R1-2023 User Manual ver 1.02

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


list

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 indictors.

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.
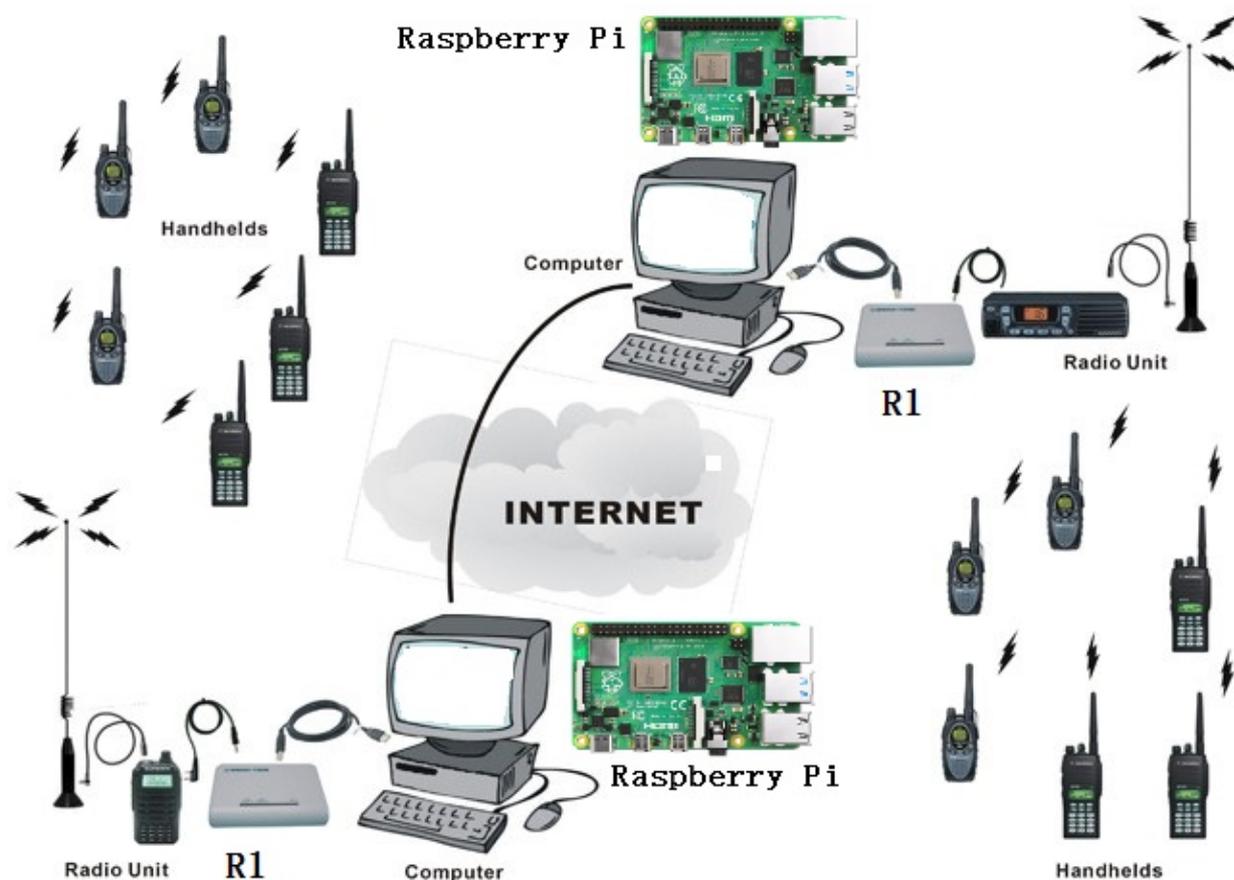

## The softwares that this product supports are :-

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

USB-D Type Connection Terminal

transformer isolation

6-pin connection port

function switch

RX and TX LED

Anti-interference magnetic beads

USB sound card chip

USB keyboard detection chip

USB keyboard detection chip

Optocoupler isolation

Audio Detection Control

USB AUDIO+ASL and ECHOLINK
BH7NOR yupopp@163.com
Design Date:2023-2-20

TP3 connected=Enable:CTRL
TP4 connected=Enable:SPACE
TP5 connected=Enable:F7

Disconnect = Disable
Keyboard Key Enable and Disable

R1 USB AUDIO CTRL V8
BH7NOR 2023-2-20 yupopp@163.com

R1-2020 and R1-2023 connected to Radio

raspberry pi

PC

TV BOX

mobile phone

USB HUB

R1-2020 or R1-2023

6-pin cable

6P-6P-plus cable

6-pin to 16-pin conversion board

6-pin to 26-pin conversion board

6P-10P conversion board

Motorola Radio accessories:16PIN

Motorola Radio accessories:26PIN

ICOM Radio accessories:6PIN
YAESU Radio accessories:6P and 10P
ICOM Radio accessories:6PIN
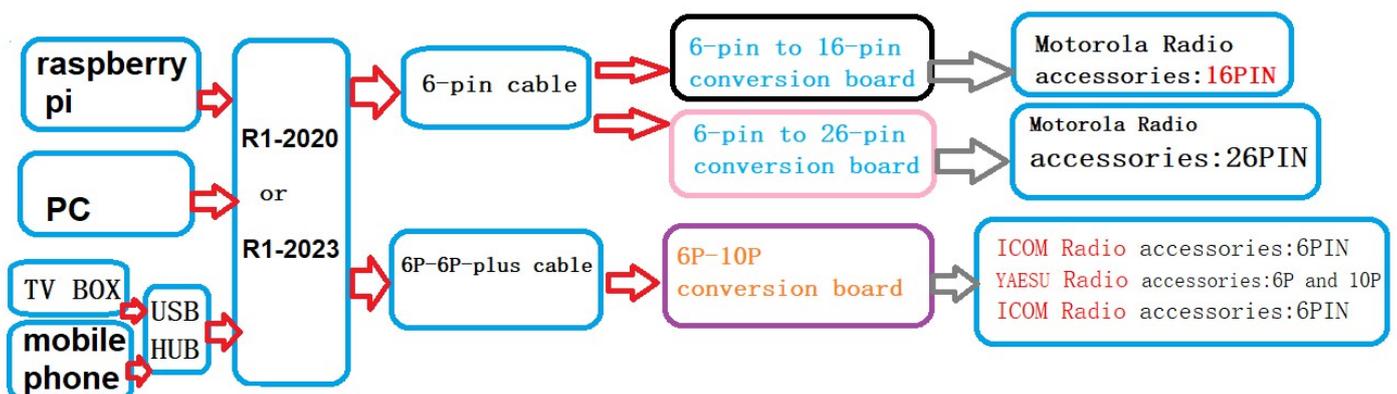
R1 external screen function description with laser engraving

"TX: RED" and **"RX:B/G"** :   This is LED status indictors.

