Reader Protocol

Reader communication protocol

Applies to all the readers which read passive tags

Document Version: 04

Release Date: 2010-05-03

Part Code:

1. Communication frame format description

1. Command frame format definition

Data flow direction: host ----》reader.

The command frame is the host operating reader's data frame. Its format as follows:

Packet Type	Length	Command Code	Device Number	Command Data	...	Command Data	Command Data	Checksum
0xA0	n +3	1 byte	1 byte	Byte 1		Byte n-1	Byte n	cc

- Packet Type is the packet type field, the command frame packet type is fixed to 0xA0.
- Length is the packet length field, it indicates the Length field latter frame' bytes.
- Command Code is a command code field.
- Device Number is no equipment field. When the equipment for the number usercode 00, says group.
- Command Data is the command frame's parameter field.
- Checksum is the checksum field. It stipulates the check-range is from the packet type field to parameter field until the last byte' checksum of all bytes. After the reader receives the command frame, it needs to calculate the checksum error detection.

2. The reader order completes the response frame form definition

Data flow direction: reader ----》host.

Reader command complete the response frame is a fixed length of data frame, the format as follows:

Packet Type	Length	Command Code	Device Number	Status	Checksum
0xE4	0x04	1 byte	1 byte	1 Byte	cc

- Packet Type is the packet type field, the command frame packet type is fixed to 0xE4.
- Length is the packet length field, it indicates the Length field latter frame' bytes, it is fixed to 0x04.

- Command Code is a command code field.
- Device Number is no equipment field. When the equipment for the number usercode 00, says group.

- Command Data is the command frame's parameter field.
- Checksum is the checksum field. It stipulates the check-range is from the packet type field to parameter field until the last byte' checksum of all bytes. After the reader receives the command frame, it needs to calculate the checksum error detection.

Status field indicates the reader' status or executive command's result after the reader completes the PC'command, its stipulation shows as follows:

No.	Value	Name	Description
1	0x00	ERR_NONE	The command completed successfully
2	0x02	CRC_ERROR	CRC check error
3	0x10	DRF_COMMAND_ERROR	Illegal command
4	0x01	OTHER_ERROR	Other errors

3. The information frame format definition which is sent by the reader

Data flow direction: reader ----》host.

Information frame is returned to the host' data frames, for example, it is used to send tags to the host, the frame format defined as follows:

Packet Type	Length	Response Code	Device Number	Response Data	...	Response Data	Response Data	Checksum
0xE0	n +3	1 byte	1 byte	Byte 1		Byte n-1	Byte n	cc

- Packet Type is the packet type field, the command frame packet type is fixed to 0xE0.
- Length is the packet length field, it indicates the Length field latter frame' bytes.
- Device Number is no equipment field. When the equipment for the number usercode 00, says group.
- Response Code is the information code field values that the type of information.
- Response Data is the information frame parameter domain.
- Checksum is the checksum field. It stipulates the check-range is from the packet type field to parameter field until the last byte'

checksum of all bytes. After the reader receives the command frame, it needs to calculate the checksum error detection.

2. Details of communication frame

1. EPC tag identification

Host send:

Reply	Data length	Command	Device Number	Checksum
Data0	Data1	Data2	Data3	Data5
A0	03	82	usercode	checksum

TEST Code: A0, 03, 82, 00, DB;

Recognition failure reply:(E4 04 82) head, (00)usercode (05) Status, (91)Chechsum

Identify successful reply:(E0 10 82)head,usercode,(01)antenna number, (12 34 33 B2 DD D9 04 80 35 05 00 00) ID, (37)checksum.

2. EPC tag read

Host send:

Reply	Data length	Command	Device Number	Memory location	Address	Read length (word)	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7
A0	06	80	usercode	MemBank	addr	Length	checksum

TEST Code: A0 06 80 00 01 02 01 D6; beginning from address 0x02 to read a word of data.

Note: 1 word = 2 BYTE;

MemBank:

00_2 Reserved Reserved Area

01_2 EPC EPC

10_2 TID TID

11_2 User user area

Slave- machine returns: E0 09 80 04 01 02 01, (12 34) ID 49, (49) checksum.

