AT Command Reference

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TELIT
TECHNICAL
DOCUMENTATION

BlueMod+B2x

AT Command Reference

Release r12

Note

This device was developed for the purpose of communication in an office environment. It is intended solely for our industrial clients for physical integration into their own technical products after careful examination by experienced technical personnel for its suitability for the intended purpose. The device was not developed for or intended for use in any specific customer application. The firmware of the device may have to be adapted to the specific intended modalities of use or even replaced by other firmware in order to ensure flawless function in the respective areas of application. Performance data (range, power requirements, etc.) may depend on the operating environment, the area of application, the configuration, and method of control, as well as on other conditions of use; these may deviate from the technical specifications, the Design Guide specifications, or other product documentation. The actual performance characteristics can be determined only by measurements subsequent to integration. Variations in the performance data of mass-produced devices may occur due to individual differences between such devices. Device samples were tested in a reference environment for compliance with the legal requirements applicable to the reference environment. No representation is made regarding the compliance with legal, regulatory, or other requirements in other environments. No representation can be made and no warranty can be assumed regarding the suitability of the device for a specific purpose as defined by our customers. Telit reserves the right to make changes to the hardware or firmware or to the specifications without prior notice or to replace the device with a successor model. Of course, any changes to the hardware or firmware of any devices for which we have entered into a supply agreement with our customers will be made only if, and only to the extent that, such changes can reasonably be expected to be acceptable to our customers. No general commitment will be made regarding periods of availability; these must be subject to individual agreement. All agreements are subject to our Terms and Conditions for Deliveries and Payments.

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1   Introduction

This document describes the command interface for the following models of the BlueMod+B2x product family featuring software version V1.027 SPP or later:

- BlueMod+B20

The BlueMod+B2x has three different operating states. The command state, the online command state and the online data state. In the command state and in the online command state, the BlueMod+B2x can be controlled using the AT-commands described below. In the online data state (data transfer mode) the BlueMod+B2x transmits each character to the remote device via an existing Bluetooth link.

To enter the online command state during an active data connection the following sequence (escape sequence) can be used:

<+><+><+><A><T>

The time interval for the full escape sequence must not exceed 1 second. The escape sequence remains transparent to the remote device.

To activate the detection of the escape sequence the corresponding bit has to be set in the firmware compatibility register (**S402**). The data throughput is decreased significant when using this feature.

2   Commands

Each command line sent from the DTE to the DCE consists of a prefix, a body, and a terminator.

All command lines begin with the prefix **AT** (ASCII 065, 084) or **at** (ASCII 097, 116).

The body is a string of characters in the ASCII range 032-255. Control characters other than <CR> (carriage return; ASCII 013) and <BS> (back space; ASCII 008) in a command line are ignored.

The terminator is <CR>.

There is no distinction between upper-case and lower-case characters. A command line can have a maximum length of 40 characters. It is automatically discarded if the input is longer. Corrections are made using <BS>. Multiple commands on the same command line are not allowed.

If a command line is not terminated with <CR> (carriage return; ASCII 013) within 30 seconds, the command line is discarded.

Commands have the following syntax:

Syntax	Description
AT<S register>?<CR>	Read the current value of the S register
AT<command>=<value><CR>	Write the value of the command

Responses are sent back to the host and can be any of the following:

Responses	Description
<CR><LF>OK<CR><LF>	Successful final message
<CR><LF>ERROR<CR><LF>	Error message, command not supported

Each parameter value is stored in the non-volatile memory immediately after executing the command.

The factory-default values of the parameters are marked using the bold letter format.

?	Get Help

AT?

This command shows a help text for the parameter.

A	Accept Incoming Call

ATA

This command accepts an incoming call if automatic call acceptance is not set (register S0=0). An incoming call is always signaled with the unsolicited response "RING" or result code "2", even if automatic call acceptance is selected.

&C	DCD Behavior

AT&C<n>

This command determines the behavior of the DCD control line.

n	Description
0	DCD always ON
1	DCD ON indicates a Bluetooth connection
2	DCD follows local DTR
4	DCD follows remote DCD

D	Initiate Bluetooth Link

ATD<Bluetooth address> | <bx> [,<UUID> | <service channel>]

This command addresses a Bluetooth device directly via its address or by reference the index bx of the bonded device list entry (b01...bx). If a connection to a Bluetooth device requires an authentication, the PIN must have been set up using **S318** command.

The default UUID from **S329** register or the optional UUID (4-digit hex value) from the command line is used to select the remote service profile.

The optional service channel (1 or 2-digit decimal value 1…31) from the command line is used to select the channel of the remote side to connect to. This will only succeed if the service on this channel is supported by the local device.

In case the remote device is not reachable, the PIN does not match, the service or the service channel is not available on the remote device the **ATD** command will respond with a "NO CARRIER" message.

The characters W P T R w p t r > ; / ^ ! @ ( ) – and space are ignored within a dial string.

