

R1-2023 User Manual ver 1.2

Zello **EchoLink** SSTV **PSK31** AllStarLink **TeamSpeak** Mumble **ESChat** **Controller**
Radio-Network link Controller



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Product features are as below :-

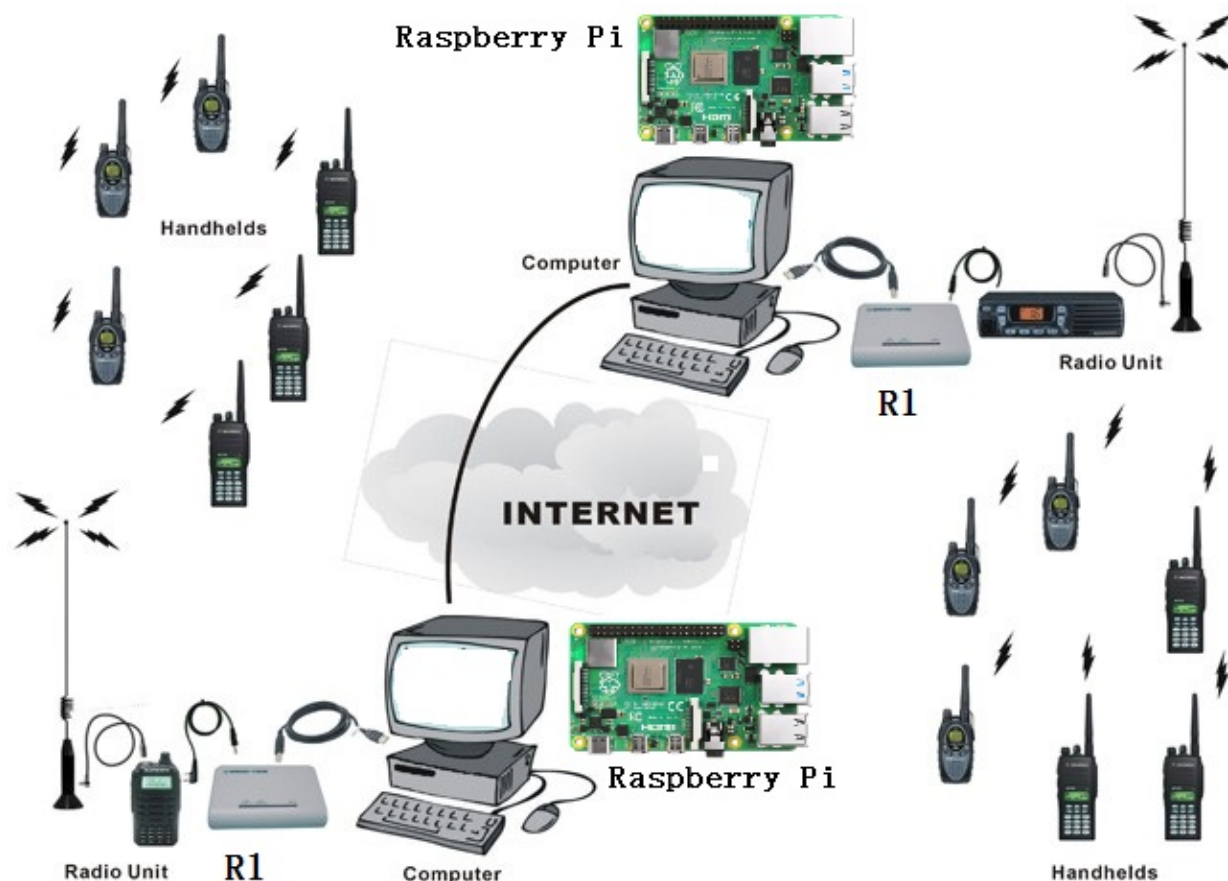
- 1, Built-in USB sound card chip, with high-quality audio input and output.
- 2, Built-in USB serial chip. E.g. launch control using **RTS**, receive control using **DSR**. (ECHOLINK User)
- 3, The built-in audio detection chip controls the radio's **PTT** button and outputs the sound to the speakers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

