Application Note 15

Configure a Dual SIM cellular router to automatically failover to the second SIM card and remain on SIM 2 until a failure is detected, then revert to SIM 1.

This configuration will cause the TransPort to give each SIM and associated cellular link equal priority. Unless a problem is detected the TransPort will permanently keep active whichever SIM card it happens to be using. This method is useful if maintaining a connection to/from the remote cellular TransPort router is a priority.

UK Support
## Contents

1  Introduction ................................................................................................................................. 4  
   1.1 Outline ................................................................................................................................. 4  
   1.2 Assumptions ............................................................................................................................. 4  
   1.3 Corrections ............................................................................................................................... 4  
   1.4 Version .................................................................................................................................. 5  

2  Configuration ............................................................................................................................... 5  
   2.1 Configure the cellular Module ................................................................................................. 5  
   2.2 Configure the Default Routes .................................................................................................. 7  
   2.3 Configure the PPP interface for SIM card 1 ........................................................................... 9  
   2.4 Configure advanced parameters the PPP interface for SIM card 1 ......................................... 10  
   2.5 Configure the PPP interface for SIM card 2 .......................................................................... 12  
   2.6 Configure advanced parameters the PPP interface for SIM card 2 ......................................... 15  
   2.7 Stateful Route Inspection ....................................................................................................... 15  
   2.8 Configuring the firewall ......................................................................................................... 16  

3  Status and Testing ....................................................................................................................... 18  
   3.1 Diagnostics - Status Menu ...................................................................................................... 18  

4  Configuration Files ...................................................................................................................... 23  
   4.1 TransPort Configuration Files ................................................................................................. 23  

5  TransPort Firmware Versions ...................................................................................................... 24
1 INTRODUCTION

Cellular 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 TransPort to monitor TCP traffic over an active cellular connection to a specified IP address. When a problem is detected with the data transfer the TransPort will drop the active cellular connection and activate the secondary cellular link using a second SIM card.

Other techniques for monitoring cellular 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 are two distinct methods, this Application Note covers method 2. For method 1, please see Application Note 14;

1. The first will be to back-up to a temporary “on demand” cellular 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 TransPort 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.) For this configuration see Application Note 14.

2. The second method will cause the TransPort to give each SIM and associated cellular link equal priority. Unless a problem is detected the TransPort will permanently keep active whichever SIM card it happens to be using. This method is useful if maintaining a connection to the remote cellular TransPort 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: All Dual SIM TransPort routers

Firmware versions: 4.674 or later.

Configuration: This Application Note assumes that the TransPort 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: uksupport@digi.com
Requests for new application notes can be sent to the same address.

## 1.4 Version

<table>
<thead>
<tr>
<th>Version Number</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>Published</td>
</tr>
<tr>
<td>1.1</td>
<td>Removed AODI timer settings</td>
</tr>
<tr>
<td>1.2</td>
<td>Removed AODI timer settings from screen shots and config files</td>
</tr>
<tr>
<td>1.3</td>
<td>Added dialling defaults for PPP 2. Changed title to reflect all dual SIM wireless products</td>
</tr>
</tbody>
</table>

## 2 CONFIGURATION

### 2.1 Configure the cellular Module

#### 2.1.1 Parameter settings for SIM 1

Using the TransPort’s web interface browse to **Configuration - Interfaces > Mobile > W-WAN Module > SIM 1 > Configure**.

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APN</td>
<td>internet</td>
<td>Enter the correct APN for your network</td>
</tr>
<tr>
<td>PIN</td>
<td>1234</td>
<td>Enter the PIN number for your SIM card if required</td>
</tr>
<tr>
<td>PUK</td>
<td>1234</td>
<td>Enter the PUK number for your SIM card if desired</td>
</tr>
</tbody>
</table>
2.1.2 Parameter settings for SIM 2

Using the TransPort’s web interface browse to Configuration - Interfaces > Mobile > W-WAN Module > SIM 2 > Configure.

