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Commands are made in green color

Software Setup

Installing Minicom

Minicom will not be installed by default in IGT-20. If your IGT-20 is connected to the internet then install minicom by entering this command > sudo apt-get install minicom. And you should be able to install minicom.

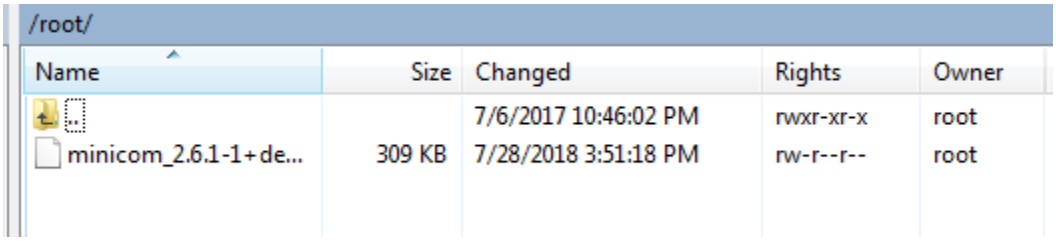
If your IGT-20 is not connected to the internet via any other Wi-Fi device then, in that case, you can download minicom for ARM device from the link below and later install the package in the IGT-20.

https://packages.debian.org/wheezy/armhf/minicom/download

Transfer the downloaded package to IGT-20 by FTP software like WinSCP. WinSCP can be download from here

https://winscp.net/eng/index.php

After starting the WinSCP hit username as root and hit connect and it should show you the directory contents of the IGT-20. Drag and drop the downloaded package from your PC to the root folder in WinSCP software.



Install the package in the Debian OS of IGT-20. Since the Debian package was copied to root folder, you can enter the following command to install the minicom package

```
root@igt20:~# sudo dpkg -i minicom_2.6.1-1+deb7u1_armhf.deb
```

Check Hardware connection

$lsusb

```
root@igt20:~# lsusb
Bus 002 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
Bus 001 Device 002: ID 1199:9071 Sierra Wireless, Inc.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
root@igt20:~#
```

To check the USB ports

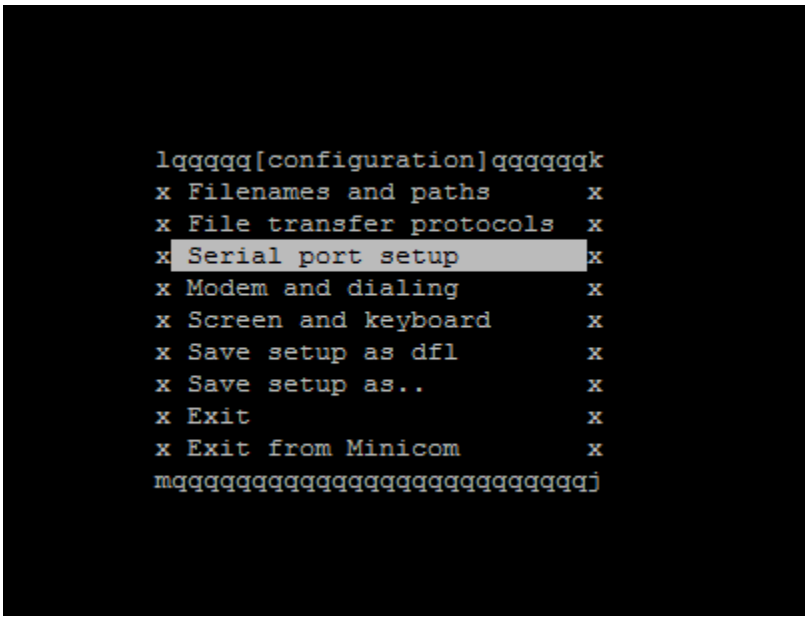
```
root@igt20:~# dmesg | grep ttyUSB
[   18.306208] usb 1-1: Qualcomm USB modem converter now attached to ttyUSB0
[   18.321677] usb 1-1: Qualcomm USB modem converter now attached to ttyUSB1
[   18.331992] usb 1-1: Qualcomm USB modem converter now attached to ttyUSB2
root@igt20:~#
```

Getting Started with Minicom

Enter > minicom –s

And this should prompt you to the setup page. In the setup page select Serial port setup and hit enter.

```
root@igt20:~# minicom -s
```



Press ‘A’ to edit the name of the serial device. My AT port is connected to /dev/ttyUSB2, Normally the AT port will be connected to this file. Hence enter> /dev/ttyUSB2 as Serial Device. Hit enter and exit minicom.