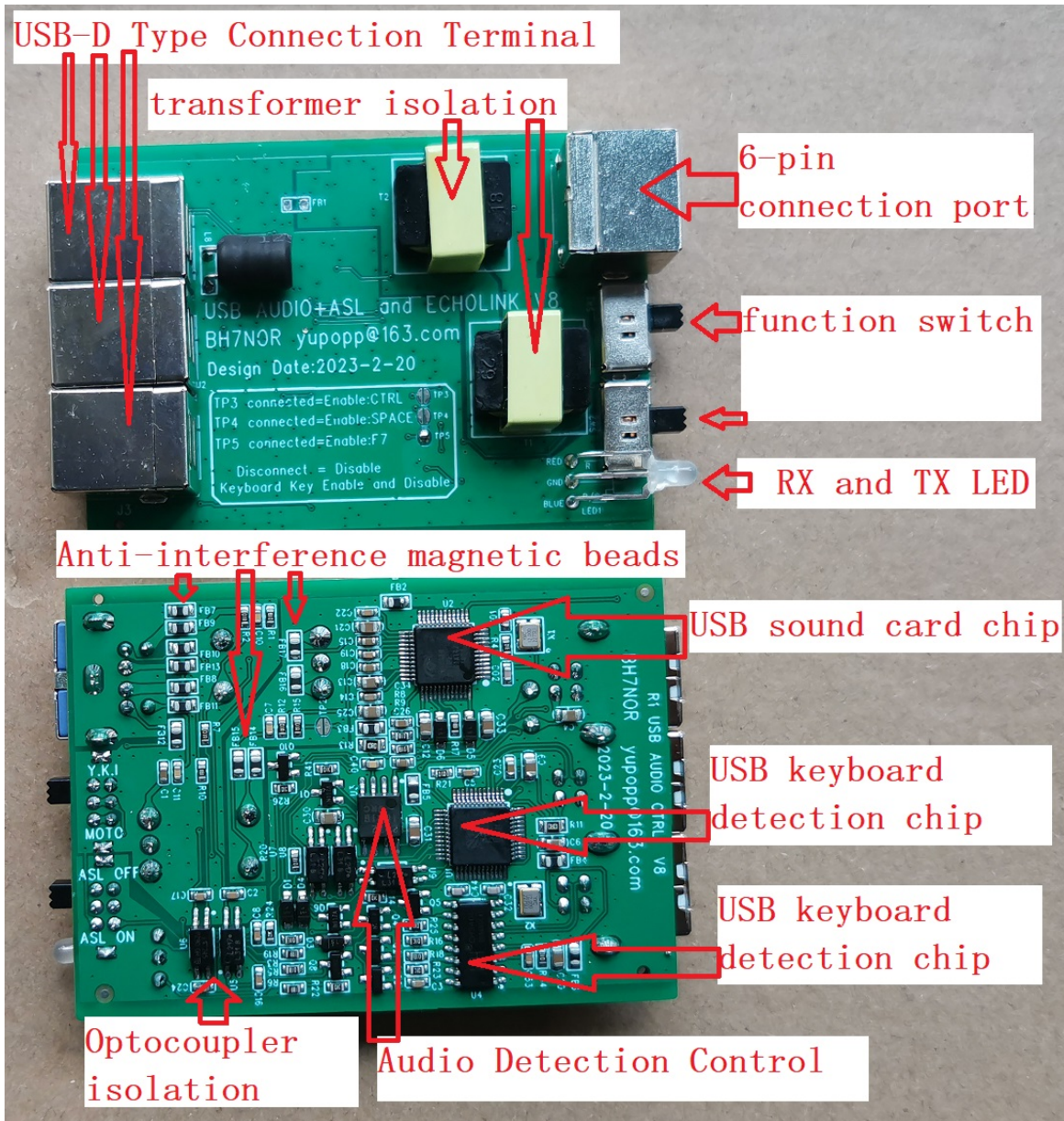


The softwares that this product supports are :-

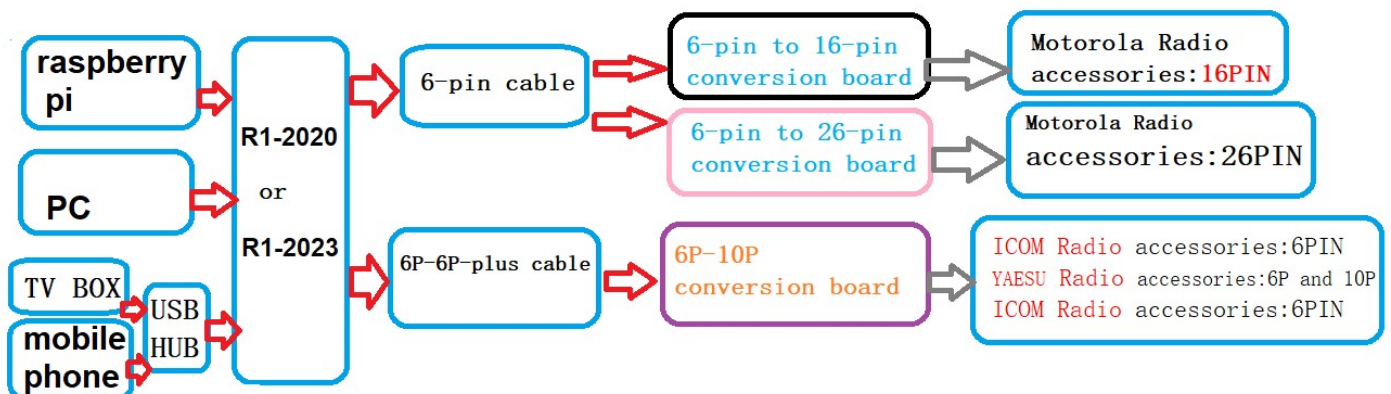
AllstarLink, ECHOLINK, ZELLO, SSTV, psk31, SKYPE, QT, TeamSpeak, Mumble,YY and other chat intercom and data transfer software.

