

REP1009V1.xx (Id.-No. 147127)

Software manual for band/channel selective Repeater

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Table of contents

LIST OF UNIT SPECIFIC ABBREVIATIONS	4
1 INTRODUCTION	5
2 INSTALLATION	6
3 RUNNING THE SOFTWARE	7
3.1 Via PC or Laptop as terminal	7
3.2 Via modem	9
3.2.1 PSTN modem	9
3.2.2 Siemens M1 modem for GSM900	11
3.2.3 Motorola mobile (CELlect1 card)	11
4 DESCRIPTION OF THE COMMANDS	12
4.1 Instruction modes	12
4.2 Conventions	12
4.3 Description of SET commands	13
4.3.1 SET ALARMMASK, definition of the severity level for an alarm	14
4.3.2 SET ALCTHR, setting of the ALC threshold	15
4.3.3 SET ALIAS*, enter name strings for external alarms 1 ... 4	16
4.3.4 SET ATT, sets attenuation in uplink or downlink path	16
4.3.5 SET BAUD, definition of baudrate used	16
4.3.6 SET CF, setting of the center frequency	17
4.3.7 SET CFO, setting of the frequency offset	17
4.3.8 SET DIALMETH, setting of the dialing method	17
4.3.9 SET ID, Repeater identification	17
4.3.10 SET ILA, definition of a limit for invalid login attempts	18
4.3.11 SET INITSTR, definition of a initialisation string	18
4.3.12 SET LMT, to change timeout for local maintenance interface	18
4.3.13 SET LOGIC, definition of the I/O port logic for the external alarms	19
4.3.14 SET NUM, definition of 2 phone numbers used for the automatic dial out	19
4.3.15 SET PAR, definition of parity	19
4.3.16 SET PWD, to change password	19
4.3.17 SET PWRDOWN, to switch off band/channel modules	20
4.3.18 SET REP, definition of waiting time between alarm call trials	20
4.3.19 SET TIME, to change actual time and date	21
4.3.20 SET UID, changes user identification	21
4.4 Description of the GET commands	22
4.4.1 GET ALARMMASK, displays the set severity level for an alarm	23
4.4.2 GET ALCTHR, displays the set value for the ALC threshold	24
4.4.3 GET ALIAS*, name strings for external alarms	24
4.4.4 GET ATT, gain setting	25

4.4.5	GET BAUD, baudrate	25
4.4.6	GET CF, set centre frequency in the GSM900 / GSM1800 band	25
4.4.7	GET CFO, frequency offset	26
4.4.8	GET ID, Repeater identification	26
4.4.9	GET ILA, displays stored number of invalid login attempts	26
4.4.10	GET INITSTR, displays the string which is used to initialize the modem	26
4.4.11	GET LMT, timeout for local interface	27
4.4.12	GET LOGIC, displays the logic of the I/O ports	27
4.4.13	GET NUM, displays stored phone numbers	27
4.4.14	GET PAR, modem parity	27
4.4.15	GET PWRDOWN, displays power down status of the modules	27
4.4.16	GET REP, defines waiting time between trials for automatic alarm call	28
4.4.17	GET TIME, to get the actual time and date	28
4.5	Status commands	29
4.5.1	STATUS ALC, displays the actual status	30
4.5.2	STATUS AMPBIAS, current consumption of the RF modules	30
4.5.3	STATUS DOOR, door open / closed	30
4.5.4	STATUS HIST, list of all occurred alarms	30
4.5.5	STATUS I2C, displays the status of the I ² C bus	32
4.5.6	STATUS LBATT, response information about Lithium battery	32
4.5.7	STATUS PWR, status of the power supplies	32
4.5.8	STATUS SYNTH, modules in operation	32
4.5.9	STATUS TEMP, temperature	33
4.6	Optional status commands	34
4.6.1	STATUS ACCU, response voltage value of backup battery	34
4.6.2	STATUS EXTALARM, status of external alarms	34
4.6.3	STATUS VSWR, displays the DL antenna VSWR	34
4.7	Action commands	35
4.7.1	ALARMACKN, acknowledgement of all alarms.	35
4.7.2	BYE, disconnect Repeater from telephone line in remote mode	35
4.7.3	BYE, disconnect Repeater from local maintenance interface	35
4.7.4	DNLOAD, starts software download	36
4.7.5	VER, displays the version of software and hardware	36
4.8	Optional action commands	37
4.8.1	ACCUDIS, starts discharge of accumulator	37
4.8.2	STOPDIS, stops battery discharging immediately	37
4.9	Error messages	38
4.9.1	SYNTAX ERROR	38
4.9.2	VALUE ERROR	38
4.9.3	I ² C-BUS ERROR	38
4.10	Features	38
5	INDEX	39

