Command and Attribute Summary for Avitec AB GSM/EDGE repeaters

Document Revision 1.0

Software Version: 1.03

Release date: 2004-06-15

Contact Information

Phone: +46 8 475 47 00
Fax: +46 8 475 47 99
Email: software.support@avitec.se
Web: http://www.avitec.se

Address:
Avitec AB

Box 20116
S-161 02 BROMMA
SWEDEN

Contents

1 Introduction

This document gives an overview of all available commands and attributes for Avitec AB GSM/EDGE repeaters. Commands and attributes described applies to 2-channel, 4-channel and frequency shifting as well as the fiber optic fed repeaters in 900, 1800 and 1900 frequency range.

Note! The commands and attributes apply to controller software version 1.03.

2 GET and SET-Attributes

This section describes all the parameters and alarms that can be GET (read) or SET (written) to the control module.

2.1 ADD - SMS Address Access List

Attribute type: Read and Write

When SMS is used for communication, addresses 1 to 4 indicates addresses that are allowed to read and write attributes from the controller. All addresses have read access to the controller, but only address one and two can set parameters and perform ACT commands.

Reply format:

```
1 X 2 Y 3 Z 4 W
```

X is address 1, Y address 2, Z address 3 and W is address 4. If no address is available, a '-'(dash) will be replied.

Example:

```
GET ADD
```

Reply:

```
1 +46705511125 2 – 3 +46705521334 4 –
```

Example:

```
SET ADD 3 +46705511125
```

Configures address number three to be +46705511125

When data call communication is used, this attribute is obsolete.

2.2 ADC - Active Devices Count

Attribute type: Read only

This attribute replies with number of installed active devices to the controller.

Format:

```
N
```

N represents the number of devices.

Example:

```
GET ADC
```

Reply:

```
5
```

meaning that the number of active devices is 5.

2.3 AIC - Antenna Isolation Measurement Channels

Attribute type: Read and Write

The repeater can be configured to measure the antenna isolation on a certain timepoint of the day (configured using attributes AIE and AIT). If antenna isolation is too low (as configured with attribute ALA AIM), an alarm is triggered.

For details about the antenna measurement, please refer to attribute ACT AIM in section “Miscellaneous Command Attributes”

The antenna isolation is measured using the BCCH downlink and a second listener channel.

By default, downlink chain 1 and 2 settings are used for the antenna measurements. If only one chain is enabled in the repeater, or if measurement should be done on other channels, this attribute can be used to configure the alternate channels.

Format:

```
X Y
```

X is the BCCH channel, and Y is the second channel used in the measurements.

If configured to 0, same as configured in CHA 1 and 2 is used.

Example:

```
GET AIC
```

Reply:

```
0 122
```

means that BCCH channel used is the one used in chain 1, but the listener channel is 122.

Example:

```
SET AIC 46 51
```

configures the BCCH used during measurements to 46, and listener channel to 51.

Note! Antenna isolation is not measured in Fiber Optic repeaters and repeaters CSFT18922 and CSFT91822.

2.4 AIE - Antenna Isolation Measurement Enabled

Attribute type: Read and Write

The repeater can be configured to measure the antenna isolation on a certain timepoint of the day (configured using attributes AIE and AIT). If antenna isolation is too low (as configured with attribute ALA AIM), an alarm is triggered.

For details about the antenna measurement, please refer to attribute ACT AIM in section “Miscellaneous Command Attributes”

This attribute configures if the automatic measurement should be enabled or not.

Format:

```
X
```

X = 0 means measurement of antenna isolation is disabled and X = 1 means measurement of antenna isolation is enabled.

Example:

```
GET AIE
```

Reply:

```
1
```

means that the repeater will measure the antenna isolation once per day.

Example:

```
SET AIE 1
```

disables the measurement.

Note! Antenna isolation is not measured in Fiber Optic repeaters and repeaters CSFT18922 and CSFT91822.

2.5 AIM - Antenna Isolation Measurement Status

Attribute type: Read only

The repeater can be configured to measure the antenna isolation on a certain time point of the day (configured using attributes AIE and AIT). If antenna isolation is too low (as configured with attribute ALA AIM), an alarm is triggered.

For details about the antenna measurement, please refer to attribute ACT AIM in “Miscellaneous Command Attributes”

This attribute replies with the status of last antenna measurement.

Format:

```
X
```

X = 0 means OK. X = 1 means antenna isolation is too low, or a failure was encountered (failure cause can be read out with attribute LAR) during measurement of the antenna isolation.

Example:

```
GET AIM
```

Reply:

```
1
```

meaning that last antenna measurement detected that the antenna isolation was too low, or the measurement failed.

Note! Antenna isolation is not measured in Fiber Optic repeaters and repeaters CSFT18922 and CSFT91822.

2.6 AIP - Antenna Isolation Measurement Progress

Attribute type: Read only

The repeater can perform an measurement of the antenna isolation measurement, either at scheduled timepoints, or upon user request by entering the command ACT AIM (for details about the antenna measurement, please refer to attribute ACT AIM in “Miscellaneous Command Attributes”). Once the antenna isolation measurement is requested, polling the AIP detects when antenna isolation measurement is completed.

This attribute replies with the progress of current antenna isolation routine.

Format:

```
X
```

X = 0 means measurements are completed, and X = 1 means antenna isolation measurement is in progress

Example:

```
GET AIP
```

Reply:

```
1
```

meaning that antenna isolation measurement is in progress.

Note! Antenna isolation is not measured in Fiber Optic repeaters and repeaters CSFT18922 and CSFT91822.

2.7 AIT - Antenna Isolation Measurement Timepoint

Attribute type: Read and Write

The repeater can be configured to measure the antenna isolation on a certain timepoint of the day (configured using attributes AIE and AIT). If antenna isolation is too low (as configured with attribute ALA AIM), an alarm is triggered.

For details about the antenna measurement, please refer to attribute ACT AIM in section “Miscellaneous Command Attributes”

This attribute configures at what timepoint of the day the antenna isolation measurement should be performed.

Format:

```
HHMMSS
```

HH is the hours (in 24 hour notation), MM is minutes and SS is seconds specifying the measurement timepoint.

Example:

```
GET AIT
```

Reply:

```
031500
```

meaning that antenna measurement timepoint is 15 minutes past three in the morning.

Example:

```
SET AIT 170000
```

sets the time for measurement to 17 in the afternoon.

Note 1! Since antenna measurement might cause dropped calls (radio parameters are changed for 3-4 seconds), it is recommended to set the antenna measurement to be performed during low traffic intervals.

Note 2! Antenna isolation is not measured in Fiber Optic repeaters and repeaters CSFT18922 and CSFT91822.

2.8 AL1 - Compressed Alarm Format

Attribute type: Read only

This is a compact message of the alarm configuration strings. This attribute replies with the configuration of the alarm sources AMU, AMD, BAT, PDL and WRD

The use of the attribute is mainly to increase the speed of repeater installations into the repeater OMC.

Example:

```
GET AL1
```

Replies:

```
0 0 1 006 003 003 0 0 1 006 003 003 0 0 1 90 115 3 0 0 2 0 0 3 012 000 003
0 0 2 013 000 003
```

which are the alarm configuration strings received as if using the commands

```
GET ALA AMU
GET ALA AMD
GET ALA BAT
GET ALA PDL
GET ALA WRD
```

For a detailed description of the different alarm attributes and alarm strings, please refer to attribute ALA and section Alarm Attribute Configuration.

2.9 AL2 - Compressed Alarm Format

Attribute type: Read only

Same as attribute AL1, but replies with configuration for alarm sources TEM, DOO, PW1, PW2 and PW3

2.10 AL3 - Compressed Alarm Format

Attribute type: Read only

Same as attribute AL1, but replies with configuration for alarm sources EX1, EX2, EX3, EX4 and PW4

2.11 AL4 - Compressed Alarm Format

Attribute type: Read only

Same as attribute AL1, but replies with configuration for alarm sources VLI, LGO, CLR and ILI

2.12 AL5 - Compressed Alarm Format

Attribute type: Read only

Same as attribute AL1, but replies with configuration for alarm sources SZU, SZD, PSL, PTM, AIM

2.13 AL6 - Compressed Alarm Format

Attribute type: Read only

Same as attribute AL1, but replies with configuration for alarm sources IOU, IOD, ASU, ASD, COM

2.14 AL7 - Compressed Alarm Format

Attribute type: Read only

Same as attribute AL1, but replies with configuration for alarm sources FRX, FTX.

Note! This attribute is only used in fiber optic fed repeaters.

2.15 ALA - Alarm Configuration Settings

Attribute type: Read and Write

Format:

```
AAA X Y Z LLL UUU TTT
```

AAA is the alarm source to configure. Please refer to “Alarm Attribute Configuration” for an overview of available alarm parameters to configure.
X has double functionality. It determines whether an alarm should be send if error is detected, and it also configures whether the alarm relay should be affected by the alarm source.

X = 0 means alarm transmission enabled, but alarm doesn’t affect the relay output
X = 1 means alarm transmission disabled, and does not affect the relay.
X = 2 means alarm transmission is enabled, and alarm affects the relay output.
X = 3 means alarm transmission is disabled, but alarm affects relay output
Y determines whether an alarm requires to be acknowledged or not.

(When using data call, an alarm is considered acknowledged when the repeater has successfully logged in to the OMC, and delivered the alarm. In case of SMS, an alarm is considered acknowledged when an acknowledge message is received from the main address. The alarms can also be acknowledged with the command ACT ACK when logged in locally or remotely. If an alarm is not acknowledged, it will be retransmitted up to MNR (maximum number of retransmissions) times, with RCA (repetition cycle for alarms) minute’s interval. Refer to attributes MNR and RCA.)

Y = 0 means Acknowledge required
Y = 1 means No acknowledge required

Z is a threshold indicator, indicating how thresholds are used for this particular alarm source.
Z = 1 means that both thresholds are used for alarm calculation.
Z = 2 means that lower threshold is used
Z = 3 means that upper threshold is used
Z = 4 means that thresholds are ignored, i.e. digital measurement.

Note! Changing parameter Z does NOT affect the measurement of the alarm source. Z is just an indicator of how the measurement is done, and should NEVER be changed.

LLL is the value of the lower threshold used for alarm calculation.
UUU is the value of the upper threshold used for alarm calculation.
TTT is the time an alarm has to be in erroneous state before an alarm is triggered.

Example:

```
GET ALA TEM
```

Returns:

```
0 0 1 -15 060 5
```

This means that alarm is enabled and acknowledge required. Both thresholds are used in measuring the alarm, lower threshold is -15 (degrees), 60 (degrees) is the upper threshold and that the temperature has to be higher than 60 for 5 seconds before an alarm is triggered.

Example:

```
SET ALA TEM 0 0 1 0 60 20
```

Modifies the above alarm source to generate an alarm when the temperature has been above 60 degrees or below 0 degrees for more than 20 seconds.

2.16 ALL - Compact Message for Getting Status and RF Parameters from Repeater

Attribute type: Read only

This attribute replies with the same information as in the heartbeat sent to the Avitec Element Manager, except the Time and Date information. Please refer to section Heartbeat Reports.

2.17 ALV - Analog Levels

Attribute type: Read only

Returns the snapshot information about the main analog levels in the repeater unit.

Depending on the number of channels in the repeater, the reply varies.

2-channel and Frequency translating repeaters:

```
<P1> <P2> <P3> <P4> <BAT> <TEM> <PTem> <PSUPLevel>
```

<P1> is the +28 V power supply level out from the Power Supply. If communication with power supply is in error, a dash (‘-‘) is reported.

<P2> is the +15 V power supply level out from the Power Supply. If communication with power supply is in error, a dash (‘-‘) is reported.

<P3> is the +6.45 V power supply level out from the Power Supply. If communication with power supply is in error, a dash (‘-‘) is reported.

<P4> is the +6.45 V power supply level from the Power Supply to the Controller. If communication with power supply is in error, a dash (‘-‘) is reported.

<BAT> is the +10.5 V (when fully charged) power supply level feeding the controller in case of a power failure. If communication with power supply is in error, a dash (‘-‘) is reported.

<TEM> is the temperature in Celsius as measured in the control module.

<PTem> is the temperature in Celsius as measured in the Power Supply. If communication with power supply is in error, a dash (‘-‘) is reported.

<PSUPLevel> is the mains voltage level in to the Power Supply. If communication with power supply is in error, a dash (‘-‘) is reported.

Example:

```
GET ALV
```

Reply:

```
+28.1 +15.0 +6.5 +6.4 +10.1 33 48 229
```

This displays the four different power levels +28.1 V, +15.0 V, +6.5 V, +6.4 V out from the Power Supply. Battery level is +10.1 V, Controller temperature is 33 °C, Power Supply temperature is 48 °C and mains input level to power supply is 229 V.

4-channel repeaters:

4-channel repeaters are equipped with two power supplies, the Master Power Supply, feeding 2 LIMPA’s, Reference Generator, FDM’s and the controller, and also the Slave Power Supply, feeding the 2 remaining LIMPA’s.

Format:

<P1$_{Master}$> <P1$_{Slave}$> <P2$_{Master}$> <P2$_{Slave}$> <P3$_{Master}$> <P3$_{Slave}$> <P4> <BAT> <TEM> <PTem $_{Master}$> <PTem $_{Slace}$> <PSUPLevel>

<P1$_{Master}$> is the +28 V power supply level out from the Master Power Supply. If communication with master power supply is in error, a dash (‘-‘) is reported.

<P1$_{Slave}$> is the +28 V power supply level out from the Slave Power Supply. If communication with slave power supply is in error, a dash (‘-‘) is reported.

<P2 $_{Master}$> is the +15 V power supply level out from the Master Power Supply. If communication with master power supply is in error, a dash (‘-‘) is reported.

<P2 $_{Slave}$> is the +15 V power supply level out from the Slave Power Supply. If communication with slave power supply is in error, a dash (‘-‘) is reported.

<P3 $_{Master}$> is the +6.45 V power supply level out from the Master Power Supply. If communication with master power supply is in error, a dash (‘-‘) is reported.

<P3 $_{Slave}$> is the +6.45 V power supply level out from the Slave Power Supply. If communication with slave power supply is in error, a dash (‘-‘) is reported.

<P4> is the +6.45 V power supply level from the Master Power Supply to the Controller. If communication with master power supply is in error, a dash (‘-‘) is reported.

<BAT> is the +10.5 V (when fully charged) power supply level feeding the controller in case of a power failure. If communication with master power supply is in error, a dash (‘-‘) is reported.

<TEM> is the temperature in Celsius as measured in the control module.

<PTem $_{Master}$> is the temperature in Celsius as measured in the Master Power Supply. If communication with master power supply in error, a dash (‘-‘) is reported.

<PTem $_{Slave}$> is the temperature in Celsius as measured in the Slave Power Supply. If communication with slave power supply in error, a dash (‘-‘) is reported.

<PSUPLevel> is the mains voltage level in to the Power Supplies. If communication with master power supply is in error, a dash (‘-‘) is reported.

Example:

```
GET ALV
```

Reply:

```
+28.1 +28.0 +15.0 +15.0 +6.5 +6.5 +6.4 +10.1 33 48 45 229
```

This displays the eight different power levels +28.1 V, +28.0, +15.0 V, +15.0, +6.5 V, +6.5 V, +6.4 V out from the Power Supply. Battery level is +10.1 V, Controller temperature is 33 °C, Master Power Supply temperature is 48 °C, Slave Power Supply temperature is 45 °C, and mains input level to power supply is 229 V.

Note! To read out full power levels in all modules, please refer to attribute PSD (Power Supply Distribution)

2.18 AMD - Status of Amplifier Chain Downlink

Attribute type: Read only

This parameter returns the status of the amplifier chains in the downlink path. Each LIMPA contains two chains, and the reply depends on number of installed channels / LIMPA’s.

Format for 2 channel repeaters:

```
XY
```

X is status of Amplifier Chain 1 DL (in downlink LIMPA 1)
Y is status of Amplifier Chain 2 DL (in downlink LIMPA 1)
0 indicates an OK, and 1 an Error.
A ‘-‘ means communication with LIMPA is in error.

Example:

```
01
```

means amplifier chain 1 DL is OK, while there is an error in chain 2 DL.

Format for 4 channel repeaters:

```
XYZW
```

X is status of Amplifier Chain 1 DL (in downlink LIMPA 1).
Y is status of Amplifier Chain 2 DL (in downlink LIMPA 1).
Z is status of Amplifier Chain 3 DL (in downlink LIMPA 2).
W is status of Amplifier Chain 4 DL (in downlink LIMPA 2).
0 indicates an OK, and 1 an Error.
A '-' means communication with corresponding LIMPA is in error.

Example:

```
0001
```

means an Error in chain 4 DL, while all other chains are OK.

2.19 AMU - Status of Amplifier Chain Uplink

Attribute type: Read only

This parameter returns the status of the amplifier chains in the uplink path. Each LIMPA contains two chains, and the reply depends on number of installed channels / LIMPA's.

Format for 2 channel repeaters:

```
XY
```

X is status of Amplifier Chain 1 UL (in downlink LIMPA 1)
Y is status of Amplifier Chain 2 UL (in downlink LIMPA 1)

0 indicates an OK, and 1 an Error.
A '-' means communication with LIMPA is in error.

Example:

```
01
```

means amplifier chain 1 UL is OK, while there is an error in chain 2 UL.

Format for 4 channel repeaters:

```
XYZW
```

X is status of Amplifier Chain 1 UL (in downlink LIMPA 1)
Y is status of Amplifier Chain 2 UL (in downlink LIMPA 1)
Z is status of Amplifier Chain 3 UL (in downlink LIMPA 2)
W is status of Amplifier Chain 4 UL (in downlink LIMPA 2)

0 indicates an OK, and 1 an Error.
A '-' means communication with corresponding LIMPA is in error.

Example:

```
00--
```

means an that chains 1 and 2 are OK, while there is an error in communication with LIMPA 2 (containing uplink chains 3 and 4).

2.20 ASC - Telephone Number to OMC, or Address of SMSC

Attribute type: Read and Write

When data call is used, ASC is the telephone number to the OMC. In case of SMS communication, this is the number to the Short Message Service Center (SMSC).

Example:

```
GET ASC
```

Reply:

```
+46705008999
```

means, if SMS is enabled, that this is the address to the Short Message Service Center.

If data call is used, the controller will dial this number if an alarm occurs, or a report is to be sent. The controller can optionally call a secondary OMC address in case message is undeliverable to the ASC address. Please refer to attribute SSC attribute for details.

Example:

```
SET ASC 90510
```

sets the address to 90510.

Note! If data call is used as communications method, setting the address to nothing will disable the sending of alarms to the OMC, while the controller is still available for remote login.

Example:

```
SET ASC
```

Disables the sending of alarms and reports (if data call is used)

2.21 ASD - Amplifier Chain Saturation Downlink Status

Attribute type: Read only

The Amplifier Chain Saturation detects if the repeater works in the optimum way. If the input signal to the repeater is too high, the amplifiers will go into saturation, and hence the repeater will not work within the optimum range.

Note! Having a chain going well into saturation might indicate that the repeater is oscillating. In this case, the gain must be decreased in order to avoid severe signal pollution. Also, the antenna isolation should be verified. Please refer to command ACT AIM for details on how to measure the antenna isolation.

Format for 2-channel and Frequency translating repeaters:

```
XY
```

X is the Amplifier Saturation status in the Downlink path 1
Y is the Amplifier Saturation status in the Downlink path 2

where

0 indicates an OK
1 indicates an Error.
- (dash) means connection with LIMPA is in error.

Example:

```
GET ASD
```

Reply:

```
10
```

meaning that the gain in downlink 1 is in error, and downlink chain 2 is OK.

Format for 4-channel repeaters:

```
XYZW
```

X is the Amplifier Saturation status in the Downlink path 1
Y is the Amplifier Saturation status in the Downlink path 2
Z is the Amplifier Saturation status in the Downlink path 3
W is the Amplifier Saturation status in the Downlink path 4

where

0 indicates an OK
1 indicates an Error.
- (dash) means connection with corresponding LIMPA is in error.

Example:

```
GET ASD
```

Reply:

```
0001
```

meaning that the saturation in downlink chain 4 is in error. In this example, it might be that chain 4 is oscillating, and hence the gain should be decreased and / or antenna isolation verified.

Note! To read out actual level of saturation on a chain by chain basis, refer to attribute ASL.

2.22 ASL - Amplifier Chain Saturation Level

Attribute type: Read only

The Amplifier Chain Saturation Level displays the amplifier saturation level on a chain by chain basis.

Format for 2-channel and Frequency Translating repeaters:

```
KLXY
```

K is the Amplifier Saturation Level in the uplink path 1
L is the Amplifier Saturation Level in the uplink path 2
X is the Amplifier Saturation Level in the downlink path 1
Y is the Amplifier Saturation Level in the downlink path 2

K, L, X, Y can have the following values

0 means amplifier is below optimum settings (can be due to lack of input signal).
1 means amplifier is working in the optimum range.
2 means amplifier is going into saturation and that gain should be decreased.
3 means amplifier is well into saturation, and that gain must be decreased to avoid degradation of signal quality.
- (dash) means connection with LIMPA is in error.

Example:

```
GET ASL
```

Reply:

```
3310
```

meaning that the uplink amplifier chains are going very hard into saturation, while downlink one works in optimum range. This probably indicates that the repeater is oscillating in the uplink, and that the gain in the uplink should be decreased.

Format for 4-channel repeaters:

```
KLMNXYZW
```

K is the Amplifier Saturation Level in the uplink path 1
L is the Amplifier Saturation Level in the uplink path 2
M is the Amplifier Saturation Level in the uplink path 3
N is the Amplifier Saturation Level in the uplink path 4

X is the Amplifier Saturation Level in the downlink path 1
Y is the Amplifier Saturation Level in the downlink path 2
Z is the Amplifier Saturation Level in the downlink path 3
W is the Amplifier Saturation Level in the downlink path 4

K-M, X-W can have the following values

0 means amplifier is below optimum settings (can be due to lack of input signal).
1 means amplifier is working in the optimum range.
2 means amplifier is going into saturation and that gain should be decreased.
3 means amplifier is well into saturation, and that gain must be decreased to avoid degradation of signal quality.
- (dash) means connection with corresponding LIMPA is in error.

Example:

```
GET ASL
```

Reply:

```
00011003
```

meaning that uplink channel 4 works in optimum range (probably traffic going through the chain), downlink chain one is working in optimum range (BCCH properly configured) and that downlink chain four is well into saturation. Downlink chain four should hence be decreased to avoid signal degradation. This can also be an indication that the downlink chain four is oscillating.

2.23 ASU - Amplifier Chain Saturation Uplink Status

Attribute type: Read only

The Amplifier Chain Saturation detects if the repeater works in the optimum way. If the input signal to the repeater is too high, the amplifiers will go into saturation, and hence the repeater will not work within the optimum range.

Note 1! Having a chain going well into saturation might indicate that the repeater is oscillating. In this case, the gain must be decreased in order to avoid severe signal pollution. Also, the antenna isolation should be verified. Please refer to command ACT AIM for details on how to measure the antenna isolation.

Note 2! A mobile phone being used very close to the server antenna might cause the amplifier saturation alarm to be activated.

Format for 2-channel and Frequency Translating repeaters:

```
XY
```

X is the Amplifier Saturation status in the Uplink path 1
Y is the Amplifier Saturation status in the Uplink path 2

where

0 indicates an OK
1 indicates an Error.
- (dash) means connection with LIMPA is in error.

Example:

```
GET ASU
```

Reply:

```
11
```

meaning that the uplink amplifier chains are in error. This probably indicates that the repeater is oscillating, and that the gain in the uplink must be decreased.

Format for 4-channel repeaters:

```
XYZW
```

X is the Amplifier Saturation status in the Uplink path 1
Y is the Amplifier Saturation status in the Uplink path 2
Z is the Amplifier Saturation status in the Uplink path 3
W is the Amplifier Saturation status in the Uplink path 4

where

0 indicates an OK
1 indicates an Error
- (dash) means connection with corresponding LIMPA is in error.

Example:

```
GET ASU
```

Reply:

```
1001
```

meaning that the amplifier chain in uplink one and uplink chain four is in error. In this example, it might be that chain one and four is oscillating, and hence the gain should be decreased and / or antenna isolation verified.

Note! To read out actual level of saturation on a chain by chain basis, refer to attribute ASL.

2.24 ATD - Attenuation Downlink

Attribute type: Read and Write

Format on setting parameter:

```
SET ATD K X [L Y] [M Z] [N W]
```

K is the chain selector, and X is the attenuation in downlink chain K. Optionally attenuation in chain L, M, N can be set in the same command.

The chain selector is 1 or 2 in 2-channel and frequency translating repeaters, and 1 to 4 in 4-channel repeaters.

The attenuation is settable in 1 dB steps from 0 to 30 dB.

Example:

```
SET ATD 2 21
```

Sets attenuation in downlink chain 2 to 21 dB.

Example:

```
SET ATD 3 20 4 22
```

Sets attenuation in downlink chain 3 to 20 dB and in chain 4 to 22 dB.

Format on getting parameters in 2 channel repeaters:

```
GET ATD
```

Reply:

```
1 XX 2 YY
```

XX is attenuation in chain one downlink, YY attenuation in downlink 2.

Reply in 2 channel repeaters:

```
1 XX 2 YY 3 ZZ 4 WW
```

XX is attenuation in chain 1 downlink, YY attenuation in downlink 2, ZZ attenuation in downlink 3 and WW in downlink 4.

Example:

```
GET ATD
```

Reply:

```
1 22 2 22 3 22 4 23
```

means that attenuation in downlink 1 to 3 is 22 dB, while channel 4 is set to 23 dB attenuation.

2.25 ATU - Attenuation Uplink

Attribute type: Read and Write

Format on setting parameter:

```
SET ATU K X [L Y] [M Z] [N WW]
```

K is the chain selector, and X is the attenuation in uplink chain K. Optionally attenuation in chain L, M, N can be set in the same command.

The chain selector is 1 or 2 in 2-channel and frequency translating repeaters, and 1 to 4 in 4-channel repeaters.

The attenuation is settable in 1 dB steps from 0 to 30 dB.

Example:

```
SET ATU 2 7
```

Sets attenuation in uplink chain 2 to 7 dB.

Example:

```
SET ATU 2 11 3 11
```

Sets attenuation in uplink chains 2 and 3 to 11 dB.

Format on getting parameters in 2 channel repeaters:

```
GET ATU
```

Reply:

```
1 XX 2 YY
```

XX is attenuation in chain 1 uplink, YY attenuation in uplink 2.

Reply in 2 channel repeaters:

```
1 XX 2 YY 3 ZZ 4 WW
```

XX is attenuation in chain one uplink, YY attenuation in uplink 2, ZZ attenuation in uplink 3 and WW in uplink 4.

