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1 Overview

Thank you for choosing the TD1204 SIGFOX™ gateway module from Telecom Design!

This document provides a reference manual for the Telecom Design TD1204 module.

As an overview, this chapter gives the scope of this document. The document's organization is then detailed, followed by a list of relevant documents.

1.1 Scope

The TD1204 module provides an integrated dual AT command interpreter for interfacing with an external application over a serial link.
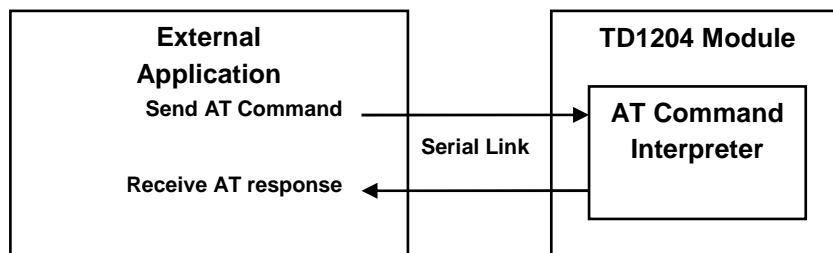
Figure 1- AT Command Interpreter

This guide focuses on the description of the commands and responses provided by the TD1204 module used in the communication with the external application.

Note: The "AT" command interpreter is only available since firmware revision SOFT1104.

1.2 Organization

Each section in this document covers a separate topic, organized as follow:

■ Section 1 is this overview

■ Section 2 is a Hayes-compatible AT command set reference

■ Section 3 is a Hayes-compatible AT Sensor command set reference

1.3 Relevant Documents

This document provides a reference manual for the TD1204 SIGFOX™ Gateway module. Additional information on this module and on its dedicated evaluation board can be found in:

■ *TD1204 Datasheet*

■ *TD1204 EVB User's Guide*

The following standards are also referenced:

■ *ITU-T Rec. T.50 (09/92) International Reference Alphabet (IRA)*

■ *ISO/IEC 646:1991, Information technology — ISO 7-bit coded character set for information interchange*

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2   TD1204 Hayes-Compatible AT Command Set Reference

This section provides a reference for the Hayes-compatible "AT" commands implemented by the TD1204 Module.

Note: The "AT" command interpreter is only available since firmware revision SOFT1104. In older revisions, including SOFT1093, the "AT" command interpreter is not functional.

2.1   TD1204 Factory Settings

A serial link handler is set with the following default values (factory settings):

■ LVTTL electrical level

■ Speed 9600 bps

■ 8 data bits

■ 1 stop bit

■ No parity

■ No hardware/software flow control

The following AT command interpreter settings are set up as factory defaults:

■ Character echo is activated ("**ATE1**")

■ Format control is set to verbose ("**ATV1**")

■ Result codes are activated ("**ATQ0**")

■ Extended result codes are activated ("**ATX1**")

2.2   AT Commands Presentation Rules

The AT commands are presented in the present documentation as follows:

■ A 'Description' section provides general information on the AT command (or response) behavior

■ A 'Syntax' section describes the command and response syntaxes and all parameters description

■ A 'Parameters and Defined Storage' section describes all parameters and values

■ A 'Parameter Storage' presents the command used to store the parameter value and/or the command to restore the parameter value

■ An 'Examples' section presents the real use of the described command

■ A 'Notes' section can also be included indicating some remarks about the command use

Figures are provided where necessary.

The commands will be listed alphabetically.

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2.3 Information Responses and Result Codes

If format control is set to verbose ("`ATV1`") and result codes are activated ("`ATQ0`"), the TD1204 module returns the "`<CR><LF>^SYSSTART<CR><LF>`" string upon device reset.

If command syntax is incorrect or the command contains wrong parameters, or the command cannot be executed successfully, the "`ERROR`" string is returned if format control is set to verbose ("`ATV1`"), or a "`4`" string is returned otherwise.

If the command line has been executed successfully, an "`OK`" string is returned if format control is set to verbose ("`ATV1`"), or a "`0`" string is returned otherwise.

2.4 AT Command Syntax Format

Command lines always start with "`AT`" and finish with a "`<CR>`" character, except for the "`A/`" command, and contain one or more commands.

Responses start and end with "`<CR><LF>`", except for the "`ATV0`" TD1204 module response format and the "`ATQ1`" (result code suppression) commands.

In the following examples "`<CR>`" and "`<CR><LF>`" characters are intentionally omitted.

2.4.1 Basic AT Command Syntax Format
The syntax of basic commands is:

```
<command>[<number>]
```

Where "`<command>`" is either a single character, a "`?`" character (IA5 3/15), or the "`&`" character (IA5 2/6) followed by a single character. Characters used in "`<command>`" shall be taken from the set of alphabetic characters.

"`<number>`" may be a string of one or more characters from "`0`" through "`9`" representing a decimal integer value. Commands that expect a "`<number>`" are noted in the description of the command. If a command expects "`<number>`" and it is missing ("`<command>`" is immediately followed in the command line by another "`<command>`" or the termination character), the value "`0`" is assumed. If a command does not expect a "`<number>`" and a number is present, an "`ERROR`" is generated. All leading "`0`"s in "`<number>`" are ignored by the TD1204 AT command interpreter.

2.4.2 S-parameters
Commands that begin with the letter "`S`" constitute a special group of parameters known as "S-parameters". These differ from other commands in important respects.

The number following the "`S`" indicates the "parameter number" being referenced. If the number is not recognized as a valid parameter number, an "`ERROR`" result code is issued.

Immediately following this number, either a "`?`" or "`=`" character (IA5 3/15 or 3/13, respectively) shall appear. "`?`" is used to read the current value of the indicated S-parameter; "`=`" is used to set the S-parameter to a new value.

```
S<parameter_number>?
S<parameter_number>=[<value>]
S<parameter_number>=?
```

If the "`?`" is used, the TD1204 module transmits a single line of information text to the external application. The ranges of returned values are given in the description of each S-parameter.

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If the "=" is used, the new value to be stored in the S-parameter is specified in decimal following the "=". If no value is given (i.e., the end of the command line occurs or the next command follows immediately), the S-parameter specified may be set to 0, or an "**ERROR**" result code issued and the stored value left unchanged. The ranges of acceptable values are given in the description of each S-parameter.

If the "=?" is used, the TD1204 module transmits a single line of information text to the external application, giving the ranges of accepted values as given in the description of each S-parameter.

2.4.3 Extended AT Command Syntax Format

The syntax of extended commands is:

```
$<command>=[<value1>[,<value2>]…]
$<command>?
```

Where "**$**" is an ISO/IEC 646 (US) code 24 character, and "**<command>**" is made up of multiple characters taken from the set of alphabetic characters.

The first form is used as an "action" command. In this form, the "**<command>**" is followed by an "=" character (IA5 3/13) and zero or more "**<valuex>**", separated by "," characters (IA5 2/12). If no value is given (i.e., the end of the command line occurs or the next command follows immediately), the extended command parameter specified may be set to 0, or an "**ERROR**" result code issued and the stored value is left unchanged.

"**<valuex>**" may be a string of one or more alphanumeric characters from "**0**" through "**9**", "**a**" to "**z**" or "**A**" to "**Z**". The range of acceptable values is given in the description of each extended command.

The second form is used as a "read" command. In this form, the "**<command>**" is followed by an "**?**" character (IA5 3/15). In this form, the TD1204 AT command interpreter transmits a single line of information text to the external application. For extended commands defined in this specification, the text portion of this information consists of one or more alphanumeric characters from "**0**" through "**9**", "**a**" to "**z**" or "**A**" to "**Z**". The range of possible values is given in the description of each extended command.

2.4.4 AT Command Concatenation

Concatenation of multiple AT commands on the same line is not supported in the current firmware version.

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2.5 Attention Command

2.5.1 Description
This command always returns OK.

2.5.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.5.3 Syntax

Action Command
AT OK

Read Command
None

Test Command
None

2.5.4 Parameters and Defined Values
None

2.5.5 Parameter Storage
None

2.5.6 Examples

Command	Responses
AT	OK

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2.6 Repeat Last Command A/

2.6.1 Description
This command repeats the last command of the open session. Only the A/ command itself cannot be repeated.

2.6.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.6.3 Syntax

Action Command
A/
Note: the response depends on the previous command

Read Command
None

Test Command
None

2.6.4 Parameters and Defined Values
None

2.6.5 Parameter Storage
None

2.6.6 Examples

Command	Responses
ATI	**Telecom Design TD1204** **OK**
A/ *Note: Repeat last command*	**Telecom Design TD1204** **OK**

2.6.7 Notes
Unlike all other AT commands, this command is executed immediately after the last "**/**" character is received, without waiting for a finish "**<CR>**" character.

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2.7 Help ?

2.7.1 Description

This command displays a summary of the available AT commands.

Note: This command is a Telecom Design extension to the basic AT command set.

2.7.2 Compatibility

This command is available in all firmware revisions since SOFT1104.

2.7.3 Syntax

Action Command

AT?
Note: The response depends on the list of available commands

Read Command

None

Test Command

None

2.7.4 Parameters and Defined Values

None

2.7.5 Parameter Storage

None

2.7.6 Examples

Command	Responses
AT? *Note: display a summary of available AT commands*	**<list of commands>** **OK** *Note: The response depends on the list of available commands*

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2.8 Echo Activation E

2.8.1 Description

This command is used to determine whether the TD1204 module echoes characters received by an external application (DTE) or not.

2.8.2 Compatibility

This command is available in all firmware revisions since SOFT1104.

2.8.3 Syntax

Action Command

ATE[<n>]
OK

Read Command

None

Test Command

None

2.8.4 Parameters and Defined Values

Parameter	Value	Description
<n>		**Echo Activation Parameter**
	0	Characters are not echoed
	1	Characters are echoed (default value)

2.8.5 Parameter Storage

The **<n>** parameter value is stored in Flash memory using the **AT&W** command. The default value can be restored using the **AT&F** command.

2.8.6 Examples

Command	Responses
ATE0	**OK**
Note: characters are not echoed	*Note: Done*
ATE1	**OK**
Note: characters are echoed	*Note: Done*

2.9 Information Display Control I

2.9.1 Description

This command causes the product to transmit one or more lines of specific information text.

2.9.2 Compatibility

This command is available in all firmware revisions since SOFT1104.

2.9.3 Syntax

Action Command

```
ATI[<n>]
Depending on <n>
OK
```

Read Command

```
None
```

Test Command

```
None
```

2.9.4 Parameters and Defined Values

Parameter	Value	Description
<n>		**Information Display Control Parameter**
	0	Display manufacturer followed by model identification (default value). Always returns the string "**Telecom Design TD1204**".
	5	Display firmware release date. Returns a string "**Mmm+yyyy**", where "**mm**" is a 2-digit month number and "**yyyy**" is a 4-digit year.
	7	Display RF serial number (SIGFOX™ ID) as an 8-digit hexadecimal number.
	10	Display baseband unique ID as a 16-digit hexadecimal number.
	11	Display hardware revision number as a 2-digit hexadecimal number.
	13	Display firmware revision number as a string "**SOFTxxxx**" ,where "**xxxx**" is a 4-digit number.
	21	Display RF chip part number as a string.
	25	Display RF chip ROM ID as a decimal number: ■ 2: Revision 0B ■ 3: Revision 1B
	26	Display module temperature in °C as a decimal number.
	27	Display module idle power supply voltage as a decimal number with 2 decimal places separated by a dot character.
	28	Display module RF active power supply voltage as a decimal number with 2 decimal places separated by a dot character. Note: the value is acquired during every SIGFOX™ RF transmission. If no value is available, the "**0.00**" value is returned. This value is the recommended value to monitor a battery supply, as it provides the supply voltage with the maximum load.

