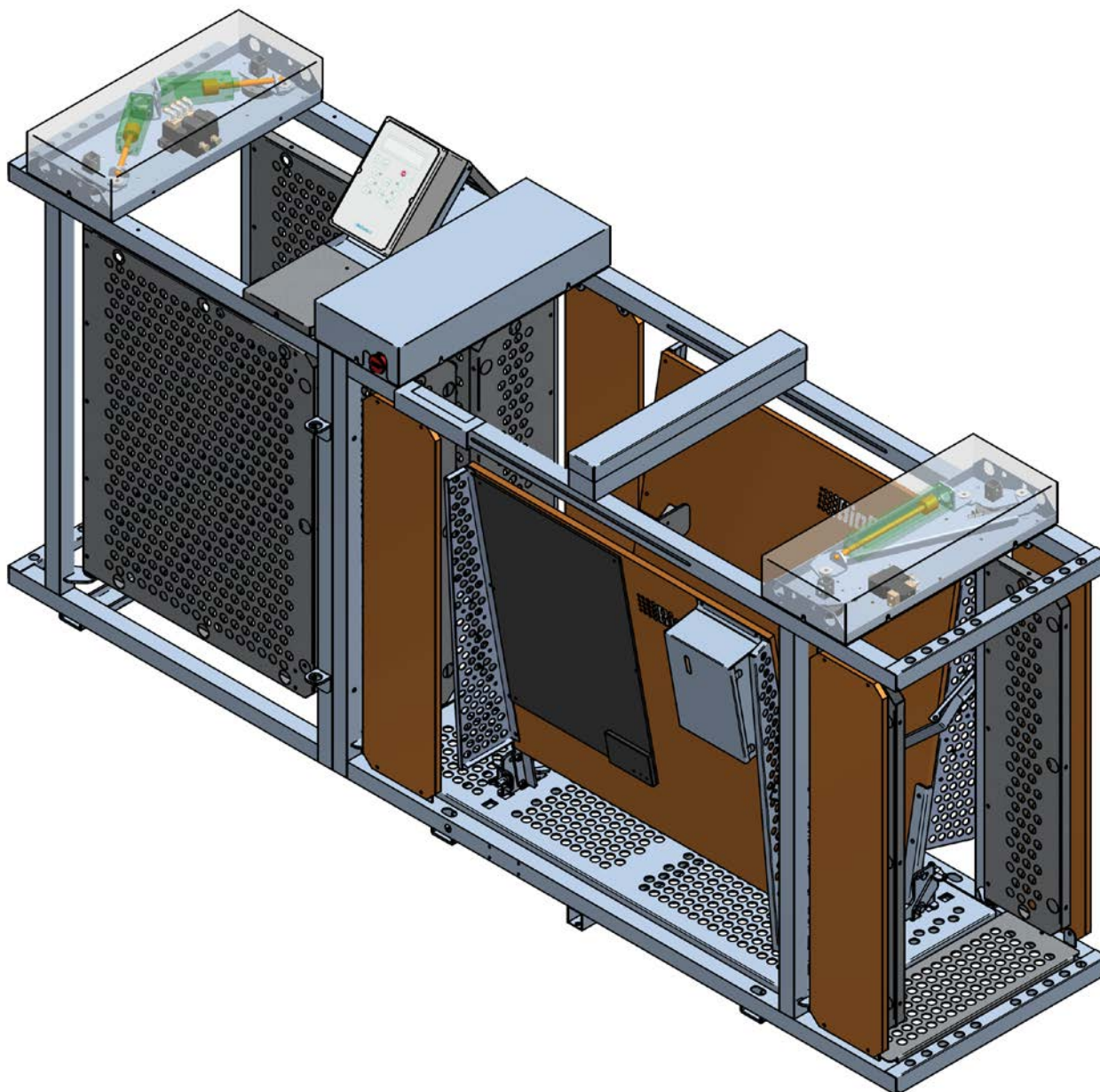


**ONLINE WSS 3000**  
**SOFTWARE MANUAL V1.0**



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Visit the section 'Community' on [www.biocontrol.no](http://www.biocontrol.no) for latest software and documentation

### 1.1. Changes in this manual compared to previous version

- Version 1.0 is the first version of this manual.

#### Note:

All information in this document describes the product and details 'as is'. BioControl cannot be held liable for (consequences of) incorrect or missing information in this document. Check our website for latest version of this document and information on this product.

