



Arctic AMR SW User Manual

Arctic AMR SW User Manual (2170)



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2. Conducted Emissions (0.15-30MHz)

EN 50082-1 Immunity Test

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Revisions

Date	Document Version	Firmware Version	Description of changes
12/2010	1.0	1.1.0	Manual released
01/2011	1.1	1.x	Information on events and commands added.
02/2011	1.2	1.2	Updated for firmware version 1.2

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1 Introduction

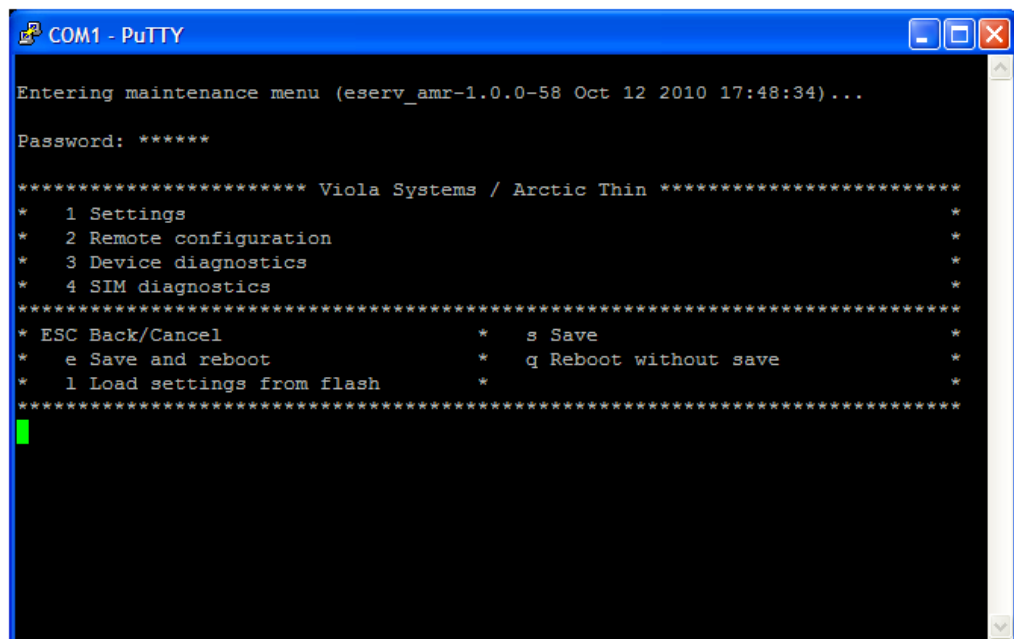
This is the user manual for Arctic AMR firmware version 1.2.

2 Serial configuration console

The serial port is shared between normal operation (meter communication) and configuration console. By default the serial console is not started; the user is required to interrupt the normal bootup sequence by inputting a special activation string (xxxxxx) to the serial port.

To activate the configuration console, a computer running a serial terminal is connected to the serial port with 19200 8N1 serial port settings. The user then holds down the the 'x' key and powers on the Arctic AMR. The Arctic AMR then prints a greeting and asks for the configuration password:

Figure 1. Serial console activation



The serial console is protected with the password **vi0la8**.

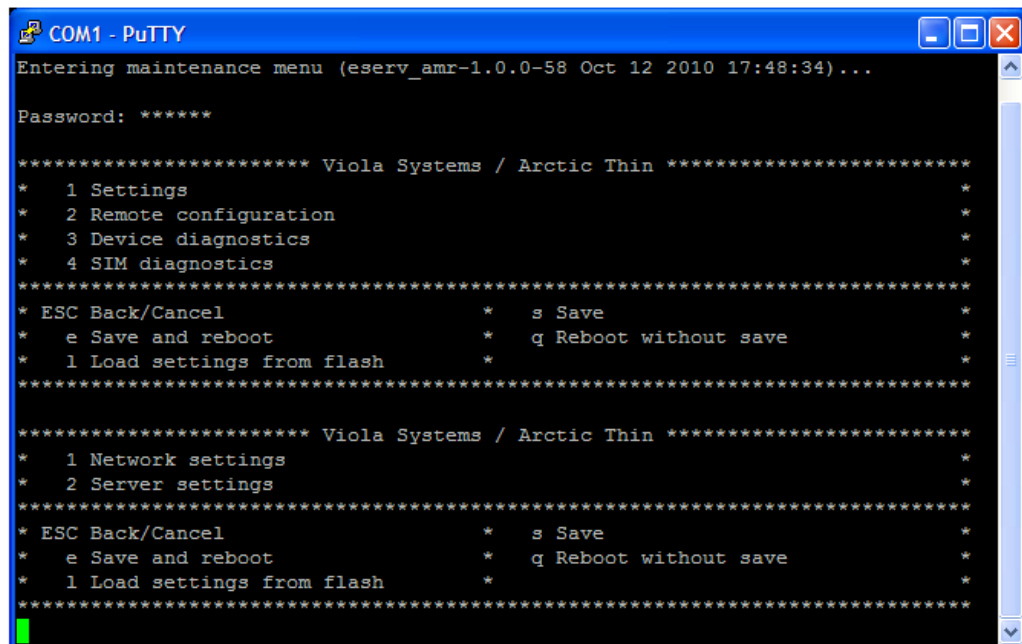
The menu is navigated by pressing the numbers and letters shown on screen. The ESC key can also be pressed to abort the current operation (or move back in the menu structure). Pressing 'l' will load the current settings from flash (discarding all unsaved changes), pressing 's' will save the current settings to flash, pressing 'e' will save current settings and reboot and pressing 'q' will reboot the device without saving the settings.

The configuration console has a timeout; when the console has been open for 15 minutes the device is rebooted into normal meter polling mode.

2.1 Mandatory device settings

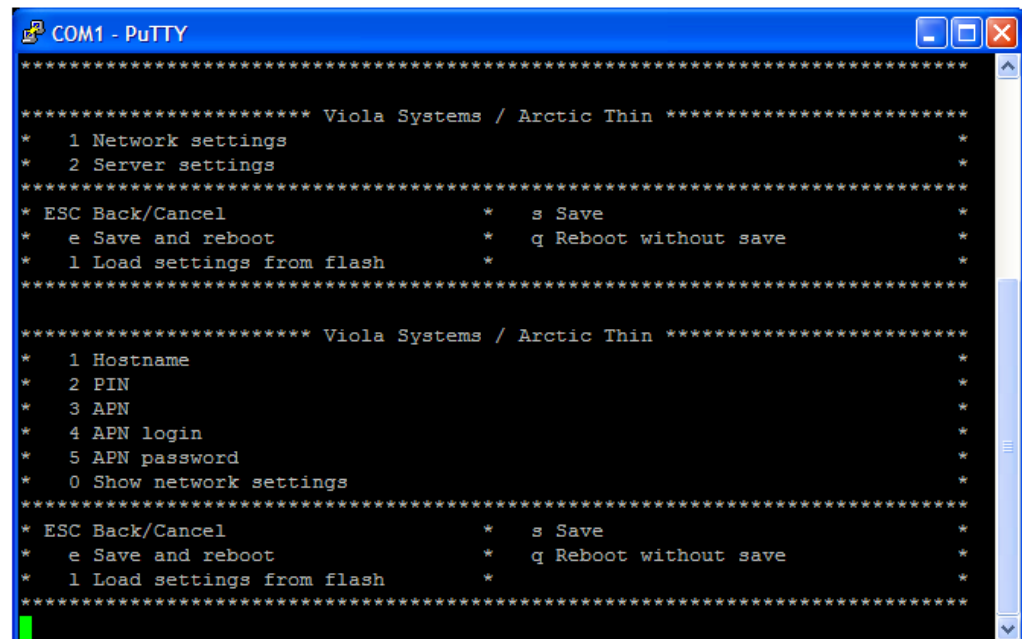
The mandatory device settings are found by entering the Settings sub-menu (by pressing '1'):

Figure 2. Settings -Submenu



The device host name and SIM/GSM settings are found under the Network settings sub-menu.

