

# R1-2023 User Manual ver 1.0

**Zello EchoLink SSTV PSK31 AllStarLink Controller**  
**Radio-Network link Controller**



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## Product features are as below :-

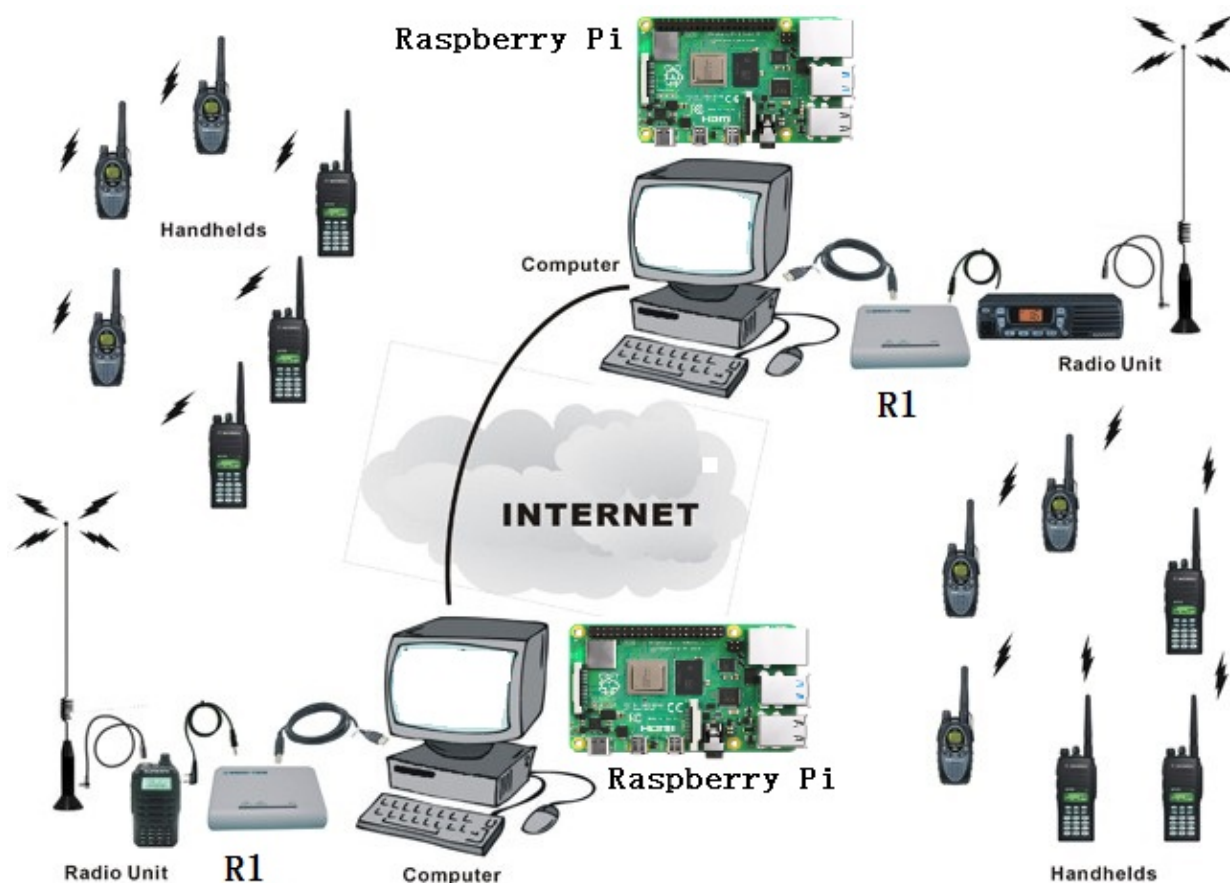
- 1, Built-in USB sound card chip, with high-quality audio input and output.
- 2, Built-in USB serial chip. E.g. launch control using **RTS**, receive control using **DSR**. (ECHOLINK **User**)
- 3, The built-in audio detection chip controls the radio's **PTT** button and outputs the sound to the speakers 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.



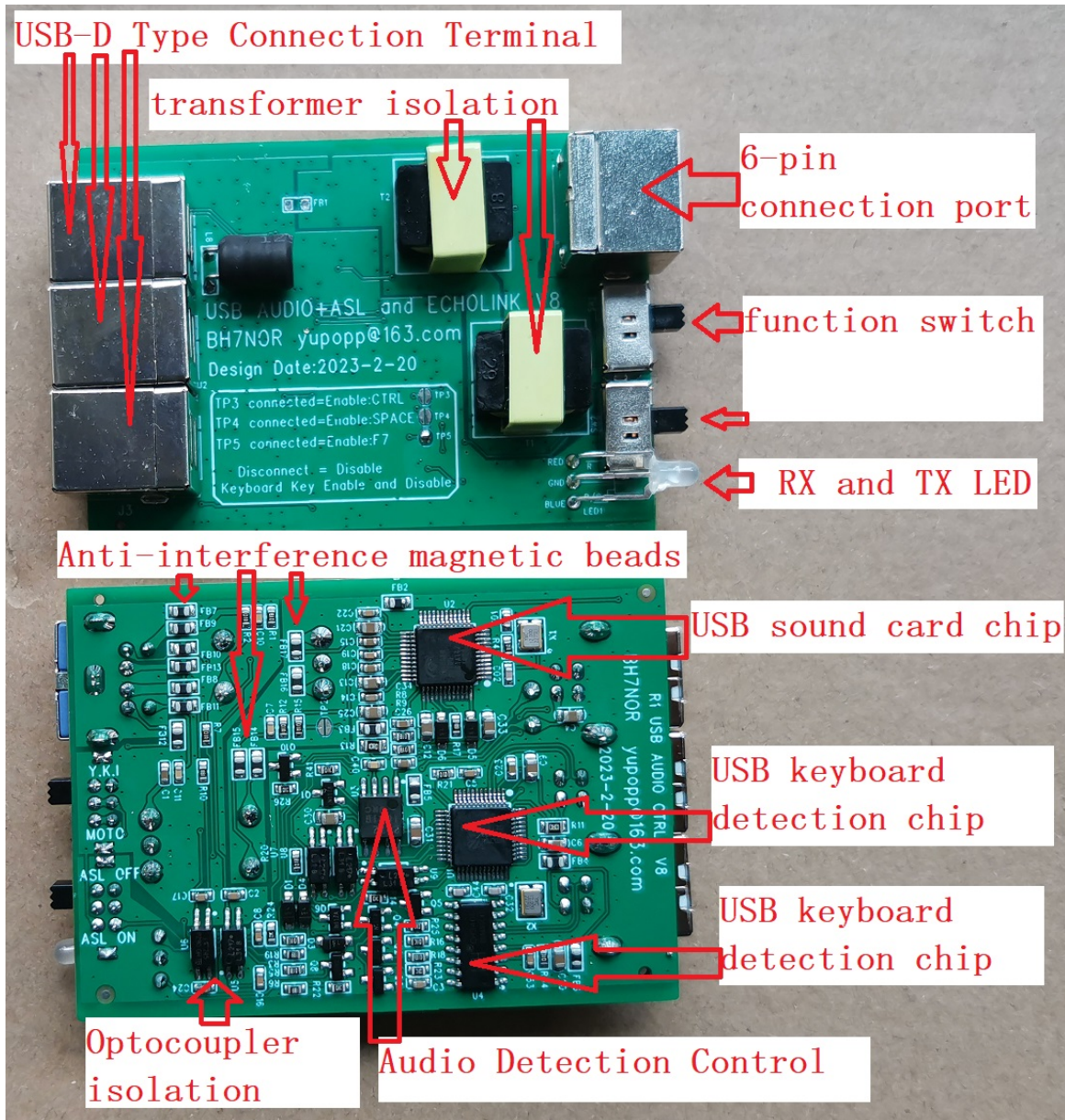
## The softwares that this product supports are :-

