IntesisBox®

USB-ENO-ASCII v.1.0.7

USB-ENO-ASCII-C v.1.0.7

USB EnOcean gateway for IntesisBox® AC Interfaces

User's Manual

r5 eng

Issue Date: 02/2012

Intesis Software S.L.
Milà I Fontanals, 1 bis, 1º
08700 Igualada
Spain

Gateway for integration of IntesisBox® EnOcean Gateways for Air Conditioners and one reference temperature sensor into USB enabled controllers or PC software using simple text messages.

2 models are available for this gateway, with the following **Order Codes**:

USB-ENO-ASCII
EnOcean communication frequency: 868 MHz
USB-ENO-ASCII-C
EnOcean communication frequency: 315 MHz

URL http://www.intesis.com
Email info@intesis.com
tel +34 938047134

INDEX

TRADEMARKS 2
1. Presentation 5
1.1 Main Features: 5
1.2 Typical application 6
2. Connection and placement 7
2.1 Connection 7
2.2 Placement 7
3. Configuration 11
3.1 Manual commissioning procedure 12
3.2 Remote commissioning procedure 13
4. Commands 14
4.1 Commands quick reference 14
4.2 Error (ER) values 15
4.3 OK values 15
4.4 Read 16
4.5 Spontaneous message 18
4.6 Write 19
4.7 List linked Devices 21
4.8 Delete linked devices 23
4.9 Remote commissioning 24
4.10 Virtual Temperature 26
4.11 Device Password 28
4.12 Get last RSSI from Device 30
4.13 Repeater configuration 31
4.14 Configuration 33
4.15 Identification 35
4.16 Read temperature sensor 36
4.17 Spontaneous temperature message 37
4.18 List linked temperature Devices 38
4.19 Delete linked temperature devices 39
4.20 Remote commissioning temperature sensor 40
4.21 Get last RSSI from Temperature sensor 41
5. Technical data and dimensions 42
6. EnOcean Interoperability Table 43
6.1 Compatible IntesisBox® Air conditioner gateways 43
6.2 Compatible temperature sensors 43
7. Regulations and standards 44

URL http://www.intesis.com
Email info@intesis.com
tel +34 938047134

1. Presentation

Supervision and control of any IntesisBox® EnOcean Gateways for Air Conditioners from USB enabled controllers or PC software using simple text messages.

IntesisBox® USB-ENO-ASCII / C gateways allow supervision and bidirectional control of any IntesisBox® EnOcean AC gateway and a temperature sensor from PC systems such as SCADA's or others using simple text messages.

1.1 Main Features:

- Bidirectional: Supervision and Control.
- Up to 10 AC IntesisBox® gateways.
- 1 external temperature sensor as a temperature reference
- Control of the AC indoor units using simple text messages.
- Spontaneous messages avoid continuous polling
- Fast and easy commissioning.
- USB Powered. No external power supply needed.
- Plug and Play (virtual COM port).
- Suitable look for home applications.
- Small dimensions.

1.2 Typical application

In Figure 1.1 it is shown a typical integration example using the USB-ENO-ASCII / C to control and/or supervise up to 10 IntesisBox® EnOcean AC Interfaces.

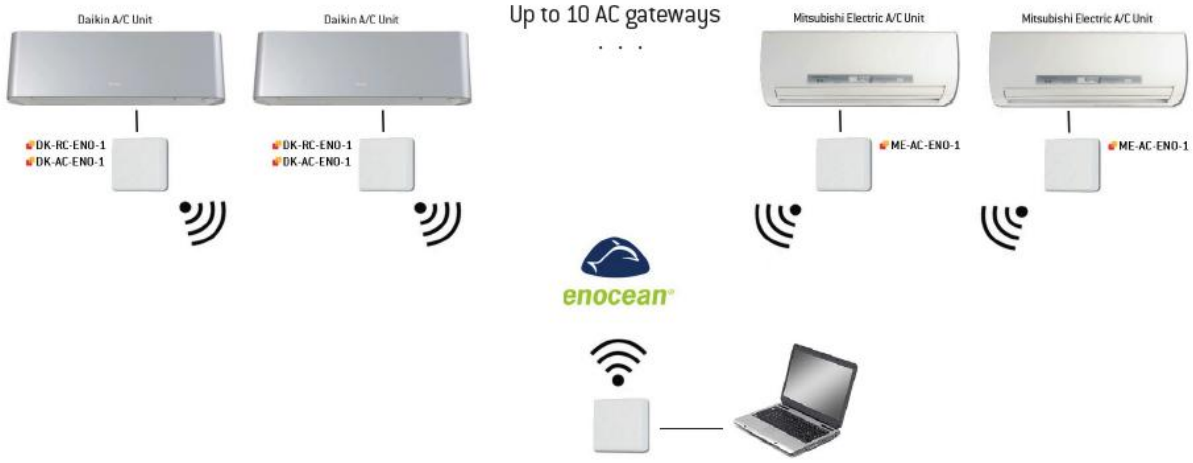


Figure 1.1 Integration example

2. Connection and placement

2.1 Connection

1. Plug the gateway to the USB port of the computer or control system.
2. The red USB LED (Figure 3.1) will turn on.
3. Once the device has been recognized a virtual COM port is going to be generated and the LED will turn off. If that doesn't happen the FTDI driver needs to be installed. They can be downloaded from http://www.ftdichip.com/FTDrivers.htm
4. To communicate with the gateway use the generated port.

2.1.1 Serial Port communication settings:

Baud rate	9600 bps
Stop bit	1
Data bits	8
Flow control	None
Parity	No Parity

Table 2.1 Serial port communication settings

2.2 Placement

The coverage distance (see Table 2.2) of the signal emitted by the USB-ENO-ASCII / C, or by any other EnOcean device, is determined by the room geometry and where they are placed. As an example, long narrow corridors with wide walls are an adverse situation. People or other obstacles can reduce the coverage distance too. It is therefore advisable to always think in the worst possible scenario to decide the placement of the device to ensure a good stability in the radio system.

Conditions	Coverage distance
Line-of-sight connections	typically 30 m range in corridors up to 100 m in halls
Plasterboard walls / dry wood	typically 30 m range, through 5 walls
Brick walls / aerated concrete	typically 20 m range, through 3 walls
Ferro concrete walls / ceilings	typically 10 m range, through 1 ceiling

Table 2.2 Device coverage distance

2.2.1 Screening zones

It is important not to place the device in a place where the airwaves must go through a metallic object as they create a screening zone where the receivers are not going to be able to receive the EnOcean telegrams. This situation is shown in Figure 2.1a.

