




TECHNICAL NOTE

BeanDevice® Data Logger User Guide

	"Plug and Play" Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	

DOCUMENT

Document number		Version	V1.1
External Reference	RF_NT_005 V1.0	Publication date	15/05/2011
Author	Christophe DONTEGREUIL		
Internal Reference		Project Code	N.A.
Document Name	<i>BeanDevice® Data Logger User Guide</i>		

VALIDATION


Function	Recipients	For Validation	For information
Reader			X
Author		X	

MAILING LIST

Function	Recipients	For action	For Info
Staffer 1	Jules SACHOT	X	
Staffer 2	Christophe DONTEGREUIL		X


Updates

Version	Date	Author	Evolution & Status
V1.0	12/03/2011	Christophe DONTEGREUIL	First version of the document
V1.1	15/05/2011	Christophe DONTEGREUIL	Minors corrections

	“Plug and Play” Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
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1.	TECHNICAL SUPPORT	4
2.	VISUAL SYMBOLS DEFINITION	5
3.	AIM OF THE DOCUMENT	6
4.	ABOUT DATA LOGGER FEATURE	8
5.	DATA LOGGER CAPACITY	9
6.	DATA LOGGING PROCESS STEP-BY-STEP	10
7.	EMBEDDED FLASH MEMORY MANAGEMENT	15
7.1	How a full memory is managed?	15
7.2	Time processing	15
8.	DATA LOGGER CONFIGURATION WITHIN THE BEANSCAPE®	16
8.1	Data Acquisition configuration tag	16
8.1.1	Configure a Data Acquisition mode with Log only option	17
8.1.1	Configure a data acquisition mode with Tx & Log option	18
8.1.1	Configure a data acquisition mode with Tx option	19
8.2	Logger tag	20
8.2.1	How to access the “Logger” Tag ?	20
8.2.2	Logger tag breakdown	21
8.2.3	Logger status	21
8.2.4	Logger manager	22
8.2.5	Acquisition information	24
8.2.6	Logger memory configuration	25

	"Plug and Play" Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	

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	"Plug and Play" Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	


1. TECHNICAL SUPPORT

For general contact, technical support, to report documentation errors and to order manuals, contact **BeanAir Technical Support Center** (BTSC) at:
tech-support@beanair.com




For detailed information about where you can buy the BeanAir equipment/software or for recommendations on accessories and components visit:
www.beanair.com


To register for product news and announcements or for product questions contact BeanAir's Technical Support Center (BTSC).

Our aim is to make this user manual as helpful as possible. Please keep us informed of your comments and suggestions for improvements. BeanAir appreciates feedback from the users.

	“Plug and Play” Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	


2. VISUAL SYMBOLS DEFINITION

<i>Visual</i>	<i>Definition</i>
	<u><i>Caution or Warning</i></u> – Alerts the user with important information about BeanAir wireless sensor networks (WSN), if this information is not followed, the equipment /software may fail or malfunction.
	<u><i>Danger</i></u> – This information MUST be followed if not you may damage the equipment permanently or bodily injury may occur.
	<u><i>Tip or Information</i></u> – Provides advice and suggestions that may be useful when installing BeanAir Wireless Sensor Networks.

	“Plug and Play” Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	

3. ACRONYMS AND ABBREVIATIONS

AES	Advanced Encryption Standard
CCA	Clear Channel Assessment
CSMA/CA	Carrier Sense Multiple Access/Collision Avoidance
GTS	Guaranteed Time-Slot
kSps	Kilo samples per second
LLC	Logical Link Control
LQI	Link quality indicator
LDCDA	Low duty cycle data acquisition
OTAC	Over-the-air-configuration
MAC	Media Access Control
PAN	Personal Area Network
PER	Packet error rate
RF	Radio Frequency
SD	Secure Digital
WSN	Wireless sensor Network

	“Plug and Play” Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	

4. AIM OF THE DOCUMENT

This document is made to bring you all the information you could possibly need to be able to use our BeanDevice® Data Logger in total independence.

5. ABOUT DATA LOGGER FEATURE

Every BeanDevice® integrates a data Logger using a flash memory (software version > V1.5). It integrates a wide spectrum of advanced features:

- A flash memory size suited for different application fields:
 - BeanDevice® Ecosensor products can log up to 32700 data acquisition;
 - BeanDevice® SmartSensor and ProcessSensor can log up to 1.000.000 data acquisition
- A very fast download rate (< 2-3 minutes);
- A great flexibility for the user who can choose between three configurations: Data logging only **or** Data logging + Data transmission **or** Data transmission only
- The BeanDevice® can operate in a standalone mode, without the necessity for being always connected to a Wireless Sensor Network;
- Data logging is compatible with a maximum sampling rate of 2 Ksamples/s;





6. DATA LOGGER CAPACITY

This table below shows the Data Logger capacity for each BeanDevice® type:

Data Logger Mode Activated: Number of acquisition per channel VS Data acquisition Mode (Stop-at-End Recording)														
	BeanDevice SUN BN	BeanDevice SUN	BeanDevice SUN T	BeanDevice SUN-TIR	BeanDevice SUN TH	BeanDevice AN-420	BeanDevice AN-MV	BeanDevice AN-V	BeanDevice TOR	BeanDevice TIR	BeanDevice TSI	BeanDevice TH	BeanDevice HI-INC	BeanDevice AX-3D
LowDutyCycle	2978	32768	16384	10922	10922	8192	8192	262144	87381	262144	349525	349525	524288	349525
Survey	2978	32768	16384	10922	10922	8192	8192	262144	87381	262144	349525	349525	524288	349525
Alarme	2978	32768	16384	10922	10922	8192	8192	262144	87381	262144	349525	349525	524288	349525
Streaming	N/A	N/A	N/A	N/A	N/A	8192	8192	262144	87381	N/A	N/A	N/A	524288	349525
Streaming Math	N/A	N/A	N/A	N/A	N/A	8192	8192	262144	N/A	N/A	N/A	N/A	524288	349525
Data Logger Mode Activated: Number of acquisition per channel VS Data acquisition Mode (Roll-Over Recording)														
	BeanDevice SUN BN	BeanDevice SUN	BeanDevice SUN T	BeanDevice SUN-TIR	BeanDevice SUN TH	BeanDevice AN-420	BeanDevice AN-MV	BeanDevice AN-V	BeanDevice TOR	BeanDevice TIR	BeanDevice TSI	BeanDevice TH	BeanDevice HI-INC	BeanDevice AX-3D
LowDutyCycle	Non disponible	32768	16384	10922	10922	8192	8192	262144	87381	262144	349525	349525	524288	349525
Survey	Non disponible	32768	16384	10922	10922	8192	8192	262144	87381	262144	349525	349525	524288	349525
Alarme	Non disponible	32768	16384	10922	10922	8192	8192	262144	87381	262144	349525	349525	524288	349525
Streaming	Non disponible	N/A	N/A	N/A	N/A	8192	8192	262144	87381	N/A	N/A	N/A	524288	349525
Streaming Math	Non disponible	N/A	N/A	N/A	N/A	8192	8192	262144	N/A	N/A	N/A	N/A	524288	349525