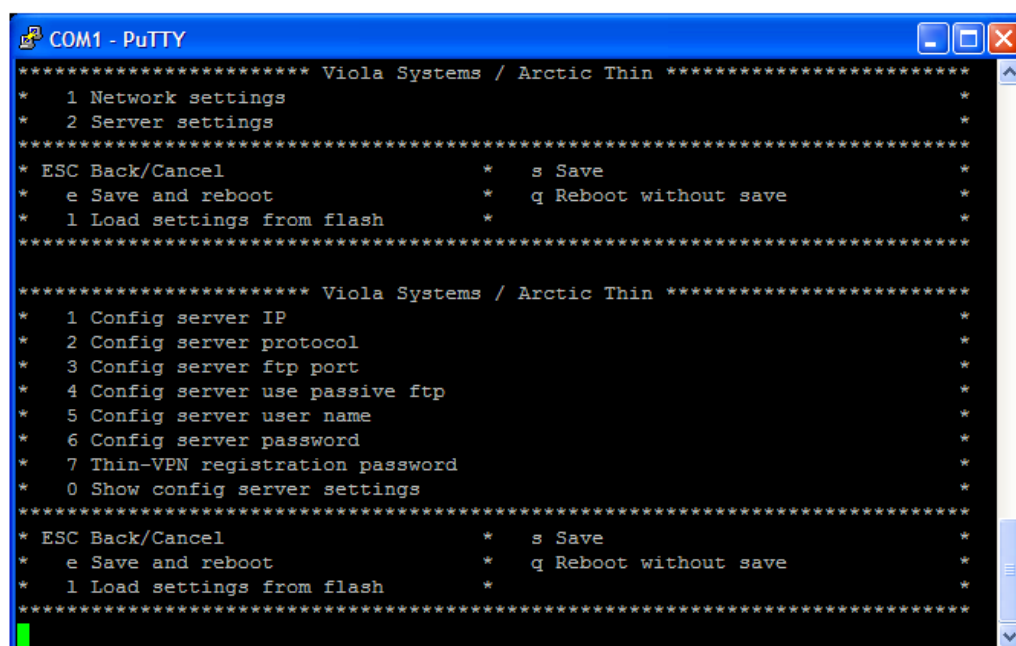
Figure 3. Network settings submenu



These settings must be configured for the device to work. By pressing '0', the current network settings can be reviewed, and finally saved by pressing 's'.

After these settings have been configured, the configuration server settings need to be configured by pressing ESC to go back one level in the menu, followed by pressing '2' to enter the Server settings sub-menu:

Figure 4. Server Settings Sub-menu



The server from where the configuration file is fetched is configured in the Server settings submenu. The following options are available:

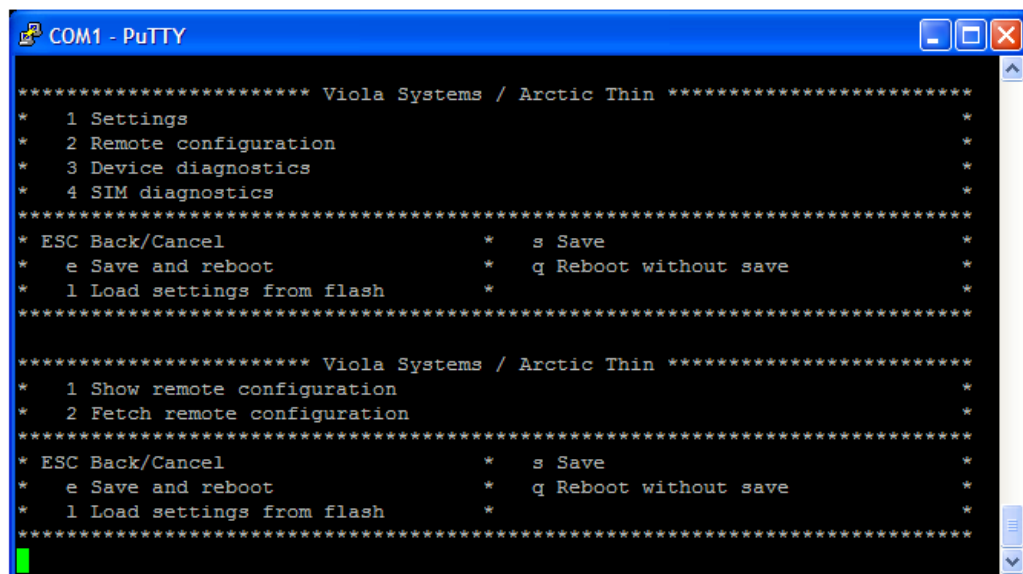
- IP
- Protocol (FTP or HTTP)
 - FTP settings:
 - server port (if non-standard)
 - passive/active FTP
- FTP/HTTP user name and password (HTTP also works without authentication, in that case these can be left empty)
- The Thin-VPN registration password

The settings can be reviewed by pressing the '0' key before they are saved by pressing the 's' key.

2.2 Remote configuration

After the device settings for the device are correct, the remote configuration will be fetched from the configuration server. The configuration fetch can be triggered manually by entering the Remote configuration sub-menu from the root menu level. At this sub-menu the remote configuration can also be reviewed.

Figure 5. Remote configuration sub-menu



```
COM1 - PuTTY

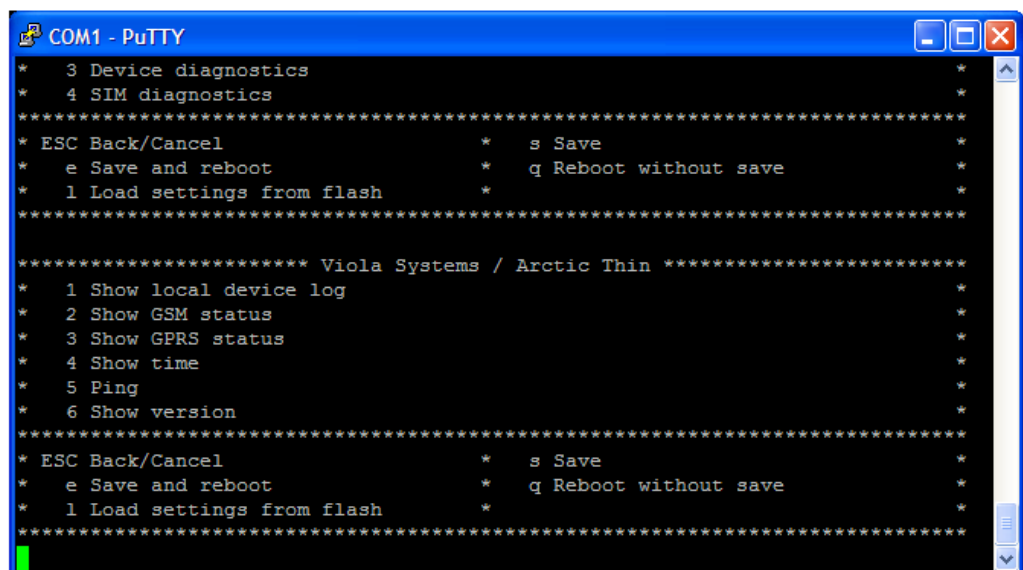
***** Viola Systems / Arctic Thin *****
* 1 Settings *
* 2 Remote configuration *
* 3 Device diagnostics *
* 4 SIM diagnostics *
*****
* ESC Back/Cancel * s Save *
* e Save and reboot * q Reboot without save *
* l Load settings from flash *
*****

***** Viola Systems / Arctic Thin *****
* 1 Show remote configuration *
* 2 Fetch remote configuration *
*****
* ESC Back/Cancel * s Save *
* e Save and reboot * q Reboot without save *
* l Load settings from flash *
*****
```

2.3 Diagnostics and device log

By entering the Device diagnostics from the root menu, various device diagnostic are available:

Figure 6. Device diagnostics sub-menu



```
COM1 - PuTTY

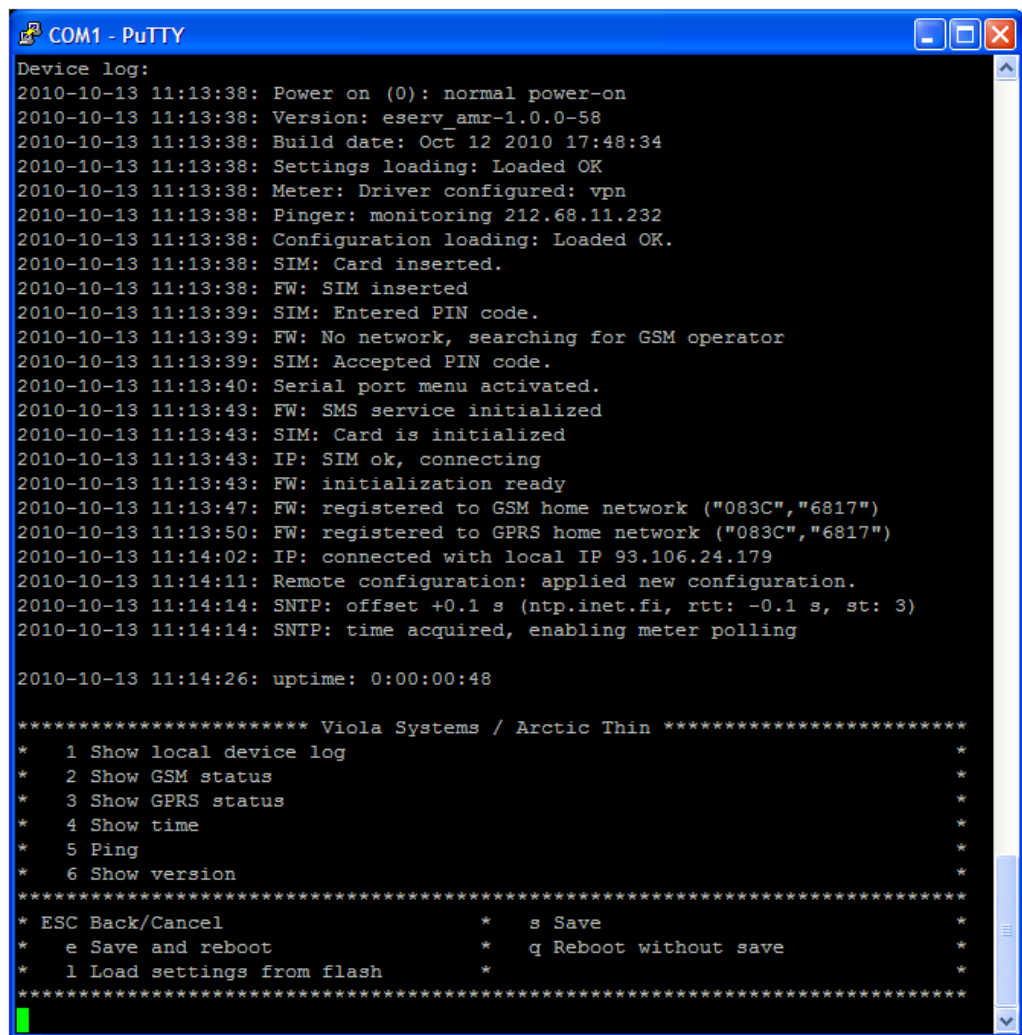
* 3 Device diagnostics *
* 4 SIM diagnostics *
*****
* ESC Back/Cancel * s Save *
* e Save and reboot * q Reboot without save *
* l Load settings from flash *
*****

***** Viola Systems / Arctic Thin *****
* 1 Show local device log *
* 2 Show GSM status *
* 3 Show GPRS status *
* 4 Show time *
* 5 Ping *
* 6 Show version *
*****
* ESC Back/Cancel * s Save *
* e Save and reboot * q Reboot without save *
* l Load settings from flash *
*****
```

At this level system diagnostic functions are available for problem solving:

- local device log
- GSM/GPRS status
- device time
- ping command for testing IP connectivity
- version information (HW/application SW/firmware version, IMEI, serial numbers)

Figure 7. Device log



```
COM1 - PuTTY
Device log:
2010-10-13 11:13:38: Power on (0): normal power-on
2010-10-13 11:13:38: Version: eserv_amr-1.0.0-58
2010-10-13 11:13:38: Build date: Oct 12 2010 17:48:34
2010-10-13 11:13:38: Settings loading: Loaded OK
2010-10-13 11:13:38: Meter: Driver configured: vpn
2010-10-13 11:13:38: Finger: monitoring 212.68.11.232
2010-10-13 11:13:38: Configuration loading: Loaded OK.
2010-10-13 11:13:38: SIM: Card inserted.
2010-10-13 11:13:38: FW: SIM inserted
2010-10-13 11:13:39: SIM: Entered PIN code.
2010-10-13 11:13:39: FW: No network, searching for GSM operator
2010-10-13 11:13:39: SIM: Accepted PIN code.
2010-10-13 11:13:40: Serial port menu activated.
2010-10-13 11:13:43: FW: SMS service initialized
2010-10-13 11:13:43: SIM: Card is initialized
2010-10-13 11:13:43: IP: SIM ok, connecting
2010-10-13 11:13:43: FW: initialization ready
2010-10-13 11:13:47: FW: registered to GSM home network ("083C","6817")
2010-10-13 11:13:50: FW: registered to GPRS home network ("083C","6817")
2010-10-13 11:14:02: IP: connected with local IP 93.106.24.179
2010-10-13 11:14:11: Remote configuration: applied new configuration.
2010-10-13 11:14:14: SNTP: offset +0.1 s (ntp.inet.fi, rtt: -0.1 s, st: 3)
2010-10-13 11:14:14: SNTP: time acquired, enabling meter polling

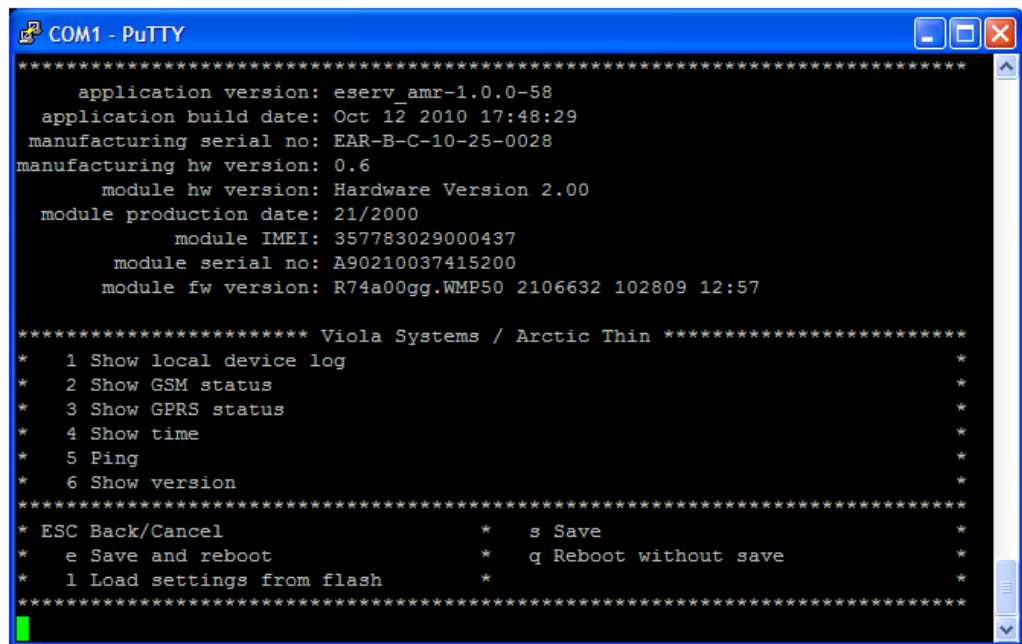
2010-10-13 11:14:26: uptime: 0:00:00:48

***** Viola Systems / Arctic Thin *****
* 1 Show local device log *
* 2 Show GSM status *
* 3 Show GPRS status *
* 4 Show time *
* 5 Ping *
* 6 Show version *
*****
* ESC Back/Cancel * s Save *
* e Save and reboot * q Reboot without save *
* l Load settings from flash *
*****
```

The local device log shows information about what has happened on the device (for example if there has been network connectivity problems).