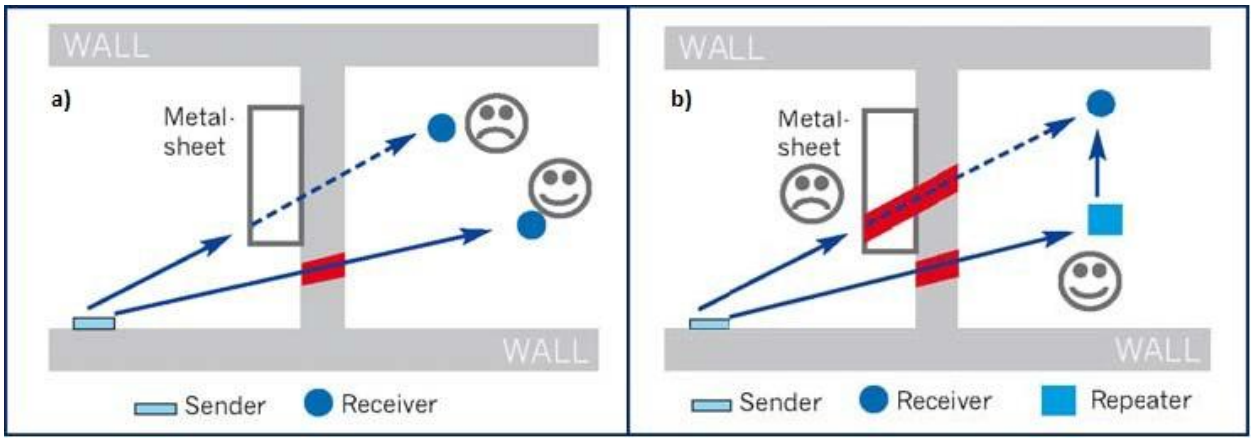


Figure 2.1 a) Screening zone b) Solution with a repeater

The situation of one of the receivers doesn't allow it to receive the transceiver telegrams. To solve this situation the use or a repeater outside the screening zone (Figure 2.1b) is recommended. The telegrams will be retransmitted from there to the receiver

2.2.2 Penetration Angle

This is the angle in which the airwaves reach a certain object they need to go through. The transmission to the other side of the object would be better as this angle gets closer to 90 º, being this the best transmission situation

In Figure 2.2a it is shown a receiver in a situation where the penetration angle is too close to 0º. The solution to that problem can be seen in Figure 2.2b using a repeater in a different position

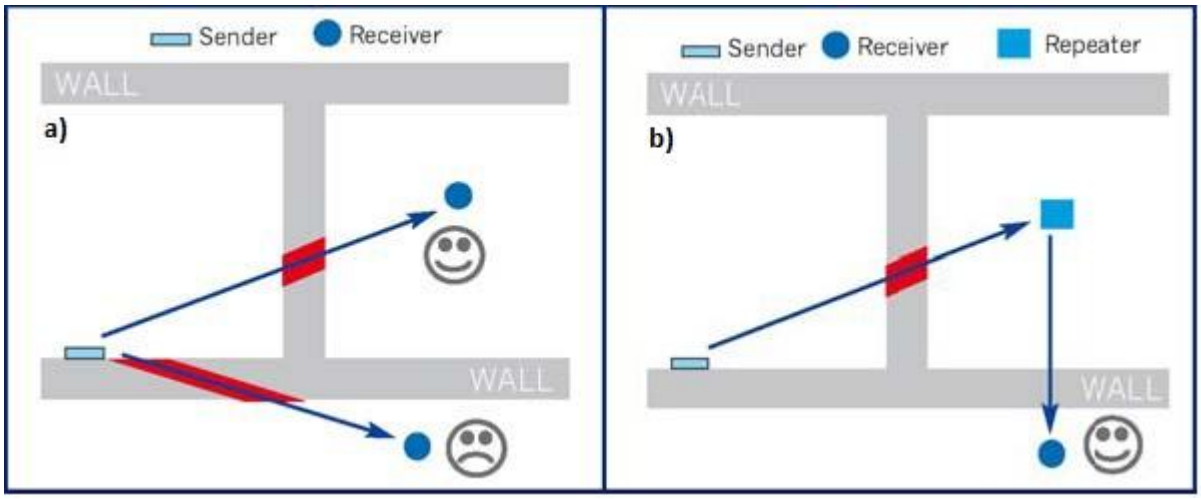


Figure 2.2 a) Penetration angle b) Solution with a repeater

2.2.3 Use of repeaters

In case of a poor radio reception, it may be helpful to use a repeater. A poor radio signal is received, refreshed and transmitted again by the repeater, so nearly a double radio range can be achieved. Repeaters can be switched to 2-level function, allowing two repeaters to be cascaded.

In order to configure one of the devices (AC gateway) which are linked with the USB-ENO-ASCII / C as a repeater (the device will perform its normal function in parallel with the repeater function) a command has been implemented (section 4.13). Nevertheless, it is advisable to avoid configuring a device as a repeater if it is not necessary due to the fact that radio traffic will increase unnecessarily.

As can be seen in section 4.13, a repeater can be configured as 1-level or 2-level repeater. The difference between them is that 1-level repeaters can only repeat original telegrams and 2-level repeaters can repeat original and repeated telegrams.

It is important to bear in mind that some telegrams cannot be repeated, like pings. Therefore if a device is configured as a repeater, the ping interval of the USB-ENO-ASCII should be increased or disabled (see section 4.14).

Although it will be possible to write (WR command) and read (RD command) from a device which needs a repeater to communicate, there are certain commands which will not work without direct communication: CM, VT, DE, PW and RP. See section 4.1 for commands' references.

The following are the requisites in order to configure a device as a repeater:

- There must be direct communication with the device to be configured as a repeater, which means that original telegrams from the device must be received by the USB-ENO-ACII, not repeated ones.

- There must be another device besides the one to be configured as a repeater, and its original telegrams must be either not received or received with poor signal strength (less than -80dBm).

2.2.3.1 Repeater 1-level

In Figure 2.3a, device B has a poor signal strength (< -80 dBm) and device A has direct communication with good signal strength. In this situation, telegrams from device B might be lost. The solution is shown in Figure 2.3b, where device A has been set as a 1-level repeater.

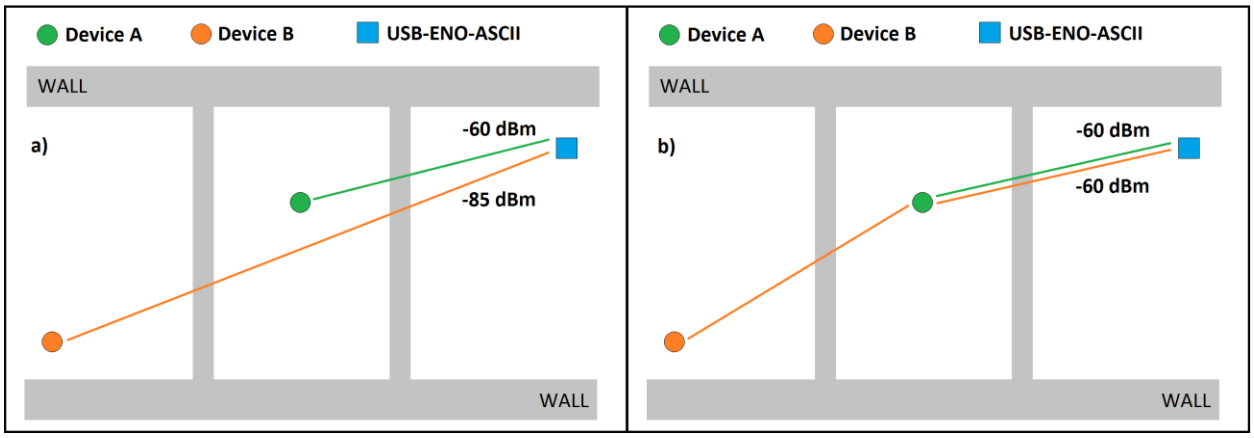


Figure 2.3 a) Poor signal strength of device B b) Solution with device A as a repeater

