

R1-2020 User Manual ver 2.2

Zello EchoLink SSTV PSK31 AllStarLink Controller
Radio-Network link Controller



list

- PAGE 2 Product features / Control Principle / Controller applications / Software Control Support
- PAGE 3 Motherboard function diagram
- PAGE 4 R1 external screen function description with laser engraving
- PAGE 5 R1 connected [YAESU/ ICOM/ KENWOOD](#) Radio Description
- PAGE 6 R1 connected to YAESU [FTM-400](#) and R1 DIY connection to other radio stations
- PAGE 7 R1 connected to motoTRBO-26 pin accessory and [XPR4550](#) settings
- PAGE 8 R1 connected to moto-16 pin accessory and Serial chip driver installation
- PAGE 9 Motorola [CDM-1250](#) connected to R1 use and settings
- PAGE 10 ECHOLINK and MMSTV Connect to use
- PAGE 13 MMSTV Set reference
- PAGE 14 RConnection to use in ZeLLO
- PAGE 17 AllstarLink Connect to use
- PAGE 18 Allstarlink settings and Raspberry Pi system mirror download
- PAGE 19 R 1 Connection to use in YY: (YY is only available in Chinese Simplified version)
- PAGE 21 R1 Optional list of accessories:
- PAGE 22 Accessories list and Accessories picture
- PAGE 22 contact me...

Product features are as below :-

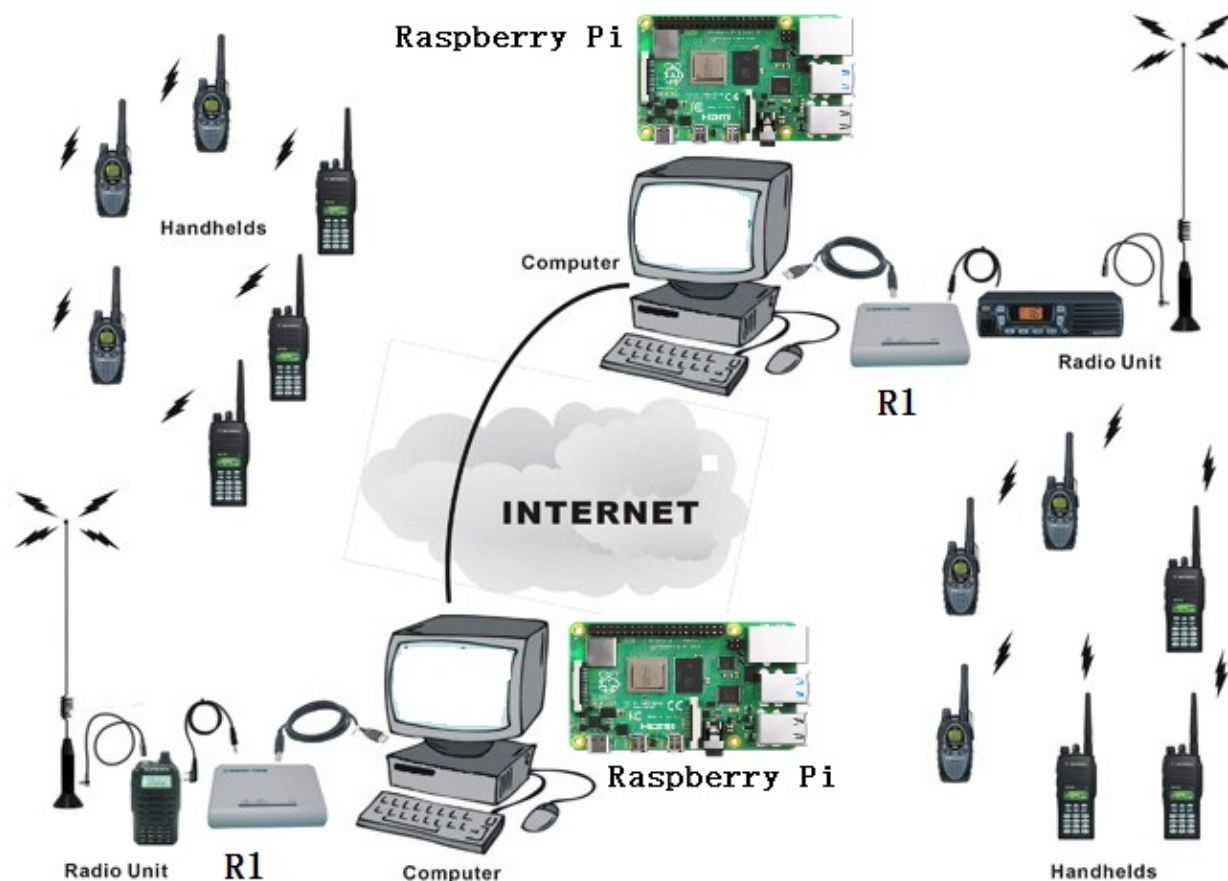
- 1, Built-in USB sound card chip, with high-quality audio input and output.
- 2, Built-in USB serial chip. E.g. launch control using **RTS**, receive control using **DSR**. (ECHOLINK User)
- 3, The built-in audio detection chip controls the radio's **PTT** button and outputs the sound to the speakers by the radio-compute-controller. (ZELLO User)
- 4, The control-software forwards the input-voice of the microphone with the detection of the **SQL** radio signal from the USB chip (ZELLO User)
- 5, [The USB-Radio Interface is compatible for AllstarLink.](#)
[GPIO Detect COS and CTCSS input . GPIO outputs and control the PTT \(ASL soundcard function\).](#)
- 6, The user's computer will not get Power/RF interference noise from the power supply from radio because the R1 has the optocouplers and the isolating transformer.
- 7, R1 introduce the of electric conductor or circuit (inductance) to isolate Power/RF interference and high-frequency radiation.
- 8, Full Metal case, shields all other interference.
- 9, Industrial design with standard production process.
- 10, LED status indicators.

Control Principle:-

In general, the Internet voice chat software, with the help of output audio controller that detects audio input from the radio PTT, hence the audio will transmit over. On the other end, once radio receive the audio, the controller detects the SQL signal through the USB control network, the voice chat software will forward to the audio to the radio. In this way, it will be on the radio-linked network.

Controller applications:-

By getting the radio link to the network, you can set up radio links or relay links and extend the range radio transceiver or repeater, therefor global radio link is achieved.



The softwares that this product supports are :-

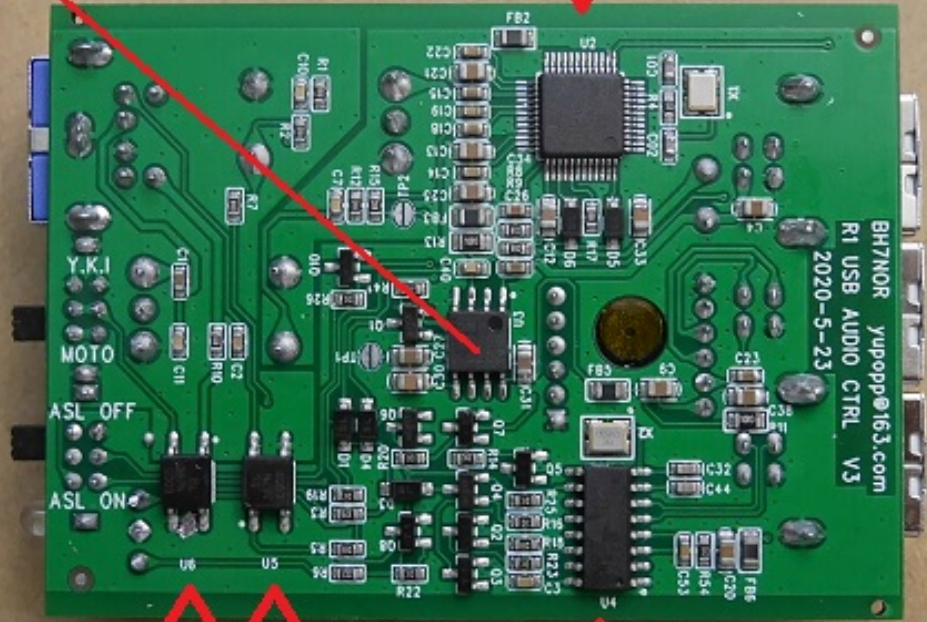
AllstarLink、 ECHOLINK, ZELLO, SSTV, psk31, SKYPE, QT, YY and other chat intercom and data transfer software.

Notes: There are some softwares are that not support on USB and control detection, thus at this time, while on the computer microphone input, we can use the software VOX function, or use the keyboard conversion software to trigger them. [Program download website: avrtx.com](http://avrtx.com) , [program name: MouseChange.zip](#),

Motherboard function diagram

**Audio Detection
Controller**

USB sound card chip



photocoupler

**CH340
USB serial chip**

USB-D Type Connection Terminal

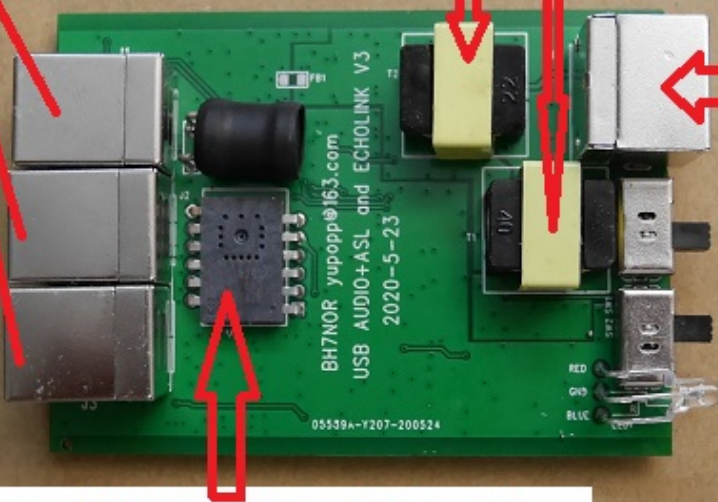
Isolation Transformer

**6 PIN Connection
Terminal**

Toggle SWitch

RX and TX LED

USB Mouse Middle Key Detection



R1 external screen function description with laser engraving



“TX: RED” and “RX:B/G” : This is LED status indicators.

