Codatex ZE03

Version 2.3

Communication Protocol

1 Content

2 General

In general all settings and operation modes are valid for all types of the ZE03 terminals. If this is not the case special advises are given.

2.1 Symbols and Notations

additional advice


wrong procedure, potential error source


correct procedure, example

indicates functions especially for the ZE03 Ethernet

indicates functions especially for the ZE03 GSM

Bold notation is used for **important informations**.
Italic notation is used for *examples* and *commands.*

<Special characters>	fix ASCII value (see table)
[value]	variable depending on commandl
{Optional value}	must not be set

2.2 Special characters in ASCII codes

Spezial characters	DEC	HEX	description
<STX>	002	02	Start of telegram
<SOH>	001	01	Start of answer (Ethernet)
<ETX>	003	03	End of data
<EOT>	004	04	End of telegram
<ENQ>	005	05	Enquiry (data available)
<ACK>	006	06	Command acknowledged
<NAK>	021	15	Command not acknowledged

Tab. 2.1: ASCII values of special characters

2.3 Examples

PC means the PC is sending (commands as characters)
ZE means ZE03 responds (responses as characters)

2.4 Format of a Telegram

<STX>[command]{[Parameter1..ParameterX]}[CHECKSUM]<EOT>

Telegrams always start with **<STX>** and end with **<EOT>**.
After the commands and data in a telegram there is always a checksum [CHECKSUM]. The checksum is created as total of the digits of the transmitted ASCII characters **without <STX> und <EOT> and sent as ASCII characters** (only the lower 8 bit).


<STX>SQ03ABCD → 53h + 51h + 30h + 33h + 41h + 42h + 43h + 44h = 211h → 11h → *<STX>SQ03ABCD**11**<EOT>*

All characters in telegrams have to be sent as capital letters only.


<STX>lb00a03F... Small letters are not accepted


<STX>LB00A03F... All characters are capital letters

3 Basic Settings for Communication

3.1 Serial RS232 Communication

Display prompt: 

Every ZE03 terminal has a serial interface. It can be used for configuration of the terminal and for data download. The serial interface needs following parameters to be set:

Parameter	Wert
Baudrate	57600
Databits	8
Stopbits	1
Parity	none
Flux control	none

Tab. 3.1: Serial Parameters

Take care of a correct fitting of the serial plug in the terminal jack. Push the plug completely into the jack.

Make sure that no other software is occupying your serial port. In many cases background software (like mobile phone or PDA sync software) is using and blocking the serial interface.

Please read under item **4.1. „ZE03 RS232 Minimum Configuration“** which minimum configuration is necessary for a correct use of the terminal.

3.2 Communication during battery operation

Display prompt: 

During battery operation only serial communication is possible. The other optional interfaces like Ethernet or GPRS are deactivated during battery operation due to power saving reasons.

3.3 Ethernet Interface

Display prompt: 

The network module inside the ZE03 Ethernet terminal needs an IP address for communication over Ethernet.
Either a DHCP server provides the IP address or a manual command, which is described under **7.2. “Change IP address”.**

3.4 GPRS Interface

Display prompt: 

To allow GPRS communication you need a valid SIM card with GPRS function (data card is sufficient) and a minimum configuration of the ZE03 GPRS terminal which is described under item **„ ZE03 GSM Minimum Configuration“.**

4 Minimum Configuration of a ZE03 Terminal

4.1 ZE03 RS232 Minimum Configuration

Following minimum configuration is necessary for a correct operation of the ZE03 terminal:

- Set the serial number of the terminal (see item 5.5.4)
- Set the actual date and time of the terminal (see item 5.5.6)

After above settings you can use the terminal. In the display you should see the actual date and time. A blinking colon shows that the actual time is normal time. A change between a colon and a single dot shows that the actual time is daylight saving time.

4.2 ZE03 Ethernet Terminal Minimum Configuration

Following minimum configuration is necessary for a correct operation of the ZE03 terminal:

- Set the serial number of the terminal (see item 5.5.4)
- Set the actual date and time of the terminal (see item 5.5.6)

After above settings you can use the terminal. In the display you should see the actual date and time. A blinking colon shows that the actual time is normal time. A change between a colon and a single dot shows that the actual time is daylight saving time.

