KAM/TCG/103

Combined GPS, IRIG and ARINC-429 input module

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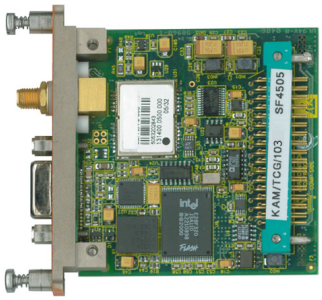

Key Features

- Synchronizes to digital IRIG-B or GPS
- Loads time from specific ARINC-429 labels
- 1µs time resolution
- Less than three parts per million drift when acting as a generator
- Time is maintained from an external battery during power-off
- GPS navigation information available
- Secondary time source input

Applications

- System synchronization
- Parameter time tagging
- Global positioning

Overview

The KAM/TCG/103 accepts time from three sources: a digital IRIG-B stream (RS-422 or TTL), its own onboard GPS receiver, or from ARINC-429 time labels (octal labels 260 and 150). It can be synchronized to the digital IRIG-B stream or GPS receiver. However it does not synchronize its clock with ARINC-429 as there is too much clock jitter. The received time is written to an internal timer and to a real-time clock that maintains time during power-off (when an external battery is connected). The time can be used for synchronization of a distributed Acra KAM-500 data acquisition system. The module generates digital IRIG-B outputs to allow external devices to synchronize with the Acra KAM-500 system.

The module contains an IRIG-B, GPS NMEA and ARINC-429 decoder that decodes incoming signals. The GPS decoder also makes navigation data such as position, altitude, velocity, and heading available as individual parameters.

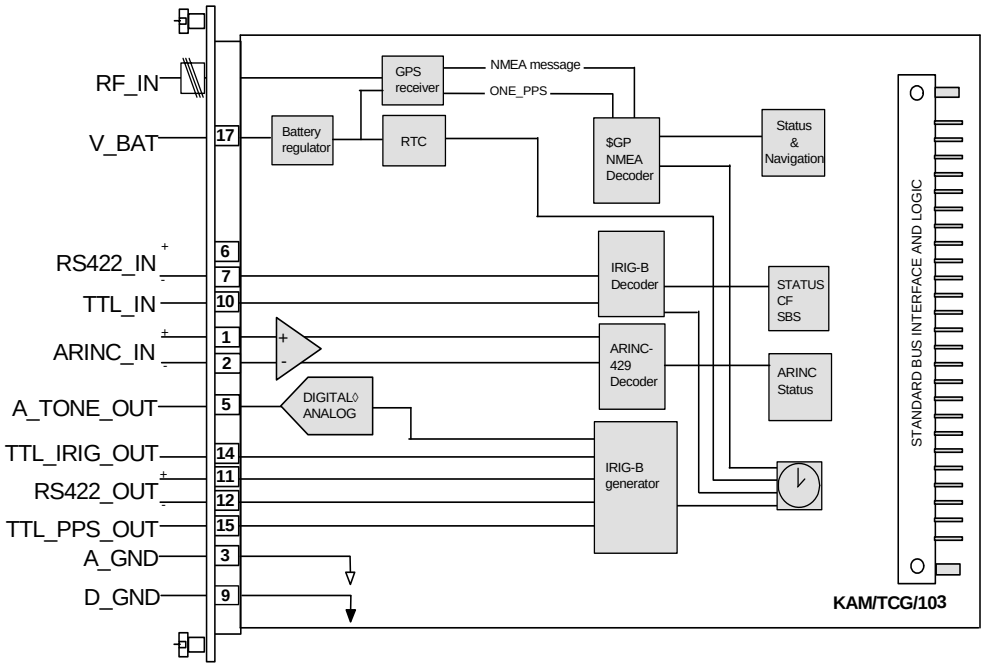

Figure 1: Inputs and outputs on a KAM/TCG/103

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	
	–	2.64	–	oz	Design metric is grams.
Height above chassis					For recommended clearance requirements see the *CON/KAD/003/CP* data sheet.
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	–	–	215	mA	
±7V	–	–	0	mA	
+12V	–	–	40	mA	When driving the recommended antenna RFE/AEG/001.
-12V	–	–	15	mA	
total power	–	–	1.8	W	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	

TABLE 2	Active antenna inputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Inputs	–	–	1	–	
Bias voltage	5.15	–	5.35	V	
Bias current	–	–	50	mA	
Signal strength	-138	–	–	dBm	
Antenna gain	10	26	50	dB	GPS antenna.