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, TM-G707
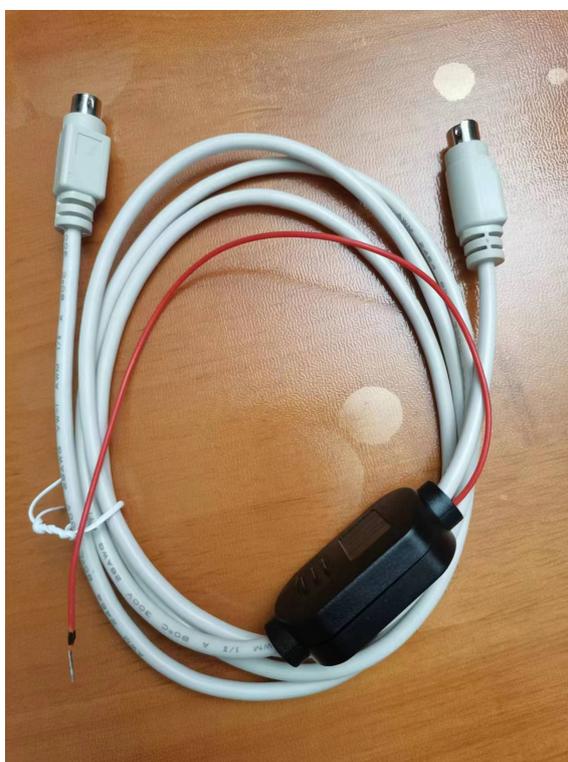
6P-6P- plus cable

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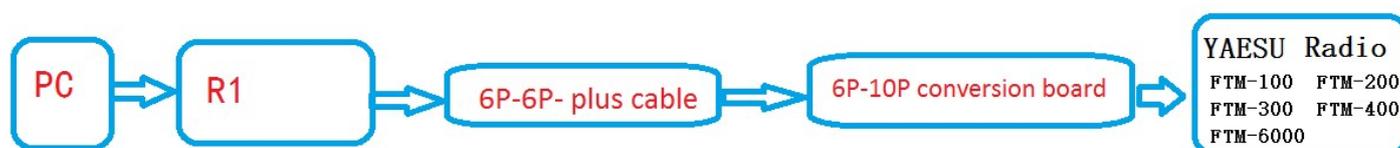
The following is the picture of R1 connected to FTM-400: **(R 1 Switch position:Y/ K/ I)**
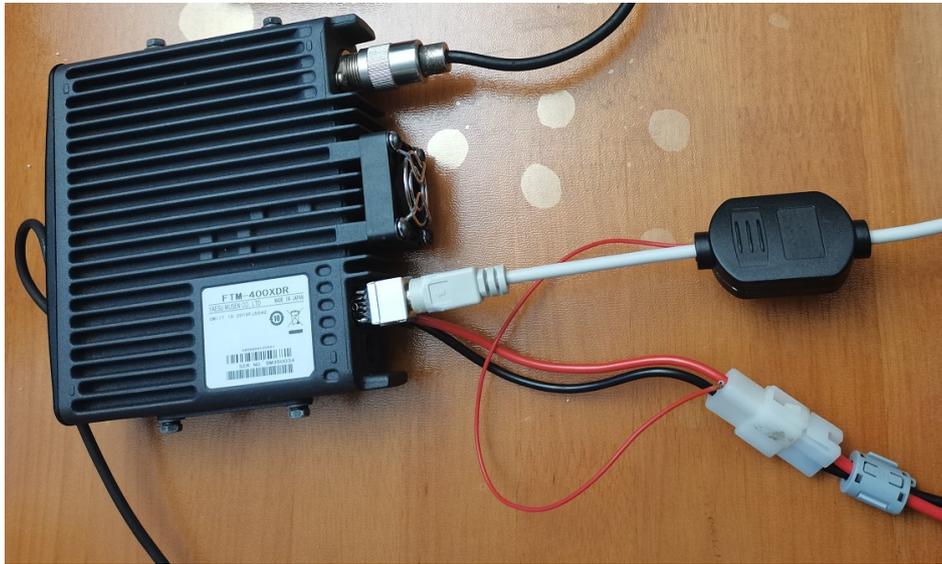
YAESU FTM-400 menu "DATA" setting reference :

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 / <u>A-BAND</u> 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   ***
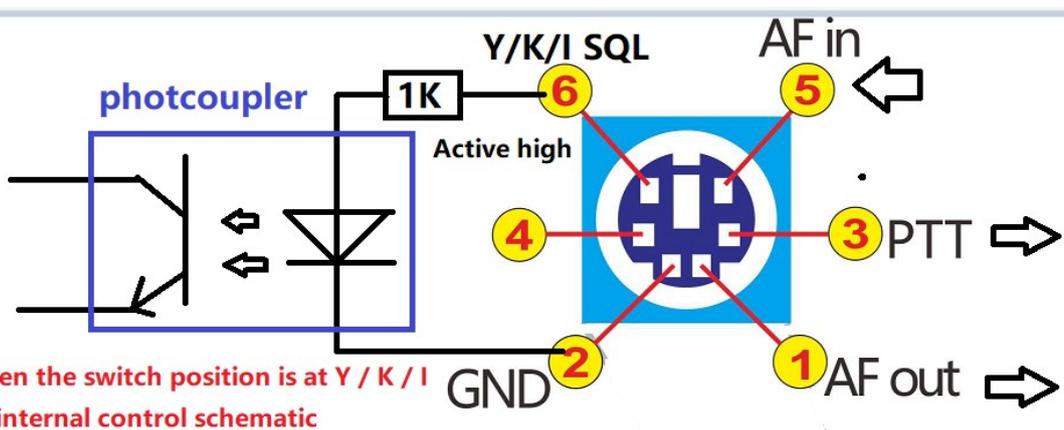
PCB support DIY date May 23, 2020, all future versions support DIY

