test setup 3** Our report reference: 3439/08 **Test setup 1** Our report reference: 2418-02

Standard	Method	Test conditions	Test setup used
Acceleration			
MIL-STD-810F	Method 513.5, Procedure II	Acceleration: 16.5g in each direction of three mutually perpendicular axes. Duration: Minimum of 1 minute in each direction.	**Test setup 1** Our certificate reference: 11983

Standard	Method	Test conditions	Test setup used
Water ingress/moisture			
MIL-STD-810F	Method 506.4, Procedure III	Precipitation rate: $280l/m^2$/hr Duration: 45 minutes, divided equally between 3 faces (one side, one end and one top)	**Test setup 1** Our certificate reference: 11986

Standard	Method	Test conditions	Test setup used
Humidity			
MIL-STD-810F	Method 507.4	Upper temperature 60°C Intermediate temperature 30°C Lower temperature 20°C Relative humidity 95% (>85% during temperature reduction) Dwell times 4 hours at each level Cycle duration 24 hours Number of cycles 5	**Test setup 1** Our certificate reference: 11611
MIL-STD-810F	Method 507.4 (Modified)	5 cycles, each comprising:- 1) 32°C, <15% rh, 10 hours 2) 38°C, <2% rh, 4 hours 3) 32°C, <15% rh, 10 hours 4) 27°C, 100% rh, 4 hours 5) 30°C, 95% rh, 20 hours	**Test setup 2** Our certificate reference: 13309

Standard	Method	Test conditions	Test setup used
Contamination testing			
BS3G100	Part 2, Section 3, Subsection 3.12 Class A for Occasional Contamination	Temperature: 70°C Duration: 93 hours Propan-2-Ol Ethylene Glycol (50% v/v in water) AVTUR F-34 Aeroshell Turbine Oil 308 Aeroshell Fluid 31 Aeroshell F31 MIL-PRF-23699-F	**Test setup 2** Our certificate reference: 13310

Standard	Method	Test conditions	Test setup used
Salt fog test			
MIL-STD-810F	Method 509.4	Test Duration: 24 hours salt exposure, 24 hours drying to be repeated twice (total test duration 96 hours) Salt Fall Out: 1 to 3 m1/80cm2/hr Salt solution: 5 ±1% concentration Salt mix pH: 6.5 to 7.2 Temperature: 35°C ± 2°C	**Test setup 6** Our certificate reference: 11692CCOIA

Standard	Method	Test conditions	Test setup used
EMC			
MIL-STD-461E	CE101	Conducted emissions, Power leads, 30Hz to 10kHz "Aircraft Curve 2" Navy ASW, 100 dBµA	**Test setup 1** Our certificate reference: 669/EMC/02012-A **Test setup 4** Our report reference: TES-002832-02
MIL-STD-461E	CE102	Conducted emissions, Power leads, 10kHz to 10MHz "Basic Curve" 28 VDC, 60 dBµV	**Test setup 4** Our report reference: TES-002832-02 **Test setup 5** Our report reference: 2819
MIL-STD-461E	CS101	Conducted Susceptibility, Power leads, 30Hz to 150kHz, 28 VDC, Curve 2	**Test setup 1** Our certificate reference: 669/EMC/02012-A **Test setup 4** Our report reference: TES-002832-02
MIL-STD-461E	CS114	Conducted Susceptibility, Bulk cable injection 10kHz to 200MHz "Curve 5"	**Test setup 4** Our report reference: TES-002832-02 **Test setup 5** Our report reference: 2819
MIL-STD-461E	CS115	Conducted susceptibility, Bulk cable injection, Impulse excitation	**Test setup 1** Our certificate reference: 669/EMC/02012-A **Test setup 4** Our report reference: TES-002832-02 **Test setup 5** Our report reference: 2819
MIL-STD-461E	CS116	Conducted susceptibility, Bulk cable injection, Impulse excitation, 10 Amps (Navy)	**Test setup 1** Our report reference: 2418/02 Our certificate reference: 669/EMC/02012-A **Test setup 5** Our report reference: 2819/05

Standard	Method	Test conditions	Test setup used
MIL-STD-461E	RE101	Radiated emissions, Magnetic field, 30Hz to 100kHz	**Test setup 4** Our report reference: TES-002832-02
MIL-STD-461E	RE102	Radiated emissions (fixed wing internal) 2MHz to 18GHz (vertical polarization), 30MHz to 18GHz (horizontal polarization) Aircraft (AF and Navy)	**Test setup 4** Our report reference: TES-002832-02
MIL-STD-461E	RS101	Radiated susceptibility, Magnetic field, 30Hz to 100kHz, 180 dBpt (Army and Navy)	**Test setup 4** Our report reference: TES-002832-02
MIL-STD-461E	RS103	Radiated susceptibility 2MHz - 1GHz @ 20V/M, 1GHz - 18GHz @ 60V/M, AF, Aircraft internal	**Test setup 4** Our report reference: TES-002832-02 **Test setup 5** Our report reference: 2819
BS3G100	Part 2, Section 2	Magnetic Influence (Compass safe distance)	**Test setup 1** Our certificate reference: 669/EMC/02012-A

Electrical

Standard	Method	Test conditions	Test setup used
ESD			
IEC 801-2:1991	EN61000-4-2:1995 Electrostatic discharge immunity	Performance criterion: B Contact discharge (exposed surfaces): Level 4, 8kV Air discharge: Level 4, 15kV	**Test setup 7** Our report reference: **01E562-2** **Test setup 5** Our report reference: 2819

Standard	Method	Test conditions	Test setup used
Electrical bonding and insulation			
AC/KAM-500-II/SLTP/1.4	Paragraph 3	Electrical bonding test	**Test setup 1** Our certificate reference: 669/EMC/02012-B
BS3G100, Part 4	Section 1, subsection 1, paragraph 5.1	Electrical insulation test, high voltage test	**Test setup 1** Our certificate reference: 669/EMC/02012-B
BS3G100, Part 4	Section 1, subsection 1, paragraph 5.2	Electrical Insulation test, insulation resistance test	**Test setup 1** Our certificate reference: 669/EMC/02012-B

Standard	Method	Test conditions	Test setup used
BS3G100, Part 4	Section 1, subsection 1, paragraph 5.3	Electrical Insulation test, leakage current measurements	**Test setup 1** Our certificate reference: 669/EMC/02012-B