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

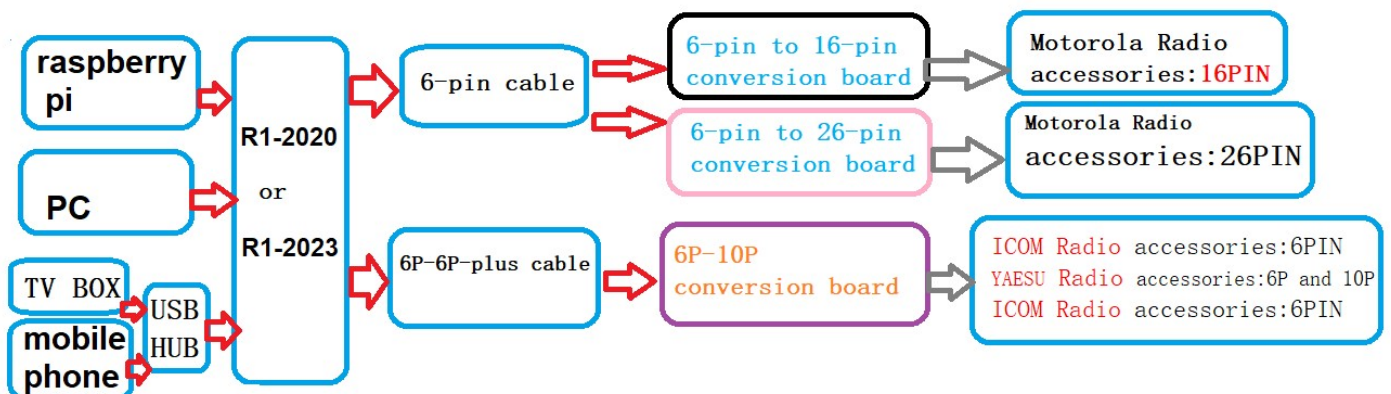
**Notes:** There are some softwares are that not support on USB and control detection, thus at this time, while on the computer microphone input, we can use the software VOX function。



# Motherboard function diagram



R1-2020 and R1-2023 connected to Radio



# 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 or 10-pin TNC interface) ,(Optional accessories)

## 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 keyboard F7 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:

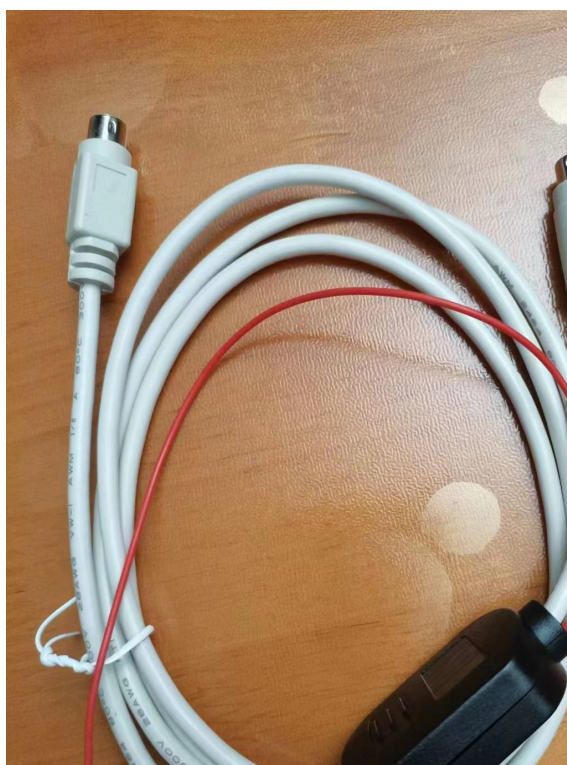
**YAESU:** FT-7800, FT-7900

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



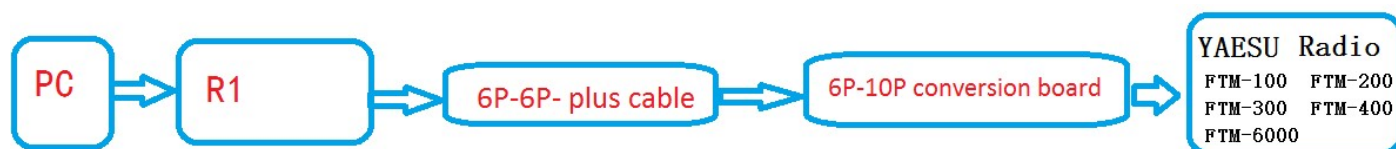
6P-6P- plus cable

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

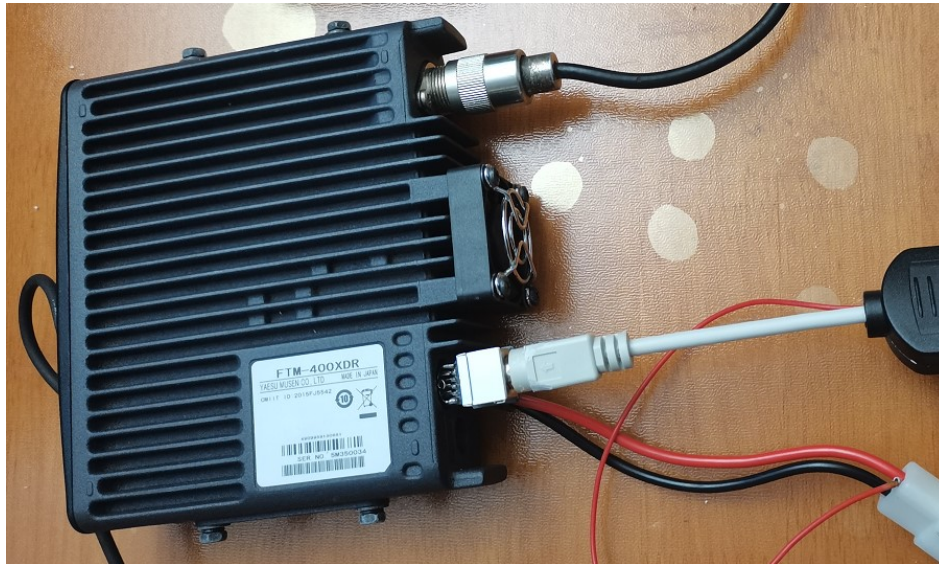
In February 2023, manual accessories 6-pin thread enhanced version, tentative number: 6P-10P conversion board, 6P-10P conversion board series accessories 6P-6P- plus cable. Including but not limited to the following models for connection use:

**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 :

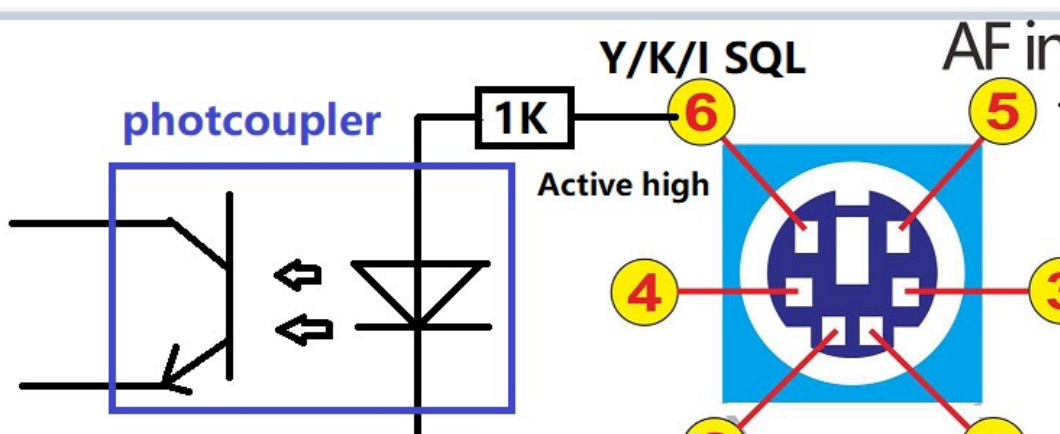
DATA		
1	COM PORT SETTING	SPEED: 4800 bps / 9600 bps / 19200 bps / 38400 bps / 57600 bps OUTPUT: OFF (camera) / GPS OUT / PACKET / WAVEFORM WP FORMAT: NMEA 6 / NMEA 8 / NMEA 9 WP FILTER: ALL / MOBILE / FREQUENCY / OBJECT / DIGIPEATER / VoIP / WEATHER YAesu / CALL RINGER / I
2	<u>DATA BAND SELECT</u>	APRS: MAIN BAND / SUB BAND A-BAND FIX / <u>B-BAND FIX</u> A=TX/B=RX / A=RX/B=TX <u>DATA</u> : MAIN BAND / SUB BAND <u>FIX</u> / <u>B-BAND FIX</u> / A=TX / A=RX/B=TX
3	DATA SPEED	APRS: 1200 bps / 9600 bps



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 \*\*\*



PCB support DIY date May 23, 2020, all future versions support DIY

**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-R8200 (2023 test passed, Accessory port only supports analog mode)**

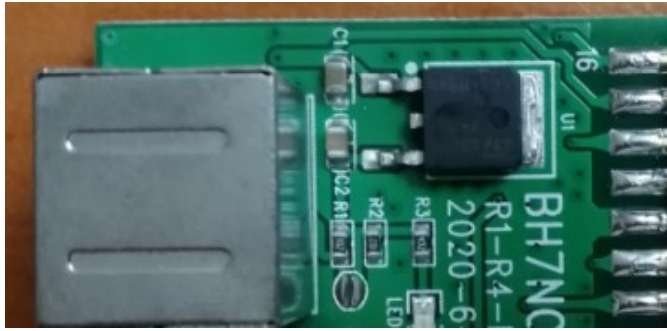
DGM Series : DGM4100, DGM6100

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), No "A" starting May 2023

**B**, PCB connection = 5 PIN MIC input , No "B" starting May 2023

**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)



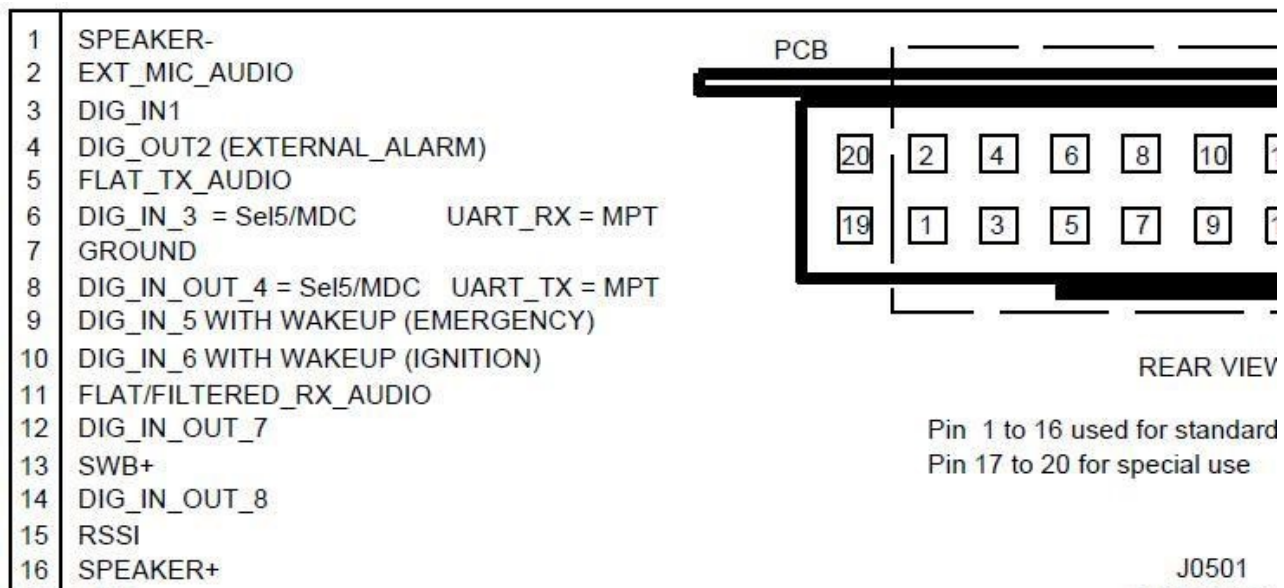
## Important function **microphone** settings:

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:

**Radio Configuration**

Voice Storage | Microphone | Password | H

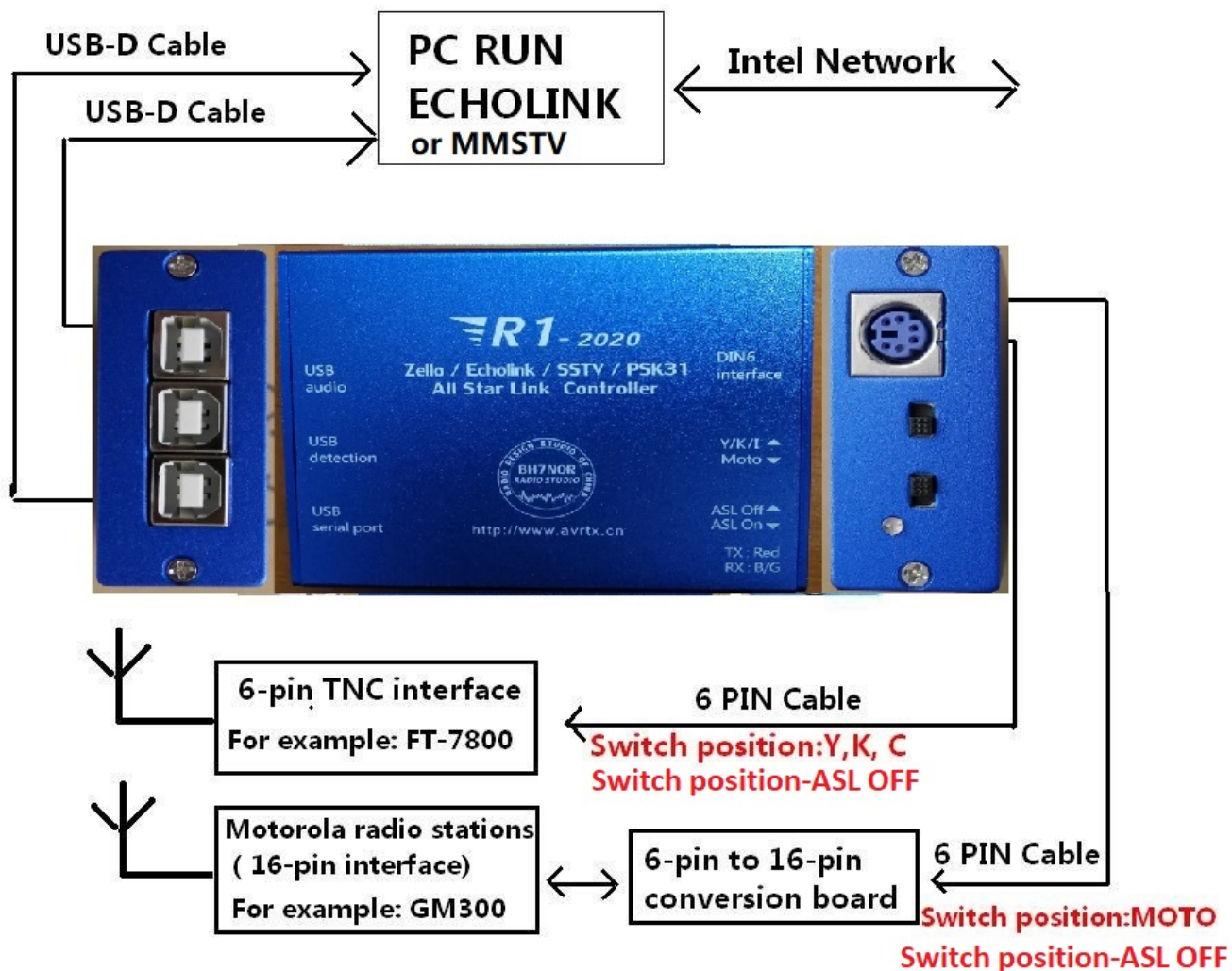
Basic | Lights/LEDs | Alert Tones | Scan | Menu | Test | Monitor