TABLE 3	Onboard GPS receiver				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Inputs	–	–	1	–	
Time accuracy	–	–	1	µs	
Position accuracy					See “Navigation data accuracy” on page 12.
2D fix	2.5	–	22	m	Circular Error Probable (CEP).
3D fix	2.5	–	22	m	Spherical Error Probable (SEP).
3D fix	2	–	–	m	With Satellite-Based Augmentation Systems (SBAS).
Satellite acquisition time					See “Acquisition” on page 11.
reacquisition	3.5	5	–	s	
warm power-on	–	40	–	s	
cold power-on	–	60	–	s	Test carried out with a minimum of four satellites in use.
GPS update rate	–	1	1	Hz	
Time format	–	–	—	–	Coordinated Universal Time (UTC).
Navigation datum	–	–	–	–	World Geodetic System-84 (WGS-84). See “Datum” on page 12.
Restrictions					Coordinating Committee for Multilateral Export Controls restrictions apply.
velocity	–	–	1,854	km/h	
velocity	–	–	1,000	knots	
altitude	–	–	18,000	m	
altitude	–	–	60,000	ft	

TABLE 4	ARINC-429 inputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Inputs	–	–	1	–	ARINC-429 compatible
Signalling rate					
DATA	12.5	–	100	kbps	Signalling rate is either 12.5 or 100.
Input resistance					
each input to GND	4	–	–	MΩ	Module powered on.
each input to GND	76	–	–	kΩ	Module powered off.

TABLE 5	BTTL inputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Inputs	–	–	1	–	
Signalling rate					
TTL_IN	–	–	100	bps	The following IRIG-B time codes are supported: IRIG-B 000, 001, 002, 003.
Input voltage					
operating range	0	–	5.25	V	
logic 0	0	–	0.7	V	
logic 1	2	–	5.25	V	
overvoltage protection	-0.3	–	6	V	Voltage in excess of these values can damage input.
Signalling currents					
logic 0	–	-0.2	-0.5	mA	
logic 1	–	2	5	mA	
Input resistance					
each input to GND	–	30	–	MΩ	Module powered on.
each input to GND	–	53	–	kΩ	Module powered off.
Time error					
offset	–	–	2	µs	Over full operating temperature range.

TABLE 6	RS-422 inputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Inputs	–	–	2	–	
Signalling rate					
RS422_IN	–	–	100	bps	The following IRIG-B time codes are supported: IRIG-B 000, 001, 002, 003.
Input voltage					
operating range	-7	–	12	V	Do not exceed operating range.
logic 0	–	–	-0.7	V	V_{IN+} - V_{IN-}.
logic 1	0.7	–	–	V	V_{IN+} - V_{IN-}.
overvoltage protection	-7	–	12	V	Voltage in excess of these values can damage input.
ESD protection	–	–	15	kV	Human Body Model.
Input resistance					
between inputs	–	117	–	MΩ	Module powered on.
between inputs	–	117	–	kΩ	Module powered off.
between inputs	–	121	–	Ω	Module powered on and inputs terminated.
between inputs	–	121	–	Ω	Module powered off and inputs terminated.
each input to GND	–	4.2	–	MΩ	Module powered on.
each input to GND	–	59	–	kΩ	Module powered off.