The ZE03 Ethernet terminal is per default set to receive its IP address from a DHCP server. Please see item 7.2. for to change the IP address.

4.3 ZE03 GSM Terminal Minimum Configuration

Following minimum configuration is necessary for a correct operation of the ZE03 terminal:

- Insert a valid SIM card into the internal card holder
- Set the serial number of the terminal (see item 5.5.4)
- Set the actual date and time of the terminal (see item 5.5.6)
- Set the basic parameters for GPRS (see item 5.5.3.)
- Set trigger for server connection: either number of bookings or fix time windows or a combination of both

After above settings you can use the terminal. In the display you should see the actual date and time. A blinking colon shows that the actual time is normal time. A change between a colon and a single dot shows that the actual time is daylight saving time.

5 Command Structure

5.1 Types of Commands

There are 4 basic command types: initialization of communication, instructions, load and store commands.

Except the initialization of communication commands all other commands are compiled according to the above mentioned telegram:

<STX>[command]{[Parameter1…ParameterX]}[CHECKSUM]<EOT>

For initialization of communication (Hello command H) there is no [CHECKSUM] used.

5.2 Initialization of Communication H

This command should be used at the beginning of every communication. The command telegram is:

<STX>H<EOT>

With the ZE03 GSM terminal it is a must to use this command at the beginning of communication. The server software has to send the H command to the terminal.

Example of a communication with a ZE03 RS232 Terminal:

PC *<STX>H<EOT>*
ZE *<STX>XTM23<EOT>*
(XTM23 stands for Version 2.3)

PC *<STX>h68<EOT>*
ZE *<STX><NAK>15<EOT>*
All letters must be sent in capital letters.

5.3 Instructions C

Instructions are used for direct execution of commands on the ZE03 terminals. This can be useful for the initial startup or for actions after collection data from the terminal.

Instructions have following format:

<STX>C[instruction]{[Parameter]}[CHECKSUM]<EOT>

5.3.1 Displaytest - A

This instruction is used for test purposes. For 3 seconds all segments are switched off and on. Finally an <ACK> will be sent.

PC *<STX>CA84<EOT>*
ZE *<STX><ACK>06<EOT>*

5.3.2 Buttontest - B

This instruction is used for testing the buttons.
Pressing the left button is answered with a “C”, the right button with a “G”. Also the beeper will be activated on pressing either of the buttons.
If no button is pressed the terminal answers with an <ACK>.

PC *<STX>CB85<EOT>*
ZE *<STX>C43<EOT>*

5.3.3 Read Transponder - R

This instruction is used for reading a transponder in the antenna field of the terminal and sending the number on the serial interface. At reading a transponder the terminal sends a “R” plus the 5 byte transponder number, otherwise a <NAK> will be sent.

PC *<STX>CR95<EOT>*
ZE *<STX>R12345678905F<EOT>*

5.3.4 Set Download Pointer to Entry Pointer - D

This instruction is used for setting the download pointer to the actual address of the entry pointer.
The entry pointer is used for addressing the actual memory address for a new booking to be made. The download pointer is pointing to the address of the latest data download. With this method the bookings are cyclically written to the memory up to a total of 2900 bookings.
After using the D instruction the available memory is 100% again.
The terminal answers with an <ACK>.

PC *<STX>CD87<EOT>*
ZE *<STX><ACK>06<EOT>*

If you cannot avoid that bookings are made during the data download (especially with the ZE03 Ethernet and GSM), it is preferable not to use the D instruction but to set the download pointer to the address of the entry pointer, which it had at the start of the download process. Use the corresponding SP command (see Load and Store commands)

5.3.5 Show message in the display - M

This instruction is used for displaying a text message (8 digits). This text will be shown as long as a connection is available or until a new message is shown. If no text is provided the actual message is deleted.
The terminal answers with an <ACK>.

PC *<STX>CMtesttest[CHECKSUM]<EOT>*
ZE *<STX><ACK>06<EOT>*

PC *<STX>CM90<EOT>* (deletes actual display)
ZE *<STX><ACK>06<EOT>*

Please calculate the correct value for [CHECKSUM].

5.3.6 Reset - C

This instruction resets the terminal into the original state. All bookings and settings will be erased and the terminal is waiting for a initial setup.
Resetting the terminal may take some time, after finishing the reset an <ACK> will be sent.

