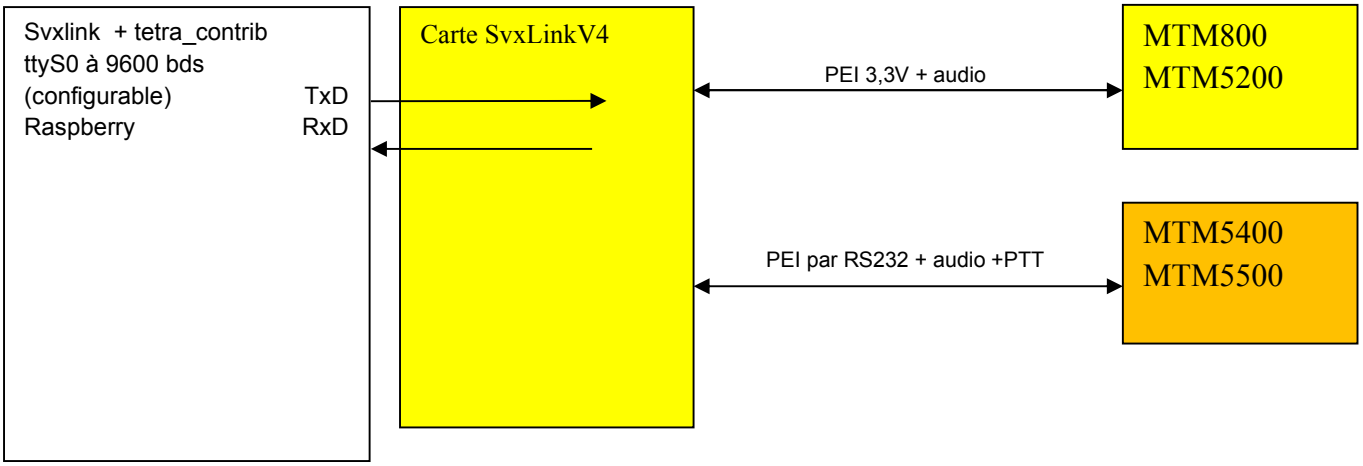
Download, install and configure the TETRALOGIC branch for SVXLINK

Based on F5UII and adapted by F1IWQ for the Tetra_contrib Branch + libraries (sept 2021)

TABLE

Tetra_contrib intercoms



First software installation

In the pi configuration, activate the "Serial Port" interface, and desactivate "serial console". Disable bluetooth (for pi3B+). This requires restarting the pi

Go to the `/home/pi` directory :

```
cd /home/pi
```

Clone the tetra-contrib branch to get the TetraLogic function which interfaces the MTM via the PEI interface:

```
sudo git clone -b tetra-contrib https://github.com/dl1hrc/svxlink
```

This creates the svxlink directory.
For information, installation instructions are provided in the INSTALL.adoc file.

```
cd svxlink
```

Install the compiler packages and other libraries (to be installed only once) :

```
sudo apt-get install cmake libsigc++-2.0-dev libasound2-dev libpopt-dev libgcrypt20-dev tk-dev libgsm1-dev libspeex-dev libopus-dev groff librtlsdr-dev libqt4-dev libcurl4-openssl-dev doxygen libjsoncpp-dev
```

This *sudo apt-get* line must be sent as a single line

To the question (Y / n) type enter and create a svxlink user, and integrate it into the group daemon. The password is your choice: (enter) :

```
sudo adduser svxlink
sudo usermod -a -G daemon svxlink
```

```
Adding user `svxlink' ...
Adding new group `svxlink' (1001) ...
Adding new user `svxlink' (1001) with group `svxlink' ...
Creating home directory `/home/svxlink' ...
Copying files from `/etc/skel' ...
Enter new UNIX password:
Retype new UNIX password:
passwd: password updated successfully
Changing the user information for svxlink
Enter the new value, or press ENTER for the default
      Full Name []:
      Room Number []:
      Work Phone []:
      Home Phone []:
      Other []:
Is the information correct? [Y/n] Y
```

Compile the source code for the Raspberry Pi. With the parameters in the cmake line, svxlink will be installed in the /usr/bin directory (parameter DCMAKE_INSTALL_PREFIX). The compilation takes about 15 mn.

```
cd src
sudo mkdir build
cd build
sudo cmake -DCMAKE_INSTALL_PREFIX=/usr -DSYSCONF_INSTALL_DIR=/etc -
DLOCAL_STATE_DIR=/var -DUSE_OSS=NO -DUSE_QT=NO ..
sudo make
sudo make doc
sudo ldconfig
sudo make install
```

The sudo cmake blue line should be sent as a single line. Note that it sets the DUSE_QT variable to no, which does not compile Qtel, which is the Echolink client.
The compilation will create the config files in `/etc/svxlink`. If they are already existing, they will not be overwritten.

