Avrtx
R1-2023 Radio Network Link Controller

Avrtx R1-2023 Radio Network Link Controller User Manual

Contents

Avrtx

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Product Specifications

- **Model:** R1-2023
- **Version:** 1.02
- **Features:** GPIO Detect COS and CTCSS input, optocouplers and isolating transformer for Power/RF interference noise reduction, full metal case for shielding interference, LED status indicators
- **Applications:** AllstarLinkECHOLINK, ZELLO, SSTV, psk31, SKYPE, QT, YY, and other chat intercom and data transfer software

Product Usage Instructions

Control Principle

The R1 controller facilitates radio network links by detecting audio input from the radio PTT and transmitting it over the network. It also receives audio from the network and forwards it to the radio.

Controller Applications

Using the R1 controller, you can set up radio links or relay links to extend the range of radio transceivers or repeaters, enabling global radio links.

Software Support

The product supports various software applications including AllstarLinkECHOLINK, ZELLO, SSTV, psk31, SKYPE, QT, YY, and others for voice chat, data transfer, and intercom purposes.

External Radio Connection

The R1 controller can be connected to radios using different converter boards based on the radio station interface. Ensure correct switch positions for different radio types.

AllStarLink Function

- Make sure to toggle the ASL switch based on the usage scenario.
- When ASL is enabled, the controller detects COS/CTCSS and controls PTT for AllStarLink connections.

DIN 6 Interface

Use the appropriate cable and conversion boards to connect R1 to YAESU/Kenwood/ICOM radios or Motorola/MotoTRBO radios through the DIN 6 interface.

USB Connectivity

The R1 controller can be connected to a PC or Raspberry Pi using USB for audio interface, keyboard detection, and serial port communication based on the software being used.

Frequently Asked Questions

Q: Can I use the R1 controller with radios other than YAESU/ICOM/KENWOOD or Motorola?

A: Yes, you can use the R1 controller with radios having different interfaces by using the appropriate converter boards and ensuring correct switch positions.

Q: How do I know if the AllStarLink function is enabled?

A: The ASL switch position determines if AllStarLink is enabled.
Make sure the switch is in the correct position based on your connection requirements.

Product features are as below

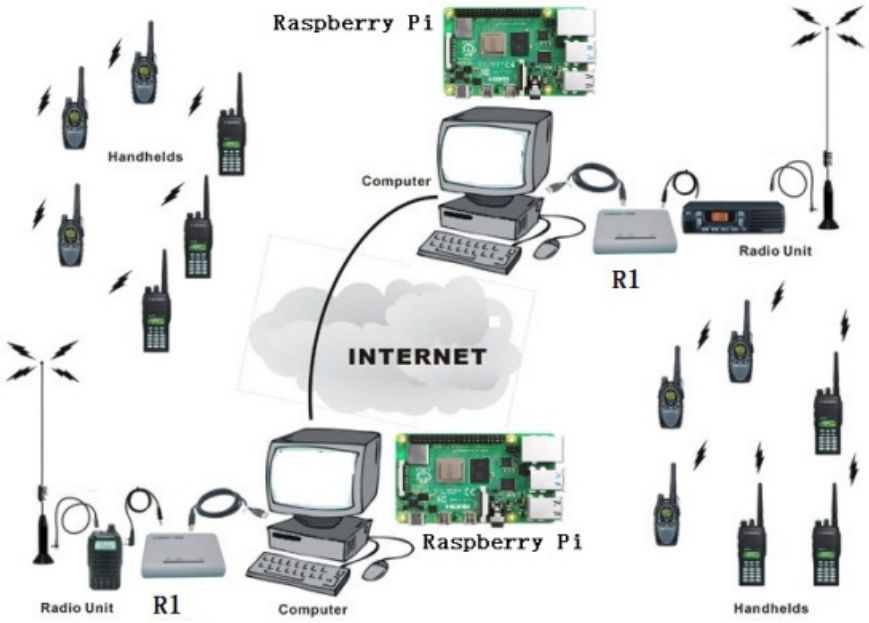
1. Built-in USB sound card chip, with high-quality audio input and output.
2. Built-in USB serial chip. E.g. launch control using RTS, receive control using DSR. ECHOLINK User
3. The built-in audio detection chip controls the radio's PTT button and outputs the sound to the speakers by the radio-compute 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 with AllstarLink.
    - GPIO Detect COS and CTCSS input. GPIO outputs and controls the PTT (ASL soundcard function).
6. The user's computer will not get Power/RF interference noise from the power supply from the radio because the R1 has the optocouplers and the isolating transformer.
7. R1 introduces 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 an output audio controller detects audio input from the radio PTT, hence the audio will transmit over.
- On the other end, once the radio receives the audio, the controller detects the SQL signal through the USB control network, and the voice chat software will forward the audio to the radio. In this way, it will be on the radio-linked network.

