baracoda Traceability

Data Capture
for Workforce
in Motion

ToughRunners / ScanWear

Communication Protocol

SUMMARY

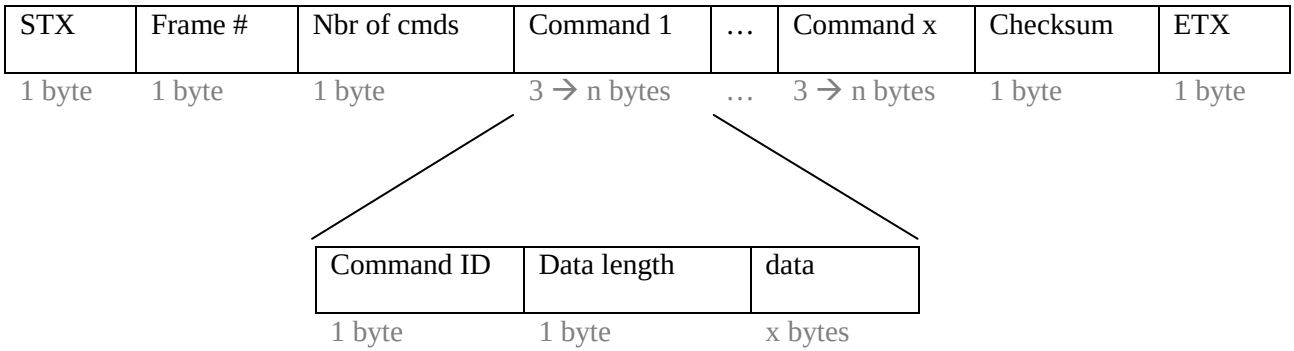
Revision History

Changes to the original manual are listed below.

Document	Date	Description
1.0	25th Sep. 07	Initial release
1.1	16th Dec. 08	Graphic Presentation updated
1.2	15th May 09	Updated for firmware version 4.00.6

1. Introduction: generic packet format

All the frames described in this document are formatted as shown (*):



B_a) 1 Byte : STX
B_b) 1 Byte : Frame number
B_c) 1 Byte : Number of commands (or number of commands responses)
B_d) 3..n Bytes : Command 1
…
B_x) 3..n Bytes : Command x
…
B_y) 1 Byte : CheckSum = $(\sum_{i=b}^{x} B_i) \bmod 256$
B_z) 1 Byte : ETX

Each command is formatted as follows:
C_a) 1 Byte : Command ID
C_b) 1 Byte : Data length
C_c) 0..n Bytes : Data

(*): a limited number of frames do not follow this format. They are described in the section 2/.

2. Command ID summary

The commands are sorted by category (4 MSB of Command ID):

0x0?	Scanner control commands
0x01	Enter "Setting Mode"
0x02	Exit "Setting Mode"
0x03	Launch autotest // RESERVED
0x04	Endurance (AutoScan) test setting // RESERVED
0x05	Retrieve operational statistics
0x06	Reset operational statistics
0x07	Get wrist motion detection level
0x08	Set wrist motion detection level
0x0E	firmware presence flag // RESERVED
0x0F	Restore default settings
0x1?	RESERVED
0x2?	Firmware upgrade commands // RESERVED
0x27	Start programming (application AT89C51ED2)
0x28	End programming
0x29	Clear firmware
0x2A	Read 128Byte bloc
0x2B	Write 128Byte bloc
0x2C	Verify checksum
0x2D	Read Boot cartouche
0x2E	Read Application cartouche
0x2F	Switch to download mode

0x3?	RESERVED
0x4?	MMI commands
0x40	Get vibrator
0x41	Set vibrator
0x42	Get beeps (since version 3.01.00)
0x43	Set beeps (since version 3.01.00)
0x5?	Bluetooth commands
0x5E	Bluetooth module commands
0x6?	Reading and triggering commands
0x60	Get reading mode
0x61	Set reading mode
0x62	Get remote triggering settings
0x63	Set remote triggering settings
0x7?	RESERVED
0x8?	Decoder commands
0x80	Get symbology settings
0x81	Set symbology settings
0x82	Get voting value
0x83	Set voting value
0x84	Get scan beam timeout
0x85	Set scan beam timeout
0x9?	RESERVED

0xA?	Data format commands
0xA2	Get symbology prefix
0xA3	Set symbology prefix
0xA4	Get data suffix
0xA5	Set data suffix
0xA6	Get data prefix
0xA7	Set data prefix
0xA8	Get AIM symbology ID transmission
0xA9	Set AIM symbology ID transmission
0xAA	Get symbology suffix
0xAB	Set symbology suffix
0xB?	RESERVED
0xC?	RESERVED
0xD?	Communication commands
0xD5	Get Radio behavior when in charge
0xD6	Set Radio behavior when in charge
0xE?	RESERVED
0xF?	Power saving commands
0xF0	Get shutdown timers
0xF1	Set shutdown timers
0xF2	Get battery status

3. Command details

3.1. Setting mode

Command ID	**0x01**
Description	Enter Setting mode
Length	0
payload	none
Response	0 (1 = ERROR)

Command ID	**0x02**
Description	Exit Setting mode
Length	0
payload	none
Response	0 (1 = ERROR)

A radio disconnection leads to an exit from this setting mode.

