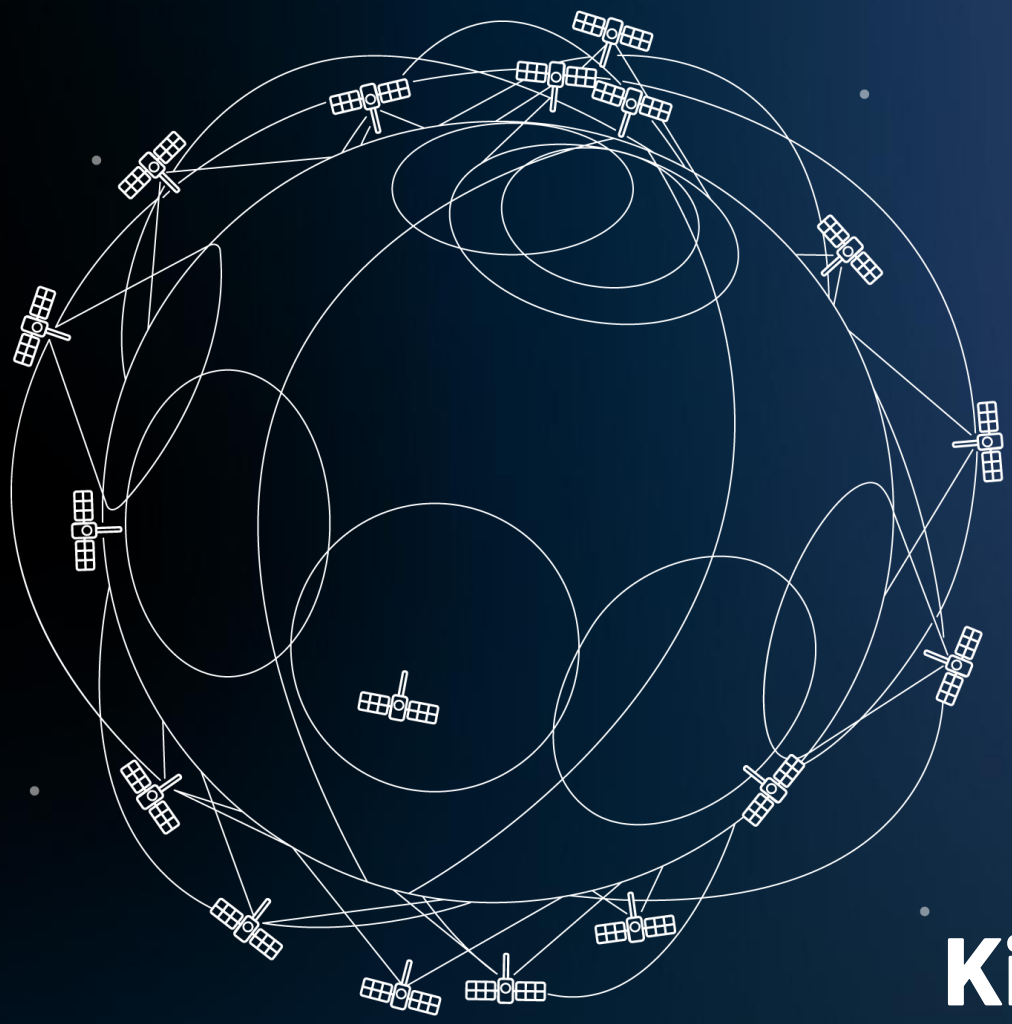

Kinéis

EXPLORER

Device Configuration

Reference:	KINEIS-MU-21-0256
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CONTENT

Terms	Definition
Satellite Pass	Visibility window of the satellite from the terminal, defined by its start time and duration above a minimum elevation.
Revisit time	Time duration a device must wait between two successive satellite passes above its position.
Orbit	Trajectory of a satellite around the Earth, described by 6 parameters in the Adapted Orbital Parameters.
Bulletin or AOP (Adapted Orbital Parameters)	The AOP gives the orbit characteristics for each satellite in the constellation.