## 2. COMMUNICATION PROTOCOL (GENERAL)

### 2.1. Communication settings

The following settings are used for the RS232 communication with the host PC:

Parameter	Value
Baud rate	115200 bit/s
Data bits	8
Parity	None
Stop bits	1
Flow control	None

### 2.2. Communication between WSS and host

The messages are sent as hexadecimal values coded in ASCII. Each hexadecimal value can be in the range 0x00 to 0xFF, thus two ASCII characters are needed for each sent value. Every frame is starting with colon ':', ASCII 0x3A and ending with semicolon ';', ASCII 0x3B. One frame consists of the following items:

<b>Start character</b>	At least one colon as the start character
<b>Destination address</b>	Two ASCII characters defines the destination address
<b>Source address</b>	Two ASCII characters defines the source address
<b>Message type Information</b>	Two ASCII characters. See tables in 2.3
<b>Checksum</b>	Optional
	The binary sum of all characters, starting with the destination address, ending with the last character before the checksum itself.
<b>Stop character</b>	One semicolon

The checksum is calculated by adding the ascii value of all characters, starting with the destination address, ending with the character in front of the checksum itself:

ASCII value of 'f' is 0x46

ASCII value of '8' is 0x38

ASCII value of '0' is 0x30

Etc

When the sum of all the ASCII values is ready, the least significant byte of the calculation is converted into ASCII and added to the end of the message.

**Note:** Be aware that uppercase letters and lowercase letters have different ASCII values. Thus the checksum will differ for a message if the case is changed!

e.g. *::01f8005f;* or *::01F8003F;*

### 2.3. Messages

The following messages are implemented:

**Table: Messages sent to the WSS**

Message*	Description
00	STOP the WSS
01	START the WSS (default; full-automatic mode)
05	Set transponder format as decimal (default; full-automatic mode)
06	Set transponder format as hexadecimal
22	Request the last read transponder number and weight
23	Spray- marks tt (time x10ms)
24	Open exit X (X - 1,2,3 or 0 – enter)
25	Close exit X (X - 1,2,3 or 0 – enter)
0c	Request system parameters
28	Set only sort mode
29	Set sort and weigh mode
30	Set transponder as forbidden
31	Delete table of forbidden transponders
32	Start logging
33	Drop log

\* Message's number is in HEX format!

**Table: Messages sent from the WSS**

Message*	Description
25	Send as decimal, e.g. "999123456789012000000"
26	Send as hexadecimal e.g. "8000f2c0002e4ff2fffff"
27	Send as decimal, two transponders.
21	ACK
34	Stop logging
0d	Return system parameters

\* Message's number is in HEX format!

### 3. COMMUNICATION PROTOCOL (MESSAGE EXAMPLES)

#### 3.1. Example (25): Transponder and weight sent in decimal format

**Transponder line:**

Country code = 999  
 Identification code = 123456789012  
 Weight = 0000000 (00000,00kg/lb)

e.g. **:f801259991234567890120000000d1;**

:: Start characters  
 f8 Destination address (the host, the address is fixed)  
 01 Source address (the WSS)  
 25 Message type, Return Transponder  
 99 the transponder  
 91 the transponder  
 23 the transponder  
 45 the transponder  
 67 the transponder  
 89 the transponder  
 01 the transponder  
 20 the transponder, weight  
 00 weight  
 00 weight  
 00 weight  
 d1 The checksum  
 ; The stop character

#### 3.2. Example (27): Transponders(?) and weight sent in decimal format

**Transponder line:**

Country code tr. 1 = 999  
 Identification code tr. 1 = 123456789012  
 Country code tr. 2 = 999  
 Identification code tr. 2 = 123456789013

Weight = 000000 (0000,00kg/lb)

e.g. **:f80127999123456789012999123456789013000000bf;**

:: Start characters  
 f8 Destination address (the host, the address is fixed)  
 01 Source address (the WSS)  
 25 Message type, Return Transponder  
 99 the transponder no 1  
 91 the transponder no 1  
 23 the transponder no 1  
 45 the transponder no 1  
 67 the transponder no 1  
 89 the transponder no 1  
 01 the transponder no 1  
 29 the transponder no 1, no 2  
 99 the transponder no 2  
 12 the transponder no 2  
 34 the transponder no 2

```

56 the transponder no 2
78 the transponder no 2
90 the transponder no 2
13 the transponder no 2
00 weight
00 weight
00 weight
bf The checksum
; The stop character