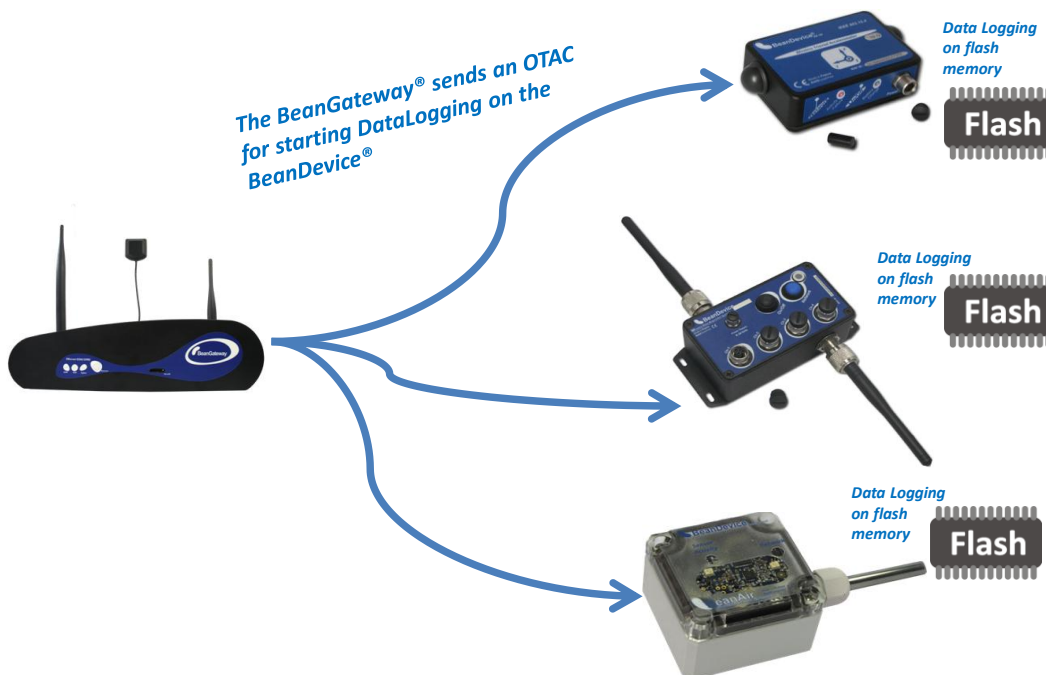
7. DATA LOGGING PROCESS STEP-BY-STEP

Step 1

- Install your BeanDevice® on your equipment
- Fully configure your Beandevice® before starting Data Logging

Step 2

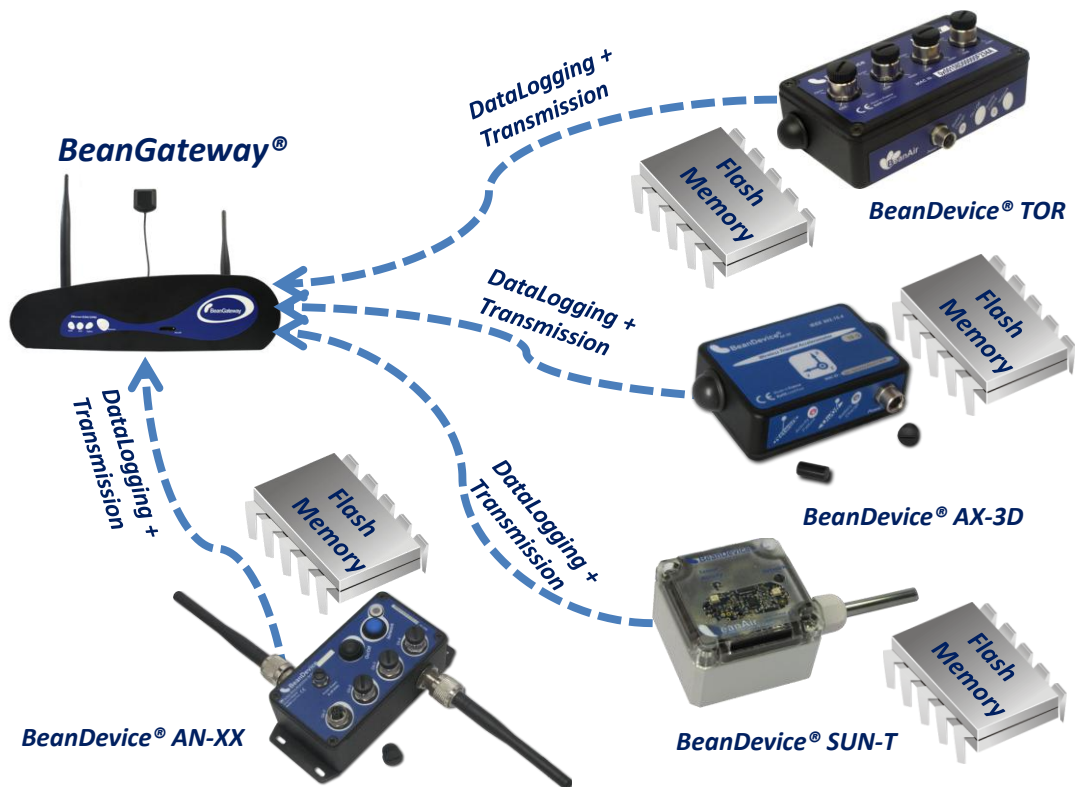
- Configure your BeanDevice® data acquisition mode and choose properly your Datalogger option: Datalogging only **or** Datalogging + Data transmission
- **Results:** The BeanGateway® sends an OTAC for starting the new data acquisition mode on the BeanDevice®. All the logs are recorded on an embedded memory flash of the Beandevice®




Step 3

- If you choose DataLogging with data transmission , the BeanDevice transmits & records all the data simultaneously;
- If you choose DataLogging without RF transmission, the BeanDevice records all the data without any transmission

Data Logging + Data Transmission



	“Plug and Play” Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	

Data Logging without Data transmission



A standalone installation of the **BeanDevice®** can be done without the necessity to be connected to the BeanGateway®.

