Installing USB Modem on the Raspberry Pi running HamVoIP

Add these 2 packages

```
Run pacman -S usb_modeswitch
Run pacman -S ppp
```

If using T-Mobile service:
Create the /etc/chatscripts/tmobile file

```
# Tested on Huawei Module's
# See http://consumer.huawei.com/solutions/m2m-
solutions/en/products/support/application-guides/detail/mu509-65-en.htm?id=82047

# Exit executition if module receives any of the following strings:
ABORT 'BUSY'
ABORT 'NO CARRIER'
ABORT 'NO DIALTONE'
ABORT 'NO DIAL TONE'
ABORT 'NO ANSWER'
ABORT 'DELAYED'
TIMEOUT 10
REPORT CONNECT

# Module will send the string AT regardless of the string it receives
"" AT

# Instructs the modem to disconnect from the line, terminating any call in progress.
All of the functions of the command shall be completed before the modem returns a
result code.
OK ATH

# Instructs the modem to set all parameters to the factory defaults.
OK ATZ

# Result codes are sent to the Data Terminal Equipment (DTE).
OK ATQ0

# Define PDP context
#OK AT+CGDCONT=1,"IP","epc.t-mobile.com"
OK AT+CGDCONT=1,"IP","fast.t-mobile.com"

# ATDT = Attention Dial Tone
OK ATDT*99#
#OK ATDT*99***1#

# Don't send any more strings when it receives the string CONNECT. Module considers
the data links as having been set up.
CONNECT ''
```

T-Mobile service (continued)
Create the /etc/ppp/peers/tmobile file

```
# The options script can specify the device used for the PPP dial-up connection,
string transmission speed, hardware acceleration, overflow, and more
```

```
connect "/usr/sbin/chat -v -f /etc/chatscripts/tmobile"

# Where is modem connect?
# Device needs to be in modem mode
# Locate gsm modem with "dmesg | grep gsm"
/dev/ttyUSB0

# Specify the baud rate (bit/s) used in the PPP dial-up connection. For
# Huawei modules, it is recommended that you set this parameter to 115200
115200

# Disables the default behaviour when no local IP address is specified, which is to
determine (if possible) the local IP address from the hostname. With this option, the
peer will have to supply the local IP address during IPCP negotiation (unless it
specified explicitly on the command line or in an options file).
#noipdefault

# Ask the peer for up to 2 DNS server addresses. The addresses supplied by the peer
(if any) are passed to the /etc/ppp/ip-up script in the environment variables DNS1
and DNS2, and the environment variable USEPEERDNS will be set to 1. In addition, pppd
will create an /etc/ppp/resolv.conf file containing one or two nameserver lines with
the address(es) supplied by the peer.

#usepeerdns

# Add a default route to the system routing tables, using the peer as the gateway,
when IPCP negotiation is successfully completed. This entry is removed when the PPP
connection is broken. This option is privileged if the nodefaultroute option has been
specified.

defaultroute

# Do not exit after a connection is terminated; instead try to reopen the connection.
The maxfail option still has an effect on persistent connections.
#persist

# Do not require the peer to authenticate itself. This option is privileged.
noauth
```

(optional) Install minicom terminal emulator

```
pacman -S minicom

minicom -s  (set port to /dev/ttyUSB0)

To monitor modem performance open a connection to /dev/ttyUSB1
```

(optional) install speedtest-cli
```
pacman -S speedtest-cli
```

Operation

IMPORTANT: Make sure the eth0 interface is set to DHCP and is unplugged, otherwise the default route will not change to ppp0

Route tweak
If needed, tweak the default linux route with: `route add default ppp0`

To Connect
```
# pon tmobile
```

To disconnect
```
# poff
```

Modem Commands and Reading Text Messages (using Minicom emulator)

```
at+cmgf=1 - put in text mode
at+cmgl - list message headers
AT+CNUM - read subscriber number
AT+CSQ - signal quality
AT^SYSINFOEX - System information (^SYSINFOEX:2,3,0,1,,1,"GSM",3,"EDGE")
ATI - Get IMEI and other info.
```

Autostart the PPP Connection when the system boots

Before the "exit 0" line in /etc/rc.local file, add:

```
#If T-Mobile dongle is installed do the following

gsm_loaded=`dmesg | grep -i "gsm"`

if [ "$gsm_loaded" ]; then
        sleep 30
        pon tmobile
        echo "Started PPP connection to T-Mobile"
        sleep 5
        route add default ppp0
        echo "Added default route to ppp0"
fi

exit 0
```

Create the `/usr/bin/cellon` script from below to turn cell on from within Allstar
(note: chmod 755 /usr/bin/cellon after creating the file)

```
# Starts the cellular link

cat /var/lib/asterisk/sounds/spy-usbradio.gsm /var/lib/asterisk/sounds/connecting.gsm
> /tmp/radioconnecting.gsm

/usr/bin/asterisk -rx "rpt localplay $NODE1 /tmp/radioconnecting"

/usr/bin/pon tmobile

sleep 10
```

```
route add default ppp0

sleep 3

/usr/local/sbin/saypublicip.sh $NODE1
```

Standard /etc/asterisk/rpt.conf changes (cellular items added in red)
(restart Asterisk or reload rpt after making changes)

```
901=cop,21 ;enable parrot
902=cop,22 ;disable parrot

903=cmd,/usr/local/sbin/sayip.sh 42435        ; Say local IP to radio
904=cmd,/usr/local/sbin/saypublicip.sh 42435  ; Say Public IP to radio
905=cmd,/usr/bin/cellon                        ; Start Cellular connection
906=cmd,/usr/bin/poff                          ; Stop Cellular connection
909=cmd,/usr/local/sbin/halt.sh 42435          ; Halt the system (linux total
shutdown)
908=cmd,/usr/local/sbin/reboot.sh 42435        ; Reboot the system
907=cmd,/usr/local/sbin/astres.sh              ; Restart Asterisk
```

In Asterisk, using DTMF on a radio

To connect cellular: *905
To disconnect cellular: *906

```
Reference:
https://www.twilio.com/docs/wireless/quickstart/raspberry-pi-headless-usb-modem
https://wiki.archlinux.org/index.php/USB_3G_Modem
https://wiki.archlinux.org/index.php/Huawei_E1550_3G_modem
```