Controller applications

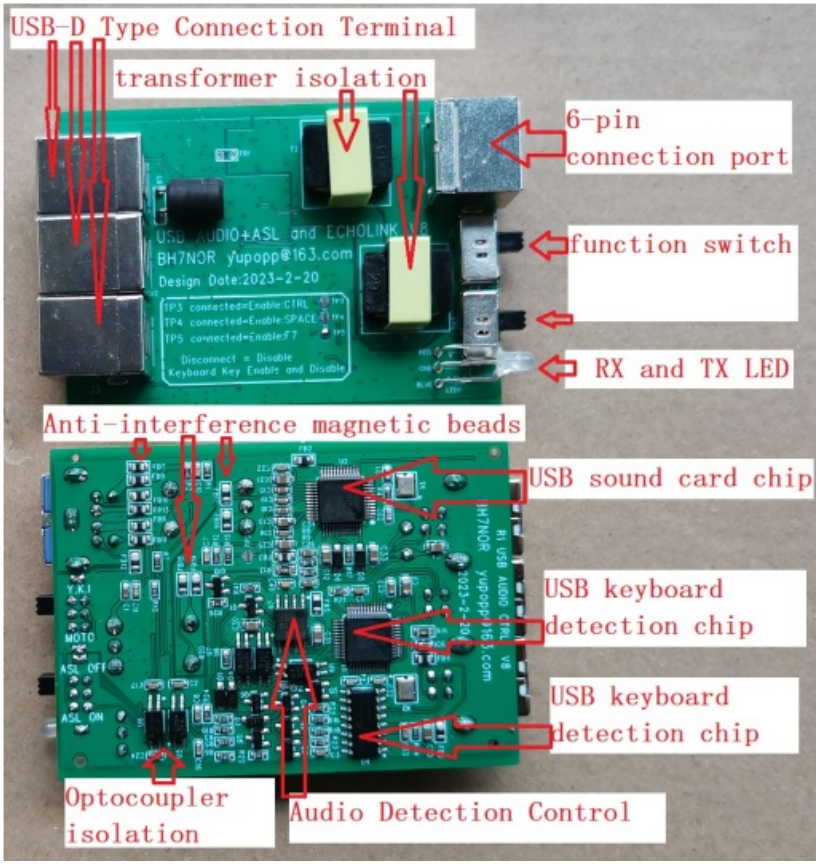
By getting the radio link to the network, you can set up radio links or relay links and extend the range radio transceiver or repeater, therefor global radio link is achieved.



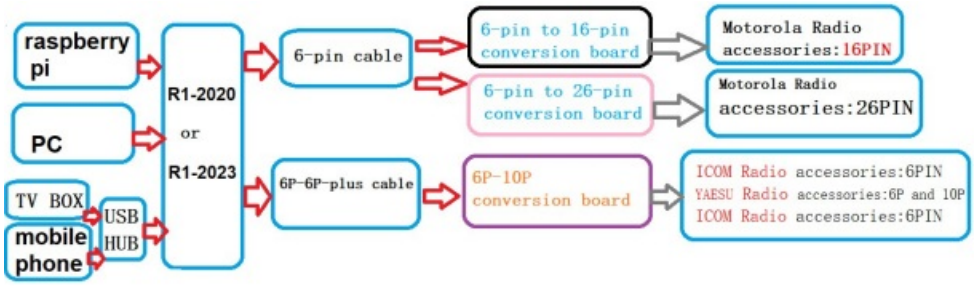
The software that this product supports is.

- AllstarLink ECHOLINK, ZELLO, SSTV, psk31, SKYPE, QT, YY, and other chat intercom and data transfer software.
- **Notes:** There are some software are that do not support 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

R1 external screen function description with laser engraving

- **TX:** RED" and "RX: B/G are 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.
- **Note 2:** “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 a 6-pin cable and a “6-pin-16 pin conversion board”. R1 connects Motorola radio;
- Use a 6-pin cable and a “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:

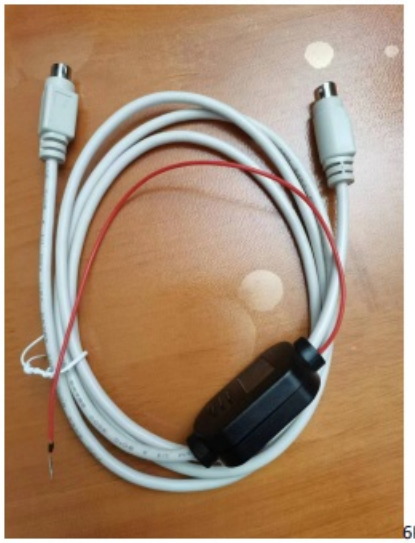
- USB serial port, connect to PC when running ECHOLINK / PSK31 / SSTV …;

R1 Link YAESU/ ICOM/ KENWOOD Radio Description

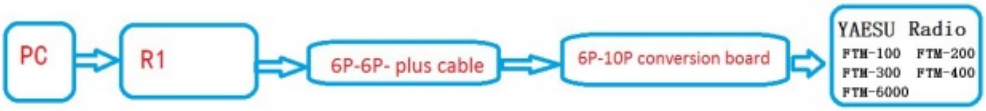
- **Note:** Before purchasing R1 to connect to YKI, first confirm the level prerequisites: TNC data port squelch level: high (activated), menu setting rate: 1200BPS. Switch position:Y/ K/ I
- The accessory 6-pin-6-pin connecting cable attached to the machine is limited by the internal SQL signal drive capability of the radio. It includes but is not limited to the following models for connection use:

YAESU: FT-7800, FT-7900

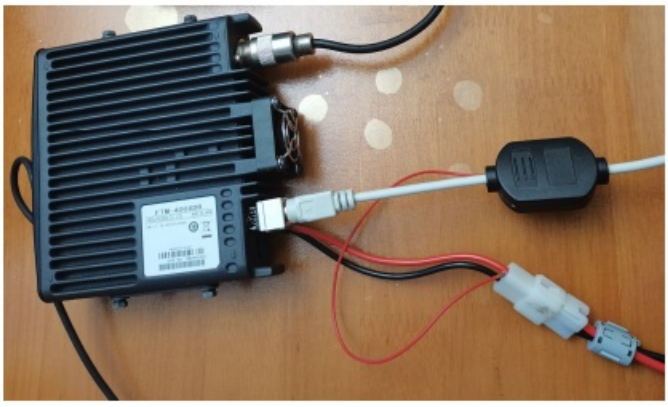
- In February 2023. Hand-made accessories 6-needle thread enhanced version, temporary number: 6P-6P-plus, including but not limited to the following models for connection use:
- **ICOM:** IC-207H, IC-208H IC-2720H IC-2820H
- **YAESU:** FT-8800 FT-8900 FT-817 FT-818 FT-847 FT-857 FT-897 FT-991
- **KENWOOD:** 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)