Example:

```
GET ATU
```

Reply:

```
1 24 2 24 3 24 4 24
```

means that attenuation in downlink 1 to 4 is 24 dB.

2.26 BAT - Battery for Mobile Equipment

Attribute type: Read only

Reports the status of the battery charge for the remote communications equipment.

Format:

```
X
```

X = 0 means charge is OK
X = 1 means charge is ERROR.
X = '-' means there is a communications error between the controller and the Master Power Supply.

Example:

```
GET BAT
```

Replies:

```
1
```

meaning that there is an error in the charging of the battery for the remote communications equipment

2.27 CHA - Channel Configuration

Attribute type: Read and Write

This attribute is used to configure and determine the repeated channels.

Format on setting channel:

```
SET CHA K X [L Y] [M Z] [N W]
```

Where K is the chain selector, and X is the repeated channel in chain K (both uplink and downlink). Depending on repeater the chain selector is 1 or 2 (2-channel and frequency translating repeaters) or 1 to 4 (4-channel repeaters). Optionally channels in chain L, M, N can be set in the same command.

Channel must be within the interval that the repeater can handle. Channel limits can be determined by using attribute CHL.

Example:

```
SET CHA 2 64
```

Sets channel in uplink and downlink chain 2 to 64.

Example:

```
SET CHA 1 562 3 570
```

Sets channel one to 562 and 2 to 570.

Format on getting parameters in 2 channel and frequency translating repeaters:

```
GET CHA
```

Replies:

```
1 X 2 Y
```

X is channel 1, Y is channel 2

Example:

```
GET CHA
```

Reply:

```
1 47 2 11
```

means that channel in chain 1 is 47 and chain 2 is set to 11.

Format on getting parameters in 4-channel repeaters:

```
GET CHA
```

Replies:

```
1 X 2 Y 3 Z 4 W
```

X is channel 1, Y is channel 2, Z is channel 3 and W is channel 4.

Example:

```
GET CHA
```

Reply:

```
1 610 2 615 3 630 4 637
```

means that channel in chain 1 is 610, chain 2 is set to 615, 3 is set to 630 and channel four is set to 637.

2.28 CHL - Channel Limits. Minimum Channel Number

Attribute type: Read only

Format:

```
X Y
```

X is lowest, and Y highest available channel that the repeater can repeat

Example:

```
GET CHL
```

Reply:

```
1 124
```

Indicates that the repeater can handle channel numbers 1 through 124

2.29 COM - Status of Communication Between Controller and Hardware Devices

Attribute type: Read only

The control module communicates with a number of hardware devices in the repeater over a serial bus. This attribute is used to determine the status of the communication between the control module and the different modules.

Note! If Reference Generator is broken, this will lead to communications alarm with the Reference Generator itself, and also with the LIMPA's, since their microcontrollers run from the Reference Generator clock.

Depending on repeater type, the format varies:

Format for 2 channel conventional and Frequency translating –IR, -SD and - DD repeaters:

```
XYZWK
```

X = Status of communication with Power Supply
Y = Status of communication with LIMPA UL
Z = Status of communication with LIMPA DL
W = Status of communication with Reference Generator
K = Status of communication with Filtering and Distribution module on server side.

0 means OK
1 means Error

Example:

```
GET COM
```

Reply:

```
00100
```

means that communication between all modules are working properly , except for communication between controller and LIMPA DL.

Format for 2-channel Fiber Optic fed repeaters:

```
XYZWKL
```

X = Status of communication with Power Supply
Y = Status of communication with LIMPA UL
Z = Status of communication with LIMPA DL
W = Status of communication with Reference Generator
K = Status of communication with Filtering and Distribution module on server side.
L = Status of communication with Fiber Optic Interface.

0 means OK
1 means Error

Example:

```
GET COM
```

Reply:

```
001000
```

means that communication between all modules are working properly , except for communication between controller and LIMPA DL.

Format for Frequency translating –ER repeaters:

```
XYZWKL
```

X = Status of communication with Power Supply
Y = Status of communication with LIMPA UL
Z = Status of communication with LIMPA DL
W = Status of communication with Reference Generator
K = Status of communication with Filtering and Distribution module on server antenna port 1
L = Status of communication with Filtering and Distribution module on server antenna port 2

0 means OK
1 means Error

Example:

```
GET COM
```

Reply:

```
0000010
```

means that communication between all modules are working properly , except for communication between controller and Filtering And Distribution module on server antenna 1.

Format for 4-channel conventional repeaters:

```
XYZWJKLM
```

X = Status of communication with Master Power Supply
Y = Status of communication with Slave Power Supply
Z = Status of communication with LIMPA UL 1
W = Status of communication with LIMPA UL 2
J = Status of communication with LIMPA DL 1
K = Status of communication with LIMPA DL 2
L = Status of communication with Reference Generator
M = Status of communication with Filtering and Distribution module on server side.

0 means OK
1 means Error

Example:

```
GET COM
```

Reply:

```
00010000
```

means that communication between all modules are working properly , except for communication between controller and LIMPA UL 2.

Format for 4-channel Fiber Optic fed repeaters:

```
XYZWJKLMN
```

X = Status of communication with Master Power Supply
Y = Status of communication with Slave Power Supply
Z = Status of communication with LIMPA UL 1
W = Status of communication with LIMPA UL 2
J = Status of communication with LIMPA DL 1
K = Status of communication with LIMPA DL 2
L = Status of communication with Reference Generator
M = Status of communication with Filtering and Distribution module on server side.
N = Status of communication with Fiber Optic Interface.

0 means OK
1 means Error

Example:

```
GET COM
```

Reply:

```
000100000
```

means that communication between all modules are working properly , except for communication between controller and LIMPA UL 2.

2.30 DAT - Date

Attribute type: Read and Write

Format:

```
DDMMYY
```

DD=Date, MM=Month, YY=Year

Example:

```
GET DAT
```

Replies:

```
181099
```

means the repeater date is set to 18'th of October, 1999

Example:

```
SET DAT 241200
```

sets the repeater date to 24'th of December year 2000.

Note! When changing the date, a heartbeat will be sent as soon as user logs out, the traffic / uplink activity log will be cleared, and all alarms in the log will have the number of retransmissions of non-acknowledged alarms set to the value MNR.

2.31 DDI - Detailed Device Information

Attribute type: Read only

Format:

```
GET DDI <Devce No>
```

<Device No> is a number from 1 to max number of attributes (as read out by ADC attribute).

Format on Reply:

```
<SerialNumber> <ArtNo> <SWV> <SWBuildTime> <SWBuildDate>
<ManufacturingInfo> <ModuleInitTime> <ModuleInitDate> <Uptime>
<HWResetCounter> <WDResetCounter> <Device Description>
```

<SerialNumber> is the Serial Number of the device

<ArtNo> is Article Number / Hardware Revision

<SWV> is a string delimited by " (double quote) signs, containing software version of the device

<SWBuildTime> is a string delimited by "(double quote) signs, containing software build time

<SWBuildDate> is a string delimited by "(double quote) signs, software build date

<ManufacturingInfo> is a string delimited by "(double quote) signs, containing manufacturing specific information. If no information is available, a '-'is reported.

<ModuleInitTime> contains the repeater initialization time on the format HHMMSS, with 24 hours notation. If no information is available, a '-'(dash) is reported.

<ModuleInitDate> contains the repeater initialization date on the format DDMMYY. If no information is available, a '-'(dash) is reported.

<Uptime> shows how many seconds the device has been up and running since last reset

<HWResetCounter> shows how many times the device has been started since device was initialized

<WDResetCounter> shows how many times the watchdog has forced the device to reset since device initialization

<Device Description> is a string delimited by "(double quote) signs, containing a textual description of the hardware device.

2.32 DEV - Sets the Different Communications Methods

Attribute type: Read and Write

Options:

SMS = Short Message Services
DTC = Data Call
NUL = No remote access enabled

In order to use SMS, modem type must be set to Wavecom (external modem, SET MTP WAVECOM), Integra (on board modem, SET MTP INTEGRA) or TrioRail (external modem, SET MTP TRIOEXT).

Example:

```
SET DEV SMS
```

Enables the repeater for remote access via SMS.

Note 1! This requires that the address of the SMS center be configured (SET ASC X, where X is SMSC address).

Also, at least one of the addresses must be configured (SET ADD X Y) and the main address must point at one of the configured addresses (SET MAD X), otherwise, the controller will not be accessible SMS.

Note 2! An SMS configured repeater will, if modem is initialized correctly, still be remotely accessible via modem connection (Data Call).

Note 3! TrioRail external modem is only supported in GSM-R (railway) repeaters.

2.33 DOO - Door Status

Attribute type: Read only

Format:

```
X
```

X = 0 means door is closed
X = 1 means door is open

Example:

```
GET DOO
```

Replies:

```
1
```

meaning that door is open

2.34 EX1 - External Alarm 1

Attribute type: Read only

Format:

```
X
```

X=0 means status is OK
X=1 means status is ERROR

Example:

```
GET EX1
```

Replies:

```
0
```

meaning status is OK.

2.35 EX2 - External Alarm 2

Attribute type: Read only

Format:

```
X
```

X=0 means status is OK
X=1 means status is ERROR

Example:

```
GET EX2
```

Replies:

```
1
```

meaning status is ERROR.

2.36 EX3 - External Alarm 3

Attribute type: Read only

Format:

```
X
```

X=0 means status is OK
X=1 means status is ERROR

Example:

```
GET EX3
```

Replies:

```
0
```

meaning status is OK.

2.37 EX4 - External Alarm 4

Attribute type: Read only

Format:

```
X
```

X=0 means status is OK
X=1 means status is ERROR.

Example:

```
GET EX4
```

Replies:

```
1
```

meaning status is ERROR.

2.38 EXT - Configuration of External Alarms

Attribute type: Read and Write

Format:

```
X Y Z W
```

X is configuration for alarm pin 1
Y is configuration for alarm pin 2
Z is configuration for alarm pin 3
W is configuration for alarm pin 4

0 means that no voltage is the OK state, i.e. a voltage applied to the pin generates an alarm
1 means that applied voltage is the OK state, i.e. absence of voltage generates an alarm

Note! If the pin is not used for alarm input, the configuration should be '0'.

Example:

```
GET EXT
```

Replies:

```
0 0 1 0
```

means that pin 3 normally should have a voltage applied, and that the other pins either normally should NOT have a voltage applied, or are not in use.

Example:

```
SET EXT 0 0 1 1
```

Configures alarm pins 1 and 2 to report OK if no voltage is available, and pin 3 and 4 to require a voltage applied in order to be in OK state.

2.39 FRX - Fiber Optic Receiver Status

Attribute type: Read only

Returns the status of the fiber optic receiver. An error might indicate that the fiber from the HUB unit is failing or that the HUB unit is experiencing a power failure.

Format:

```
X
```

X = 0 means receiver status is OK
X = 1 means receiver has an ERROR detected.

If there is a communications error with fiber optic module, a '-' (dash) is reported.

Example:

```
GET FRX
```

Replies:

```
1
```

meaning that something is wrong in the fiber optic receiver.

2.40 FTX - Fiber Optic Transmitter Status

Attribute type: Read only

Returns the status of the fiber optic transmitter. A fiber optic transmitter most likely indicates that there is something wrong with the fiber optic unit.

Format:

```
X
```

X = 0 means transmitter status is OK
X = 1 means transmitter has an ERROR detected.

If there is a communications error with fiber optic module, a '-' (dash) is reported.

Example:

```
GET FTX
```

Replies:

```
1
```

meaning that something is wrong in the fiber optic transmitter.

2.41 HDC - Hardware Device Count

Attribute type: Read only

Returns number of configured hardware devices in the repeater.
Format:

```
X
```

Example:

```
GET HDC
```

Replies:

```
12
```

meaning that there are 12 hardware devices configured in the system. Please refer to attribute HDI on how to retrieve information about the different devices.

2.42 HDI - Hardware Device Information

Attribute type: Read only

This command returns device information about a specific device.

```
GET HDI X
```

X is from 1 to HDC.

Reply:

```
<Serial> <ArticleNo> <Device Information String>
```

<Serial> is 4 characters containing the device serial number.

<ArticleNo> is the Avitec Article Number, up to 12 characters.

<Device Information String> contains a quoted textual description of the hardware device. String can be up to 40 characters wide.

Example:

```
GET HDI 1
```

Reply:

```
4711 H311001A "Control Module"
```

If Device Number X doesn't exist, a dash '-' is replied.

Example:

```
GET HDI 4000
```

Reply:

```
-
```

2.43 HWV - Hardware Version

Attribute type: Read only

Returns a string with the hardware version of the control module.

Example:

```
GET HWV
```

Replies:

```
H121001C
```

meaning that the controller version is H121001C.

2.44 ILA - Invalid Login Attempts

Attribute type: Read and Write

Format:

```
X
```

X is the number of invalid login attempts that can be made before the login is locked for login. Every time an erroneous login attempt is made to the repeater, a counter is increased. This counter is decreased with one every hour. If the counter exceeds the ILA value, the login will be blocked for one hour. After that one more login attempt is allowed.

Example:

```
GET ILA
```

Replies:

```
8
```

meaning that 8 erroneous login attempts can be made before login is blocked.

Example:

```
SET ILA 5
```

Modifies this value to 5.

2.45 IOD - Input Overload Downlink Status

Attribute type: Read only

The input circuitry in the downlink chain contains circuitry to detect if there is an input overload on the downlink chain.

The measurement is always measuered in downlink chain 1, but the detector is a broadband detector, covering the entire repeater band where the repeater is operational.

This attribute can be used to see if there is other equipment in the frequency band causing the input of the repeater to be blocked, and hence decreasing the repeater performance. This can for example be a base station from another operator being mounted too close to the repeater donor antenna.

Format:

```
X
```

X = 0 means that the input in the downlink is OK
X = 1 means that there is a strong input signal in the downlink, causing the input to be blocked.

Example:

```
GET IOD
```

Replies:

```
1
```

meaning that a radio source is injecting a strong signal in the downlink path, causing the repeater performance to be decreased. Most likely, the antenna is facing a base station from another operator, the repeater is mounted too close to the base station or the antenna has too much gain, causing the repeater input to be blocked.

2.46 IOU - Input Overload Uplink Status

Attribute type: Read only

The input circuitry in the uplink chain contains circuitry to detect if there is an input overload on the uplink chain.

The measurement is always measured in uplink chain 1, but the detector is a broadband detector, covering the entire repeater band where the repeater is operational.

This attribute can be used to see if there is other equipment in the frequency band causing the input of the repeater to be blocked, and hence decreasing the repeater performance.

Format:

```
X
```

X = 0 means that the input in the uplink is OK and X = 1 means that there is a strong input signal in the uplink, causing the input to be blocked.

Example:

```
GET IOU
```

Replies:

```
1
```

meaning that a radio source is injecting a strong signal in the uplink path, causing the repeater performance to be decreased. If the repeater stays in this stage for a long time, a visit to the site is necessary, in order to find the cause for the alarm.

2.47 IPL - Input Level

Attribute type: Read only

Displays the maximum input power of the last sampled frame. The input power is continuously sampled, and the highest value each second is saved in the controller on a chain by chain basis.

Reply format in 2-channel and Frequency translating repeaters:

```
X Y Z W
```

where value is input level in dBm

X is input level in chain 1 UL
Y is input level in chain 2 UL
Z is input level in chain 1 DL
W is input level in chain 2 DL

If a value is below lowest detectable value, '-110' is reported

Example:

```
GET IPL
```

Reply:

```
–110 -77 -59 -110
```

This means chain 1 UL is lower than lowest detectable, Uplink 2 has –77 dBm, chain 1 DL has –59 dBm and chain 2 DL is lower than lowest detectable level.

Reply format in 4-channel repeaters:

```
X Y Z W K L M N
```

where value is input level in dBm

X is input level in chain 1 UL
Y is input level in chain 2 UL
Z is input level in chain 3 UL
W is input level in chain 4 UL
K is input level in chain 1 DL
L is input level in chain 2 DL
M is input level in chain 3 DL
N is input level in chain 4 DL.

If a value is below lowest detectable level, '-110' is reported

Example:

```
GET IPL
```

Reply:

```
–82 -56 -110 -110 -66 -110 -110 -110
```

This means chain 1 UL has -82 dBm, chain 2 UL has -56 dBm, 1 DL has -66 dBm, and all other chain has input level lower than lowest detectable level.

2.48 LAI - Last Antenna Isolation Measurement Level

Attribute type: Read only

This attribute is used to read out the last antenna isolation measurement. The antenna isolation measurements can be configured to be scheduled on a certain time of the day (using the attribute AIT

Format:

```
<Last Status> <Isolation> <BCCH Channel> <Listener Channel> <HHMMSS>
<DDMMYYMM>
```

If measure has never been done, a ‘-‘ (dash) is replied, otherwise

<Last Status> determines the status of the last antenna isolation measurement, 0 is OK 1 is ERROR or ‘-‘ if last measurement for some reason failed (failure cause is read out with attribute LAR).

<Isolation> displays the measured isolation in dB. If last measurement failed, a ‘-‘ is reported.
<BCCH Channel> displays the BCCH channel used during the measurements.

<Listener Channel> displays the listener channel used during the measurements.

<HHMMSS> displays timepoint when last measurement was performed. If no measurements have been performed, a ‘-‘ is reported.

<DDMMYY> is the date when last measurement was performed. If no measurements have been performed, a ‘-‘ is reported.

Example 1:

```
GET LAI
```

Returns:

```
- - 17 42 - -
```

means that no antenna measurement has been completed since system startup.

Example 2:

```
GET LAI
```

Returns:

```
- - 17 42 020306 023000
```

means that last measurement was attempted at 02.30 AM the 2'nd March 2003, but that measurement failed. Failure cause should be read out with attribute LAR.

Example 3:

```
GET LAI
```

Returns:

```
1 73 17 42 020306 023000
```

means that last measurement was

completed at 02.30 AM the 2'nd March 2003, and measurement showed that antenna is 73 dBm, which in this case is too low, and considered an ERROR.

Note! Antenna isolation is not measured in Fiber Optic repeaters and repeaters CSFT18922 and CSFT91822.

2.49 LAR - Last Antenna Isolation Measurement Reply

Attribute type: Read only

This attribute is used to read out a reply string with additional information about last antenna isolation, including failure cause when failing to perform a measurement.

Format:

```
<Text>
```

<Text> is a quoted string, in clear. If no information is available, a '-' (dash) is replied.

Example:

```
GET LAR
```

Returns:

```
"BCCH input on channel 42 too low."
```

In this example, another BCCH channel might be required in order to perform the antenna isolation measurement successfully.

Note! Antenna isolation is not measured in Fiber Optic repeaters and repeaters CSFT18922 and CSFT91822.

2.50 LLN - Log Length

Attribute type: Read only

Format:

```
X
```

Where is the number of log entries in the alarm log.

Example:

```
GET LLN
```

Returns:

```
17
```

means that there are 17 alarms that can be read out from the alarm log, starting with log item 1.

2.51 LIT - Log Item

Attribute type: Read only

Format:

```
GET LIT M
```

Reads alarm log entry number M.

Reply format:

```
X Y N A S C K R B Text
```

X = Time on the format HHMMSS
Y = Data on the format DDMMYY
N = Message Number of Alarm Message 0 to 99999
A = Attribute Name SZU, SZD, AMU ……. Please refer to section Alarm Attribute Configuration for an overview of available alarm.
S = Severity WA, CR, MI….
C = Class EN, EQ, CO
K = Acknowledged 0 = No, 1 = Yes
R = Number of Retransmissions
B = Attribute i.e. 00, 1, 1100

Text = Additional information about the alarm entry within double quotes up to 45 characters long, for example “Current out level is +26 dBm”. This textual information applies to when the alarm occurred.

Note! If no log entry exists in log, an empty string is replied.

2.52 LMT - Timeout in Minutes

Attribute type: Read and Write

Format:

```
X
```

If a logged in user does not perform any activity within LMT minutes, the control module will initiate an automatic logout.

Example:

```
GET LMT
```

Reply:

```
20
```

meaning that the user will be logged out after 20 minutes of inactivity.

Example:

```
SET LMT 15
```

Changes this time to 15 minutes.

2.53 LNK - Link Channel

Attribute type: Read and Write

This parameter is used to configure the link channels used between Donor and Remote units.

Note! This parameter should only be used in frequency translating repeaters.

Format on setting parameter:

```
SET LNK N X [M Y]
```

N is the chain selector, and X is the link channel between the Donor and Remote unit in chain N (both uplink and downlink). Optionally link channel in chain M can be set to Y in the same command.

The chain selector is either 1 or 2, depending on what chain is to be modified.

Link Channel must be within the interval that the repeater can handle. Attribute CHL can be used to determine channel limits in the repeater.

Example:

```
SET LNK 2 112
```

Sets link channel in uplink and downlink chain two to 112

Example:

```
SET LNK 1 120 2 112
```

Sets channel one to 120 and two to 112.

Format on getting parameters:

```
GET CHA
```

Replies:

```
1 X 2 Y
```

X is channel 1 and Y is channel 2

Example:

```
GET LNK
```

Reply:

```
1 23 2 43
```

means that link channel in chain 1 is 23 and link chain 2 is set to 43.

Note! If changes are made to a Remote Unit via remote login over wireless modem, changing this parameter might cause the call to be dropped, since the Remote and Donor units get different link channels.

If a frequency re-tuning of a repeater pair should be performed, first change the Remote link channels, then the Donor link channels. After that, change the Remote channels and finally the Donor channels.

2.54 LPC - Last Power Cycling of Modem

Attribute type: Read only

The controller can be configured to automatically turn off and turn on the modem once per day. This feature can be used to ensure that the modem parameters when using for example GSM modems contain the latest network parameters such as HLR update interval etc.
This attribute displays when last power cycling of the modem was performed.

Format:

```
HHMMSS DDMMYY
```

HHMMSS is the timepoint, with 24 hours notation, and DDMMYY is the date when last modem power cycling (more precisely last modem power ON) was performed.

Example:

```
GET LPC
```

Reply:

```
201300 110503
```

indicating that the modem was last power cycled on 11’th of May 2003 at 20:13.

Attribute MPE is used to configure if automatic modem power cycling should be enabled.

Timepoint for when to power cycling the modem can be set with attribute MPT. In order to read out Last modem Power Cycling timepoint, use attribute LPC.

In order to perform an instant modem power cycling, please refer to attribute ACT RCD in section Miscellaneous Command Attributes

2.55 LVD - Peak Power Out level Downlink

Attribute type: Read and Write

This attribute is used to control the peak power limiting in the downlink path.

Format on setting peak power:

```
SET LVD K X [L Y] [M Z] [N W]
```

K is the chain selector, and X is the maximum peak power (outlevel) in the downlink chain before the ALC is activated. Optionally peak power in chain L, M, N can be set in the same command.

The chain selector is 1 or 2 in 2-channel and frequency translating repeaters, and 1 to 4 in 4-channel repeaters.

Depending on repeater model, the different valid peak powers in dBm are:

2-channel repeaters:	37, 34, 31, -100
4-channel repeaters:	34, 31, 28, -100

Frequency translating –ER units:	43, 40, 37, -100
Frequency translating –IR units:	40, 37, 34 -100
Frequency translating –SD units:	37, 34, 31, -100
Frequency translating –DD units:	37, 34, 31 -100
2-channel Fiber Fed repeaters:	37, 34, 31, -100
4-channel Fiber Fed repeaters:	34, 31, 28, -100

Output power -100 means output power is turned off.

Example:

```
SET LVD 1 43 2 43
```

sets chain 1 and chain 2 peak limiting to 43 dBm.

Format on getting parameters in 2-channel and Frequency translating repeaters:

```
GET LVD
```

Replies:

```
1 X 2 Y
```

X is out level in downlink chain 1 and Y is out level in downlink chain 2.

Example:

```
GET LVD
```

Reply:

```
1 37 2 -100
```

meaning that Peak Limiting is set to 37 dBm in chain one, while chain 2 has output power turned off.

Format on getting parameters in 4-channel repeaters:

```
GET LVD
```

Replies:

```
1 X 2 Y 3 Z 4 W
```

X is out level in downlink chain 1, Y is out level in downlink chain 2, Z is out level in downlink chain 3 and W is outlevel in chain 4.

Example:

```
GET LVD
```

Reply:

```
1 34 2 34 3 34 4 -100
```

meaning that Peak Limiting is set to 34 dBm in chain 1, chain 2 and chain 3, while chain 4 has output power turned off.

2.56 LVU - Peak Power Out level Uplink

Attribute type: Read and Write

This attribute is used to control the peak power limiting in the uplink path.

Format on setting peak power:

```
SET LVU K X [L Y] [M Z] [N W]
```

K is the chain selector, and X is the maximum peak power (outlevel) in the uplink chain before the ALC is activated. Optionally peak power in chain L, M, N can be set in the same command.

The chain selector is 1 or 2 in 2-channel and frequency translating repeaters, and 1 to 4 in 4-channel repeaters.

Depending on repeater model, the different valid peak powers in dBm are:

2-channel repeaters:	37, 34, 31, -100
4-channel repeaters:	34, 31, 28, -100
Frequency translating –ER, -IR units:	37, 34, 31, -100
Frequency translating –SD units:	-10, -13, -16, -100
Frequency translating –DD units:	-7, -10, -13, -100
2-channel Fiber Fed repeaters:	-1, -4, -7, -100 (-1 is not a recommended setting)
4-channel Fiber Fed repeaters:	-4, -7, -10, -100

Output power -100 means output power is turned off.

Example:

```
SET LVU 1 34 2 34
```

sets chain 1 and chain 2 peak limiting to 34 dBm.

Format on getting parameters in 2-channel and Frequency translating repeaters:

```
GET LVU
```

Replies:

```
1 X 2 Y
```

X is out level in uplink chain 1 and Y is out level in uplink chain 2.

Example:

```
GET LVU
```

Reply:

```
1 37 2 -100
```

meaning that Peak Limiting is set to 37 dBm in chain one, while chain 2 has output power turned off.

Format on getting parameters in 4-channel repeaters:

```
GET LVU
```

Replies:

```
1 X 2 Y 3 Z 4 W
```

X is out level in uplink chain 1, Y is out level in uplink chain 2, Z is out level in uplink chain 3 and W is outlevel in uplink chain 4.

Example:

```
GET LVU
```

Reply:

```
1 34 2 34 3 34 4 -100
```

meaning that Peak Limiting is set to 34 dBm in chain 1, chain 2 and chain 3, while chain 4 has output power turned off.

2.57 MAD - Main Address

Attribute type: Read and Write

When SMS is used for communication, the controller contains a list of four addresses that are allowed to read and write attributes from the controller (refer to attribute ADD for a description of how to modify the list). All addresses have read access to the controller, but only address one and two can set parameters and perform ACT commands. However, alarms and reports are always sent to the main address. Main Address select which one of the four addresses in the list is the main address.

Format:

```
X
```

X is 1 to 4.