Example:

ATD 0080371443AB,1106	Connect to Bluetooth device 0080371443AB using the remote service profile UUID 1106
ATD 0080371443AB,1	Connect to Bluetooth device 0080371443AB to rfcomm channel 1
ATD b01	Connect to first entry of the bonded device list

DL   Initiate Bluetooth Link to Last Dialed Bluetooth Address

ATDL<Bluetooth address>

This command initiates a Bluetooth link to the last Bluetooth address used with the **ATD** command.

If the **ATD** command was not used prior to the **ATDL** command (e.g. after reset), the command is answered with an ERROR message.

&D   DTR Behavior

AT&D<n>

This command determines the behavior of the DTR line controlling the Bluetooth connection.

n	Description
0	Ignore: Incoming calls will be accepted independently of the DTR status; DTR drop does not disconnect an active connection
1	On DTR drop go to online command state. Afterwards you can use ATH for hang-up. Leave online command state with ATO command.
2	Control: Incoming calls will be accepted only when DTR is ON; DTR drop disconnects an active connection
4	Hang-up: Incoming calls will be accepted independently of the DTR status; DTR drop disconnects an active connection

E   Local Echo

ATE / ATE1

This command sets the local echo in command states on or off.

Param.	Description
ATE	No local echo
ATE1	Local echo on in command states

&F   Factory Defaults

AT&F

The factory-default values will be loaded.

H   Disconnect

ATH

This command disconnects an existing Bluetooth connection or disconnects an incoming connection.

The disconnection of an existing Bluetooth connection is only possible in online command state (see setting for AT&D1). After executing the command the firmware automatically performs a transition to command state.

It is possible to disconnect an incoming Bluetooth connection in the state RING. If the incoming Bluetooth connection is disconnected with **ATH**, the firmware automatically performs a transition to command state.

I   Display Information

ATI<n>

Read out information from the module. These values can not be changed.

Param.	Description
ATI	Show own device name
ATI3	Read out the firmware version
ATI4	Read out the own Bluetooth device address
ATI99	Read out the firmware version

O   Return to Online State

ATO

If the device is in online command state while a connection is active, **ATO** returns the device to data mode. All received data from remote side is lost in command state. See AT&D1 for entering command state during connection.

Q   Result Messages

ATQ / ATQ1

This command allows/suppresses result codes and messages.

Param.	Description
ATQ	Enable result messages after command input
ATQ1	Suppress result messages after command input

&S   DSR Control

AT&S<n>

This command determines the behavior of the DSR control line of the BlueMod+B2x.

n	Description
0	DSR always ON
1	DSR ON indicates a Bluetooth connection
2	DSR follows DTR
3	DSR follows DCD
4	DSR follows remote DSR

S0   Call Acceptance

ATS0=<value>

This command configures the call acceptance.

Value	Description
0	No automatic call acceptance; acceptance of an incoming call is controlled by the data terminal (**ATA** command after RING)
1	Immediate call acceptance
2…15	Call acceptance after n RING messages

S3	Command Line Termination Character

ATS3=<value>

This command sets the default command line termination character.

To reset the command line termination character to the factory-default, use the **AT&F** command (all parameters will be set to the factory-default). The factory-default setting is 13.

Example:

ATS3=**13**	Set command line termination character <CR>

Note: The command line termination character is set in decimal format.

S4	Response Formatting Character

ATS4=<value>

This command sets the default response formatting character.

To reset the response formatting character to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default). The factory-default setting is 10.

Example:

ATS4=**10**	Set response formatting character <LF>

Note: The response formatting character is set in decimal format.

S5	Command Line Editing Character

ATS5=<value>

This command sets the default command line editing character .

To reset the BS character to the factory-default, use the **AT&F** command (all parameters will be set to the factory-default). The factory-default setting is 8.

Example:

ATS5=**8**	Set command line editing character to <BS>

Note: The command line editing character is set in decimal format.

S301 — Local Device Name

ATS301=<name>

This command allows the modification of the local device name. The device name is shown on a remote Bluetooth device during device/service discovery. It is limited to 31 characters, the output of the string has to match this length.

The device name can contain a format string to include the device's own address or parts of it in the name.

Format: "%[<s>][<d>]a"

"%"	Identifier start format string
<s>	Character separator on byte order (optional)
<d>	Number (1-12) of digits included in device name (optional, default is 4)
"a"	Identifier end format string

Examples: Device address = "0123456789AB"

ATS301=**BlueMod+B20 %:4a**	Display on remote end: BlueMod+B20 89:AB
ATS301=BlueMod+B20 %4a	Display on remote end: BlueMod+B20 89AB
ATS301=BlueMod+B20 %:3a	Display on remote end: BlueMod+B20 9:AB
ATS301=BlueMod+B20 %3a	Display on remote end: BlueMod+B20 9AB
ATS301=BlueMod+B20 %:12a	Display on remote end: BlueMod+B20 01:23:45:67:89:AB

Note: This command has to be executed with a "=" sign, if a blank is used between ATS301 and name an ERROR is the feedback. This is because blanks are allowed for a device name, e.g. "B20 device".