2.9.5 Parameter Storage

None

2.9.6 Examples

Command	Responses

`ATI0`
Note: Manufacturer and model identification
	`Telecom Design TD1204`
	`OK`
	Note: Command valid

`ATI5`
Note: result firmware release date
	`M08+2012`
	`OK`
	Note: August 2012

`ATI7`
Note: serial number (SIGFOX™ ID)
	`1058`
	`OK`
	Note: Serial number 1058

`ATI10`
Note: baseband unique ID
	`209531004F62DFF9`
	`OK`
	Note: baseband unique ID 209531004F62DFF9

`ATI11`
Note: hardware revision number
	`0F`
	`OK`
	Note: hardware 0F

`ATI13`
Note: firmware revision number
	`SOFT1100`
	`OK`
	Note: firmware SOFT1100

`ATI21`
Note: RF chip part number
	`Si4461`
	`OK`
	Note: RF chip is Si4461

`ATI25`
Note: RF chip revision number
	`2`
	`OK`
	Note: RF chip revision is 0B

`ATI26`
Note: module temperature
	`21`
	`OK`
	Note: module temperature is 21°C

`ATI27`
Note: module idle power supply voltage
	`3.25`
	`OK`
	Note: module idle power supply voltage is 3.25 V

`ATI28`
Note: module RF active power supply voltage
	`3.22`
	`OK`
	Note: module RF active power supply voltage is 3.22 V

2.10 Result Code Suppression Q

2.10.1 Description
This command determines whether the TD1204 module sends result codes or not.

2.10.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.10.3 Syntax

Action Command

```
ATQ[<n>]
[OK]
```

Read Command

```
None
```

Test Command

```
None
```

2.10.4 Parameters and Defined Values

Parameter	Value	Description
`<n>`		**Result Code Suppression Parameter**
	0	The TD1204 module transmits result codes (default value)
	1	Result codes suppressed and not transmitted

2.10.5 Parameter Storage
The `<n>` parameter value is stored in Flash memory using the `AT&W` command. The default value can be restored using the `AT&F` command.

2.10.6 Examples

Command	Responses
`ATQ0` *Note: the TD1204 transmits result codes*	`OK` *Note: Command valid*
`ATQ1` *Note: result codes are suppressed and not transmitted*	*Note: No response*

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2.11 Restart Banner Display S200

2.11.1 Description
This command configures, queries or disables the restart banner display.

2.11.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.11.3 Syntax

Action Command
ATS200=[<display>] OK

Read Command
ATS200? <display> OK

Test Command
ATS200=? 0..1 OK

2.11.4 Parameters and Defined Values

Parameter	Value	Description
<display>		**SIGFOX™ Keepalive Period Parameter**
	0	Disable restart banner display (default value)
	1	Enable restart banner display

2.11.5 Parameter Storage
The **<display>** parameter value is stored in Flash memory using the **AT&W** command. The default value can be restored using the **AT&F** command.

2.11.6 Examples

Command	Responses
ATS200?	0 **OK** *Note: restart banner display is disabled*
ATS200=1 *Note: enable the restart banner display*	**OK** *Note: Command valid*
AT&W *Note: save parameter value in Flash memory*	**OK** *Note: Command valid*
ATZ *Note: restart the TD1204 module*	**OK** **^SYSSTART** *Note: Command valid and restart banner is displayed*

2.11.7 Notes

The restart banner is only displayed if this parameter is enabled ("**ATS200=1**"), format control verbosity is enabled ("**ATV1**") and result code suppression is disabled ("**ATQ0**") in Flash memory during restart.

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2.12 SIGFOX™ Keepalive S300

2.12.1 Description

This command configures, queries or disables the SIGFOX™ keepalive RF messages period.

2.12.2 Compatibility

This command is available in all firmware revisions since SOFT1104.

2.12.3 Syntax

Action Command

ATS300=[<period>]
OK

Read Command

ATS300?
<period>
OK

Test Command

ATS300=?
0..127
OK

2.12.4 Parameters and Defined Values

Parameter	Value	Description
<period>		**SIGFOX™ Keepalive Period Parameter**
	0	Disable SIGFOX™ keepalive RF messages
	1..127	Period between 2 SIGFOX™ keepalive RF messages in hours (default value is 24)

2.12.5 Parameter Storage

The **<period>** parameter value is stored in Flash memory using the **AT&W** command. The default value can be restored using the **AT&F** command.

2.12.6 Examples

Command	Responses
ATS300?	**24**
	OK
	Note: SIGFOX™ keepalive messages are sent every 24 hours
ATS300=48	**OK**
Note: enable the SIGFOX™ keepalive messages every 48 hours	*Note: Command valid*
ATS300=0	**OK**
Note: disable the SIGFOX™ keepalive messages	*Note: Command valid*

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2.13 SIGFOX™ Keepalive S301

2.13.1 Description
This command configures, queries or disables the SIGFOX™ keepalive RF messages number of repeats.

2.13.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.13.3 Syntax

```
Action Command

ATS301=[<repeat>]
OK
```

```
Read Command

ATS301?
<repeat>
OK
```

```
Test Command

ATS301=?
0..2
OK
```

2.13.4 Parameters and Defined Values

Parameter	Value	Description
`<repeat>`		**SIGFOX™ Keepalive Repeat Parameter**
	0	Disable SIGFOX™ keepalive RF message retries
	1..2	Number of repeats of SIGFOX™ keepalive RF message (default value is 2)

2.13.5 Parameter Storage
The `<repeat>` parameter value is stored in Flash memory using the `AT&W` command. The default value can be restored using the `AT&F` command.

2.13.6 Examples

Command	Responses

`ATS301?`	`2`
	`OK`
	Note: SIGFOX™ keepalive messages are with 2 repeats

`ATS301=1` *Note: enable the SIGFOX™ keepalive messages with 1 repeat*	`OK` *Note: Command valid*
`ATS301=0` *Note: disable the SIGFOX™ keepalive message retries*	`OK` *Note: Command valid*

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2.14 SIGFOX™ Power S302

2.14.1 Description
This command configures or queries the SIGFOX™ RF power level in dBm.

2.14.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.14.3 Syntax

Action Command

```
ATS302=[<dbm_level>]
OK
```

Read Command

```
ATS302?
<dbm_level>
OK
```

Test Command

```
ATS302=?
0..14
OK
```

2.14.4 Parameters and Defined Values

Parameter	Value	Description
`<dbm_level>`		**SIGFOX™ Power Parameter**
	0..14	SIGFOX™ RF power level in dBm (default value is 14)

2.14.5 Parameter Storage
The `<dbm_level>` parameter value is stored in Flash memory using the `AT&W` command. The default value can be restored using the `AT&F` command.

2.14.6 Examples

Command	Responses

`ATS302?`	`14`
	`OK`
	Note: SIGFOX™ power is 14 dBm

`ATS302=10` *Note: set the SIGFOX™ RF power to 10 dBm*	`OK` *Note: Command valid*

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2.15 SIGFOX™ RF Pin Configuration S303

2.15.1 Description
This command configures or queries the SIGFOX™ RF pin configuration.

2.15.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.15.3 Syntax

Action Command

```
ATS303=[<config>]
OK
```

Read Command

```
ATS303?
<config>
OK
```

Test Command

```
ATS303=?
1..39
OK
```

2.15.4 Parameters and Defined Values

Parameter	Value	Description
<config>		**SIGFOX™ RF Pin Configuration Parameter**
	1..39	SIGFOX™ RF pin configuration (default value is 1)

2.15.5 Parameter Storage
The `<config>` parameter value is stored in Flash memory using the `AT&W` command. The default value can be restored using the `AT&F` command.

2.15.6 Examples

Command	Responses
ATS303?	1 **OK** *Note: SIGFOX™ RF pin configuration is 1*
ATS303=33 *Note: set the SIGFOX™ RF pin configuration to 33*	**OK** *Note: Command valid*

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2.16 Format Control V

2.16.1 Description

This command determines whether the TD1204 module response format uses or not the header characters <CR><LF>, and whether the result codes are provided as numeric or verbose.

2.16.2 Compatibility

This command is available in all firmware revisions since SOFT1104.

2.16.3 Syntax

Action Command
ATV<n>
OK

Read Command
None

Test Command
None

2.16.4 Parameters and Defined Values

Parameter	Value	Description	
<n>		**Format Control Parameter**	
	0		
		Information Responses	**Result Code**
		<text><CR><LF>	**<numeric code><CR>**
	1 (default value)	(default value)	
		Information Responses	**Result Code**
		<CR><LF> **<text><CR><LF>**	**<CR><LF>** **<verbose code><CR><LF>**

2.16.5 Parameter Storage

The **<n>** parameter value is stored in Flash memory using the **AT&W** command. The default value can be restored using the **AT&F** command.

2.16.6 Examples

Command	Responses
ATV0 *Note: the TD1204 transmits limited headers and trailers and numeric result codes*	**0** *Note: Command is valid (0 means OK)*
ATV1 *Note: result the TD1204 transmits full headers and trailers and verbose response text*	**OK** *Note: Command valid*

2.17 Extended Result Code X

2.17.1 Description

This command determines whether the TD1204 module sends extended result codes or not.

Note: this command is only included for compatibility reason, as the TD1204 module does not feature any result code requiring an extension.

2.17.2 Compatibility

This command is available in all firmware revisions since SOFT1104.

2.17.3 Syntax

Action Command

ATX[<n>]
OK

Read Command

None

Test Command

None

2.17.4 Parameters and Defined Values

Parameter	Value	Description
<n>		**Extended Result Code Parameter**
	0	The TD1204 module transmits normal result codes
	1	The TD1204 module transmits extended result codes (default value)

2.17.5 Parameter Storage

The **<n>** parameter value is stored in Flash memory using the **AT&W** command. The default value can be restored using the **AT&F** command.

2.17.6 Examples

Command	Responses
ATX0	**OK**
Note: the TD1204 transmits normal result codes	*Note: Command valid*
ATX1	**OK**
Note: the TD1204 transmits extended result codes	*Note: Command valid*

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2.18 Default Configuration Z

2.18.1 Description
This command restores the configuration profile from non-volatile memory (Flash).

Note: As a Telecom Design extension, this command also resets the TD1204 module to its power-on state.

2.18.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.18.3 Syntax

Action Command
ATZ OK

Read Command
None

Test Command
None

2.18.4 Parameters and Defined Values
None

2.18.5 Parameter Storage
None

2.18.6 Examples

Command	Responses
ATS302?	**14** **OK** *Note: Default value is in Flash memory*
ATS302=10 *Note: change transmission in volatile memory only*	**OK** *Note: Command valid*
ATZ	**OK** *Note: Command valid, will restart immediately*
ATS302?	**14** **OK** *Note: Default value set back from Flash memory*

2.19 Restore Factory Settings &F

2.19.1 Description
This command is used to restore factory settings from Flash memory.

2.19.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.19.3 Syntax

Action Command
`AT&F` OK

Read Command
None

Test Command
None

2.19.4 Parameters and Defined Values
None

2.19.5 Parameter Storage
None

2.19.6 Examples

Command	Responses
`AT&F` *Note: Asks for restoring the factory settings*	OK *Note: Done*

2.19.7 Notes
For each parameter, the section "Parameter Storage" specifies which default values can be restored using `AT&F`. The parameters are restored in RAM and in Flash memory, overwriting the profile set with `AT&W`.

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2.20 Display Configuration &V

2.20.1 Description
This command is used to display the TD1204 module configuration.

2.20.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.20.3 Syntax

Action Command

```
AT&V
Telecom Design TD1204
Hardware Version: <hardware_revision>
Software Version: <firmware_revision>
S/N: <serial_number>
ACTIVE PROFILE
E<val1> V<va2> Q<val3> X<val4> S200:<val5> S300:<val6> S301:<val7> S302:<val8>
S303:<val9>
OK
```

Note: For each **<valx>** *parameter value, please refer to the corresponding command.*

Read Command

```
None
```

Test Command

```
None
```

2.20.4 Parameters and Defined Values

Parameter	Value	Description
<hardware_revision>		**Hardware Revision Number Parameter**
	2 ASCII hex digits	The TD1204 module hardware revision number
<firmware_revision>		**Firmware Revision Number Parameter**
	"**SOFTxxxx**"	The TD1204 module firmware revision number, with "**x**" being an ASCII-coded digit
<serial_number>		**Serial Number Parameter**
	8 ASCII hex digits	The TD1204 module serial number
<valx>		**Active Profile Parameters**
		For each "**<valx>**" parameter value, please refer to the corresponding command

2.20.5 Parameter Storage
None

2.20.6 Examples

Command	Responses

`AT&V`
Note: Display active parameters in RAM
	`Telecom Design TD1204`
	`Hardware Version: 0F`
	`Software Version: SOFT1100`
	`S/N: 00001058`
	`ACTIVE PROFILE`
	`E1 V1 Q0 X1 S200:0 S300:24 S301:2`
	`S302:14 S303:1`
	`OK`
	Note: Done for echo.