Accessory Configuration | Accessory Pins | Auxiliary Control

Accessory Package: **Default**

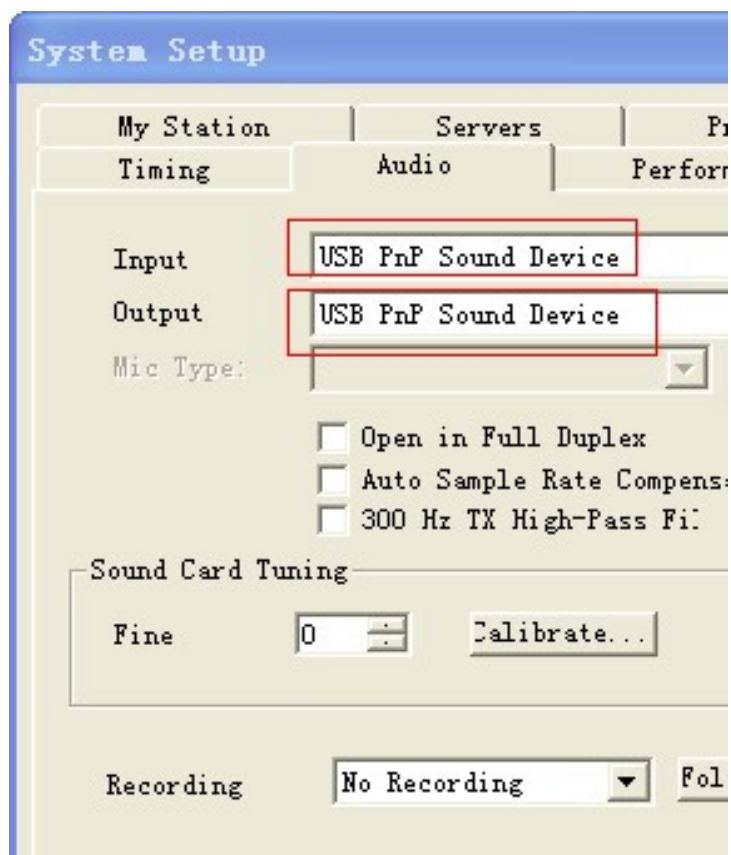
Pin #	Function Selection (Direction)	Active Level
3	External Mic PTT (Input)	Low
4	Null	Low
6	Null	Low
8	PL and CSQ Detect/Talkgroup Detect (Output)	Low
9	Null	Low
12	Null	Low

## ECHOLINK and MMSTV Connect to use:



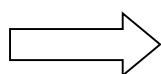


## ECHOLINK Set reference



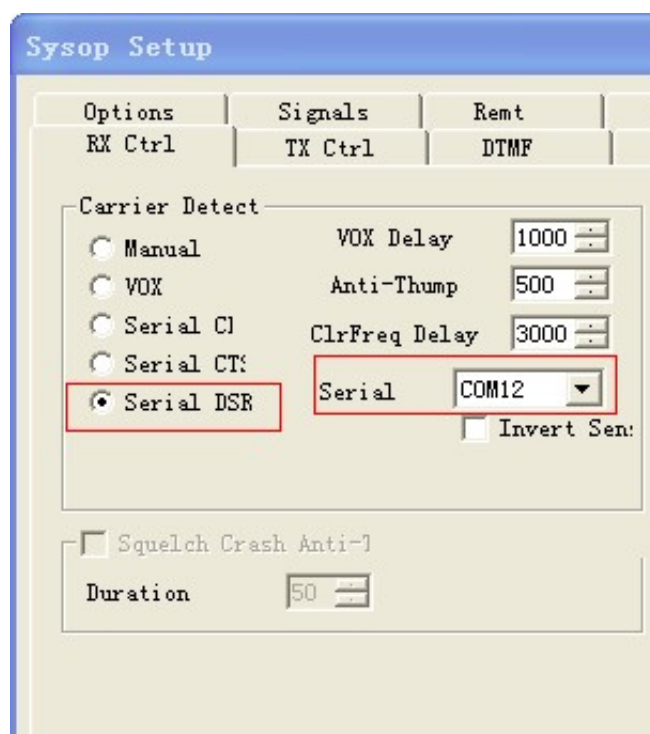
Select audio input and output as: **USB pnp sound device**

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



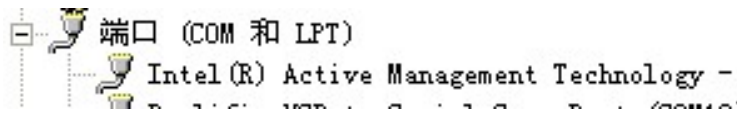
### Important function **microphone** settings:

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.