Example:

```
GET MAD
```

Reply:

```
3
```

means that address number three is the main address.

Example:

```
SET MAD 2
```

Changes main address to two.

Note! When communication is done via Data Call (refer to attribute DEV), attribute MAD is obsolete.

2.58 MAR - Minimum Alarm Repetition Cycle

Attribute type: Read and Write

If there is an alarm toggling between OK and ERROR, the controller will continuously send alarms to the OMC, with the new alarm detected, and then directly end of alarm, causing the communications interface between the controller and the OMC to be blocked for a long time. If lots of alarms are received at the OMC, the operator must be able to send a message to disable the particular alarm at the controller until service of the unit has been performed. The Minimum Alarm Repetition Cycle takes care of this problem by defining a minimum time between two consecutive alarms from the same alarm source. Typically the MAR should be set to a minimum of two or three times the time it takes for the controller to report the alarm to the OMC.

Format:

```
X
```

X is the Minimum Alarm Repetition Cycle in minutes.

Example:

```
GET MAR
```

Reply:

```
3
```

meaning that the minimum time between two consecutive alarms is three minutes.

Example:

```
SET MAR 4
```

changes this interval to four minutes.

Note! The first error will always be detected with the normal Threshold time, only the repeated alarms will be blocked/delayed.

2.59 MCT - Modem Connection Time

Attribute type: Read and Write

When a repeater is answering an incoming modem call, or calling up the OMC to deliver an alarm or a report, the controller will wait up to MCT seconds for the call to be established. If no communication is established within this time, the call will be hung up.

Format:

```
X
```

X is the connection time in seconds.

Example:

```
GET MCT
```

Reply:

```
45
```

meaning that the repeater will wait up to 45 seconds for a call to be established.

Example:

```
SET MCT 50
```

changes the timeout to 50 seconds.

2.60 MDL - Repeater Model

Attribute type: Read only

This attribute returns a string containing the repeater model.

The repeater model is built up of a number of fields, uniquely identifying the repeater model:

Format:

```
[Model][GSM System][Repeater Series][Number of channels][Optional
Frequency Band Configuration][Optional Repeater Configuration]
```

[Model] is ‘CSR’ for conventional repeaters and ‘CSHP’ for Frequency translating repeaters.

[GSM System] is ‘9’ for GSM900 and GSM-R, ‘18’ for DCS1800 and ‘19’ for PCS1900
[Repeater Series] is always set to ‘2’

[Number of channels] is number of channels the repeater is capable of amplifying, 2 (conventional and frequency translating repeaters) or 4 (conventional repeaters only).

[Optional Frequency Band Configuration] If repeater is used in the GSM-R band, this is set to 'R'.

[Optional Repeater Configuration] If this is a Frequency translating repeater (CSHP), the following identifiers apply:
'-SD', meaning this repeater has a Single BTS port, and is a Donor unit.

'-DD', meaning this repeater has Dual BTS ports, channels Duplexed, and is a Donor unit.

'-IR', meaning this repeater has Internal combiner for sever antenna, and is a Remote unit.

'-ER', meaning this repeater has External (air) combiner for sever antenna, and is a Remote unit.

Example:

```
GET MDL
```

Replies:

```
CSHP922-DD
```

meaning that this is a frequency translating (CSHP) 2-channel repeater in the GSM 900 band with Dual BTS ports, channels Duplexed, and is a Donor unit.

2.61 MGA - Maximum Gain

Attribute type: Read only

Returns maximum gain in repeater.

Format:

```
X
```

X is maximum gain in dB.

Example:

```
GET MGA
```

Reply:

```
NG_GSM 108
```

meaning that maximum gain in the repeater is 108 dB.

Note 1! This attribute only replies with maximum gain that the repeater is able to give, not what it is currently configured for.

Note 2! Please refer to attribute RFP for detailed description about the gain distribution in the repeater.

2.62 MIS - Modem Initialization String

Attribute type: Read and Write

In order for some modems to work correctly in a network, they might require different configurations. The configuration is modified with this attribute.

Format:

```
<String>
```

<string> is the actual modem initialization string.

Example:

```
GET MIS
```

Reply:

```
ATB98%U1\N6&W
```

which is the modem specific modem initialization string.

Example:

```
SET MIS ATB98%U1\N0&W
```

modifies the modem initialization string.

Note 1! Modem string must NOT contain any white space (blanks).

Note 2! The changes will not take effect until the user logs out from the controller. As soon as the user logs out, the initialization of the modem will be initiated.

2.63 MPE - Automatic Modem Power Cycling Enabled

Attribute type: Read and Write

The controller can be configured to automatically turn off and turn on the modem once per day. This feature can be used to ensure that the modem parameters when using for example GSM modems contain the latest network parameters such as HLR update interval etc. This attribute configures whether automatic power cycling should be enabled or not.

Format:

```
X
```

X = 1 means modem power cycling is enabled
X = 0 means modem power cycling is disabled

Example:

```
GET MPE
```

Reply:

```
1
```

means that the modem power cycling is enabled.

Example:

```
SET MPE 0
```

disables the automatic modem power cycling.

Timepoint for when to power cycling the modem can be set with attribute MPT. In order to read out Last modem Power Cycling timepoint, use attribute LPC. In order to perform an instant modem power cycling, please refer to attribute ACT RCD in section “Miscellaneous Command Attributes”.

2.64 MPT - Automatic Modem Power Cycling Timepoint

Attribute type: Read and Write

The controller can be configured to automatically turn off and turn on the modem once per day. This feature can be used to ensure that the modem parameters when using for example GSM modems contain the latest network parameters such as HLR update interval etc. This attribute configures at what timepoint the modem power cycling should be performed.

Format:

```
HHMMSS
```

HH is the hours (in 24 hour notation), MM is minutes and SS is seconds specifying the modem power cycling timepoint.

Example:

```
GET MPC
```

Reply:

```
010000
```

means that the modem power cycling is performed att one in the morning.

Example:

```
SET MPC 160000
```

configures modem power cycling to be performed at 4 in the afternoon.

Enabling / Disabling of the automatic power cycling can be configured with attribute MPE. Timepoint for when to power cycling the modem can be set with attribute MPT. In order to read out Last modem Power Cycling timepoint, use attribute LPC. In order to perform an instant modem power cycling, please refer to attribute ACT RCD in section “Miscellaneous Command Attributes”.

2.65 MNR - Maximum Number of Alarm Retransmissions

Attribute type: Read and Write

Every alarm is sent to the OMC up to MNR number of times, or until it is acknowledged. The alarms are retransmitted with RCA minutes intervals. When using data call, an alarm is considered acknowledged when the controller has successfully logged in to the OMC, and delivered the alarm. In case of SMS, an alarm is considered acknowledged when an acknowledge message is received from the main address.

The alarms can also be acknowledged with the command ACT ACK when logged in locally or remotely.

Example:

```
SET MNR 4
```

Sets the number of retransmissions to 4.

2.66 MRR - Maximum Report Retransmission

Attribute type: Read and Write

Every heartbeat and traffic / activity report is sent to the OMC up to MRR number of times, or until it is successfully delivered. The reports are retransmitted with RCR minutes intervals. When using data call, report is considered successfully delivered when the controller has successfully logged in to the OMC, and delivered the report. In case of SMS, report is considered successfully delivered when it has been successfully transmitted to the SMSC.

Format:

```
X
```

X is interval in minutes.

Example:

```
GET MRR
```

Reply:

```
3
```

meaning that the repeater will try to retransmit a failed report 3 times.

Example:

```
SET MRR 2
```

Sets the number of retransmissions to 2.

2.67 MSG - Message Counter

Attribute type: Read and Write

When a message (alarm, SMS-reply or report) is sent to the Avitec Element Manager, the message contains a message number. This message number is increased for every message sent (except for alarm and report retransmission). If the controller is communicating via SMS, all four addresses (as read by attribute ADD) have their own counter.

The MSG attribute is used to receive the list of these four counters.

Format on getting parameters:

```
1 X 2 Y 3 Z 4 W
```

X, Y, Z and W are the individual counters 1 – 4.

Example:

```
GET MSG
```

Reply:

```
1 00167 2 03421 3 00032 4 00000
```

indicating the different counters for addresses 1 to 4.

Format on setting value:

```
X M
```

X is the counter to modify, and M is the new value.

X is from 1 to 4, and M is from 0 to 99999

Example:

```
SET MSG 4 234
```

Sets the value of counter 4 to 234.

Note 1! Counters are wrap around, i.e. when reaching 99999, next value is 0.

Note 2! When an address is changed (SET ADD), corresponding counter is cleared.

Note 3! When using data call, only counter 1 is used for the alarm and report message numbers.

2.68 MTP - Modem Type

Attribute type: Read and Write

Attribute is used to determine/configure what modem type installed in the repeater.

Format:

```
<Modem Description>
```

<Modem Description> is one of

WAVECOM
INTEGRA
STANDARD
TRIOEXT
WAVECOM is the external Wavecom GSM module
INTEGRA is the on-board Wavecom GSM module
STANDARD is a normal Standard Hayes compatible modem
TRIOEXT is the TrioRail external GSM-R modem. (only available in GSM-R repeaters).

If remote communication is disabled (using command SET DEV NUL), the string “Modem disabled” is returned.

When setting the modem type, the same names are used. For the standard modem, the short form STD can be used.

Example:

```
SET MTP STD
```

sets the modem type to Standard Hayes compatible modem.

2.69 NCH - Number of Channels

Attribute type: Read only

Returns the number of installed channels

Example:

```
GET NCH
```

Replies:

```
2
```

meaning that the repeater has 2 channels installed.

2.70 NCT - Network Connect Time

Attribute type: Read and Write

This attribute is used to configure how long to wait before trying to initialize a modem after power up or a modem power cycle.

Format:

```
X
```

X is in seconds.

Example:

```
GET NCT
```

Reply:

```
15
```

meaning modem connect time is set to 15 seconds.

Example:

```
SET NCT 30
```

Sets this time to 30 seconds.

2.71 NOL - Number of Successful Logins

Attribute type: Read only

Format:

```
X Y
```

X is number of successful logins locally, and Y is number of successful logins remotely

Example:

```
GET NOL
```

Reply:

```
55 123
```

means that 55 successful and 123 successful remote logins have been made.

2.72 NUA - Next Un-acknowledged Alarm

Attribute type: Read only

This attribute gives the next non-acknowledged alarm in the alarm log. If no alarm exists, a '-' is replied.

Format:

```
<Alarm No> <Originating Node> <Originating Alarm No> <DDMMYY> <HHMMSS>
<Parameters> <Severity> <Class> <Attribute> "<Textual description>"
```

Example:

```
GET NUA
```

Reply:

```
00017 1 00042 101202 145523 PW2 CR EQ 1 "Current power level is 0.0 V"
```

Please refer to ACT ACK in section "Miscellaneous Command Attributes" for details on how to acknowledge alarms.

2.73 OLV - Optical Levels

Attribute type: Read only

By using this attribute, transmitted and received optical level for the Fiber Optic Interface can be obtained.

Format:

```
<Tx> <Rx>
```

<Tx> represents the dBm value of transmitted optical level
<Rx> represents the dBm value of the received optical level

If there is a communications error with the Fiber Optic Interface, '- -' (two dashes separated by a blank) is replied.

If input signal is lover than lowest detectable value, <X is replied, where X is lowest detectable level for the Fiber Optic Interface.

Example:

```
GET OLV
```

Reply:

```
-5 –11
```

meaning that transmitted optical level is -5 dBm and received optical level is -11 dBm.

Note! This attribute is only used in Fiber Optic repeaters.

2.74 OPL - Output Levels

Attribute type: Read only

Displays the maximum output power of the last sampled frame. The output power is continuously sampled, and the highest value each second is saved in the controller on a chain by chain basis.

Reply format in 2-channel and Frequency translating repeaters:

```
X Y Z W
```

where value is output level in dBm

X is output level in chain 1 UL
Y is output level in chain 2 UL.
Z is output level in chain 1 DL.
W is output level in chain 2 DL.

If a value is below lowest detectable level, '<X' is reported, where X is the lowest detectable level (this and other radio performance related parameters can be read using attribute RFP).

Example:

```
GET OPL
```

Reply:

```
<12 <12 39 32
```

This means chain 1 UL and 2 UL is lower than lowest detectable level (12 dBm), chain 1 DL has 39 dBm output power level and chain 2 DL has 32 dBm output power.

Reply format in 4-channel repeaters:

```
X Y Z W K L M N
```

where value is input level in dBm

X is output level in chain 1 UL
Y is output level in chain 2 UL
Z is output level in chain 3 UL.
W is output level in chain 4 UL
K is output level in chain 1 DL
L is output level in chain 2 DL
M is output level in chain 3 DL
N is output level in chain 4 DL

If a value is below lowest detectable level, '<X' is reported, where X is the lowest detectable level (this and other radio performance related parameters can be read using attribute RFP).

Example:

```
GET OPL
```

Reply:

```
<12 27 <12 <12 37 32 35 <12
```

This means that chain 1 UL, 3 UL, 4 UL and 4 DL has output level lower than lowest detectable level (12dBm), 2 UL has an output power of 27 dBm. Output power in 1 DL is 37 dBm, 2 DL is 32 dBm and outlevel in 3 DL is 35 dBm.

2.75 ORP - OMC to Controller Password

Attribute type: Write only

When the controller is configured to use data call for configuration and alarm transmission, the OMC have a unique password to log in to the controller, together with a unique username, OMCUNAME.

Format:

```
SET ORP MMMMMMMM
```

MMMMMMM is a password, up to 8 characters long.

Note 1!. If data call is used, this password should be changed from the Avitec Element Manager.

If SMS is used, this password should be changed to avoid unauthorized access to the controller.

Note 2!. This login will NOT cause any VLI, LGO or CLR alarms to be sent.

Note 3!. When logging in with this user ID, Terminal Mode is automatically set to 1.

2.76 PDC - Power Downlink measurement Configuration

Attribute type: Read and Write

This attribute is used to configure the way the BCCH is measured.

By default, all repeaters measure the BCCH only on chain one. By changing this attribute, the BCCH can be measured on other channels as well.

When BCCH is measured on more than one chain, the repeater will always make sure that at least one of the chains have an output power above threshold configured with ALA PDL attribute.

This attribute can be used to maintain BCCH monitoring in network where BTS uses the second TRX as a backup for TRX one. Furthermore, this attribute can be used in systems where more than one cell feeds the repeater, for Example two BTS's with two TRX's feeds one four channel repeater. Measurements can be used to ensure that the signal from both BTS's / cells are sufficiently high.

Note1! By changing this attribute, all PDL alarm sources will be reset. If a PDL alarm was detected, an end of alarm will be generated, and, if BCCH still is too low, a new PDL alarm after the configured time.

Note 2! Setting Required on a non installed/available channel will have no effect.

Format in 2-channel and Frequency translating repeaters:

```
XY
```

X represents chain one and Y chain two.

X, Y can be either

R as Required
E as Either
S as Skip measurements on this chain

Required means that this chain MUST have BCCH high enough.

Either means that this chain OR one of the other needs to have BCCH all the time.

Skip means that this chain is ignored in the BCCH measurements.

Example 1:

```
GET PDC
```

Reply:

```
RS
```

means that chain one must have BCCH output power, while two is ignored.

Example 2:

```
GET PDC
```

Reply:

```
EE
```

means that any of the two channels should have BCCH above the threshold all the time, or an alarm will be triggered

Example:

```
SET PDC RS
```

configures the repeater to require BCCH output power on chain one, while chain two is ignored.

Format in 4-channel repeaters:

```
XYZW
```

X represents chain one, Y chain two, Z chain three and W chain 4.

X, Y can be either

R as Required
E as Either
S as Skip measurements on this chain

Required means that this chain MUST have BCCH high enough.

Either means that this chain OR one of the other needs to have BCCH all the time.

Skip means that this chain is ignored in the BCCH measurements.

Example 1:

```
GET PDC
```

Reply:

```
RSRS
```

means that chain one and three must have BCCH output power, while two and four are ignored.

Example 2:

```
GET PDC
```

Reply:

```
EEEE
```

means that any of the four channels should have BCCH above the threshold all the time, or an alarm will be triggered

Example:

```
SET PDC RSSS
```

configures the repeater to require BCCH output power on chain one, while chains two through four are ignored.

2.77 PDL - Power Downlink Level

Attribute type: Read only

Status of BCCH output power measurement in the downlink chains.

Format in 2-channel and Frequency translating repeaters:

```
XY
```

X represents the BCCH status for chain 1 and Y for chain 2.

1 means that output power in BCCH is lower than the configured threshold (configured with attribute ALA PDL)
0 means that output power level is OK.

If measurement (configurable with attribute PDC) shouldn't be performed on chain, a '-' is reported.

If PDC for the chains are set to Either, and none of the chains reports output power, all configured chains will report '1' (Error).

Example 1:

```
GET PDL
```

Reply:

```
00
```

meaning that output power of BCCH is OK on chains one and two.

Example 2, PDC is configured as RS:

```
GET PDL
```

Reply:

```
1-
```

meaning that BCCH in chain one requires BCCH above a certain threshold, but chain reports a BCCH alarm.

Format in 4-channel repeaters:

```
XYZW
```

X represents the BCCH status for chain 1, Y for chain 2, Z for chain 3 and W for chain 4.

1 means that output power in BCCH is lower than the configured threshold (configured with attribute ALA PDL)
0 means that output power level is OK.

If measurement (configurable with attribute PDC) shouldn't be performed on chain, a '-' is reported.

If PDC for the chains are set to Either, and none of the chains reports output power, all configured chains will report ‘1’ (Error).

Example 1:

```
GET PDL
```

Reply:

```
00--
```

meaning that output power of BCCH is OK on chains one and two, and that chains three and four are configured as Skip in the PDC attribute.

Example 2, PDC is configured as RSRS:

```
GET PDL
```

Reply:

```
0-1-
```

meaning that BCCH in chain one and three requires BCCH above a certain threshold, but chain three reports a BCCH alarm.

2.78 PIN - Sets the PIN Code Used to Lock Up GSM Module

Attribute type: Write only

Sets the PIN code associated with the SIM card in the GSM module.

Format:

```
SET PIN XXXXXXXX
```

XXXXXXXX is a number, up to 8 characters long, representing the PIN code of the SIM card.

Note! If wrong PIN code is entered, the controller will only try to open it up once. After that it will not try to lock it up again until the PIN code is changed. This is to avoid that the SIM card is blocked if wrong PIN code is enabled.

2.79 PLB - Level of BCCH output power in Downlink

Attribute type: Read only

This attribute displays BCCH output power in the downlink channels.

By default, the BCCH is monitored in downlink chain one. However, for special purposes, the BCCH can be configured to be monitored in other chains (see attribute PDC).

Format in 2-channel and Frequency translating repeaters:

```
X Y
```

X, Y is the BCCH output power in dBm for downlink chains 1 DL and 2 DL.

If BCCH is not measured in chain, a ‘-‘ (dash) is reported. If value is lower than lowest detectable value, a ‘<X’ will be replied, where X is lowest detectable output power of the repeater.

Example:

```
GET PLB
```

Reply:

```
33 –
```

meaning that output power in chain one downlink is 33 dBm, while chain two not is configured for BCCH downlink measurement.

Format in 4-channel repeaters:

```
X Y Z W
```

X, Y is the BCCH output power in dBm for downlink chains 1 DL, 2 DL, 3 DL and 4 DL.

If BCCH is not measured in chain, a ‘-‘ (dash) is reported. If value is lower than lowest detectable value, a ‘<X’ will be replied, where X is lowest detectable output power of the repeater.

Example:

```
GET PLB
```

Reply:

```
33 – <12 -
```

meaning that output power in chain one downlink is 33 dBm, while chain two is not configured for BCCH downlink measurement, chain 3 has less than 12 dBm and downlink chain 4 is not configured for BCCH measurements.

2.80 PSD - Power Supply Distribution Levels

Attribute type: Read only

This attribute is used to read out the snapshot power supply levels in all the modules in the repeater.

Format in conventional 2-channel and Frequency translating repeaters:

```
<P1PSUP> <P1LIMPAUL> <P1LIMPADL> <P2PSUP> <P2LIMPAUL> <P2LIMPADL> <P3PSUP>
<P3LIMPAUL> <P3LIMPADL> <P3REFGEN> <P4>
```

<P1PSUP> is the +28 V measured in the Power Supply
<P1LIMPAUL> is the +28 V measured in LIMPA UL
<P1LIMPADL> is the +28 V measured in LIMPA DL
<P2PSUP> is the +15 V measured in the Power Supply
<P2LIMPAUL> is the +15 V measured in the LIMPA UL
<P2LIMPADL> is the +15 V measured in the LIMPA DL
<P3PSUP> is the +6.45 V measured in the Power Supply
<P3LIMPAUL> is the +6.45 V measured in the LIMPA UL
<P3LIMPADL> is the +6.45 V measured in the LIMPA DL
<P3REFGEN> is the +6.45 V measured in the Reference Generator
<P4> is the +6.45 V to the controller, measured in the Power Supply

If communication between the controller and the module where voltage is measured is in error, a '-' is reported.

Example:

```
+28.0 +28.1 - +15.1 +15.1 - +6.5 +6.5 - +6.4
```

This shows the different power supply levels in the modules, except for power supply levels in LIMPA DL, which has a communications failure.

Format in conventional 4-channel repeaters:

```
<P1MasterPSUP> <P1SlavePSUP ><P1LIMPAUL 1> <P1LIMPAUL 2> <P1LIMPADL 1>
<P1LIMPADL 2> <P2MasterPSUP> <P2SlavePSUP > <P2LIMPAUL 1> <P2LIMPAUL 2>
<P2LIMPADL 1> <P2IMPADL 2> <P3MasterPSUP> <P3SlavePSUP> <P3LIMPAUL 1>
<P3LIMPAUL 2> <P3LIMPADL 1> <P3LIMPADL 1> <P3RefGen> <P4>
```

<P1MasterPSUP> is the +28 V measured in the Master Power Supply
<P1SlavePSUP> is the +28 V measured in the Slave Power Supply
<P1LIMPAUL 1> is the +28 V measured in LIMPA UL 1
<P1LIMPAUL 2> is the +28 V measured in LIMPA UL 2
<P1LIMPADL 1> is the +28 V measured in LIMPA DL 1
<P1LIMPADL 1> is the +28 V measured in LIMPA DL 2
<P2MasterPSUP> is the +15 V measured in the Master Power Supply
<P2SlavePSUP> is the +15 V measured in the Slave Power Supply
<P2LIMPAUL 1> is the +15 V measured in the LIMPA UL 1
<P2LIMPAUL 2> is the +15 V measured in the LIMPA UL 2
<P2LIMPADL 1> is the +15 V measured in the LIMPA DL 1
<P2LIMPADL 2> is the +15 V measured in the LIMPA DL 2
<P3MasterPSUP> is the +6.45 V measured in the Master Power Supply
<P3SlavePSUP> is the +6.45 V measured in the Slave Power Supply
<P3LIMPAUL 1> is the +6.45 V measured in the LIMPA UL 1
<P3LIMPAUL 2> is the +6.45 V measured in the LIMPA UL 2
<P3LIMPADL 1> is the +6.45 V measured in the LIMPA DL 1
<P3LIMPADL 2> is the +6.45 V measured in the LIMPA DL 2
<P3REFGEN> is the +6.45 V measured in the Reference Generator
<P4> is the +6.45 V to the controller, measured in the Power Supply

If communication between the controller and the module where voltage is measured is in error, a '-' is reported.

Example:

```
+28.0 +0.0 +28.0 +0.0 +28.1 +0.0 +15.1 +14.9 +15.1 +14.9 +15.1 +14.9 +6.5
+6.5 +6.5 +6.5 +6.4 +6.5 +6.4 +6.5
```

This shows the different power supply levels in the modules. In the Example, 0.0 Volts is measured at the +28 V in the Slave Power Supply, LIMPA UL 2 and LIMPA DL 2. This indicates that the level out from the Slave Power Supply is broken.

Format in fiber optic 2-channel repeaters:

```
<P1PSUP> <P1LIMPAUL> <P1LIMPADL> <P2PSUP> <P2LIMPAUL> <P2LIMPADL>
<P2FIBEROPTIC> <P3PSUP> <P3LIMPAUL> <P3LIMPADL> <P3REFGEN> <P3FIBEROPTIC>
<P4>
```

<P1PSUP> is the +28 V measured in the Power Supply
<P1LIMPAUL> is the +28 V measured in LIMPA UL
<P1LIMPADL> is the +28 V measured in LIMPA DL
<P2PSUP> is the +15 V measured in the Power Supply
<P2LIMPAUL> is the +15 V measured in the LIMPA UL
<P2LIMPADL> is the +15 V measured in the LIMPA DL
<P2FIBEROPTIC> is the +15 V measured in the Fiber Optic Interface
<P3PSUP> is the +6.45 V measured in the Power Supply
<P3LIMPAUL> is the +6.45 V measured in the LIMPA UL
<P3LIMPADL> is the +6.45 V measured in the LIMPA DL
<P3REFGEN> is the +6.45 V measured in the Reference Generator
<P3FIBEROPTIC> is the +6.45 V measured in the Fiber Optic Interface
<P4> is the +6.45 V to the controller, measured in the Power Supply

If communication between the controller and the module where voltage is measured is in error, a '-' is reported.

Example:

```
+28.0 +28.1 - +15.1 +15.1 - +15.0 +6.5 +6.5 - +6.4 +6.4
```

This shows the different power supply levels in the modules, except for power supply levels in LIMPA DL, which has a communications failure.

Format in fiber optic 4-channel repeaters:

```
<P1MasterPSUP> <P1SlavePSUP ><P1LIMPAUL 1> <P1LIMPAUL 2> <P1LIMPADL 1>
<P1LIMPADL 2> <P2MasterPSUP> <P2SlavePSUP > <P2LIMPAUL 1> <P2LIMPAUL 2>
<P2LIMPADL 1> <P2IMPADL 2> <P3MasterPSUP> <P3SlavePSUP> <P3LIMPAUL 1>
<P3LIMPAUL 2> <P3LIMPADL 1> <P3LIMPADL 1> <P3RefGen> <P3FiberOptic>  <P4>
```

<P1MasterPSUP> is the +28 V measured in the Master Power Supply
<P1SlavePSUP> is the +28 V measured in the Slave Power Supply
<P1LIMPAUL 1> is the +28 V measured in LIMPA UL 1
<P1LIMPAUL 2> is the +28 V measured in LIMPA UL 2
<P1LIMPADL 1> is the +28 V measured in LIMPA DL 1
<P1LIMPADL 1> is the +28 V measured in LIMPA DL 2
<P2MasterPSUP> is the +15 V measured in the Master Power Supply
<P2SlavePSUP> is the +15 V measured in the Slave Power Supply
<P2LIMPAUL 1> is the +15 V measured in the LIMPA UL 1
<P2LIMPAUL 2> is the +15 V measured in the LIMPA UL 2
<P2LIMPADL 1> is the +15 V measured in the LIMPA DL 1
<P2LIMPADL 2> is the +15 V measured in the LIMPA DL 2
<P2FIBEROPTIC> is the +15 V measured in the Fiber Optic Interface
<P3MasterPSUP> is the +6.45 V measured in the Master Power Supply
<P3SlavePSUP> is the +6.45 V measured in the Slave Power Supply
<P3LIMPAUL 1> is the +6.45 V measured in the LIMPA UL 1
<P3LIMPAUL 2> is the +6.45 V measured in the LIMPA UL 2
<P3LIMPADL 1> is the +6.45 V measured in the LIMPA DL 1
<P3LIMPADL 2> is the +6.45 V measured in the LIMPA DL 2
<P3REFGEN> is the +6.45 V measured in the Reference Generator
<P3FIBEROPTIC> is the +6.45 V measured in the Fiber Optic Interface
<P4> is the +6.45 V to the controller, measured in the Power Supply

If communication between the controller and the module where voltage is measured is in error, a '-' is reported.