- /dev/ttyUSB0 - Diagnotics Monitoring (DM) port
- /dev/ttyUSB1 = GPS NMEA port
- /dev/ttyUSB2 - AT commands

```
lqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqk
x A -    Serial Device      : /dev/ttyUSB2                               x
x B - Lockfile Location     : /var/lock                                  x
x C -   Callin Program      :                                            x
x D -  Callout Program      :                                            x
x E -    Bps/Par/Bits       : 115200 8N1                                 x
x F - Hardware Flow Control : Yes                                        x
x G - Software Flow Control : No                                         x
x                                                                        x
x    Change which setting?                                               x
mqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqqj
        x Screen and keyboard      x
        x Save setup as dfl        x
        x Save setup as..          x
        x Exit                     x
        x Exit from Minicom        x
        mqqqqqqqqqqqqqqqqqqqqqqqqqqj
```

After selecting exit minicom you will be prompted to the window where you will be allowed to enter AT commands.

Enter > atie

To enable loopback and check information of the manufacturer of the 4G module.

```
Welcome to minicom 2.6.1

OPTIONS: I18n
Compiled on Apr 24 2017, 18:35:09.
Port /dev/ttyUSB2

Press CTRL-A Z for help on special keys

atie
Manufacturer: Sierra Wireless, Incorporated
Model: EM7455
Revision: SWI9X30C_02.24.05.06 r7040 CARMD-EV-FRMWR2 2017/05/19 06:23:09
MEID: 35907306064914
IMEI: 359073060649146
IMEI SV: 12
FSN: LF808472260210
+GCAP: +CGSM


OK
```

To check SIM is connect properly

Enter > at+cpin?

If not error then SIM is connected properly.

```
at+cpin?
+CPIN: READY

OK
```

To get network information

Enter > at+cops?

```
at+cops?
+cops: 0,0,"Verizon Wireless",7

OK
```

Enter > at+cgdcont=3,”IPV4V6”,”vzwinternet”

This defines the PDP context and above command is for Verizon. To ensure PDP profile 3 has correct APN, enter at+cgdcont?

```
at+cgdcont?
+CGDCONT: 1,"IPV4V6","","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0
+CGDCONT: 3,"IPV4V6","vzwinternet","0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0",0,0,0,0

OK
```

Enter > at+cgact=1,3

Activate PDP profile 3, required for Verizon

And enter > at+cgpaddr=3 to get the assigned IP addresses for profile 3.

```
at+cgact=1,3
OK
at+cgpaddr=3
+CGPADDR: 3,100.66.0.19,38.0.16.8.177.102.101.165.0.0.0.74.57.159.30.1

OK
```

Enter > at+csq , to check the signal quality. Exit minicom.

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Installing wvdial

Wvdial may not be included as a default in Debian OS. So hence you can download the wvdial from Debian source in a PC connected to the internet and transfer the package to IGT-20 by software WinSCP. Installing wvdial software may require additional dependencies so I downloaded them individually and install them one by one.

```
root@igt20:~# sudo dpkg -i wvdial_1.61-4.1_armhf.deb
Selecting previously unselected package wvdial.
(Reading database ... 21208 files and directories currently installed.)
Preparing to unpack wvdial_1.61-4.1_armhf.deb ...
Unpacking wvdial (1.61-4.1) ...
dpkg: dependency problems prevent configuration of wvdial:
 wvdial depends on ppp (>= 2.3.0); however:
  Package ppp is not installed.
 wvdial depends on libuniconf4.6; however:
  Package libuniconf4.6 is not installed.
 wvdial depends on libwvstreams4.6-base; however:
  Package libwvstreams4.6-base is not installed.
 wvdial depends on libwvstreams4.6-extras; however:
  Package libwvstreams4.6-extras is not installed.

dpkg: error processing package wvdial (--install):
 dependency problems - leaving unconfigured
Processing triggers for man-db (2.7.0.2-5) ...
Errors were encountered while processing:
 wvdial
root@igt20:~# ppp
```

I had to download the following package and transfer them to IGT-20, /root folder and install them using following commands

- sudo dpkg –i package name.deb

libpcap0.8_1.3.0-1_armhf.deb	126 KB	7/28/2018 5:08:33 PM	rw-r--r--	root
libuniconf4.6_4.6.1-5_armhf.deb	155 KB	7/28/2018 5:09:47 PM	rw-r--r--	root
libwvstreams4.6-base_4.6.1-5_armhf.deb	215 KB	7/28/2018 5:11:36 PM	rw-r--r--	root
libwvstreams4.6-extras_4.6.1-5_armhf.deb	409 KB	7/28/2018 5:10:29 PM	rw-r--r--	root
minicom.log	1 KB	7/6/2017 10:48:59 PM	rw-r--r--	root
minicom_2.6.1-1+deb7u1_armhf.deb	309 KB	7/28/2018 3:51:18 PM	rw-r--r--	root
ppp_2.4.6-3.1_armhf.deb	304 KB	7/28/2018 5:06:50 PM	rw-r--r--	root
wvdial_1.61-4.1_armhf.deb	104 KB	7/28/2018 5:05:45 PM	rw-r--r--	root