3.2. Operational statistics

Command ID	**0x05**
Description	Retrieve operational statistics
Length	0
payload	none
Response	10 bytes : **AAAABBBBCC** where : **AAAA** = Number of scans done **BBBB** = Operating time (minutes) **CC** = Number of charge cycles done (MSB first)

Command ID	**0x06**
Description	Reset operational statistics
Length	10
payload	10 bytes : **AAAABBBBCC** where : **AAAA** = Number of scans done **BBBB** = Operating time (minutes) **CC** = Number of charge cycles done (MSB first)
Response	0 (1 = ERROR)

3.3. Wrist motion detection level (for BSW only)

Command ID	**0x07**
Description	Get wrist motion detection level
Length	0
payload	none
Response	1 byte : **A** = 0, 1 or 2 0 = medium, 1 = easy, 2 = hard **Default setting = 1 (easy)**

Command ID	**0x08**
Description	Set wrist motion detection level
Length	1
payload	**A** = 0, 1 or 2 0 = medium, 1 = easy, 2 = hard
Response	0 (1 = ERROR)

3.4. Restore default settings

Command ID	**0x0F**
Description	Restore factory default settings (reboots scanner)
Length	1
payload	**A** = 0
Response	none

3.5. MMI settings

Command ID	**0x40**
Description	Get vibrator
Length	0
payload	none
Response	**ABC** where : **A** = Vibration duration on BAD READ event **B** = Vibration duration on BARCODE LOST event **C** = Vibration duration on NACK event Durations in 1/10 sec Default settings: 0x0A 0x0A 0x0A

Command ID	**0x41**
Description	Set vibrator
Length	3
payload	**ABC** where : **A** = Vibration duration on BAD READ event

	B = Vibration duration on BARCODE LOST event **C** = Vibration duration on NACK event Durations in 1/10 sec
Response	0 (1 = ERROR)

Command ID	**0x42 (Since version 3.01.00)**
Description	Get beeps
Length	0
payload	none
Response	1 byte: Bit **A.0** = 0 → enable barcode decoded beep, 1 → disable barcode decoded beep Bit **A.1** = 0 → enable barcode acknowledgement beep, 1 → disable barcode acknowledgement beep Default settings: 0x00

Command ID	**0x43 (Since version 3.01.00)**
Description	Set beeps
Length	1
payload	1 byte: Bit **A.0** = 0 → enable barcode decoded beep, 1 → disable barcode decoded beep Bit **A.1** = 0 → enable barcode acknowledgement beep, 1 → disable barcode acknowledgement beep
Response	0 (1 = ERROR)

3.6. Bluetooth commands

Command ID	**0x5E**
Description	Bluetooth Commands
Length	Variable (1-255)
payload	{Code ID} {length} "Parameters"
Response	If the device responds: {Code ID} {length} "Response" Else: {0}

Bluetooth specific commands from the Bluetooth communication protocol are to be framed within the payload of this message. See Appendix A for more details.

The default Bluetooth settings are the BT module's default settings, excepted the BT name which default value must be handled by the firmware:

ToughRunners : "ToughRunners xx xx"

Scanwear : "ScanWear xx xx"

xx xx being the 4 last readable characters of the BDA written in hexadecimal (two last bytes of BDA).

Example : "Get PIN Code"

Command :

B_a) 0x02 : STX
B_b) 0x00 : Frame number
B_c) 0x01 : Number of commands (or number of commands responses)
B_d) : Command
B_{d1}) 0x5E : Command ID
B_{d2}) 0x03 : Data length
B_{d3}) : Data
B_{d31}) 0x07 : Get PIN Code
B_{d32}) 0x00 : Length MSB
B_{d33}) 0x00 : Length LSB

B_e) 0x69 : CheckSum = ($\sum_{i=b}^{e} B_i$) mod 256

B_f) 0x03 : ETX

Response:

B_a) 0x02 : STX
B_b) 0x00 : Frame number
B_c) 0x01 : Number of commands (or number of commands responses)
B_d) : Command
B_{d1}) 0x5E : Command ID
B_{d2}) 0x07 : Data length
B_{d3}) : Data
B_{d31}) 0x07 : Get PIN Code

B_{d32}) 0x00 : Length MSB
B_{d33}) 0x04 : Length LSB
B_{d34}) 0x30 : PIN Code 0
B_{d35}) 0x30 : PIN Code 1
B_{d36}) 0x30 : PIN Code 2
B_{d37}) 0x30 : PIN Code 3
B_e) 0x31 : CheckSum

$$= (\sum_{i=b}^{x} B_i) \bmod 256$$

= 0x01+0x5E+x007+0x07+0x04+0x00
+0x30+0x30+0x30+0x30 mod 0x100
= 0x131 mod 0x100
= 0x31

B_f) 0x03 : ETX

3.7. Reading and triggering commands

Command ID	**0x60**
Description	Get reading mode
Length	0
payload	none
Response	**ABCDEFGHI** where : **A** = long press action (1 sec.): ------00 : Disabled ------01 : Hold laser beam ------10 : Shut down scanner ------11 : Start Multiscan Session **B** = simple press action : ------00 : Disabled ------01 : Simple scan ------10 : Start Multiscan Session ---1---- : Stop Multiscan Session **C** = wrist motion action : ------00 : Disabled

