Option Globetrotter HSDPA USB Modem

Introduction

This example shows how to get the Option Globetrotter HSDPA USB Modem working with a generic carrier (UMTS/GPRS networks). Service in your country might have different requirements and strings, but this is just to give you an outline of what is required.

Hardware

USB Modem: Option N.V. Globetrotter HSDPA USB Modem H7.2

Modem manufacturer: Teltonika, model number U3G150

Router Hardware: HauteWRAP Router with USB port(s)

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Router Software

HauteRouterOS V4.2 or later. Works in previous versions 2.9 and 3, but slightly different configuration.

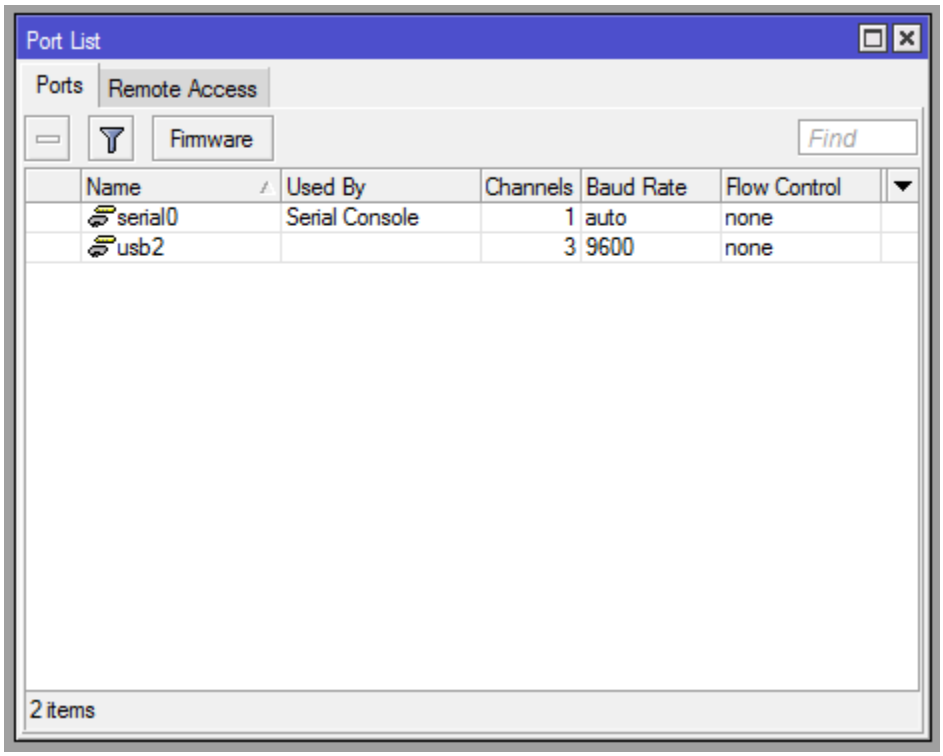
The USB Modem is recognized in HauteRouterOS as an USB device and listed under the USB resources:

```
[admin@hautespot] > /system resource usb print
 # DEVICE VENDOR                   NAME                    SPEED
2 1:3    Option N.V.              Globetrotter HSDPA... 12 Mbps
[admin@hautespot] >
```

Make sure the USB port is listed under the port menu:

```
[admin@hautespot] > /port print
Flags: I - inactive
 #    NAME                      CHANNELS   USED-BY                     BAUD-RATE
 0    serial0                   1          Serial Console              auto
 1    usb2                      3                                      9600
[admin@hautespot] >
```

In HS Configurator you can find this in the System Ports menu option:



Since HauteRouterOS V3.23 there is one port per modem, and modem has channels used for commands and data. Channels have numbers 0,1,2, etc. Some modems may have just two channels, some have more. Set the baud rate to 9600 for communicating with the modem, in case it's not done already:

```
[admin@hautespot] > /port set usb2 baud-rate=9600
```