The following command avoids the TclVoiceMail error message when running svxlink:
**** ERROR: The spool directory (/var/spool/svxlink/voice_mail) is not writable by the current user or does not exist."*

```
sudo chmod -R 777 /var/spool/svxlink/voice_mail
```

French voices installation

To give French voices to the repeater, install the sound files (16k WAV format). Choose one of the French voices available on the F8ASB GitHub repository.
`cd /usr/share/svxlink/sounds/`

```
sudo wget https://github.com/F8ASB/fr_FR_Agnes/archive/fr_FR_Agnes.zip
sudo unzip fr_FR_Agnes.zip
ls
```

The fr_FR_Agnes directory now contains all the directories and wav files used to give voice to the relay.
Rename the directory to fr_FR (This is the name that must be configured in the svxlink.conf file in the default language)
sudo mv fr_FR_Agnes-master fr_FR

Installing the USB sound card

On a Raspberry Pi 3 and Jessie configuration, it is necessary to add dwc_otg.fiq_split_enable = 0 at the end of the line of the /boot/cmdline.txt file

Add the line `snd-usb-audio` in /etc/modules file.

Modify `/lib/modprobe.d/aliases.conf` and change. `snd-usb-audio index` from -2 to 0. Add at the end of the file `options snd-usb-audio nrpacks=1`

Reboot the pi.

Connect the USB sound card to your Raspberry Pi. The LED will light up. Check that the USB device is recognized:

```
Lsusb

Bus 001 Device 004: ID 0d8c:013c C-Media Electronics, Inc. CM108 Audio Controller
Bus 001 Device 003: ID 0424:ec00 Standard Microsystems Corp. SMSC9512/9514 Fast
Ethernet Adapter
Bus 001 Device 002: ID 0424:9514 Standard Microsystems Corp.
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
```

The USB card here is Device 004 CM108 Audio Controller.
Check if the microphone audio input is present:

```
arecord -l

**** List of CAPTURE Hardware Devices ****
card 1: Device [USB PnP Sound Device], device 0: USB Audio [USB Audio]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
```

For the audio recording channel, locate the card number (here 'card 1') and the device number (here 'device 0'), because they will be used in the configuration of SvxLink
Check the audio output channel (speaker). It also appears the reading device that equips the Raspberry Pi (bcm2835)

```
aplay -l

**** List of PLAYBACK Hardware Devices ****
card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 8/8
  Subdevice #0: subdevice #0
  Subdevice #1: subdevice #1
  Subdevice #2: subdevice #2
  Subdevice #3: subdevice #3
  Subdevice #4: subdevice #4
  Subdevice #5: subdevice #5
  Subdevice #6: subdevice #6
  Subdevice #7: subdevice #7
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 ALSA [bcm2835 IEC958/HDMI]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
card 1: Device [USB PnP Sound Device], device 0: USB Audio [USB Audio]
  Subdevices: 1/1
  Subdevice #0: subdevice #0
```

Configuring SVXLINK

All the configuration (except modules) is in the file `/etc/svxlink/svxlink.conf`.
The original unconfigured (raw) file is located in
`/home/pi/svxlink/src/svxlink/svxlink/svxlink.conf`

Configuring TetraLogic

TetraLogic is the logic used by the TETRA_CONTRIB branch of SvxLink.
TetraLogic uses the 115200 baud /dev/ttyUSB0 link by default to connect to the MTM and send information back to svxlink. This has to be changed if you want to use the pi internal UART.

Use the Uart serial pi :
Edit in the [TetraLogic] section
Change `dev/ttyUSB0` by `/dev/ttyS0` on a pi3
And for a pi2, `/dev/ttyAM0`
Change Bauds to 9600, which is the default speed of the PEI interface in the codeplug.

Turn off Bluetooth.

At start, TetraLogic sets the Tetra station in DMO mode using AT+CTOM=1 command. It use the PEI link to retrieve information from Squelch (COS) and send PTT.
It also fetch the GPS to send the position to APRS. If the GPS card is not in place, you will get an error on the specific AT command if you use the DEBUG set to 1.

Two access modes to squelch / PTT are possible depending on the logic used: TETRALOGIC to use squelch and PTT via software PEI interface or traditionally via hardware : SimplexLogic or RepeaterLogic for squelch and PTT via GPIO (but the SQ signal must be taken from the MTM800)

To use the MTM800/MTM5x00 in Direct DMO mode, set AT+CTOM=1.
To use the MTM5x00 in DMO Repeater, set AT+CTOM=6. In this case you must use the wired PTT (otherwise broadcasts from network won't be transmitted).