LIST OF UNIT SPECIFIC ABBREVIATIONS

ALC	Automatic Level Control
DL	Downlink
EEPROM	Electrical erasable programming read only memory
I ² C-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)

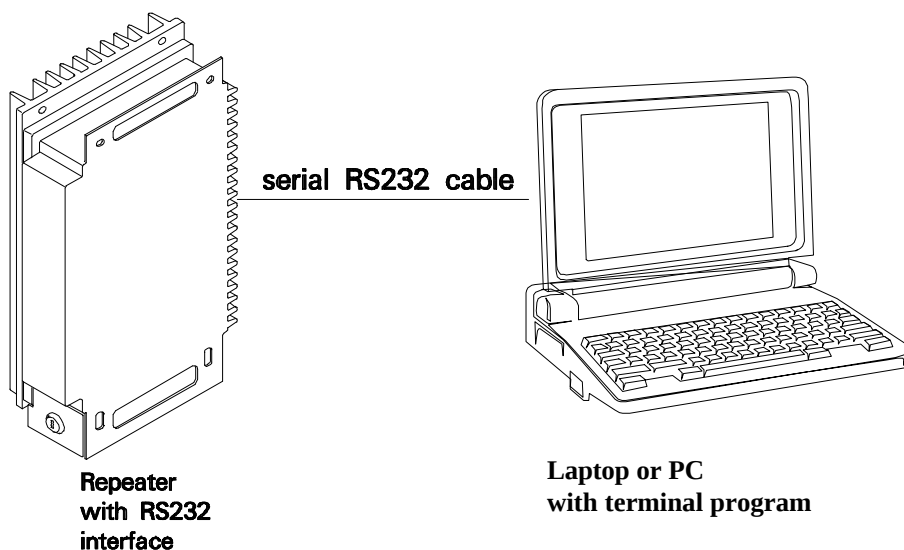


figure 1-1 Repeater locally controlled

- Furthermore the communication can be realized remotely via modem.