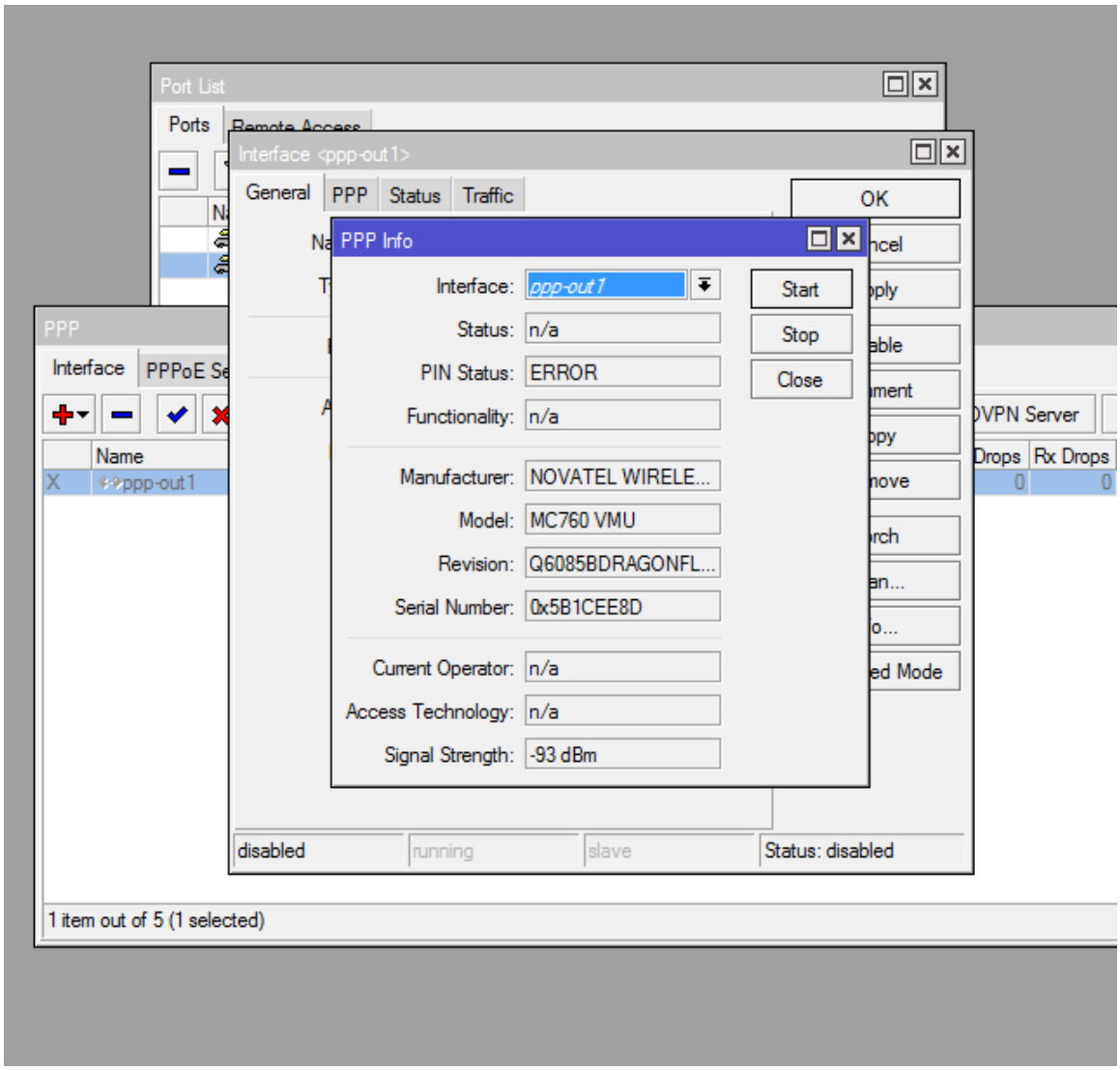
Check the modem responses using serial-terminal, like this:

```
[admin@hautespot] > /system serial-terminal usb2 channel=2

[Ctrl-A is the prefix key]


ATI
Manufacturer: Option N.V.
Model: GTM378
Revision: 2.3.3Hd (Date: Jul 17 2007, Time: 15:49:23)

OK
```

Disconnect from the modem, by pressing "Ctrl-A", and then "Q":

```
[Q - quit connection]       [B - send break]
[A - send Ctrl-A prefix]    [R - autoconfigure rate]


Welcome back!
[admin@hautespot] >
```

In HS Configurator the easiest way to find the modem is to look in PPP interfaces where it should appear at ppp-out1. From this interface you can click on the info button and it will confirm if the driver has loaded and if the interface is responding:



Workaround for Globetrotter devices offering no modem interface

There is no guarantee that the commands above work on all the modems that need the HSO driver. The tested device was a T-Mobile branded Globetrotter iCON 225

"web'n'walk Stick". That device was able to connect without problems after the method described. Some Globetrotter HSDPA cards, for example the iCON 225 (branded as Orange, T-Mobile web'n'walk stick, etc. have the serial modem interface disabled by default, and only offer an NDIS network interface for the data connection. If a dial command is issued, but no CONNECT response happens from the modem, it might be helpful to check this. To check on the setting, issue:

```
[admin@hautespot] > /system serial-terminal port=usb2 channel=0

[Ctrl-A is the prefix key]


ATZ
OK
ATI0
Manufacturer: Option N.V.
Model: GlobeTrotter HSDPA Modem
Revision: 2.5.24Hd (Date: Apr 17 2009, Time: 08:59:36)

OK
AT_OIFC?
_OIFC: 2,1,1,0

OK
AT_OIFC=?

_OIFC: [2-3], [0,1], [1], [0-5]
         mdm,  diag,  app1,  pcsc/gps
MDM      (0: N/A)  (1: N/A) (2: ndis) (3: modem and ndis)
DIAG     (0: none) (1: enable)
APP1     (0: none) (1: enable)
PCSC/GPS (0: none) (1: pcsc enable) (2: GPS enable) (3: app2 enable) (4: GPS &
PCSC) (5: GPS & app2)
OK
```

In this example, the MDM (modem) interface is set to 2, so no serial modem interface is enabled in the device.

