BLUETOOTH SERIAL PORT ADAPTER AT COMMANDS

Document Revision
Document number: 4128776
Release: Apr 14, 2015 15:44
Document version: 32

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2 Introduction

Related Documents

[1] Bluetooth Serial Port Adapter - Getting Started: describes the basic concepts and functionality of the connectBlue Serial Port Adapter products.

[2] cB-OBS4xx Electrical Mechanical Datasheet: For each module there is an associated Electrical Mechanical Data Sheet describing the electrical and mechanical interface, operating status, antennas solutions, Bluetooth and regulatory information as well as some usage and connection guidelines.

[3] Bluetooth Serial Port Adapter Security: describes the extensions to the security modes introduced in the Bluetooth 2.1+EDR specification.

[4] Bluetooth Specification Version 4.0: the Bluetooth Specification including Bluetooth Low Energy.

3 Data Mode and AT Mode

The Serial Port Adapter can be in two different modes AT mode and data mode. It starts in data mode and can be requested to move to AT mode by sending an escape sequence. The default escape sequence consists of three consecutive forward slash characters '/'. The escape sequence character can be changed using the ATS2 command. Pressing the restore-button on the Serial Port Adapter, when it is powered up, restores the default escape character.

The following criteria must be met for the Serial Port Adapter to interpret the sequence as a valid escape sequence:

- Before the escape sequence there must be silence for 1 second. This time can be changed using the AT*AMET command.
- After the escape sequence there must be silence for 1 second. This time can be changed using the AT*AMET command.
- The entire escape sequence must be sent within 200 ms.

To move from AT mode to data mode, use the "AT*ADDM" command
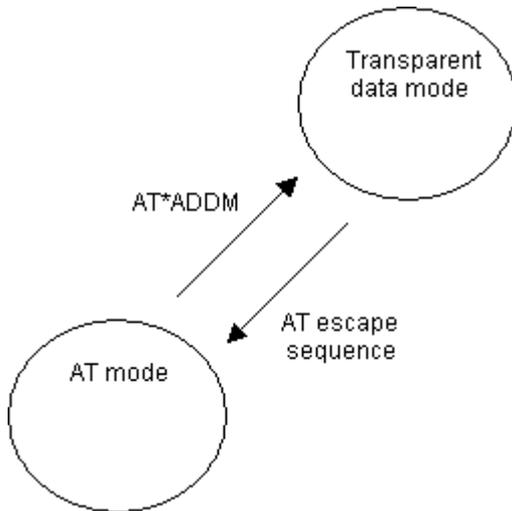
4 Default Serial Settings

The Serial Port Adapter does not support auto baud rate. The baud rate is set using the "Write RS232 Settings" command. The default RS232 settings are 57600 bits/s, 8 data bits, no parity, 1 stop bit, and hardware flow control.

Pressing the restore-button on the Serial Port Adapter, when it is powered up, restores the default serial settings.

5 Configuration and Operation

This chapter gives some guidelines on how to perform basic configuration and operation.

There are several commands that can be used to configure the Serial Port Adapter. Many of these request packets take a boolean parameter called <store_in_startup_database>. If this parameter is set to 1 the setting will be applied immediately and also when the Serial Port Adapter starts up in the next power cycle. If this parameter is set to 0 the setting will be applied immediately but it will not be applied when the Serial Port Adapter starts up in the next power cycle.

Note that for some versions of the modules there are constraints on some AT commands, which means that the module must be restarted for the command to take affect. For those commands the <store_in_startup_database> parameter must always be 1.

Note that for applications that always configure the serial port adapter at startup, it is not necessary to store settings in the startup database. It is intended for applications where the serial port adapter is configured once before installation.

5.1 LED Indication

The LED indicates what mode is currently active and what activity that is currently in progress. The following color indications are used.

- *Green*: The current mode is data mode and no connection attempt is in progress.
- *Orange*: The current mode is AT mode.
- *Purple*: A connection attempt is in progress.
- *Blue*: A connection is currently active.
- *Blue Blinking*: A connection is active and data is transmitted or received over air.
- *Red Blinking*: Buffer overflow, parity or framing error detected on the UART.

5.2 Bluetooth Settings

A Bluetooth device can be in several different operation modes. The operation mode determines whether or not a device can be connected to and whether or not other devices performing searches can discover a device. Use the "Write Discoverability Mode" and "Write Connectability Mode" commands to set the operation mode.

All Bluetooth devices have a user-friendly name. Use the "Write Local Name" command to set the local device name.

All Bluetooth devices have a 'class-of-device' indicator that can be discovered by other devices when they are performing searches. Use the "Write Local COD" command to set the 'class-of-device'.

5.3 Searching for Other Bluetooth Devices

Two commands are available to search for other devices:

- The "Inquiry" command returns the Bluetooth device address and the class of device of all the devices in the vicinity that are in discoverable mode.
- The "Device Discovery" command returns the Bluetooth device address, the class of device and the name of all the devices in the vicinity that are in discoverable mode.

The "Inquiry" command is faster than the "Device Discovery" command. A "Device Discovery" is an "Inquiry" followed by a "Name Discovery" on each found device.

5.4 Searching for Services

It is possible to search for services on remote devices. A service search is performed using the "Service Search" command.

5.5 Creating Serial Connections and Sending Data

Serial connections are Bluetooth connections based on the Serial Port Profile, the Dial-up Networking Profile and the PAN Access Profile.

Some models of the Serial Port Adapter do not support all profiles.

5.5.1 How to Select What Profile to Use

It is important that the same profile is used on both devices wanting to communicate. If the remote device is not a Serial Port Adapter, refer to the documentation of that device to determine what profile it uses or to find out how to select what profile to use.

5.5.2 Client or Server

First decide if your device is supposed to act as a client (initiator of connections), a server (acceptor of connections) or both.

5.5.3 Wireless Multidrop™

The Wireless Multidrop™ feature allows the Serial Port Adapter to simultaneously communicate with several devices even when it is in data mode. If Wireless Multidrop™ is used all data sent to the Serial Port Adapter via the serial interface will be forwarded to all connected devices. All data received from any of the connected devices will be forwarded on the serial interface in the order that the data was received.

The Wireless Multidrop™ feature can be used if the Serial Port Adapter has been configured as a server as

well as if it has been configured as a client. When configured as a server several devices are able to connect to your Serial Port Adapter and join the wireless multidrop network. If configured as a client you must tell the Serial Port Adapter which devices to connect to. Exactly how to configure for Wireless Multidrop™ see Connection Establishment - Server and Connection Establishment - Client.

The Wireless Multidrop™ feature is not supported in all Serial Port Adapter models, please see AT command description for AT*ADWM.

5.5.4 Repeater

The repeater functionality is part of the Wireless Multidrop™ AT command AT*ADWM. If the "auto forward" parameter is enabled, the module starts acting as a repeater.

When configured as a repeater, the module does not transmit or receive any data (except for escape sequence and AT commands) on the serial port. Instead data received from one Bluetooth channel is transmitted on all others. Of course this means that at least two Bluetooth channels must be configured using the Wireless Multidrop™ AT command.

A repeater cannot be configured to use extended data mode.

5.5.5 Connection Establishment - Server

In AT mode, use the "Write Default Server Profile" command to select what profile to use when acting as a server. If you want to use the Wireless Multidrop™ feature and allow several devices to simultaneously connect to your device you must enable Wireless Multidrop™ using the "Write Wireless Multidrop Configuration" command. In addition, the Serial Port Adapter must be configured to perform a master/slave switch every time a remote device connects to it. This is done using the "Write MasterSlaveRole Policy" command with "Always Master". After configuring the Serial Port Adapter for server operation, move to data mode.

5.5.6 Connection Establishment - Client

For clients there are two methods that can be used to create connections to a remote device:

1. Establish the connection in AT mode using the "Connect To Serial Service Data Mode" command. Then move to data mode and utilize the connection as a transparent data mode connection. It is possible to utilize the Wireless Multidrop™ feature and connect to several devices. Note that Wireless Multidrop™ must be enabled to be able to connect to more than one device.
2. Configure the Serial Port Adapter in AT mode then move to data mode.
    a. Select the number of devices to connect to using the "Write No Of Remote Peers" command. Select 1 for point-to-point operation and more than 1 for Wireless Multidrop™ operation. Note that Wireless Multidrop™ must be enabled to be able to use a value higher than 1. The maximum number of remote peers can be determined by calling the "Read Max No Of Remote Peers" command.
    b. Select what device(s) to communicate with using the "Write Default Remote Peer" command.
    c. Then use the "Write Default Client Profile" command to select what profile to use when connecting to the selected default remote peer.
    d. Finally move to data mode and send data. The Serial Port Adapter will connect to the selected remote peer(s) using the selected profile according to the connect scheme setting (connect on data, always connected or connect on external signal).

Specify zero number of remote peers using the "Write No Of Remote Peers" command if you do not want to act as a client.

5.6 Master/Slave Handling

Master/Slave handling does normally not need to be considered.

It is important only to the Wireless Multidrop™ case.

When a device communicates with several other devices it is called the master. The other devices are called slaves.

A master can:

- Setup a connection to another device.
- Perform searches.
- Accept connections from other devices.

A slave cannot:

- Connect to another device.
- Perform searches.
- Accept connections from other devices.

There are a few settings and parameters that affect how the roles master and slave are assigned to the devices communicating. First, it is possible for a device to request to become the master when another device connects to it. This setting is called the master/slave role policy. Use the "Write MasterSlaveRole Policy" command to set the policy to either:

- 0, the device will request to become the master every time another device tries to connect.
- 1, the device will become the slave every time another device tries to connect.

Second, when connecting to another device using the "Connect To Serial Service" command the parameter <must_be_master> indicates whether or not the connecting device allows the server to become the master of the connection. NOTE: If <must_be_master> is 1 and the server has set master/slave role policy to 0 (become master) the connection will *not* be established. If you do not specifically need to become the master the <must_be_master> parameter should be set to 0 to allow the server to select which role to take.

5.7 Bluetooth Security

The Bluetooth security mechanism has had a major revision in BT 2.1 compared to BT 2.0. The addition is called *secure simple pairing* or just *simple pairing*.

When a BT 2.1 device and BT 2.0 device sets up a connection, the BT 2.1 device must apply to the BT 2.0 security.

If two BT 2.1 devices wants to connect, *simple pairing* must be used.

BT 2.0

There are two basic security levels in BT 2.0 (or previous) security.

- *Service Level* - Security is enabled when a channel establishment request is made. Hence, a service search may be performed without pairing.
- *Link Level* - Security is enabled when a link is initiated. Hence, a service search may not be performed without first pairing.

For both levels encryption is enabled.

BT 2.1

There are three basic use cases described in BT 2.1 security (*simple pairing*).

- *Just Works* - It is primarily intended for scenarios where one of the devices does not have a display or keypad. An example is mobile phone and headset. The headset accepts all pairing attempts and the mobile phone gets an option to accept or reject the pairing attempt. The serial port adapter uses the headset side mechanism and it is called *Auto Accept* in the Security Modes description below.

- *Numeric Comparison* - It is intended for scenarios where both sides have a display and possibility for the user to enter yes or no. A six digit number is displayed on both sides and the user selects yes or no. If yes is entered on both devices, pairing is successful. An example is a PC and mobile phone.
- *Passkey Entry* - It is primarily intended for scenarios where one device has input capabilities and the other device has output capabilities. An example is a PC and a keyboard. The PC displays a six digit number which shall then be entered on the keyboard. If the entered number is correct pairing is successful. The serial port adapter uses the keyboard side mechanism and it is called *Fixed Pin* in the Security Modes description below. Please note that this is only useful between two connectBlue serial port adapters since the "pin" would normally be selected in some random manner. Between two connectBlue adapters the fixed pin code is used (see AT*AGFP2).

There is also another use case where an *out of band* mechanism (e.g. memory stick, NFC, etc..) to perform pairing. This is not considered at the moment for the connectBlue serial port adapter.

5.7.1 Security Modes

The security mode supported must now deal with both BT 2.1 and BT 2.0 depending on what remote device that is involved.

1. Security Disabled (default value)
- Remote Device BT 2.1: Auto accept (No man-in-the-middle attack protection, encryption enabled)
- Remote Device BT 2.0: Authentication and encryption disabled.
- Bluetooth Low Energy: Auto accept (No man-in-the-middle attack protection, encryption enabled)

2. Security Enabled
- Enforce BT 2.0 (Service level authentication and encryption enabled) Please note that the device is not BT 2.1 qualified for this setting. It is included for backward compatibility.
Invalid for Bluetooth Low Energy.

3. Security Enabled - Fixed Pin
- Remote Device BT 2.1: Service level authentication and encryption enabled.
- Remote Device BT 2.0: Service level authentication and encryption enabled.
- Bluetooth Low Energy: Service level authentication and encryption enabled.
Please note that this security mode will not work with a general BT 2.1 device. However, it will work between two connectBlue BT 2.1 Serial Port Adapters. Use security mode 4 to make the device work with a general BT 2.1 device.

Note that the fixed pin code is 0 by default and must be changed for this security mode for Classic Bluetooth.

4. Security Enabled - Just Works
- Remote Device BT 2.1: Auto accept (no man-in-the-middle attack protection, encryption enabled)
- Remote Device BT 2.0: Service level authentication and encryption enabled.
- Bluetooth Low Energy: Auto accept (no man-in-the-middle attack protection, encryption enabled)
This security mode is intended for pairing in safe environments. If this security mode is set, pairable is disabled which means the module will not accept any pairing attempts. The user should not enable pairing again unless disabled afterwards. If the External Connect button is pressed for at least 5 seconds, pairing is enabled for 60 seconds and during this time it is possible to pair or connect. The LED will blink during this time.

5. Security Enabled - Display Only
- Remote Device BT 2.1: Service level authentication and encryption enabled. User should be presented a passkey.
- Remote Device BT 2.0: Service level authentication and encryption enabled. No user interaction required.
- Bluetooth Low Energy: Service level authentication and encryption enabled. User should be presented a passkey.
This security mode is used when the device has a display that can present a 6-digit value that the user shall enter on the remote device.

Note that the fixed pin code is 0 by default and must be changed for this security mode for Classic Bluetooth.

6: Security Enabled - Display Yes/No
- Remote Device BT 2.1: Service level authentication and encryption enabled. User should compare two values.
- Remote Device BT 2.0: Service level authentication and encryption enabled. No user interaction required.
This security mode is used when the device has a display that can present a 6-digit value that the user shall verify with yes or no to the remote device's presented value.
Invalid for Bluetooth Low Energy.

Note that the fixed pin code is 0 by default and must be changed for this security mode for Classic Bluetooth.

7: Security Enabled - Keyboard Only
- Remote Device BT 2.1: Service level authentication and encryption enabled. User should enter a passkey.
- Remote Device BT 2.0: Service level authentication and encryption enabled. No user interaction required.
- Bluetooth Low Energy: Service level authentication and encryption enabled. User should enter a passkey.
This security mode is used when the device only has a keyboard where the user can enter a 6-digit value that is presented on the remote device.

Note that the fixed pin code is 0 by default and must be changed for this security mode for Classic Bluetooth.

The security modes are in detail described in the **Bluetooth Serial Port Adapter Security** *document.*

5.7.2 Bonding and Pairing

To be able to communicate if security has been enabled, bonding has to be performed. The bonding procedure creates a link key, valid between two devices, which is used during the authentication procedure. Once bonded the two devices can establish connections with each other using security enabled. During bonding both devices must be in pairable mode (able to accept bonding). Use the "Write Pairing Mode" command to set the device(s) in pairable mode. During bonding a pin code is used. Use the "Write Fixed PIN" command to set the PIN code to use. To perform bonding use one of the following methods:

- Create a connection. If authentication or encryption is turned on, on either device, bonding will be performed automatically.
- On one device use the "Bond" command. Not supported in all versions of the serial port adapter.

