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MIK⊙M

REP1009V1.xx (Id.-No. 147127)

Software manual
for band/channel selective Repeater

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LIST OF UNIT SPECIFIC ABBREVIATIONS

ALC	Automatic Level Control
DL	Downlink
EEPROM	Electrical erasable programming read only memory
I²C-Bus	Inter Integrated Circuit Bus
LMT	Local Maintenance Terminal
MR	Mikom Repeater
OMC	Operation and Maintenance Center
RF	Radio Frequency
RSSI	Receive Signal Strength Indication
UL	Uplink
UPS	Uninterruptable Power Supply
VSWR	Voltage Standing Wave Ratio

1 Introduction

This manual describes the functions of the standard software REP1009V1.xx implemented in band/channel selective Repeaters of the second generation. These Repeaters can be set locally or remotely. A PCMCIA slot for modem operation is available. The design of the Repeater comprises a large number of functions which the operator may monitor via terminal emulation program or the MIKOM OMC software platform. An easy to understand and easy to learn communication language supports the operator to query status reports from the Repeater or to change settings.

Your Repeater is equipped with the required software which enables the operator to communicate with the microprocessor of the control module.

The communication with the microprocessor of the control module is realized with a VT100 compatible dialogue.

The software is accessible in two different ways.

- Locally
- Remotely

Both possibilities are described below.

- The communication can be done locally by connecting a Laptop or a PC with VT100 emulation or a VT100 terminal via the control cable.

Required equipment: - Laptop or PC with terminal program, e.g. PROCOMM
                              - one serial RS232 cable: SUB-D9 (female) to SUB-D9 (female)

serial RS232 cable

Repeater with RS232 interface

Laptop or PC with terminal program
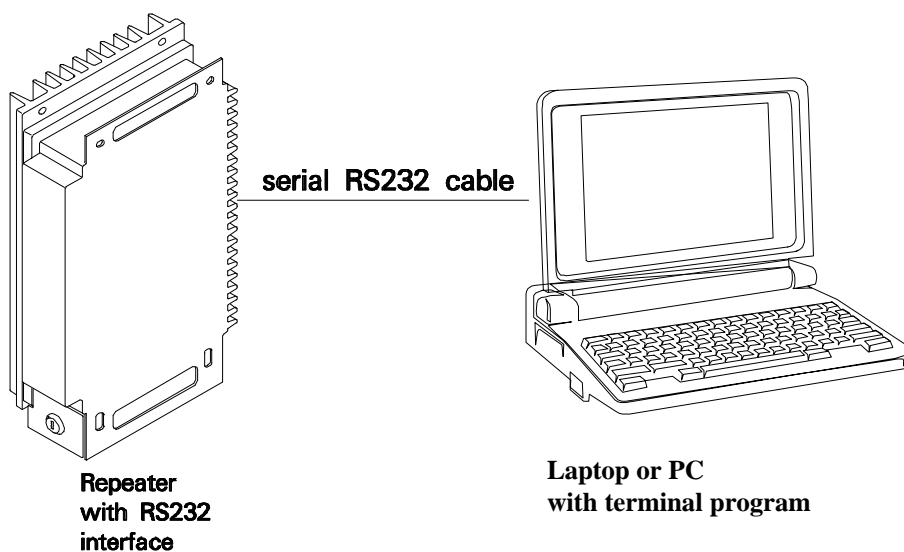
figure 1-1 Repeater locally controlled

- Furthermore the communication can be realized remotely via modem.
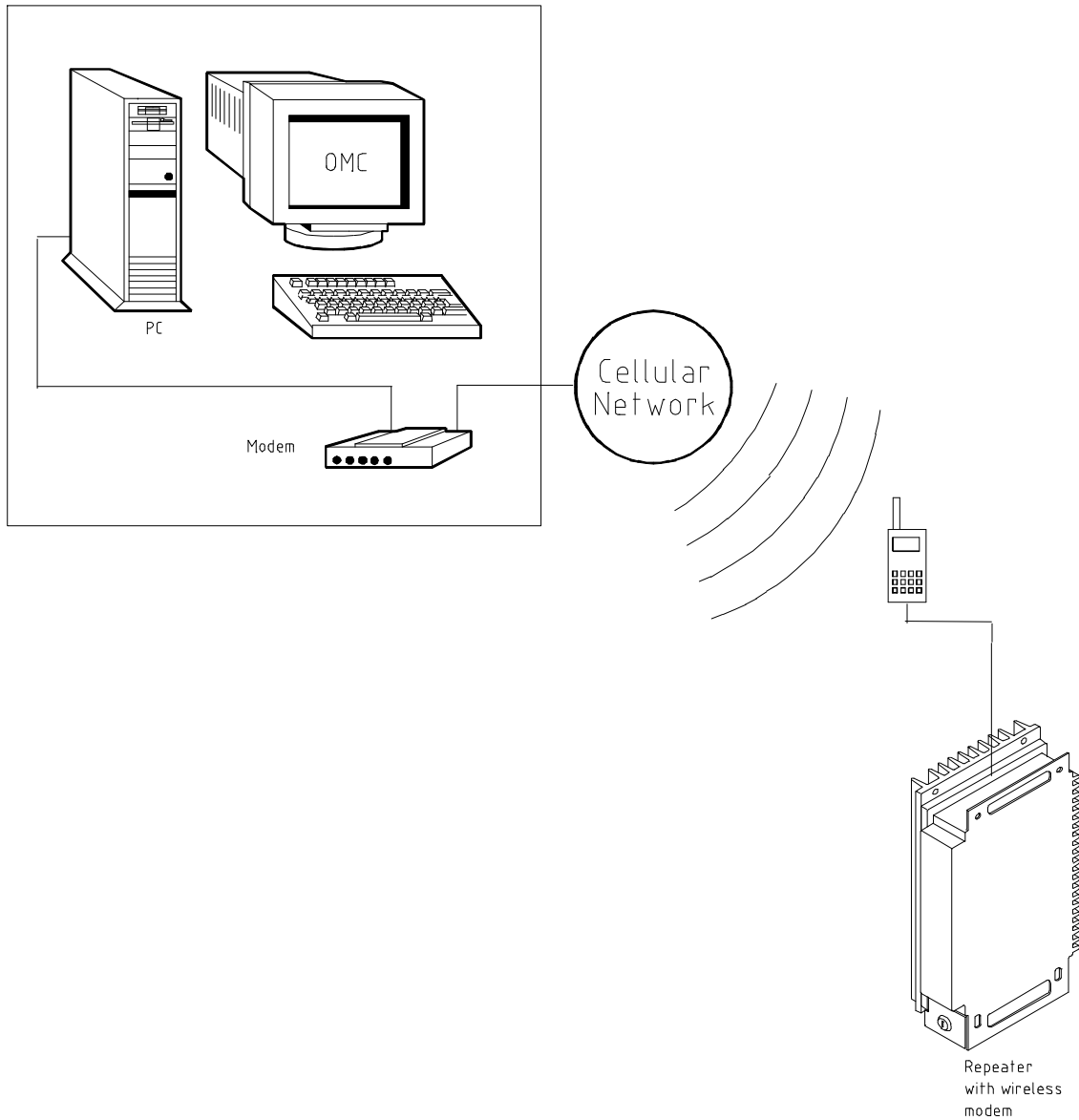
figure 1-2 Repeater remotely controlled

2 Installation

The actual software version is part of the delivery schedule of your Repeater unit and will be installed in factory.