TETRA branch configuration:

```
[GLOBAL]
(…)
LOGICS=TetraLogic,SimplexLogic
LINKS=ALLlinks, avec ALLlinks qui lie les deux logiques
(…)

[TetraLogic]
DTMF_CTRL_PTY=/tmp/dtmf
TYPE=Tetra
RX=RxTetra
TX=TxTetra
MODULES=ModuleHelp,ModuleParrot,ModuleEchoLink,ModuleTclVoiceMail
#MODULES=ModuleHelp,ModuleTclVoiceMail
CALLSIGN=F1ZDN
DEFAULT_LANG=fr_FR_Agnes
BAUD=9600
#0=pas de debug 1=LOGWARNING 2=LOGINFO 3=LOGDEBUG
DEBUG=0
PORT=/dev/ttyS0
#ISSI=2089144
ISSI=208903
GSSI=1
MNC=1995
MCC=901
# AT+CTOM=1 = mode DMO
# AT+CTOM=6 = relais DMO
# AT+CTSP=1,3,131 = activation du GPS vers PEI. Renvoie une erreur si pas de GPS connecté
# AT+CTSP=1,3,130 = activation des SDS vers PEI
INIT_PEI=AT+CTOM=6;AT+CTSP=1,3,131;AT+CTSP=1,3,130;AT+CTSP=1,3,138;AT+CTSP=1,2,20;AT+CTSP=2,0,0;AT+CTSP=1,3,2
4;AT+CTSP=1,3,25;AT+CTSP=1,3,3;AT+CTSP=1,3,10;AT+CTSP=1,1,11;AT+CTSDC=0,0,0,1,1,0,1,1,0,0
#balise courte toutes les xx mn doit être un multiple de LONG_IDENT_INTERVAL
SHORT_IDENT_INTERVAL=0
#balise longue toutes les xx mn
LONG_IDENT_INTERVAL=60
TIME_FORMAT=24
#IDENT_ONLY_AFTER_TX=4
EVENT_HANDLER=/usr/share/svxlink/events.tcl
RGR_SOUND_DELAY=0
#RGR_SOUND_ALWAYS=0
MACROS=Macros
FX_GAIN_NORMAL=0
FX_GAIN_LOW=-12
PROXIMITY_WARNING=3.1
TIME_BETWEEN_SDS=3600
INFO_SDS=Welcome new user
#TETRA_USERS=Tetra_Users
TETRA_USER_INFOFILE=/etc/svxlink/tetra_users.json
STATUS=Tetra_Status
SDS_ON_USERACTIVITY=SdsOnUserActivity
SDS_TO_OTHERS_ON_ACTIVITY=DMO_ON,DMO_OFF,PROXIMITY
SDS_TO_COMMAND=SdsToCommand
END_CMD=ATH
#SHARE_USERINFO=1
#DAPNET_SERVER=dapnet.afu.rwth-aachen.de
DAPNET_PORT=43434
```

```
DAPNET_CALLSIGN=F1IWQ
DAPNET_KEY=jfjfhfhfhf
DAPNET_RIC2ISSI=Ric2ISSI
DAPNET_RUBRIC_REGISTRATION=RicRegistration

[Tetra_Users] this section has been moved to tetra_users.json
# ISSI = Call,Name,comment
901163830000023401=DM0SVX,DMO-Repeater,\\r,Halle/Saale
901163830000023404=DL1HRC,Adi,\\E,SvxLink operator
901163830000023428=DL1HQN,Martin,\\E,Groebers

[Tetra_Status]
# status=message
8051=not available
8052=available
8053=no further information

[SdsOnUserActivity]
0=Hello user you have powered on
1=Hello user you have powered off
2=Hello user you want to declare the state of emergency?
3=Hello user Push-to-talk condition is detected
4=Hello user Status
5=Hello user TXI=on

[SdsToCommand]
8200=121
8201=120

[RxTetra]
TYPE=Local
#RX_ID=?
# numéro de carte son
AUDIO_DEV=alsa:plughw:0
# numéro de device
AUDIO_CHANNEL=0
#AUDIO_DEV_KEEP_OPEN=0
SQL_DET=TETRA_SQL
SQL_START_DELAY=0
SQL_DELAY=0
(…)
```

ReflectorLogic configuration

```
[ReflectorLogic]
TYPE=Reflector
# host or ip address
HOST=rlf-87.dyndns.org
PORT=5387
CALLSIGN="xxxxxx"
AUTH_KEY="xxxxxxx"
JITTER_BUFFER_DELAY=2
EVENT_HANDLER=/usr/share/svxlink/events.tcl
DEFAULT_TG=20887
MONITOR_TGS=20887
TG_SELECT_TIMEOUT=4000000000
```

DEFAULT_TG
The node will select this TG on local inbound traffic if no other TG is currently selected. Default: 0 (no TG).