TABLE 7	Battery inputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Inputs	–	–	1	–	
Input voltage					
operating range	4.5	–	12	V	The Acra KAM-500 must be powered on (or the power should be cycled) when the battery is connected for the first time. Otherwise, 10mA will be drawn from the battery, shortening its life span.
overvoltage	-12	–	12	V	Voltage in excess of these values can damage input.
Input current					
operating range	–	–	100	µA	
Input resistance					
battery input	130	–	–	kΩ	Module powered off.
battery input	2	–	–	MΩ	Module powered on.

TABLE 8	Tone outputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Outputs	–	–	1	–	
Signalling rate					
TONE_OUT	500	–	2,000	Hz	500Hz, 1,000Hz, 1,500Hz, and 2,000Hz are the permitted values.
Output voltage					
operating range	4	–	20	V_{p-p}	
short circuit current	–	10	–	mA	
short circuit duration	∞	–	–	s	To GND.
Output resistance	–	0.2	–	Ω	

TABLE 9	BTTL outputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Outputs	–	–	2	–	
Signaling rate					
TTL_IRIG_OUT	–	–	100	bps	Operating as an IRIG-B 003 digital output.
TTL_PPS_OUT	1	–	10	Hz	Operating as a selectable one or ten pps output.
Output voltage					
logic 0	–	–	0.2	V	Sinking 0.1mA through 100Ω output resistance.
logic 1	4.8	–	–	V	Sourcing 0.1mA through 100Ω output resistance.
short circuit current	–	–	50	mA	
short circuit duration	∞	–	–	s	To GND.
Output resistance	–	200	–	Ω	

TABLE 10	RS-422 outputs				
PARAMETER	MIN.	TYP.	MAX.	UNITS	CONDITION/DETAILS
Outputs	–	–	1	–	
Signaling rate					
RS422_OUT	100	–	–	bps	When providing IRIG-B.
Output voltage					
operating voltage	-7	–	12	V	Absolute voltage of the operating signal must stay within this range.
logic 0	–	–	-2	V	V_{0+} - V_{0-} ; R_{LOAD} = 100Ω.
logic 1	2	–	–	V	V_{0+} - V_{0-} ; R_{LOAD} = 100Ω.
overvoltage protection	-7	–	12	V	
short circuit current	–	–	250	mA	
short circuit duration	∞	–	–	s	Only one output may be shorted at a time.
ESD protection	-15	–	15	kV	Human Body Model.
Output resistance	–	25	–	Ω	

Setting up the KAM/TCG/103

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/TCG/103	KAM/TCG/103	The instrument part reference.
SerialNumber	SN1234	SN1234	Unique name for each module.
Settings Time	-	-	-
Priority Input	GPS IRIG-B ARINC-429	ARINC-429	Specifies the first input to search for time on. If the first source is not available the secondary one will be used.
Matches To Lock	0 to 7	5	Specifies the number of times an IRIG-B time message must be correctly received before it is loaded.
Current Year	2010 to 2020	2010	Indicates the current year.
IRIG Source	RS-422 TTL	RS-422	-
Channels	-	-	-
GPS-In GPS Input	-	-	-
Settings	-	-	-
ARINC-429-In ARINC-429 Input	-	-	Represents a typical ARINC-429 bus monitor channel configuration.
Settings	-	-	-
RS-422-In RS-422 Input	-	-	-
Settings	-	-	-
TTL-In TTL Input	-	-	-
PPS-Out TTL Output	-	-	-
Settings	-	-	-
PPS Rate	1 10	1	-
RS-422-Out RS-422 Output	-	-	-
TTL-Out TTL Output	-	-	-
Analog-ToneOut Analog Output	-	-	-
Settings	-	-	-
Frequency	500 to 2000	500	Specifies the frequency of the analog tone output in Hz.
Amplitude	2 to 10	4	Specifies the peak amplitude, in volts, of the signal (Vp).

