

# Application Note 13

Configure a Dual SIM Wireless router to automatically back up to a second SIM card.



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# 1.0 INTRODUCTION

GPRS technology has proven to be extremely reliable. However, the consequences of losing contact with a remote unit many miles away are so severe that it warrants extra precautions.

The configuration detailed in this note causes the Sarian to monitor TCP traffic over an active GPRS connection to a specified IP address. When a problem is detected with the data transfer the Sarian will drop the active GPRS connection and activate the secondary GPRS link using a second SIM card.

Other techniques for monitoring GPRS connections (such as automatic pings) are available but not detailed in this application note.

It is also possible to monitor other types of traffic such as UDP or ICMP instead of TCP. Again these methods are not detailed in this application note.

## 1.1 Outline

There will be two distinct **methods** covered in this application note;

1. The first will be to back-up to a temporary “on demand” GPRS connection using the second SIM card. Whenever the second SIM card is used, after a specified period of inactivity or after a maximum amount of time has been reached, the backup link will deactivate and the Sarian will attempt to use the first SIM card again. This method is useful if it is not desirable to use the back-up SIM card indefinitely. (For example if some functionality is lost or the data charges are higher.)
2. The second method will cause the Sarian to give each SIM and associated GPRS link equal priority. Unless a problem is detected the Sarian will permanently keep active whichever SIM card it happens to be using. This method is useful if maintaining a connection to the remote GPRS Sarian router is a priority.

## 1.2 Assumptions

This guide has been written for use by technically competent personnel with a good understanding of the communications technologies used in the product and of the requirements for their specific application.

This application note applies only to;

**Model:** Wireless Dual SIM units only

**Firmware versions:** 4.674 or later.

**Configuration:** This Application Note assumes that the Sarian product is set to its factory default. Most configuration commands are only shown if they differ from the factory default.

## 1.3 Corrections

Requests for corrections or amendments to this application note are welcome and should be addressed to: [applicationnotes@sarian.co.uk](mailto:applicationnotes@sarian.co.uk)

Requests for new application notes can be sent to the same address.

## 1.4 Version

Version Number	Status
1.0	Published
1.1	Removed AODI timer settings
1.2	Removed AODI timer settings from screen shots and config files
1.3	Added dialling defaults for PPP 2. Changed title to reflect all dual SIM wireless products

# 2.0 CONFIGURATION

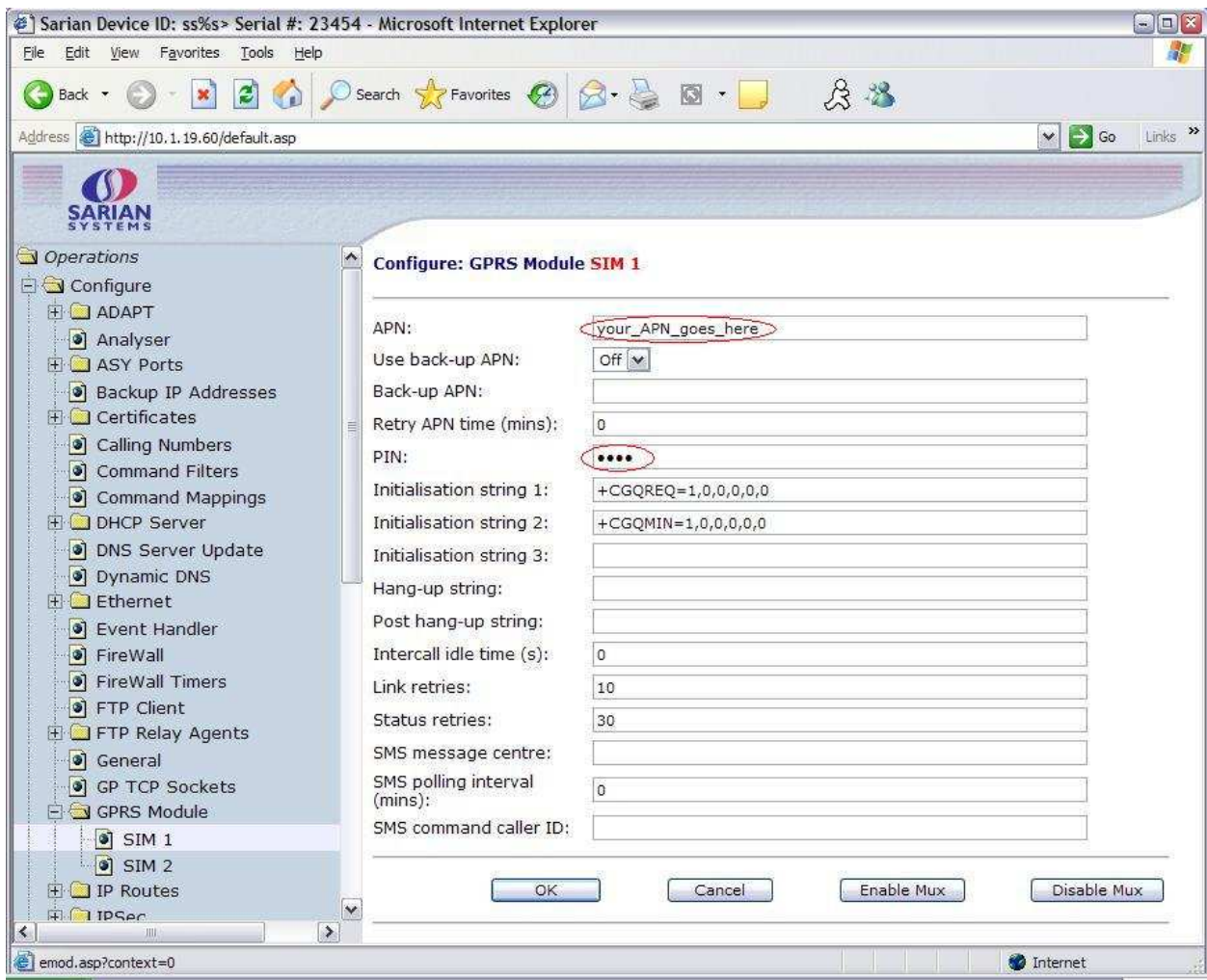
## 2.1 Configure the GPRS Module

### Parameter settings for SIM 1

Using the Sarian's web interface browse to **Configure → GPRS Module → SIM 1**.

Enter the APN (Access Point Name) and PIN number (if required) for SIM card 1. (Usually these will be provided by your mobile operator.)