PC *<STX>CC86<EOT>*
ZE *<STX><ACK>06<EOT>*

Please switch off and on the terminal after a reset has been made.

5.4 Load commands L and Store commands S

Load and Store commands are shown together in the following, because the structure of both commands is almost identical.

Load commands are used for downloading parameters or data from the terminal. Load commands have following structure:

<STX>**L**[Param. Type]{[Param. Number]}[CHECKSUM]<EOT>

Store commands are used for uploading and storing data or parameters to the terminal for configuration purposes. Store commands have following structure:

<STX>**S**[Param. Type]{[Param. Number]}[CHECKSUM]<EOT>

Not every command requires the parameter number.

5.4.1 8 bit Parameter - P

This command is used for loading or storing of an 8 bit parameter. The parameter is defined by a 2 digit parameter number (00 to FF).

Nr.	Beschreibung
00	Number of optional type of bookings for the buttons
01	Settings (display, beeper, time change)
02	Mode of operation for ZE03 Ethernet
03	Settings for dial-up of the ZE03 GSM
04	Delay time for dial-up of the ZE03 GSM

Tab. 5.1: 8 bit Parameter

5.4.1.1 Number of optional type of bookings – Nr. 00

With this command you can load or store the number of optional texts fort he buttons.

Load:

PC <*STX>LP00FC<EOT>*
ZE <*STX>01[CHECKSUM]<EOT>*

Store:

PC <*STX>SP00076A<EOT>*
ZE <*STX><ACK>06<EOT>*

5.4.1.2 Settings – Nr. 01

With this command settings for the display, beeper and time change can be made as shown below

Bit 7	6	5	4	3	2	1	Bit 0
128	64	32	16	8	4	2	1

Tab. 5.2: 8 bit Parameter and decimal values

Bit 0 → Beeper ON (1) / OFF (0)
Bit 1 → Progress bar on display ON (1) / OFF (0)

Bit 2 – 5 currently not used

Bit 6 → daylight saving time change automatically ON (1) / OFF (0)
Bit 7 → actual time is daylight saving time (1) / no (0)

Load:

PC <*STX>LP01FD<EOT>*
ZE <*STX>C3[CHECKSUM]<EOT>*

C3 corresponds to 1100 0011,
Meaning of bits see above

Store:

PC <STX>SP01C37A<EOT>
ZE <STX><ACK>06<EOT>

5.4.1.3 Mode of operation ZE03 Ethernet – Nr. 02

This command loads or stores settings regarding the mode of operation of the ZE03 Ethernet terminals.

Bit 7	6	5	4	3	2	1	Bit 0
128	64	32	16	8	4	2	1

Tab. 5.3: 8 bit Parameter and decimal values

Bit 0 → store booking if offline ON (1) / OFF (0)
Bit 1 → send bookings online ON (1) / OFF (0)

Bit 2 – 7 currently not used

Load:

PC <STX>LP02FE<EOT>
ZE <STX>03[CHECKSUM]<EOT>

03 corresponds to 0000 0011,

Store:

PC <STX>SP020368<EOT>
ZE <STX><ACK>06<EOT>

5.4.1.4 Settings for dial-up of ZE03 GSM – Nr. 03

This command sets parameters for the dial-up of an ZE03 GSM terminal.

Bit 7	6	5	4	3	2	1	Bit 0
128	64	32	16	8	4	2	1

Tab. 5.4: 8 bit Parameter and decimal values

Bit 0 → GPRS Power Off on Disconnect (CX) ON (1) / OFF (0)
Bit 1 → GPRS Connect on Power On ON (1) / OFF (0)
Bit 2 → GPRS Connect on Timer ON (1) / OFF (0)
Bit 3 → GPRS Connect on Entry ON (1) / OFF (0)

Bit 4 – 7 currently not used

Load:

PC <STX>LP03FF<EOT>
ZE <STX>18[CHECKSUM]<EOT>

18 corresponds to 0001 1000,

Store:

PC <STX>SP03186F<EOT>
ZE <STX><ACK>06<EOT>

5.4.1.5 Delay time for dial-up of ZE03 GSM– Nr. 04

This command loads or stores the delay time between a trigger condition for a dial-up and the dial-up of a ZE03 GSM terminal. The delay time is set in minutes hex-coded (from 00 to FF).