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, TM-G707



6P-6P- plus cable

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

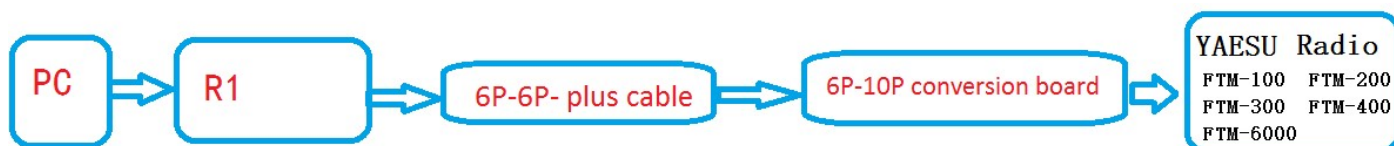
Yaesu repeater: 12V power needs to be obtained from pin 15 of the CONTROL I/O port and connected to the red wire

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-150, FTM-200, FTM-300, TM-310,FTM-400,FTM-500,FTM-510, FTM-6000,

YAESU repeater: DR-1, DR-1E,DR-1X, DR-1X FR, DR-1XE, DR-1XE FR, DR-2X, DR-2XE, DR-1XLAN

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



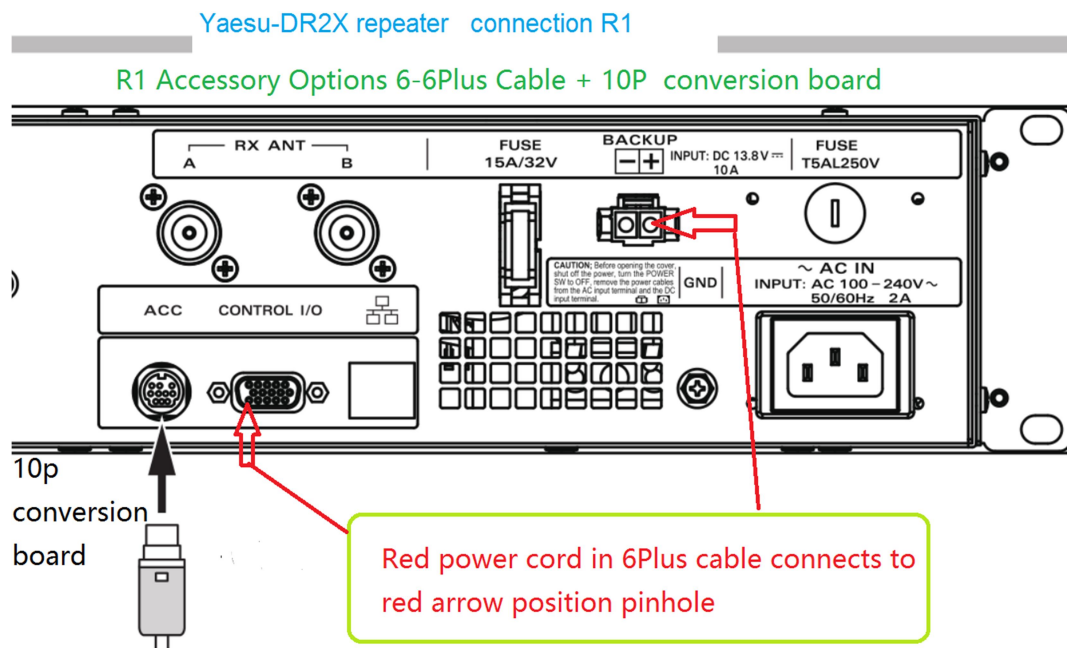
The following is the picture of R1 connected to FTM-400: **(R 1 Switch position:Y/ K/ I)**



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	<u>APRS</u> : MAIN BAND / SUB BAND / A-BAND FIX / B-BAND FIX / A=TX/B=RX / A=RX/B=TX <u>DATA</u> : 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

YAESU FTM-400 menu "DATA" setting reference

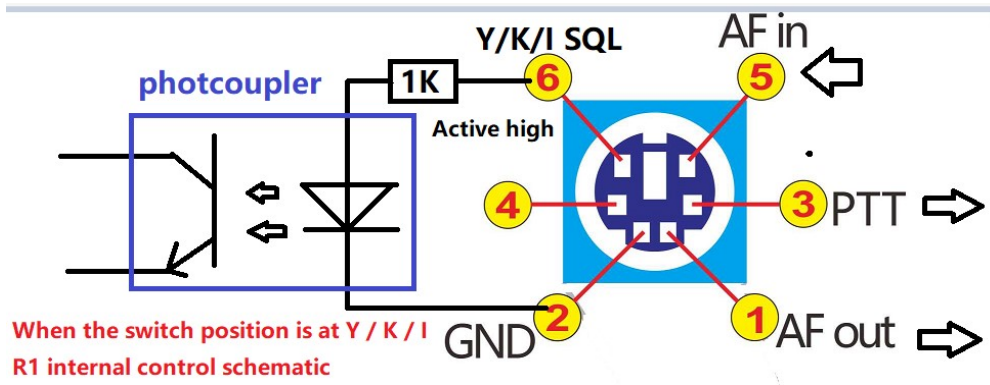
Note: The data transmission of the TNC port of FTM-400 is enabled by default. It is disabled by the "SQL" signal level control triggered by panel "A" and "B" receive frequencies. Therefore, the reception frequency SQL level for panels "A" and "B" should be set to favor "High Threshold". If the SQL level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



The 6-6PLUS cable requires power from the DR-2X repeater. Referring to the attached diagram, connect the red power wire of the 6-6PLUS cable to the positive terminal of the DR-2X repeater's spare battery, or to pin 15 of the "CONTROL I/O interface". This uses the DR-2X's internal power output, eliminating the need for an external power supply.