Parameter	Setting	Description
APN	internet	Enter the correct APN for your network
PIN	1234	Enter the PIN number for your SIM card if required

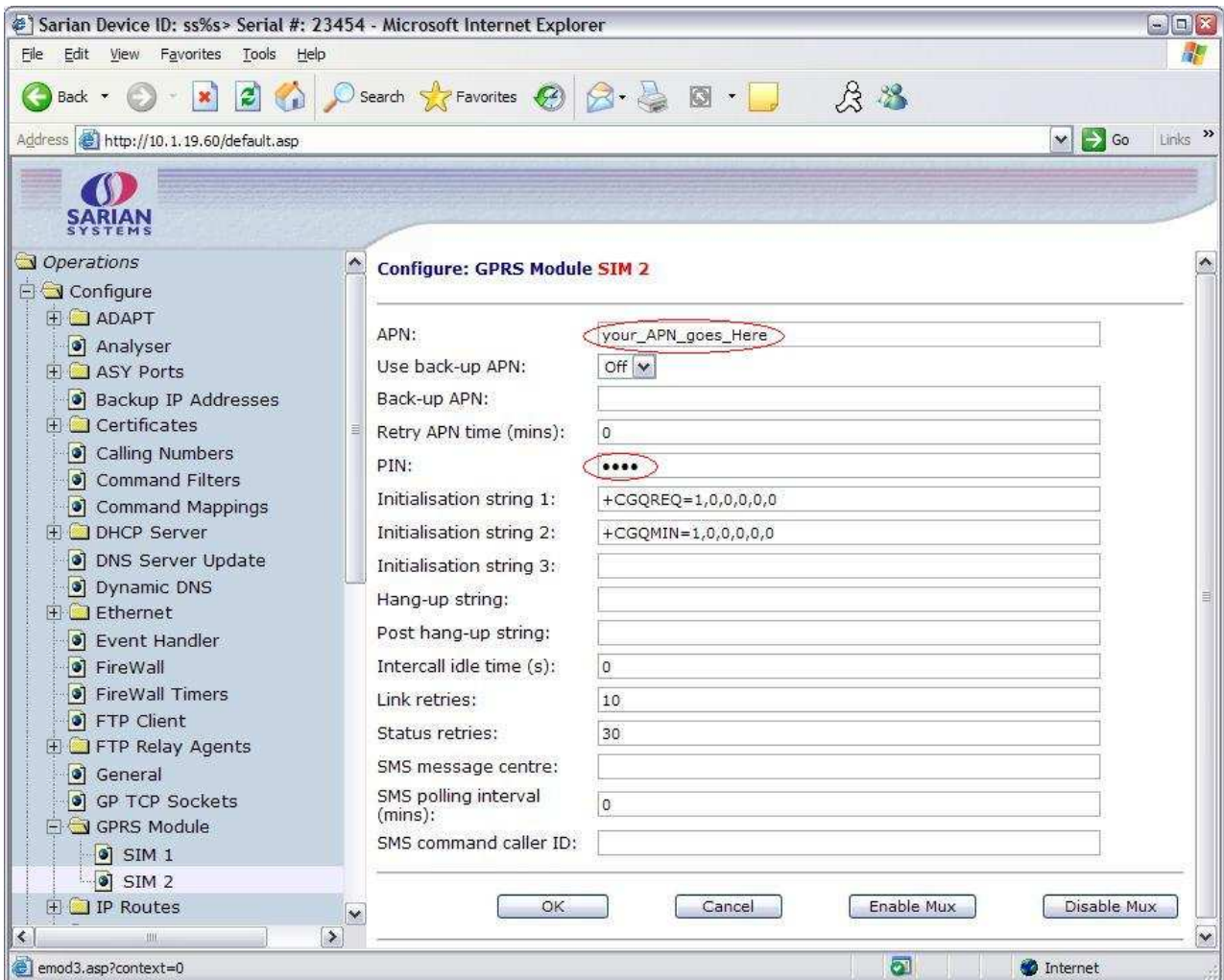


### Parameter settings for SIM 2

Using the Sarian's web interface browse to **Configure → GPRS Module → SIM 2**.

Enter the APN (Access Point Name) and PIN number (if required) for SIM card 2.

Parameter	Setting	Description
APN	internet	Enter the correct APN for your network
PIN	1234	Enter the PIN number for your SIM card if required



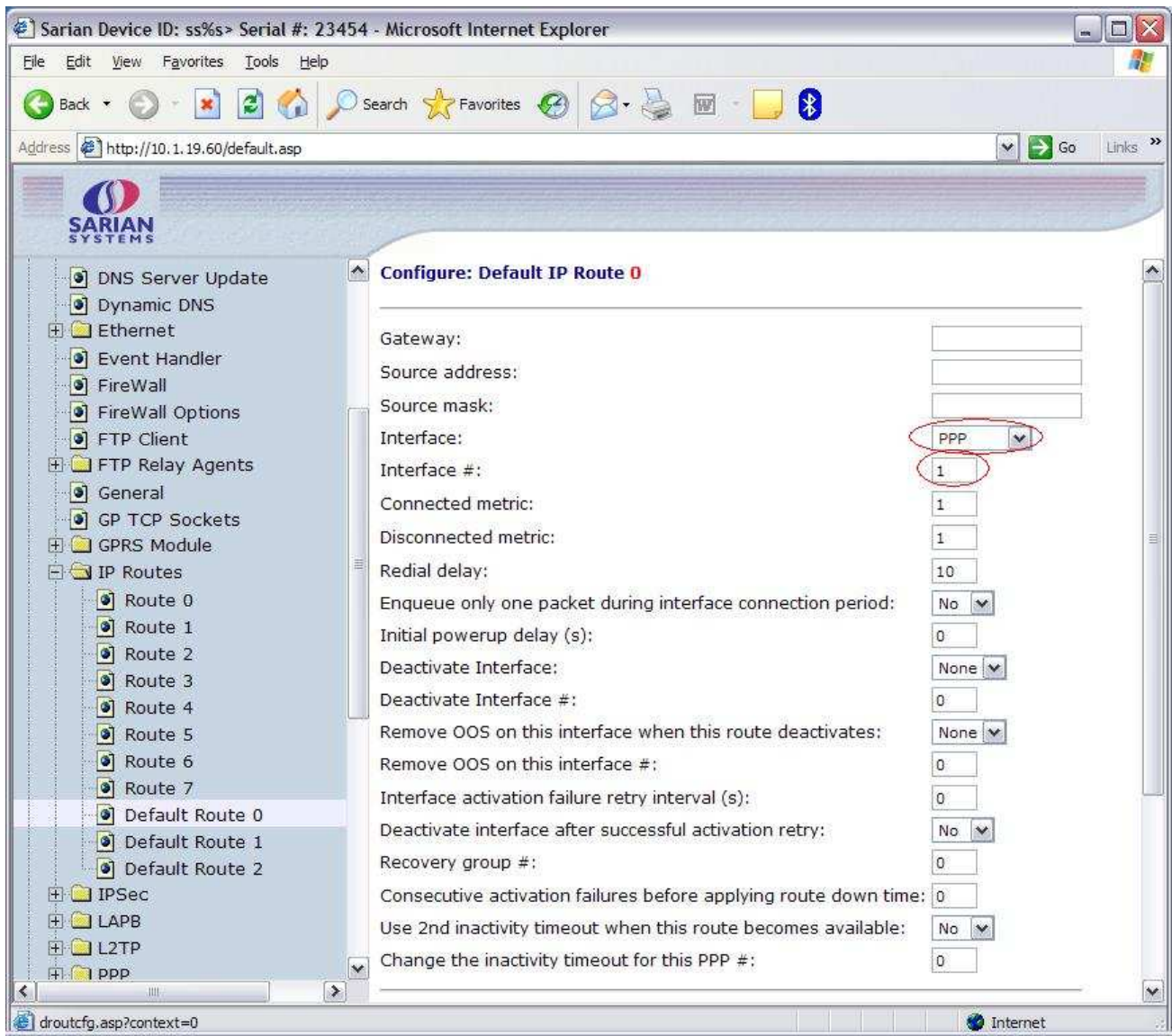
## 2.2 Configure the Default Routes

### Default Route 0

Configure **default route 0** to send packets to destinations not on the local are network out of PPP 1. Interface PPP 1 is configured for GPRS using SIM 1.