The show version function provides SW/HW version information:

Figure 8. Device version information



```
COM1 - PuTTY
*****
application version: eserv_amr-1.0.0-58
application build date: Oct 12 2010 17:48:29
manufacturing serial no: EAR-B-C-10-25-0028
manufacturing hw version: 0.6
    module hw version: Hardware Version 2.00
    module production date: 21/2000
        module IMEI: 357783029000437
        module serial no: A90210037415200
        module fw version: R74a00gg.WMP50 2106632 102809 12:57

***** Viola Systems / Arctic Thin *****
* 1 Show local device log *
* 2 Show GSM status *
* 3 Show GPRS status *
* 4 Show time *
* 5 Ping *
* 6 Show version *
*****
* ESC Back/Cancel * s Save *
* e Save and reboot * q Reboot without save *
* l Load settings from flash *
*****
█
```

3 LEDs

The Arctic AMR has the following LEDs:

- Power
- Run
- Signal
- Network
- Meter

3.1 Power

The Power LED is directly connected to the power supply and will glow constantly once power is available for the internal microprocessor. Note that the product may operate for several minutes without the AC power connected due to the internal ultra high capacity capacitor required for power outage event communication.

3.2 Run

The Run LED has the following operating modes:

- **Off:** error situation, application is not running
- **Blinks slowly (1/s):** device is booting up and allowing the configuration console activation string to be entered
- **Glowes constantly:** device is running in normal operation mode; configuration console access is not possible

3.3 Signal

The Signal LED has the following operating modes:

- **Off:** no or very weak GSM/GPRS signal
- **Blinks slowly (1/s):** signal level is between weak and normal
- **Glowes constantly:** signal level is normal or better

3.4 Network

The Network LED has the following operating modes:

- **Off:** GPRS network not available
- **Blinks slowly (1/s):** trying to connect to the GPRS network (SIM initialization, inputting PIN code, waiting for GSM network registration, waiting for GPRS connection, testing FTP server connection)
- **Bursts:** GPRS data or SMS activity
- **Glowes constantly:** GPRS network connection OK

3.5 Meter

The Meter LED has the following operating modes:

- **Off:** meter communication (local polling) is not used
- **Blinks slowly (1/s):** trying to connect to meter

- **Bursts:** sending data to meter
- **Glow constantly:** meter communication OK

3.6 ALL-OK indication

When all five LEDs glow constantly it indicates that everything is OK (provides easy field installation verification).

4 Events

The events can be detected when they occur (e.g. power off outage) and when the situation is restored (power available again). The events are stored to a non-volatile memory and will be erased only when successfully delivered or when all the delivery retries are used up. The events can be delivered by using SMS or FTP. The event message syntax is given below.

4.1 Event Occurred message format

The general event occurred message syntax is:

```
oevent=event_name,dev=hostname,otime=hh:mm:ss dd mm yyyy
```

where the event_name is the identification (name) of the event, dev is the hostname of the device and otime is the time when the event occurred.

example:

```
oevent=outage,dev=eserv-amr,otime=21:00:36 01:06:2010
```

4.2 Event Restored message format

The general event restoration message syntax is:

```
revent=event_name,dev=hostname,otime=hh:mm:ss dd mm yyyy,  
rtime=hh:mm:ss dd mm yyyy
```

where the event_name is the identification (name) of the event, dev is the hostname of the device, otime is the time when the event occurred and rtime is the time when the event was detected as restored.

Example:

```
revent=outage,dev=eserv-amr,otime=21:00:36 01:06:2010,  
rtime=21:10:46 01:06:2010
```

4.3 Firmware Change message

The firmware change occurrence event contains extra fields after the general message structure:

```
oevent=fwchange,dev=hostname,otime=hh:mm:ss dd mm  
yyyy,oldfw=version,newfw=version
```

where the extra fields "oldfw" contains the old firmware name and version information whereas the "newfw" contains the new firmware name and version information.

4.4 Outage message

The outage occurred/restored events contain information about when power outage/power restoration has happened.

4.5 No meter message

Meter occurred/restored events are generated when the meter is removed/attached from/to the serial port on the Arctic AMR.

4.6 Pinger Failure Occurred and Restored Messages

The pinger failure occurrence and restoration messages contain extra fields after the general message structure:

```
oevent=nogprs,dev=hostname,otime=hh:mm:ss dd mm  
yyyy,sig=siglevel,ber=ber level,gprs=up or  
down  
  
revent=nogprs,dev=hostname,otime=hh:mm:ss dd mm yyyy,  
rtime=hh:mm:ss dd mm yyyy,  
  
sig=siglevel,ber=ber level,gprs=up or down
```

where the extra fields “sig” contains the signal level, “ber” contains the bit-error-ratio and “gprs” contains information whether the gprs interface is up or down.

4.7 No SIM message

SIM events are sent when the SIM card is removed/inserted.

4.8 Tamper message

Tamper events are sent when the tamper status in the meter is triggered.

4.9 Conferror message

Conferror events are sent when the remote configuration file on the configuration server contains an error.

4.10 Noftp message

Noftp occurred events are sent when there is a problem with the FTP connection (either testing or meter data transfer). Noftp restored events are only sent the next time the meter data transfer succeeds.

5 Meter polling

5.1 Polling configurations

The software generates three different measurement data files:

- instantaneous data
- historical (billing) data
- loadsurvey data

Each polling mode can be scheduled independently using different scheduling algorithms:

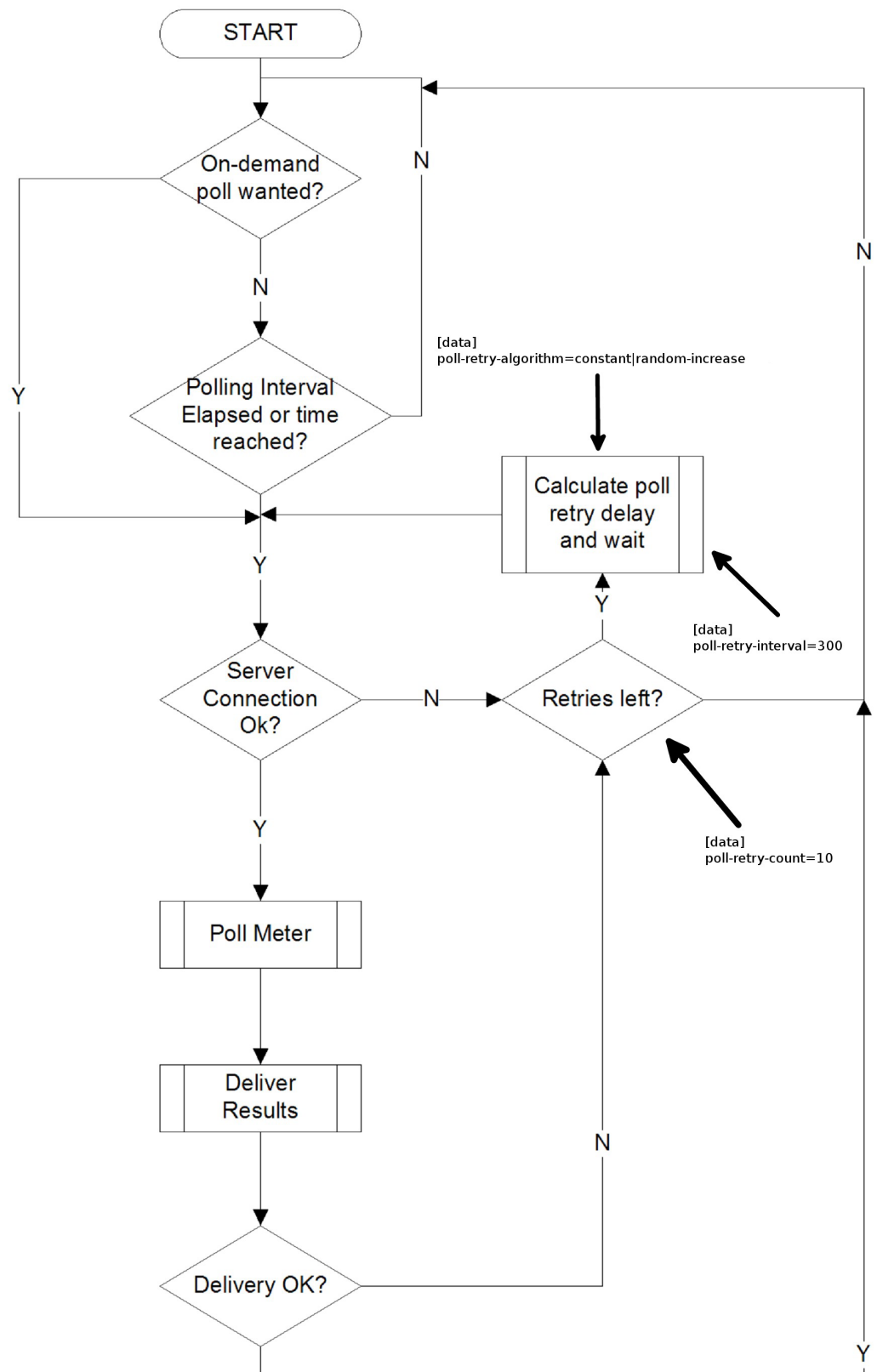
- interval polling (poll at a configured interval)
- hourly polling (poll once an hour when minutes are MM)
- daily polling (poll once a day at a configured HH:MM time)
- monthly polling (poll once a month at a configured DD:HH:MM time)