When R1 controls an external radio, R1 lights up red.

When the external radio receives the signal, R1 blue light or green light.

Switch position-MOTO:

Connect 6-pin to 16-pin converter board, used by Motorola radio stations (16-pin interface) ,(Default accessories)

Connect 6-pin to 26-pin converter board, used by Motorola radio stations (26-pin interface) ,(Optional accessories)

Switch position -Y, K, I:

Direct connection, YAESU、 Kenwood、 ICOM ... Radio use (6-pin TNC interface)

Switch position-ASL OFF:

AllStarLink is disabled, the USB sound card chip stops detecting COS / CTCSS and controlling PTT.

Switch position –ASL ON:

AllStarLink is enabled, USB sound card chip detects COS / CTCSS and controls PTT.

Note2: “ASL ON”, Only use AllStarLink to connect with Raspberry Pi.

In other states, the switch position must be in ASL OFF !!!

DIN 6 Interface:

Use 6-pin Cable.R1 to connect YAESU / Kenwood / ICOM-radio;

Use 6-pin cable and "6-pin-16 pin conversion board". R1 connect Motorola-radio;

Use 6-pin cable and "6-pin-26 pin conversion board". R1 connect MotoTRBO-radio;

USB Audio:

USB-Radio Interface, Connect to PC or Raspberry Pi;

USB Detection:

USB mouse middle button detection, connect to PC when running ZELLO or YY...;

USB Serial Port:

USB serial port, connect to PC when running ECHOLINK / PSK31 / SSTV ...;

R1 Link **YAESU**/ **ICOM**/ **KENWOOD** Radio Description

Note: Before purchasing R1 to connect to YKI, first confirm the level prerequisites: TNC data port squelch level: high (activated), menu setting rate: 1200BPS. **Switch position:Y/ K/ I**

The accessory 6-pin-6-pin connecting cable attached to the machine is limited by the internal SQL signal drive capability of the radio. It includes but is not limited to the following models for connection use:

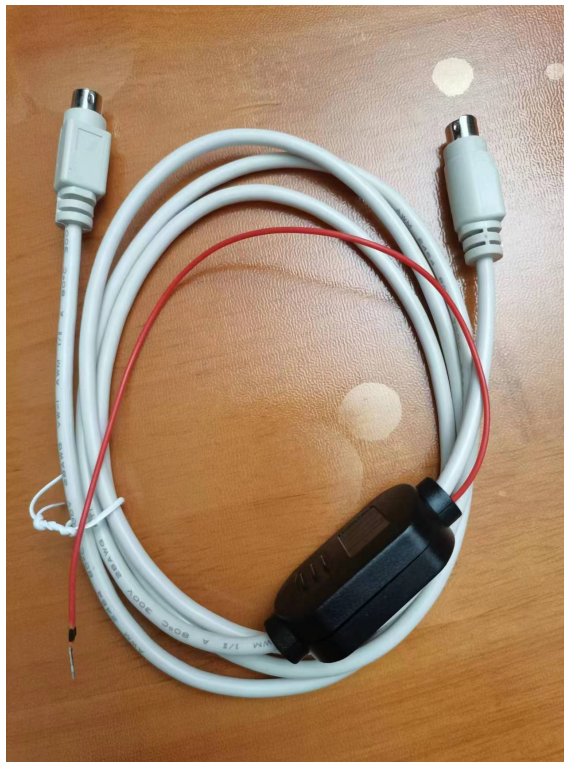
YAESU: FT-7800, FT-7900

In February 2023. Hand-made accessories 6-needle thread enhanced version, temporary number: 6P-6P-plus, including but not limited to the following models for connection use:

ICOM: IC-207H, IC-208H, IC-2720H、IC-2820H

YAESU: FT-8800、FT-8900、FT-817、FT-818、FT-847、FT-857、FT-897、 **FT-991**

KENWOOD: TM-V7A, TM-V71, TM-D700, TM-D710, TM-255, TM-455, TM-733



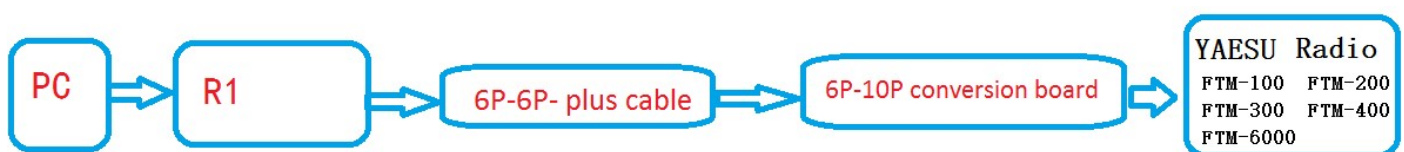
6P-6P- plus cable

Note: The red power cord is connected to the radio +13.8V power supply.

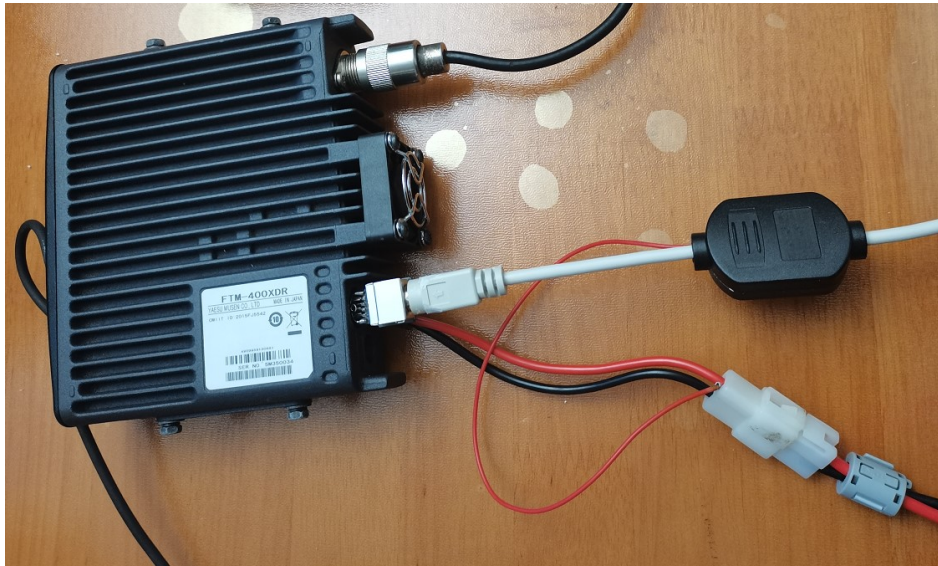
In February 2023, manual accessories 6-pin thread enhanced version, tentative number: 6P-10P conversion board, 6P-10P conversion board series accessories 6P-6P- plus cable. Including but not limited to the following models for connection use:

YAESU: FTM-100, FTM-200, FTM-300, FTM-400, FTM-6000

6P-10P conversion board series accessories 6P-6P- plus cable Description:



The following is the picture of R1 connected to FTM-400: (**R 1 Switch position:Y/ K/ I**)



YAESU FTM-400 menu "DATA" setting reference :

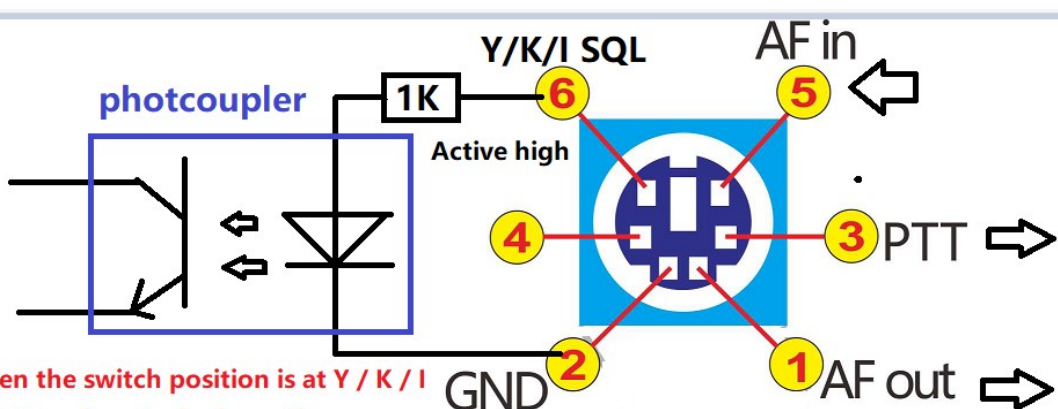
DATA	
1	COM PORT SETTING SPEED: 4800 bps / 9600 bps / 19200 bps / 38400 bps / 57600 bps OUTPUT: OFF (camera) / GPS OUT / PACKET / WAYPOINT WP FORMAT: NMEA 6 / NMEA 7 / NMEA 8 / NMEA 9 WP FILTER: ALL / MOBILE / FREQUENCY / OBJECT/ITEM / DIGIPEATER / VoIP / WEATHER / YAESU / CALL RINGER / RNG RINGER
2	DATA BAND SELECT APRS: MAIN BAND / SUB BAND / A-BAND FIX / B-BAND FIX / A=TX/B=RX / A=RX/B=TX DATA: MAIN BAND / SUB BAND / A-BAND FIX / B-BAND FIX / A=TX/B=RX / A=RX/B=TX
3	DATA SPEED APRS: 1200 bps / 9600 bps DATA: 1200 bps / 9600 bps
4	DATA SQUELCH APRS: RX BAND / TX/RX BAND DATA: RX BAND / TX/RX BAND TX: ON / OFF



Note:

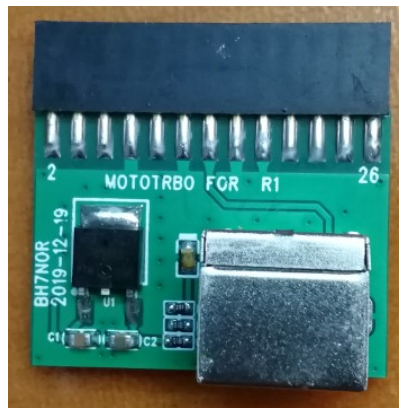
The data transmission of the TNC port of FTM-400 is enabled by default. It is disabled by the "SQL" signal level control triggered by panel "A" and "B" receive frequencies. Therefore, the reception frequency SQL level for panels "A" and "B" should be set to favor "High Threshold". If the SQL level is set too low, receiving SQL is opened due to radiation interference, which may cause port data transmission to be disabled.