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   (Need to select "Enable")
Pin #21 : PL/Talkgroup Detect   Action Level : Low   (Need to select "Enable")

"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, DGM5000,DGM5500,DGM6100,DGM8000,DGM8500
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-750、CDM-1250 、CDM-1550、GM140、GM160、GM340、GM350、GM360、GM380、GM640、GM660、GM1280、CM140、CM160、CM200、CM300、CM340、CM360、PM400、M1225、**pro3100、pro5100、pro7100、

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:

1	SPEAKER-
2	EXT_MIC_AUDIO
3	DIG_IN1
4	DIG_OUT2 (EXTERNAL_ALARM)
5	FLAT_TX_AUDIO
6	DIG_IN_3 = Sel5/MDC UART_RX = MPT
7	GROUND
8	DIG_IN_OUT_4 = Sel5/MDC UART_TX = MPT
9	DIG_IN_5 WITH WAKEUP (EMERGENCY)
10	DIG_IN_6 WITH WAKEUP (IGNITION)
11	FLAT/FILTERED_RX_AUDIO
12	DIG_IN_OUT_7
13	SWB+
14	DIG_IN_OUT_8
15	RSSI
16	SPEAKER+
17	BUS+
18	BOOT_CNTRL
19	N.C.
20	N.C.

REAR VIEW

Pin 1 to 16 used for standard accessories
Pin 17 to 20 for special use

J0501
ACCESSORY
20-PIN CONNECTOR

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

CDM-1250 "CPS" programming setting:
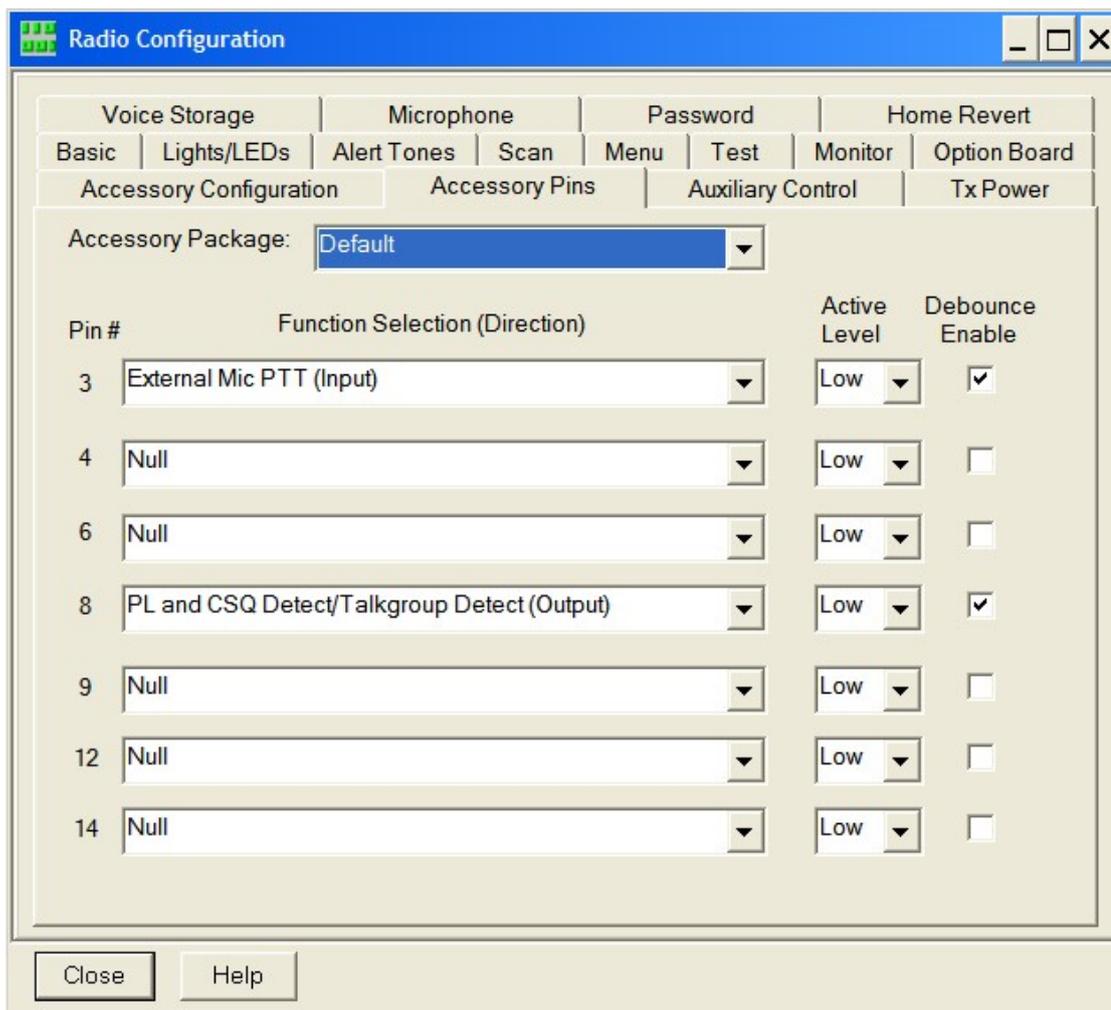
(Need to select "Enable")

ECHOLINK and MMSTV Connect to use:

USB-D Cable

USB-D Cable

PC RUN ECHOLINK or MMSTV

Intel Network

R1- 2020
Zella / Echolink / SSTV / PSK31
All Star Link Controller

USB audio

USB detection

USB serial port

DIN6 interface

Y/K/I ▲ Moto ▼

ASL Off ▲ ASL On ▼

TX : Red RX : B/G

BH7NOR RADIO STUDIO

http://www.avrtx.cn

6-pin TNC interface
For example: FT-7800

6 PIN Cable

Switch position:Y,K, C
Switch position-ASL OFF

Motorola radio stations
(16-pin interface)
For example: GM300

6-pin to 16-pin conversion board

6 PIN Cable

Switch position:MOTO
Switch position-ASL OFF

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
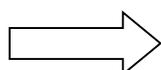
⟹ **Important function microphone settings:**