In addition, each polling mode can be triggered on-demand (by console or SMS). On demand polling does not affect the normal polling schedules.

5.2 Polling process

The following illustration shows the overall meter polling process and configuration parameters. Each polling mode (instantaneous, historical and loadsurvey) has its own independent state machine.

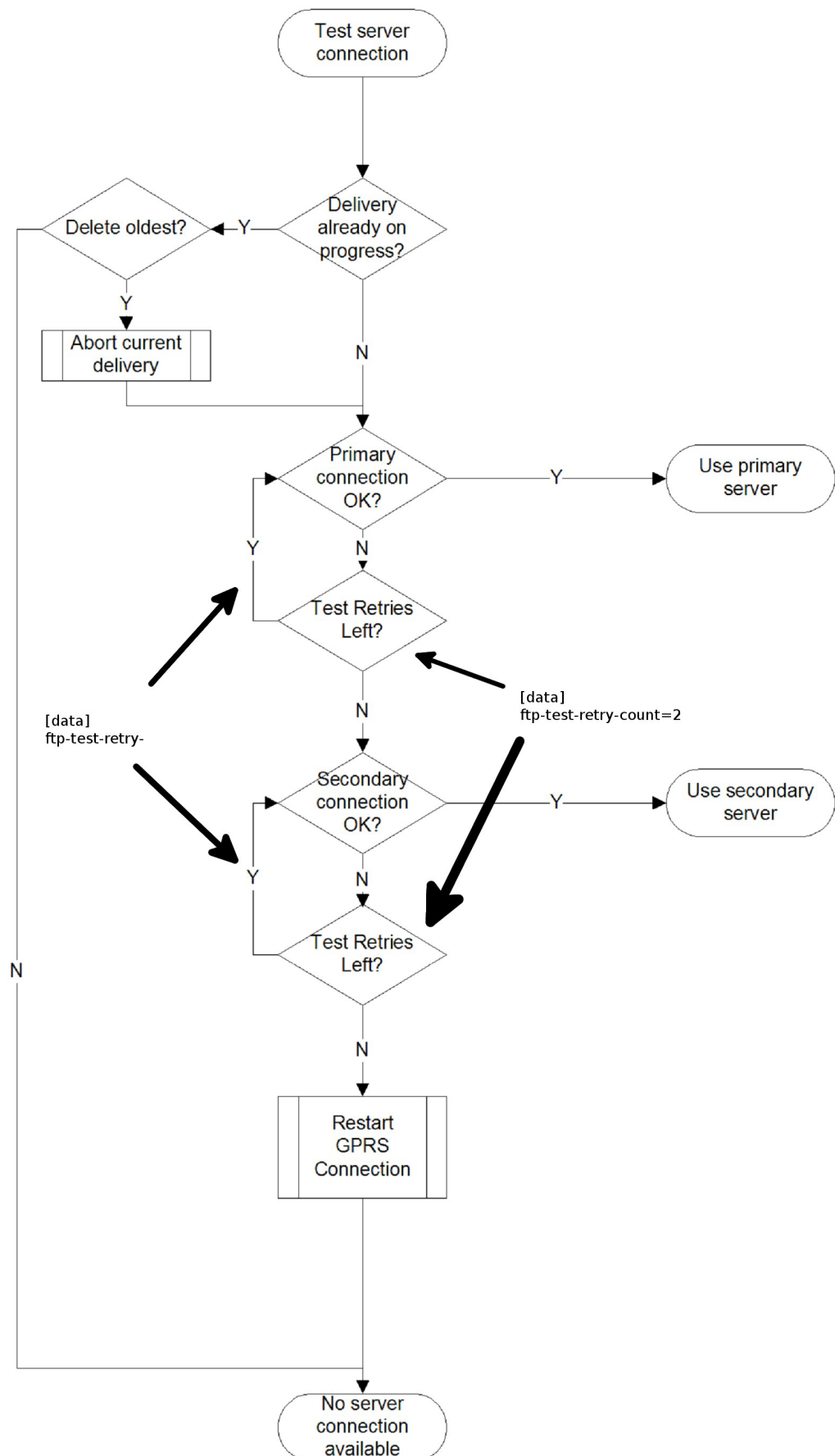
Figure 9. Overall meter polling process



5.3 Testing the connection to the ftp servers

When a polling has been scheduled, the server connection is tested before actually polling the meter. The following illustration shows the decision logic and ftp configuration parameters.

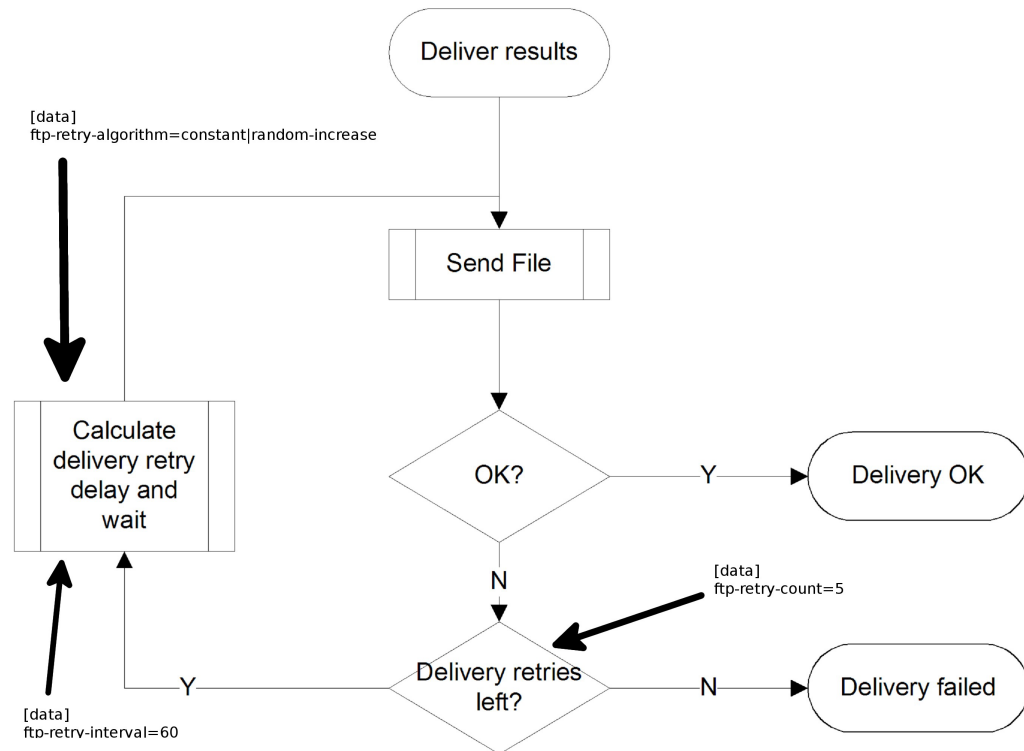
Figure 10. Testing the server connection



5.4 Delivery retry

When the meter has been polled the actual delivery may fail even if the server connection was tested before polling. For that purpose the file delivery may be retried. The retry interval may be constant (e.g. retry after every 60 seconds) or random-increase (e.g. firstly retry after 0-60 seconds, next retry after 60-120 seconds, next retry after 120-180 seconds). The algorithm, maximum retry count and interval are adjustable parameters.