Parameter definitions

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
Global Parameters				
StatusIn IRIG-B and timer status register.	BitVector	BitVector	16	R[15:0] R(15) IRIG-BLock - When 1, the IRIG-B decoder is locked to a valid IRIG-B stream. R(14) StraightBinarySeconds - Bit 16 (MSB) of the Straight Binary Seconds decoded from the IRIG-B stream (see StraightBinarySeconds for bits 15 to 0). R[13:3] Reserved R(2) SourcePrimary - When 1 the timer is locked to the primary timer source. R(1) TimerLock - When 1, the timer's PLL is in lock with the input TIME ONE_PPS source. R(0) BatteryFail - When 1, power-on test fails (battery voltage is not present or real time clock is not running).
ControlFunction Control Function (CF) bits received from the IRIG-B input.	Unitless	BitVector	32	R[31:0]
StraightBinarySeconds Sixteen LSB's of the seventeen Straight Binary Seconds received in the IRIG-B stream.	Unitless	BitVector	16	R[15:0]
GPS-In Parameters				
Latitude Latitude received in the NMEA stream.	Unitless	BitVector	48	R[47:0]
LatitudeHi Degrees and minutes of latitude.	Unitless	BitVector	16	R[47:32] R[15:8] Degrees - Degrees of latitude 0 to 89. R[7:0] Minutes - Minutes of latitude 0 to 59.
LatitudeLo Decimal minutes of latitude.	Unitless	BitVector	16	R[31:16] R[31:16] DecimalMinutes - Decimal places of minutes of latitude 0.0000 to 0.9999.
LatitudeMicroMinutes Fifth decimal place of minutes of latitude.	Unitless	BitVector	16	R[15:0] R[15:4] Reserved R[3:0] DecimalMinutes - Fifth decimal place of minutes of latitude 0.00000 to 0.00009.
Longitude Longitude received in the NMEA stream.	Unitless	BitVector	48	R[47:0]
LongitudeHi Degrees of Longitude.	Unitless	BCD	16	R[47:32] R[47:44] Reserved R[43:32] Degrees - Degrees of longitude 0 to 179.
LongitudeLo Minutes and decimal minutes of longitude.	Unitless	BCD	16	R[31:16] R[31:24] Minutes - Minutes of longitude 0 to 59. R[23:16] DecimalMinutes - Decimal places of minutes of longitude 0.00 to 0.99.
LongitudeMicroMinutes Decimal minutes of longitude.	Unitless	BCD	16	R[15:0] R[15:12] Reserved R[11:0] DecimalMinutes - Last three decimal places of minutes of longitude 0.00000 to 0.00999.

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
Altitude Altitude expressed as height above or below Mean Sea Level (MSL).	BitVector	BitVector	32	R[31:0]
AltitudeHi Tens of thousands of meters.	BitVector	BCD	16	R[31:16] R(31) BelowMeanSeaLevel - When 0 the altitude in above Mean Sea Level. When 1 the altitude is Mean Sea Level. R[30:20] Reserved R[19:16] Altitude - Tens of thousands of meters 0 to 9.
AltitudeLo Thousands of meters.	BitVector	BCD	16	R[15:0] R[15:0] Altitude - Meters 0 to 9999.
VelocityInKph Velocity in kilometers per hour.	Unitless	BCD	16	R[15:0] R[15:0] VelocityInKph - KM 0 to 9999.
VelocityInKn Velocity in nautical miles per hour.	Unitless	BCD	16	R[15:0] R[15:0] VelocityInKn - KN 0 to 9999.
Heading True course over ground.	Unitless	BitVector	32	R[31:0]
HeadingHi Degrees of true course over ground.	BitVector	BitVector	16	R[31:16] R[31:26] Reserved R[25:16] Degrees - Degrees 0 to 179.
HeadingLo Decimal degrees of true course over ground	BitVector	BitVector	16	R[15:0] R[7:0] Reserved R[15:0] DecimalDegrees - Decimal degrees of true course over ground.
DilutionOfPrecision Dilution of precision. See "Dilution of Precision (DOP)" section.	Unitless	BitVector	16	R[15:0] R[15:12] Reserved R[11:8] PDOP - Positional DOP; if DOP >15 then 15 is returned. R[7:4] HDOP - Horizontal DOP; if DOP >15 then 15 is returned. R[3:0] VDOP - Vertical DOP; if DOP >15 then 15 is returned.