If the power management mode of your BeanDevice® is set to “**Sleeping With Network Listening**” mode, every N cycle (defined by the user) the Beandevic® precedes to a listening for a download request coming from the Beangateway®.



If your BeanGateway® has been used to configure your Beandevic® Data Logger feature then Don't try to change the PAN ID or the RF channel. Your BeanDevice® will not be able to reach the BeanGateway® during the “Network Listening” process. If this is the case, you must power down (OFF) then power up (ON) your BeanDevice®, following this action a new WSN association will be done.

Step 4

- At anytime, you can send a request (through the BeanScape®) for downloading all the Data acquisition logged on the BeanDevice®
- **Results:** This request is backed up on the BeanGateway® and will be transmitted to the BeanDevice once it starts listening to the BeanGateway®



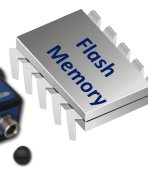
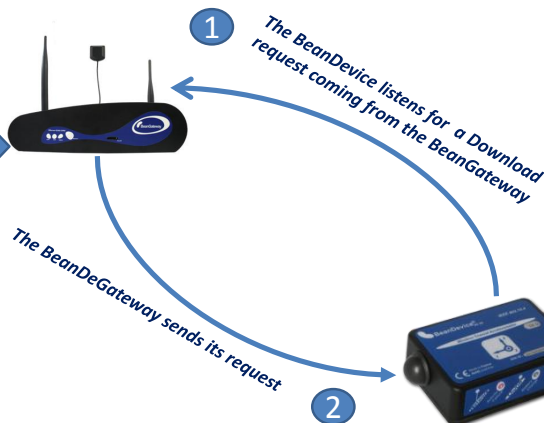
The BeanScape sends a request for downloading all the Data acquisition logged on the BeanDevice



Request pending

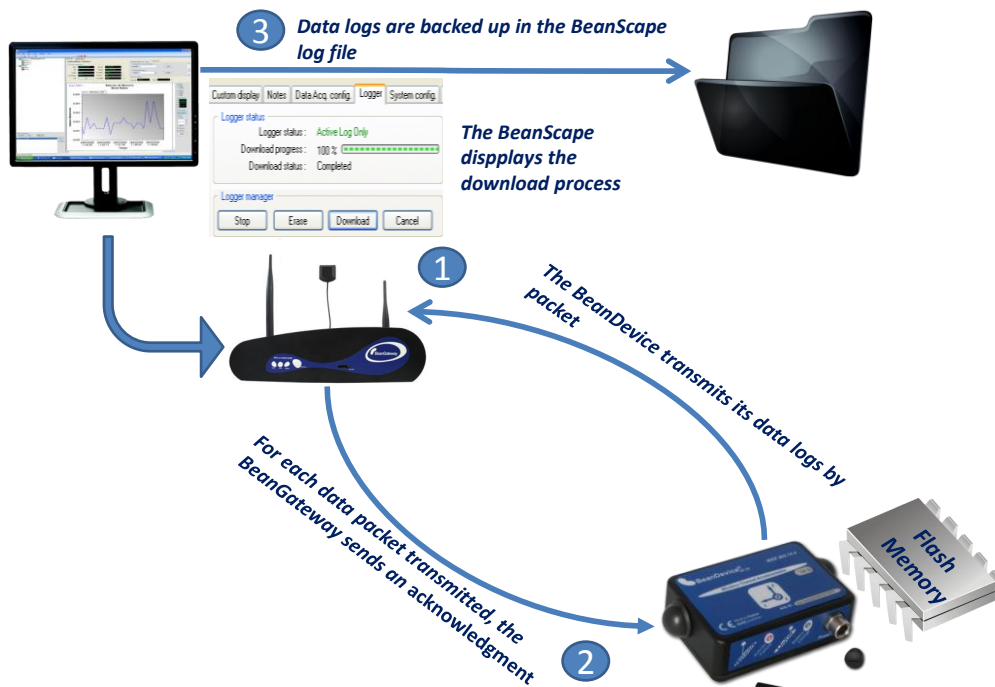
Step 5

- The BeanGateway® must be placed near the BeanDevice®;
- **Results: If the your BeanDevice® power management mode is set to sleeping mode with Network listening,** the request will be received by the BeanDevice® once it started listening to the BeanGateway®;
- **Results: If your BeanDevice power management mode is set to sleeping mode,** the request will be received once you power down (OFF) and then power up (ON) your BeanDevice®



Step 6

- **Results:** The BeanDevice® starts sending all the logged data;
- **Results:** The BeanScape® displays the download process;
- **Results:** At the end of the download process: a log file is created/updated in the BeanScape log folder



	“Plug and Play” Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	

8. EMBEDDED FLASH MEMORY MANAGEMENT


8.1 HOW A FULL MEMORY IS MANAGED?

The user can choose how the embedded flash memory must be managed if it is full. There are two options:

- Data Logging can stop;
- Data Logging continues by erasing the oldest recorded data and logging the new data (FIFO)