DO-160G

Climatic/mechanical

Test[1]	Section	Category	Range	Certificate reference
Temperature	4	B2	Storage Survival: -55 to +85°C	TRA-017011 CC 01B
Temperature	4	B2	Operating: -45 to +70°C air temp	TRA-017011 CC 02C
Altitude	4.6.1	E1	70,000ft = 21,300m (4.44kPa)	TRA-017011 CC 12A
Decompression	4.6.2	A3	Reduce to 4.44kPa in 15 sec	TRA-017011 CC 13B
Overpressure	4.6.3	A3	170kPa/-4600m	TRA-017011 CC 14B
Temperature variation	5	S2	>10°C/min	TRA-017011 CC 03B
Humidity	6	A	Std, 1 day/+50°C plateau, 95% RH	TRA-017011 CC 04C
Operational shock	7.2	A + B	6g x 11ms x 6 axis	TRA-017011 CC 08B
Vibration – type 2 turbofan (fixed wing)	8.5.2	S Standard	Fixed wing turbofan zone 3,5,7 (fuselage, wing, nacelle) D, E curves, 1hr per axis Peak 0.08 g2/Hz	TRA-017011 CC 07B
Vibration – type 3 turboprop (Unit 2)	8.5.1	S	Fixed wing turboprop, zones 3,5 (nacelle, wing) curve T (10gPK), 1hr per axis	TRA-017011 CC 11A
Condensation	10	Y	-10° -> +40°, 85%RH	TRA-017011 CC 05C
Icing	24	A	+30°, 95%RH -> -55°	TRA-017011 CC 06C
Fluids (Unit 3)	11.0	F (brush)	6 fluids, brushed, to note effects	TRA-017011 CC 16B
Crash Shock (Unit 3)	7.3.1	B	20g, 11ms, 6-way	TRA-017011 CC 09B
Crash Safety (Unit 3)	7.3.3	B	20g, 3s, 6-way	TRA-017011 CC 10B

1. Tests above were with Unit 1 unless otherwise noted.

EMC/Electrical

Test[1]	Section	Category	Range	Report reference
Magnetic Effects	15	Z	0 < D <= 0.3m	TRA-017011-39-00A
Power Input – Normal Conditions DC	16.6.1	B (DC)	18.0-30.3v, 47v surge, 10v under voltage start	TRA-017011-39-00A
Power Input – Abnormal Conditions DC	16.6.2	B	60v x 100ms surge	TRA-017011-39-00A
Voltage Spike	17.4	A	600v±, 2us, x 50, 1Hz	TRA-017011-39-00A
AF Conducted – Power	18	R (DC)	10Hz-150kHz	TRA-017011-39-00A
AF Susceptibility	19.3	ZW		TRA-017011-39-00A

Test[1]	Section	Category	Range	Report reference
- Magnetic/Equipment	19.3.1	ZW	20 A rms	TRA-017011-39-00A
- Electric/Equipment	19.3.2	ZW	170 V rms	TRA-017011-39-00A
- Magnetic/Wiring	19.3.3	ZW	30 A-m	TRA-017011-39-00A
- Electric/Wiring	19.3.4	ZW	1800 V-m	TRA-017011-39-00A
Induced Spikes - Wiring	19.3.5	ZW	600v, 1ms	TRA-017011-39-00A
Conducted Susceptibility	20.4	T	10kHz-400MHz T: 7.5 mA (moderate)	TRA-017011-39-00A
Radiated Susceptibility, E-Field	20.5	T	100MHz-18GHz T: 5 V/m (moderate)	TRA-017011-39-00A
Conducted Emissions –P	21.4	M	150kHz-6GHz Power lines	TRA-017011-39-00A
Conducted Emissions – S	21.4	M	150kHz-6GHz Signal cables	TRA-017011-39-00A
Radiated Emissions	21.5	M	100MHz-6GHz	TRA-017011-39-00A
Lightning Induced Transient	22	A3J3M3	WF3	TRA-017011-39-02B
Pin Injected	22.5.1	A3	WF3 @ 600V WF4 @ 300V	TRA-017011-39-02B PSU/Isolated interfaces only.
Single and multiple stroke cable induction	22.5.2	J3	WF3 @ 600V, WF1 @ 300V 6 cable bundles (SWI, MBM, EBM, ABM, BCU, UBM)	TRA-017011-39-02B Shielded cables
Cable, multiple burst	22.5.2	M3	600V/30A, WF 6H	TRA-017011-39-02B Shielded cables
ElectroStatic Discharge (ESD)	25	A	±15kV, Exposed surfaces only, Air discharge	TRA-017011-39-00A

1. EMC testing was with Unit 2.

Tests with non functional Unit 3

Test	Section	Category	Range	Certificate reference
Drip test	10.3.2	W	140 l/m^2/h rain x 3 facings.	TRA-017011CC 15B
Fluids, solvents	11.0	F	Brushed, not spray; 7 fluids, 1 day x 3 cycles each (Aviation Jet A-1, Propanol, Jeyes Fluid, Pyrethrum 5EC, Kilfrost ABC-3, Skydrol 500B4, Aeroshell 100).	TRA-017011CC 16B
Crash Safety Acceleration	7.3.3	B (5R)	Sustained 20g, 3s, 6-way. Mechanical mounting strength test only.	TRA-017011CC 10B
Crash Safety Impulse	7.3.1	B	20g, 11ms, 6-way.	TRA-017011CC 09B

Test	Method	Test conditions	Report reference
Load Measurements	LDC 101	28 VDC, no current limit set, measurement only	NLR-CR-2016-674-PT-2 Chapter 4
Steady State Limits for Voltage	LDC 102	NLSS 22 VDC NHSS 29 VDC	NLR-CR-2016-674-PT-2 Chapter 5
Input Voltage Distortion	LDC 103	704F conditions A-K (1000 mV pk)	NLR-CR-2016-674-PT-2 Chapter 6
Input Voltage Total Ripple	LDC 104	704F conditions A (688 mVpp) & B (540 mVpp)	NLR-CR-2016-674-PT-2 Chapter 7
Normal Voltage Transients	LDC 105	Conditions AA-RR & repetitive transient	NLR-CR-2016-674-PT-2 Chapter 8
Power Interrupt	LDC 201	Conditions A-L, restarts allowed[1] 50 ms, 30 ms, 10 ms	NLR-CR-2016-674-PT-2 Chapter 9
Abnormal Steady State Limits for Voltage	LDC 301	ALSS 20.0 VDC AHSS 31.5 VDC	NLR-CR-2016-674-PT-2 Chapter 10
Under-voltage, Over-voltage, Combined Transient	LDC 302	Conditions AAA-NNN, restarts allowed[2]. Undervoltage 7V/50 ms Overvoltage 50V/50 ms	NLR-CR-2016-674-PT-2 Chapter 11 NLR-CR-2017-075 Chapter 8
Emergency Limits for Voltage	LDC 401	704F: ELSS 18.0 VDC 704F: EHSS 29.0 VDC 704D: ELSS 16.0 VDC[3]	NLR-CR-2016-674-PT-2 Chapter 12
Starting Voltage Transients	LDC 501	Condition AA, 12 VDC/30 sec[4]	NLR-CR-2016-674-PT-2 Chapter 13
Power Failure	LDC 601	Conditions A-D 100 ms – 7 sec[5]	NLR-CR-2016-674-PT-2 Chapter 14 NLR-CR-2017-075 Chapter 8
Polarity Reversal (704F only)	LDC 602	Reverse -28 VDC, 30 minutes	NLR-CR-2016-674-PT-2 Chapter 15