2.2.3.2 Repeater 2-level

In Figure 2.4a can be seen how device B has poor signal strength and device C has no communication. The problem is been solved in Figure 2.4b, where device B has been set as 1-level repeater and device A as 2-level repeated. So telegrams from device C would be repeated by device B and repeated again by device A.

Important! This configuration is recommended just in the case that there is no communication between device C and A, otherwise it would be enough setting device A as 1-level repeater.

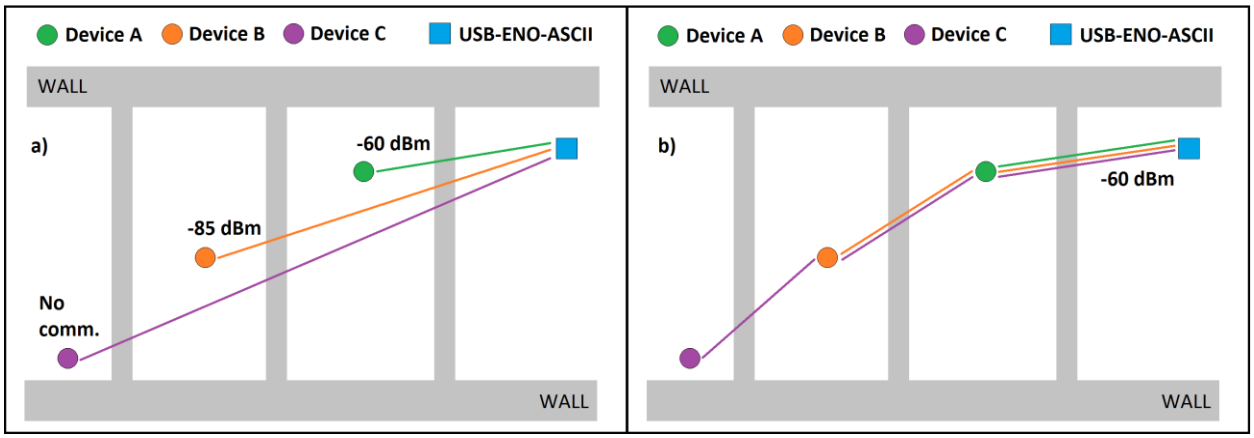
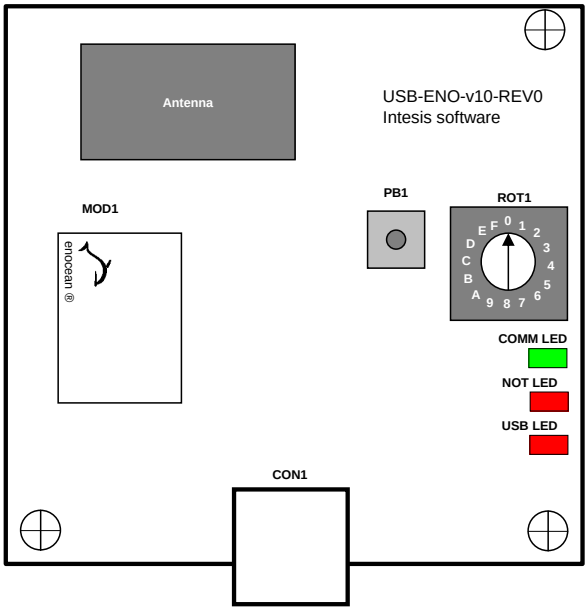


Figure 2.4 a) No communication in device C b) Solution with device A and B as repeaters

It might happen, in a situation similar to the one in Figure 2.4, that there is no communication with device B. Therefore it is not possible to configure device B as a repeater. The only way would be moving either the USB-ENO-ASCI or the device B closer to each other in order to have direct communication.

3. Configuration

In Figure 3.1 a schematic of the device can be seen. This is useful to follow the instruction in section 3.1



PB1: Button

ROT1: Configuration selector

MOD1: Enocean module

CON1: USB connector

USB LED: USB LED (red)

CONF LED: Configuration LED (red)

COMM LED: communication LED (green)

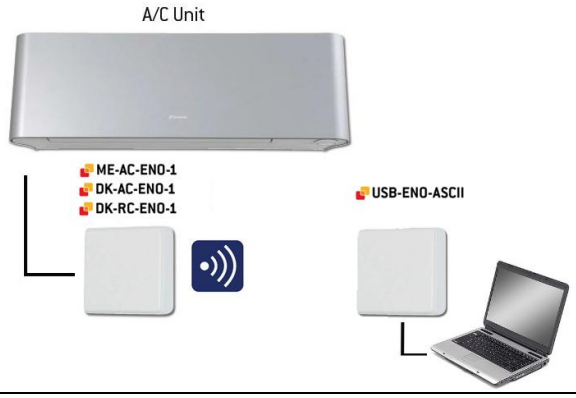
Figure 3.1 Device diagram

3.1 Manual commissioning procedure

1. Set the channel of the USB-ENO-ASCII (ROT1 in Figure 3.1) in which the IntesisBox® AC interface wants to be linked

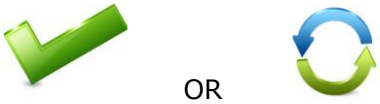
2. Press PB1 (Figure 3.1) for 5 seconds to set the USB-ENO-ASCII to commissioning mode. The COMM LED will turn on.

3. Set profile F in the IntesisBox® AC interface (ROT1)
4. In the IntesisBox® AC interface press the teach-in button (PB1). The USB-ENO-ASCII receives the signal, stores the device in the selected channel and replies to the IntesisBox® AC interface that stores its ID
5. After blinking of the COMM LED the commissioning has finished



6. The IntesisBox® AC interface and the USB-ENO-ASCII are linked and ready to be used.

7. To link a temp. sensor follow the same steps using profile F
8. Once finished press PB1 to exit the commissioning mode



3.2 Remote commissioning procedure

IntesisBox® AC interfaces can be commissioned without need of using the rotary switch (ROT1 in Figure 3.1) and push button of the USB-ENO-ASCII. To do so, follow the instructions below:

1. Use the remote commissioning command (explained in section 4.9) to set the desired channel of the USB-ENO-ASCII.

2. Follow manual commissioning instructions from point 3 to 8

3. Exit the remote commissioning mode with the appropriate command (section 4.9).

4. Commands

All queries and responses have the same structure, which consists of one keyword followed by a comma and a list of parameters separated by commas. The following generic representation may help to understand this structure:

<keyword>,<parameter_1>,…,<parameter_n>

When a command is sent to USB-ENO-ASCII, it is executed by sending a carriage return (\r). Combinations with line feed are accepted, such as \r\n and \n\r.