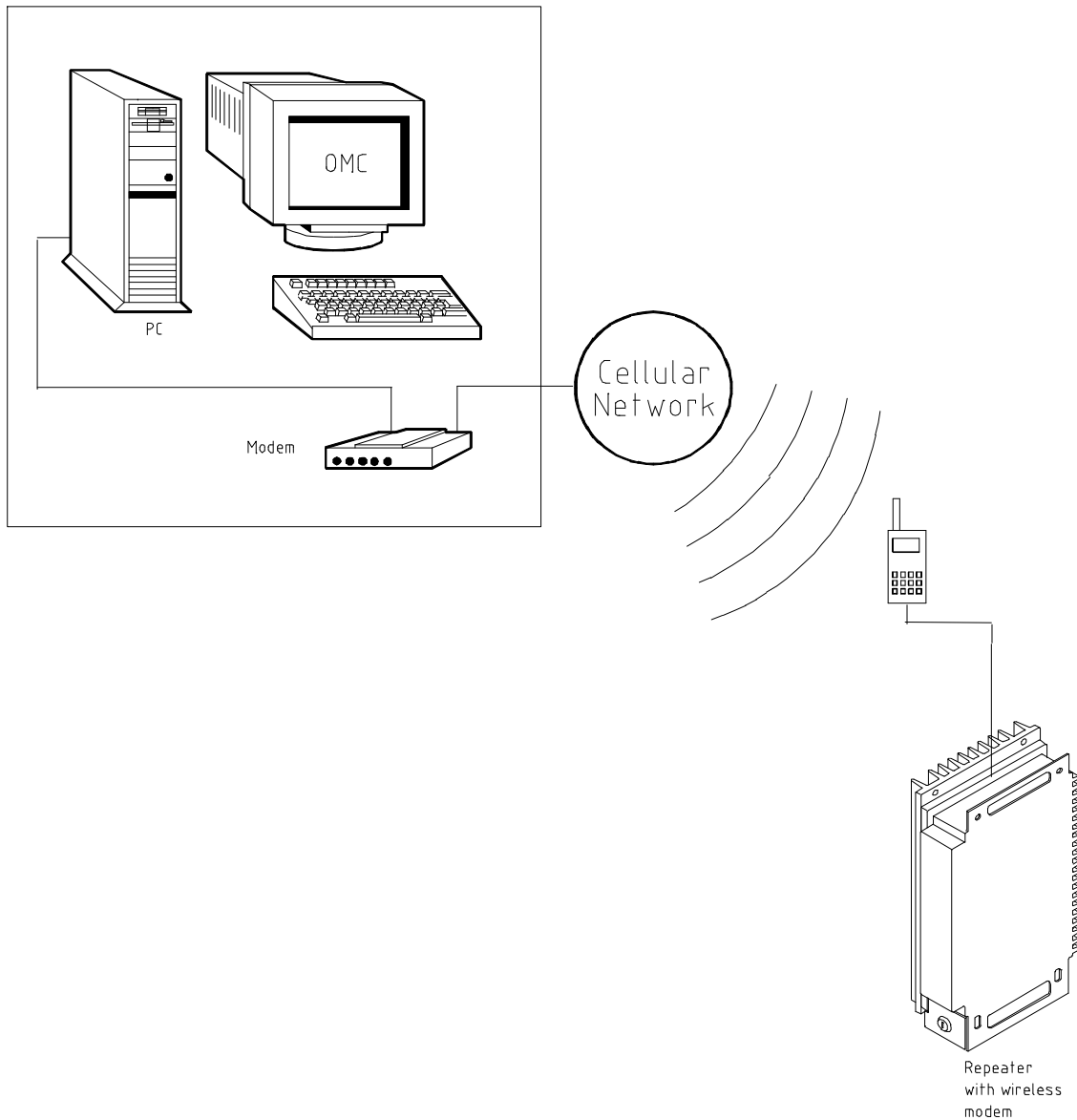


figure 1-2 Repeater remotely controlled

2 Installation

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

3 Running the software

3.1 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.

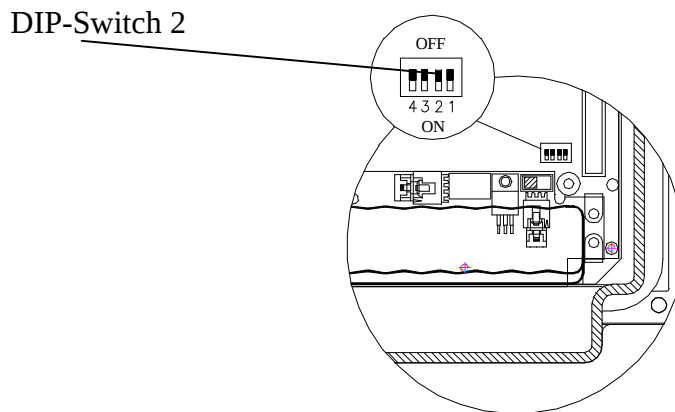


figure 3-1 DIP-Switch 2 for local mode

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.