3 Software download

It might be necessary to download another software version. This can be realized in two different ways.

■ Software download in local mode
■ Software download in remote mode

3.1 Download procedure in local mode

Two different download procedures exist in local mode. The software download **software** or **manually** controlled. After a software download previous user settings (data default values) might be overwritten. Before you start a software download save the set values for:

■ attenuation
■ ALC threshold

3.1.1 Download procedure in local mode, software controlled:

Required equipment: - PC with terminal program, e.g. PROCOMM
                            - one serial RS232 cable: SUB-D9 (female) to SUB-D9 (female)

1. Check the position of DIP-Switch 4 (position OFF) on the control module.
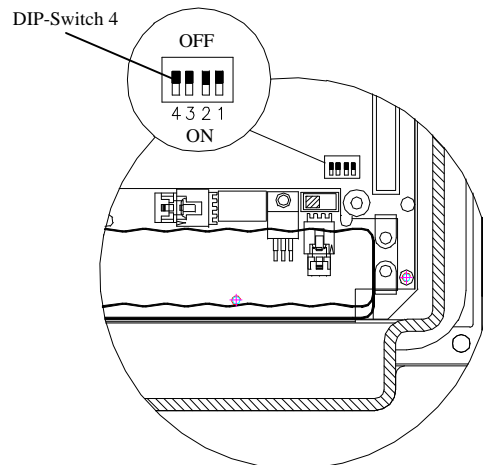
figure 3-1 Position of DIP-Switch 4

1. Switch on Repeater and PC and connect control cable. Wait until the boot process is finished.
2. Start Repeater software and login by typing **'User-ID1'** and **'P-word1'**.
3. Type software command:

                    Syntax: DNLOAD ↵

4. Exit terminal program immediately.

5. To start upload procedure type:

> Syntax: upload 1 ↵ or
>   upload 2 ↵

depending on which serial interface is available (COM 1 or COM 2).

6. The copy procedure is running. You will be asked to continue by pressing any key. Now the software download is in progress. The download lasts approximately 1 minute.

7. Software boot starts automatically.

> Response: 'MIKOM REPEATER MRx01A – SM2009 – SW:REP1009V1.xx'
>   ENTER <.> <CR> TO LOGIN

3.1.2 Download procedure in local mode, manually controlled:

Required equipment: - PC or Laptop
                            - one serial RS232 cable: SUB-D9 (female) to SUB-D9 (female)

1. Set the DIP-Switch 4 to position ON on the control module.
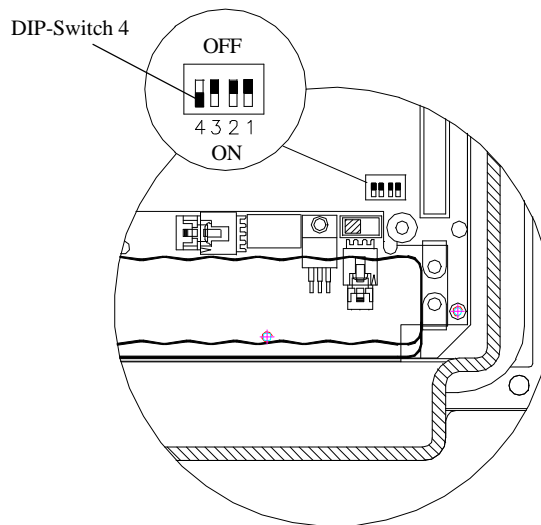
figure 3-2 Position of DIP-Switch 4

1. To start upload procedure type:

> Syntax: upload 1 ↵ or
>   upload 2 ↵

depending on which serial interface is available (COM 1 or COM 2).

2. The copy procedure is running. You will be asked to continue by pressing any key. Now the software download is in progress. The download lasts approximately 5 minutes in local mode.
3. Software boot starts automatically.
4. Don't forget to switch back the DIP-Switch 4 to position OFF.

4 Running the software

4.1 Via PC or Laptop as terminal

The local mode for settings via PC has to be set. Therefore the DIP-Switch 2 has to be at position OFF.
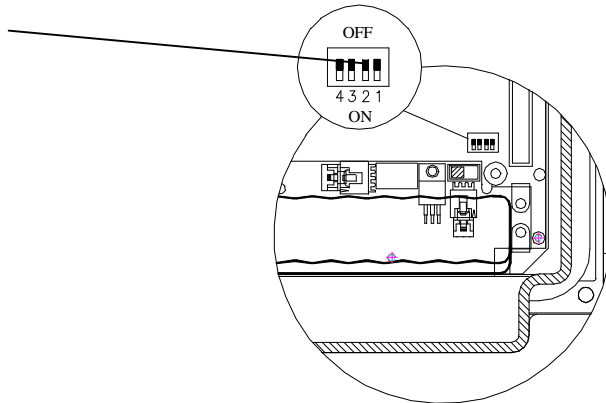
figure 4-1 DIP-Switch 2 for local mode

☞ **Note:** **Only if a Modem M1 is used DIP-Switch 2 has to be set.**

A VT100 terminal or a PC with VT100 emulation can be connected to the control module SM2009 by a standard RS232 cable, if necessary in connection with an adapter 9 to 25.

PC or Laptop	-	Control Module SM2009
9 contact SUB - D- Connector		9 contact SUB - D- Connector
male		male
PC		RS 232
PIN		PIN
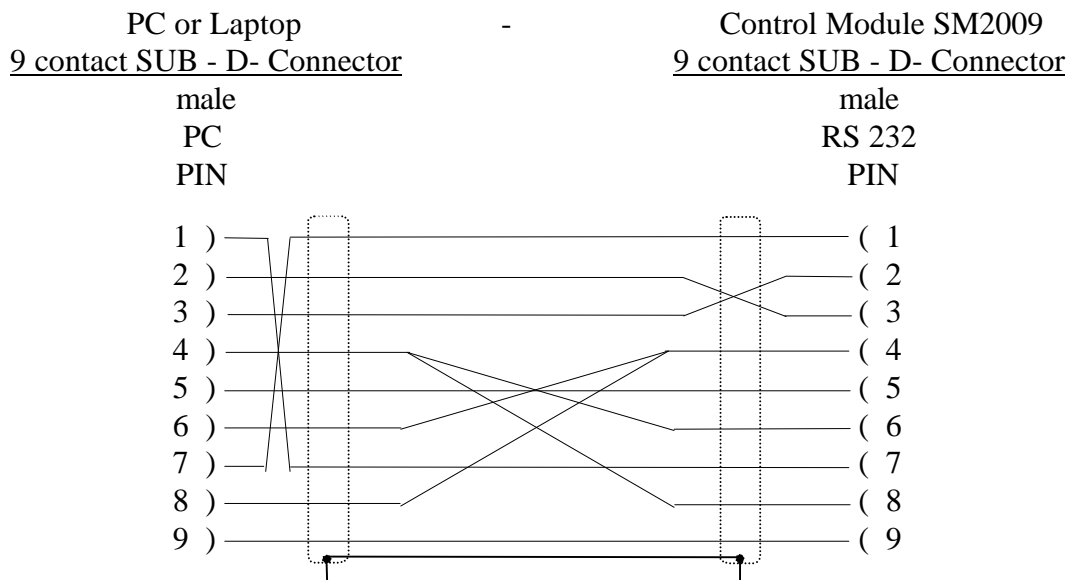
figure 4-2 Cable connection

The following communication mode between control module and VT100 is set initially.