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。
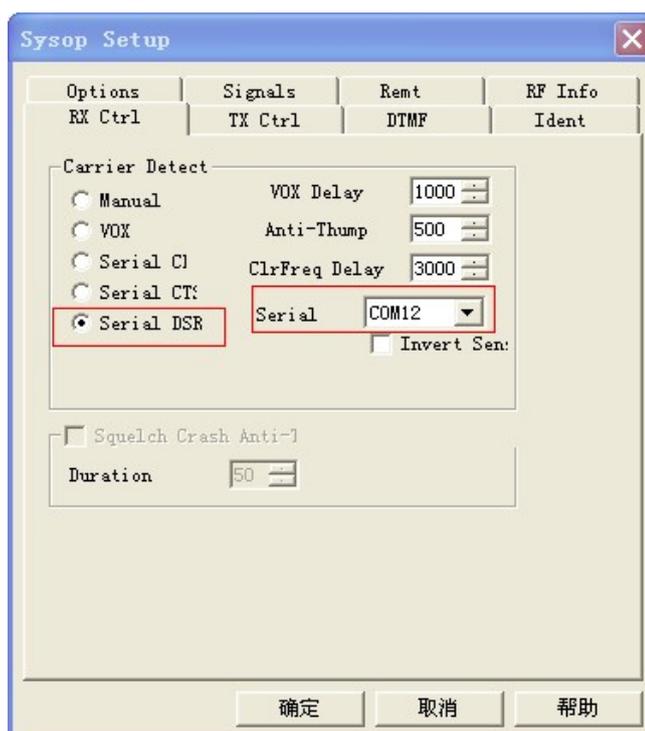
Set receive control as: Serial **DSR**

Select: **USB serial number**

端口 (COM 和 LPT)
Intel(R) Active Management Technology - SOL (COM3)
Prolific USB-to-Serial Comm Port (COM12)

USB serial number, see the hardware manager
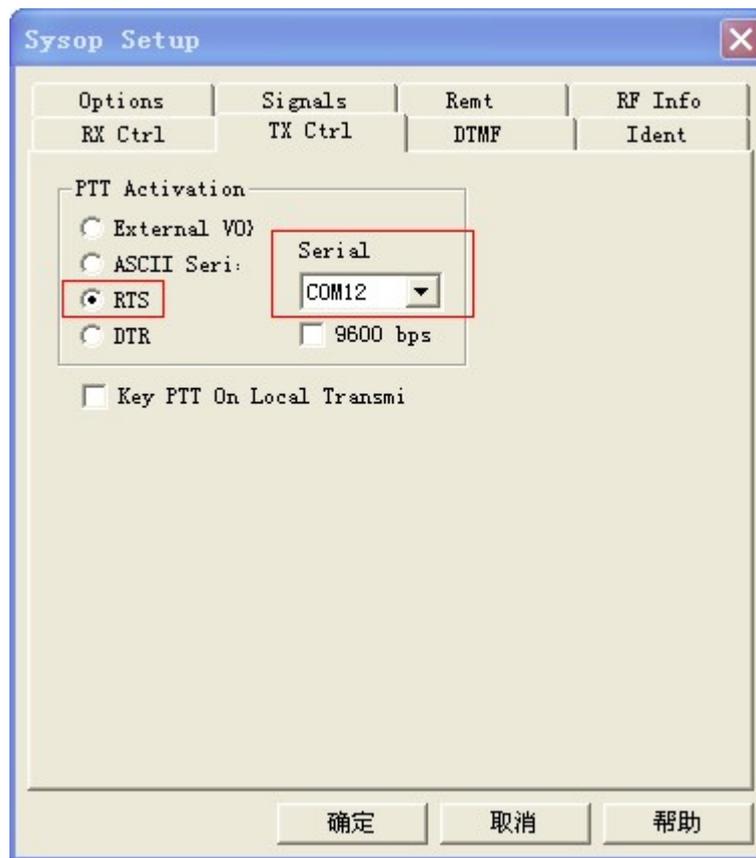
Set the launch control as: Serial port RTS