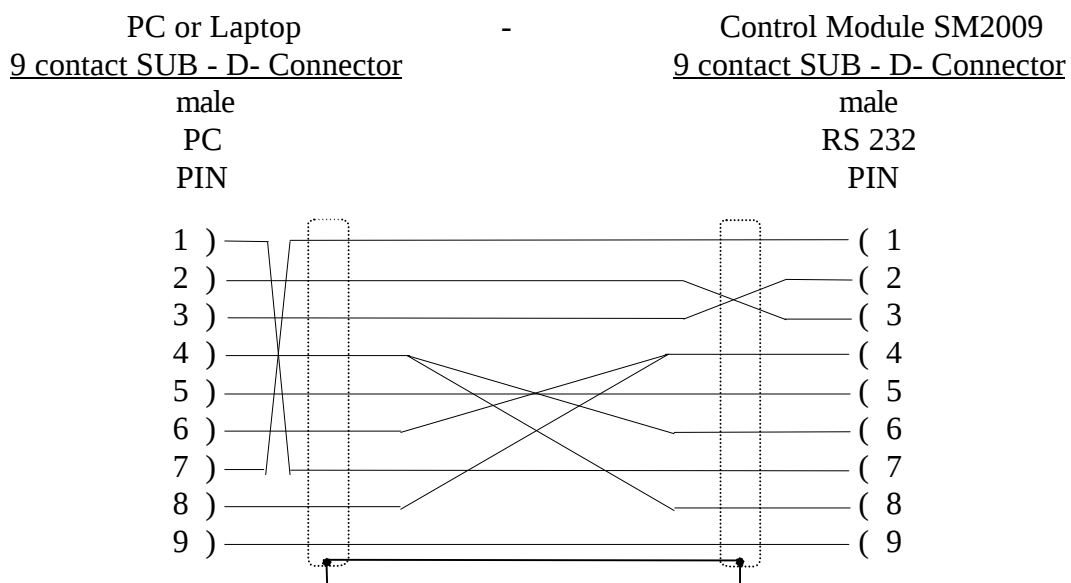


figure 3-2 Cable connection

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.

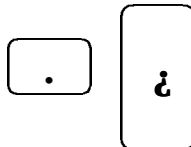
 **Note:** **Settings on the Repeater can be performed after the following procedure only.**

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.**

3.2 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 3.2-1 List of AT commands

3.2.1 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

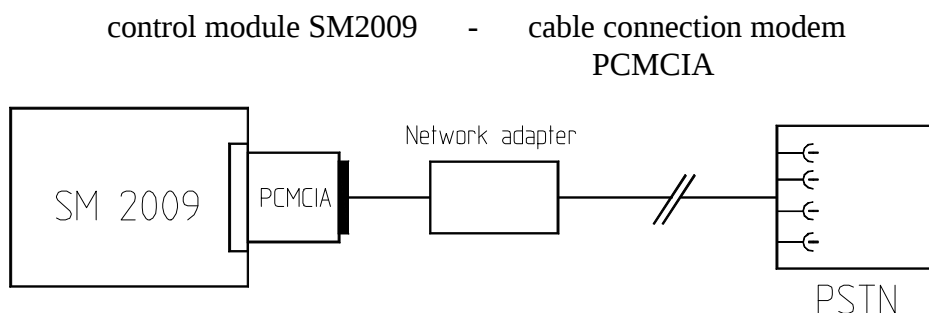


figure 3-3 Connection of control module and PSTN modem

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.**

3.2.2 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.

3.2.3 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

4 Description of the commands

All available software commands are described in the following chapter.

4.1 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

4.2 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 directly 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 consist 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 ↵

4.3 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.

4.3.1 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.

4.3.2 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.

4.3.3 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.**

4.3.4 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).

4.3.5 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.

4.3.6 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.

4.3.7 SET CFO, setting of the frequency offset

Syntax: SET CF0 ↵

Response: ENTER BAND MODULE (1-8): ↵

ENTER CF0 UL <kHz>: ↵

ENTER CF0 DL <kHz>: ↵

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

4.3.8 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.

4.3.9 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

4.3.10 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.

4.3.11 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.

4.3.12 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.

4.3.13 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): ↵

4.3.14 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.

4.3.15 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.

4.3.16 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.

4.3.17 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.

4.3.18 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)

4.3.19 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

```

4.3.20 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.

4.4 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.

```

COM2 9600.n.0.1
get1

*** GET ***
REPEATER ID : MIKOM
MODEM INITSTRING : AT&FE0S0=2
DIALMETHOD : TONE DIALING
PHONE NUMBER 1 : 0
PHONE NUMBER 2 : 0
REP CYCLE : 10 min
TIMEOUT FOR LMT : 28 min
LOCAL-INTERFACE : 9600 bps, 8 bits, NO PARITY
TIME : 14:27:23
DATE : 10-12-1998
BAND-MODULE 1 2 3 4 5 6 7 8
CF UL [MHz] : 833.5
CF DL [MHz] : 880.5
CFO UL [KHz] : 0
CFO DL [KHz] : 0
ATT UL [dB] : 0
ATT DL [dB] : 0
PWR DOWN MODE : DIS
ALC THRESHOLD UL : 255
ALC THRESHOLD DL : 255
TYPE GET2 FOR MORE
MIKOM >
  
```

figure 4-1 Example of a GET1 report