It is possible for the Serial Port Adapter to store link keys for several devices at the same time. Use the "Read Bonded Devices" command to get a list of the currently bonded devices. It is also possible to remove a device from the list of bonded devices. To do this, use the "Un Bond" command.

5.7.3 Privacy

Privacy is a feature in Bluetooth low energy that provides a level of privacy which makes it more difficult for an attacker to track a device over a period of time. A privacy enabled Bluetooth device uses a private random Bluetooth address. A normal non-private address is called a public address. This random address can be any of the following:

- Resolvable address - changes every 15 min
- Static address - might change between power cycles
- Non-resolvable address - might change any time, on re-connection

The module itself will not use a private address.

The support when a remote device uses a private address is as follows:

- Remote uses resolvable address and the devices are not bonded and requires no security
  - A central can not re-connect using the original address when the remote address has changed. A new discovery is needed to re-connect.

- A peripheral can accept a re-connection from a remote central that has changed it's resolvable address because no link key is stored and associated with the original address.
- Remote uses resolvable address and the devices are bonded
  - A central can re-connect using the original(or latest) address even when the remote address has changed. An intermediate address will not be possible to use.
  - A peripheral can accept a re-connection from a remote central that has changed it's resolvable address
- Remote uses static/non-resolvable address
  - If the remote address has changed, the central must discover the new address using inquiry before a new connection is possible

AT*AGLB must be used to enable connections to random addresses otherwise only public addresses can be connected to. This command will append a public address tag 'p' or random address tag 'r' to the Bluetooth address in all AT-command responses. Make sure to append the tag when issuing any AT-command that is containing a Bluetooth address.

Note that a connection setup to a device using a resolvable private address will take longer time than to a device using a normal public address.

Some AT commands in the platform can resolve a remote's device resolvable address and thus re-connect without re-discover the device again. Those AT commands can then connect using the original resolvable address used when the devices were bonded.

The list below contains AT commands that use the original resolvable address.

AT command	Comment
Connect To Serial Service Data Mode (AT*ADCP)	-
Un-bond (AT*AGUB)	-
Read Bonded Devices (AT*AGBD)	-
Inquiry (AT*AGI)	-
Get RSSI (AT*AGRSS)	-
Default Remote Peer (AT*ADRDRP/AT*ADWDRP)	Connect to name schemes can NOT be used

The list below contains AT commands that can NOT use the original resolvable address and must use the real currently used resolvable address.

AT command/event	Comment
Name Discovery (AT*AGND)	Can be done with AT*ADCP and GATT commands instead if the original address is to be used
Bond (AT*AGB)	Delete the bond and then do an inquiry to get the real address
User Confirmation (AT*AGUC)	-
User Passkey Entry (AT*AGUPE)	-
User Passkey Display (*AGUPD)	-
User Passkey Entry (*AGUPE)	-

Model	Constraint
OBS421	Privacy for version >= v5.3.0
OBS421_iAP	Privacy for version >= v5.1.0
OBP421	Privacy for version >= v4.1.0

6 Power Save Modes

For Power Save Modes and DTR/DSR pin configuration on the Bluetooth Low Energy module *cB-OLS425/426*, please see **Bluetooth Low Energy Serial Port Adapter - Getting Started**.

The Serial Port Adapter is optimized to consume as little power as possible. However, the deepest power save mode, called stop mode, is not turned on by default. Instead an AT command (AT*AMPM) is available to allow the host system to turn on the stop mode feature. When the Serial Port Adapter is in stop mode:

- It can accept incoming connections over Bluetooth.
- The host system cannot send data to the Serial Port Adapter.
- The Serial Port Adapter will send data received over air to the host

The Serial Port Adapter will only enter stop mode if:

- The stop mode feature has been turned on using the AT*AMPM AT command
- The DSR pin on the Serial Port Adapter is not active.
- If the "Always connected" feature has not been turned on.

The Serial Port Adapter will exit stop mode if:

- The host system moves the DSR pin from non-active to active.

Note: The Serial Port Adapter needs 10 ms to leave stop mode. As a consequence the host system must not send data to the Serial Port Adapter until 10 ms after the host system has activated the DSR pin.

6.1 Version Differences
- In version 2 of the Serial Port Adapter the device will exit stop when there is an active Bluetooth connection.
- In version 3 of the Serial Port adapter the device will stay in stop when there is an active Bluetooth connection.
- In version 4 of the Serial Port adapter the device will stay in stop when there is an active Bluetooth connection.

6.2 How to Use the Stop Mode Feature

When the Serial Port Adapter is in stop mode, the UART is disabled and all data sent to it is lost. This means that the host system has to wake up the Serial Port Adapter before sending any data over the serial interface. Data received over air by the Serial Port Adapter will be written to the host even when it is in stop mode.

7 Restoring Default Configuration

7.1 Serial Settings

In some situations it is necessary to restore some settings to their default values. The following settings can be restored using the procedure described below:

- **Serial settings**: 57600 baud, 8 data bits, no parity, 1 stop bit, hardware flow control.
- **Serial interface type**: RS232.
- **AT escape sequence**: '///'.
- **Escape sequence timing**: 1000 ms of no data transmission required before and after the escape sequence for the escape sequence to be valid.

To restore the above settings to the default values, a logic low signal on the Switch-1 input on the module should be applied during startup.

If the module is mounted on the *OEM RS232 Module Adapter* (cB-ACC-24), this is done in the following way:

1. Disconnect power from the Module Adapter
2. Press and hold the *Restore / S1* button input (the one closest to the RS232 connector)
3. Connect power to the Module Adapter
4. When the module powers up, the serial settings will be restored to their default values
5. Release the *Restore / S1* button

If the module is mounted on the *OEM USB Module Adapter* (cB-ACC-34), this is done in the following way:

1. Connect the Module Adapter to a USB port
2. Press and hold the *Restore* button input (the one closest to the *RGB LED* at the short side)
3. Press the *Reset* button input (the small button at the long side, next to the *Yellow LED* for UART RxD)
4. When the module powers up, the serial settings will be restored to their default values
5. Release the *Restore* button

7.2 Factory Settings

The factory setting is the configuration of the serial port adapter when it is produced.

To restore the factory settings configuration use the "AT&F" command or perform the below described procedure. The latter only applies to the following Serial Port Adapters:

- CB-OEMSPA310
- CB-OEMSPA311
- CB-OEMSPA331
- CB-OEMSPA312
- CB-OEMSPA332
- cB-OBS410
- cB-OBS411
- cB-OBS414
- cB-OBS418
- cB-OBS419
- cB-OBS421
- cB-OBS433
- cB-OLS425
- cB-OLS426
- cB-RBS421

To restore all settings to the default values, a logic low signal on the Switch-1 and the Switch-0 input on the

module should be applied during startup.

If the module is mounted on the *OEM RS232 Module Adapter* (cB-ACC-24), this is done in the following way:

1. Disconnect power from the Module Adapter
2. Press and hold both the *Restore* / *S1* button input and the *Function* / *S0* button input
3. Connect power to the Module Adapter
4. When the module powers up, all settings will be restored to their default values
5. Release both buttons

If the module is mounted on the *OEM USB Module Adapter* (cB-ACC-34), this is done in the following way:

1. Connect the Module Adapter to a USB port
2. Press and hold both the *Restore* button input and the *Function* button input (the ones at the short side)
3. Press the *Reset* button input (the small button at the long side, next to the *Yellow LED* for UART RxD)
4. When the module powers up, all settings will be restored to their default values
5. Release both buttons

Note that this command should not be used at every startup to restore the factory settings. Instead it is better not to write to the startup database at all.

8 AT Commands Over Bluetooth

It is possible to configure and control a remote Serial Port Adapter via Bluetooth using AT commands. Criteria for using AT commands over Bluetooth:

- A Bluetooth connection to the remote device (the device to configure) must exist. The Bluetooth connection can e.g. be established using another Serial Port Adapter, a device with a PC-card/compact flash or a device with embedded Bluetooth support.
- The remote Serial Port Adapter must have turned on the support for configuration over Bluetooth, for more information see the "Write Allow Configuration Over Bluetooth" command.
- Once the connection has been established, the escape sequence must be sent over the Bluetooth connection to the remote Serial Port Adapter to move it into AT mode.
    - The same escape sequence rules apply to AT over Bluetooth as for AT over cable, for more information see the section about Data Mode and AT Mode.
    - Note that the same escape sequence is used for cable and Bluetooth. Therefore, if you are using two Serial Port Adapters one of the Serial Port Adapters must have its escape sequence changed using the ATS2 command. This is to keep the first Serial Port Adapter to enter AT mode instead of the remote Serial Port Adapter.

9 Optimization

On some versions of the serial port adapter there are some limited optimization support regarding throughput, response time and power consumption. See the "Write Link Policy" command for details.

10 Version Differences

If you are migrating between different versions of the Serial Port Adapters from connectBlue there are some AT commands/events that have been changed, added or removed.

Each AT command description will include a table to clarify what the differences are (if any) between different models.

11 Syntax

11.1 Command Line Format

Each command line sent from the DTE to the DCE is made up of a prefix, body and terminator. As prefix for the Serial Port Adapter AT commands, only "AT" (ASCII 065, 084) and "at" (ASCII 097, 116) can be used. There is no distinction between upper and lower case characters. The body is a string of characters in the range ASCII 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>. Commands denoted with a "*" character are extended AT commands, i.e. Serial Port Adapter specific AT commands. There is only limited support for S-register, see ATS command description for more information. Multiple commands in the same command line are not supported. Each command has to be terminated by a <CR> before a new command can be sent. A command must not be larger than 300 characters. A command can either be:

- Read commands without parameters: AT<command>?<CR>
- Write commands without parameters: AT<command><CR>
- Read and write commands with parameters: AT<command>=<parameter1>, parameter2, ...<parameterN><CR>

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

- Successful final message: <CR><LF>OK<CR><LF>
- Successful intermediate/final message with parameters follows an OK message in some commands. In these cases the OK message works as a confirm message only.
  <CR><LF><result_response>:<parameter1>, parameter2, ...<parameterN>
- Error message:<CR><LF>ERROR<CR><LF>

11.2 Data Types

The definition of each command specifies the data types used for values associated with the command. There are four data types:

- String
- Integer
- Enumerator
- Bluetooth Device Address
- Byte Array

11.2.1 String

A string shall consist of a sequence of displayable characters from the ISO 8859-1 (8-bit ASCII) character set, except for characters "\" and """ and characters below 32 (space). A string constant shall be delimited by two double-qoute (""") characters, e.g. "Donald Duck". If the double-quote character (""") is to be used within a string, e.g. "My friend "Bono" is a singer", they have to be represented as "\22". If the back-slash character ("\") is to be used within a string constant, it has to be represented as "\5C". An empty string is represented by two adjacent delimiters, "".

11.2.2 Integer

An integer value consists of a sequence of characters all in the range {0..9}. Numeric constants are expressed in decimal format only.

11.2.3 Enumerator

An enumerator value is actually an integer, where all its possible values are specified in each case. Only the defined values are accepted for the command in question.

11.2.4 Bd_Addr

This type is used to represent the Bluetooth Device Address. The type is composed of six fields, each representing a hexadecimal value using two characters. For example, the Bluetooth Device Address 0x112233AABBCC is represented as 112233AABBCC or 112233aabbcc. Note that the Bluetooth Device Address is **not** delimited with by two double-qoute (""") characters.

11.2.5 Byte Array

This type is used to represent a byte array such as e.g. a UUID.

For example, the AT*ADUUID configures a 128 bits UUID as 00112233445566778899AABBCCDDEEFF

12 AT Commands Reference

12.1 Standard AT Commands

12.1.1 Command "AT"

AT Command	Description
AT<CR>	Attention command determining the presence of a DCE, i.e. the Serial Port Adapter.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

12.1.2 Command "AT*"

AT Command	Description
AT*<CR>	Lists the supported AT commands.

Responses	Description
<CR><LF><command>	This response is sent to the host for every supported command.
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OLS425/426	Not supported.

12.1.3 Command "ATZ"

AT Command	Description
ATZ<CR>	Does nothing.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint
cB-OEMSPA3xx, cB-OBS4xx, cB-OLS425/426, cB-RBS421	Not supported.

12.1.4 Command "AT&F"

AT Command	Description
AT&F<CR>	Restore all settings to the factory settings. When the command "Store Factory Settings" has been used to update the factory settings database then this command will restore all the settings to the stored factory settings. Note that this command should not be used at every startup to restore the factory settings. Instead it is better not to write to the startup database at all.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Model	Constraint

cB-OEMSPA3xx, cB-OBS4xx, cB-OLS425/426, cB-RBS421	The Store Factory Settings command is not available. Instead, the command will restore the settings to default factory settings. After the AT&F command has been sent, the module must be reset for the restored settings to take affect.

12.1.5 Command "ATE"

AT Command	Description
ATE<echo><CR>	Set whether or not the Serial Port Adapter shall echo incoming characters.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Description
echo	integer	0: Incoming characters will not be echoed. 1: Incoming characters will be echoed.

12.1.6 S-Register (ATS)

For Bluetooth Low Energy the S-register command is used to configure link supervision timeout, advertisement interval and connection interval. Common for both Bluetooth Classic and Bluetooth Low Energy is ATS2, configuration of escape character.

AT Command	Description
ATS<XXX>?<CR>	Reads S-register<XXX>.
ATS<XXX>=<value><CR>	Writes S-register <XXX>. **The module must be restarted for the command to take effect.**

Responses	Description
<CR><LF><value><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

S-Register (<XXX>)	Parameters	Type	Value
2	<value>	integer	Escape Character ASCII value of the escape character. E.g. 47 equals '/'. Default: '/'. Note that the escape sequence will be "///". Hence, the character is used three times.
6000	<value>	integer	Link loss timeout in ms. Range: 100..32000 Default: 2000
6001	<value>	integer	Advertising Interval Min Range: 32 to 16384 Default: N = 1600(1.000 second) Time = N * 0.625 msec Must always be less than or equal to Advertising Interval Max
6002	<value>	integer	Advertising Interval Max Range: 32 to 16384 Default: N = 2000(1.250 second) Time = N * 0.625 msec Must always be greater than or equal to Advertising Interval Min
6003	<value>	integer	Advertising Channel Map Bitmap Bit0: channel 37 Bit1: channel 38 Bit2: channel 39 Default: 7(ch 37,38,39)
6004	<value>	integer	Connection Interval Min Range: 6 to 3200 Default: N=6(0.0075 second) Time = N * 1.25 msec Must always be less than or equal to Connection Interval Max
6005	<value>	integer	Connection Interval Max Range: 6 to 3200 Default: N=6(0.0075 second) Time = N * 1.25 msec Must always be greater than or equal to Connection Interval Min

6006	<value>	integer	Slave latency for the connection in number of connection events Range: 0 to 500 Default: N=0
6007	<value>	integer	Create Connection Timeout in ms Range: 0 to 65535 Default: 5000
6008	<value>	integer	Scan Window Range: 16 - 16384 Default: N=16(0.01 second) Time = N * 0.625 msec Must always be less than or equal to Scan Interval
6009	<value>	integer	Scan Interval Range: 16 - 16384 Default: N=16(0.01 second) Time = N * 0.625 msec Must always be greater than or equal to Scan Window
6010	<value>	integer	Always Connected interval. Interval used for remote peers with "always connected" configuration. Default: 10000 Time = N * 1 ms
7000	<value>	integer	UART receive time out. Default 0 (The time out is depending on the configured baud rate). Range: 0 - 65535 microseconds.
7001	<value>	integer	Number of bytes to receive before triggering an immediate receive time out event. To be used together with AT*AMPSF configurations Sleep on Uart RX or Disconnect on data sent. Default: 0 (Disabled) Range: 0-255 bytes.
7002	<value>	integer	TX power. Default: 255 (Max output power, 4 dbm) Range: 0-255 (128 = 0 dbm)
7003	<value>	integer	Rx gain. Receiver signal strength. Default: 1 (High) Range: 0 (Standard) - 1 (High)

7004	<value>	integer	Initial online period. Value in milliseconds. During this period of time the device does not enter power save mode when DSR is not used to control power save modes. This gives a possibility to enter AT mode for configuration after a reset of the device. Default: 5000 Range:0 - 65535

Model	Constraint
cB-OLS425/426, cB-OBS421, cB-RBS421	Module must be restarted for the AT command to take effect.
All models except cB-OLS425/426, cB-OBS421 and cB-RBS421	Only ATS2 is supported.