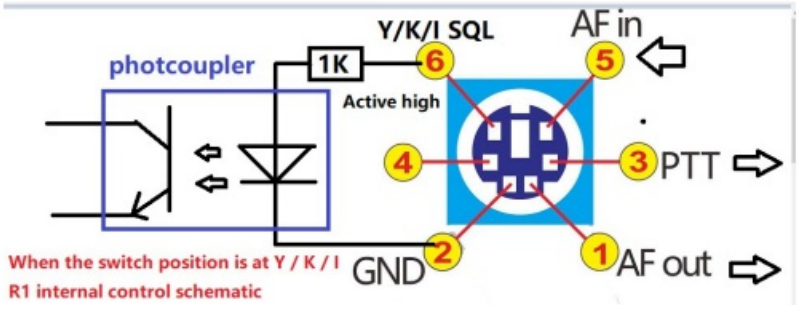


YAESU FTM-400 menu “DATA” setting reference:

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 / 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 panels “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 limited 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, the 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 the 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 an integrated driver; hence, installation is not needed.
- USB mouse middle key detection chip: the Windows operating system also has an 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

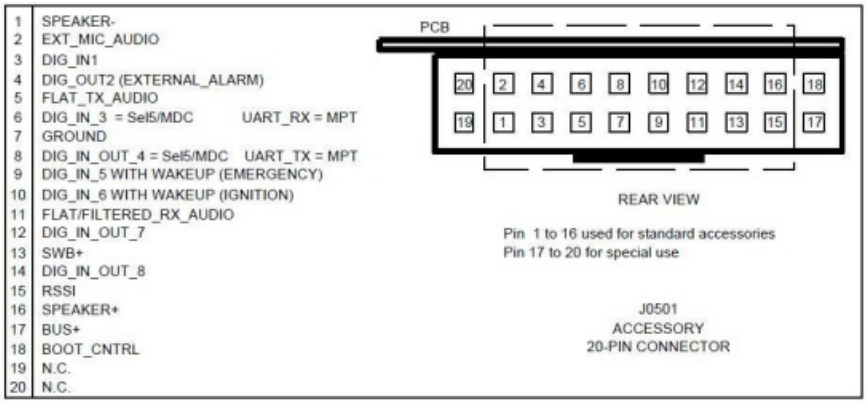
Important function microphone settings:

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

Motorola CDM-1250 connected

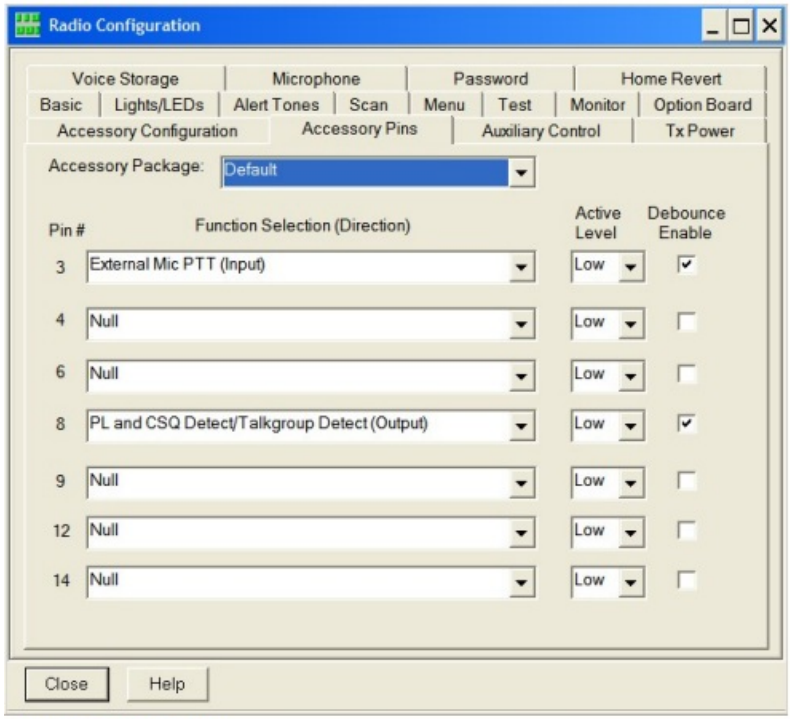
Motorola CDM-1250 connected to R1-2020 use and settings

CDM-1250 accessory connector definition.