1. LDC 201: System restarts noted for the B series where 22V supply drops to 0 for 50 ms. Acceptable as 50 ms exceeds stated KAM/CHS power glitch immunity for this load. System recovered cleanly. Survives A & E series. (Recorder in Remote mode, see also note 5 for expected behavior.)
2. LDC 302: Transients caused restarts when dipping below 10V for 50 ms. Acceptable as this exceeds stated power glitch immunity. System recovered cleanly. [NLR-CR-2017-075 Chapter 8] System retested with recorder in Local control mode for transients JJJ, KKK, LLL to observe automatic recording restart sequence in more detail. System recovery verified < 5 seconds long for each DAU restart. Recorder restarted by one LLL transient only. Switch was not restarted by any of JJJ, KKK, LLL transients.
3. LDC 401: Passed, system operational throughout, including additional 16V emergency low voltage test per 704D levels.
4. LDC 501: Dip to 12V caused restart, system recovered cleanly. (Recorder was in Remote mode so didn't start recording automatically on restart. Recording was started manually several seconds after power-up and some sample data was collected. Acceptable but Local mode would have provided more detail.)
5. LDC 601: Original test result TBD as recorder was in Remote control mode and needed a command to continue. Retested [NLR-CR-2017-075 Chapter 8] with recorder in Local control mode to observe automatic recording restart after a 3-second power interrupt (condition C). Verified system restarted and automatically logging data 7 seconds after power restored, with no operator intervention. File open at time of power failure was not closed properly, which is expected behavior.

The test conditions meet or exceed conditions of MIL-STD-704D and MIL-STD-704F.

Configuration-specific testing

Certain Acra KAM-500 chassis and module combinations have also been tested and found to be compliant against the following relevant standards for these specific configurations only.

Standard	Method	Test conditions	Test setup used
Thermal vacuum test			
See Report	See Report	-25°C to 85°C at less than 1 x 10^{-5}mbar	**Test setup 7** Our report reference: TOS-MCV/2002/2805/In/BL
KAM/SBM/001 Vibration Test			
MIL-STD-810F	Method 514.5 Procedure I - General Vibration	Sinusoidal Frequency Sweeps (to identify resonances) Frequency range: 10 to 2000Hz Amplitude: 20mm peak to peak from 10 to 16Hz 10g peak from 16 to 2000Hz Sweep rate: 1octave/minute Duration:1 upward sweep from 10 to 2000Hz and 1 downward sweep from 2000 to 10Hz Random Endurance Frequency range:15 to 2000Hz Spectrum: 0.01g^2/Hz from 15 to 30Hz 4dB/octave from 30 to 300Hz 0.208g^2/Hz from 300 to 1000Hz -6dB/octave from 1000 to2000Hz	**Test setup 1** Our certificate reference: 11982
Explosive atmosphere testing			
MIL-STD-810F	Method 511.4, Procedure I	Operating high temperature of 85°C	**Test setup 2** Our report reference: 2662/03 - Appendix
Low temperature			
MIL-STD-810F	Method 502.4, Procedure II (Operational)	Temperature: -55°C Duration: maintain temperature at least 2 hours following temperature stabilization of the test specimen and prior to the operational check.	**Test setup 1** Our certificate reference: 12060

Exceptions

None, except where explicitly stated in product data sheets.

Limitations

If there are any module limitations with respect to form factor, sampling rate or environmental conditions they are listed in the specifications section of the appropriate data sheet.

The *Equipment interface* chapter of the *Acra KAM-500 Databook* contains important information with respect to grounding and cabling.

As with all FTI equipment there are limits to the acquisition cycle lengths, filter settings and sampling rates available within the Acra KAM-500. The following are general guidelines for Acra KAM-500 systems.

• All data acquisition cycles must be an integral number of microseconds long and be at least 100µs long.

- The aggregate sampling rate must be 500,000 samples per second (sps) or less (worst case rule). The aggregate sampling rate must be 2,000,000sps or less if the system contains 100 series Acra KAM-500 modules.
- The sample rates available from ADC modules are discrete, binary and bounded. They are bounded in the sense that they are usually less than 20ksps and greater than 1sps. They are binary in the sense that, for example, if 16sps is chosen as the sampling rate on one channel then the rates available for other channels on that module are 1,2,4,8,16,32...16384sps. They are discrete in the sense that the highest sampling rate selectable for each module is of the form (8Msps x N)/M where N and M are integers.

Appendix I - Product descriptions and physical properties

Chassis

System	Description	
KAM/CHS/02F	Acra KAM-500 chassis (base-mounted power supply and housing) - 2 user-slots	
	Height	84.2mm (3.31in.)
	Length	136.5mm (5.37in.)
	Width	50.0mm (1.97in.)
KAM/CHS/03F	Acra KAM-500 chassis (base-mounted power supply and housing) - 3 user-slots	
	Height	84.2mm (3.31in.)
	Length	121.5mm (4.78in.) including power supply and module connectors
	Width	84.0mm (3.31in.)
KAM/CHS/03U	Acra KAM-500 chassis - 3 user-slots	
	Height	94.0mm (3.70in.) including module retention screws
	Length	140.0mm (5.51in.) including mounting lugs
	Width	140.0mm (5.51in.) including mounting lugs
KAM/CHS/04L	Acra KAM-500 chassis, narrow form - 4 user-slots	
	Height	98.5mm (3.88in.) including module retention screws and ground bolt
	Length	242mm (9.5in.)
	Width	40mm (1.6in.)
KAM/CHS/05F/SC	Acra KAM-500 chassis - 5 user-slots	
	Height	117.5mm (4.62in.) including module retention screws and ground bolt
	Length	140mm (5.51in.) including mounting lugs
	Width	92mm (3.62in.) excluding heat sinks
KAM/CHS/06U	Acra KAM-500 chassis - 6 user-slotss	
	Height	94.0mm (3.70in.) including module retention screws
	Length	182.0mm (7.17in.) including mounting lugs
	Width	80.0mm (3.15in.) excluding heat sinks
KAM/CHS/09U	Acra KAM-500 chassis - 9 user-slots	
	Height	94.0mm (3.70in.) including module retention screws
	Length	224.0mm (8.82in.) including mounting lugs
	Width	80.0mm (3.15in.) excluding heat sinks