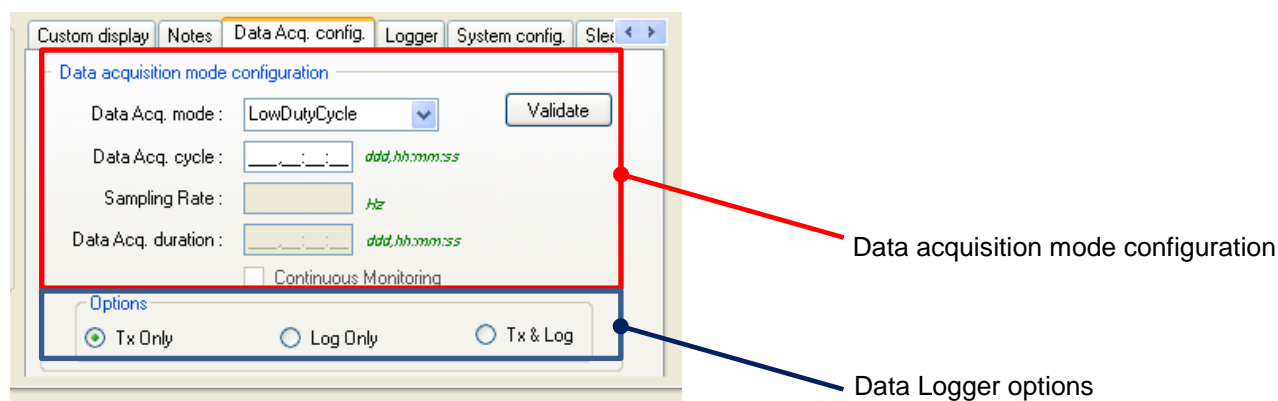
8.2 TIME PROCESSING

<i>Full Download time</i>	<i>Typ</i>
<i>BeanDevice® SUN-XX</i>	<i><2min</i>
<i>BeanDevice TSI/TH</i>	<i><3min</i>
<i>BeanDevice AN-XX</i>	<i><3min</i>
<i>BeanDevice AX-3D</i>	<i><3min</i>
<i>BeanDevice AX-3D</i>	<i><3min</i>
<i>BeanDevice HI-INC</i>	<i><3min</i>
<i>BeanDevice AN-XX (Hardware version VXX)</i>	<i><3min</i>
<i>BeanDevice AN-XX (Hardware version VXX)</i>	<i><2min</i>

	“Plug and Play” Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	

9. DATA LOGGER CONFIGURATION WITHIN THE BEANSCAPE®

9.1 DATA ACQUISITION CONFIGURATION TAG



Tx only: The BeanDevice® transmits the data acquisition without data logging

Log only: The Beandevicé® logs the data without wireless transmission

Tx & Log: The BeanDevice® transmits and logs the data ;



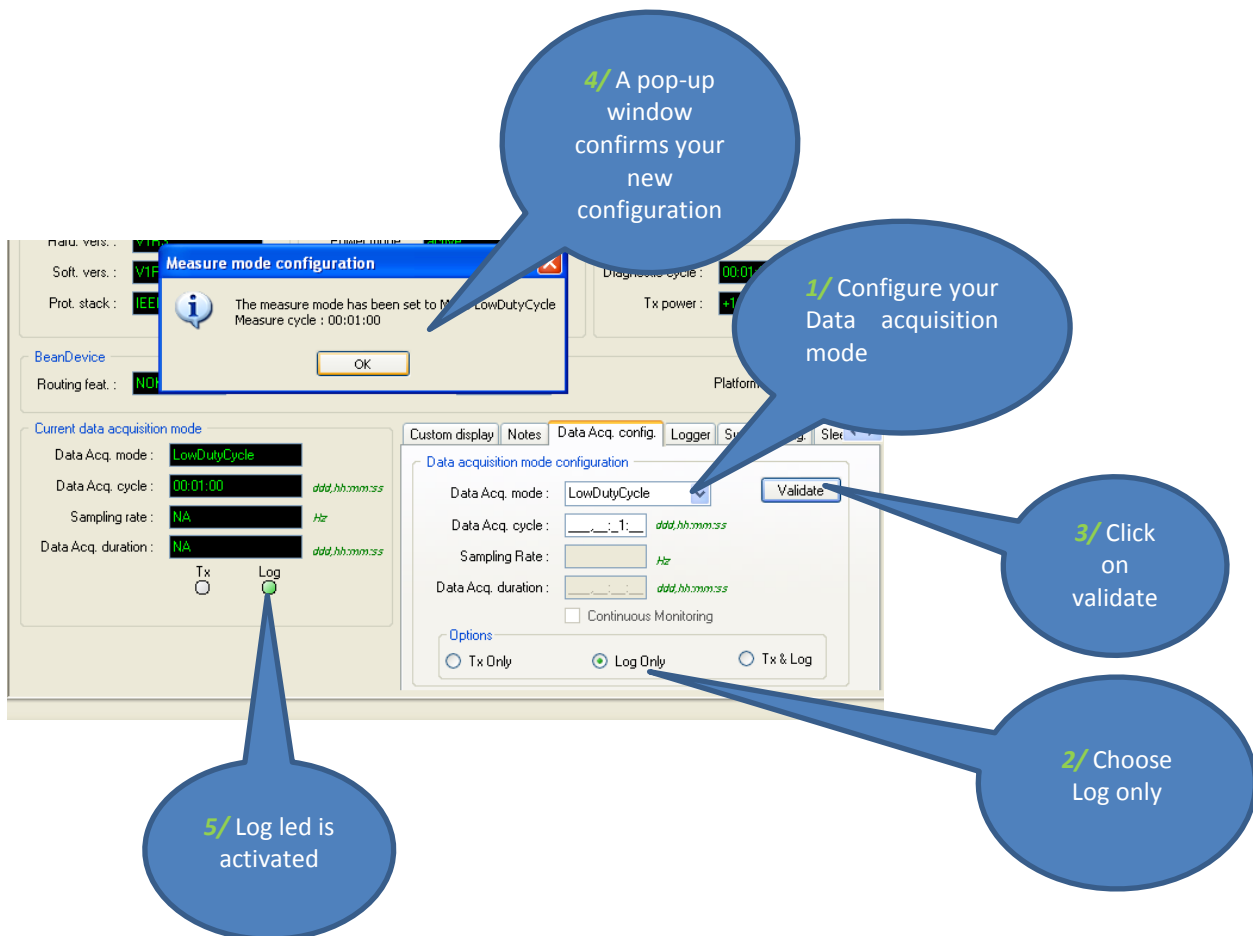
If the your BeanDevice® power management mode is set to sleeping mode with Network listening, the OTAC request will be received by the BeanDevice® once it started listening to the BeanGateway®;

If your BeanDevice power management mode is set to sleeping mode, the OTAC request will be received once you power down (OFF) and then power up (ON) your BeanDevice®

If your BeanDevice power management mode is set to active mode, the OTAC request will be received instantly.