Example:

```
+28.0 +0.0 +28.0 +0.0 +28.1 +0.0 +15.1 +14.9 +15.1 +14.9 +15.1 +14.9 +15.0
+6.5 +6.5 +6.5 +6.5 +6.4 +6.5 +6.4 +6.4 +6.5
```

This shows the different power supply levels in the modules. In the Example, 0.0 Volts is measured at the +28 V in the Slave Power Supply, LIMPA UL 2 and LIMPA DL 2. This indicates that the level out from the Slave Power Supply is broken.

2.81 PSL - Status of Power Supply Level

Attribute type: Read only

The Power Supply constantly monitors the mains input power level. This can be used to generate an alarm if repeater is experiencing a power brownout or a blackout.

Note! In order to read out current power supply level, please refer to attribute ALV.

Format:

```
X
```

X=0 means mains power level is within configured thresholds
X=1 means power level is outside allowed interval (too low or too high)

If there is a communications error with master power supply, a '-' (dash) is reported.

Example:

```
GET PSL
```

Replies:

```
1
```

meaning input power supply level is outside allowed interval.

2.82 PTM - Power Supply Temperature Status

Attribute type: Read only

The Power Supply temperature is constantly monitored, and if temperature is outside configured interval, an alarm is generated. This attribute shows the status of the power supply temperature.

Note! In order to read out current power supply temperature, please refer to attribute ALV.

Format in 2-channel and Frequency translating Repeaters:

```
X
```

X = 0 means temperature OK and X = 1 means temperature is outside allowed interval.

If communication with Power Supply is in error, a '-' (dash) is reported.

Example:

```
GET PTM
```

Reply:

```
1
```

indicating that the Power Supply Temperatyre is outside allowed interval.

Format in 4-channel Repeaters:

```
XY
```

X is temperature status for Master Power Supply.
Y is temperature status for Slave Power Supply.
0 means status is OK, and 1 means power supply temperature is outside allowed interval.

If communication with power supply is in error, a '-' (dash) is reported.

Example:

```
GET PTM
```

Reply:

```
01
```

indicating that the Master Power Supply temperature is OK, and that Slave Power Supply temperature is in error.

2.83 PW1 - Status of Power 1

Attribute type: Read only

This is the status for the +28V Power Distribution in the repeater.

Format for 2-channel and Frequency translating repeaters:

```
XYZ
```

X is status for +28 V in Power Supply
Y is status for +28 V in LIMPA UL.
Z is status for +28 V in LIMPA DL.

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means communication with module is in error.

Note! To read out the actual level, use attribute ALV (Analog Levels) or attribute PSD (Power Supply Distribution levels).

Example:

```
GET PW1
```

Replies:

```
0-1
```

meaning status is OK in Power Supply, there is a communications failure with LIMPA UL, and there is an error in +28 V level to LIMPA DL.

Format for 4-channel repeaters:

```
XYZWKL
```

X is status for +28 V in Master Power Supply
Y is status for +28 V in Slave Power Supply
Z is status for +28 V in LIMPA UL 1.
W is status for +28 V in LIMPA UL 2.
K is status for +28 V in LIMPA DL 1.
L is status for +28 V in LIMPA DL 2.

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means communication with module is in error.

Note! To read out the actual level, use attribute ALV (Analog Levels) or attribute PSD (Power Supply Distribution levels).

Example:

```
GET PW1
```

Replies:

```
010101
```

meaning status is OK in Master Power Supply, LIMPA UL 1 and LIMPA DL 1 an an, there is a power failure in Slave Power Supply, LIMPA UL 2 and LIMPA DL 2. In this Example, it seems the Slave Power Supply is failing; leading to a power failure in the two LIMPA's fed by the slave power supply.

2.84 PW2 - Status of Power 2

Attribute type: Read only

This is the status for the +15 V Power Distributions in the repeater.

Format for 2-channel conventional and Frequency translating repeaters:

```
XYZ
```

X is status for +15 V in Power Supply
Y is status for +15 V in LIMPA UL.
Z is status for +15 V in LIMPA DL.

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means communication with module is in error.

Note! To read out the actual level, use attribute ALV (Analog Levels) or attribute PSD (Power Supply Distribution levels).

Example:

```
GET PW2
```

Replies:

```
0100
```

meaning status is OK in Power Supply and LIMPA DL and there is an error in +15 V level to LIMPA UL.

Format for 2 channel Fiber Optic fed repeaters:

```
XYZ
```

X is status for +15 V in Power Supply
Y is status for +15 V in LIMPA UL.
Z is status for +15 V in LIMPA DL.
W is status for +15 V in Fiber Optic Interface.

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means communication with module is in error.

Note! To read out the actual level, use attribute ALV (Analog Levels) or attribute PSD (Power Supply Distribution levels).

Example:

```
GET PW2
```

Replies:

```
010
```

meaning status is OK in Power Supply and LIMPA DL and there is an error in +15 V level to LIMPA UL.

Format for conventional 4-channel repeaters:

```
XYZWKL
```

X is status for +15 V in Master Power Supply
Y is status for +15 V in Slave Power Supply
Z is status for +15 V in LIMPA UL 1.
W is status for +15 V in LIMPA UL 2.
K is status for +15 V in LIMPA DL 1.
L is status for +15 V in LIMPA DL 2

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means communication with module is in error.

Note! To read out the actual level, use attribute ALV (Analog Levels) or attribute PSD (Power Supply Distribution levels).

Example:

```
GET PW2
```

Replies:

```
010000
```

meaning there is an error in +15 V power supply in LIMPA UL1, and all other statuses are OK.

Format for 4-channel Fiber Optic fed repeaters:

```
XYZWKLM
```

X is status for +15 V in Master Power Supply
Y is status for +15 V in Slave Power Supply
Z is status for +15 V in LIMPA UL 1.
W is status for +15 V in LIMPA UL 2.
K is status for +15 V in LIMPA DL 1.
L is status for +15 V in LIMPA DL 2
M is status for +15 V in Fiber Optic Interface.

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means communication with module is in error.

Note! To read out the actual level, use attribute ALV (Analog Levels) or attribute PSD (Power Supply Distribution levels).

Example:

```
GET PW2
```

Replies:

```
0100000
```

meaning there is an error in +15 V power supply in LIMPA UL1, and all other statuses are OK.

2.85 PW3 - Status of Power 3

Attribute type: Read only

This is the status for the +6.45 V Power Distribution in the repeater.

Format for 2-channel conventional and Frequency translating repeaters:

```
XYZW
```

X is status for +6.45 V in Power Supply
Y is status for +6.45 V in LIMPA UL.
Z is status for +6.45 V in LIMPA DL.
W is status for +6.45 V in Reference Generator.

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means communication with module is in error.

Note! To read out the actual level, use attribute ALV (Analog Levels) or attribute PSD (Power Supply Distribution levels).

Example:

```
GET PW3
```

Replies:

```
0010
```

meaning status is OK in Power Supply, LIMPA UL and Reference Generator and there is an error in +6.45 V supply to LIMPA DL.

Format for 2-channel Fiber Optic repeaters:

```
XYZWK
```

X is status for +6.45 V in Power Supply
Y is status for +6.45 V in LIMPA UL.
Z is status for +6.45 V in LIMPA DL.
W is status for +6.45 V in Reference Generator.
K is status for +6.45 V in Fiber Optic Interface.

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means communication with module is in error.

Note! To read out the actual level, use attribute ALV (Analog Levels) or attribute PSD (Power Supply Distribution levels).

Example:

```
GET PW3
```

Replies:

```
00100
```

meaning status is OK in Power Supply, LIMPA UL and Reference Generator and there is an error in +6.45 V supply to LIMPA DL.

Format for conventional 4-channel repeaters:

```
XYZWKLM
```

X is status for +6.45 V in Master Power Supply
Y is status for +6.45 V in Slave Power Supply
Z is status for +6.45 V in LIMPA UL 1.
W is status for +6.45 V in LIMPA UL 2.
K is status for +6.45 V in LIMPA DL 1.
L is status for +6.45 V in LIMPA DL 2.
M is status for +6.45 V in Reference Generator.

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means communication with module is in error.

Note! To read out the actual level, use attribute ALV (Analog Levels) or attribute PSD (Power Supply Distribution levels).

Example:

```
GET PW3
```

Replies:

```
0010000
```

meaning there is an error in +6.45 V power supply in LIMPA UL2, and all other statuses are OK.

Format for 4-channel Fiber Optic repeaters:

```
XYZWKLM
```

X is status for +6.45 V in Master Power Supply
Y is status for +6.45 V in Slave Power Supply
Z is status for +6.45 V in LIMPA UL 1.
W is status for +6.45 V in LIMPA UL 2.
K is status for +6.45 V in LIMPA DL 1.
L is status for +6.45 V in LIMPA DL 2.
M is status for +6.45 V in Reference Generator.
N is status for +6.45 V in Fiber Optic Interface.

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means communication with module is in error.

Note! To read out the actual level, use attribute ALV (Analog Levels) or attribute PSD (Power Supply Distribution levels).

Example:

```
GET PW3
```

Replies:

```
0010000
```

meaning there is an error in +6.45 V power supply in LIMPA UL2, and all other statuses are OK.

2.86 PW4 - Status of Power 4

Attribute type: Read only

This is the status for the +6.45 V Power Supply to the Control Module, as measured in the power supply.

Format:

```
X
```

X is status for +6.45 V Power Supply to the controller

0 means OK
1 means Power Supply is outside allowed thresholds
- (dash) means rack is not installed / configured.

Note! To read out the actual level, use attribute ALV (Analog Levels).

Example:

```
GET PW4
```

Replies:

```
1
```

meaning that power supply to control module is outside allowed interval.

Note! Since this power supply is feeding the controller itself, if power supply is completely lost the controller will not be up and running, and hence can not be detected / alarmed.

2.87 PWD - Set Password to Access Repeater

Attribute type: Write only

The repeater is accessed via four different User ID's. User ID 1 and 2 have full access to the repeaters parameters, while users 3 and 4 only have read access to the repeater.

Attribute PWD is used to change the password associated with the different user ID's.

Format:

```
SET PWD X NNNNNNNN
```

X is the selector of what password to modify, $1 \leq X \leq 4$
N is a password, up to 8 characters long, and NOT including white space.

Example:

```
SET PWD 1 AVITECAB
```

Modifies password number 1 to AVITECAB.

Note! To modify the corresponding user ID, please refer to attribute UID.

2.88 RCA - Repetition Cycle for non Acknowledged Alarms

Attribute type: Read and Write

Every alarm is sent to the OMC up to MNR number of times, or until it is acknowledged. The alarms are retransmitted with RCA minutes intervals. When using data call, an alarm is considered acknowledged when the controller has successfully logged in to the OMC, and delivered the alarm. In case of SMS, an alarm is considered acknowledged when an acknowledge message is received from the main address.

The alarms can also be acknowledged with the command ACT ACK when logged in locally or remotely.

Format:

```
X
```

X is the interval in minutes.

Example:

```
GET RCA
```

Reply:

```
10
```

meaning that the interval between retransmissions is 10 minutes.

Example:

```
SET RCA 12
```

sets the interval to 12 minutes

2.89 RCH - Repetition Cycle for Heartbeat

Attribute type: Read and Write

Sets the interval for how often the heartbeat reports are sent to the repeater OMC. The heartbeat report is a report containing all relevant status parameters of the repeater. If a report fails to be sent, it will try to retransmit the reports with a settable interval. Refer to attributes RCR and MRR for information on how to change the number of retransmissions and retransmit interval.

Format:

```
X
```

X is the heartbeat interval in minutes. Valid values are from 1 to 1440 minutes.

Example:

```
GET RCH
```

Reply:

```
1335
```

meaning that a heartbeat will be sent to the repeater OMC every 1335 minutes.

Example:

```
SET RCH 1400
```

Changes this interval to 1400 minutes.

Note! As soon as the heartbeat interval is changed, and the user is logged out, a new heartbeat will be sent to the repeater OMC, in order to cause resynchronization of the heartbeat intervals between the repeater and the OMC.

2.90 RCR - Repetition Cycle for Reports

Attribute type: Read and Write

Every heartbeat and traffic / uplink activity report is sent to the OMC up to MRR number of times, or until it is successfully delivered. The reports are retransmitted with RCR minutes intervals. When using data call, report is considered successfully delivered when the controller has successfully logged in to the OMC, and delivered the report. In case of SMS, report is considered successfully delivered when it has been successfully transmitted to the SMSC.

Format:

```
X
```

X is the retransmit interval in minutes. Valid values for X is from 1 to 20 minutes

Example:

```
GET RCR
```

Reply:

```
3
```

meaning that the report will be retransmitted after 3 minutes.

Example:

```
SET RCR 2
```

Sets the time between retransmissions to 2 minutes.

2.91 RFP - RF Parameters

Attribute type: Read only

This attribute gives information about gain and gain distribution in the repeater

Format:

```
<Max Gain UL> <Max Gain DL> <PreAmp UL> <PreAmp DL> <Loss after PA UL>
<Loss after PA DL> <Lowest Detectable Output UL> <Lowest Detectable Output
DL>
```

<Max Gain UL> <Max Gain DL> is the maximum gain in dB in Uplink and Downlink

<PreAmp UL> <PreAmp DL> is the gain in dB from the inport to the input to the LIMPA's in Uplink and Downlink

<Loss after PA UL> <Loss after PA DL> is the loss in dB after the Power Amplifiers to the outport of the repeater in Uplink and Downlink

<Lowest Detectable Output UL> <Lowest Detectable Output UL> is the lowest output level that the detector in the Power Amplifiers in Uplink and Downlink.

Example:

```
GET RFP
```

Reply:

```
45.0 45.0 17.1 –25.1 2.1 4.9 –15.1 17.2
```

means maximum gain in repeater in Uplink and Downlink is 45.0 dBm. In uplink, the gain before the RSSI is 17.1 dB, while the gain in downlink is –25.1 dB (an attenuation of 25.1 dB). Loss after the PA in uplink is 2.1 dB and in downlink 4.9 dB. The lowest detectable output in the uplink is –15.1 dBm, while lowest detectable in Downlink is 17.2 dBm.

2.92 RID - Repeater ID

Attribute type: Read and Write

The repeater ID gives the OMC (Avitec Element Manager) a way to give the each network element (boosters, repeaters, Hubs) a unique number in the network.

Format:

```
XX-YY-ZZZZ
```

XX,YY,ZZZZ are unique numbers to identify the element.

The length of this attribute is exactly 10 characters.

Example:

```
GET RID
```

Reply:

```
01-01-0334
```

which is the unique ID for this element.

Example:

```
SET RID 02-01-0077
```

Modifies the repeater ID.

Note! If the element is installed into and controlled by the Avitec Element Manager, this attribute should NEVER be modified. This ID is unique in the Element Manager database. Changing this ID will cause the OMC database to be corrupt.

2.93 RLY - Relay Status

Attribute type: Read only

By using the attribute status of the relay can be read out.

Format:

```
N
```

N is 0 or 1

0 means that relay circuit is currently open, no alarms configured to activate relay is detected.
1 means relay circuit is closed. One or more of the alarms configured to activate the relay is detected.

2.94 ROP - Controller to OMC password.

Attribute type: Write only

When the controller is configured for data call, and the equipment is controlled from the Avitec Element Manager, every time the controller connects to the OMC, a login is required. The username is the equipment ID (attribute RID), and the password is set with this attribute, ROP.

Format:

```
NNNNNNNN
```

NNNNNNN is the password, up to 8 characters, no space allowed.

Example:

```
SET ROP REPEATER
```

sets the password to REPEATER.

Note! This password should normally be changed from the Element Manager, since a wrong configured password will cause the login to the Element Manager to fail.

2.95 RSP - Repeater Status Parameters

Attribute type: Read only

This attribute replies with the status of all alarm sources in the repeater. The attribute can be used to quickly get an overview of all the statuses in the repeater.

Non Fiber Optic Fed Repeaters:

Attribute replies with the status of the alarm sources:

```
<PDL> <ASU> <ASD> <AMU> <AMD> <SZU> <SZD> <COM>
<BAT/DOO/EX1/EX2/EX3/EX4/TEM> <IOU/IOD/AIM> <PSL> <PTM> <PW1> <PW2> <PW3>
<PW4> <WRD>
```

Example:

```
GET RSP
```

Reply:

```
0- 00 11 00 00 00 00 0000 0000 00000 0100010 000 0 0 000 000 0000 0 0
```

which means all parameters are OK, except door status and status of external alarm input 4.

Note! Reply on this parameter will be different depending on if this is a 2-channel or 4-channel capable repeater.

Fiber Optic Fed Repeaters:

Attribute replies with the status of the alarm sources:

```
<PDL> <ASU> <ASD> <AMU> <AMD> <SZU> <SZD> <COM>
<BAT/DOO/EX1/EX2/EX3/EX4/TEM> <IOU/IOD/AIM> <PSL> <PTM> <PW1> <PW2> <PW3>
<PW4> <WRD> <FRX/FTX>
```

Example:

```
GET RSP
```

Reply:

```
0- 00 11 00 00 00 00 0000 0000 00000 0100010 000 0 0 000 000 0000 0 0 00
```

which means all parameters are OK, except door status and status of external alarm input 4.

Note! Reply on this parameter will be different depending on if this is a 2-channel or 4-channel capable repeater.

2.96 SAC - SMS Acknowledge Configuration

Attribute type: Read and Write

This command affects controllers using SMS for alarm transmission.

SAC configures how the controller determines whether an alarm is acknowledged or not.

Format:

```
X
```

X can be of two values:

0 means that the alarm is considered acknowledged when an acknowledge message is received from the OMC
1 means that an alarm is considered acknowledged when the alarm is successfully transmitted to the Short Message Service Center (SMSC), i.e. when the message is successfully delivered to the network.

Example:

```
GET SAC
```

Reply:

```
0
```

meaning that the controller requires an acknowledge message back from the OMC (if the individual alarm source is configured for that).

Example:

```
SET SAC 1
```

changes the behavior to consider the alarm acknowledged when the message is sent successfully to the SMSC.

Note! This configuration will work in conjunction with the other alarm attributes (ALA XXX, RCA and MNR).

If for example SAC is set to “1”, and RCA is set to 3 and MNR 3, the controller will try to send the message to the SMSC center up to 3 times with 3 minute intervals.

If the individual alarm source is configured to not require an acknowledge, it will only try to send it once to the SMSC.

2.97 SFT - Secondary OMC address Fallback Timer

Attribute type: Read and Write

This configures how many minutes the controller will wait before going back to the primary address again after calling the secondary OMC address. If this parameter is set to zero, no fallback will be done, i.e., the controller will toggle between the addresses for every failure to deliver messages.

See also attributes SSC, ASC and command ACT UPA.

Format:

```
X
```

X is number of minutes to wait before fallback to primary OMC address.

Example:

```
GET SFT
```

Reply:

```
15
```

meaning that the controller will use the secondary address for 15 minutes before going back to normal OMC address.

Example:

```
SET SFT 10
```

changes this value to 10 minutes.

2.98 SIS - System Information String

Attribute type: Read only

Compact string containing system versions and system dates. The string contains the following data, separated by spaces

Format:

```
<BIOS Ver>
<PLD Ver>
<HW Version>
<SW Version>
<Controller Serial Number>
<Repeater Serial Number>
<System Initialization Time>
<System Initialization Date>
<Controller Initialization Time>
<Controller Initialization Date>
<Manufacturing specific information>
<Software Build Date>
```

<BIOS Ver> is a string delimited by “ (double quote) signs, containing the controller BIOS version. If no information is available, an empty string (“”) is replied.

<PLD Ver> is a string delimited by " (double quote) signs, containing on chip specific version information.

<HW Version> is a string delimited by " (double quote) signs, containing the controller hardware version. This can also be obtained with the attribute HWV.

<SW Version> is a string delimited by " (double quote) signs, containing the controller software version. This can also be obtained with the attribute SWV.

<Controller Serial Number> reports the serial number of the controller (4 characters). If no information is available, a '-' (dash) is reported.

<Repeater Serial Number> reports the serial number of the controller (4 characters). If no information is available, a '-' (dash) is reported.

<System Initialization Time> contains the repeater initialization time on the format HHMMSS, with 24 hours notation. If no information is available, a '-' (dash) is reported.

<System Initialization Date> contains the repeater initialization date on the format DDMMYY. If no information is available, a '-' (dash) is reported.

<Controller Initialization Time> contains the controller initialization time on the format HHMMSS, with 24 hours notation. If no information is available, a '-' (dash) is reported.

<Controller Initialization Date> contains the controller initialization date on the format DDMMYY. If no information is available, a '-' (dash) is reported.

<Manufacturing specific information> is a string delimited by " (double quote) signs, containing information entered during manufacturing.

<Software Build Date> is a string delimited by " (double quote) signs, containg the timepoint when the software was built.

Example:

```
GET SIS
```

Reply:

```
"1.11" "12" "H041001C" "2.32" 2JG5 2JF3 174200 991220 120333 991101 "JK"
"Jan 18 2002 10:09:30"
```

indicating that BIOS version is 1.11, PLD version is 12, hardware version is H041001C and software version is 2.32. The control module has the serial number 2JG5, the repeater serial is 2JF3, the system (repeater) was initialized at 17:42.00 on Dec 20, 1999, and controller was initialized at 12:03.33 on Nov 1, 1999. Factory information is JK. Finally, software was built at 18'th of January 2002 at 10:09:30 AM.

2.99 SIT - System Initialization Time

Attribute type: Read only

Returns a string containing the system initialization time, i.e. when the controller was initialized for the first time.

Format:

```
HHMMSS DDMMYY
```

Where HHMMSS is the time point, with 24 hours notation, and DDMMYY is the date of the initialization.

Example:

```
GET SIT
```

Reply:

```
164500 070498
```

indicating that the controller was initialized on 7'th of April 1998 at 16:45.

2.100 SSC - Secondary Service Center Address

Attribute type: Read and Write

When controller is configured for data call, if the controller fails to dial the first service center (configured with the attribute ASC), the controller will automatically switch over to the secondary service center address.

If secondary address is not set, it will be neglected. Furthermore, if controller experiences problems connecting to secondary address, it will switch back to primary address.

A fallback timer can be configured so that the controller goes back to primary address after a specified interval. Please refer to attribute SFT for details

Note! The controller will always check if first address is set. If not, the secondary address will be ignored.

Example:

```
GET SSC
```

Reply:

```
118118
```

meaning that the secondary address is set to 118118.

Example:

```
SET SSC
```

Disables the use of a secondary address.

2.101 SUT - System Up Time

Attribute type: Read only

Format:

```
N
```

Returns the number of seconds that has elapsed since last system reset, or since last power up.

Example:

```
GET SUT
```

Reply:

```
34423
```

meaning that the system booted up 34 423 seconds ago.

2.102 SWV - Software Version

Attribute type: Read only

Format:

```
<String>
```

returns a string with the software version in the control module.

Example:

```
GET SWV
```

Reply:

```
2.36
```

meaning that the software version is 2.36.

2.103 SZD - Status of Synthesizers in Downlink Chain

Attribute type: Read only

This parameter returns the status of the synthesizer in the downlink path. Each LIMPA contains two chains, and each chain contains two synthesizers. One synthesizer is for down conversion of the radio signals to the IF frequency, and one for up conversion. The reply depends on number of installed channels / LIMPA's.

Format for 2 channel repeaters:

```
XYZW
```

X is status of In Synthesizer in Chain 1 DL (in downlink LIMPA 1)
Y is status of Out Synthesizer in Chain 1 DL (in downlink LIMPA 1)
X is status of In Synthesizer in Chain 2 DL (in downlink LIMPA 1)
Y is status of Out Synthesizer in Chain 2 DL (in downlink LIMPA 1)

0 indicates an OK
1 indicates an Error.

A '-' means communication with LIMPA is in error.

Example:

```
0100
```

means all synthesizers in downlink are OK, except Out Synthesizer in chain 1 DL.

Format for 4 channel repeaters:

```
XYZWKLMN
```

X is status of In Synthesizer in Chain 1 DL (in downlink LIMPA 1)
Y is status of Out Synthesizer in Chain 1 DL (in downlink LIMPA 1)
X is status of In Synthesizer in Chain 2 DL (in downlink LIMPA 1)
Y is status of Out Synthesizer in Chain 2 DL (in downlink LIMPA 1)
K is status of In Synthesizer in Chain 3 DL (in downlink LIMPA 2)
L is status of Out Synthesizer in Chain 3 DL (in downlink LIMPA 2)
M is status of In Synthesizer in Chain 4 DL (in downlink LIMPA 2)
N is status of Out Synthesizer in Chain 4 DL (in downlink LIMPA 2)

0 indicates an OK
1 indicates an Error.

A '-' means communication with LIMPA is in error.

Example:

```
00000010
```

means all synthesizers in downlink are OK, except In Synthesizer in chain 4 DL.

2.104 SZU - Status of Synthesizers in Uplink Chain

Attribute type: Read only

This parameter returns the status of the synthesizer in the uplink path. Each LIMPA contains two chains, and each chain contains two synthesizers. One synthesizer is for down conversion of the radio signals to the IF frequency, and one for up conversion. The reply depends on number of installed channels / LIMPA's.

Format 2 channel repeaters:

```
XYZW
```

X is status of In Synthesizer in Chain 1 UL (in uplink LIMPA 1)
Y is status of Out Synthesizer in Chain 1 UL (in uplink LIMPA 1)
X is status of In Synthesizer in Chain 2 UL (in uplink LIMPA 1)
Y is status of Out Synthesizer in Chain 2 UL (in uplink LIMPA 1)

0 indicates an OK
indicates an Error.

A '-' means communication with LIMPA is in error.

Example:

```
0100
```

means all synthesizers in uplink are OK, except Out Synthesizer in chain 1 UL.