NAME/DESCRIPTION	BASE UNIT	DATA FORMAT	BITS	REGISTER DEFINITION
StatusGPS GPS status register.	Unitless	BitVector	16	R[15:0] R(15) GPSLock - When 1, the GPS decoder is locked to a valid NMEA stream. R(14) FixError - When 1, indicates that the Fix Flag was not set R(15)=0. R(13) CheckSumError - When 1, indicates that a checksum error was detected R(15)=0. R(12) ToFewSatellites - When 1, indicates that less than the minimum configured number of satellites are used, which can affect the quality of the received data. R(11) DOPTooHigh - When 1, indicates that one of the DOP (Dilution of Precision) figures is outside a specified range. R(10) NorthSouth - When 0, the latitude read is in the northern hemisphere; when 1, the latitude read is in the southern hemisphere. R(9) East/West - When 0, the longitude read is east of the Greenwich Meridian; when 1, the longitude read is west of the Greenwich Meridian. R(8) Reserved R[7:4] SatellitesInView - Number of satellites in view. R[3:0] SatellitesInUse - Number of satellites used to calculate GPS solution.
ARINC-429-In Parameters				
ArincStatus ARINC-429 bus status, gives indication of activity and errors	BitVector	BitVector	16	R[15:0] R(15) FreshError R(14) DateReceived - When 1, the date was received since last read. R(13) TimeReceived - When 1, the time was received since last read. R[12:4] Reserved R[3:0] ErrorCode 0000: Bad Bit 0001: Not Enough Bits 0010: Too Many Bits 0011: Reserved 0100: Parity Error 1111: Reset Occurred

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/TCG/103

Time seeding

On power-on of the DAU, the KAM/TCG/103's timer is seeded with time from the real-time clock (provided an external battery is connected and the real-time clock is running). Otherwise, the module resets and begins counting from day 1, time 0. The timer then loads time from the selected time source (GPS, IRIG-B or ARINC-429). If there is no time input connected to the module, the timer continues counting while powered on.

NOTE: The KAM/TCG/103's timer cannot be seeded over the backplane.

When the time source is GPS or IRIG-B the KAM/TCG/103 synchronizes its internal clock to GPS or IRIG time to within one microsecond. If the selected source is ARINC-429 the KAM/TCG/103 decodes the time from the ARINC bus and compares it to its own time. If there is a difference of more than two seconds, the KAM/TCG/103 loads the time from the ARINC bus on the start of the next received second.

Primary and secondary inputs

The KAM/TCG/103 accepts time from either an IRIG-B stream, an onboard GPS receiver or from ARINC-429.

It is possible to use one time source as the primary input and optionally enable another time source as the secondary input. If the primary time source becomes unavailable (missing or has errors), then after 10 seconds the KAM/TCG/103 reverts back to the secondary source. If the primary source becomes available at a later stage, then the KAM/TCG/103 switches back to the primary time source after 10 seconds.

This allows for synchronization to a secondary IRIG-B source when an aircraft is in the hanger where GPS is not available; this also allows GPS to be used when the aircraft is on the runway or in flight, without reprogramming the Acra KAM-500.

If the primary source is GPS, then the secondary source must be IRIG-B or ARINC-429 and vice versa. For instance, you cannot use RS-422 IRIG as the primary source and TTL IRIG as the secondary source, the secondary source must not be of the same type as the primary source.

Clock synchronization

When loading time from IRIG-B or GPS, the KAM/TCG/103's timer uses a digital Phase Locked Loop (PLL) to synchronize its own clock to the time source. Frequency and phase error are corrected every second. If the error is greater than 500 microseconds, the PLL jumps to the correct time immediately. After that, it tracks the external time source. When the PLL is locked to the external time source, R(1) of the IRIG_STATUS register is set to 1.