If user is typing commands manually, or a buffer flush is needed by some reason, sending the character with ASCII value 26 (CTRL+Z) will produce a flush into the command reception buffer of USB-ENO-ASCII, and the device will answer with a carriage return (\r)

The sections 4.4 to 4.15 follow the same structure: A request and a response section (and their subsections if apply). In them the commands specific implementation of the abovementioned structure is explained.

A subset of replies has been defined:

- Command confirmation: It only specifies if the command has been accepted and transmitted, or not
- Procedure confirmation: It specifies if the procedure has been executed successfully or not
- Answer for an specific channel: Value/s of the command in the enquired channel
- Answer for all channels: Value of the command for all channels

4.1 Commands quick reference

Command	*Meaning*	*Device where command applies*	*Section*
RD	Read	AC interface	Section 4.4.1
DA	Read response		Section 4.4.2
SP	Spontaneous		Section 4.5
WR	Write		Section 4.6.1
LD	List devices		Section 4.7.1
DE	Delete devices		Section 4.8.1
CM	Remote commissioning		Section 4.9.1
VT	Virtual temperature		Section 4.10.1
PW	Password		Section 4.11.1
XD	Get last RSSI		Section 4.12.1
RP	Repeater configuration		Section 4.13
CF	Configuration	USB-ENO-ASCII	Section 4.14.1
ID	Identification		Section 4.15.1
RT	Read temperature sensor	Temperature sensor	Section 4.16.1
ST	Spontaneous temperature		Section 4.17
LT	List temperature device		Section 4.18.1
DT	Delete temperature device		Section 4.19.1
CT	Commissioning temperature device		Section 4.20.1
XT	Get last RSSI temperature		Section 4.21.1
ER	Error	All devices	Section 4.2
OK	OK		Section 4.3

4.2 Error (ER) values

Error Code	Enumeration Name	Description
1	ERR_WRITE_NOT_LINKED	Not linked channel
2	ERR_WRITE_NOT_RESPONSIVE	Non-responsive channel
3	ERR_SYNTAX	Syntax error
4	ERR_INCORRECT_CHANNEL	Incorrect channel (channel out of range)
5	ERR_INCORRECT_VALUE	Incorrect value (value out of range)
6	ERR_INCORRECT_PARAM_INDEX	Incorrect parameter index (index out of range)
7	ERR_VT_NOT_COMPLETED	Virtual Temperature setting not applied
8	ERR_CM_NOT_COMPLETED	Commissioning procedure not completed
9	ERR_PW_NOT_COMPLETED	Password setting procedure not completed
10	ERR_TOO_LONG_COMMAND	Entered string is too long (> 63 characters)
11	ERR_WRITE_ONGOING	Previous Write haven't finished processing
12	ERR_NO_ACK_RECEIVED	No ACK received when ACK is activated
13	ERR_NOT_LINKED_PROPERLY	Data received in the ACK from an IntesisBox AC interface from an incorrect channel. If received commissioning needs to be repeated. It only works when ACK is activated
14	ERR_RPT_NOT_COMPLETED	Repeater configuration not completed

4.3 OK values

OK Code	Enumeration Name	Description
0	OK_COMMAND	Command received and parsed OK
1	OK_VT_COMPLETED	Virtual Temperature setting applied successfully
2	OK_CM_COMPLETED	Commissioning procedure completed successfully
3	OK_PW_COMPLETED	Password setting procedure completed successfully
4	OK_ACK_RECEIVED	ACK received when ACK is activated
5	OK_RPT_RECEIVED	Repeater configuration completed

4.4 Read

4.4.1 Read request

Description			
Read status of an AC unit			
Keyword			
RD			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	AC Channel	01 to 10
Example		**Description**	
RD,03\r		Read status of channel 03	

4.4.2 Read response

Description			
The actual status of an AC unit, as a response of Read Request			
Keyword1			
DA			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	AC Channel	01 to 10
2	1	AC Interface status	0 - OK 1 - No communication 2 - Not linked
3	1	On/Off status	0 - Off 1 – On
4	1	Mode status	0 – Cool 1 – Heat 2 – Fan 3 – Dry 4 – Auto 5 – Auto Heat 6 – Auto Cool
5	2	Set point temperature	AC unit related [1]
6	2	Ambient temperature	AC unit related [1]
7	1	Fan Speed	0 to 6
8	2	Vane position	00 to 14. AC unit related [1]
9	1	IR Disablement status	0 – IR Enabled 1 – IR Disabled
10	1	Alarm status	0 – No alarm 1 – Alarm
11	4	Error code (HEX)	AC unit related [1]

[1] Check IntesisBox® AC User Manual for details

Important	
If a parameter is unknown a literal * will be filled in its position. It happens when the USB-ENO-ASCII has just been turned on or when a parameter is not supplied by the AC interface	
Examples	**Description**
DA,03,0,0,4,25,20,1,01,1,0,0000\r	Status of channel 03 with all its values
DA,03,1,*,*,**,**,*,**,*,*,****\r	Status of channel 03: No communication with the AC interface and no values available

Keyword2
ER

Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	1	Error index	ERR_INCORRECT_CHANNEL

Examples	**Description**
ER,4\r	Incorrect channel (the channel written is out of the valid range)

URL http://www.intesis.com
Email info@intesis.com
tel +34 938047134

4.5 Spontaneous message

Description			
Spontaneous sending on status change on AC unit.			
Keyword			
SP			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	AC Channel	01 to 10
2	1	AC Interface status	0 - OK 1 - No communication 2 - Not linked
3	1	On/Off status	0 - Off 1 – On
4	1	Mode status	0 – Cool 1 – Heat 2 – Fan 3 – Dry 4 – Auto 5 – Auto Heat 6 – Auto Cool
5	2	Set point temperature	AC unit related [2]
6	2	Ambient temperature	AC unit related [2]
7	1	Fan Speed	0 to 6
8	2	Vane position	00 to 14. AC unit related [2]
9	1	IR Disablement status	0 – IR Enabled 1 – IR Disabled
10	1	Alarm status	0 – No alarm 1 – Alarm
11	4	Error code (HEX)	AC unit related [2]
Important			
If a parameter is unknown a literal * will be filled in its position. That can happen when the USB-ENO-ASCII has just been turned on or when a parameter is not supplied by the IntesisBox® AC interface Check configuration command (section 4.14) for more information about spontaneous messages configuration			