MONITOR_TGS
Comma separated list of TGs whose node will monitor activity when no other TG is selected.
It is also possible to mark TGs as being higher priority than others by adding one or more + signs after the TG number. More + signs mean higher priority. When a TG is selected and there is activity on another TG with a higher priority, the higher priority TG will be selected unless there has been local activity on the node.

Example: MONITOR_TGS=112++,240,2403 +,2403123

Will monitor TGs for Sweden, District 3 of Sweden and a specific TG 2403123. Traffic on TG 2403 will be given priority and 112 will have the highest priority.

TG_SELECT_TIMEOUT
Number of seconds after which a selected TG will be deselected. The node will return to talkgroup 0 (no TG) and resume monitoring configured TGs. Default: 30 seconds.

ANNOUNCE_REMOTE_MIN_INTERVAL
Minimum number of seconds between announcements of the same TG for remote TG activations. If the same TG is activated remotely multiple times, it will not be announced until at least the number of seconds specified in this configuration variable has elapsed.

NODE_INFO_FILE
Configuration file to use to send information about this client to the reflector server. This is not a mandatory configuration. The file has mostly a free form JSON structure, but the general structure should be kept so that SvxLink and the reflector server can populate dynamic information about the node, like signal strength for receivers. Use the default node_info.json as a template. You can add more information quite freely, but don't change the overall structure.
It is also possible to set the audio codec parameters using the same configuration variables as documented for networked receivers and transmitters. For example, to lighten the CPU load on the encoder for the Opus encoder, set OPUS_ENC_COMPLEXITY to less than 9 for example.

MUTE_FIRST_TX_LOC
Mutes the sound of the first transmission after selecting a TG due to local activity. It is recommended that you have this feature enabled for a number of reasons. One reason is to suppress short newsgroup openings when someone is doing just one push to test the local node. Another reason is to allow someone to submit DTMF commands to the node without disturbing the reflector array. An example is that someone activates a TG using CTCSS, but immediately selects another talkgroup using DTMF. In this case, no transmission will be made on the first talkgroup. This feature is enabled by default.

MUTE_FIRST_TX_REM
Mute the first transmission after selecting a talkgroup due to remote activity. This feature can be enabled to allow local node users to enter DTMF commands without disrupting an active talkgroup. For example, the local node monitors an active talkgroup. However, no one on the local node is participating in the QSO, and a local user wants to select another talkgroup. With this feature enabled, it is possible to do this without transmitting to the reflector array while entering DTMF commands. This feature is not enabled by default because it is not intuitive. If a local user hears a call and wants to answer it, he must first do a short PTT to “open” the local node. It's easy to forget.

TMP_MONITOR_TIMEOUT
This configuration variable determines after how many seconds a manually added temporary TG monitor will expire. Set to 0 to disable this function. The default is 3600, one hour.

Echolink.conf

Be careful to check if the MUTE_LOGIC_LINKING variable is set to 0 :

```
[ModuleEchoLink]
NAME=EchoLink
ID=2
#timeout de déconnexion si pas d'activité
#TIMEOUT=60
# si 0 alors echolink transmet vers le gateway sinon non!
MUTE_LOGIC_LINKING=0
```

Audio setup

Configure the Audio device to be used by Svxlink. Above it was identified that the recording (therefore the receiving channel Rx) is card 1, device 0. You must therefore have this in the configuration file:

```
[RxXXX]
TYPE=Local
AUDIO_DEV=alsa:plughw:1
AUDIO_CHANNEL=0
```

For the transmission part, the audio output channel (speaker) is also card 1, device 0 therefore in the configuration file:

```
[TxXXX]
TYPE=Local
AUDIO_DEV=alsa:plughw:1
AUDIO_CHANNEL=0
```

TETRA events (Tetralogic.tcl)

If the TetraLogic.tcl file is missing in /usr/share/svxlink/event.d

Copy the file `/home/pi/svxlink/src/svxlink/svxlink/`**`TetraLogic.tcl`**
to `/usr/share/svxlink/event.d`

Handling events to GPIO

It is possible to output event states to the GPIO interface. TCL syntax must be used in the TCL files. For instance, the code shows below how to export the squelch signal (whatever it comes from the GPIO or the PEI interface).

File `/usr/share/svxlink/events.d/TetraLogic.tcl`

```
(…)
# Executed each time the squelch is opened or closed
#
proc squelch_open {rx_id is_open} {
  Logic::squelch_open $rx_id $is_open;
  puts "Le squelch change: $is_open";
  if {$is_open==0} { exec echo 0 >/sys/class/gpio/gpio18/value; }
  if {$is_open==1} { exec echo 1 >/sys/class/gpio/gpio18/value; }
}
```

Write 1 (3,3V) to the GPIO18 when squelch opens. *Exec* command is the TCL script execution command. You can then use any raspbian command which is not supported by TCL syntax. Don't forget to declare the use of GPIO18 in `/etc/rc.local` (see below).