Chassis

System	Description	
KAM/CHS/12R	Acra KAM-500 circular form chassis with 12 user-slots	
	Height	98.5mm (3.88in.) including module retention screws and ground bolt
	Diameter	250mm (9.84in.)
KAM/CHS/13U	Acra KAM-500 chassis - 13 user-slots	
	Height	94.0mm (3.70in.) including module retention screws
	Length	280.0mm (11.02in.) including mounting lugs
	Width	80.0mm (3.15in.) excluding heat sinks

User-modules

Component	Description
KAD/ABM/101	ARINC-429 bus monitor parser/snarfer - 8ch
KAD/ABM/102	ARINC-429 bus monitor packetizer - 8ch
KAD/ABM/102/EM1	ARINC-429 bus monitor parser/packetizer/accumulator - 8ch
KAD/ABM/103	ARINC-429 bus monitor parser/packetizer - 24ch
KAD/ADC/008	Single ended ADC (programmable analog gain, three phase power monitor, 1kHz b/w) - 6ch at 20sps
KAD/ADC/010	Differential ended ADC (22kHz b/w) - 2ch at 100ksps
KAD/ADC/011	Single ended ADC (0.66kHz or 1.17kHz b/w) - 48ch at 8.5ksps
KAD/ADC/012	24-channel D/E analog-to-digital converter
KAD/ADC/013	16 channel ¼-bridge A/D converter with excitation and signal conditioning for PT100
KAD/ADC/014	16-channel bridge A/D converter with voltage excitation and signal conditioning
KAD/ADC/105	Differential ended ADC (programmable analog gain, 6kHz b/w) - 8ch at 24ksps
KAD/ADC/106	Accelerometer ADC (current excitation, programmable analog gain, 6kHz b/w) - 6ch ICP and 2ch D/E at 24ksps
KAD/ADC/109/QB120	¼-bridge 120Ω ADC (current excitation, programmable analog gain, 6kHz b/w) – 8ch at 24ksps
KAD/ADC/109/QB350	¼-bridge 350Ω ADC (current excitation, programmable analog gain, 6kHz b/w) - 8ch at 24ksps
KAD/ADC/109/S1	Full-bridge ADC (voltage excitation, programmable analog gain, 6kHz b/w) – 8ch at 24ksps
KAD/ADC/109/S2	Full-bridge ADC (voltage excitation, programmable analog gain, sense lines, 6kHz b/w) – 8ch at 24ksps
KAD/ADC/111	Single ended ADC (1kHz b/w) - 48ch at 4ksps
KAD/ADC/112	Differential ended ADC (3kHz b/w) - 24ch at 12ksps
KAD/ADC/113	1/4-bridge ADC (current excitation, PT100 temp. sensors, 3kHz b/w) - 16ch at 12ksps
KAD/ADC/114	Full-bridge ADC (voltage excitation, strain gages, 3kHz b/w) - 16ch at 12ksps
KAD/ADC/115	¼-bridge ADC (current excitation, PT1000 temp. sensors, 6.25kHz b/w) - 16ch at 25ksps
KAD/ADC/116	Accelerometer ADC (current excitation, programmable analog gain, 3 kHz b/w) – 12ch at 12 ksps

User-modules (continued)

Component	Description
KAD/ADC/117	Full-bridge ADC (current excitation, programmable analog gain, 6kHz b/w) - 8ch at 24ksps
KAD/ADC/117/EC1	Full-bridge ADC (current excitation, programmable analog gain, configurable FIR/IIR filter, 3.75kHz b/w) - 8ch at 24ksps
KAD/ADC/118	Full-bridge ADC (voltage excitation, 3kHz b/w) - 12ch at 12ksps
KAD/ADC/120	Full-bridge ADC (voltage excitation, 3kHz b/w) - 12ch at 12ksps
KAD/ADC/126	Accelerometer ADC (current excitation, programmable analog gain, 25kHz b/w) - 4ch at 100ksps
KAD/ADC/129/S1	Full-bridge ADC (voltage excitation, programmable analog gain, 25kHz b/w) - 4ch at 100ksps
KAD/ADC/129/S2	Full-bridge ADC (voltage excitation, programmable analog gain, sense lines, 25kHz b/w) - 4ch at 100ksps
KAD/ADC/130	±200V differential ended ADC (3kHz b/w) - 4ch at 12ksps
KAD/ADC/135	Full/½-bridge ADC (voltage/current excitation, programmable analog gain, FIR/IIR, 6.25kHz b/w) - 12ch at 25ksps
KAD/ADC/136	Flexible ADC (full/½-bridge, ICP, PT100, thermocouple, FIR/IIR, 12.5kHz b/w) - 8ch at 50ksps (uses ±7V)
KAD/ADC/136/E12	Flexible ADC (full/½-bridge, ICP, PT100, thermocouple, FIR/IIR, 12.5kHz b/w) - 8ch at 50ksps (uses ±12V)
KAD/ADC/141	¼-bridge ADC (current excitation, RTD temp. sensors, 3.125kHz b/w) - 16ch at 12.5ksps
KAD/ARI/002	ARINC-429 transmitter - 1ch
KAD/ARI/103	ARINC-573 bus monitor parser - 1ch
KAD/ARR/101	AFDX redundancy remover
KAD/BCU/101	IRIG-106 backplane controller and encoder
KAD/BCU/105	Ethernet backplane controller - IENA compatible
KAD/BCU/140	Ethernet backplane controller - IENA/iNET-X compatible with TFTP programming
KAD/BCU/143	Ethernet backplane controller - IENA/iNET-X compatible, SNTP support
KAD/BIT/101	Built-in self test module
KAM/BIT/102	Network built-in self test module with event packetizer
KAD/CBM/101	CCDL bus monitor parser - 4ch
KAD/CBM/102	CAN bus monitor parser - 4ch
KAD/CBM/103	4-bus CCDL/MCDL monitor
KAD/CBM/104	4-bus CSDB monitor
KAD/CBM/107	CAN bus monitor parser/packetizer - 4ch
KAD/CDC/002	Differential ended current-to-digital converter (1.1kHz b/w) - 24ch at 17.5ksps
KAM/CDC/101	Charge-to-digital converter (piezoelectric sensors) - 4ch at 24ksps
KAD/DAC/001	8-channel analog outputs with 16-channel discrete outputs
KAD/DAC/002	8 analog output channels, with 16 discrete output channels
KAD/DEC/003	IRIG-106 PCM decoder/merger - 2ch