2.21 Save Configuration &W

2.21.1 Description
This command writes the active configuration into a non volatile memory (Flash).

2.21.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.21.3 Syntax

Action Command

AT&W
OK

Read Command

None

Test Command

None

2.21.4 Parameters and Defined Values
None

2.21.5 Parameter Storage
None

2.21.6 Examples

Command	Responses
ATS302=10 *Note: change transmission power in volatile memory only*	OK
AT&W	OK
ATZ *Note: reset the TD1204 module*	OK
ATS302?	10 OK *Note: Default value set back from Flash memory*

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2.22 SIGFOX™ Send RF Bit $SB

2.22.1 Description

This command sends a SIGFOX™ RF bit.

2.22.2 Compatibility

This command is available in all firmware revisions since SOFT1445.

2.22.3 Syntax

Action Command

```
AT$SB=<bit>[,<repeat>[,<ack>[,<reserved>]]]
OK
```

Read Command

```
None
```

Test Command

```
None
```

2.22.4 Parameters and Defined Values

Parameter	Value	Description
`<bit>`		**SIGFOX™ Message Bit Value Parameter**
	0..1	Single-digit binary value
`<repeat>`		**SIGFOX™ Message Repeat Count Parameter**
	2 or 1..2	Number of times the RF frame is repeated, fixed to 2 for uplink-only transmissions, but can be set to 1 or 2 for bidirectional transmissions (default to 2).
`<ack>`		**SIGFOX™ Acknowledgement Request Parameter**
	0	Uplink-only transmission (default value)
	1	Request a bidirectional transmission ("downlink")
`<reserved>`		**SIGFOX™ Reserved Parameter**
	0	Reserved value

2.22.5 Parameter Storage

None

2.22.6 Examples

Command	Responses
`AT$SB=1`	`OK` *Note: Transmission of bit value 1 completed, using 2 repeated frames and requesting a downlink bidirectional transmission*

TELECOM DESIGN

AT$SB=1,2,1	OK
	Note: Transmission of bit value 1 completed
	+RX BEGIN
	Note: Start of downlink reception, 20 s after transmitting the first uplink frame transmission
	+RX=01 02 03 04 05 06 07 08
	Note: successful downlink frame received, fixed 8-byte payload length returned as eight 2-digit hexadecimal values ('0' to '9' and 'A' to 'F' characters) separated by a space ((' ') character
	+RX END
	Note: End of downlink reception, 25 s max after the start of downlink reception or upon successful downlink frame reception

2.22.7 Notes

The repeat count parameter can only be set to '1' if a bidirectional transmission is requested.

When requesting a bidirectional transmission, the "OK" response is returned just after the uplink transmission is performed, allowing to enter new commands right away. However, all commands requiring an RF interaction will return an error before the downlink reception period is over.

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2.23 SIGFOX™ Send RF Frame $SF

2.23.1 Description
This command sends a SIGFOX™ RF frame.

2.23.2 Compatibility
This command is available in all firmware revisions since SOFT1445.

2.23.3 Syntax

Action Command

```
AT$SF=[<hex_byte1>[[ ]..<hex_byte2>]..[,<repeat>[,<ack>[,<reserved>]]]]
OK
```

Note: There can be from 1 to 12 `<hex_bytex>` parameter values, optionally separated by single or multiple space or tabulation characters.

Read Command

```
None
```

Test Command

```
None
```

2.23.4 Parameters and Defined Values

Parameter	Value	Description
`<hex_bytex>`		**SIGFOX™ Message Byte Value Parameter**
	00..FF	2-digit hexadecimal byte value ('`0`' to '`9`', '`a`' to '`f`' and '`A`' to '`F`' characters are valid) There can be from 1 to 12 `<hex_bytex>` parameter values, optionally separated by single or multiple space (IA5 2/0) or tabulation (IA5 0/9) characters
`<repeat>`		**SIGFOX™ Message Repeat Count Parameter**
	2 or 1..2	Number of times the RF frame is repeated, fixed to 2 for uplink-only transmissions, but can be set to 1 or 2 for bidirectional transmissions (default to 2).
`<ack>`		**SIGFOX™ Acknowledgement Request Parameter**
	0	Uplink-only transmission (default value)
	1	Request a bidirectional transmission ("downlink")
`<reserved>`		**SIGFOX™ Reserved Parameter**
	0	Reserved value

2.23.5 Parameter Storage
None

2.23.6 Examples

Command	Responses
`AT$SF=0D 0A`	`OK` *Note: Transmission of 2 hexadecimal bytes "`0D 0A`" completed*

TELECOM DESIGN

AT$SF=33 31,2,1	OK
	Note: Transmission of 2 hexadecimal bytes "33 31" completed
	+RX BEGIN
	Note: Start of downlink reception, 20 s after transmitting the first uplink frame transmission
	+RX=01 02 03 04 05 06 07 08
	Note: successful downlink frame received, fixed 8-byte payload length returned as eight 2-digit hexadecimal values ('0' to '9' and 'A' to 'F' characters) separated by a space ((' ') character
	+RX END
	Note: End of downlink reception, 25 s max after the start of downlink reception or upon successful downlink frame reception

2.23.7 Notes

The repeat count parameter can only be set to '1' if a bidirectional transmission is requested.

When requesting a bidirectional transmission, the "OK" response is returned just after the uplink transmission is performed, allowing to enter new commands right away. However, all commands requiring an RF interaction will return an error before the downlink reception period is over.

If the message length is greater than 1 and is odd, a null padding byte is appended at the end of the message.

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2.24 SIGFOX™ Send RF Message $SS

2.24.1 Description
This command sends a SIGFOX™ RF message.

2.24.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.24.3 Syntax

Action Command

```
AT$SS=[<hex_byte1>[[ ]..<hex_byte2>]..]
OK
```

Note: There can be from 1 to 12 <hex_bytex> parameter values, optionally separated by single or multiple space or tabulation characters.

Read Command

```
None
```

Test Command

```
None
```

2.24.4 Parameters and Defined Values

Parameter	Value	Description
`<hex_bytex>`		**SIGFOX™ Message Byte Value Parameter**
	00..FF	2-digit hexadecimal byte value ('`0`' to '`9`', '`a`' to '`f`' and '`A`' to '`F`' characters are valid) There can be from 1 to 12 `<hex_bytex>` parameter values, optionally separated by single or multiple space (IA5 2/0) or tabulation (IA5 0/9) characters

2.24.5 Parameter Storage
None

2.24.6 Examples

Command	Responses
`AT$SS=0D 0A`	`OK` *Note: Transmission of 2 hexadecimal bytes "`0D 0A`" completed*

2.24.7 Notes
If the message length is greater than 1 and is odd, a null padding byte is appended at the end of the message.

TELECOM DESIGN

2.25 SIGFOX™ Send RF Test Message $ST

2.25.1 Description
This command sends a SIGFOX™ test RF message.

2.25.2 Compatibility
This command is available in all firmware revisions since SOFT1104.

2.25.3 Syntax

Action Command

```
AT$ST=[<count>,<period>,<channel>]]]
OK
```

Read Command

```
None
```

Test Command

```
None
```

2.25.4 Parameters and Defined Values

Parameter	Value	Description
`<count>`		**SIGFOX™ Test Message Count Parameter**
	0..65535	Count of SIGFOX™ test RF messages (default value is 10).
`<period>`		**SIGFOX™ Test Message Period Parameter**
	1..255	Period in seconds between SIGFOX™ test RF messages (default value is 10 seconds).
`<channel>`		**SIGFOX™ Test Message Channel Parameter**
	-1	Use automatic channel selection (default value).
	0..180 or 220..400	Channel number to use for SIGFOX™ test RF messages. Channels have a fixed 100 Hz bandwidth, starting at 868.180 MHz for channel 0, ending at 868.198 Mhz for channel 180, restarting at 868.202 MHz for channel 220 and ending at 868.220 MHz for channel 400.

2.25.5 Parameter Storage
None

2.25.6 Examples

Command	Responses
`AT$ST=10,30,-1` *Note: send a SIGFOX™ test message 10 times every 30 s, each message is sent once, using automatic channel selection*	`OK` *Note: Test done*

3 TD1204 Hayes-Compatible AT Core Command Set Reference

This section provides a reference for the Hayes-compatible "AT" Core commands implemented by the TD1204 Module.

3.1 TD CORE Watchdog Configuration S250

3.1.1 Description
This command set or queries the watchdog configuration. When enabled the watchdog is automatically fed.

3.1.2 Compatibility
This command is available in all firmware revisions since SOFT1292.

3.1.3 Syntax

Action Command

```
ATS250=[<enable>,<interval>]
OK
```

Read Command

```
ATS250?
<enable>, <interval>
OK
```

Test Command

```
ATS250=?
0..1, 8|16|32|64|128|256
OK
```

3.1.4 Parameters and Defined Values

Parameter	Value	Description
`<enable>`		**Watchdog Configuration Enable Parameter**
	0	Disable the watchdog
	1	Enable the watchdog
		Watchdog Configuration Interval Parameter
`<interval>`	8|16|32|64|128|256	Interval in seconds at which the watchdog will trigger a reboot if not fed. Please note that the watchdog will not be fed during a Sigfox transmission and that the watchdog clock can be inaccurate up to 50%.

3.1.5 Parameter Storage
The `<enable> and <interval>` parameters values are stored in Flash memory using the `AT&W` command. The default values can be restored using the `AT&F` command.

3.1.6 Examples

Command	Responses
`ATS250=1,256` *Enable the watchdog to trigger a reset if not fed for 256s.*	`OK` *Note: Command valid*
`ATS250=0` *Disable the watchdog*	`OK` *Note: Command valid*

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3.2 TD CORE Set I/O Mode - $SIO=

3.2.1 Description
This command configures pins as input or output.

3.2.2 Compatibility
This command is available in all firmware revisions since SOFT1292.

3.2.3 Syntax

Action Command

```
AT$SIO=[<port>,<pin>,<mode>,<out>]
OK
```

3.2.4 Parameters and Defined Values

Parameter	Value	Description
`<port>`		**TD CORE Set I/O Port Parameter**
	0..5	Port number
		TD CORE Set I/O Pin Parameter
`<pin>`	0..15	Pin number
		TD CORE Set I/O Mode Parameter
`<mode>`	0	
	2	
	4	
	5	
		TD CORE Set I/O Pull Parameter
`<pull>`	0	Pull-down
	1	Pull-up

3.2.5 Examples

Command	Responses
`AT$SIO=3,6,4,1` *Note: Set PD6 as push-pull with high output (switch-on TIM2).*	`OK` *Note: Command valid*
`AT$SIO=0,0,2,0` *Note: Set SDA pin as input with pull-down.*	`OK` *Note: Command valid*

3.2.6 Details
Please refer to your module's datasheet to find port and pin value.

TELECOM DESIGN

3.3 TD CORE Get Input - $GIO=

3.3.1 Description

This command retrieves the value of a pin configured as input.

3.3.2 Compatibility

This command is available in all firmware revisions since SOFT1292.

3.3.3 Syntax

Action Command

```
AT$GIO=[<port>,<pin>]
1
OK
```

3.3.4 Parameters and Defined Values

Parameter	Value	Description
`<port>`		**TD CORE Get I/O Port Parameter**
	0..5	Port number
		TD CORE Get I/O Pin Parameter
`<pin>`	0..15	Pin number

3.3.5 Examples

Command	Responses

`AT$GIO=0,0`
 Note: Read the state of SDA pin. Note that this pin should have previously been set as input thanks to the AT$SIO= command.
	`1`
	 `OK`
	 Note: Command valid

3.3.6 Details

Please refer to your module's datasheet to find port and pin value.

