

BLUEBOX



INDUSTRIAL RFID DEVICES



Quick Start Guide Configuration Commands

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1 Introduction

1.1 Simple Configuration Commands

Configuration commands without page addresses have 7 Bytes of configuration data. These are transferred in 14 Bytes payload per telegram. These are labelled <param 1 h>...<param 7 l>. For the General Configuration it looks this way.

- 6 Bytes header of telegram with command code
- 14 Bytes configuration data ASCII
- 3 Bytes trail of telegram with checksum

SOH <adda h> <adda l> STX '2' 'F'

1. <param 1 h>
2. <param 1 l>
3. ...
4. ...
5. ...
6. ...
7. <param i h>
8. <param i l>
9. ...
10. ...
11. ...
12. ...
13. <param 7 h>
14. <param 7 l>

ETX <bcc> CR

1.1.1 Replies

On successful setting the addressed **BLUEBOX** replies with:

SOH <add h> <add l> ACK <bcc> CR

If an error occurs, the **BLUEBOX** replies with:

SOH <add h> <add l> NAK <bcc> CR

1.2 Example: General Configuration

This table from the manual of the device lists for each configuration field (first line) the meaning (second line) and the default value (third line):

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------|---------|---------|------|------|-------------|-------|
| Device Address | Serial1 | Serial2 | 0x00 | 0x00 | Filter Time | Flags |
| 0xFF | 0x48 | 0x10 | 0x00 | 0x00 | 0x01 | 0x80 |

Here the corresponding configuration telegram:

SOH <adda h> <adda l> STX '2' 'F'

1. **ASCII F = 0x46 (New device address high nibble)**
2. **ASCII F = 0x46 (New device address low nibble)**
3. **ASCII 4 = 0x34 (Serial configuration Byte 1 high nibble)**
4. **ASCII 8 = 0x38 (Serial configuration Byte 1 low nibble)**
5. **ASCII 1 = 0x31 (Serial configuration Byte 2 high nibble)**
6. **ASCII 0 = 0x30 (Serial configuration Byte 2 low nibble)**
7. **ASCII 0 = 0x30 (Padding Byte)**
8. **ASCII 0 = 0x30 (Padding Byte)**
9. **ASCII 0 = 0x30 (Padding Byte)**
10. **ASCII 0 = 0x30 (Padding Byte)**
11. **ASCII 1 = 0x31 (Filter time* high nibble)**
12. **ASCII 7 = 0x37 (Filter time* low nibble)**
13. **ASCII 8 = 0x38 (Flags high nibble)**
14. **ASCII 0 = 0x30 (Flags low nibble)**

ETX <bcc> CR

* Example for filter time: 23 seconds = 23 decimal = 0x17 hexadecimal = 0001.0111 binary => „ASCII 1 = 0x31“ + ASCII 7 = 0x37“

Telegram from PC/SPS to BLUEBOX

| Byte # | Number of Bytes | Data | Value | Description |
|---------|-----------------|-----------|----------|----------------------------------|
| 0 | 1 | 0x01 | SOH | Start of Header |
| 1...2 | 2 | 0x46 0x46 | FF (255) | Bluebox device address |
| 3 | 1 | 0x02 | STX | Start of telegram contents |
| 4...5 | 2 | 0x32 0x46 | 2F | Command code |
| 6...7 | 2 | | | New device address |
| 8...9 | 2 | | | Serial configuration Byte 1 |
| 10...11 | 2 | | | Serial configuration Byte 2 |
| 12...15 | 4 | | | Padding |
| 16...17 | 2 | | | Filter teit |
| 18...19 | 2 | | | Flags |
| 20 | 1 | 0x03 | ETX | End of telegram contents |
| 21 | 1 | | | BCC |
| 22 | 1 | 0D (CR) | 0D (CR) | Carriage Return, End of telegram |

23 Bytes in total

1.2.1 Replies

On successful setting the addressed **BLUEBOX** replies with:

SOH <add h> <add l> ACK <bcc> CR

If an error occurs, the **BLUEBOX** replies with:

SOH <add h> <add l> NAK <bcc> CR

1.3 Commands with Configuration Page Address

Then there are configuration commands with configuration page address.

Configuration pages at addresses 0x00 ... 0x0F have 7 Bytes configuration data per page, that are transferred in 14 Bytes of telegram payload (pls. see 1.1.1 for example).