Note: I do not have the programming setup instructions for YAESU repeater: DR**. You will need to figure out the programming settings yourself!

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



Important programming settings:

When the radio receives a signal, the squelch (COS or SQL) output level should be **high (active)**, and the switch position should be "YKI"; if the squelch (COS or SQL) output level is **low (active)**, the switch position should be "MOTO". This is the condition for the R1 box to work properly.



The following example demonstrates how a user can connect an R1-2023 box to another walkie-talkie using a connection cable. I only know that the connection works correctly after the connection and programming settings are configured; I haven't conducted any verification tests, nor have I provided detailed programming setup instructions. You will need to evaluate the connection results yourself!

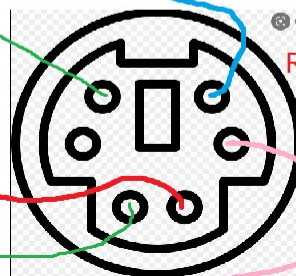
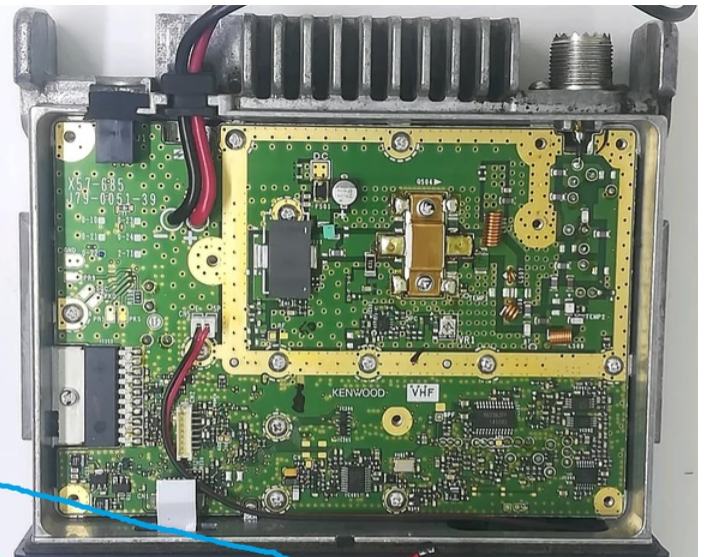
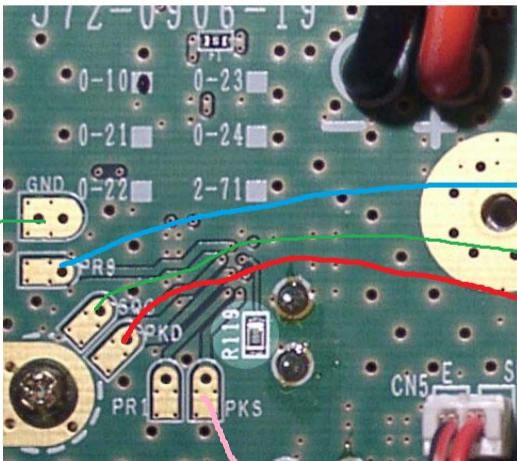
KENWOOD TM-271 connector R1

Kenwood TM-271 Packet Connector, COS and PL Mod

This document is to combine three necessary modifications to the Kenwood TM-271 for use as a remote base radio. For the PL mod I would like to thank Bernie Parker (K5BP) for sharing his modification. For the COR mod I would like to thank Ken Arck (AH6LE).

The first mod is to pull the necessary signal leads out of the radio using the packet connector pads on the circuit board. The US version of the TM-271 is not available with the factory packet connector. This is a very simple mod, the pads are very clearly marked. Simply solder the signal wires to the pads on the board. The pin out is as follows.

- GND is of course Ground
- PR9 is RX Audio
- SQL is COR
- PKD is TX Audio
- PKS is PTT