E0: Read the successful data frame head

08: Data length

80: Label read command

usercode: Device Number

01: Membank type

02: Address, 01: Read length (word)

12 34: The data read

4E Checksum

3. EPC tags to write a single word

Host send:

Reply	Data length	Command	Device Number	Write method	Memory location	Address	Write length (word)	Write data	Write data	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data8	Data9	Datan
A0	09	81	uesercode	WriteMode	MemBank	addr	01	D1	D2	checksum

TEST Code: A0 09 81 00 00 01 02 01 12 34 8C

Slave- machine returns: (E0 03 81) head, Status, checksum.

Note: 1 word = 2 BYTE;

MemBank:

00_2 Reserved Reserved Area

01_2 EPC EPC Area

10 $_2$ TID TID Area

11 $_2$ User User Area

WriteMode: 00 Write a single word

Status = 00: write was successful; Status = Other values: write failure;

Addr Description: EPC area effective from 0x02-0x07;

4. EPC tag to write multi-words (fast write)

Reply	Data length	Command	Device Number	Write method	Memory location	Address	Write length (word)	Write data	Write data	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data8	Datan-1	Datan
A0	07 + (Length * 2)	81	usercode	WriteMode	MemBank	addr	Length	D1	D (Length)	checksum

TEST Code1: A0 0B 81 00 01 01 02 02 55 55 AA AA D0

Parameters right returns from t slave- machine: E0 04 81 （00） usercode （05）Status （96）Checksum

Parameter error returns from slave- machine: E0 04 81 （00） usercode （00）Status （9B）Checksum

Status = 00: write was successful; Status = Other values: write failure;

Note: Reserved area, addr> = 0, addr + length <= 4, otherwise the parameter error

Note: EPC area addr + length <= 8, and ADDR> = 2, otherwise the parameter error

Note: TID area can not be written, it is read only

Note: The data area based on the actual situation of the card, the maximum is eight words each time to write;

Note: 1 word = 2 BYTE;

MemBank:

00 $_2$ Reserved Reserved Area

01 $_2$ EPC EPC

10 $_2$ TID TID

11 $_2$ User User area

WriteMode: 01 Fast Write

Note: Most tags do not support.

5.Lock tags

Reply	Data length	Command	Device Number	Password 1	Password 2	Password 3	Password 4	LOCK type	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data8	Data9
A0	08	A5	usercode	MM1	MM2	MM3	MM4	LOCK Type	checksum

LOCK Type Description:

00: LOCK USER

01: LOCK TID

02: LOCK EPC

03: LOCK ACCESS

04: LOCK KILL

05: LOCK ALL

Other values: Not locked

Such as: the access password is 12345678, lock EPC Area ,

Device address is 00.

Then sends the command: A0 08 A5 00 12 34 56 78 02 9D

Slave- machine returns: E4, 04, A5, （00）usercode （00）Status （73）Checksum

Status = 00: write was successful; Status = other values: write failure;

6.Unlock Tags

Reply	Data length	Command	Device Number	Password 1	Password 2	Password 3	Password 4	UNLOCK Type	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data8	Data9
A0	08	A6	usercode	MM1	MM2	MM3	MM4	UNLOCK Type	checksum

UNLOCK Type Description:

00: UNLOCK USER

01: UNLOCK TID

02: UNLOCK EPC

03: UNLOCK ACCESS

04: UNLOCK KILL

05: UNLOCK ALL

Other values: Not unlock

Such as ： the access password is 12345678, unlock the EPC Area

Then sends the command: A0 08 A6 00 12 34 56 78 02 9C

Slave- machine returns: E4, 04, A6 (00) usercode (00) Status (72)Checksum

Status = 00: write was successful;

Status = other values: write failure;

(1) EPC tags KILL

Reply	Data length	Command	Device Number	RFU	Password 1	Password 2	Password 3	Password 4	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data8	Data9
A0	08	86	usercode	00	MM1	MM2	MM3	MM4	checksum

TEST Code: A0 08 86 00 00 12 34 56 78 BE

Slave- machine returns: E4 04 86 (00) usercode (00) Status (92) Checksum

Status = 00: write was successful; Status = other values: write failure;