Browse to **Configure → IP Routes → Default Route 0**

Parameter	Setting	Description
Interface:	PPP	Identifies the interface type to be associated with default route 0.
Interface # :	1	Identifies the instance number of the interface to be associated with default route 0.

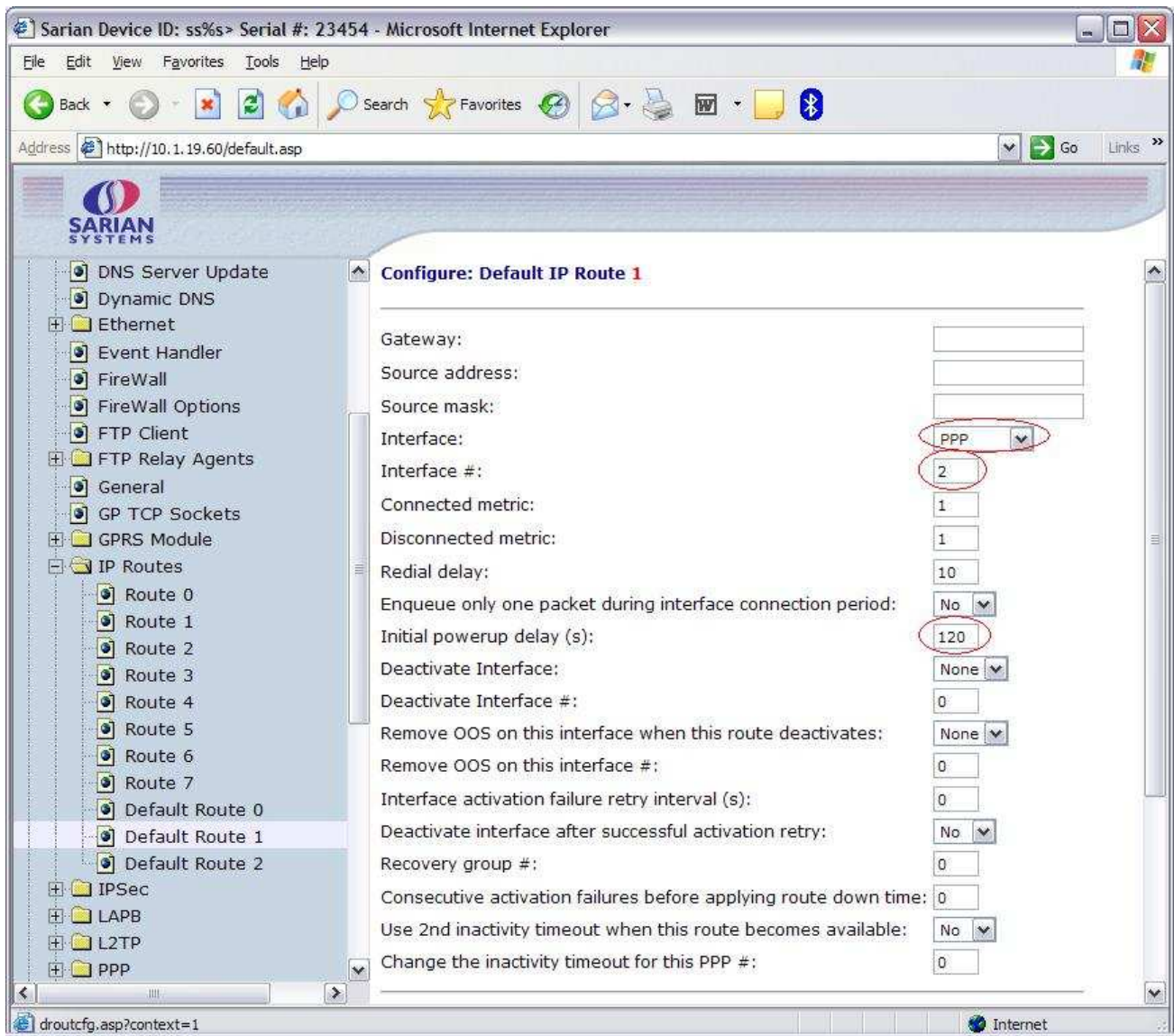


## Default Route 1

Interface PPP 2 is configured for GPRS using SIM 2.

Browse to **Configure** → **IP Routes** → **Default Route 1**

Parameter	Setting	Description
Interface:	PPP	Identifies the interface type to be associated with default route 1.
Interface # :	2	Identifies the instance number of the interface to be associated with default route 1.
Initial Power Up delay (s):	120	Delays activation of the PPP 2 link after power-up for two minutes (recommended). This is to prevent conflict of the two GPRS interfaces.

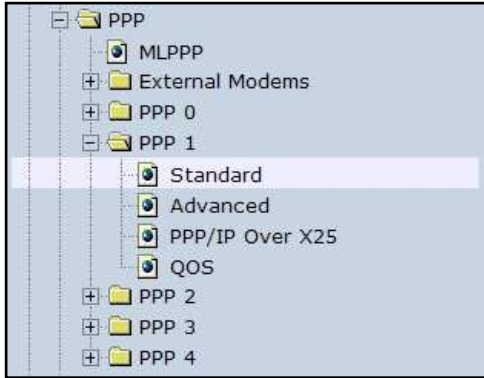


## 2.3 Configure the GPRS interfaces for SIM card 1

### PPP 1 Standard Page

Browse to **Configure** → **PPP** → **PPP 0-4** → **PPP 1** → **Standard**

Parameter	Setting	Description
Dial-out number:	*98*1#	Dial string to attach to the GPRS network
Use GPRS/external modem:	Any GPRS Channel	Configures the Sarian to use any available GPRS channel
GPRS SIM:	SIM 1	Configures GPRS Link on PPP 1 to use SIM card 1
Username:	username	Username given by the GPRS provider
Password:	access	Username given by the GPRS provider
Confirm Password:	access	Same as above
Always On Mode:	ON	Auto activates PPP 1 and keeps the link up
Firewall	ON	Activates the Firewall/Stateful Route Inspection on PPP 1
Local IP Address:	0.0.0.0	Requests an IP address from the GPRS provider



**Configure: PPP 1 (Standard)**

IP Analysis:  Off

PPP Analysis:  Off

Answering:  Off

Calling number:

MSN:

Sub-address:

CLI:

Remote access options:  No restrictions

Dial-out prefix:

Dial-out number:  \*98\*1#

Use GPRS/external modem:  Any GPRS Channel

GPRS SIM:  SIM 1

Username:  username

Password (Assigned):  .....

Confirm password:  .....

