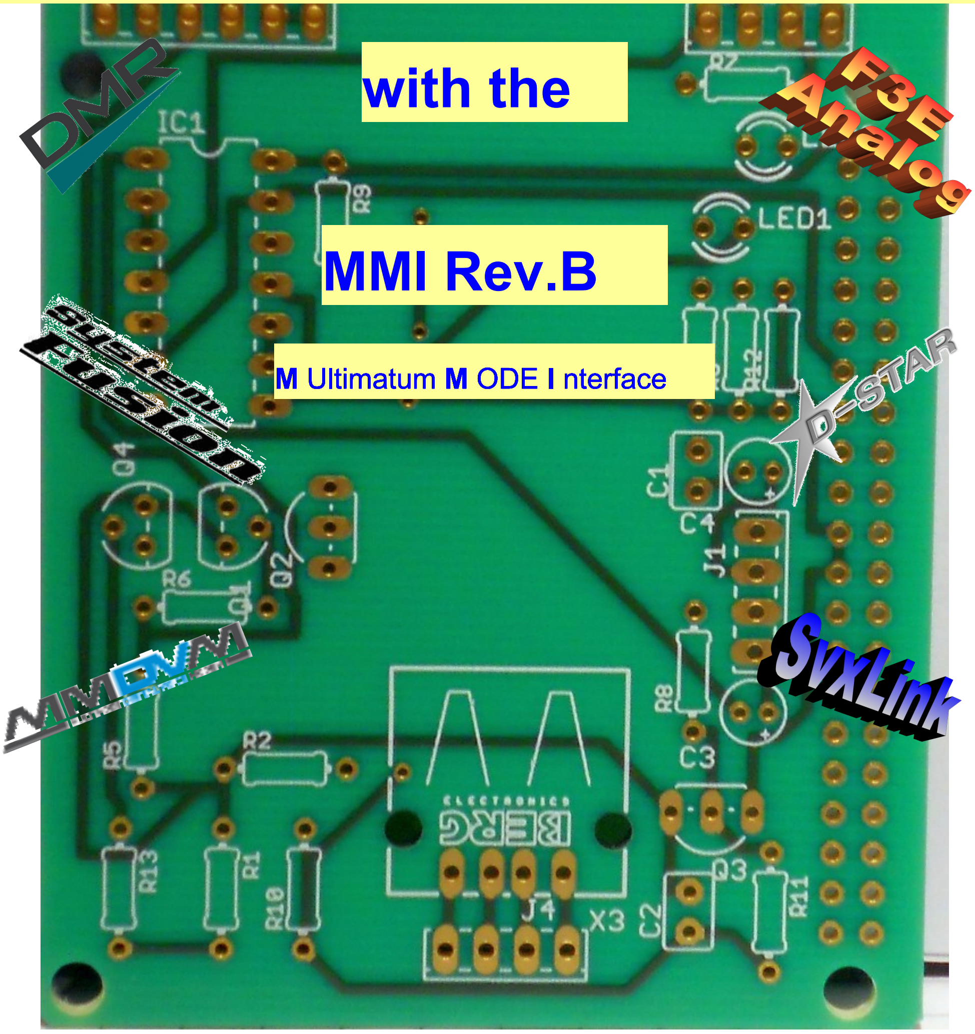
Small cookbook to operate



with the

MMI Rev.B

M Ultimatum **M** ODE **I** nterface

Table of Contents

Modification of operating a multi-mode repeater with SvxLink and MMDVM

- **What is needed everything.**

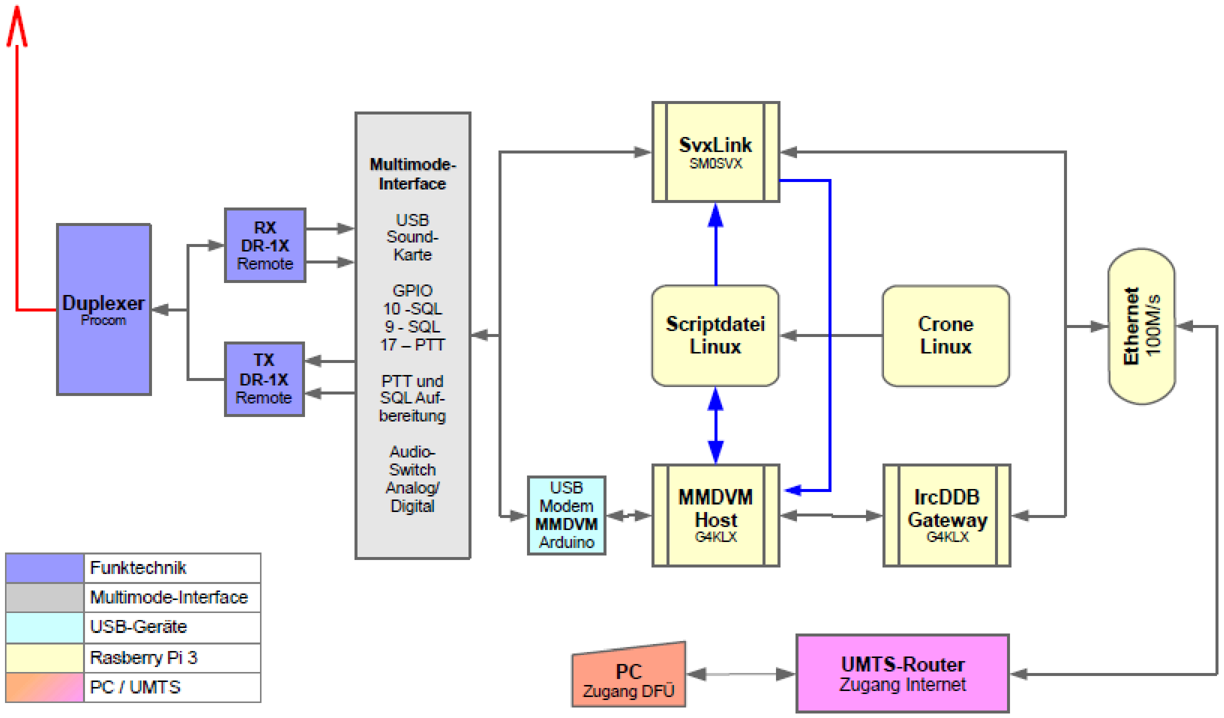
Raspberry Pi 2 or 3
MMI board for the Raspi (Mutlimode interface) SvxLink
Software
Arduino DUE with MMDVM-Shield
software for the Arduino MMDVM
software for Raspi
Linux Editor mc (Midnight Commander), or nano

In addition, some files must be created in order to provide effective control.