	------01 : Simple scan ------10 : Start Multiscan Session ---1---- : Stop Multiscan Session **D** = long press duration x 100ms **E** = maximum scans in session: -0000000 : unlimited -XXXXXXX : number of scans in the session 1------- : Anti-doubloon in the session **F** = Inter-scan interval x100ms **G** = 0 **H** = 0 **I** = 0 Default settings : ScanWear : 0x00 0x01 0x01 0x0A 0x00 0x0A 0x00 0x00 0x00 ToughRunners :0x01 0x01 0x01 0x0A 0x00 0x0A 0x00 0x00 0x00

Command ID	**0x61**
Description	Set reading mode
Length	9
payload	**ABCDEFGHI** where : **A** = long press action (1 sec.): ------00 : Disabled ------01 : Hold laser beam ------10 : Shut down scanner ------11 : Start Multiscan Session **B** = simple press action : ------00 : Disabled ------01 : Simple scan ------10 : Start Multiscan Session ---1---- : Stop Multiscan Session **C** = wrist motion action : ------00 : Disabled ------01 : Simple scan ------10 : Start Multiscan Session ---1---- : Stop Multiscan Session **D** = long press duration x 100ms **E** = maximum scans in session: -0000000 : unlimited -XXXXXXX : number of scans in the session 1------- : Anti-doubloon in the session **F** = Inter-scan interval x100ms

	G = 0 **H** = 0 **I** = 0
Response	0 (1 = ERROR)

Command ID	**0x62**
Description	Get remote triggering settings
Length	0
payload	none
Response	**ABCDEFG** where : **A** = character to trigger a Good Read signal **B** = character to trigger a Good Read signal **C** = character to trigger a Simple Scan **D** = character to start an Multiscan Session **E** = character to stop an Multiscan Session **F** = character to lock the scan engine **G** = character to unlock the scan engine Default settings : 0xA1 0xA2 0xB1 0xB2 0xB3 0xC1 0xC2

Command ID	**0x63**
Description	Set remote triggering settings
Length	7
payload	**ABCDEFG** where : **A** = character to trigger a Good Read signal **B** = character to trigger a Good Read signal **C** = character to trigger a Simple Scan **D** = character to start an Multiscan Session **E** = character to stop an Multiscan Session **F** = character to lock the scan engine **G** = character to unlock the scan engine
Response	0 (1 = ERROR)

3.8. Decoder commands

Command ID	**0x80**
Description	Get symbology settings
Length	0 or 1
payload	none
Response	17 or 20 bytes (since version 3.02.03) (cf. Appendix B for more details) If length = 0 then 17 bytes, if length = 1 then 20 bytes Default value: 0xB4 0x90 0xEF 0x20 0x36 0x00 0x00 0x00 0x77 0x00 0x00 0x00 0xE3 0x2F 0x08 0x00 0x1D

Command ID	**0x81**
Description	Set symbology settings
Length	20 (since version 3.02.03)
payload	cf. Appendix B for details
Response	0 (1 = ERROR)

Command ID	**0x82**
Description	Get voting value
Length	0
payload	none
Response	**V** = number of decodes to validate a good scan Default value = 1

Command ID	**0x83**
Description	Set voting value
Length	1
payload	**V** = number of decodes to validate a good scan
Response	0 (1 = ERROR)

Command ID	**0x84**
Description	Get scan beam timeout
Length	1
payload	**T** = timeout in seconds (255 = Autoscan mode) Default value = 3
Response	0 (1 = ERROR)

Command ID	**0x85**
Description	Set Scan beam timeout

Length	1
payload	**T** = timeout in seconds (255 = Autoscan mode)
Response	0 (1 = ERROR)

3.9. Data format commands

Command ID	**0xA2**
Description	Get symbology prefix
Length	0 or 1
payload	None
Response	22 or 28 bytes (since version 3.02.03) (if length = 0 then 22 bytes, if length = 1 then 28 bytes): **AABBCCDDEEFFGGHHIIJJKKLLMMNN** Where: **AA** = Code39 **BB** = Interleaved 2 of 5 **CC** = Standard 2 of 5 **DD** = Codabar **EE** = EAN/UPC **FF** = Code128 **GG** = MSI **HH** = PLESSEY **II** = Code93 **JJ** = EAN128 **KK** = Codablock F **LL** = RSS 14 (GS1 Databar) **MM** = RSS Ltd (GS1 Databar Ltd) **NN** = RSS Expanded (GS1 Databar Expanded) 0x00 means disabled.

	Default settings : 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00

Command ID	**0xA3**
Description	Set symbology prefix
Length	28 (since version 3.02.03)
payload	**AABBCCDDEEFFGGHHIIJJKKLLMMNN** Where: **AA** = Code39 **BB** = Interleaved 2 of 5 **CC** = Standard 2 of 5 **DD** = Codabar **EE** = EAN/UPC **FF** = Code128 **GG** = MSI **HH** = PLESSEY **II** = Code93 **JJ** = EAN128 **KK** = Codablock F **LL** = RSS 14 (GS1 Databar) **MM** = RSS Ltd (GS1 Databar Ltd) **NN** = RSS Expanded (GS1 Databar Expanded) 0x00 means disabled.
Response	0 (1 = ERROR)

Command ID	**0xA4**
Description	Get data suffix
Length	0
payload	None
Response	0-32 bytes: **suffix** Default settings : No suffix
Command ID	**0xA5**
Description	Set data suffix
Length	0-32
payload	**suffix**
Response	0 (1 = ERROR)