9600 baud - 8 bit - no parity -1 stopbit

These settings can only be changed after connection of the terminal. If all wanted settings have been initialized and a modem has to be used it will be recommended to check whether the settings comply with the capabilities of the modem and the line. Modifications are possible by software commands.

☞ **Note:** **Settings on the Repeater can be performed after the following procedure only.**

After connecting the PC to the Repeater, following procedure is necessary to get access to the program.

```
MIKOM REPEATER MRx01A – SM2009 – SW: REP1009V1.xx
ENTER <.> <CR>
```

1. Step:	Type the two keys (.) FULLSTOP and (↵) ENTER

You have to type the keys:
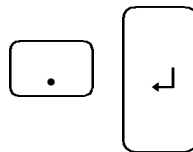
2. Step:	ENTER USER ID

You have to enter: **UserID1** ↵

☞ **Note:** **The input is case sensitive, no blanks. After three mistrial follows disconnection.**

3. Step:	ENTER PASSWORD

You have to enter: **P-word1** ↵

☞ **Note:** **The input is case sensitive, no blanks. After three mistrials follows disconnection.**

4.2 Via modem

The Repeater will be delivered with a preset init string. This init string was used for internal tests. In case no connection can be established check the local conditions and change the init string if necessary.

Three different modem types are available

- PSTN modem (DigiTel 34P), line modem
- Siemens M1 for GSM900, wireless modem
- Motorola for GSM900 or GSM1800, wireless modem

The following list contains the description of the AT commands:

&F	Sets modem to factory configuration
E0	Echo OFF
S0=1	Auto answer ON; the GSM module / M1 modem goes off-hook after the first ringing signal.
S7=60	Waiting time for connection after dialing; permissible values are from 0 ... 60.
B13	Setting to 9600 bps asynchronous mode
\ N6	Auto reliable operation
\ N0	Standard operation, no error correction
+CBST=7,0,1	Set bearer service type to 9600 bps. Non-transparent connection (uses RLP)
X3	Not waiting for dial tone; usually used at PABX.
*P1	Switch ON phone
&K4	Enables XON / XOFF flow control

Table 4.2-1 List of AT commands

4.2.1 PSTN modem

A Hayes compatible PSTN modem can be connected to the control module SM 2009 by the control cable, which is subject of the delivery schedule.

The init string for the PSTN modem is:

AT&F X3 E0 S0=2

control module SM2009   -   cable connection modem
PCMCIA
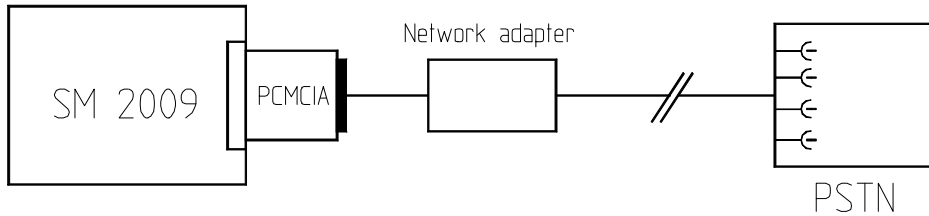
figure 4-3 Connection of control module and PSTN modem

The following communication mode between control module and VT100 is initially set for the use of a Hayes-compatible modem.

9600 baud - 8 bit - no parity -1 stopbit

These settings can only be changed after connection of the terminal. If a different modem has to be used or if the quality of the line does not allow to use the set parameters, the settings have to be changed in PC mode. This is the same for all other parameters, which can be set previously for modem mode by software.

☞ **Note:**   **Settings on the Repeater can be performed after the following procedure only.**

After connection to the Repeater following response appears on screen:

1. Step: ENTER USER ID

Response on the screen: `ENTER USER ID:------`

You have to enter: **UserID1** ↵

☞ **Note:**   **The input is case sensitive, no blanks. After three mistrial follows disconnection.**

2. Step: ENTER PASSWORD

Response on the screen: `ENTER PASSWORD:--------`

You have to enter: **P-word1** ↵

☞ **Note:**   **The input is case sensitive, no blanks. After three mistrials follows disconnection.**

4.2.2 Siemens M1 modem for GSM900

The Siemens M1 modem can be connected to the control module SM 2009 by the control cable, which is subject of the delivery schedule.

If an individual antenna of a wireless modem is required, the antenna cable may be fed through a watertight grommet at the connector panel of the housing.

The init string for the Siemens M1 modem is (without reset circuit)

AT E0 S0=1 B13 S7=60 \N6

The init string for the Siemens M1 modem has to be set by PC / Laptop (with reset circuit)

AT E0 S0=1 B13 S7=60 \N6 &W

This is the standard init string. If no connection can be established check the local conditions and change the init string if necessary.

4.2.3 Motorola mobile (CELLect1 card)

The Motorola mobile (Dual band) together with the CELLect1 card can be connected to the control module SM 2009 by the control cable, which is subject of the delivery schedule.

If an individual antenna of a wireless modem is required, the antenna cable may be fed through a watertight grommet at the connector panel of the housing.

The init string for the Motorola module is:

AT&F &K4 E0 S0=2 *P1 \N0+CBST=7,0,1

5 Description of the commands

All available software commands are described in the following chapter.

5.1 Instruction modes

There are four different types of commands:

- SET commands   - to change variable parameters

- GET commands   - to ask status of variable parameters

- STATUS commands   - to ask status of fixed parameters

- ACTION commands   - to perform certain actions

5.2 Conventions

The instruction is written in capital letters followed by selections in square brackets to be entered.

SET NUM **[x] [number]** ↵

The selections can be entered <u>directly</u> following the instruction e.g. SET NUM, but in case only SET NUM has been entered the computer queries for the missing information in an interactive dialogue. As an example, **x** can be substituted by **1** or **2** corresponding to the wanted position in the telephone list and **number** can be substituted by the telephone number, which may consists of up to 25 characters.

↵ stands for carriage return. It indicates to press the return key. If, in the above example, the telephone number 2716 with priority 2 has to be entered the following command has to be typed:

SET NUM 2 2716 ↵

5.3 Description of SET commands

SET commands are used to set variable parameters. These parameters are stored non-volatile in an EEPROM.

Table 5.3-1 presents a summary of SET commands.