Load:

PC *<STX>LP04[CHECKSUM]<EOT>*
ZE *<STX>0A[CHECKSUM]<EOT>*
0A → the dial-up starts 10 minutes after dial-up trigger

Store:

PC *<STX>SP040067<EOT>*
ZE *<STX><ACK>06<EOT>*
00 → the dial-up starts 0 minutes (immediately) after dial-up trigger

5.4.2 16 bit Parameter - Q

This command is used for loading and storing 16 bit parameters. The parameter number is defined by a 2 digit number (00 to FF)

Nr.	Beschreibung
00	Entry Pointer (pointer to address for next booking)
01	Download Pointer (pointer to address of latest download)
02	Number of bookings for triggering a dial-up

Tab. 5.5: 16 bit Parameter

All 16 bit parameters have following interchanged high/low byte format:

Lowbyte / Highbyte: 1380 → 8013

5.4.2.1 Entry Pointer - Nr. 00

Loads or stores the address pointer for the next booking.

Load:

PC *<STX>LQ00FD<EOT>*
ZE *<STX>8D00[CHECKSUM]<EOT>*
8D00 means 008D,i.e. that the next booking will be stored to address 008D.

Store:

PC *<STX>SQ009A00E0<EOT>*
ZE *<STX><ACK>06<EOT>*
The Entry Pointer will be set to address 009A.

Changing the Entry Pointer is dangerous and can cause overwriting of existing bookings without prior warning.

5.4.2.2 Download Pointer – Nr. 01

Loads or stores the download pointer.

Load:

PC *<STX>LQ01FE<EOT>*
ZE *<STX>7C00[CHECKSUM]<EOT>*
7C00 means 007C, i.e that the latest download has been completed up to address 007C.

Store:

PC *<STX>SQ019A00E1<EOT>*

ZE <STX><ACK>06<EOT>
The download pointer will be set to address 009A.

Setting the download pointer should be done only after a successful download of the bookings. The bookings (latest 2900) are still available in the terminal and can be downloaded any time in case of loss of data.

5.4.2.3 Number of Bookings for dial-up trigger – Nr. 02

This command sets the number of bookings to be made on a ZE03 GSM terminal to trigger a dial-up connection. The value is a 4 digit hex number with high/low byte interchanged

Load:

PC <STX>LQ02FF<EOT>
ZE <STX>0200[CHECKSUM]<EOT>

0200 means 0002 bookings, i.e. after 2 bookings a dial-up will be started.

Store:

PC <STX>SQ021400CB<EOT>
ZE <STX><ACK>06<EOT>
1400 means 0014, i.e. the terminal will start a dial-up after 14hex = 20dec bookings.

5.4.3 Basic Settings ZE03 GSM – G

This command is used for reading and setting basic parameters for the ZE03 GSM terminal.
A parameter number from 00 to 09 defines the single settings.

Parameter	Nr.	length	Example
Mobile phone number	00	20	„00436641234567“
e-mail/FTP address	01	50	e-mail: „yourname@provider.com“ FTP:„username:password:provider .com[:portnumber]“
SIM Card PIN	02	10	„12345“
SMS Password *	03	10	„hugo1“
Server IP Address	04	15	„123.123.123.123“
Server Port Number	05	5	„16200“
GPRS Username	06	20	„username“
GPRS Password	07	20	„password“
GPRS APN	08	20	„web.provider.de“
GPRS Timeout in sec	09	5	„10“ bis „86400“

Tab. 5.6: Basic Settings ZE03 GSM

* The SMS password must only contain letters from A to Z and numbers from 0 to 9.

Load:

PC <STX>LG02F5<EOT>
ZE <STX>12345[CHECKSUM]<EOT>
Reads the PIN number of the SIM card. PIN is 12345.

Store:

PC <STX>SG020000004321E6<EOT>
ZE <STX><ACK>06<EOT>
Sets the PIN number to 4321

5.4.4 Serial Number - S

This command is used to load and store the serial number of the terminal. The serial number is a 20 digit (10 byte) number, of which the first 10 digit are fix programmed and cannot be changed.