Command ID	**0xA6**
Description	Get data prefix
Length	0
payload	None
Response	0-32 bytes: **prefix** Default settings : No prefix

Command ID	**0xA7**
Description	Set data prefix
Length	0-32
payload	**prefix**
Response	0 (1 = ERROR)

Command ID	**0xA8**
Description	Get AIM symbology ID transmission
Length	0
payload	None
Response	**A** : 0 = disabled 1 = enabled Default settings : A = 0

Command ID	**0xA9**
Description	Set AIM symbology ID transmission
Length	1
payload	**A** : 0 = disabled 1 = enabled
Response	0 (1 = ERROR)
Command ID	**0xAA**
Description	Get symbology suffix
Length	0 or 1
payload	None
Response	22 or 28 bytes (since version 3.02.03) (if length = 0 then 22 bytes, if length = 1 then 28 bytes): **AABBCCDDEEFFGGHHIIJJKKLLMMNN** Where: **AA** = Code39 **BB** = Interleaved 2 of 5

	CC = Standard 2 of 5 **DD** = Codabar **EE** = EAN/UPC **FF** = Code128 **GG** = MSI **HH** = PLESSEY **II** = Code93 **JJ** = EAN128 **KK** = Codablock F **LL** = RSS 14 (GS1 Databar) **MM** = RSS Ltd (GS1 Databar Ltd) **NN** = RSS Expanded (GS1 Databar Expanded) 0x00 means disabled. Default settings : 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00 0x00

Command ID	**0xAB**
Description	Set symbology suffix
Length	28 (since version 3.02.03)
payload	**AABBCCDDEEFFGGHHIIJJKKLLMMNN** Where: **AA** = Code39 **BB** = Interleaved 2 of 5 **CC** = Standard 2 of 5 **DD** = Codabar

	EE = EAN/UPC **FF** = Code128 **GG** = MSI **HH** = PLESSEY **II** = Code93 **JJ** = EAN128 **KK** = Codabloc F **LL** = RSS 14 (GS1 Databar) **MM** = RSS Ltd (GS1 Databar Ltd) **NN** = RSS Expanded (GS1 Databar Ltd) 0x00 means disabled.
Response	0 (1 = ERROR)

3.10. Communication commands

Command ID	**0xD5**
Description	Get radio behavior when in charge
Length	0
payload	None
Response	1 byte: Bit **A.0** = 1 if switch to slave when charging Bit **A.1** = 1 if switch radio off when charging Default settings : A = 0x01

Command ID	**0xD6**
Description	Set radio behavior when in charge

Length	1
payload	Bit **A.0** = 1 if switch to slave when charging Bit **A.1** = 1 if switch radio off when charging
Response	0 (1 = ERROR)

3.11. Power saving commands

Command ID	**0xF0**
Description	Get shutdown timers
Length	0
payload	None
Response	7 bytes: **AABBCCU** Where: **AA** = scanner shutdown timer (sec.) **BB** = radio shutdown timer when in Master mode (sec.) **CC** = radio shutdown timer when in Slave mode (sec.) **U** = 0 (unused) Default settings : 0x04 0xB0 0x04 0xB0 0x04 0xB0 0x00

Command ID	**0xF1**
Description	Set shutdown timers
Length	7
payload	**AABBCCU** Where: **AA** = scanner shutdown timer (sec.) **BB** = radio shutdown timer when in Master mode (sec.)

	CC = radio shutdown timer when in Slave mode (sec.) **U** = 0 (unused)
Response	0 (1 = ERROR)

Command ID	**0xF2**
Description	Get battery status
Length	0
payload	None
Response	1 byte: Bits **A.0-6** = battery level (RFU) Bit **A.7** = 1 → low battery

4. Special packets

These packets do not follow the above frame format.

4.1. Deprecated packets

Code ID	Description	frame
0x01	Legacy	1 1 1 or 1 2 1

These 2 sequences will be recognized and purged for backward compatibility with older Baracoda products.

4.2. Acknowledgment packets

Code ID	Description	frame
0x06	ACK	0x06 1 X
0x15	NAK	0x15 1 X

These messages acknowledge the reception of a valid message with the expected sequence number X, before processing it.
For captured data from the scanner, ACK and NAK have the same meaning but will trigger a different event on the scanner.

Code ID	Description	Frame
0x16	SYN	0x16 1 X

This message acknowledges the reception of a message to acknowledge with an unexpected sequence number. X is the expected sequence number.
The device will resynchronize its remote sequence number when receiving this message.

From this point, all the frames described in this section 2/ are formatted as shown:

Code ID	length	Payload
1 byte	2 bytes	-

- 1 byte for code ID
  - Bits 7:5 is the logical device
  - Bits 4:1 is the command
  - Bit 0: when set, the message must be acknowledged
- 2 bytes for the size of the payload (big-endian), including the sequence number byte which is considered as part of the payload
- Payload (including 1 byte for sequence number when applicable).

The response will have the same code ID as the command.