12.2 GAP Commands

12.2.1 Discoverability Mode (AT*AGDM)

AT Command	Description
AT*AGDM?<CR>	Reads the GAP discoverability mode.
AT*AGDM=<discoverability_mode>, <store_in_startup_database><CR>	Writes the GAP discoverability mode.

Responses	Description
<CR><LF>*AGDM:<discoverability_mode><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
discoverability_mode	enumerator	1: GAP non-discoverable mode 2: GAP limited discoverable mode 3: GAP general discoverable mode (default value)
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA3xx, cB-OBS4xx, cB-RBS421	Limited discoverability mode not supported.
cB-OLS425/426	Limited discoverability mode not supported. Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.2.2 Connectability Mode (AT*AGCM)

AT Command	Description
AT*AGCM?<CR>	Reads the GAP connectability mode.
AT*AGCM=<connectability_mode>, <store_in_startup_database><CR>	Writes the GAP connectability mode.

Responses	Description
<CR><LF>*AGCM:<connectability_mode><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
connectablilty_mode	enumerator	1: GAP non-connectable mode 2: GAP connectable mode (default value)
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OLS425/426	Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.2.3 Pairing Mode (AT*AGPM)

AT Command	Description
AT*AGPM?<CR>	Reads the pairing mode.
AT*AGPM=<pairing_mode>,<store_in_startup_database><CR>	Writes the pairing mode.

Responses	Description
<CR><LF>*AGPM:<pairing_mode><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
pairing_mode	enumerator	1: GAP non-pairing mode 2: GAP pairing mode (default value)
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

12.2.4 Security Mode (AT*AGSM)

The security modes are described more in detail in the *Bluetooth Serial Port Adapter Security* document. Note that the fixed pin code is 0 by default and must be changed for security modes 3, 5, 6, 7 for Classic Bluetooth.

AT Command	Description
AT*AGSM?<CR>	Reads the security mode.
AT*AGSM=<security_mode>,<store_in_startup_database><CR>	Writes the security mode.

Responses	Description
<CR><LF>*AGSM:<security_mode><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value

security_mode	enumerator	1. Security Disabled (default value) - Remote Device BT 2.1: Auto accept (No man-in-the-middle attack protection, encryption enabled) - Remote Device BT 2.0: Authentication and encryption disabled. - Bluetooth Low Energy: Auto accept (No man-in-the-middle attack protection, encryption enabled) 2. Security Enabled - Enforce BT 2.0 (Service level authentication and encryption enabled) Please note that the device is not BT 2.1 qualified for this setting. It is included for backward compatibility. Invalid for Bluetooth Low Energy. 3. Security Enabled - Fixed Pin - Remote Device BT 2.1: Service level authentication and encryption enabled. - Remote Device BT 2.0: Service level authentication and encryption enabled. - Bluetooth Low Energy: Service level authentication and encryption enabled. Please note that this security mode will not work with a general BT 2.1 device. However, it will work between two connectBlue BT 2.1 Serial Port Adapters. Use security mode 4 to make the device work with a general BT 2.1 device. 4: Security Enabled - Just Works - Remote Device BT 2.1: Auto accept (no man-in-the-middle attack protection, encryption enabled) - Remote Device BT 2.0: Service level authentication and encryption enabled. - Bluetooth Low Energy: Auto accept (no man-in-the-middle attack protection, encryption enabled) This security mode is intended for pairing in safe environments. When this mode is set, pairability (see AT*AGPM) is automatically disabled. In data mode, pairing can be enabled for 60 seconds by pressing the "External Connect" button for at least 5 seconds. When the module is pairable, the LED will blink. If the mode is changed from Just Works to another, pairability must be enabled again using the AT*AGPM command. 5: Security Enabled - Display Only* - Remote Device BT 2.1: Service level authentication and encryption enabled. User should be presented a passkey. - Remote Device BT 2.0: Service level authentication and encryption enabled. No user interaction required. - Bluetooth Low Energy: Service level authentication and encryption enabled. User should be presented a passkey. This security mode is used when the device has a display that can present a 6-digit value that the user shall enter on the remote device. 6: Security Enabled - Display Yes/No* - Remote Device BT 2.1: Service level authentication and encryption enabled. User should compare two values. - Remote Device BT 2.0: Service level authentication and encryption enabled. No user interaction required.

This security mode is used when the device has a display that can present a 6-digit value that the user shall verify with yes or no to the remote device's presented value.
Invalid for Bluetooth Low Energy.

7: Security Enabled - Keyboard Only*
- Remote Device BT 2.1: Service level authentication and encryption enabled. User should enter a passkey.
- Remote Device BT 2.0: Service level authentication and encryption enabled. No user interaction required.
- Bluetooth Low Energy: Service level authentication and encryption enabled. User should enter a passkey.
This security mode is used when the device only has a keyboard where the user can enter a 6-digit value that is presented on the remote device.

		* For security modes 5, 6 and 7 the SPA must be in AT-mode to be able to do bonding because user interaction might be required (If the remote device is BT2.0 no user interaction is required.).
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA3xx	security_mode 3-7 not supported.
cB-OLS425/426	Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.2.5 Name Discovery (AT*AGND)

This command uses different syntaxes for Bluetooth classic devices and Bluetooth Low Energy dual mode devices. The mode parameter is used to distinguish between Bluetooth Low Energy and Bluetooth classic in dual mode radios.

AT Command	Description
AT*AGND=<bd_addr><CR>	Retrieves the device name of a remote device given its Bluetooth device address. Used for Bluetooth classic radios.
AT*AGND=<bd_addr>,<timeout>,<mode><CR>	Retrieves the device name of a remote device given its Bluetooth device address. Used for Bluetooth Low Energy dual mode radios.

Responses	Description
<CR><LF>*AGND:<device_name><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
device_name	string	Null terminated string of maximum 240 characters (8-bit ASCII).
bd_addr	Bd_Addr	Bluetooth device address of the device from which to retrieve the name.

| timeout | integer | Bluetooth classic:
Page timeout measured in Number of Baseband slots
Interval Length = N * 0.625 msec (1 Baseband slot)
Range for N: 0x0016 – 0xFFFF
Time Range: 10 msec -40.9 Seconds

Bluetooth Low Energy:
Timeout measured in milliseconds
Time Range: 10 msec - 65535 msec |
| mode | integer | This parameter is only used for Bluetooth Low Energy dual mode radios.

0: Bluetooth classic
1: Bluetooth Low Energy |

Model	Constraint
cB-OEMSPA3xx, cB-OBS4xx, cB-RBS421	Device names longer than 31 bytes will be truncated.
cB-OLS425/426	Not supported.

12.2.6 Device Discovery (AT*AGDD)

AT Command	Description
AT*AGDD=<inquiry_type>,<inquiry_length><CR>	Performs device discovery.

Responses	Description
<CR><LF>*AGDD: <no_of_devices><CR><LF>OK<CR><LF>	Successful response
*AGDDE:<bd_addr>, <cod>, <device_name_valid>, <device_name><CR><LF>	This response is sent for every found device when inquiry_type is 1 or 2
*AGDDE:<bd_addr>, <cod>, <device_name_valid>, <device_name>,<rssi><CR><LF>	This response is sent for every found device when inquiry_type is 3 or 4
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
no_of_devices	integer	Value in range {0..255}. Number of devices discovered during the inquiry procedure.
bd_addr	Bd_Addr	Bluetooth device address of a discovered device.
cod	integer	See Read_Local_COD command.

device_name_valid	enumerator	1: device_name parameter valid. 0: Device was discovered, but its name could not be retrieved. device_name is parameter invalid and should be ignored.
device_name	string	Name of discovered device. ASCII represented string of maximum 240 bytes.
inquiry_type	enumerator	1: Limited inquiry 2: General inquiry 3: Limited extended inquiry with RSSI 4: General extended inquiry with RSSI
inquiry_length	integer	Maximum amount of time specified before the inquiry is halted. Range: 1-48 Time = inquiry_length*1.28 seconds Range in seconds: 10.24-61.44
rssi	integer	128: 0 dBm For example, a value of 130 means +2 dBm

Model	Constraint
cB-OLS425/426	Not supported.
cB-OEMSPA3xx	inquiry_type 3 and 4 not supported.

12.2.7 Inquiry (AT*AGI)

AT Command	Description
AT*AGI=<inquiry_Type>,<inquiry_length>, <max_no_of_devices_to_find><CR>	Performs an inquiry procedure to find any discoverable devices in the vicinity.

Responses	Description
<CR><LF>*AGI:<bd_addr>,<cod>	This response is sent for every found device when inquiry_type is 1 or 2.
<CR><LF>*AGI:<bd_addr>,<cod>,<device_name_valid>,<device_name>,<rssi>	This response is sent for every found device when inquiry_type is 3, 4 or 6.
<CR><LF>*AGI:<bd_addr>,<data>,<rssi>,<adv_data_type>	This response is sent for every found device when inquiry_type is 8 or 9.
<CR><LF>OK<CR><LF>	Successful response.

<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of a found device.
cod	integer	See Read Local COD command.
inquiry_type	enumerator	1: Limited inquiry 2: General inquiry 3: Limited extended inquiry with RSSI and device name 4: General extended inquiry with RSSI and device name 6: General extended inquiry with RSSI and device name for Bluetooth Low Energy 8: General extended inquiry with RSSI and complete advertise data for Bluetooth Low Energy 9: Unfiltered extended inquiry with RSSI and complete advertise data for Bluetooth Low Energy.
inquiry_length	integer	Maximum amount of time specified before the inquiry is halted. Range: 1-48 Time = inquiry_length*1.28 seconds Range in seconds: 1.28-61.44
max_no_of_devices_to_find	integer	0: No limitation on the number of devices to find. 1-255: Maximum number of devices to find.
device_name_valid	enumerator	1: device_Name parameter valid. 0: Device was discovered, but its name could not be retrieved. device_name parameter is invalid and should be ignored.
device_name	string	Name of discovered device. ASCII represented string of maximum 240 bytes. **Note:** Name of discovered devices is only returned by devices supporting Bluetooth 2.1 or later.
rssi	integer	128: 0 dBm For example, a value of 130 means +2 dBm
data	byte array	Complete advertise / scan response data received from remote device
adv_data_type	integer	0: Advertise data 1: Scan response data

Model	Constraint
cB-OEMSPA3xx, cB-OBS4xx, cB-RBS421	If more than 20 devices are found, then devices may be listed several times.
cB-OEMSPA3xx	inquiry_type 3, 4, 6, 8 and 9 not supported.

cB-OBS421, cB-RBS421	Bluetooth Low Energy: Does not work for an inquiry_type of 6, 8 or 9 if the module is configured as LE Peripheral.
cB-OLS425/426	Not supported.
cB-OBS41x, cB-OBS43x	inquiry_type 6, 8 and 9 not supported.

12.2.8 Bond (AT*AGB)

AT Command	Description
AT*AGB=<bd_addr>,<CR>	Performs a GAP bond procedure with another Bluetooth device. During the bonding procedure either the fixed pincode/passkey is used or user interaction is required. Which procedure to use is determined by the security mode. For fixed pincode/passkey see Write Fixed PIN/PASSKEY and Read Fixed PIN/PASSKEY. For user interaction bonding see User Confirmation and User Passkey commands and events. Note that to be able to perform bonding the remote device must be in pairable mode.
AT*AGB=<bd_addr>,<mode><CR>	Same as above but only for Bluetooth Low Energy dual mode radios.

Responses	Description
<CR><LF>*AGB:<bd_addr>,<status><CR><LF>OK<CR><LF>	Successful response **For cB-OEMSPA333, <CR><LF>OK<CR><LF> is returned.**
<CR><LF>*AGB:<bd_addr>,<status><CR><LF>ERROR<CR><LF>	Error message **For cB-OEMSPA333, <CR><LF>ERROR<CR><LF> is returned.**

Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the device to bond with.
mode	integer	This parameter is only used for Bluetooth Low Energy dual mode radios. 0: Bluetooth classic 1: Bluetooth Low Energy
status	enumerator	0: bonding succeeded 1: bonding failed because of page timeout 2: bonding failed because authentication or pairing failed. This could be due to incorrect PIN/passkey. 3: bonding failed because protection against Man-In-The-Middle attack could not be guaranteed(The generated link key was too weak)

Model	Constraint
cB-OBS411	Bond command support from version 4.3.1.
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332	Not supported. Bonding is automatic when connecting if either of the sides enforces security. The link keys are stored in a FIFO of size seven.
cB-OEMSPA333	Returns: <CR><LF>OK<CR><LF> for a successful bonding attempt <CR><LF>ERROR<CR><LF> for an unsuccessful attempt
cB-OBS421, cB-RBS421	Does not work for mode 1 if module is configured as Client-Peripheral or Server-Peripheral.
cB-OLS425/426	Not supported

12.2.9 Un-bond (AT*AGUB)

AT Command	Description
AT*AGUB=<bd_addr><CR>	This command un-bonds a previously bonded device.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the device subject to un-bond. If address FFFFFFFFFFFF is selected all bonded devices will be remove.

Model	Constraint
cB-OEMSPA333	Bluetooth address of FFFFFFFFFFFF to remove all bonded devices is not supported.

12.2.10 Read Bonded Devices (AT*AGBD)

This command uses different syntaxes for Bluetooth classic and Bluetooth Low Energy. The mode parameter is used to distinguish between Bluetooth Low Energy bondings and Bluetooth classic bondings in dual mode radios.

AT Command	Description

AT*AGBD?<CR>	Read the bonded devices Bluetooth classic.
AT*AGBD=<mode><CR>	Read the bonded devices Bluetooth Low Energy and dual mode radios.

Responses	Description
<CR><LF>*AGBD:<no_of_devices><CR><LF>OK<CR><LF>	Successful response
*AGBDE:<bd_addr>,<device_name_valid>,<device_name><CR><LF>	This response is sent for every found device.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
mode	integer	This parameter is only used for Bluetooth Low Energy and dual mode radios. 0: Bluetooth classic 1: Bluetooth Low Energy
no_of_bonded_devices	integer	Number of bonded devices.
bd_addr	Bd_Addr	Bluetooth device address of the device from which to retrieve the name.
device_name_valid	enumerator	0: device_name parameter valid. 1: Device is bonded but its name is not available. Device_name is parameter invalid.
device_name	string	Name of bonded device.