Examples	**Description** (more info in section 4.14)
SP,03,0,0,4,26,20,2,01,1,0,0000\r	Any of the values in channel 03 has changed
SP,03,-,-,-,26,--,2,--,-,-,----\r	Only the Setpoint temperature and Fan speed in Channel 03 have changed
SP,03,1,*,*,**,**,*,**,*,*,****\r	Communication lost in Channel 03. Last data is lost
SP,03,1,0,4,26,20,2,01,1,0,0000\r	Communication lost in Channel 03. Last data is kept

[2] Check IntesisBox® AC User Manual for details

4.6 Write

4.6.1 Write request

Description			
Write desired status to the AC unit			
Keyword			
WR			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	AC Channel	01 to 10
2	1	On/Off status	0 - Off 1 – On
3	1	Mode status	0 – Cool 1 – Heat 2 – Fan 3 – Dry 4 – Auto
4	2	Set point temperature in ºC	AC unit related [3]
5	2	Ambient temperature in ºC	AC unit related [3]
6	1	Fan Speed	0 to 6
7	1	Vane position	00 to 14.AC unit related [3]
8	1	IR Disablement status	0 – IR Enabled 1 – IR Disabled
Important			
All or only some of the parameters can be written. Fill with literal * the parameters you don't want to change. The IR disablement status should not be toggled periodically			
Example		**Description**	
WR,03,1,*,**,**,*,**,*\r		Turn On the AC linked to channel 03	
WR,03,1,4,25,**,5,00,0\r		Turn On the AC linked to channel 03 and change all values but ambient temperature.	

4.6.2 *Write* response

Description			
An OK is only a command confirmation not a Procedure confirmation (introduction of section 4). A spontaneous would be received with the actual values written to the AC unit. The controlling system is the one responsible of processing this information. If the command is not valid, an error message will be sent.			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	1	Error or OK index	OK_COMMAND OK_ACK_RECEIVED ERR_INCORRECT_CHANNEL

[3] Check IntesisBox® AC User Manual for details

			ERR_WRITE_NOT_LINKED ERR_WRITE_NOT_RESPONSIVE ERR_SYNTAX ERR_WRITE_ONGOING ERR_NO_ACK_RECEIVED ERR_NOT_LINKED_PROPERLY

Notes
OK_ACK_RECEIVED will only be received when ACK are activated (section 4.14). OK_COMMAND is included in it. That means that only one OK will be received.

Examples	**Description**
OK,0\r	The write command was correct
OK,4\r	The write command was correct and ACK was received (only if ACK activated (section 4.14).
ER,3\r	Syntax error in the write command

4.7 List linked Devices

4.7.1 List request

Description			
Returns if a channel has a device commissioned or not, its status and its ID			
Keyword			
LD			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	01 to 10 – Channel ** - All the channels are listed
Important			
Configuration parameters are stored in internal flash. Periodic writing must be avoided due to limited write cycles to flash memory.			
Examples		**Description**	
LD,03\r		List Channel 03	
LD,**\r		List all channels	

4.7.2 List response

4.7.2.1 List response for an specific channel

Description			
Status information of the requested channel			
Keyword1			
LR			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	AC Channel	00 to 10
2	1	Bit that indicates if a device is commissioned in this Channel	0 – Not commissioned 1- Commissioned
3	1	Bit that indicates if there is communication with the AC interface	0 – Not communicating 1- Communicating
4	8	AC interface HEX ID (32 bit)	Any
5	2	AC interface identification	01 – ME-AC-ENO-1 / C 02 – DK-AC-ENO-1 / C 03 – DK-RC-ENO-1 / C
Important			

Only the following combinations from index 2 and 3 are possible

Index2	Index3	
0	0	Channel not assigned
1	0	Channel assigned, but device not responding
1	1	Channel assigned and device responding radio.

Examples	**Description**
LR,03,0,0,********,**\r	In channel 03 there is no commissioned device

LR,03,1,0,010046E9,01\r	In channel 03 there is a commissioned device (ME-AC-ENO-1 / C) with ID 010046E9 and there is no communication with it.
LR,03,1,1,010046E8,02\r	In channel 03 there is a commissioned device (DK-AC-ENO-1 / C) with ID 010046E8 and there is communication with it.

Keyword2			
ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	1	Error index	ERR_INCORRECT_CHANNEL

Examples	**Description**
ER,4\r	Incorrect channel (the channel written is out of the valid range)

4.7.2.2 List response for all channels

Description			
Information of the channels with linked AC interfaces			
Keyword			
LR			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	All AC Channel identifier	**
2 to 11	1	Linked status of the channels, being index 2 channel one and increasing accordingly.	0 – Not commissioned 1 – Commissioned

Examples	**Description**
LR,**,1,0,0,0,0,0,0,0,0,0\r	There is only a device commissioned in channel 01
LR,**,1,0,0,0,1,0,0,0,0,1\r	There are commissioned devices in channels 01, 05 and 10

4.8 Delete linked devices

4.8.1 Delete request

Description			
Erase a commissioned channel			
Keyword			
DE			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	01 to 10 – Channel ** - All the channels are deleted
Important			
It is **extremely important** that remote password is set to NOT_ASSIGNED when deleting a device. See Password command (section 4.11) Remote devices information is stored in internal flash. Periodic writing must be avoided due to limited write cycles to flash memory.			
Examples	**Description**		
DE,03\r	Delete linked device in channel 03		
DE,**\r	Delete linked device in all channels		

4.8.2 Delete response

Description			
Delete command confirmation			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_COMMAND ERR_INCORRECT_CHANNEL ERR_SYNTAX
Examples	**Description**		
OK,0\r	The Delete command was executed successfully		
ER,3\r	Syntax error in the delete command		

4.9 Remote commissioning

4.9.1 Remote commissioning request

Description			
Set a channel to commissioning mode			
Keyword			
CM			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	00 – Exits commissioning mode 01 to 10 – Channel
Important			
Remote devices information is stored in internal flash. Periodic writing must be avoided due to limited write cycles to flash memory.			
Examples		**Description**	
CM,00\r		Exits commissioning mode	
CM,03\r		Sets channel 03 to commissioning mode. If a teach-in telegram from an IntesisBox® AC interface is received this device is going to be linked to channel 03	

4.9.2 Remote commissioning command replies

4.9.2.1 Remote commissioning command confirmation

Description			
Remote commissioning command confirmation			
Keywords			
OK , ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_COMMAND ERR_INCORRECT_CHANNEL
Examples		**Description**	
OK,0\r		The Remote commissioning command was executed successfully	
ER,4\r		Incorrect channel (the channel written is out of the valid range)	

4.9.2.2 Remote commissioning procedure confirmation

Description			
Remote commissioning procedure confirmation. It only applies when the commissioning procedure is executed from the IntesisBox® AC interface (section 3.2) while the commissioning mode is activated			
Keywords			
OK , ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_CM_COMPLETED ERR_CM_NOT_COMPLETED