Figure 11. Delivery retry logic



6 SNTP timekeeping

The Arctic AMR should be configured to fetch time from remote time servers over the network as it does not contain a battery backed up real-time clock. Before the time is known the device will not do scheduled meter polls as these normally contain timestamped information.

The Arctic AMR fetches time using Simple Network Time Protocol (SNTP). SNTP is a simplified version of the Network Time Protocol (NTP) and can use normal NTP servers. If more than one (S)NTP server is specified, the application switches to the next server in the list if problems are encountered.

There is an adjustable grace-time for getting the initial SNTP time. If the SNTP query fails the operation continue normally after this grace time has been acquired (even when the time is known to be invalid). Forced polling ignores the SNTP time acquired status.

7 Pinger

If the pinger is configured, the Arctic AMR tests IP connectivity to the configured server. If the pinger fails, the GPRS connection will be restarted, and if that does not help the device will be rebooted. Ping interval, timeouts and retries limits can be configured. The ping interval is randomized in the device to avoid ping storms. In addition there is a 5 minute ping grace time after boot. No pinging will occur before the grace time has expired.

8 Firmware upgrades

The GPRS link is dropped for few seconds while receiving/sending SMS. So, SMS traffic can be avoided during a firmware upgrade.

All meter polling is disabled during upgrades.

8.1 Configuration file upgrades

Firmware upgrades are done by specifying a [firmware] section in the remote configuration file. The update server information, file name and version of the new firmware is specified, and then the upgrade will start the next time the configuration file is fetched.

The firmware version is also verified every time the device has booted.

8.2 SMS upgrades

Firmware upgrades can also be done manually using the set vupdatefw SMS command (see the SMS/Thin-VPN SMSGW commands section for details).

9 SMS/Thin-VPN SMSGW commands

The device can be managed used SMS commands. If a Thin-VPN connection is established, the same SMS commands can also be given over a TCP socket.

9.1 SMS command format

SMS commands have the format:

```
[<password>#]<get|set>command1[;command2[;command3...]]
```

For example:

```
p4ssw0rd#set reboot
```

9.2 SMS get commands

SMS get commands sends back information from the Arctic AMR. No data on the devices is changed by SMS get commands.

9.2.1 Get status

Reply syntax:

```
<hostname>,<gprs status (up or  
down)>,<ip>,<dns1>,dns2>,<signal (unknown, none, weak,  
normal, good)>,<signal strength (0-31, 99)>,<signal ber  
(0-7, 99)>,<meter link (up or down)>
```

9.2.2 getswstatus

Reply syntax:

```
<uptime>,<last boot reason>,(updating|idle),<number of  
failed upgrade attempts>
```

9.2.3 get firmware

Reply syntax:

```
<application version>,<application build date>,<Wavecom  
firmware version>
```

9.2.4 get siglevel

Reply syntax:

```
<signal (unknown, none, weak, normal, good)>,<signal  
strength (0-31, 99),<signal ber (0-7, 99)>
```

9.2.5 get log [n]

- n is the number of messages to use for reply
- n defaults to 1 if not specified
- a maximum of 10 messages are sent
- to save space, log entries received over SMS are not timestamped

Reply syntax:

```
<one or more log lines>
```

9.2.6 get hostname

Reply syntax:

```
<hostname>
```

9.2.7 get gapn

Reply syntax:

```
<apn>
```

9.2.8 get guser

Reply syntax:

```
<apn username>
```

9.2.9 get gpass

Reply syntax:

```
<apn password>
```

9.2.10 get configserver

Reply syntax:

```
ftp <ip> <username> <password> <port> [passive|active]
```

or

```
http <ip> <username> <password>
```

9.2.11 get hwinfo

```
<manufacturing serial>,<manufacturing hw version>,<module  
imei>,<module serial>,<module  
version>,<module week/year of production>
```

9.2.12 get thinvpnregpassword

Returns the registration password currently set for Thin-VPN.

- needs password

9.3 SMS set commands

9.3.1 set reboot

- Needs password

9.3.2 set vupdatefw http <ip> <filename> [<username> <password>]

- needs password

9.3.3 set vupdatefw ftp <ip> <filename> <username> <password> [<port> [<passive>]]

```
<passive> = true|1|false|0|passive|active
```

- needs password

9.3.4 set ATxyz

- needs password

9.3.5 set VATxyz

- needs password
- sends back AT command output (Verbose AT) (waits 5 seconds for output)
- only sends back what fits in one SMS.

Reply syntax:

```
<at command output>
```

9.3.6 set fetchconf

Force immediate fetch of the configuration file from the remote server.

9.3.7 set forcepoll

Force immediate instantaneous meter data poll.

9.3.8 set forcehistpoll

Force immediate historical meter data poll.

9.3.9 set forcelspoll

Force immediate loadsurvey meter data poll.

9.3.10 set hostname

- needs password

9.3.11 set gapn

- needs password

9.3.12 set guser

- needs password

9.3.13 set gpass

- needs password

9.3.14 set configserver http <ip> [<username> <password>]

- needs password

9.3.15 set configserver ftp <ip> <username> <password> [<port> [<passive>]]

```
<passive> = true|1|false|0|passive|active
```

- needs password

9.3.16 set savesettings

- needs password

9.3.17 set loadsettings

- needs password

9.3.18 set clearevents

9.3.19 set thinvpnregpassword <password>

Sets a new Thin-VPN registration password.

- needs password

10 Thin-VPN

If configured to use a Thin-VPN server, the Arctic AMR will connect to the Thin-VPN server where it will get its own IP address. On this socket the server provides a number of services for the Arctic AMR device, including a transparent serial port over TCP and a TCP interface compatible with the SMS commands syntax.

The IP address is not directly connected to the device at IP level; for example, FTP data transfers will still be routed using the normal 3G/GPRS IP address.

10.1 Transparent serial port

If configured, the transparent serial port is listening as a TCP socket on port 7001 of the device's Thin-VPN IP address. A client may connect to this socket to get raw access to the meter connected to the serial port of the Arctic AMR. The serial settings defined in the [meter] section of the configuration file will be used for the serial port.

10.2 SMS compatible command interface

The SMS command compatible interface is available as a TCP socket listening on port 7002 of the device's Thin-VPN IP address. Messages using the same syntax as the SMS commands are accepted, with the addition that each request must be terminated by \n, \r or \r\n and each reply will be terminated by \n.

10.3 Ping

It is possible to check IP connectivity by pinging the Thin-VPN IP of a device. Ping packets transferred over Thin-VPN is limited in size to 247 data bytes (255 ICMP data bytes including the 8 byte ICMP header).

10.4 Authentication

Thin-VPN uses the Challenge-Handshake Authentication Protocol (CHAP) to authenticate Arctic AMR devices.