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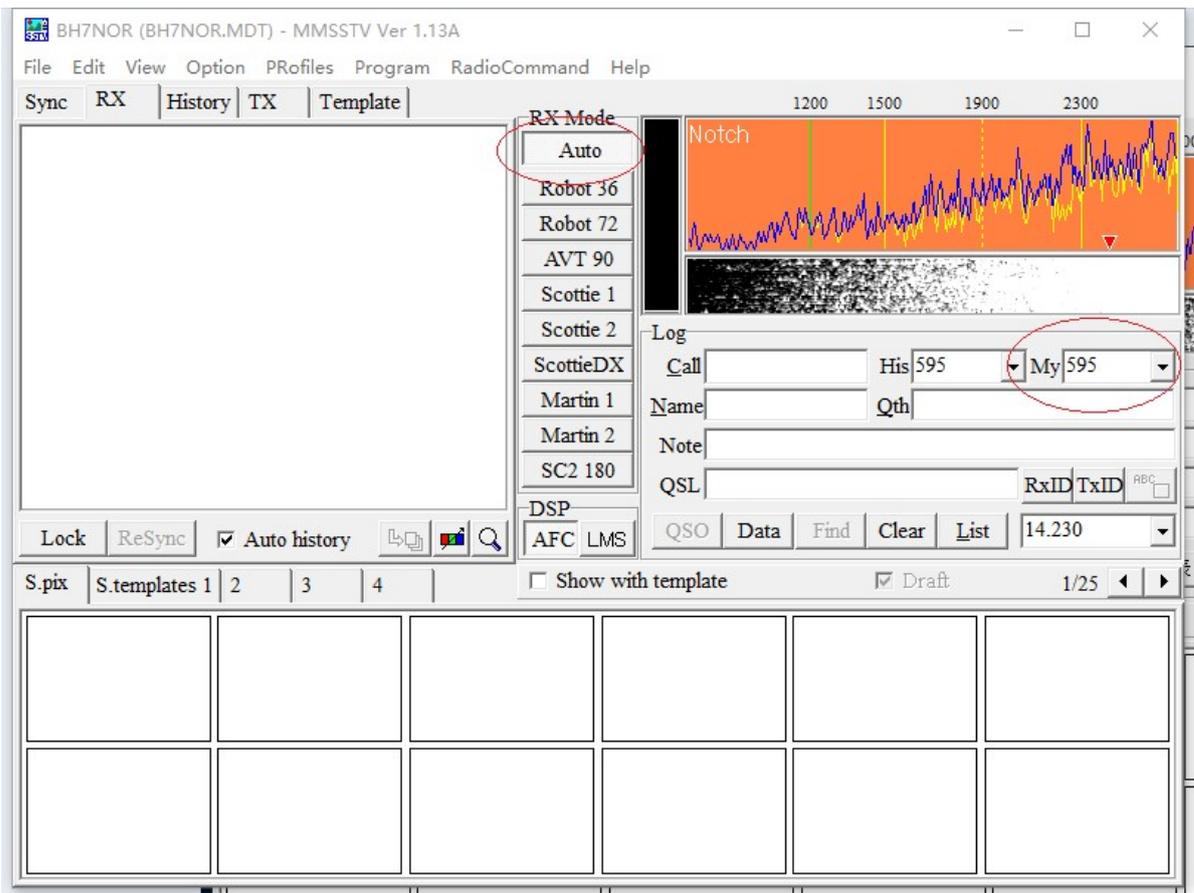
Select RX MODE : AUTO
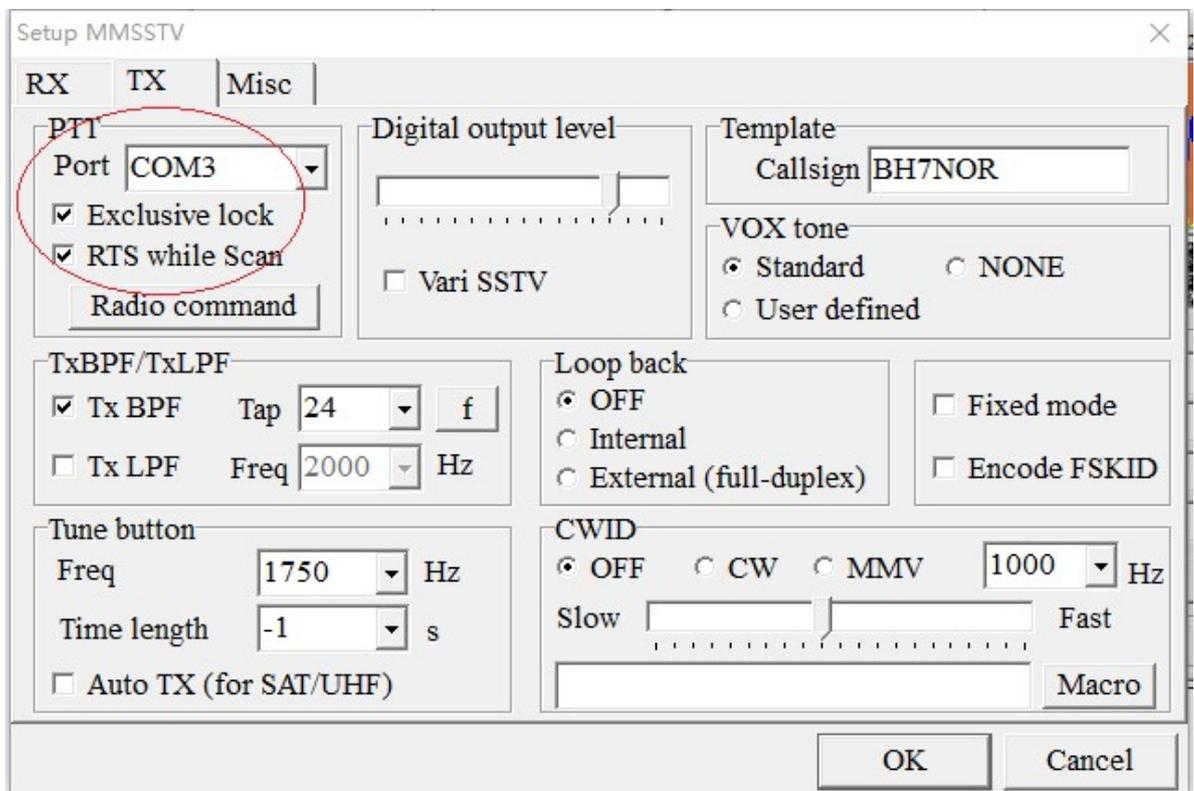
Select: USB serial COM number, Select Exclusive Lock and RTS While Scan

