BI310CICADA PROTOCOL DESCRIPTION

1. HTTP-packet structure

Data transfer using the POST method. Data transferred in text form. Packet structure:

POST http://<HOST>/<SCRIPT> HTTP/1.1\r\n
Host: <HOST>\r\n
Content-Type: application/x-www-form-urlencoded\r\n
Content-Length: <LENGTH>\r\n
\r\n
IMEI=<IMEI>& Data string 1& Data string 2
....
&Data string N

Where:
<HOST> - IP- address and server name
<SCRIPT> - full path to the script and title
<LENGTH> - data length
<IMEI> - IMEI devices

2. Data string structure

Data string transmitted the information, needed to calculate location of the base stations, current position by GPS, state of internal device sensor and settings. In packet strings always present +COPS, #INFO. If there is GPS signal, the packet may be not available the string with information about the base stations (#MONI). If the GPS signal is not available, then in packet data string with GPS-($GPGGA, $GPVTG, $GPZDA, $GPGSA)may be not available.

2.1. Data about base stations

Main strings of parameters MCC, MNC, LAC, CELLID, TA.
MCC+MNC delivery is made with the string
&COPS=0,2,"MCC+MNC"
Example:
&COPS=0,2,"25506"
Where:
MCC = 255, MNC = 06.

Data transmission of the base stations (LAC, CELLID, TA) with the string:
&BSMn=<bsic> <LAC> <CELLID> <arfcn> <dBm> <C1value> <C2value> <TA> <qual> <netname>

and
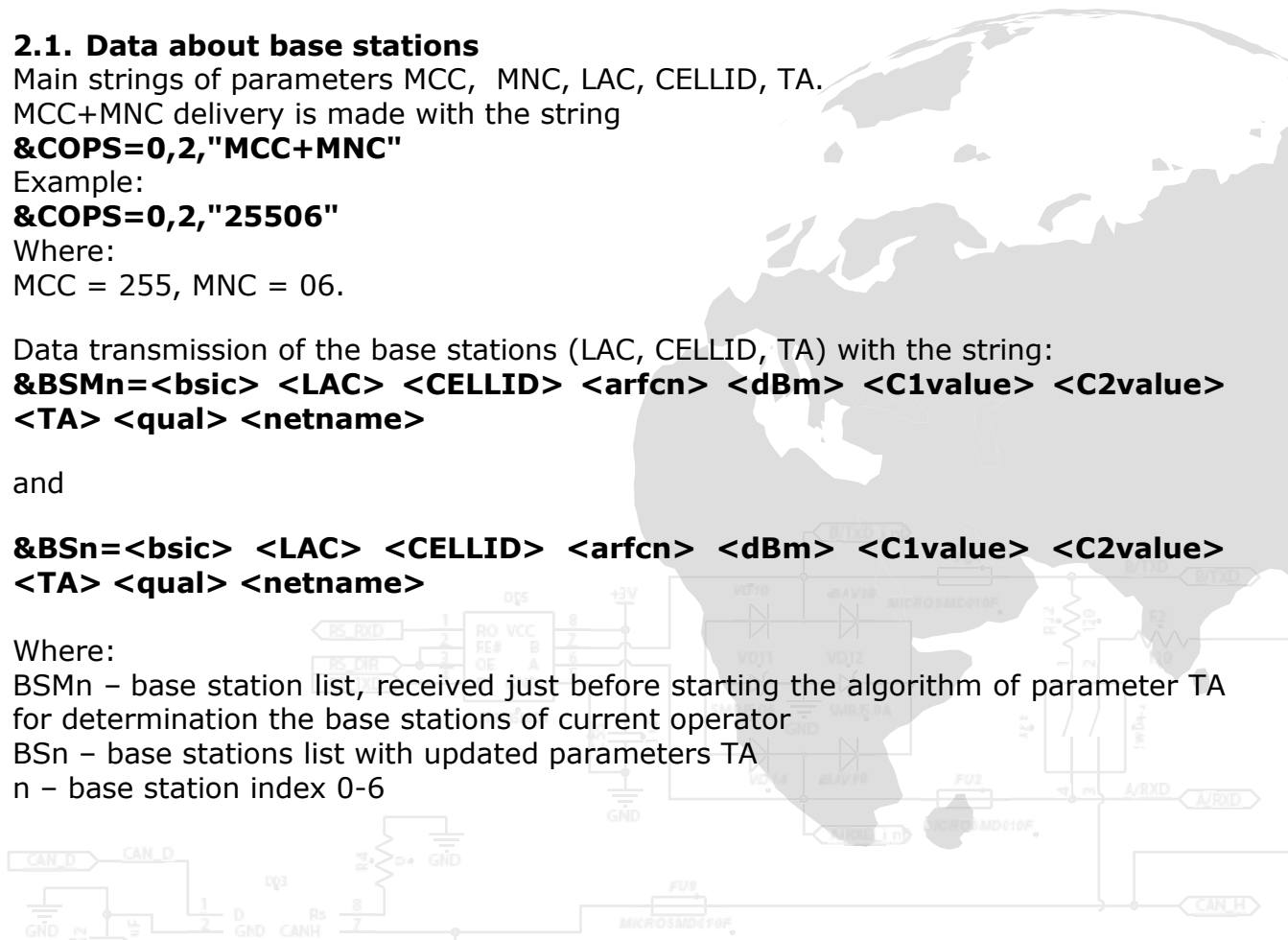
&BSn=<bsic> <LAC> <CELLID> <arfcn> <dBm> <C1value> <C2value> <TA> <qual> <netname>