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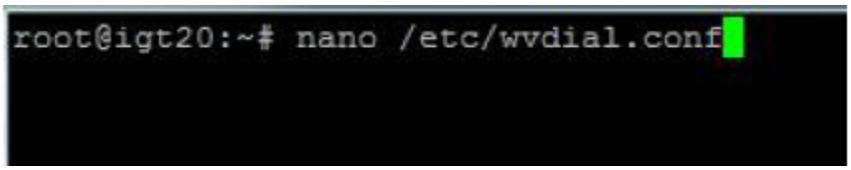
Using Wvdial Software to dial:

If the IGT-20 does not have wvdial.conf file in /etc folder then creates one with following commands. This conf file will be important to dial using wvdial software



And copy the following contents to file and save to wvdial.conf.

For Verizon

[Dialer Defaults]

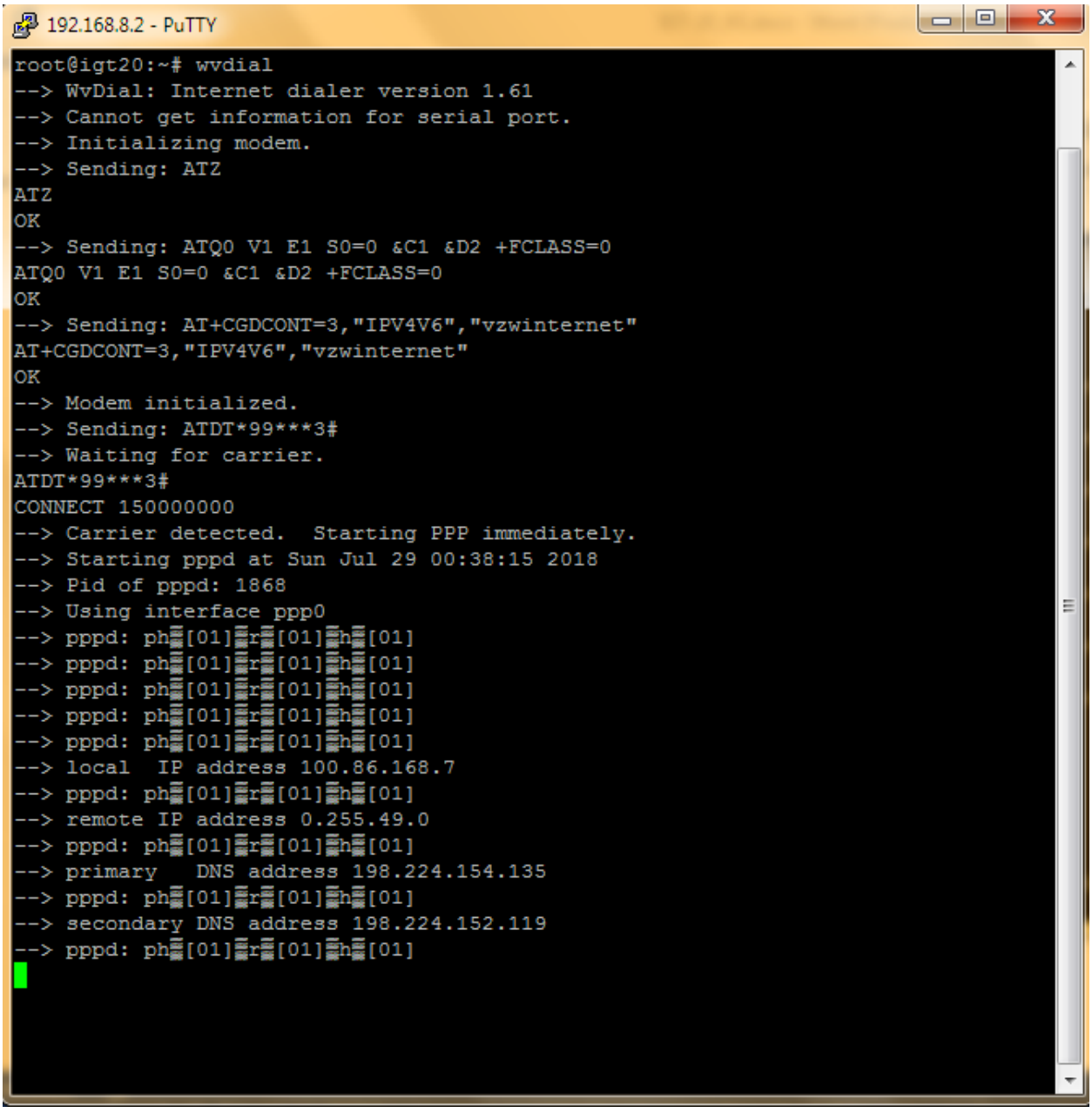
Init1 = ATZ
Init2 = ATQ0 V1 E1 S0=0 &C1 &D2 +FCLASS=0
Init3 = AT+CGDCONT=5,"IPV4V6","vzwinternet"
ISDN = 0
Modem = /dev/ttyUSB2
stupid mode = 1
Password = passowrd
Username = username
Phone = *99***3#
APN = vzwinternet
New PPPD = yes
Baud = 460800