It can be used to drive leds according to svxlink state (running/idle), drive a PTT keyer for another transceiver etc…

Codeplug parameters to use the PEI interface

The parameters of this interface are set in the CPS in Data_services> AT commands and check the 3 options ETSI group format, ETSI AT SDS / Status format and Extended ETSI addressing.

Please note, depending on the firmware version or radio, the above parameters may not be available. In this case, they are validated internally, and there is nothing to be done.

In LAB mode: cp_ergo_block / ergo_data / ro / rui_parameters / limited_access_services
Change the value 7 (pei) from 0 to 1 to activate the pei interface

To test the serial link with the MTM, install the minicom terminal:
`sudo apt-get install minicom`

Start the terminal with
`minicom -b 9600 -o -D /dev/ttyS0`
To quit minicom, type CTRL-A Q

GPIO configuration

You don't have to use GPIO configuration with tetra PEI interface (except for DMO repeater mode for PTT). For the use of the classic wired interface, the GPIO from the PI to the local station is used. Open the `/etc/rc.local` file for editing and change it according to the wiring of the PTT and COS (Squelch). Example here GPIO16 = PTT = output = out; GPIO19 = SQL = input = active when 1.

```
#!/bin/sh -e
#
# rc.local
#
# This script is executed at the end of each multiuser runlevel.
# Make sure that the script will "exit 0" on success or any other
# value on error.
#
# In order to enable or disable this script just change the execution
# bits.
#
# By default this script does nothing.

# Print the IP address
_IP=$(hostname -I) || true
if [ "$_IP" ]; then
  printf "My IP address is %s\n" "$_IP"
fi

#GPIO16=PTT
echo "16" >/sys/class/gpio/export
sleep 2
echo out >/sys/class/gpio/gpio16/direction

#GPIO19=SQL
echo "19" >/sys/class/gpio/export
sleep 2
echo "in" >/sys/class/gpio/gpio19/direction

#GPIO18=utilitaire
echo "18" >/sys/class/gpio/export
sleep 2
echo out >/sys/class/gpio/gpio18/direction

#GPIO23=stop button directly handling in python script

# vide le tampon du MTM en envoyant un CR
/home/pi/serial_write-CR.py
(…)

exit 0
```

GPIO I/O can be tested with the instruction:
`gpio readall`

Restriction

With the MTM5x00, if the DMO Repeater mode is used, it is not possible to use the PEI interface to key the transmiter on. A broadcast from the network will to be transmited by the MTM5x00. You must use the wired PTT via GPIO16 and modify the Tx section accordingly.

UART release script

In order for TetraLogic to communicate correctly with the PEI interface the first time it is powered on, a carriage return (CR) must be sent to the station to empty the buffer. This macro must be launched before running svxlink, in a file called "serial_write_CR" in /home/pi:

```
#!/usr/bin/env python
import serial

ser = serial.Serial(port='/dev/ttyS0',   ← adresse de l'UART for pi3
    baudrate=9600,                       ← speed baudrate à adapter en fonction du PEI
    parity=serial.PARITY_NONE,
    stopbits=serial.STOPBITS_ONE,
    bytesize=serial.EIGHTBITS,
    timeout=1
)

ser.write(13)
ser.close
```

Make the script executable with
`chmod 744 serial_write-CR.py`

This script is to be launched when starting the pi, it will of course be necessary for the MTM station to be powered on when the pi is powered on:
add it in `/etc/rc.local`

```
#!/bin/sh -e
#
# rc.local
#
# This script is executed at the end of each multiuser runlevel.
# Make sure that the script will "exit 0" on success or any other
# value on error.
#
# In order to enable or disable this script just change the execution
# bits.
#
# By default this script does nothing.
```

```
# Print the IP address
_IP=$(hostname -I) || true
if [ "$_IP" ]; then
  printf "My IP address is %s\n" "$_IP"
fi

#GPIO16=PTT
echo "16" >/sys/class/gpio/export
sleep 2
echo out >/sys/class/gpio/gpio16/direction

#GPIO19=SQL
echo "19" >/sys/class/gpio/export
sleep 2
echo "in" >/sys/class/gpio/gpio19/direction

# vide le tampon du MTM en envoyant un CR
/home/pi/serial_write-CR.py

exit 0
```

Run Svxlink for testing

Before launching svxlink, free the MTM buffer by with the command
`./serial_write-CR.py`

Start svxlink by typing the following command:
`svxlink`

The led of the USB sound card should blink if it is equipped. At launch it is possible to get errors from the PEI.

According to the MUTE_FIRST_TX_LOC variable, the first push of PTT selects the TG (described in TETRALOGIC). The 2nd PTT call starts the talker which directs the audio to the TG on the network.