The KAM/TCG/103 can be time seeded by an ARINC-429 interface, octal labels 150 and 260. The KAM/TCG/103 does not synchronize with the ARINC-429 interface as there is too much clock jitter. Instead, the KAM/TCG/103 only accepts a time seed from the ARINC-429 interface when there is a two-second difference between its onboard time and the time contained in the ARINC-429 message. The KAM/TCG/103 then free runs until there is another two-second time difference between the onboard clock and the ARINC-429 message, at which point it is seeded again. This process is repeated indefinitely.

GPS antenna

The recommended antenna RFE/AEG/001 has an antenna gain of 26dB with an antenna noise figure of 2.5dB. A minimum antenna gain of 10dB is recommended to compensate for losses in the cable connecting the antenna to the KAM/TCG/103. We recommend a maximum antenna noise figure of 1.5dB for an antenna with a gain of 50dB.

The GPS receiver calculates the carrier-to-noise ratio for the antenna at power-on. It is therefore important that the GPS antenna is connected to the module before it is powered on.

GPS receiver

The KAM/TCG/103 uses a civilian-band (L1) receiver. The United States Department of Defence can turn on Selective Availability at any time without warning. This degrades the accuracy of the GPS data.

NOTE: GPS is a broad subject and beyond the scope of this data sheet. There are many online guides and GPS dictionaries such as those found at the following links:
www.gps.oma.be
www.colorado.edu/geography/gcraft/notes/gps/gps_f.html

GPS time

The KAM/TCG/103 derives time from data received from a constellation of satellites. These satellites are in continuous moving orbit which affects the behavior of the KAM/TCG/103 as described in “Acquisition” on page 11 and “Reacquisition” on page 12.

Acquisition

Along with time and navigation data, GPS satellites transmit GPS ephemeris data and GPS almanac data.

Ephemeris data tells the GPS receiver where each GPS

satellite should be at any time throughout the day. Each satellite transmits ephemeris data showing the orbital information for that satellite and for every other satellite in the system.

Almanac data is constantly transmitted by each satellite. It contains information about the status of the satellite, current date and time.

Cold power-on

When the receiver is powered up for the first time or has no backup battery connected, it has no knowledge of its last position or approximate time and has no ephemeris or almanac data. The receiver starts to search for signals blindly. This is normal behavior. Cold power-up for GPS receivers can take several minutes.

Warm power-on

If the receiver was connected to a backup battery before powering off, the receiver knows its last position, approximate time and almanac. The ephemeris data is cleared. Because the almanac data is retained, it can acquire satellites and get a position fix faster than in cold start mode.

Reacquisition

If the receiver was off for less than two hours with battery backup, the almanac and ephemeris data are used to acquire satellites. Because the ephemeris data is retained, it can acquire satellites and get a position fix faster than in other modes.

Navigational data

The KAM/TCG/103 may be used to record navigation information. The information provided by the KAM/TCG/103 is referenced to a specific datum.

Datum

The internal GPS receiver uses WGS-84, which is a geographic model obtained by referencing the earth's sea level surface area and applying theoretical mathematical calculations. The chart datum is usually defined in the legend of the chart.

Navigation data accuracy

Unlike GPS time, the position information is subject to a number of inaccuracies due to the inherent behavior of the GPS system.

Dilution of Precision (DOP)

DOP is a function expressing the mathematical uncertainty in a position fix based on the relative positions of the satellites used to obtain that position fix. In standard GPS applications, there are three types of DOP information available.

PDOP: Position (3 coordinates)

HDOP: Horizontal (2 horizontal coordinates)

VDOP: Vertical (height only)

DOP has a best case value of 1; higher numbers indicating a greater uncertainty in the precision of the position fix. A low DOP value (2) is considered good, a high number (>7) is considered poor.

