

Silence data messages structure

multiple byte values are coded as big endian (integer) or ASCII, see details

Every message packet consists of

- A) pkt header including message length and number of reports transmitted
 B) 1+x reports including report no., time stamp, report module mask, vehicle status and a (variable) set of concatenated data modules according to the report module mask
 If (for any reason) a generated report cannot be transmitted, it is stored in Astra memory and sent as soon as possible together with next reports. Those messages are marked as „stored“, i.e. not actual.
 C) CRC checksum (unknown start value)

A: Packet Header (4 bytes)

Byte No.	Bit pos. (0-x)	example(hex)	description
0		5A	ASCII letter „Z“
1-2		03 A1	message length, starting with „Z“, ending with CRC (e.g. 929)
3		9	quantity of messages (9)

B: Report Header (17 bytes)

RH	Bit pos.	example(hex)	description
RH 0			report number (0-255, looping)
RH 1-6		00 01 00 00 08 27	report module mask – see the report module section for known bits and values
RH 7-10		50 60 63 1B	Julian seconds based report time (RTC, from Astra internal clock)
RH 11-14		10 00 00 80	report reason flags (e.g. SCUTUM, JNY_STOP)
	31		MOTION bike is moved when powered off
	30		bikefall bike has fallen or overturned (accident)
	29		??? Sleep mode? In previous docs bikefall
	28		SCUTUM Silence firmware custom specified event
	27		(gritter? Serial?)
	26		tow_end
	25		tamp_al Tamper alarm
	24		Carrier
	23		CANBUS
	22		gpsRequ
	21		decelX deceleration threshold exceeded
	20		CorneringMax heading angle change exceeds setting
	19		accelX acceleration threshold exceeded
	18		collisG collision detected
	17		unauthdriv unauthorized driver
	16		tow_evt bike is towed away (changes position with ignition off)
	15		overspeed speed alarm threshold exceeded
	14		powOn if the bike was switched on
	13		idle_on bike is in idle mode
	12		idle_end bike leaves idle status
	11		idle_strt bike enters idle status
	10		extBat external Battery connection lost/established
	9		lowBat Astra external power supply is low?
	8		heading
	7		jny_stop journey is ended (generated if ignition on>off)
	6		jny_start journey is started
	5		extIO
	4		panic Panic Switch was pressed
	3		geofenc Geofence was leaved
	2		polled on external request
	1		dist_exc journey distance exceeded
	0		TIMED timer interval is elapsed
RH 15-16			report status flags
	15-11		unknown
	10		bkpBattChng 1=backup battery is charging
	9		luggComp 1=luggage compartment / topcase locked
	8		GPSjam GPS jammer detected
	7		RS232err 1=external device RS232 error
	6		Immobz 1=bike is locked electronically
	5		Rep2follow 1=there are reports stored (not transmitted yet) and reports are following
	4		storedRep 1=stored (maybe outdated) report 0=live(new)
	3		roaming 1=SIM is roaming 0=SIM is in home net
	2		GPSinvalid 1=GNSS data are (still) invalid
	1		privM 0=business mode / 1=private mode
	0		Ignition 1=on, 0=off

Known and used Report Modules

Bxx: value xx is the corresponding bit number in the report module mask

All report data are concatenated in ascending order. The report module mask defines which modules are to be expected here

There is no absolute byte position in this section, thus the byte counting is referred to the report module instead.

Remark: report module mask and report reason flags use different bit numbers

Remark: there may be multiple reasons to generate a report, but this defines not what modules are sent.

Remark: the \$PROT mask defines which reasons may generate reports, but not the report modules that may appear here

B00: Astra module power status (2 bytes)

Byte No.	Bit pos. (0-x)	example(hex)	unit	description
B00:01		3D	Volts /5	Astra external power supply voltage (divide value by 5 to get voltage, 61/5=12.2)
B00:02		61	Percent	Astra backup battery state of charge (97%)

B01: Astra GNSS status (18 bytes)

RH	Bit pos.	example(hex)	unit	description
B01:00-03		50 60 62 17		Julian seconds based report timestamp (6.1.1980, 0 if no time received yet)
B01:04-07				GNSS latitude (divide by 1.000.000)
B01:08-11				GNSS longitude (divide by 1.000.000)
B01:12			km/h *2	GNSS based speed
B01:13			km/h *2	GNSS based maximum journey speed
B01:14			° *2	heading (direction)