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3.4 TD CORE Set Drive Mode - $SDM=

3.4.1   Description
This command configures the drive mode strength of a specific port.

3.4.2   Compatibility
This command is available in all firmware revisions since SOFT1292.

3.4.3   Syntax

Action Command

```
AT$SDM=[<port>,<mode>]
OK
```

3.4.4   Parameters and Defined Values

Parameter	Value	Description
`<port>`		**TD CORE Set Drive Mode Port Parameter**
	0..5	Port number
`<mode>`		**TD CORE Set Drive Mode Mode Parameter**
	0	Standard (default): 6mA
	1	Lowest: 0.5mA
	2	High: 20mA
	3	Low: 2mA

3.4.5   Examples

Command	Responses
`AT$SDM=0,2` *Note: Set the port A with High drive mode capabilities (20mA current sourcing)*	`OK` *Note: Command valid*

3.4.6   Details
Please refer to your module's datasheet to find port and pin value.

TELECOM DESIGN

4   TD1204 Hayes-Compatible AT LAN Command Set Reference

This section provides a reference for the Hayes-compatible "AT" LAN commands implemented by the TD1204 Module.

4.1   Introduction to the TD LAN

The TD LAN is an energy-efficient local network that enables devices to communicate low-bandwidth data (up to 17 bytes per second) over the air.

In order to save power, the TD LAN operates as a time division duplexing (TDD) network where the device alternately transmits and receives data packets over the same radio channel. And although not fixed by the firmware and that these roles may be swapped at any time, it is assumed that one single device is in permanent receive mode, while the other devices are in transmit upon request mode, resulting in a non symmetric, star-topology network.

4.1.1   RF Parameters

The TD LAN network operates over the license-free ISM 869 MHz radio band (868.0 to 869.7 MHz). The devices use a single 25 kHz narrow-band channel to transmit data @ 9600bps using a GFSK modulation.

The operating frequency can be set using an AT command for a particular application.

The transmit power can also be adjusted using an AT command, in order to reduce the transmit power consumption or increase the radio range when required.

4.1.2   Network Addressing

Each device is assigned a logic 24-bit logic address and a corresponding 24-bit address mask. The logic address is transmitted into the RF frames that are sent and matched by the receiver after applying the address mask to it. The default null address and full address mask (all bits set to 1) ensure that receiving is enabled by default.

However, the recommended setup is to have a full address mask (all bits set to 1) for the transmitter and a partial address mask (not all bits are set to 1) for the receiver, both devices having a common address field (i.e. same "subnet") over the partial address mask bits. This addressing scheme provides a way for transmitters to access the receiver when they are using the same "subnet", and for the receiver a way to acknowledge a particular frame has been received to the original transmitter only.

Here is an example for a 4-bit subnet mask:

- Receiver: Address 0x5ED709, Mask 0xF00000

Address	0	1	0	1	1	1	1	0	1	1	0	1	0	1	1	1	0	0	0	0	1	0	0	1
Mask	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

- Transmitter: Address 0x55C344, Mask 0xFFFFFF

Address	0	1	0	1	0	1	0	1	1	1	0	0	0	0	1	1	0	1	0	0	0	1	0	0
Mask	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

4.1.3   Time Windowing

Having a device in permanent receive mode would put a heavy constraint on its average power consumption. Thus, a time windowing method is used where a device in receive mode is only listening to incoming RF traffic the

time required to capture a frame, then the radio is turned off for a fixed 1 second period, achieving a power reduction that is proportional to this duty cycle.

On the other hand, when in transmit mode, a device has to send radio frames for a duration that is at least equal to the receiver's time window plus 2 frame receive time in order to been seen by the receiver.

4.1.4   Data Transmission

From 1 to 17 data bytes may be transmitted into a single message frame, which is acknowledged by the receiver. If this acknowledgement is not received within 2 seconds, the message frame is resent up to 2 times before giving up.

The data bytes to transmit must be given using 2 hexadecimal digits per byte; each byte may be separated by space or tab characters for clarity.

Upon reception, the data bytes are provided using the same 2 hexadecimal digit per byte format. By default, no space character is inserted between data bytes, but an AT command allows to specify if space separators must be inserted between every byte, word or long word.

4.2 TD LAN Address S400

4.2.1 Description
This command configures or queries the TD LAN address.

4.2.2 Compatibility
This command is available in all firmware revisions since SOFT1134.

4.2.3 Syntax

Action Command

```
ATS400=[<address>]
OK
```

Read Command

```
ATS400?
<address>
OK
```

Test Command

```
ATS400=?
0..16777215 or 0x000000..0xFFFFFF
OK
```

4.2.4 Parameters and Defined Values

Parameter	Value	Description
`<address>`		**TD LAN Address Parameter**
	0..16777215 or 0x000000..0xFFFFFF	TD LAN 24-bit address (default value is 0)

4.2.5 Parameter Storage
The `<address>` parameter value is stored in Flash memory using the `AT&W` command. The default value can be restored using the `AT&F` command.

4.2.6 Examples

Command	Responses
`ATS400?`	`000000` **OK** *Note: TD LAN address is 0*
`ATS400=1` *Note: set the TD LAN address to 1*	**OK** *Note: Command valid*

4.3 TD LAN Mask S401

4.3.1 Description
This command configures or queries the TD LAN address mask.

4.3.2 Compatibility
This command is available in all firmware revisions since SOFT1134.

4.3.3 Syntax

Action Command

```
ATS401=[<mask>]
OK
```

Read Command

```
ATS401?
<mask>
OK
```

Test Command

```
ATS401=?
0..16777215 or 0x000000..0xFFFFFF
OK
```

4.3.4 Parameters and Defined Values

Parameter	Value	Description
`<mask>`		**TD LAN Address Mask Parameter**
	0..16777215 or 0x000000..0xFFFFFF	TD LAN 24-bit address mask (default value is 0xFFFFFF)

4.3.5 Parameter Storage
The **`<mask>`** parameter value is stored in Flash memory using the **`AT&W`** command. The default value can be restored using the **`AT&F`** command.

4.3.6 Examples

Command	Responses

`ATS401?`	`FFFFFF`
	`OK`
	Note: TD LAN address mask is 0xFFFFFF

`ATS401=0x7FFFFF` *Note: set the TD LAN address mask to 0x7FFFFF*	`OK` *Note: Command valid*

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4.4 TD LAN Separator S402

4.4.1 Description
This command configures or queries the TD LAN separator value.

4.4.2 Compatibility
This command is available in all firmware revisions since SOFT1134.

4.4.3 Syntax

Action Command

```
ATS402=[<separator_count>]
OK
```

Read Command

```
ATS402?
<separator_count>
OK
```

Test Command

```
ATS402=?
0,1,2,4
OK
```

4.4.4 Parameters and Defined Values

Parameter	Value	Description
`<separator_count>`		**TD LAN Separator Count Parameter**
	0	No space separator between received TD LAN data bytes (default value)
	1	A space separator is inserted between each received TD LAN data bytes
	2	A space separator is inserted between each received TD LAN data words
	4	A space separator is inserted between each received TD LAN data long words

4.4.5 Parameter Storage
The `<separator_count>` parameter value is stored in Flash memory using the `AT&W` command. The default value can be restored using the `AT&F` command.

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4.4.6 Examples

Command	Responses

`ATS402?`	`0`
	`OK`
	Note: no space separator between TD LAN data bytes

`ATS402=1` *Note: add a space character between every TD LAN data bytes*	`OK` *Note: Command valid*

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4.5 TD LAN Frequency S403

4.5.1   Description
This command configures or queries the TD LAN frequency value.

4.5.2   Compatibility
This command is available in all firmware revisions since SOFT1134.

4.5.3   Syntax

Action Command

```
ATS403=[<frequency>]
OK
```

Read Command

```
ATS403?
<frequency>
OK
```

Test Command

```
ATS403=?
868000000..869700000 or 868.000000..869.700000
OK
```

4.5.4   Parameters and Defined Values

Parameter	Value	Description
`<frequency>`		**TD LAN Separator Count Parameter**
	868000000..869700000 or 868.000000..869.700000	Frequency in Hz or MHz (default value 869312500)

4.5.5   Parameter Storage
The `<frequency>` parameter value is stored in Flash memory using the `AT&W` command. The default value can be restored using the `AT&F` command.

4.5.6   Examples

Command	Responses
`ATS403?`	869312500 **OK** *Note: theTD LAN frequency is 869.3125 MHz*
`ATS403=869.3625` *Note: the TD LAN frequency is set to 869.3625 MHz*	**OK** *Note: Command valid*

4.6 TD LAN Power S404

4.6.1 Description

This command configures or queries the TD LAN RF power level in dBm.

4.6.2 Compatibility

This command is available in all firmware revisions since SOFT1134.

4.6.3 Syntax

Action Command

```
ATS404=[<dbm_level>]
OK
```

Read Command

```
ATS404?
<dbm_level>
OK
```

Test Command

```
ATS404=?
-35..14
OK
```

4.6.4 Parameters and Defined Values

Parameter	Value	Description
`<dbm_level>`		**TD LAN Power Parameter**
	-35..14	TD LAN RF power level in dBm (default value is 14)

4.6.5 Parameter Storage

The `<dbm_level>` parameter value is stored in Flash memory using the `AT&W` command. The default value can be restored using the `AT&F` command.

4.6.6 Examples

Command	Responses

`ATS404?`	`14`
	`OK`
	Note: TD LAN power is 14 dBm

`ATS404=10` *Note: set the TD LAN RF power to 10 dBm*	`OK` *Note: Command valid*

4.7 TD LAN Receive RF Message $RL

4.7.1 Description

This command receives a TD LAN RF message or sets the TD LAN receive mode.

4.7.2 Compatibility

This command is available in all firmware revisions since SOFT1134.

4.7.3 Syntax

Action Command
`AT$RL=<mode>[,<timeout>]` OK

Read Command
None

Test Command
None

4.7.4 Parameters and Defined Values

Parameter	Value	Description
`<mode>`		**TD LAN Receive RF Message Mode Parameter**
	0	Disable TD LAN RF receive mode (default value)
	1	Enable TD LAN RF synchronous single-frame receive mode, either infinite or until a timeout value is reached
	2	Enable TD LAN RF asynchronous multi-frame receive mode
`<timeout>`	0.. 4294967295	Only valid when <mode> is equal to 1: provides the timeout value in seconds to wait before aborting receive mode

4.7.5 Parameter Storage

None

4.7.6 Examples

Command	Responses
`AT$RL=0` *Note: disable TD LAN RF receive mode*	`OK` *Note: Command valid*

`AT$RL=1`
Note: enable TD LAN RF synchronous receive mode
	`0102030405060708090a0b0c0d0e0f1011`
	`OK`
	Note: Response is only obtained after receiving a valid TD LAN frame

`AT$RL=1,5`
Note: enable TD LAN RF synchronous receive mode for 5s maximum
	`0102030405060708090a0b0c0d0e0f1011`
	`OK`
	Note: Response is only obtained after receiving a valid TD LAN frame

`AT$RL=1,5` *Note: enable TD LAN RF synchronous receive mode for 5 seconds maximum*	`ERROR` *Note: No valid TD LAN frame received within 5 seconds*

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AT$RL=2	OK
Note: enable TD LAN RF asynchronous receive mode	*Note: Command valid*
	+RX_LAN=0102030405060708090a0b0c0d0e0f1011 *Note: Unsolicited response is obtained after receiving a valid TD LAN frame*
	+RX_LAN=f1f2f3f4f5f6f7f8f9fafbfcfdfeff0001 *Note: Unsolicited response is obtained after receiving a valid TD LAN frame*

4.7.7   Notes

The message length is always 17 byte long.

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D E S I G N

4.8 TD LAN Send RF Message $SL

4.8.1 Description

This command sends a TD LAN RF message.

4.8.2 Compatibility

This command is available in all firmware revisions since SOFT1134.

4.8.3 Syntax

Action Command

```
AT$SL=[<hex_byte1>[[ ]..<hex_byte2>]..]
OK
```

Note: There can be from 1 to 17 `<hex_bytex>` parameter values, optionally separated by single or multiple space or tabulation characters.