9.1.1 Configure a Data Acquisition mode with Log only option

If the user chooses to configure the data acquisition mode with the **Log** option activated:



The screenshot shows the 'Data acquisition mode configuration' window. A 'Measure mode configuration' pop-up is visible, indicating the mode has been set to 'LowDutyCycle' with a 'Measure cycle' of '00:01:00'. The main configuration window has the following settings:

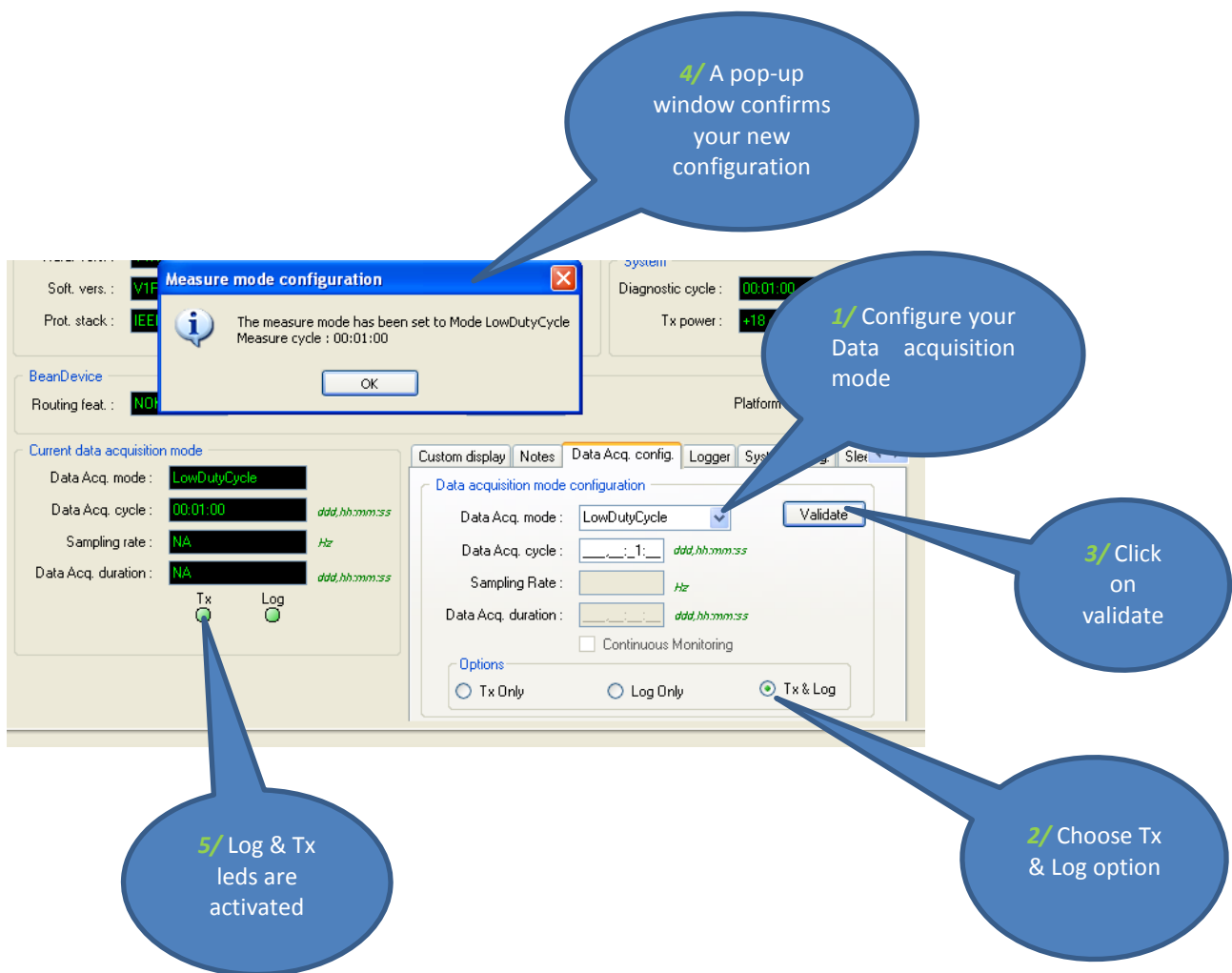
- Data Acq. mode: LowDutyCycle
- Data Acq. cycle: 00:01:00
- Sampling rate: NA
- Data Acq. duration: NA
- Options: Log Only

Five callouts provide the following steps:

- 1/ Configure your Data acquisition mode
- 2/ Choose Log only
- 3/ Click on validate
- 4/ A pop-up window confirms your new configuration
- 5/ Log led is activated

9.1.1 Configure a data acquisition mode with Tx & Log option

If the user chooses to configure the data acquisition mode with *Tx & Log option* activated then:



The screenshot shows the 'Data Acq. config.' window in the BeanDevice software. A 'Measure mode configuration' pop-up window is displayed, indicating the mode has been set to 'LowDutyCycle' with a 'Measure cycle' of '00:01:00'. The main configuration window shows 'Data Acq. mode' set to 'LowDutyCycle', 'Data Acq. cycle' set to '00:01:00', and 'Sampling rate' set to 'NA'. The 'Options' section has 'Tx & Log' selected. The 'Tx' and 'Log' LEDs are shown as active (green) in the 'Current data acquisition mode' section. A 'Validate' button is visible in the configuration window.