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B01:15		m * 20	GNSS based altitude (20m steps)
B01:16-17		km /10	journey (trip) distance (0.1 km steps)
B02: digital input and output bitmask status		(4 bytes)	
B02:00			state of digital inputs
B02:01			state of digital outputs
B02:02			indicates which inputs have changed since last report
B02:03			indicates which outputs have changed since last report
B03: analogue input values		(4 bytes)	
B03:00-01	seems to be unused	mV?	Analogue voltage ADC1 value (raw)
B03:02-03	seems to be unused	mV?	Analogue voltage ADC2 value (raw)
B05: GNSS satellites used / mobile network signal quality			
B05:00	4-7 (low nibble)		numbers of satellites used by GNSS (A=10)
	0-3 (hi nibble) D	(-113+x*4) dB	RSSI of GSM/LTE, 15=-53dB, 1=-109dB, 0= - 111dB
B06: GSM Network information		(4 bytes)	
B06:00-01			only on module boot? GSM network MCC
B06:02-03			GSM network MNC
B11: Journey Stop		(5 bytes)	
B11:00-02		km	occurs when bike is switched off. May be resetted by Silence/Astra GNSS total distance (reported internally in 100m steps, here rounded to km)
B12:03-04		h	total bike runtime (ignition on)
B27: SIM Card Serial Number ICCID		(20 bytes)	
B27:00-19			only on module boot? ASCII formatted serial number. Is filled righthand with FF if it has less than 20 chars
B32: SCUTUM_S01		(46 bytes)	
B32:00		Percent	Silence firmware custom specified event Silence main battery state of charge (interger)
B32:01		° C	Highest battery temperature (of three sensors inside)
B32:02		° C	Lowest battery temperature (of three sensors inside)
B32:03-04		Volts /10	battery voltage
B32:05-06		Ampere /10	battery current
B32:07-10			battery ID convert to decimal, add leading up to 6 Digits, add leading letter „S“
B32:11			battery warning flags
	7	WLS	???
	6	WUT	warning under temperature
	5	WOT	warning overtemperature
	4	WOCC	warning overcurrent charging
	3	WOCC	warning overcurrent recuperation
	2	WOCD	warning overcurrent driving
	1	WUV	warning undervoltage occurs on heavy driving at low SoC
	0	WOV	warning overvoltage
B32:12			battery error flags
	7	SCD	???
	6	LUT	limit under temperature
	5	LOT	limit overtemperature
	4	LOCC	limit overcurrent charging
	3	LOCR	limit overcurrent recuperation
	2	LOCD	limit overcurrent driving
	1	LUV	limit undervoltage occurs on heavy driving at very low SoC, power is limited immediately
	0	LOV	limit overvoltage
B32:13-14		°C /10	engine temperature (delivered via motor controller)
B32:15-16		°C /10	motor controller temperature
B32:17		km/h	speed (display)
B32:18		km	remaining travel distance (depends on SoC and drive mode)
B32:19-22		???	unknown counter, 0-FFFFFFF
B32:23-26		kWs	charged energy total (depends on fw version)
B32:27-30		kWs	recuperated energy total (depends on fw version)
B23:31-34		kWs	overall consumption total (depends on fw version)
B32:35		°C	ambient temperature
B32:36	(value)		status of bike (decimal value)
	0		all systems are off
	1		BMS is active (and sends data via CAN)
	2		Ignition is on
	3		Bike is ready to go, but stands
	4		bike is in move
	5		main battery is removed
	6		main battery is charging
B32:37			unknown (is always 0)
B32:38-40		km	ODO (display)
B32:41			ECU errors
B32:42			unknown (is always 0)
B32:43	(bit)		active outputs on ECU (deliver power to)
	7		hazard lights
	3		low beam
	2		high beam
	1		turn signal RIGHT
	0		turn signal LEFT
B32:44	Bit mask		Drive mode/Sidestand/Reverse gear
	xx10 xxxx		SPORT mode
	xx11 xxxx		CITY mode
	xx01 xxxx		ECO mode
	xxxx 1xxx		sidestand is out
	xxxx xxx1		bike is in move (0 if stands) copy of B32:36?
B32:45			unknown
B34: Unit Ids		(106 bytes)	
B34:00-16			occurs a few seconds after the bike is switched on (after the Astra has queried all Ids from the CAN) Frame ID (VIN, ASCII coded)
B34:17-28			ECU UID (L,M,H?)

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B34:29-48		ECU firmware hash
B34:59-52		battery ID see B32:07-10
B34:53-64		BMS UID???
B34:65-84		BMS firmware hash
B34:85-92		Sigfox BMS ID
B34:93-102	„NOT_STORED“	unknown ID (ASCII coded)
B34:103-105		unknown

B36: Battery Cell voltages

(31 bytes)

B36:00-02		unknown value
B36:03-04	mV	Battery Cell Voltage 1
B36:95-06	mV	Battery Cell Voltage 2
B36:07-08	mV	Battery Cell Voltage 3
B36:09-10	mV	Battery Cell Voltage 4
B36:11-12	mV	Battery Cell Voltage 5
B36:13-14	mV	Battery Cell Voltage 6
B36:15-16	mV	Battery Cell Voltage 7
B36:17-18	mV	Battery Cell Voltage 8
B36:19-20	mV	Battery Cell Voltage 9
B36:21-22	mV	Battery Cell Voltage 10
B36:23-24	mV	Battery Cell Voltage 11
B36:25-26	mV	Battery Cell Voltage 12
B36:27-28	mV	Battery Cell Voltage 13
B36:29-30	mV	Battery Cell Voltage 14

C: Packet Checksum

0-1	CCIRT checksum (no informations available)
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