Examples	Description
OK,2\r	A device has been linked to the channel in commissioning mode
ER,8\r	A device has NOT been linked to the channel in commissioning mode. The procedure should be repeated

4.10 Virtual Temperature

The use of Virtual temperature implies that the AC unit uses an external temperature as a reference (it is supplied to the AC unit with the write command. Section 4.6)

4.10.1 Virtual temperature request

Description			
Set a virtual temperature enablement of a given channel and updates this setting in the commissioned remote device, if it exists.			
Keyword			
VT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	** - All channels 01 to 10 – Channel
2	1	Enabling or disabling of virtual temperature (not needed when index1 value is **)	0 – Disable Virtual temperature 1 – Enable Virtual temperature ? – Enquires the channel status
Important			
When activated the ambient temperature used by the AC unit is the one supplied using the write command. This behaviour should not be activated unless a real ambient temperature is supplied When a device is commissioned with the given channel, it is configured according to the new settings.			
Examples			
VT,**\r		Enquires the virtual temperature status for all channels	
VT,03,1\r		Enables the virtual temperature in channel 03	
VT,03,?\r		Enquires the virtual temperature status for channel 03	

4.10.2 Virtual temperature replies

4.10.2.1 Virtual temperature command confirmation

Description			
Virtual temperature command confirmation. It only specifies if the command has been accepted and transmitted or not			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_COMMAND ERR_INCORRECT_CHANNEL
Examples		**Description**	
OK,0\r		The virtual temperature command was executed successfully	
ER,4\r		Incorrect channel (the channel written is out of the valid range)	

4.10.2.2 Virtual temperature procedure confirmation

Description			
It only applies when the virtual temperature command confirmation it's been OK_COMMAND and there is a linked device in the channel. It specifies if the procedure has been executed successfully or not			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_VT_COMPLETED ERR_VT_NOT_COMPLETED
Examples		**Description**	
OK,1\r		The linked device in Channel 03 has been configured to work with virtual temperature (external temperature reference)	
ER,7\r		Error while trying to set the linked device to work with virtual temperature	

4.10.2.3 Virtual temperature answer for an specific channel

Description			
It only applies when there is an enquire in the channel status			
Keywords			
VT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	01 to 10 – Channel
2	1	Virtual temperature status	0 – Virtual temperature disabled 1 – Virtual temperature enabled
Examples		**Description**	
VT,03,1\r		Channel 03 is working with virtual temperature	

4.10.2.4 Virtual temperature answer for an all channels

Description			
It only applies when there is an enquire in the channel status			
Keywords			
VT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	** - All channels
2 to 11	1	Virtual temperature status of the channels, being index2 channel one and increasing accordingly.	0 – Virtual temperature disabled 1 – Virtual temperature enabled
Examples		**Description**	
VT,**,1,0,0,0,0,0,0,0,0,0\r		Only channel 01 is working with virtual temperature	

4.11 Device Password

4.11.1 Password request

Description			
Sets or gets the password in the remote device of the given channel.			
Keyword			
PW			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	01 to 10 – Channel
2	8	32-bit value expressed in hex that sets the password	???????? – Enquires the password Any HEX value: sets that value
Important			
It is **extremely important** that remote password is set to NOT_ASSIGNED when deleting a device (section 4.8). A password is considered NOT_ASSIGNED when is filled with zeros (i.e.: 0x00000000) During the password setting procedure, some spontaneous can be sent by USB-ENO-ASCII to USB UART due to remote device rebooting. Password setting is stored in internal flash. Periodic writing must be avoided due to limited write cycles to flash memory.			
Examples	**Description**		
PW,03,?\r	Enquires the password in channel 03		
PW,03,ABCD1234\r	Sets the password in channel 03 to 0xABCD1234		
PW,03,00000000\r	Sets the password in channel 03 to NOT_ASSIGNED (it is deleted)		

4.11.2 Password response

4.11.2.1 Password command confirmation

Description			
Password command confirmation. It only specifies if the command has been accepted and transmitted or not			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_COMMAND ERR_INCORRECT_VALUE ERR_INCORRECT_CHANNEL ERR_SYNTAX ERR_WRITE_ONGOING
Examples		**Description**	
OK,0\r		The password command was executed successfully	
ER,4\r		Incorrect channel (the channel written is out of the valid range)	

4.11.2.2 Password procedure confirmation

Description			
It only applies when the password command confirmation it's been OK_COMMAND. It specifies if the procedure has been executed successfully or not			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_PW_COMPLETED ERR_PW_NOT_COMPLETED
Examples		**Description**	
OK,3\r		The password has been applied to the IntesisBox® AC interface	
ER,9\r		The password has NOT been applied to the IntesisBox® AC interface. There might be no communication or no linked device in the Channel	

4.11.2.3 Password answer

Description			
It only applies when there is an enquire in the channel password			
Keywords			
PW			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	01 to 10 – Channel
2	8	32-bit value expressed in hex that sets the password	Any HEX value: sets that value
Examples		**Description**	
PW,03,ABCD1234\r		The password in channel 03 is 0xABCD1234	
PW,03,00000000\r		The password in channel 03 is NOT_ASSIGNED (it has no password)	

4.12 Get last RSSI from Device

4.12.1 Get RSSI request

Description			
Returns the last Received Signal Strength Indication from the given channel			
Keyword			
XD			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	01 to 10 – Channel
Examples		**Description**	
XD,01\r		Get RSSI from Channel 01	

4.12.2 Get RSSI response

Description			
RSSI value from the requested channel			
Keyword1			
XD			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel	01 to 10
2	1	RSSI value in dBm. Note that the value should be negative, but is represented without sign. Excellent communication: -45dBm Normal communication: -45dBm to -75dBm Poor communication: -75 dBm to -90 dBm No communication, or very unstable: Below -90 dBm	45 to 99
Examples		**Description**	
XD,01,**\r		In channel 01 there is no commissioned device, or no telegram received yet.	
XD,01,45\r		In channel 01 there is a commissioned device and the last RSSI is -45 dBm	

Keyword2			
ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	1	Error index	ERR_INCORRECT_CHANNEL
Examples		**Description**	
ER,4\r		Incorrect channel (the channel written is out of the valid range)	

4.13 Repeater configuration

4.13.1 Repeater configuration request

Description			
Enable / disable and configure the repeater functionality of a given channel			
Keyword			
RP			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	01 to 10 – Channel
2	1	Enabling or disabling of repeater and level setting	0 – Repeater disabled 1 – Repeater enabled / 1-level 2 – Repeater enabled / 2-level ? – Enquires the repeater configuration
Important			
It is necessary to have direct communication (not through repeaters) with the device to be configured as a repeater. When repeater is enabled it is recommended to set the ping interval to a longer time due to the fact that ping telegrams are not repeated. During the repeater configuration procedure, some spontaneous can be sent by USB-ENO-ASCII to USB UART because of remote device rebooting.			
Examples			
RP,03,1\r		Enables the level 1 repeater of the device in channel 03	
RP,03,?\r		Enquires the repeater configuration of the device in channel 03	