*** R1 DIY connection to other radio stations ***



When the switch position is at Y / K / I
 R1 internal control schematic

6-pin to 26-pin conversion board (connected to motoTRBO-26 pin accessory):-



Below is the XPR4550 physical connection:-



Accessories Terminal Settings by CPS:

RX Audio Type : Filtered Squelch

Pin #17 : Ext Mic PTT Action Level : Low

Pin #21 : PL/Talkgroup Detect Action Level : Low

“6-pin to 26-pin conversion board” supports most Motorola mobile radios with 26-pin accessory connector including but not limit to below models:

XPR Series : XPR4300, XPR4350, XPR4380, XPR4500, XPR4550, XPR4580, XPR5350, XPR5550, XPR8300

XiR Series : XiRM8200, XiRM8220, XiRM8228, XiRM8620, XiRM8628, XiRM8660, XiRM8668, **XiR-R200 (2023 test passed, Accessory port only supports analog mode)**

DGM Series : DGM4100, DGM6100

DM Series: DM3400, DM3401, DM3600, DM3601, DM4400, DM4401, DM4600, DM4601

Note 4: There is no guarantee that all versions can be used normally, please make sure that the radio version matches your region.

Below is the picture of the 6-pin to 16-pin conversion board (the accessory to be connected to Motorola-16 pin):



The above 6-pin to 16-pin conversion board, it is for Motorola radio and to use for connection on **GM300**、**SM50**、**SM120**、**GM338**、**GM339**、**GM398**、**GM3188**、**GM3688**、**GM950I**、**CDM-1250**、**GM140**、**GM160**、**GM340**、**GM360**、**GM380**、**GM640**、**GM660**、**GM1280**、

Radio default setting :

PIN2=MIC INPUT, PIN3=PTT, PIN7=GND, PIN8=SQL (Action Level : Low), PIN11=AF OUT



6-pin to 16-pin conversion board, PCB pad description

- A**, PCB connection = 2 PIN MIC input (default setting PIN2 = MIC INPUT)
- B**, PCB connection = 5 PIN MIC input
- C**, PCB connection = connect 15 PIN and 16 PIN, RADIO built-in speaker = enable sound output; PCB not connected = no sound output from the speaker

Driver Installation:

- **USB sound card chip:** the Windows operating system has the integrated driver; hence, installation is not needed.
- **USB mouse middle key detection chip:** the Windows operating system also has the integrated driver; hence, driver installation is not needed.
- But you need to install the USB serial driver, the download link is as below:-

<http://avrtx.cn/download/USB%20driver/CH340/CH340%20DRIVER.ZIP>

<http://www.wch-ic.com/search?t=all&q=CH340> (CH341 Driver compatible)

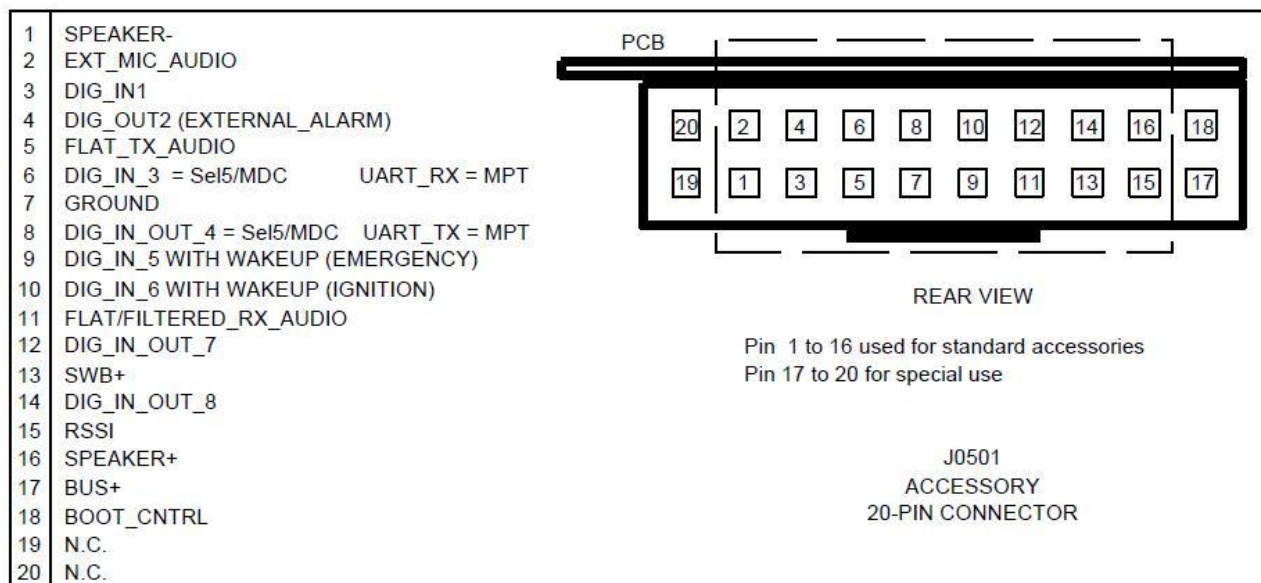


Important function **microphone** settings:

System audio management interface, do not select the **microphone to enhance** or **AGC**, if you select the option , the audio of other party will be very loud and noisy.

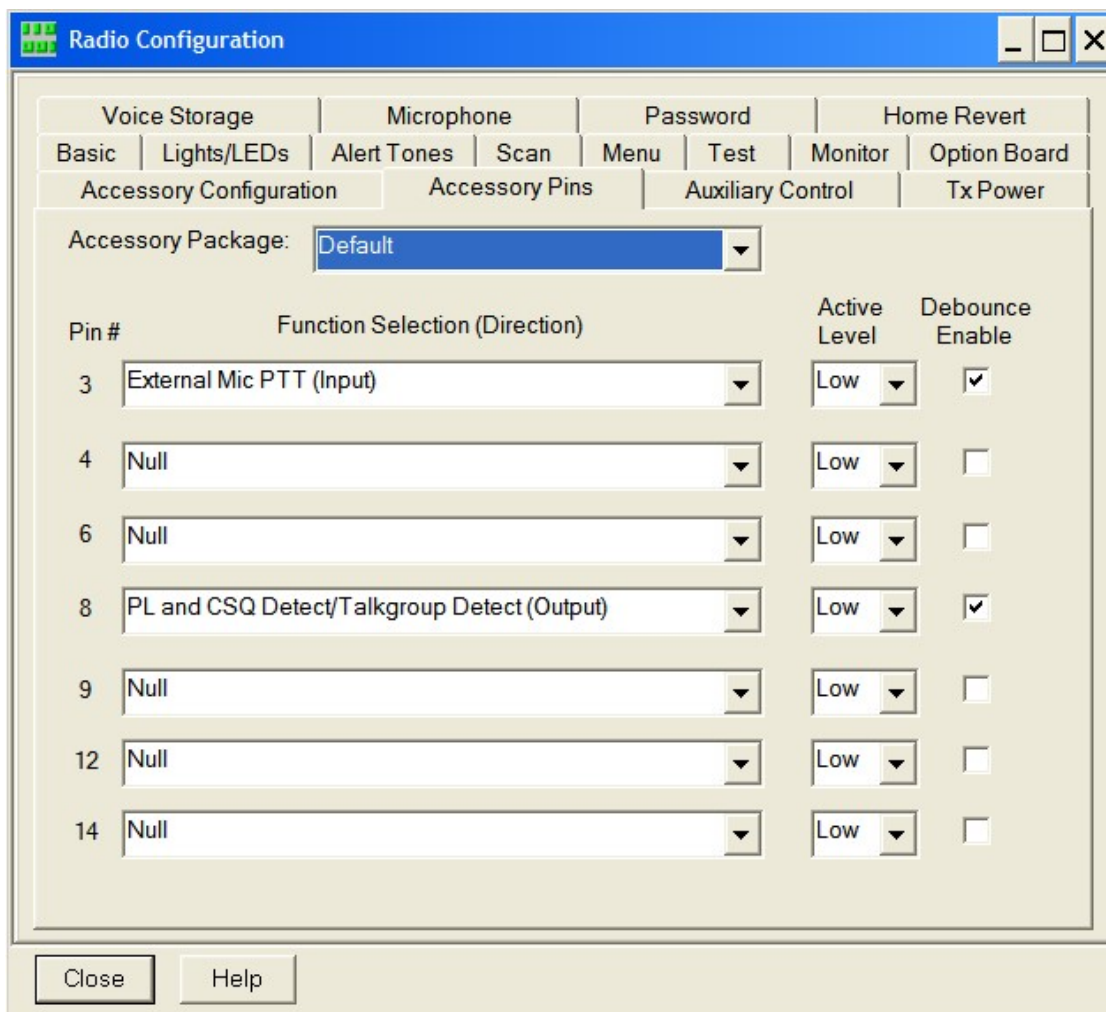
Motorola CDM-1250 connected to R1-2020 use and settings

CDM-1250 accessory connector definition:

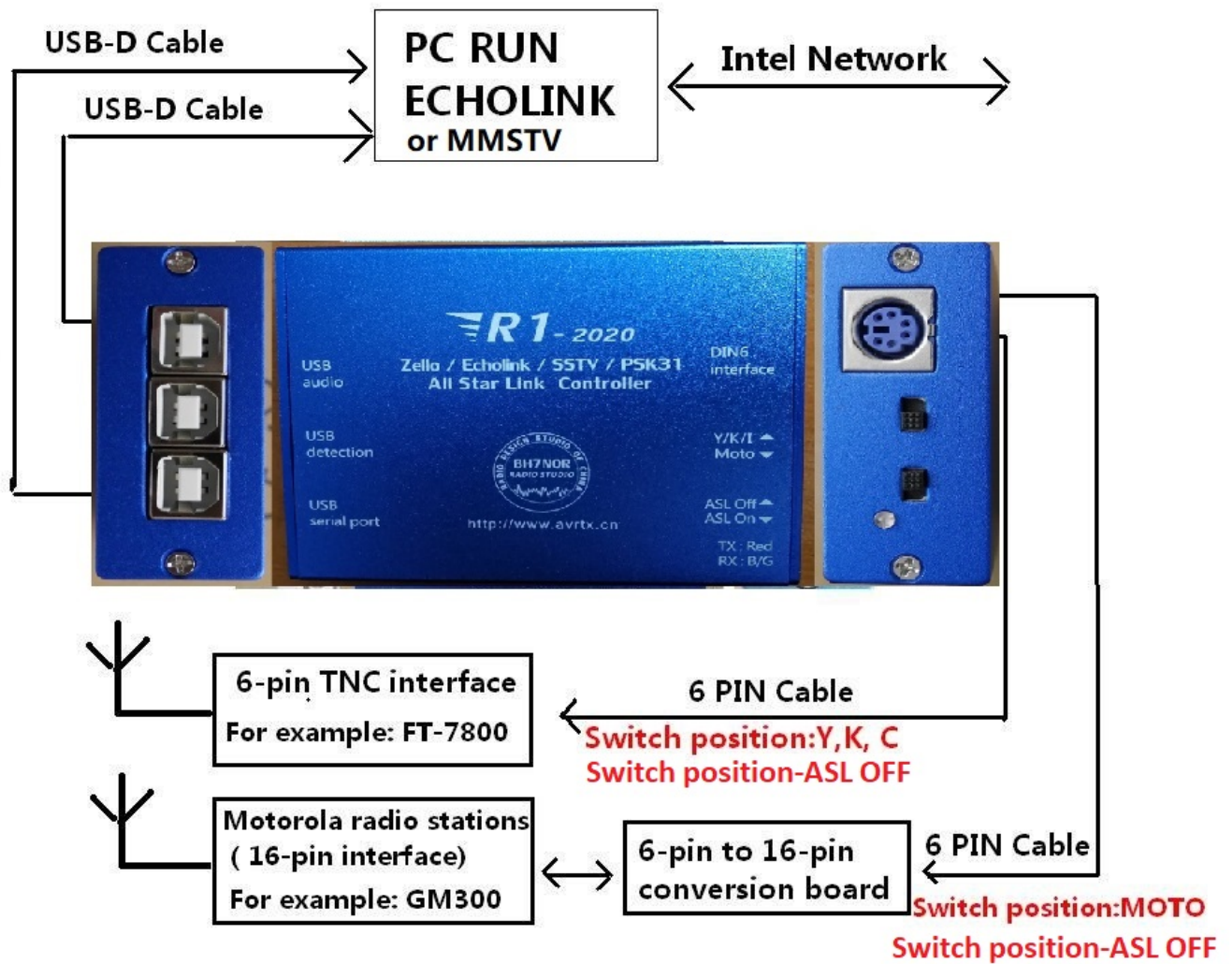


Use "6-pin to 16-pin conversion board" to insert CDM-1250 accessory connector 1-16

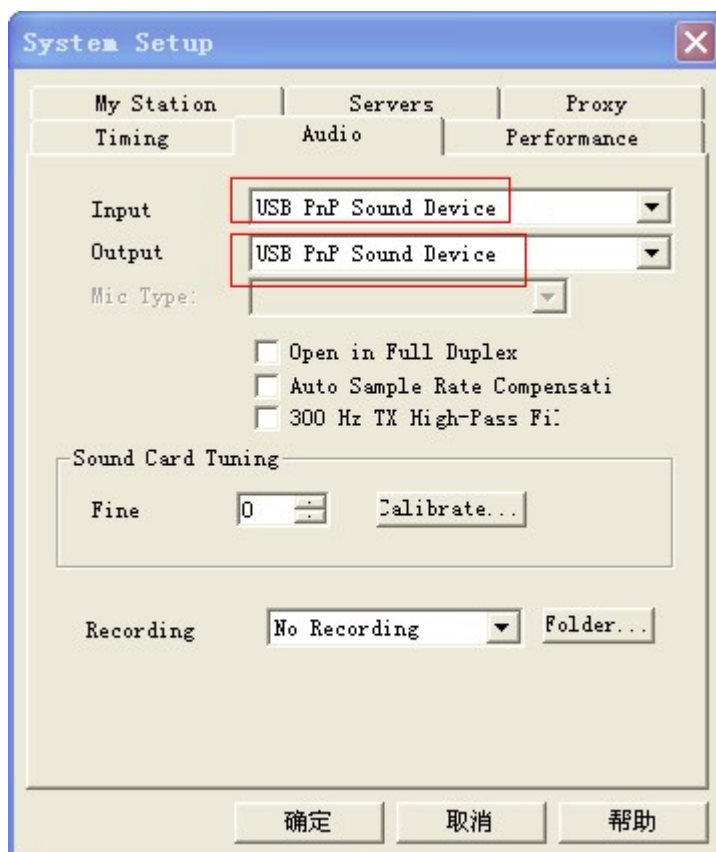
CDM-1250 "CPS" programming setting:



ECHOLINK and MMSTV Connect to use:

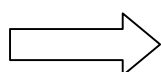


ECHOLINK Set reference



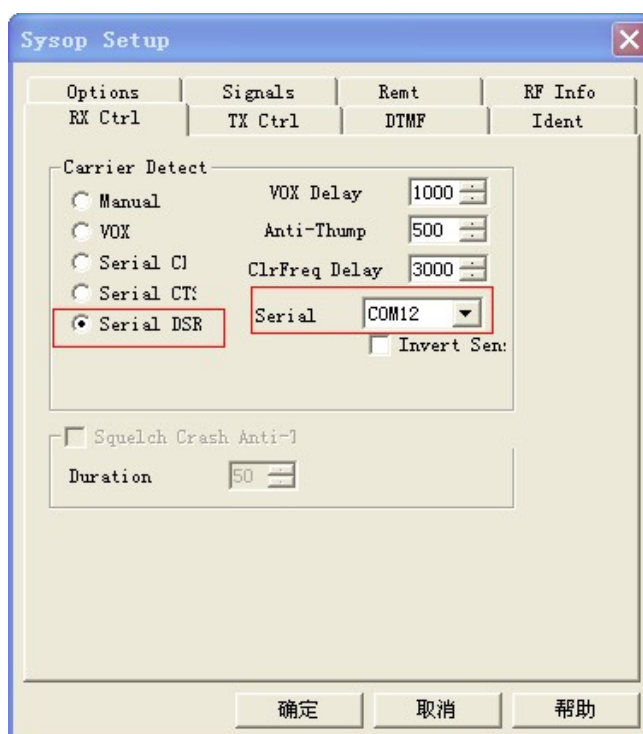
Select audio input and output as: **USB pnp sound device**

Input and output volume setting, please set to the system audio management interface



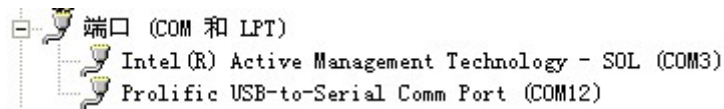
Important function **microphone** settings:

System audio management interface, do not select the **microphone to enhance** or **AGC**, if you select the option , the audio of other party will be very loud and noisy.