Command	Description
SET ALARMMASK	definition of the severity level for an alarm
SET ALCTHR	setting of the ALC threshold
SET ALIAS*	alarm message name for external alarms
SET ATT	attenuation in DL and UL path
SET BAUD	definition of local interface baudrate
SET CF	sets the center frequency in UL and DL
SET CFO	sets frequency offset in UL and DL
SET DIALMETH	changes the dialing method pulse / tone
SET ID	Repeater identification
SET ILA	sets the maximum value for invalid login attempts
SET INITSTR	definition of string for initialisation of the modem
SET LMT	changes timeout of local interface
SET LOGIC	definition of the logic of I/O ports for external alarms
SET NUM	two phone numbers for automatic dial out
SET PAR	definition of parity
SET PWD	changes password
SET PWRDOWN	switch off band/channel modules
SET REP	definition of waiting time between alarm calls
SET TIME	changes date and time
SET UID	changes user identification

* Option

Table 5.3-1 Summary of SET commands

If a SET command has been entered not correctly SYNTAX ERROR or VALUE ERROR will be returned depending on whether the erroneous input was due to an error in correct writing the command or the erroneous input was a non-plausible value.

5.3.1 SET ALARMMASK, definition of the severity level for an alarm

Syntax: SET ALARMMASK ↵

Response：   ENTER ALARMMASKSTRING: ↵

                  ENTER BAND MODULE (1-8) : ↵

                  ENTER PERCEIVED SEVERITY(CRI,MAJ,MIN,WAR,DIS): ↵

where the ALARMMASKSTRING must be one of the following strings

```
PWR-SUPPLY-MAIN
PWR-SUPPLY-8V
PWR-SUPPLY-12V
LITHIUM-BATT
PASSWORD
TEMPERATURE
DOOR
SYNTH-LOCK-UL
SYNTH-LOCK-DL
ALC-UL
ALC-DL
CURRENT-AT-8V
CURRENT-AT-12V
```

or if the corresponding option is active

```
ACCU-VOLTAGE-L1
ACCU-VOLTAGE-L2
VSWR
EXT-ALARM-1
EXT-ALARM-2
EXT-ALARM-3
EXT-ALARM-4
```

For each alarmmask string it is also possible to set the severity level for all modules at the same time.

Syntax:

```
SET ALARMMASK-ALL ALC-UL CRI CRI CRI CRI CRI CRI CRI CRI
```

With this command it is possible to change the severity level for an alarm message. The severity level for an optional alarm can only be changed if the option is enabled. There will be no alarm message if the severity level has been set to DIS (disabled), or if the corresponding band/channel module has been switched off with the command SET PWRDOWN ENA.

The severity parameter defines five levels for an alarm message and can be set in the alarm mask. The severity levels indicate how the capability of the managed object has been affected.

The levels are described below and are ordered from most severe to least severe:

- Critical: The critical severity level indicates that a service affecting condition has occurred and an immediate corrective action is required to restore the capability of the managed object.

- Major: The major severity level indicates that a service affecting condition has developed and an urgent corrective action is required. Such a severity can be reported, for example, when there is a severe degradation in the capability of the managed object and its full capability must be restored.

- Minor: The minor severity level indicates the existence of a non-service affecting fault condition and that corrective actions should be taken in order to prevent a more serious failure. Such a severity can be reported, for example, when the detected alarm condition is not currently degrading the capability of the managed object.

- Warning: The warning severity level indicates the detection of a potential or impending service affecting failure before any significant effect has been caused. Action should be taken to further diagnose and correction of the problem shall prevent a more serious service affecting failure.

- Disable: The disable severity level indicates that the detected failure has no influence on the system and shall not be sent to the terminal.

The alarm message for all status alarms will not be sent, if the alarm mask is set to DIS or the module is deactivated with PWRDOWN ENA.

5.3.2 SET ALCTHR, setting of the ALC threshold

With this command it is possible to set the ALC threshold. The value for the ALC threshold will be determined in factory and can be found on a label on the RF modules. In case a second module will be mounted or a module will be exchanged the values for the ALC threshold have to be compared. If the modules have different values, the higher value must be set, due to the fact that the threshold can only be set for the whole Repeater.

☞ **Note:**   **The higher ALC threshold value has to be set.**

        Syntax: SET ALCTHR ↵

        Response: BAND-MODULE (1/2 3/4 5/6 7/8): ↵

```
ENTER MODE (UL or DL) : ↵

ENTER ALC THRESHOLD 0 - 255 : ↵

* * * C A U T I O N * * *

THE FOLLOWING ACTION MAY CAUSE DAMAGE TO
EXTERNAL HARDWARE

PRESS <Y> + <CR> TO PERFORM CHANGE
```

Allowed values are binary digits 0 ... 255. Default value is 255.

5.3.3 SET ALIAS*, enter name strings for external alarms 1 ... 4

Syntax: `SET ALIAS ↵`

Response:
```
ENTER ENTRY - 1 TRU 4: ↵
ENTER ALARM ACTIVE NAME STRING -MAX 30 CHARS
: ↵
ENTER ALARM NON ACTIVE NAME STRING -MAX 30 CHARS
: ↵
```

You will be asked to enter a name string for the external alarms 1 ... 4. Two different names can be defined, the first input is the name for the alarm active name and the second input is the name if the alarm is not active. **Be aware the OMC needs appropriate key words for recognising an alarm.**

5.3.4 SET ATT, sets attenuation in uplink or downlink path

Syntax :   `SET ATT ↵`

Response:
```
ENTER BAND MODULE ( 1-8 ): ↵
ENTER MODE ( UL or DL): ↵
ENTER ATTENUATION: ↵
```

You will be asked to enter the band module, mode and attenuation (attenuation in dB, only values between 0 and 30 dB in steps of 2 dB).

5.3.5 SET BAUD, definition of baudrate used

Syntax: `SET BAUD [ baudrate ] ↵`

Response: `ENTER BAUDRATE – 1200, 2400, 4800 OR 9600:`

After first power on or change of battery a baudrate of 9600 is used.

5.3.6 SET CF, setting of the center frequency

Syntax: `SET CF ↵`

Response: `ENTER BAND MODULE (1-8): ↵`

`ENTER CF UL <MHz>: ↵`

`ENTER CF DL <MHz>: ↵`

The frequency can be set within the range of the GSM900 / GSM1800 band.

5.3.7 SET CFO, setting of the frequency offset

Syntax: `SET CFO ↵`

Response: `ENTER BAND MODULE (1-8): ↵`

`ENTER CFO UL <kHz>: ↵`

`ENTER CFO DL <kHz>: ↵`

The frequency offset can be set in the range of +/- 1 MHz in steps of 10 kHz.

5.3.8 SET DIALMETH, setting of the dialing method

Syntax: `SET DIALMETH ↵`

Response: `ENTER DIALING METHOD:   T - TONE DIALING`
`                        P - PULSE DIALING`
`ENTER CHOICE: ↵`

The default method is tone dialing.

5.3.9 SET ID, Repeater identification

Syntax: `SET ID ↵`

Response: `ENTER ID STRING - MAX 25 CHARS: ↵`

where Repeater ID may be max. 25 symbols. All characters between 21 H and 7E H will be accepted.