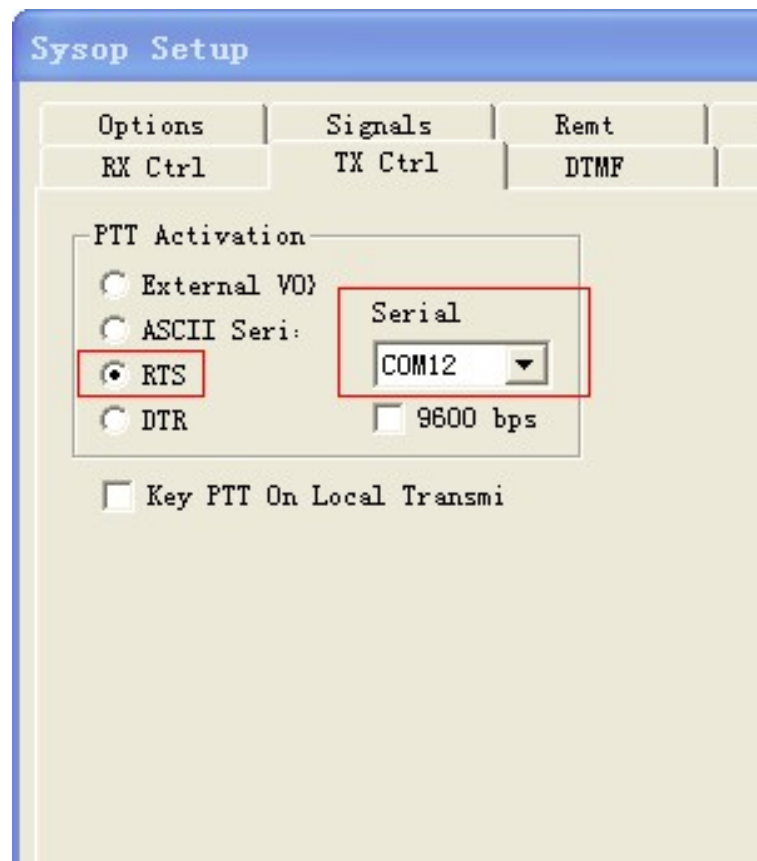


Set receive control as: **Serial DSR**

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:**

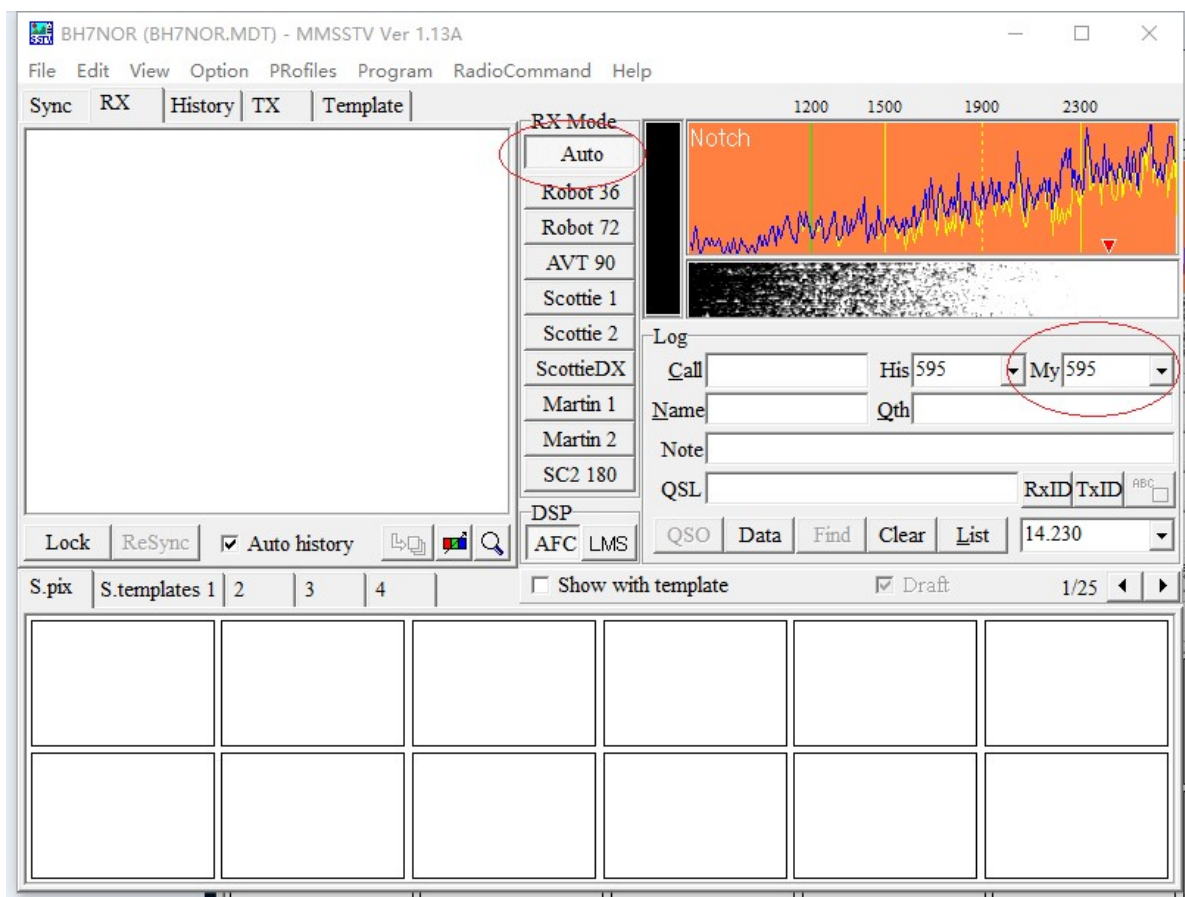
Regarding on this R1 appliance box, please be informed that when PC is restarted, it will become abnormal. Please power off/turn off the radio power supply first, then only restart the PC.

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.

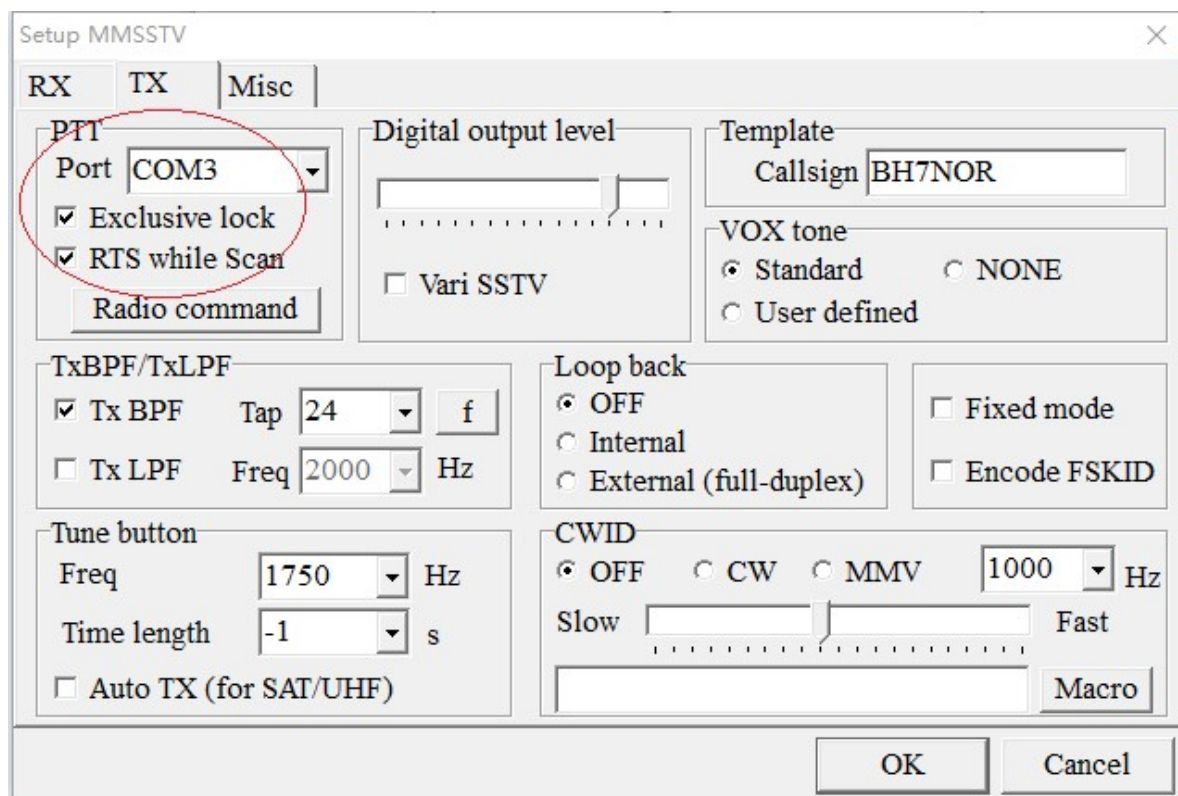
For the extra info, if the R1 control encounter abnormality after the PC turned off, please set "PC shutdown = USB no power supply" in the PC BIOS.