4.13.2 Repeater configuration response

4.13.2.1 Repeater configuration command confirmation

Description			
Repeater configuration command confirmation. It only specifies if the command has been accepted and transmitted or not.			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_COMMAND ERR_SYNTAX ERR_INCORRECT_CHANNEL ERR_WRITE_ONGOING
Examples		**Description**	
OK,0\r		The repeater configuration command was executed successfully	
ER,4\r		Incorrect channel (the channel written is out of the valid range)	

4.13.2.2 Repeater configuration procedure confirmation

Description			
It only applies when the repeater configuration command confirmation it's been OK_COMMAND. It specifies if the procedure has been executed successfully or not			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_RPT_COMPLETED ERR_RPT_NOT_COMPLETED
Examples		**Description**	
OK,5\r		The repeater configuration has been applied to the IntesisBox® AC interface.	
ER,14\r		The repeater configuration has NOT been applied to the IntesisBox® AC interface. There might be no communication or no linked device in the Channel.	

4.13.2.3 Repeater configuration answer

Description			
It only applies when there is an enquire of the channel's repeater configuration			
Keywords			
RP			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	01 to 10 – Channel
2	1	Repeater configuration of the channel	0 – Repeater disabled 1 – Repeater enabled / level 1 2 – Repeater enabled / level 2
Examples		**Description**	
RP,03,1\r		The repeater function of the device in channel 03 is enabled and it is configured as 1-level repeater.	

4.14 Configuration

4.14.1 Configuration request

Description			
Sets or gets a configuration parameter in the USB-ENO-ASCII			
Keyword			
CF			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Configuration Parameter number	01 to 07
2	2	Value	?? – requests parameter value Other values in following table

Configuration parameters allowed values			
Parameter number	**Size**	**Description**	**Allowed Values**
01	2	Spontaneous sending enabled	00 - Disable 01 - Enable (default)
02	2	Echo enabled	00 - Disable 01 - Enable (default)
03	2	Error Led enabled	00 - Disable 01 - Enable (default)
04	2	Communication and commissioning Led enabled	00 - Disable 01 - Enable (default)
05	2	Spontaneous send only changes. If enabled only the changes will be send. The other parameters will be set to literal "-"	00 - Disable 01 - Enable (default)
06	2 to 4	Ping interval [seconds]	15 to 1270 00 – Disable ping
07	2	Keep values when communication is lost. If disabled the values of the channels will be set to literal * if the communication is lost.	00 - Disable (default) 01 - Enable
08	2	Enable ACK	00 - Disable (default) 01 - Enable
09	2	Write only if change in data. When working with ACK it is recommended to disable it	00 - Disable 01 - Enable (default)

Important	
Configuration parameters are stored in internal flash. Periodic writing must be avoided due to limited write cycles to flash memory.	
Examples	**Description**
CF,01,01\r	Enables spontaneous messages
CF,01,??\r	Request if the spontaneous messages are enabled or not

4.14.2 Configuration response

4.14.2.1 Configuration command and procedure confirmation

Description			
It's a configuration command confirmation			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	1	Error or OK index	OK_COMMAND ERR_INCORRECT_CHANNEL ERR_WRITE_NOT_LINKED ERR_WRITE_NOT_RESPONSIVE ERR_SYNTAX
Examples		**Description**	
OK,0\r		The write command was correct	
ER,3\r		Syntax error in the write command	

4.14.2.2 Configuration answer

Description			
It only applies when there is an enquire in the channel			
Keyword			
CF			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Configuration Parameter	01 to 07
2	2	Value of the parameter	Values from the request table
Examples		**Description**	
CF,01,01\r		Spontaneous messages are enabled	

4.15 Identification

4.15.1 Identification request

Description	
Retrieves device information	
Keyword	
ID	
Parameters	
No parameters	
Example	**Description**
ID\r	Retrieves device information

4.15.2 Identification response

Description
Device information containing: • Device name • Firmware version • Manufacturer
Keyword
OK. It is used to terminate the information
Example
USB-ENO-ASCII\r FW ver: v1.0.7\r Intesis Software, SL (C) 2011\r \r OK,0\r

4.16 Read temperature sensor

4.16.1 Read temperature sensor request

Description			
Read status of an EnOcean temperature sensor			
Keyword			
RT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Temperature Sensor Channel	01 to 01
Example		**Description**	
RT,01\r		Read status of temperature channel 01	

4.16.2 Read temperature sensor response

Description			
The actual status of an EnOcean temperature sensor, as a response of Read Request			
Keyword1			
RT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Temperature Channel	01
2	1	Temperature sensor status	0 - OK 2 - Not linked
3	5	Temperature (ºC). Signed fixed point value, with 1 decimal precision	-99.9 to +99.9
Important			
If a parameter is unknown a literal * will be filled in its position. It happens when the USB-ENO-ASCII has just been turned on or when a parameter is not supplied by the temperature sensor			
Examples		**Description**	
RT,01,0,+24.6\r		Temperature channel 01 has a temperature of 24.6ºC	
RT,01,0,*****\r		Status of temperature channel 01: no value available	
Keyword2			
ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	1	Error index	ERR_INCORRECT_CHANNEL ERR_SYNTAX
Examples		**Description**	
ER,4\r		Incorrect channel (the channel written is out of the valid range)	

4.17 Spontaneous temperature message

Description			
Spontaneous sending on status change on temperature sensor.			
Keyword			
ST			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Temperature Sensor Channel	01 to 01
2	1	Temperature sensor status	0 - OK 2 - Not linked
3	5	Temperature (ºC). Signed fixed point value, with 1 decimal precision	-99.9 – +99.9
Important			
If a parameter is unknown a literal * will be filled in its position. It happens when the USB-ENO-ASCII has just been turned on or when a parameter is not supplied by the temperature sensor Check configuration command (section 4.14) for more information about spontaneous messages configuration			

Examples	**Description** (more info in section 4.14)
ST,01,0,24.8\r	Any of the values in temperature channel 01 has changed
ST,-,24.8\r	Only the temperature in temperature channel 01 has changed

4.18 List linked temperature Devices

4.18.1 List request

Description			
Returns if a channel has a device commissioned or not, its status and its ID			
Keyword			
LT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Temperature Channel index	01 to 01 – Channel
Examples		**Description**	
LT,01\r		List Temperature Channel 01	

4.18.2 List response

Description			
Status information of the requested temperature channel			
Keyword1			
LT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Temperature Channel	01 to 01
2	1	Bit that indicates if a device is commissioned in this Channel	0 – Not commissioned 1- Commissioned
3	1	Bit that indicates if there is communication with the temperature sensor (always 1)	0 – Not communicating 1- Communicating
4	8	Temperature sensor HEX ID (32 bit)	Any
5	2	Temperature sensor HEX ORG	Any (see interoperability table)
6	2	Temperature sensor HEX Function	Any (see interoperability table)
7	2	Temperature sensor HEX Type	Any (see interoperability table)