If you skip this request, the default Repeater identification appears:

      Response: `Repeater ID:  MIKOM`

5.3.10 SET ILA, definition of a limit for invalid login attempts

      Syntax: `SET ILA ↵`

      Response: `ENTER VALUE : ↵`

The maximum allowed number of invalid login attempts have to be entered. Default value is 8. Setting range is 3 – 10 invalid login attempts.

5.3.11 SET INITSTR, definition of a initialisation string

      Syntax :   `SET INITSTR [Initstring] ↵`

      Response: `ENTER MODEM INIT STRING - MAX 60 CHARS`
                       `: ↵`

      where :   [Initstring] is max. 60 symbols, 21 H to
                    7E H is allowed.

Initstring stands for the string stored in the modem for initialisation. It is defined in the manual of the modem.

This stored INIT STRING was used for internal tests. In case no connection can be established check the local conditions and change the INIT STRING if necessary

☞ **Note:**   **Use upper case characters for entry.**

5.3.12 SET LMT, to change timeout for local maintenance interface

      Syntax: `SET LMT ↵`

      Response: `ENTER VALUE: ↵`

Enter the local maintenance terminal timeout in minutes. LMT can be set in the range from 5 to 99 minutes. Default value is 25 minutes.

5.3.13 SET LOGIC, definition of the I/O port logic for the external alarms

With this command it is possible to set the logic of the I/O ports for the external alarms. The logic can be changed for each alarm separately. The default settings of the I/O ports on the control module are LLHH. This command is only available if the option "External Alarms" is active.

```
Syntax:       SET LOGIC↵

Response:     ENTER ALARM LEVEL 1 (H/L): ↵
              ENTER ALARM LEVEL 2 (H/L): ↵
              ENTER ALARM LEVEL 3 (H/L): ↵
              ENTER ALARM LEVEL 4 (H/L): ↵
```

5.3.14 SET NUM, definition of 2 phone numbers used for the automatic dial out

```
Syntax:       SET NUM ↵

Response:     ENTER ENTRY - 1 TRU 2: ↵
              ENTER PHONE NUMBER - MAX 25 CHARS: ↵
```

Depending on the entry the numbers can have the priority 1 or 2 and max. 25 symbols are allowed.

5.3.15 SET PAR, definition of parity

```
Syntax :      SET PAR [ parameter ] ↵

Response:     SELECT PARAMETER:
              7 BITS ODD PARITY   - 1
              7 BITS EVEN PARITY  - 2
              8 BITS NO PARITY    - 3
              enter choice        :
```

After first power on or change of battery the interface module is preset to 8 Bits no parity.

5.3.16 SET PWD, to change password

```
Syntax:       SET PWD ↵

Response:     ENTER ENTRY   -   1 TRU 4: ↵
```

1 to 4 different passwords are possible. Users with password 1 or 2 have full access to the Repeater (SET and GET commands possible). Users with password 3 or 4 have restricted access (only GET commands are available).

After typing this command you are requested to type the old password and finish with ↵.

```
ENTER OLD PASSWORD: ----- ↵
```

If the old password was correct you are requested to type the new password (1 - 10 symbols long - letters, numbers, case sensitive) and finish with ↵.

```
ENTER NEW PASSWORD – MIN 1 MAX 10 CHARS: --------- ↵
```

To store the new password the new password has to be typed again.

```
ENTER NEW PASSWORD AGAIN TO CONFIRM : ---------- ↵
PASSWORD HAS BEEN CHANGED
```

After first power on or change of batteries the default password (to be determined for each customer) is used.

5.3.17 SET PWRDOWN, to switch off band/channel modules

```
       Syntax:        SET PWRDOWN ↵



       Response:      ENTER BAND MODULE ( 1-8 ): ↵
                      SET POWER DOWN MODE: E – ENABLE POWER DOWN
                                           D – DISABLE POWER DOWN
                      ENTER CHOICE: ↵
```

After typing the command you are asked to enter band module and the mode.

Power down enable, means to **switch off** the band module.

5.3.18 SET REP, definition of waiting time between alarm call trials

If an alarm call is not acknowledged, the call will be repeated in time intervals, until it is acknowledged. The minimum value for the waiting time is 5 minutes.

```
       Syntax :       SET REP [ cycle length ] ↵

       Response:      ENTER CYCLE LENGTH IN MIN: ↵
                      REP CYCLE: 10 MIN
```

where :   [cycle length] is the waiting time in minutes
                 5 - 99 is allowed (default: 10 min)

5.3.19 SET TIME, to change actual time and date

Syntax: SET TIME ↵

After carriage return the software queries line by line for the input as follows:

```
ENTER YEAR < YYYY >     (SKIP WITH CR):
ENTER MONTH < MM >      (SKIP WITH CR):
ENTER DAY < DD >        (SKIP WITH CR):
ENTER HOURS < HH >      (SKIP WITH CR):
ENTER MINUTES < MM >    (SKIP WITH CR):
PRESS CR TO START
```

5.3.20 SET UID, changes user identification

Syntax: SET UID ↵

Response: ENTER ENTRY - 1 TRU 4: ↵

1 to 4 user identification terms are possible. Users with user ID 1 or 2 have full access to the Repeater (SET and GET commands possible). Users with ID 3 or 4 have restricted access (only GET commands are available).

After typing this command you are requested to type the old UID and finish with ↵.

```
ENTER OLD USER ID: ----- ↵
```

If the old UID was correct you are requested to type the new UID and finish with ↵.

```
ENTER NEW USER ID - MIN 1 MAX 10 CHARS:: --------- ↵
```

To store the new UID type it again.

```
ENTER NEW USER ID AGAIN TO CONFIRM : ---------- ↵
USER ID HAS BEEN CHANGED
```

After first power on or changing of the Lithium battery the default password (to be determined for each customer) will be loaded.

5.4 Description of the GET commands

GET commands are used to ask for the status of variable parameters.

Table 5.4-1 presents a summary of GET commands.

Command	Description
GET ALARMMASK	definition of the severity level for an alarm
GET ALCTHR	setting of the ALC threshold
GET ALIAS*	displays all name strings of external alarms
GET ATT	attenuation in DL and UL path
GET BAUD	baudrate of the local interface
GET CF	lists center frequencies of 8 band modules
GET CFO	frequency offset
GET DIALMETH	information about dial method pulse / tone
GET ID	Repeater identification
GET ILA	sets the maximum value for invalid login attempts
GET INITSTR	initialisation string for the modem
GET LMT	timeout of the local interface
GET LOGIC	definition of the logic of I/O ports for external alarms
GET NUM	two phone numbers for automatic dial out
GET PAR	parity (communication parameter of the local interface)
GET PWRDOWN	displays state if a band module is powered down
GET REP	waiting time between alarm calls via modem
GET TIME	date and time of system

* Option

Table 5.4-1 Summary of GET commands

If a GET command has been entered not correctly, SYNTAX ERROR will be returned.

By typing the GET command all status information are given. Due to the fact that the report is very long the GET report can be split in two parts. You have to type GET1 to see the first part and GET2 to see the second part.