1/ Configure your Data acquisition mode

2/ Choose Tx & Log option

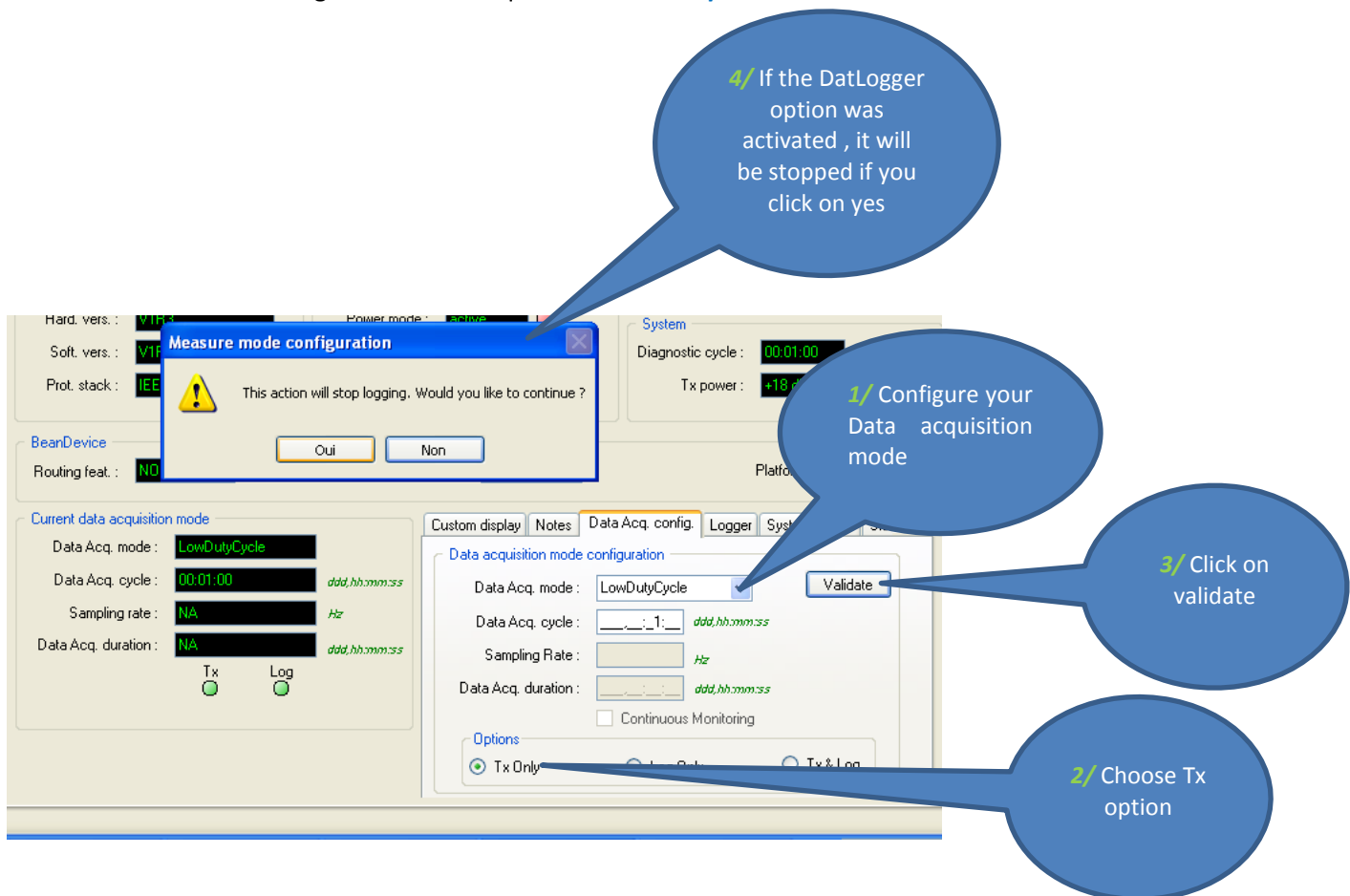
3/ Click on validate

4/ A pop-up window confirms your new configuration

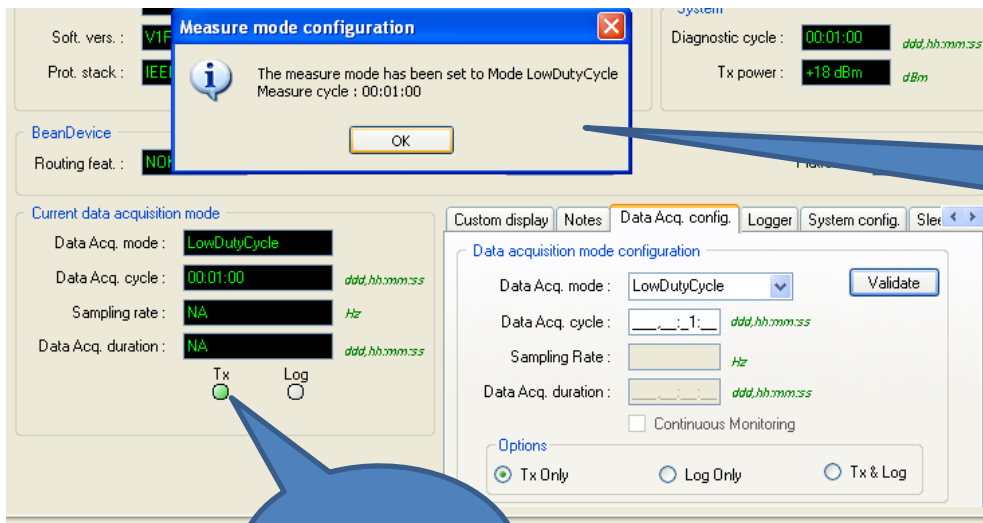
5/ Log & Tx leds are activated

9.1.1 Configure a data acquisition mode with Tx option

If the user chooses to configure the data acquisition with *Tx option* activated:



The screenshot shows the 'Data Acq. config.' tab in the BeanDevice software. A 'Measure mode configuration' dialog box is open, displaying a warning icon and the text: 'This action will stop logging. Would you like to continue?'. Below the dialog are 'Oui' and 'Non' buttons. The background interface shows the 'Data acquisition mode configuration' section with the following settings: 'Data Acq. mode' set to 'LowDutyCycle', 'Data Acq. cycle' set to '00:01:00', 'Sampling Rate' set to 'NA', and 'Data Acq. duration' set to 'NA'. The 'Options' section has 'Tx Only' selected. A 'Validate' button is visible. Four callouts provide instructions: 1/ Configure your Data acquisition mode (pointing to the 'Data Acq. mode' dropdown), 2/ Choose Tx option (pointing to the 'Tx Only' radio button), 3/ Click on validate (pointing to the 'Validate' button), and 4/ If the DatLogger option was activated, it will be stopped if you click on yes (pointing to the 'Measure mode configuration' dialog box).