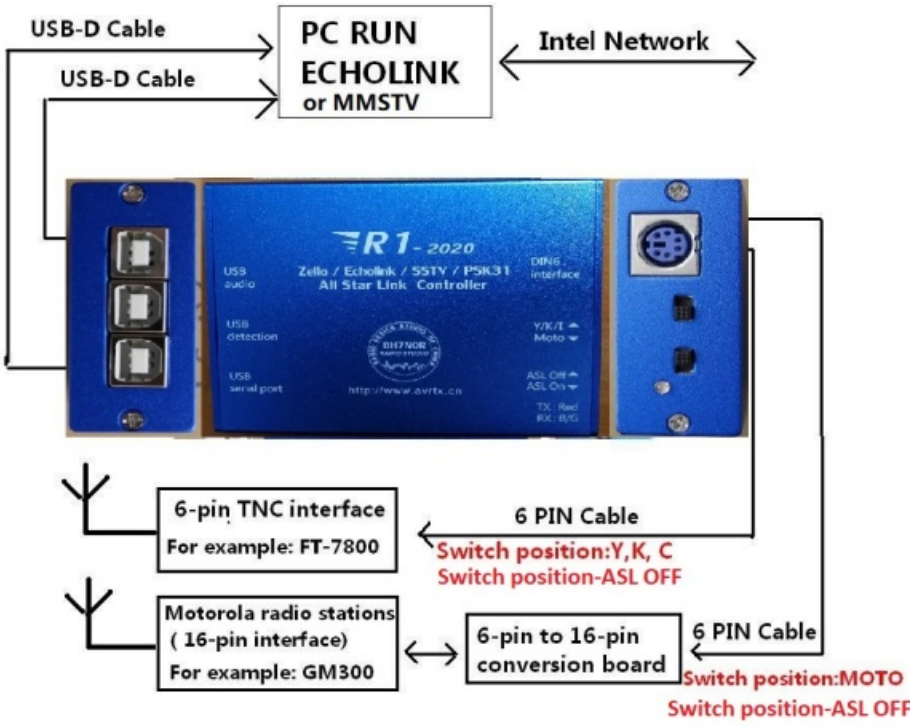
Use” 6-pin to 16-pin conversion board” to insert CDM-1250 accessory connector 1-16

CDM-1250 “CPS” programming setting:



(Need to select "Enable")

ECHOLINK and MMSTV Connect to use



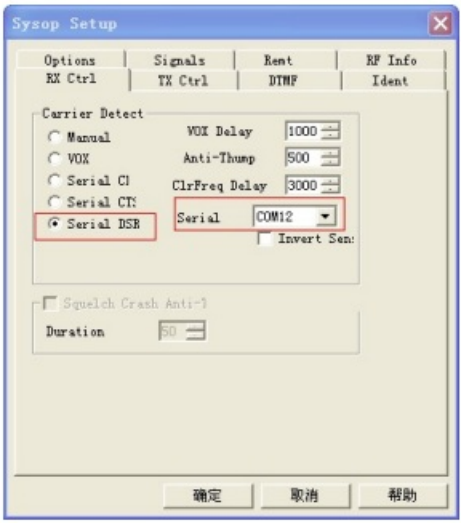
ECHOLINK Set reference

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

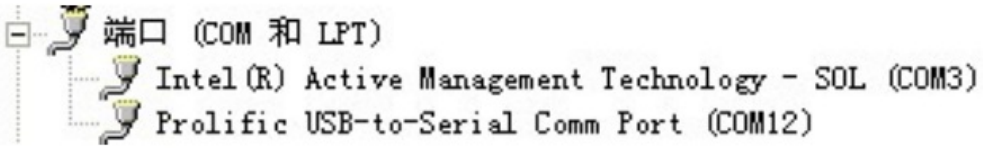
- Input and output volume setting, please set to the system audio management interface

Important function microphone settings

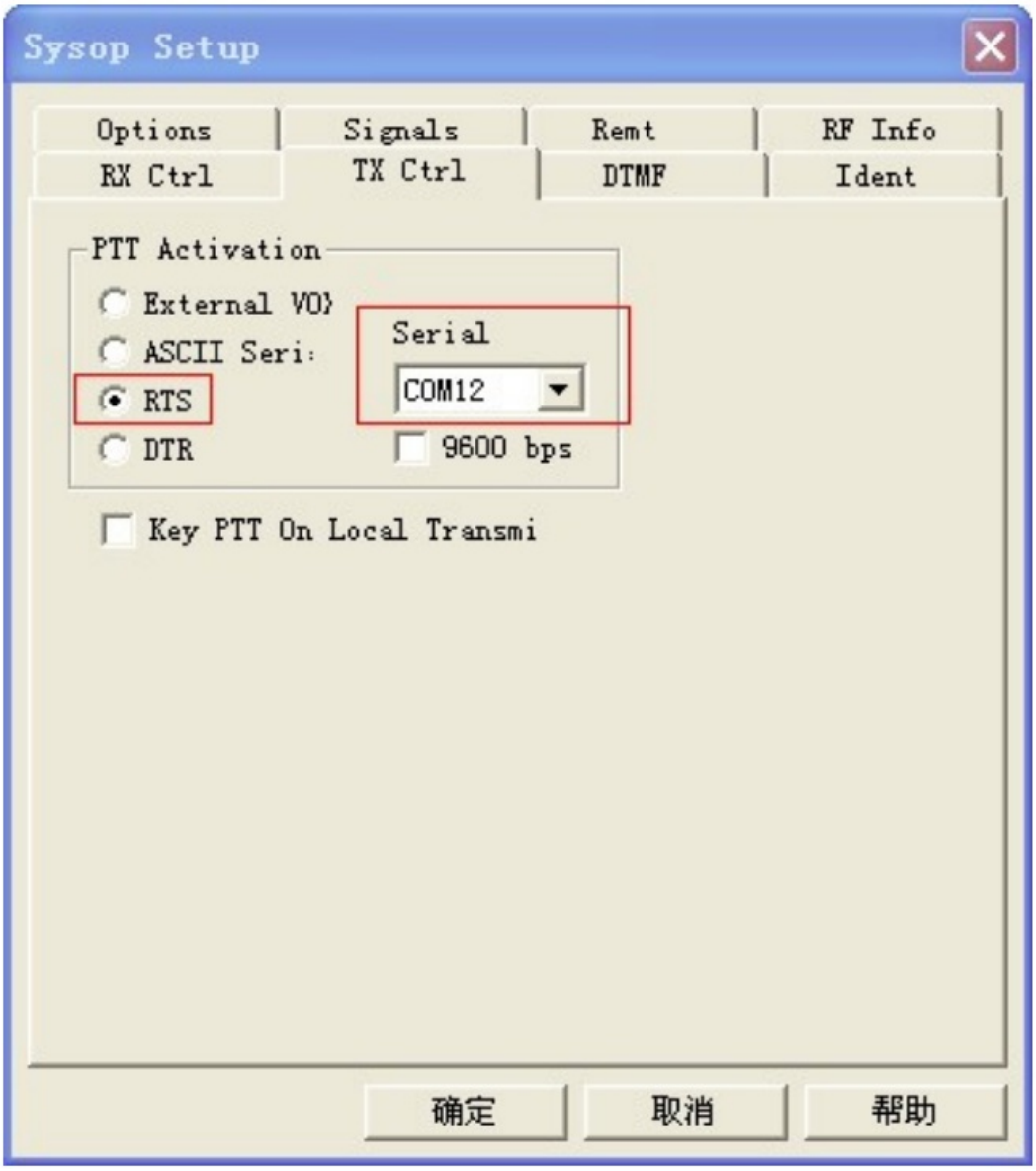
- System audio management interface, do not select the microphone to enhance or AGC, if you select the option, the audio of the other party will be very loud and noisy.