Load:

PC *<STX>LS9F<EOT>*
ZE
<STX>08035309990123456789[CHECKSUM]<EOT>

Store:

PC *<STX>SSxxxxxxxxxx1234567890<CRC><EOT>*
ZE *<STX><ACK>06<EOT>*

Even the first 10 digit are fix programmed you have to enter 20 digits for writing the last 10 digits of the serial number

5.4.5 Text - T

This command is used for reading and storing of standard texts which are shown on the terminal display.
There are two kind of texts: standard and optional texts (type of boolings). The standard texts are available with parameter numbers 80 to 8E. Optional texts are available with parameter numbers 00 to 07.

5.4.5.1 Standard texts – Nr. 80 bis 8D

These texts are used for standard actions and modes of the terminal. The length of the text has to be exactly 8 digits (filled with ◦ in the table).

Text Nr.	Bedeutung	Werkseinstellung
80	Name of the model	◦TIMER◦◦
81	Firmware Version	VER:◦1.2
82	Week days (Su - We)	SuMoTuWe
83	Week days (Th – Sa)	ThFrSa◦◦
84	Left button display	◦◦◦IN◦◦◦
85	Right button display	◦◦◦OUT◦◦
86	Transponder reading	Reading◦
87	Finished transponder reading	Ready!◦◦
88	Same booking within 1 min	Double!◦◦
89	Memory full	mem◦full
8A	Network Error	Net Err!
8B	Error	Error!◦◦
8C	Warning memory full next 100 bookings	Memory!
8D	Inital mode	◦Setup◦◦

Tab 5.7: Standard texts

Load:

PC *<STX>LT840C<EOT>*
ZE *<STX> IN [CHECKSUM]<EOT>*

Store:

PC *<STX>ST84 COME 6A<EOT>*
ZE *<STX><ACK>06<EOT>*

5.4.5.2 Optional Texts – Nr. 00 bis 07

The optional texts are available for distinguishing additional types of bookings. They are shown on the display on repeated pressing of the left or right button. The texts are sent in ASCII format and have to be exactly 8 digits.

For using the optional texts you have to set also the parameter "number of optional texts (type of bookings)" with the command P00.

Load:

PC *<STX>LT0101<EOT>*
ZE *<STX>pause [CHECKSUM]<EOT>*

Schreiben:

PC *<STX>ST01doctor [CHECKSUM]<EOT>*
ZE *<STX><ACK>06<EOT>*

The checksum has to be calculated using the hex values of the ASCII digits, i.e. 0x44 for the letter „D".

5.4.6 Date and Time - U

This command reads and stores the date and time of the terminal.
The format is:

<STX>ssmmhhWWDDMMYY[CHECKSUM]<EOT>

ss	... Seconds	(00 ... 59)
mm	... Minutes	(00 ... 59)
hh	... Hours	(00 ... 23)
WW	... Week days starting with Sunday	(01 ... 07)
DD	... Day	(01 ... 31)
MM	... Month	(01 ... 12)
YY	... Year	(00 ... 99)

Load:

PC *<STX>LUA1<EOT>*
ZE *<STX>00251304200803BC<EOT>*
(Wednesday, 20th of August 2003, 13:25:00)

Store:

PC *<STX> SU001709051910066F<EOT>*
ZE *<STX><ACK>06<EOT>*
Sets Date and Time to
Thursday, 19 th of October 2006, 09:17:00

5.4.7 Time Window for dial-up trigger – Z

ZE03 GSM

This command loads and stores the time windows for triggering a dial-up connection of the ZE03 GSM terminal.
There are 4 possible time windows with parameter number 00 to 03 with following format:

hhmmWW

hh ... Hour (00 bis 23)
mm ... Minutes (00 bis 59)
WW ... Week Days (coded as shown below)

Bit 7	6	5	4	3	2	1	Bit 0
SU	Sa	Fr	Th	We	Tu	Mo	

Tab. 5.8: Coding of Week Days in 8 bit

An active week day has to be set to "1".
Bit 0 is ignored.

Mo, Tu and Sa → 0100 0110 → 46 hex

Load:

PC *<STX>LZ0107<EOT>*
ZE *<STX>235080[CHECKSUM]<EOT>*
(time window 01, every Sunday at 23:50)

Store:

PC <STX>SZ020400FE5E<EOT>
ZE <STX><ACK>06<EOT>
(time window 02, daily at 04:00)

5.4.8 Blockdownload of Bookings - E

This command is used for downloading bookings from the terminal in a block format.
Block format means that the bookings are transferred as a memory map of the EEPROM memory with 125 blocks of 256 bytes each.

as the number of bytes per booking (11) is not a divisor of 256, one booking may be distributed to two consequent blocks, see following table.