Below is the connection to use in ZeLLO:-

USB-D Cable → **PC RUN** ZELLO、YY... ← **Intel Network** →

USB-D Cable

=R1-2020
USB audio
USB detection
USB serial port

Zello / Echolink / SSTY / PSK31
All Star Link Controller

BH7NQR
http://www.avrtx.cn

DIN6 interface
Y/K/I ▲ Moto ▼
ASL Off ▲ ASL On ▼
TX : Red
RX : B/G

6-pin TNC interface
For example: FT-7800

6 PIN Cable
Switch position -Y, K, C:
Switch position-ASL OFF

Motorola radio stations (16-pin interface)
For example: GM300

6-pin to 16-pin conversion board

6 PIN Cable
Switch position:MOTO
Switch position-ASL OFF

The "set reference" for ZeLLO:-

zello ver 1.38
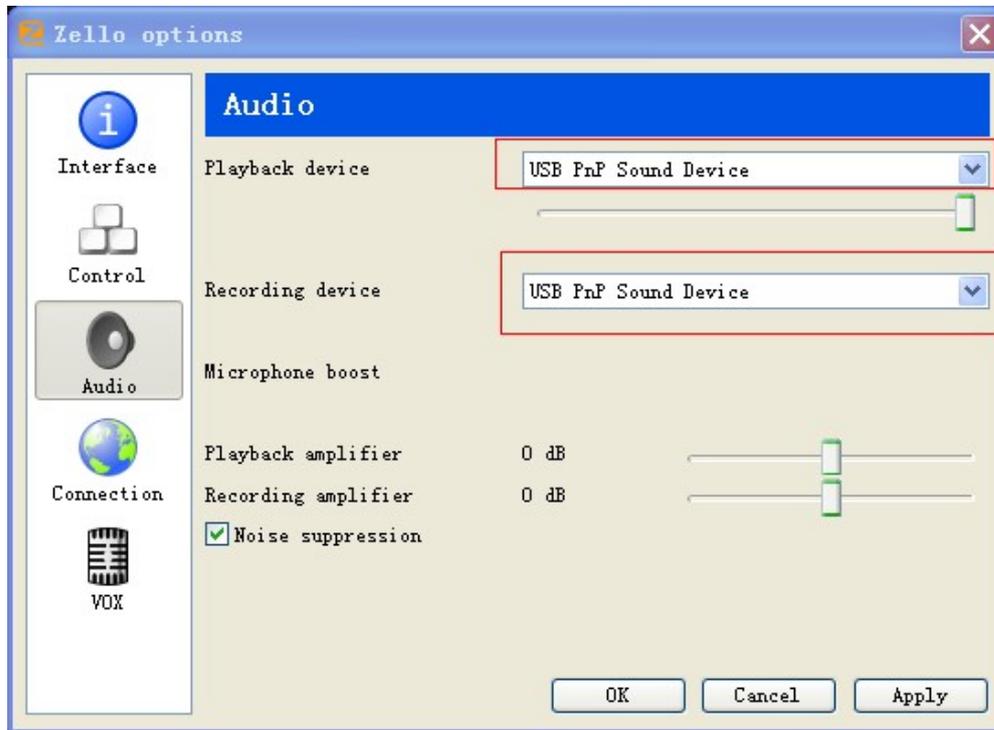
1, set the audio on both input and output to USB PnP Sound Device **(windows operating system already has the integrated driver)**

⟹ **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 "
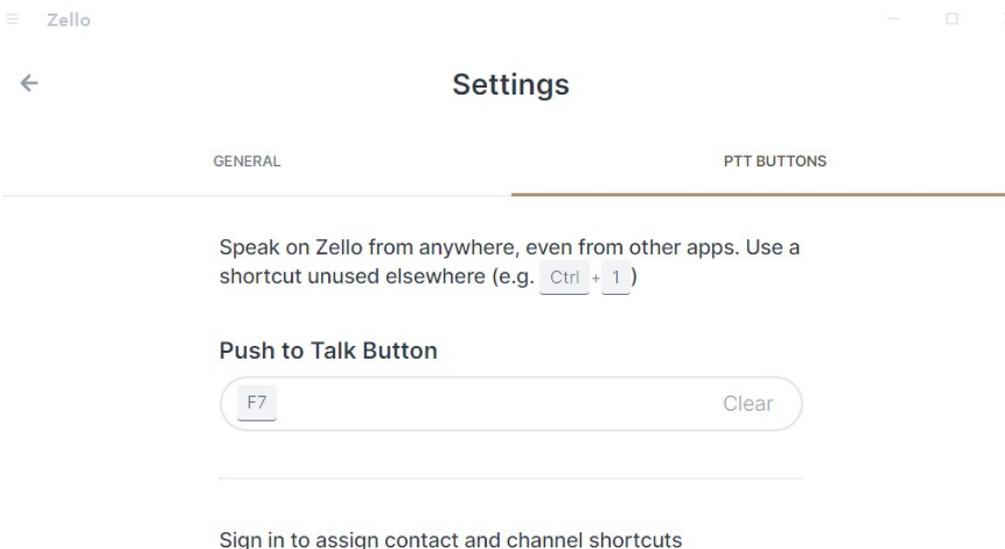
zello ver 15.0.1

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:

Raspberry Pi Run **AllStarLink** | WIFI LAN

USB-D Cable → Intel Network →

R1-2020
Zello / Echolink / SSTV / PSK31
All Star Link Controller

USB audio
USB detection
USB serial port

DIN6 interface
Y/K/I ▲ Moto ▼
ASL Off ▲ ASL On ▼
TX : Red
RX : B/G

BH7NOR
http://www.avrtx.cn

6-pin TNC interface
For example: FT-7800

6 PIN Cable
Switch position: Y,K, C
Switch position- ASL ON

Motorola radio stations
(16-pin interface)
For example: GM300

6-pin to 16-pin conversion board

6 PIN Cable

MotoTRBO XPR4550

6-PIN to 26-PIN

Switch position: MOTO
Switch position- ASL ON

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:
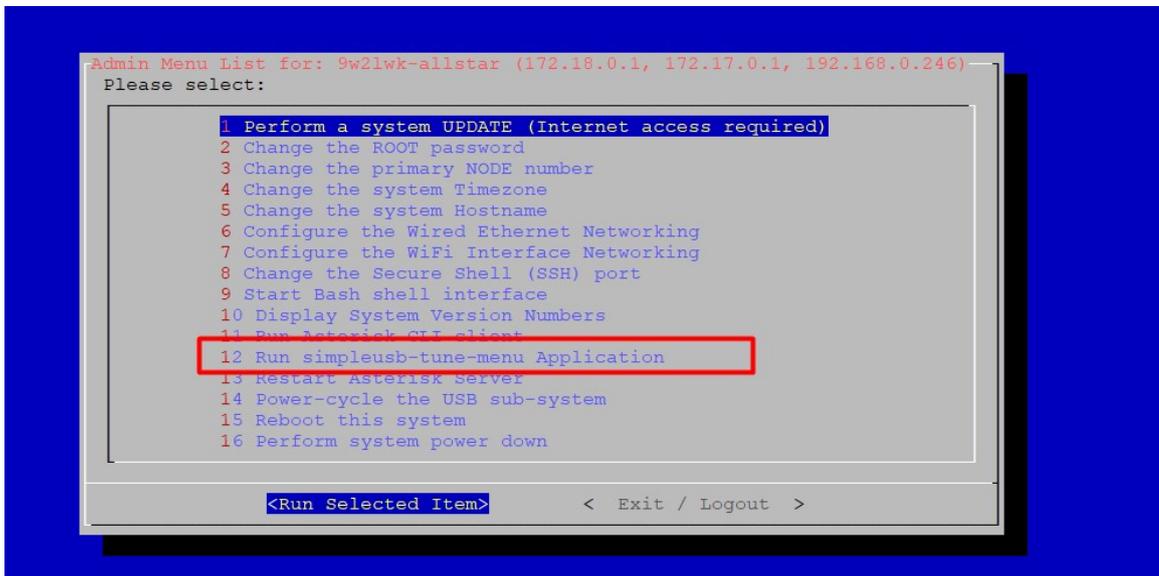
just follow the below setting like mine
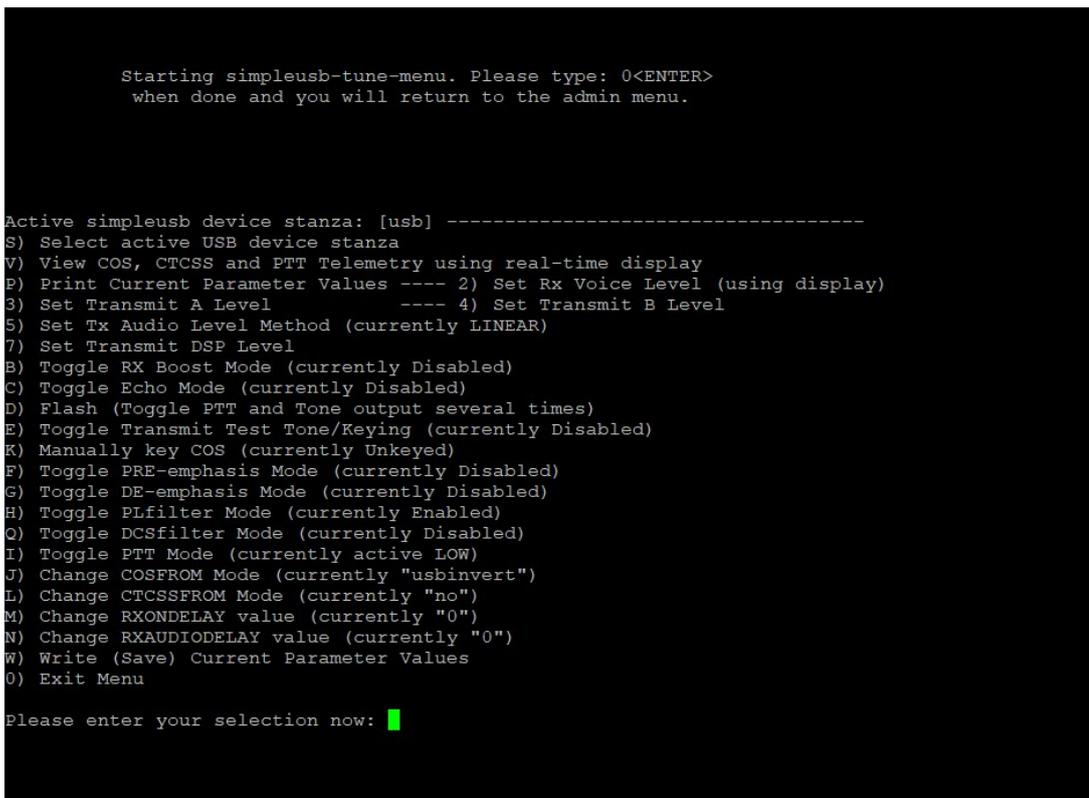
and make sure you have the toggle here:-
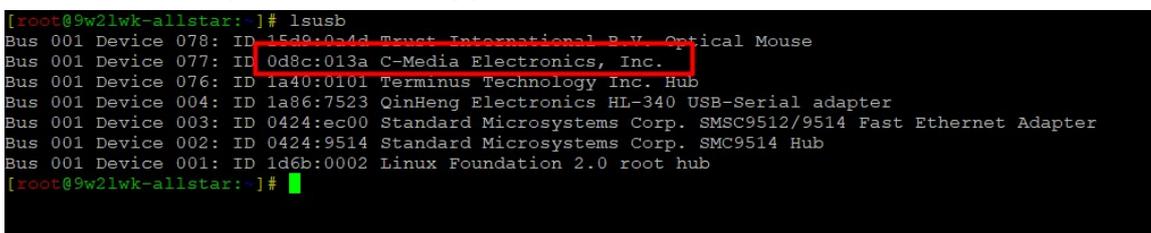
Connection to use in YY: (YY is only available in Chinese Simplified version)
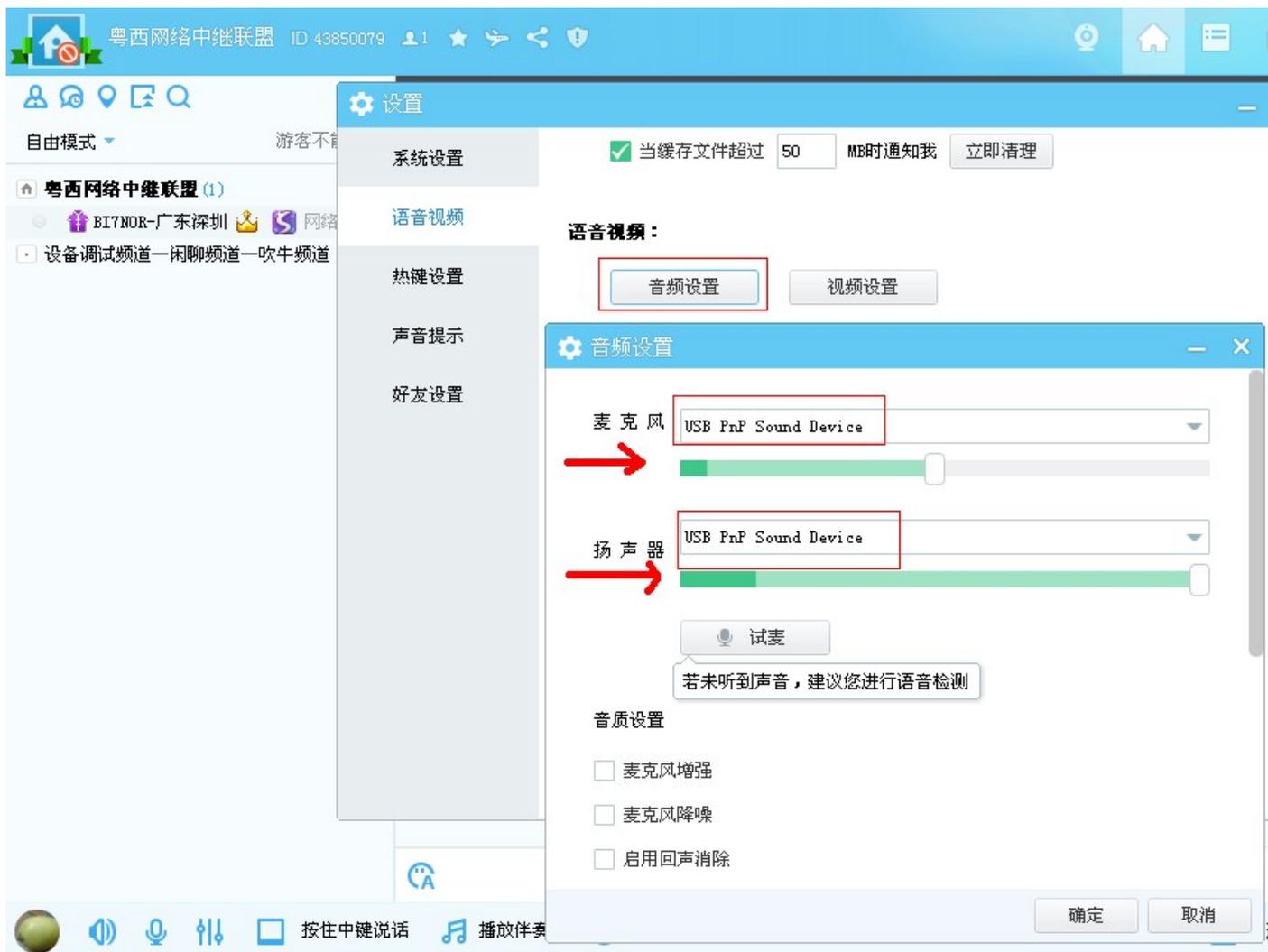
On the YY channel, select both the microphone input and speaker output to "USB PnP Sound Device" on the system audio management interface, please do not select microphone enhancement or AGC, if you select the option, the audio of other party will be very loud and noisy