Format 4 channel repeaters:

```
XYZWKLMN
```

X is status of In Synthesizer in Chain 1 UL (in uplink LIMPA 1)
Y is status of Out Synthesizer in Chain 1 UL (in uplink LIMPA 1)
X is status of In Synthesizer in Chain 2 UL (in uplink LIMPA 1)
Y is status of Out Synthesizer in Chain 2 UL (in uplink LIMPA 1)

K is status of In Synthesizer in Chain 3 UL (in uplink LIMPA 2)
L is status of Out Synthesizer in Chain 3 UL (in uplink LIMPA 2)
M is status of In Synthesizer in Chain 4 UL (in uplink LIMPA 2)
N is status of Out Synthesizer in Chain 4 UL (in uplink LIMPA 2)

0 indicates an OK
1 indicates an Error.

A '-' means communication with LIMPA is in error.

Example:

```
00000010
```

means all synthesizers in uplink are OK, except In Synthesizer in chain 4 UL.

2.105 TAG - Equipment Tag

Attribute type: Read and Write

The tag can be used to give the equipment a unique name, for example the site name.

Format:

```
<String>
```

<String> can be up to 20 characters long, NOT containing any space. All characters will be converted to uppercase.

Example:

```
GET TAG
```

Reply:

```
X3431_HIGHWAY_15
```

Indicating the tag associated with this equipment.

Example:

```
SET TAG ERNEST_HEMINGWAY
```

modifies the tag.

2.106 TEM - Status of Temperature

Attribute type: Read only

Format:

```
X
```

X=0 means status is OK
X=1 means status is ERROR

Example:

```
GET TEM
```

Reply:

```
1
```

meaning temperature is outside configured threshold (see attribute ALA TEM).

2.107 TIM - Time

Attribute type: Read and Write

Time of the real time clock in the repeater

Format:

```
HHMMSS
```

HH is 24-hour representation of the hours, MM is minutes, and SS is seconds.

Example:

```
GET TIM
```

Reply:

```
145000
```

meaning the repeater time is 10 minutes to three in the afternoon.

Example:

```
SET TIM 150542
```

modifies the time settings.

Note! If the time in the repeater is changed, as soon as the user logs out, a new heartbeat will be sent, in order to cause resynchronization of the heartbeat intervals between the repeater and the OMC.

2.108 TMD - Terminal Mode

Attribute type: Read and Write

When logged in to the controller, either locally or remote, the output to the user can appear in two different ways: Terminal Mode or VT100 mode. Terminal mode gives the replies back to the user on the next row, while VT100 mode replies in the old-fashioned way, with the clock, ID and Tag etc displayed on the top of the screen.

Terminal Mode is normally used by Avitec Maintenance Console and Avitec Element Manager.

Format:

```
SET TMD X
```

X = 0 means VT100 mode
X = 1 means Terminal mode

Example:

```
SET TMD 1
```

Switches to Terminal mode.

Note! When logging in, Terminal Mode is always defaulted to VT100 mode.

2.109 UID - User ID

Attribute type: Write only

The repeater is accessed via four different User ID's. User ID 1 and 2 have full access to the repeaters parameters, while users 3 and 4 only have read access to the repeater.

Attribute UID is used to change the different user ID's.

Format:

```
SET UID X NNNNNNNN
```

X is the selector of what user ID to modify, $1 \leq X \leq 4$.

N is a name, up to 8 characters long, and NOT including white space.

Example:

```
SET UID 1 KAFKA
```

Modifies user ID number 1 to KAFKA.

Note! To modify the corresponding password, please refer to attribute PWD.

2.110 VLD - Valid Peak Limiting Levels Downlink

Attribute type: Read only

This attribute replies with the valid peak limiting values settable in the downlink path of the repeater, as set with the attribute LVD.

Format:

```
[Value 1] [Value 2] .. [Value N]
```

where the different values are in dBm. A value of -100 means that this is used to turn the output power off.

Example:

```
GET VLD
```

Reply:

```
-100 31 34 37
```

meaning that the different peak limiting levels possible to set are -100 (turning off output power), 31, 34 and 37 (dBm).

2.111 VLU - Valid Peak Limiting Levels Uplink

Attribute type: Read only

This attribute replies with the valid peak limiting values settable in the uplink path of the repeater, as set with the attribute LVU.

Format:

```
[Value 1] [Value 2] .. [Value N]
```

where the different values are in dBm. A value of -100 means that this is used to turn the output power off.

Example:

```
GET VLU
```

Reply:

```
-100 28 31 34
```

meaning that the different peak limiting levels possible to set are -100 (turning off output power), 28, 31 and 34 (dBm).

2.112 WRD - Status of Voltage Standing Wave Ratio Downlink

Attribute type: Read only

The repeaters measure the VSWR on the antenna ports, and, if reflected power is too high, an alarm is triggered. This can indicate a bad connector or a broken antenna.

Format in all repeaters except Frequency Translating –ER repeaters:

```
X
```

X=0 means reflected power level in downlink is OK
X=1 means reflected power level in downlink chain is in error
X='-' (dash) means there is a failure in communication between the controller and the FDM where VSWR is measured.

Example:

```
GET WRD
```

Reply:

```
1
```

meaning that reflected power in the downlink path is outside of the allowed range (please refer to ALA WRD for configuration).

Format in Frequency translating –ER repeaters:

```
XY
```

X is status for reflected power at antenna port 1 downlink
Y is status for reflected power at antenna port 2 downlink '

0 means reflected power level is OK
1 means reflected power level is in error.
'-' (dash) means there is a failure in communication between the controller and the FDM where VSWR is measured.

Example:

```
GET WRD
```

Reply:

```
01
```

meaning that reflected power at antenna port 2 downlink 2 is outside of the allowed range (please refer to ALA WRD for configuration), and port 1 is OK.

2.113 WRL - Voltage Standing Wave Ratio Level

Attribute type: Read only

Shows the return loss in dBm in the uplink and downlink at the antenna ports of the repeater.

Depending on repeater type, there are different number of antennas connected, and hence different number of levels to display.

Format for 2-channel, 4-channel and Frequency translating –IR, -SD and -DD repeaters:

```
X
```

X is the return loss at the server antenna (downlink path). If return loss is higher than repeater is able to detect, a '-' (dash) is reported instead

Example:

```
GET WRL
```

Reply:

```
13
```

meaning that the return loss in the downlink is 13 dB.

Format for Frequency translating –ER repeaters:

```
X Y
```

X is the return loss at the server antenna 1 (downlink path)
Y is the return loss at the server antenna 2 (downlink path).

If return loss is higher than repeater is able to detect, a '-' (dash) is reported instead.

Example:

```
GET WRL
```

Reply:

```
19 -
```

meaning that the return loss in downlink 1 is 19 dB and downlink 2 is not detectable.

3 Traffic Related GET and SET Attributes

The controller constantly measures all timeslots in the uplink paths of all the chains.
Every 15 minutes, the utilization is calculated and stored in a log. At a configurable time of the day, the report can optionally be sent to the repeater OMC. The report consists of 96 intervals, each interval 15 minutes long. As soon as the report is sent away, OR after measurements of the first interval of the next day is completed, the log is cleared.

The utilization is measured in percentage:

Utilization = (Number occupied timeslots) / (Number of available timeslots) * 100

Example:

A two-channel repeater is sampled for one frame. 9 timeslots are utilized, which means ”Number of occupied timeslots” is increased by 9, and ”Number of available timeslots” is increased by 16.

3.1 AIS - Active Intervals String

Attribute type: Read only

Reply format:

```
X Y M……M
```

X is the date of the first measurement in the format DDMMYYY
Y is the time point of the start of the first interval in the measurement in the format HHMMSS
M..M shows information about the 96 intervals of 15 minutes each

M = '0' means no active timeslots were detected during the 15 minutes interval
M = '1' means one or more intervals were detected during the interval.
M =’-‘ (dash) means interval has not been measured.

This can be used for troubleshooting if there are suspicions that a Server antenna is broken.

During startup of the repeater this string is filled with ‘-‘. It is also cleared when the traffic report is successfully delivered to the OMC.

The starting time point of the first measurement is set with the attribute TPD.

Traffic Activity Threshold (attribute TAT) can be used to define the threshold for this

Note! When using remote communication, the detected timeslots can be from the communication itself, i.e., the Server antenna still might be broken.

3.2 ATS - Active Timeslots

Attribute type: Read only

This is a snapshot of how many timeslots where detected during last sampled frame.

Format in 2-channel and Frequency translating repeaters:

```
GET ATS
```

Replies:

```
X Y
```

X is the number of occupied timeslots in Uplink chain 1
Y is number of timeslots in chain 2 Uplink.

Value of X, Y is 0-8 timeslots.

If communication with LIMPA is in error, value is replaced by a dash ('-').

Example:

```
3 0
```

means that 3 timeslots were detected in chain 1, and that no timeslots where detected in chain 2 uplink.

Format in 4-channel repeaters:

```
GET ATS
```

Replies:

```
X Y Z W
```

X is the number of occupied timeslots in Uplink chain 1
Y is timeslots in chain 2 Uplink, Z is timeslots in chain 3 Uplink and W is timeslots in chain 4 Uplink.

Value of X, Y, Z , W is 0-8 timeslots.

If communication with LIMPA is in error, value is replaced by a dash ('-').

Example:

```
0 3 – -
```

means that on timeslots where detected in uplink chain a, 3 timeslots were detected in chain 2, and that there was a communications alarm with LIMPA 2 in uplink (containing chains 3 and 4).

3.3 CTI - Current Traffic Interval

Attribute type: Read only

Format:

```
GET CTI
```

Replies:

```
X
```

X is the Current Traffic Measurement Interval

Each Interval is 15 minutes, and the traffic is reported in 24-hour intervals.

Therefore X is between 1 and 96

The first interval starts at the time point set by attribute TPD.

3.4 LAT - Last Active Timeslot

Attribute type: Read only

Format:

```
GET LAT
```

Replies:

```
DDMMYY HHMMSS
```

HHMMSS is the time point, with 24 hours notation, and DDMMYY is the date of the last measured timeslot / activity. This can be used for troubleshooting if there are suspicions that a Server antenna is broken.

During startup of the repeater this time point is set to current time.

Example:

```
GET LAT
```

Reply:

```
164500 070498
```

indicating that last active timeslot was detected on 7’th of April 1998 at 16:45.

3.5 PRF - Sending of Report

Attribute type: Read and Write

This parameter determines whether sending of traffic report is enabled or not.

Format:

```
X
```

X = 0 means sending of traffic report enabled
X = 1 means sending of traffic report disabled

Example:

```
GET PRF
```

Reply:

```
1
```

means no traffic report will be sent to the repeater OMC.

Example:

```
SET PRF 0
```

enables the sending of the report.

3.6 TAT - Traffic Activity Threshold

Attribute type: Read and Write

The Traffic Activity Threshold defines how many timeslots should be sampled during one traffic interval (15 minutes) in order for the repeater to consider traffic to have passed through the repeater.

This threshold is used in conjunction with the Active Intervals String (attribute AIS.

Interval is settable from 1 to 32000, but value is defaulted to 10.

Format:

```
X
```

X determines the number of detected timeslots needed in one interval to define that traffic has been sent through the repeater.

Note! This value is the total number of timeslots, independent of the number of channels installed in the repeater.

Example:

```
GET TAT
```

Reply:

```
100
```

meaning that 100 timeslots are needed to define an interval as active.

Example:

```
SET TAT 10
```

changes this value to 10 timeslots.

3.7 TTL - Traffic Threshold

Attribute type: Read and Write

Threshold for traffic. This defines above what level the in signal has to be in the uplink path to be considered traffic.

Format:

```
GET TTL
```

Replies:

```
X
```

X is the lowest signal that should be sampled on the input to be considered traffic.

Example:

```
GET TTL
```

Replies:

```
-85
```

meaning that in signal has to be –85 dBm or higher to be considered traffic.

Example:

```
SET TTL -80
```

changes this value to –80 dBm.

3.8 TPD - Timepoint of Traffic Report Transmission

Attribute type: Read and Write

This parameter sets the time of the day when the traffic report is to be sent to the repeater OMC.

If a report fails to be sent, the repeater will try to retransmit the reports with a settable interval. Refer to attributes RCR and MRR for information on how to change the number of retransmissions and retransmit interval.

Format:

```
HHMMSS
```

HH is the hour in 24-hour representation, MM is minutes and SS is seconds.

Example:

```
GET TPD
```

Reply:

```
031500
```

means that the report is sent to the repeater OMC at a quarter past three in the morning.

Example:

```
SET TPD 230000
```

Changes this time to 11 in the evening.

3.9 TRF - Traffic String

Attribute type: Read only

Reply format:

```
X Y M……M
```

X is the date of the first measurement in the Format DDMMYYY
Y is the time point of the start of the first interval in the measurement in the format HHMMSS
M..M shows information about the 96 intervals of 15 minutes each
M = '0' means a utilization of 0% to 2%
M = '1' means a utilization of 2% to 4%
...
M = '9' means a utilization of 18% to 20%
M = 'A' means a utilization of 20% to 22%
M = 'B' means a utilization of 22% to 24%
...
...
M = 'T' means a utilization of 58% to 60%
M = 'a' means a utilization of 60% to 62%
M = 'b' means a utilization of 62% to 64%
M = 't' means a utilization of 98% to 100%
If no data is available, a dash ('-') is reported.

The starting time point of the first measurement is set with the attribute TPD.

3.10 UCI - Utilization Current Interval

Attribute type: Read only

Gives a reply of the utilization so far in current interval.

Format:

```
X
```

X is a one decimal value of the repeater utilization.

Example:

```
GET UCI
```

Reply:

```
16.8
```

meaning 16.8% of the timeslots are used so far in the current interval.

3.11 ULI - Utilization Last Interval

Attribute type: Read only

Gives a reply of the utilization in last measured interval.

Format:

```
X
```

X is a one decimal value of the repeater utilization of the last measured interval.

Example:

```
GET ULI
```

Reply:

```
12.7
```

meaning 12.7% of the timeslots where used in the last measured 15 minutes interval.

4 Alarm Attribute Configuration

Format:

```
AAA X Y Z LLL UUU TTT
```

AAA is the alarm attribute to configure (see table below).

X has double functionality. It determines whether an alarm should be send if error is detected, and it also configures whether the alarm relay should be affected by the alarm source.

X = 0 means alarm transmission enabled, but alarm doesn't affect the relay output
X = 1 means alarm transmission disabled, and does not affect the relay.
X = 2 means alarm transmission is enabled, and alarm affects the relay output.
X = 3 means alarm transmission is disabled, but alarm affects relay output

Y determines whether an alarm requires to be acknowledged or not.

(When using data call, an alarm is considered acknowledged when the controller has successfully logged in to the OMC, and delivered the alarm. In case of SMS, an alarm is considered acknowledged when an acknowledge message is received from the main address. The alarms can also be acknowledged with the command ACT ACK when logged in locally or remotely. If an alarm is not acknowledged, it will be retransmitted up to MNR (maximum number of retransmissions) times, with RCA (repetition cycle for alarms) minutes interval. Refer to attributes MNR and RCA.)

Y = 0 means Acknowledge required
Y = 1 means No acknowledge required

Z is a threshold indicator, indicating how thresholds are used for this particular alarm source.

Z = 1 means that both thresholds are used for alarm calculation.
Z = 2 means that lower threshold is used
Z = 3 means that upper threshold is used
Z = 4 means that thresholds are ignored, i.e. digital measurement.

Note! Changing parameter Z does NOT affect the measurement of the alarm source. Z is just an indicator of how the measurement is done, and should NEVER be changed.

LLL is the value of the lower threshold used for alarm calculation
UUU is the value of the upper threshold used for alarm calculation.
TTT is the time an alarm has to be in erroneous state before an alarm is triggered.

Example:

```
GET ALA TEM
```

Returns:

```
0 0 3 000 060 5
```

This means that alarm is enabled and acknowledge required. Upper threshold is used in measuring the alarm, , lower threshold not set (000), 60 (degrees) is the upper threshold and that the temperature has to be higher than 60 for 5 seconds before an alarm is triggered.

Example:

```
SET ALA TEM 0 0 3 0 60 20
```

modifies the above alarm source to generate an alarm when the temperature has been above 60 degrees for more than 20 seconds.

The following table describes the usage of the thresholds of the different alarm sources.

4.1 AIM - Antenna Isolation Measurements

Antenna isolation measurement is performed using a special feature in the LIMPA's, allowing for output channel to be shifted from the input channel.

Two channels are used, one BCCH channel, and one so called Listener channel. By default, these channels are the ones configured in chain one and two, but can with attribute AIC (Antenna Isolation

Measurement Channels) be changed.
The measurement is automatically performed by the following steps:

1. Output is turned of in the repeater downlink paths, except in chain 1.
2. Channel in chain 1 is optionally changed to the alternative BCCH channel.
3. Channel in chain 2 is optionally changed to the alternative Listener channel.
4. Output channel in chain 1 downlink is changed to the Listener channel.
5. Since the BCCH in chain one is transmitted as the Listener channel, we measure the input signal on the Listener channel. Antenna isolation can now be calculated as transmitted output power in chain one – received input signal in chain 2.
6. Compare the measured signal with the alarm threshold (ALA AIM), and, depending on measurement result, generate alarm or end of alarm.
7. All radio parameters are restored to the default.

The repeater can be configured to measure the antenna isolation on a certain timepoint of the day, configurable using attributes AIE and AIT)

All measurements in the repeater will affect the alarm transmission, meaning that a user initiated measurement (using command ACT AIM) will also generate an alarm if isolation is outside allowed interval.

Lower Threshold:

This is treated differently in Frequency Shifting repeaters and conventional repeaters;

2- and 4-channel Conventional Repeaters:

The lower threshold determines how many dB above the gain settings in downlink chain one the isolation must be.

Frequency Translating Repeaters:

The lower threshold shows the lowest absolute isolation in dB before an alarm is triggere.

Upper Threshold:

Not used.

Time Threshold:

This indicates how many times the antenna isolation should have been measured as outside allowed interval before an alarm is triggered.

Note! Since the antenna isolation is scheduled for measurement once per day, it is recommended that the value is set to one.

Example in Frequency Translating repeaters:

```
GET ALA AIM
```

Returns:

```
0 0 2 75 0 1
```

This means that alarm is enabled and acknowledge required. Lower threshold is used in calculating the alarms. Lowest allowed antenna isolation is 75 dB, and the isolation needs to be outside allowed interval in one measurement before the alarm is triggered.

Example in Frequency 2- and 4-channel Conventional Repeaters:

```
SET ALA AIM 0 0 2 20 1
```

This sets the alarm as enabled and that acknowledge is required. Lower threshold is used in calculating the alarms. Lowest allowed antenna isolation is 20 dB above gain settings in chain 1 DL, and the isolation needs to be outside allowed interval in one measurement before the alarm is triggered. If the gain in the repeater is set to 84 dB, the isolation in this example must be at least 104 dB.

Note! Antenna isolation is not measured in Fiber Optic repeaters and repeaters CSFT18922 and CSFT91822.

4.2 AMD - Amplifier Chain Downlink

When measuring the amplifier chains, the input signal to and output power in the chain is measured. Depending on input signal level, the expected output power is calculated with regards to attenuation and gain in repeater. If the expected output level is not correct, an alarm is generated..

Lower Threshold:
This indicates how many dB's the output power is allowed to drop from the expected output power before an alarm is generated.

Upper Threshold:
This indicates how many dB's the output power is allowed to increase from the calculated output power before an alarm is generated.

Time Threshold:
This defines how many seconds an alarm source must be in error state before an alarm is triggered.

Example:

```
GET ALA AMD
```

Reply:

```
0 0 1 003 003 003
```

meaning that output power level can be 3 dB higher or 3 dB lower than expected before an alarm is triggered.

The amplifier chain must be measured as error for 3 seconds before alarm is triggered.

4.3 AMU - Amplifier Chain Uplink

When measuring the amplifier chains, the input signal to and output power in the chain is measured. Depending on input signal level, the expected output power is calculated with regards to attenuation and gain in repeater. If the expected output level is not correct, an alarm is generated..

Lower Threshold:
This indicates how many dB's the output power is allowed to drop from the expected output power before an alarm is generated.

Upper Threshold:
This indicates how many dB's the output power is allowed to increase from the calculated output power before an alarm is generated.

Time Threshold:
This defines how many seconds an alarm source must be in error state before an alarm is triggered.

Example:

```
GET ALA AMU
```

Reply:

```
0 0 1 003 003 003
```

meaning that output power level can be 3 dB higher or 3 dB lower than expected before an alarm is triggered.

The amplifier chain must be measured as error for 3 seconds before alarm is triggered.

4.4 ASD - Amplifier Chain Saturation Downlink

The LIMPA's contain circuitry to see how far into saturation the amplifier chain has gone. As described for the ASL attribute, the saturation can be detected in four different levels:

0 means amplifier is below optimum settings (can be due to lack of input signal)
1 means amplifier is working in the optimum range.
2 means amplifier is going into saturation and that gain should be decreased.
3 means amplifier is well into saturation, and that gain must be decreased to avoid degradation of signal quality.

This alarm attribute configures when a saturation alarm should be generated.

Lower Threshold:
Not used

Upper Threshold:
This defines what from what saturation level (0-3) an alarm situation is entered. Setting this value to 0 will always generate an alarm.

Time Threshold:
Defines how many seconds the amplifier chain has to be in an error state before an alarm is triggered.

Example:

```
GET ALA ASD
```

Reply:

```
0 0 3 000 002 3
```

indicates that if saturation level two or higher is entered an alarm situation has occurred, and that an alarm will be triggered after three seconds in this situation.

4.5 ASU - Amplifier Chain Saturation Uplink

The LIMPA's contain circuitry to see how far into saturation the amplifier chain has gone. As described for the ASL attribute, the saturation can be detected in four different levels:

0 means amplifier is below optimum settings (can be due to lack of input signal)
1 means amplifier is working in the optimum range.
2 means amplifier is going into saturation and that gain should be decreased.
3 means amplifier is well into saturation, and that gain must be decreased to avoid degradation of signal quality.

This alarm attribute configures when a saturation alarm should be generated.

Lower Threshold:
Not used

Upper Threshold:
This defines what from what saturation level (0-3) an alarm situation is entered. Setting this value to 0 will always generate an alarm.

Time Threshold:
Defines how many seconds the amplifier chain has to be in an error state before an alarm is triggered.

Example:

```
GET ALA ASU
```

Reply:

```
0 0 3 000 002 3
```

indicates that if saturation level two or higher is entered an alarm situation has occurred, and that an alarm will be triggered after three seconds in this situation.

4.6 BAT - Battery for Mobile Equipment

The mobile equipment is backed up by an external battery, which contains enough power to generate an alarm to the repeater OMC in case of a power failure.

The Battery alarm generates an alarm if the battery charge under normal conditions (no power failure) drops below a configurable threshold, or if a too high charge is detected.

Lower Threshold:
Indicates the lower voltage level that is allowed before an alarm is generated.

The level is displayed without decimal point. Configuring lower level as 89 means that the lowest allowed level is 8.9 Volts.

Upper Threshold:
Indicates the upper voltage level that is allowed before an alarm is generated.

The level is displayed without decimal point. Configuring upper level as 110 means that the highest allowed level is 11.0 Volts.

Time Threshold:

Defines how many seconds the battery charge has to be in an error state before an alarm is triggered.

Example:

```
GET ALA BAT
```

Reply:

```
0 0 1 83 112 3
```

indicates that if the power drops below 8.3 Volts, or exceeds 11.2 Volts, an erroneous state is reached.

After 3 seconds in error state, an alarm is triggered.

4.7 CLR - Changes made by logged in user

If a user logs in to the repeater, and changes one or more of the repeater settings, an alarm can be sent to the repeater OMC. The alarm configuration for the CLR attribute is only used to configure whether the alarm should be sent (Enabled), and if the alarm requires an acknowledgement.

Lower Threshold:

Not Used

Upper Threshold:

Not Used

Time Threshold:

Not Used

Example

```
GET ALA CLR
```

Reply:

```
0 0 4 0 0 0
```

indicates that the alarm will be generated, and also requires an acknowledgement.

4.8 COM - Communication Between Controller and Active Devices

The COM alarm indicates if there is an error in the communication between the controller and active devices.

This is a purely digital measurement, i.e. either the communication is OK, or in Error.

Lower Threshold:

Not Used.

Upper Threshold:

Not Used

Time Threshold:

Defines how many seconds a communications error should be detected before an alarm is generated.

Example:

```
GET ALA COM
```

Reply:

```
0 0 4 000 000 003
```

Meaning that lower and upper thresholds are ignored, and the communication must fail for 3 seconds before an alarm is generated.

4.9 DOO - Door

The Door alarm is generated if the door is opened.

This is a purely digital measurement, i.e. either the door is closed (OK), or opened (Error).

Lower Threshold:
Not Used.

Upper Threshold:
Not Used

Time Threshold:
Defines how many seconds the door should be opened before an alarm is generated.

Example:

```
GET ALA DOO
```

Reply:

```
0 0 4 000 000 010
```

meaning that lower and upper thresholds are ignored, and the door needs to be opened for 10 seconds before an alarm is triggered.

4.10 EX1 - External Alarm 1

The external alarm allows the user to connect external alarm sources, for example fire alarms or external door sensors to the controller.

This is a purely digital measurement, i.e. either the external alarm is OK, or in Error.

Lower Threshold:
Not Used.

Upper Threshold:
Not Used

Time Threshold:
Defines how many seconds an external alarm should be in error state before an alarm is generated.

Example:

```
GET ALA EX1
```

Reply:

```
0 0 4 000 000 020
```

Meaning that lower and upper thresholds are ignored, and the external alarm needs to be in Error state for 20 seconds before an alarm is generated.

Note! In order to configure the external alarm polarity (active high or active low), please refer to attribute EXT.

4.11 EX2 - External Alarm 2

The external alarm allows the user to connect external alarm sources, for example fire alarms or external door sensors to the controller.

This is a purely digital measurement, i.e. either the external alarm is OK, or in Error.

Lower Threshold:
Not Used.

Upper Threshold:
Not Used

Time Threshold:
Defines how many seconds an external alarm should be in error state before an alarm is generated.

Example:

```
GET ALA EX2
```

Reply:

```
0 0 4 000 000 005
```

Meaning that lower and upper thresholds are ignored, and the external alarm needs to be in Error state for 5 seconds before an alarm is generated.

Note! In order to configure the external alarm polarity (active high or active low), please refer to attribute EXT.

4.12 EX3 - External Alarm 3

The external alarm allows the user to connect external alarm sources, for example fire alarms or external door sensors to the controller.

This is a purely digital measurement, i.e. either the external alarm is OK, or in Error.

Lower Threshold:
Not Used.

Upper Threshold:
Not Used

Time Threshold:
Defines how many seconds an external alarm should be in error state before an alarm is generated.