## MMSTV Set reference

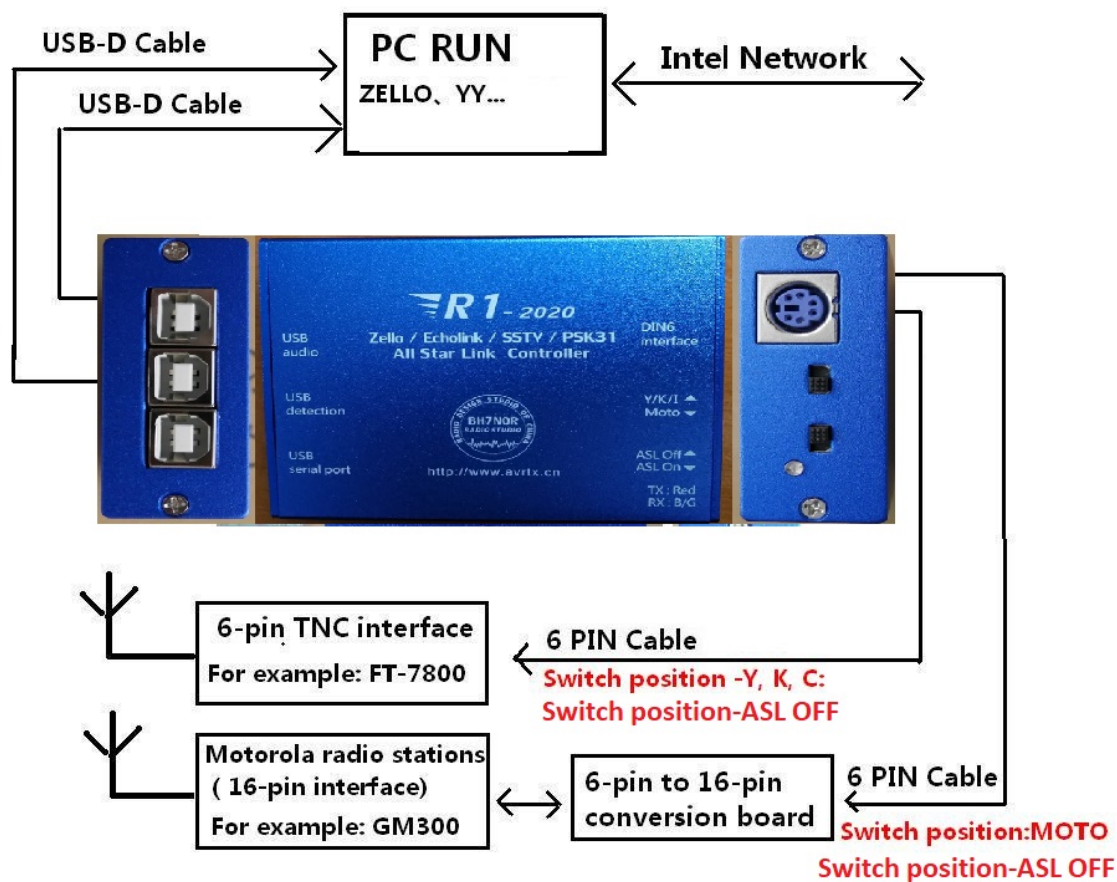


Select RX MODE : AUTO



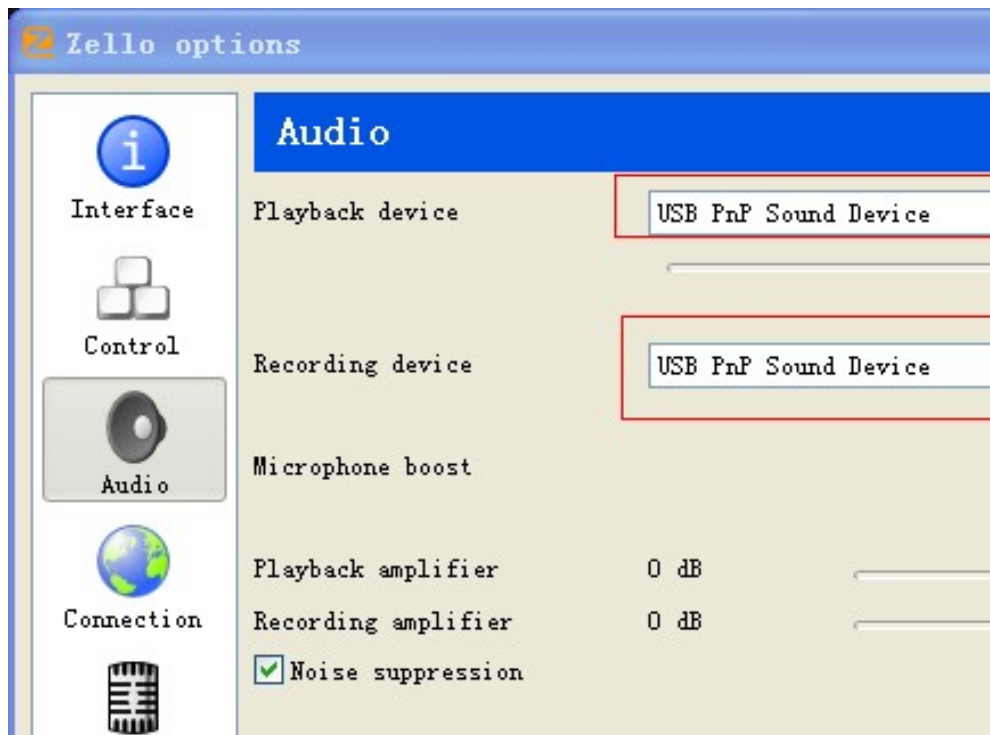
Select: USB serial COM number, Select Exclusive Lock and RTS While Scan

Below is the connection to use in ZeLLO:-



The “set reference” for ZeLLO:-



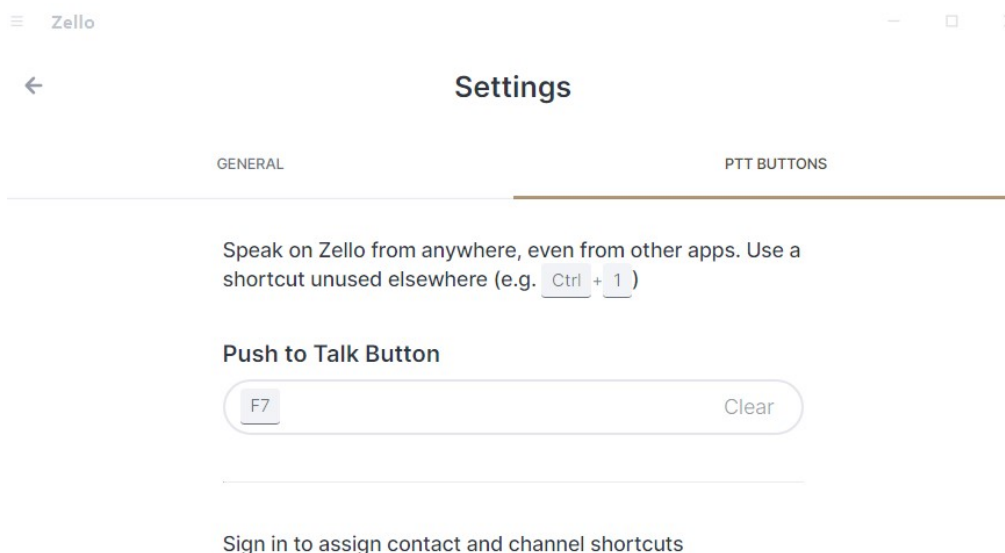


zello ver 1.38

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.