I. Product presentation

The Kinéis Explorer demonstration device is a highly adaptable device enabled with Kinéis connectivity, operating on a specific bandwidth dedicated for Kinéis-enabled devices.
Battery powered with micro-USB charging option, this ready-to-use device is compact, versatile and combines four sensors, GPS, dry contact, and a button. Designed to fit most environments, the Kinéis Explorer offers multiple mounting options.
Supporting your Proof of Concept (PoC), Kinéis Shuttle Program is the end-to-end solution offer proposed by Kinéis combining the Kinéis Explorer with demo platform, Kinéis connectivity and support.

Kinéis' direct-to-satellite IoT connectivity service opens a whole new world of possibilities: available everywhere, simple, reliable, low power and affordable, our unique technology serves multiple use cases, remote assets, infrastructure, agriculture, logistics and environmental around the globe.

The Kinéis Explorer is currently sending uplink messages exclusively.

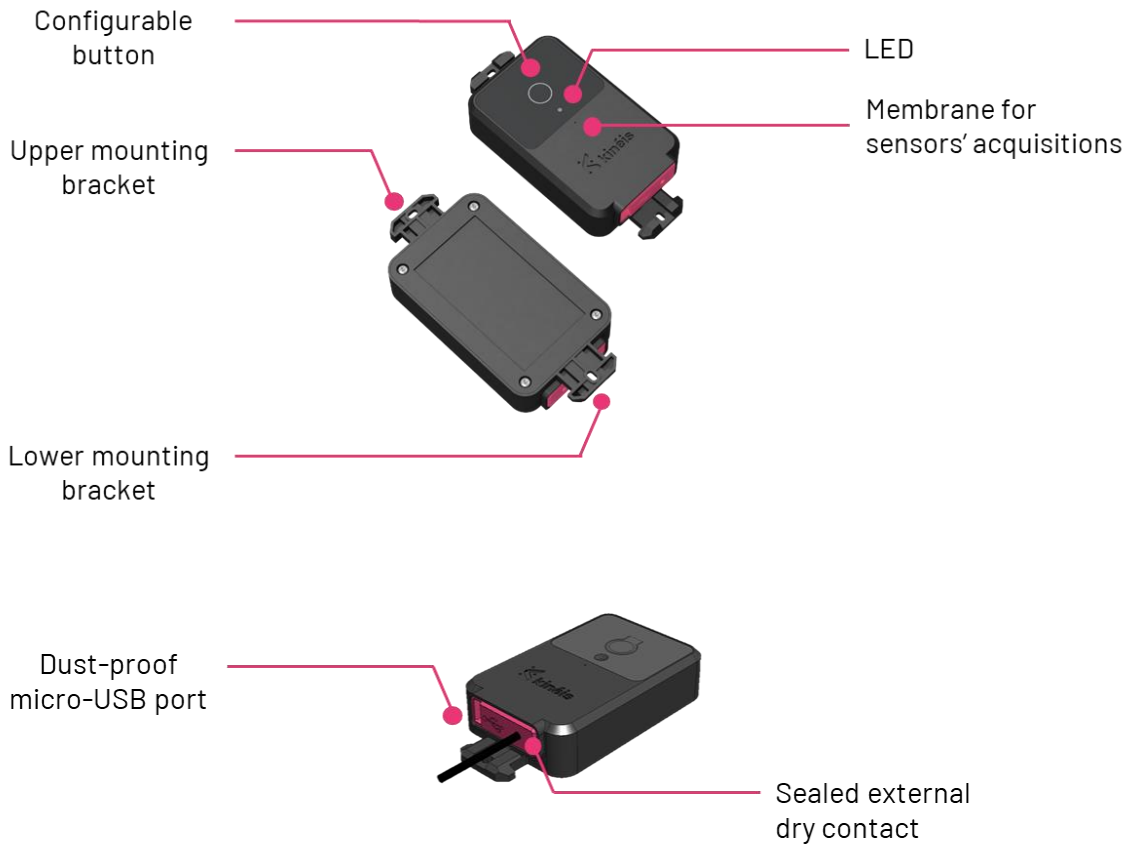

Figure 1 - Kinéis Explorer features

II. Configuration

A. Commissioning

1. Power supply

The Kinéis Explorer is powered with a polymer lithium-ion battery. The nominal voltage of the battery is 3,7V and the nominal capacity is 2800mAh. It can be charged via the micro-USB port at the bottom of the device, protected by the pink silicon cap.