Example:

```
GET ALA EX3
```

Reply:

```
0 0 4 000 000 002
```

Meaning that lower and upper thresholds are ignored, and the external alarm needs to be in Error state for 2 seconds before an alarm is generated.

Note! In order to configure the external alarm polarity (active high or active low), please refer to attribute EXT.

4.13 EX4 - External Alarm 4

The external alarm allows the user to connect external alarm sources, for example fire alarms or external door sensors to the controller.

This is a purely digital measurement, i.e. either the external alarm is OK, or in Error.

Lower Threshold:
Not Used.

Upper Threshold:
Not Used

Time Threshold:
Defines how many seconds an external alarm should be in error state before an alarm is generated.

Example:

```
GET ALA EX4
```

Reply:

```
0 0 4 000 000 010
```

Meaning that lower and upper thresholds are ignored, and the external alarm needs to be in Error state for 10 seconds before an alarm is generated.

Note! In order to configure the external alarm polarity (active high or active low), please refer to attribute EXT.

4.14 FRX - Fiber Optic Receiver

The Fiber Optic Receiver alarm is triggered when there is a failure in the Fiber Optic Interface receiver equipment.

This is a purely digital measurement, i.e. either the receiver is OK, or broken (Error).

Lower Threshold:
Not Used.

Upper Threshold:
Not Used

Time Threshold:
Defines how many seconds the receiver should be in error condition opened before an alarm is generated.

Example:

```
GET ALA FRX
```

Reply:

```
0 0 4 000 000 003
```

Meaning that lower and upper thresholds are ignored, and the receiver needs needs to be in error for 3 seconds before an alarm is triggered.

Note! This alarm attribute is only used in Fiber Optic fed repeaters.

4.15 FTX - Fiber Optic Transmitter

The Fiber Optic Transmitter alarm is triggered when there is a failure in the Fiber Optic transmitter equipment.

This is a purely digital measurement, i.e. either the transmitter is OK, or broken (Error).

Lower Threshold:
Not Used.

Upper Threshold:
Not Used

Time Threshold:
Defines how many seconds the transmitter should be in error condition opened before an alarm is generated.

Example:

```
GET ALA FTX
```

Reply:

```
0 0 4 000 000 003
```

Meaning that lower and upper thresholds are ignored, and the transmitter needs needs to be in error for 3 seconds before an alarm is triggered.

Note! This alarm attribute is only used in Fiber Optic fed repeaters.

4.16 ILI - Illegal Logins exceeded limit

When a user makes an invalid login attempt, the repeater increases a counter of invalid logins. This counter is decreased by one every hour. If the counter reaches a configurable threshold (please refer to the ILA attribute), an alarm can be generated to the repeater OMC. The alarm configuration for the ILI attribute is only used to configure whether the alarm should be sent (Enabled), and if the alarm requires an acknowledgement.

Lower Threshold:
Not Used

Upper Threshold:
Not Used

Time Threshold:
Not Used

Example

```
GET ALA ILI
```

Reply:

```
0 1 4 0 0 0
```

indicates that the alarm will be generated, but doesn't require an acknowledgement.

4.17 IOD - Input Overload Downlink

The input circuitry in the downlink chain contains circuitry to detect if there is an input overload on the downlink chain.

The measurement is always measured in downlink chain 1, but the detector is a broadband detector, covering the entire downlink band where the repeater is operational.

This alarm is used to detect if there is other equipment in the frequency band causing the input of the repeater to be blocked, and hence decreasing the repeater performance. This can for example be a base station from another operator being mounted too close to the repeater donor antenna.

This is a purely digital measurement, meaning that either the measurement is OK, or input overload is high.

Lower Threshold:
Not Used

Upper Threshold:
Not Used

Time Threshold:
Number of consecutive measurements on the input overload detector before an alarm is triggered.

Exampl:

```
GET ALA IOD
```

Repyl:

```
0 0 4 0 0 3
```

indicates that the alarm transmission is enabled, and also requires an acknowledgement. The input overload has to be measured as too high three consecutive times before an alarm is triggered.

4.18 IOU - Input Overload Uplink

The input circuitry in the uplink chain contains circuitry to detect if there is an input overload on the uplink chain.

The measurement is always measured in uplink chain 1, but the detector is a broadband detector, covering the entire uplink band where the repeater is operational.

This alarm is used to detect if there is other equipment in the frequency band causing the input of the repeater to be blocked, and hence decreasing the repeater performance. This can for example be harmonics from TV-transmitters or other strong radio signals.

This is a purely digital measurement, meaning that either the measurement is OK, or input overload is high.

Lower Threshold:
Not Used

Upper Threshold:
Not Used

Time Threshold:
Number of consecutive measurements on the input overload detector before an alarm is triggered.

Exampl:

```
GET ALA IOU
```

Repyl:

```
0 0 4 0 0 3
```

indicates that the alarm is enabled, and also requires an acknowledgement. The input overload has to be measured as too high three consecutive times before an alarm is triggered.

4.19 LGO - User logged out from repeater

If a user logs in to the repeater, an alarm is triggered.

Also, an alarm can be configured to be sent away indicating the user logged out. The alarm configuration for the LGO attribute is only used to configure whether the alarm should be sent (Enabled), and if the alarm requires an acknowledgement.

Lower Threshold:
Not Used

Upper Threshold:
Not Used

Time Threshold:
Not Used

Example

```
GET ALA LGO
```

Reply:

```
0 0 4 0 0 0
```

indicates that the alarm will be generated, and also requires an acknowledgement.

4.20 PDL - Power Level BCCH Downlink

If the output power of the BCCH in the downlink drops below a certain threshold, for example if an obstacle is raised between the feeding base station and the repeater, an alarm is generated.

Lower Threshold:
This indicates the lower value in dBm for when the BCCH is considered too low.

Upper Threshold:
Not Used.

Time Threshold:
Defines how many seconds a too low output power should be measured before an alarm is generated.

Example:

```
GET ALA PDL
```

Reply:

```
0 0 3 024 000 003
```

indicating that if BCCH drops below 24 dBm an erroneous level is detected, upper threshold is ignored and the output level must be too low for 3 seconds before an alarm is generated.

Note! If the lower threshold is set lower than the lowest detectable output power in the repeater, the alarm will be ignored.

4.21 PSL - Power Supply Level

The Power Supply Level is configured to generate an alarm if the mains power supply level drops below or increases above a configured threshold.

Depending on if power supply is AC or DC configured, the alarm thresholds are set correspondingly.

Lower Threshold:
Indicates the level in Volts that is the lowest allowed input voltage.

Upper Threshold:
Indicates the level in Volts that is the highest allowed input voltage.

Time Threshold:
Defines how many seconds the input voltage has to be outside allowed interval in order to be considered an alarm.

Example:

```
GET ALA PSL
```

Reply:

```
0 0 1 207 263 3
```

indicates that if the allowed input Voltage range is 207 Volts to 263 Volts, and that an alarm will be triggered if Voltage is outside allowed interval for 3 seconds.

4.22 PTM - Power Supply Temperature

If the temperature in the power supply exceeds or decrease below a certain threshold, an alarm is triggered.

Lower Threshold:

Defines the temperature in degrees Celsius for when the temperature is considered too low.

Upper Threshold:

Defines the temperature in degrees Celsius for when the temperature is considered too high.

Time Threshold:

Defines how many seconds a too high temperature should be measured before an alarm is generated.

Example:

```
GET ALA PTM
```

Reply:

```
0 0 1 -20 080 005
```

Meaning that lower threshold is –20° C , upper temperature threshold is 80° C and the power supply temperature must be out of range for 5 seconds before an alarm is generated.

4.23 PW1 - Power Supply 1

The Power Supply 1 alarm is configured to generate an alarm if the +28 V drops below, or raise above a certain threshold.

This threshold is used for all alarm sources where the PW1 is monitored.

Lower Threshold:

Configures in Volts*10 how much the voltage can drop before an alarm status is entered.

For example, configuring lower threshold to 265 means that the lower threshold is 26.5 Volts.

Upper Threshold:

Configures in Volts*10 how much the voltage can increase before an alarm status is entered.

For example, configuring upper threshold to 290 means that the upper threshold is 29.0 Volts.

Time Threshold:

Defines how many seconds the Power Supply has to be in an error state before an alarm is triggered.

Example:

```
GET ALA PW1
```

Reply:

```
0 0 1 275 285 3
```

indicates that if the power drops 0.5 Volts, or increases 0.5 Volts, an erroneous state is reached. It also shows that after 3 seconds of error, an alarm is triggered.

4.24 PW2 - Power Supply 2

The Power Supply 2 alarm is configured to generate an alarm if the +15 V drops below, or raise above a certain threshold.

This threshold is used for all alarm sources where the PW2 is monitored.

Lower Threshold:

Configures in Volts*10 how much the voltage can drop before an alarm status is entered.

For example, configuring lower threshold to 145 means that the lower threshold is 14.5 Volts.

Upper Threshold:
Configures in Volts*10 how much the voltage can increase before an alarm status is entered.

For example, configuring upper threshold to 155 means that the upper threshold is 15.5 Volts.

Time Threshold:
Defines how many seconds the Power Supply has to be in an error state before an alarm is triggered.

Example:

```
GET ALA PW2
```

Reply:

```
0 0 1 143 157 3
```

indicates that if the power drops 0.7 Volts, or increases 0.5 Volts, an erroneous state is reached. It also shows that after 3 seconds of error, an alarm is triggered.

4.25 PW3 - Power Supply 3

The Power Supply 3 alarm is configured to generate an alarm if the +6.45 V drops below, or raise above a certain threshold.

This threshold is used for all alarm sources where the PW3 is monitored.

Lower Threshold:
Configures in Volts*100 how much the voltage can drop before an alarm status is entered.

For example, configuring lower threshold to 610 means that the lower threshold is 6.1 Volts.

Upper Threshold:
Configures in Volts*100 how much the voltage can increase before an alarm status is entered.

For example, configuring upper threshold to 670 means that the upper threshold is 6.7 Volts.

Time Threshold:
Defines how many seconds the Power Supply has to be in an error state before an alarm is triggered.

Example:

```
GET ALA PW3
```

Reply:

```
0 0 1 630 680 3
```

indicates that if the power drops below 6.3 Volts, or exceeds 6.8 Volts, an erroneous state is reached. It also shows that after 3 seconds of error, an alarm is triggered.

4.26 PW4 - Power Supply 4

The Power Supply 4 alarm is configured to generate an alarm if the +6.45 V feeding the controller drops below, or raise above a certain threshold.

Lower Threshold:
Configures in Volts*100 how much the voltage can drop before an alarm status is entered.

For example, configuring lower threshold to 630 means that the lower threshold is 6.3 Volts.

Upper Threshold:
Configures in Volts*100 how much the voltage can increase before an alarm status is entered.

For example, configuring upper threshold to 670 means that the upper threshold is 6.7 Volts.

Time Threshold:
Defines how many seconds the Power Supply has to be in an error state before an alarm is triggered.

Example:

```
GET ALA PW4
```

Reply:

```
0 0 1 630 680 3
```

indicates that if the power drops below 6.3 Volts, or exceeds 6.8 Volts, an erroneous state is reached. It also shows that after 3 seconds of error, an alarm is triggered.

4.27 SZD - Synthesizer Downlink

The synthesizer alarm indicates if a synthesizer in the repeater is unlocked.

This is a purely digital measurement, i.e. either the synthesizer is OK, or in Error.

Lower Threshold:
Not Used.

Upper Threshold:
Not Used

Time Threshold:
Defines how many seconds a synthesizer should be unlocked before an alarm is generated.

Example:

```
GET ALA SZD
```

Reply:

```
0 0 4 000 000 003
```

Meaning that lower and upper thresholds are ignored, and the synthesizer needs to be unlocked for 3 seconds before an alarm is generated.

4.28 SZU - Synthesizer Uplink

The synthesizer alarm indicates if a synthesizer in the repeater is unlocked.

This is a purely digital measurement, i.e. either the synthesizer is OK, or in Error.

Lower Threshold:
Not Used.

Upper Threshold:
Not Used

Time Threshold:
Defines how many seconds a synthesizer should be unlocked before an alarm is generated.

Example:

```
GET ALA SZU
```

Reply:

```
0 0 4 000 000 003
```

Meaning that lower and upper thresholds are ignored, and the synthesizer needs to be unlocked for 3 seconds before an alarm is generated.

4.29 TEM - Temperature

If the temperature in the unit exceeds or decrease below a certain threshold, an alarm is triggered.

Lower Threshold:
Defines the temperature in degrees Celsius for when the temperature is considered too low.

Upper Threshold:
Defines the temperature in degrees Celsius for when the temperature is considered too high.

Time Threshold:
Defines how many seconds a too high temperature should be measured before an alarm is generated.

Example:

```
GET ALA TEM
```

Reply:

```
0 0 1 -20 65 5
```

Meaning that lower threshold is –20° C , upper temperature threshold is 65° C and the temperature must be out of range for 5 seconds before an alarm is generated.

4.30 VLI - Valid Login to repeater

If a user logs in to the repeater, an alarm is triggered. The alarm configuration for the VLI attribute is only used to configure whether the alarm should be sent (Enabled), and if the alarm requires an acknowledgement.

Lower Threshold:

Not Used

Upper Threshold:

Not Used

Time Threshold:

Not Used

Example

```
GET ALA VLI
```

Reply:

```
0 1 4 0 0 0
```

indicates that the alarm will be generated, but does not require an acknowledgement.

Note! The VLI alarm will not be sent to the repeater OMC until the user logged out from the repeater, and thus releases the communications interface.

4.31 WRD - Voltage Standing Wave Ratio Downlink

The VSWR unit monitors the reflected power level at the server anenna port(s). If the the difference between the transmitted and reflected power is too low, an alarm is generated.

Lower Threshold:

This configures how many dB that can differ between transmitted and reflected power in the downlink before an alarm is generated.

Upper Threshold:

Not used.

Time Threshold:

This defines after how many seconds in alarm condition that an alarm will be generated.

Example:

```
GET ALA WRD
```

Reply:

```
0 0 2 013 000 003
```

This shows that if the difference between transmitted and reflected power is less than 13 dB, and this is measured for three seconds in a row, an alarm will be generated.

5 Miscellaneous Command Attributes

The following commands are available both from login and, when supported, via Short Message Service (SMS). The commands can also be sent from the Avitec Element Manager and the Avitec Maintenance Console

5.1 ACT ACK

Acknowledges alarm

Format:

```
ACT ACK X
```

X is alarm with message number X.

Example:

```
ACT ACK 42
```

Acknowledges alarm with message number 42

Requires Read and Write access when logged in.

Via SMS, this can only be performed by the Main Address

5.2 ACT AIM

This command is used to perform antenna isolation measurements.

Antenna isolation measurement is performed using a special feature in the LIMPA's, allowing for output channel to be shifted from the input channel.

Two channels are used, one BCCH channel, and one so called Listener channel. By default, these channels are the ones configured in chain one and two, but can with attribute AIC (Antenna Isolation Measurement Channels) be changed.
The measurement is performed by the following steps:

8. Output is turned of in chain 2 of the repeater in the downlink path.
9. Channel in chain 1 is optionally changed to the alternative BCCH channel.
10. Channel in chain 2 is optionally changed to the alternative Listener channel.
11. Output channel in chain 1 downlink is changed to the Listener channel.
12. Since the BCCH in chain one is transmitted as the Listener channel, we measure the input signal on the Listener channel. Antenna isolation can now be calculated as transmitted output power in chain one – received input signal in chain 2.
13. Compare the measured signal with the alarm threshold (ALA AIM), and, depending on measurement result, generate alarm or end of alarm.
14. All radio parameters are restored to the default.

The repeater can be configured to measure the antenna isolation on a certain timepoint of the day (configured using attributes AIE and AIT).

By default, downlink chain 1 and 2 settings are used for the antenna measurements. If only one chain is enabled in the repeater, or if measurement should be done on other channels, this attribute can be used to configure the alternate channels.

Typically this measurement takes around 3-4 seconds. Under normal circumstances, the GSM network should be able to keep the call during this absence of radio signal, but in some cases the call might be dropped.

If this measurement is requested remotely, the call might be dropped. In order to read out the last measurement, use the command GET LAI (Last Antenna Isolation Measurement).

Note 1! This command will return the command prompt directly, and the actual measurement will be performed in the background. In order to get the last measurement, poll the GET LAI until time stamp in the reply shows that the measurement is completed.

Note 2! Since Fiber Optic repeaters and repeaters CSFT18922 and CSFT91822 cannot oscillate, measuring antenna isolation will not give a meaningful result. For that reason, automatic antenna isolation is not by default enabled in these repeaters.

5.3 ACT CLO

Clears all entries in the alarm log.

Requires Read and Write access when logged in.

Via SMS, this can only be performed by the Main Address

5.4 ACT HBT

Heartbeat Request

Causes the controller to send a heartbeat immediately after logout. Can be used to synchronize the heartbeat transmissions in the Element Manager.

5.5 ACT RCD

This command is used to perform a power cycle of the modem directly after the next logout from the repeater is performed.

Note! The controller can also be configured to automatically turn off and turn on the modem once per day. This feature can be used to ensure that the modem parameters when using for example GSM modems contain the latest network parameters such as HLR update interval etc.
Attribute MPE is used to configure if automatic modem power cycling should be enabled.

Timepoint for when to power cycling the modem can be set with attribute MPT. In order to read out Last modem Power Cycling timepoint, use attribute LPC.

5.6 ACT RHW

Performs a hardware reset of the active devices (not including the controller)

5.7 ACT RSR

Resets the controller software, as if the power has been switched off and back on.

Requires Read and Write access when logged in.

Via SMS, this can only be performed by the Main Address

Note 1! If logged in, an automatic logout will immediately occur.

Note 2! Since the controller always sends End of Power alarm after power up, two alarms will be sent away every time a reset is performed, end of Power 1 and end of Power 2.

5.8 ACT TRE

Test Relay Connection. For installation testing purposes, it is possible to test the open / close function of the relay. This test procedure makes sure the relay is closed for 2.5 seconds, then opens for 10 seconds, and finally closes for 2.5 seconds before going back to original state.

Note! During this test interval, the relay connection will be unaffected by all alarms.

5.9 ACT UPA

Use Primary Address.

Causes the controller to force the controller back to primary OMC address, in case secondary address is used.

6 Commands

The following commands are only available when logged in to the repeater, either via Local Maintenance Terminal (LMT), or via a remote login over a modem.

6.1 ACCESS MODEM

If user is logged in locally, the user can directly send characters from the keyboard to the modem attached to the controller.

When typing `ACCESS MODEM`, the controller will send all the characters typed directly out the modem port. All characters replied back from the modem will go directly out the LMT port.

This command can, together with the modem manual, be used to troubleshoot specific modem communication problems.

To abort an ACCESS MODEM session, press <Ctrl>-C, or use the escape sequence <Wait 1 s> '---' <Wait 1 s>. Note that the three '-' must be pressed within one second.

Note! When accessing the modem port the modem might be configured with "echo off", meaning that the characters entered will not be echoed back to the screen. In order to enable the characters to be echoed back from the modem, please hit <CR>.

After that, type

```
ATE1
```

followed by <CR>.The modem should then reply with

```
OK
```

indicating that the echo is enabled.

6.2 CLEAR LOG

By entering this command, the alarm log in the controller will be cleared.

This is the same as using the command ACT CLO, as described in section Miscellaneous Command Attributes.

6.3 CLEAR SCREEN

By entering this command, the screen will be cleared from old information.

6.4 HARDWARE

Displays a list of all the configured hardware devices in the equipment, including serial number, software and hardware versions.

This command is also used to reconfigure the system after replacing a broken module.

Format:

```
HARDWARE REPLACE <OldSNO> <NewSNO> [Article Number]
```

<OldSNO> is the serial number of the module that has been removed
<NewSNO> is the serial number of the new module

[Article Number] is used if a passive module, such as a distribution board or external interface board is changed.

Example 1:

```
HARDWARE REPLACE 2J3A 3ASA
```

replaces the broken module 2J3A with the new module 3ASA.

Example 2:

```
HARDWARE REPLACE 3AZC 3EEF J691001A
```

replaces the old module 3AZC with the new module 3EEF, with article number J691001A.

6.5 HELP

Displays a simple help screen.

Note! This screen can also, if terminal emulation for the communications package is set to VT100, be brought up by pressing the key F1.

6.6 LOG

The LOG command displays all the entries in the alarm log. Information is given about when the alarm was detected, what kind of alarm, severity, attribute etc.

6.7 LOGOUT

Ends the controller login session. If logged in remotely, the modem connection will, as a part of the logout procedure, be disconnected.

6.8 MODEM

This command gives a quick overview of some of the modem configurations, such as modem type and initialization string etc.

6.9 MP

The controller is responsible for applying power to the communications equipment (CE).

This command turns on and off the power to the modem (MP = Modem Power).

MP ON

Turn the power to the modem on.

MP OFF

Turn the power to the modem off. If this is done remotely, the connection will hang up immediately.

6.10 PERF

Displays the traffic report screen.

Note! This screen can also, if terminal emulation for the communications package is set to VT100, be brought up by pressing the key F4.

6.11 REINIT

This command reinitializes ALL controller factory settings.

The controller will prompt for Date, Time, serial number of active devices etc.

Note! All the hardware configuration, address information, modem configuration, etc will be set to default values. This means that the unit will not be operational with the old settings anymore.

This command should normally ONLY be used if a control module have been replaced.

6.12 SILENT ON / SILENT OFF

When the user is logged out from the controller, the controller sends information out on the LMT port about current activities, such as modem check, alarm transmission and report transmissions etc.

```
SILENT ON
```

configures the controller to not send any information out, while

```
SILENT OFF
```

will enable the controller to send information out on the LMT port.

6.13 STATUS

Displays the status screen, containing all relevant RF-parameters, and all status parameters.

Note! This screen can also, if terminal emulation for the communications package is set to VT100, be brought up by pressing the key F3.

6.14 SYSTEM

Displays a screen with different system parameters, such as serial numbers, failure statistics and hardware/software versions.

6.15 TRACE AMP

This command displays a trace of the sampled input and output power levels. This trace is useful for verifying if BCCH signals exists, and see the approximate input and output signal levels in dBm. Also, gain calculation status is displayed for each chain, indicating whether the gain is within expected interval or not.

If an output power is below lowest detectable output power, a '<X' is displayed, where X is the lowest detectable output power.

Trace Example:

```
4UL Ipl:-106.9 Opl:<15.0 - OK
1DL Ipl:-53.7 Opl:36.5 - OK
2DL Ipl:-98.5 Opl:<15.0 - OK
1UL Ipl:-105.2 Opl:<15.0 - OK
2UL Ipl:-105.8 Opl:<15.0 - OK
3DL Ipl:-103.2 Opl:<15.0 - OK
4DL Ipl:-102.8 Opl:<15.0 - OK
3UL Ipl:-63.2 Opl:33.0 - OK
4UL Ipl:-106.6 Opl:<15.0 - OK
1DL Ipl:-53.7 Opl:36.5 - OK
2DL Ipl:-98.6 Opl:<15.0 - OK
1UL Ipl:-105.2 Opl:<15.0 - OK
2UL Ipl:-105.8 Opl:<15.0 - OK
3UL Ipl:-63.1 Opl:33.1 - OK
4UL Ipl:-106.8 Opl:<15.0 – OK
```

As seen in the example, chain 1 downlink (BCCH) has -53.7 dBm input signal, and the output signal is 36.5 dBm. Also, uplink channel 3 (a traffic channel) has an input signal of around -63 dBm and an output power of 33.1 dBm. Since input level + repeater corresponds to measured output power level, an OK is displayed after each measurement, indicating the amplifier chain works as expected.

Note! Please refer to attributes IPL and OPL for further description of input and output power measurements.

6.16 TRACE TRAFFIC

The controller constantly measures all timeslots in the uplink paths of all the chains. Every 15 minutes an average of the utilization in the uplink path is calculated and stored in a log.

In order to be able to detect number of time slots occupied in each frame, the repeater extracts a downlink synchronization signal from the BCCH, which must be configured for chain one downlink. This synchronization signal is used by the uplink LIMPA's to measure timeslots in last frame. If the BCCH cannot be extracted, a built in timer in the LIMPA tries to generate an approximate frame length, from which number of occupied timeslots in this frame is measured.

Note! Total numbers of time slots detected are correctly detected even if the frame synchronization is not present.

By using the TRACE TRAFFIC command it is possible to see the actual utilization on a chain by chain basis.

Depending on if this is a two or four channel repeater a number of columns are presented.

The first two (or four) columns represent the number of time slots detected in last sampled frame. The following columns, starting with *S:* denotes number of timeslots detected in this interval. The columns starting with *Tot:* shows how many timeslots have elapsed so far in this interval. The *%* column shows percent of the timeslots have been active/occupied in this interval. If the string *"No DL sync!"* follows the trace, it means that the BCCH signal cannot be extracted from downlink chain one, and that timeslots last frame are estimated based on the timer in the LIMPA.

Example:

```
1 0 S:1680 8220 Tot:259950 259950  %:1.46 No DL sync!
0 2 S:1708 8244 Tot:261683 261683  %:1.45 No DL sync!
1 2 S:1723 8267 Tot:263416 263416  %:1.44 No DL sync!
0 0 S:1730 8301 Tot:265149 265149  %:1.43 No DL sync!
1 2 S:1755 8330 Tot:266882 266882  %:1.41 No DL sync!
```

This trace shows an average utilization of around 1.4 % so far in this interval.

7 Heartbeat Format

For Status parameters ‘0’ means OK and ‘1’ means ERROR. The information in the Heartbeat message can also be achieved by using the command GET ALL, which will reply with all information except fields RepeaterID..Time.