You should see this (with TetraLogic, and DEBUG = 1)

```
pi@raspberrypi:~ $ svxlink
SvxLink v1.7.99.24 Copyright (C) 2003-2020 Tobias Blomberg / SM0SVX

SvxLink comes with ABSOLUTELY NO WARRANTY. This is free software, and you are
welcome to redistribute it in accordance with the terms and conditions in the
GNU GPL (General Public License) version 2 or later.
Using configuration file: /etc/svxlink/svxlink.conf
--- Using sample rate 48000Hz
Starting logic: ReflectorLogic
ReflectorLogic: Connecting to rlf-87.dyndns.org:5387
Starting logic: TetraLogic
Loading RX: RxTetra
Loading TX: TxTetra
Loading module "ModuleHelp" into logic "TetraLogic"
        Found /usr/lib/arm-linux-gnueabihf/svxlink/ModuleHelp.so
        Module Help v1.0.0 starting...
Loading module "ModuleTclVoiceMail" into logic "TetraLogic"
        Found /usr/lib/arm-linux-gnueabihf/svxlink/ModuleTcl.so
```

```
       Module Tcl v1.0.1 starting...
TetraLogic: Event handler script successfully loaded.
8200=121
8201=120
Creating tetra specific Sql ok
  To PEI:
  To PEI:AT+CTOM=1
Activating link ALLlinkTetra
ReflectorLogic: Connection established to 82.64.55.4:5387
From PEI:+CME ERROR: 35
35 - Syntax error. The syntax of the command is incorrect e.g. mandatory
 parameters are missing or are exceeding Data received without command
From PEI:+CME ERROR: 35
35 - Syntax error. The syntax of the command is incorrect e.g. mandatory
 parameters are missing or are exceeding Data received without command
ReflectorLogic: Authentication OK
ReflectorLogic: Connected nodes: (19)-F8KHC, (87)-F1ZJA, (59)-F1IWQ
------ Opus encoder parameters ------
Frame size           = 320
Complexity           = 9
Bitrate              = 20000
VBR                  = YES
Constrained VBR      = YES
Maximum audio bw     = MEDIUMBAND
Audio bw             = FULLBAND
Signal type          = VOICE
Application type     = AUDIO
Inband FEC           = NO
Expected Packet Loss = 0%
DTX                  = NO
LSB depth            = 16
--------------------------------------
------ Opus decoder parameters ------
Gain       = 0dB
--------------------------------------
ReflectorLogic: Using audio codec "OPUS"
From PEI:+CTOM: 1
+++ New Tetra mode: 1 - DMO
From PEI:OK
Connected to APRS server 217.160.179.143 on port 14580
  To PEI:AT+CTSP=1,3,131
From PEI:+CME ERROR: 3   (c'est parce que j'ai enlevé le GPS de mon MTM)
3 - This is a general error report code which indicates that the MT supports
 the command but not in its current state. This code shall be used when no
 other code is more appropriate for the specific context
  To PEI:AT+CTSP=1,3,130
From PEI:OK
  To PEI:AT+CTSP=1,3,138
From PEI:OK
  To PEI:AT+CTSP=1,2,20
From PEI:OK
  To PEI:AT+CTSP=2,0,0
From PEI:OK
  To PEI:AT+CTSP=1,3,24
From PEI:OK
  To PEI:AT+CTSP=1,3,25
From PEI:OK
  To PEI:AT+CTSP=1,3,3
From PEI:OK
  To PEI:AT+CTSP=1,3,10
From PEI:OK
  To PEI:AT+CTSP=1,1,11
From PEI:OK
  To PEI:AT+CTSDC=0,0,0,1,1,0,1,1,0,0
From PEI:OK
  To PEI:AT+CNUMF?
From PEI:+CNUMF: 0,9010000102089144
<num type> is 0 (0 - Individual (ISSI or ITSI))
From PEI:2,16777184
From PEI:3,16777184
```

```
From PEI:OK
From PEI:+CTICN: 1,0,0,,,1,1,0,1,1,1,9011638300000001,0
*** No valid +CTICN response, message to short
From PEI:+CTCC: 1,1,1,0,0,1,1
From PEI:+CTXG: 1,3,0,0
TetraLogic: The squelch is OPEN
RxTetra: The squelch is OPEN (5.89658)
TetraLogic: The squelch is OPEN
ReflectorLogic: Selecting TG #20887   <-- sélection du TG sur le 1er coup de PTT
From PEI:+CTICN: 1,0,0,1,7530236102089144,1,1,0,1,1,1,9011638300000001,0
*** No valid +CTICN response, message to short
From PEI:+CDTXC: 1,0
TetraLogic: The squelch is CLOSED
RxTetra: The squelch is CLOSED (5.89336)
TetraLogic: The squelch is CLOSED
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
From PEI:+CTXG: 1,3,0,0,1,7530236102089144
TetraLogic: The squelch is OPEN
RxTetra: The squelch is OPEN (5.955)
TetraLogic: The squelch is OPEN
ReflectorLogic: Talker start on TG #20887: (59)-F1IWQ    <-- 2eme coup de PTT
From PEI:+CDTXC: 1,0
TetraLogic: The squelch is CLOSED
ReflectorLogic: Talker stop on TG #20887: (59)-F1IWQ
RxTetra: The squelch is CLOSED (5.67421)
TetraLogic: The squelch is CLOSED
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
RxTetra: Distorsion detected! Please lower the input volume!
From PEI:+CTCR: 1,13
APRS,qAR,F1IWQ-10:Transmission ended
  To PEI:AT
From PEI:OK
  To PEI:AT
From PEI:OK
  To PEI:AT
```