To change the setting, issue:

```
AT_OIFC=3,1,1,0
```

You should get: OK

To write the change permanently to the NVRAM of the device, issue:

```
AT&W
```

Unplug and re-plug the device, and issue:

```
[admin@hautespot] > /port print
```

```
Flags: I - inactive
 #   NAME                          CHANNELS USED-BY
BAUD-RATE
 0   usb1                                 4
9600
```

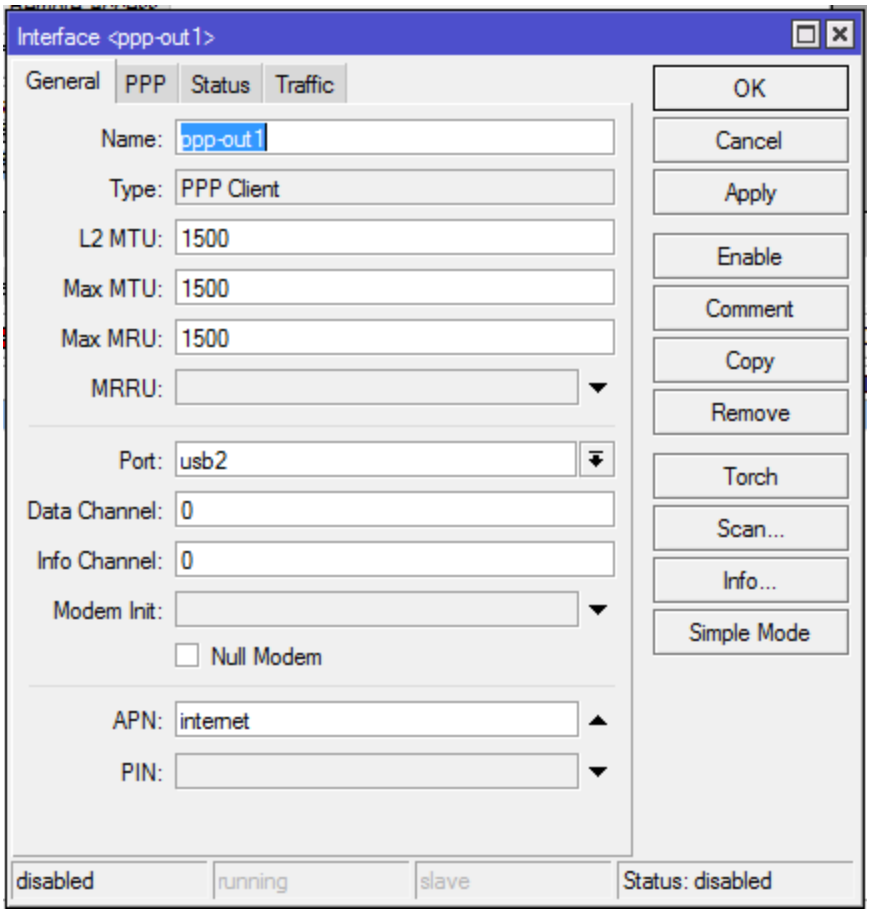
Number of channels should have increased. On the tested device, the last channel is the modem-interface (number 3 in HauteRouterOS).

According to the Linux HSO driver page at least five Option devices exist which do not have the modem interface enabled by default.