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>APN</td>
<td>internet</td>
<td>Enter the correct APN for your network</td>
</tr>
<tr>
<td>PIN</td>
<td>1234</td>
<td>Enter the PIN number for your SIM card if required</td>
</tr>
<tr>
<td>PUK</td>
<td>1234</td>
<td>Enter the PUK number for your SIM card if desired</td>
</tr>
</tbody>
</table>
2.2 Configure the Default Routes

2.2.1 Default Route 0

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

Browse to Configuration - Routing > Default Route 0

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface:</td>
<td>PPP</td>
<td>Identifies the interface type to be associated with default route 0.</td>
</tr>
<tr>
<td>Interface #:</td>
<td>1</td>
<td>Identifies the instance number of the interface to be associated with default route 0.</td>
</tr>
</tbody>
</table>
2.2.2 Default Route 1

Interface PPP 2 is configured for cellular using SIM 2.

Browse to Configuration - Routing > Default Route 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interface:</td>
<td>PPP</td>
<td>Identifies the interface type to be associated with default route 1.</td>
</tr>
<tr>
<td>Interface #:</td>
<td>2</td>
<td>Identifies the instance number of the interface to be associated with default route 1.</td>
</tr>
<tr>
<td>Initial Power Up delay (s):</td>
<td>120</td>
<td>Delays activation of the PPP 2 link after power-up for two minutes (recommended). This is to prevent conflict of the two cellular interfaces.</td>
</tr>
</tbody>
</table>
2.3 Configure the PPP interface for SIM card 1

2.3.1 PPP 1 Standard Page

Browse to **Configuration - Interfaces > PPP > PPP 0 - 4 > PPP 1 > Standard**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dial-out number:</td>
<td><em>98</em>1#</td>
<td>Dial string to attach to the cellular network</td>
</tr>
<tr>
<td>Use W-WAN /external</td>
<td>Any W-WAN Channel</td>
<td>Configures the TransPort to use any available cellular channel</td>
</tr>
<tr>
<td>modem:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W-WAN SIM:</td>
<td>SIM 1</td>
<td>Configures cellular Link on PPP 1 to use SIM card 1</td>
</tr>
<tr>
<td>Username:</td>
<td>username</td>
<td>Username given by the cellular provider</td>
</tr>
<tr>
<td>Password:</td>
<td>password</td>
<td>Username given by the cellular provider</td>
</tr>
<tr>
<td>Confirm Password:</td>
<td>password</td>
<td>Same as above</td>
</tr>
<tr>
<td>Always On Mode:</td>
<td>ON</td>
<td>Auto activates PPP 1 and keeps the link up</td>
</tr>
<tr>
<td>Firewall</td>
<td>ON</td>
<td>Activates the Firewall/Stateful Route Inspection on PPP 1</td>
</tr>
</tbody>
</table>
### 2.4 Configure advanced parameters the PPP interface for SIM card 1

Browse to **Configuration - Interfaces > PPP > PPP 0 - 4 > PPP 1 > Advanced**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto-activation attempts allowed:</td>
<td>5</td>
<td>Allows PPP 1 a total of 5 activation attempts before the PPP 2 link can override it</td>
</tr>
<tr>
<td>Inhibit auto-activation when these PPPs are active:</td>
<td>2</td>
<td>Configures PPP 1 to inhibit PPP 2 from raising it’s cellular link whilst PPP 1 is active</td>
</tr>
<tr>
<td>Inhibit mode</td>
<td>Inhibit if other PPP active</td>
<td>Stops PPP 2 from activating when PPP 1 is UP</td>
</tr>
</tbody>
</table>
These parameters are configured correctly by default, however, please check your PPP Advanced parameters match these.
2.5 Configure the PPP interface for SIM card 2

2.5.1 Load the dialling defaults for PPP 2

Browse to Configuration - Interfaces > PPP > PPP 0 - 4 > PPP 2 > Standard

Very Important:

Click the 'Load Dialling defaults' button at the bottom of the PPP 2 standard page.