```

### 3.3. Example (26): Transponder and weight sent in hexadecimal format

When the transponder number is sent in hexadecimal format, the 64 bit specified by ISO 11784 is sent:

#### **The 64 bit of transponder specified by ISO 11784**

Bit #	Description
1	Flag for animal (1) or non animal (0) application
2-15	Reserved field, usually zero
16	Flag indicating the existence of a data block (1) or not (0)
17-26	ISO 3166 numeric-3 country code
27-64	Individual identification code

In the list above, bit 1 is MSB and bit 64 is LSB

#### **Transponder line:**

```

Transponder = 8000f2c0002e4ff2
Weight      = 000000 (unsigned int, DEC 00000,00kg/lb)

```

e.g. **:f801268000f2c0002e4ff2000000a3;**

```

:: Start characters
f8 Destination address (the host, the address is fixed)
01 Source address (the WSS)
26 Message type, Return Transponder
80 The 8 most significant bits of the transponder, bit 1-8
00 Bit 9-16 of the transponder
f2 Bit 17-24 of the transponder
c0 Bit 25-32 of the transponder
00 Bit 33-40 of the transponder
2e Bit 41-48 of the transponder
4f Bit 49-56 of the transponder
f2 Bit 57-64 of the transponder
00 weight byte MSB (hex format of 00000,00kg/lb)
00 weight
00 weight LSB
a3 the checksum
; The stop character

```

### 3.4. Example (00): STOP the WSS

The message "STOP the WSS" sent to address 01 from address 0xF8 is:

**::01f8005f;**

```

:: Start characters
01 Destination address (the reader)
f8 Source address (the host, the address is fixed)
00 Message type, STOP the WSS
5f the checksum

```

;        The stop character

The WSS will answer with ACK message.

### 3.5. Example (01): START the WSS (default)

The message "START the WSS" sent to address 01 from address 0xF8 is:

**::01f80160;**

::        Start characters  
01       Destination address (the reader)  
f8       Source address (the host, the address is fixed)  
01       Message type, START the WSS  
60       The checksum  
;        The stop character

The WSS will answer with ACK message.

### 3.6. Example (05): Set decimal format of transponders (default)

The message "Send as decimal" sent to address 01 from address 0xF8 is:

**::01f80564;**

::        Start characters  
01       Destination address (the reader)  
f8       Source address (the host, the address is fixed)  
05       Message type, Send as decimal  
64       The checksum  
;        The stop character

The WSS will answer with ACK message.

### 3.7. Example (06): Set hexadecimal format of transponders

The message "Send as hexadecimal" sent to address 01 from address 0xF8 is:

**::01f80665;**

::        Start characters  
01       Destination address (the reader)  
f8       Source address (the host, the address is fixed)  
06       Message type, Set hexadecimal  
65       The checksum  
;        The stop character

The WSS will answer with ACK message.

### 3.8. Example (22): Request the last read transponder number and weight

The message "Request the last read transponder number" sent to address 01 from address 0xF8 is:

**::01f82263;**

::        Start characters  
01       Destination address (the reader)  
f8       Source address (the host, the address is fixed)  
22       Message type, Send as hexadecimal

63 The checksum  
; The stop character

The WSS will answer with 25 or 26 message.

### 3.9. Example (23): Spray marker tt (time x10msec)

The message "Spray- marks tt (time x10ms)" sent to address 01 from address 0xF8 is:

Set output 1 = ON for 180ms, output 2=OFF:  
**::01f823011228;**

:: Start characters  
01 Destination address (the WSS)  
F8 Source address (the host, the address is fixed)  
23 Message type, Send as hexadecimal  
01 Output number, binary: Bit 0 is output 1, bit 1 is output 2  
12 time of working spray x10ms = 180ms  
28 The checksum  
; The stop character

The WSS will answer with ACK message.

### 3.10. Example (24): Open exit 1,2,3 or 0 - enter

The message opens one of exits or enter gate; sent to address 01 from address 0xF8 is:

Open exit 1:  
**::01f82401c6;**

:: Start characters  
01 Destination address (the WSS)  
f8 Source address (the host, the address is fixed)  
24 Message type, Send as hexadecimal  
01 Open exit 1  
c6 The checksum  
; The stop character

The WSS will answer with ACK message

### 3.11. Example (25): Close exit 1,2,3 or 0 - enter

The message closes one of exits or enter gate; sent to address 01 from address 0xF8 is:

Open exit 1:  
**::01f82501c7;**

:: Start characters  
01 Destination address (the WSS)  
f8 Source address (the host, the address is fixed)  
25 Message type, Send as hexadecimal  
01 Open exit 1  
c7 The checksum  
; The stop character

The WSS will answer with ACK message.