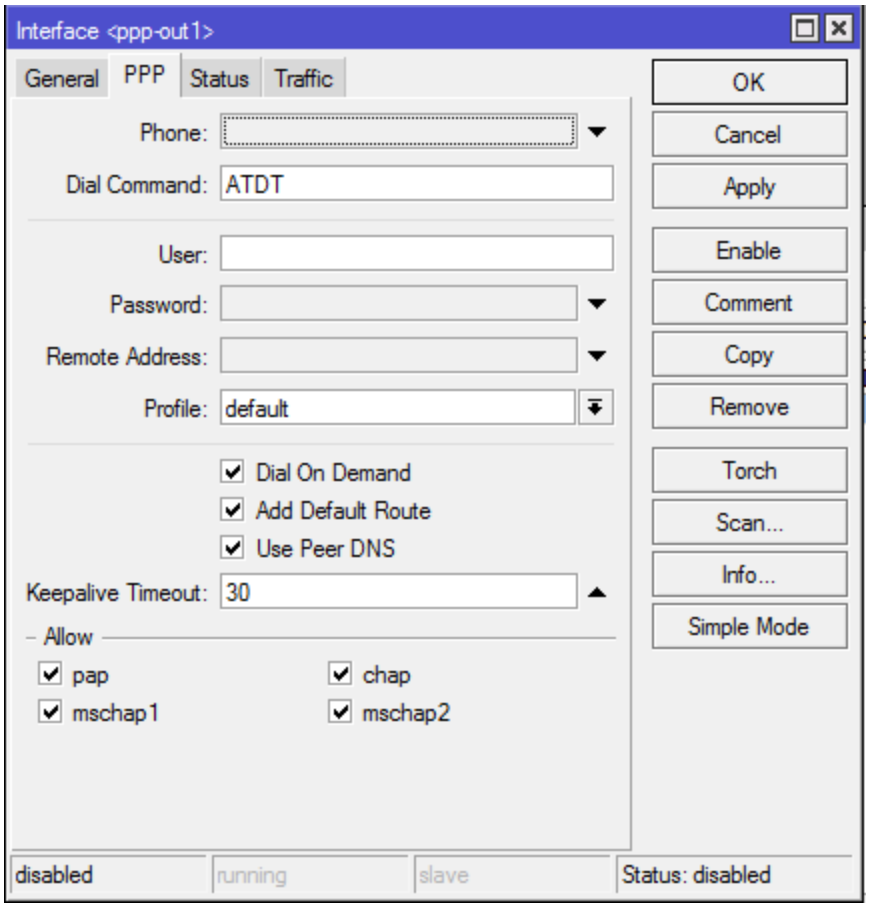
Router Configuration for PPP

Since RouterOS V4 (and latest versions 3) the PPP client configuration is made much easier compared to previous versions. There is no need to use ppp profiles, and ppp-client interface might have been added automatically to the /interface ppp-client list:

```
[admin@hautespot] > /interface ppp-client
[admin@hautespot] /interface ppp-client> print
Flags: X - disabled, R - running
 0 X  name="ppp-out1" max-mtu=1500 max-mru=1500 mrru=disabled port=usb2
      data-channel=2 info-channel=2 apn="internet" pin="" user=""
password=""
      profile=default phone="" dial-command="ATDT" modem-init=""
      null-modem=no dial-on-demand=yes add-default-route=yes use-peer-
dns=yes
      allow=pap,chap,mschap1,mschap2
[admin@hautespot] /interface ppp-client> info 0
```



The interface has 3G/GPRS modem specific arguments, like apn, pin. Consult your network provider what to use for APN, user, and password. Adjust your peer-dns and default-route settings according to what you want to do over that interface! In our case, we want permanent connection and won't use dial on demand:




```
[admin@hautespot] /interface ppp-client> set 0 dial-on-demand=no
[admin@hautespot] /interface ppp-client> enable 0
[admin@hautespot] /interface ppp-client> print
Flags: X - disabled, R - running
 0  R name="ppp-out1" max-mtu=1500 max-mru=1500 mrru=disabled port=usb2
      data-channel=2 info-channel=2 apn="internet" pin="" user="" password=""
      profile=default phone="" dial-command="ATDT" modem-init=""
      null-modem=no dial-on-demand=no add-default-route=yes use-peer-dns=yes
      allow=pap,chap,mschap1,mschap2
[admin@hautespot] /interface ppp-client>
```

After enabling the interface watch the logs to see how the connection is being established over the USB modem:

```
[admin@hautespot] /interface ppp-client> /log print
12:29:16 async,ppp,info ppp-out1: initializing...
12:29:16 async,ppp,info ppp-out1: reseting link...
12:29:16 system,info device changed by admin
12:29:16 system,info dns changed
12:29:17 async,ppp,info ppp-out1: initializing modem...
12:29:17 async,ppp,info ppp-out1: dialing out...
12:29:17 async,ppp,info ppp-out1: authenticated
12:29:20 async,ppp,info ppp-out1: could not determine remote address, using
10.112.112.119
12:29:20 async,ppp,info ppp-out1: connected
```

```
12:29:20 system,info dns changed

[admin@hautespot] /interface ppp-client>
```

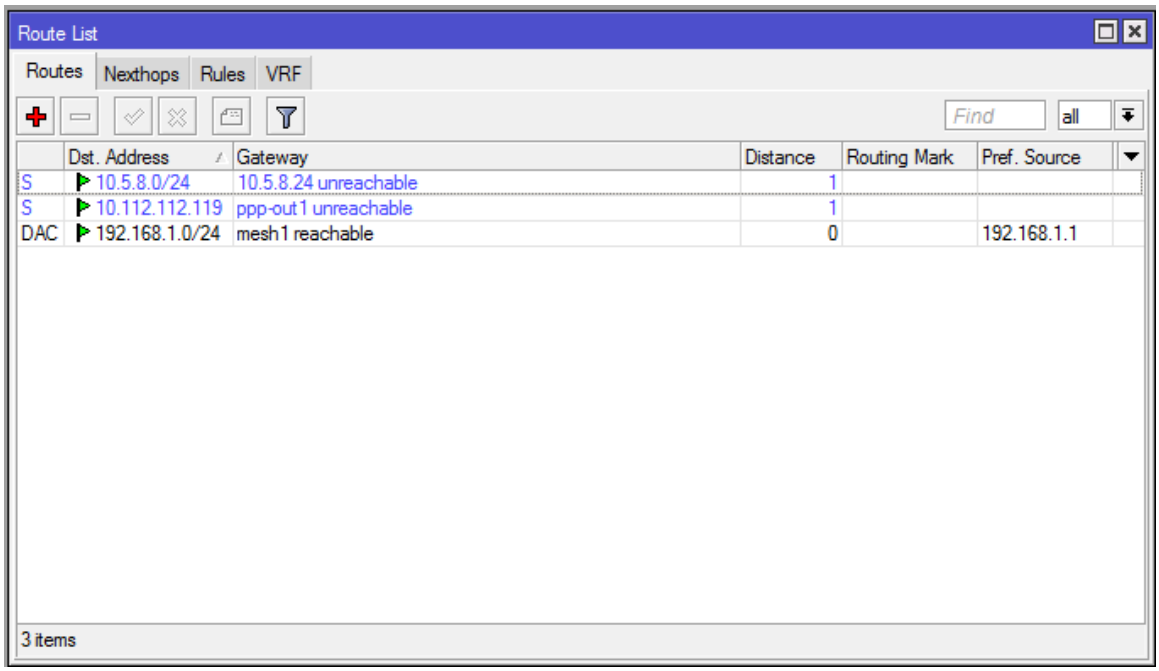
The serial port is used by ppp client:

```
[admin@hautespot] > /port print
Flags: I - inactive
 #    NAME                      CHANNELS    USED-BY                      BAUD-RATE
 0    serial0                   1           Serial Console               auto
 1    usb2                      3           PPP <ppp-out1>              9600
[admin@hautespot] >
```