2.5.2 Configure PPP 2

Return to the PPP 2 Standard page and proceed with the following parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dial-out number:</td>
<td><em>98</em>1#</td>
<td>Dial string to attach to the cellular network</td>
</tr>
<tr>
<td>Use W-WAN/external modem:</td>
<td>Any W-WAN Channel</td>
<td>Configures the TransPort to use any available cellular channel</td>
</tr>
<tr>
<td>W-WAN SIM:</td>
<td>SIM 2</td>
<td>Configures cellular Link on PPP 1 to use SIM card 2</td>
</tr>
<tr>
<td>Username:</td>
<td>username</td>
<td>Username given by the cellular provider</td>
</tr>
<tr>
<td>Password:</td>
<td>password</td>
<td>Username given by the cellular provider</td>
</tr>
<tr>
<td>Confirm Password:</td>
<td>password</td>
<td>Same as above</td>
</tr>
<tr>
<td>Always On Mode:</td>
<td>ON</td>
<td>Auto activates PPP 2 and keeps the link up</td>
</tr>
<tr>
<td>Firewall</td>
<td>ON</td>
<td>Activates the Firewall/Stateful Route Inspection on PPP 2</td>
</tr>
<tr>
<td>Local IP Address:</td>
<td>0.0.0.0</td>
<td>Requests an IP address from the cellular provider</td>
</tr>
</tbody>
</table>
## PPP 2 (Standard)

<table>
<thead>
<tr>
<th>Configuration</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>IP Analysis</td>
<td>Off</td>
</tr>
<tr>
<td>PPP Analysis</td>
<td>Off</td>
</tr>
<tr>
<td>Answering</td>
<td>Off</td>
</tr>
<tr>
<td>Metric</td>
<td>1</td>
</tr>
<tr>
<td>Calling number</td>
<td></td>
</tr>
<tr>
<td>MSN</td>
<td></td>
</tr>
<tr>
<td>Sub-address</td>
<td></td>
</tr>
<tr>
<td>CLI</td>
<td>No restrictions</td>
</tr>
<tr>
<td>Dial-out prefix</td>
<td><em>98</em>1#</td>
</tr>
<tr>
<td>Dial-out number</td>
<td></td>
</tr>
<tr>
<td>Dial-out number #2</td>
<td></td>
</tr>
<tr>
<td>Dial-out number #3</td>
<td></td>
</tr>
<tr>
<td>Dial-out number #4</td>
<td></td>
</tr>
<tr>
<td>Use W-WAN/external modem</td>
<td>Any W-WAN channel</td>
</tr>
<tr>
<td>Detach W-WAN on link failure</td>
<td>No</td>
</tr>
<tr>
<td>Detach W-WAN between connection attempts</td>
<td>No</td>
</tr>
<tr>
<td>W-WAN SIM</td>
<td>SIM 2</td>
</tr>
<tr>
<td>Username</td>
<td>username</td>
</tr>
<tr>
<td>Password (Empty)</td>
<td></td>
</tr>
<tr>
<td>Confirm password</td>
<td></td>
</tr>
<tr>
<td>AODI NUA</td>
<td></td>
</tr>
<tr>
<td>Always on mode</td>
<td>On</td>
</tr>
<tr>
<td>AODI delay (s)</td>
<td>0</td>
</tr>
<tr>
<td>AODI delay when other PPPs inhibited by this one are connected (s)</td>
<td>0</td>
</tr>
<tr>
<td>Setting</td>
<td>Value</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Secondary DNS IP served to peer:</td>
<td></td>
</tr>
<tr>
<td>Multi-link</td>
<td>Off</td>
</tr>
<tr>
<td>Inactivity timeout (s):</td>
<td>0</td>
</tr>
<tr>
<td>Inactivity timeout #2 (s):</td>
<td>0</td>
</tr>
<tr>
<td>RX packet Inactivity timeout (s):</td>
<td>0</td>
</tr>
<tr>
<td>Traffic activation inactivity timeout (s):</td>
<td>0</td>
</tr>
<tr>
<td>Minimum link up-time (s):</td>
<td>0</td>
</tr>
<tr>
<td>Maximum link up-time (s):</td>
<td>0</td>
</tr>
<tr>
<td>Maximum negotiation time (s):</td>
<td>80</td>
</tr>
<tr>
<td>Firewall:</td>
<td>On</td>
</tr>
<tr>
<td>IGMP:</td>
<td>Off</td>
</tr>
<tr>
<td>IPSec:</td>
<td>Off</td>
</tr>
<tr>
<td>QOS:</td>
<td>Off</td>
</tr>
<tr>
<td>RIP version:</td>
<td></td>
</tr>
<tr>
<td>RIP destination IP address list:</td>
<td></td>
</tr>
<tr>
<td>RIP authentication method:</td>
<td></td>
</tr>
<tr>
<td>Only send RIP when interface is in service:</td>
<td>No</td>
</tr>
<tr>
<td>Include in RIP advertisements:</td>
<td>Yes</td>
</tr>
<tr>
<td>Enabled Triggered RIP:</td>
<td>No</td>
</tr>
<tr>
<td>DEFLATE compression:</td>
<td>Off</td>
</tr>
<tr>
<td>MPPE encryption:</td>
<td>Off</td>
</tr>
<tr>
<td>MPPE key size:</td>
<td>Auto</td>
</tr>
<tr>
<td>Time band:</td>
<td></td>
</tr>
<tr>
<td>Log event up-time (mins):</td>
<td>0</td>
</tr>
<tr>
<td>Max up-time per day (mins):</td>
<td>0</td>
</tr>
<tr>
<td>Local IP address:</td>
<td>0.0.0.0</td>
</tr>
<tr>
<td>Remote IP address pool minimum:</td>
<td>10.10.10.0</td>
</tr>
<tr>
<td>Remote IP address pool range:</td>
<td></td>
</tr>
</tbody>
</table>
2.6 Configure advanced parameters the PPP interface for SIM card 2