S302 — Class of Device

ATS302=<value (hex)>

This command allows the manipulation of the Bluetooth class of device (CoD).

Note: Changing the class of device affects profile-specific requirements and may influence interoperability. Change this only if you are certain of all side effects.

The CoD consists of 3 octets (24 bits). Bits 23 through 13 define the service class, bits 12 through 8 define the major device class, and bits 7 through 2 define the minor device class. Bits 1 and 0 are reserved and must always be set to 0.

The **service class** field is a bit field; no bit, one bit or several bits can be set, depending on the profile requirements.

Service classes:

Bit	Description
13	Limited discoverable mode
14	Reserved
15	Reserved
16	Positioning (location identification)
17	Networking (LAN, ad-hoc, …)
18	Rendering (printing, speaker, …)
19	Capturing (scanner, microphone, …)
20	Object transfer (v-inbox, v-folder, …)
21	Audio (speaker, microphone, headset service, …)
22	Telephony (cordless telephony, modem, headset service, …)
23	Information (Web server, WAP server, …)

The **major device** class field represents the highest level of granularity for defining a Bluetooth device. The main function of a device is used to determine the major device class setting (bits 12 through 8 in the CoD).

Major device class:

Bit	12	11	10	9	8	Description
	0	0	0	0	1	Computer (desktop, notebook, PDA, organizer, …)
	0	0	0	1	0	Phone (cellular, cordless, payphone, modem, …)
	0	0	0	1	1	LAN/network access point
	0	0	1	0	0	Audio/video (headset, speaker, stereo, video display, VCR, …)
	0	0	1	0	1	Peripheral (mouse, joystick, keyboards, …)
	0	0	1	1	0	Imaging (printing, scanner, camera, display, …)
	1	**1**	**1**	**1**	**1**	Uncategorized, specific device code not specified

The **minor device** class field (bits 7 through 2 in the CoD) can be interpreted only in the context of the major device class (but independently of the service class field). The meaning of the bits may therefore change depending on the major device class.

Minor device class values for the "Computer" major device class:

Bit	7	6	5	4	3	2	Description
	0	0	0	0	0	0	Uncategorized, specific device code not assigned
	0	0	0	0	0	1	Desktop workstation
	0	0	0	0	1	0	Server-class computer
	0	0	0	0	1	1	Laptop
	0	0	0	1	0	0	Handheld PC/PDA (clam shell)
	0	0	0	1	0	1	Palm-sized PC/PDA
	0	0	0	1	1	0	Wearable computer (watch-sized)

Minor device class values for the "Phone" major device class:

Bit	7	6	5	4	3	2	Description
	0	0	0	0	0	0	Uncategorized, specific device code not assigned
	0	0	0	0	0	1	Cellular
	0	0	0	0	1	0	Cordless
	0	0	0	0	1	1	Smart phone
	0	0	0	1	0	0	Wired modem or voice gateway
	0	0	0	1	0	1	Common ISDN access

For the description of other minor device classes, refer to the Bluetooth specification.

Examples:

ATS302=**0x00001F00**	Uncategorized, specific device code not specified
ATS302=0x00000210	Wired modem

S305   Device Role

ATS305=<value>

This command sets the device role for all connections.

Value	Description
0	Master preferred
1	Slave preferred
2	Don't care

To reset the device role to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

Example:

ATS305=2	Set device role to "don't care"

S307   Link Supervision Timeout

ATS307=<value>

This command sets the link supervision timeout in seconds. The factory-default setting is 20. The valid range is 1 - 40.

The link supervision timeout parameter is used by the master or slave Bluetooth device to monitor link loss. If, for any reason, no base band packets are received on an active connection for a duration longer than the link supervision timeout, the connection is disconnected. This value is used on all connections. However only the master device of a Bluetooth connection can set this timeout value for a connection.

To reset the link supervision timeout to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

Example:

| ATS307=**20** | Set link supervision timeout to 20 sec. |

S308   Page Scan Interval

ATS308=<value>

This command sets the page scan interval. The factory-default setting is 2048.
Valid range is from 18 to 4096, only even values are allowed.

Value	Description
n=18…4096	Page scan interval for n*0.625 ms (n is a decimal value)
2048	Page scan interval set to 1.28 s

To reset the page scan interval to the factory-default, use the **AT&F** command
(Attention: All parameters will be set back to the factory-default).

Example:

| ATS308=20 | Set current value of the page scan interval to 12.5 ms |

*Note: Setting the page scan interval to values below the default significantly
increases the power consumption.*

S309   Page Scan Window

ATS309=<value>

This command sets the page scan window value. The factory default setting is 18.
Valid range is from 17 to 4096.

To reset the page scan window to the factory-default, use the **AT&F** command
(Attention: All parameters will be set back to the factory-default).