Check the addresses, in our case we have:

```
[admin@hautespot] > /ip address print
Flags: X - disabled, I - invalid, D - dynamic
 #    ADDRESS            NETWORK         BROADCAST       INTERFACE
 0 D 10.5.8.64/24       10.5.8.0        10.5.8.255      ether1
 1 D 10.40.192.214/32   10.112.112.119  0.0.0.0         ppp-out1
[admin@hautespot] >
```

and routes:




```
[admin@hautespot] > /ip route print
Flags: X - disabled, A - active, D - dynamic,
C - connect, S - static, r - rip, b - bgp, o - ospf, m - mme,
B - blackhole, U - unreachable, P - prohibit
 #      DST-ADDRESS        PREF-SRC        GATEWAY             DISTANCE
 0 ADS  0.0.0.0/0                          10.112.112.119      1
 1 ADC  10.5.8.0/24        10.5.8.64       ether1              0
```

```
 2 ADC  10.112.112.119/32  10.40.192.214   ppp-out1           0
[admin@hautespot] >
```

You can get more status information about the modem and network by running the "info" command. In our case the modem uses the same channel for data and info, thus, we disable the ppp-client and run the "info" command then:

```
[admin@hautespot] /interface ppp-client> info 0
failure: can't reuse channel while ppp-client running!
[admin@hautespot] /interface ppp-client> disable 0
[admin@hautespot] /interface ppp-client> info 0
             status: "ready"
         pin-status: "no password required"
      functionality: "minimum"
         gprs-class: "A - GPRS & GSM simultaneous"
       manufacturer: "Option N.V."
              model: "GTM378"
           revision: "2.3.3Hd (Date: Jul 17 2007, Time: 15:49:23)"
      serial-number: "356237010662581,S23977B51N"
   current-operator: "LV LMT GSM"
  access-technology: "3G"
     signal-strengh: -89

[admin@hautespot] /interface ppp-client>
```

You may need to use masquerade to hide your private network when going out through the ppp!

Modem Preferred Operation Settings

OPTION modems can be set for preferred operation in UMTS(3G) or GPRS networks. To change the operation mode, use AT_OPSYS command via terminal, or, include it into the modem init string:

```
AT_OPSYS=0,2 Only GPRS
AT_OPSYS=1,2 Only UMTS(3g)
AT_OPSYS=2,2 Prefer GPRS over UMTS(3G)
AT_OPSYS=3,2 Prefer UMTS(3G) over GPRS
```

Query the current _OPSYS setting using the AT_OPSYS? command:

```
[admin@hautespot] > sys serial-terminal usb2 channel=0

[Ctrl-A is the prefix key]


AT_OPSYS?
_OPSYS: 3,2

OK
```

The _OPSYS operation mode setting stays intact after router reboot or power off/on. If you lock the modem operation setting to 3G only, the scan command won't show GPRS networks, and vice versa.

Troubleshooting

- If you do not get "authenticated" and "connected", then there is something wrong with your settings. Most likely, the ppp-client interface settings should be changed to match your provider's requirements.

- If the data-channel setting is wrong, there would be no connection. The number of available channels is shown under the /port list, port numbers start with 0. Disable the interface and try another port number!

- Check if you can communicate with the modem by using the serial-terminal! Make sure the ppp-client is disabled!

- Turn off PIN request for your SIM card, it makes the life much easier. Do it in a phone if you do not know the correct AT command.

- When speed of the link is not what expected, it's possible that the modem has connected to GPRS network, not 3G. Use the "scan" command for list of available networks:

```
[admin@hautespot] /interface ppp-client> scan 0
Flags: C - current, A - available, F - forbidden
  OPERATOR                    CODE       ACCESS-TECHNOLOGY
SIGNAL-STRENGH
C LV LMT GSM                  24701      GSM compact
-65
A LV LMT GSM                  24701      3G
F BITE LV                     24705      3G
F LV TELE2                    24702      GSM compact
F LV TELE2                    24702      3G
F BITE LV                     24705      GSM compact
-- [Q quit|D dump|C-z pause]
```

- If you need to add multiple inits (multiline inits) then it is possible by dividing them using ; character. Example:

```
modem-
init="AT+CGDCONT=5,\"IP\",\"internet.lmt.l\";AT+CGDCONT=6,\"IP\",\"inte
rnet.lmt.lv\";AT"
```

Typical things to check

- sms sending not working

1. check port
2. check PIN
3. enable debug logging GSM, DEBUG
4. check log
5. create supout

- sms receiving not working

1. check port
2. check PIN
3. got delivery accounting sms ?
4. allowed-number is correct with country code prefix +XXX ?
5. secret matches ?
6. check sms store directly /sys serial usbX by issuing command at+cmgl=1 (lists all messages in message store)
7. enable debug logging GSM, DEBUG
8. check log
9. create supout

- ppp client not working

1. check port
2. check PIN
3. dial-on-demand is set to no?
4. apn correct?
5. needs special modem-init (to handle PIN use at+cpin=XXXX) ?
6. enable debug logging with topics ASYNC, DEBUG
7. check log
8. create supout

- ppp info not working

1. check port
2. uses same channel info-channel == data-channel (can't work while ppp-client is enabled) ?
3. enable debug logging with topics ASYNC, DEBUG
4. check log
5. create supout