10.5 Registration key

The first time a Arctic AMR device connects to a Thin-VPN server CHAP authentication is not possible because the server and the device does not have a shared secret. In this case the device uses the pre-configured Thin-VPN registration password as the CHAP secret. After the authentication has succeeded, the server sends a new secret to the device (this secret is device specific), and the client removes the registration password from flash. The registration password is a global shared secret for the system, but can only be used to register a device once.

11 Remote configuration file

11.1 Configuration process

Arctic AMR fetches the configuration from the configuration server using HTTP or FTP. The file the device fetches is `hostname.conf` (where `hostname` is the hostname of the device) from the root directory of the server.

After loading a configuration file from the configuration server, the Arctic AMR parses the file. If the file contains an error, the file is rejected and the device is configured using default parameters. Using the `verify_eserv_amr_conf.sh` tool the configuration file can be verified on the server before it is loaded to the device.

11.2 Syntax

The Arctic AMR accepts a INI style configuration file. The file is a text file with the following structure:

- `key=value` pairs for specifying configuration parameters
- [sections] enabling parameter grouping
- a ; (semicolon) at the beginning of a line marks the entire line as a comment
- white spaces (spaces, tabs) at the beginning and end of lines are ignored

If a `key=value` pair is missing (or commented out), the Arctic AMR uses its default value for that option. A key must always contain a value, i.e., a line with an empty value (`key=`) results in an invalid configuration.

Simple configuration file example:

```
; host.conf
[primary ftp server]
ip=10.9.8.7
username=ftpdata
password=secretpassword
;commented out section
;[sntp]
;ip=pool.ntp.org
```

11.3 File format specification

11.3.1 [primary ftp server]

```
ip=<ip or host>
```

- both numerical and dns name formats are accepted

```
port=<port>
```

- defaults to 21
- min 0
- max 65535

```
username=<username>  
password=<password>  
passive-mode=true|false
```

- defaults to true

11.3.2 [secondary ftp server]

Specifies parameters of the secondary ftp server used for storage of meter data. Parameters are the same as for the [primary ftp server] section.

11.3.3 [secondary ftp server]

Specifies parameters of the ftp server used for storage of events data. Parameters are the same as for the [primary ftp server] section.

11.3.4 [meter]

```
type=<protocol>
```

- possible protocol values: sec_pact, hwell, lt_ir, vpn

```
speed=<speed>
```

- possible values: 300-115200
- unit: bps
- defaults to 9600

```
databits=<bits>
```

- possible values: 7,8
- defaults to 8

```
parity=<parity>
```

- possible values: N,E,O
- defaults to N

```
retries=<n>
```

- meter polling retry limit
- integer value
- defaults to 3

```
vpn-dual-mode=true|false
```

- if enabled, performs normal meter polling (according to type setting) until data is available from the socket, then switches to Thin-VPN transparent serial port mode until no data has been transferred for the time specified by vpn-dual-mode-idle-timeout
- if the serial port is busy when a client tries to send data over the link, the Arctic AMR responds with a string with the syntax BUSY: <reason>, for example "BUSY: polling instantaneous data"
- defaults to false

```
vpn-dual-mode-idle-timeout=<seconds>
```

- how long the transparent serial Thin-VPN link should be idle before switching back to meter polling mode
- defaults to 5

```
maddress=<n>
```

- Modbus meter protocol address
- integer value
- defaults to 1

```
password=<password>
```

- meter password
- defaults to empty string
- max 30 characters

```
timeout=<seconds>
```

- meter response timeout (in seconds)
- defaults to 2

```
miregstart=<n>
```

- Modbus input register start
- integer value
- defaults to 0

```
miregcount=<n>
```

- Modbus input register count
- defaults to 0
- min 0
- max 30

```
mhregcount=<n>
```

- Modbus Holding Register count (for Honeywell driver)
- integer value
- defaults to 10
- min 0
- max 30

```
kwhtype=<priority list>
```

- kwh energy type priority list
- a priority list is a
 - list of comma separated integers
 - a list contains max 5 items
- defaults to 212,130,134

```
kvahtype=<priority list>
```

- kvah energy type priority list
- defaults to 216,160

```
kvarhtype=<priority list>
```

- kvarh (combined) energy type priority list
- defaults to 146

```
kvarhlgtpe=<priority list>
```

- kvarh (lag) energy type priority list
- defaults to 217

```
kvarhldtype=<priority list>
```

- kvarh (lag) energy type priority list
- defaults to 218

```
frame-spacing-serial=<x>
```

- if enabled (> 0), the AMR detects end of serial frame when a gap is detected in the serial data coming from meter
- when meter has been quiet for x milliseconds, a serial frame is detected and is transferred over the Thin-VPN transparent serial port
- defaults to 0 (disabled)

11.3.5 [instant meter poll]

```
poll-mode=disabled|interval|hourly|daily|monthly
```

- poll modes:
 - disabled polling is disabled
 - interval poll every poll-interval seconds
 - hourly poll every hour when minutes is poll-hourly-minutes
 - daily poll daily at time specified by poll-daily-time
 - monthly poll monthly at time specified by poll-monthly-time
- defaults to disabled

```
poll-interval=<interval in seconds>
```

- how often the meter is polled and data is transferred to ftp server
- defaults to 900 for instant polling and 86400 for historical and loadsurvey polling

```
poll-hourly-minutes=<minutes>
```

- min 0
- max 59

```
poll-hourly-random-delay=<seconds>
```

- defaults to 0

```
poll-daily-time=<HH:MM>
```

- for example: poll-daily-time=23:59

```
poll-daily-random-delay=<seconds>
```

- defaults to 0

```
poll-monthly-time=<DD:HH:MM>
```

- for example: poll-monthly-time=01:00:00
- if day is 32, it will use the last day of the month (28, 29, 30 or 31)

```
poll-monthly-random-delay=<seconds>
```

- defaults to 0

11.3.6 [historical meter poll]

- accepts same parameters as [instant meter poll] section

11.3.7 [loadsurvey meter poll]

- accepts same parameters as [instant meter poll] section, in addition:

```
days=<days>
```

- meter loadsurvey days to poll
- 0 == all
- defaults to 2

11.3.8 [data]

```
discard=newest|oldest
```

- what to do when the internal buffers are full of meter data (e.g., due to ftp failures)
- newest discards newest data
- oldest discards oldest data
- defaults to oldest

```
retry-after-outage=true|false
```

- restart polling after power outage if the polling/data transfer was interrupted or the poll trigger expired during the outage
- defaults to true

```
poll-retry-algorithm=constant|random-increase
```

- defaults to random-increase

```
poll-retry-count=<count>
```

- defaults to 10

```
poll-retry-interval=<seconds>
```

- constant poll algorithm:
 - how long to wait between retries
- random-increase algorithm:

- initial interval to wait between retries
- how much the interval is increased after each failure
- defaults to 300 seconds (5 minutes)

```
ftp-test-retry-count=<count>
```

- defaults to 2

```
ftp-test-retry-delay=<seconds>
```

- defaults to 30 seconds

```
ftp-retry-algorithm=constant|random-increase
```

- defaults to random-increase

```
ftp-retry-count=<count>
```

- defaults to 5

```
ftp-retry-interval=<seconds>
```

- defaults to 60 seconds

11.3.9 [configuration server]

```
poll-interval=<seconds>
```

- how often the configuration file is read from the configuration server
- defaults to 900 seconds
- min 30 seconds
- max 604800 (1 week)

11.3.10 [sntp]

```
ip=<ip or host>
```

- one or two ip lines can be specified, the second ip will be used as a backup sntp server

```
poll-interval=<seconds>
```

- how often the SNTP server should be polled
- defaults to 86400 seconds (24h)
- 0 means that the time is only fetched once at startup, no regular polling is performed
- min 60 seconds

```
utc-diff=<seconds>
```

- seconds to add to SNTP time (which is UTC)
- defaults to 0

```
grace-time=<seconds>
```

- 0 disables the grace time (polling is not started until the correct time is received)
- defaults to 0 seconds

11.3.11 [sms]

```
password=<password>
```

- sets password for protected SMS commands
- default is no password

```
recipient=<telephone number>
```