```

COM2 9600.n.0.1
get2

*** ALARMMASK ***
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
MIKOM >
  
```

figure 4-2 Example of a GET2 report

4.4.1 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.

4.4.2 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

```

4.4.3 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

4.4.4 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							

4.4.5 GET BAUD, baudrate

Syntax: GET BAUD ↵

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

(also 4800, 2400 or 1200 are possible)

4.4.6 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						

4.4.7 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						

4.4.8 GET ID, Repeater identification

Syntax: GET ID ↵

Response: REPEATER ID: MIKOM

4.4.9 GET ILA, displays stored number of invalid login attempts

Syntax: GET ILA ↵

Response: ILA Invalid login attempts:

4.4.10 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

4.4.11 GET LMT, timeout for local interface

Syntax: GET LMT ↵

Response: TIMEOUT FOR LMT : 25 min

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

Syntax: GET LOGIC ↵

Response: EXT. ALARM LEVEL: L L H H

4.4.13 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

4.4.14 GET PAR, modem parity

Syntax: GET PAR ↵

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

4.4.15 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**'.

4.4.16 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)

4.4.17 GET TIME, to get the actual time and date

Syntax: GET TIME ↵

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

4.5 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 4.6.1
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 4.6.2
STATUS HIST	history of alarms
STATUS I2C	status of the I ² C 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 4.6.3

* Option

Table 5.5-1 Summary of STATUS commands

By typing STATUS commands all status information are given.

```

station
*** STATUS ***
PWR-SUPPLY-MAINS: OK
PWR-SUPPLY-8V : OK
PWR-SUPPLY-12V : OK
LITHIUM-BATTERY : OK
ACCU-VOLTAGE-L1 : OK
ACCU-VOLTAGE-L2 : OK
EXT. ALARM 1 OK
EXT. ALARM 2 OK
EXT. ALARM 3 FAILURE <WAR>
EXT. ALARM 4 FAILURE <WAR>
PASSWORD : OK
VSWR : OK
BAND-MODULE 1 2 3 4 5 6 7 8
CURRENT-AT-8V : OK
CURRENT-AT-12V : OK
SYNTH-LOCK-UL : FAIL <CR>
SYNTH-LOCK-DL : FAIL <CR>
ALC-UL : OK
ALC-DL : OK
TEMP [deg C]: 55
DOOR : OPEN <WAR>
MIKOM >
  