In the following an example of a GET1 and a GET2 report is given.

figure 5-1 Example of a GET1 report

figure 5-2 Example of a GET2 report

5.4.1 GET ALARMMASK, displays the set severity level for an alarm

Syntax: GET ALARMMASK ↵

Response:

```
*** A L A R M M A S K ***
PWR-SUPPLY-MAIN: CRI
PWR-SUPPLY-8V  : CRI
PWR-SUPPLY-12V : CRI
LITHIUM-BATT   : WAR
ACCU-VOLTAGE-L1*: WAR
ACCU-VOLTAGE-L2*: MIN
VSWR*          : MAJ
EXT-ALARM-1*   : WAR
EXT-ALARM-2*   : WAR
EXT-ALARM-3*   : WAR
EXT-ALARM-4*   : WAR
PASSWORD       : WAR
BAND-MODULE      1/2       3/4       5/6       7/8
TEMPERATURE    : CRI       CRI       CRI       CRI
DOOR           : WAR       WAR       WAR       WAR
BAND-MODULE      1    2    3    4    5    6    7    8
SYNTH-LOCK-UL  : CRI  CRI  CRI  CRI  CRI  CRI  CRI  CRI
SYNTH-LOCK-DL  : CRI  CRI  CRI  CRI  CRI  CRI  CRI  CRI
ALC-UL         : CRI  CRI  CRI  CRI  CRI  CRI  CRI  CRI
ALC-DL         : CRI  CRI  CRI  CRI  CRI  CRI  CRI  CRI
CURRENT-AT-8V  : MAJ  MAJ  MAJ  MAJ  MAJ  MAJ  MAJ  MAJ
CURRENT-AT-12V : MAJ  MAJ  MAJ  MAJ  MAJ  MAJ  MAJ  MAJ
```

* Optional

The alarmmask string will only be displayed if the corresponding option is implemented. Depending on the system configuration the response might be different compared to the example above.

5.4.2 GET ALCTHR, displays the set value for the ALC threshold

Syntax: GET ALCTHR ↵

Response: BAND-MODULE   1/2   3/4   5/6   7/8
            ALC THRESHOLD UL : 170
            ALC THRESHOLD DL : 200

5.4.3 GET ALIAS*, name strings for external alarms

Syntax: GET ALIAS ↵

```
Response:    NAME STRINGS FOR ALARMS
             EXT. ALARM 1     ACTIVE - EXT. ALARM 1 FAILURE
             EXT. ALARM 1 NON ACTIVE - EXT. ALARM 1 OK
             EXT. ALARM 2     ACTIVE - EXT. ALARM 2 FAILURE
             EXT. ALARM 2 NON ACTIVE - EXT. ALARM 2 OK
             EXT. ALARM 3     ACTIVE - EXT. ALARM 3 FAILURE
             EXT. ALARM 3 NON ACTIVE - EXT. ALARM 3 OK
             EXT. ALARM 4     ACTIVE - EXT. ALARM 4 FAILURE
             EXT. ALARM 4 NON ACTIVE - EXT. ALARM 4 OK
or
             UPS ALARM ACTIVE
             UPS NON ACTIVE
             BATTERY VOLTAGE LOW
             BATTERY VOLTAGE OK
             UPS DOOR OPEN
             UPS DOOR CLOSED
             BATTERY DOOR OPEN
             BATTERY DOOR CLOSED
```

5.4.4 GET ATT, gain setting

Syntax: GET ATT ↵

Response:

```
BAND-MODULE     1     2     3     4     5     6     7     8
CF UL  [MHz] 833.5
CF DL  [MHz] 947.5
CFO UL [kHz]    0
CFO DL [kHz]    0
ATT UL [dB]     0
ATT DL [dB]     4
```

5.4.5 GET BAUD, baudrate

Syntax: GET BAUD ↵

Response: LOCAL - INTERFACE : 9600 bps, 8 bits, NO PARITY

(also 4800, 2400 or 1200 are possible)

5.4.6 GET CF, set centre frequency in the GSM900 / GSM1800 band

Syntax: GET CF ↵

Response, e.g. for the GSM900 system:

```
BAND MODULE      1    2    3    4    5    6    7    8
CF UL  [MHz] 833.5  0
CF DL  [MHz] 880.5  0
CFO UL [kHz]   0    0
CFO DL [kHz]   0    0
ATT UL [dB]    0    0
ATT DL [dB]    4    0
```

5.4.7 GET CFO, frequency offset

Syntax: GET CFO ↵

Response, e.g. for the GSM900 system:

```
BAND MODULE      1    2    3    4    5    6    7    8
CF UL  [MHz] 833.5  0
CF DL  [MHz] 880.5  0
CFO UL [kHz]   0    0
CFO DL [kHz]   0    0
ATT UL [dB]    0    0
ATT DL [dB]    4    0
```

5.4.8 GET ID, Repeater identification

Syntax: GET ID ↵

Response: REPEATER ID: MIKOM

5.4.9 GET ILA, displays stored number of invalid login attempts

Syntax: GET ILA ↵

Response: ILA Invalid login attempts:

5.4.10 GET INITSTR, displays the string which is used to initialize the modem

Syntax: GET INITSTR ↵

Response: If a Hayes compatible modem is used:

            MODEM INITSTRING: AT&F &K4 E0 S0=2

5.4.11 GET LMT, timeout for local interface

Syntax: `GET LMT ↵`

Response: `TIMEOUT FOR LMT : 25 min`

5.4.12 GET LOGIC, displays the logic of the I/O ports

Syntax: `GET LOGIC↵`

Response: `EXT. ALARM LEVEL: L L H H`

5.4.13 GET NUM, displays stored phone numbers

Syntax :   `GET NUM [ x ] ↵`

where: [x] is priority in the list, may be 1 or 2

or

Syntax: `GET NUM ↵`

Response: `PHONE NUMBER 1: 0000`
                      `PHONE NUMBER 2: 0000`

5.4.14 GET PAR, modem parity

Syntax: `GET PAR ↵`

Response: `LOCAL-INTERFACE : 9600 bps, 8 bits, NO PARITY`

5.4.15 GET PWRDOWN, displays power down status of the modules

Syntax: `GET PWRDOWN ↵`

Response: `BAND-MODULE    1    2    3    4    5    6    7    8`
                      `PWR DOWN MODE: ENA  DIS`

This command displays the status of the band modules.

If a module is switched **off** the response is 'POWER DOWN MODE **ENA**'.
If a module is switched **on** the response is 'POWER DOWN MODE **DIS**'.

5.4.16 GET REP, defines waiting time between trials for automatic alarm call

Syntax: GET REP ↵

Response: REP CYCLE : 10 min
                   (Possible range is 5....99 min)

5.4.17 GET TIME, to get the actual time and date

Syntax: GET TIME ↵

Response: TIME : 13:30:20
                   DATE : 02-12-98

5.5 Status commands

Status commands are used to receive information about fixed parameters.

Table 5.5-1 presents a summary of STATUS commands.