In the SvxLink software two TCL scripts must be edited. Of course, the ini files need to be adjusted. Here where the MMDVMHost log is stored must be ensured.

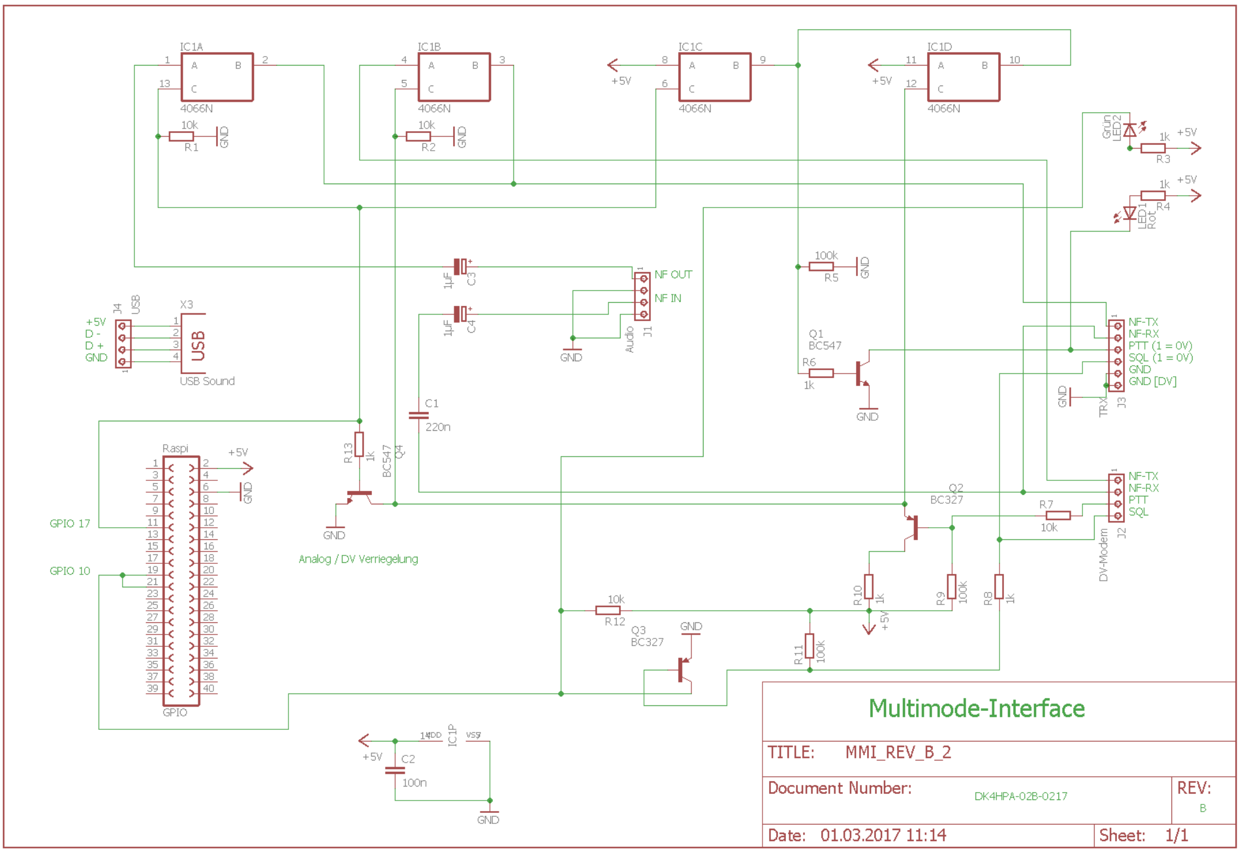
A little hint, the whole project can be understood only as a suggestion. Commercial use of the circuit or publication is expressly prohibited without my consent.