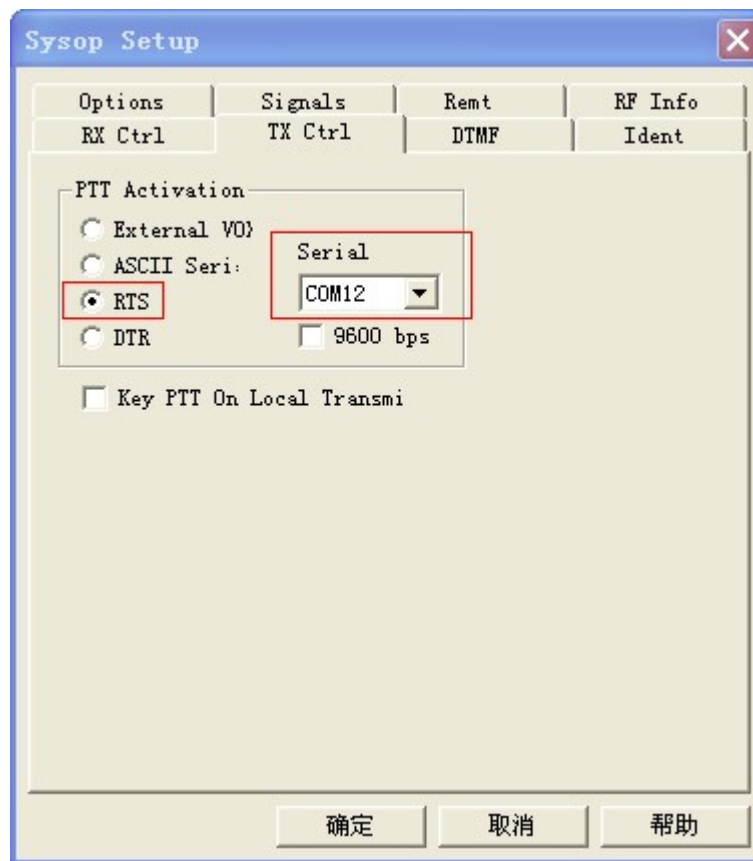


Set receive control as: **Serial DSR**

Select: **USB serial number**



USB serial number, see the hardware manager



Set the launch control as: Serial port **RTS**

Select: USB serial number

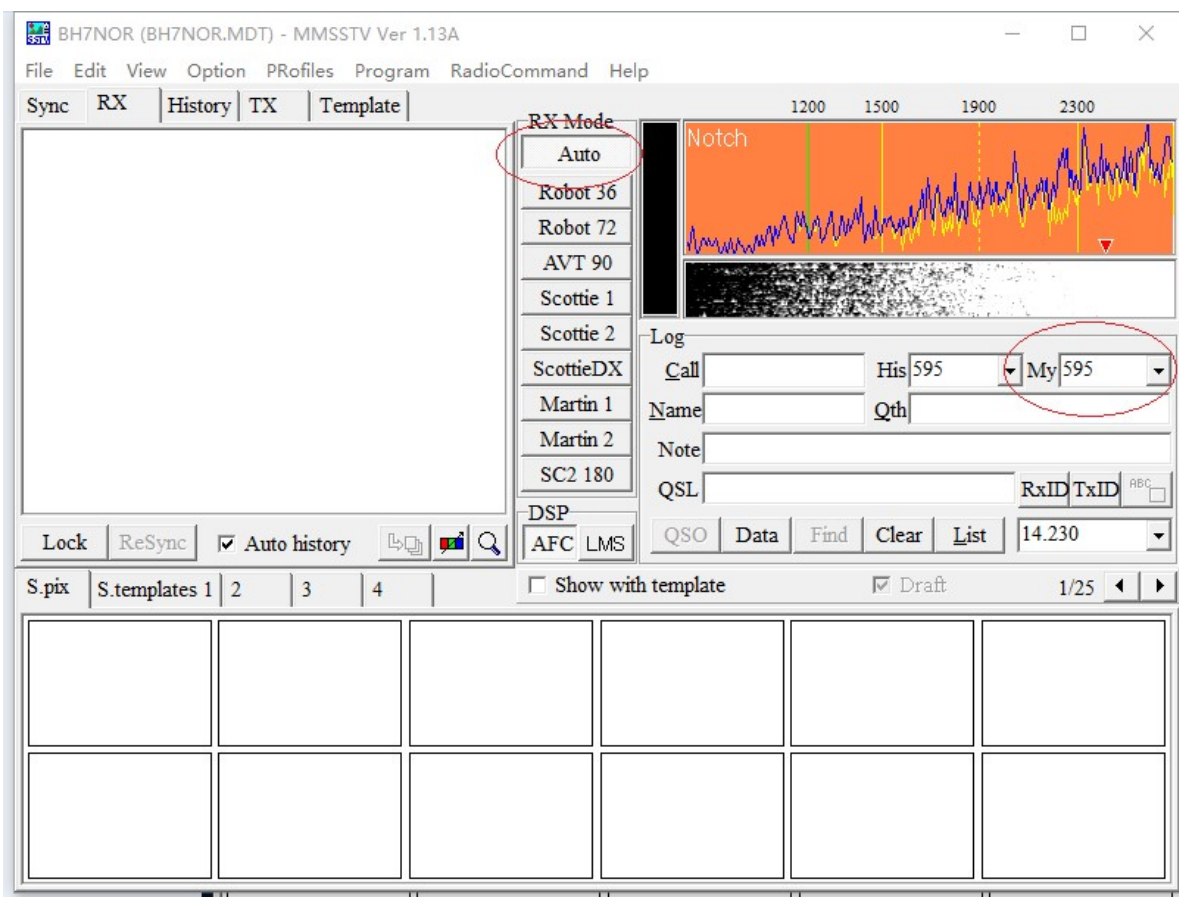
Note 5:

Regarding on this R1 appliance box, please be informed that when PC is restarted, it will become abnormal. Please power off/turn off the radio power supply first, then only restart the PC.

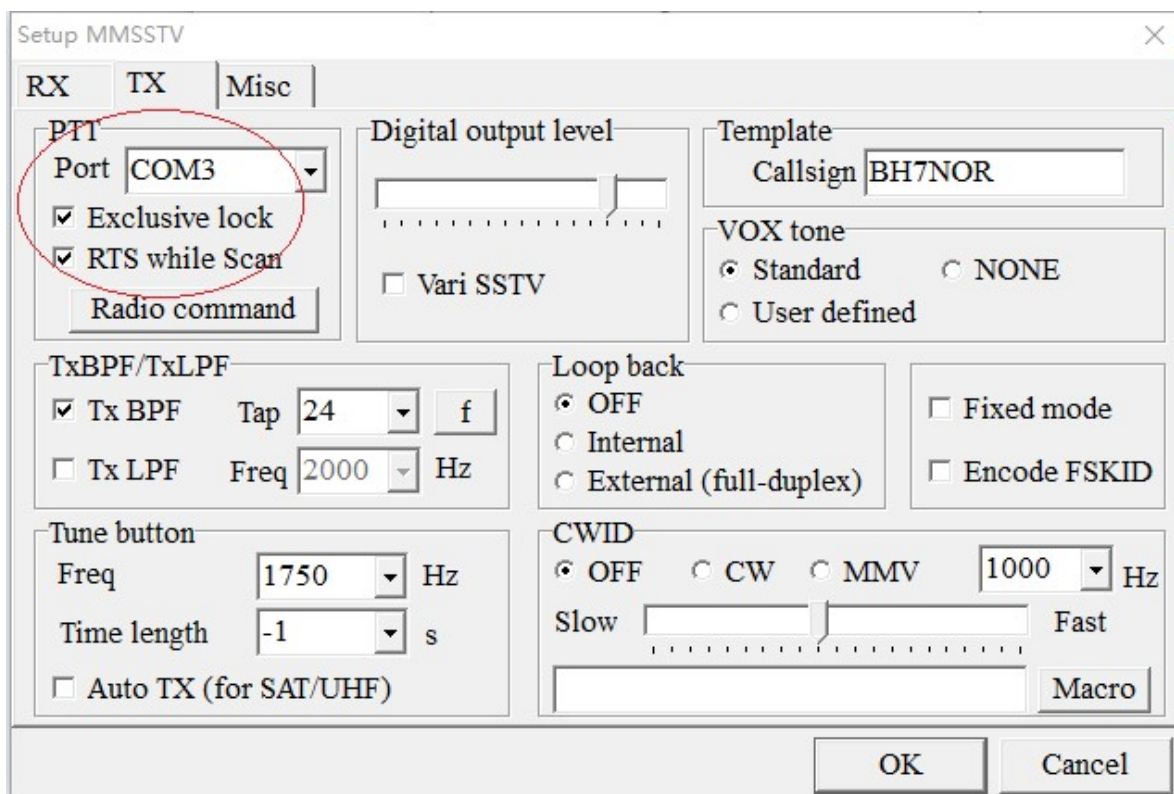
The reason for the above problem is related to the driving control principle of the R1 and PC. There is no solution on this problem yet.

For the extra info, if the R1 control encounter abnormality after the PC turned off, please set "PC shutdown = USB no power supply" in the PC BIOS.