- ppp info command reports functionality=minimum

1. use /system serial-terminal usbX channel=X and execute the at+cfun=1

2. ppp info command should report functionality=full
3. If after each reboot the functionality is in minimum state add the at+cfun=1 into the modem-init field

- after executing some AT commands the modem doesn't respond correctly or reports error values

1. resetting the modem functionality might solve the problem
2. use /system serial-terminal usbX channel=X
3. execute the at+cfun=0 command and wait few seconds and execute at+cfun=1

- port invalid or not working

1. unplug the modem
2. disable the ppp-client interface
3. reboot the router
4. plug in the modem and after 5s proceed to nex step
5. create supout

- modem stops responding

1. upgrade the modem firmware and check if it solves the problem
2. create supout

To check port

- port busy ? /port print (check used-by)
- channel busy ? (two application can't use same channel)
- is chosen channel working? check if you get any output /sys ser usbX channel=X with command ATI
- port shown ? /port print
- device shown ? /sys reso usb pr
- create supout

To check PIN

- /int ppp-client info CONNAME or run /sys serial usbX and issue at+cpin?
- enter pin at+cpin=XXXX

To create supout

- run /sys sup-output
- contact support and provide supout file

3G modem cards supported

Model	Tested Haute RouterOS version	Comments	Format
AirPrime/Sierra PC 5220!	v3		PCMCIA
Alcatel One Touch X020X USB (aka Longcheer WM66; Nuton NT36HD; MWalker mbd 100hu; Novacom GNS-3.5G White, SU-8200U; MTE MW610?)	v5.10	Config like Option_Globetrotter_HSDPA_USB_ Modem Connected to Internet, Did not test Speed + Reliability (Alcatel OT X020X on x86) (data 0, info channel: 2)	USB
AnyData ADU E100A (aka "USB Wireless HSDPA/UMTS 2.1GHz GSM/GPRS/EGPRS 900/17000MHz/CDMA 1x EVDO Rev.A")	v3.14		USB
AnyData ADU 500A USB (aka "USB Wireless HSDPA/UMTS 2.1GHz GSM/GPRS/EGPRS 900/1800MHz/CDMA 1x EVDO Rev.A")	v3.14		USB
Audiovox PC5220 CDMA Dual Band 1XEV-DO PC Card	v3		PCMCIA
C-motech CNU-680 CDMA 1x EV-DO 450Mhz USB Modem (used by Triatel) [1]	v3.22		USB
Dell 5520	v3		
Ericsson_F3507g_Mobile_Broadband_Module [2]	V3.28	Set init string AT+CFUN=1, data channel and info channel to 3.	MiniPCI-e
Huawei E226 USB modem,	3.25		USB
Huawei E220 USB modem,	3.0rc8		USB

Model	Tested Haute RouterOS version	Comments	Format
E200BIS [3]			
Huawei E169 USB modem (used by Tele2) [4]	3.22		USB
Huawei E180 USB modem	3.20		USB
Huawei E1550 [5]	v3.26		USB
Huawei E1553 (USB)	v4.6		USB
Siemens M20	v3.28		
Huawei Mobile Connect Model E620 (3G);	v3		
Kyocera KPC650	v3		
Nokia CS-17 (USB)	v5.0	data channel=2, info channel=4	USB
Nokia CS-18 (USB) Rogers Canada	5.12	Data channel=1, Info channel =1, APN= internet.com, Phone = *99# , Dial = ATDT , pap , Tested on rb-751 and rb-493	USB
Novatel EU740	v3		MiniPCI-e
Novatel EU870 [6]	v3		
Novatel MIFI 2372 Bell Canada	5.12	Data Channel=0 , Info Channel= 0, APN = pda2.bell.ca , Phone = *99# , Dial = ATDT , pap, Tested on Rb-750UP and RB-493	USB
Novatel EV620 CDMA/EV-DO	v3		MiniPCI-e
Novatel Merlin ES620 / Merlin ES720 / Ovation U720 [7]	v3		USB
Novatel Merlin ES620 SM Bus	v3		
Novatel Merlin S720 (HSDPA) [8]	v3		PCMCIA
Novatel Merlin XU870 HSDPA/3G [9]	v3		ExpressCard
Novatel U720 Wireless CDMA Modem	v4.5		USB

Model	Tested Haute RouterOS version	Comments	Format
Novatel U730 (Wireless HSDPA Modem) [10]	v3		PCMCIA
Novatel Wireless CDMA card	v3		
Option Fusion UMTS Quad-GPRS (Vodafone Globetrotter);	v3.4		
Option Globetrotter HSDPA USB aka Teltonika ModemUSB/H7.2 (U3G150) [11]	v3		USB
Probably most of the cards needing the HSO driver on Linux, tested: Option Globetrotter HSDPA USB (Globetrotter iCon 225 [12]	v5.12	Option_Globetrotter_HSDPA_USB_Modem see Workaround for Globetrotter devices offering no modem interface	USB
Option Qualcomm 3G WCDMA Model M00201-10886 (GTM378) [13]	v3.27		miniPCI-e
Option Qualcomm 3G CDMA Model M00301 (GTM380) [14]	v3.28	Set data channel and info channel to 3.	miniPCI-e
Option Qualcomm 3G CDMA Model M00401 (GTM382) [15]	v3.28 & v4.6	Set data channel and info channel to 3.	miniPCI-e
Ericsson 3G F3607gw miniPCI-e	v3.28	Set data channel and info channel to 2. Set init string AT+CFUN=1	miniPCI-e
Sierra Aircard 595 [17]	v3		PCMCIA
Sierra Aircard 595U USB Sprint Card [18]	v3		USB
Sierra Wireless USB 306	v5.9	Data & Info Channel 2. For Telecom NZ use APN internet.telecom.co.nz and Phone number *99#	
Sierra Wireless USB 308 or AT&T Shockwave [19]	v5.0rc11	AT Commands are sent through Data Channel 2 or 3. Change this under Interface -> PPP, General Tab	USB