AODI NUA:

Always on mode:  On

AODI delay (s):  0

DNS server:

Multi-link:  Off

Inactivity timeout (s):  0

Inactivity timeout #2 (s):  0

Minimum link up-time (s):  0

Maximum link up-time (s):  0

Maximum negotiation time (s):  0

Firewall:  On

IGMP:  Off

IPSec:

GRE:  Off

QOS:  Off

RIP version:  Off

RIP destination IP:

DEFLATE compression:  Off

MPPE encryption:  Off

MPPE key size:  Auto

Time band:

Log event up-time (mins):  0

Max up-time per day (mins):  0

---

Local IP address:  0.0.0.0

Remote IP address pool minimum:  10.10.10.0

Remote IP address pool range:  5

Remote network address:  0.0.0.0

Remote network mask:  255.255.255.255

NAT mode:  NAT

NAT source IP address:

Browse to **Configure** → **PPP** → **PPP 0-4** → **PPP 1** → **Advanced**

Parameter	Setting	Description
Auto-activation attempts allowed:	5	Allows PPP 1 a total of 5 activation attempts before the PPP 2 link can override it
Inhibit auto-activation when these PPPs are active:	2	Configures PPP 1 to inhibit PPP 2 from raising it's GPRS link whilst PPP 1 is active





**Configure: PPP 1 (Advanced)**

Desired local ACCM:	<input type="text" value="0x00000000"/>
Desired local MRU:	<input type="text" value="1500"/>
Desired remote ACCM:	<input type="text" value="0xffffffff"/>
Desired remote MRU:	<input type="text" value="1500"/>
DNS server port:	<input type="text" value="53"/>
Request local ACFC:	<input checked="" type="checkbox"/> Yes
Request BACP:	<input type="checkbox"/> No
Request callback:	<input type="checkbox"/> No
Allow remote to request callback:	<input type="checkbox"/> No
Request IPCP local address option:	<input checked="" type="checkbox"/> Yes
Request local PAP authentication:	<input type="checkbox"/> No
Request local CHAP authentication:	<input type="checkbox"/> No
Request local compression:	<input checked="" type="checkbox"/> Yes
Request local PFC:	<input checked="" type="checkbox"/> Yes
Request remote ACFC:	<input type="checkbox"/> No
Request IPCP remote address option:	<input type="checkbox"/> No
Request remote PAP authentication:	<input checked="" type="checkbox"/> Yes
Request remote CHAP authentication:	<input type="checkbox"/> No
Request remote compression:	<input type="checkbox"/> No
Request remote PFC:	<input type="checkbox"/> No
LCP echo request interval (s):	<input type="text" value="0"/>
Reset link after this many failed LCP echo requests:	<input type="text" value="0"/>
PING request interval (s):	<input type="text" value="0"/>
PING IP address:	<input type="text"/>
No PING response reset delay (s):	<input type="text" value="0"/>
Use ETH 0 for PING source IP:	<input type="checkbox"/> No
Settling time (*100ms):	<input type="text" value="0"/>
Heartbeat interval (s):	<input type="text" value="0"/>
Heartbeat destination:	<input type="text"/>
Maximum unanswered TX packets before link reset:	<input type="text" value="0"/>
Minimum time before link reset (s):	<input type="text" value="0"/>
Reboot after this many consecutive link resets:	<input type="text" value="0"/>
Reboot after this many consecutive failed connections:	<input type="text" value="0"/>
Auto-activation attempts allowed:	<input checked="" type="checkbox"/> 5
Post-disconnect activation attempts allowed:	<input type="text" value="0"/>
Inhibit auto-activation when these PPPs are active:	<input checked="" type="checkbox"/> 2
IPSec source IP from interface:	<input type="text" value="Default"/>
IPSec source IP from interface #:	<input type="text" value="0"/>
Layer 1 interface:	<input type="text" value="Default"/>
Layer 1 interface #:	<input type="text" value="0"/>
Data limit warning level (kb):	<input type="text" value="0"/>
Data limit stop level (kb):	<input type="text" value="0"/>
Data limit reset day of month:	<input type="text" value="0"/>

**Local CHAP Login Configuration Options**

CHAP MD5:	<input checked="" type="checkbox"/> Enabled
MS-CHAP Algorithm:	<input type="checkbox"/> Disabled
MS-CHAPv2 Algorithm:	<input type="checkbox"/> Disabled

**Remote CHAP Login Configuration Options**

CHAP MD5:	<input checked="" type="checkbox"/> Enabled
MS-CHAP Algorithm:	<input checked="" type="checkbox"/> Enabled
MS-CHAPv2 Algorithm:	<input checked="" type="checkbox"/> Enabled

OK Cancel

Load answering defaults Load dialling defaults

## **Important Note**

The following pages (11 to 14 inclusive) show how to configure the PPP 2 Standard page for the two different methods of fall back to SIM 2 mentioned in the “Outline” section 1.1.

Page 15 onwards is required for both methods.

## 2.4 Configure the GPRS interfaces for SIM card 2 - Method 1

**Method 1 ONLY:** Fall back to temporary GPRS connection on SIM 2. After a specified amount of link up-time or inactivity the Sarian will attempt to raise GPRS on SIM 1.

### Parameter settings for the PPP 2 Standard Page

Browse to **Configure** → **PPP** → **PPP 0 - 4** → **PPP 2** → **Standard**

**Important:** First click the 'Load Dialling defaults' button at the bottom of the standard page.

Then proceed with the following parameters;

Parameter	Setting	Description
Dial-out number:	*98*1#	Dial string to attach to the GPRS network
Use GPRS/external modem:	Any GPRS Channel	Configures the Sarian to use any available GPRS channel
GPRS SIM:	SIM 2	Configures GPRS Link on PPP 1 to use SIM card 2
Username:	username	Username given by the GPRS provider
Password:	access	Username given by the GPRS provider
Confirm Password:	access	Same as above
Always On Mode:	ON	Auto activates PPP 2 and keeps the link up
<b>Inactivity Timeout (s):</b>	<b>120</b>	<b>Causes the Sarian to drop this GPRS link after specified period of inactivity on that link (variable)</b>
<b>Maximum link up-time (s):</b>	<b>1200</b>	<b>Causes the Sarian to drop this GPRS link after it has been active for the specified period of time (variable)</b>
Firewall	ON	Activates the Firewall/Stateful Route Inspection on PPP 2
Local IP Address:	0.0.0.0	Requests an IP address from the GPRS provider



### Configure: PPP 2 (Standard)

IP Analysis:	Off
PPP Analysis:	Off
Answering:	Off
Calling number:	
MSN:	
Sub-address:	
CLI:	
Remote access options:	No restrictions
Dial-out prefix:	
Dial-out number:	*98*1#
Use GPRS/external modem:	Any GPRS Channel
GPRS SIM:	SIM 2
Username:	username
Password (Assigned):	*****
Confirm password:	*****
AOD1 NUA:	
Always on mode:	On
AOD1 delay (s):	0
DNS server:	
Multi-link:	Off
Inactivity timeout (s):	120
Inactivity timeout #2 (s):	0
Minimum link up-time (s):	0
Maximum link up-time (s):	1200
Maximum negotiation time (s):	0
Firewall:	On
IGMP:	Off
IPSec:	Off
GRE:	Off
QOS:	Off
RIP version:	Off
RIP destination IP:	
DEFLATE compression:	Off
MPPE encryption:	Off
MPPE key size:	Auto
Time band:	
Log event up-time (mins):	0
Max up-time per day (mins):	0