Examples	**Description**
LT,01,0,0,********,**,**,**\r	In channel 01 there is no commissioned temperature sensor
LT,01,1,1,00038263,07,10,02\r	In channel 01 there is a commissioned temperature sensor with ID 00038263 and EEP [07-10-02]

Keyword2			
ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	1	Error index	ERR_INCORRECT_CHANNEL

Examples	**Description**
ER,4\r	Incorrect channel (the channel written is out of the valid range)

4.19 Delete linked temperature devices

4.19.1 Delete temperature device request

Description			
Erase a commissioned temperature channel			
Keyword			
DT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	01 to 01 – Channel
Important			
Remote devices information is stored in internal flash. Periodic writing must be avoided due to limited write cycles to flash memory.			
Examples		**Description**	
DT,01\r		Delete linked temperature device in channel 01	

4.19.2 Delete temperature device response

Description			
Delete command confirmation			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_COMMAND ERR_INCORRECT_CHANNEL ERR_SYNTAX
Examples		**Description**	
OK,0\r		The Delete command was executed successfully	
ER,3\r		Syntax error in the delete command	

4.20 Remote commissioning temperature sensor

4.20.1 Remote commissioning temperature sensor request

Description			
Set a temperature sensor channel to commissioning mode			
Keyword			
CT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel index	00 – Exits commissioning mode 01 – Channel 01
Important			
Remote devices information is stored in internal flash. Periodic writing must be avoided due to limited write cycles to flash memory.			
Examples		**Description**	
CT,00\r		Exits commissioning mode	
CT,01\r		Sets channel 01 to commissioning mode. If a teach-in telegram from an EnOcean temperature sensor is received this device is going to be linked to channel 01	

4.20.2 Remote commissioning temperature sensor command replies

4.20.2.1 Remote commissioning temperature sensor command confirmation

Description			
Remote commissioning temperature sensor command confirmation			
Keywords			
OK ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Error or OK index	OK_COMMAND ERR_INCORRECT_CHANNEL
Examples		**Description**	
OK,0\r		The Remote commissioning command was executed successfully	
ER,4\r		Incorrect channel (the channel written is out of the valid range)	

4.21 Get last RSSI from Temperature sensor

4.21.1 Get RSSI temperature sensor request

Description			
Returns the last Received Signal Strength Indication from the given temperature channel			
Keyword			
XT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Temperature Channel index	01 to 01 – Channel
Important			
Examples	**Description**		
XT,01\r	Get RSSI from Temperature Channel 01		

4.21.2 Get RSSI temperature sensor response

Description			
RSSI value from the requested temperature channel			
Keyword1			
XT			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	2	Channel	01 to 10
2	1	RSSI value in dBm. Note that the value should be negative, but is represented without sign. Excellent communication: -45dBm Normal communication: -45dBm to -80dBm Poor communication: -80 dBm to -90 dBm No communication, or very unstable: Below -90 dBm	45 to 99
Examples	**Description**		
XT,01,**\r	In channel 01 there is no commissioned device, or no telegram received yet.		
XT,01,65\r	In channel 01 there is a commissioned device and the last RSSI is -65 dBm		
Keyword2			
ER			
Parameters			
Index	**Size**	**Description**	**Allowed Values**
1	1	Error index	ERR_INCORRECT_CHANNEL
Examples	**Description**		
ER,4\r	Incorrect channel (the channel written is out of the valid range)		

5. Technical data and dimensions

The main features of the devices USB-ENO-ASCII / C are shown in Table 5.1. For further detail check the USB-ENO-ASCII / C datasheet.

Dimensions	*71 x 71 x 27 mm*
Weight	*60 g*
Operating Temperature	*-25 . . . 85ºC*
Stock Temperature	*-40 . . . 85ºC*
Operating Humidity	*<93% HR, non-condensing*
Stock Humidity	*<93% HR, non-condensing*
Power requirements	USB powered. 50mA
EnOcean Frequencies	*USB-ENO-ASCII: 868 MHz* *USB-ENO-ASCII-C: 315 MHz*

Table 5.1 Technical data

6. EnOcean Interoperability Table

In this section there is a list of the allowed devices

6.1 Compatible IntesisBox® Air conditioner gateways

In Table 6.1 the compatible IntesisBox® AC gateways are listed.

USB-ENO-ASCII	USB-ENO-ASCII-C
ME-AC-ENO-1	ME-AC-ENO-1-C
DK-AC-ENO-1	DK-AC-ENO-1-C
DK-RC-ENO-1	DK-RC-ENO-1-C

Table 6.1 Device compatibility

The IntesisBox® Air conditioner gateways use all the following EEP's:

EEP[4]	EEP description
[07-10-03]	Temperature Sensor; Set Point Control
[07-20-10]	HVAC Components. Generic HVAC interface. Functions: Mode, vane position, fan speed, sensors and on/off
[07-20-11]	HVAC Components. Generic HVAC interface. Functions: Error control: AC Error code, Error states and disablements

Any EnOcean IntesisBox® AC gateways not specified in this list might not be compatible. To check the model compatibility, contact your USB-ENO-ASCII / C supplier for this.

6.2 Compatible temperature sensors

Any temperature sensor using one of the following EEPs can be used with the USB-ENO-ASCII

EEP Rx	EEP description
[07-02-04]	Temperature Sensor. Range -10°C to +30°C
[07-02-05]	Temperature Sensor. Range 0°C to +40°C
[07-02-06]	Temperature Sensor. Range +10°C to +50°C
[07-02-07]	Temperature Sensor. Range +20°C to +60°C
[07-02-11]	Temperature Sensor. Range -50°C to +30°C
[07-02-12]	Temperature Sensor. Range -40°C to +40°C
[07-02-13]	Temperature Sensor. Range -30°C to +50°C
[07-02-14]	Temperature Sensor. Range -20°C to +60°C
[07-02-15]	Temperature Sensor. Range -10°C to +70°C
[07-02-16]	Temperature Sensor. Range 0°C to +80°C
[07-02-17]	Temperature Sensor. Range +10°C to +90°C
[07-10-xx]	Room controller panel. Range 0ºC to +40ºC

[4] EnOcean Equipment Profiles (EEP) V2.1

7. Regulations and standards

CE conformity:

R&TTE EU-directive on Radio and Telecommunications Terminal Equipment

The general registration for the radio operation is valid for all EU countries as well as for Switzerland.

Standards:

UNE-EN 50491-3:2010
UNE-EN 60950-1:2007
UNE-EN 61000-6-2:2006
UNE-EN 61000-6-3:2007

FCC ID: SZV-STM300C
IC: 5731A-STM300C

The enclosed device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (i.) this device may not cause harmful interference and (ii.) this device must accept any interference received, including interference that may cause undesired operation.

Warning: Changes or modifications made to this equipment not expressly approved by Intesis Software may void the FCC authorization to operate this equipment.