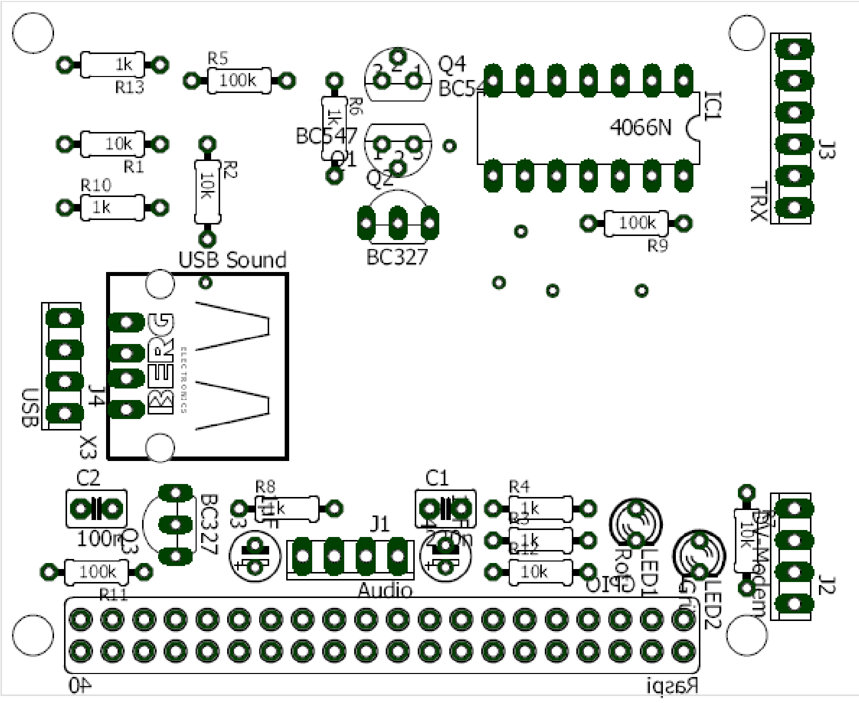
- **Block diagram of the control**



Modification of operating a multi-mode repeater with SvxLink and MMDVM

- The multi-mode interface





Modification of operating a multi-mode repeater with SvxLink and MMDVM

parts list

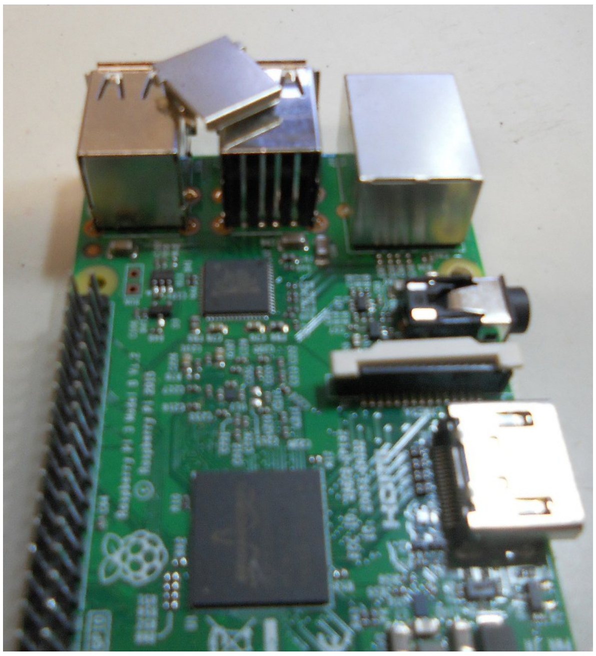
MMI_REV_B

part	Value	Device	package	Library
C1	220n	C2,5-3	C2.5-3	capacitor-wima
C2	100n	C2,5-3	C2.5-3	capacitor-wima
C3	1ĩF	CPOL EUE1.8-4	E1,8-4	rcl
C4	1ĩF	CPOL EUE1.8-4	E1,8-4	rcl
GPIO	Raspi	FE20-2	FE20-2	con-lsta
IC1	4066N	4066N	DIL14	40xx
J1	Audio	MTA04-100	10X04MTA	con-amp
J2	DV modem	MTA04-100	10X04MTA	con-amp
J3	TRX	MTA06-100	10X06MTA	con-amp
J4	USB	MTA04-100	10X04MTA	con-amp
LED1	red	LED3MM	LED3MM	led
LED2	green	LED3MM	LED3MM	led
Q1	BC547	BC547	TO92	transistor NPN
Q2	BC327	BC327	TO92 EBC	transistor-pnp
Q3	BC327	BC327	TO92 EBC	transistor-pnp
Q4	BC547	BC547	TO92	transistor NPN
R1	10k	R-EU_0204 / 7	0204/7	rcl
R2	10k	R-EU_0204 / 7	0204/7	rcl
R3	1k	R-EU_0204 / 7	0204/7	rcl
R4	1k	R-EU_0204 / 7	0204/7	rcl
R5	100k	R-EU_0204 / 7	0204/7	rcl
R6	1k	R-EU_0204 / 7	0204/7	rcl
R7	10k	R-EU_0204 / 7	0204/7	rcl
R8	1k	R-EU_0204 / 7	0204/7	rcl
R9	100k	R-EU_0204 / 7	0204/7	rcl
R10	1k	R-EU_0204 / 7	0204/7	rcl
R11	100k	R-EU_0204 / 7	0204/7	rcl
R12	10k	R-EU_0204 / 7	0204/7	rcl
R13	1k	R-EU_0204 / 7	0204/7	rcl
X3	USB Sound	PN87520	PN87520	con-berg

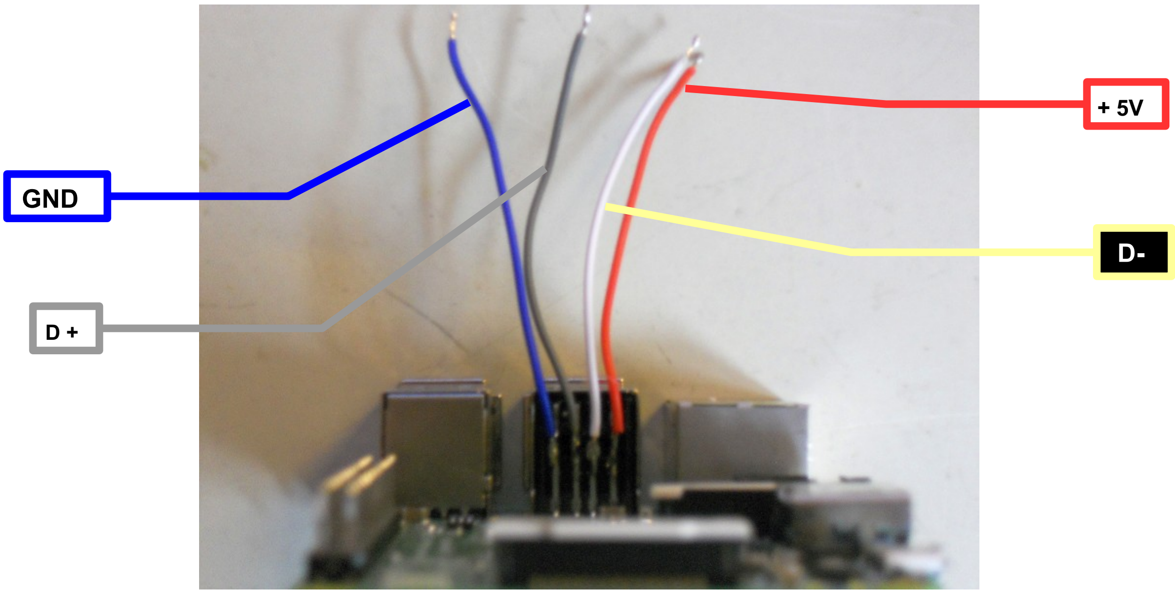
Easy USB sound card (eg 3D Sound)