Model	Constraint
cB-OEMSPA3xx, cB-OBS4xx, cB-RBS421	The command will always return an empty string as device name with the device_name_valid parameter always set to 1.
cB-OLS425/426	The mode parameter must be 1.

12.2.11 Fixed PIN/PASSKEY (AT*AGFP)

The fixed PIN code is used when pairing to a remote BT 2.0 device.
The fixed passkey is used when pairing and bonding to a remote BT 2.1 or Bluetooth Low Energy device.

AT Command	Description
AT*AGFP?<CR>	Read the BT 2.0 fixed PIN code used by the Serial Port Adapter during bond and pairing.

AT*AGFP2?<CR>	Read the BT 2.1 passkey used by the Serial Port Adapter during bond and pairing.
AT*AGFP=<pin_code>, <store_in_startup_database><CR>	Writes the BT 2.0 fixed PIN code used by the Serial Port Adapter during bond and pairing.
AT*AGFP2=<passkey>, <store_in_startup_database><CR>	Writes the BT 2.1 / Bluetooth Low Energy passkey used by the Serial Port Adapter during bond and pairing.

Responses	Description
<CR><LF>*AGFP:<pin_code><CR><LF>OK<CR><LF>	Successful BT 2.0 read response
<CR><LF>*AGFP2:<passkey><CR><LF>OK<CR><LF>	Successful BT 2.1 read response
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
pin_code	string	The BT 2.0 PIN code is a string of one to sixteen alphanumerical characters. It is recommended to use a pin code of at least eight characters of mixed type, e.g. "12w35tg7". The default value is "0".
passkey	integer	The BT 2.1 / Bluetooth Low Energy passkey is an integer in the range of [0..999999]. The default value is 0.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OBS4xx, cB-RBS421	The AT*AGFP? and AT*AGFP2? are not supported for security reasons.
cB-OEMSPA3xx	The AT*AGFP2 is not supported.
cB-OLS425/426	The AT*AGFP is not supported. The AT*AGFP2? is not supported for security reasons. Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.2.12 User Confirmation (AT*AGUC)

AT Command	Description
AT*AGUC=<bd_addr>,<yes_no><CR>	The user confirmation is used together with security mode 6 to respond on a user confirmation request(*AGUC). The command should only be used when bonding has been initiated with AT*AGB and after *AGUC has been received.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
bd_addr	string	The remote Bluetooth Device address
yes_no	enumerator	0: No. The remote and local values are different or the user cancels. 1: Yes. The remote and local values are the same.

Model	Constraint
cB-OEMSPA3xx	Not supported.

12.2.13 User Passkey Entry (AT*AGUPE)

AT Command	Description
AT*AGUPE=<bd_addr>,<ok_cancel>,<passkey><CR>	The user passkey entry is used together with security mode 7 to respond on a user passkey entry request(*AGUPE). The command should only be used when bonding has been initiated with AT*AGB and after *AGUPE has been received.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
bd_addr	string	The remote Bluetooth Device address

ok_cancel	enumerator	0: Cancel. 1: Ok.
passkey	integer	This is an integer in the range of [0..999999].

Model	Constraint
cB-OEMSPA3xx	Not supported.

12.2.14 Local Name (AT*AGLN)

AT Command	Description
AT*AGLN?<CR>	Reads the local Bluetooth device name.
AT*AGLN=<device_name>, <store_in_startup_database><CR>	Writes the local Bluetooth device name.

Responses	Description
<CR><LF>*AGLN:<device_name><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
device_name	string	Max 240 characters. The default name is "Bluetooth Device".
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-RBS421	The name is limited to a maximum of 31 characters.
cB-OLS425/426	The name is limited to a maximum of 20 characters. Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.2.15 Local COD (AT*AGLC)

AT Command	Description
AT*AGLC?<CR>	Reads the Local Class Of Device code.
AT*AGLC=<cod>, <store_in_startup_database><CR>	Writes the Local Class Of Device code.

Responses	Description
<CR><LF>*AGLC:<cod><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
cod	integer	Valid values for this parameter are specified in the Bluetooth Assigned Numbers Document, www.bluetooth.com. The parameter has been divided into three segments, a service class segment, a major device class segment and a minor device class segment (bits 2-7). Extract from the Bluetooth Assigned Numbers Document: Service class (bit mask, bits 13-23): Bit 16: Positioning (Location identification) Bit 17: Networking (LAN, Ad hoc, etc) Bit 18: Rendering (Printing, Speaker, etc) Bit 19: Capturing (Scanner, Microphone, etc) Bit 20: Object Transfer (v-Inbox, v-Folder, etc) Bit 21: Audio (Speaker, Microphone, Headset service, etc) Bit 22: Telephony (Cordless telephony, Modem, Headset service) Bit 23: Information (WEB-server, WAP-server, etc) Major device class (number, bits 12-8): 00000: Miscellaneous 00001: Computer (desktop, notebook, PDA, etc) 00010: Phone (cellular, cordless, modem, etc) 00011: LAN/Network Access point 00100: Audio/Video (headset, speaker, stereo, video display, VCR) 00101: Peripheral (mouse, joystick, keyboards) 00110: Imaging (printing, scanner, camera, etc) 11111: Uncategorized, specific device code not specified For the minor device class field please refer to [1]. The default value is 0.

Model	Constraint

cB-OLS425/426	Not supported.

12.2.16 Get MasterSlaveRole (AT*AGGMSR)

AT Command	Description
AT*AGGMSR=<bd_addr><CR>	Read the local master-slave role. Returns the role of the Serial Port Adapter, master or slave, for the connection between the Serial Port Adapter and the remote device identified by the 'bd_addr' parameter.

Responses	Description
<CR><LF>*AGGMSR:<role><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
role	enumerator	0: Slave 1: Master
bd_addr	Bd_Addr	Identifies a device that the Serial Port Adapter is currently communicating with.

Model	Constraint
cB-OLS425/426	Not supported.
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-RBS421	Not supported. The module always allows a master slave switch if requested by the remote side.

12.2.17 Change MasterSlaveRole (AT*AGCMSR)

AT Command	Description
AT*AGCMSR=<bd_addr>,<role><CR>	Changes the master-slave role. Changes the role of the Serial Port Adapter, master or slave, for the connection between the Serial Port Adapter and the remote device identified by the 'bd_addr' parameter. Note that the remote device does not have to accept the master/slave switch.

Responses	Description

<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
bd_addr	Bd_Addr	Identifies a device that the Serial Port Adapter is currently communicating with. The role will be changed on the connection to this device.
role	enumerator	0: Slave 1: Master

Model	Constraint
cB-OLS425/426	Not supported.
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-RBS421	Not supported. The module always allows a master slave switch if requested by the remote side.

12.2.18 MasterSlaveRole Policy (AT*AGMSP)

AT Command	Description
AT*AGMSP?<CR>	Reads the role policy of the device.
AT*AGMSP=<role_policy>,<store_in_startup_database><CR>	Writes the role policy of the device.

Responses	Description
<CR><LF>*AGMSP:<role_policy><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
role_policy	enumerator	0: Always attempt to become master on incoming connections. 1: Always let the connecting device select master/slave role on incoming connections (default value).
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OLS425/426	Not supported.

12.2.19 Get RSSI (AT*AGRSS)

AT Command	Description
AT*AGRSS=<bd_addr><CR>	This request returns the current received signal strength, RSSI, for the connection between the Serial Port Adapter and the remote device identified by the 'bd_addr' parameter. Note that this command can only be used on an existing connection that has been established using the Connect_To_Serial_Service_Data_Mode command and only while still in AT mode.

Responses	Description
<CR><LF>*AGRSS:<rssi><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
rssi	integer	< 128: The received signal strength is 128-RSSI dB below the optimal signal range. 128: The received signal strength is within the optimal signal range. >128: The received signal strength is RSSI-128 dB above the optimal signal range. For example, a read value of 130 means +2 dB.
bd_addr	Bd_Addr	Identifies a device that the Serial Port Adapter is currently communicating with.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OLS425/426	Not supported.

12.2.20 Get Link Quality (AT*AGLQ)

AT Command	Description
AT*AGLQ=<bd_addr><CR>	This request returns the current link quality for the connection between the Serial Port Adapter and the remote device identified by the 'bd_addr' parameter.

Responses	Description
<CR><LF>*AGLQ:<link_quality><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
link_quality	integer	The link quality is calculated as follows : every 5 seconds a new link quality is calculated based on the packets received during that period. The link quality is based on the ratio of packets received with CRC errors to the total nr of packets with a CRC-protected payload that were received. • 50% CRC errors or more is reported as link-quality 0 (i.e. minimal quality). • 0% CRC errors is reported as 255 (i.e. maximal quality). • Between 0% and 50% CRC errors, link quality is proportional, i.e. 25% is reported as 128. Packet types are not taken into account, i.e. the same physical channel could have a link quality of 100 using DH5 packets while using DM5 would give 255. *Please note that the implementation is vendor specific and may differ for future module versions.*
bd_addr	Bd_Addr	Identifies a device that the Serial Port Adapter is currently communicating with.

Model	Constraint
cB-OBS411	Supported in version 4.3.2 and later.
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS410, cB-OLS425/426	Not supported.

12.2.21 Bluetooth Low Energy Mode (AT*AGLE)

Read/Write Bluetooth Low Energy role, for models supporting Bluetooth Low Energy. This command can be used to enable/disable Bluetooth Low Energy for dual mode radios, and to read out the role of single mode Low Energy radios.

AT Command	Description
AT*AGLE?<CR>	Reads the configuration status.
AT*AGLE=<role>, <store_in_startup_database><CR>	Writes the configuration status.

Responses	Description
<CR><LF>*AGLE:<role><CR><LF>OK<CR><LF>	Successful read response.

<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
role	integer	0: Disabled (default) 1: Low Energy Central 2: Low Energy Peripheral
store_in_startup_database	enumerator	Must be 1 **Module must be restarted for the command to take affect.**

Model	Constraint
All models except cB-OBS421, cB-RBS421 and cB-OLS425/426	Not supported
cB-OBS421, cB-RBS421	Configuration restrictions when Bluetooth Low Energy is enabled. • Cannot be both client (AT*ADDCP) and server (AT*ADDSP) at the same time. • Number of links are restricted and repeater functionality is disabled (AT*ADWM). • Security mode 2 and 6 are not allowed.
cB-OLS425/426	Write Low Energy role (AT*AGLE=) is not supported.

12.2.22 Low Energy Advertise Data (AT*AGAD)

Command for use of custom advertise data in Low Energy. Any custom advertise data will be appended to the default mandatory flags field. Note that the Inquiry AT command AT*AGI supports scan modes that can be used to see the complete advertising data. This is useful when testing advertising configurations set with the AT*AGAD.

By default the service UUID for the connectBlue Serial Port Service is part of the scan response data. For details please see the section on advertising vs scan response data.

Note that the local name used in the advertising data is normally set with AT*AGLN. AT*AGAD will override what is set with AT*AGLN. Note that it is highly advised to run AT*AGLN with the correct local name before any AT*AGAD/AT*AGSD to make sure it is the same name for Classic Bluetooth, the GAP device name and the advertising data.

There will be no check whether the same data types are used in AT*AGAD and AT*AGSD. It is up to the application to make sure the data types are used in only one of the advertisement and scan response data.

AT Command	Description
AT*AGAD?<CR>	Read custom advertise data.

AT*AGAD=<data>,<store_in_startup_database><CR>	Write custom advertise data.

Responses	Description
<CR><LF>*AGAD:<data><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
data	byte array	Custom advertise data. Maximum 28 bytes. The default value includes AD Flags, Tx power, Slave connection interval and the Complete local name. The data must follow the Bluetooth Specification, see GAP section in ref[4]. Data is divided into different consecutive data blocks, where each block has the following structure: Byte 0: Length of data block, N, excluding length byte. Byte 1: GAP advertisement data type, see below. Byte 2-N: Data. Typical GAP advertisement data types: 0x01 AD Flags (Mandatory for advertising data) 0x02 16-bit Service UUIDs, more available 0x03 16-bit Service UUIDs, complete list 0x04 32-bit Service UUIDs, more available 0x05 32-bit Service UUIDs, complete list 0x06 128-bit Service UUIDs, more available 0x07 128-bit Service UUIDs, complete list 0x08 Shortened Local name 0x09 Complete Local Name 0x0A Tx Power in dBm 0x12 Slave connection interval range 0xFF Manufacturer Specific Data *(The first 2 octets contain the Company Identifier Code followed by additional manufacturer specific data)* See GAP section in ref[4] for complete list. Example: "07FF710000112233", where "07" is the length, "FF" is the GAP advertisement data type "Manufacturer Specific Data" and "7100" is the connectBlue Company Identifier written with lowest octet first and "00112233" is the application data.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
All models except cB-OLS425/426, cB-OBS421 and cB-RBS421	Not supported.
cB-OBS421, cB-RBS421	Only supported in LE peripheral mode.

12.2.22.1 Avertising vs scan response data

For the v1.1.1 release the connectBlue Serial Service service UUID was added to the scan response data. It was added to the scan response data instead of the advertising data for backwards compatibility with earlier firmware versions. However, when a central device is using passive scan instead of active scan the central device will only see the advertising data and not the scan response data.

For example Apple recommends filtering on UUIDs when doing a scan in iOS apps and may use passive scan when the app is not active. This may require that the UUID is part of the advertising data instead of the scan response data.

Use the commands below to set the connectBlue Serial Service service UUID in the advertising data and set the device name in the scan response data:

At command	Description
AT*AGAD=020a04110701d7e9014ff344e7838fe226b9e15624,1	Set advertising data to: Tx power: 4dBm [020a04] 128-bit Service UUIDs, complete list: connectBlue Serial Service UUID [110701d 7e9014ff344e7838fe226b9e15624]
AT*AGSD=07094f4c53343235,1	Set scan response data to: Complete Local Name: OLS425 [07094f4c 53343235] where 07 is the length of the data 09 is the AD type complete local name 4f4c53343235 is the name data to set a different name change the length and name data fields

12.2.23 Low Energy Scan Response Data (AT*AGSD)

Command for use of custom scan response data in Low Energy. Any custom scan response data will overwrite the default scan response data. Note that the Inquiry AT command AT*AGI supports scan modes that can be used to see the complete scan response data. This is useful when testing configurations set with the AT*AGSD command.

By default the service UUID for the connectBlue Serial Port Service is part of the scan response data. For details please see the section on advertising vs scan response data.

AT Command	Description
AT*AGSD?<CR>	Read scan response data.
AT*AGSD=<data>,<store_in_startup_database><CR>	Write scan response data.

Responses	Description
<CR><LF>*AGSD:<data><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
data	byte array	Custom scan response data. Maximum 31 bytes.
		The default value includes Service UUIDs, complete list with connectBle Serial Service UUID.
		It is recomended to use the connectBlue Serial Service UUID [2456e1b926e28f83e744f34f01e9d701] for filtering when doing scan in smartphone apps.
		Same format as data parameter of the AT*AGAD command.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
All models except cB-OLS425/426, cB-OBS421 and cB-RBS421	Not supported.
cB-OBS421, cB-RBS421	Only supported in LE peripheral mode.

12.2.24 Enable low energy Bluetooth address mode(AT*AGLB)

This command is used to enable the public address tag 'p' and random address tag 'r' appended to the Bluetooth address in all AT-command responses. This must be used when a device needs to connect to all Bluetooth low energy address types i.e. public and random addresses.