Read Command

```
None
```

Test Command

```
None
```

4.8.4 Parameters and Defined Values

Parameter	Value	Description
`<hex_bytex>`		**TD LAN Send RF Message Parameter**
	00..FF	2-digit hexadecimal byte value ('`0`' to '`9`', '`a`' to '`f`' and '`A`' to '`F`' characters are valid) There can be from 1 to 17 `<hex_bytex>` parameter values, optionally separated by single or multiple space (IA5 2/0) or tabulation (IA5 0/9) characters

4.8.5 Parameter Storage

None

4.8.6 Examples

Command	Responses
`AT$SL=01`	`OK`
Note: send a single-byte TD LAN RF frame	*Note: Frame sent and receive acknowledgment received*
`AT$SL=0102030405060708090A0B0C0D0E0F1011`	`OK`
Note: send a 17-byte long TD LAN RF frame	*Note: Frame sent and receive acknowledgment received*
`AT$SL=0102030405060708090A0B0C0D0E0F1011`	`ERROR`
Note: send a TD LAN RF frame	*Note: No frame sent or no receive acknowledgment received*

4.8.7 Notes

The actual length of the sent message is always 17-byte long.

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5   TD1204 Hayes-Compatible AT Sensor Command Set Reference

This section provides a reference for the Hayes-compatible "AT" Sensor commands implemented by the TD1204 Module.

5.1   Introduction to Sensor

Sensor is a way to automatically send and process most relevant information from your TD1204 to a Web Service without having to worry about hardware monitoring, data transmission and message decoding.

Any TD1204 Module can monitor information concerning its battery level, its temperature level and state of any connected switch. Moreover in the case of a LAN, information concerning connection status and signal level can also be monitored.

Sensor is providing data interpretation and action triggering for a whole set of pre-defined messages. Thus each message can, according to its type and associated payload, trigger an action that can either be pre-defined or configured online via the Sensor Web Interface. Message types are the following.

1. **Register**: this message allows the module to register on Sensor in order to enable proper data processing. This message should only be sent once.

2. **Event**: this message is sent when a specific event occurs. All event messages are monitoring related. Following events can be emitted:
   - Boot
   - Battery status (low, ok)
   - Temperature status (low, ok, high)
   - Switch status (on, off)
   - Connection status (lost,ok)
   - Signal level status (low,ok)

   Note that all these events are being sent automatically if their respective monitoring is enabled.

3. **Data:** this message is used to carry data information such as sensor measurements, phone numbers, passwords, etc…

4. **Service:** this message is used to trigger a pre-defined action on Sensor. Already defined services are:
   - Sending a SMS (up to 9 ASCII characters). SMS will be sent to phone numbers registered with the corresponding Data frame or via the Sensor Web Interface.
   - Tweeting a message (up to 9 ASCII characters). Tweets will be sent to a previously defined Twitter account via the Sensor Web Interface.

5. **Keep-Alive:** this message is sent to confirm the Module activity to Sensor.

6. **Raw:** this message can be used to send raw information to Sensor. Up to 10 bytes can be sent.

In order to look at all the received frames please go to the Sensor Web Interface: https://developers.insgroup.fr/

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5.2   Sensor and LAN

5.2.1   Introduction

Alongside being able to send data over the Sigfox Network, the TD1204 Module is also capable of short range radio communication. Therefore modules can communicate between each other and become a LAN.

Sensor LAN is organized in a Gateway which manages a set of Devices. Up to 15 Devices can be connected to a Gateway. Thus a Gateway represents a network with one specific address. Any Device willing to join this network must first register to the Gateway. If the Gateway is not already managing 15 Devices, it will issue an address to the Device.

Devices can only register successfully if the Gateway has previously being set into registration mode. Note that as long as registration is opened on the Gateway side, already registered Devices can NOT communicate with the Gateway anymore. Once registration of the Devices is done, the Gateway should therefore close the registration for normal activity to restart.

Once a Device has obtained an address it can only communicate with the Gateway it had registered on. In a LAN, only a Gateway can send Sensor messages. If a Device has to send a message to Sensor it must send it to the Gateway which will forward it to Sensor.

Having a LAN allows to monitor Device connection and signal level status. In order to perform connection monitoring, a local device will send a local keep-alive message on a customizable interval. The Gateway will then make sure the Device has sent the keep-alive information on time.

Eventually a Device might want the Gateway to process some kind of information and reply back. Communication between a Device and its Gateway can be achieved by using the LAN Data command. Default behaviour for the Gateway is to echo the data back.

5.2.2   Collision Handling

One must be aware that a Gateway can receive a message from only one Device at a time. Furthermore, the Gateway cannot receive any message at all when emitting in Sigfox (up to 6 seconds). This can lead to collision issues when Devices try to communicate with the Gateway.

Concerning Event frames, a collision handler will ensure data delivery by repeating the frame until acked by the Gateway.

Concerning other frame types, no collision handling is provided and the user should always checked wether a frame has been received or not.

5.3   TD1204 Module Type

Depending on your application requirements, three behaviours can be associated to your module. These last are called Module type and can be one of the following:

- Transmitter: a transmitter is a standalone module. That is to say it can send messages to the Sigfox network on its own. This is the default behaviour for a TD1204 module.

- Device: a device is a module that can not directly send messages to Sensor. It must rely on a Gateway which will forward all its messages.

- Gateway: a gateway is a transmitter that can also handle up to 15 Devices by forwarding their messages to Sensor and monitoring individually their connection and signal level status.

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5.4 Examples

5.4.1 Transmitter with battery level, temperature and boot monitoring

```
AT$REG                   Note: Register the Transmitter on Sensor
OK


ATS502=1,2400,2900       Note: Enable battery monitoring with a 2.4V low level
OK                               and 2.9 OK level


ATS503=1,3600,-5,35      Note: Enable temperature monitoring every hours with a -5°C
OK                       low level and a 35°C high level.


ATS507=1,                Note: Enable boot monitoring
OK


AT&W                     Note: Save configuration in flash
OK
```

5.4.2 Gateway with boot monitoring

```
ATS500=1                 Note: Define Module Type as Gateway
OK


AT&w                     Note: Save configuration into Flash memory.
OK


ATZ                      Note: Reboot the Module.
OK


AT$REG                   Note: Register the Gateway on Sensor
OK


ATS507=1,                Note: Enable boot monitoring
OK


AT&w                     Note: Save configuration into Flash memory.
OK
```

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5.4.3 Device Registration on a Gateway with connection monitoring

```
Device:

ATS500=0              Note: Define Module Type as Device
OK

AT&w                  Note: Save Module type into Flash memory.
OK

ATZ                   Note: Reboot the Module.
OK

Gateway:

AT$LR=1               Note: Open registration on the Gateway.
OK

Device:

AT$LR                 Note: Device registration on the gateway
OK

Gateway:

AT$LR=0               Note: Close registration on the Gateway.
OK

Device:

AT$REG                Note: Register the Device on Sensor
OK

ATS505=1,300          Note: Enable connection monitoring with a
OK                          5mn checking interval.

AT&w                  Note: Save configuration into Flash memory.
OK
```

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5.5 TD SENSOR – Module Type S500

5.5.1 Description
This command configures or queries the TD SENSOR module type.

5.5.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.5.3 Syntax

```
Action Command

ATS500=<type>
OK

AT&W
OK

ATZ
OK
```

```
Read Command

ATS500?
<type>
OK
```

```
Test Command

ATS500=?
Device: 0, Gateway: 1, Transmitter: 2
OK
```

5.5.4 Parameters and Defined Values

Parameter	Value	Description
<type>		**TD SENSOR Type Parameter**
	0	Change the module behaviour to Device
	1	Change the module behaviour to Gateway
	2	Change the module behaviour to Transmitter (default value)

5.5.5 Parameter Storage
The <type> parameter value is stored in Flash memory using the AT&W command. The default value can be restored using the AT&F command.

5.5.6 Examples

Command	Responses
ATS500?	0

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	OK
	Note: the Module is a Device
`ATS500=1`	OK
`AT&W`	OK
`ATZ`	OK
Note: Change the Module behaviour to Gateway	
	Note: Commands valid

5.5.7   Notes

Changing the Module Type requires to save the new configuration to Flash and to reboot the Module to be effective. Therefore the following set of AT commands should always be executed when a Module Type has to be modified.

Full List of Commands to properly update the Module Type

`ATS500=<type>`
OK

`AT&w`
OK

`ATz`
OK

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5.6 TD SENSOR – Device Class S501

5.6.1 Description

This command configures or queries the TD SENSOR Device Class. It allows differentiating several kinds of Modules.

5.6.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.6.3 Syntax

Action Command

```
ATS501=<class>
OK
```

Read Command

```
ATS501?
<class>
OK
```

Test Command

```
ATS501=?
0..65535
OK
```

5.6.4 Parameters and Defined Values

Parameter	Value	Description
`<class>`		**TD SENSOR Class Parameter**
	0..65535	Change the Device Class

5.6.5 Parameter Storage

The `<class>` parameter value is stored in Flash memory using the `AT&W` command. The default value can be restored using the `AT&F` command.

5.6.6 Examples

Command	Responses
`ATS501=0x1234`	`OK`
Note: Change the Device Class to 0x1234	*Note: Command valid*

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5.7 TD SENSOR – Battery Monitoring S502

5.7.1 Description
This command configures or queries the TD SENSOR battery monitoring status.

5.7.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.7.3 Syntax

Action Command

```
ATS502=<enable>[,<level_low>,<level_ok>]
OK
```

Read Command

```
ATS502?
<enable>,<level_low>,<level_ok>
OK
```

Test Command

```
ATS502=?
0..1, 2100..3300, 2100..3300
OK
```

5.7.4 Parameters and Defined Values

Parameter	Value	Description
<enable>		**TD SENSOR Battery Monitoring Enable Parameter**
	0	Disable Battery Monitoring (default value)
	1	Enable Battery Monitoring
<level_low>		**TD SENSOR Battery Monitoring Level Low Parameter**
	2100..3300	Battery Low Level in millivolts. If the Battery level falls below the specified level, a Battery Low Event will be emitted.
<level_ok>		**TD SENSOR Battery Monitoring Level OK Parameter**
	2100..3300	Battery OK Level in millivolts. If the Battery level rises above the specified level, a Battery OK Event will be emitted. Note that a Battery OK Event will only be emitted if a Battery Low Event occurred previously.

5.7.5 Parameter Storage
All Battery Monitoring parameters values can be stored in Flash memory using the **AT&W** command. The default values can be restored using the **AT&F** command.

5.7.6 Examples

Command	Responses
`ATS502=1,2300,2800` *Note: enable battery monitoring. A Battery Low event will be emitted if the battery level falls below 2.3V and a battery OK will be emitted if, following the battery Low*	`OK` *Note: Command valid*

Event, the battery level rises above 2.8V.	
`ATS502=0`	`OK`
Note: Disable battery monitoring	*Note: Command valid*

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5.8 TD SENSOR – Temperature Monitoring S503

5.8.1 Description

This command configures or queries the TD SENSOR temperature monitoring status.

5.8.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.8.3 Syntax

Action Command

```
ATS503=<enable>[,<interval>,<level_low>,<level_high>]
OK
```

Read Command

```
ATS503?
<enable>,<interval>,<level_low>,<level_high>
OK
```

Test Command

```
ATS503=?
0..1, 0..4294967295, -30..85, -30..85
OK
```

5.8.4 Parameters and Defined Values

Parameter	Value	Description
`<enable>`		**TD SENSOR Temperature Monitoring Enable Parameter**
	0	Disable Temperature Monitoring (default value)
	1	Enable Temperature Monitoring
`<interval>`		**TD SENSOR Temperature Monitoring Interval Parameter**
	0.. 4294967295	Interval in seconds at which the Temperature should be checked.
`<level_low>`		**TD SENSOR Temperature Monitoring Level Low Parameter**
	-30..85	Temperature Low Level in Celsius degrees. If the Temperature level falls below the specified level, a Temperature Low Event will be emitted.
`<level_high>`		**TD SENSOR Temperature Monitoring Level High Parameter**
	-30..85	Temperature High Level in Celsius degrees. If the Temperature level rises above the specified level, a Temperature High Event will be emitted.

5.8.5 Parameter Storage

All Temperature Monitoring parameters values can be stored in Flash memory using the `AT&W` command. The default values can be restored using the `AT&F` command.