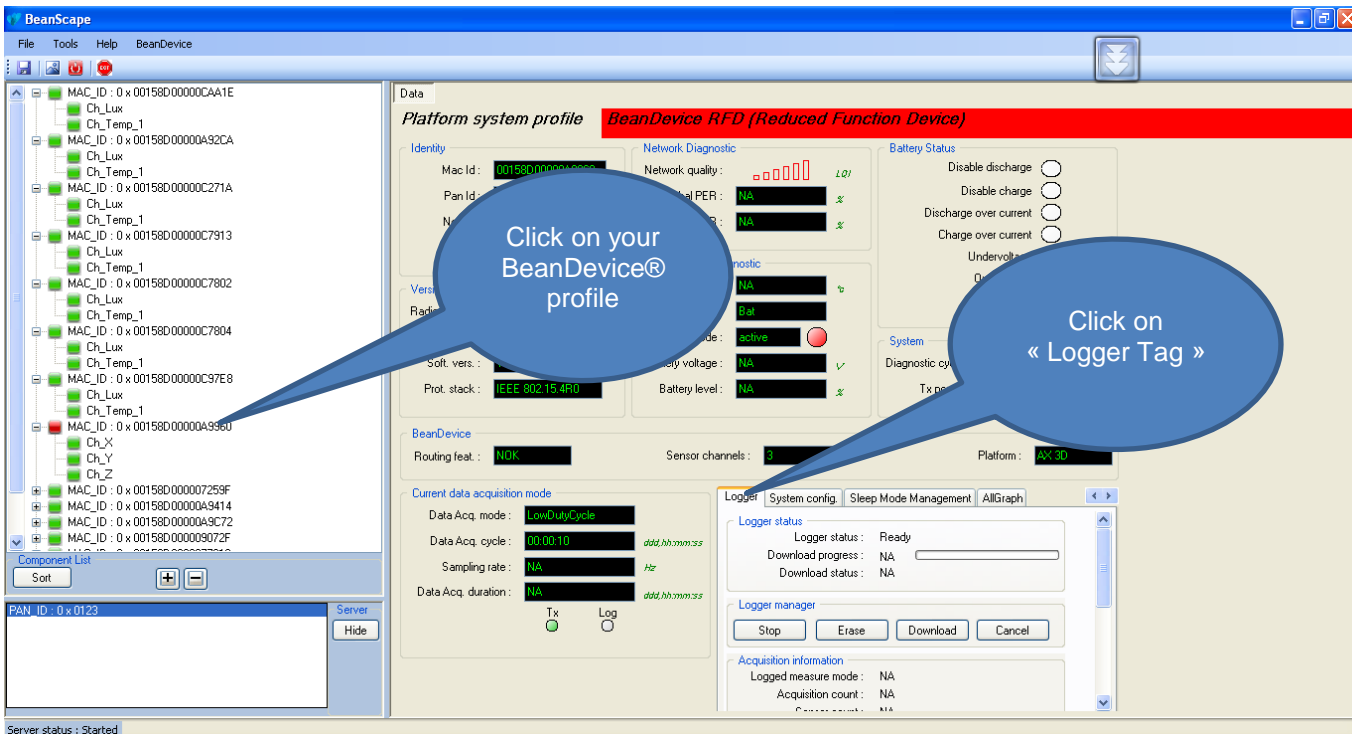
6/ A pop-up window confirms your new configuration

7/ Tx led is activated

9.2 LOGGER TAG

9.2.1 How to access the "Logger" Tag ?

1. Open your BeanScape®
2. Click on your BeanDevice® profile
3. Click on "Logger" tag

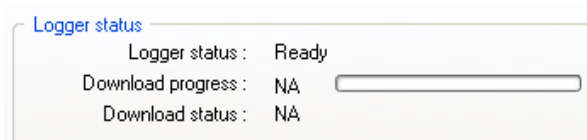


9.2.2 Logger tag breakdown


The Logger tag is composed of 4 different fields:

- **Logger Status**
- **Logger manager**
- **Acquisition information**
- **Logger memory configuration**

9.2.3 Logger status

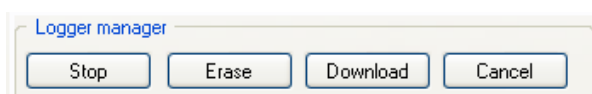


- **Logger status:** Displays the logger’s status, four status are available:
 - **Ready:** the data logger is ready to record data;
 - **NotInIt:** the data logger is not initialized;
 - **Active logs only:** the data is logged only;
 - **Active Tx and Log:** the data is logged & transmitted by Radio;
 - **Stopped:** the data logger is stopped;

	"Plug and Play" Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	

- **Download process:** Displays the download process ranging from 0 to 100%. If 100% is achieved then all the logged data are successfully downloaded on your PC.
- **Download status:** Displays the download status , two types of status are available:
 - **Processing:** Data logs download is under process;
 - **Completed:** Data Logs are completely downloaded on your PC;

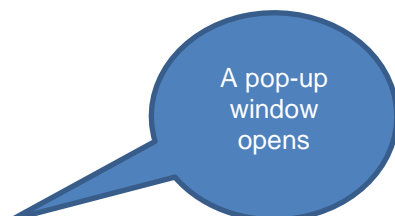
9.2.4 Logger manager

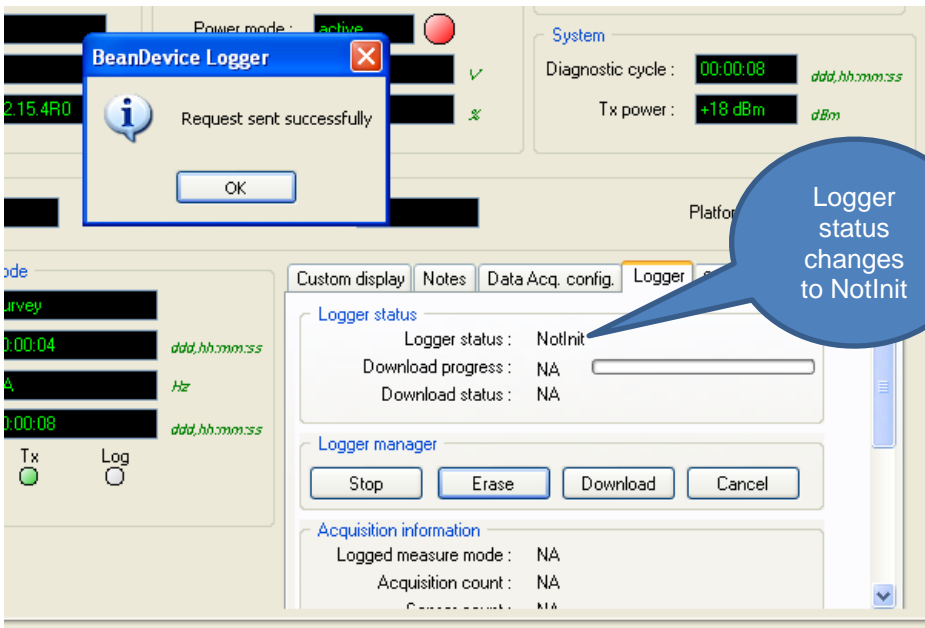


- **Stop:** Stops data Logging process
- **Erase:** Stops & erases all the logs on flash memory
- **Download:** Starts to download all the logs on the flash memory
- **Cancel:** Stops the download process