- Set receive control as Serial DSR
- **Select:** the USB serial number

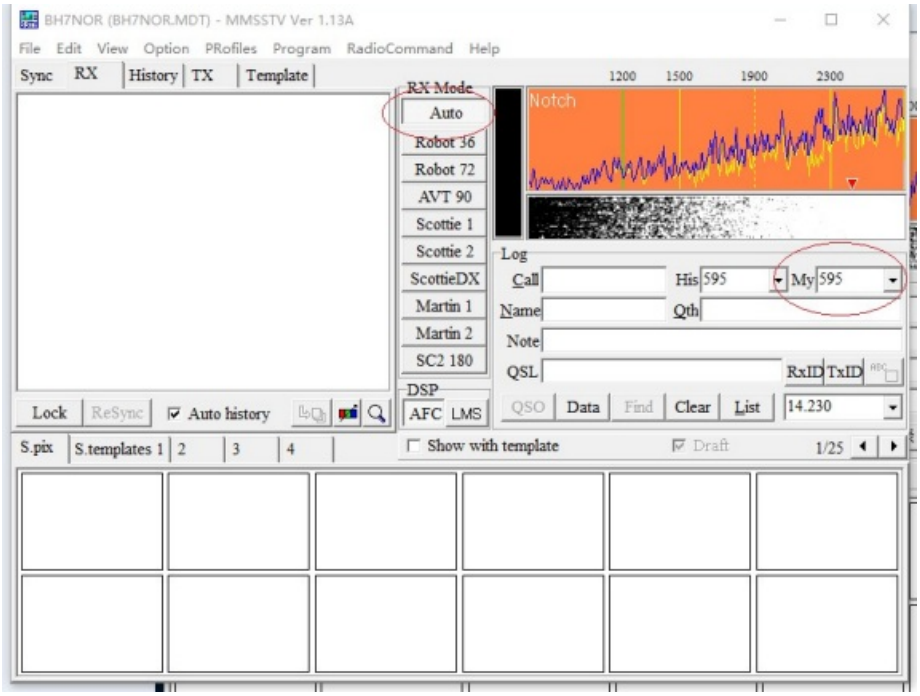


USB serial number, see the hardware manager

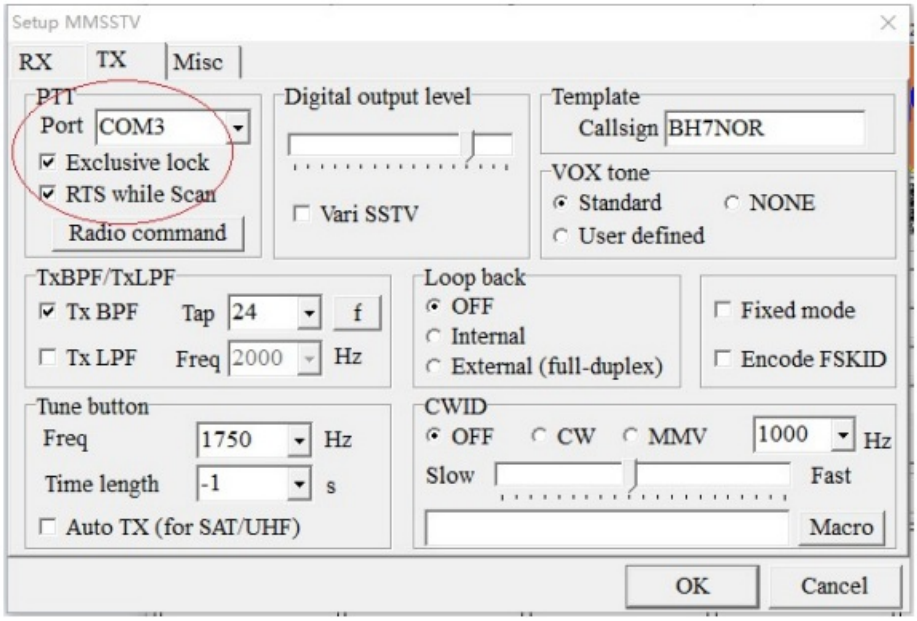


- **Set the launch control as** Serial port RTS
- **Select:** the USB serial number
- **Note 5:** Regarding this R1 appliance box, please be informed that when the PC is restarted, it will become abnormal. Please power off/turn off the radio power supply first, then only restart the PC.
- The reason for the above problem is related to the driving control principle of the R1 and PC. There is no solution to this problem yet.
- For the extra info, if the R1 control encounters abnormality after the PC is turned off, please set “PC shutdown = USB no power supply” in the PC BIOS.

