



Application Note 20

Lock a TransPort to a single mobile provider

Digi Technical Support
June 2016

Contents

1	Introduction	3
1.1	Outline	3
1.2	Assumptions.....	3
1.3	Corrections	3
1.4	Version	3
2	Configuration	4
2.1	Deactivate the PPP interface	4
2.2	Scan for Networks	5
2.3	Re-Activate the PPP interface	7
2.4	Save the configuration.....	7
2.5	Extract the configuration change and apply it to other TransPorts.	8
3	Testing	9
3.1	Checking that the TransPort is locked to the correct network	9
3.2	Checking that the correct command is sent to the module	10
4	Hardware and firmware details	11
4.1	TransPort firmware versions.....	11

1 INTRODUCTION

1.1 Outline

Some mobile providers allow their users to roam on to the networks of other providers. If users are away from their home country, this can sometimes cause a problem when a unit is located near a country border. Here, the TransPort's modem module may attach to a bordering foreign network and incur expensive roaming charges.

This Application Note (AN) outlines:

- (i) A way of 'locking' the TransPort to one mobile provider's network.
- (ii) Applying the resulting configuration change to other TransPorts.

1.2 Assumptions

This AN applies to:

Models shown: Digi Transport WR44v2

Other Compatible Models: All Digi TransPort products.

Firmware versions: All firmware versions.

Configuration: This AN assumes the devices are set to their factory default configurations. Most configuration commands are only shown if they differ from the factory default.

Users have access to the TransPort command line interface (via serial port or telnet) and also the web interface.

1.3 Corrections

Requests for corrections or amendments to this AN are welcome and should be addressed to: tech.support@digi.com

Requests for new ANs can be sent to the same address.

1.4 Version

Status	
1.0	Published
1.1	Revision for new W-WAN usage in the web GUI post release 5.036.
2.0	Updated and rebranded
2.1	Completed and published
2.2	Updated screenshots and instructions for new web interface, rebranding (Jun 2016)

2 CONFIGURATION

2.1 Deactivate the PPP interface

In order to perform a successful scan of available networks, it is necessary to have the PPP session deactivated.

Navigate to: **Configuration - Network > Interfaces > Advanced > PPP 0 - 9 > PPP 1 > Advanced**

Remove the tick from the option **Enable "Always On" mode of this interface** so the PPP interface remains down while the scan takes place.

Click the **Apply** button.

[Configuration - Network > Interfaces > Advanced > PPP 0 - 9 > PPP 1 > Advanced](#)

▼ **Advanced**

Metric:

Allow this PPP interface to settle for x 100 milliseconds after the connection has come up

Enable "Always On" mode of this interface

Attempt to re-connect after seconds

If a PPP interface that would be inhibited by this PPP is connected, attempt to re-connect after seconds

Wait seconds after power-up before activating this interface

Keep this interface up for at least seconds

Navigate to: **Management - Network Status > Interfaces > Advanced > PPP > PPP 0 - 9 > PPP 1**

Click the **Drop Link** button.

[Management - Network Status > Interfaces > Advanced > PPP > PPP 0 - 9 > PPP 1](#)

▼ **Advanced**

▼ **PPP**

▼ **PPP 0 - 9**

▶ **PPP 0**

▼ **PPP 1 - W-WAN**

2.2 Scan for Networks

To detect all networks in range, navigate to: **Management - Network Status > Interfaces > Mobile**
Click the "Scan for networks" button.

[Management - Network Status > Interfaces > Mobile](#)

Mobile Information

Results of Last Module Status Poll at 29 Jan 2016 16:05:14

Outcome: Got modem status OK

SIM status: Ready (PIN checking disabled)
Signal strength: -78 dBm
Radio technology: UMTS
Signal quality (UMTS): RSSI -78 dBm, Ec/Io -3.5 dB
Radio band: WCDMA 850
Channel: 487
Manufacturer: Sierra Wireless, Incorporated
Model: MC7354
IMEI: 359225051479608
ESN: 8082D50E
MEID: 35922505147960
IMSI: 310410825281959
MDN: 15337055232
ICCID: 89014103278252819597
Firmware: SWI9X15C_05.05.58.00 r27038 carmd-fwbuild1
2015/03/04 21:30:23
Bootcode: SWI9X15C_05.05.58.00 r27038 carmd-fwbuild1
2015/03/04 18:38:46
Hardware version: 1.0
Firmware Carrier ID: ATT_005.026_000
GPRS Attachment Status: Attached
GPRS Registration: Registered lac:84CA ci:00DA16EC
Network: AT&T, 310410
Preferred system: Auto

Refresh

Scan for networks

Unlock networks

Note: any network lock/unlock actions only take effect after next data disconnect/reconnect

After 1-2 minutes, the router will have scanned all the “visible” networks and populated these networks into the ‘Networks Detected’ table.