Buchungsnummer	Transponder	Zeit/Datum	Buchungsart
1	1234567890	2408200803	00
2	1234567890	1216200803	80
....			
23	ABCDEF7890	1609230803	00
24	ABCDEF7890	2310230803	80
25	1234567890	0012230803	80
....			

Tab. 5.9: Block format

Data in **RED** are from block 1, Data in **BLUE** are block 2.

The block is defined by a 2 digit hex number (**from 00 to 7C**) The terminal answers with 256 bytes as hex coded numbers (512 digits).

Additional to the common protocol format sends the terminal an <ETX> between data and checksum.
The <ETX> has to be calculated for the checksum.

<STX>[256 Bytes Data]<ETX>[CHECKSUM]<EOT>

5.4.8.1 Format of a booking

[Transpondernumber][Time/Date][type of booking]

The transponder number is of 5 byte (10 digits).
Time/Date are 5 bytes as well with following format:

Time/Date Format: mmhhDDMMYY

mm	... Minutes	(00 ... 59)
hh	... Hours	(00 ... 23) / (40 ... 63)
DD	... Day	(01 ... 31)
MM	... Month	(01 ... 12)
YY	... Year	(00 ... 99)

Bit 7 of the hours is showing if daylight saving time was activated. In case of daylight saving time the value 0x40 will be added to the hours value:

20.08.2003 13:56 → 56**5**3200803 (daylight saving time)
20.01.2003 13:56 → 56**1**3200103 (normal time)

The last two digits (1 byte) show the type of booking. The left button will generate bookings from 00 to 07 (depending on the number of optional texts you have set) and the right button will generate bookings from 80 to 87.

No opt. text set → press button 1x → 00

first opt. text set → press button 2x → 81

5.4.9 Download Single Bookings – B

Command format:

<STX>LB[start address]{[end address]}[CHECKSUM]<EOT>

This command is used for downloading one or more bookings from the terminal. The start and end address are defined as 3 digit address pointer between **000 and B53;**
The terminal answers with:

<STX>[11 Bytes Booking]{[2…n Booking]}[CHECKSUM]<EOT>

The format of a booking is shown in item 5.4.8.1 above.

PC *<STX>LB000[CHECKSUM]<EOT>*
ZE *<STX>0123456789565320080380[CHECKSUM]<EOT>*

ZE03 GSM

The download of more than one booking is only available with ZE03 GSM terminals. Other terminals answer with a <NAK>.

6 Network Communication ZE03 Ethernet

6.1 General

ZE03 ETHERNET

For establishing a network link the client software must open a TCP/IP channel to the terminal. The local port in the terminal is 10001. Once the link is established the terminal switches into the online mode.
In the online mode every booking will be sent immediately.
In case of offline mode or transmission failure the booking will be stored in the terminal and sent as soon as the link is established again.

If a network link is established, the network symbol  will be shown in the terminal display.

All commands sent from the terminal during the online mode and the answers from the client software must have following format:

<SOH>[command]{[Parameter1…ParameterX]}[CHECKSUM]<EOT>

Please take care of proper use of <STX> and <SOH>.
If used wrongly the terminal cannot distinguish between answers and commands.

6.2 Terminal sends booking – A

ZE03 ETHERNET

This telegram will be sent if the terminal is set to send bookings online (item 5.4.1.3).
The client must answer within 3 seconds.
In case the answer is <NAK> or missing, the procedure will be repeated twice before the terminal switches into the offline mode.

The answer to a sent booking has to have following format:

<SOH><ACK>[result]{Text}[CHECKSUM]<EOT>

or

<SOH><NAK>[CHECKSUM]<EOT> causes a repetition

As [result] following digit can be sent:

B … Booking was successfully transferred, terminal provides a beep signal for OK
N … Booking transfer failed, terminal shows error

An additional text can be sent from the client and will be shown in the second line of the display. The length can be 8 or 16 digit. In case of 16 digit, first the first 8 digit will be shown and then the second 8 digit in the second line.