Configuration pages at addresses 0x80 ... 0x87 have 14 Bytes configuration data per page, that are transferred in 28 Bytes of telegram payload:

- 6 Bytes header of telegram with command code
- 2 Bytes configuration page address
- 28 Bytes configuration data ASCII
- 3 Bytes trail of telegram with checksum

SOH <adda h> <adda l> STX '2' 'F'

1. **<Configuration page address high nibble>**
2. **<Configuration page address low nibble>**
3. **<param 1 h>**
4. **<param 1 l>**
5. ...
6. ...
7. ...
8. ...
9. **<param i h>**
10. **<param i l>**
11. ...
12. ...
13. ...
14. ...
15. **<param 7 h>**
16. **<param 7 l>**
17. **<param 8 h>**
18. ...
19. ...
20. ...
21. ...
22. ...
23. ...
24. ...
25. ...
26. ...
27. **<param 13 h>**
28. **<param 13 l>**

29. <param 14 h>
 30. <param 14 l>
 ETX <bcc> CR

Reply telegram from BLUEBOX to PC/SPS

Successful setting: SOH <add h> <add l> ACK <bcc> CR
 Not successful: SOH <add h> <add l> NAK <bcc> CR

1.4 Example: RF Configuration

Here the settings are distributed among several configuration pages.

This tables from the manual of the device lists for each configuration field (first line) the meaning (second line) and the default value (third line).

1.4.1 Configuration address 0x01

7 Bytes configuration data, 14 Bytes of telegram payload

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------------|-------|------|------|------|------|------|
| RF Input Sensitivity | Flags | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 |
| 0x4C | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 |

SOH <adda h> <adda l> STX '3' 'D'

1. 0x30 <Configuration page address high nibble>
2. 0x31 <Configuration page address low nibble>
3. 0x34 <param 1 h, Input sensitivity>
4. 0x43 <param 1 l, Input sensitivity>
5. 0x30 <Flags High Nibble>
6. 0x30 <Flags Low Nibble>
7. ...
8. ...
9. <param i h>
10. <param i l>
11. ...
12. ...
13. ...
14. ...
15. <param 7 h>

16. <param 7 I> ETX <bcc> CR

Telegram from PC/SPS to BLUEBOX

| Byte # | Number of Bytes | Data | Value | Description |
|---------|-----------------|---|--------------------------------------|----------------------------------|
| 0 | 1 | 0x01 | SOH | Start of Header |
| 1...2 | 2 | 0x46 0x46 | FF (255) | Bluebox device address |
| 3 | 1 | 0x02 | STX | Start of telegram contents |
| 4...5 | 2 | 0x33 0x44 | 3D | Command code |
| 6...7 | 2 | 0x30 0x31 | 0x01 | Configuration page address |
| 8...9 | 2 | 0x34 0x43 | 0x4C = 76 | Input Sensitivity: -76 dBm |
| 10...11 | 2 | 0x30 0x30 | 0x00 | Flags |
| 12...21 | 10 | 0x30 0x30 0x30 0x30 0x30 0x30 0x30 0x30 0x30 0x30 | 0x00 0x00 0x00 0x00 0x00 | Padding |
| 22 | 1 | 0x03 | ETX | End of telegram contents |
| 23 | 1 | | | BCC |
| 24 | 1 | 0D (CR) | 0D (CR) | Carriage Return, End of telegram |

25 Bytes in total

1.4.2 Configuration address 0x02

7 Bytes configuration data, 14 Bytes of telegram payload

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-----------|-----------------|------------|---------------------|----------|----------------------------|-----------------------|
| RF Region | RF Output Power | RF Channel | Antennas Activation | EPC C1G2 | RF Maximum Allocation Time | RF Minimum Pause Time |
| 0x02 | 0x14 | 0x00 | 0x01 | 0x30 | 0x00 | 0x00 |

| Byte # | Number of Bytes | Data | Value | Description |
|---------|-----------------|-----------|-----------|--|
| 0 | 1 | 0x01 | SOH | Start of Header |
| 1...2 | 2 | 0x46 0x46 | FF (255) | Bluebox device address |
| 3 | 1 | 0x02 | STX | Start of telegram contents |
| 4...5 | 2 | 0x33 0x44 | 3D | Command code |
| 6...7 | 2 | 0x30 0x32 | 0x02 | Configuration page address |
| 8...9 | 2 | 0x30 0x32 | 0x02 | Region where the device is operating, ETSI |
| 10...11 | 2 | 0x31 0x45 | 0x1E = 30 | RF TX Power: + 30 dBm |