AT Command	Description
AT*AGLB?<CR>	Read address mode
AT*AGLB=<mode>,<store_in_startup_database><CR>	Write address mode

Responses	Description
<CR><LF>*AGLB:<mode><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message

Parameters	Type	Value
mode	enumerator	0: Disable low energy address mode 1: Enable low energy address mode
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
All models except cB-OBS421 and cB-RBS421	Not supported

12.3 Service Search Commands

12.3.1 Service Search (AT*ARSS)

AT Command	Description
AT*ARSS=<bd_addr>,<role_and_profile>, <max_nbr_of_results><CR>	Search for services on a remote device.

Responses	Description
<CR><LF>*ARSS:<matching_service_records><CR><LF>OK<LR><CR>	Successful response
*ARSRSP:<bd_addr>, <rfcomm_server_chan>, < service_name_valid >, <service_name><CR><LF>	This response is the result of a device B serial port profile service search.
*ARSRDUN:<bd_addr>, <rfcomm_server_chan>, <service_name_valid >, <service_name>, <audio_feedback_support_valid>, <audio_feedback_support><CR><LF>	This response is the result of a GW dial-up networking profile service search.
*ARSRFTP:<bd_addr>, <rfcomm_server_chan>, < service_name_valid >, <service_name><CR><LF>	This response is the result of a file transfer profile service search.
*ARSROPP:<bd_addr>, <rfcomm_server_chan>, < service_name_valid >, <service_name><CR><LF>	This response is the result of a object push profile service search.
*ARSRPANU:<bd_addr>, < service_name_valid >, <service_name><CR><LF>	This response is the result of a PAN-PANU service search.
*ARSRNAP:<bd_addr>, < service_name_valid >, <service_name>, <net_access_type>, <max_net_access_rate><CR><LF>	This response is the result of a PAN-NAP service search.

<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the device on which to search for services.
role_and_profile	enumerator	0: DevB role, Serial Port Profile 1: Gateway role, Dial-Up Networking Profile 4: File transfer profile 5: Object push profile 8: PAN-PANU profile 9: PAN-NAP profile 128: SPP iPhone 129: SPP Android (according to defined UUID, see AT*ADUUID)
max_nbr_of_results	integer	The maximum number of services to be collected, use value 65535 if no limitation of the number of results is needed.
matching_service_records	integer	The number of matching service records. Range 0 to 255.
rfcomm_server_chan	integer	RFCOMM server channel number on which this service can be found. It is used when connecting to a profile. Range 1 to 30.
service_name_valid	enumerator	0: The service_name parameter could not be retrieved from the remote device and the value is not valid. 1: The service_name parameter could be retrieved from the remote device and the value is valid.
service_name	string	Service name.
audio_feedback_support_valid	enumerator	0: The audio_feedback_support parameter could not be retrieved from the remote device and the value is not valid. 1: The audio_feedback_support parameter could be retrieved from the remote device and the value is valid.
audio_feedback_support	enumerator	0: No, device does not support audio feedback. 1: Yes, device supports audio feedback.
service_description_valid	enumerator	0: The service_description parameter could not be retrieved from the remote device and the value is not valid. 1: The service_description parameter could be retrieved from the remote device and the value is valid.
service_description	string	Manufacturer description of the services a product can provide.

service_ availability_valid	enumerator	0: The service_availability parameter could not be retrieved from the remote device and the value is not valid. 1: The service_availability parameter could be retrieved from the remote device and the value is valid.
service_availability	integer	The service availability parameter available in the LAN Access Profile service record.
lp_subnet_valid	enumerator	0: The Ip_subnet parameter could not be retrieved from the remote device and the value is not valid. 1: The Ip_subnet parameter could be retrieved from the remote device and the value is valid.
lp_subnet	string	IP subnet mask to reach the device on the LAN.
net_access_type	integer	Type of network.
max_net_access_rate	integer	Data rate of network.

Model	Constraint
cB-OLS425/426	Not supported.
cB-OEMSPA3xx, cB-OBS410	Does not support PAN profile.

12.4 Data Mode Commands

12.4.1 Data Mode (AT*ADDM)

AT Command	Description
AT*ADDM<CR>	Request the Serial Port Adapter to move to data mode or extended data mode according to configuration (see AT*ADDM=). After a successful response the Serial Port Adapter will leave AT-mode and enter data mode or extended data mode.
AT*ADDM?	Reads the configured mode; data mode or extended data mode.
AT*ADDM=<mode>,<store_in_startup_database><CR>	Configures data mode or extended data mode. This command will not make the module enter data mode. To enter data mode the AT*ADDM<CR> must be called.

Responses	Description

<CR><LF>*ADDM:<mode><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
mode	integer	1: Data Mode (default value) 2: Extended Data Mode. Cannot be used by a module configured as a repeater (see AT*ADWM).
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OBS411	AT*ADDM? and AT*ADDM= supported in version 4.3.2 and later.
cB-OEMSPA3xx, cB-OBS410, cB-OLS425/426	AT*ADDM? and AT*ADDM= is not supported.

For details on the Extended Data Mode protocol see the *Serial Port Adapter - Extended Data Mode* document.

12.4.2 Connect To Serial Service Data Mode (AT*ADCP)

AT Command	Description
AT*ADCP=<bd_addr>, <role_and_profile>, <rfcomm_server_channel>, <must_be_master><CR>	Connect to a serial service enabled on a remote device. This request is used to connect to profiles based on the Serial Port Profile. The connection shall be used in data mode. When the host connects to a service on a remote device it implicitly registers to receive the "Serial Connection Data Mode Closed" event.

Responses	Description
<CR><LF>*ADCP:<connection_handle><CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value

bd_addr	Bd_Addr	Bluetooth device address of the device to connect to.
role_and_profile	enumerator	0: DevB role, Serial Port Profile 1: Gateway role, Dial-Up Networking Profile 4: FTP 5: OPP 8: PAN-PANU (To be used in Extended Data Mode. See "Serial Port Adapter - Extended Data Mode" for details). 9: PAN-NAP (To be used in Extended Data Mode. See "Serial Port Adapter - Extended Data Mode" for details) 14: Serial Port Service Bluetooth Low Energy
rfcomm_server_chan	enumerator	RFCOMM server channel number on which this service can be found. 0: Service search will be performed automatically and the first available <role_and_profile> will be connected. 1-30: RFCOMM server channel number. This server channel number can be retrieved using a service search operation. 31-255: Invalid values. For PAN this denotes the local side PAN role that the client send to the remote side. 8: PANU 9: NAP
must_be_master	enumerator	0: The remote device may choose to become master or slave. 1: This device must be master of the new connection.
connection_handle	integer	The connection handle identifies the connection. The connection handle is used when closing the connection.

Model	Constraint
cB-OEMSPA3xx, cB-OBS410, cB-OBS418	Does not support PAN profile.
cB-OBS421, cB-RBS421	For Bluetooth Low Energy, the rfcomm_server_chan and must_be_master are ignored. The command is not supported for the Client-Peripheral and Server-Peripheral configuration.
cB-OLS425/426	Not supported

12.4.3 Close Serial Connection Data Mode (AT*ADCC)

AT Command	Description
AT*ADCC=<connection_handle><CR>	Close an existing data mode connection.

Responses	Description

<CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
connection_handle	integer	The connection handle identifies the connection.

Model	Constraint
cB-OLS425/426	Not supported

12.4.4 Default Client Profile (AT*ADDCP)

AT Command	Description
AT*ADDCP?<CR>	This command reads the default client profile. The default client profile is the profile that the Serial Port Adapter uses when it establishes a connection, in data mode, to the default remote peer(s).
AT*ADDCP=<role_and_profile>,<store_in_startup_database><CR>	This command writes the default client profile. The default client profile is the profile that the Serial Port Adapter uses when it establishes a connection, in data mode, to the default remote peer(s).

Responses	Description
<CR><LF>*ADDCP:<role_and_profile><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value

role_and_profile	Enumerator	0: Serial Port Profile (DevA role) 1: Dial-Up Networking Profile (DT role) 3: Serial Port and Dial-Up Networking Profile 4: File Transfer Profile 5: Object Push Profile 6: Serial Port and File Transfer Profile 7: Serial Port and Object Push Profile 8: Personal Area Network - PANU (To be used in Extended Data Mode. See "Serial Port Adapter - Extended Data Mode" for details) 9: Personal Area Network - NAP (To be used in Extended Data Mode. See "Serial Port Adapter - Extended Data Mode" for details) 11: Serial Port and Personal Area Network - PANU (To be used in Extended Data Mode. See "Serial Port Adapter - Extended Data Mode" for details) 12: Serial Port and Personal Area Network - NAP (To be used in Extended Data Mode. See "Serial Port Adapter - Extended Data Mode" for details) 14: Serial Port Profile Bluetooth classic and Serial Port Service Bluetooth Low Energy 255: No profile (default value)
store_in_startup_database	Enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OBS421, cB-RBS421	The module cannot be configured as both a Bluetooth Low Energy server and client.
cB-OLS425/426	Supports only <role_and_profile> 14 (Bluetooth Low Energy only). Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.4.5 Default Server Profile (AT*ADDSP)

AT Command	Description
AT*ADDSP?<CR>	This command reads the default server profile. The default server profile is the profile that other devices can connect to when the Serial Port Adapter is in data mode. The default server profile is activated when the Serial Port Adapter is moved to data mode if no connection exists. The default server profile is deactivated when the Serial Port Adapter is moved from data mode to AT mode.
AT*ADDSP=<role_and_profile>, <store_in_startup_database><CR>	This command writes the default server profile. The default server profile is the profile that other devices can connect to when the Serial Port Adapter is in data mode. The default server profile is activated when the Serial Port Adapter is moved to data mode if no connection exists. The default server profile is deactivated when the Serial Port Adapter is moved from data mode to packet mode.

Responses	Description
<CR><LF>*ADDSP:<role_and_profile><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value

| role_and_profile | Enumerator | 0: Serial Port Profile (DevB role) (default value)
1: Dial-Up Networking Profile (Gateway role)
For the serial port and dial-up networking profiles, the number of services is equal to the maximum number of slaves.
3: Serial Port Profile (DevB role) and Dial-Up Networking (Gateway role)
The number of services for each profile is equal to the number of slaves divided by two rounding up. E.g. if three slaves are allowed, there will be two SPP and two DUN services registered
4: File Transfer Profile
5: Object Push Profile
6: Serial Port and File Transfer Profile
7: Serial Port and Object Push Profile
8: Personal Area Network - PANU (To be used in Extended Data Mode. See "Serial Port Adapter - Extended Data Mode" for details)
9: Personal Area Network - NAP (To be used in Extended Data Mode. See "Serial Port Adapter - Extended Data Mode" for details)
11: Serial Port and Personal Area Network - PANU (To be used in Extended Data Mode. See "Serial Port Adapter - Extended Data Mode" for details)
12: Serial Port and Personal Area Network - NAP (To be used in Extended Data Mode. See "Serial Port Adapter - Extended Data Mode" for details)
14: Serial Port Service Bluetooth Low Energy + Serial Port Profile (DevB role)
255: No profile |
| store_in_startup_database | enumerator | 0: The setting will only be valid for the current power cycle.
1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated. |

Model	Constraint
cB-OEMSPA3xx, cB-OBS4xx, cB-RBS421	If the current default server profile is not "255: No profile", the "store in startup database" parameter must be 1 and the module must be restarted for the command to take affect.
cB-OEMSPA3xx, cB-OBS410, cB-OBS418	PAN is not supported.
All models except cB-OBS421, cB-RBS421 and cB-OLS425/426	<role_and_profile> value 14 (Bluetooth Low Energy) is not supported.
cB-OBS421, cB-RBS421	The module cannot be configured as both a Bluetooth Low Energy server and client.
cB-OLS425/426	Supports only <role_and_profile> value 14 (Bluetooth Low Energy only). Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.4.6 Read Service Name (AT*ADRSN)

AT Command	Description
AT*ADRSN=<role_and_profile><CR>	This command reads the service name of the selected role and profile. The service name is read by a remote SPA with AT*ARSS.

Responses	Description
<CR><LF>*ADRSN:<service_name><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
role_and_profile	Enumerator	0: Serial Port Profile (DevB role) 1: Dial-Up Networking Profile (Gateway role) 4: File Transfer Profile 5: Object Push Profile 8: Personal Area Network - PANU 9: Personal Area Network - NAP
service_name	string	The service name can be max 15 characters.

Model	Constraint
cB-OEMSPA3xx, cB-OLS425/426	Not supported.

12.4.7 Write Service Name (AT*ADWSN)

AT Command	Description
AT*ADWSN=<role_and_profile>,<service_name>,<store_in_startup_database><CR>	This command writes t service name for the selected role and profi an empty string is prov the default service nar used("SPP", "DUN"). N that the module must I reset before the chang take place. Hence, "store_in_startup_data must be set to 1.

Responses	Description
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
role_and_profile	Enumerator	0: Serial Port Profile (DevB role) 1: Dial-Up Networking Profile (Gateway role) 4: File Transfer Profile 5: Object Push Profile 8: Personal Area Network - PANU 9: Personal Area Network - NAP
service_name	string	The service name can be max 15 characters.
store_in_startup_database	Enumerator	0: Invalid value 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated. The module must be reset for command to take affect.

Model	Constraint
cB-OEMSPA3xx, cB-OLS425/426	Not supported.

12.4.8 Max No Of Remote Peers (AT*ADMRP)

AT Command	Description
AT*ADMRP?<CR>	For some Serial Port Adapters it is possible to have more than one remote peer defined. This command reads the maximum number of allowed remote peers.

Responses	Description
<CR><LF>*ADMRP:<max_no_of_remote_peers> <CR><LF>OK<CR><LF>	Successful response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
max_no_of_remote_peers	integer	The maximum number of allowed remote peers.

Model	Constraint

cB-OLS425/426	Not supported.
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-RBS421	Obsolete.

12.4.9 No Of Remote Peers (AT*ADNRP)

AT Command	Description
AT*ADNRP?<CR>	For some Serial Port Adapters it is possible to have more than one remote peer defined. This command reads the number of remote peers defined.
AT*ADNRP=<no_of_remote_peers>, <store_in_startup_database><CR>	This command writes the number of remote peers defined. The number of remote peers may not be greater than the number returned by the Read_Max_No_Of_Remote_Peers command. After writing the number of remote peers the host must use the Write_Default_Remote_Peer command to write all the remote peers to the Serial Port Adapter.

Responses	Description
<CR><LF>*ADNRP:<no_of_remote_peers> <CR><LF>OK<CR><LF>	Successful read response.
<CR><LF >OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
no_of_remote_peers	integer	The number of remote peers currently defined. The default value is 0.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OBS421, cB-RBS421	Supports max 7 remote peers if Bluetooth Low Energy is disabled (AT*AGLE). Supports max 3 remote peers if Bluetooth Low Energy is enabled (AT*AGLE).
cB-OLS425/426	Supports max 1 remote peer. Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.4.10 Default Remote Peer (AT*ADRDRP/AT*ADWDRP)

The remote peer command works for both Bluetooth classic and Bluetooth Low Energy. To configure a Bluetooth Low Energy remote peer, the <connect_scheme> bit 8 must be set.

AT Command	Description
AT*ADRDRP=< peer_id ><CR>	This command reads the Bluetooth device address and device name of the selected default remote peer (peer id).
AT*ADWDRP=<peer_id>,<bd_addr>, <connect_scheme>, <update_remote_peer_on_incoming>, <device_name>, <store_in_startup_database><CR>	This command writes the Bluetooth device address, connect scheme and device name of the currently selected default remote peer.

Responses	Description
<CR><LF>*ADRDRP:<bd_addr>,<connect_scheme>, <update_remote_peer_on_incoming>, <device_name><CR><LF>OK<CR><LF>	Successful read response.
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error response.