MMSTV Set reference



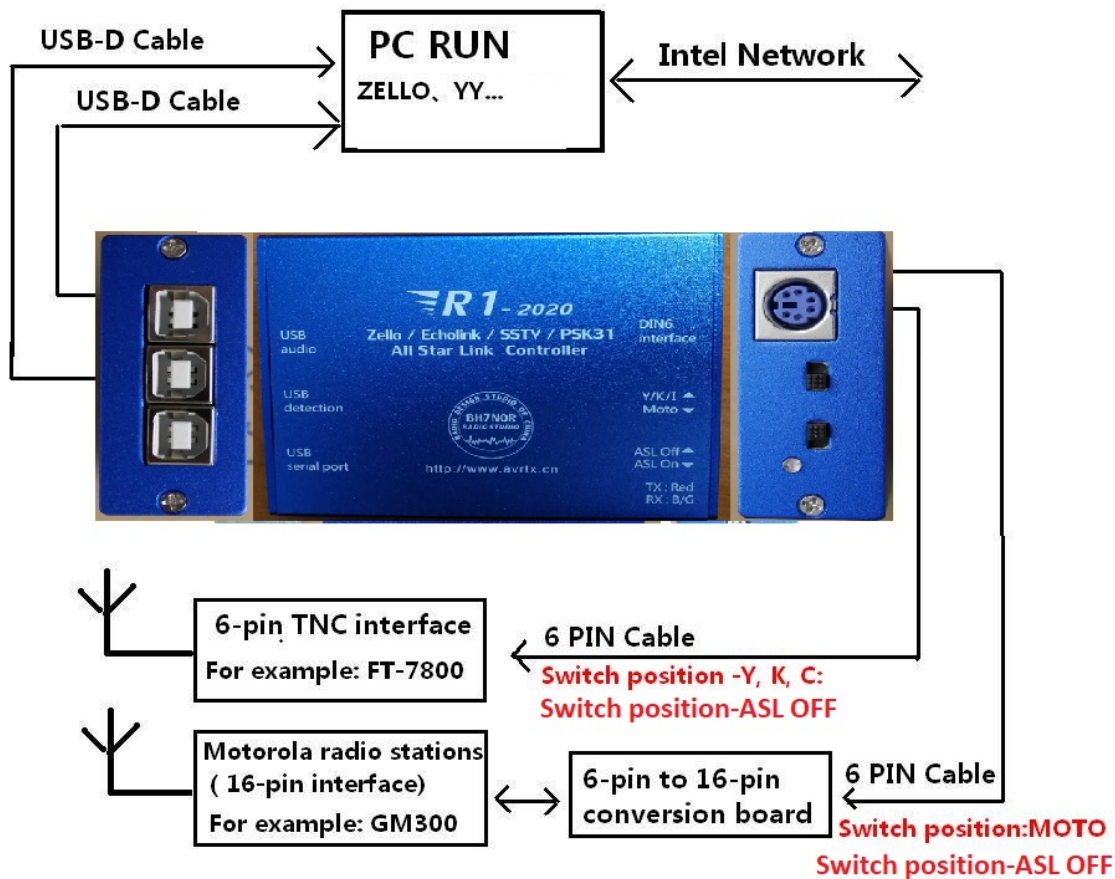
Select RX MODE : AUTO



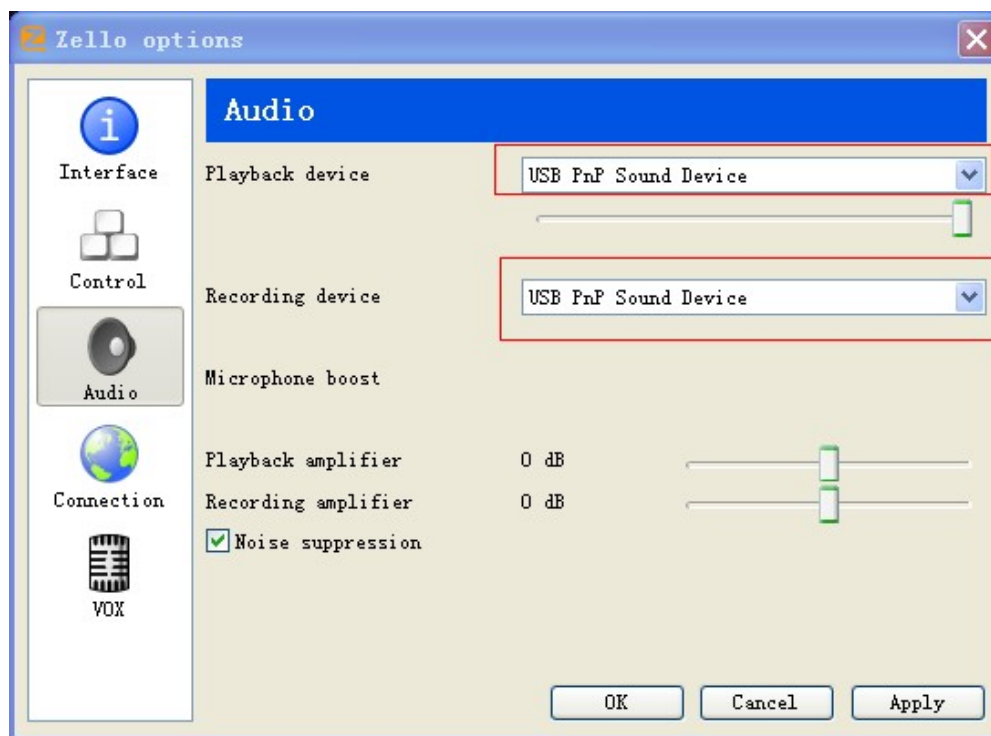
Select: USB serial COM number, Select Exclusive Lock and RTS While Scan

Below is the connection to use in ZeLLO:-

!!! Important Note: Since the new version of ZELLO does not support the middle mouse button mode, you can use the "VOX" mode. Or use mouse-to-keyboard software, the software name is "MouseChange". Convert "middle mouse button" to: keyboard value "F7", minimize the window and run it. Program MouseChange download website: avrtx.cn.



The “set reference” for ZeLLO:-

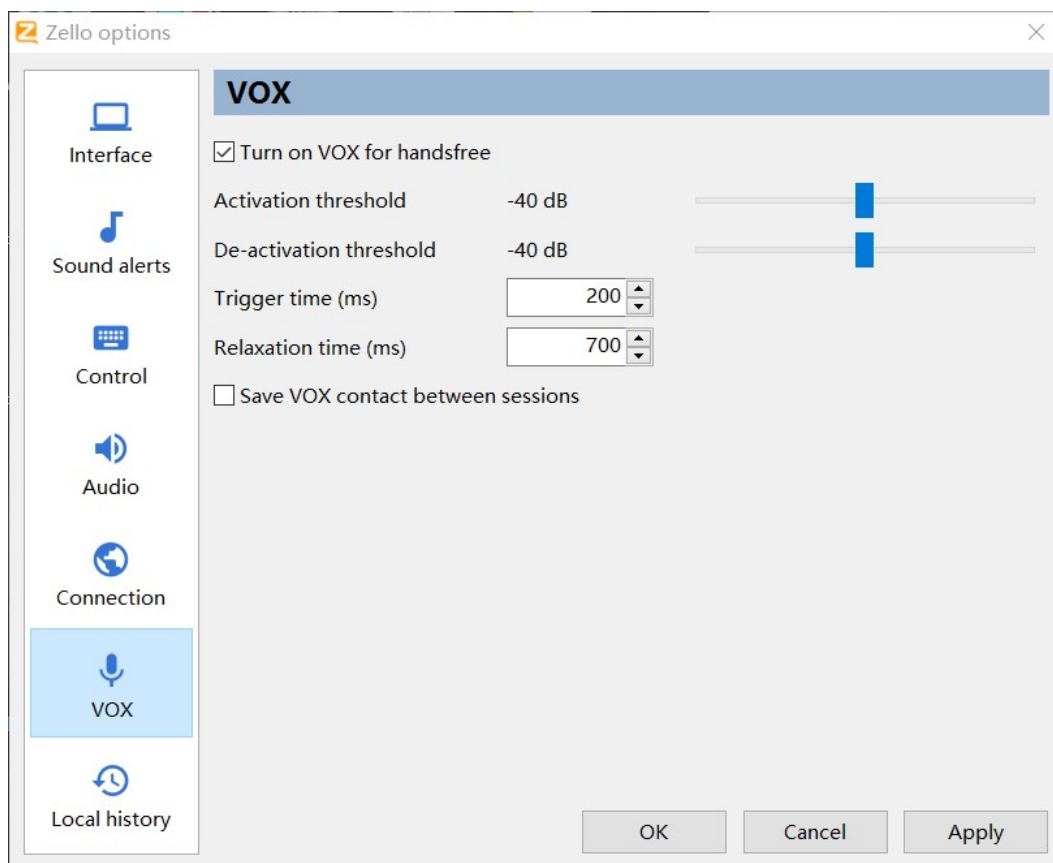


zello ver 1.38

1, set the audio on both input and output to **USB PnP Sound Device** (windows operating system already has the integrated driver)

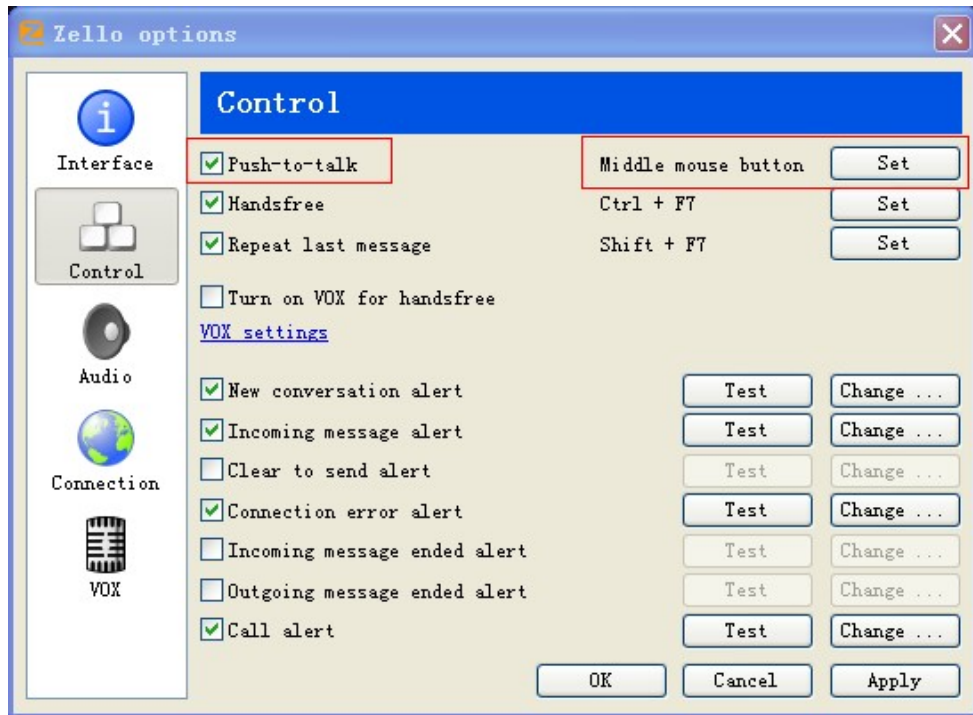


Important function microphone settings: System audio management interface, do not select the **microphone to enhance** or **AGC**, if you select the option , the audio of other party will be very loud and noisy.



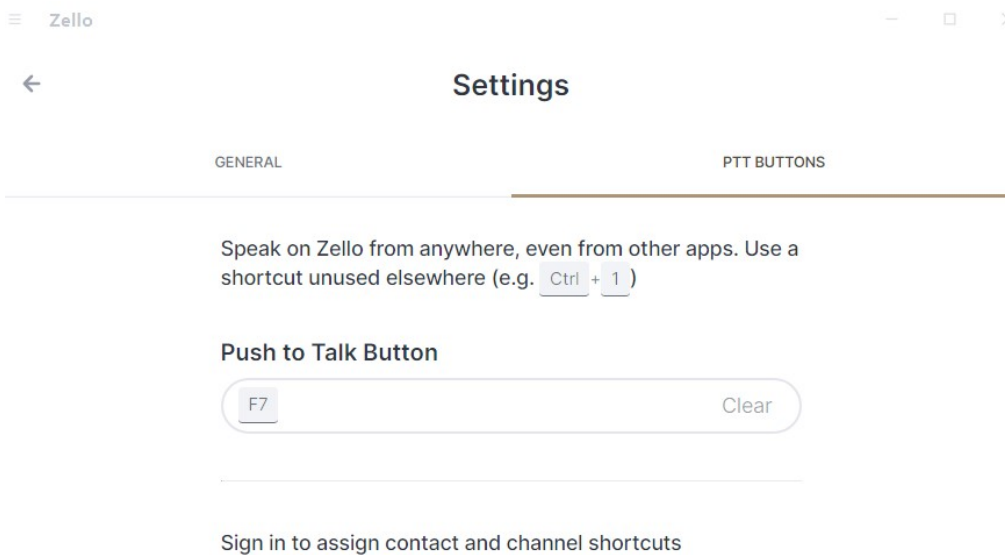
zello ver 2.6

2-A, Select ZeLLO detection as "VOX Enabled"