For AT&T

[Dialer Defaults]
Init1 = ATZ
Init2 = ATQ0 V1 E1 S0=0 &C1 &D2 +FCLASS=0
Init3 = AT+CGDCONT=5,"IPV4V6","m2m.com.attz"
ISDN = 0
Modem = /dev/ttyUSB2
stupid mode = 1
Password = blank
Username = blank
Phone = *99***1#
APN = m2m.com.attz
New PPPD = yes
Baud = 460800

After you configure the wvdial.conf file saves and exit. Verizon uses ***99***3#** as a dialing number

In the terminal windows enter >**wvdial** and you should be able to see the dialing progress



Open another instance of the terminal while dialing is connected.

Enter >ifconfig and you should be able to see the additional interface, pp0 as seen in the screen below.

```
root@igt20:~# ifconfig
eth0      Link encap:Ethernet  HWaddr 78:d0:04:25:4b:ec
          inet addr:192.168.8.2  Bcast:192.168.8.255  Mask:255.255.255.0
          inet6 addr: 2601:246:5580:53cf:7ad0:4ff:fe25:4bec/64 Scope:Global
          inet6 addr: fe80::7ad0:4ff:fe25:4bec/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST DYNAMIC  MTU:1500  Metric:1
          RX packets:1871 errors:0 dropped:0 overruns:0 frame:0
          TX packets:2257 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:199140 (194.4 KiB)  TX bytes:362365 (353.8 KiB)
          Interrupt:174

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:8216 errors:0 dropped:0 overruns:0 frame:0
          TX packets:8216 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:633120 (618.2 KiB)  TX bytes:633120 (618.2 KiB)

ppp0      Link encap:Point-to-Point Protocol
          inet addr:100.86.168.7  P-t-P:0.255.49.0  Mask:255.255.255.255
          UP POINTOPOINT RUNNING NOARP MULTICAST  MTU:1500  Metric:1
          RX packets:4 errors:0 dropped:0 overruns:0 frame:0
          TX packets:5 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:3
          RX bytes:64 (64.0 B)  TX bytes:97 (97.0 B)

root@igt20:~#
```

Add pp0 interface to the route by entering > **sudo route add default dev ppp0**. And hit '**ping www.google.com**' and you should be connected to the internet.

```
root@igt20:~# sudo route add default dev ppp0
root@igt20:~# ping www.google.com
PING www.google.com (172.217.6.4) 56(84) bytes of data.
64 bytes from ord38s01-in-f4.1e100.net (172.217.6.4): icmp_seq=1 ttl=50 time=34.2 ms
64 bytes from ord38s01-in-f4.1e100.net (172.217.6.4): icmp_seq=2 ttl=50 time=73.7 ms
64 bytes from ord38s01-in-f4.1e100.net (172.217.6.4): icmp_seq=3 ttl=50 time=72.4 ms
64 bytes from ord38s01-in-f4.1e100.net (172.217.6.4): icmp_seq=4 ttl=50 time=60.8 ms
^C
--- www.google.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 34.248/60.309/73.749/15.868 ms
root@igt20:~#
```

Automatically connect on reboot

/etc/network/interfaces file and add these lines before connmanctl services lines.
auto ppp0
iface ppp0 inet wvdial

Also edit rc.local file and add

sudo route add default dev ppp0

and copy the contents of wvdial.conf file at the of this file /etc/init.d/rc.local file

```
[Dialer Defaults]
Init1 = ATZ
Init2 = ATQ0 V1 E1 S0=0 &C1 &D2 +FCLASS=0
Init3 = AT+CGDCONT=5,"IPV4V6","vzwinternet"
ISDN = 0
Modem = /dev/ttyUSB2
stupid mode = 1
Password = passowrd
Username = username
Phone = *99***3#
APN = vzwinternet
New PPPD = yes
Baud = 460800
```