| | | | | |
|---------|---|-----------|-----------|-----------------------------------|
| 12...13 | 2 | 0x30 0x30 | 0x00 = 0 | What channels are used |
| 14...15 | 2 | 0x30 0x31 | 0x01 = 1 | What antennas are used |
| 16...17 | 2 | 0x33 0x30 | 0x30 = 48 | EPC settings |
| 18...19 | 2 | 0x30 0x30 | 0x00 = 0 | Maximum time-slot allocation time |
| 20...21 | 2 | 0x30 0x30 | 0x00 = 0 | Minimum time-slot pause time |
| 22 | 1 | 0x03 | ETX | End of telegram contents |
| 23 | 1 | | | BCC |
| 24 | 1 | 0D (CR) | 0D (CR) | Carriage Return, End of telegram |

25 Bytes in total

1.4.3 Configuration address 0x04

7 Bytes configuration data, 14 Bytes of telegram payload

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----------------|----------------|------------|------|----------|------|------|
| Inventory Mode | Link Frequency | Bit Coding | 0x00 | EPC Size | 0x00 | 0x00 |
| 0x02 | 0x02 | 0x01 | 0x00 | 0x00 | 0x00 | 0x00 |

1.4.4 Configuration address 0x82

14 Bytes configuration data, 28 Bytes of telegram payload

| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------|---------------------------|---------------------------|---------------------------|----------------------|--------------------------|--------------------------|
| ReadAfterDetect Password0 | ReadAfterDetect Password1 | ReadAfterDetect Password2 | ReadAfterDetect Password3 | ReadAfterDetect Bank | ReadAfterDetect Address0 | ReadAfterDetect Address1 |
| 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 | 0x00 |

| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|--------------------------|--------------------------|------------------------|-------------------------------|------|-----------------|------------------|
| ReadAfterDetect Address2 | ReadAfterDetect Address3 | ReadAfterDetect Length | ReadAfterDetect EPC Bank Info | Q | Q Adjust Rounds | Inventory Cycles |
| 0x00 | 0x00 | 0x00 | 0x03 | 0x05 | 0x03 | 0x03 |

| Byte # | Number of Bytes | Data | Value | Description |
|--------|-----------------|-----------|----------|------------------------|
| 0 | 1 | 0x01 | SOH | Start of Header |
| 1...2 | 2 | 0x46 0x46 | FF (255) | Bluebox device address |

| | | | | |
|---------|---|-----------|---------|----------------------------------|
| 3 | 1 | 0x02 | STX | Start of telegram contents |
| 4...5 | 2 | 0x33 0x44 | 3D | Command code |
| 6...7 | 2 | 0x30 0x31 | 0x01 | Configuration page address |
| 8...9 | 2 | | | ReadAfterDetect Password Byte 0 |
| 10...11 | 2 | | | ReadAfterDetect Password Byte 1 |
| 12...13 | 2 | | | ReadAfterDetect Password Byte 2 |
| 14...15 | 2 | | | ReadAfterDetect Password Byte 3 |
| 16...17 | 2 | | | ReadAfterDetectBank |
| 18...19 | 2 | | | ReadAfterDetect Address0 |
| 20...21 | 2 | | | ReadAfterDetect Address1 |
| 22...23 | 2 | | | ReadAfterDetect Address2 |
| 24...25 | 2 | | | ReadAfterDetect Address3 |
| 26...27 | 2 | | | ReadAfterDetect Lenght |
| 28...29 | 2 | | | ReadAfterDetect EPC Bank Info |
| 30...31 | 2 | | | Q start value |
| 32...33 | 2 | | | Q adjust rounds |
| 34...35 | 2 | | | Inventory Cycles |
| 36 | 1 | 0x03 | ETX | End of telegram contents |
| 37 | 1 | | | BCC |
| 38 | 1 | 0D (CR) | 0D (CR) | Carriage Return, End of telegram |

39 Bytes in total

Appendix A –ASCII Characters used in Telegrams

| | |
|-----------|--|
| SOH | 01h (0x01) |
| STX | 02h (0x02) |
| ETX | 03h (0x03) |
| EOT | 04h (0x04) |
| ENQ | 05h (0x05) |
| ACK | 06h (0x06) |
| NAK | 15h (0x15) |
| SYN | 16h (0x16) |
| CR | 0Dh (0x0D) |
| '0'...'9' | 30h ...39h (0x30 ... 0x39) |
| 'A'...'F' | 41h ...46h (0x41 ... 0x46) |
| <..> | 30h ...39h (0x30 ... 0x39), 41h ...46h (0x41 ... 0x46) |
| <bcc> | Checksum |