4.3. Special scanner to host messages

Code ID	Description	Payload
0x32–0x33	Barcode data	Barcode string

4.4. Special host to scanner messages

Code ID	0x46-0x47
Description	Get Capture Frame Format
Payload	None
Response	1 byte {0 = Baracoda, 1 = Baracoda + ACK, 2 = Raw} Default settings = 0

Code ID	0x48-0x49
Description	Set Capture Frame Format
Payload	1 byte {0 = Baracoda, 1 = Baracoda + ACK, 2 = Raw}
Response	1 byte: {Bit 0: Success}

Code ID	0x76-0x77
Description	Get Product Version
Payload	None
Response	x bytes : «Baracoda ScanWear…» / «Baracoda ToughRunners…»

5. Appendix A: Bluetooth Protocol.

5.1. The configuration frames are as follows:

Header	Length	Payload
1 byte	2 bytes(MSB, LSB)	0 to 65535 bytes

5.2. Commands:

Command	Header	Length	Payload	Answer
Set PinCode	0x01	xx xx (new pin size)	N digits PIN. (Default “0000”)	0x01 00 01 01 if done 0x01 00 01 00 if not

Max Pin length=16

Command	Header	Length	Payload	Answer
Get PinCode	0x07	00 00	N digits PIN. (Default “0000”)	0x07 {PinCode size} {Pincode}

Command	Header	Length	Payload	Answer
Set Name	0x02	xx xx (new name size)	New name	0x02 00 01 01 if done 0x02 00 01 00 if not

(Names up to 20 Bytes)

Command	Header	Length	Payload	Answer
Get Name	0x08	00 00		0x08 {name size} {name}

(Name size: 2 Bytes MSB, LSB)

Command	Header	Length	Payload	Answer
Set mode	0x03	00 01	0x01 if MASTER, 0x00 if SLAVE (default SLAVE)	0x03 00 01 01 if done 0x03 00 01 00 if not

When in Master, the Module connects to the address specified by Set REMOTE BDA or to the last paired device.

Command	Header	Length	Payload	Answer
Set mode	0x03	00 02	[0x01 if MASTER, 0x00 if SLAVE], [BT Clock Role switch] (default SLAVE)	0x03 00 01 01 if done 0x03 00 01 00 if not

You can set the size to 2. In this case, the second argument tells the module for an automatic BT clock role switch. This is an optional argument.

The real MASTER in a Bluetooth piconet is the device which manages the clock used for the frequency hopping. We used to speak about MASTER too for devices which create the connection(that's true if you do not switch the clock role)

A device with a slave BT clock role is unable to synchronize more than one master clock. If more than one SmartModule needs to connect to the same other device (PC, Access Point…) you will need to switch the clock role to allow the slave to be connected to more than one master. Note that most of the BT access point already generate the BT clock role switch when a master device creates a connection. In that case you don't need to specify this argument (if you do, it will cancel the Access Point clock switch and the result is as nothing was done).

Command	Header	Length	Payload	Answer
Get mode	0x04	00 00	-	0x04 00 02 {Mode (1byte) | Switch role (1byte)}

Mode: 0x01 if MASTER, 0x00 if SLAVE
Switch role: 0x01 if want automatic switch role, 0x00 otherwise

Command	Header	Length	Payload	Answer
Set Remote BDA (Used by Master Mode)	0x05	00 06	BDA(ex:0x00,0x02,0xC3,0x21, 0xDE,0xFA)	0x05 00 01 01 if done 0x05 00 01 00 if not

If The SM is set to Master (using Set MODE command), the SM use this Address to connect to.
(No default value, depends of the last programmed)

Command	Header	Length	Payload	Answer
Get Remote BDA	0x06	00 00	-	0x06 00 06 {6 bytes of BDA}

Command	Header	Length	Payload	Answer
Get Bluetooth Version	0x76	00 00	-	0x76, x, x, {version string}

Command	frame	Answer
Restore Factory Settings	'R', 's', 't'	-

Restore default settings:
Pin code “0000”
Mode : Slave
Link Timeout : 5s
Security mode : ON
Sniff
Uart settings.
Class of Device : 0x500 (peripheral)
Encryption Mode
Page And Inquiry Scan.
Remote Channel (0) and Target Service (SPP)
Bluetooth Name (Smart Module)
Local Services (SPP only)
All other settings are not changed.

Command	Header	Length	Payload	Answer
Get inquiry scan timeout	0x27	00 00	-	0x27 00 04 [Inquiry Interval (MSB) | Inquiry Interval (LSB) | Inquiry Window (MSB) | Inquiry Window (LSB)]

Inquiry Interval and Inquiry Window are in number of Bluetooth slots) (1 slot = 0.625 ms)

Command	Header	Length	Payload	Answer
Set inquiry scan timeout	0x26	00 04	[Inquiry Interval (MSB) | Inquiry Interval (LSB) | Inquiry Window (MSB) | Inquiry Window (LSB)] (default 0xC80, 0x18)	0x26 00 01 01 if done 0x26 00 01 00 if not

Inquiry Scan TimeOuts are used by the Module to answer to Inquiries. So, if you set both values to 0, the Module will not be discoverable.

