

## ISIS Triton-1 AX.25 beacon decoder

version: 1.0, 2013-11-24

### AX.25 frame properties

**Frametype** UI frame  
**FROM callsign** TRIV0-0 or TRIV1-0  
**TO callsign** TRIV0-0 or TRIV1-0

### Byte and bit order notes

**Byte order** Least significant byte first on multi-byte numbers  
**Bit order** Most significant bit first

### AX.25 frame contents

Data group	Byte	Description	Interpretation	Unit	Format	Conversion
Frame header	0	Frametype	Always 1 in nominal mode beacon			
	1	Satellite operational mode	1 = Idle mode 2 = Deployment mode 3 = Safe mode 4 = Nominal mode 5 = Detumbling mode			
	2 3	Satellite boot counter	Incrementing satellite boot counter, increments every satellite boot or reset	# of boots	16 bit unsigned	<b>VALUE</b>
	4 5	Packet number	Incrementing packet identification number, resets every boot	# of packets	16 bit unsigned	<b>VALUE</b>
	6 7 8 9	Satellite uptime	Number of seconds passed since the satellite booted	seconds	32 bit unsigned	<b>VALUE</b>
	10	Last received command hash	Hash of the last received command		hexadecimal	
	11	Valid command counter	Number of valid commands received		8 bit unsigned	
	OBCblock 1	12	Data valid 1	Data validity markers, block 1		hexadecimal
13		Data valid 2	Data validity markers, block 2		hexadecimal	
14		Data valid 3	Data validity markers, block 3		hexadecimal	
15 16 17 18		OBC epoch	Number of seconds passed since 01-01-1970 00:00:00 UTC	seconds	32 bit unsigned	<b>VALUE</b>
19		FP editor plan loaded	0 = false 1 = true		low nibble	
19		FP editor plan modified	0 = false 1 = true		high nibble	
20		FP editor index loaded	ID of the flight plan loaded into the FP editor			
21		FP editor plan size	Size of the flight plan loaded into the FP editor	# of items	8 bit unsigned	

Data group	Byte	Description	Interpretation	Unit	Format	Conversion
Electrical Power Subsystem (EPS)	22	Powerpoint tracking mode	0 = HW default 1 = Maximum power point tracking 2 = SW settable			
	23	Channel status	EPS output channel status		hexadecimal	
	24 25	Battery voltage	Battery voltage of the satellite battery	mV	16 bit unsigned	VALUE
	26 27	System current	Total current consumption of the satellite	mA	16 bit unsigned	VALUE
	28 29	Main battery temperature	Temperature of the main battery	degrees C.	16 bit 2s complement	VALUE
	30 31	Secondary battery temperature 1	Temperature of the secondary battery - sensor 1	degrees C.	16 bit 2s complement	VALUE
	32 33	Secondary battery temperature 2	Temperature of the secondary battery - sensor 2	degrees C.	16 bit 2s complement	VALUE
	34 35	Photovoltaic voltage 1	Voltage delivered by solar panel string 1	mV	16 bit unsigned	VALUE
	36 37	Photovoltaic voltage 2	Voltage delivered by solar panel string 2	mV	16 bit unsigned	VALUE
	38 39	Photovoltaic voltage 3	Voltage delivered by solar panel string 3	mV	16 bit unsigned	VALUE
	40 41	Photovoltaic current	Total current delivered by the solar panels to the EPS	mA	16 bit unsigned	VALUE
	Antenna Systems	42 43	Antenna 0 deployment status	Deployment status of antenna 0		hexadecimal
44 45		Antenna 1 deployment status	Deployment status of antenna 1		hexadecimal	
46 47		Antenna 2 deployment status	Deployment status of antenna 2		hexadecimal	
48 49		Antenna 0 temperature	Temperature of antenna 0	degrees C.	16 bit unsigned	VALUE * -0.2922 + 190.65
50 51		Antenna 1 temperature	Temperature of antenna 1	degrees C.	16 bit unsigned	VALUE * -0.2922 + 190.65
52 53		Antenna 2 temperature	Temperature of antenna 2	degrees C.	16 bit unsigned	VALUE * -0.2922 + 190.65

Data group	Byte	Description	Interpretation	Unit	Format	Conversion
<b>OBC block 2</b>	54 55	OBC temperature	Temperature of on-board computer	degrees C.	16 bit unsigned	<b>VALUE</b> * 0.38991 - 67.84
	56	Flight planner status	0 = Empty 1 = Running 2 = Paused 3 = Finished 4 = Error loading 5 = Error invalid time 6 = Error start time 7 = Error running			
	57	FP index running	ID of the flight plan currently executing			
	58	FP next execution item	ID of the flight plan item that will be executed next			
<b>Attitude Determination and Control</b>	59	ADCS operational mode	0 = Off 1 = Determination 2 = Detumbling		low nibble	
	59	ADCS magnetometer selection	0 = Auxiliary board 1 = OBC		high nibble	
	60 61 62 63 64 65 66 67	Magnetic delta X	Difference between two consecutive measurements of the magnetic field - X-axis	nanoTesla	double precision floating point number	<b>VALUE</b>
	68 69 70 71 72 73 74 75	Magnetic delta Y	Difference between two consecutive measurements of the magnetic field - Y-axis	nanoTesla	double precision floating point number	<b>VALUE</b>
	76 77 78 79 80 81 82 83	Magnetic delta Z	Difference between two consecutive measurements of the magnetic field - Z-axis	nanoTesla	double precision floating point number	<b>VALUE</b>

Data group	Byte	Description	Interpretation	Unit	Format	Conversion
	84	AUX board status	Status of the auxiliary board		hexadecimal	
Telemetry & Telecommand	85 86	TRXUV-0 TX Current	Current consumption of the transmitter of TRXUV-0	mA	16 bit unsigned	<i>VALUE</i> * 0.395
	87 88	TRXUV-0 RX Current	Current consumption of the receiver of TRXUV-0	mA	16 bit unsigned	<i>VALUE</i> * 0.395
	89 90	TRXUV-0 Doppler	Doppler offset indicator		16 bit unsigned	
	91 92	TRXUV-0 RSSI	Received Signal Strength Indicator of the receiver of TRXUV-0		16 bit unsigned	
	93 94	TRXUV-1 TX Current	Current consumption of the transmitter of TRXUV-1	mA	16 bit unsigned	<i>VALUE</i> * 0.395
	95 96	TRXUV-1 RX Current	Current consumption of the receiver of TRXUV-1	mA	16 bit unsigned	<i>VALUE</i> * 0.395
	97 98	TRXUV-1 Doppler	Doppler offset indicator		16 bit unsigned	
	99 100	TRXUV-1 RSSI	Received Signal Strength Indicator of the receiver of TRXUV-1		16 bit unsigned	
	Miscellaneous	101	Payload status A	Primary status indication of the AIS payload		hexadecimal
102 103		Payload current	Current consumption of the AIS payload	mA	16 bit unsigned	<i>VALUE</i> * 0.444193548
104 105		Payload temperature	Temperature of the AIS payload	degrees C.	16 bit unsigned	<i>VALUE</i> * -0.3903 + 189.75
106		Payload status B	Secondary status indication of the AIS payload		8 bit unsigned	
107 108		OBC HK log size	Current size of the housekeeping log on the on-board computer	records	16 bit unsigned	
109		OBC Flash state	0 = OK 255 = NOT OK		8 bit unsigned	