[Management - Network Status](#) > [Interfaces](#) > [Mobile](#)

Mobile Information

Results of Last Module Status Poll at 29 Jan 2016 16:17:53

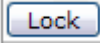
Outcome: Got modem status OK

SIM status: Ready (PIN checking disabled)
 Signal strength: -74 dBm
 Radio technology: UMTS
 Signal quality (UMTS): RSSI -74 dBm, Ec/Io -4.0 dB
 Radio band: WCDMA 850
 Channel: 487
 Manufacturer: Sierra Wireless, Incorporated
 Model: MC7354
 IMEI: 359225051479608
 ESN: 8082D50E
 MEID: 35922505147960
 IMSI: 310410825281959
 MDN: 15337055232
 ICCID: 89014103278252819597
 Firmware: SWI9X15C_05.05.58.00 r27038 carmd-fwbuild1
 2015/03/04 21:30:23
 Bootcode: SWI9X15C_05.05.58.00 r27038 carmd-fwbuild1
 2015/03/04 18:38:46
 Hardware version: 1.0
 Firmware Carrier ID: ATT_005.026_000
 GPRS Attachment Status: Attached
 GPRS Registration: Registered lac:84CA ci:00DA16EC
 Network: AT&T, 310410
 Preferred system: Auto

Networks Detected

Status	LongName	Short Name	Numeric	Technology	Action	
Available		AT&T	310410	LTE	Preferred	Lock
Current		AT&T	310410	UMTS	Preferred	Lock
Available		AT&T	310410	GSM	Preferred	Lock
Available		T-Mobile	310260	UMTS	Preferred	Lock
Available		Verizon	311480	LTE	Preferred	Lock
Available		T-Mobile	310260	LTE	Preferred	Lock
Available		T-Mobile	310260	GSM	Preferred	Lock

Note: any network lock/unlock actions only take effect after next data disconnect/reconnect

Look for the network that requires locking to and click the  button (refer to the above screenshot). This action sends an AT+COPS modem command to the cellular module (e.g. `AT+COPS=1,2,310410`) which will only allow the module to attach to the mobile network with the specified ID number.

Confirmation of Locking (note the “No Errors” message):

[Management - Network Status](#) > [Interfaces](#) > [Mobile](#)

▼ Mobile

Configuration Results

No Errors

Remember to [save to flash](#) when done making changes.

2.3 Re-Activate the PPP interface

The PPP deactivation performed in step 2.1 needs to be reversed.

Navigate to: **Configuration - Network > Interfaces > Advanced > PPP 0 – 9 > PPP 1 > Advanced**

Insert a tick in the option **Enable "Always On" mode of this interface** so the PPP interface will automatically try and connect.

[Configuration - Network](#) > [Interfaces](#) > [Advanced](#) > [PPP 0 - 9](#) > [PPP 1](#) > [Advanced](#)

▼ Advanced

Metric:

Allow this PPP interface to settle for x 100 milliseconds after the connection has come up

Enable "Always On" mode of this interface
 On On and return to service immediately

Put this interface "Out of Service" when an always-on connection attempt fails

Attempt to re-connect after seconds

If a PPP interface that would be inhibited by this PPP is connected,
attempt to re-connect after seconds

Wait seconds after power-up before activating this interface

Click the **Apply** button.

2.4 Save the configuration

The AT+COPS command is not retained by the cellular module, so it is added to the current configuration of the TransPort to be issued every time the router attempts a mobile network connection. It is therefore now necessary to save the configuration.

Administration - Save configuration

Save current configuration to Config

Save all configuration. This includes the following

- Save the current configuration to config 0
- Save the current firewall
- Save all sregisters on all ports to profile 0
- Save all PAD parameters on all PADs to profile 0

2.5 Extract the configuration change and apply it to other TransPorts.

To avoid the necessity of using the web interface on every other TransPort that needs locking to the same network, the AT command to lock the network can be extracted from the configuration.

To read the value of the AT command, send the "modemcc o net_str?" command:

```
modemcc 0 net_str ?
+COPS=1,2,310410
OK
```

Or enter the "config c show" command and look for "modemcc o net_str" in the output:

```
config c show
---cut---
modemcc 0 net_str "+COPS=1,2,310410"
---cut---
```

In order to lock other TransPorts to the same network, simply send the following commands, but replace the network numerical ID with the one seen in the previous steps output.

NOTE: Only the numbers shown in red should be altered; the "1,2," should not be altered:

```
modemcc 0 net_str "+COPS=1,2,310410"
config 0 save
Please wait...
Power Up Profile: 0
OK
reboot
```


3 TESTING

3.1 Checking that the TransPort is locked to the correct network

After the changes are complete, the TransPort has rebooted (or PPP has been dropped then raised) and some time has been allowed for a connection to the cellular network to be established, navigate to:

Management - Network Status > Interfaces > Mobile

Check that the network registration shows the correct network number.