- used as a recipient for asynchronous SMS messages (currently only events)
- for SMS management the replies are sent to the sender, not to this recipient number

11.3.12 [thin-vpn]

```
ip=<ip or host>
```

- IP address of Thin-VPN server

```
port=<port>
```

- IP port of Thin-VPN server
- min 0

- max 65535
- defaults to 10001

```
idle-timeout=<seconds>
```

- reconnects if link is idle this many seconds
- sends ping packet over Thin-VPN link if it has been idle for about half this time
- defaults to 600 (10 minutes)

```
extra-ping-interval=<seconds>
```

- regularly sends ping packets over the Thin-VPN link after the configured interval
- debugging aid; can be set much lower than idle-timeout to keep the link alive without resulting in unwarranted idle disconnects
- idle-timeout is not affected by this settings
- defaults to 0 (disabled)

11.3.13 [pinger]

```
ip=<ip or host>
```

- IP address to ping in order to test IP connectivity

```
interval=<seconds>
```

- how often to do ping check
- actual interval is randomized from configured value
- defaults to 600 (10 minutes)
- min 30
- max 86400 (24h)

```
timeout=<seconds>
```

- ping timeout in seconds (how long to wait for a ping reply)
- defaults to 10 seconds
- min 3
- max 180

```
retries=<n>
```

- how many times to retry ping before attempt is considered to have failed
(=> restart gprs)
- defaults to 3
- min 1
- max 20

```
reset=<n>
```

- how many consequent ping attempts to allow before resetting the device
- 0 disables reset
- defaults to 5
- min 3

11.3.14 [events]

```
method=sms | ftp | disabled
```

- how to deliver events
- defaults to disabled
- telephone number configured in [sms] sections is used as SMS recipient

```
retries=<n>
```

- how many times to retry delivery in case of delivery failure
- 0 = retry until successful
- defaults to 0

```
timeout=<seconds>
```

- how long to wait between delivery attempts in case of delivery failure
- 0 = retry until successful
- defaults to 60

```
retry-algorithm=constant | random-increase
```

- defaults to random-increase

```
event-occured-fwchange=yes | no
```

- enable/disable occurred event delivery for event fwchange
- generates an fwchange event when a new firmware version has been installed
- defaults to yes

```
event-occured-outage=yes | no
```

- send event when power outage occurs
- defaults to no

```
event-restored-outage=yes | no
```

- send event when power is restored
- defaults to no

```
event-restored-time-outage=<seconds>
```

- how long the power must be available before generating a outage restored event
- defaults to 60

```
event-occured-nometer=yes | no
```

- send event when meter not connected
- defaults to no

```
event-restored-nometer=yes | no
```

- send event when meter re-connected
- defaults to no

```
event-occured-time-nometer=<seconds>
```

- how long the meter link must be down to detect nometer event
- defaults to 3600 s

```
event-occured-nogprs=yes | no
```

- send event when pinger fails
- defaults to no

```
event-restored-nogprs=yes | no
```

- send restored event when pinger works again
- defaults to no

```
event-occured-filter-nogprs=<n>
```

- how many consecutive pinger failures before nogprs event is detected
- defaults to 3
- minimum 1
- care must be taken that this filter is less or equal to to pinger retries setting, otherwise the event will never happen (this is a know issue which will be fixed in the next firmware version)

```
event-occured-nosim=yes|no
```

- enable/disable occured event delivery for event nosim
- generates a nosim event when sim card is removed
- defaults to no

```
event-restored-nosim=yes|no
```

- enable/disable restored event delivery for event nosim
- generates a nosim event when sim card is inserted
- defaults to no

```
event-restored-time-nosim=<seconds>
```

- how long the sim card must have been inserted in order to detect the restored event
- defaults to 120

```
event-occured-tamper=yes|no
```

- defaults to no

```
event-restored-tamper=yes|no
```

- defaults to no

```
event-occured-time-tamper=<seconds>
```

- how long tamper status must be active before the tamper event is generated
- defaults to 60 s

```
event-restored-time-tamper=<seconds>
```

- how long tamper status must be inactive before the tamper restoration event is generated
- defaults to 60 s

```
event-occured-conferror=yes | no
```

- defaults to no

```
event-restored-conferror=yes | no
```

- defaults to no

```
event-occured-noftp=yes | no
```

- defaults to no

```
event-restored-noftp=yes | no
```

- defaults to no

11.3.15 [firmware]

This section is not saved to flash.

If the version string is different from the version string of the currently running software, the firmware pointed to by filename is downloaded and installed.

```
ip=<ip or host>  
protocol=ftp | http
```

- defaults to http

```
username=<username>  
password=<password>
```

```
passive-mode=true|false
```

- defaults to true

```
port=<port>
```

- only for ftp

```
filename=<filename string>
```

- filename of the firmware image (e.g. arctic_amr-1.2.0-179.erv)

```
version-verify=true|false
```

- defaults to true
- only disable this option if version field is used

```
version=<version string>
```

- optional field if version-verify is true

11.3.16 [debug]

This section is not saved to flash.

If this section is enabled, the device opens up a TCP connection to ip:port.

```
ip=<ip or host>
```

- disabled by default ("")

```
port=<port>
```

- disabled by default (0)
- min 0
- max 65535

11.3.17 Configuration file example

```
; primary ftp server for measurement data
[primary ftp server]
ip=112.67.13.23
port=21
passive-mode=true
username=meter-data
password=sLay332g
path=data
```

```
[secondary ftp server]
ip=112.67.13.24
port=21
passive-mode=true
username=meter-data
password=sLay332g
;path=dir1/dir2

[events ftp server]
ip=112.67.13.23
port=21
passive-mode=true
username=meter-data
password=sa2a93s
path=/

[meter]
type=sec_pact
speed=1200
databits=8
parity=N

;retries=3
;maddress=1
;password=
;timeout=2
;miregstart=0
;miregcount=0
;mhregstart=0
;mhregcount=10

;kwhtype=212,134,130
;kvahtype=216,160
;kvarhtype=146
;kvarhlgtype=217
;kvarhldtype=218

;kwhtype=212,134,130
;kvahtype=216,160
;kvarhtype=146
;kvarhlgtype=217
;kvarhldtype=218

[instant meter poll]
poll-mode=hourly
poll-hourly-minutes=17
poll-hourly-random-delay=60
poll-daily-time=14:20
poll-daily-random-delay=120

[historical meter poll]
poll-mode=daily
poll-interval=900
poll-hourly-minutes=16
poll-hourly-random-delay=60
poll-daily-time=22:20
poll-daily-random-delay=120
```

```
[loadsurvey meter poll]
poll-mode=disabled
poll-interval=120
poll-hourly-minutes=36
poll-hourly-random-delay=60
poll-daily-time=16:21
poll-daily-random-delay=120

[data]
discard=oldest
poll-retry-algorithm=constant
poll-retry-interval=30
ftp-test-retry-delay=10
ftp-retry-algorithm=constant
ftp-retry-algorithm=constant
ftp-retry-count=2
ftp-retry-interval=10

[configuration server]
poll-interval=300

[sntp]
ip=ntp.inet.fi
ip=pool.ntp.org
poll-interval=10800
utc-diff=10800
grace-time=180

[sms]
password=qwerty

[pinger]
ip=212.68.11.232
interval=300
timeout=15
retries=5
;reset=3

[events]
method=ftp
timeout=60
retry-algorithm=random-increase
event-occured-fwchange=yes
event-occured-outage=yes
event-restored-outage=yes
event-restored-time-outage=120
event-restored-nometer=yes
event-occured-time-nometer=30
;event-occured-nogprs=yes
;event-restored-nogprs=yes
;event-occured-filter-nogprs=1
;event-occured-nosim=yes
;event-restored-nosim=no
;event-restored-time-nosim=60

[firmware]
ip=112.67.13.24
protocol=http
filename=eserv_amr-1.0.0-58.erv
```

```
version=eserv_amr-1.0.0-58
```