The Kinéis Explorer is running on battery and can take up to 9 hours to be fully charged. Kinéis recommends charging completely the battery before installing the Kinéis Explorer to its definitive location.

2. Initialisation

To start the boot up process, you need to perform a short press on the button. The LED will be flashing alternatively green then red five times. Then, the flashing will pause and turn green two times. This means the Kinéis Explorer is starting sensors acquisition.

If the Kinéis Explorer was already in operation and the alert on the button is configured, then a short press on the button will trigger sensors acquisition and the LED will be notifying the user with a solid red for the duration of the short press.

You can turn the Kinéis Explorer off to inactive mode by pressing for 5 seconds on the button: the LED stays red solid and then goes off, indicating the user that the Kinéis Explorer is going to inactive mode.

3. LED status

Actions	LED	Meaning
None	Off	No power
		On but without any acquisition or configuration under way.
Short press on the button	1. Alternatively green and red - Flashing five times. 2. Pause	Initialisation: Kinéis Explorer starts the boot up process.
	3. Then green – flashing two times.	Starting sensors acquisition
None	Green – flashing two times	Notifying sensors acquisition is under way
None	Green – solid for 5 seconds	Notifying message emission
Short press on the button	Red – solid	Trigger sensors acquisition (if configured this way)
		Device listening for 10s for configuration with AT commands. Kinéis Explorer needs to be connected with a micro-USB/USB cable to a computer with console.
Kinéis Explorer is connected to a power supply	Green solid	Green solid until fully charged. LED is off when the battery is full.
Long press on the button – For 5s	1. Red – Solid 2. Pause 3. Then flashing red – two times	The Kinéis Explorer is going down to inactive mode.

When the light alert is activated, the LED is disabled. The boot up process stays the same and a long press on the button will turn the device to inactive mode. Other LED-based indications are off.

B. Device configuration

The Kinéis Explorer has a USB/ UART interface which uses fixed parameters:

Specification	Description
Baud rate	115200 bps
Data bits	8 bits
Parity	None
Stop bits	1 bit
Flow control	No

The module embedded in the Kinéis Explorer can be driven via the micro-USB interface using the standard AT commands[1]. The Kinéis Explorer is compliant with UART serial console and supports Kinéis proprietary AT commands for specific purposes.

There are three types of extended AT commands:

- Information type commands allows to read only the module information.
- Parameter type commands:
    - "Set" to store a value or values for later use.
    - "Read" the current value or values stored.

For each AT command, there will be the following possible responses:

- +OK, means the command is accepted and executed.
- +ERROR [,<ID>] means an error occurred during the execution of the command

The Kinéis Explorer can also send unsolicited responses occurring asynchronously between command execution to indicate its state. For example: EXPLORER -- TX to indicate that the Kinéis Explorer is sending a message.

More generally, the AT command or responses will be a sentence terminated by <CR><LF> on both side of communication.

[1] The AT is an ATTENTION command and is used as a prefix to other parameters in a string. The AT command combined with other parameters can be set up in the communications package or typed in manually as a command line instruction.

To send an AT command to the Kinéis Explorer, you need to connect the device to your computer with a micro-USB/USB cable, and push the button before sending an AT command. The console should response with EXPLORER -- BUTTON PUSHED<CR><LF>.

Once an AT command has been sent to module, one shall not send again a new command until previous has been completed with a response. All AT commands shall deliver a response. Some AT commands might take up to 10s to return a response.

At the end of a configuration sequence, the user needs to run a reset command, AT+RST=<CR><LF> to save the configuration.