Model	Tested Haute RouterOS version	Comments	Format
		using Advanced Mode, or command line /interface ppp-client set 0 data-channel=2	
Sierra Wireless AirCard 312U [20]	v5.2	Use Info Channel 2 and Data Channel 3. Modem also known in Australia as the Telstra BigPond Ultimate. The MicroSD slot on the modem can be used for additional storage (tested on 5.11) such as a web proxy.	USB
Sierra Wireless AirCard 580 [21]	v3		PCMCIA
Sierra Wireless AirCard 595 [22]	v3		PCMCIA
Sierra Wireless AirCard 597E [23]	v3		ExpressCard
Sierra Wireless AirCard 875 [24]	v3		PCMCIA
Sierra Wireless AirCard 880 [25]	v3.8		PCMCIA
Sierra Wireless AirCard 880 E [26]	v3.8		ExpressCard
Sierra Wireless AirCard 881 [27]	v3.8		PCMCIA
Sierra Wireless AirCard 881 E [28]	v3.8		ExpressCard
Sierra Wireless EM5625 [29]	v3		MiniPCI-e
Sierra Wireless MC5720 [30]	v3		MiniPCI-e
Sierra Wireless MC5725 [31]	v3		MiniPCI-e
Sierra Wireless MC8705 [32]	v5.1	Data and Info channel are 3. Suitable for 850,900 and 2100Mhz 3G networks. GPS not yet tested. Sim card slot required. Capable of HSPA+ speeds of 21Mbps down and 5.76Mbps up.	MiniPCI-e

Model	Tested Haute RouterOS version	Comments	Format
Sierra Wireless MC8755 [33]	v3	Users have reported that the device doesn't show up after shutdown, reboot is required. Init-string: ATE0V1&D2&C1S0=0+IFC=2,2;AT+CGDCONT=1,"IP","apn-string"; - where the apn-string is your correct APN. A reboot can be required after settings are changed, to make it working. Data and Info channel are 0.	MiniPCI-e
Sierra Wireless MC8755 for Europe [34]	v3		MiniPCI-e
Sierra Wireless MC8765 [35]	v3		MiniPCI-e
Sierra Wireless MC8775 [36]	v3		MiniPCI-e
Sierra Wireless MC8780 [37]	v3.8		MiniPCI-e
Sierra Wireless MC5725 [38]	v3.18		MiniPCI-e
Sierra Wireless MC5727 [39]	v3.18		MiniPCI-e
Sierra Wireless MC8785	v3.18		MiniPCI-e
Sierra Wireless MC8790 [40]	v3.18	Few models do not send echo for input commands, modem does not work properly.	MiniPCI-e
Sierra Wireless MC8792 [41]	v5.2	Info works only in channel 3. Channels 4 and 5 has limited AT set. datachannel=4, infochannel=3	MiniPCI-e
Sierra Wireless MC8781 [42]	v3.8		MiniPCI-e
Sierra Wireless Sierra 598 (Sprint) USB [43]	v3.x		USB
Sierra Wireless MP3G - EVDO	v3.8		
Sierra Wireless MP3G - UMTS/HSPA	v3.8		
Sierra Wireless Compass 885 (USB) [44]	v3.28	AKA Telecom New Zealand's new XT network. Works a treat.	USB
Silicon Labs MobiData GPRS USB Modem	v3.22		USB

Model	Tested Haute RouterOS version	Comments	Format
Sprint U301/301U 4G wireless card [45]	v4.6	C-MOTECH Co, FW301DOWMX, QUALCOMM Patch 3350. Data CH=1 Info CH=3 Phone #777 for Sprint in US	USB
Sprint U300/300U 4G wireless card [46]	v4.6	C-MOTECH Co, FW301DOWMX, QUALCOMM Patch 33504	USB
Franklin M600 3G/4G wireless card [47]	v5.x	only 3G mode works	MiniPCI-e
Verizon Express Network PC5220 (AirPrime 5220)	v3		
ZTE AC8700	v3.6		
ZTE MF620 / MF622 [48]	v3		USB
ZTE MF620 / MF622 (3G) [49]	v3.6		USB
ZTE MF680 [50]	v5.4	Used by 3 in Sweden. Set data chanel to 1	USB
ZTE MF668 [51]	v4.5	for Rogers Wireless (Canada) Set APN: isp.apn and Info & Data Channel to 1	USB
T-Mobile (Germany) Web´n´Walk Box Micro (Huawei E220) [52]	v3.x		USB
Vodafone (Germany) Easybox 2 (Huawei E220) [53]	v3.x		USB
O2 (Germany) Surfbox Mini (Huawei E220) [54]	v3.x		USB
E-Plus & Base (Germany) USB Minimodem (Huawei E220) [55]	v3.x		USB
Huawei E600	v3.15		
Novatel Merlin V640/XV620 [56]	v3.15		ExpressCard
Novatel Merlin V620/S620 [57]	v3.15		PCMCIA