---

Local IP address:	0.0.0.0
Remote IP address pool minimum:	10.10.10.0
Remote IP address pool range:	5
Remote network address:	0.0.0.0
Remote network mask:	255.255.255.255
NAT mode:	NAT
NAT source IP address:	

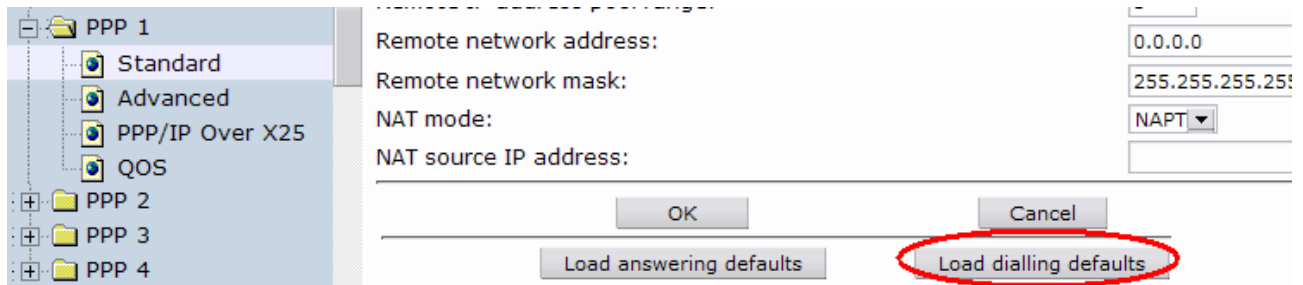
## 2.5 Configure the GPRS interfaces for SIM card 2 - Method 2

**Method 2 ONLY:** Fall back to a permanent connection on SIM 2. The Sarian will continue to use SIM 2 until such a time when a problem is detected on that link. The Sarian will then attempt to raise GPRS on SIM 1.

### Parameter settings for the PPP 2 Standard Page

Browse to **Configure** → **PPP** → **PPP 0 - 4** → **PPP 2** → **Standard**

**Important:** First click the 'Load Dialling defaults' button at the bottom of the standard page.



Then proceed with the following parameters;

Parameter	Setting	Description
Dial-out number:	*98*1#	Dial string to attach to the GPRS network
Use GPRS/external modem:	Any GPRS Channel	Configures the Sarian to use any available GPRS channel
GPRS SIM:	SIM 2	Configures GPRS Link on PPP 1 to use SIM card 1
Username:	username	Username given by the GPRS provider
Password:	access	Username given by the GPRS provider
Confirm Password:	Access	Same as above
Always On Mode:	ON	Auto activates PPP 2 and keeps the link up
Firewall	ON	Activates the Firewall/Stateful Route Inspection on PPP 2
Local IP Address:	0.0.0.0	Requests an IP address from the GPRS provider



### Configure: PPP 2 (Standard)

IP Analysis:  ▾

PPP Analysis:  ▾

Answering:  ▾

Calling number:

MSN:

Sub-address:

CLI:

Remote access options:  ▾

Dial-out prefix:

Dial-out number:

Use GPRS/external modem:  ▾

GPRS SIM:  ▾

Username:

Password (Assigned):

Confirm password:

AODI NUA:

Always on mode:  ▾

AODI delay (s):

DNS server:

Multi-link:  ▾

Inactivity timeout (s):

Inactivity timeout #2 (s):

Minimum link up-time (s):

Maximum link up-time (s):

Maximum negotiation time (s):

Firewall:  ▾

IGMP:  ▾

IPSec:  ▾

GRE:  ▾

QOS:  ▾

RIP version:  ▾

RIP destination IP:

DEFLATE compression:  ▾

MPPE encryption:  ▾

MPPE key size:  ▾

Time band:  ▾

Log event up-time (mins):

Max up-time per day (mins):

---

Local IP address:

Remote IP address pool minimum:

Remote IP address pool range:

Remote network address:

Remote network mask:

NAT mode:  ▾

NAT source IP address:

## 2.6 Configure advanced parameters the GPRS interfaces for SIM card 2 - Methods 1 & 2

**NB: The following settings are required for both methods:**

### Parameter settings for the PPP 2 Advanced Page

Browse to **Configure** → **PPP** → **PPP 0 - 4** → **PPP 2** → **Advanced**

Parameter	Setting	Description
Auto-activation attempts allowed:	5	Allows PPP 2 a total of <b>5</b> activation attempts after power up before the PPP 1 link can override it
Inhibit auto-activation when these PPP's are active:	1	Configures PPP 2 to inhibit PPP 1 from raising it's GPRS link whilst PPP 2 is active

## 2.7 Stateful Route Inspection

SRI or Stateful Route Inspection is a passive error detection technique. All >= 2000 series Sarian units contain a powerful statefull firewall facility. In addition to the blocking of un-authorized traffic the firewall can be used to monitor traffic on a particular interface and flag routes as OOS (out of service) or even deactivate PPP links. In the context of GPRS problem detection this facility can be used to deactivate a PPP link to the GPRS network and cause it to re-negotiate thus potentially fixing the problem detected. For the purpose of this application note we shall allow all traffic to pass through the firewall unhindered.

This configuration will cause the Sarian to send the data through a standby interface, which will be a GPRS link using a second SIM card. Both SIM cards can be registered with the same or different GPRS providers.

To detect a problem on a current GPRS link the Sarian is configured to monitor traffic to a frequently used host over that connection. If the connection to that host fails (e.g. suffers packet loss) the Sarian can drop the current GPRS link and raise another link using the second SIM card.

## 2.8 Configuring the firewall.

You need to configure three rules in the Sarian's firewall. The first is to monitor traffic to the host on the PPP 1 link. The second is to monitor traffic to the host on the PPP 2 link. As the default action for the firewall is to block all traffic the third rule is required to allow all other traffic to pass through.

The firewall can be configured in one of two ways.

The first is to write the firewall directly into the Sarian's web interface by browsing to **Configure** → **Firewall**.

The second is to write your firewall rules on single lines in a text file and name it "fw.txt". This file can then be uploaded via FTP to the Sarian's file directory.

### Firewall Stateful Route Inspection Rules.

The rules are as follows

```
Rule 1: pass out break end on ppp 1 proto tcp from any to <Host IP Address>
      flags s!a inspect-state oos 1 t=5 c=2 d=2

Rule 2: pass out break end on ppp 2 proto tcp from any to <Host IP Address>
      flags s!a inspect-state oos 1 t=5 c=2 d=2

Rule 3: pass
```

- The first rule monitors tcp traffic on PPP 1 (when active) to the host IP address.
- The second rule monitors tcp traffic on PPP 2 (when active) to the host IP address.
- The third rule allows all other traffic to pass unhindered.

## Inspect-State with Out of Service Option

This allows the stateful inspect engine to mark as “out of service” any routes that are associated with the specified interface. **oos 1** marks the route out of service for 1 second enabling the second default route to come in to service.

**t=5** specifies the length of time in seconds the unit will wait for a tcp connection to the host to be successful

**c=2** specifies the number of times that the rule must expire before the route is marked as out of service. This means that 2 tcp connections in a row to the host IP address will have to fail.