Command	Header	Length	Payload	Answer
Get page scan timeout	0x25	00 00	-	0x25 00 04 [Page Interval (MSB) | Page Interval (LSB) | Page Window (MSB) | Page Window (LSB)]

Page Scan Interval and Page Scan Window are in number of Bluetooth slots) (1 slot = 0.625 ms)

Command	Header	Length	Payload	Answer
Set page scan timeout	0x24	00 04	[Page Interval (MSB) | Page Interval (LSB) | Page Window (MSB) | Page Window (LSB)] (default 0x320, 0xb0)	0x24 00 01 01 if done 0x24 00 01 00 if not

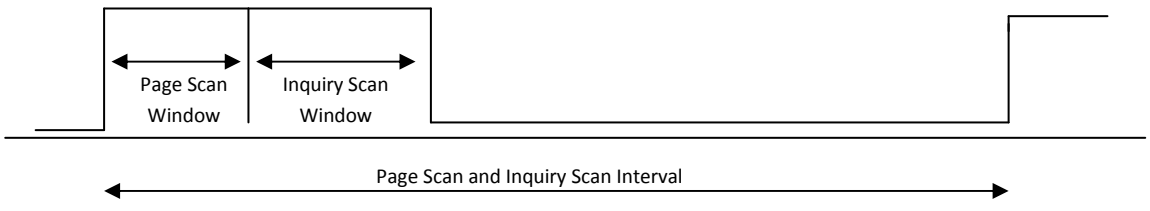
Page Scan TimeOuts are used by the Module to answer to Connect Inquiries. So, if you set both values to 0, the Module will not be Connectable.

<u>Typical values are:</u>

Full power:
Inquiry Interval = 0x400
Inquiry Window = 0x200
Page Scan Interval = 0x400
PageScan Window = 0x200

Low power:
Inquiry Interval = 0x320
Inquiry Window = 0x80
Page Scan Interval = 0x320
PageScan Window = 0x80

Here is how these values change the consumption of the Module:



Command	Header	Length	Payload	Answer
Set sniff	0x09	00 04	[MSB of MinSniff interval, LSB of MinSniff interval, MSB of MaxSniff interval, LSB of MaxSnif interval]	0x09 00 01 01 if done 0x09 00 01 00 if not

Command	Header	Length	Payload	Answer
Set sniff (advanced)	0x09	00 08	[MSB of MinSniff interval, LSB of MinSniff interval, MSB of MaxSniff interval, LSB of MaxSnif interval, Sniff Attempts MSB, Sniff attempts LSB, Sniff timeout MSB, Sniff timeout LSB]	0x09 00 01 01 if done 0x09 00 01 00 if not

(default 0xf0, 0x50, 0x08, 0x08)

Command	Header	Length	Payload	Answer
Get sniff	0x10	00 00		0x10 00 08 [MSB of MinSniff interval, LSB of MinSniff interval, MSB of MaxSniff interval, LSB of MaxSnif interval, Sniff Attempts MSB, Sniff attempts LSB, Sniff timeout MSB, Sniff timeout LSB]

When setting only MinSniff and MaxSniff values, the default value 0x08 will be used for Sniff attempts and Sniff timeout.

Typical values are:

Full speed (full power)
MinSniff = 0
MaxSniff = 0

Very Low Power (low speed): (sniff of 500ms Only are accepted. If the remote device does not support sniffs of 500ms, no sniff will be used)
MinSniff = 0x0320
MaxSniff = 0x0320

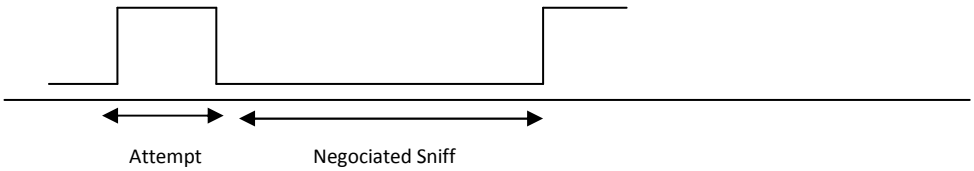
Very Low Power (low speed): (sniff between 250ms to 500ms are accepted. No sniff will be used if the remote device does not support any sniff values in this specified range)
MinSniff = 0x0160
MaxSniff = 0x0320

Low Power (medium speed):

MinSniff = 0x0050
MaxSniff = 0x00F0
Attempt = 0x0008
Timeout = 0x0030

MaxSniff and MinSniff are only used for sniff negociation between the Smartodule and the other BT device. If both sides allow sniff value MaxSniff, then MaxSniff will be used. If the other side does not accept Sniff values MinSniff to MaxSniff, no sniff will be used.

Values are in number of Bluetooth slots (1 slot = 625µs)
Set MinSniff and MaxSniff to 0 to disable Sniff.
MinSniff must be inferior to MaxSniff.
Possible values for MinSniff and MaxSniff are 0x12 to 0xFFFF.
Sniff attempts of 0 is not allowed.
Warning: Setting MaxSniff to 0xFF means a sniff period of 40s! You will have very very low data rate.
Note: This setting takes effect immediately.



For further details on Sniff values, see the Bluetooth spec 1.1, chapter 10.8.2

Command	Header	Length	Payload	Answer
Set link timeout	0x19	00 02	[MSB of link Tmo, LSB of link Tmo]	0x19 00 01 01 if done 0x19 00 01 00 if not

The link Time Out is a multiple of 625µsec (625µs = 1 Bluetooth slot) (default 0x7D00 (=20s))

This Timeout is used by the Link Manager to monitor the Bluetooth Link. If there is no answer from the other device after this timeout, the Link Manager assumes that we are disconnected. By default, this value is set to 20 seconds. You can go down to 1s, but then you can have disconnection even if it's only a temporary perturbation.

This value will take effect at the next connection.