Modification of operating a multi-mode repeater with SvxLink and MMDVM

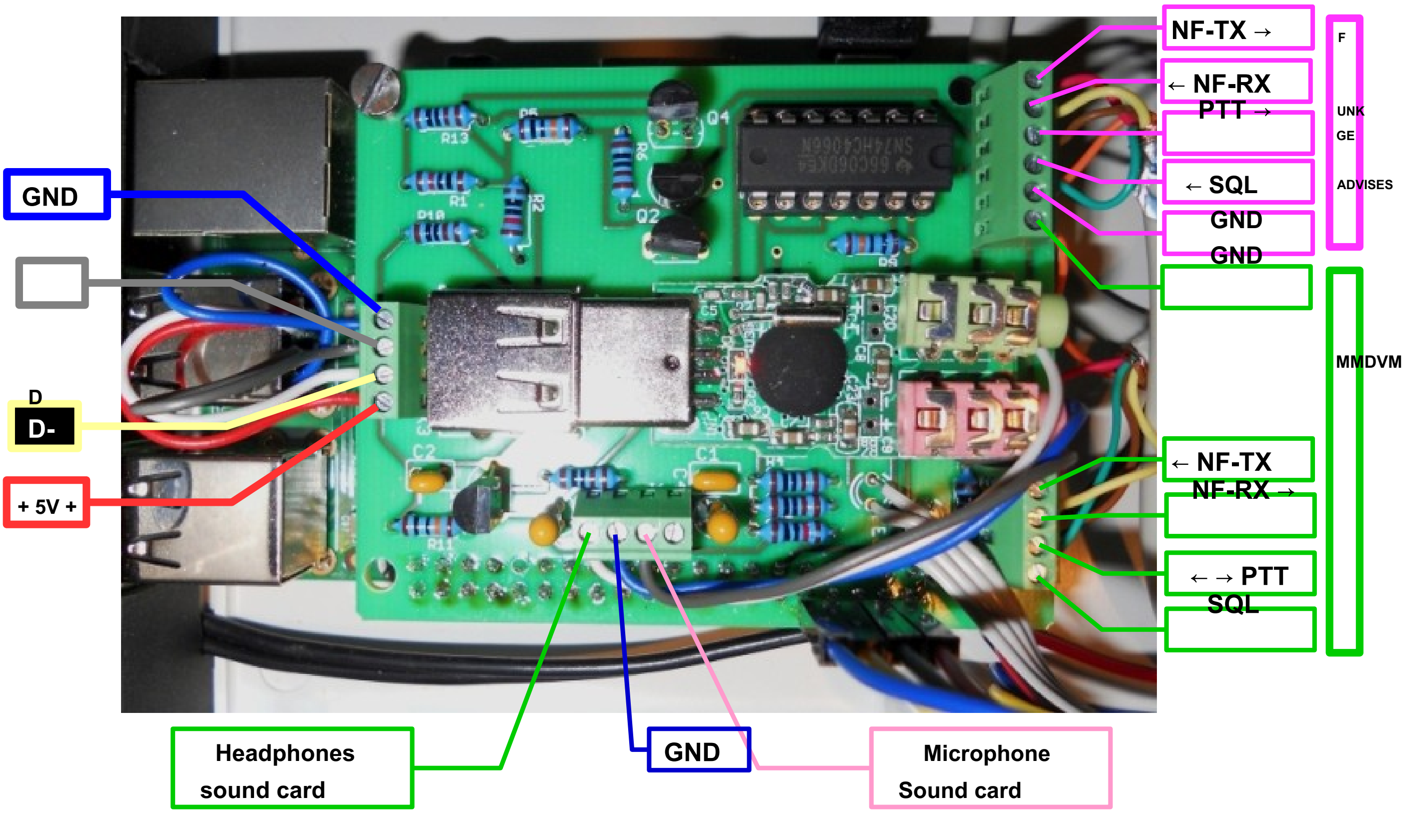
Modification of the Raspberry Pi for the USB sound card connector



Remove the shield cover from the back of the USB port

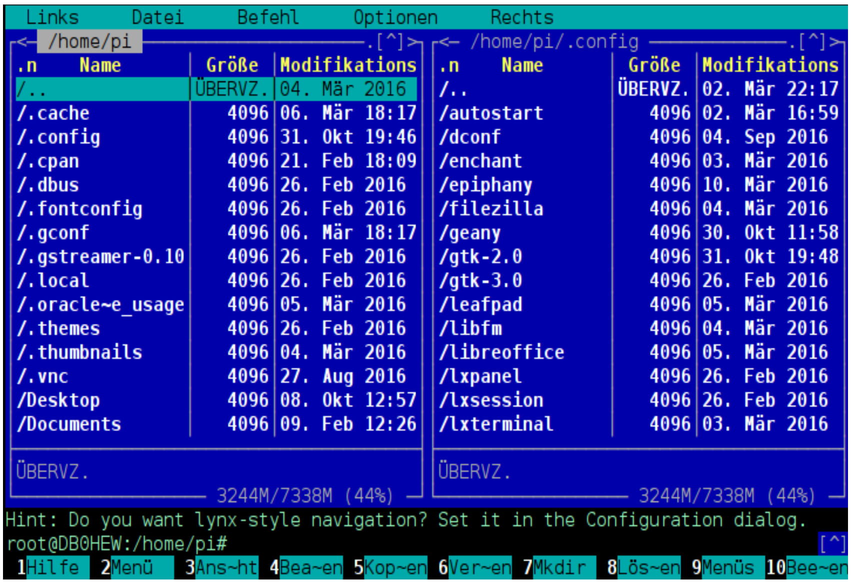


Soldering of the connection cable for the MMI board



Instead of a sound chips for audio digitization, for the program SvxLink, here the USB port is provided for receiving a USB sound card. The sound card is essential Affordable (about 2 to 3 euros) as a sound chip. It therefore appears that for the components incl. USB sound card at a cost of about 15 euros.

The small plug-on board for the Raspberry Pi includes an audio switch 4066N, four transistors for the controller and a connector for the USB sound card. The audio switch provides for the through-connection of the modulation signals for the analog transmission (SvxLink) and the digital transmission (MMDVM).



```
  Links      Datei      Befehl      Optionen      Rechts
┌<─ /home/pi ──────────────────.[^]>┐┌<─ /home/pi/.config ──────────.[^]>┐
│.n      Name        │ Größe │Modifikations││.n     Name        │ Größe │Modifikations│
│/..                 │ÜBERVZ.│04. Mär 2016 ││/..                │ÜBERVZ.│02. Mär 22:17│
│/.cache             │  4096 │06. Mär 18:17││/autostart         │  4096 │02. Mär 16:59│
│/.config            │  4096 │31. Okt 19:46││/dconf             │  4096 │04. Sep 2016 │
│/.cpan              │  4096 │21. Feb 18:09││/enchant           │  4096 │03. Mär 2016 │
│/.dbus              │  4096 │26. Feb 2016 ││/epiphany          │  4096 │10. Mär 2016 │
│/.fontconfig        │  4096 │26. Feb 2016 ││/filezilla         │  4096 │04. Mär 2016 │
│/.gconf             │  4096 │06. Mär 18:17││/geany             │  4096 │30. Okt 11:58│
│/.gstreamer-0.10    │  4096 │26. Feb 2016 ││/gtk-2.0           │  4096 │31. Okt 19:48│
│/.local             │  4096 │26. Feb 2016 ││/gtk-3.0           │  4096 │26. Feb 2016 │
│/.oracle~e_usage    │  4096 │05. Mär 2016 ││/leafpad           │  4096 │05. Mär 2016 │
│/.themes            │  4096 │26. Feb 2016 ││/libfm             │  4096 │04. Mär 2016 │
│/.thumbnails        │  4096 │04. Mär 2016 ││/libreoffice       │  4096 │05. Mär 2016 │
│/.vnc               │  4096 │27. Aug 2016 ││/lxpanel           │  4096 │26. Feb 2016 │
│/Desktop            │  4096 │08. Okt 12:57││/lxsession         │  4096 │26. Feb 2016 │
│/Documents          │  4096 │09. Feb 12:26││/lxterminal        │  4096 │03. Mär 2016 │
│ÜBERVZ.                                   ││ÜBERVZ.                                   │
└──────────────────── 3244M/7338M (44%) ─┘└──────────────────── 3244M/7338M (44%) ─┘
Hint: Do you want lynx-style navigation? Set it in the Configuration dialog.
root@DB0HEW:/home/pi#                                                        [^]
 1Hilfe  2Menü   3Ans~ht 4Bea~en 5Kop~en 6Ver~en 7Mkdir  8Lös~en 9Menüs 10Bee~en
```