2.6.1 Parameter settings for the PPP 2 Advanced Page

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

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auto-activation attempts allowed:</td>
<td>5</td>
<td>Allows PPP 2 a total of 5 activation attempts after power up before the PPP 1 link can override it</td>
</tr>
<tr>
<td>Inhibit auto-activation when these PPP’s are active:</td>
<td>1</td>
<td>Configures PPP 2 to inhibit PPP 1 from raising it’s cellular link whilst PPP 2 is active</td>
</tr>
</tbody>
</table>

These parameters will have been configured by clicking ‘Load dialling defaults’ in the previous step, however, please check your PPP Advanced

2.7 Stateful Route Inspection

SRI or Stateful Route Inspection is a passive error detection technique. All TransPort units contain a powerful statefull firewall facility. In addition to the blocking of un-authorised 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 cellular problem detection this facility can be used to deactivate a PPP link to the cellular 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 TransPort to send the data through a standby interface, which will be a cellular link using a second SIM card. Both SIM cards can be registered with the same or different cellular providers.

To detect a problem on a current cellular link the TransPort 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 TransPort can drop the current cellular link and raise another link using the second SIM card.

2.8 Configuring the firewall.

You need to configure three rules in the TransPort’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 TransPort’s web interface by browsing to Configuration - Security > 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 TransPort’s file directory.

2.8.1 Firewall Stateful Route Inspection Rules.

The rules are as follows

<table>
<thead>
<tr>
<th>Rule</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rule 1:</td>
<td>pass out break end on ppp 1 proto tcp from any to &lt;Host IP Address&gt; flags s!a inspect-state oos 1 t=5 c=2 d=2</td>
</tr>
<tr>
<td>Rule 2:</td>
<td>pass out break end on ppp 2 proto tcp from any to &lt;Host IP Address&gt; flags s!a inspect-state oos 1 t=5 c=2 d=2</td>
</tr>
<tr>
<td>Rule 3:</td>
<td>pass break end</td>
</tr>
</tbody>
</table>

- 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 succesfull
\textbf{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.

\textbf{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: \textbf{c=n} and \textbf{d=n} should be the same value
3 STATUS AND TESTING

3.1 Diagnostics - Status Menu

The Diagnostics - Status menu of the TransPort’s web interface is a useful tool for giving the user a definitive view of the router’s current state and in the case of the eventlog a history of events.