(2) Initialize the EPC CODE

Reply	Data length	Command	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	99	usercode	checksum

TEST Code: A0 03 99 00 C4

Slave- machine returns: E4 04 99 usercode Status Checksum

Status = 00: write successful; Status = other values: write failure;

(3) Read Reader software version number CODE

Reply	Data length	Command	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	6A	usercode	checksum

TEST Code: A0 03 6A 00 F3

Slave- machine returns: (E0 05 6A) head, （00）usercode（ 05 56 ） Version number,（56）Checksum

(4) Reset reader command frame CODE

Packet Type	Length	Command Code	Device Number	Checksum
A0	03	65	usercode	Checksum

After reader receives this command frame, firstly, returns to the command to complete the frame, and then reset the reader.

TEST Code: A0 03 65 00 F8

Slave- machine returns: (E4 04 65) usercode Status Checksum

Status bit 00: Successful ; Other values: Failure

(5) Stop reading the tag CODE

Reply	Data length	Command	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	A8	usercode	checksum

Host send: A0 03 A8 00 B5

Slave- machine returns: E0 04 A8 usercode Status Checksum

Status bit 00: Successful; Other values: Failure.

Note: EPC tags operating on a "word" as a unit; ISO18000-6B tag is "byte" as a unit**.**

(6) Re-identification tag CODE (multi-tag mode effective)

Reply	Data length	Command	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	FC	usercode	checksum

Host send: A0 03 FC 00 61

Slave- machine returns: E0 04 FC usercode Status Checksum

Status bit 00: Successful; Other values: Failure

(7) Retrieve data CODE (multi-tag mode effective)

Reply	Data length	Command	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	FF	usercode	checksum

Host send: A0 03 FF 00 5E

Successful returns: E0 04 FF 00 02 1B 00 00 12 34 AA AA 00 00 00 00 55 55 AA AA 01 67 FF 00 00 E2 00 05 11 11 18 02 73 00 00 02 9C 01 CB FF，Among them: 12 34 AA AA 00 00 00 00 55 55 AA AA and E2 00 05 11 11 18 02 73 00 00 02 9C for ID

(8) Fast write tag command

Reply	Data length	Command	Device Number	Write length (word)	Write data	Write data	Write data	Write data	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Data(4+2*WordLength)	Data(5+2*WordldLength)
A0	4+2*（WordLength）	9C	usercode	WordLength	D1	D2	D3	D(leng*2)	Checksum

Such as: in the label EPC area address 4, 5 write two words (1234 5678)

orders: A0 08 9 C 00 02 12 34 56 78 A6

Returns: E0 04 9C usercode Status Checksum

Status = 00 successful; Status = Other values: write failure;

(9) Get the data (multi-tag mode effective)

Reply	Data length	Command	Device Number	Checksum
Data0	Data1	Data2	Data3	Data4
A0	03	A6	usercode	Checksum

Host send: A0 03 A6 00 B7

Returns: E0 04 A6 (00) usercode 01TagCount 71checksum

TagCount: label total data, if not, label for data 0;

Then upload label data.

(10) Designated EPC, read TID area

Reply	Data length	Command	Device Number	EPC ID			Checksum
Data0	Data1	Data2	Data3	Data4	…	Data15	Data16
A0	0F	AA	usercode	00	…	72	D7

D4... D15 respectively is 00 02 25 56 52 65 85 74 12 36 65 72, is designated the EPC ID, a total of 12 bytes

Host send: A0 0F AA 00 00 02 25 56 52 65 85 74 12 36 65 72 5B

Read success reply: E0 0C AA 00 00 01 3B F4 00 01 26 74 92 0D

E2 00 34 12 01 36 F4 00 for the specified number of EPC TID area, 8 bytes

Read failure from machine to return: E4 04 AA usercode Status Checksum

(such as: E4 04 AA 00 05 69)

(11) More than words to write tag

a0 XX AB ReaderAddr memtype startaddr wordlength d0 d1 d2 d3 d4 d5 d6 d7 checksum

Reply	Data Length	Command	Device Number	Memory position	Address	Write length (word)	Write data	Write Data	Checksum

Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	Datan-1	Datan
A0	06+(2*Word Length)	AB	usercode	MemBank	addr	WordLength	D1	D(2*Word Length)	Checksum

Host send : A0 0E AB 00 03 00 04 11 11 22 22 33 33 44 44 4C
Failed to reply: E0 04 AB （00）usercode （05）Status （17）Checksum
Succeed to reply: E0 04 AB （00）usercode （00）Status （1C）Checksum

Status = 0 successful Status = Other values: write failure;

Note: keep area, addr > = 0, addr + Length < = 4, or parameters mistakes
Note: EPC area addr + Length < = 8, and addr > = 2, or error parameters
Note: TID area do not write, only to read
Note: data area according to the actual card case, every time the most capital 8 words;
Note: a word = two BYTE;
MemBank: 00_2 Reserved The reservations
01_2 EPC EPC
10_2 TID TID
11_2 User User area

(12) Control the BUZZER

Reply	Data length	Command	Device Number	Buzzer control	Checksum
Data0	Data1	Data2	Data3	Data4	Data5
A0	04	B0	usercode	00	checksum

BuzzerCtrl = 0: close reading card of sound when beef;

BuzzerCtrl = 1: open reading card of sound when beef;

BuzzerCtrl >= 2: single ring again beef sound;

Host send: A0 04 B0 00 00 AC;

From the machine back: E0 04 B0 （00）usercode 00 68

Host send: A0 03 A6 (00) DeviceID (B7) CheckSum

E4 The reading and writing commands to complete response frame, frame head

04 Data length

B0 BUZZER control command

00 Usercode Device Number

00 Conditon，00 Control success

68 Checksum

(13) Control relay

Reply	Data length	Command	Device Number	Buzzer control	Checksum
Data0	Data1	Data2	Data3	Data4	Data5
A0	04	B1	usercode	RelayOnOff	Checksum

RelayOnOff =0： Close relay；

RelayOnOff =1: Open relay；

Host send: A0 04 B1 00 00 AB;

From the machine back: E0 04 B1 （00）usercode 00 67

E4: The reading and writing commands to complete response frame, frame head

04: Data length

B1: Control relay command

Usercode: Device Number

00: Conditon，00 Control success

67: Checksu

（14）Set baud rate command

Reply	Data length	Command	Device Number	Baud rate parameters	校验和
Data0	Data1	Data2	Data3	Data4	Data5
A0	04	A9	usercode	SelectBaud	Checksum

Set baud rate command： A9

SelectBaud parameters：

00 9600

01 19200

02 38400

03 57600

04 115200

Send Command: a0 04 a9 00 04 af Set to: 115200

Set up the correct response：E4 04 A9 00 00 6F

Send Command: a0 04 a9 00 00 b3 Set to: 9600 command

Set up the correct response：E4 04 A9 00 00 6F

Note: send baud rate set command is correct, the receiving, or the current baud rate response, but next time he with new baud rate to communication;

3. Reader parameter setting of communication protocol

1. Stop working set

Reply	Data length	Command	Device Number	Checksum
Data0	Data1	Data2	**Data3**	Data4
0xA0	0x02	0x50	**usercode**	Checksum (0x0E)

Host send: A0 03 50 00 D

Slave- machine returns: (E4 04 50) head,（00 ）usercode（00 ）Status（C8）Checksum

Status bit 00: Success ; Other values: Failure

2. Multiple query reader parameters setting simultaneously

Reply	Data length	Command	Device Number	Inquires the number of parameters	Query parameter specifies the high address	Query parameters specified low address	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7
0xA0	0x06	0x63	usercode	Length	Parameter address (MSB)	Parameter address (LSB)	Checksum

Such as: Host sends: A0 06 63 00 05 00 20 D2 (Product ID check)

Slave- machine returns: (E0 0B 63) head, (00) usercode， 05 00 20，(38 32 32 30 FF) parameters ，(C2) Checksum

3. Query a single parameters setting of the reader

Reply	Data length	Command	Device Number	Query parameter specifies the high address	Query parameters specified low address	Checksum
Data0	Data1	Data2	Data3	Data4	Data5	Data6