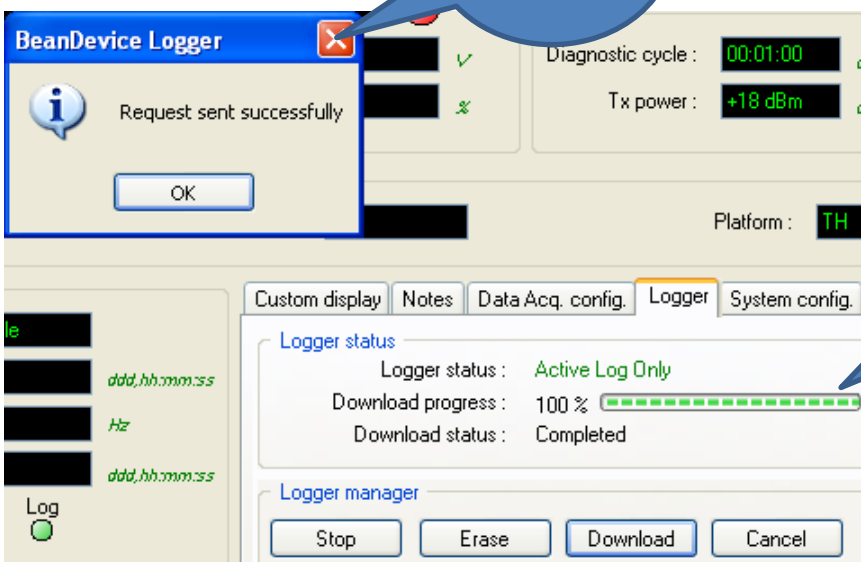
These

When you click on Erase:

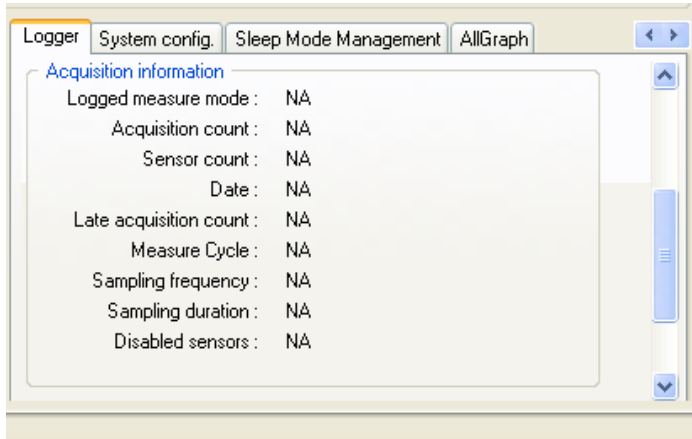




When you click on Download:

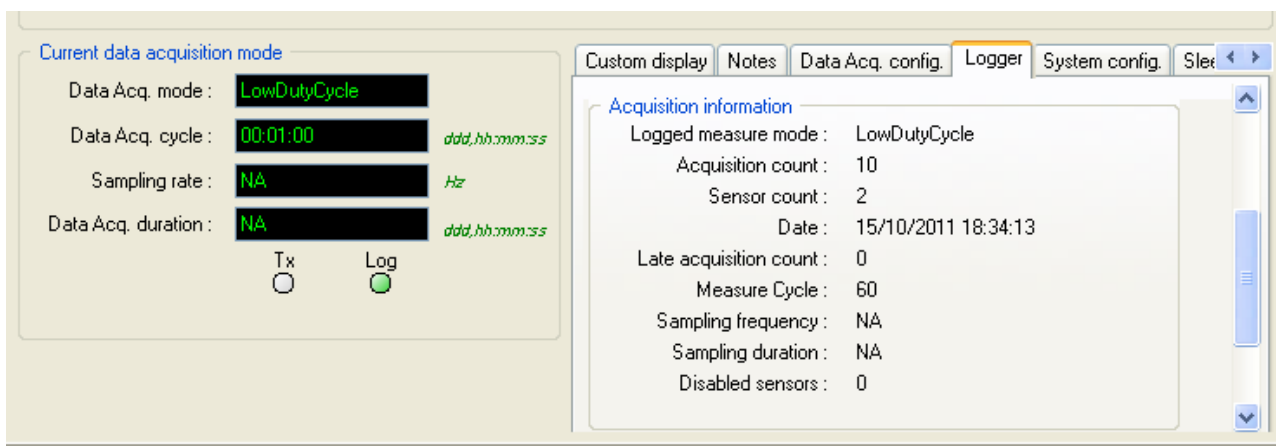



9.2.5 Acquisition information



- **Logged measure mode:** Data acquisition mode used during logging
- **Acquisition count:** Amount of data records logged
- **Sensor count:** Number of sensors activated
- **Date:** Data Logging startup time
- **Late acquisition count:** Data acquisition lost during the data logs download process
- **Measure cycle:** Latest acquisition cycle
- **Sampling frequency:** Latest sampling frequency during data logging (displayed if Streaming & Streaming Packet modes are activated)
- **Sampling duration:** Latest sampling duration during data logging (displayed if Streaming & Streaming Packet modes are activated)
- **Disabled sensors:** Number of sensors disabled during data logging

Example:



	"Plug and Play" Wireless Sensor Networks	Ref: TN_RF_007	Version: 1.1
	Document Type : Technical Note	<i>BeanDevice® DataLogger user guide</i>	

9.2.6 Logger memory configuration

When the flash memory is full:

- Logs will restart at the beginning (Check **"Rollover" recording** option)
- Data logging is stopped (Check **"Stop at end" recording** option)

Click on **"Validate"** to validate your choice.

Logger memory configuration

"Rollover" recording

"Stop at end" recording