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.

Accessories list ：

USB-D cable

6-pin cable

6-pin to 16-pin
conversion board

6-pin to 26-pin
conversion board

6P-10P
conversion board

R1

6P-6P-plus cable
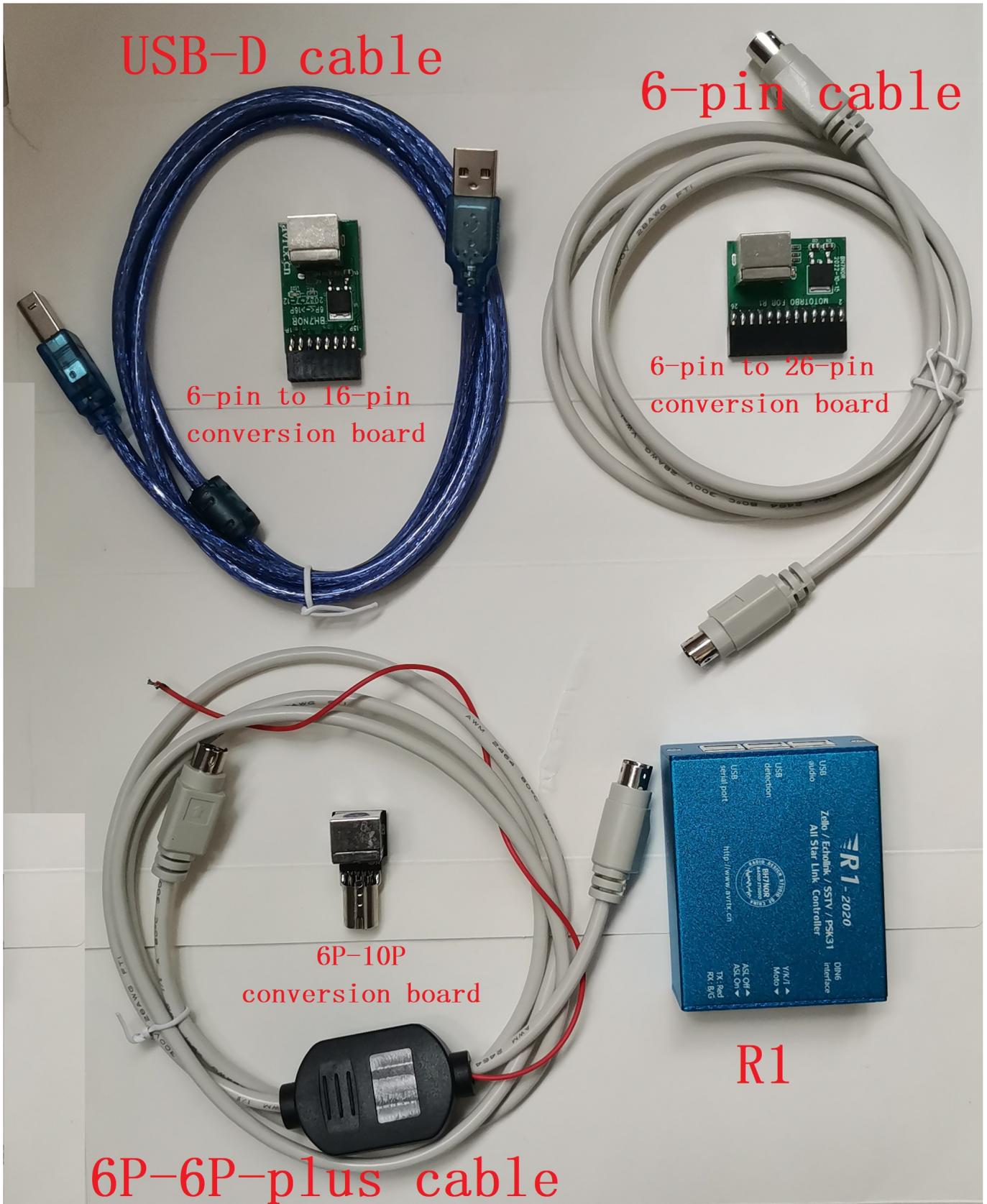
R1 Optional list of accessories:

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-750、CDM-1250 、CDM-1550、GM140、GM160、GM340、GM350、GM360、GM380、GM640、GM660、GM1280、CM140、CM160、CM200、CM300、CM340、CM360、PM400、M1225、pro3100、pro5100、pro7100、
A26	R1 * 1PCS +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,DGM5000,DGM5500,DGM6100,DGM8000,DGM8500 DM Series: DM3400, DM3401, DM3600, DM3601, DM4400, DM4401, DM4600, DM4601
B10P	R1 * 1PCS +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, TM-G707
	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

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**

April 9, 2024