SVXLINK launch at boot

You need to create a service that starts svxlink after the network is available and the sound card (svxlink.service).
Another service will be created to start svxlink 60s after booting (svxlink.timer)

In the `/lib/systemd/system` directory, create the svxlink.service file which contains:

```
[Unit]
Description=this start SVXlink
After=syslog.target network-online.target sound.target
```

```
[Service]
User=root
ExecStart=sudo /usr/bin/svxlink --config=/etc/svxlink/svxlink.conf --
logfile=/var/log/svxlink

[Install]
WantedBy=multi-user.target
```

And create `svxlink.timer` file which contains :

```
[Timer]
OnStartupSec=60

[Install]
WantedBy=multi-user.target
```

Reload the new services services in the system:

```
sudo systemctl daemon-reload
```

Start the timer service :

`sudo systemctl start svxlink.timer` : start timer service

`sudo systemctl enable svxlink.timer` : enable timer service on each boot

Do not start the svxlink.service service, svxlink timer starts it.

Check if the services started with

```
sudo systemctl status svxlink.timer
```

(ctrl c to leave)

The service is started forever, the next time the pi starts, svxlink will start after the network is available, and after 60s.

The svxlink log file is located in /var/log/svxlink

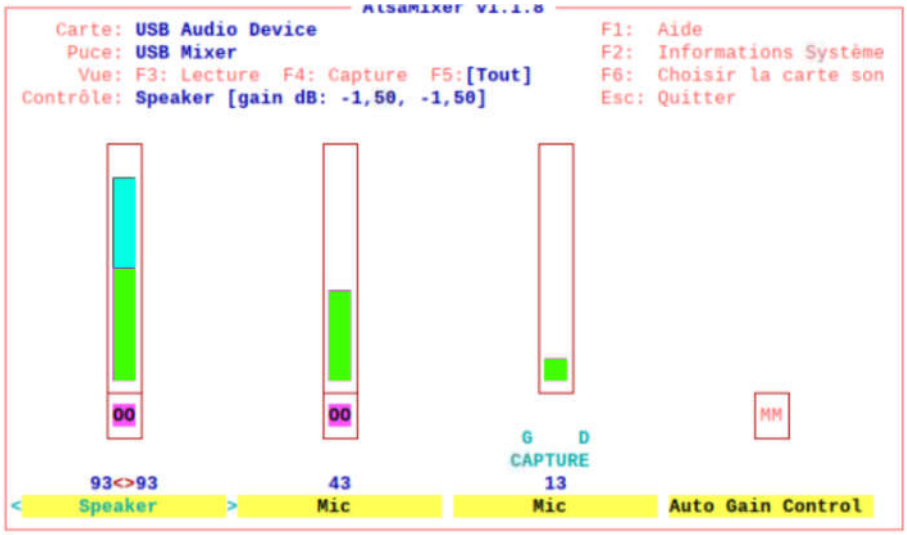
To stop SVXLINK, type `sudo systemctl stop svxlink.service`
This stops the service.

Open the router ports according to the reflector settings:

For Echolink:
5198-5199 udp
5200 tcp

For RLF (this is not TETRA DACH master)
5387 udp / tcp

ALSAMIXER SETTINGS



Start alsamixer

Press F5 to display all settings.