1. General AT commands

a. AT+PING – Test device status

AT+PING	Send the Kinéis Explorer a ping to test device status
Request command AT+PING=?	Response +OK If there is any error, the response is: +ERROR=<error_code>

Example

```
EXPLORER -- BUTTON PUSHED <CR><LF>
AT+PING=?<CR><LF>
+OK<CR><LF>
```

b. AT+FW – Get firmware version

AT+FW	Get the firmware version
Request command AT+FW=?	Response +FW=<firmware version>

Parameters

<firmware version>	The firmware version

Example

```
EXPLORER -- BUTTON PUSHED <CR><LF>
AT+FW=?<CR><LF>
+FW=SW1.0<CR><LF>
```

c. AT+ID – Get Kinéis Module (KIM) ID

AT+ID	Get Kinéis Module (KIM) ID (hexadecimal)
Request command AT+ID=?	Response +ID=<ID nb>

Parameters

<ID nb>	The Kinéis module hexadecimal identifier

Example

```
EXPLORER -- BUTTON PUSHED <CR><LF>
AT+ID=?<CR><LF>
ID=21030001<CR><LF>
```

2. Satellite pass predictions AT commands

a. AT+PREPASS_EN – Get and enable/disable Pass predictions

AT+PREPASS_EN	Get/Enable/Disable pass predictions
Request command AT+PREPASS_EN=?	Response + PREPASS_EN=<1 or 0>
Write command AT+PREPASS_EN=<enable/disable>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<enable/disable>	Enabling or disabling the pass predictions (Prepass). disable: 0 enable: 1

Example

```
EXPLORER -- BUTTON PUSHED <CR><LF>
AT+PREPASS_EN=?<CR><LF>
+PREPASS_EN=1<CR><LF>
```

b. AT+AOP – Get and update the Adapted Orbital Parameters of the satellites

AT+AOP	Get and update the AOP
Request command AT+AOP=?	Response +AOP=6,2020-3-5T22:26:14Z,6891.398926,97.457497,109.755997,-23.753000,95.013298,-3.510000 +AOP=a,2020-3-5T23:24:31Z,7195.602051,98.504700,316.014008,-25.341000,101.359901,0.000000 +AOP=9,2020-3-5T22:57:46Z,7195.580078,98.712799,338.095001,-25.339001,101.358902,0.000000 +AOP=b,2020-3-5T22:10:13Z,7195.645996,98.720100,350.315002,-25.340000,101.360298,0.000000 +AOP=5,2020-3-5T23:2:51Z,7180.390137,98.704903,303.872986,-25.259001,101.038597,-0.550000 +AOP=8,2020-3-5T21:38:31Z,7225.992188,99.026497,358.329987,-25.497999,102.000298,-0.860000 +AOP=c,2020-3-5T23:40:57Z,7226.346191,99.194504,279.122986,-25.499001,102.007301,-0.400000

	+AOP=d,2020-3-5T22:41:9Z,7160.221191,98.540497,108.457001,-25.153999,100.614304,-0.130000
Write command AT+AOP= <SAT hex ID>, <Year>-<Month>-<Day>T<Hour>:<Minute>:<Second>Z, <SemiMajorAxis Deg>, <Longitude ascending Deg>, <ascending drift>, <Orbit period (min)>, <SemiMajorAxis Drift (MeterPerDay)>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<SAT hex ID>	The satellite identifier in hexadecimal
<Year>-<Month>-<Day>T<Hour>:<Minute>:<Second>Z	UTC date of the AOP year: current year month: 1-12 day: 1-31 T: character 'T', refers to time hour: 0-23 minute: 0-59 second: 0-59 Z: character 'Z', refers to UTC
<SemiMajorAxis Deg>	Radius in degree of the orbit with respect to the centre of the Earth (Earth radius + satellite altitude on the ascending node of the orbit).
<Longitude ascending Deg>	Longitude in degree of the Ascending node of the orbit at the given UTC date.
<ascending drift>	Drift in longitude of the ascending node during the nodal period
<Orbit period (min)>	Period in minutes of the satellite orbit between two successive ascending nodes crossing (nodal period).
<SemiMajorAxis Drift (MeterPerDay)>	Drift in meter per day of the semi-major axis (altitude decay per day).

Note: All the above-mentioned parameters will be provided by Kinéis.

Even though most of the satellites are maintained on their orbit thanks to maneuver capability (propulsion), they still drift with time because of the solar activity. The linear time margin parameter compensates for the drift by adding extra time to the computed satellite passes, allowing to use the same AOP data for up to 6 months, but the resulting passes have a much greater duration. Therefore, it is recommended to update the AOP at maximum every 3 months for the computation to be as accurate as possible and limit the time margin contribution in the satellite passes output calculations.