Value	Description
n=17…4096	Page scan window for n*0.625 ms (n is a decimal value)
18	Page scan window set to 11.25 ms

Example:

| ATS309=20 | Set current value of the page scan window to 12.5 ms |

Note: The page scan window has to be less or equal the page scan interval.

S310 — Inquiry Scan Interval

ATS310=<value>

This command sets the inquiry scan interval. The factory default setting is 2048.

Valid range is from 18 to 4096, only even values are allowed.

To reset the inquiry scan interval to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

Value	Description
n=18…4096	Inquiry scan interval for n*0.625 ms (n is a decimal value)
2048	Inquiry scan interval set to 1.28 s

Example:

ATS310=20	Set current value of the inquiry scan interval to 12.5 ms

Note: Setting the inquiry scan interval to values below the default significantly increases the power consumption.

S311 — Inquiry Scan Window

ATS311=<value>

This command sets the page scan window. The factory default setting is 18.

Valid range is from 17 to 4096.

To reset the inquiry scan window to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

Value	Description
n=17…4096	Inquiry scan window for n*0.625 ms (n is a decimal value)
18	Inquiry scan window set to 11.25 ms

Example:

ATS311=20	Set current value of the inquiry scan window to 12.5 ms

S314 — Own Service Profiles (Bit field)

ATS314=<value>

This command defines the services the BlueMod+B2x reports to a remote Bluetooth device during a service discovery sequence. 2 multiple profiles at the same time are supported and can be selected by combining the profile values (AND operation).

If the own service profiles are changed by the **ATS314** command the class of device is automatically set in the **S302** register.

Value	Description
0x01	SPP (UUID 1101)
0x02	DUN (UUID 1103)
0x08	Headset (UUID 1108)
0x80	Obex Push (UUID 1105)
0x100	Obex FTP (UUID 1106)

Example:

ATS314=0x100	Set Obex FTP profile

Note: The profile specific higher protocols (DUN AT, PPP, Obex), must be implemented on the device host.

S316   Scanning Capability

ATS316=<value>

This command controls the visibility (inquiry) of the device and its ability to accept connections (paging). If set to "0" all paging/inquiry requests from other Bluetooth devices will be ignored, and the RF receiver of the BlueMod+B2x is disabled.

Value	Description
0	Page scan and inquiry scan are disabled; the BlueMod+B2x is not connectable and not discoverable
1	Inquiry scan is enabled; the BlueMod+B2x is discoverable, but not connectable
2	Page scan is enabled; the BlueMod+B2x is connectable, but not discoverable
3	Page scan and inquiry scan are enabled; the BlueMod+B2x is connectable and discoverable

S317   Page-Scan Repetition Mode

ATS317=<value>

This command modifies the page-scan repetition mode of the module. Possible values according to the Bluetooth base band specification are:

Value	Description
0	R0 continuous scan, page scan interval <= 1.28 s and = page scan window
1	R1 page scan interval <= 1.28 s, page scan window is defined in S309 register
2	R2 page scan interval <= 2.56 s, page scan window is defined in S309 register

Continuous scanning decreases the connect time down to about 200 ms:

- R0: about 200 ms
- R1: about 2.2 s
- R2: about 3.5 s

Note: The page scan window and interval must be set in conformance to the page-scan repetition mode.

S318   Local PIN

ATS318=<PIN>

This command sets the PIN for the device. The PIN has a maximum length of 16 alphanumeric characters; the factory-default is "0000".

After a bonding has taken place (PIN successful exchanged), Bluetooth links can be established between the bonded devices independently of the settings and of the PIN.

To reset the PIN to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

Example:

ATS318=1234	Set PIN to 1234

Note: Prefer a PIN composed of only decimal digits. Do not assume that a remote device with limited user-interface capabilities supports alphabetic characters.

S319   Authentication for Incoming Connections

ATS319=<value>

This commands sets the authentication mode for incoming connections.

Value	Mode name	Description
0	No authentication	Device will never initiate any authentication procedure.
1	Authentication	During an incoming connection the device asks for a link key. If no link key is available, a PIN authentication is done.

S320   Authentication for Outgoing Connections

ATS320=<value>

This commands sets the authentication mode for outgoing connections.

Value	Mode name	Description
0	No authentication	Device will never initiate any authentication procedure.
1	Authentication	During establishing the connection the device asks for a link key. If no link key is available, a PIN authentication is done.

S321   Encryption Mode

ATS321=<value>

This commands sets the encryption mode for a link. The factory-default setting is 0, no encryption.

Value	Description
0	No encryption
1	Encryption

During encryption enabled, all the outgoing data will be encrypted.

If encryption is enabled, all outgoing and incoming connections are forced to do authentication, even if the corresponding registers **S319/S320** are set to 0.

S323   Local Baud Rate

ATS323=<value>

This command determines the baud rate for the UART.