Component	Description
KAD/DEC/103	IRIG-106 PCM decoder/merger - 2ch
KAD/DPI/002	Data input (RAM reader) - dual-port
KAD/DSI/002	Discrete input (counters, time tagging) - 24ch
KAD/DSI/003	Bi-level input (counters, time tagging) - 24ch
KAD/DSI/004	Optoisolated input (counters, time tagging) -24ch
KAD/DSI/102	Discrete input (programmable counters, time tagging) - 24ch
KAD/DSI/104	Optoisolated isolated input (counters, time tagging) - 24ch
KAD/EBM/101	Ethernet bus monitor parser - 1ch
KAD/EBM/102	Gigabit Ethernet bus monitor parser - 1ch
KAD/EBM/103	Parser for ARINC-429 on an ARINC 664 Part 7 (ARINC-664P7) network
KAD/EBM/104	GE Aviation ARINC-664P7 bus monitor parser
KAM/ENC/003	Acra KAM-500 controller with IRIG-106 PCM encoder
KAM/ENC/004	Acra KAM-500 Controller With IRIG-106 PCM Encoder
KAD/ENC/005	IRIG-106 PCM encoder - 1ch
KAD/ENC/106	IRIG-106 PCM encoder (PMF output)
KAD/ENC/111	CCSDS encoder (Ethernet interface, internal 64MB memory buffer)
KAD/ETH/101	Ethernet transmission and programming interface module (IENA compatible)
KAD/ETH/102	Gigabit Ethernet bus monitor parser - 1ch
KAD/FBM/102	FireWire bus monitor parser - 1ch
KAD/FBM/103	FireWire S200b bus monitor parser - 1ch
KAD/HBM/102	G1000 HSDB bus monitor parser - 1ch
KAD/IBM/101	IMB serial bus monitor parser/packetizer - 2ch
KAD/LDC/101	LVDT/RVDT-to-digital converter (voltage excitation, 6 kHz b/w) - 4ch at 24 ksps
KAD/MBM/101	Dual redundant MIL-STD-1553 bus monitor with parser-packetizer
KAD/MBM/102	MIL-STD-1553 bus monitor parser/packetizer - 4ch dual redundant
KAD/MDC/002	Multiplexing ADC (programmable analog gain, pressure scanner, external temp. compensation) - 2ch at 12.5ksps
KAD/MDC/103	Multiplexing ADC (programmable analog gain, pressure scanner, polynomial temp. compensation) - 2ch at 20ksps
KAD/MEM/004	CompactFlash® memory module (data extraction via Fast Ethernet)
KAM/MEM/103	CompactFlash memory module
KAM/MEM/113	CompactFlash memory module with PCAP format
KAD/MSB/103	MIL-STD-1553 bus monitor parser - 1ch dual redundant
KAD/PBM/001	Panavia bus monitor parser - 8ch
KAD/PBM/002	MC/ENMC bus monitor snarfer/parser - 1ch

Component	Description
KAD/PBM/104	4-channel IRIG-106 PCM bus packetizer
KAD/RDC/101	3-channel resolver-to-digital converter with programmable excitation
KAM/SBM/101	EFAbus Express/STANAG 3910 bus monitor parser - 1ch dual redundant
KAD/SDC/001	Synchro-to-digital converter - 2ch at 24ksps
KAD/SDC/101	3-channel synchro-to-digital converter with programmable excitation
KAD/SDI/103	Serial data bus parser
KAD/SWI/101	Ethernet switch - 3 to 1 aggregator
KAD/SWI/102	4-port Ethernet switch module with a dedicated programming port
KAD/SWI/107	Ethernet tap module 4-port
KAD/SWI/108	Ethernet switch (Xbar) - 4 port
KAD/TBM/101	TTP bus monitor
KAM/TCG/102	Combined GPS and IRIG input
KAM/TCG/105	Time-code generator with GPS/IRIG input and battery backup
KAD/TDC/002/10M	Thermocouple ADC (reference compensation, 10mV input range, 40Hz b/w) - 15ch at 512sps
KAD/TDC/005	15-ch. thermocouple A/D converter with external temperature sensor
KAD/TDC/102	Thermocouple ADC (reference compensation, 250Hz b/w) - 15ch at 1ksps
KAD/TDC/107	Thermocouple ADC (reference compensation, high accuracy, 4Hz b/w) - 12ch at 8sps
KAD/UAR/002	RS-232/422/485 bus monitor parser - 4ch
KAD/UAR/003	RS-422 bus monitor parser - 2ch
KAD/UAR/102	RS-232/422/485 bus monitor snarfer/parser - 4ch
KAD/UBM/103	RS-232, RS-422 or RS-485 serial bus parser/packetizer - 16ch
KAD/UBM/105	RS-232, RS-422, or RS-485 high data rate up to 5 Mbps serial bus parser/packetizer -12ch
KAD/UAT/101	RS-232/422 asynchronous transmitter - 4ch
KAD/UTL/110	Format select line sequencing module for use in Ethernet based systems
KAD/VDC/001	Differential ended voice-to-digital converter (CVSD) - 2ch at 64kbps
KAD/VID/103	Single-channel MPEG-4 encoder
KAD/VID/106	H.264 video encoder (analog video input) - 1ch

Data sheets for products listed in this section cover both KAD and KAM where both product versions exist.

Accessories

Component	Description
ACC/HSK/001	Optional heat sinks for the Acra KAM-500 system
ACC/TRF/001	Power transformer - 6ch
ACC/TRF/002	Power transformer for variable frequency supplies from 200 Hz to 900 Hz - 6ch

Accessories

Component	Description
ACD/BAC/002	Backshell for KAD connectors (straight-through)
ACD/BAC/003	Backshell for KAD connectors (20°)
ACD/BAC/004	Backshell for CON/KAD/003/CP
ACD/BAC/005	Backshell for KAD/TDC/107 (straight-through, heavy thermal mass)
ACD/BAC/006	Backshell for KAD connectors (90°)
ACD/BAC/007	Backshell for KAD connectors (180°)
ACD/CJB/001	Cold junction block for thermocouples -15ch
ACD/CJB/002	Cold junction block for KAD/TDC/107 (built in sensors, straight-through heavy thermal mass backshell) - 12ch
ACD/CJB/003	Cold junction block for KAD/TDC/102 (built in sensors, straight-through backshell) - 15ch
ACD/CJB/005	Cold junction block for KAD/ADC/136 (built-in sensor, straight-through backshell) - 7ch
ACM/LID/001	Spare user-slot lids for the Acra KAM-500 system
ACM/EXT/001	Extender board for the Acra KAM-500 system
BAC/PSU/007	Backshell for CON/PSU/007
CON/KAD/002/CP	Mating connector (DD, 52-way)
CON/KAD/002/SR	Mating connector for KAD/TDC/002 (DD, 52-way)
CON/KAD/003/CP	Mating connector for KAM/TCG/102, KAM/TCG/103, and KAM/TCG/105 (DD, 19-way)
CON/KAD/004	Mating connector for CON/KAD/002/CP (female, DD, 52-way)
CON/KAD/005/CP	Mating connector (DD, 52-way, rear grommet)
CON/KAD/005/SR	Mating connector for KAD/TDC/002 (DD, 52-way, rear grommet)
CON/KAD/008/CP	Mating connector (DD, 52-way, rear grommet, no mating screws)
CON/KAD/008/SR	Mating connector for KAD/TDC/002 (DD, 52-way, rear grommet, no mating screws)
CON/KAD/010	Mating connector for KAD/TDC/102 and KAD/TDC/107 (DD, 52-way, 3 built-in temperature sensors)
CON/PSU/007	Mating connector for PSU (6-way)
CON/SAV/001	6-way bayonet-style connector saver
CON/SAV/002	52-way D-SUB module connector saver
CON/SAV/003	3-way bayonet-style connector saver
KAM/DMY/001	Dummy module
KAM/PSU/011	Power supply unit for Acra KAM-500 chassis (+5V, ±7V and ±12V) - 9-way connector
KAM/PSU/012	+5V, ±7V and ±12V power supply unit for KAM-500 chassis with 6-way connector
KAM/PSU/014	Power supply unit for Acra KAM/CHS/02F (+5V and ±12V) - 6-way connector