7.1 Heartbeat Format in conventional 2-channel Repeaters

Field	Format	Description
Repeater ID	XX-YY-ZZZZ	
Message no	NNNNN	
State	STATE	
Date	DDMMYY	
Time	HHMMSS	
RCH	NNNN	Repetition cycle for heartbeat reports
CHA 1	NNN	Repeated channel in chain 1
CHA 2	NNN	Repeated channel in chain 2
ATU 1	NN	Attenuation in uplink chain 1
ATU 2	NN	Attenuation in uplink chain 2
ATD 1	NN	Attenuation in downlink chain 1
ATD 2	NN	Attenuation in downlink chain 2
LVU 1	NNN	Peak Limiting in uplink chain 1. If output power is turned off, - is replied.
LVU 2	NNN	Peak Limiting in uplink chain 2. If output power is turned off, - is replied.
LVD 1	NN	Peak Limiting in downlink chain 1. If output power is turned off, - is replied.
LVD 2	NN	Peak Limiting in downlink chain 2. If output power is turned off, - is replied.
PDL	BB	BCCH Status Downlink
ASU	BB	Status of amplifier saturation alarm uplink
ASD	BB	Status of amplifier saturation alarm downlink
AMU	BB	Status of amplifier chains uplink
AMD	BB	Status of amplifier chains downlink
SZU	BBBB	Synthesizer Alarm Uplink
SZD	BBBB	Synthesizer Alarm Downlink
COM	BBBBBB	Status communication with active devices
BAT / DOO / EXT / TEM	BBBBBB	State of battery charge for mobile phone equipment/ State of door / State of external pins 1-4 / Status of temperature
IOU / IOD / AIM	BBB	Status of Input Overload Uplink / Downlink / Antenna Isolation Measurement
PSL	B	Status of Power Supply input Level
PTM	B	Status of Power Supply Temperature

PW1	BBB	Status of +28 V Power Distribution
PW2	BBB	Status of +15 Power Distribution
PW3	BBBB	Status of +6.45 V Power Distribution
PW4	B	Status of +6.45 V to Controller
WRD	B	Status of VSWR downlink

7.2 Heartbeat Format in 2-channel Fiber Optic Repeaters

Field	Format	Description
Repeater ID	XX-YY-ZZZZ	
Message no	NNNNN	
State	STATE	
Date	DDMMYY	
Time	HHMMSS	
RCH	NNNN	Repetition cycle for heartbeat reports
CHA 1	NNN	Repeated channel in chain 1
CHA 2	NNN	Repeated channel in chain 2
ATU 1	NN	Attenuation in uplink chain 1
ATU 2	NN	Attenuation in uplink chain 2
ATD 1	NN	Attenuation in downlink chain 1
ATD 2	NN	Attenuation in downlink chain 2
LVU 1	NNN	Peak Limiting in uplink chain 1. If output power is turned off, - is replied.
LVU 2	NNN	Peak Limiting in uplink chain 2. If output power is turned off, - is replied.
LVD 1	NN	Peak Limiting in downlink chain 1. If output power is turned off, - is replied.
LVD 2	NN	Peak Limiting in downlink chain 2. If output power is turned off, - is replied.
PDL	BB	BCCH Status Downlink
ASU	BB	Status of amplifier saturation alarm uplink
ASD	BB	Status of amplifier saturation alarm downlink
AMU	BB	Status of amplifier chains uplink
AMD	BB	Status of amplifier chains downlink
SZU	BBBB	Synthesizer Alarm Uplink
SZD	BBBB	Synthesizer Alarm Downlink
COM	BBBBBBB	Status communication with active devices
BAT / DOO / EXT / TEM	BBBBBB	State of battery charge for mobile phone equipment/ State of door / State of external pins 1-4 / Status of temperature
IOU / IOD / AIM	BBB	Status of Input Overload Uplink / Downlink / Antenna Isolation Measurement
PSL	B	Status of Power Supply input Level
PTM	B	Status of Power Supply Temperature

PW1	BBB	Status of +28 V Power Distribution
PW2	BBB	Status of +15 Power Distribution
PW3	BBBB	Status of +6.45 V Power Distribution
PW4	B	Status of +6.45 V to Controller
WRD	B	Status of VSWR downlink
FRX/FTX	BB	Status Fiber Optic Receiver/Transmitter

7.3 Heartbeat Format in Frequency Translating Repeaters

Field	Format	Description
Repeater ID	XX-YY-ZZZZ	
Message no	NNNNN	
State	STATE	
Date	DDMMYY	
Time	HHMMSS	
RCH	NNNN	Repetition cycle for heartbeat reports
CHA 1	NNN	Repeated channel in chain 1
CHA 2	NNN	Repeated channel in chain 2
LNK 1	NNN	Link Channel in chain 1
LNK 2	NNN	Link Channel in chain 2
ATU 1	NN	Attenuation in uplink chain 1
ATU 2	NN	Attenuation in uplink chain 2
ATD 1	NN	Attenuation in downlink chain 1
ATD 2	NN	Attenuation in downlink chain 2
LVU 1	NNN	Peak Limiting in uplink chain 1. If output power is turned off, - is replied.
LVU 2	NNN	Peak Limiting in uplink chain 2. If output power is turned off, - is replied.
LVD 1	NN	Peak Limiting in downlink chain 1. If output power is turned off, - is replied.
LVD 2	NN	Peak Limiting in downlink chain 2. If output power is turned off, - is replied.
PDL	BB	BCCH Status Downlink
ASU	BB	Status of amplifier saturation alarm uplink
ASD	BB	Status of amplifier saturation alarm downlink
AMU	BB	Status of amplifier chains uplink
AMD	BB	Status of amplifier chains downlink
SZU	BBBB	Synthesizer Alarm Uplink
SZD	BBBB	Synthesizer Alarm Downlink
COM	BBBBBB(B)	Status communication with active devices (optionally an extra status byte in –ER repeaters)
BAT / DOO / EXT / TEM	BBBBBB	State of battery charge for mobile phone equipment/ State of door / State of external pins 1-4 / Status of temperature

IOU / IOD / AIM	BBB	Status of Input Overload Uplink / Downlink / Antenna Isolation Measurement
PSL	B	Status of Power Supply input Level
PTM	B	Status of Power Supply Temperature
PW1	BBB	Status of +28 V Power Distribution
PW2	BBB	Status of +15 Power Distribution
PW3	BBBB	Status of +6.45 V Power Distribution
PW4	B	Status of +6.45 V to Controller
WRD	B(B)	Status of VSWR downlink (optionally an extra status byte in –ER repeaters)

7.4 Heartbeat Format in conventional 4-channel Repeaters

Field	Format	Description
Repeater ID	XX-YY-ZZZZ	
Message no	NNNNN	
State	STATE	
Date	DDMMYY	
Time	HHMMSS	
RCH	NNNN	Repetition cycle for heartbeat reports
CHA 1	NNN	Repeated channel in chain 1
CHA 2	NNN	Repeated channel in chain 2
CHA 3	NNN	Repeated channel in chain 3
CHA 4	NNN	Repeated channel in chain 4
ATU 1	NN	Attenuation in uplink chain 1
ATU 2	NN	Attenuation in uplink chain 2
ATU 3	NN	Attenuation in uplink chain 3
ATU 4	NN	Attenuation in uplink chain 4
ATD 1	NN	Attenuation in downlink chain 1
ATD 2	NN	Attenuation in downlink chain 2
ATD 3	NN	Attenuation in downlink chain 3
ATD 4	NN	Attenuation in downlink chain 4
LVU 1	NN	Peak Limiting in uplink chain 1. If output power is turned off, - is replied.
LVU 2	NN	Peak Limiting in uplink chain 2. If output power is turned off, - is replied.
LVU 3	NN	Peak Limiting in uplink chain 3. If output power is turned off, - is replied.
LVU 4	NN	Peak Limiting in uplink chain 4. If output power is turned off, - is replied.
LVD 1	NN	Peak Limiting in downlink chain 1. If output power is turned off, - is replied.
LVD 2	NN	Peak Limiting in downlink chain 2. If output power is turned off, - is replied.

<table>
<tr><td>LVD 3</td><td>NN</td><td>Peak Limiting in downlink chain 3. If output power is turned off, - is replied.</td></tr>
<tr><td>LVD 4</td><td>NN</td><td>Peak Limiting in downlink chain 4. If output power is turned off, - is replied.</td></tr>
<tr><td>PDL / ASU / ASD</td><td>BBBB
BBBBBBBB</td><td>BCCH Status Downlink/ Amplifier Saturation Status Uplink/Downlink</td></tr>
<tr><td>AMU / AMD / SZU / SZD / COM</td><td>BBBBBBBBBB</td><td>Status of amplifier chains uplink / Downlink, Amplifier Saturation Alarm / Uplink / Downlink, Synthesizer Alarm Uplink / Downlink and Status of Communication with active devices in a compressed format.
These values are Hex Coded, and should be used in conjunction with COM alarm.
For example, the AMU is sent as Hex ‘4’, which is extracted to 0100. However, COM alarm reports an alarm for LIMPA 2 uplink, why AMU should be extracted to 01--.
Byte 1
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>AMU:1</td><td>AMU:2</td><td>AMU:3</td><td>AMU:4</td></tr>
</table>
Byte 2
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>AMD:1</td><td>AMD:2</td><td>AMD:3</td><td>AMD:4</td></tr>
</table>
Byte 3
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
Byte 4
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>0</td></tr>
</table>
Byte 5
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>SZU:1</td><td>SZU:2</td><td>SZU:3</td><td>SZU:4</td></tr>
</table>
Byte 6
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>SZU:5</td><td>SZU:6</td><td>SZU:7</td><td>SZU:8</td></tr>
</table>
Byte 7
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>SZD:1</td><td>SZD:2</td><td>SZD:3</td><td>SZD:4</td></tr>
</table>
Byte 8
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>SZD:5</td><td>SZD:6</td><td>SZD:7</td><td>SZD:8</td></tr>
</table>
Byte 9
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>COM:1</td><td>COM:2</td><td>COM:3</td><td>COM:4</td></tr>
</table>
Byte 10
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>COM:5</td><td>COM:6</td><td>COM:7</td><td>COM:8</td></tr>
</table></td></tr>
</table>

<table>
<tr><td>BAT / DOO / EXT / TEM</td><td>BBBBBBB</td><td>State of battery charge for mobile phone equipment/ State of door / State of external pins 1-4 / Status of temperature</td></tr>
<tr><td>IOU / IOD / AIM / PSL / PTM</td><td>BBBBBBBB</td><td>Status of Input Overload Uplink / Downlink / Antenna Isolation Measurement/ Status of Power Supply input Level / Status of Power Supply Temperature</td></tr>
<tr><td>PW1 / PW2 / PW3 / PW4</td><td>BBBBB</td><td>Status of Power Distribution. These values are Hex Coded, and should be used in conjunction with COM alarm.
Byte 1<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW1:1</td><td>PW1:2</td><td>PW1:3</td><td>PW1:4</td></tr></table>Byte 2<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW1:5</td><td>PW1:6</td><td>PW2:1</td><td>PW2:2</td></tr></table>Byte 3<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW2:3</td><td>PW2:4</td><td>PW2:5</td><td>PW2:6</td></tr></table>Byte 4<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW3:1</td><td>PW3:2</td><td>PW3:3</td><td>PW3:4</td></tr></table>Byte 5<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW3:5</td><td>PW3:6</td><td>PW3:7</td><td>PW4</td></tr></table></td></tr>
<tr><td>WRD</td><td>B</td><td>Status of VSWR downlink</td></tr>
</table>

7.5 Heartbeat Format in 4-channel Fiber Optic Repeaters

Field	Format	Description
Repeater ID	XX-YY-ZZZZ	
Message no	NNNNN	
State	STATE	
Date	DDMMYY	
Time	HHMMSS	
RCH	NNNN	Repetition cycle for heartbeat reports
CHA 1	NNN	Repeated channel in chain 1
CHA 2	NNN	Repeated channel in chain 2
CHA 3	NNN	Repeated channel in chain 3
CHA 4	NNN	Repeated channel in chain 4
ATU 1	NN	Attenuation in uplink chain 1
ATU 2	NN	Attenuation in uplink chain 2
ATU 3	NN	Attenuation in uplink chain 3
ATU 4	NN	Attenuation in uplink chain 4
ATD 1	NN	Attenuation in downlink chain 1
ATD 2	NN	Attenuation in downlink chain 2

<table>
<tr><td>ATD 3</td><td>NN</td><td>Attenuation in downlink chain 3</td></tr>
<tr><td>ATD 4</td><td>NN</td><td>Attenuation in downlink chain 4</td></tr>
<tr><td>LVU 1</td><td>NN</td><td>Peak Limiting in uplink chain 1. If output power is turned off, - is replied.</td></tr>
<tr><td>LVU 2</td><td>NN</td><td>Peak Limiting in uplink chain 2. If output power is turned off, - is replied.</td></tr>
<tr><td>LVU 3</td><td>NN</td><td>Peak Limiting in uplink chain 3. If output power is turned off, - is replied.</td></tr>
<tr><td>LVU 4</td><td>NN</td><td>Peak Limiting in uplink chain 4. If output power is turned off, - is replied.</td></tr>
<tr><td>LVD 1</td><td>NN</td><td>Peak Limiting in downlink chain 1. If output power is turned off, - is replied.</td></tr>
<tr><td>LVD 2</td><td>NN</td><td>Peak Limiting in downlink chain 2. If output power is turned off, - is replied.</td></tr>
<tr><td>LVD 3</td><td>NN</td><td>Peak Limiting in downlink chain 3. If output power is turned off, - is replied.</td></tr>
<tr><td>LVD 4</td><td>NN</td><td>Peak Limiting in downlink chain 4. If output power is turned off, - is replied.</td></tr>
<tr><td>PDL / ASU / ASD</td><td>BBBB
BBBBBBBB</td><td>BCCH Status Downlink/ Amplifier Saturation Status Uplink/Downlink</td></tr>
<tr><td>AMU / AMD / SZU / SZD / COM</td><td>BBBBBBBBB</td><td>Status of amplifier chains uplink / Downlink, Synthesizer Alarm Uplink / Downlink and Status of Communication with active devices in a compressed format.
These values are Hex Coded, and should be used in conjunction with COM alarm.
For example, the AMU is sent as Hex ‘4’, which is extracted to 0100. However, COM alarm reports an alarm for LIMPA 2 uplink, why AMU should be extracted to 01--.
Byte 1
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>AMU:1</td><td>AMU:2</td><td>AMU:3</td><td>AMU:4</td></tr>
</table>
Byte 2
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>AMD:1</td><td>AMD:2</td><td>AMD:3</td><td>AMD:4</td></tr>
</table>
Byte 3
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>SZU:1</td><td>SZU:2</td><td>SZU:3</td><td>SZU:4</td></tr>
</table>
Byte 4
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>SZU:5</td><td>SZU:6</td><td>SZU:7</td><td>SZU:8</td></tr>
</table>
Byte 5
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>SZD:1</td><td>SZD:2</td><td>SZD:3</td><td>SZD:4</td></tr>
</table>
Byte 6
<table>
<tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr>
<tr><td>SZD:5</td><td>SZD:6</td><td>SZD:7</td><td>SZD:8</td></tr>
</table></td></tr>
</table>

<table>
<tr><td></td><td></td><td>Byte 7<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>COM:1</td><td>COM:2</td><td>COM:3</td><td>COM:4</td></tr></table>Byte 8<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>COM:5</td><td>COM:6</td><td>COM:7</td><td>COM:8</td></tr></table>Byte 9<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>COM:9</td><td>0</td><td>0</td><td>0</td></tr></table></td></tr>
<tr><td>BAT / DOO / EXT / TEM</td><td>BBBBBBB</td><td>State of battery charge for mobile phone equipment/ State of door / State of external pins 1-4 / Status of temperature</td></tr>
<tr><td>IOU / IOD / AIM / PSL / PTM</td><td>BBBBBB</td><td>Status of Input Overload Uplink / Downlink / Antenna Isolation Measurement/ Status of Power Supply input Level / Status of Power Supply Temperature</td></tr>
<tr><td>PW1 / PW2 / PW3 / PW4</td><td>BBBBBB</td><td>Status of Power Distribution. These values are Hex Coded, and should be used in conjunction with COM alarm.
Byte 1<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW1:1</td><td>PW1:2</td><td>PW1:3</td><td>PW1:4</td></tr></table>Byte 2<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW1:5</td><td>PW1:6</td><td>PW2:1</td><td>PW2:2</td></tr></table>Byte 3<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW2:3</td><td>PW2:4</td><td>PW2:5</td><td>PW2:6</td></tr></table>Byte 4<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW2:7</td><td>PW3:1</td><td>PW3:2</td><td>PW3:3</td></tr></table>Byte 5<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW3:4</td><td>PW3:5</td><td>PW3:6</td><td>PW3:7</td></tr></table>Byte 6<table><tr><td>Bit 1</td><td>Bit 2</td><td>Bit 3</td><td>Bit 4</td></tr><tr><td>PW3:8</td><td>PW4</td><td>0</td><td>0</td></tr></table></td></tr>
<tr><td>WRD</td><td>B</td><td>Status of VSWR downlink</td></tr>
<tr><td>FRX/FTX</td><td>BB</td><td>Status Fiber Optic Receiver/Transmitter</td></tr>
</table>

GSM Frequency Tables

GSM 900

Channel	Uplink	Downlink
1	890.2	935.2
2	890.4	935.4
3	890.6	935.6
4	890.8	935.8
5	891.0	936.0
6	891.2	936.2
7	891.4	936.4
8	891.6	936.6
9	891.8	936.8
10	892.0	937.0
11	892.2	937.2
12	892.4	937.4
13	892.6	937.6
14	892.8	937.8
15	893.0	938.0
16	893.2	938.2
17	893.4	938.4
18	893.6	938.6
19	893.8	938.8
20	894.0	939.0
21	894.2	939.2
22	894.4	939.4
23	894.6	939.6
24	894.8	939.8
25	895.0	940.0
26	895.2	940.2
27	895.4	940.4
28	895.6	940.6
29	895.8	940.8
30	896.0	941.0
31	896.2	941.2
32	896.4	941.4
33	896.6	941.6
34	896.8	941.8
35	897.0	942.0
36	897.2	942.2
37	897.4	942.4
38	897.6	942.6
39	897.8	942.8
40	898.0	943.0
41	898.2	943.2
42	898.4	943.4
43	898.6	943.6
44	898.8	943.8
45	899.0	944.0
46	899.2	944.2
47	899.4	944.4
48	899.6	944.6
49	899.8	944.8
50	900.0	945.0

Channel	Uplink	Downlink
51	900.2	945.2
52	900.4	945.4
53	900.6	945.6
54	900.8	945.8
55	901.0	946.0
56	901.2	946.2
57	901.4	946.4
58	901.6	946.6
59	901.8	946.8
60	902.0	947.0
61	902.2	947.2
62	902.4	947.4
63	902.6	947.6
64	902.8	947.8
65	903.0	948.0
66	903.2	948.2
67	903.4	948.4
68	903.6	948.6
69	903.8	948.8
70	904.0	949.0
71	904.2	949.2
72	904.4	949.4
73	904.6	949.6
74	904.8	949.8
75	905.0	950.0
76	905.2	950.2
77	905.4	950.4
78	905.6	950.6
79	905.8	950.8
80	906.0	951.0
81	906.2	951.2
82	906.4	951.4
83	906.6	951.6
84	906.8	951.8
85	907.0	952.0
86	907.2	952.2
87	907.4	952.4
88	907.6	952.6
89	907.8	952.8
90	908.0	953.0
91	908.2	953.2
92	908.4	953.4
93	908.6	953.6
94	908.8	953.8
95	909.0	954.0
96	909.2	954.2
97	909.4	954.4
98	909.6	954.6
99	909.8	954.8
100	910.0	955.0

GSM 900, cont.

Channel	Uplink	Downlink
101	910.2	955.2
102	910.4	955.4
103	910.6	955.6
104	910.8	955.8
105	911.0	956.0
106	911.2	956.2
107	911.4	956.4
108	911.6	956.6
109	911.8	956.8
110	912.0	957.0
111	912.2	957.2
112	912.4	957.4
113	912.6	957.6
114	912.8	957.8
115	913.0	958.0
116	913.2	958.2
117	913.4	958.4
118	913.6	958.6
119	913.8	958.8
120	914.0	959.0
121	914.2	959.2
122	914.4	959.4
123	914.6	959.6
124	914.8	959.8
125	915.0	960.0
126	915.2	960.2
127	915.4	960.4
128	915.6	960.6
129	915.8	960.8
130	916.0	961.0
131	916.2	961.2
132	916.4	961.4
133	916.6	961.6
134	916.8	961.8
135	917.0	962.0
136	917.2	962.2
137	917.4	962.4
138	917.6	962.6
139	917.8	962.8
140	918.0	963.0
141	918.2	963.2
142	918.4	963.4
143	918.6	963.6
144	918.8	963.8
145	919.0	964.0
146	919.2	964.2
147	919.4	964.4
148	919.6	964.6
149	919.8	964.8
150	920.0	965.0

Channel	Uplink	Downlink
151	920.2	965.2
152	920.4	965.4
153	920.6	965.6
154	920.8	965.8
155	921.0	966.0
156	921.2	966.2
157	921.4	966.4
158	921.6	966.6
159	921.8	966.8
160	922.0	967.0
161	922.2	967.2
162	922.4	967.4
163	922.6	967.6
164	922.8	967.8
165	923.0	968.0
166	923.2	968.2
167	923.4	968.4
168	923.6	968.6
169	923.8	968.8
170	924.0	969.0
171	924.2	969.2
172	924.4	969.4
173	924.6	969.6
174	924.8	969.8
175	925.0	970.0
176	925.2	970.2
177	925.4	970.4
178	925.6	970.6
179	925.8	970.8
180	926.0	971.0
181	926.2	971.2
182	926.4	971.4
183	926.6	971.6
184	926.8	971.8
185	927.0	972.0
186	927.2	972.2
187	927.4	972.4
188	927.6	972.6
189	927.8	972.8
190	928.0	973.0
191	928.2	973.2
192	928.4	973.4
193	928.6	973.6
194	928.8	973.8
195	929.0	974.0
196	929.2	974.2
197	929.4	974.4
198	929.6	974.6
199	929.8	974.8
200	930.0	975.0

GSM 900 R

Channel	Uplink	Downlink
955	876.20	921.20
956	876.40	921.40
957	876.60	921.60
958	876.80	921.80
959	877.00	922.00
960	877.20	922.20
961	877.40	922.40
962	877.60	922.60
963	877.80	922.80
964	878.00	923.00
965	878.20	923.20
966	878.40	923.40
967	878.60	923.60
968	878.80	923.80
969	879.00	924.00
970	879.20	924.20
971	879.40	924.40
972	879.60	924.60
973	879.80	924.80
974	880.00	925.00
975	880.20	925.20
976	880.40	925.40
977	880.60	925.60
978	880.80	925.80
979	881.00	926.00
980	881.20	926.20
981	881.40	926.40
982	881.60	926.60
983	881.80	926.80
984	882.00	927.00
985	882.20	927.20
986	882.40	927.40
987	882.60	927.60
988	882.80	927.80
989	883.00	928.00
990	883.20	928.20
991	883.40	928.40
992	883.60	928.60
993	883.80	928.80
994	884.00	929.00
995	884.20	929.20
996	884.40	929.40
997	884.60	929.60
998	884.80	929.80
999	885.00	930.00
1000	885.20	930.20
1001	885.40	930.40
1002	885.60	930.60
1003	885.80	930.80
1004	886.00	931.00

Channel	Uplink	Downlink
1005	886.20	931.20
1006	886.40	931.40
1007	886.60	931.60
1008	886.80	931.80
1009	887.00	932.00
1010	887.20	932.20
1011	887.40	932.40
1012	887.60	932.60
1013	887.80	932.80
1014	888.00	933.00
1015	888.20	933.20
1016	888.40	933.40
1017	888.60	933.60
1018	888.80	933.80
1019	889.00	934.00
1020	889.20	934.20
1021	889.40	934.40
1022	889.60	934.60
1023	889.80	934.80
1024	890.00	935.00
1	890.20	935.20
2	890.40	935.40
3	890.60	935.60
4	890.80	935.80
5	891.00	936.00
6	891.20	936.20
7	891.40	936.40
8	891.60	936.60
9	891.80	936.80
10	892.00	937.00
11	892.20	937.20
12	892.40	937.40
13	892.60	937.60
14	892.80	937.80
15	893.00	938.00
16	893.20	938.20
17	893.40	938.40
18	893.60	938.60
19	893.80	938.80
20	894.00	939.00
21	894.20	939.20
22	894.40	939.40
23	894.60	939.60
24	894.80	939.80
25	895.00	940.00
26	895.20	940.20
27	895.40	940.40
28	895.60	940.60
29	895.80	940.80

GSM 900 R, cont.

Channel	Uplink	Downlink
30	896.00	941.00
31	896.20	941.20
32	896.40	941.40
33	896.60	941.60
34	896.80	941.80
35	897.00	942.00
36	897.20	942.20
37	897.40	942.40
38	897.60	942.60
39	897.80	942.80
40	898.00	943.00
41	898.20	943.20
42	898.40	943.40
43	898.60	943.60
44	898.80	943.80
45	899.00	944.00
46	899.20	944.20
47	899.40	944.40
48	899.60	944.60
49	899.80	944.80
50	900.00	945.00
51	900.20	945.20
52	900.40	945.40
53	900.60	945.60
54	900.80	945.80
55	901.00	946.00
56	901.20	946.20
57	901.40	946.40
58	901.60	946.60
59	901.80	946.80
60	902.00	947.00
61	902.20	947.20
62	902.40	947.40
63	902.60	947.60
64	902.80	947.80
65	903.00	948.00
66	903.20	948.20
67	903.40	948.40
68	903.60	948.60
69	903.80	948.80
70	904.00	949.00
71	904.20	949.20
72	904.40	949.40
73	904.60	949.60
74	904.80	949.80
75	905.00	950.00
76	905.20	950.20
77	905.40	950.40
78	905.60	950.60
79	905.80	950.80

Channel	Uplink	Downlink
80	906.00	951.00
81	906.20	951.20
82	906.40	951.40
83	906.60	951.60
84	906.80	951.80
85	907.00	952.00
86	907.20	952.20
87	907.40	952.40
88	907.60	952.60
89	907.80	952.80
90	908.00	953.00
91	908.20	953.20
92	908.40	953.40
93	908.60	953.60
94	908.80	953.80
95	909.00	954.00
96	909.20	954.20
97	909.40	954.40
98	909.60	954.60
99	909.80	954.80
100	910.00	955.00
101	910.20	955.20
102	910.40	955.40
103	910.60	955.60
104	910.80	955.80
105	911.00	956.00
106	911.20	956.20
107	911.40	956.40
108	911.60	956.60
109	911.80	956.80
110	912.00	957.00
111	912.20	957.20
112	912.40	957.40
113	912.60	957.60
114	912.80	957.80
115	913.00	958.00
116	913.20	958.20
117	913.40	958.40
118	913.60	958.60
119	913.80	958.80
120	914.00	959.00
121	914.20	959.20
122	914.40	959.40
123	914.60	959.60
124	914.80	959.80

GSM 1800

Channel	Uplink	Downlink
511	1710.0	1805.0
512	1710.2	1805.2
513	1710.4	1805.4
514	1710.6	1805.6
515	1710.8	1805.8
516	1711.0	1806.0
517	1711.2	1806.2
518	1711.4	1806.4
519	1711.6	1806.6
520	1711.8	1806.8
521	1712.0	1807.0
522	1712.2	1807.2
523	1712.4	1807.4
524	1712.6	1807.6
525	1712.8	1807.8
526	1713.0	1808.0
527	1713.2	1808.2
528	1713.4	1808.4
529	1713.6	1808.6
530	1713.8	1808.8
531	1714.0	1809.0
532	1714.2	1809.2
533	1714.4	1809.4
534	1714.6	1809.6
535	1714.8	1809.8
536	1715.0	1810.0
537	1715.2	1810.2
538	1715.4	1810.4
539	1715.6	1810.6
540	1715.8	1810.8
541	1716.0	1811.0
542	1716.2	1811.2
543	1716.4	1811.4
544	1716.6	1811.6
545	1716.8	1811.8
546	1717.0	1812.0
547	1717.2	1812.2
548	1717.4	1812.4
549	1717.6	1812.6
550	1717.8	1812.8
551	1718.0	1813.0
552	1718.2	1813.2
553	1718.4	1813.4
554	1718.6	1813.6
555	1718.8	1813.8
556	1719.0	1814.0
557	1719.2	1814.2
558	1719.4	1814.4
559	1719.6	1814.6
560	1719.8	1814.8

Channel	Uplink	Downlink
561	1720.0	1815.0
562	1720.2	1815.2
563	1720.4	1815.4
564	1720.6	1815.6
565	1720.8	1815.8
566	1721.0	1816.0
567	1721.2	1816.2
568	1721.4	1816.4
569	1721.6	1816.6
570	1721.8	1816.8
571	1722.0	1817.0
572	1722.2	1817.2
573	1722.4	1817.4
574	1722.6	1817.6
575	1722.8	1817.8
576	1723.0	1818.0
577	1723.2	1818.2
578	1723.4	1818.4
579	1723.6	1818.6
580	1723.8	1818.8
581	1724.0	1819.0
582	1724.2	1819.2
583	1724.4	1819.4
584	1724.6	1819.6
585	1724.8	1819.8
586	1725.0	1820.0
587	1725.2	1820.2
588	1725.4	1820.4
589	1725.6	1820.6
590	1725.8	1820.8
591	1726.0	1821.0
592	1726.2	1821.2
593	1726.4	1821.4
594	1726.6	1821.6
595	1726.8	1821.8
596	1727.0	1822.0
597	1727.2	1822.2
598	1727.4	1822.4
599	1727.6	1822.6
600	1727.8	1822.8
601	1728.0	1823.0
602	1728.2	1823.2
603	1728.4	1823.4
604	1728.6	1823.6
605	1728.8	1823.8
606	1729.0	1824.0
607	1729.2	1824.2
608	1729.4	1824.4
609	1729.6	1824.6
610	1729.8	1824.8

GSM 1800, cont.