**d=2** specifies the number of times that rule must expire before the PPP interface is deactivated. This means that 2 tcp connections in a row to the host IP address will have to fail

NB The rule will also expire (triggering interface deactivation and SIM switching) if 10 TCP re-transmit packets in a row are seen to leave the PPP interface with no reply received.

\*Note: **c=n** and **d=n** should be the same value



## 3.0 STATUS AND TESTING

### 3.1 Status Menu

The **Status** menu of the Sarian's web interface is a useful tool for giving the user a definitive view of the routers current state and in the case of the eventlog a history of events.

#### Status→GPRS Module

Sarian Device ID: ss%s > Serial #: 1104 - Microsoft Internet Explorer

Address <http://10.1.19.60/default.asp>

**SARIAN SYSTEMS**

- Operations
  - Configure
  - Statistics
  - Status
    - Analyser Trace
    - DHCP Server
    - DNS Cache
    - Ethernet
      - Event Log
      - File Directory
      - Firewall Trace
      - Firmware Versions
      - GPRS Module**
      - IGMP Groups
    - IPSec
    - PPP
    - Web Directory
    - Web Server
    - X25 Sessions
  - Save
  - Reboot
  - Display Mode

**Results of Last Module Status Poll:**  
**Outcome: Got modem status OK:**  
**Time: 5 Aug 2004 14:58:55**

SIM status	READY
Signal strength	>= -51 dBm
Manufacturer	SIEMENS
IMEI	350450410682127
Firmware	REVISION 02.04
GPRS Attachment Status	Attached
Network Registration	Registered, roaming
Network	0,0,"vodafone UK"
Connection Status	0,0,0

Click the refresh button to get the current status.

Click the scan button to scan for available networks.

Click the auto button to unlock all network preferences.

</goform/emodstat?context=0&state=i> Internet

## Status → PPP n (n being the number of the PPP instance)

The screenshot shows a web browser window displaying the Sarian Systems interface. The left sidebar shows a tree view with 'Status' expanded to 'PPP' and 'PPP 1' selected. The main content area displays 'PPP 1 Status' with a table of configuration options.

Option	Local	Remote
MRU	1500	1500
ACCM	0xa0000	0xa0000
VJ Compression	OFF	OFF
Link Active With Entity	ASY 2	
IP Address	213.233.138.14	
DNS Server IP Address	213.233.128.1	
Outgoing Call To	*98*1#	

Below the table are two buttons: 'Raise Link' and 'Drop Link'.

## Status→Eventlog

The screenshot shows a web browser window displaying the Sarian Systems interface. The left sidebar shows a tree view with 'Status' expanded to 'Event Log' selected. The main content area displays a 'Clear Event Log' button and a list of event log entries.

```
15:19:20, 16 May 2005,WEB Login OK by username lvl 0
15:19:07, 16 May 2005,Telnet session closed
15:19:06, 16 May 2005,GP socket connected: l_port[23] r_ip[10.1.4.10] :
14:04:32, 16 May 2005,GPRS URC CIEV: signal,99
14:04:31, 16 May 2005,GPRS URC CIEV: signal,6
14:04:30, 16 May 2005,GPRS URC CIEV: signal,0
11:17:28, 16 May 2005,WEB Login OK by username lvl 0
11:09:37, 16 May 2005,WEB Login OK by username lvl 0
11:04:59, 16 May 2005,Default Route 0 Available,Activation
11:04:59, 16 May 2005,PPP 1 Available,Activation
11:04:59, 16 May 2005,PPP 1 up
11:04:56, 16 May 2005,PPP 1 Start IPCP
11:04:56, 16 May 2005,PPP 1 Start AUTHENTICATE
11:04:54, 16 May 2005,PPP 1 Start LCP
11:04:54, 16 May 2005,PPP 1 Start
11:04:51, 16 May 2005,GPRS Attachment On
11:04:47, 16 May 2005,GPRS Attachment Off
11:04:47, 16 May 2005,PPP 1 down,LL disconnect
```

Any event that occurs in the Sarian router is logged here.

## Testing the behaviour when a GPRS link is unable to activate

To test this behaviour, remove the antenna so that the signal strength is too low to allow a connection. The Sarian is thus unable to raise a link. (Unless you are located very close to a base station!)

You should see events similar to the following in the eventlog (Note that the example is presented as it would be seen in the eventlog i.e. most recent entries at the top) This means that you should start reading from the bottom of the grey box upwards:

The GPRS link on PPP 2 comes up:

```
15:29:00, 16 May 2005, PPP 2 up
15:29:00, 16 May 2005, Event delay, Logger busy
15:28:56, 16 May 2005, PPP 2 Start IPCP
15:28:56, 16 May 2005, PPP 2 Start AUTHENTICATE
15:28:56, 16 May 2005, Event delay, Logger busy
15:28:53, 16 May 2005, PPP 2 Start LCP
15:28:52, 16 May 2005, PPP 2 Start

15:28:52, 16 May 2005, Event delay, Logger busy
15:28:51, 16 May 2005, GPRS URC CIEV: smsfull,0
15:28:51, 16 May 2005, GPRS URC CIEV: roam,0
15:28:51, 16 May 2005, GPRS URC CIEV: call,0
15:28:51, 16 May 2005, GPRS URC CIEV: message,0
15:28:51, 16 May 2005, GPRS URC CIEV: service,1
15:28:51, 16 May 2005, GPRS URC CIEV: signal,99
15:28:51, 16 May 2005, GPRS URC CIEV: battchg,5
```

Now the antenna has been replaced GPRS attachment and GSM registration can now occur:

```
15:28:50, 16 May 2005, GSM Registration On
15:28:50, 16 May 2005, GPRS Attachment On
15:28:46, 16 May 2005, PPP 2 down, LL disconnect
15:28:46, 16 May 2005, Event delay, Logger busy
15:28:39, 16 May 2005, LAPB 6 up
15:28:39, 16 May 2005, LAPB 5 up
15:28:39, 16 May 2005, LAPB 4 up
15:28:39, 16 May 2005, LAPB 3 up
15:28:29, 16 May 2005, DTR Up ASY 1
15:28:28, 16 May 2005, LAPB 6 down, Lower deactivated
15:28:28, 16 May 2005, LAPB 5 down, Lower deactivated
15:28:28, 16 May 2005, LAPB 4 down, Lower deactivated
15:28:28, 16 May 2005, LAPB 3 down, Lower deactivated
15:28:28, 16 May 2005, DTR Drop on GPRS
15:28:28, 16 May 2005, DTR Down ASY 1
15:28:27, 16 May 2005, LAPB 6 down, Lower deactivated
15:28:27, 16 May 2005, LAPB 5 down, Lower deactivated
15:28:27, 16 May 2005, LAPB 4 down, Lower deactivated
15:28:27, 16 May 2005, LAPB 3 down, Lower deactivated
```

Here the Sarian detects SIM 2 is present and powercycles the GPRS module at this stage you need to re-connect the antenna:

```
15:28:21, 16 May 2005, GPRS link failed -> power cycle, New SIM
15:28:21, 16 May 2005, GPRS SIM 2 present
15:28:21, 16 May 2005, GPRS using SIM 2 (present)

15:28:21, 16 May 2005, Event delay, Logger busy
```

Here you see that the Sarian is unable to raise the link on PPP 1:

```
15:28:18, 16 May 2005, PPP 1 down, LL disconnect
15:28:12, 16 May 2005, PPP 1 down, LL disconnect
15:28:06, 16 May 2005, PPP 1 down, LL disconnect
```

## Testing the behaviour when data stops routing over the GPRS network;

To test this scenario, either disconnect the host specified in the firewall stateful route inspection rules or change the host IP address to an address that does not exist. Configure the Sarian's Ethernet IP address as your PC's gateway and try and route data to that IP address. For a TCP connection you could test by attempting to make 2 telnet connections to that IP address.