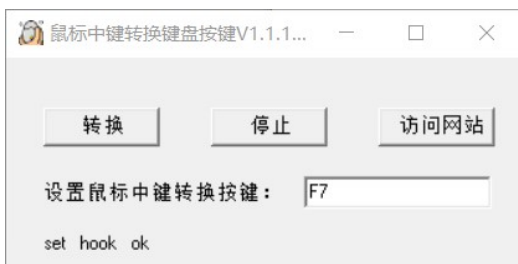
zello ver 1.38

2-B, Set Push to talk on ZELLO to “Middle Mouse Button”



zello ver 15.0.1

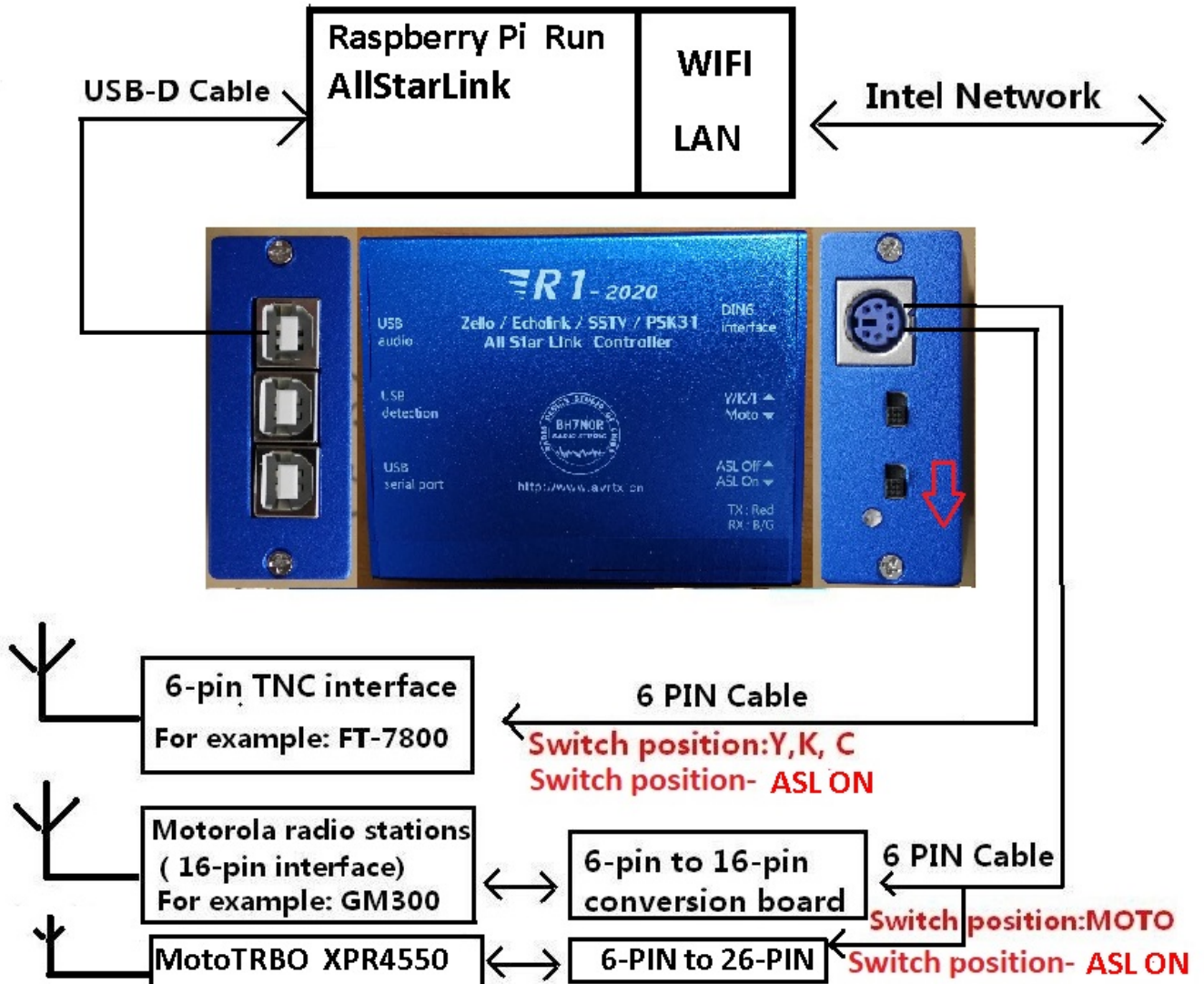
Note: The new version of ZELLO does not support the middle mouse button mode, you need to run "MouseChange". Convert the "middle mouse button" to: keyboard value "F7". The window is minimized to run. At this time, R1 internal detection will be converted to "F" 7 to trigger ZELLO forwarding. Program MouseChange download website: avrtx.cn



This is a screenshot of the mouse to keyboard settings

Using the same settings, you can also control other keyboard trigger software, for example: ESChat...

AllstarLink Connect to use:

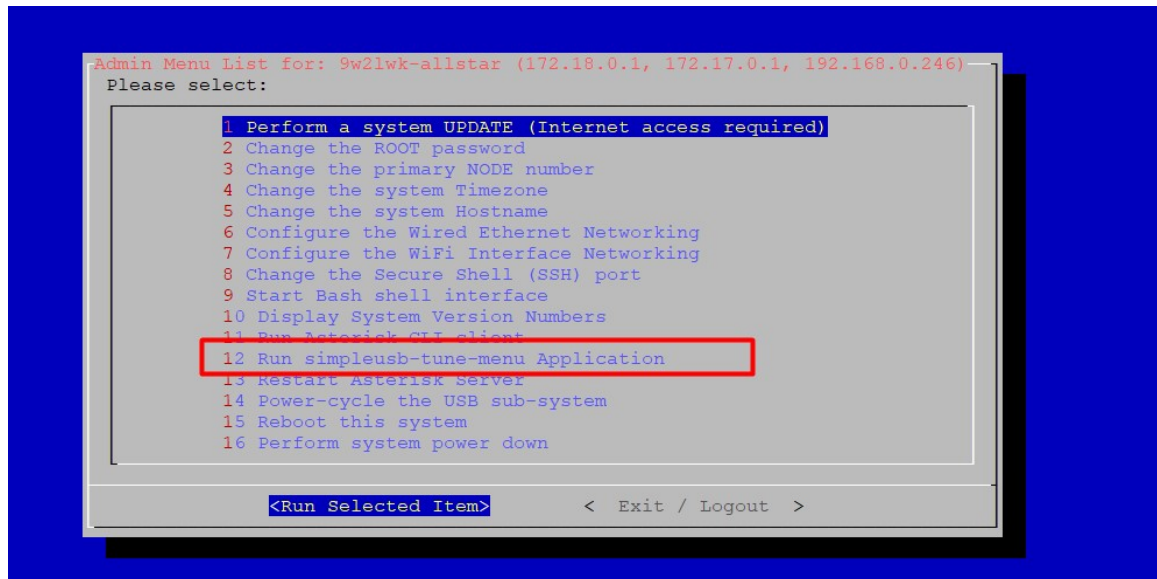


Allstarlink settings and Raspberry Pi system mirror download URL:

<https://allstarlink.org/> <https://hamvoip.org/>

allstarlinkr image download: <https://hamvoip.org/#download>

R1 hardware related settings of allstarlink:



just follow the below setting like mine

```
Starting simpleusb-tune-menu. Please type: 0<ENTER>
when done and you will return to the admin menu.

Active simpleusb device stanza: [usb] -----
S) Select active USB device stanza
V) View COS, CTCSS and PTT Telemetry using real-time display
P) Print Current Parameter Values ---- 2) Set Rx Voice Level (using display)
3) Set Transmit A Level ---- 4) Set Transmit B Level
5) Set Tx Audio Level Method (currently LINEAR)
7) Set Transmit DSP Level
B) Toggle RX Boost Mode (currently Disabled)
C) Toggle Echo Mode (currently Disabled)
D) Flash (Toggle PTT and Tone output several times)
E) Toggle Transmit Test Tone/Keying (currently Disabled)
K) Manually key COS (currently Unkeyed)
F) Toggle PRE-emphasis Mode (currently Disabled)
G) Toggle DE-emphasis Mode (currently Disabled)
H) Toggle PLfilter Mode (currently Enabled)
Q) Toggle DCSfilter Mode (currently Disabled)
I) Toggle PTT Mode (currently active LOW)
J) Change COSFROM Mode (currently "usbinvert")
L) Change CTCSSFROM Mode (currently "no")
M) Change RXONDELAY value (currently "0")
N) Change RXAUDIODELAY value (currently "0")
W) Write (Save) Current Parameter Values
0) Exit Menu

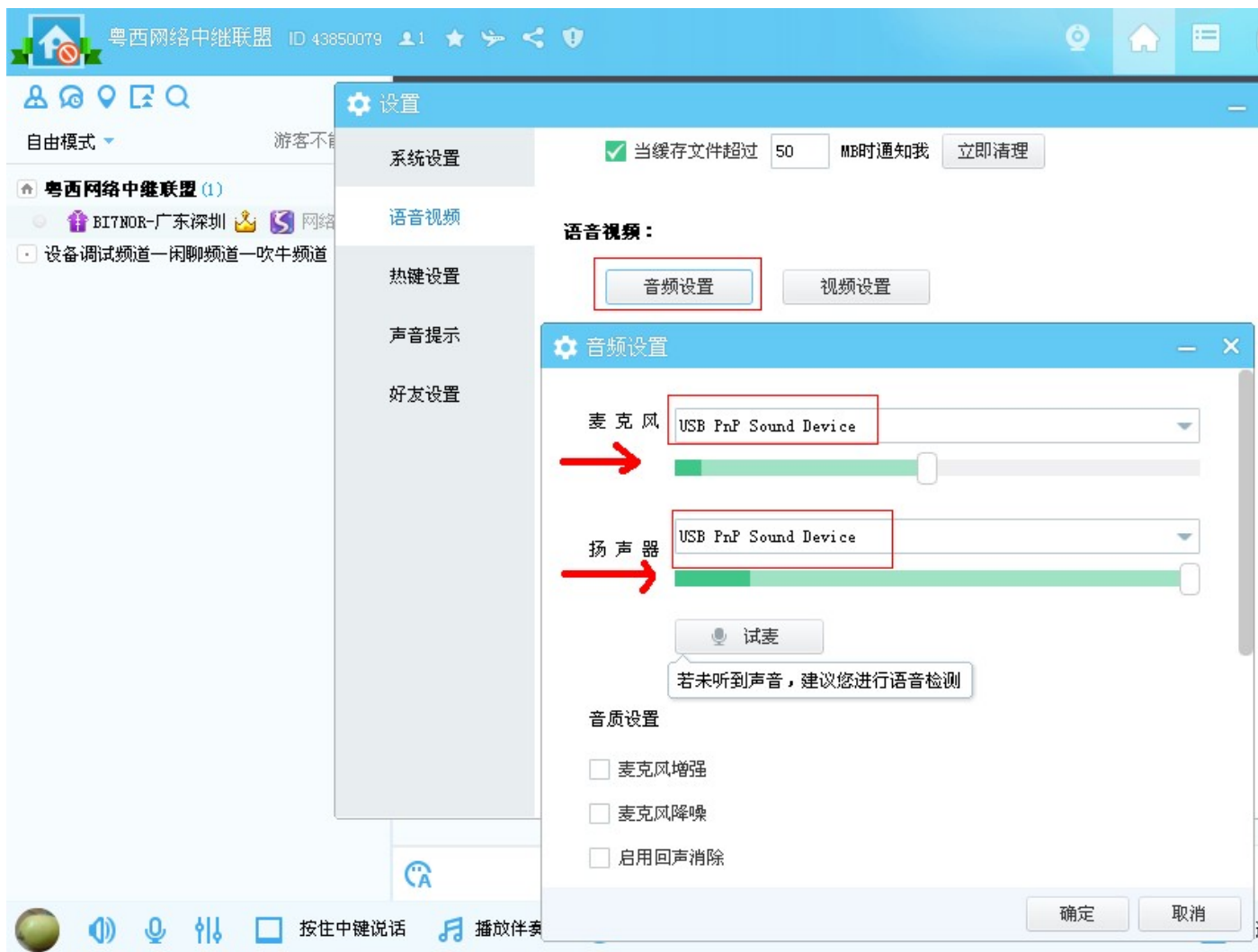
Please enter your selection now: █
```