The analog audio signals are connected to the USB sound card. Experience has shown that the signals via solder should be removed from the USB sound card and not with the plugs. With terminal strip J1 signals from the sound card are firmly connected.

Modification of operating a multi-mode repeater with SvxLink and MMDVM

To the terminal block J4, the USB signals are connected directly by a modified USB receptacle from Raspberry Pi. This makes for a compact construction.

the signals NF-TX, NF-RX, PTT and SQL be connected to the MMDVM on the terminal board J2.

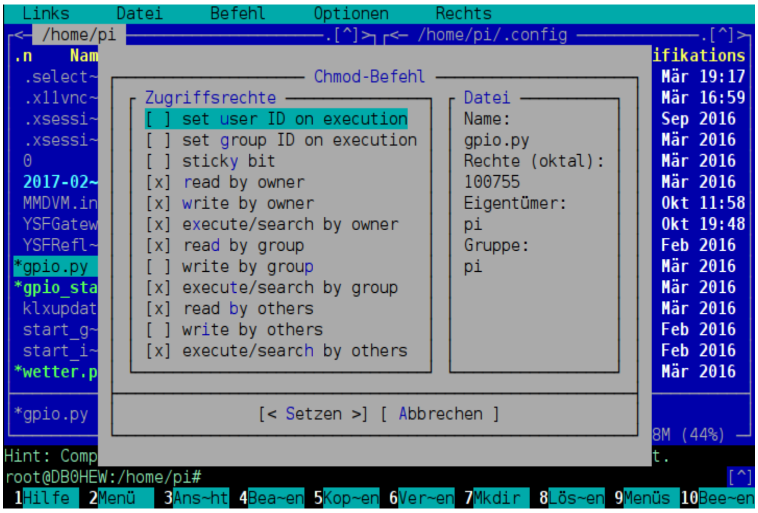
a connection to the radio technology for the signals NF-TX, NF RX, PTT and SQL is produced on the terminal block J3. In addition, two terminals are provided for the GND connections of the radio technology and the MMDVM.

Transistor Q1 controls the PTT of the radio. As a signal 0V is switched through here, which should be generally the case with many devices. The Q2 provides a level conversion from MMDVM to the analog switch to be able to control it. Q4 ensures a priority of analog side. If the MMDVM only network operation are transferred and the analog beacon runs, the input PIN is blocked by 5 4066N. Thus, the hearing of the analog subscriber is not strappaziert.

Q3 provides for control of the SQL signal for SvxLink software. If the SQL signal 0V amount, it must in which the signal is inverted svxlink.conf (see adjusting svxlink.conf file page 16).

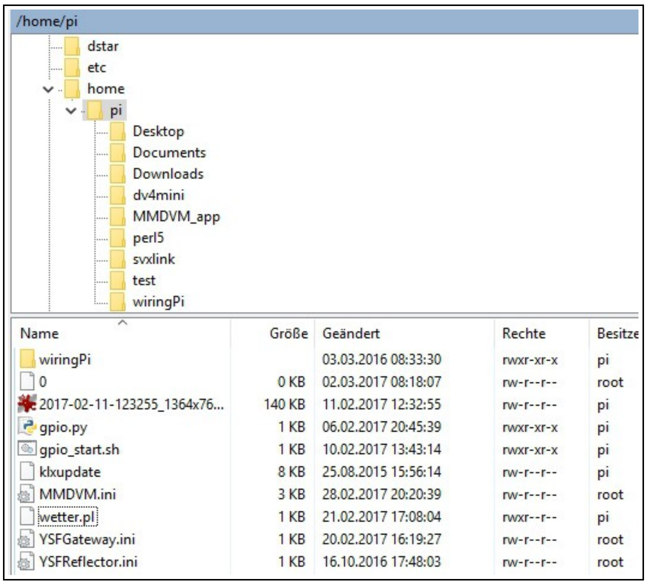
For the function a lot needs to be done to programming. On Linux, you can work at best with the program part of MC. If scripts are created in Windows, so pay attention to the CR at the end of lines. It may happen that the scripts do not work.

Whether one is now using nano or MC up to you. When the corresponding editor I have always worked with root privileges (eg ~ sudo mc).



```
  Links     Datei     Befehl     Optionen     Rechts
┌<─ /home/pi ──────────────────.[^]>┐┌<─ /home/pi/.config ─────────.[^]>┐
│.n    Nam                                                      ifikations│
│ .select~          ┌──────── Chmod-Befehl ────────┐            Mär 19:17 │
│ .x11vnc~  ┌ Zugriffsrechte ───────────┐ ┌ Datei ─────────┐    Mär 16:59 │
│ .xsessi~  │ [ ] set user ID on execution │ Name:           │   Sep 2016  │
│ .xsessi~  │ [ ] set group ID on execution│ gpio.py         │   Mär 2016  │
│ 0         │ [ ] sticky bit               │ Rechte (oktal): │   Mär 2016  │
│ 2017-02~  │ [x] read by owner            │ 100755          │   Mär 2016  │
│ MMDVM.in  │ [x] write by owner           │ Eigentümer:     │   Okt 11:58 │
│ YSFGatew  │ [x] execute/search by owner  │ pi              │   Okt 19:48 │
│ YSFRefl~  │ [x] read by group            │ Gruppe:         │   Feb 2016  │
│*gpio.py   │ [ ] write by group           │ pi              │   Mär 2016  │
│*gpio_sta  │ [x] execute/search by group  │                 │   Mär 2016  │
│ klxupdat  │ [x] read by others           │                 │   Mär 2016  │
│ start_g~  │ [ ] write by others          │                 │   Feb 2016  │
│ start_i~  │ [x] execute/search by others │                 │   Feb 2016  │
│*wetter.p  └──────────────────────────────┘ └─────────────────┘  Mär 2016  │
│*gpio.py           [< Setzen >] [ Abbrechen ]                  8M (44%) ─┘
Hint: Comp                                                      t.
root@DB0HEW:/home/pi#                                                   [^]
 1Hilfe  2Menü  3Ans~ht 4Bea~en 5Kop~en 6Ver~en 7Mkdir  8Lös~en 9Menüs 10Bee~en
```