Value	Description
1200	1,200 bps
2400	2,400 bps
4800	4,800 bps
9600	9,600 bps
19200	19,200 bps
38400	38,400 bps
57600	57,600 bps
115200	115,200 bps
230400	230,400 bps
460800	460,800 bps
921600	921,600 bps

Example:

ATS323=9600	Set baud rate to 9,600 bps

S324   Data Bits

ATS324=<value>

This command defines the number of data bits (asynchronous characters).

Value	Description
8	Use 8 data bits

Note: This product supports 8 data bits only!

S325 Stop Bits

ATS325=<value>

This command defines the number of stop bits of asynchronous character.

Value	Description
1	One stop bit
2	Two stop bits

S326 Parity

ATS326=<value>

This command defines the parity of asynchronous characters.

Value	Description
0	No parity
1	Odd parity
2	Even parity

S327 Variable Baud Rate

ATS327=<value>

This command configures the baud rate of the UART interface within the range of 1,200 - 921,600 bps. All values that are a multiple of 244.141 can be set.

Values that are not exactly a multiple of 244.141 will be recalculated internally. So if the value of this command is set to 10,000, 41*244.141 = 10009 will be set.

Be careful in use with this command, if set to a value not supported by your remote device the user PSKEY's have to be reset!

Value	Description
1200-921600	All multiples of 244.141 within this range are possible
115200	115,234 bps

*Note: When **S327** command is set, **S323** command will show the same value. When **S323** command is set, **S327** command will show the same value. So both commands are consistent.*

S329 Outgoing Default UUID

ATS329=<value>

This command sets the default UUID for outgoing call. The default setting is 0x1101. The module will use this UUID to search the service on the remote device.

Value	Description
0x1101	Serial port (SPP)
0x1103	Dial-up networking
0x1105	OBEX object push
0x1106	OBEX file transfer

To reset the default UUID to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

Example:

ATS329=0x1103	Set to DUN

S330-S332   Auto Connect Device Address

ATS330=<Bluetooth address>[,<UUID> | <service channel>]
ATS331=<Bluetooth address>[,<UUID> | <service channel>]
ATS332=<Bluetooth address>[,<UUID> | <service channel>]

This command sets up up to 3 Bluetooth addresses of remote Bluetooth devices that should be connected using an automatic link setup if auto connect mode is enabled in **S404** register. It contains a complete dial string, with an optional UUID (4-digit hex value) or service channel (1 or 2-digit decimal value 1…31). In the default configuration no automatic link setup will be performed.

If auto connect mode is enabled in **S404** register the module tries to connect to the Bluetooth address from **S330** register with the specified UUID or service channel. If no UUID or service channel is stored, the default UUID from **S329** register is used. If **S330** does not contain a Bluetooth address or if the connection setup fails, the device tries to set up a connection to the Bluetooth address from **S331** register. If **S331** does not contain a Bluetooth address or if the connection setup fails, the device tries to set up a connection to the Bluetooth address from **S332** register. If **S332** does not contain a Bluetooth address or if the connection setup fails a call retry starts after a time period from **S334** register. This connection retry has a maximum counter set in **S335** register. It begins with the Bluetooth address from **S330** register again.

ATS330=0, ATS331=0, ATS332=0 deletes the stored dial string.

Example:

ATS330=0123456789AB	Automatic link setup to Bluetooth device 0123456789AB
ATS330=0123456789AB,1103	Automatic link setup to Bluetooth device 0123456789AB to UUID 1103
ATS330=0123456789AB,2	Automatic link setup to Bluetooth device 0123456789AB to rfcomm channel 2

*Note: For an automatic link setup the register **S404** has to be set to 1 and at least one of the registers **S330-S332** has to contain a dial string.*

S334   Call Retry Timer

ATS334=<value>

This command defines the timeout (in seconds) before making the next call attempt by using auto connect mode. The default setting is 0, no call retry attempt will be performed. The maximum value is 255.

S335   Max Call Retry Counter

ATS335=<value>

This command defines the max call retry counter by using auto connect mode. The default setting is 0, call retry will be performed forever. The maximum value is 255.

Value	Description
0	Retry forever
1	Retry 1 time
5	Retry 5 times

S337   Maximum Sniff Interval

ATS337?

Read out current value of the maximum sniff interval (in ms) from module. This value is read-only. It depends on the settings of the **S341** command. The default value is 250 ms.

To reset the maximum sniff interval to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

S338   Minimum Sniff Interval

ATS338?

Read out current value of the minimum sniff interval (in ms) from module. This value is read-only. It depends on the settings of the **S341** command. The default value is 20 ms.

To reset the minimum sniff interval to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

S339	Sniff Attempt

ATS339?

Read out current value of the sniff attempts from module. This value is read-only. It depends on the settings of the **S341** command. The default value is 1 attempt.

To reset the sniff attempts to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

S340	Sniff Timeout

ATS340?

Read out current value of the sniff timeout from the module. This value is read-only. It depends on the settings of the **S341** command. The default value is 8 time slots.

To reset the sniff timeout to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

S341	Sniff Mode Supported

ATS341=<value>

This command sets the supported sniff mode. The factory default setting is 1.