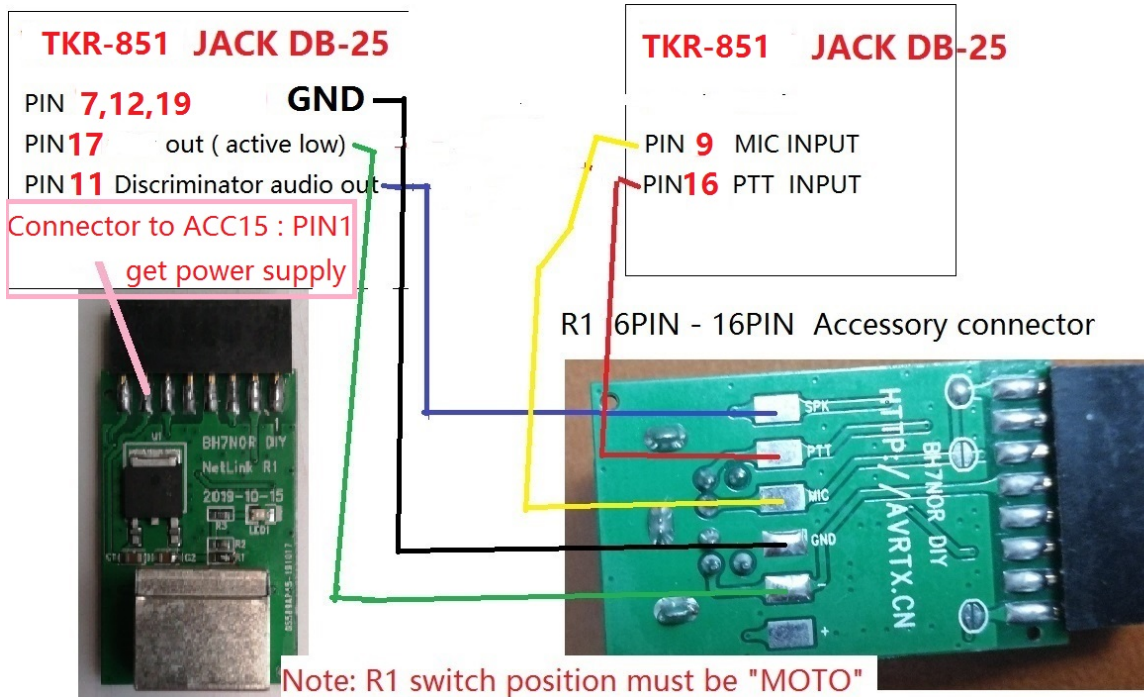
R1 switch position: YKI



The following example demonstrates how a user can connect an R1-2023 box to another walkie-talkie using a connection cable. I only know that the connection works correctly after the connection and programming settings are configured; I haven't conducted any verification tests, nor have I provided detailed programming setup instructions. You will need to evaluate the connection results yourself!