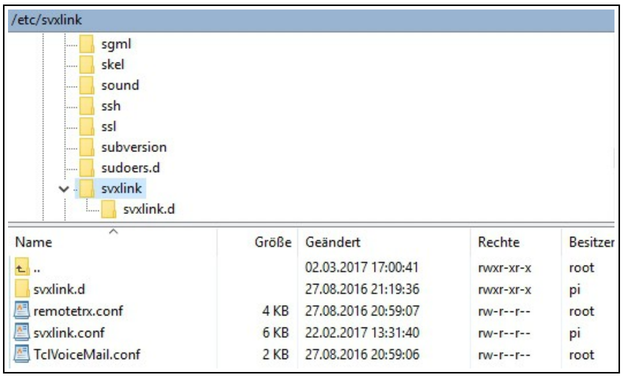
Must also be given to the assignment of rights. This is easiest to check with mc and adapt. The paths are created, depending on the installation or used image. So the little path selection is only an example.



/home/pi

```
dstar
etc
home
  pi
    Desktop
    Documents
    Downloads
    dv4mini
    MMDVM_app
    perl5
    svxlink
    test
    wiringPi
```

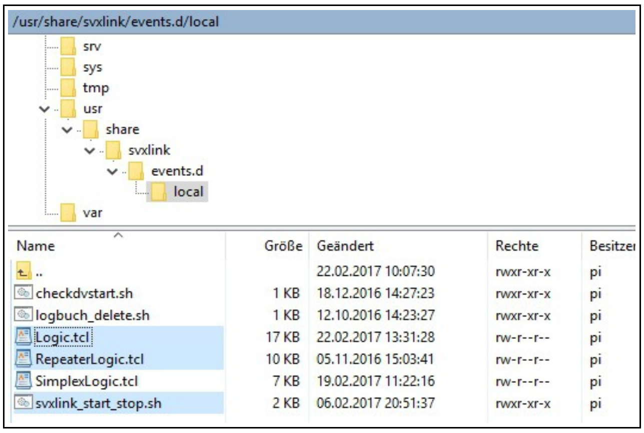
Name	Größe	Geändert	Rechte	Besitze
wiringPi		03.03.2016 08:33:30	rwxr-xr-x	pi
0	0 KB	02.03.2017 08:18:07	rw-r--r--	root
2017-02-11-123255_1364x76...	140 KB	11.02.2017 12:32:55	rw-r--r--	pi
gpio.py	1 KB	06.02.2017 20:45:39	rwxr-xr-x	pi
gpio_start.sh	1 KB	10.02.2017 13:43:14	rwxr-xr-x	pi
klxupdate	8 KB	25.08.2015 15:56:14	rw-r--r--	pi
MMDVM.ini	3 KB	28.02.2017 20:20:39	rw-r--r--	root
wetter.pl	1 KB	21.02.2017 17:08:04	rwxr--r--	pi
YSFGateway.ini	1 KB	20.02.2017 16:19:27	rw-r--r--	root
YSFReflector.ini	1 KB	16.10.2016 17:48:03	rw-r--r--	root



/etc/svxlink

```
sgml
skel
sound
ssh
ssl
subversion
sudoers.d
svxlink
  svxlink.d
```

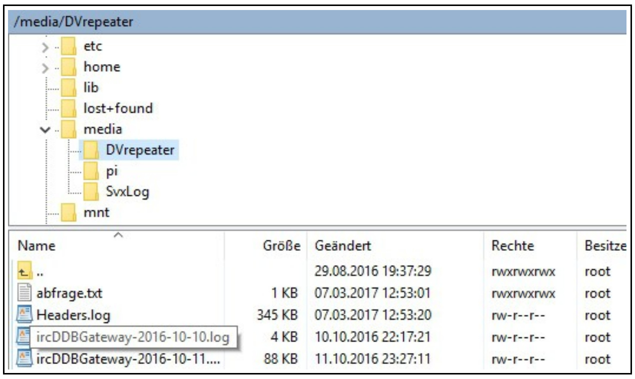
Name	Größe	Geändert	Rechte	Besitzer
..		02.03.2017 17:00:41	rwxr-xr-x	root
svxlink.d		27.08.2016 21:19:36	rwxr-xr-x	pi
remotetrx.conf	4 KB	27.08.2016 20:59:07	rw-r--r--	root
svxlink.conf	6 KB	22.02.2017 13:31:40	rw-r--r--	pi
TclVoiceMail.conf	2 KB	27.08.2016 20:59:06	rw-r--r--	root



/usr/share/svxlink/events.d/local

```
srv
sys
tmp
usr
  share
    svxlink
      events.d
        local
var
```

Name	Größe	Geändert	Rechte	Besitzer
..		22.02.2017 10:07:30	rwxr-xr-x	pi
checkdvstart.sh	1 KB	18.12.2016 14:27:23	rwxr-xr-x	pi
logbuch_delete.sh	1 KB	12.10.2016 14:23:27	rwxr-xr-x	pi
Logic.tcl	17 KB	22.02.2017 13:31:28	rw-r--r--	pi
RepeaterLogic.tcl	10 KB	05.11.2016 15:03:41	rw-r--r--	pi
SimplexLogic.tcl	7 KB	19.02.2017 11:22:16	rw-r--r--	pi
svxlink_start_stop.sh	2 KB	06.02.2017 20:51:37	rwxr-xr-x	pi



/media/DVrepeater

```
etc
home
lib
lost+found
media
  DVrepeater
  pi
  SvxLog
mnt
```

Name	Größe	Geändert	Rechte	Besitze
..		29.08.2016 19:37:29	rwxrwxrwx	root
abfrage.txt	1 KB	07.03.2017 12:53:01	rwxrwxrwx	root
Headers.log	345 KB	07.03.2017 12:53:20	rw-r--r--	root
ircDDBGateway-2016-10-10.log	4 KB	10.10.2016 22:17:21	rw-r--r--	root
ircDDBGateway-2016-10-11....	88 KB	11.10.2016 23:27:11	rw-r--r--	root

Note:

Now the change and adjustment of the various scripts follows. All that is in bold, must be added or created. The lines are to be inserted, the prefix text and the following is shown in italics.