Select ZELLO detection as " keyboard F7 "

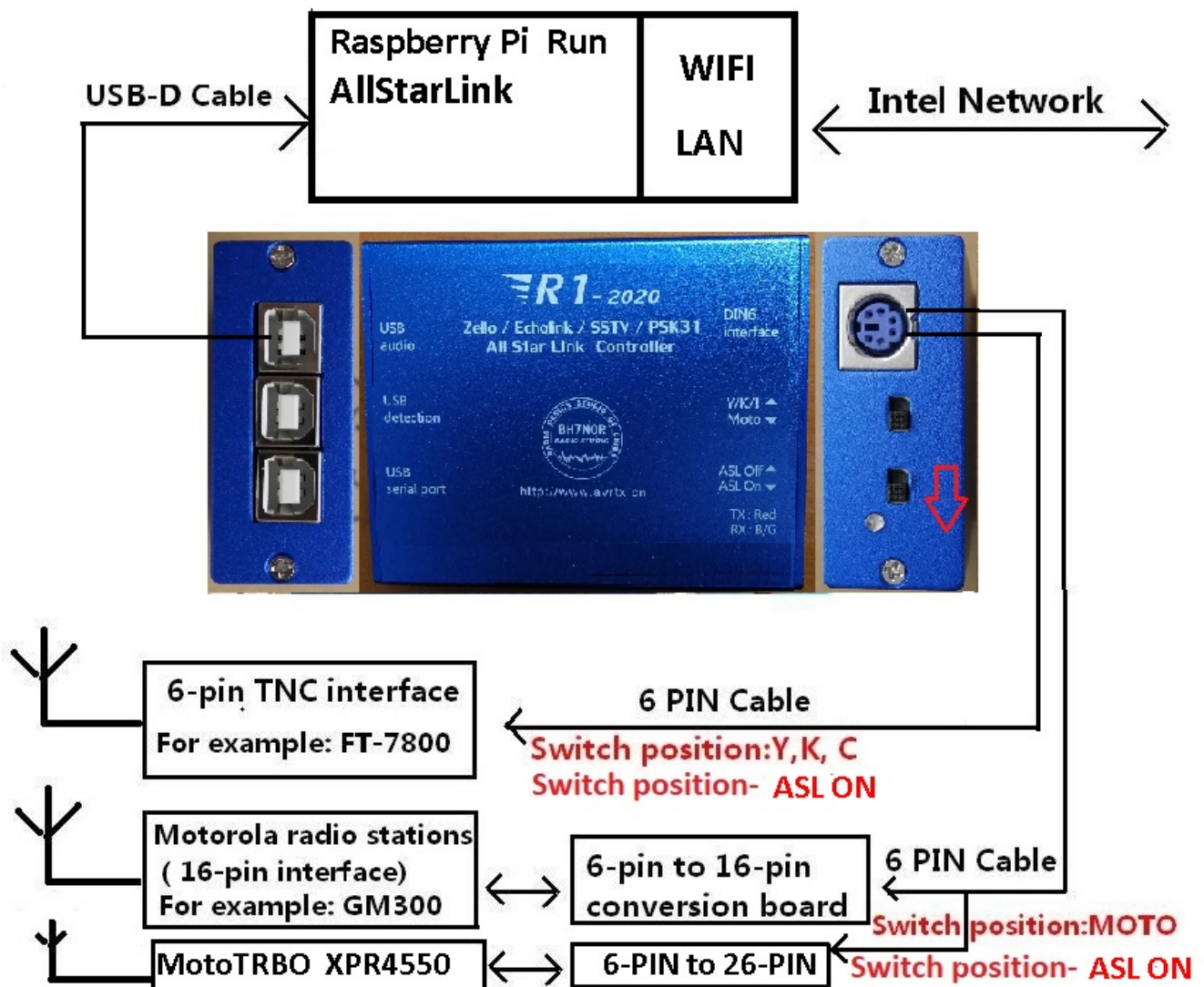


zello ver 15.0.1

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

**Note:** Note: The new version of ZELLO supports any keyboard value, and the internal default keyboard value of R1-2023 is "F7". Therefore, only "F7" can be selected. If you need other keyboard values, you need to change the keyboard values inside R1-2023.

## 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:

```
Admin Menu List for: 9w2lwk-allstar (172.18.0.1, 172.17.0.1, 192.168.0.2)
Please select:

1 Perform a system UPDATE (Internet access required)
2 Change the ROOT password
3 Change the primary NODE number
4 Change the system Timezone
5 Change the system Hostname
6 Configure the Wired Ethernet Networking
7 Configure the WiFi Interface Networking
8 Change the Secure Shell (SSH) port
9 Start Bash shell interface
10 Display System Version Numbers
11 Run Asterisk CLI client
12 Run simpleusb-tune-menu Application
13 Restart Asterisk Server
14 Power-cycle the USB sub-system
15 Reboot this system
16 Perform system power down
```

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.