0xA0	0x05	0x61	usercode	Parameter address (MSB)	Parameter address (LSB)	Checksum

Such as: Host sends: A0 05 61 00 00 65 95 (check power)

Slave- machine returns: (E0 06 61) head, （00） usercode ，00 65，

(96) parameters (BE) Checksum

4. Set multiple reader parameter simultaneously

Reply	**Data length**	**Command**	**Device Number**	**Set the number of parameters**	**Query parameter specifies the high address**	**Query parameters specified low address**	**Command Data**			**Checksum**
Data0	Data1	Data2	Data3	Data4	Data5	Data6	Data7	…	Data E	Data F
0xA0	0x05 + Length	0x62	usercode	Length	Parameter address (MSB)	Parameter address (LSB)	01	…	01	Checksum

Data 7... Data E are respectively: 01 04 10 40 00 01 02 01

Such as: Host sends: A0 0E 62 00 08 00 92 01 04 10 40 00 01 02 01 FD (frequency setting)

Slave- machine returns: (E4 04 62) head, （00 ）usercode（00 ） Status，

（B6）Checksum

Status bit 00: Success ; Other values: Failure

5. Set the parameters of a single reader

Reply	**Data Length**	**Command**	**Device Number**	**Query parameter specifies the high address**	**Query parameters specified low address**	**Command Data**	**Checksum**

0xA0	5	0x60	00	Parameter address (MSB)	Parameter address (LSB)	Parameter value	Checksum

Parameter address (MSB) is the parameter in the address high byte of EEPROM.

Parameter address (LSB) is the parameter in the address low byte of EEPROM.

Parameter value is the parameter value which needs to set. After the reader receives this command frame, it will need to set the parameters into EEPROM, and returns the command to complete the frame.

Such as: Host sends: A0 06 60 00 00 65 96 FF (set power)

Slave- machine returns: (E4 04 60) head, usercode（00 ）Status,（B8）Checksum

Status bit 00: set successfully ; Other values: Setting failure

Table 1:

Parameters in the EEPROM address (Hex)	Project Meaning	Set operation effective value (decimal)	Explain the meaning of values	Other
0x64	Equipment No.	0 - 255	User Settings marking value	
0x65	Transmit power	0 - 150	Power Analog	
0x70	Card reader mode operation occurs	1, 2, 3	1:master-slave mode，2:Timer mode，3:Trigger mode.	Note: Working in mode 2, 3, the master-slave mode is still valid

Table 2:

Parameters in the EEPROM address (Hex)	Project Meaning	Set operation effective value (decimal)	Explain the meaning of values	Other
0x71	Reader interval	N	Value units: (N * 10) ms N is 10 - 100;	The reader-writer reads the card effectively for the mode 2,3

0x72	When the reader reads the data ,it sends the data link options initiatively	1, 2, 3	1: RS485 link 2: wiegand link 3: RS232 link	

Table 3:

Parameters in the EEPROM address (Hex)	Project Meaning	Set operation effective value (decimal)	Explain the meaning of values	Other
0x73	Wiegand protocol selection	1, 2, 3	1: wiegand26 2: wiegand34 3: wiegand32	Wiegand is effective
0x74	Wiegand output data pulse width	1 - 255	Internal card reader converts into time, time = this value * 10 (microseconds).	
0x75	Wiegand output data pulse period	1 - 255	Internal card reader converts into time, time = this value * 100 (microseconds).	
0x76	Wiegand output repeats	1, 2, 3	Does not support temporarily	
0x77	Wiegand output repetition interval	1, 2, 3, 4, 5, 6, 7, 8, 9, 10	The reader converts internally into time, time = this value * 10 (ms). Does not support temporarily	

Table 4:

Parameters in the EEPROM address (Hex)	Project Meaning	Set operation effective	Explain the meaning of values	Other

		value (decimal)		
0x80	Trigger pin is enabled to set the trigger mode	The low four bits set to 0 or 1, means work does not trigger or trigger	Bit0: corresponding to the trigger pin 0	The reader-writer reads the card effectively for the mode 2,3
			Bit1: corresponding to the trigger pin (not supported)	
			Bit2: corresponds to the trigger pin 2 (not supported)	
			Bit3: corresponds to the trigger pin 3 (not support)	
0x81	Trigger pin's trigger mode	The low four bits set to 0 or 1, indicating low level triggering or high level triggering	Bit0: corresponding to the trigger pin 0 (supports high level trigger)	
			Bit1: corresponding to the trigger pin 1 (not supported)	
			Bit2: corresponding to the trigger pin 2 (not supported)	
			Bit3: corresponding to the trigger pin 3 (not support)	
0x84	OFF-delay time	0 - 240	Internal card reader converts into time, time = this value * 100 ((ms).	

Table 5:

Parameters in the EEPROM address (Hex)	Project Meaning	Set operation effective value (decimal)	Explain the meaning of values	Other
0x90	Hopping Setting	0 - 50	0: frequency-hopping mode.	
			1 - 50: Fixed-frequency operation, this value determines the frequency	
0x92 ~ 0x98	FH - Frequency parameters	Bit set to 0 or 1, means they do not select the frequency or not	From 0x92 BIT0 (1st frequency) - BIT7 (7th frequency), the rest may be deduced by analogy, may set 50 frequency periodic duty	

Table 6:

Parameters in the EEPROM address (Hex)	Project Meaning	Set operation effective value (decimal)	Explain the meaning of values	Other
0x87	Single tag and multi-tag identification	0, 1, 2, 3	0: EPC single tag identification 1: EPC multi-tag identification 2: 18000_6B single tag identification 3: 18000_6B multi-tag identification （ Not support）	

Table 7:

Parameters in the EEPROM address (Hex)	Project Meaning	Set operation effective value (decimal)	Explain the meaning of values	Other
0x89	Antenna work mode	1, 4	1: Single antenna work mode 4: Multi-loop antenna work mode	
0x8A	Choose antenna work mode	The low four bits set to 0 or 1, means they do not choose or select the appropriate antenna work mode.	0: do not choose any antenna work 1:antenna 1 work 2: antenna 2 work 4: Antenna 3 work 8: Antenna 4 work 15: All antennas working	

Table 8:

Parameters in the EEPROM address (Hex)	Project Meaning	Set operation effective value (decimal)	Explain the meaning of values	Other
0x7B	ID neighboring identification	1, 2	1: ID neighboring identification starts 2: Don't start (send real-time data available)	
0x7A	ID neighboring identification the time	1 - 255	Internal card reader converts into time, time = this value *1(sec)	Note: When ID neighboring identification starts, time value can not be 0, otherwise turns to not start automatically.

The above address in the command uses two bytes, because the above bytes just have a byte range， therefore，when actual use, fill the high bytes of the command to 0.

For example: If the reader reads cards occur in timing work mode, the actual fill is:

Parameter address (MSB)	Parameter address (LSB)
0x00	0x70

Description:

After the above command completed, you need to make the reader work with the new parameters, you can use one of following ways:

(1) Manual reset reader, so the operator needs to be close with the reader (power again);

(2) PC remote operation, by using the Reset Reader command to control reader with the PC software.

4. Test and calculation methods (C language)

unsigned char CheckSum (unsigned char * uBuff, unsigned char uBuffLen)

```
{
unsigned char i, uSum = 0;
for (i = 0; i <uBuffLen; i + +)
{
uSum = uSum + uBuff [i];
}
uSum = (~ uSum) + 1;
return uSum;
}
```

5. Automated identification and data output format routines

EPC G2 tag output format is as follows:

Here is an example:

A total of 17 bytes Tag Data: (The following values are hexadecimal)

---

00 00 E3 00 60 19 D2 6D 1C E9 AA BB CC DD 01 51 FF

Of which:

00: the head sign , this is fixed

00: Device Number

E3 00 60 19 D2 6D 1C E9 AA BB CC DD: ID No.

01: antenna number, from which the antenna of this recognition Note: (integrated antenna is fixed)

51: checksum, calculates: From first byte to from the bottom the third byte, altogether 15 bytes

FF: flag, this is fixed

Each time the reader returns to a tag data.