Example

```
EXPLORER -- BUTTON PUSHED <CR><LF>
AT+AOP=?<CR><LF>
+AOP=6,2020-3-5T22:26:14Z,6891.398926,97.457497,109.755997,-23.753000,95.013298,
-3.510000<CR><LF>
+AOP=a,2020-3-5T23:24:31Z,7195.602051,98.504700,316.014008,-25.341000,101.359901
,0.000000<CR><LF>
+AOP=9,2020-3-5T22:57:46Z,7195.580078,98.712799,338.095001,-25.339001,101.358902
,0.000000 <CR><LF>
+AOP=b,2020-3-5T22:10:13Z,7195.645996,98.720100,350.315002,-25.340000,101.360298
,0.000000<CR><LF>
+AOP=5,2020-3-5T23:2:51Z,7180.390137,98.704903,303.872986,-25.259001,101.038597,
-0.550000<CR><LF>
+AOP=8,2020-3-5T21:38:31Z,7225.992188,99.026497,358.329987,-25.497999,102.000298
,-0.860000<CR><LF>
+AOP=c,2020-3-5T23:40:57Z,7226.346191,99.194504,279.122986,-25.499001,102.007301
,-0.400000<CR><LF>
+AOP=d,2020-3-5T22:41:9Z,7160.221191,98.540497,108.457001,-25.153999,100.614304,
-0.130000<CR><LF>
+AOP=end<CR><LF>
```

```
EXPLORER -- BUTTON PUSHED <CR><LF>
AT+AOP=6,2020-3-5T22:26:14Z,6891.398926,97.457497,109.755997,-23.753000,95.013298,
-3.510000<CR><LF>
+OK<CR><LF>
AT+AOP=a,2020-3-5T23:24:31Z,7195.602051,98.504700,316.014008,-25.341000,101.359901
,0.000000<CR><LF>
+OK<CR><LF>
AT+AOP=9,2020-3-5T22:57:46Z,7195.580078,98.712799,338.095001,-25.339001,101.358902
,0.000000 <CR><LF>
+OK<CR><LF>
```

AT+AOP=b,2020-3-5T22:10:13Z,7195.645996,98.720100,350.315002,-25.340000,101.360298
,0.000000<CR><LF>
+OK<CR><LF>
AT+AOP=5,2020-3-5T23:2:51Z,7180.390137,98.704903,303.872986,-25.259001,101.038597,
-0.550000<CR><LF>
+OK<CR><LF>
AT+AOP=8,2020-3-5T21:38:31Z,7225.992188,99.026497,358.329987,-25.497999,102.000298
,-0.860000<CR><LF>
+OK<CR><LF>
AT+AOP=c,2020-3-5T23:40:57Z,7226.346191,99.194504,279.122986,-25.499001,102.007301
,-0.400000<CR><LF>
+OK<CR><LF>
AT+AOP=d,2020-3-5T22:41:9Z,7160.221191,98.540497,108.457001,-25.153999,100.614304,
-0.130000<CR><LF>
+OK<CR><LF>

c. AT+PREPASS_CFG – Get and update the satellite pass predictions

AT+PREPASS_CFG	Get and set the satellite pass predictions
Request command AT+PREPASS_CFG=?	Response +PREPASS_CFG=<beaconLongitude>,<beaconLatitude>,<start.year>-<start.month>-<start.day>T<start.hour>:<start.minute>:<start.second>Z,<start.year>-<start.month>-<start.day>T<start.hour>:<start.minute>:<start.second>Z,<minElevation>,<maxElevation>,<minPassDurationMinute>,<maxPasses>,<timeMarginMinPer6months>,<computationStepSecond>
Write command AT+PREPASS_CFG=<beaconLongitude>,<beaconLatitude>,<start.year>-<start.month>-<start.day>T<start.hour>:<start.minute>:<start.second>Z,<start.year>-<start.month>-<start.day>T<start.hour>:<start.minute>:<start.second>Z,<minElevation>,<maxElevation>,<minPassDurationMinute>,<maxPasses>,<timeMarginM	Response +OK If there is any error, the response is: +ERROR=<error_code>