You should see events similar to the following in the eventlog. Again read from the bottom of the grey box upwards:

### GPRS Link on PPP 2 (SIM 2) comes up:

```
10:17:55, 06 Aug 2004, Default Route 1 Available, Activation
10:17:55, 06 Aug 2004, PPP 2 up
10:17:48, 06 Aug 2004, PPP 2 Start IPCP
10:17:48, 06 Aug 2004, PPP 2 Start AUTHENTICATE
10:17:48, 06 Aug 2004, PPP 2 Start LCP
10:17:48, 06 Aug 2004, PPP 2 Start
10:17:44, 06 Aug 2004, GPRS Attachment On
10:17:42, 06 Aug 2004, PPP 2 down, LL disconnect
10:17:36, 06 Aug 2004, PPP 2 down, LL disconnect
10:17:31, 06 Aug 2004, GPRS URC CIEV: smsfull, 0
10:17:31, 06 Aug 2004, GPRS URC CIEV: roam, 0
10:17:31, 06 Aug 2004, GPRS URC CIEV: call, 0
10:17:31, 06 Aug 2004, GPRS URC CIEV: message, 1
10:17:31, 06 Aug 2004, GPRS URC CIEV: service, 1
10:17:31, 06 Aug 2004, GPRS URC CIEV: signal, 99
10:17:31, 06 Aug 2004, GPRS URC CIEV: battchg, 5
10:17:30, 06 Aug 2004, Default Route 1 Out Of Service, Activation
10:17:30, 06 Aug 2004, PPP 2 down, LL disconnect
10:17:30, 06 Aug 2004, GPRS Attachment Off
10:17:23, 06 Aug 2004, LAPB 5 up
10:17:23, 06 Aug 2004, LAPB 4 up
10:17:23, 06 Aug 2004, LAPB 3 up
10:17:23, 06 Aug 2004, Event delay, Logger busy
10:17:17, 06 Aug 2004, DTR Up ASY 1
10:17:17, 06 Aug 2004, LAPB 5 down, Lower deactivated
10:17:17, 06 Aug 2004, LAPB 4 down, Lower deactivated
10:17:17, 06 Aug 2004, LAPB 3 down, Lower deactivated
10:17:17, 06 Aug 2004, DTR Drop on GPRS
10:17:17, 06 Aug 2004, DTR Down ASY 1
10:17:17, 06 Aug 2004, Event delay, Logger busy
10:17:15, 06 Aug 2004, LAPB 5 down, Lower deactivated
10:17:15, 06 Aug 2004, LAPB 4 down, Lower deactivated
10:17:15, 06 Aug 2004, LAPB 3 down, Lower deactivated
10:17:09, 06 Aug 2004, GPRS link failed -> power cycle, New SIM
```

### The Sarian detects SIM 2 is present:

```
10:17:09, 06 Aug 2004, GPRS SIM 2 present
10:17:09, 06 Aug 2004, GPRS using SIM 2 (present)
```

### The stateful route inspection detects a problem on PPP 1 and the firewall rule causes PPP 1 to drop:

```
10:17:05, 06 Aug 2004, PPP 1 down, Firewall Request
10:17:05, 06 Aug 2004, Default Route 0 Out Of Service, Firewall
10:17:05, 06 Aug 2004, PPP 1 Out Of Service, Firewall
```

```
10:15:49, 06 Aug 2004,PPP 2 down,Call Req Timeout
10:14:19, 06 Aug 2004,DTR Up ASY 0
10:14:16, 06 Aug 2004,DTR Down ASY 0
```

**GPRS Link on PPP 1 (SIM 1) comes up:**

```
10:07:27, 06 Aug 2004,PPP 1 up
10:07:24, 06 Aug 2004,PPP 1 Start IPCP
10:07:24, 06 Aug 2004,PPP 1 Start AUTHENTICATE
10:07:24, 06 Aug 2004,PPP 1 Start LCP
10:07:24, 06 Aug 2004,PPP 1 Start
```

## 4.0 CONFIGURATION FILES

### 4.1 Sarian Configuration Files

#### Method 1

This is the configuration file for method 1. SIM 2 will only be used when there is a problem with SIM 1. After a period of inactivity or the “link up time” timer expires, the MR2110 will attempt to use SIM 1 again.

```
eth 0 IPaddr "10.1.19.50"
eth 0 mask "255.255.0.0"
lapb 0 ans OFF
lapb 0 tinact 120
lapb 1 tinact 120
lapb 3 dtemode 0
lapb 3 asyport 1
lapb 3 mux_0710 ON
lapb 4 dtemode 0
lapb 4 dlc 1
lapb 4 asyport 1
lapb 4 virt_async "mux0"
lapb 4 mux_0710 ON
lapb 5 dtemode 0
lapb 5 dlc 2
lapb 5 asyport 1
lapb 5 virt_async "mux1"
lapb 5 mux_0710 ON
lapb 6 dtemode 0
lapb 6 dlc 3
lapb 6 asyport 1
lapb 6 virt_async "mux2"
lapb 6 mux_0710 ON
mc45mon 0 asy_add "mux0"
def_route 0 ll_ent "ppp"
def_route 0 ll_add 1
def_route 1 ll_ent "PPP"
def_route 1 ll_add 2
def_route 1 pwr_dly 120
ppp 0 timeout 300
ppp 1 r_chap OFF
ppp 1 IPaddr "0.0.0.0"
ppp 1 username "test"
ppp 1 epassword "LDplTg=="
ppp 1 phonenum "*98*1#"
ppp 1 timeout 0
ppp 1 use_modem 1
ppp 1 gprs_sim 1
ppp 1 aodion 1
ppp 1 autoassert 1
ppp 1 firewall ON
ppp 1 liface "Default"
ppp 1 acttries 5
ppp 1 inhibitno "2"
ppp 2 l_pap OFF
ppp 2 l_chap OFF
ppp 2 l_addr ON
ppp 2 r_pap ON
ppp 2 r_addr OFF
```

```

ppp 2 IPaddr "0.0.0.0"
ppp 2 username "username"
ppp 2 epassword "KD5lSVJDVVg="
ppp 2 phonenum "*98*1#"
ppp 2 timeout 120
ppp 2 maxup 1200
ppp 2 use_modem 1
ppp 2 gprs_sim 2
ppp 2 aodion 1
ppp 2 autoassert 1
ppp 2 firewall ON
ppp 2 liface "Default"
ppp 2 acttries 5
ppp 2 inhibitno "1"
ppp 3 defpak 16
ppp 4 defpak 16
modemcc 0 asy_add "mux1"
modemcc 0 info_asy_add "mux2"
modemcc 0 init_str "+CGQREQ=1,0,0,0,0,0"
modemcc 0 init_str1 "+CGQMIN=1,0,0,0,0,0"
modemcc 0 apn "Your_APN_Goes_Here"
modemcc 0 link_retries 10
modemcc 0 stat_retries 30
modemcc 0 init_str_2 "+CGQREQ=1,0,0,0,0,0"
modemcc 0 init_str1_2 "+CGQMIN=1,0,0,0,0,0"
modemcc 0 apn_2 "Your_APN_Goes_Here"
modemcc 0 link_retries_2 10
modemcc 0 stat_retries_2 30
modemcc 1 link_retries 10
ana 0 anon ON
ana 0 llon ON
ana 0 asyon 13
ana 0 logsize 45
cmd 0 unitid "ss%s>"
cmd 0 cmdnua "99"
cmd 0 hostname "ss.2000r"
cmd 0 tremto 3000
user 0 name "Sarian"
user 0 epassword "FQ0kCxQc"
user 0 access 0
user 1 name "username"
user 1 epassword "KD5lSVJDVVg="
user 1 access 0
user 2 epassword "A==="
user 2 access 0
user 3 epassword "A==="
user 3 access 0
user 4 epassword "A==="
user 4 access 0
user 5 epassword "A==="
user 5 access 0
user 6 epassword "A==="
user 6 access 0
user 7 epassword "A==="
user 7 access 0
user 8 epassword "A==="
user 8 access 0
user 9 epassword "A==="
user 9 access 0
scep 0 app "pkiclient.exe"