Sniffing is used to reduce power consumption during an active Bluetooth connection. When a Bluetooth link is in sniff mode both connected devices can enter a power-saving state for a short time interval. The length of this interval is called "sniff interval" and is negotiated between the connected devices. The maximum and minimum acceptable values for the sniff interval can be set using the appropriate AT commands. The sniff interval value has an impact on the propagation delay and maximum throughput on the Bluetooth link. Note that in order to enter sniff mode, both devices need to support sniff mode.

Value	Description
0	No sniff support
1	Active sniff support – 250 ms
2	Passive sniff support
3	Active sniff support – 500 ms
4	Active sniff support – 1000 ms

If active sniff support is enabled, the device tries to setup a sniff interval with the value mentioned in the table above.

Passive sniff support means that the device accepts sniff requests from the remote device with an interval negotiated with the remote device.

Example:

ATS341=0	Disable sniff support
ATS341=2	Enable passive sniff support

S342   HSAG Remote Bluetooth Address

ATS342=<Bluetooth address>

This command determines the Bluetooth address of the headset audio gateways (HSAG) remote communication device. The default setting is 000000000000, no Bluetooth address is defined. For further information please refer to the "BlueMod+B2x – HSAG User Manual".

Note: HSAG is an optional feature of the BlueMod+B2x. With the HSAG it is possible to communicate to another Bluetooth device with audio profile.

S343   Maximum Output Power

ATS343=<value>

This command sets the maximum output power for the device.

Value	Description
-128	Use factory default maximum output power
-24…4	Maximum output power in dBm

All other values in the range of -128 to 127 could be set in the register as well, but the equal or next lower value from the power table will be set internally. Furthermore the value will be set to a value amongst minimum and maximum output power value of the device.

Example:

ATS343=-15	The maximum output power will be set to -16 dBm

S344   RI Control

ATS344=<value>

This command configures the behavior of the RI signal.

Value	Description
0	RI indicates an incoming Bluetooth link request
1	RI follows the remote RI line status

S345   Restricted Device Address

ATS345=<Bluetooth address>

This command configures a Bluetooth address which is restricted for incoming connection requests to BlueMod+B2x. The default value is 000000000000, no device is restricted. If a valid Bluetooth address is stored, the according device is restricted and the incoming connection request is refused. ATS345=0 deletes the restriction.

S346   RSSI Value

ATS346?

Read out current absolute receive signal strength (RSSI) value in dBm of an active link. This value is read-only.

Most common values are in the range of -20 dBm to -80 dBm. The higher the value the better the receive signal. In unconnected state the value 0 is shown.

To get the current RSSI value of an active link switch into online command mode either using DTR drop or escape sequence and enter ATS346? command.

S347   Link Quality Value

ATS347?

Read out current link quality value of an ACL connection. This value is read-only.

The range of the value is from 0 to 255. ATS347 returns a number that is directly equivalent to bit error rate (BER).

Each bit distance between 255 and 215 represents 0.0025% BER:

Value	Description
255	0.0000% BER
254	0.0025% BER
…	
215	0.1000% BER

Each bit distance between 214 and 90 represents 0.08% BER.

Each bit distance between 89 and 0 represents 0.08% BER.

In general, a link with a BER between 0% and 0.1% is workable. Trying to run a link with a BER above 1% will give poor results.

S348   Bonding Timeout

ATS348=<value>

This command defines the bonding timeout in seconds. The factory-default setting is 300. The valid range is 1 - 3600.

The bonding timeout parameter is used to control the time for the bonding procedure. If, for any reason, the bonding procedure (PIN exchange) exceeds the specified value, the bonding fails. This value is used with all connections that require bonding. However only the master device of a Bluetooth connection can set this timeout value for a connection.

To reset the bonding timeout to the factory-default, use the **AT&F** command (Attention: All parameters will be set back to the factory-default).

Example:

ATS348=180	Set bonding timeout to 180 s

S350   Local Service Name for SPP

ATS350=<name>

This command allows the modification of the local service name for the serial port of the BlueMod+B2x. The service name is shown on a remote Bluetooth device during a service discovery. It is limited to 15 characters.

Example:

ATS350=**SPP**	Display on remote end: SPP

Note: This command has to be executed with a "=" sign, if a blank is used between ***ATS350*** *and name an ERROR is the feedback. This is because blanks are allowed for a service name, e.g. "serial port".*

S401   Bonded Device List Properties

ATS401=<value>

This command controls the storing behavior of the bonded device list.

Value	Description
0	Authenticated devices are not stored on the bonded device list, existing entries are unaffected
1	Authenticated devices are stored on the bonded device list

S402   Firmware Compatibility Register

ATS402=<value>

This command controls the compatibility of the firmware to prior versions. The register contains 16 bits, the value is shown as hex value.

Bit 1 controls the storing behavior of the parameter set.