Appendix II - Product weights

Chassis weights (with baseplate, no modules)

System	Metric	Imperial
KAM/CHS/02F	0.59kg	1.33lb
KAM/CHS/03F	0.6kg	1.33lb
KAM/CHS/03U	1.01kg	2.23lb
KAM/CHS/04L	1.11kg	2.45lb
KAM/CHS/05F/SC	1.12kg	2.46lb
KAM/CHS/06U	1.22kg	2.69lb
KAM/CHS/09U	1.42kg	3.13lb
KAM/CHS/12R	2.79kg	6.17lb
KAM/CHS/13U	1.66kg	3.66lb

User-module weights[1]

Component	Metric	Imperial
KAD/ABM/101	70g	2.47oz
KAD/ABM/102	70g	2.47oz
KAD/ABM/103	75g	2.64oz
KAD/ABM/102/EM1	70g	2.47oz
KAD/ADC/008	65g	2.29oz
KAD/ADC/010	75g	2.64oz
KAD/ADC/011	75g	2.64oz
KAD/ADC/012	75g	2.64oz
KAD/ADC/013	75g	2.64oz
KAD/ADC/014	88g	3.1oz
KAD/ADC/105	80g	2.82oz
KAD/ADC/106	98g	3.45oz
KAD/ADC/109/QB120	98g	3.45oz
KAD/ADC/109/QB350	98g	3.45oz
KAD/ADC/109/S1	102g	3.59oz
KAD/ADC/109/S2	102g	3.59oz
KAD/ADC/111	90g	3.18oz
KAD/ADC/112	86g	3.03oz
KAD/ADC/113	92g	3.25oz
KAD/ADC/114	92g	3.25oz

User-module weights[1] (continued)

Component	Metric	Imperial
KAD/ADC/115	85g	2.99oz
KAD/ADC/116	87g	3.07oz
KAD/ADC/117	94g	3.32oz
KAD/ADC/117/EC1	92g	3.25oz
KAD/ADC/118	92g	3.25oz
KAD/ADC/120	92g	3.25oz
KAD/ADC/126	86	3.03oz
KAD/ADC/129/S1	88g	3.1oz
KAD/ADC/129/S2	88g	3.1oz
KAD/ADC/130	65g	2.29oz
KAD/ADC/135	95g	3.35oz
KAD/ADC/136	95g	3.35oz
KAD/ADC/136/E12	95g	3.35oz
KAD/ADC/141	90g	3.07oz
KAD/ARI/002	70g	2.47oz
KAD/ARI/103	70g	2.47oz
KAD/ARR/101	74g	2.61oz
KAD/BCU/101	72g	2.53oz
KAD/BCU/105	74g	2.61oz
KAD/BCU/140	77g	2.7oz
KAD/BCU/143	80g	2.82oz
KAD/BIT/101	68g	2.4oz
KAM/BIT/102	68g	2.4oz
KAD/CBM/101	66g	2.32oz
KAD/CBM/102	66g	2.32oz
KAD/CBM/103	66g	2.32oz
KAD/CBM/104	66g	2.33oz
KAD/CBM/105	66g	2.32oz
KAD/CDC/002	75g	2.65oz
KAM/CDC/101	66g	2.32oz
KAD/DAC/001	66g	2.32oz
KAD/DAC/002	60g	2.12oz
KAD/DEC/003	60g	2.12oz
KAD/DEC/103	66g	2.23oz

Component	Metric	Imperial
KAM/DMY/001	48g	1.69oz
KAD/DPI/002	40g	1.41oz
KAD/DSI/002	60g	2.12oz
KAD/DSI/003	60g	2.12oz
KAD/DSI/004	82g	2.89oz
KAD/DSI/102	76g	2.68oz
KAD/DSI/104	70g	2.47oz
KAD/EBM/101	74g	2.61oz
KAD/EBM/102	75g	2.65oz
KAD/EBM/103	74g	2.61oz
KAD/EBM/104	90g	3.17
KAM/ENC/003	72g	2.53oz
KAM/ENC/004	72g	2.53oz
KAD/ENC/005	60g	2.12oz
KAD/ENC/106	68g	2.39oz
KAD/ENC/111	73g	2.57oz
KAD/ETH/101	74g	2.61oz
KAD/ETH/102	74g	2.61oz
KAD/FBM/102	76g	2.68oz
KAD/FBM/103	74g	2.61oz
KAD/HBM/102	75g	2.54oz
KAD/LDC/101	96g	3.39oz
KAD/MBM/101	76g	2.68oz
KAD/MDC/002	71g	2.5oz
KAD/MDC/103	72g	2.54oz
KAD/MEM/004	88g	3.1oz
KAM/MEM/103	86g	3.03oz
KAM/MEM/113	105g	3.7oz
KAD/MSB/103	76g	2.68oz
KAD/PBM/001	57g	2.01oz
KAD/PBM/002	55g	1.94oz
KAD/PBM/104	70g	2.47oz
KAD/RDC/101	70g	2.47oz
KAM/SBM/101	225g	7.93oz

Component	Metric	Imperial
KAD/SDC/001	70g	2.47oz
KAD/SDC/101	70g	2.47oz
KAD/SDI/103	64g	2.25oz
KAD/SWI/101	74g	2.61oz
KAD/SWI/102	88g	3.1oz
KAD/SWI/107	88g	3.1oz
KAD/SWI/108	90g	3.2oz
KAD/TBM/101	66g	2.33oz
KAM/TCG/102	68g	2.39oz
KAD/TDC/002/10M	94g	3.31oz
KAD/TDC/005	102g	3.59oz
KAD/TDC/102	65g	2.29oz
KAD/TDC/107	66g	2.33oz
KAD/UAR/002	53g	1.9oz
KAD/UAR/003	56g	1.98oz
KAD/UAR/102	70g	2.49oz
KAD/UBM/103	75g	2.64oz
KAD/UBM/105	75g	2.64oz
KAD/UAT/101	66g	2.33oz
KAD/UTL/110	64g	2.25oz
KAD/VDC/001	64g	2.25oz
KAD/VID/103	132g	4.65oz
KAD/VID/106	91g	3.2oz

1. All user-module weights are for modules with KAD connectors. A user-module with a KAM connector weighs approximately 8g less.