### 3.12. Example (21): acknowledge ACK

The message acknowledges last message; sent to address 0xf8 from address 0x01 is:



ACK:

:: **f8012162;**

:: Start characters  
 F8 Destination address (the host, the address is fixed)  
 01 Source address  
 21 Message type, ACK  
 62 The checksum  
 ; The stop character

### 3.13. Example (28): Set only sort mode

The message acknowledges last message; sent to address 0xf8 from address 0x01 is:

:: **f8012869;**

:: Start characters  
 F8 Destination address (the host, the address is fixed)  
 01 Source address  
 28 Message type  
 69 The checksum  
 ; The stop character

### 3.14. Example (29): Set sort and weigh mode

The message acknowledges last message; sent to address 0xf8 from address 0x01 is:

:: **f801296a;**

:: Start characters  
 F8 Destination address (the host, the address is fixed)  
 01 Source address  
 29 Message type  
 6a The checksum  
 ; The stop character

### 3.15. Example (0C): Request system parameters

The message "Request system parameters" sent to address 01 from address 0xF8 is:

:: **01f80c92;**

:: Start characters  
 01 Destination address (the WSS)  
 f8 Source address (the host, the address is fixed)  
 0c Message type, Request system parameters  
 92 The checksum  
 ; The stop character

The WSS will answer with this 0d message.

### 3.16. Example (0D): Return system parameters

The message "Return system parameters" sent to address 01 from address 0xF8 is:

:: **f8010d000146010406020164012c0ea1;**

:: Start characters  
 f8 Destination address (the host)

```

01 Source address (the reader)
0d Message type, Return system parameters
00 Program version 0
01 Program revision 1
00 Test version, 'F'
01 ATmega Program version 1
04 ATmega Program revision 4
06 ATmega Test version 6
02 DSP Program version 2
01 DSP Program revision 1
64 DSP Test version 'd'
01 Antenna voltage byte MSB
2c Antenna voltage LSB
0e Antenna tune value, 0 – 63 decimal (sent as hexadecimal)
a1 the checksum
; The stop character

```

### 3.17. Example (30): Set forbidden transponder

**NOTE:** Transponders have to have format as it was set by 0x05 or 0x06 commands. When you changed transponder format you have to upload new table of forbidden transponders!

#### Decimal format:

##### **Transponder line:**

```

Country code      = 0982*
Identification code = 2000027717763

```

e.g. **::01f83009820000277177639d;**

```

:: Start characters
01 Destination address
f8 Source address
30 Message type, Set forbidden transponder
09 the transponder, 0 – additional character
82 the transponder
00 the transponder
00 the transponder
27 the transponder
71 the transponder
77 the transponder
63 the transponder
9d the checksum
; The stop character

```

**\*NOTE:** The additional digit '0' at country code is required to ensure an even number of characters. Use always '0' !

#### Hexadecimal format:

##### **Transponder line:**

```

Transponder      = 8000f2c0002e4ff2

```

e.g. **: 01f8308000f2c0002e4ff27e;**

```

:: Start characters
01 Destination address
f8 Source address
30 Message type, Set forbidden transponder
80 The 8 most significant bits of the transponder, bit 1-8

```

```

00 Bit 9-16 of the transponder
f2 Bit 17-24 of the transponder
c0 Bit 25-32 of the transponder
00 Bit 33-40 of the transponder
2e Bit 41-48 of the transponder
4f Bit 49-56 of the transponder
f2 Bit 57-64 of the transponder
7e The checksum
; The stop character

```

The WSS will answer with ACK message.

### 3.18. Example (31): Delete table of forbidden transponders

The message "Request system parameters" sent to address 01 from address 0xF8 is:

```
::01f83163;
```

```

:: Start characters
01 Destination address (the reader)
f8 Source address (the host, the address is fixed)
31 Delete table of forbidden transponders
63 The checksum
; The stop character

```

The WSS will answer with ACK message.