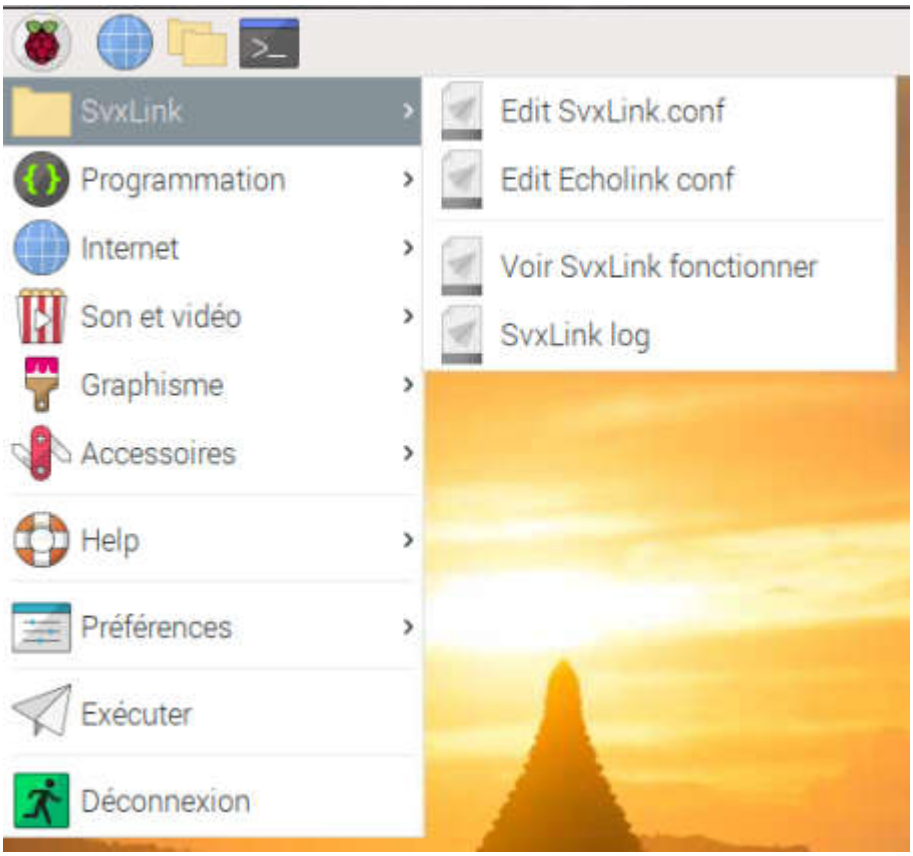
Speaker is used to adjust the audio coming from the network to the radio.

Capture allows to set the audio from the radio to the network.

Mic has no effect.

Note that Auto Gain control is muted (MM) press m.

Menu bar



Edit SvxLink.conf allows you to launch an editor to modify the svxlink.conf configuration file
Edit EchoLink.conf allows you to launch an editor to modify the EchoLink.conf configuration file

See SvxLink working: displays the window of the last 40 lines of the svxlink log file
SvxLink.log allows you to launch an editor to view the svxlink.log log file

DTMF controls

DTMF commands are not possible from a TETRA station.
* Repeater presentation
# disconnection
0# help module activation
1# parrot activation
2# ECHOLINK module activation
5# metarInfo module module (weather forecast)
01# List of available weather stations

Update svxlink/tetra

Go to /home/pi

Sudo ./maj.sh

File maj.sh :

```
#!/bin/bash

cd /home/pi/svxlink
git fetch

LOCAL=$(git rev-parse @)
REMOTE=$(git rev-parse @{u})
BASE=$(git merge-base @ @{u})

if [ $LOCAL = $REMOTE ]; then
       echo "[UPDATE][$(date)] Svxink est à jour"
elif [ $LOCAL = $BASE ]; then
       echo "[UPDATE][$(date)] ===== arrêt de Svxlink ====="
       sudo pkill -f svxlink
       sleep 1
       echo "[UPDATE][$(date)] ===== mise à jour de Svxlink depuis Repository ====="
       git pull
       cd src
        cd build
        sudo cmake -DCMAKE_INSTALL_PREFIX=/usr -DSYSCONF_INSTALL_DIR=/etc -DLOCAL_STATE_DIR=/var
-DUSE_OSS=NO -DUSE_QT=NO ..
        sudo make
        sudo make doc
        sudo ldconfig
        sudo make install
       sleep 2
        sudo chmod -R 777 /var/spool/svxlink/voice_mail
       echo "[UPDATE][$(date)] ===== Mise à jour réussie de Svxlink ====="

else
       echo "[UPDATE][$(date)] !!!!! Erreur de mise à jour de Svxlink !!!!!"
fi
```

SVXLINK Console

The console allows you to activate the macros of the [Macros] section of svxlink.conf. #
There are several ways to simulate DTMF commands on SVXLINK:

Using a socket

Launch svxlink so that it can be remotely controlled from a remote client:
```
nc -lk port | sudo svxlink
```

And from the client, type:
```
echo -n "command" | nc ip_address port
```

ip_address = 127.0.0.1 if the client is on the same network as the server
port = communication port number
command = command to send to svxlink (example: *0#)

DTMF simulator

In TetraLogic section :
```
DTMF_CTRL_PTY=/tmp/dtmf
```
Defines a folder for exchanging DTMF commands (example: /tmp /dtmf)

And type in a console window:
```
sudo echo "command" >/temp/dtmf
```

Type in the command to send.