Parameters	Type	Value
peer_id	integer	The peer ID can be between 0 and the value written by the Write_No_Of_Peers command -1 or read by the Read_No_Of_Peers command -1.
bd_addr	Bd_Addr	Bluetooth device address of the default remote peer.
connect_scheme	integer	

This parameter is a bit field. Bit 0 is the least significant bit. Each bit is defined as follows:

Bit 0: Connect on data
Try to connect to default remote peer on data traffic.

Bit 1: Always connected
Always try to be connected to the default remote peer when in data mode.

Bit 2: External connect
Try to connect to default remote peer on external signal. The external signal is implementation specific, e.g. some Serial Port Adapters might have a button. Note that the external signal/button must not be pressed more than 1 second.

Bit 3: Connect to name
On reset, try to connect to a device with the name given by the <device_name> parameter. The <device_name> may specify a part of, or the full name of the remote device. The SPA will at reset perform an inquiry followed by name requests on devices found during inquiry until a matching device is found. If no matching device is found the SPA will stop this procedure and operate as normal. If a matching device is found, the SPA will try to connect to this device. If no matching device is found, this is seen as an LED error indication.

Bit 4: Reserved

Bit 5:Connect to name permanent
The functionality is the same as for " Connect to name" except that a matching device will be stored in the startup database and used as remote peer even after a reset. The <bd_addr> parameter must be set to 000000000000 for the SPA to start the "connect to name" procedure. Any other address will be interpreted as the remote peer is already found and no connect to name procedure will be initiated.

Bit 6:Easy connect
The SPA will search for and try to any device at close range. At reset the SPA will perform an inquiry at low output power (-36dBm). If one single device is found during the inquiry then the SPA will try to connect to it and store it as a remote peer in the startup database. Note that if several devices are found, then the SPA will not initiate a connection. The <bd_addr> parameter must be set to 000000000000 for the SPA to start the easy connect procedure. Any other address will be interpreted as the remote peer is already found and "no easy connect" procedure will be initiated.

Bit 7:Connect to service name
The SPA will search for and try to connect to a Serial Port Profile service with the name specified by the <device_name> parameter.

Bits 3,5,6 and 7 cannot be combined.

		Bit 8: Bluetooth Low Energy remote peer.
		Bit 9-15: Reserved for future use.
		Advanced: Bit 16-23: Always connected period This field can be used to define the period for connection attempts for always connected (Bit 1 set). If not set or set to 0 then the default period 10s is used. Time in seconds.
		Bit 24-31: Page timeout The page timeout. This field defines for how long the module tries to connect to the remote device. The time is defined in units of 80ms. For example, to set the page time out to 1,040s choose the value 0x0D. If not set or set to 0 then the default page timeout 5,12s is used.
update_remote_peer_on_incoming	enumerator	1: Every time a remote device connects to the selected DefaultServerProfile, update the remote peer device address to the device address of the connecting device. The new remote peer device address will be stored in the startup database. Only one of all the remote peers can use this feature. 0: Do not update the remote peer device address on incoming connections.
device_name	string	Maximum 240 characters.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OBS4xx, cB-RBS421	Easy connect functionality is not supported.
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx	The parameter <device_name> is only used when bit 3 in the connect scheme is set. The maximum length is 32 characters.
cB-OEMSPA333	Connect to name and easy connect functionality is not supported. This means that bits 3 - 7 in the connect scheme parameter is ignored. Setting the always connected period and the page timeout is not supported. This means that bits 16 to 31 are ignored.
cB-OBS421, cB-RBS421	For Bluetooth Low Energy only "connect on data", "always connected" and "external connect" is valid. Others are not valid.

cB-OLS425/426	Warning! Setting a remote peer in cB-OLS425/426 will enable directed advertisement. When directed advertisement is activated it will lock up the module CPU for 1,28 s, implying that the module is not receptive to any input during this time. If connect_scheme "always connected" is used, this means the module will be non-receptive for 1,28 s in each period of attempt. In this state, the module can for example not enter AT-mode. Only Bluetooth Low Energy remote peers can be configured. Hence, the <connect_scheme> bit 8 must be set. The "connect on data", "always connected" and "external connect" connect_schemes are valid. Others are not valid. The advanced settings for the connect_scheme are not valid. update_remote_peer_on_incoming and device_name are not supported. Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.4.11 Inactivity Tick (AT*ADIT)

AT Command	Description
AT*ADIT?<CR>	This command reads the current inactivity tick setting. If there is no data activity between two consecutive ticks the Serial Port Adapter will automatically disconnect the current data mode connection(s).
AT*ADIT=<inactivety_tick>, <store_in_startup_database><CR>	This command writes a new inactivity tick setting. If there is no data activity between two consecutive ticks the Serial Port Adapter will automatically disconnect the current connection(s).

Responses	Description
<CR><LF>*ADIT:<inactivity_tick><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
inactivety_tick	integer	0: no inactivity tick (default value). 1-255: the period (in minutes) of the inactivity timer.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint

cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-OLS425/426, cB-RBS421	Not supported. Instead use the watchdog functionality (see AT*AMWS).

12.4.12 Wireless Multidrop Configuration (AT*ADWM)

AT Command	Description
AT*ADWM?<CR>	This request returns whether or not the Wireless Multidrop™ feature has been enabled. When the Wireless Multidrop™ has been enabled; all data sent to the Serial Port Adapter in data mode will be forwarded to all connected devices. Data received from a remote device will be forwarded to the host. If the Auto_Forward parameter is set to TRUE is will also forward all received data to all the other connected devices. Connections to remote devices can be established using three methods: • Let the Serial Port Adapter connect to the desired devices when it is in data mode. The host uses the request Write_No_Of_Remote_Peers and Write_Default_Remote_Peer to tell the Serial Port Adapter how many devices to connect to, which devices to connect to and when to connect to the defined devices. • A server has been enabled using the request Write_Default_Server_Profile and one or several devices connect to this server. • One or several connections are established in packet mode using the request Connect_To_Serial_Service_Data_Mode. After all desired connection have been setup by the host it moves to data mode. When the Wireless Multidrop™ has been disabled; only one connection at a time can be established. A maximum of one remote peer can be defined.
AT*ADWM=<enable>, <auto_forward>, <store_in_startup_database><CR>	Writes the Wireless Multidrop™ configuration.

Responses	Description
<CR><LF>*ADWM:<enabled>, <auto_forward><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value

enabled	enumerator	0: Wireless Multidrop™ disabled (default value). 1: Wireless Multidrop™ enabled enabled for maximum number of slaves. 2-7: Wireless Multidrop™ enabled for the parameter "enabled" number of slaves. Hence, if 2 is selected, only 2 slaves are allowed.
auto_forward	enumerator	0: Data received from a connected device will only be forwarded to the host (default value). 1: Enables repeater functionality which means that no data will be transmitted to or from the host. Data received from one Bluetooth connection is transmitted on all others (if any). A module configured as a repeater cannot use extended data mode.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332	Not supported in standard FW. FW supporting multipoint and Wireless Mulitdrop is available for download at: www.connectblue.com.
cB-OBS410, cB-OBS418	Not supported.
cB-OBS421, cB-RBS421	Bluetooth Low Energy disabled: • Max 7 links allowed. Bluetooth Low Energy enabled: • Repeater is not supported. • Max 3 links allowed in total(Bluetooth Classic plus Bluetooth Low Energy central) for version =< v5.2.1 • Max 6 links allowed in total(Bluetooth Classic plus Bluetooth Low Energy central) for version => v5.3.0 for -14 /16 • Max 7 links allowed in total(Bluetooth Classic plus Bluetooth Low Energy central) for version => v5.3.0 for -24/26 • Peripheral can handle one Bluetooth Low Energy link Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.
cB-OLS425/426	Not supported. cB-OLS425/426 supports point-to-point only.

12.4.13 iPhone Enable (AT*ADIPE)

AT Command	Description
AT*ADIPE?<CR>	Reads the iPhone enabled parameter.
AT*ADIPE=<enable_disable>, <store_in_startup_database><CR>	Writes the iPhone enable parameter.

Responses	Description
<CR><LF>*ADIPE:<enable_disable><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
enable_disable	integer	1: disable 2: enable 0: restores default value for module. **Only valid for write command!** By default, iPhone support is enabled for modules with iPhone authentication hardware (e.g. OBS414). For a module with no iPhone authentication hardware, the iPhone support is disabled.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OLS425/426	Not supported.
cB-OBS4xx	Supported in firmware released after May 31, 2011.

12.4.14 Android Setting (AT*ADUUID)

The Android Serial Port Profile support is slightly different from what is normally the case. The following Serial Port Adapters supports Android connections:

- All OBS4xx modules
- All OBI4xx modules
- RBS421

Normally, a Serial Port service class UUID is set in the SPP service record. A remote device typically use the service class UUID to retrieve the service name and a server channel in order to be able to set up the connection to the correct service. The Serial Port service class UUID is defined in the Bluetooth specification (Assigned Numbers Service Discovery) and it is the same for all SPP devices.

With Android phones, the service class UUID is set by each Android application and it does not need to apply to the Serial Port service class UUID. Instead any 128-bit number is used to identify the Android application. The idea is to increase the number of Serial Port services from 32 which is the limitation using server channels to 2^16 different numbers. The selected number is not registered anywhere but hopefully it will not collide with other Android applications. Of course it is still possible to set the standard Serial Port Service Class UUID to work with standard Serial Port devices. Note that there may only be one Android application that registers this number for this to work

The Serial Port Adapter accept one additional 128 bit service class UUID to support also Android phones. The 128 bit UUID is set using the command AT*ADUUID (see AT command specification for details). This UUID is used by the Serial Port Adapter both for server and client functionality and it must match the UUID of the requested Android application.

AT Command	Description
AT*ADUUID?<CR>	Reads the Android UUID
AT*ADUUID=<uuid>,<store_in_startup_database><CR>	Writes the Android UUID.

Responses	Description
<CR><LF>*ADUUID:<uuid><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
uuid	byte array	Android App UUID 128 bit service class UUID For example 00112233445566778899AABBCCDDEEFF A <uuid> value of 0 will remove the UUID configuration.
store_in_startup_database	enumerator	Must be 1. The Serial Port Adapter will remember the setting between power cycles.

Model	Constraint
cB-OEMSPA3xx, cB-OLS425/426	Not supported.
cB-OBS411	Supported in version 4.3.4 and later.
cB-OBS433	Supported in version 4.7.1 or later.
cB-OBS414	Supported in version 4.0.0 or later.

12.4.15 Device Identifier Record (AT*ADDIP)

AT Command	Description
AT*ADDIP?<CR>	Reads the Device Identifier Record.
AT*ADDIP=<vendor_id>, <vendor_id_source>, <product_id>, <version>, <startup_database><CR>	Writes the Device Identifier Record.

Responses	Description
<CR><LF>*ADDIP:<vendor_id>,<vendor_id_source>, <product_id>,<version><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
vendor_id	integer	A UInt16 to uniquely define the vendor of the device. The device vendor id can be assigned by the Bluetooth SIG or by the USB Implemeters forum. By default it is set to 0x0071, which is the connectBlue vendor id defined by the SIG.
vendor_id_source	integer	A Uint16 that defines from where the <vendor_id> was assigned. If the <vendor_id> was assigned by the SIG it is set to 0x0001 or if the <vendor_id> was assigned by the USB Implementers forum it is assigned to 0x0002. By default it is set to 0x0001.
product_id	integer	A Uint16 that shall identify different products from the same vendor. By default it is set to 0x0106.
version	integer	A Uint16 with the structure of 0xJJMN for version JJ.M.N. JJ is the major version, M is the minor version and N is the sub-minor version. By default it will be the firmware version of the module. Hence, for firmware version 4.0.0 it will be 0x0400.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA3xx	Not supported.

cB-OBS4xx, cB-OLS425/426, cB-RBS421	Not supported.
cB-OBS411_iAP, cB-OBS421_iAP	Supported in version 4.0.0 or later.

12.4.16 GATT Device Information Service (AT*ADDIS)

AT Command	Description
AT*ADDIS?<CR>	Reads the Device Information Service configuration.
AT*ADDIS=<manufacturer>, <model_number>, <fw_revision>, <sw_revision>, <startup_database><CR>	Writes the Device Information Service configuration. An omitted value means that the default value is used.

Responses	Description
<CR><LF>*ADDIS:<manufacturer>, <model_number>, <fw_revision>, <sw_revision><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
manufacturer	string	String identifying the manufacturer of the device. Default value is set to "connectBlue".
model_number	string	String identifying the model_number of the device.
fw_revision	string	String identifying the firmware revision of the device.
sw_revision	string	String identifying the firmware revision of the device.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA3xx	Not supported.
cB-OBS4xx, cB-RBS421	Not supported.

OLS425/OLS426	A reset of the device is required for new settings to be activated. The default model number is OLS425 and the default firmware and software revision is the current firmware revision of the serial port adapter. The maximum total length of the parameters allowed is 60 characters.

12.5 Informational Commands

12.5.1 Read Local BD ADDR (AT*AILBA)

AT Command	Description
AT*AILBA?<CR>	Reads the Bluetooth Device Address of the local device.

Responses	Description
<CR><LF>*AILBA:<bd_addr>,<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
bd_addr	Bd_Addr	Local Bluetooth device address.

12.5.2 Read Local Version Information (AT*AILVI)

AT Command	Description
AT*AILVI?<CR>	This command reads the local version information to the Serial Port Adapter.

Responses	Description
<CR><LF>*AILVI:<manufacturer>, < sw_ver>, <host_stack_sw_ver>, <link_manager_sw_ver>, <bluetooth_hardware_manufacturer><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
manufacturer	string	Serial Port Adapter manufacturer.
sw_ver	string	Serial Port Adapter software version.
host_stack sw_ver	string	Bluetooth host stack version.

link_manager_sw_ver	string	Bluetooth link manager version.
bluetooth_hardware_manufacturer	string	Bluetooth hardware manufacturer.

12.5.3 Read Local Type Information (AT*AILTI)

AT Command	Description
AT*AILTI?<CR>	This command reads the type information from the Serial Port Adapter.

Responses	Description
<CR><LF>*AILTI:<major_id>, <minor_id><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
major_id	enumerator	1: Bluetooth SPA 2: Wireless LAN SPA 3: IEEE 802.15.4 SPA 4: N/A 5: Bluetooth EPA 6: Wireless LAN EPA 7: Multi-radio SPA
minor_id	enumerator	The different types of Bluetooth SPAs are identified by the following numbers: 0: cB-OEMSPA310 1: cB-OEMSPA311 2: cB-OEMSPA331 3: cB-OEMSPA312 4: cB-OEMSPA332 5: cB-OEMSPA333 6: cB-OBS411 7: cB-OBS433 8: cB-OBS410 9: cB-OBS413 10: cB-OBS421 11: cB-OBS421-RD 12: cB-OLS425 / cB-OLS426 13: cB-OBS418 14: cB-OBS419

Model	Constraint
cB-OEMSPA333	Not supported.

12.6 Miscellaneous Commands

12.6.1 RS232 Settings (AT*AMRS)

AT Command	Description
AT*AMRS?<CR>	This command reads current RS232 settings from the Serial Port Adapter.
AT* AMRS=<baud_rate>, <data_bits>, <stop_bits>, <parity>, <flow_control>, <change_after_confirm>, <store_in_startup_database><CR>	This command applies new RS232 settings to the Serial Port Adapter. If 5, 6 or 7 data bits are selected the Serial Port Adapter will not change its RS232 settings until the next power cycle. If the command is successful, the baud rate is changed after the response. Wait 100ms from that the response is received before sending a new command to the Serial Port Adapter.