Channel	Uplink	Downlink		Channel	Uplink	Downlink
611	1730.0	1825.0		667	1741.2	1836.2
612	1730.2	1825.2		668	1741.4	1836.4
613	1730.4	1825.4		669	1741.6	1836.6
614	1730.6	1825.6		670	1741.8	1836.8
615	1730.8	1825.8		671	1742.0	1837.0
616	1731.0	1826.0		672	1742.2	1837.2
617	1731.2	1826.2		673	1742.4	1837.4
618	1731.4	1826.4		674	1742.6	1837.6
619	1731.6	1826.6		675	1742.8	1837.8
620	1731.8	1826.8		676	1743.0	1838.0
621	1732.0	1827.0		677	1743.2	1838.2
622	1732.2	1827.2		678	1743.4	1838.4
623	1732.4	1827.4		679	1743.6	1838.6
624	1732.6	1827.6		680	1743.8	1838.8
625	1732.8	1827.8		681	1744.0	1839.0
626	1733.0	1828.0		682	1744.2	1839.2
627	1733.2	1828.2		683	1744.4	1839.4
628	1733.4	1828.4		684	1744.6	1839.6
629	1733.6	1828.6		685	1744.8	1839.8
630	1733.8	1828.8		686	1745.0	1840.0
631	1734.0	1829.0		687	1745.2	1840.2
632	1734.2	1829.2		688	1745.4	1840.4
633	1734.4	1829.4		689	1745.6	1840.6
634	1734.6	1829.6		690	1745.8	1840.8
635	1734.8	1829.8		691	1746.0	1841.0
636	1735.0	1830.0		692	1746.2	1841.2
637	1735.2	1830.2		693	1746.4	1841.4
638	1735.4	1830.4		694	1746.6	1841.6
639	1735.6	1830.6		695	1746.8	1841.8
640	1735.8	1830.8		696	1747.0	1842.0
641	1736.0	1831.0		697	1747.2	1842.2
642	1736.2	1831.2		698	1747.4	1842.4
643	1736.4	1831.4		699	1747.6	1842.6
644	1736.6	1831.6		700	1747.8	1842.8
645	1736.8	1831.8		701	1748.0	1843.0
646	1737.0	1832.0		702	1748.2	1843.2
647	1737.2	1832.2		703	1748.4	1843.4
648	1737.4	1832.4		704	1748.6	1843.6
649	1737.6	1832.6		705	1748.8	1843.8
650	1737.8	1832.8		706	1749.0	1844.0
651	1738.0	1833.0		707	1749.2	1844.2
652	1738.2	1833.2		708	1749.4	1844.4
653	1738.4	1833.4		709	1749.6	1844.6
654	1738.6	1833.6		710	1749.8	1844.8
655	1738.8	1833.8		711	1750,0	1845,0
656	1739.0	1834.0		712	1750,2	1845,2
657	1739.2	1834.2		713	1750,4	1845,4
658	1739.4	1834.4		714	1750,6	1845,6
659	1739.6	1834.6		715	1750,8	1845,8
660	1739.8	1834.8		716	1751,0	1846,0
661	1740.0	1835.0		717	1751,2	1846,2
662	1740.2	1835.2		718	1751,4	1846,4
663	1740.4	1835.4		719	1751,6	1846,6
664	1740.6	1835.6		720	1751,8	1846,8
665	1740.8	1835.8		721	1752,0	1847,0
666	1741.0	1836.0		722	1752,2	1847,2
				723	1752,4	1847,4

GSM 1800, cont.

Channel	Uplink	Downlink
724	1752.6	1847.6
725	1752.8	1847.8
726	1753.0	1848.0
727	1753.2	1848.2
728	1753.4	1848.4
729	1753.6	1848.6
730	1753.8	1848.8
731	1754.0	1849.0
732	1754.2	1849.2
733	1754.4	1849.4
734	1754.6	1849.6
735	1754.8	1849.8
736	1755.0	1850.0
737	1755.2	1850.2
738	1755.4	1850.4
739	1755.6	1850.6
740	1755.8	1850.8
741	1756.0	1851.0
742	1756.2	1851.2
743	1756.4	1851.4
744	1756.6	1851.6
745	1756.8	1851.8
746	1757.0	1852.0
747	1757.2	1852.2
748	1757.4	1852.4
749	1757.6	1852.6
750	1757.8	1852.8
751	1758.0	1853.0
752	1758.2	1853.2
753	1758.4	1853.4
754	1758.6	1853.6
755	1758.8	1853.8
756	1759.0	1854.0
757	1759.2	1854.2
758	1759.4	1854.4
759	1759.6	1854.6
760	1759.8	1854.8
761	1760.0	1855.0
762	1760.2	1855.2
763	1760.4	1855.4
764	1760.6	1855.6
765	1760.8	1855.8
766	1761.0	1856.0
767	1761.2	1856.2
768	1761.4	1856.4
769	1761.6	1856.6
770	1761.8	1856.8
771	1762.0	1857.0
772	1762.2	1857.2
773	1762.4	1857.4

Channel	Uplink	Downlink
774	1762.6	1857.6
775	1762.8	1857.8
776	1763.0	1858.0
777	1763.2	1858.2
778	1763.4	1858.4
779	1763.6	1858.6
780	1763.8	1858.8
781	1764.0	1859.0
782	1764.2	1859.2
783	1764.4	1859.4
784	1764.6	1859.6
785	1764.8	1859.8
786	1765.0	1860.0
787	1765.2	1860.2
788	1765.4	1860.4
789	1765.6	1860.6
790	1765.8	1860.8
791	1766.0	1861.0
792	1766.2	1861.2
793	1766.4	1861.4
794	1766.6	1861.6
795	1766.8	1861.8
796	1767.0	1862.0
797	1767.2	1862.2
798	1767.4	1862.4
799	1767.6	1862.6
800	1767.8	1862.8
801	1768.0	1863.0
802	1768.2	1863.2
803	1768.4	1863.4
804	1768.6	1863.6
805	1768.8	1863.8
806	1769.0	1864.0
807	1769.2	1864.2
808	1769.4	1864.4
809	1769.6	1864.6
810	1769.8	1864.8
811	1770.0	1865.0
812	1770.2	1865.2
813	1770.4	1865.4
814	1770.6	1865.6
815	1770.8	1865.8
816	1771.0	1866.0
817	1771.2	1866.2
818	1771.4	1866.4
819	1771.6	1866.6
820	1771.8	1866.8
821	1772.0	1867.0
822	1772.2	1867.2
823	1772.4	1867.4

GSM 1800, cont.

Channel	Uplink	Downlink
824	1772.6	1867.6
825	1772.8	1867.8
826	1773.0	1868.0
827	1773.2	1868.2
828	1773.4	1868.4
829	1773.6	1868.6
830	1773.8	1868.8
831	1774.0	1869.0
832	1774.2	1869.2
833	1774.4	1869.4
834	1774.6	1869.6
835	1774.8	1869.8
836	1775.0	1870.0
837	1775.2	1870.2
838	1775.4	1870.4
839	1775.6	1870.6
840	1775.8	1870.8
841	1776.0	1871.0
842	1776.2	1871.2
843	1776.4	1871.4
844	1776.6	1871.6
845	1776.8	1871.8
846	1777.0	1872.0
847	1777.2	1872.2
848	1777.4	1872.4
849	1777.6	1872.6
850	1777.8	1872.8
851	1778.0	1873.0
852	1778.2	1873.2
853	1778.4	1873.4
854	1778.6	1873.6
855	1778.8	1873.8
856	1779.0	1874.0
857	1779.2	1874.2
858	1779.4	1874.4
859	1779.6	1874.6
860	1779.8	1874.8
861	1780.0	1875.0
862	1780.2	1875.2
863	1780.4	1875.4
864	1780.6	1875.6
865	1780.8	1875.8
866	1781.0	1876.0
867	1781.2	1876.2
868	1781.4	1876.4
869	1781.6	1876.6
870	1781.8	1876.8
871	1782.0	1877.0
872	1782.2	1877.2
873	1782.4	1877.4

Channel	Uplink	Downlink
874	1782.6	1877.6
875	1782.8	1877.8
876	1783.0	1878.0
877	1783.2	1878.2
878	1783.4	1878.4
879	1783.6	1878.6
880	1783.8	1878.8
881	1784.0	1879.0
882	1784.2	1879.2
883	1784.4	1879.4
884	1784.6	1879.6
885	1784.8	1879.8

GSM 1900

Channel	Uplink	Downlink	
512	1850.2	1930.2	A
513	1850.4	1930.4	A
514	1850.6	1930.6	A
515	1850.8	1930.8	A
516	1851.0	1931.0	A
517	1851.2	1931.2	A
518	1851.4	1931.4	A
519	1851.6	1931.6	A
520	1851.8	1931.8	A
521	1852.0	1932.0	A
522	1852.2	1932.2	A
523	1852.4	1932.4	A
524	1852.6	1932.6	A
525	1852.8	1932.8	A
526	1853.0	1933.0	A
527	1853.2	1933.2	A
528	1853.4	1933.4	A
529	1853.6	1933.6	A
530	1853.8	1933.8	A
531	1854.0	1934.0	A
532	1854.2	1934.2	A
533	1854.4	1934.4	A
534	1854.6	1934.6	A
535	1854.8	1934.8	A
536	1855.0	1935.0	A
537	1855.2	1935.2	A
538	1855.4	1935.4	A
539	1855.6	1935.6	A
540	1855.8	1935.8	A
541	1856.0	1936.0	A
542	1856.2	1936.2	A
543	1856.4	1936.4	A
544	1856.6	1936.6	A
545	1856.8	1936.8	A
546	1857.0	1937.0	A
547	1857.2	1937.2	A
548	1857.4	1937.4	A
549	1857.6	1937.6	A
550	1857.8	1937.8	A
551	1858.0	1938.0	A
552	1858.2	1938.2	A
553	1858.4	1938.4	A
554	1858.6	1938.6	A
555	1858.8	1938.8	A
556	1859.0	1939.0	A
557	1859.2	1939.2	A
558	1859.4	1939.4	A
559	1859.6	1939.6	A
560	1859.8	1939.8	A
561	1860.0	1940.0	A

Channel	Uplink	Downlink	
562	1860.2	1940.2	A
563	1860.4	1940.4	A
564	1860.6	1940.6	A
565	1860.8	1940.8	A
566	1861.0	1941.0	A
567	1861.2	1941.2	A
568	1861.4	1941.4	A
569	1861.6	1941.6	A
570	1861.8	1941.8	A
571	1862.0	1942.0	A
572	1862.2	1942.2	A
573	1862.4	1942.4	A
574	1862.6	1942.6	A
575	1862.8	1942.8	A
576	1863.0	1943.0	A
577	1863.2	1943.2	A
578	1863.4	1943.4	A
579	1863.6	1943.6	A
580	1863.8	1943.8	A
581	1864.0	1944.0	A
582	1864.2	1944.2	A
583	1864.4	1944.4	A
584	1864.6	1944.6	A
585	1864.8	1944.8	A
586	1865.0	1945.0	
587	1865.2	1945.2	D
588	1865.4	1945.4	D
589	1865.6	1945.6	D
590	1865.8	1945.8	D
591	1866.0	1946.0	D
592	1866.2	1946.2	D
593	1866.4	1946.4	D
594	1866.6	1946.6	D
595	1866.8	1946.8	D
596	1867.0	1947.0	D
597	1867.2	1947.2	D
598	1867.4	1947.4	D
599	1867.6	1947.6	D
600	1867.8	1947.8	D
601	1868.0	1948.0	D
602	1868.2	1948.2	D
603	1868.4	1948.4	D
604	1868.6	1948.6	D
605	1868.8	1948.8	D
606	1869.0	1949.0	D
607	1869.2	1949.2	D
608	1869.4	1949.4	D
609	1869.6	1949.6	D
610	1869.8	1949.8	D
611	1870.0	1950.0	

GSM 1900, cont.

Channel	Uplink	Downlink	
612	1870.2	1950.2	B
613	1870.4	1950.4	B
614	1870.6	1950.6	B
615	1870.8	1950.8	B
616	1871.0	1951.0	B
617	1871.2	1951.2	B
618	1871.4	1951.4	B
619	1871.6	1951.6	B
620	1871.8	1951.8	B
621	1872.0	1952.0	B
622	1872.2	1952.2	B
623	1872.4	1952.4	B
624	1872.6	1952.6	B
625	1872.8	1952.8	B
626	1873.0	1953.0	B
627	1873.2	1953.2	B
628	1873.4	1953.4	B
629	1873.6	1953.6	B
630	1873.8	1953.8	B
631	1874.0	1954.0	B
632	1874.2	1954.2	B
633	1874.4	1954.4	B
634	1874.6	1954.6	B
635	1874.8	1954.8	B
636	1875.0	1955.0	B
637	1875.2	1955.2	B
638	1875.4	1955.4	B
639	1875.6	1955.6	B
640	1875.8	1955.8	B
641	1876.0	1956.0	B
642	1876.2	1956.2	B
643	1876.4	1956.4	B
644	1876.6	1956.6	B
645	1876.8	1956.8	B
646	1877.0	1957.0	B
647	1877.2	1957.2	B
648	1877.4	1957.4	B
649	1877.6	1957.6	B
650	1877.8	1957.8	B
651	1878.0	1958.0	B
652	1878.2	1958.2	B
653	1878.4	1958.4	B
654	1878.6	1958.6	B
655	1878.8	1958.8	B
656	1879.0	1959.0	B
657	1879.2	1959.2	B
658	1879.4	1959.4	B
659	1879.6	1959.6	B
660	1879.8	1959.8	B
661	1880.0	1960.0	B

Channel	Uplink	Downlink	
662	1880.2	1960.2	B
663	1880.4	1960.4	B
664	1880.6	1960.6	B
665	1880.8	1960.8	B
666	1881.0	1961.0	B
667	1881.2	1961.2	B
668	1881.4	1961.4	B
669	1881.6	1961.6	B
670	1881.8	1961.8	B
671	1882.0	1962.0	B
672	1882.2	1962.2	B
673	1882.4	1962.4	B
674	1882.6	1962.6	B
675	1882.8	1962.8	B
676	1883.0	1963.0	B
677	1883.2	1963.2	B
678	1883.4	1963.4	B
679	1883.6	1963.6	B
680	1883.8	1963.8	B
681	1884.0	1964.0	B
682	1884.2	1964.2	B
683	1884.4	1964.4	B
684	1884.6	1964.6	B
685	1884.8	1964.8	B
686	1885.0	1965.0	
687	1885.2	1965.2	E
688	1885.4	1965.4	E
689	1885.6	1965.6	E
690	1885.8	1965.8	E
691	1886.0	1966.0	E
692	1886.2	1966.2	E
693	1886.4	1966.4	E
694	1886.6	1966.6	E
695	1886.8	1966.8	E
696	1887.0	1967.0	E
697	1887.2	1967.2	E
698	1887.4	1967.4	E
699	1887.6	1967.6	E
700	1887.8	1967.8	E
701	1888.0	1968.0	E
702	1888.2	1968.2	E
703	1888.4	1968.4	E
704	1888.6	1968.6	E
705	1888.8	1968.8	E
706	1889.0	1969.0	E
707	1889.2	1969.2	E
708	1889.4	1969.4	E
709	1889.6	1969.6	E
710	1889.8	1969.8	E
711	1890.0	1970.0	

Avitec Remote Maintenance Console Short Guide

Valid from RMC version 2.02

Installation

Requirements

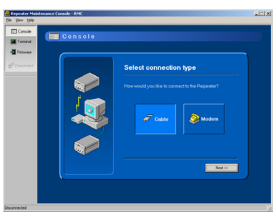
CPU	Pentium, 200 MHz (Pentium III, 500 MHz recommended)
RAM	64 MB (128 MB recommended)
Hard Drive	10 MB free disk space
CD-ROM	Required for installation
Video resolution	800 x 600 with at least 15 bit color depth (approx. 32000 colors) 24 bit color depth (16.7 million colors) recommended It is possible to run the program in 256 or 16 color modes, but colors will appear distorted
Operating system	Windows 98SE/NT/2000/XP

Installation Procedure

1. Ensure the computer and operation system complies with the requirements above.
2. Insert the CD-ROM into your CD-ROM reader. This will in most cases auto-start the setup program. If not select your CD-ROM drive and double-click the file “Setup.exe”.
3. Follow the setup program guide through the installation process. Specify where the program should be installed.
4. When the installation is finished, start the RMC from the” Start” menu (no reboot is needed)

Connection Setup

At startup the “connection wizard” is displayed. This wizard contains a step-by-step guide through the connection and login process.

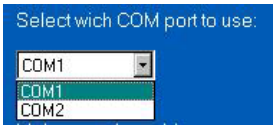


Cable Connection Set up

Click “Cable”
Click “Next”

Select the serial port to be used.

Click “Connect”



Modem Connection Set up

Click “Modem”

Click “Next”

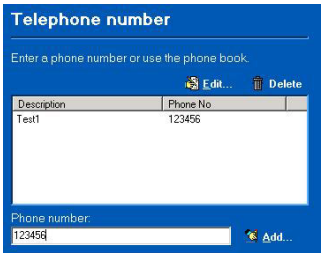
Select the modem to use. The RMC automatically receives a list of available modems from the Windows operation system.

Click “Next”

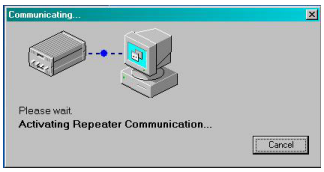
Note!

It is important that your modem is installed in Windows according to the manual provided by the modem manufacturer.

Enter the phone number. Type the number or choose one from the phone book.



Click “Connect” and wait for connection to be established

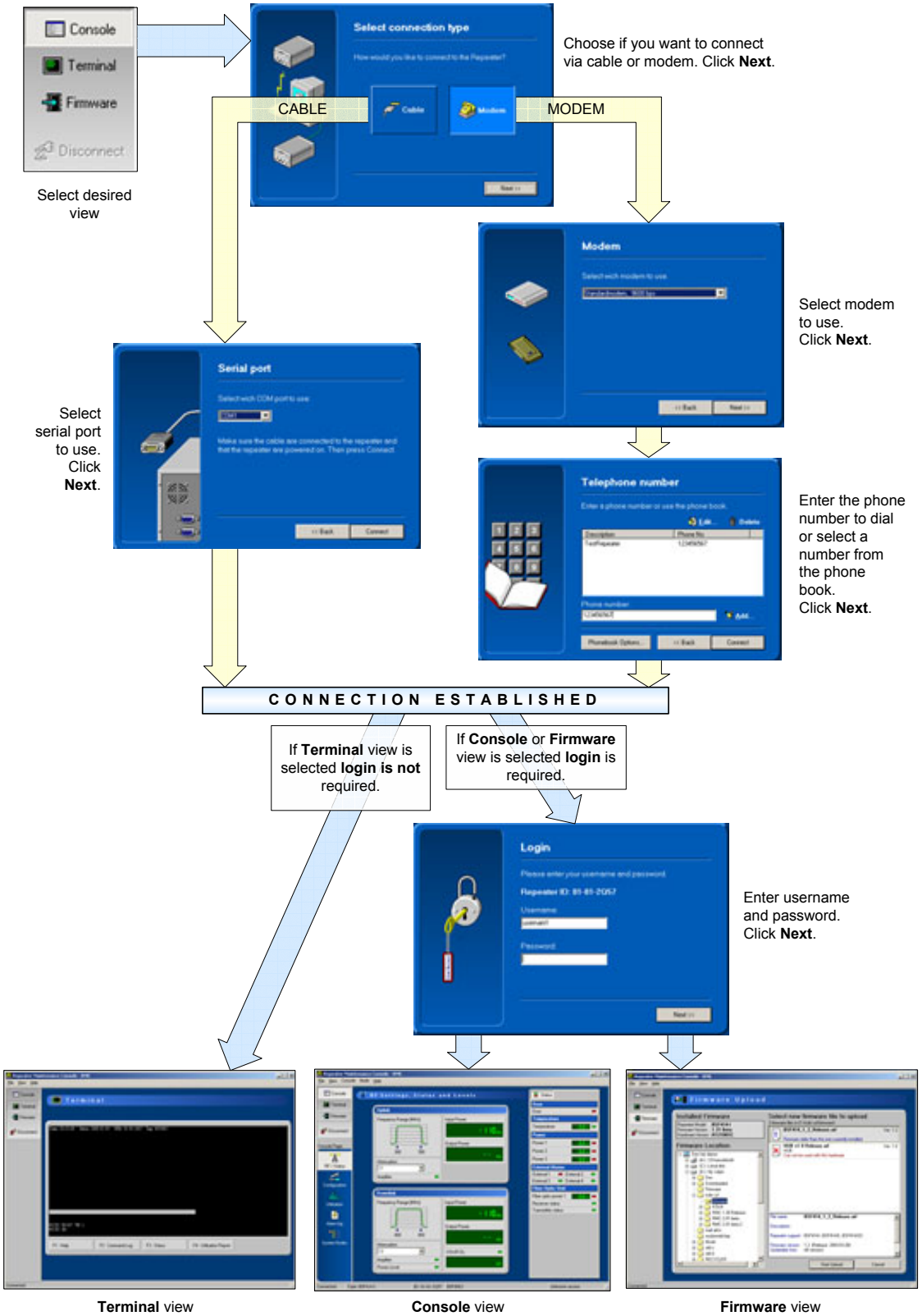


Login

Enter username and password (for Terminal view no login is required).

Click “Next”

Work Flow for Connection Set up



Terminal view | **Console** view | **Firmware** view

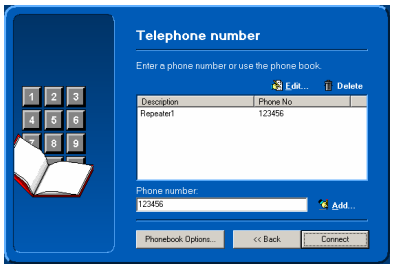
How to Change a Parameter

There is a two step procedure to change a parameter in RMC.

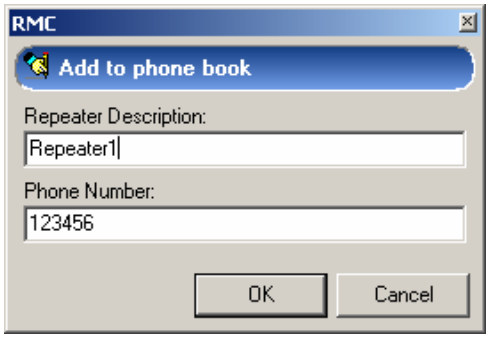
Change the value	A value can be changed by typing it or by choosing a value from a drop down menu  In this case there is a drop down menu. Click on "▼" to the right of the box and chose a value.
Apply or cancel the change	As soon as a change is made or a value is inserted this symbol appears  The change is applied by clicking the green "accept button" The change is canceled by clicking the red cross (or by pressing Esc)

How to Use the Phone Book

Modem phone numbers to can be stored in the RMC phone book. Each computer user is allocated an individual RMC phonebook which is stored in the windows registry.

Initial screen	

Add a Phone Number

Type the number in the phone number edit box Click "Add" This brings up a dialog box Enter a description of the phonebook entry Click "Ok"	

Edit a Phone Number

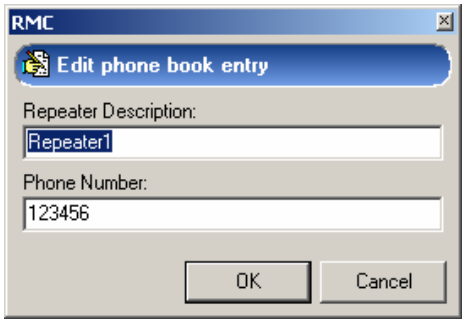
Select a number in the list

Click “Edit”

This brings up a dialog box

Make the changes

Click “Ok”

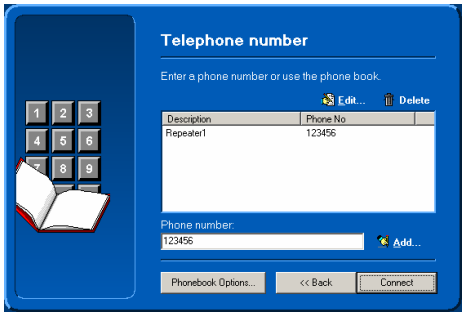


Delete a Phone Number

Select a phone number in the list

Click “Delete”

Confirm



Import/Export Phonebook Data

Click “Phonebook Options”

Choose between the options:

-

The file extension is RPF. Files can be used in RMC versions 2.00 and later.

Phonebook data from RMC version 1.xx (INI-files) can also be imported.