Command	Description
STATUS ACCU*	see chapter 5.6.1
STATUS ALC	ALC in DL and UL for each band module
STATUS AMPBIAS	current consumption of the RF modules
STATUS DOOR	door open/ closed
STATUS EXTALARM *	see chapter 5.6.2
STATUS HIST	history of alarms
STATUS I2C	status of the I²C bus
STATUS LBATT	Lithium battery
STATUS PWR	power supply
STATUS SYNTH	modules in operation / not in operation
STATUS TEMP	actual temperature inside Repeater cabinet
STATUS VSWR *	see chapter 5.6.3

* Option

Table 5.5-1 Summary of STATUS commands

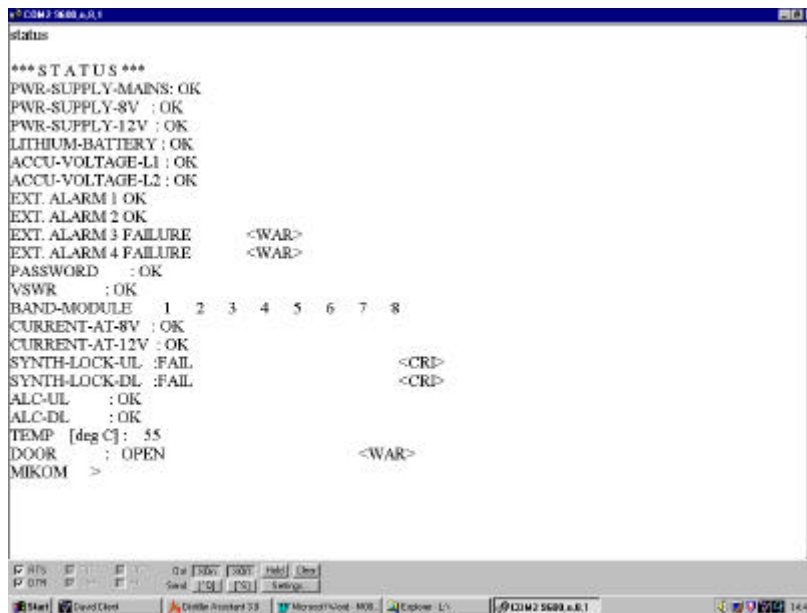By typing STATUS commands all status information are given.

figure 5-3 Example of a STATUS report

5.5.1 STATUS ALC, displays the actual status

Syntax: `STATUS ALC ↵`

```
Response:   BAND-MODULE   1    2    3    4    5    6    7    8
            ALC-UL      : OK   OK
            ALC-DL      : OK   ALARM < CRI >
```

If the Repeater exceeds the set ALC threshold an alarm will be released. The value for the ALC threshold is written on a label on the conversion module. The alarm may have one of the severity levels.

5.5.2 STATUS AMPBIAS, current consumption of the RF modules

Syntax: `STATUS AMPBIAS ↵`

```
Response:   BAND-MODULE     1    2    3    4    5    6    7    8
            CURRENT-AT-8V :OK   OK
            CURRENT-AT-12V:OK   ALARM < CRI >
```

Displays the status of the current consumption in the conversion modules. In case of a defect conversion module, the values might be too low or too high, which results in an alarm message. The alarm can have on of the severity levels

5.5.3 STATUS DOOR, door open / closed

Syntax: `STATUS DOOR ↵`

```
Response :  BAND MODULE  1/2     3/4     5/6     7/8
            DOOR :       OPEN                        < WAR >
```

A DOOR OPEN condition results in an alarm message. The alarm may have one of the five severity levels.

5.5.4 STATUS HIST, list of all occurred alarms

Syntax: `STATUS HIST ↵`

Response: `HISTORY OF ALARMS:`

                        `NO ALARMS STORED`

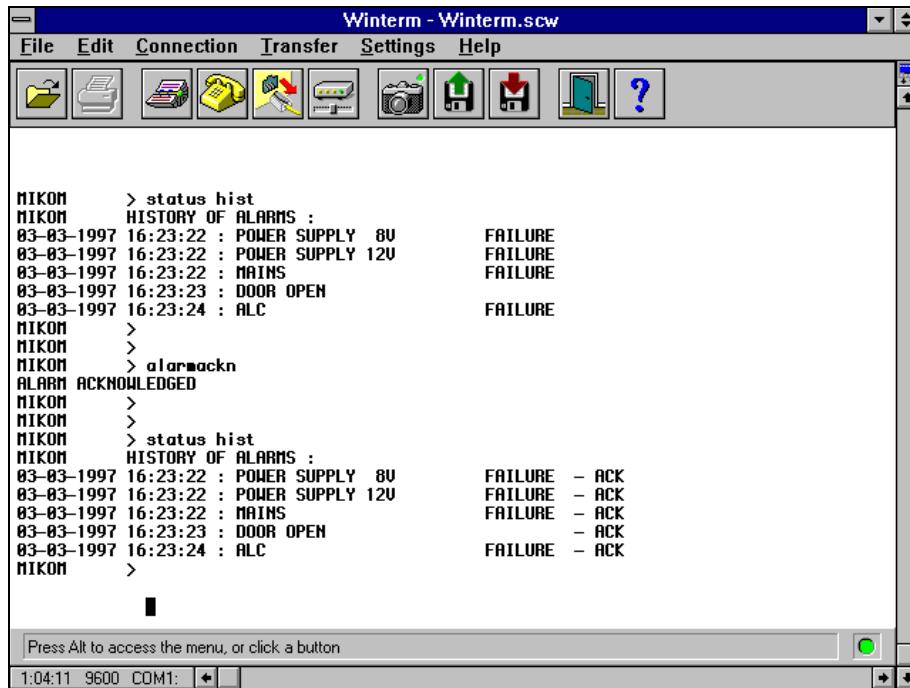In the following example there is also a status hist listing depicted, after the alarms have been acknowledged.

figure 5-4 Example of a STATUS HIST report

The following table contains a list of all available alarm:

NO.	ALARM NAME	ALARM ACTIVE STATUS
1	AMPLIFIER BIAS	FAILURE
2	POWER SUPPLY 8 V	FAILURE
3	POWER SUPPLY 12 V	FAILURE
4	POWER SUPPLY MAINS	FAILURE
5	SYNTH	FAILURE
6	DOOR	OPEN
7	VSWR**	ALARM
8	ALC	FAILURE
9	ACCU VOLTAGE**	LOW
10	LITHIUM BATTERY VOLTAGE	LOW
11	OVERTEMP	FAILURE
12	INVALID LOGIN ATTEMPT	
13	I2C BUS	FAILURE
14*	EXT. ALARM 1**	FAILURE
15*	EXT. ALARM 2**	FAILURE
16*	EXT. ALARM 3**	FAILURE
17*	EXT. ALARM 4**	FAILURE

*   Alarms default settings, changeable by software instruction SET ALIAS

**   Only available if the option is active

5.5.5 STATUS I2C , displays the status of the I²C bus

Syntax: `STATUS I2C ↵`

Response: `I2C BUS OK`

or   `I2C BUS FAILURE < WAR >`

This alarm may have one of the possible severity levels. A defect ribbon cable between the control module and the modules might be the cause for an I²C bus failure or if a Repeater was disconnected from mains.