5.8.6 Examples

Command	Responses
`ATS503=1,3600,-5,35`	`OK`
Note: enable temperature monitoring by checking	*Note: Command valid*

temperature level every hour. A Temperature Low event will be emitted if the temperature level falls below -5°C, a temperature High Event will be emitted if the temperature level rises above 35°C and following any of the two previous event if the temperature level goes back into the authorized range a Temperature OK Event will be emitted.	
`ATS503=0` *Note: Disable temperature monitoring*	`OK` *Note: Command valid*

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5.9 TD SENSOR – RSSI Monitoring S504

5.9.1 Description
This command configures or queries the TD SENSOR RSSI monitoring status. Module Type must be set to Device and keep-alive monitoring must be enabled to use this functionality.

5.9.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.9.3 Syntax

Action Command

```
ATS504=<enable>[,<level_low>,<level_ok>]
OK
```

Read Command

```
ATS504?
<enable>,<level_low>,<level_ok>
OK
```

Test Command

```
ATS504=?
0..1, -122..14, -122..14
OK
```

5.9.4 Parameters and Defined Values

Parameter	Value	Description
`<enable>`		**TD SENSOR RSSI Monitoring Enable Parameter**
	0	Disable RSSI Monitoring (default value)
	1	Enable RSSI Monitoring
`<level_low>`		**TD SENSOR RSSI Monitoring Level Low Parameter**
	-122..14	RSSI Low Level in dBm. If the RSSI level falls below the specified level, a RSSI Low Event will be emitted.
`<level_ok>`		**TD SENSOR RSSI Monitoring Level High Parameter**
	-122..14	RSSI OK Level in dBm. If the RSSI level rises above the specified level, a RSSI OK Event will be emitted.

5.9.5 Parameter Storage
All RSSI Monitoring parameters values can be stored in Flash memory using the **AT&W** command. The default values can be restored using the **AT&F** command.

5.9.6 Examples

Command	Responses
`ATS504=1,-50,-10`	`OK`
Note: enable RSSI monitoring. A RSSI Low event will be emitted if the RSSI level falls below -50dBm and if RSSI	*Note: Command valid*

level then rises back above -10dBm a RSSI OK event will be emitted.	
`ATS504=0` *Note: Disable RSSI monitoring*	`OK` *Note: Command valid*

5.9.7   Notes

RSSI monitoring requires the device to communicate with a Gateway. Therefore a Gateway or a Transmitter cannot monitor its own RSSI status. Hence to activate RSSI monitoring the Module type must be set to Device. Moreover RSSI status is only checked when a Gateway receives a message from a Device. Checking RSSI level at regular interval requires then to communicate with the Gateway at the very same interval (whichever the message type is). We therefore also require having Keep-Alive monitoring enabled in order to monitor RSSI.

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5.10 TD SENSOR – Connection Monitoring S505

5.10.1 Description

This command configures or queries the TD SENSOR Connection monitoring status. Module Type must be set to Device to use this functionality.

5.10.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.10.3 Syntax

Action Command

```
ATS505=<enable>[,<interval>]
OK
```

Read Command

```
ATS505?
<enable>,<interval>
OK
```

Test Command

```
ATS505=?
0..1, 10..4294967295
OK
```

5.10.4 Parameters and Defined Values

Parameter	Value	Description
`<enable>`		**TD SENSOR Connection Monitoring Enable Parameter**
	0	Disable Connection Monitoring (default value)
	1	Enable Connection Monitoring
`<interval>`		**TD SENSOR Connection Monitoring Interval Parameter**
	10.. 4294967295	Connection checking interval in seconds. Due to transmission duration and risks of collisions the minimum checking interval is 10s. Minimum recommended interval when monitoring connection for several devices is 300 seconds.

5.10.5 Parameter Storage

All Connection Monitoring parameters values can be stored in Flash memory using the `AT&W` command. The default values can be restored using the `AT&F` command.

5.10.6 Examples

Command	Responses
`ATS505=1,300` *Note: enable Connection monitoring and check every 5 minutes if the connection is still alive. If it is not the case a Connection Lost event will be emitted by the gateway.*	`OK` *Note: Command valid*

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A Connection OK event will be emitted by the gateway if, following a Connection Lost event, a connection can be established.	
`ATS505=0` *Note: Disable Connection monitoring*	`OK` *Note: Command valid*

5.10.7 Notes

Connection monitoring requires the device to communicate with a Gateway. Therefore a Gateway or a Transmitter cannot monitor its own connection status. Hence to activate connection monitoring the Module type must be set to Device.

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5.11 TD SENSOR – Switch Monitoring S506

5.11.1 Description
This command configures or queries the TD SENSOR Switch monitoring status.

5.11.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.11.3 Syntax

Action Command

```
ATS506=<enable>,<port>,<bit>[,<falling>,<rising>,<pull>,<state>]
OK
```

Read Command

```
ATS506?
<port>,<bit>,<falling>,<rising>,<pull>,<state>

..

<port>,<bit>,<falling>,<rising>,<pull>,<state>


OK

Note: return information only about enabled switch
```

Test Command

```
ATS506=?
0..1, 0..5, 0..15, 0..1, 0..1, 0..1, 0..1
OK
```

5.11.4 Parameters and Defined Values

Parameter	Value	Description
`<enable>`		**TD SENSOR Switch Monitoring Enable Parameter**
	0	Disable Switch Monitoring (default value)
	1	Enable Switch Monitoring
`<port>`		**TD SENSOR Switch Monitoring Port Parameter**
	0..5	Port on which the switch is connected.
`<bit>`		**TD SENSOR Switch Monitoring Bit Parameter**
	0..15	Bit on which the switch is connected.
`<falling>`		**TD SENSOR Switch Monitoring Falling Parameter**
	0	Disable sending Switch ON Message on falling edge
	1	Enable sending Switch ON Message on falling edge
`<rising>`		**TD SENSOR Switch Monitoring Rising Parameter**
	0	Disable sending Switch OFF Message on rising edge
	1	Enable sending Switch OFF Message on rising edge
`<pull>`		**TD SENSOR Switch Monitoring Pull Parameter**

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	0	Disable pull-up on GPIO.
	1	Enable pull-up on GPIO.
`<state>`		**TD SENSOR Switch Monitoring State Parameter**
	0	If pull is set to 1, pull the GPIO down.
	1	If pull is set to 1, pull the GPIO up.

5.11.5 Parameter Storage

All Switch Monitoring parameters values can be stored in Flash memory using the `AT&W` command. The default values can be restored using the `AT&F` command.

5.11.6 Examples

Command	Responses
`ATS506=1,2,15,1,1,1,1` *Note: enable Switch monitoring on port 2 bit 15 (USR1) for both edges with a pull-up. On a rising edge a Switch Off event will be emitted. On a falling edge a switch On event will be emitted.*	`OK` *Note: Command valid*
`ATS504=0,2,15` *Note: disable Switch monitoring on port 2 bit 15 (USR1)*	`OK` *Note: Command valid*

5.11.7 Notes

In order to receive Switch On or Switch Off event messages that corresponds to the reality, all switches must be connected to GND and have the GPIO pull-up enabled. Available GPIOs for switch monitoring and corresponding port and bit values can be found in the following table:

Pin Name	Port	Bit
SDA	0	0
SCL	0	1
USR0	1	13
DAC0	1	11
USR2	2	0
USR3	2	1
USR4	2	14
USR1	2	15
ADC0	3	6

5.12 TD SENSOR – Boot Monitoring S507

5.12.1 Description
This command configures or queries the TD SENSOR boot monitoring status.

5.12.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.12.3 Syntax

Action Command

ATS507=<enable>
OK

Read Command

ATS507?
<enable>
OK

Test Command

ATS507=?
0..1
OK

5.12.4 Parameters and Defined Values

Parameter	Value	Description
<enable>		**TD SENSOR Boot Monitoring Enable Parameter**
	0	Disable Boot Monitoring (default value)
	1	Enable Boot Monitoring

5.12.5 Parameter Storage
All Boot Monitoring parameters values can be stored in Flash memory using the **AT&W** command. The default values can be restored using the **AT&F** command.

5.12.6 Examples

Command	Responses
ATS507=1	**OK**
Note: enable Boot monitoring. A Boot event will be sent each time the Module boots.	*Note: Command valid*
ATS507=0	**OK**
Note: Disable Boot monitoring	*Note: Command valid*

5.12.7 Notes
To be effective this command should always be followed by the **AT&W** command.

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5.13 TD SENSOR – Keep-Alive Monitoring S508

5.13.1 Description
This command configures or queries the TD SENSOR Keep-Alive monitoring status.

5.13.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.13.3 Syntax

```
Action Command

ATS508=<enable>[,<interval>]
OK
```

```
Read Command

ATS508?
<enable>,<interval>
OK
```

```
Test Command

ATS508=?
0..1, 1..255
OK
```

5.13.4 Parameters and Defined Values

Parameter	Value	Description
`<enable>`		**TD SENSOR Keep-Alive Monitoring Enable Parameter**
	0	Disable Keep-Alive Monitoring (default value)
	1	Enable Keep-Alive Monitoring
`<interval>`		**TD SENSOR Keep-Alive Monitoring Interval Parameter**
	1..255	Keep-Alive monitoring interval in hours. A Keep-alive Sensor frame will be sent every interval if enable is set to 1.

5.13.5 Parameter Storage
All Keep-Alive Monitoring parameters values can be stored in Flash memory using the **AT&W** command. The default values can be restored using the **AT&F** command.

5.13.6 Examples

Command	Responses
`ATS508=1,24` *Note: enable Keep-alive monitoring. A Keep-Alive frame will be sent every 24hours. Note that information about battery temperature level will be sent with the frame.*	`OK` *Note: Command valid*
`ATS508=0` *Note: Disable Keep-Alive monitoring*	`OK` *Note: Command valid*

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5.14 TD SENSOR LAN – Send Data $LD=

5.14.1 Description
This command sends a Data Message to the Gateway. Module type must be set to Device and a Local Register must have previously been issued for this command to be successful.

5.14.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.14.3 Syntax

Action Command

AT$LD=<hex_byte1> [[ ]..<hex_byte2>..]
RX: <hex_byte1> … <hex_byte15>
OK

*Note: There can be from 1 to 16 **<hex_bytex>** parameter values, optionally separated by single or multiple space or tabulation characters.*

Read Command

None

Test Command

None

5.14.4 Parameters and Defined Values

Parameter	Value	Description
<hex_bytex>		**SENSOR LAN Send Data Value Parameter**
	00..FF	2-digit hexadecimal byte value ('**0**' to '**9**', '**a**' to '**f**' and '**A**' to '**F**' characters are valid)
		There can be from 1 to 16 **<hex_bytex>** parameter values, optionally separated by single or multiple space (IA5 2/0) or tabulation (IA5 0/9) characters

5.14.5 Parameter Storage
None

5.14.6 Examples

Command	Responses
AT$LD=01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F 10 *Note: sends 16 bytes to the gateway. Note that whichever is the length of your data, 16 bytes will always be sent. Also note that default behavior for the Gateway is to echo the message back. Please be aware that due to acknowledgment protocol, the gateway's reply will only contain 15 bytes thus removing the last byte from the original message.*	RX: 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F OK

5.15 TD SENSOR LAN – Open Registration $LR=

5.15.1 Description
This command enables or disables Devices registration on the Gateway. Module type must be set to Gateway for this command to be issued. A maximum of 15 Devices can register on a unique Gateway.

5.15.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.15.3 Syntax

Action Command

AT$LR=<enable>
OK

Read Command

None

Test Command

None

5.15.4 Parameters and Defined Values

Parameter	Value	Description
<enable>		**SENSOR LAN Open Registration Enable Parameter**
	0	Devices Registration disabled (default value)
	1	Devices Registration enabled

5.15.5 Parameter Storage
None

5.15.6 Examples

Command	Responses
AT$LR=1 *Note: Devices are allowed to register on the Gateway.*	**OK**
AT$LR=0 *Note: Devices are not allowed to register on the Gateway.*	**OK**

5.16 TD SENSOR LAN – Registration $LR

5.16.1 Description

This command allows a Device to register on the Gateway. Module type must be set to Device for this command to be issued. Any Device must first register to the Gateway to obtain a LAN address and be able to send messages to Sensor.