Responses	Description
<CR><LF>*AMRS:<baud_rate>, <data_bits>, <stop_bits>, <parity>, <flow_control><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value

baud_rate	enumerator	Standard baud rates: 1: 300 2: 1200 3: 2400 4: 4800 5: 9600 6: 19200 7: 38400 8: 57600 (default value) 9: 115200 10: 230400 11: 460800 12: 921600 Non standard baud rates: 17: 7200 18: 31250 19: 75000 20: 93750 21: 136000 22: 187500 23: 230000 24: 125000 25: 312500 26: 625000 Special baudrates: A value above 256 will be interpreted as a baudrate in raw format. If the SPA is able to generate the baudrate with less than 2% error then the baudrate is accepted. If not, the baudrate is not accepted and error is returned.
data_bits	enumerator	1: 8 data bits (default value) 2: 7 data bits 3: 6 data bits 4: 5 data bits
stop_bits	enumerator	1: 1 stop bit (default value) 2: 2 stop bits
parity	enumerator	1: no parity (default value) 2: odd parity 3: even parity
flow_control	enumerator	1: CTS/RTS used for flow control (default value) 2: CTS/RTS not used.
change_after_confirm	integer	0: New settings takes affect after a reset. 1: New settings takes affect directly after confirmation of command.

store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332	For the non-standard baud rates the 312500 and 625000 has an accuracy of 1.5% and 2.5 %. For all other baud rates the accuracy is no worse than 0.5 %.
cB-OEMSPA333	Special baudrates is not supported.
cB-OBS433, cB-OBS411, cB-OBS419, cB-OBS421, cB-RBS421	5-7 data bits not supported. Baud rate of 300 bits/s not supported. In Extended Data Mode, the parameter <change_after_confirm> must be set to 0. Hence, it is not possible to change the baud rate without resetting the module.
cB-OBS410, cB-OBS418	5-7 data bits not supported. Baud rate above 460800 bits/s not supported.
cB-OLS425/426	Supported values: baud rates: (1200 - 115200) (Warning! 115200 is not recommended) data bits: 1 (8 bits) stop bits: 1-2 (1-2 bits) parity: 1 (no parity) flow control: 1 (CTS/RTS) and 2 (off) Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.6.2 Serial Interface Type (AT*AMSIT)

AT Command	Description
AT*AMSIT?<CR>	This command reads the serial interface type currently used.
AT*AMSIT=<serial_interface_type>, <store_in_startup_database><CR>	This command writes the serial interface type currently used. Note that the Serial Port Adapter does not change serial interface type until the next time it is restarted.

Responses	Description
<CR><LF>*AMSIT:<serial_interface_type> <CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response

<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
serial_interface_type	enumerator	1: RS232 (default value) 2: RS422 3: RS485 4-255: Reserved for future use.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OLS425/426	Not supported.
cB-OEMSPA310	RS422/RS485 is not supported.

12.6.3 Read Favorites (AT*ACF)

AT Command	Description
AT*ACF?<CR>	Read the stored favorites.

Responses	Description
<CR><LF>*ACF:<no_of_stored_favorites><CR><LF>OK<CR><LF>	Successful response
*ACFD:<bd_addr>,<favorite_name><CR><LF>	This response is sent for every found favorite device.
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
no_of_stored_favorites	integer	Number of stored favorite devices.
bd_addr	string	Bluetooth device address of the stored favorite.
favorite_name	string	Name of favorite.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-OLS425/426, cB-RBS421	Not supported.

12.6.4 Add Change Favorite (AT*ACACF)

AT Command	Description
AT*ACACF=<bd_addr>,<favorite_name><CR>	Add or change a favorite. If the favorite, identified by its Bluetooth device address does not exist, it will be created.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the favorite.
favorite_name	string	Maximum 240 characters (8-bit ASCII).

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-OLS425/426, cB-RBS421	Not supported.

12.6.5 Delete Favorite (AT*ACDF)

AT Command	Description
AT*ACDF=<bd_addr><CR>	Deletes a stored favorite.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
bd_addr	Bd_Addr	Bluetooth device address of the stored favorite.

Model	Constraint

cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-OLS425/426, cB-RBS421	Not supported.

12.6.6 Allow Configuration Over Bluetooth (AT*ACCB)

AT Command	Description
AT*ACCB?<CR>	Reads allow configuration over Bluetooth. If enabled, it is possible to read/write AT commands over air.
AT*ACCB= <allow_configuration_over_bluetooth>, <store_in_startup_database><CR>	Writes allow configuration over Bluetooth.

Responses	Description
<CR><LF>*ACCB:<allow_configuration_over_bluetooth> <CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
allow_configuration_over_bluetooth	enumerator	0: Configuration over Bluetooth is not allowed (default value). 1: Configuration over Bluetooth is allowed.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OLS425/426	Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.6.7 Power Save Mode (AT*AMPM)

AT Command	Description
AT*AMPM?<CR>	This command reads the current power save mode setting.
AT*AMPM=<mode>, <store_in_startup_database><CR>	This command writes a new power save mode setting to the Serial Port Adapter.

Responses	Description
<CR><LF>*AMPM:<mode> <CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
mode	enumerator	1: Allow only online mode. The Serial Port Adapter will never enter sleep or stop mode to save power. 2: Allow sleep mode (default value). The Serial Port Adapter will enter sleep mode when possible to save power. 3: Allow sleep mode and stop mode. The Serial Port Adapter will enter sleep or stop mode when possible to save power. 4: As online mode except that the internal clock will always be 32 MHz. 5 - 255: Power modes reserved for future use.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OBS410	Stop mode (3) and online 32 MHz mode (4) is not supported.
cB-OBS418	Stop mode (3) and online 32 MHz mode (4) is not supported. Module must be restarted for the command to take affect, and thus store_in_startup_database 0 is not supported. Online 32 MHz mode (4) is not supported. Stop mode cannot be configured if the DSR mode is 2 (see AT*AMDS)

cB-OBS4xx, cB-RBS421	Module must be restarted for the command to take affect, and thus store_in_startup_database 0 is not supported. Online 32 MHz mode (4) is not supported. Stop mode cannot be configured if the DSR mode is 2 (see AT*AMDS).
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332	Online 32 MHz mode (4) is not supported. Stop mode cannot be configured if the DSR mode is 2 (see AT*AMDS). For the cB-OEMSPA310 stop mode is not supported at all.
cB-OEMSPA333	Stop mode (3) can be configured for compatibility reasons, but sleep mode (2) will be used. Online 32 Mhz mode (4) can be configured for compatibility reasons, but online mode (1) will be used.
cB-OLS425/426	Only online mode (1) and stop mode (3) are supported. Stop mode is default. Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.6.8 Max Output Power (AT*AMMP)

AT Command	Description
AT*AMMP?<CR>	Read the maximum output power used by the Serial Port Adapter when communicating.
AT*AMMP=<max_output_power>, <store_in_startup_database><CR>	Set the maximum output power to be used by the Serial Port Adapter when communicating.

Responses	Description
<CR><LF>*AMMP:<max_output_power> <CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value

max_output_power	integer	255: Use the highest output power supported by the Serial Port Adapter as the maximum output power (default value). 128-m: -m dBm (m<30) 128: 0 dBm 128+n: n dBm (n<30) For example, a value of 130 means +2 dBm.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OLS425/426, cB-OBS418, cB-OBS419, cB-OBS421, cB-RBS421	Module must be restarted for the command to take effect, and thus store_in_startup_database 0 is not supported.

12.6.9 Esc Sequence Timing (AT*AMET)

AT Command	Description
AT*AMET?<CR>	For an escape sequence to be valid, a period of no data activity is required before and after the escape sequence. This command reads the minimum time of no data activity required before and after the escape sequence.
AT*AMET=<min_before_time>, <min_after_time>, <store_in_startup_database><CR>	For an escape sequence to be valid, a period of no data activity is required before and after the escape sequence. This command sets the minimum time of no data activity required before and after the escape sequence.

Responses	Description
<CR><LF>*AMET:<min_before_time>, <min_after_time> <CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
min_before_time	integer	50-5000 ms. The default value is 1000.

min_after_time	integer	50-5000 ms. The default value is 1000.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OLS425/426	Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.6.10 Read Button Operation_Mode (AT*AMBOR)

AT Command	Description
AT*AMBOR=<button_id><CR>	For some Serial Port Adapters it is possible to select the operation that shall be associated with a specific button.

Responses	Description
<CR><LF>*AMBOR:<operation_mode>, <general_parameter><CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
button_id	integer	Identifies the button to control.
operation_mode	integer	The button operation mode (1=default).
general_parameter	integer	The meaning of this parameter depends on the value of the operation_mode parameter.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-OLS425/426, cB-RBS421	Not supported.

12.6.11 Write Button Operation Mode (AT*AMBO)

AT Command	Description
AT*AMBO=<button_id>, <operation_mode>, <general_parameter>, <store_in_startup_database><CR>	For some Serial Port Adapters it is possible to select the operation that shall be associated with a specific button.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
button_id	integer	See Read_Button_Operation_Mode.
operation_mode	integer	See Read_Button_Operation_Mode.
general_parameter	integer	See Read_Button_Operation_Mode.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-OLS425/426, cB-RBS421	Not supported.

12.6.12 LED Operation Mode (AT*AMLO)

AT Command	Description
AT*AMLO?<CR>	For some Serial Port Adapters it is possible to select an alternate operation mode for control of LEDs.
AT*AMLO=<operation_mode>, <general_parameter>, <store_in_startup_database><CR>	For some Serial Port Adapters it is possible to select an alternate operation mode for control of LEDs.

Responses	Description

<CR><LF>*AMLO: <operation_mode>, <general_parameter><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
operation_mode	integer	The new LED operation mode (1=default).
general_parameter	integer	The meaning of this parameter depends on the value of the operation_mode parameter.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-OLS425/426, cB-RBS421	Not supported.

12.6.13 Store Factory Settings (AT*AMSF)

AT Command	Description
AT*AMSF<CR>	Store all the current settings in the factory settings database. The factory settings can be restored using the AT&F command.

Responses	Description
<CR><LF>OK<CR><LF>	Successful response
<CR><LF>ERROR<CR><LF>	Error message.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-OLS425/426, cB-RBS421	Not supported. Factory settings can only be set in production.

12.6.14 Watchdog Settings (AT*AMWS)

AT Command	Description
AT*AMWS?<CR>	Read current watchdog settings. Watchdog settings are only active in data mode and not AT mode.
AT*AMWS=<bt_write_timeout>, <bt_inactivity_timeout>, <bt_connect_timeout>, <bt_disconnect_reset>, <reset>, <store_in_startup_database><CR>	Write watchdog parameters. The watchdog functionality is only active in data mode and not AT mode. Furthermore, the power mode must also be set to online (see AT*AMPM).

Responses	Description
<CR><LF>*AMWS: <bt_write_timeout>, <bt_inactivity_timeout>, <bt_connect_timeout>, <bt_disconnect_reset>, <reset><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
bt_write_timeout	integer	Time in seconds before SPA disconnects if out of credits. 0: Disabled > 0: Timeout in seconds (default value 10s) Note: AT*AMWFM may be used to set timeout in milliseconds instead.
bt_inactivity_timeout	integer	Time in seconds before SPA disconnects if no activity. 0: Disabled (default value) > 0: Timeout in seconds Note: AT*AMWFM may be used to set timeout in milliseconds instead.
bt_connect_timeout	integer	Max connection time in seconds before a connection is terminated. 0: Disabled (default value) > 0: Timeout in seconds Note: AT*AMWFM may be used to set timeout in milliseconds instead.
bt_disconnect_reset	integer	0: Disabled (default value) 1: An SPA acting as a server will reset on a terminated connection.

| reset | integer | Will always read a value of 0.
If written, 1 means reset of module. Other parameters are then ignored. |
| store_in_startup_database | enumerator | 0: The setting will only be valid for the current power cycle.
1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated. |

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OEMSPA333	Default <bt_write_timeout> is 0 seconds.
cB-OLS425/426	Parameters <bt_connect_timeout> and <bt_disconnect_reset> are not used. Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.

12.6.15 DTR DSR Settings (AT*AMDS)

AT Command	Description
AT*AMDS?<CR>	Read current DTR/DSR configuration.
AT*AMDS=<dtr_cfg>, <dsr_cfg>, <store_in_startup_database><CR>	Write DTR/DSR configuration.

Responses	Description
<CR><LF>*AMDS: <dtr_cfg>, <dsr_cfg><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
dtr_cfg	integer	Configuration of module behavior on the UART DTR pin. 1: DTR is activated when module is started. (default value) 2: DTR is active if there is a Bluetooth connection. If there is no connection, DTR is inactive.

dsr_cfg	integer	Configuration of module behavior on the UART DSR pin. 1: DSR is ignored. (default value) 2: If DSR goes from inactive to active, the module will try to connect to a remote peer if a remote peer is configured. If DSR goes from active to inactive, the module will disconnect. For the remote peer, the external connect scheme must be set. See" Write Default Remote Peer command".
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA310, cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332, cB-OBS4xx, cB-RBS421	DSR mode 2 cannot be configured if module is configured for stop mode (see AT*AMPM).
cB-OEMSPA333	Not supported.
cB-OLS425/426	Not supported, see AT*AMDS2.

12.6.16 DTR DSR Settings Low Energy (AT*AMDS2)

Configure the low energy module to let the host control the module operation using the DTR and DSR pins of the UART interface to achieve a customized behavior. The DTR pin is output from the module and the DSR pin is input to the module.

AT Command	Description
AT*AMDS2?<CR>	Read current DTR/DSR configuration.
AT*AMDS2=<dtr_cfg>, <dsr_cfg>, <store_in_startup_database><CR>	Write DTR/DSR configuration.

Responses	Description
<CR><LF>*AMDS2: <dtr_cfg>, <dsr_cfg><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value

dtr_cfg	integer	UART DTR pin configuration (module output pin). *Currently this value is ignored and the "AT*AMDS2?" command always returns 0.* Default behavior is that DTR is active if there is a Bluetooth connection. If there is no connection, DTR is inactive.
dsr_cfg	integer	UART DSR pin configuration (module input pin). This parameter is a bit field. Bit 0 is the least significant bit. **Bit 0 and 1 (Default 11): DSR control of Stop Mode** **00**: DSR does not affect stop mode. **11**: When DSR is active, stop mode is not allowed and the module will leave stop mode. When DSR is inactive, stop mode is allowed. Note that the module may not enter stop mode just because the host allows it. There may be internal conditions that does not allow it or delays it. When the module power mode is not set to *stop mode* (see AT*AMPM) these bits have no effect, since the module is always awake. Please note that the module must be awake to be able to receive data on the UART. **Bit 2 and 3 (Default 00): DSR control of Discoverability and Connectability** **00**: DSR does not affect discoverability or connectability. **11**: When DSR is active, discoverability and connectability are enabled. When DSR is inactive, discoverability and connectability are disabled**.** Discoverability is only affected if *general discoverability* (see AT*AGDM) is enabled and connectability is only affected if module is configured to be *connectable* (see AT*AGCM). **Bit 4 (default 0): DSR control of External Connect** **0**: External connect is not affected. **1**: If module is configured for external connect (see AT*ADWDRP), a DSR transition from inactive to active will trigger the connection attempt. **Bit 5 (default 0): DSR control of Disconnection** **0**: LE connection is not affected by DSR **1**: A DSR transition from active to inactive will trigger a disconnect.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OLS425/426	Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1. The wake-up time from stop mode is 150s. This means that when DSR is used to wake the module from stop mode the module is ready to receive data on the UART after 150s.
All models except cB-OLS425/426	Not supported, see AT*AMDS.