Accessory weights

Component	Metric	Imperial
ACC/HSK/001	195g	6.87oz
ACC/TRF/001	0.75kg	1.65lb
ACC/TRF/002	0.62g	1.37lb
ACD/BAC/002	15g	0.52oz
ACD/BAC/003	15g	0.52oz
ACD/BAC/004	15g	0.5oz

Accessory weights

Component	Metric	Imperial
ACD/BAC/005	96g	3.39oz
ACD/BAC/006	27g	0.95oz
ACD/BAC/007	27g	0.95oz
ACD/CJB/001	370g	0.82lbs
ACD/CJB/002	106g	3.74oz
ACD/CJB/003	28g	0.99oz
ACD/CJB/005	24g	0.85oz
ACM/LID/001	14g	0.49oz
ACM/EXT/001	38g	1.34oz
BAC/PSU/007	8g	0.28oz
CON/KAD/002/CP	8.7g	0.3oz
CON/KAD/002/SR	8.7g	0.3oz
CON/KAD/003/CP	8g	0.3oz
CON/KAD/004	12g	0.42oz
CON/KAD/005/CP	10g	0.35oz
CON/KAD/005/SR	10g	0.35oz
CON/KAD/008/CP	10g	0.35oz
CON/KAD/008/SR	10g	0.35oz
CON/KAD/010	10g	0.35oz
CON/PSU/007	6g	0.21oz
CON/SAV/001	10g	0.35oz
CON/SAV/002	36g	1.27oz
CON/SAV/003	10g	0.35oz
KAM/PSU/011	538g	1.18lb
KAM/PSU/012	538g	1.18lb
KAM/PSU/014	204g	7.19oz

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Revision history

Date	Action	Reason
25 Jul. 2019	"User-modules" on page 12 and "User-module weights" on page 17 updated to reflect released products.	
20 Apr. 2018	"Environmental qualifications" section including DO-160G 7 tables and Configuration-specific testing tables reformatted to match corresponding section in *Environmental Qualification Handbook*. "User-modules" on page 12 and "User-module weights" on page 17 updated to reflect released products.	
3 May 2017	"User-modules" on page 12 and "User-module weights" on page 17 updated to reflect released products. In DO-160G section, corrected typo for Icing test from Category S to Category A.	
15 Aug. 2016	Changed certification approval authority on page 1 from Head of Research and Development to Reliability Engineer. Removed KAM/SBM/001 vibration Test table from "Configuration-specific testing" on page 18; merged its content with the Random endurance table on page 3. Appendix I and Appendix II updated to reflect released products.	
25 Sep. 2015	Reinserted reference to CS116 method for EMC testing. Added DO-160 test setups on page 7. "User-modules" on page 12 and "User-module weights" on page 17 updated to reflect released products. In accordance with internal documentation control, changed document control number from "QD/QS/DDP/0001	Date UNCLASSIFIED" to "DDP/0001	Date"	2418/02 results for CS116 still applicable. Erroneously omitted when table was updated with TES-002832-02 test results.
26 Nov. 2013	"User-modules" on page 12 and "User-module weights" on page 17 updated to reflect currently released products.	
9 Apr. 2013	"User-modules" on page 12 and "Accessories" on page 15 updated to reflect released products. Product descriptions in "Chassis" on page 11, "User-modules" on page 12 and "Accessories" on page 15 updated to reflect changes in data sheets.	
11 Sep. 2012	Updated "Environmental qualifications" on page 2 to include test setups used in environmental testing. Updated Shock testing and Vibration testing to include reference to report 3439/08. Updated shock and vibration test details in "Environmental qualifications" on page 2 to reference report 3439/09. To reflect all products released, "User-modules" on page 12, "Chassis" on page 11, "Accessories" on page 15, "User-module weights" on page 17, "Chassis weights (with baseplate, no modules)" on page 17 and "Accessory weights" on page 18 were updated. Removed details for switch products. Ordering code moved to back cover.	
4 Nov. 2011	"Environmental qualifications" on page 2 updated to reflect information from current version of Environmental Qualifications Handbook "User-modules" on page 12 and "User-module weights" on page 17 updated to reflect released products.	
10 Jan. 2011	"User-modules" on page 12 and "Accessories" on page 15 updated to reflect released products. "User-module weights" on page 17 and "Accessory weights" on page 18 updated to reflect released modules.	
29 Jun. 2010	Updated "Introduction" on page 1 to include reference to switches. Added Table 4, "Switches," on page 11. Updated "User-modules" on page 12 to reflect released modules.	

Date	Action	Reason
3 Mar. 2010	Added details of salt fog test to "The products listed in "Appendix II - Product weights" on page 17 are compliant with the standards/tests listed in the following tables. For a breakdown of products used in each test setup, see the Equipment under test section of the Environmental Qualification Handbook. The certificates and reports stated here are available on request." on page 2. Updated "Limitations" on page 10 to expand on aggregate sampling rate. Updated "User-modules" on page 12 to reflect released modules. Updated "User-module weights" on page 17 to reflect released modules.	
25 Aug. 2009	"User-modules" on page 12 updated to reflect released modules. "User-module weights" on page 17 updated to reflect released modules.	
23 Feb. 2009	New template applied. Cross reference to Table 1 inserted in "Certification history" on page 6.	
28 Apr. 2008	EEC council directive conformity section removed from document. Certification section moved to page one.	EEC council directive conformity section not required.
28 Feb. 2008	Corrected title of standard from "BSG100" to "BS3G100".	Typographical error.
25 Jan. 2008	Updated to new format.	
19 Jan. 2007	Corrected heading for ETL/06081Explosive decompression test.	Customer feedback.
20 Nov. 2006	Added ETL/06081Explosive decompression test.	New testing report for KAM-500 DAU.
22 Mar. 2006	All data sheets have been converted to a new format.	Please see the Revision Histories section of the *Acra KAM-500 Databook.*
15 Nov. 2005	Data sheets for the following modules have been updated: KAM/CHS/03F KAM/CHS/04L/B KAD/ADC/010/C KAD/ADC/011/C KAD/ADC/012/C KAD/ADC/013/C KAD/ADC/104/D KAD/ADC/105 KAD/ADC/106/B KAD/ADC/109/B/S1 KAD/ADC/109/B/S2 KAD/BCU/001/B KAD/BCU/101 KAD/MSB/003/B	Please see the Revision Histories section of the *Acra KAM-500 Databook.*