5.5.6 STATUS LBATT, response information about Lithium battery

Syntax: `STATUS LBATT ↵`

Response: `LITHIUM BATTERY OK`

or   `LITHIUM BATTERY VOLTAGE TOO LOW`

If the voltage of the Lithium battery is < 1 V, an alarm will be released.

5.5.7 STATUS PWR, status of the power supplies

Syntax :   `STATUS PWR ↵`

```
Response:        PWR-SUPPLY-8V      : OK
                 PWR-SUPPLY-12V     : OK
                 PWR-SUPPLY-MAINS   : OK
```

In case of power supply 12 Volts failure.

```
Response:        PWR-SUPPLY-12V   :  FAILURE < WAR >
```

If power is available the message is OK, if no power can be detected a failure will be displayed.

5.5.8 STATUS SYNTH, modules in operation

Syntax :   `STATUS SYNTH ↵`

```
Response:    BAND-MODULE      1    2    3    4    5    6    7    8
             SYNTH-LOCK-UL: OK    OK
             SYNTH-LOCK-DL: OK    FAIL                    < CRI >
```

A defect synthesizer indicates that the conversion module has to be exchanged.

5.5.9 STATUS TEMP, temperature

```
Syntax:      STATUS TEMP ↵
```

```
Response:    BAND-MODULE     1/2    3/4    5/6    7/8
             TEMP [deg C] :   56
```

In case 4 Repeaters are installed, the temperature will be displayed for each unit with a resolution of 1° C. The accuracy is ± 2° C.

An alarm will be released at a temperature ≥ +75° C
The response then is: `TEMPERATURE = 76 °C, Temperature Alarm - Stage 1`

Another alarm will be released at a temperature ≥ +90° C.
The response then is: `TEMPERATURE = 91 °C, Temperature Alarm - Stage 2`

RF stages are in POWER DOWN mode as long as the temperature alarm stage 2 exists and will be switched on again if the temperature is below +85° C.

5.6 *Optional status commands*

In case of implementing optional modules like external alarms, battery backup module or VSWR following commands are available.

5.6.1 STATUS ACCU, response voltage value of backup battery

```
Syntax:              STATUS ACCU ↵

Response:            ACCU-VOLTAGE-L1 :  OK
                     ACCU-VOLTAGE-L2 :  OK
```

If the voltage of the backup battery is < 7.7 V, a warning will be released (L1).
If the voltage of the backup battery is < 7.0 V, an alarm will be released (L2).

5.6.2 STATUS EXTALARM, status of external alarms

```
Syntax:              STATUS EXTALARM ↵

Response:            EXT. ALARM 1 OK
                     EXT. ALARM 2 OK
                     EXT. ALARM 3 FAILURE < WAR >
                     EXT. ALARM 4 FAILURE < WAR >
```

5.6.3 STATUS VSWR, displays the DL antenna VSWR

```
Syntax:              STATUS VSWR ↵

Response:            VSWR      : OK
```

The VSWR module measures the voltage standing wave ratio of the DL output antenna port. If the VSWR falls below approximately 10 dB an alarm is released.

This enables the provider to know the status of the cable to the antenna. If a cable is defective the VSWR will decrease and the alarm will be released. The alarm can be forwarded to an OMC, so that faults and irregularities can be recognised and eliminated rather quick.

The alarm has one of the severity levels (DISable, WARning, MINor, MAJor, CRItical).

5.7 Action commands

Action commands are used to perform a certain kind of action without an additional parameter.

Table 5.7-1 presents a summary of action commands.

Command	Description
ACCUDIS *	starts to discharge the accumulator, see chapter 5.8.1
ALARMACKN	acknowledgement of all occurred alarms
BYE	disconnect Repeater from telephone line in remote mode
BYE	disconnect Repeater from local maintenance interface
DNLOAD	starts software download
STOPDIS *	stops to discharge the accumulator, see chapter 5.8.2
VER	revision number of software

* Options

Table 5.7-1 Summary of action commands

5.7.1 ALARMACKN, acknowledgement of all alarms.

Syntax: ALARMACKN ↵

Response: ALARM ACKNOWLEDGED

Entered alarms in the alarm list can be acknowledged by simply ringing back a dn typing ALARMACKN.

Acknowledged alarms will be indicated in the STATUS HIST with '-ack'. As soon as the alarms have been acknowledged the alarm relay will be reset and the summary LEDs switch to green light again. Additionally connected devices for alarm indication will be switched off with this command. All data of the STATUS HIST are lost if the Repeater will be booted or if the Repeater was disconnected from mains.

A new failure will be written immediately in the STATUS HIST.

5.7.2 BYE, disconnect Repeater from telephone line in remote mode

Syntax: BYE ↵

5.7.3 BYE, disconnect Repeater from local maintenance interface

Syntax: BYE ↵

Response: LOGOUT FROM LOCAL MAINTENANCE INTERFACE

5.7.4 DNLOAD, starts software download

Syntax: DNLOAD ↵

It is not possible to interrupt this process after typing the command DNLOAD. If there is no input for about 1 minute the Repeater boots automatically.

A separate documentation is available for the remote download procedure.

Exit terminal program immediately.

To start upload procedure type:

Syntax: upload1.bat or
            upload2.bat

depending on which serial interface is available (COM 1 or COM 2).

5.7.5 VER, displays the version of software and hardware

Syntax :   VER ↵

Response: HW MRx01A – SM2009 SW REP1009 V1.xx

*actual version number

Displays the hardware configuration (control module SM2009) and the integrated software version.

5.8 Optional action commands

5.8.1 ACCUDIS, starts discharge of accumulator

Syntax: ACCUDIS ↵

Response: START DISCHARGE OF BACKUP BATTERY

Starts to discharge the backup battery and stops automatically if the minimum voltage is reached.

5.8.2 STOPDIS, stops battery discharging immediately

Syntax: STOPDIS ↵

Response: BATTERY DISCHARGE STOPPED

Stops the discharge of the backup battery immediately.

5.9 Error messages

There are two error messages resulting from erroneous inputs and one error message that results from hardware failure.

5.9.1 SYNTAX ERROR

This error message will be returned if a command is written not correctly or if the written command does not exist. The computer is ready for new inputs immediately.

5.9.2 VALUE ERROR

This error message will be returned if a non-plausible value has been entered. Possibly, the value was out of the defined range, as e.g. in case of a negative number, or it was not in the defined range of the character set as e.g. 19H in INIT STR.

5.9.3 I²C-BUS ERROR

This error occurs if a part of the hardware has been damaged, e.g. the control module cannot get access to a synthesizer, because of a bad ribbon cable or an I²C-Bus slave ties the one line of the bus to ground.

5.10 Features

1. By pressing the arrow keys ↑ or ↓, the last ten commands, stored in the command buffer will be repeated forward and backward.

2. To correct a typing error use backspace function as usual.

3. After typing a command of an option which is not active, the response is "OPTION NOT ACTIVE".

6 Index