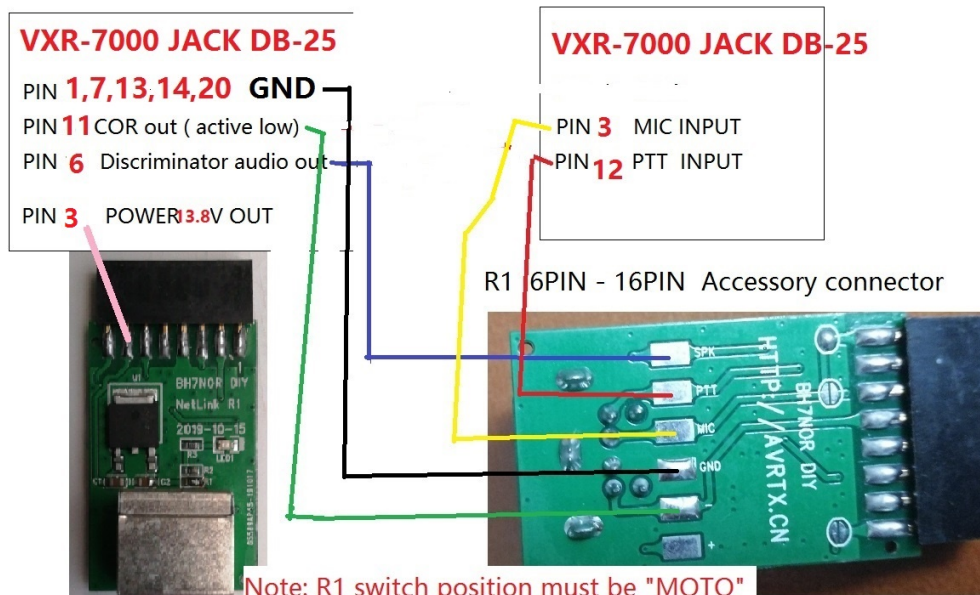
Repeater: KENWOOD TKR-851 connector R1

Two-way radio repeater for **TKR-851** connection R1



Repeater: Vertex Standard VXR-7000 connector R1

Two-way radio repeater for **vxr-7000u** connection R1



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

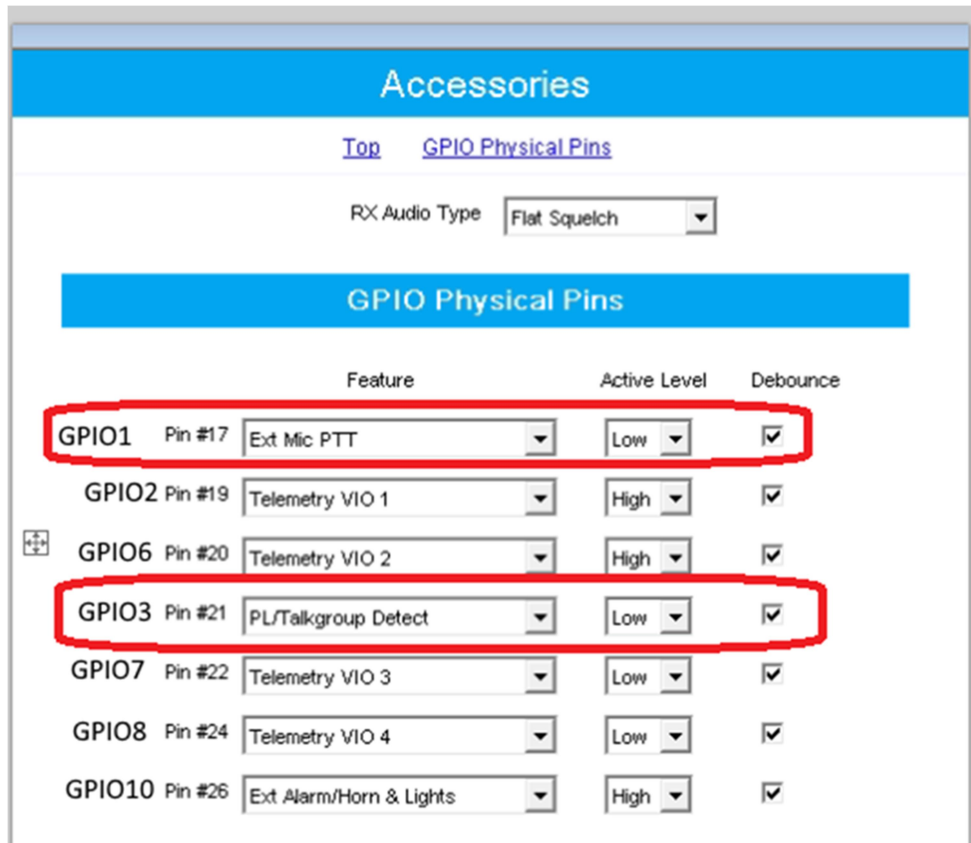
XiR Series : XiRM8200, XiRM8220, XiRM8228, XiRM8620, XiRM8628, XiRM8660, XiRM8668, **XiR-R200 (2023 test passed, Accessory port only supports analog mode)**

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.

MOTOTRBO Use" 6-pin to 26-pin conversion board" connected to R1 use and settings Accessories Terminal Settings by CPS 1



Accessories Terminal Settings by CPS 2

	Feature	
GPIO1	Ext Mic PTT	17 PIN
GPIO2	Unassigned	19 PIN
GPIO3	PL/Talkgroup Detect	21 PIN
GPIO6	Unassigned	20 PIN
GPIO7	Unassigned	22 PIN
GPIO8	Unassigned	24 PIN
GPIO10	Unassigned	26 PIN

Note: Mototrbo cps2 uses GPIO mapping pins, GPIO1 mapping 17 PIN, GPIO3 mapping 21 PIN, the firmware mapping may be different in different regions, you can set the test in order GPIO1-GPIO10 respectively.

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)

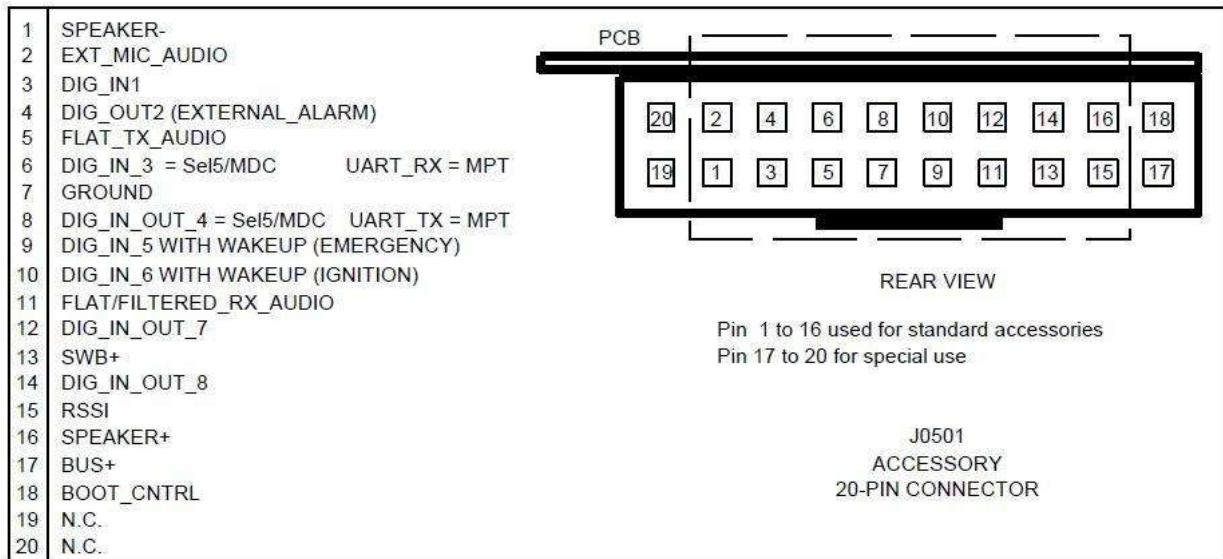


Important function **microphone** settings:

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.