MMSTV Set reference

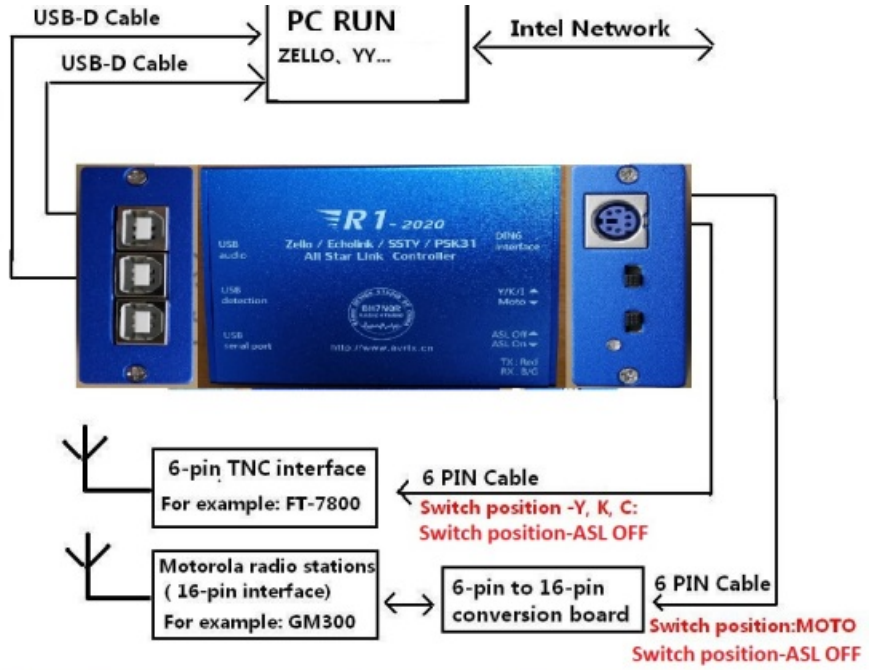


Select RX MODE: AUTO

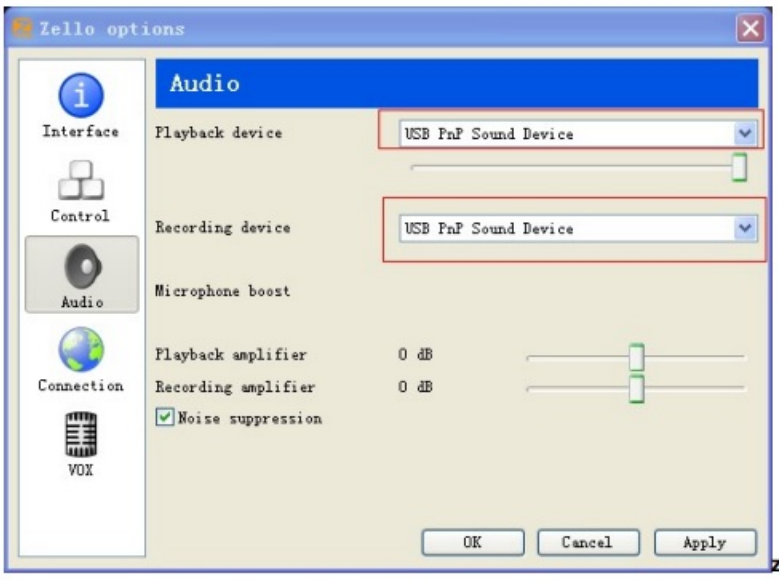


Select: USB serial COM number, Select Exclusive Lock and RTS While Scan

Below is the connection to use in ZeLLO



The “set reference” for ZeLLO

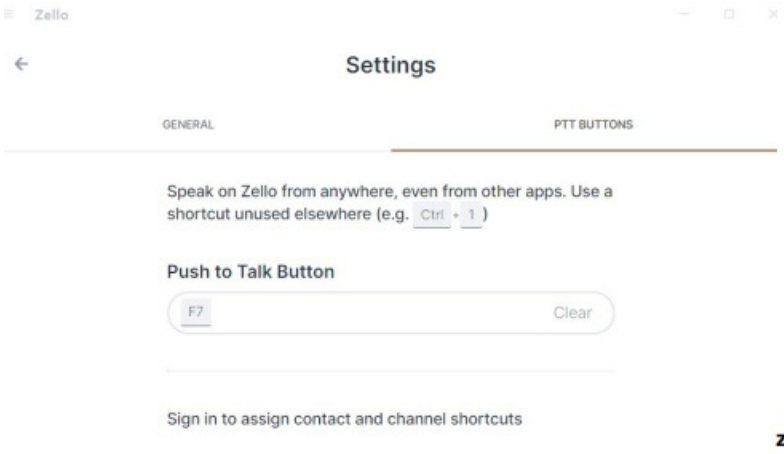


zello ver 1.38

- 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 the other party will be very loud and noisy.