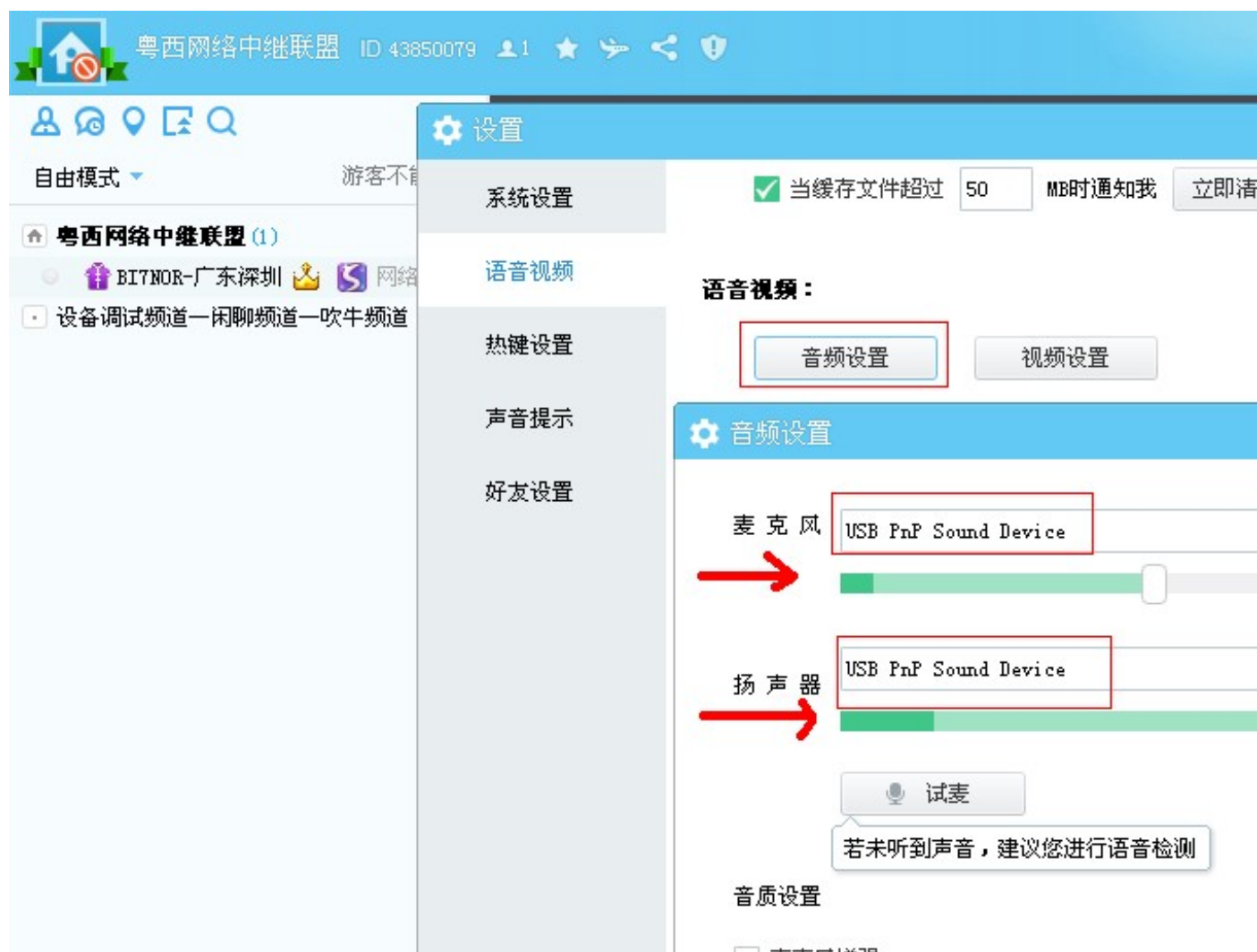
Active simpleusb device stanza: [usb] -----
S) Select active USB device stanza
V) View COS, CTCSS and PTT Telemetry using real-time display
P) Print Current Parameter Values ---- 2) Set Rx Voice Level (using display)
3) Set Transmit A Level ---- 4) Set Transmit B Level
5) Set Tx Audio Level Method (currently 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")
```

and make sure you have the toggle here:-

```
[root@9w2lwk-allstar:~]# lsusb
Bus 001 Device 078: ID 15d9:0a4d Trust International P.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. SMSC9512/9514 Fast Ethernet Controller
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](mailto: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.**

设置

系统设置

语音视频

热键设置

声音提示

好友设置

**热键设置：**

您可以通过点击选择要更改的热键：

功能说明	热键设置
提取聊天信息	无
弹出主窗口	无
弹出频道窗口	无
截取屏幕	无
减少麦克风音量	无
增大麦克风音量	无
切换语音模式	无
关闭/打开频道声音	无
关闭/打开频道麦克风	无

**声音设置：**

设置

系统设置

语音视频

热键设置

声音提示

好友设置

**声音设置：**

☒ 关闭所有声音提示

你可设置开启不同类型的声音提示，双击可以切换“状态”。

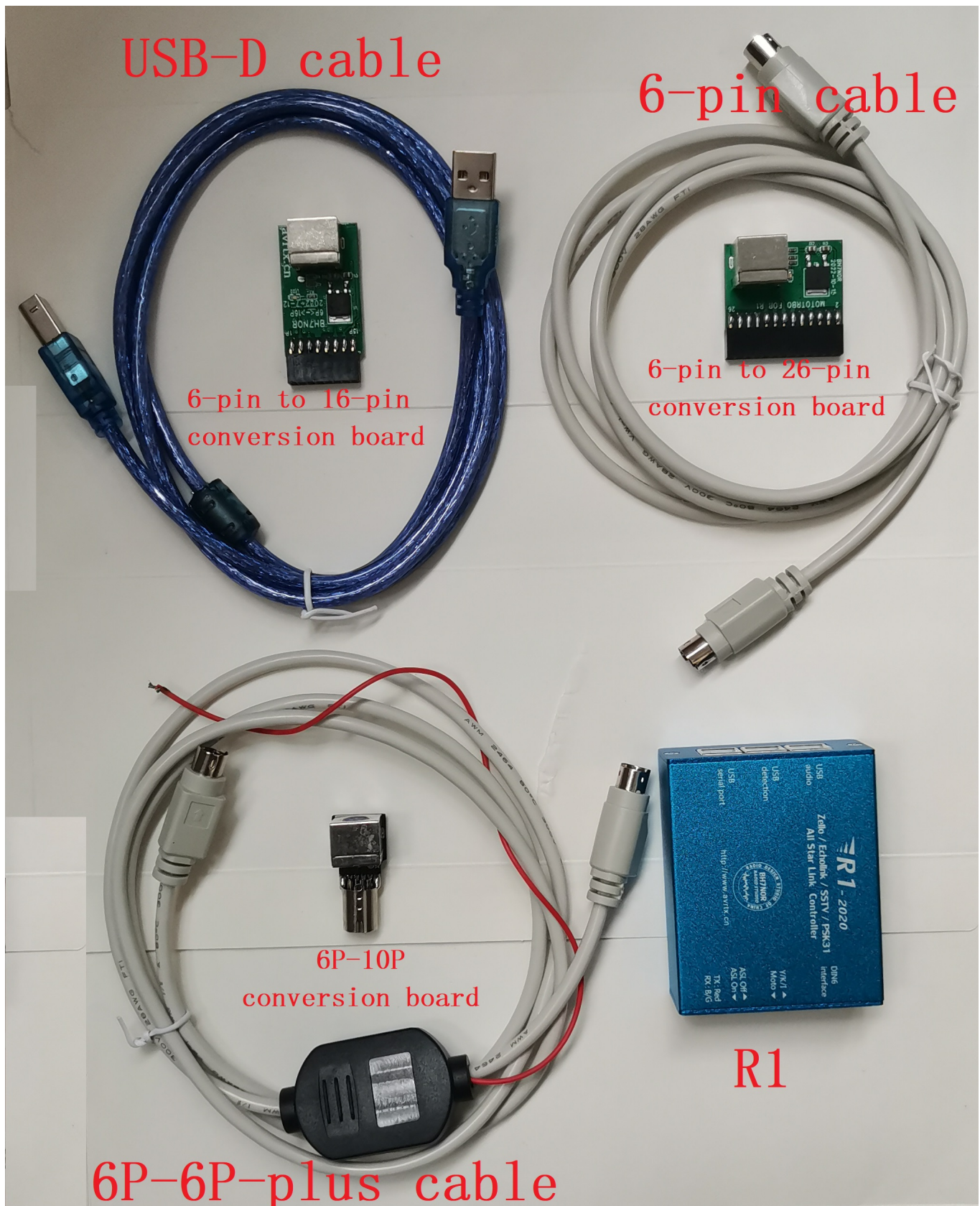
	声音类型	状态
🔊	系统声音提示	开启
🔊	好友消息声音提示	开启
🔊	频道私聊声音提示	关闭
🔊	用户进入频道时声音提示	关闭
🔊	用户退出频道时声音提示	关闭
🔊	群消息声音提示	开启
🔊	语音视频呼叫	开启

**好友设置：**

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



## Accessories list :



## R1 Optional list of accessories:

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



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Contact E-mail: [yupopp@163.com](mailto:yupopp@163.com) yupopp@gmail.com

manufacture: BH7NOR (Old callsign: BI7NOR)

Manual Fix: 9W2LWK

April 10, 2023