Model	Tested Haute RouterOS version	Comments	Format
Novatel Merlin EX720/V740/X720 [58]	v3.15		ExpressCard
Novatel Merlin V720/S720/PC720 [59]	v3.15		PCMCIA
Novatel Merlin XU870 HSDPA/3G [60]	v3.15		ExpressCard
Novatel X950D [61]	v3.15		ExpressCard
Novatel ES620/ES720/U720/USB720	v3.15		USB
Novatel E725/E726 [62]	v3.15		MiniPCI-e
Vodafone EU740/Novatel non-Vodafone EU740	v3.15		MiniPCI-e
Vodafone K3565/Huawei E160 [63]	v3.23		USB
Novatel EU850D/EU860D/EU870D [64]	v3.15		MiniPCI-e
Novatel MC930D/MC950D [65]	v3.15		USB
Novatel MC727/U727 [66]	v3.15		USB
Novatel Expedite EV620 CDMA/EV-DO	v3.15		MiniPCI-e
Novatel Expedite EU740 HSDPA/3G, Dell Wireless 5500 Mobile/Dell Wireless 5505 Mobile	v3.15		MiniPCI-e
Novatel Expedite E720 CDMA/EV-DO	v3.15		MiniPCI-e
Novatel Expedite ET620 CDMA/EV-DO	v3.15		
Onda H600/ZTE MF330	v3.15		
BP3-USB & BP3-EXT HSDPA	v3.15		USB
ZTE MY 39 (MSM 6500	v3.20		PCMCIA

Model	Tested Haute RouterOS version	Comments	Format
based) [67]			
Cricket A600	v3.26		
Globetrotter HSDPA Modem Option N.V.	v3.26		
Sony Ericsson MD300	v3.26		
ZTE MF 626 [68]	v3.26		USB
ZTE MF 627 [69]	v3.26		USB
Pantech / UTStarcom UM175	v3.27	On Alltel's CDMA EVDO RevA network average 700-800kbps up and 2.4-2.8Mbps down	
Novatel U760 [70]	v3.30		USB
ZTE K3565-Z [71]	v4.4	Revision: BD_P673A2V1.0.0B09	USB
Novatel Expedite EV620	v4.5		MiniPCI-e
Novatel MC760 VMU [72]	v4.5		USB
Franklin Wireless FW300DOWMX	v4.5		
Huawei EC1260	v4.5		
Vodafone K3520-Z [73]	v4.6		USB
Vodafone K3765 [74]	v4.6		USB
Telstra 3G Elite	v5.x		
Vodafone Huawei K4505	v5.x	Data-channel=0 Info-channel=3	USB
Vertex VW 110	v5.x		
ZTE MF112 [75]	v5.x	Power issues on mipsbe boards	USB
Huawei ET127	v5.x		
Huawei EC1261	v5.x		
Huawei E173 [76]	v5.x		USB
ZTE MF190 [77]	v5.x	Data channel=3 and info Channel=1	USB
ZTE MF102 [78]	v5.x	Possible that need to change data channel=2 and info channel=2	USB
China TeleCom or ZTE AC682	v5.x		
Option Globetrotter GT380	v5.x		

Model	Tested Haute RouterOS version	Comments	Format
Simcom 5220	v5.x		
Huawei K3770	v5.x		
Novatel USB551L (Verizon) [79]	v5.9	Only 3G support (No LTE support)	UB
Novatel Wireless MIFI4510		Not supported	
ZTE MC2718 [80]	v5.8	Possible data-channel=0 info-channel=1 GPS(NMEA)=4	MiniPCI-e
LG-VL600 (Verizon)		Not supported	
Huawei EC156 [81]	v5.8		USB
K3806 [82]	v5.8		USB
ZTE MF-210V [83]	v5.9		MiniPCI-e
Huawei E398 [84]	v5.9	2G, 3G, 4G supported	USB
Huawei E367	v5.11	Works OK	USB
Huawei EM770 [85]	v5.11	interface listing at the startup might be slowed down for a small period of time	MiniPCI-e
Nokia E52 (Series 60)	v5.12	Set Usb mode to "PC Suite" in phone menu Baud rate - 115200 Ports - 0/0 APN - internet No modem init string, Dial number - *99# Phone is charged up through the USB port	USB
Nokia 6700 Classic (Series 40)	v5.12	Set Usb mode to "PC Suite" in phone menu Baud rate - 115200 Ports - 0/0 APN - internet Modem init string - ATZ, Dial number - *99# Phone is charged up through the USB port	USB
Alcatel X220S [86]	v5.13		USB

Model	Tested Haute RouterOS version	Comments	Format
MO835UP	v5.14		USB
Nokia Datacard CS-11 & CS-15	v5.14		USB
Pantech UML290	V5.12	3G EVDO only, No 4G LTE support	USB
Pantech UMW190	V5.12	Verizon	USB

***** - Currently Haute RouterOS works with PPP 3G modems over serial interfaces, 4G modems with IP drivers are not supported.

4G LTE cards

Model	Tested RouterOS version	Comments	Format
BandRich C501 [87]	v5.12	Configure under the new "/interface lte" menu	USB