5.16.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.16.3 Syntax

Action Command

```
AT$LR
OK
```

Read Command

```
None
```

Test Command

```
None
```

5.16.4 Parameters and Defined Values

None

5.16.5 Parameter Storage

None

5.16.6 Examples

Command	Responses
`AT$LR` *Note: Try to Register on the Gateway*	`OK` `Note : Registration OK`

5.17 TD SENSOR LAN – Get Address $LA?

5.17.1 Description
This command displays current address and mask values for Sensor LAN.

5.17.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.17.3 Syntax

Action Command

```
AT$LA?
Address: 5B2D3F, Mask: FFFFFF
OK
```

Read Command

```
None
```

Test Command

```
None
```

5.17.4 Parameters and Defined Values
None

5.17.5 Parameter Storage
None

5.17.6 Examples

Command	Responses
AT$LA? *Note: Request LAN address and mask for Sensor.*	Address: 5B2D3F, Mask: FFFFFF OK

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5.18 TD SENSOR LAN – LAN Reset $LZ

5.18.1   Description

If the Module type is set to Device, this command resets the current LAN address. If the Module type is set to Gateway, this commands reset the list of Devices connected to the gateway.

5.18.2   Compatibility

This command is available in all firmware revisions since SOFT1154.

5.18.3   Syntax

Action Command

AT$LZ
OK

Read Command

None

Test Command

None

5.18.4   Parameters and Defined Values

None

5.18.5   Parameter Storage

None

5.18.6   Examples

Command	Responses
AT$LZ *Note: Reset LAN configuration depending on Module type.*	**OK**

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5.19 TD SENSOR SEND - Data Phone $DP

5.19.1 Description
This command sends a Sensor message containing a phone number. If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received.

5.19.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.19.3 Syntax

Action Command

```
AT$DP=<index>,<cell_phone>
OK
```

Read Command

```
None
```

Test Command

```
None
```

5.19.4 Parameters and Defined Values

Parameter	Value	Description
`<index>`		**SENSOR Send Data Phone Index Parameter**
	1..4	Phone number index. Can be used to save several phone numbers.
`<cell_phone>`		**SENSOR Send Data Cell Phone Parameter**
	0.. 18446744073709551615	Cell Phone number up to 18 digits (leading zeros excluded).

5.19.5 Parameter Storage
None

5.19.6 Examples

Command	Responses
`AT$DP=3,0033601020304` *Note: assign the cell-phone number 0033601020304 to cell phone n°3 on Sensor.*	`OK`

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5.20 TD SENSOR SEND - Event Boot $EB

5.20.1 Description

This command sends a Sensor message indicating a Boot Event. If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received. Please keep in mind that this command is provided for event simulation only. Event messages should be sent automatically if the corresponding monitoring is enabled. Please do not send any Event message in your application.

5.20.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.20.3 Syntax

Action Command

AT$EB
OK

Read Command

None

Test Command

None

5.20.4 Parameters and Defined Values

None

5.20.5 Parameter Storage

None

5.20.6 Examples

Command	Responses
AT$EB *Note: send a Boot Event to Sensor.*	**OK**

5.21 TD SENSOR SEND - Event Connection $EC

5.21.1 Description

This command sends a Sensor message indicating a Connection Lost or Connection OK Event for a given device in a LAN. If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received. Please keep in mind that this command is provided for event simulation only. Event messages should be sent automatically if the corresponding monitoring is enabled. Please do not send any Event message in your application.

5.21.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.21.3 Syntax

Action Command

```
AT$EC=<status>,<entry_id>
OK
```

Read Command

```
None
```

Test Command

```
None
```

5.21.4 Parameters and Defined Values

Parameter	Value	Description
`<entry_id>`		**SENSOR Send Event Connection Entry ID Parameter**
	1..15	Address of the concerned device in the LAN. . Note that address 0 being reserved to the gateway it cannot be used for sending a Connection Event.
`<status>`		**SENSOR Send Event Connection Status Parameter**
	0	Connection Lost Event.
	1	Connection OK Event.

5.21.5 Parameter Storage

None

5.21.6 Examples

Command	Responses
`AT$EC=0,13` *Note: send the Connection Lost Event for Device of which network address is 13.*	`OK`

5.22 TD SENSOR SEND - Event RSSI $ER

5.22.1 Description

This command sends a Sensor message indicating a RSSI Level Low or RSSI Level OK Event for a given device in a LAN. If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received. Please keep in mind that this command is provided for event simulation only. Event messages should be sent automatically if the corresponding monitoring is enabled. Please do not send any Event message in your application.

5.22.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.22.3 Syntax

```
Action Command

AT$ER=<entry_id>,<status>
OK
```

```
Read Command

None
```

```
Test Command

None
```

5.22.4 Parameters and Defined Values

Parameter	Value	Description
`<entry_id>`		**SENSOR Send Event RSSI Entry ID Parameter**
	1..15	Address of the concerned device in the LAN. Note that address 0 being reserved to the gateway it cannot be used for sending a RSSI Event.
`<status>`		**SENSOR Send Event RSSI Status Parameter**
	0	RSSI Level Low Event.
	1	RSSI Level OK Event.

5.22.5 Parameter Storage

None

5.22.6 Examples

Command	Responses
`AT$ER=1,0` *Note: send the RSSI Low Event for Device of which network address is 1.*	`OK`

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5.23 TD SENSOR SEND - Event Switch $ES

5.23.1 Description

This command sends a Sensor message indicating a Switch ON or a Switch OFF Event for a given switch connected to a device. If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received. Please keep in mind that this command is provided for event simulation only. Event messages should be sent automatically if the corresponding monitoring is enabled. Please do not send any Event message in your application.

5.23.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.23.3 Syntax

Action Command

AT$ES=<port>,<bit>,<status>
OK

Read Command

None

Test Command

None

5.23.4 Parameters and Defined Values

Parameter	Value	Description
<port>		**SENSOR Send Event Switch Port Parameter**
	0..5	Port number for the concerned switch.
<bit>		**SENSOR Send Event Switch Bit Parameter**
	1..255	Bit number for the concerned switch.
<status>		**SENSOR Send Event Switch Status Parameter**
	0	Switch OFF Event.
	1	Switch ON Event.

5.23.5 Parameter Storage

None

5.23.6 Examples

Command	Responses
AT$ES=0,15,1 *Note: send the Switch ON Event for the switch connected to port 0, bit 15.*	**OK**

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5.24 TD SENSOR SEND - Event Temperature $ET

5.24.1 Description

This command sends a Sensor message indicating a Temperature Level Low, Temperature Level OK or Temperature Level High Event. If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received. Please keep in mind that this command is provided for event simulation only. Event messages should be sent automatically if the corresponding monitoring is enabled. Please do not send any Event message in your application.

5.24.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.24.3 Syntax

Action Command
AT$ET=<status> OK

Read Command
None

Test Command
None

5.24.4 Parameters and Defined Values

Parameter	Value	Description
<status>		**SENSOR Send Event Temperature Status Parameter**
	0	Temperature Low Event.
	1	Temperature OK Event.
	2	Temperature High Event.

5.24.5 Parameter Storage

None

5.24.6 Examples

Command	Responses
AT$ET=1 *Note: send a Temperature OK Event.*	**OK**

5.25 TD SENSOR SEND - Event Battery $EV

5.25.1 Description

This command sends a Sensor message indicating a Battery Level Low, Battery Level OK Event. If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received. Please keep in mind that this command is provided for event simulation only. Event messages should be sent automatically if the corresponding monitoring is enabled. Please do not send any Event message in your application.

5.25.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.25.3 Syntax

Action Command

```
AT$EV=<status>
OK
```

Read Command

```
None
```

Test Command

```
None
```

5.25.4 Parameters and Defined Values

Parameter	Value	Description
`<status>`		**SENSOR Send Event Battery Status Parameter**
	0	Battery Low Event.
	1	Battery OK Event.

5.25.5 Parameter Storage

None

5.25.6 Examples

Command	Responses
`AT$EV=1` *Note: send a Battery OK Event. Note that for Battery OK Event, battery level will be measured and added to the Sensor Message.*	`OK`

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5.26 TD SENSOR SEND - Event Keep-Alive $KA

5.26.1 Description

This command sends a Sensor message indicating a Keep-Alive Event. If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received. Please keep in mind that this command is provided for event simulation only. Event messages should be sent automatically if the corresponding monitoring is enabled. Please do not send any Event message in your application.

5.26.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.26.3 Syntax

Action Command
AT$KA OK

Read Command
None

Test Command
None

5.26.4 Parameters and Defined Values

None

5.26.5 Parameter Storage

None

5.26.6 Examples

Command	Responses
AT$KA *Note: send a Keep-Alive Event to Sensor.*	**OK**

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5.27 TD SENSOR SEND - Service SMS $SSMS

5.27.1 Description
This command sends an SMS to a pre-registered cell-phone number (either via the Sensor Web Interface or the Data Phone Message). If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received.

5.27.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.27.3 Syntax

Action Command

AT$SSMS=<message>
OK

Read Command

None

Test Command

None

5.27.4 Parameters and Defined Values

Parameter	Value	Description
<message>		**SENSOR Send Service SMS Message Parameter**
	Up to 9 ASCII bytes	ASCII Message, up to 9 characters. Note that commas cannot be sent using this command. Moreover sending 0 will not work (but will return OK).

5.27.5 Parameter Storage
None

5.27.6 Examples

Command	Responses
AT$SSMS=whats up? *Note: send the message "whats up?" as a SMS to a pre-registered cell-phone.*	OK

5.28 TD SENSOR SEND - Service Tweet $STWT

5.28.1 Description
This command sends a Tweet to a pre-registered tweet account (via the Sensor Web Interface). If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received.

5.28.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.28.3 Syntax

Action Command

AT$STWT=<message>
OK

Read Command

None

Test Command

None

5.28.4 Parameters and Defined Values

Parameter	Value	Description
<message>		**SENSOR Send Service Tweet Message Parameter**
	Up to 9 ASCII bytes	ASCII Message, up to 9 characters.

5.28.5 Parameter Storage
None

5.28.6 Examples

Command	Responses
AT$STWT=tweeting *Note: tweet the message "tweeting" on a pre-registered Twitter account.*	OK

5.29 TD SENSOR SEND - Raw $RAW=

5.29.1 Description

This command sends a Raw Sensor Message. If the Module Type is set to Device, then a Local Register and a Sensor Register command must have previously been issued for the message to be received. It the Module type is set to either Gateway or Transmitter a Sensor Register command must have previously been issued for the message to be received.

5.29.2 Compatibility

This command is available in all firmware revisions since SOFT1154.

5.29.3 Syntax

Action Command

```
AT$RAW=<hex_byte1> [[ ]..<hex_byte2>..]
OK
```

Note: There can be from 0 to 10 <hex_bytex> parameter values, optionally separated by single or multiple space or tabulation characters.

Read Command

```
None
```

Test Command

```
None
```

5.29.4 Parameters and Defined Values

Parameter	Value	Description
<hex_bytex>		SENSOR Send Raw Message Byte Value Parameter
	00..FF	2-digit hexadecimal byte value ('0' to '9', 'a' to 'f' and 'A' to 'F' characters are valid) There can be from 0 to 10 <hex_bytex> parameter values, optionally separated by single or multiple space (IA5 2/0) or tabulation (IA5 0/9) characters

5.29.5 Parameter Storage

None

5.29.6 Examples

Command	Responses
AT$RAW=01 02 03 04 05 06 07 08 09 0A *Note: send a raw message that can be decoded on Sensor by configuring properly the Web Interface.*	OK

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5.30 TD SENSOR SEND - Event Register $REG

5.30.1 Description
This command allows registering a Module on Sensor.

5.30.2 Compatibility
This command is available in all firmware revisions since SOFT1154.

5.30.3 Syntax

Action Command

AT$REG
OK

Read Command

None

Test Command

None

5.30.4 Parameters and Defined Values
None

5.30.5 Parameter Storage
None

5.30.6 Examples

Command	Responses
AT$REG *Note: Register the module on Sensor.*	OK

5.30.7 Note
This command must be issued once prior any other command in order to ensure proper message processing for the SIGFOX™-compatible commands implemented by the TD1204 Module.