```

figure 4-3 Example of a STATUS report

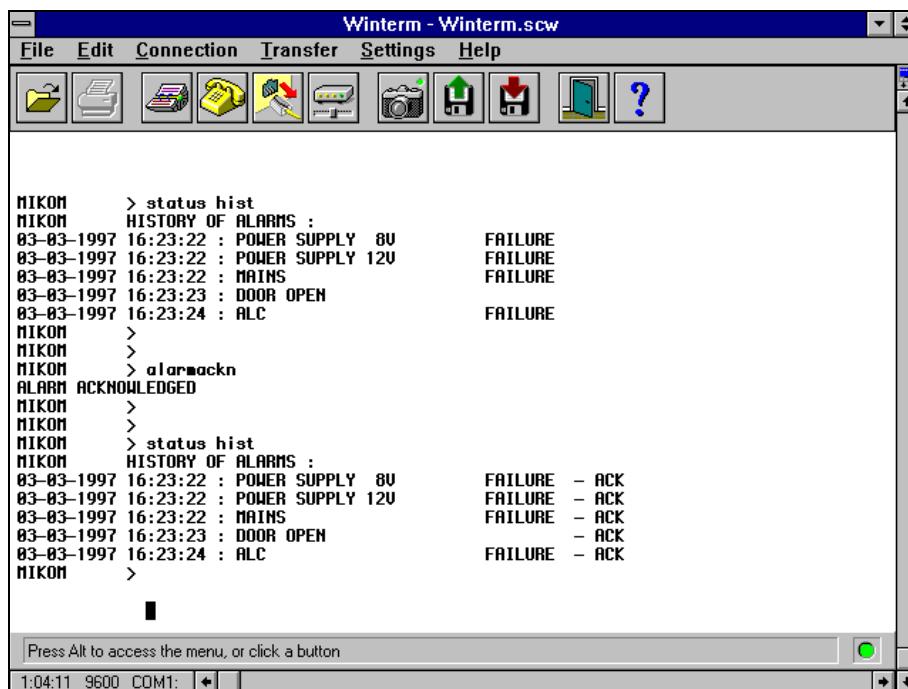


figure 4-4 Example of a STATUS HIST report

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

4.5.5 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.

4.5.6 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.

4.5.7 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.

4.5.8 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.

4.5.9 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 $\pm 2^\circ$ C.

An alarm will be released at a temperature $\geq +75^\circ$ C

The response then is: TEMPERATURE = 76 °C, Temperature Alarm - Stage 1

Another alarm will be released at a temperature $\geq +90^\circ$ 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 $+85^\circ$ C.

4.6 Optional status commands

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

4.6.1 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).

4.6.2 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 >

4.6.3 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).

4.7 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 4.8.1
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 4.8.2
VER	revision number of software

* Options

Table 5.7-1 Summary of action commands

4.7.1 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.

4.7.2 BYE, disconnect Repeater from telephone line in remote mode

Syntax: BYE ↵

4.7.3 BYE, disconnect Repeater from local maintenance interface

Syntax: BYE ↵

Response: LOGOUT FROM LOCAL MAINTENANCE INTERFACE

4.7.4 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).

4.7.5 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.

4.8 Optional action commands

4.8.1 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.

4.8.2 STOPDIS, stops battery discharging immediately

Syntax: STOPDIS ↵

Response: BATTERY DISCHARGE STOPPED

Stops the discharge of the backup battery immediately.

4.9 Error messages

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

4.9.1 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.

4.9.2 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.

4.9.3 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.

4.10 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".

5 Index

A

Action commands
 ALARMACKN 35
 BYE 35
 DNLOAD 36
 VER 36
 AT commands 9

C

Commands
 GET 22
 SET 13
 STATUS 29
 Communication
 locally 5
 remotely 6

E

Error message 38
 Errors
 I²C-Bus 38
 Syntax error 38
 Value error 38

G

Gain
 Settings via modem 9
 GET commands
 GET ALARMMASK 24
 GET ALCTHR 24
 GET ALIAS* 25
 GET ATT 25
 GET BAUD 25
 GET CF 25
 GET CFO 26
 GET ID 26
 GET ILA 26
 GET INITSTR 26
 GET LMT 27
 GET LOGIC 27
 GET NUM 27
 GET PAR 27
 GET PWRDOWN 27
 GET REP 28
 GET TIME 28

I

Init string
 for Motorola modem 11
 for PSTN modem 9
 for Siemens M1 modem 11

used in factory 9
 Installation 6

L

Login procedure
 in modem mode 10

M

Modem 8
 Modem types 9
 Motorola (Flare) 11
 PSTN 9
 Siemens M1 11

O

Optional action commands
 ACCUDIS 37
 STOPDIS 37

R

Repeating commands 38
 Running the software
 via Laptop/PC 7
 via modem 9

S

SET commands
 SET ALARMMASK 14
 SET ALCTHR 15
 SET ALIAS 16
 SET ATT 16
 SET BAUD 16
 SET CF 17
 SET CFO 17
 SET DIALMETH 17
 SET ID 17
 SET ILA 18
 SET INITSTR 18
 SET LMT 18
 SET LOGIC 19
 SET NUM 19
 SET PAR 19
 SET PWD 19
 SET PWRDOWN 20
 SET REP 20
 SET TIME 21
 SET UID 21
 Severity levels 15
 STATUS commands
 STATUS ALC 30
 STATUS AMPBIAS 30
 STATUS DOOR 30

STATUS HIST 30
STATUS I2C 32
STATUS LBATT 32
STATUS PWR 32
STATUS SYNTH 33

STATUS TEMP 33
STATUS commands, optional
STATUS ACCU 34
STATUS EXTALARM 34
STATUS VSWR 34