and make sure you have the toggle here:-

```
[root@9w2lwk-allstar:~]# lsusb
Bus 001 Device 078: ID 1589:0a4d Trust International B.V. Optical Mouse
Bus 001 Device 077: ID 0d8c:013a C-Media Electronics, Inc.
Bus 001 Device 076: ID 1a40:0101 Terminus Technology Inc. Hub
Bus 001 Device 004: ID 1a86:7523 QinHeng Electronics HL-340 USB-Serial adapter
Bus 001 Device 003: ID 0424:ec00 Standard Microsystems Corp. SMC9512/9514 Fast Ethernet Adapter
Bus 001 Device 002: ID 0424:9514 Standard Microsystems Corp. SMC9514 Hub
Bus 001 Device 001: ID 1d6b:0002 Linux Foundation 2.0 root hub
[root@9w2lwk-allstar:~]# █
```

Note:For help with connecting Allstarlink to R1, please contact 9W2LWK, email: 9w2lwk@gmail.com

Connection to use in YY: (YY is only available in Chinese Simplified version)



On the YY channel, select both the microphone input and speaker output to “USB PnP Sound Device” on the system audio management interface, please do not select **microphone enhancement or AGC**, if you select the option, the audio of other party will be very loud and noisy



If you want to set the external radio to receive the audio sent through the network from each other, choose to press the mouse to speak: the middle button (selected the green point, and click the middle mouse button).

External radio transmission is the internal default control, it does not need to set.
Tip: The middle mouse button control function should be reserved for YY software. In order to avoid mis-forwarding network communications, other software can not overlaps/reuse/override the middle mouse button.



The last two suggestions are to disable the voice prompt function. This is to avoid miss trigger on communication.

R1 Optional list of accessories:

packages	main parts	Optional cable	conversion board	Radio Support List
A16	R1 * 1 PCS +USB-D cable * 2 PCS	6-pin cable	6-pin to 16-pin conversion board	Motorola: GM300、SM50、SM120、GM338、GM339、GM398、GM3188、GM3688、GM950I、CDM-1250、GM140、GM160、GM340、GM360、GM380、GM640、GM660、GM1280
A26	R1 * 1 PCS +USB-D cable * 2 PCS	6-pin cable	6-pin to 26-pin conversion board	Motorola: XPR Series : XPR4300,XPR4350,XPR4380, XPR4500, XPR4550, XPR4580, XPR5350, XPR5550, XPR8300 XiR Series : XiRM8200, XiRM8220, XiRM8228, XiRM8620, XiRM8628, XiRM8660, XiRM8668, XIR-R8200 DGM Series : DGM4100, DGM6100 DM Series: DM3400, DM3401, DM3600, DM3601, DM4400, DM4401, DM4600, DM4601
B10P	R1 * 1 PCS +USB-D cable * 2 PCS	6P-6P-plus cable		ICOM: IC-207H, IC-208H, IC-2720H、IC-2820H YAESU: FT-7800、 FT-7900、 FT-8800、 FT-8900、 FT-817、 FT-818、 FT-847、 FT-857、 FT-897、 FT-991 KENWOOD: TM-V7A, TM-V71, TM-255, TM-455, TM-733, TM-D700, TM-D710
	R1 * 1 PCS +USB-D cable * 2 PCS	6P-6P-plus cable	6P-10P conversion board	YAESU: FTM-100, FTM-200, FTM-300, FTM-400, FTM-6000

Sales package A16: R1 * 1PCS + USB-D cable * 2PCS + 6-pin cable * 1PCS + 6-pin to 16-pin conversion board * 1PCS

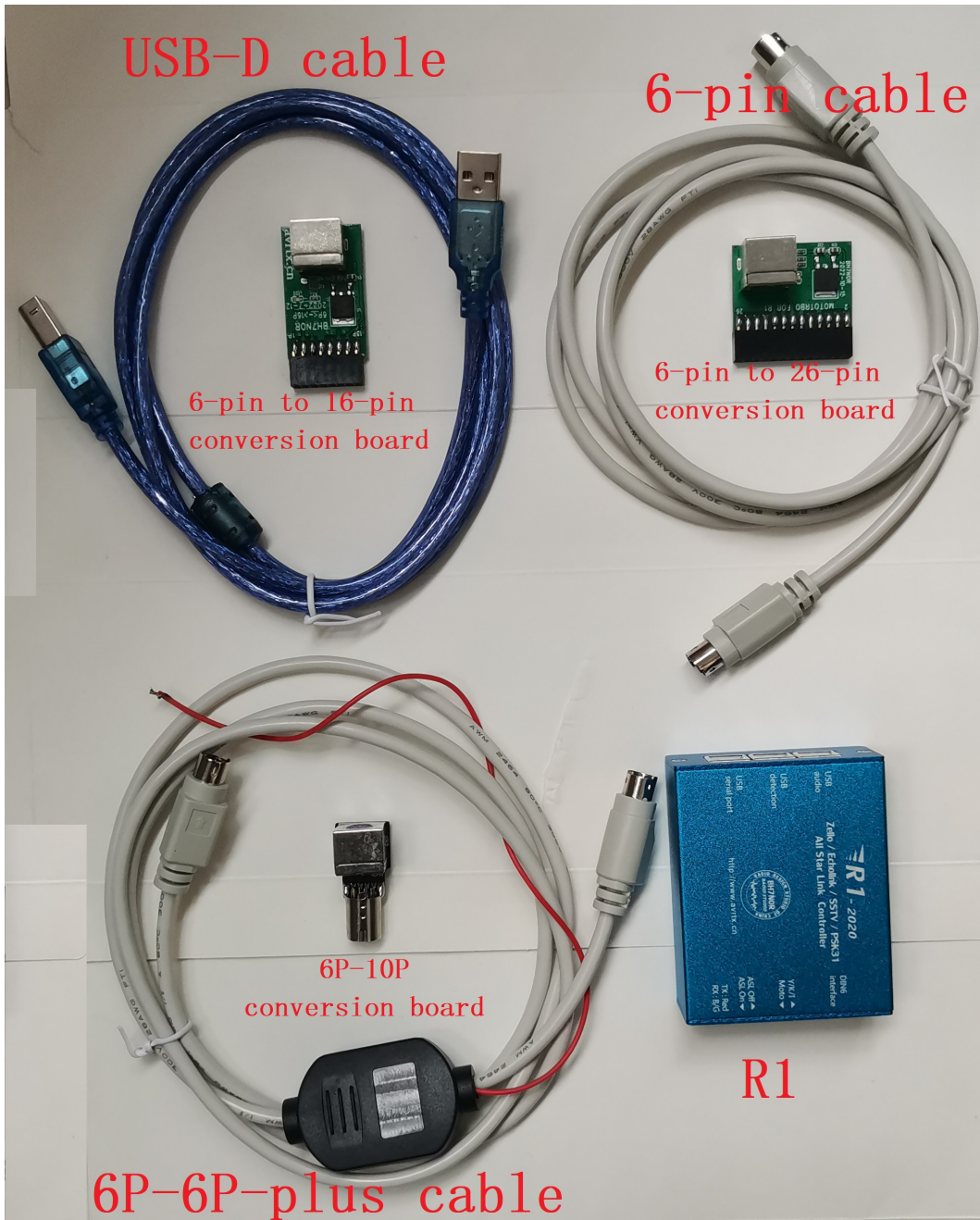
Sales package A26: R1 * 1PCS + USB-D cable * 2PCS + 6-pin cable * 1PCS + 6-pin to 26-pin conversion board * 1PCS

Sales package B10P: R1 * 1PCS + USB-D cable * 2PCS + 6P-6P-plus cable * 1PCS + 6P-10P conversion board * 1PCS

NOTE:The following list is not for sale "packages *", only describes the addition of CT-141cable to R1 which can be connected to FTM-350

R1 * 1 PCS +USB-D * 2 PCS	YAESU:CT-141 Cable	Note:I don't have CT-141 Cable, need to buy from YAESU	YAESU: FTM-350
------------------------------	--------------------	---	----------------

Accessories list :



Sales package :

package A16: R1 * 1PCS + USB-D cable * 2PCS + 6-pin cable * 1PCS + 6-pin to 16-pin conversion board * 1PCS

package A26: R1 * 1PCS + USB-D cable * 2PCS + 6-pin cable * 1PCS + 6-pin to 26-pin conversion board * 1PCS

package B10P: R1 * 1PCS + USB-D cable * 2PCS + 6P-6P-plus cable * 1PCS + 6P-10P conversion board * 1PCS

Manual Download URL: <http://avrtx.cn/>

Contact E-mail: yupopp@163.com yupopp@gmail.com

manufacture: BH7NOR (Old callsign: BI7NOR) Manual Fix: 9W2LWK