Command	Header	Length	Payload	Answer
Get link timeout	0x18	00 00	-	0x18 00 02 [MSB of link Tmo, LSB of link Tmo]

Command	Header	Length	Payload	Answer
Set security mode	0x21	00 {size}	{00 non secured, 01 secured} {PIN CODE (default 01)	0x21 00 01 01 if done, 0x21 00 01 00 if not

Size=PINCODE size + 1
For example : 0x21 00 05 00 30 30 30 30 to disable security

Command	Header	Length	Payload	Answer
Get security mode	0x20	00 00	-	0x20 00 01 01 if secured 0x20 00 01 00 if non secured

Command	Header	Length	Payload	Answer
Get Bluetooth class of device	0x30	00 00	-	0x30 00 04 [Class of Device]

See the Bluetooth spec. for more details.

Typical Bluetooth class of device:

Peripheral	0x000500 (default)
Undefined	0x001F00
Phone	0x502204
Computer	0x120104
PDA	0x100114
Access Point	0x120320

Command	Header	Length	Payload	Answer
Set BT class of device	0x31	00 04	[Class of Device (4 bytes, MSB->LSB)] (default 0x500)	0x31 00 01 01 if done 0x31 00 01 00 if not

Command	Header	Length	Payload	Answer
Get BT class of device	0x30	00 00	-	0x30 00 04 [CoD (4 bytes, MSB->LSB)]

Command	Header	Length	Payload	Answer
Get local BT address	0x43	00 00	-	0x43 00 06 {6 Bytes (BD_address MSB, ..., LSB)}

Command	Header	Length	Payload	Answer
Set Target Service UUID	0x38	00 02	[UUID (2 Bytes)] (default 0x1101)	0x38 00 01 01 if done 0x38 00 01 00 if not

Try to connect to this remote service.

Here are some service UUID:

SPP	0x1101
DUN	0x1103
FAX	0x1102

You can get more UUIDs by reading the Bluetooth spec.

Command	Header	Length	Payload	Answer
Get Target Service UUID	0x39	00 00	-	0x39 00 02 [UUID]

Command	Header	Length	Payload	Answer
Set Encryption Mode	0x41	00 01	[Encryption (1 Byte)]	0x41 00 01 01 if done 0x41 00 01 00 if not

Argument is: 0x01 to enable encryption, 0x00 to disable.

Command	Header	Length	Payload	Answer
Get Encryption mode	0x40	00 00	-	0x40 00 01 [encryption]

Command	Header	Length	Payload	Answer
Set Remote rfcomm channel	0x36	00 01	[channel (1 Byte)]	0x36 00 01 01 if done 0x36 00 01 00 if not

Command	Header	Length	Payload	Answer
Get Remote rfcomm channel	0x37	00 00	-	0x37 00 01 [channel]

If “channel” is not zero, the Module will directly try to connect (if in master mode) to the specified rfcomm channel.
Setting the channel to zero will force the Module to connect (if in master mode) to the first specified Remote Service UUID (by default SPP).
The services in the Module are all set to channel 1.

6. Appendix B: Decoder Protocol.

This section describes in detail the 20 bytes of the response/payload of the 0x80/0x81.

Byte #	Byte name	Default value
1	COD1	0xB4
2	COD2	0x90
3	OPC39	0xEF
4	OPMUL	0x20
5	OP25I	0x36
6	LEI1	0x00
7	LEI2	0x00
8	LEI3	0x00
9	OP25S	0x77
10	LES1	0x00
11	LES2	0x00
12	LES3	0x00
13	OPMON	0xE3
14	OPEAN1	0x2F
15	OPEAN2	0x08
16	OPC93	0x00
17	FNC1	0x1D
18	RSS 14 (GSS Databar)	0x3B
19	RSS Ltd (GSS Databar Ltd)	0x3B
20	RSS Expanded (GSS Databar Expanded)	0x3B

The symbologies 18,19,20 are available since firmware version 3.02.03.

COD1	Description	Default
b0	Reserved	0
b1	Enable MSI-PLESSEY	0
b2	Enable Code 128	1
b3	Enable standard 2/5	0
b4	Enable CODABAR / MONARCH	1
b5	Enable UPC/EAN	1
b6	Enable interleaved 2/5	0
b7	Enable CODE 39	1

COD2	Description	Default
b0	unused	0
b1	unused	0
b2	unused	0
b3	unused	0
b4	Enable EAN 128	1
b5	Enable AIM ID for EAN128	0
b6	Disable EAN8 check digit transmission	0
b7	Enable code 93	1

Remark:

The EAN128 is encoded with code128 symbology.

When code128 is enabled, EAN128 barcodes are decoded but the symbology ID is the code128's one.

When both code128 and EAN128 are enabled, both are decoded but have a different symbology ID.
When only EAN128 is enabled, only EAN128 codes are decoded.