Bit 1	Function
0	All values are stored in volatile memory only. To store persistently use the AT&W command
1	All values are stored in non volatile memory automatically

Bit 2 controls the escape sequence detection in connected state.

Bit 2	Function
0	Escape sequence detection switched off
1	Escape sequence detection switched on (limited data throughput)

All other bits are reserved and can not be modified via AT commands.

Examples:

ATS402=**0x0001**	Auto save to non volatile memory is switched on and escape sequence detection is switched off
ATS402=0x0000	Auto save to non volatile memory is switched off and escape sequence detection is switched off
ATS402=0x0003	Auto save to non volatile memory is switched on and escape sequence detection is switched on

S403   Remote Config Port Access Level

ATS403=<value>

This command defines the accessibility and visibility of the Bluetooth remote configuration port.

Value	Description
0	Config port is neither accessible nor visible
1	Config port is accessible but not visible
2	Config port is accessible and visible

S404   Auto Connect Mode

ATS404=<value>

This command controls the auto connect behavior of the device.

Value	Description
0	Auto connect off
1	Auto connect on (at least one of the registers **S330-S332** has to be set, otherwise no auto connect could be done)

Once the auto connect mode is activated it can be switched off again after resetting the device and immediately (before the connection is established) setting the **S404** register back to "0". If possible it is recommended to power-off the remote device(s) before this operation.

Note: Changes becomes active after resetting the device.

V	Result Message Format

ATV / ATV1

This command determines the format of the result messages.

Param.	Description
ATV	Result message is presented numerically (followed by <CR>)
ATV1	Result message is presented as text

&V	Display Configuration

AT&V

This command displays the current configuration of the BlueMod+B2x.

W	Extended Result Codes

ATW / ATW1

This command enables/disables extended result codes.

Param.	Description
ATW	Result message is presented without extended result codes
ATW1	Result message is presented with extended result codes (include Bluetooth address when CONNECT, include Bluetooth address and UUID when RING)

&W	Store Active Configuration

AT&W

This command stores the active configuration (parameter set) in non-volatile memory.

Z   Load Stored Settings

ATZ

This command loads the stored configuration (parameter set) from non-volatile memory.

Note: This command must be the last command in the AT command line.

+BBND   Bond With a Bluetooth Device

AT+BBND=<Bluetooth address>

This command initiates a bonding process with a remote Bluetooth device.

If the bonding is successful, the BlueMod+B2x returns "SUCCESS", otherwise "FAILED".

After a successful bonding the device is stored on the bonded device list. The maximum capacity of this list depends on the implementation in the firmware, actual maximum is eight entries. If the bonded device list is full and another device is bonded, the least recently used device will be overwritten by the new one.

Example:

AT+BBND=010203040506	Bond with device with Bluetooth address 010203040506

+BBTA   Set Device to the Bonded Device List with Link Key

AT+BBTA=<Bluetooth address>,<link key>

This command sets a device with a given link key to the bonded device list (see **+BBND** command).

The link key is a 32-digit hex value (0…F) like shown in the example below.

Example:

```
AT+BBTA=001025011111,00112233445566778899AABBCCDDEEFF
        ➔ Bond with device with Bluetooth address 001025011111
            using link key 00112233445566778899AABBCCDDEEFF
```

+BBTD   Delete Bonding Information

AT+BBTD=<Bluetooth address>

This command deletes the bonding information stored by the BlueMod+B2x.

Example:

AT+BBTD=*	Delete whole bonding table
AT+BBTD=010203040506	Delete bonded device with Bluetooth address 010203040506

+BBTL   Show Bonded Device List

AT+BBTL

This command shows information about the devices bonded with the BlueMod+B2x.

Example:

AT+BBTL	b01: 00038949AFAC OK

+BINQ   Start Device Inquiry

AT+BINQ [class value]

This command starts a device inquiry. In the result it lists the found Bluetooth devices with their Bluetooth address, class code and RSSI value. For a detailed description about the class code see **S302** parameter. The RSSI value represents the absolute receive signal strength of the found Bluetooth device.

In the example below "0080250000A7" represents the Bluetooth address, "1F00" the class code and "rssi –68" the RSSI value in dBm.

Example:

Command	Response
AT+BINQ	0080250000A7 1F00 rssi –68 OK

The inquiry time is 10 seconds. During this time several inquiry attempts are made. If a found Bluetooth device answers to each inquiry attempt it can happen that the device occurs more than one time in the list. The number of found Bluetooth devices is limited by the 10 second timeout.

When no class value is given, the device searches for all class codes. If the class value is set, only devices with those bits set in their class of device will be reported. This filter can be made as specific or as general as necessary. Please note that the filter reports devices that have a minimum of the specified bits set, however it is possible that a device also has other bits set in its class of device field. In that case that device will be reported back.

To discover all devices with major device class set to audio/video, set the class value to 0x400. This will result in devices with, class of device set to 0x200404 and 0x200408 to be reported. If, however, we want to limit the device search even further and only discover devices with their class of device set to headset, for example, the class of device field should be set to 0x200404.