### 3.19. Example (32): Start logging

The message "Start logging" sent to address 01 from address 0xF8 is:

```
::01f83264;
```

```

:: Start characters
01 Destination address (the reader)
f8 Source address (the host, the address is fixed)
32 Start logging
64 The checksum
; The stop character

```

The WSS will answer with ACK message.

### 3.20. Example (34): Stop logging

The message "Stop logging" sent to address f8 from address 0x01 is:

```
:: f8013466;
```

```

:: Start characters
01 Destination address (the reader)
f8 Source address (the host, the address is fixed)
34 Stop logging
66 The checksum
; The stop character

```

### 3.21. Example (33): Drop log

The message "Drop log" sent to address 01 from address 0xF8 is:

**::01f83365;**

```

::      Start characters
01      Destination address (the reader)
f8      Source address (the host, the address is fixed)
32      Start logging
64      The checksum
;       The stop character

```

The WSS will answer with a Log, e.g.:

```

** Start Log **
00027 Photocell ON.
00031 Animal on the platform.
00031 Gate close: Entry
00075 Weight stable: 016142
00075 Transp: 942000001054597
00075 Message to host: RETURN_WEIGHT_TRANSP_DEC 0x25
00157 Message from host: OPEN_EXIT 0x24
00157 Gate open: 2
00169 Photocell OFF.
00171 Photocell ON.
00172 Photocell OFF.
00182 No animal on the platform.
00184 Gate close: 2
00184 Gate open: Entry
** End Log **

```

The command *Start logging(32)* cancels the previous log and sets the memory pointer to the beginning. With the command *Drop log(33)* you can send whole the log to a PC via RS232. This command and when log reaches end of memory stop logging events. It will be confirmed with *Stop Logging(34)* command. Memory capacity allows you to save log for about 20 – 30 animal weighing procedures.

**Structure an one log record:**

***time event\_name: parameters\_of\_event \r\n***

**time** - It is a time to write the record count from the *Start logging(32)* command, unit 100ms.(maximum range is 6553,5[s])  
e.g.00222 = 22,2[s]

**event\_name** - see table below.

**parameters\_of\_event** - parameters are depending on a kind of events  
e.g: gate number or transponder.

Every event ends with \r\n.

**Event names and descriptions:**

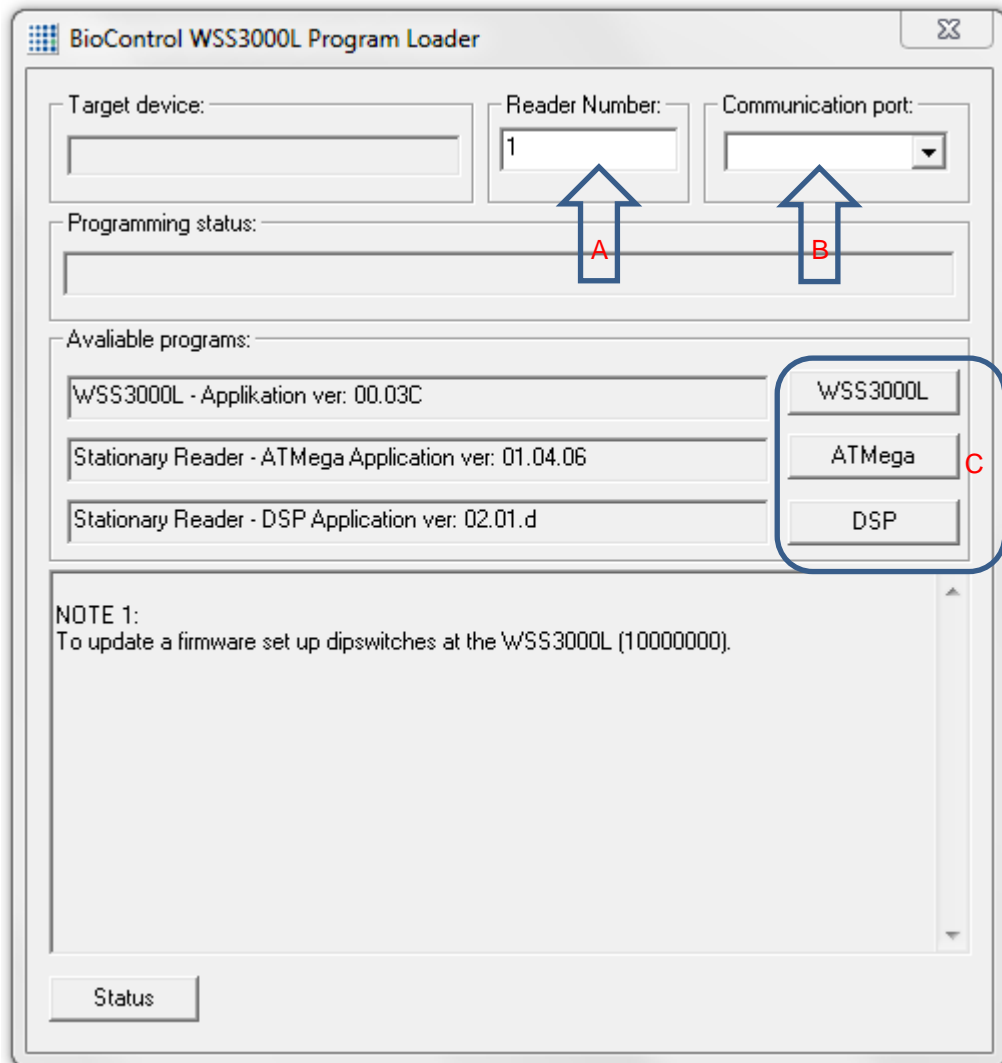
Event :	Description:
"*** Start log ***".	- first line of the log.
"*** End log ***"	- last line of the log.
"Animal on the platform."	- both conditions are complied: photocell is covered and >7kg on the platform
"No animal on the platform."	- both conditions are complied: photocell is not covered and <7kg on the platform.
"Photocell ON."	- photocell is not covered.
"Photocell OFF."	- photocell is covered.