12.6.17 Power Save Feature Low Energy (AT*AMPSF)

Configure the low energy module to use different power save features.

AT Command	Description
AT*AMPSF?<CR>	Read current power save feature configuration.
AT*AMPSF=<cfg>, <store_in_startup_database><CR>	Write power save feature configuration.

Responses	Description
<CR><LF>*AMPSF: <cfg><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
cfg	integer	Power save feature configuration. This parameter is a bit field. Bit 0 is the least significant bit. **Bit 0 and 1 (default 00):Connection control of Stop Mode** • **00**: Stop mode is not affected by the connection. • **11**: When the connection is active, stop mode is not allowed. When disconnected, stop mode is allowed. When the module power mode is not set to *stop mode* (see AT*AMPM) these bits have no effect, since the module is always awake. Please note that the module must be awake to be able to receive data on the UART.

.store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OLS425/426	Module must be restarted for the AT command to take affect. Hence, store_in_startup_database must always be set to 1.
All models except cB-OLS425/426	Not supported.

12.6.18 Link Policy (AT*AMLP)

AT Command	Description
AT*AMLP?<CR>	Read current Link Policy.
AT*AMLP=<link_policy>, <parameter>, <store_in_startup_database><CR>	Write link policy. The link policy can be chosen to optimize the link for a specific application. The link policy can be chosen to reduce power consumption, get faster response times, increase the range or to optimize the SPA as either sender or receiver. **Note!** **Using other link policies than the default may lead to interoperability problems. Verify that the chosen link policy works with other devices your application is intended to interoperate with. If not, use the default link policy.** Link policy 3,4,10,12 gives the shortest response times. Link policy 8 combined with stop mode (AMPM: 3) gives the lowest power consumption. When using a baud rate of 460 kbps or more on the serial interface, a combination of link policy 2 on the sender and link policy 1 on the receiver gives the highest throughput. When using a slower baud rate, then the default link policy gives equally high throughput. If the remote device rejects the link policy requested by the SPA, then the red LED gives an error indication. If the remote device rejects the link policy, then the default link policy is used.

Responses	Description
<CR><LF>*AMLP: <link_policy>, <parameter><CR><LF>OK<CR><LF>	Successful read response
.<CR><LF>OK<CR><LF>	Successful write response

<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
link_policy	integer	Link policy configurations: 0: Default, No sniff, Exact packet configuration depends on <parameter> and module type. 1: Receiver, No sniff, 1 slot Basic Rate (BR) packets only. 2: Sender, No sniff, 5 slot packets (including EDR packets if supported). 3: QoS, No sniff, Basic Rate (BR) packets only, Short poll interval 4: Sniff, interval 10ms, 1 slot Basic Rate (BR) packets 5: Sniff, interval 50ms, 1 slot Basic Rate (BR) packets 6: Sniff, interval 100ms, 1 slot Basic Rate (BR) packets 7: Sniff, interval 200ms, 1 slot Basic Rate (BR) packets 8: Sniff, interval 500ms, 1 slot Basic Rate (BR) packets The link policies with sniff may be used to get a link with a specific response time or to decrease the power consumption. 9: Long range, DM1 packets 10: Long range, DM1 packets and QoS 11. Long range, all DM packets 12. Long range, all DM packets and QoS 13. Basic Rate (BR) packets only The link policies using only DM1 packets extend the range of the SPA on the cost of a decreased data throughput. Wireless Multidrop™ QoS or Sniff mode is not activated until maximum number of links are connected. This is to ensure that page scan is allowed and that every connection can be setup. If a link goes down the QoS or Sniff mode is disabled until all links are setup again.

parameter	integer	This parameter has different meaning for different link policies and for link policy 0 also module types.
		Default link policy (0)
		OBS411, OBS419 0 (default): connectBlue RSSI based packet control is enabled with both EDR and BR packets. 1: connectBlue RSSI based packet control is disabled.
		OBS433, OBS421 0 (default): connectBlue RSSI based packet control is enabled with BR packets only. 1: connectBlue RSSI based packet control is disabled. 3: connectBlue RSSI based packet control is enabled with EDR packets only (faster for short range).
		OBS410, OBS418 0 (default): Basic Rate 1 and 3 slot packets only.
		OEMSPA3xx 0 (default): Basic Rate (BR) packets only.
		Link policies with sniff (4-8): Bit 0: Exit sniff on data activity. Only used when link policy supports sniff. If set the SPA will try to temporarily exit sniff when receiving data on the serial interface. When no data has been received on the serial interface for 1s, then the link will be put back into sniff mode. If not set, then the link will always be in sniff. Using exit sniff on data activity may be useful when using longer sniff intervals since these links have a low throughput.
		Link policies with QoS (3,10,12): If set to 0 then the shortest pollinterval possible is used. If different from 0 then the value defines the pollinterval. If multidrop is enabled, the pollinterval will not change until the max numbers of clients are connected.
		For the other link policies this parameter has no meaning and shall be set to 0.
		*Only OEMSPA333 *Link policies with All packet sizes (0, 2, 3):* If set to 1, then the device is optimized for throughput. Note, for link policy 3 a value of 1 will also set the shortest possible pollinterval.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	**Constraint**

cB-OLS425/426	Not supported.
cB-OEMSPA333	No support for link policies with sniff (4-8).
cB-OEMSPA3xx	Link policy 13 not supported.

12.6.19 Feature Mask (AT*AMRFM/AT*AMWFM)

AT Command	Description
AT*AMRFM=<feature_mask_id><CR>	Read current feature mask.
AT*AMWFM=<feature_mask_id>, <mask_value>, <store_in_startup_database><CR>	Write feature mask. A set of special features can be enabled/disabled using this command. The Serial Port Adapter must be reset for a new feature mask to take affect.

Responses	Description
<CR><LF>*AMRFM: <feature_mask_id>, <mask_value><CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
feature_mask_id	integer	Feature mask to write. Currently only feature mask 1 is used.

mask_value	integer	Feature mask 1:
		Bit 0: Disable LEDs in stop mode
		This feature disables the LEDs when the Serial Port Adapter is in stop mode. If the Serial Port Adapter has an active connection, then the Blue LED will be enabled.
		Bit 1: Enable fast connection.
		Increased page scan activity for faster response to incoming connections.
		Bit 2: Enable fast discovery.
		Increased inquiry scan activity for faster detection of the device during inquiry or device discovery.
		Bit 3-4: Reserved
		Bit 5: Windows 7 authentication work-around
		Solves an authentication problem detected on some Windows 7 PCs.
		Bit 6: Reserved
		Bit 7: UART fast poll
		This will improve latency but may also increase the power consumption slightly. For iAP1 throughput will also be improved.
		Bit 8: Force un-sniff on data activity.
		If there is data to transmit and sniff is active, the module will leave sniff mode and then transmit data no matter what link policy that is set.
		Bit 9: Delay DTR connect mode.
		Bit 10: Extended Data Mode start event.
		If the module is started or restarted, the start event is sent in Extended Data Mode.
		Bit 11-13: Reserved
		Bit 14: Power reduction. Reduces power consumption. Suitable for applications running baudrates up to 115200. cB-OBS421 based modules only.
		Bit 15: Watchdog milliseconds. Watchdog timeouts set with AT*AMWS will be interpreted as milliseconds instead of seconds.
		Bit 16-17: *Reserved*
		By default all bits are set to 0.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle.
		1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA333	Limited support. Only *Enable fast connection.*
cB-OBS410	Bit 5 supported from firmware version 4.1.1
cB-OBS411	Bit 5 supported fromfirmware version 4.3.6
cB-OBS433	Bit 5 supported from firmware version 4.7.3

| cB-OBS4xx | Bit 8 implemented in releases from 1st December 2011. Bit 7 available in releases from Oct 2011 Bit 15 available in releases from May 2013. |
| cB-OLS425/426 | Not supported. |

12.6.20 Channel Map (AT*AMCM)

AT Command	Description
AT*AMCM? <CR>	Read static channel map. Does not include any changes caused by the adaptive frequency hopping algorithm. Hence, the channel map is the same for all channels in the case of Wireless Multidrop™. Also see "Dynamic Channel Map".
AT*AMCM= <channel0to15>, <channel16to31>, <channel32to47>, <channel48to63>, <channel64to78>, <store_in_startup_database><CR>	Write static channel map. This command can be useful to avoid channels that are already preoccupied by other technologies. However, the adaptive frequency hopping algorithm works very well and it is recommended not to use this command. Each channel in the spectrum is represented by a bit in the bit masks passed as parameters to this command. Set the bit to enable the channel and clear the bit to disable the channel. A minimum of 20 channels must always be enabled. The channel map only has effect when the Serial Port Adapter acts as master.

Responses	Description
<CR><LF>*AMCM:<channel0to15>, <channel16to31>,<channel32to47>, <channel48to63>,<channel64to78> <CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
channel0to15	Integer	Bit mask used to enable or disable channels 0 to 15 (Bit 0 = Channel 0). Default value is 0xFFFF.
channel16to31	Integer	Bit mask used to enable or disable channels 16 to 31. Default value is 0xFFFF. (Bit 0 = Channel 16)

channel32to47	Integer	Bit mask used to enable or disable channels 32 to 47 (Bit 0 - Channel 32). Default value is 0xFFFF.
channel48to63	Integer	Bit mask used to enable or disable channels 48 to 63 (Bit 0 = Channel 48). Default value is 0xFFFF.
channel64to78	Integer	Bit mask used to enable or disable channels 64 to 78 (Bit 0 = Channel 64). Default value is 0x7FFF.
store_in_startup_database	enumerator	0: The setting will only be valid for the current power cycle. 1: The Serial Port Adapter will remember the setting between power cycles. The settings database in the Serial Port Adapter will be updated.

Model	Constraint
cB-OEMSPA333, cB-OLS425/426	Not supported.

12.6.21 Dynamic Channel Map (AT*AMRCM)

AT Command	Description
AT*AMRCM? <CR>	Read dynamic channel map. The dynamic channel map is the static channel map adjusted by the adaptive frequency hopping algorithm. The static channel map is the same for all channels but the dynamic channel map may differ between channels. Also see "Static Channel Map".

Responses	Description
<CR><LF>*AMRCM: <channel0to15>, <channel16to31>,<channel32to47>, <channel48to63>,<channel64to78> <CR><LF>OK<CR><LF>	Successful read response
<CR><LF>OK<CR><LF>	Successful write response
<CR><LF>ERROR<CR><LF>	Error message.

Parameters	Type	Value
channel0to15	Integer	Bit mask used to enable or disable channels 0 to 15 (Bit 0 = Channel 0). Default value is 0xFFFF.
channel16to31	Integer	Bit mask used to enable or disable channels 16 to 31. Default value is 0xFFFF. (Bit 0 = Channel 16)

channel32to47	Integer	Bit mask used to enable or disable channels 32 to 47 (Bit 0 - Channel 32). Default value is 0xFFFF.
channel48to63	Integer	Bit mask used to enable or disable channels 48 to 63 (Bit 0 = Channel 48). Default value is 0xFFFF.
channel64to78	Integer	Bit mask used to enable or disable channels 64 to 78 (Bit 0 = Channel 64). Default value is 0x7FFF.

Model	Constraint
cB-OEMSPA333, cB-OLS425/426	Not supported.
cB-OEMSPA311, cB-OEMSPA331, cB-OEMSPA312, cB-OEMSPA332	Supported only by the Wireless Multidrop™ firmware.

12.6.22 Read / Write IO (AT*AMCIO / AT*AMRIO / AT*AMWIO)

Some of the IO pins can be configured and set using AT commands.

In reset the IO pins are input floating. About 1 ms after start, the boot will configure the IO pins for input pull-up which is the Serial Port Adapter default configuration.

AT Command	Description
AT*AMCIO=<io_pin>,<cfg><CR>	Configure IO for input or output.
AT*AMRIO=<io_pin><CR>	Read IO.
AT*AMWIO=<io_pin>,<value>,<CR>	Write IO.

Responses	Description
<CR><LF>OK<CR><LF>	Successful configuration or write response
<CR><LF>ERROR<CR><LF>	Error message.
<CR><LF>*AMRIO: <value><CR><LF>OK<CR><LF>	Successful read response.

Parameters	Type	Value

io_pin	Integer	IO pin to configure, read or write.
		The following pins are available only for reading. 0: UART-DTR 1: SW0 2: Red 3: Green/SW1 4: Blue 5: UART-CTS 6: UART-Tx 7: UART-RTS 8: UART-Rx 9: UART-DSR 19: I2C-Clock/SS1 20: I2C-Data/SS0 The following pins are available for both reading and writing. 10: SPI-Irq 11: SPI-Miso 12: SPI-Clock 13: SPI-Mosi 14: SPI-SS 15: ADC-IN0 16: ADC-IN1 17: ADC-IN2 18: ADC-IN3 See Electrical Mechanical data sheet for details on pins.
cfg	Integer	IO pin configuration 0: Output Push-Pull 1: Input pull-up 2: Input pull-down 3: Input floating
value	Integer	IO pin value to read or write. 0: Inactive 1: Active See Electrical and Mechanical data sheet for details.

Model	Constraint
cB-OEMSPA3xx	Not supported.
cB-OBS411	Supported in version 4.3.3 or later.
cB-OLS425/426	Pins available for both reading and writing: 10, 15, 16, 17, 18, 19, 20

12.7 Events

12.7.1 Serial Connection Data Mode Closed (*ADCCO)

Event	Description
*ADCCO:<connection_handle>,<reason><CR><LF>	A connection to a remote device has been disconnected.

Event Parameters	Type	Value
connection_handle	integer	Identifies the connection.
reason	enumerator	0: Disconnected by command 1: Disconnected by link loss 255: Reason unknown

Model	Constraint
cB-OLS425/426	Not supported.

12.7.2 User Confirmation (*AGUC)

The security modes, events and commands are described more in detail in the *Bluetooth Serial Port Adapter Security* document.

AT Command	Description
*AGUC:<bd_addr>,<numeric_value><CR><LF>	This event is used during bonding with security mode 6 to indicate that user confirmation of a numeric value is required. If the local and remote sides numeric values are equal a positive reply with AT*AGUC should be issued, otherwise a negative reply.

Event Parameters	Type	Value
bd_addr	Bd_Addr	The remote Bluetooth Device address
numeric_value	integer	This is an integer in the range of [0..999999].

Model	Constraint
cB-OEMSPA3xx	Not supported.

12.7.3 User Passkey Display (*AGUPD)

The security modes, events and commands are described more in detail in the *Bluetooth Serial Port Adapter Security* document.

AT Command	Description
*AGUPD:<bd_addr>,<passkey><CR><LF>	This event is used to indicate to the user a passkey to be entered on the remote device during a bonding procedure with security mode 5. The event should not be replied on.

Event Parameters	Type	Value
bd_addr	Bd_Addr	The remote Bluetooth Device address
passkey	integer	This is an integer in the range of [0..999999].

Model	Constraint
cB-OEMSPA3xx	Not supported.

12.7.4 User Passkey Entry (*AGUPE)

The security modes, events and commands are described more in detail in the *Bluetooth Serial Port Adapter Security* document.

AT Command	Description
*AGUPE:<bd_addr><CR><LF>	This event is used during bonding with security mode 7 to indicate that a passkey is required from the user. The event should be responded with AT*AGUPE.

Event Parameters	Type	Value
bd_addr	Bd_Addr	The remote Bluetooth Device address

Model	Constraint
cB-OEMSPA3xx	Not supported.