Modification of operating a multi-mode repeater with SvxLink and MMDVM

- **downscale SvxLink in digital signal on the input**

  To this end, a Python script is required to run on the basis of the SQL signal via a GPIO9 Interupt.

  Here is the script gpio.py This script is
  located in / home / pi

```
import time
import RPi.GPIO as GPIO import os


#   Query whether DV mode via repeater def interrupt
(channel):
        time.sleep (3.0)
        os.system ( "sudo / usr / share / SvxLink / events.d / local / svxlink_start_stop.sh")

#   RPi.GPIO layout use (such as PIN numbers) GPIO.setmode
(GPIO.BOARD) GPIO.setup (21, GPIO.IN)

#   RUN interrupt
GPIO.add_event_detect (21, GPIO.FALLING, callback = Interrupt)

#   Continuous loop
while True:
        #   Waiting 100 ms
        time.sleep (0.01)
```

- **Now, a shell script is required which checks the log file from the host MMDVM**

  Paths that are marked with XXXXX must of course be adapted. An empty file **abfrage.txt** and **log.txt** must be created in the specified path. The svxlink_start_stop.sh file I have posted in /usr/share/svxlink/events.d/local. Here is the script svxlink_start_stop.sh

```
# ! / Bin / bash

#   Starts and stops SvxLink by evaluating the log files MMDVM

#   Setting a variable PIDMMH = $ (pidof

MMDVMHost) if [$ PIDMMH> "0"]; then


        Logfile = $ (date + "/ XXXXX / MMDVM-% Y-% m-% d.log") PIDFILE = $
        (pidof SvxLink) FILING TIME = "/ XXXXX / abfrage.txt" ALT = $ (tail -n
        $ 1 TIME STORAGE) LOGDAT = "/ XXXXX / log.txt" DIFF = "180"



        REQUEST = $ (($ (date +% s) - $ DIFF)) RF1 = "0"
        RF2 = "0"
```

Modification of operating a multi-mode repeater with SvxLink and MMDVM

```
#   Check whether DV mode is present on the input side
#   stop and SvxLink.

        RF1 = $ (tail -n 10 $ LOGFILE | grep -c "DMRSlotRX") RF2 = $ (tail -n 10 $
        LOGFILE | grep -c "RF") if [$ RF1 -ne "0" -o $ RF2 - ne "0"]; then

            if [ "$ (tail -n 1 $ LOGDAT)" = "$ (tail -n 1 $ LOGFILE)"!]; then
                    if [$ PIDFILE> "0"]; then sudo systemctl stop
                    svxlink.service fi

                    stat -c% Z $ LOGFILE> $ TERM STORAGE ALT =
                 $ (tail -n 1 $ TIME STORAGE) echo "STOP SvxLink"
                 fi

            tail -n 1 $ LOGFILE> $ LOGDAT fi


#   (DIFF) SvxLink start when no RF DV mode after a time.

        if [$ ALT -lt $ QUERY]; then
                stat -c% Z $ LOGFILE> $ TERM STORAGE if [$
            PIDFILE> "0"]; then
                    echo "SvxLink running" else sudo systemctl start

            svxlink.service
                    echo "START SvxLink" fi fi fi
```

- **Now just set up the GPIO's for SvyLink missing with another shell script**

  The file is named gpio_start.sh and is located in / home / pi.

```
# ! / Bin / bash

#   Create GPIO for SvxLink echo "10"> / sys / class /

gpio / export
sudo chmod o + rw / sys / class / gpio / gpio10 / direction sudo chmod o + rw /
sys / class / gpio / gpio10 / active_low sudo chmod o + rw / sys / class / gpio /
gpio10 / value echo "in"> / sys / class / gpio / gpio10 / direction echo "1"> /
sys / class / gpio / gpio10 / active_low echo "17"> / sys / class / gpio / export


sudo chmod o + rw / sys / class / gpio / gpio17 / direction sudo chmod o +
rw / sys / class / gpio / gpio17 / value echo "out"> / sys / class / gpio / gpio17
/ direction
```

- **The files created must be called at the start of Linux**

  In the file /etc/rc.local at the end the following message:

  **sudo /home/pi/gpio_start.sh sudo python
  /home/pi/gpio.py**

- **are added under crontab still has the following entry**

  Call with sudo crontab -e and following the end add:

  *** / 1 * * * * /usr/share/svxlink/events.d/local/svxlink_start_stop.sh> / dev / null 2> &**

- **modify file Logik.tcl of SvxLink**

  /usr/share/svxlink/events.d/Logik.tcl after /usr/share/svxlink/events.d/local copy If update of SvxLink the files in the local path will not be overwritten and remain the adjustments. add the following lines and paste:

```
... .... From line ~ 123
#
#   Executed When a short identification Should be sent
#       hour          -    The hour on Which this identification Occur
#       minute - The hour on Which this identification Occur
#
proc send_short_ident {{-1} {minute hour -1}} {
    global mycall; variable
    CFG_TYPE;
    TX_ON global;

#   Query whether DV mode available via the net? if {$ TX_ON

    == "0"} {
        set date [clockformat [clock seconds] Size, "-% Y-% m-% d.log"]; set time [clock seconds];

        set a [file mtime "/ XXXXX / MMDVM $ date"]; set b 0;

        set b [expr {$ time $ a}]; if {$ b <
        "120"} {
            puts "DV mode / No Bake"; return; }



    spell word $ mycall;
    if {$ CFG_TYPE # == "repeater"} {
        playMsg "Core" "repeater"; } ... ...
```

```
... ... From line ~ 141
#
#   Executed When a long identification (eg hourly) Should be sent
#       hour          -    The hour on Which this identification Occur
#       minute - The hour on Which this identification Occur
#
proc send_long_ident {} {hour minute
    global mycall;
    global loaded_modules;
    active_module global; variable
    CFG_TYPE;
    TX_ON global;

#   Query whether DV mode available via the net?
```

```
    if {$ TX_ON == "0"} {
        set date [clockformat [clock seconds] Size, "-% Y-% m-% d.log"]; set time [clock seconds];

        set a [file mtime "/ XXXXX / MMDVM $ date"]; set b 0;

        set b [expr {$ time $ a}]; if {$ b <
        "120"} {
            puts "DV mode / No Bake"; return; }


    spell word $ mycall;
    if {$ CFG_TYPE == "repeater"} {
        playMsg "Core" "repeater"; }

... ... From line ~ 335
#
#   Executed each time the squelch is opened or closed
#       RX_ID - The ID of the RX did the squelch opened / closed on
#       is_open - Set to 1 if the squelch is open or 0 if it's closed
#
proc squelch_open {} {RX_ID is_open
    variable sql_rx_id;
#
#       - - - - - MMDVM modification -----
#
  global sql_time_div;
  dvdowntime global; variable
  akttime;

  set akttime [clock seconds];

  puts "The squelch is $ is_open on RX $ RX_ID"; if {$ is_open} {

          set sql_time_div $ akttime; } if {$ is_open == 0 && ([clock seconds] - $ sql_time_div> 30) {}


      set dvdowntime [expr [clock second] +120]; }


    set sql_rx_id $ RX_ID; } ... ... ... ... From

line ~ 403


#
#   Executed once every whole minute. Do not put any code here Directly
#   Create a new function and add it to the timer tick subscriber list
#   by using the function addTimerTickSubscriber.
#
proc every_minute {} {
    variable timer_tick_subscribers;
#
#   - - - - - - - MMDVM modification -------
#
  dvmute global; dvdowntime
  global; TX_ON global;
  variable akttime;
```

```
set akttime [clock seconds]; if {$ dvmute ==

1} {
    if {$ TX_ON == 1} {
        set dvdowntime [expr [clock second] +60]; } Else {

          if {[clock second]> $ dvdowntime} {
              set dvmute 0;
              exec sudo systemctl start mmdvmhost.service &; }}}
```

```
# puts [clockformat [clock seconds] -format "% Y-% m-% d% H:% M:% S"]; foreach subscriber $
timer_tick_subscribers {
    $ Subscriber; }} ... ...
```

Done and save not forget ....

- **modify the RepeaterLogik.tcl of SvxLink**

  Copy /usr/share/svxlink/events.d/RepeaterLogik.tcl after /usr/share/svxlink/events.d/local

  add the following lines and paste:

```
... .... From row 28 ~
#
#   Executed When the software is started SvxLink
#
proc startup {} {
    logic_name global;
#
#   - - - - - - - MMDVM modification --------
#
    dvdowntime global; dvmute
    global; TX_ON global; set
    dvdowntime 0; set dvmute 0;
    set TX_ON 0;



    append func $ logic_name ":: checkPeriodicIdentify"; Logic ::
  addTimerTickSubscriber $ func; Logic :: startup; } ... ...
```

```
... ... From line ~ 169
#
#   Executed each time the transmitter is turned on or off
#
proc transmit {} {IS_ON
#
#   MMDVM modification
#
    set TX_ON $ IS_ON;
    Logic :: transmit $ IS_ON; } ... ...


... ... From line ~ 193
#
#   Executed When the repeater is activated
#        reason - The reason why the repeater which activated
#                           SQL_CLOSE             -   Open on squelch, close flank
#                           SQL_OPEN              -   Open on squelch, open flank
#                           CTCSS_CLOSE           -   Open on CTCSS squelch close flank
#                           CTCSS_OPEN            -   Open on CTCSS squelch open flank
#                           TONE                  -   Open on tone burst (always on squelch close)
#                           DTMF                  -   Open on DTMF digit (always on squelch close)
#                           MODULE                -   Open on module activation
#                           AUDIO                 -   Open on incoming audio (module or logic linking)
#                           SQL_RPT_REOPEN - Reopen on squelch after repeater down
#
proc repeater_up {reason} {
    global mycall;
    active_module global; variable
    repeater_is_up;
#
#                         - - - - - MMDVM modification ------
#
  variable uptime; dvmute
  global; downtime
  globally;

  set repeater_is_up 1;

  set uptime [clock seconds]; set downtime

  $ uptime; if {$ dvmute == 0} {


      set dvmute 1;
      set down time [expr $ uptime + 60];
        exec sudo systemctl stop mmdvmhost.service &; puts "Stop MMDVM $
     uptime $ downtime"; }


  if {($ reason! = "SQL_OPEN") && ($ reason! = "CTCSS_OPEN") &&
            ($ Reason = "SQL_RPT_REOPEN"!)} {Set now [clock
        seconds];
        if {$ now- $ Logic :: prev_ident <$ Logic :: min_time_between_ident} {
            return; } ...
   ...
```

Done and save not forget ....

Modification of operating a multi-mode repeater with SvxLink and MMDVM

- **Adjusting svxlink.conf file**

  The file is located in the / etc / SvxLink and must be adapted for your own needs. To use the GPIO's, which must be taken into account.

... ... *From line ~ 175 [x1]*

```
TYPE = Local
AUDIO_DEV = alsa: plughw: 0 = 0
AUDIO_CHANNEL
# SQL_DET = CTCSS
# SQL_DET = SERIAL
SQL_DET = GPIO
... ... ...
...
# CTCSS_BPF_HIGH = 270
# Serial_port = / dev / ttyUSB0
# SERIAL_PIN = CTS
GPIO_SQL_PIN = gpio10
# SERIAL_SET_PINS = DTR! RTS
# EVDEV_DEVNAME = / dev / input / by-id / usb SYNIC_SYNIC_Wireless_Audio-event-
... ...
```

If the SQL not exceed 0V 12V but 1 signal, the line is GPIO_SQL_PIN = gpio10 to invert as follows: **GPIO_SQL_PIN =! Gpio10.**

... ... *From line ~ 230*

```
[Tx 1]
TYPE = Local
AUDIO_DEV = alsa: plughw: 0
AUDIO_CHANNEL = 1
# PTT_TYPE = SerialPin
# PTT_PORT = / dev / ttyUSB0
# PTT_PIN = RTS
PTT_TYPE = GPIO
PTT_PIN = gpio17
# SERIAL_SET_PINS = DTR! RTS
# PTT_HANGTIME = 1000
TIMEOUT = 7200 ... ...
```

The installation of the software on the Raspberry PI can be found by following the instructions of their authors.

Happy coding and crafting wishes Peter DK4HPA

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