Date	Action	Reason
7 Sep. 2005	Data sheets for the following modules have been updated: ACD/CJB/001 Chassis Accessories KAD/ADC/002/B KAD/ADC/006 KAD/ADC/009/QB/120 KAD/ADC/009/QB/350 KAD/ADC/009/S1 KAD/ADC/009/S2 KAD/ADC/014/C KAD/ARI/001/B KAD/DEC/003 KAD/MSB/001/B KAD/PBM/001 KAD/SDC/001 KAD/UAR/002/C KAM/CHS/03U/B KAM/CHS/06U/B KAM/CHS/09U/B KAM/CHS/13U/B Standard Cables Standard Tools	Please see the Revision Histories section of the *Acra KAM-500 Databook*.
11 Apr. 2005	Rewritten for clarity, added references to ACRA CONTROL "KAD" modules.	
13 Feb. 2004	Updated to show that the KAM-500 system has been tested and found to be compliant against the following relevant standards: MIL-STD-810F, Method 507.4 (Modified) BS 3G 100 Part 2, Section 3, Subsection 3.12 Class A for Occasional Contamination	
4 Mar. 2003	Updated to show that the data sheets for the following modules had been updated: KAM/ADC/003 Standard Cables	Please see the Revision Histories section of the *Acra KAM-500 Databook*.
3 Feb. 2003	Updated to show that the data sheets for the following modules had been updated: KAM/MDC/001	Please see the Revision Histories section of the *Acra KAM-500 Databook*.
3 Jan. 2003	Updated to show that the data sheets for the following modules had been updated: KAM/ADC/003 KAM/DAC/001 KAM/MDC/001 KAM/SDC/001	Please see the Revision Histories section of the *Acra KAM-500 Databook*.
3 Dec. 2002	Updated to show that the data sheets for the following modules had been updated: KAM/DAC/001	Please see the Revision Histories section of the *Acra KAM-500 Databook*.
1 Aug 2002	Updated to show that the KAM-500 system has been tested and found to be compliant against the following relevant standards: MIL-STD-810F, Method 514.5, Procedure I - General Vibration Updated to show that data sheets for the following modules have been updated: KAM/ADC/008 KAM/RTC/002 KAM/TCG/001	Please see the Revision Histories section of the *Acra KAM-500 Databook*.
1 Jul. 2002	Updated to show that the KAM-500 system has been tested and found to be compliant against the following relevant standards: MIL-STD-810F Method 513.5 Procedure II Updated to show that the data sheets for the following modules had been updated: KAM/ENC/003 KAM/MSB/001 Accessories	Please see the Revision Histories section of the *Acra KAM-500 Databook*.

Date	Action	Reason
4 Jun. 2002	Updated to show that the KAM-500 system has been tested and found to be compliant against the following relevant standards: MIL-STD-810F Method 502.4 Procedure II Updated to show that the data sheets for the following modules had been updated: KAM/ADC/008 KAM/PSU/003 KAM/PSU/005	Please see the Revision Histories section of the *Acra KAM-500 Databook.*
13 May 2002	Updated to show that the KAM-500 system has been tested and found to be compliant against the following relevant standards: MIL-STD-461E AC/KAM-500-II/SLTP/1.4, Paragraph 3 BS3G100, Part 4, Section 1, Subsection 1,1	
1 May 2002	Updated to show that the data sheets for the following modules had been updated: KAM/ENC/004 SAM/DEC/005 SAM/DEC/006 KAM/ADC/009/S2 KAM/MEM/002 Heat Sinks	Please see the Revision Histories section of the Acra *KAM-500 Databook.*
18 Apr. 2002	Updated to show that the KAM-500 system has been tested and found to be compliant against the following relevant standards: Shock MIL-STD-810F Drip Test MIL-STD-810F Vibration MIL-STD-810F	
1 Apr. 2002	Updated to show that the data sheet for the following module had been updated: KAM/MSB/001	Please see the Revision Histories section of the *Acra KAM-500 Databook.*
1 Mar. 2002	Updated to show that data sheets for the following modules had been updated: KAM/ARI/001 KAM/MSB/001	Please see the Revision Histories section of the *Acra KAM-500 Databook.*
22 Feb. 2002	Updated to show that the KAM-500 system has been tested and found to be compliant against the following relevant standards: Temperature MIL-STD-810F Altitude and Rapid Decompression MIL-STD-810F Sinusoidal Vibration MIL-STD-810B Sinusoidal and random vibration GAME-EG-13 Humidity MIL-STD-810F EMC MIL-STD-461E ESD IEC 801-2:1991 (ESD) EN61000-4-2:1995 (Electrostatic discharge)	

Date	Action	Reason
1 Feb. 2002	Updated to show that data sheets for the following modules had been updated: ACC/CJB/001 Chassis Accessories KAM/ADC/001 KAM/ADC/006 KAM/ADC/008 KAM/ADC/009/S1 KAM/ADC/009/S2 KAM/ARI/001 KAM/ARI/002 KAM/DAC/001 KAM/DEC/002 KAM/DPI/001 KAM/DPI/002 KAM/ENC/002 KAM/MDC/001 KAM/PBM/001 KAM/PSU/003 KAM/SDC/001 KAM/SYS/03U KAM/SYS/06U KAM/SYS/09U KAM/SYS/13U KAM/TCG/001 KAM/UAR/001 KAM/VDC/001 Standard Cables	Please see the Revision Histories section of the *Acra KAM-500 Databook.*
1 Dec. 2001	KAM/ARI/002 KAM/DPI/002 KAM/PSU/003 KAM/SYS/03U KAM/SYS/06U KAM/SYS/09U KAM/SYS/13U	Please see the Revision Histories section of the *Acra KAM-500 Databook.*
1 Nov. 2001	KAM/ADC/005 KAM/ADC/006 KAM/ADC/008 KAM/ADC/009/S1 KAM/ADC/009/S2	Please see the Revision Histories section of the *Acra KAM-500 Databook.*
1 Oct. 2001	KAM/ADC/008 KAM/ARI/001 KAM/MSB/001 KAM/SDC/001 KAM/ADC/003 KAM/DAC/001 KAM/DPI/002	Please see the Revision Histories section of the *Acra KAM-500 Databook.*
31 Aug. 2001	Issued first release of Declaration of Design and Performance	

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