7 Extended Configuration ZE03 Ethernet

7.1 UDP Broadcast for IP Adress

ZE03 ETHERNET

The actual IP address of the terminal can be queried with an UDP broadcast. This broadcast will be received by all terminals available in the network.

First step is UDP Broadcast with binary data 00 00 00 F6 (4 bytes) to Port 30718. All terminals have to reply with a standard answer (30 byte):

000000F7[Version 16 Byte][Data 4 Bytes][MAC address 6 Byte]

The MAC address of a terminal is visible on a label at the backside of the terminal.
The IP address of the terminal is available in the return address of the UDP data package.

7.2 Change IP Address for ZE03 Ethernet

ZE03 ETHERNET

You can change the IP address of a terminal with a UDP broadcast to port 30718.

Format of the Broadcast:

000000FC 49 50 2D 53 45 54 55 50 00 00 [Serial number 2 Byte][Neue IP 4 Byte]

The serial number is last 2 Byte of the MAC address.

MAC = 00 20 4A 80 27 2E → Serial number = 27 2E

The new IP address has to sent hex coded.

IP = 192.168.0.123 → HEX coded = C0 A8 00 7B

If you set the new IP to 0.0.0.0, then the DHCP function is activated and the terminal will get its IP from the DHCP server (default setting)

8 GPRS Communication ZE03 GSM

8.1 General

For uploading data to a server, the ZE03 GSM terminal uses an embedded GPRS module. As the GPRS modules get dynamic IP addresses from the provider, the upload has to be started from the terminal.

You have to put a SIM card into the slot of the GPRS module and set parameters accordingly using above commands or the ZE03 Configurator software.

After setting these parameters and powering up the terminal, you can see the registration status at the bottom right side of the display of the terminal. The numbers have following meaning.

1	the terminal has been registered in the GPRS net
2	the terminal is looking for an available GSM net
3	registration denied
4	unknown state of registration
5	the terminal has been registered in a roaming net
6	limited service (net overloaded)
7	GSM call active
8	no GPRS cell available

For successfully uploading data you need in any case a registration (number 1 or 5) in the display.

After the terminal has successfully established a link to the server, the server software is sending commands to the terminal according to above mentioned command description. The following steps are a typical sequence of commands for a successful upload of bookings:

- terminal establishes a link to the server
- server sends “Hello“ command
- server uploads the download pointer (LP01)
- server uploads the entry pointer (LP00)
- server uploads bookings (LBxxxyyy)
- server sets donloadpointer to the address of the entrypointer
- server sets actual date and time in the terminal
- server closes the link to the terminal (CX)

8.2 Dial-up trigger

The trigger for a terminal dial-up has to be set in the terminal, either by using above corresponding commands or by using the ZE03 configurator software.

Following conditions can be set for triggering a dial-up:

- number of bookings
- time-windows

8.3 Finish Upload

The server finishes the upload by sending the CX command:

<STX>CX9B<EOT>

8.4 GPRS communication error

Following reasons for a communication error may appear:

- no GSM net available
- no GPRS link possible
- weak GPRS signal strength
- noise or other disturbances during the communication

In case of a communication error the terminal automatically retries to establish a link to the server:

- First: 3 times with a delay of 1 minute
- And then: continuously with a delay of 10 minutes

9 SMS Communication ZE03 GSM

9.1 General

Most of the time the terminals do not have a link to the server, as the GPRS communication will always be closed after data transmission.
Therefore there are two possibilities to activate the terminal via a SMS:

- trigger a connection to the server and
- change IP address and port

following SMS commands are used:

Kommando	Beschreibung
connect	Requests the terminal to dial-up to the server
server	Change IP address and port number

Tab. 9.1: SMS commands

The SMS commands are password protected. The password can be set in the terminal either by above commands or by using the ZE03 configurator software.

9.2 SMS commands

The SMS can be sent from any SMS capable device. The structure of the SMS commands is defined:

[pwd]<BLANK>[command]<BLANK>{[parameter]}

[pwd] ... Password
[command] ... command
[parameter] ... optional parameter
<BLANK> ... space

The SMS has to be sent to the mobile number of the used SIM card in the terminal.

SMS example for changing IP address and port:

alpha server 123.123.123.123:12345

SMS example for establishing a link to the server:

alpha connect