inPer6months>,<computationStepSecond>	

Parameters

<beaconLongitude>	The Kinéis Explorer longitude East in degree, value: 0, 360
<beaconLatitude >	The Kinéis Explorer latitude in degree, value: -90, 90
<start.year>-<start.month>-<start.day>T<start.hour>:<start.minute>:<start.second>Z	start.year: year start.month: 1-12 start.day: 1-31 T: character 'T', refers to time start.hour: 0-23 start.minute: 0-59 start.second: 0-59 Z: character 'Z', refers to UTC
< minElevation>	Minimum elevation bound in degree of the satellite above the horizon from which it is considered visible from the device. The minimum elevation defines the starting and ending point of the pass.
<maxElevation >	Maximum elevation in degree the satellite shall not exceed for the pass to be considered. Typical values are 70° for native location computation optimisation and 90° otherwise.
<minPassDurationMinute>	Minimum duration for the computed satellite passes, in minutes
< maxPasses>	Maximum number of passes to compute for each satellite.
<timeMarginMinPer6months>	Margin to take to extend the satellite pass prediction in minutes
< computationStepSecond>	Step for pass computation in second

Note: All the above-mentioned parameters will be provided by Kinéis.

Example

```
EXPLORER -- BUTTON PUSHED <CR><LF>
AT+PREPASS_CFG=?<CR><LF>
+PREPASS_CFG=43.604500,1.416600,2021-6-7T14:59:31Z,2020-3-7T0:0:0Z,6.000000,90.0
00000,5.000000,1000,5.000000,30<CR><LF>
```

```
EXPLORER -- BUTTON PUSHED <CR><LF>
AT+PREPASS_CFG=43.549702,1.485000,2020-3-6T3:50:0Z,2020-3-T0:0:0Z,6.0,90.0,5.0,
1000,5.0,30 <CR><LF>
+OK<CR><LF>
```

d. AT+UDATE – Get/Set Kinéis Explorer date and time

AT+UDATE	Get/Set Kinéis Explorer date and time
Request command AT+UDATE=?	Response +UDATE=<year>-<month>-day>T<hour>:<minute>:<second>Z
Write command AT+UDATE=<year>-<month>- <day>T<hour>:<minute>:<second>Z	Response +OK If there is any error, the response is: +ERROR=<error_code>

Note: If the GNSS is enabled, this date will be overridden.

Parameters

<year>-<month>- <day>T<hour>:<minute>:<second>Z	UTC time year: current year month: 1-12 day: 1-31 T: character 'T', refers to time hour: 0-23 minute: 0-59 second: 0-59 Z: character 'Z', refers to UTC

Example

```
EXPLORER -- BUTTON PUSHED<CR><LF>
AT+UDATE=?<CR><LF>
+UDATE=2021-6-7T16:12:52Z<CR><LF>
```

```
EXPLORER -- BUTTON PUSHED<CR><LF>
AT+UDATE=2021-6-7T16:12:52Z<CR><LF>
+OK<CR><LF>
```

3. Kinéis Explorer dedicated AT commands

a. AT+PACQ – Get/Set acquisition period

AT+PACQ	Get/Send acquisition period
Request command AT+PACQ=?	Response +PACQ=<time in s>
Write command AT+PACQ=<time in s>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<time in s>	The period between two acquisitions in seconds

Example

```
EXPLORER -- BUTTON PUSHED<CR><LF>
AT+PACQ=?<CR><LF>
+PACQ=3600<CR><LF>
```

```
EXPLORER -- BUTTON PUSHED<CR><LF>
AT+PACQ=10800<CR><LF>                    Configuration of the acquisition every 3 hours
+OK<CR><LF>
```

b. AT+PACQ_SENS – Get/Set periodic acquisition sensors list

AT+PACQ_SENS	Get/Set periodic acquisition sensors list
Request command AT+PACQ_SENS=?	Response + PACQ_SENS=<s1>,<s2>,<s3>,<s4>,<s5>,<s6>,<s7>
Write command AT+PACQ_SENS=<s1>,<s2>,<s3>, <s4>,<s5>,<s6>,<s7>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<s1>	GNSS
<s2>	Temperature
<s3>	Humidity
<s4>	Pressure
<s5>	Light
<s6>	Accelerometer
<s7>	Dry contact