3.1.1 Diagnostics - Status > Mobile

The SIM status should be ‘Ready’ and the should be a good signal strength (better than -95dBm). The router should be attached and registered on the home network.
3.1.2 Diagnostics - Status > PPP > PPP 0 - 4 > PPP n > View (n being the number of the PPP instance)

The PPP link should be up and have a valid IP address.
3.1.3 Diagnostics - Event Log

Any event that occurs in the TransPort router is logged in the Event Log.

3.1.4 Testing the behaviour when a cellular PPP 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 TransPort is then 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 cellular link on PPP 2 comes up:**

15:29:00, 16 Feb 2010,PPP 2 up
15:29:00, 16 Feb 2010,Event delay,Logger busy
15:28:56, 16 Feb 2010,PPP 2 Start IPCP
15:28:56, 16 Feb 2010,PPP 2 Start AUTHENTICATE
15:28:56, 16 Feb 2010,Event delay,Logger busy
15:28:53, 16 Feb 2010,PPP 2 Start LCP
15:28:52, 16 Feb 2010,PPP 2 Start

15:28:52, 16 Feb 2010,Event delay,Logger busy
15:28:51, 16 Feb 2010,GPRS URC CIEV: smsfull,0
15:28:51, 16 Feb 2010,GPRS URC CIEV: roam,0
15:28:51, 16 Feb 2010,GPRS URC CIEV: call,0
15:28:51, 16 Feb 2010,GPRS URC CIEV: message,0
15:28:51, 16 Feb 2010,GPRS URC CIEV: service,1
15:28:51, 16 Feb 2010,GPRS URC CIEV: battchg,5
Now the antenna has been replaced GPRS attachment and GSM registration can now occur:

15:28:50, 16 Feb 2010, GSM Registration On
15:28:50, 16 Feb 2010, GPRS Attachment On
15:28:46, 16 Feb 2010, PPP 2 down, LL disconnect
15:28:46, 16 Feb 2010, Event delay, Logger busy
15:28:39, 16 Feb 2010, LAPB 6 up
15:28:39, 16 Feb 2010, LAPB 5 up
15:28:39, 16 Feb 2010, LAPB 4 up
15:28:39, 16 Feb 2010, LAPB 3 up
15:28:29, 16 Feb 2010, DTR Up ASY 1
15:28:28, 16 Feb 2010, LAPB 6 down, Lower deactivated
15:28:28, 16 Feb 2010, LAPB 5 down, Lower deactivated
15:28:28, 16 Feb 2010, LAPB 4 down, Lower deactivated
15:28:28, 16 Feb 2010, LAPB 3 down, Lower deactivated
15:28:28, 16 Feb 2010, DTR Drop on GPRS
15:28:28, 16 Feb 2010, DTR Down ASY 1
15:28:27, 16 Feb 2010, LAPB 6 down, Lower deactivated
15:28:27, 16 Feb 2010, LAPB 5 down, Lower deactivated
15:28:27, 16 Feb 2010, LAPB 4 down, Lower deactivated
15:28:27, 16 Feb 2010, LAPB 3 down, Lower deactivated

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

15:28:21, 16 Feb 2010, GPRS link failed -> power cycle, New SIM
15:28:21, 16 Feb 2010, GPRS SIM 2 present
15:28:21, 16 Feb 2010, GPRS using SIM 2 (present)
15:28:21, 16 Feb 2010, Event delay, Logger busy

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

15:28:18, 16 Feb 2010, PPP 1 down, LL disconnect
15:28:12, 16 Feb 2010, PPP 1 down, LL disconnect
15:28:06, 16 Feb 2010, PPP 1 down, LL disconnect

3.1.5 Testing the behaviour when data stops routing over the cellular 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 TransPort’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 a telnet connection 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:

The router is now up and running on PPP 2 and SIM 2:

16:20:49, 16 Feb 2010, Default Route 1 Available, Activation
16:20:49, 16 Feb 2010, PPP 2 up
16:20:47, 16 Feb 2010, PPP 2 Start IPCP
16:20:47, 16 Feb 2010, PPP 2 Start AUTHENTICATE
16:20:47, 16 Feb 2010, PPP 2 Start LCP
16:20:46, 16 Feb 2010, PPP 2 Start
16:20:46, 16 Feb 2010, Modem connected on asy 5
16:20:46, 16 Feb 2010, Modem dialing on asy 5 #:*98*1#
16:20:43, 16 Feb 2010, GSM Registration On
16:20:43, 16 Feb 2010, GPRS Registration On
16:20:36, 16 Feb 2010, Default Route 1 Out Of Service, Activation
16:20:36, 16 Feb 2010, PPP 2 down, LL disconnect
16:20:36, 16 Feb 2010, Modem disconnected on asy 5, 18
16:20:35, 16 Feb 2010, Modem dialing on asy 5 #:*98*1#
16:20:33, 16 Feb 2010, ASY 7 assigned to usb-2-1 (Globetrotter HSDPA Modem)
16:20:33, 16 Feb 2010, ASY 6 assigned to usb-2-1 (Globetrotter HSDPA Modem)
16:20:33, 16 Feb 2010, ASY 5 assigned to usb-2-1 (Globetrotter HSDPA Modem)
16:20:33, 16 Feb 2010, USB-2 device 2 connected: Globetrotter HSDPA Modem
16:20:32, 16 Feb 2010, DTR Down ASY 7
16:20:32, 16 Feb 2010, DTR Down ASY 6
16:20:32, 16 Feb 2010, DTR Down ASY 5
16:20:32, 16 Feb 2010, ASY 7 unassigned
16:20:32, 16 Feb 2010, ASY 6 unassigned
16:20:32, 16 Feb 2010, ASY 5 unassigned
16:20:32, 16 Feb 2010, USB-2 device 2 disconnected
16:20:14, 16 Feb 2010, GPRS link failed -> power cycle, New SIM
16:20:14, 16 Feb 2010, GPRS SIM 2 present

The router starts using SIM 2 instead:

16:20:14, 16 Feb 2010, GPRS using SIM 2 (present)
16:20:12, 16 Feb 2010, Modem disconnected on asy 5, Normal Breakdown

Telnet is tried to an IP address monitored by the firewall, the remote device has Telnet blocked. The stateful route inspection detects a problem on PPP 1 and the firewall rule causes PPP 1 to drop:

16:20:10, 16 Feb 2010, PPP 1 down, Firewall Request
16:20:10, 16 Feb 2010, Default Route 0 Out Of Service, Firewall
16:20:10, 16 Feb 2010, PPP 1 Out Of Service, Firewall
16:18:54, 16 Feb 2010, DTR Down ASY 0
PPP 1 is UP and working:

16:17:04, 16 Feb 2010, PPP 1 up
16:17:02, 16 Feb 2010, PPP 1 Start IPCP
16:17:02, 16 Feb 2010, PPP 1 Start AUTHENTICATE
16:17:02, 16 Feb 2010, PPP 1 Start LCP
16:17:02, 16 Feb 2010, PPP 1 Start
16:17:02, 16 Feb 2010, Modem connected on asy 5
16:17:01, 16 Feb 2010, Modem dialing on asy 5 #:*98*1#
16:17:00, 16 Feb 2010, GPRS Registration On
16:17:00, 16 Feb 2010, GPRS Attachment On
16:16:52, 16 Feb 2010, GPRS Connection Status: No cause information available
16:16:52, 16 Feb 2010, Network technology changed to UMTS/HSDPA
16:16:52, 16 Feb 2010, GSM Registration On
16:16:52, 16 Feb 2010, GPRS Registration Off
16:16:51, 16 Feb 2010, PPP 1 down, LL disconnect
16:16:51, 16 Feb 2010, Modem disconnected on asy 5, 18
16:16:50, 16 Feb 2010, ASY 7 assigned to usb-2-1 (Globetrotter HSDPA Modem)
16:16:50, 16 Feb 2010, ASY 6 assigned to usb-2-1 (Globetrotter HSDPA Modem)
16:16:50, 16 Feb 2010, ASY 5 assigned to usb-2-1 (Globetrotter HSDPA Modem)
16:16:50, 16 Feb 2010, USB-2 device 2 connected: Globetrotter HSDPA Modem
16:16:46, 16 Feb 2010, DTR Up ASY 0
16:16:39, 16 Feb 2010, Modem dialing on asy 5 #:*98*1#
16:16:35, 16 Feb 2010, ETH 0 up
16:16:34, 16 Feb 2010, ETH 2 up
16:16:34, 16 Feb 2010, ETH 1 up
16:16:34, 16 Feb 2010, SD/MMC device connected: memory card
16:16:34, 16 Feb 2010, USB-2 device 1 connected: EHCI root hub
16:16:34, 16 Feb 2010, USB-1 device 1 connected: EHCI root hub
16:16:34, 16 Feb 2010, Power control profile 0 activated
16:16:34, 16 Feb 2010, Power-up[ ]
4 CONFIGURATION FILES