[Management - Network Status](#) > [Interfaces](#) > [Mobile](#)

Mobile Information

Results of Last Module Status Poll at 1 Feb 2016 10:14:34

Outcome: Got modem status OK

SIM status: Ready (PIN checking disabled)
Signal strength: -66 dBm
Radio technology: UMTS
Signal quality (UMTS): RSSI -66 dBm, Ec/Io -4.5 dB
Radio band: WCDMA 850
Channel: 4381
Manufacturer: Sierra Wireless, Incorporated
Model: MC7354
IMEI: 359225051479608
ESN: 8082D50E
MEID: 35922505147960
IMSI: 310410825281959
MDN: 15337055232
ICCID: 89014103278252819597
Firmware: SWI9X15C_05.05.58.00 r27038 carmd-fwbuild1
2015/03/04 21:30:23
Bootcode: SWI9X15C_05.05.58.00 r27038 carmd-fwbuild1
2015/03/04 18:38:46
Hardware version: 1.0
Firmware Carrier ID: ATT_005.026_000
GPRS Attachment Status: Attached
GPRS Registration: Registered lac:07E0 ci:081C84CA
Network: AT&T, 310410
Preferred system: Auto

Refresh

Scan for networks

Unlock networks

Note: any network lock/unlock actions only take effect after next data disconnect/reconnect

3.2 Checking that the correct command is sent to the module

The TransPort communicates with its wireless module via AT Style “modem” commands. The AT+COPS command sets the provider selection. This can be captured in the Analyser trace by enabling the “W-WAN” ASY source as seen below.

NOTE: You must follow these steps PRIOR to locking and re-activating of the PPP interface.

Management - Analyser > Settings

▼ Settings

Enable Analyser

Maximum packet capture size: bytes

Log size: Kbytes

Protocol layers

- Layer 1 (Physical)
- Layer 2 (Link)
- Layer 3 (Network)
- XOT

Enable IKE debug

Enable QMI trace

LAPB Links

- LAPB 0
- LAPB 1

Serial Interfaces

- ASY 0
- ASY 1
- ASY 2
- ASY 3
- ASY 4
- ASY 6
- ASY 7
- ASY 8
- ASY 9
- ASY 10
- ASY 11
- ASY 12
- ASY 13
- ASY 14
- ASY 15
- ASY 16
- ASY 17
- ASY 18
- W-WAN

```
----- 08-11-2011 10:45:11.490 -----
ASY 1 DCE to DTE:
F9 0F EF 25 41 54 2B 43 4F 50 53 3D 31 2C 32 2C y.o%AT+COPS=1,2,
32 33 34 31 30 0D 4D F9                23415.My
-----
----- 08-11-2011 10:45:12.630 -----
ASY 1 DTE to DCE:
F9 0D EF 25 41 54 2B 43 4F 50 53 3D 31 2C 32 2C y.o%AT+COPS=1,2,
32 33 34 31 30 0D 2C F9 F9 0D EF 0D 0D 0A 4F 4B 23415.,yy.o...OK
0D 0A 1A F9                ...y
-----
```

4 HARDWARE AND FIRMWARE DETAILS

4.1 TransPort firmware versions

This is the firmware & hardware information from the unit used making this AN:

```
Command: ati5
Command result

Digi TransPort WR44-L500-NE1-SU Ser#:350462 HW Revision: 2202a
Software Build Ver5.2.13.4. Nov 20 2015 07:17:06 LW
ARM Bios Ver 7.56u v45 800MHz B995-M1003-F80-08140,0 MAC:00042d0558fe
Power Up Profile: 0
Async Driver Revision: 1.19 Int clk
Wi-Fi Revision: 2.0
Ethernet Port Isolate Driver Revision: 1.11
Firewall Revision: 1.0
EventEdit Revision: 1.0
Timer Module Revision: 1.1
(B)USBHOST Revision: 1.0
L2TP Revision: 1.10
PPTP Revision: 1.00
TACPLUS Revision: 1.00
MODBUS Revision: 0.00
MySQL Revision: 0.01
RealPort Revision: 0.00
MultiTX 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
TELITUPD Revision: 1.0
SCRIBATSK Revision: 1.0
BASTSK Revision: 1.0
PYTHON Revision: 1.0
CLOUDSMS Revision: 1.0
ARM Sync Driver Revision: 1.18
TCP (HASH mode) Revision: 1.14
TCP Utils Revision: 1.13
PPP Revision: 5.2
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
BRIDGE Revision: 1.1
MODEM CC (SIERRA LTE) Revision: 5.2
```

FLASH Write	Revision: 1.2
Command Interpreter	Revision: 1.38
SSLCI	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
SSH Client	Revision: 1.0
CERT	Revision: 1.0
LowPrio	Revision: 1.0
Tunnel	Revision: 1.2
OVPN	Revision: 1.2
TEMPLOG	Revision: 1.0
QDL	Revision: 1.0
OK	