Example

EXPLORER -- BUTTON PUSHED<CR><LF>	
AT+PACQ_SENS=?<CR><LF>	
+PACQ_SENS=1,1,1,1,1,1<CR><LF>	*All the sensors acquisition are enabled*

EXPLORER -- BUTTON PUSHED<CR><LF>	
AT+PACQ_SENS=1,1,1,1,0,1,1<CR><LF>	*Disabling the light sensor acquisition*
+OK<CR><LF>	

c. AT+ALRT_SENS – Get/Set alerts on acquisitions (sensors list)

AT+PACQ_SENS	Get/Set alerts on acquisitions (sensors list)
Request command AT+ALRT_SENS=?	Response + ALRT_SENS=< s1>,<s2>,<s3>,<s4>,<s5>,<s6>,<s7>
Write command AT+ALRT_SENS= s1>,<s2>,<s3>,<s4>,<s5>,<s6>,<s7>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<s1>	GNSS
<s2>	Temperature
<s3>	Humidity
<s4>	Pressure
<s5>	Light
<s6>	Accelerometer
<s7>	Dry contact

Example

EXPLORER -- BUTTON PUSHED<CR><LF>	
AT+ALRT_SENS=?<CR><LF>	
+ALRT_SENS=0,1,1,1,1,1<CR><LF>	*Alerting on the GNSS is disabled*

EXPLORER -- BUTTON PUSHED<CR><LF>	
AT+ALRT_SENS=0,1,1,1,0,1,1<CR><LF>	*Alerting on the GNSS and light sensor are disabled*
+OK<CR><LF>	

d. AT+ALRT_LIGHT – Get/Set light-based alerts with thresholds

AT+ALRT_LIGHT	Get/Set light-based alerts with thresholds
Request command AT+ALRT_LIGHT=?	Response + ALRT_LIGHT=<status>,<paramL>,<paramH>
Write command AT+ALRT_LIGHT=<status>, <paramL>, <paramH>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<status>	Enabling or disabling the light-based alert disable: 0 enable: 1
<paramL>	Low threshold, lower bound to be configured to use the transition light-based alerts
<paramH>	High threshold, higher bound to be configured to use the transition light-based alerts

Example

EXPLORER -- BUTTON PUSHED<CR><LF> AT+ALRT_LIGHT=?<CR><LF> +ALRT_LIGHT=0,400, 3000<CR><LF>	*Light-based alert is disabled. Thresholds are defined with 400 being the lower threshold and 3000 being the higher one. Both thresholds are not used since the light-based alert is disabled.*

EXPLORER -- BUTTON PUSHED<CR><LF> AT+ALRT_LIGHT=1,400, 3000<CR><LF> +OK<CR><LF>	*Light-based alert is enabled. Thresholds are defined with 400 being the lower threshold and 3000 being the higher one.*

e. AT+ALRT_ACC – Get/Set accelerometer-based alerts

AT+ALRT_ACC	Get/Set accelerometer-based alerts
Request command AT+ALRT_ACC=?	Response + ALRT_ACC=<status>,<param>
Write command AT+ALRT_ACC=<status>,<param>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<status>	Enabling or disabling the accelerometer-based alert disable: 0 enable: 1
<param>	Threshold, bound to be configured to use the accelometer-based alerts

Example

EXPLORER -- BUTTON PUSHED<CR><LF> AT+ALRT_ACC=?<CR><LF> +ALRT_ACC =0,8000<CR><LF>	*Accelerometer-based alert is disabled. The threshold is not used since the alert is disabled.*

EXPLORER -- BUTTON PUSHED<CR><LF> AT+ALRT_ACC =1,4000<CR><LF> +OK<CR><LF>	*Accelerometer-based alert is enabled. The threshold is set at 4000.*

f. AT+ALRT_DRYC – Get/Set dry contact-based alerts

AT+ALRT_DRYC	Get/Set dry contact-based alerts
Request command AT+ALRT_DRYC=?	Response + ALRT_DRYC=<status>,<activeLvl>
Write command AT+ALRT_DRYC=<status>,<activeLvl>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<status>	Enabling or disabling the dry contact-based alert disable: 0 enable: 1
<activeLvl>	The active level where the indicator is considered as being normal