```

## Method 2

This is the configuration file for method 2. Once activated SIM 2 will be used indefinitely.

```
eth 0 IPaddr "10.1.19.50"
eth 0 mask "255.255.0.0"
lapb 0 ans OFF
lapb 0 tinact 120
lapb 1 tinact 120
lapb 3 dtemode 0
lapb 3 asyport 1
lapb 3 mux_0710 ON
lapb 4 dtemode 0
lapb 4 dlc 1
lapb 4 asyport 1
lapb 4 virt_async "mux0"
lapb 4 mux_0710 ON
lapb 5 dtemode 0
lapb 5 dlc 2
lapb 5 asyport 1
lapb 5 virt_async "mux1"
lapb 5 mux_0710 ON
lapb 6 dtemode 0
lapb 6 dlc 3
lapb 6 asyport 1
lapb 6 virt_async "mux2"
lapb 6 mux_0710 ON
mc45mon 0 asy_add "mux0"
def_route 0 ll_ent "ppp"
def_route 0 ll_add 1
def_route 1 ll_ent "PPP"
def_route 1 ll_add 2
def_route 1 pwr_dly 120
ppp 0 timeout 300
ppp 1 r_chap OFF
ppp 1 IPaddr "0.0.0.0"
ppp 1 username "test"
ppp 1 epassword "LDplTg=="
ppp 1 phonenum "*98*1#"
ppp 1 timeout 0
ppp 1 use_modem 1
ppp 1 gprs_sim 1
ppp 1 aodion 1
ppp 1 autoassert 1
ppp 1 firewall ON
ppp 1 lliface "Default"
ppp 1 acttries 5
ppp 1 inhibitno "2"
ppp 2 l_pap OFF
ppp 2 l_chap OFF
ppp 2 l_addr ON
ppp 2 r_pap ON
ppp 2 r_addr OFF
ppp 2 IPaddr "0.0.0.0"
ppp 2 username "username"
ppp 2 epassword "KD5lSVJDVWg="
ppp 2 phonenum "*98*1#"
ppp 2 timeout 0
ppp 2 use_modem 1
ppp 2 gprs_sim 2
ppp 2 aodion 1
ppp 2 autoassert 1
ppp 2 firewall ON
```



```
ppp 2 lliface "Default"
ppp 2 acttries 5
ppp 2 inhibitno "1"
ppp 3 defpak 16
ppp 4 defpak 16
modemcc 0 asy_add "mux1"
modemcc 0 info_asy_add "mux2"
modemcc 0 init_str "+CGQREQ=1,0,0,0,0,0"
modemcc 0 init_str1 "+CGQMIN=1,0,0,0,0,0"
modemcc 0 apn "Your_APN_Goes_Here"
modemcc 0 link_retries 10
modemcc 0 stat_retries 30
modemcc 0 init_str_2 "+CGQREQ=1,0,0,0,0,0"
modemcc 0 init_str1_2 "+CGQMIN=1,0,0,0,0,0"
modemcc 0 apn_2 "Your_APN_Goes_Here"
modemcc 0 link_retries_2 10
modemcc 0 stat_retries_2 30
modemcc 1 link_retries 10
ana 0 anon ON
ana 0 llon ON
ana 0 asyon 13
ana 0 logsize 45
cmd 0 unitid "ss%s>"
cmd 0 cmdnua "99"
cmd 0 hostname "ss.2000r"
cmd 0 tremto 3000
user 0 name "Sarian"
user 0 epassword "FQ0kCxQc"
user 0 access 0
user 1 name "username"
user 1 epassword "KD5lSVJDVWg="
user 1 access 0
user 2 epassword "A==="
user 2 access 0
user 3 epassword "A==="
user 3 access 0
user 4 epassword "A==="
user 4 access 0
user 5 epassword "A==="
user 5 access 0
user 6 epassword "A==="
user 6 access 0
user 7 epassword "A==="
user 7 access 0
user 8 epassword "A==="
user 8 access 0
user 9 epassword "A==="
user 9 access 0
scep 0 app "pkiclient.exe"
```

## 5.0 SARIAN FIRMWARE VERSIONS

This is the firmware and hardware information from the MR2110 used for this application note:

```
ati5
Sarian Systems. Sarian MR2110 GPRS Router Ser#:22952 HW Revision: 2505c
Software Build Ver4767. May 10 2005 13:04:55 NW
ARM Sarian Bios Ver 2.92 v13 50MHz B32-M32-F80-00,0 MAC:00042d0059a8
Power Up Profile: 0
Async Driver Revision: 1.19 Ext clk:3686400
Ethernet Driver Revision: 1.11
Firewall Revision: 1.0
Timer Module Revision: 1.1
L2TP Revision: 1.10
LAPB Revision: 1.12
X25 Layer Revision: 1.19
PAD Revision: 1.4
V120 Revision: 1.16
MC45MON Revision: 1.0
ARM Sync Driver Revision: 1.18
TCP Revision: 1.14
TCP Utils Revision: 1.13
PPP Revision: 1.18
WEB Revision: 1.5
SMTP Revision: 1.1
FTP Client Revision: 1.5
FTP Revision: 1.4
IKE Revision: 1.0
PollANS Revision: 1.2
PPPOE Revision: 1.0
MODEM CC (Siemens GPRS) Revision: 1.3
FLASH Write Revision: 1.2
Command Interpreter Revision: 1.38
QOS Revision: 1.0
SSH Server Revision: 1.0
SCP Revision: 1.0
CERT Revision: 1.0
LowPrio Revision: 1.0
OK
```