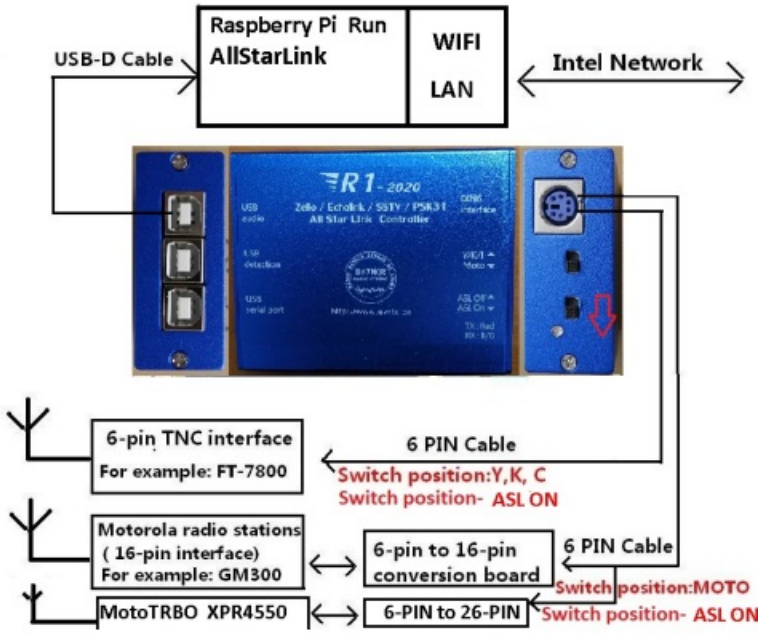
Select ZeLLO detection as ” keyboard F7

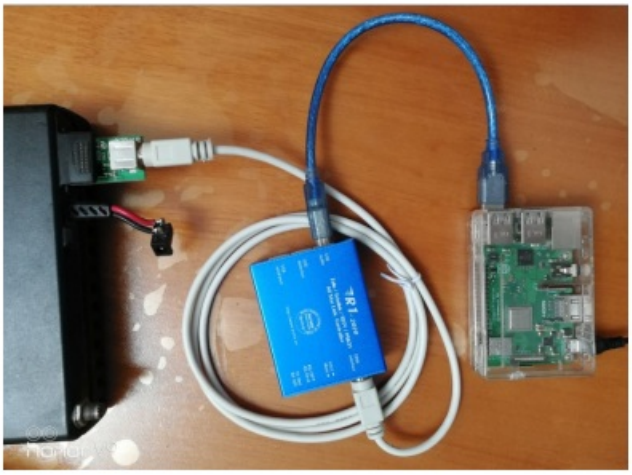


zello ver 15.0.1

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

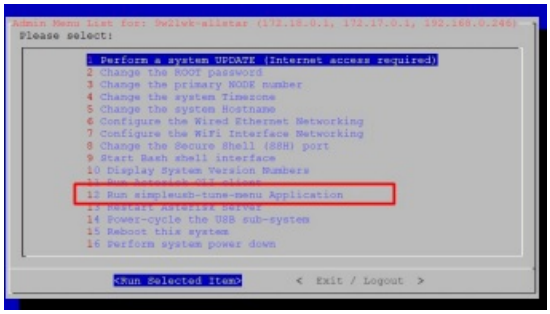
AllstarLink Connect to use



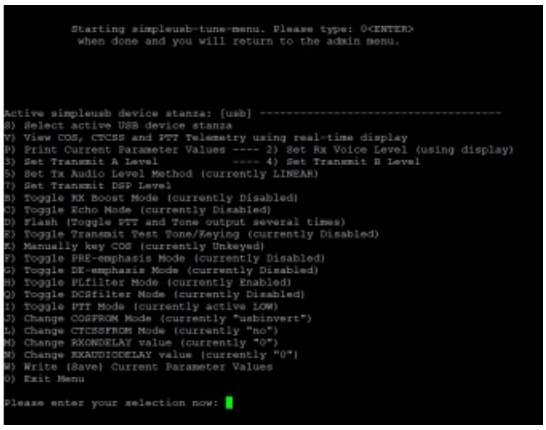


Allstarlink settings and Raspberry Pi system mirror download URL:
https://allstarlink.org/https://hamvoip.org/allstarlinkr image download: https://hamvoip.org/#download

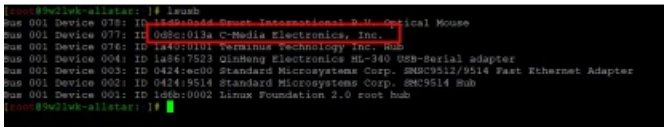
R1 hardware-related settings of Allstar link:



- just follow the below setting like mine

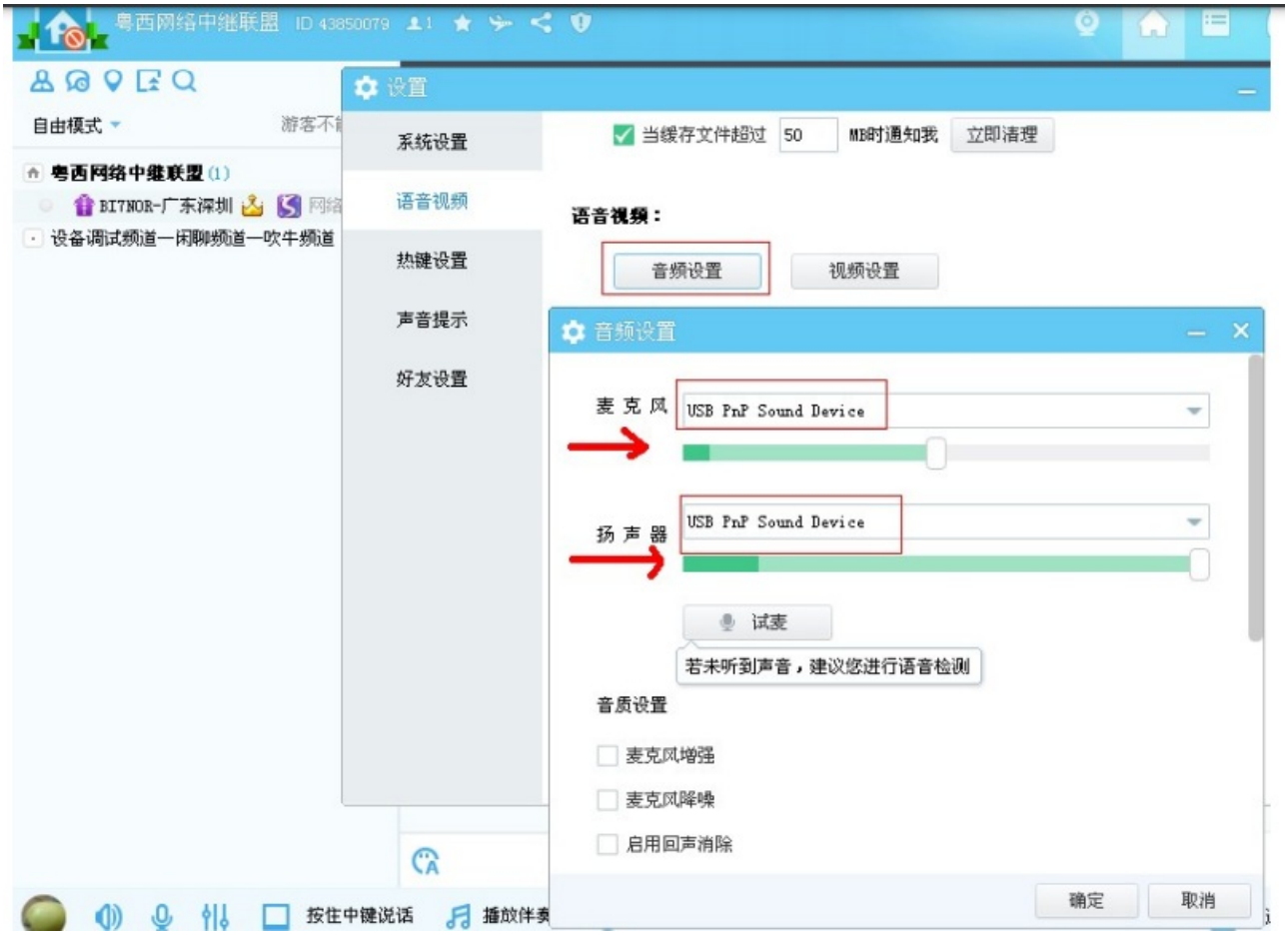


- and make sure you have the toggle here.



- **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 the Chinese Simplified version)

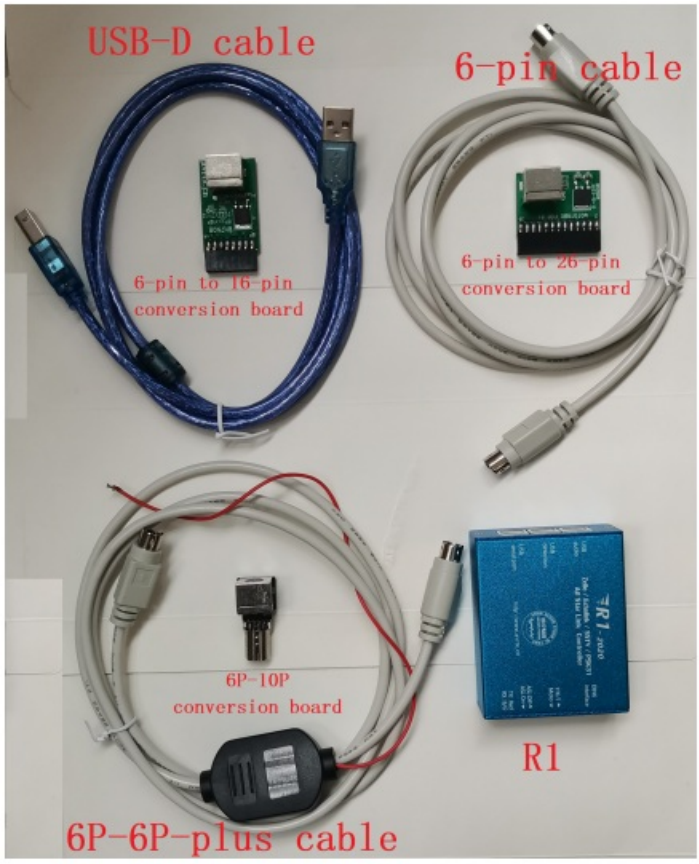


- On the YY channel, select both the microphone input and speaker output to “USB PnP Sound Device” on the system audio management interface, please do not select microphone enhancement or AGC, if you select the option, the audio of other party will be very loud and noisy

- 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 (select the green point, and click the middle mouse button).
- External radio transmission is the internal default control, it does not need to be set.
- **Tip:** The middle mouse button control function should be reserved for YY software.
- To avoid mis-forwarding network communications, other software can not overlap/reuse/override the middle mouse button.

- The last two suggestions are to disable the voice prompt function. This is to avoid miss triggers in communication.

Accessories list



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

Documents / Resources

	Avrtx R1-2023 Radio Network Link Controller [pdf] User Manual R1-2023, R1-2023 Radio Network Link Controller, Radio Network Link Controller, Network Link Controller, Link Controller, Controller

References

- AP510 AP610 AvrTx SainSonic software download
- avrtx.cn/download/USB%20driver/CH340/CH340%20DRIVER.ZIP
- AllStarLink.org
- User Manual