6 TD1204 Hayes-Compatible AT Geolocation Command Set Reference

This section provides a reference for the Hayes-compatible "AT" Geolocation commands implemented by the TD1204 Module.

6.1 Introduction to Global Positioning System (GPS)

The TD1204 allows you to make use of the GPS satellites constellation in order to obtain precise timing and positioning information. This information can only be computed if the TD1204 has previously obtained ephemeris data from currently visible satellites. Also having a rough knowledge concerning current timing and position can help the TD1204 to compute positioning information. In order to better understand the behavior of your TD1204 when trying to lock to satellites, one must consider the following possibilities.

- Cold start: the module does not have any information. In that case the module will need to download ephemeris data from satellites which requires in the very best case at least 16 seconds per satellite and in most cases at least 30 seconds.

- Hot start: the module already has downloaded ephemeris information for visible satellites. In such a case the TD1204 only needs to lock to satellites which can achieved be in less than a second. Note that if the module has downloaded ephemeris concerning four satellites and then has been moved in a place where only three of these satellites are visible, the module will then need to download again ephemeris for a fourth satellite resulting in a longer time to fix.

Due to ephemeris encoding, it is harder for a GPS to decode ephemeris than locking into a signal to compute a position. Therefore cold start sensitivity is significantly lower than hot start sensitivity. Therefore it is possible to obtain a fix under severe condition in hot start but not in cold start. In order to keep previously downloaded ephemeris data, the TD1204 must at least be kept in Hardware Backup mode. Also keep in mind that ephemeris data become useless four hours after they have been downloaded.

Why is my phone so much faster to obtain a fix than the TD1204? Mobile phones use A-GPS in order to compute a position which means they make use of the GSM network to download ephemeris and even delegate position computation to a distant server.

6.2 GPS output and quality

In order to qualify the GPS capability of the TD1204 it is possible to output all information concerning the current fix as NMEA messages on the serial port. One would advantageously make use of the u-center software from U-blox: http://www.u-blox.com/en/evaluation-tools-a-software/u-center/u-center.html in order to decode these messages.

There are many figures which matters when qualifying a GPS but most relevant are the number of visible satellites and their respective signal level. At least three satellites are required to compute a 2D position and four satellites are required to compute a 3D position. This is because like most GPS receiver the TD1204 does not embed an atomic clock providing extremely precise timing information. Thus four coordinates need to be computed: latitude, longitude, altitude and time. Four satellites are therefore required to obtain timing and positioning information. Nevertheless if altitude is being ignored (when already known or irrelevant for example on a boat) only 3 satellites are required to compute latitude, longitude and time information. This is called to 2D fix.

Once a position has been computed, it is possible to get any idea of how accurate coordinates are. This is called dilution of precision (DOP) and only depends on satellite geometry in the sky. The dilution of precision does not tell if the position is accurate or not, it tells how likely it is to be accurate. That is to say the smallest your DOP is,

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the more likely are your data to be accurate. This is because the DOP only takes into account the geometry of the satellites in the sky and does not take into account perturbation due to the signal travel. Therefore DOP cannot be reliably linked to accuracy in meters. There are several DOP values, the most useful being the HDOP or horizontal dilution of precision. HDOP values can be considered as excellent when lower than 2, good when lower than 5, acceptable when lower than 10 and bad when higher than 10.

6.3 TD GEOLOC – GPS Mode $GPS

6.3.1 Description

This command sets the embedded GPS chip power mode. If the GPS is enabled, additional parameters define whether a computed position should be considered as good enough or not. A timeout can be specified and NMEA messages from the GPS chip can be outputted for further analysis of GPS signal quality.

6.3.2 Compatibility

This command is available in all firmware revisions since SOFT1180.

6.3.3 Syntax

Action Command

```
AT$GPS=<mode>[,<min_sv>,<max_hdop>,<timeout>,<end_mode>,<nmea>]
OK
```

Read Command

```
None
```

Test Command

```
None
```

6.3.4 Parameters and Defined Values

Parameter	Value	Description
`<mode>`		**TD GEOLOC GPS mode Parameter**
	0	Power Off
	1	Power On
	2	Hardware Backup
`<min_sv>`		**TD GEOLOC GPS min_sv Parameter**
	0..255	Minimum number of satellites which should be used to compute position before considering a fix as valid.
`<max_hdop>`		**TD GEOLOC GPS min_sv Parameter**
	0..65535	Maximum hdop value before considering a fix as valid. Note that a value of 154 equals an hdop of 1.54
`<timeout>`		**TD GEOLOC GPS timeout Parameter**
	0.. 65535	Timeout in seconds after which the fix is stopped if it did not already succeed. A value of 65535 means no timeout.
`<end_mode>`		**TD GEOLOC GPS end_mode Parameter**
	0	Power Off the GPS after a valid fix or a timeout
	1	Leave the GPS On after a valid fix or a timeout
	2	Set the GPS in Hardware Backup after a valid fix or a timeout
`<nmea>`		**TD GEOLOC GPS nmea Parameter**
	0	Do not print any information concerning current fix
	1	Print all NMEA messages during current fix
	2	Only print GPGGA message containing position information when a valid fix is computed.

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6.3.5   Parameter Storage

None

6.3.6   Examples

Command	Responses

`AT$GPS=1,16,0,65535,1,1`
Note: start the GPS and navigate permanently (neither fix valid nor timeout will never get triggered).
	`OK`
	`$GPVTG,,,,,,,,,N*30`
	`$GPGGA,,,,,,0,00,99.99,,,,,,*48`
	`$GPGSA,A,1,,,,,,,,,,,,,99.99,99.99,99.99*30`
	`$GPGSV,1,1,02,14,,,36,25,,,37*78`
	`$GPGLL,,,,,,V,N*64`
	…

`AT$GPS=1,4,900,180,2,2`
Note: start the GPS and stop it when a fix based on 4 satellites and a hdop≤9 is computed or after 3 minutes if no valid position could have been obtained. Set the GPS into hardware backup mode when stopping and print one NMEA message (GPGGA) containing current position information when a valid fix is obtained or a timeout occurred.
	`OK`
	…
	
	`$GPGGA,151146.00,4446.95545,N,00039.42463,W,`
	`1,08,1,72,0,0,*5d`

`AT$GPS=0` *Note: completely stops the GPS.*	`OK`
`AT$GPS=2` *Note: set the GPS into hardware backup.*	`OK`

6.4 TD GEOLOC – GPS Send Position $GSND

6.4.1 Description

This command sends the last computed position over the Sigox Network as a Sensor frame.

6.4.2 Compatibility

This command is available in all firmware revisions since SOFT1180.

6.4.3 Syntax

Action Command

AT$GSND
OK

Read Command

None

Test Command

None

6.4.4 Parameters and Defined Values

None

6.4.5 Parameter Storage

None

6.4.6 Examples

Command	Responses
AT$GSND **Note: Send last computed GPS position to Sensor.**	OK

6.5 TD GEOLOC – Accelerometer Data Monitoring S650

6.5.1 Description

This command allows monitoring from the accelerometer. By enable data monitoring you will get x,y and z acceleration value being outputted to the serial interface. Please note that Accelerometer Data monitoring and Event monitoring cannot be active at the same time. If you activate Data monitoring while Event monitoring is active then this last will be disabled.

6.5.2 Compatibility

This command is available in all firmware revisions since SOFT1180.

6.5.3 Syntax

Action Command

```
ATS650=<enable>[,<low_power> ,<rate> ,<scale>, <filter>]
```
OK

Read Command

```
ATS650?
<enable>[,<low_power> ,<rate> ,<scale> ,<filter>]
```
OK

Test Command

```
ATS650=?
0..1, 0..1, 1..4, 2|4|8|16, 0..1
```
OK

6.5.4 Parameters and Defined Values

Parameter	Value	Description
<enable>		**TD Accelero Data Monitoring enable Parameter**
	0	Disable data monitorning
	1	Enable data monitorning
low_power		**TD Accelero Data Monitoring rate Parameter**
	0	Normal power, high resolution
	1	Low power, low resolution
rate		**TD Accelero Data Monitoring rate Parameter**
	1	1Hz
	2	10Hz
	3	25Hz
	4	50Hz
scale		**TD Accelero Data Monitoring scale Parameter**
	2	±2g
	4	±4g
	8	±8g
	16	±16g
filter		**TD Accelero Data Monitoring filter Parameter**
	0..1	Enable or disable high pass filter

6.5.5 Parameter Storage

None

6.5.6 Examples

Command	Responses

`ATS650=1,0,1,2,0`
`Note:  Activate  Data  Monitoring  for  the`
`accelerometer  with  a  1Hz  rate,  +-2g  full`
`scale  in  normal  power  mode  and  with  data`
`filtering  disabled.  Output  format  is  :`
`X Y Z`
`Acceleration  values  are  displayed  in  mg.`
	`OK`
	`-93   0   1000`
	`-93   0.  1015`
	`-109   0   1000`
	`-78  -15 1015`
	`…`

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6.6 TD GEOLOC – Accelerometer Event Monitoring S651

6.6.1 Description

This command allows monitoring event from the accelerometer chip. By enabling this mode you can choose to monitor the accelerometer on events and then a low or high acceleration value will trigger a message. Please note that Accelerometer Event monitoring and Data monitoring cannot be active at the same time. If you activate Event monitoring while Data monitoring is active then this last will be disabled.

6.6.2 Compatibility

This command is available in all firmware revisions since SOFT1180.

6.6.3 Syntax

Action Command

```
ATS651=<enable>[,<scale>, <rate>, <threshold>, <duration>, <source>, <filter>]
OK
```

Read Command

```
ATS651?
<enable>[,<scale>, <rate>, <threshold>, <duration>, <source>, <filter>]
OK
```

Test Command

```
ATS651=?
0..1, 2|4|8|16, 1..4, 0..127, 0..127, 0..63, 0..1
OK
```

6.6.4 Parameters and Defined Values

Parameter	Value	Description
<enable>		**TD Accelero Event Monitoring enable Parameter**
	0	Disable data monitorning
	1	Enable data monitorning
rate		TD Accelero Event Monitoring rate Parameter
	1	1Hz
	2	10Hz
	3	25Hz
	4	50Hz
scale		TD Accelero Event Monitoring scale Parameter
	2	±2g
	4	±4g
	8	±8g
	16	±16g
threshold		TD Accelero Event Monitoring threshold Parameter

	0..127	Absolute threshold value. LSB value depends on scale: 2g: ~16mg 4g: ~31mg 8g: ~63mg 16g: ~125mg
duration		**TD Accelero Event Monitoring duration Parameter**
	0..127	LSB value depends on rate. Least significant bit equals 1/rate. For example if rate is 10Hz and duration is 15, the corresponding time = 15*1/10 = 1.5 seconds.
`source`		**TD Accelero Event Monitoring source Parameter**
	0..63	Binary OR combination of following event source.
	1	X event low
	2	X event high
	4	Y event low
	8	Y event high
	16	Z event low
	32	Z event high
`filter`		**TD Accelero Event Monitoring filter Parameter**
	0..1	Enable or disable high pass filter

6.6.5   Parameter Storage
None

6.6.6   Examples

Command	Responses

`ATS651=1,2,2,3,1,10,1`
 	
`Note:    Enable    accelerometer    event monitoring  with  a  2g  full  scale,  10Hz rate.  Movement  detection:  trigger   an event if an acceleration>48mg occurs on X or Y during more than 1/10 second.`
	OK

`ATS651=1,1,2,4,5,21,1`
 	
`Note:    Enable    accelerometer    event monitoring  with  a  2g  full  scale,  1Hz rate. No  movement  detection:  trigger  an event  if  no  acceleration>64mg  occurs during more than 5 seconds on X, Y or Z.`
	OK

DOCUMENT CHANGE LIST

Revision 0.2

- Draft

Revision 0.3

- Changed contact information

Revision 0.4

- GPS output corrected. ATS651 syntax error corrected.

Revision 1.0

- Added AT core and Sigfox command set functions.

Revision 1.1

- Corrected ATI7 result format.

Revision 1.2

- Changed contact information

Revision 1.3

- Corrected port for DAC0 GPIO

Revision 1.4

- Moved SIGFOX AT commands to original section
- Added AT$SB and AT$SF bidirectional SIGFOX commands

NOTES:

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