4.1 TransPort Configuration Files

4.1.1 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 "10.1.51.4"
eth 0 mask "255.255.0.0"
lapb 0 ans OFF
lapb 0 tinact 120
lapb 1 tinact 120
lapb 3 dtmode 0
lapb 4 dtmode 0
lapb 5 dtmode 0
lapb 6 dtmode 0
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 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 l1iface "Default"
ppp 1 ipanon ON
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_chap ON
ppp 2 r_addr OFF
ppp 2 IPaddr "0.0.0.0"
ppp 2 prefix "{98*1#"
ppp 2 use_modem 1
ppp 2 gprs_sim 2
ppp 2 aodion 1
ppp 2 autoassert 1
ppp 2 firewall ON
ppp 2 l1iface "Default"
ppp 2 acttries 5
ppp 2 inhibitno "1"
ppp 3 defpak 16
ppp 4 defpak 16
modemcc 0 info_asy_add 7
modemcc 0 init_str "+CGQREQ=1"
```
5 TRANSPORT FIRMWARE VERSIONS

This is the firmware and hardware information from the WR41 used for this application note:

ati5
Digi TransPort WR41H-AEU-B00 Ser#:102691 HW Revision: 7103a
Software Build Ver5091. Feb 04 2010 09:36:33 ZW
ARM Bios Ver 5.83 v36 399MHz B128-M128-F80-0140,0 MAC:00042d019123
Power Up Profile: 0
Async Driver             Revision: 1.19 Int clk
Ethernet Driver          Revision: 1.11
Firewall                 Revision: 1.0
EventEdit                Revision: 1.0
Timer Module             Revision: 1.1
(B)USBHOST               Revision: 1.0
SDMMC                    Revision: 1.0
L2TP                     Revision: 1.10
PPTP                     Revision: 1.00
LAPB                      Revision: 1.12
X25 Layer                 Revision: 1.19
MACRO                     Revision: 1.0
PAD                       Revision: 1.4
X25 Switch                Revision: 1.7
V120                      Revision: 1.16
TPAD Interface            Revision: 1.12
GPS                       Revision: 1.0
SCRIBATSK                 Revision: 1.0
BASTSK                    Revision: 1.0
PYTHON                    Revision: 1.0
ARM Sync Driver           Revision: 1.18
TCP (HASH mode)           Revision: 1.14
TCP Utils                 Revision: 1.13
PPP                       Revision: 1.19
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 (Option 3G)      Revision: 1.4
FLASH Write               Revision: 1.2
Command Interpreter       Revision: 1.38
SSLCLI                    Revision: 1.0
OSPF                      Revision: 1.0
BGP                       Revision: 1.0
QOS                       Revision: 1.0
PWRCTRL                   Revision: 1.0
RADIUS Client             Revision: 1.0
SSH Server                Revision: 1.0
SCP                       Revision: 1.0
CERT                      Revision: 1.0
LowPrio                   Revision: 1.0
Tunnel                    Revision: 1.2
OK