Circular Error Probable (CEP)

CEP is the radius of a circle within which there is a 50% probability of the antenna being located.

Spherical Error Probable (SEP)

SEP is the three-dimensional analog of CEP. It is the radius of a sphere within which there is a 50% probability of being located.

Satellite-Based Augmentation Systems (SBAS)

The onboard GPS receiver is capable of receiving additional GPS corrections from SBAS systems. The US Wide Area Augmentation System is operational, but the European Geostationary Navigation Overlay Service (EGNOS) is not yet out of the test phase. The onboard GPS receiver cannot detect that EGNOS is in test mode, and this could result in large navigation errors. Therefore, while the hardware supports SBAS, it is currently disabled. For details, contact Curtiss-Wright support (acra-support@curtisswright.com).

Connector pinout of the KAM/TCG/103

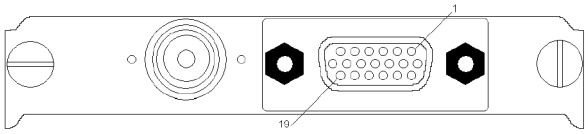

Figure 2: 19-way DD-type connector plus SMA connector

19-way DD-type connector

PIN	NAME		COMMENT
1	ARINC-IN+	ARINC-429 inputs	
2	ARINC-IN-	ARINC-429 inputs	
3	A_GND	Internal ground	
4	DNC		Do not connect
5	TONE_OUT	Tone outputs	
6	RS422_IN+	RS-422 inputs	Either IRIG-B time (PWM) or NMEA data
7	RS422_IN-	RS-422 inputs	Either IRIG-B time (PWM) or NMEA data
8	RS_IRIG_TERM	RS-422 inputs	Termination pin for RS-422; connect to RS422_IN+ if needed
9	D_GND	Internal ground	
10	TTL_IN	BTTL inputs	Either IRIG-B or ONE_PPS in from an external IRIG/GPS source
11	RS422_OUT+	RS-422 outputs	IRIG-B
12	RS422_OUT-	RS-422 outputs	IRIG-B
13	D_GND	Internal ground	
14	TTL_IRIG_OUT	BTTL outputs	IRIG-B time out (PWM)
15	TTL_PPS_OUT	BTTL outputs	One or ten pulses per second
16	DNC		Do not connect
17	V_BAT	Battery inputs	Positive battery input
18	D_GND	Internal ground	Ground return for battery
19	CHASSIS	Chassis	

SMA connector

PIN	NAME	SEE SPECIFICATIONS TABLE	COMMENT
Center	RF_IN	Active antenna inputs	Excitation output to active antenna and RF input to module
Outer shell	RF_GND	Active antenna inputs	RF ground reference; isolated from chassis

Ordering information

PART NUMBER	DESCRIPTION
KAM/TCG/103	Combined GPS, IRIG and ARINC-429 input module

By default, the standard mating connector, CON/KAD/003/CP, and ACD/BAC/004/B, are included with each module in the shipment. Their part numbers will be added to the Confirmation of Order unless an alternative option is specified (see the *Cables* data sheet). Additional items must be ordered separately; refer to Related Products for options.

Revision history

REVISION	DIFFERENCES	STATUS
KAM/TCG/103	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
ACC/GPS/001/05M	GPS antenna interface cable (5m long) terminated with Threaded Neill-Concelman (TNC) male (shield isolated)
ASM/TCG/102	GPS antenna interface cable (1.82m long) terminated with TNC male (shield isolated)
RFE/AEG/001	Airborne GPS antenna with 26dB amplifier

Related documentation

DOCUMENT	DETAILS
DOC/DBK/001	Acra KAM-500 Databook
DOC/HBK/002	Environmental Qualification Handbook
DOC/MAN/030	DAS Studio 3 User Manual
TEC/NOT/003	IRIG-B
TEC/NOT/006	ARINC-429
TEC/NOT/016	Power dissipation
TEC/NOT/049	Power estimation