Where:
BSMn – base station list, received just before starting the algorithm of parameter TA for determination the base stations of current operator
BSn – base stations list with updated parameters TA
n – base station index 0-6

Example:
&BS0=56 2AA4 0E95 696 -86dbm 24 24 1 0 UA 06

Where:
LAC = 2AA4 (transmitted in HEX)
CELLID = 0E95   (transmitted in HEX)
TA = 1 (transmitted in DEC)

Available 7 strings with information about the base stations. While strings BSMn received, field <netname> presents only in the string BSM0. In strings BSM1-BSM6 this field can be not available.
In string BS0-BS6 this field is always present.
All fields separated by a single space.

2.2. GPS-data transfer
GPS-data string transmitted GPGGA, GPVTG, GPZDA and GPGSA.
Detailed descriptions of all GPS-strings can be found in **"The NMEA 0183 Protocol"**
Example strings with GPS-coordinates:
&GPGGA=084303.000,5025.1979,N,03025.6670,E,1,8,1.03,172.2,M,27.9,M,,
*57
&GPVTG=309.71,T,,M,0.09,N,0.17,K,A*3E
&GPZDA=084303.000,20,05,2010,,*5E
&GPGSA=A,3,05,28,07,19,13,,,,,,,,1.73,1.46,0.92*0D

2.3. Transmission state of internal sensors and device parameters
Device can transmit to the server a number of internal sensors and parameters.
Sensors or parameters can be numeric or string.
All string values taken in quotation marks "...".
Empty strings passed as "".
General format of transmission sensors looks like this:
&sens[ID]=x
General format of transmission parameters looks like this:
&par[ID]=x

Where:
sens – sensor transmission
par – parameters transmission
ID - sensor index or parameter is a 4 characters == ID parameter. ID sensors or parameters 3-digit number, the ID always recorded as 0xxx
x – sensor value or parameter

Example for sensors transmission and some parameters:

&sens[0100]=1&sens[0200]="GPS MAYAK VER
1.25"&par[0201]=300&par[0504]="www.google.com**"**

In this example sent:
source of reset - sensor, ID = 100, a value of 1,
software version - sensor, ID = 200, the value "GPS MAYAK VER 1.25",
timeout GPS-coordinates - the parameter, ID = 201, the value 300 seconds
server name - parameter, ID = 504, value of **"**www.google.com**"**

In response, server transmitted will present the values of all sensors and parameters described above.

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3. Response structure

After server packet, expected response for confirmation the reception of data with the following structure:

HTTP/1.1 200 OK\r\n
Content-Length: X\r\n
\r\n
STATUS=RECEIVED&setparam   xxxx   yyyy&setparam   xxxx
yyyy&cmd0&cmdx\r\n

Where:
X – data length
STATUS=RECEIVED – status that the data accepted by server
&setparam xxxx yyyy — string settings
&cmd0, &cmdx – additional commands
\r\n – mark of the command strings end (if present)
In settings string xxxx – ID parameter, yyyy – value of parameter. Command &setparam separated from ID parameter xxxx single space, ID parameter xxxx separated from value parameter yyyy single space.
ID parameter (see description in **ID parameters** table) is a 4 character == ID parameter. ID sensors or parameters 3-digit number, the ID always recorded as 0xxx
yyyy – value parameter. Numeric or string value. **String values are not taken in quotation marks "…". If you want to set an empty string parameter, it is written as "& setparam 0xxx", marked that the string parameter is an empty string space, and the absence of data after space.**
Device recognizes the following additional commands — "loadparam", "saveparam", "cpureset", "BOOT host,port,path".
"loadparam" — forced loading of parameters from non-volatile memory into RAM
"saveparam" — forced saving settings from memory to non-volatile memory
"cpureset" — immediate restart of processor
"BOOT host,port,path" –software update command

While operating, device automatically loads all parameters of the non-volatile memory in the operational and saves all changes in parameters after each successful data transfer. To save the resource of non-volatile memory there is no need for save settings with command "saveparam".

Example of typical response:
HTTP/1.1 200 OK\r\n
Content-Length: X\r\n
\r\n
STATUS=RECEIVED
Data taken.

Example response to parameter GPS COORD TIMEOUT, HOST, PORT and with an optional command save changes in non-volatile memory:
HTTP/1.1 200 OK\r\n
Content-Length: X\r\n
\r\n
STATUS=RECEIVED&setparam   0201   300&setparam   0504
biakom.com&setparam 0200 80&saveparam\r\n

After sending the confirmation packet server should automatically disconnect from the device.

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4. Software update command – "BOOT host,port,path"

To update software BOOT command is used. This command contains IP-address or server name that contains the update file, server port and path to the file. The command parameters separated from the BOOT keywords with a single space. From each other separated by commas. Length of **host** and **path** should not exceed 46 characters, **port** – 6 characters. Download the software update server must support files transfer parts (partial get).

Example response to software update command:
HTTP/1.1 200 OK\r\n
Content-Length: X\r\n
\r\n
STATUS=RECEIVED&setparam 0201 300&setparam 0504 biakom.com&setparam 0200 80&BOOT biakom.com,80,pr/gps_mayak_1_32.bin\r\n

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