"Transp: "	- Transponder number has read. e.g.: 999123456789012
"NO Transp."	- Transponder number has not read.
"Weight stable:"	- Weight is stable.e.g. 016142 = 16,1kg
"Message to host:"	- WSS sends message to the HOST:
"RETURN_WEIGHT_TRANSP_DEC 0x25 " "RETURN_WEIGHT_TRANSP_HEX 0x26 " "LOG_STOP 0x34 "	
"Message from host:"	- WSS receive message from the HOST:
"WSS_OFF 0x00 " "WSS_ON 0x01 " "NUMBER_FORMAT_DECIMAL 0x05 " "NUMBER_FORMAT_HEX 0x06 " "SPRAY 0x23 " "OPEN_EXIT 0x24 " "CLOSE_EXIT 0x27 " "RETURN_LAST_WEIGHT_TRANSP 0x22 " "ONLY_SORT 0x28 " "SORT_WEIGH 0x29 " "TR_FORBIDDEN 0x30 " "DEL_FORBIDDEN 0x31 " "LOG_START 0x32 " "LOG_DROP 0x 33 " "GOTO_PROGRAMMING_MODE 0x50 " "REQUEST_SYSTEM_PARAMETERS 0x0c "	
"Gate open:"	- WSS has opened gate nr 1,2,3 or Entry.
"Gate close:"	- WSS has closed gate nr 1,2,3 or Entry.
"Emergency."	- "Emergency" procedure – open close exit
"Forbiden transp.:"	- Forbiden transp. hes been read received from SR

## 4. SOFTWARE TOOLS

### 4.1. Online WSS Program Loader

To update the online WSS firmware use the PC-program 'Online WSS Program Loader' that can be found in the Community Section on the BioControl website.



To reprogram the device, do as follows:

1. Download the latest version of "WSS3000L Program Loader" from our website and run it,
2. Connect RS232 cable from WSS3000L to PC,
3. Check dipswitches at the WSS3000L and set as (10000000) on PCB.
4. Power on WSS,
5. Set Reader Number as '1' (see picture 1.2.1- 'A')
6. Choose COM Port (see picture 1.2.1- 'B')
7. Click "WSS3000L" button, if necessary, in order to upload WSS PCB, and wait "Programming succeed" (see picture 1.2.1- 'C')
8. Click "DSP" button, if necessary (DSP uploading works only with 00.01F or later version of WSS program.) , and wait "Programming succeed"
9. Click "ATMega" button, if necessary (ATMega uploading works only with 00.01F or later version of WSS program.) , and wait "Programming succeed"

#### 4.2. Online WSS Config program

The PC-program 'Online WSS Config' can be used to test all hardware and software functionalities of the online WSS.

This program can be downloaded from our website, the description in the buttons is self-explanatory.



## 5. EXAMPLE APPLICATION FLOWCHART FOR ONLINE WSS