Example:

AT+BINQ	0080250000A7 1F00 rssi –68 008025084FBB 1F18 rssi –73 008025084FBA 1F98 rssi –71 00802501D11A 1F00 rssi –66 0009DD502C46 2010C rssi –83 010203040506 220404 rssi –81 OK
AT+BINQ 0x1F00	0080250000A7 1F00 rssi –66 008025084FBB 1F18 rssi –73 008025084FBA 1F98 rssi –71 OK
AT+BINQ 0x200400	010203040506 220404 rssi –81 OK

+BSRV   Start Service Discovery

AT+BSRV <Bluetooth address>

This command starts a service discovery for given Bluetooth address. It responds with the remote device name, UUID, service channel number and the name of profile supported by this device (depending on the device it can be only one UUID or multiple UUID's).

The remote device name is limited to 31 characters. If the name of the remote device is longer than 31 characters, only the first 31 characters are shown.

In the example below "BlueRS+E/G2 D1:1A" represents the remote device name, "1101" the UUID, "1" the service channel number and "serial port" the name of profile.

If the service discovery fails the command responds with "NO CARRIER".

Example:

Command	Response
AT+BSRV 00802501D11A	BlueRS+E/G2 D1:1A 1101, 1, serial port OK

+EDUT   Device Under Test Mode

AT+EDUT

This command sets the device to "device under test mode" for measuring and testing Bluetooth parameters. This mode stays active until the next reset of the device.

3   Remote Configuration

The BlueMod+B2x can be configured via Bluetooth by using another Bluetooth device. Make sure the BlueMod+B2x is powered on and in range of the local Bluetooth device.

By default the configuration port of the BlueMod+B20 is not accessible and not visible. To make it visible and accessible for other Bluetooth devices the configuration port must be set to "accessible and visible" first (ATS403=2).

Initiate a new scan of the Bluetooth area. When the BlueMod+B2x is found perform a service discovery. In the result you will get 2 services (ports):

- "SPP" (UUID 0x1101, service channel 1)
- "Remote Config" (UUID 0x1101, service channel 2 or other)

Connect to the "Remote Config" and open the terminal program at the appropriate COM port.

Once the Bluetooth connection is established successfully the BlueMod+B2x answers the commands in the UART of the remote side. Now you can configure the remote BlueMod+B2x using the AT commands. You can close the connection by using the ATH command.

The configuration port of the BlueMod+B2x can be disabled using the ATS403=0 command.

4   Restrictions

The local flow control is set to RTS/CTS and cannot be disabled. When using only VCC, GND and UART_Rx, UART_Tx serial lines, UART_CTS# should be set to active state (for further information please refer to the hardware reference).

The BlueMod+B2x only supports DCE mode.

5   Appendix

5.1   AT Result Codes

Result codes (numerical and verbose):

Numeric	Text	Meaning
0	OK	Command completed
1	CONNECT <radr>	Connection established
2	RING <radr>	Indicates an incoming call (link request received)
3	NO CARRIER	General connection setup error
4	ERROR	Illegal command or error that can not be indicated otherwise
6	NO DIALTONE	Local connection setup error

<radr> = Address of the remote device

6 History

Version	Release Date	By	Change description
1.00	03.08.2006	TA	Initial version
1.01	12.10.2006	MBu	Added new parameters S342, BBTL, BBTD
1.02	29.11.2006	TA	Corrected command syntax (AT<command>?<CR>) Corrected default value of ATS0=1
1.03	02.02.2007	MBu	Added new parameters for SPP-Step2 firmware
1.10	30.03.2007	JW	Final release after review and alignment with the firmware
r06d01	11.07.2007	MBu	Added new function of ATH, ATW and ATS341
r06d02	29.08.2007	BG	New template
r06	14.11.2007	TA	Enhanced description of S314,+BBND, +BINQ, +BSRV commands, Added new commands S319, S320, S321, S327, S343, S401, +BBTA
r07	07.12.2007	TA	Added new commands S350, +EDUT, Enhanced description of S301, S343, +BBTA commands, Modified behavior of ATD, S314, +BINQ, +BSRV commands
r08	22.01.2008	TA	Enhanced description of S309, S317, S330, S341, Added new functionality of S301, +BSRV
r09	20.02.2008	TA	Added remote configuration, Added new commands AT&W, ATZ, S402, S403 Revised description of RTS/CTS handling when using three-wire interface, Revised default values of S337 and S338 command, Revised input format of S314 command, Removed support for BlueMod+B28
r10	25.04.2008	TA	Added "DCD follows remote DCD" option, Added new commands S331, S332, S344, S404, Enhanced behavior of ATD command, Enhanced output format of +BBTL command
r11	11.09.2008	TA	Added description about escape sequence, Added bit in S402 register to control the escape sequence, Added new commands ATDL, S345, S346, S347, S348 Added headset service to S314 command
r12	25.05.2016	BG	Telit cover page added

Life Support Policy

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