Code39 parameters:

OPC39	Description	Default
b0	Standard 43 characters (1) / FULL ASCII (0)	1
b1	Start/Stop characters not transmitted	1
b2	(0,0): mod43 checksum calculation enabled (0,1): CIP checksum calculation enabled (1,0): Italian checksum calculation enabled (1,1): checksum calculation disabled	1
b3		1
b4	Check digit not transmitted	0
b5	Reserved (do not modify)	1
b6	Reserved (do not modify)	1
b7	Reserved (do not modify)	1

OPMUL	Description	Default
b0	Reserved (do not modify)	0
b1	Reserved (do not modify)	0
b2	Reserved (do not modify)	0
b3	Reserved (do not modify)	0
b4	Reserved (do not modify)	0
b5	Reserved (do not modify)	1
b6	Reserved (do not modify)	0
b7	Reserved (do not modify)	0

Interleaved 2 of 5 parameters:

OP25I	Description	Default
b0	Reserved (do not modify)	0
b1	(0,0) : 1 fixed allowed length (specified in LEI1) (1,0) : 2 fixed allowed lengths (specified in LEI1 and LEI2) (0,1) : 3 fixed allowed lengths (specified in LEI1, LEI2 and LEI3) (1,1) : any length allowed (>4)	1
b2		1
b3	Check digit not transmitted	0
b4	Check Digit not calculated	1
b5	Reserved (do not modify)	1
b6	Reserved (do not modify)	0
b7	Reserved (do not modify)	0

LEI1 / LEI2 / LEI3	Description	Default
n	0: No length test >0: Authorise n-character barcodes	0

Nota :
If one length allowed, specify it in LEI1.
If two lengths allowed, fill LEI1 and LEI2 with positive values.
If zero is specified and the (b1,b2) bits of OP25I are not (1,1) then the first interleaved 2/5 decoded barcode will fix the length.

Standard 2 of 5 and MSI parameters:

OP25S	Description	Default
b0	Reserved (do not modify)	1
b1	(0,0) : 1 fixed allowed length (specified in LES1) (1,0) : 2 fixed allowed lengths (specified in LES1 and LES2) (0,1) : 3 fixed allowed lengths (specified in LES1, LES2 and LES3) (1,1) : any length allowed (>4)	1
b2		1
b3	Check digit not transmitted	0
b4	Check digit not calculated	1
b5	Code MSI Check Digit (0,0): not calculated (1,0): Modulo 11 (0,1): Double modulo 10 (1,1) : Modulo 10	1
b6		1
b7	Code MSI check digit not transmitted	0

LES1 / LES2 / LES3	Description	Default
n	0: No length test >0: Authorise n-character barcodes	0

Nota :
If one length allowed, specify it in LES1.
If two lengths allowed, fill LES1and LES2 with positive values.
If zero is specified and the (b1,b2) bits of OP25S are not (1,1) then the first standard 2/5 decoded barcode will fix the length.

CODABAR et PLESSEY parameters :

OPMON	Description	Default
b0	Reserved (do not modify)	1
b1	Reserved (do not modify)	1
b2	Start/Stop CODABAR (0,0) : start/stop abcd/abcd (1,0) : start/stop ABCD,ABCD (0,1) : start/stop abcd,tn*e (1,1) : standard	0
b3		0
b4	Reserved (do not modify)	0
b5	Reserved (do not modify)	1
b6	Reserved (do not modify)	1
b7	Code PLESSEY check digit not transmitted	1

UPC/EAN parameters :

OPEAN1	Description	Default
b0	Validation UPCA	1
b1	Validation UPCE	1
b2	Validation EAN8	1
b3	Validation EAN13	1
b4	ADD-ON required and transmitted (**)	0
b5	ADD-ON disabled	1
b6	UPCA number system not transmitted	0
b7	UPCA check digit not transmitted	0

(**) when decoded, the add-on is transmitted.

OPEAN2	Description	Default
b0	UPCE check digit not transmitted	0
b1	UPCE conversion enabled	0
b2	0: transmit UPCE as UPCA 1: transmit UPCE as EAN13	0
b3	0: transmit UPCA as EAN13 1: transmit UPCA as UPCA	1
b4	Reserved (do not modify)	0
b5	UPCE number system not transmitted	0
b6	Reserved (do not modify)	0
b7	EAN13check digit not transmitted	0

Code93 parameters :

OPC93	Description	Default
	Reserved (do not modify)	0

EAN128 parameters :

FNC1	Description	Default
b0-b6	ASCII (0 à 127) GS replacment character	0x1D
b7	FNC1 separator character transmitted	0

RSS 14 (GS1 Databar) parameters :

RSS14	Description	Default
b0	RSS14 validation	1
b1	AIM Prefix «]e0 » validation	1
b2	AIM Prefix «]C1 » validation (prioritary over b1)	0
b3	Application indentifier AI=(01) validation	1
b4	Checksum modulo 10 validation	1
b5	Linear decoding of composite 2D barcodes allowed	1
b6	Not used	0
b7	Not used	0

RSS Ltd (GS1 Databar Ltd) parameters :

RSS Ltd	Description	Default
b0	RSS Ltd validation	1
b1	AIM Prefix «]e0 » validation	1
b2	AIM Prefix «]C1 » validation (prioritary over b1)	0
b3	Application indentifier AI=(01) validation	1
b4	Checksum modulo 10 validation	1
b5	Linear decoding of composite 2D barcodes allowed	1
b6	Not used	0
b7	Not used	0

RSS Expanded (GS1 Databar Expanded) parameters :

RSS Expanded	Description	Default
b0	RSS Expanded validation	1
b1	AIM Prefix «]e0 » validation	1
b2	AIM Prefix «]C1 » validation (prioritary over b1)	0
b3	Application indentifier AI=(01) or (019) validation	1
b4	Checksum modulo 10 validation	1
b5	Linear decoding of composite 2D barcodes allowed	1
b6	Not used	0
b7	Not used	0