Example

EXPLORER -- BUTTON PUSHED<CR><LF>	
AT+ALRT_DRYC=?<CR><LF>	
+ALRT_DRYC =0,1<CR><LF>	*Dry contact-based alert is disabled. The threshold is not used since the alert is disabled.*

EXPLORER -- BUTTON PUSHED<CR><LF>	
AT+ALRT_DRYC =1,0<CR><LF>	
+OK<CR><LF>	*Dry contact-based alert is enabled. The normal behaviour is 0..*

g. AT+ALRT_PB – Get/Set push button-based alerts

AT+ALRT_PB	**Get/Set push button-based alerts**
Request command AT+ALRT_PB=?	Response + ALRT_PB=<status>
Write command AT+ALRT_PB=<status>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<status>	Enabling or disabling the push button-based alert disable: 0 enable: 1

Example

EXPLORER -- BUTTON PUSHED<CR><LF>	
AT+ALRT_PB=?<CR><LF>	
+ALRT_PB =0<CR><LF>	*Push button-based alert is disabled.*

EXPLORER -- BUTTON PUSHED<CR><LF>	
AT+ALRT_PB =1<CR><LF>	
+OK<CR><LF>	*Push button-based alert is enabled.*

h. AT+RST – Reset the Kinéis Explorer

AT+RST	Reset the Kinéis Explorer
Write command AT+RST=	Response +OK

Note: At the end of a configuration sequence, the user needs to run a reset command, AT+RST=<CR><LF> to save the configuration.

Example

EXPLORER -- BUTTON PUSHED<CR><LF>
AT+RST=<CR><LF>
+OK<CR><LF> .
EXPLORER -- PARAMETERS SAVED <RESET NEEDED><CR><LF>
EXPLORER -- START<CR><LF>
EXPLORER -- PARAMETERS RESTORED<CR><LF>

i. AT+KIM_TX – Send a message

AT+KIM_TX	Send a message
Write command AT+KIM_TX=<data>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<data>	The user data in a hexadecimal string • Maximum length is 24 bytes (48 hexadecimal characters) • If the last block is not complete the module performs zero-padding Note: This AT command is only for RF-testing purpose.

Example

```
EXPLORER -- BUTTON PUSHED<CR><LF>
AT+KIM_TX=ABCDEF<CR><LF>
+OK<CR><LF>
EXPLORER -- TX<CR><LF>
EXPLORER -- SLEEP<CR><LF>
```

j. AT+KIM_REDUN – Get/Set the message transmission redundancy

AT+KIM_REDUN	Get/Set the message transmission redundancy
Request command AT+KIM_REDUN=?	Response + KIM_REDUN=<redundancy>
Write command AT+KIM_REDUN=<redundancy>	Response +OK If there is any error, the response is: +ERROR=<error_code>

Parameters

<redundancy>	The number of repetitions of the same message the Kinéis Explorer must send. Default value: 4

Example

```
EXPLORER -- BUTTON PUSHED<CR><LF>
AT+KIM_REDUN=?<CR><LF>
+KIM_REDUN=4<CR><LF>                    The number of repetitions for a message is four (4).
```

EXPLORER – BUTTON PUSHED<CR><LF>

AT+KIM_REDUN=4<CR><LF>

+OK<CR><LF>

4. Error codes

Error response to an AT command sent to the Kinéis Explorer. ERROR=<error_id>

a. General errors

Numeric format	Verbose format
0	ERROR_NO
1	ERROR_UNKNOWN
2	ERROR_PARAMETER_FORMAT
3	ERROR_MISSING_PARAMETERS
4	ERROR_TOO_MANY_PARAMETERS
5	ERROR_INCOMPATIBLE_VALUE
6	ERROR_UNKNOWN_AT_CMD
7	ERROR_INVALID_ID
8	ERROR_UNKNOWN_ID

b. User data errors

Numeric format	Verbose format
20	ERROR_INVALID_USER_DATA_LENGTH
21	ERROR_DATA_QUEUE_FULL