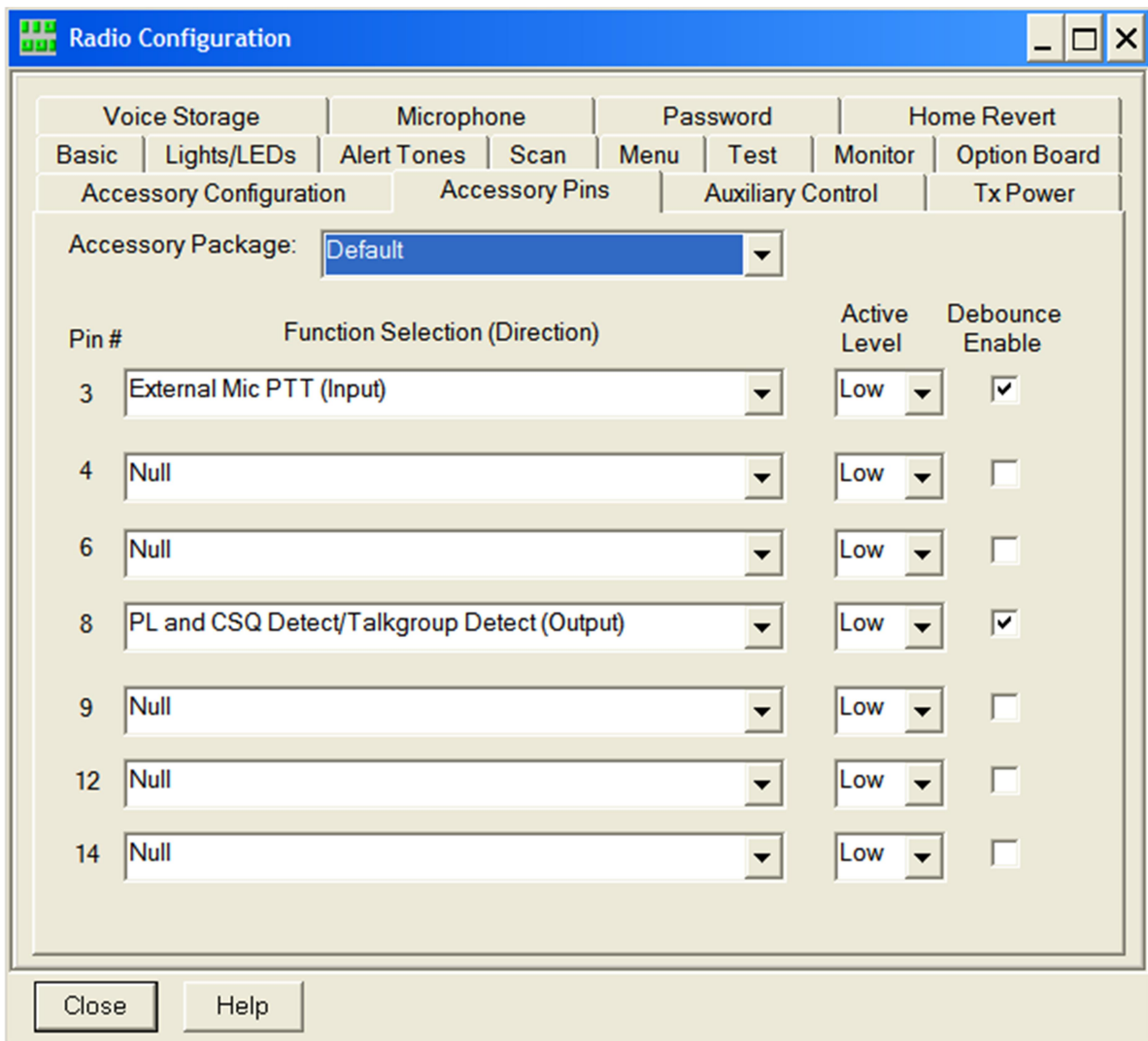
Motorola CDM-1250 connected to R1-2020 use and settings

CDM-1250 accessory connector definition:



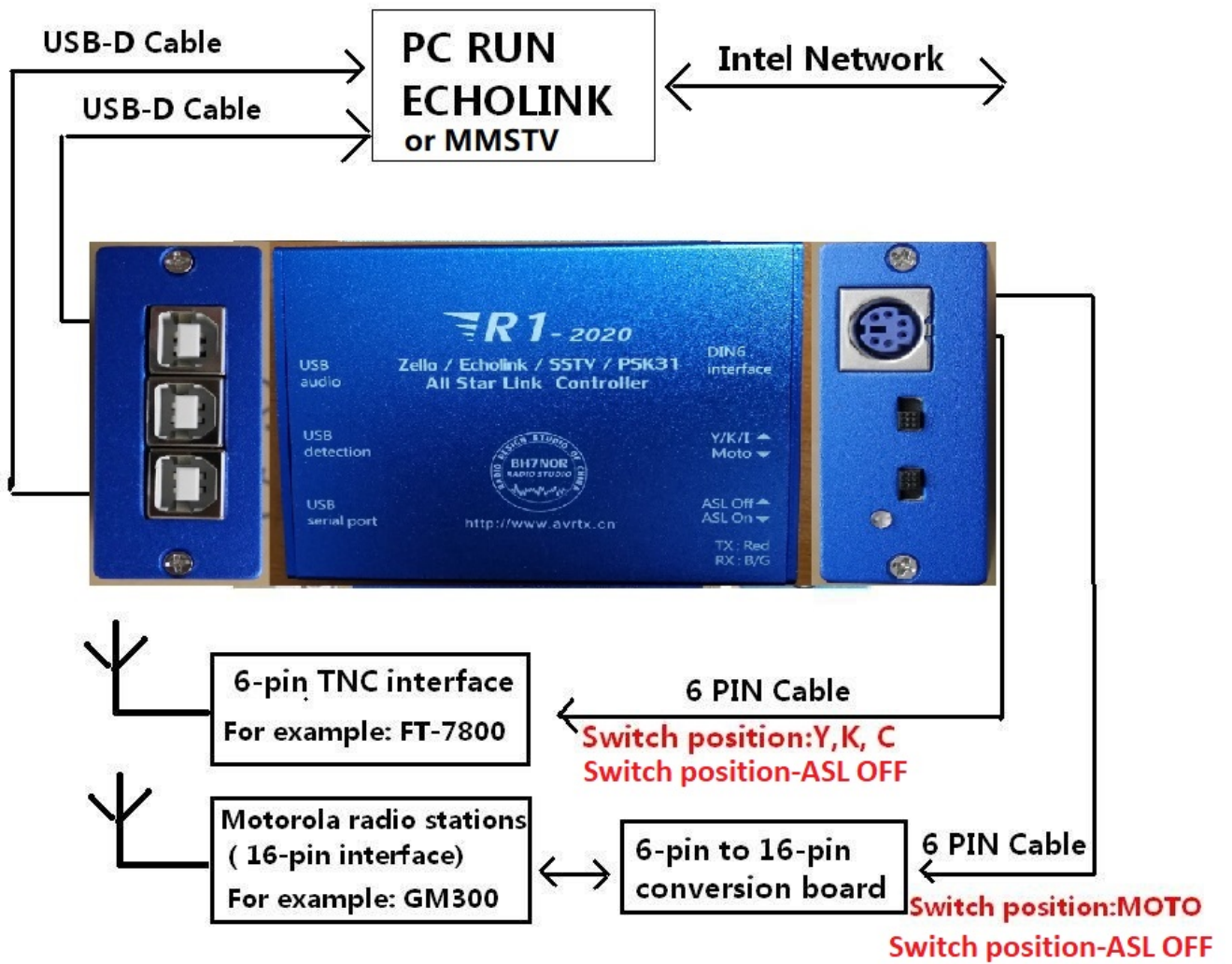
Use "6-pin to 16-pin conversion board" to insert CDM-1250 accessory connector 1-16

CDM-1250 "CPS" programming setting:

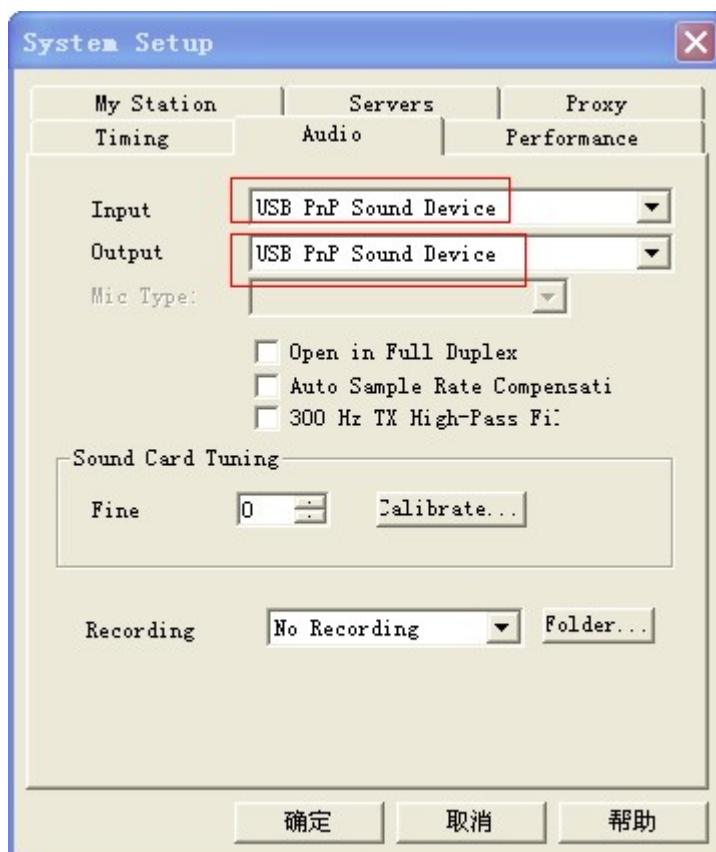


(Need to select "Enable")

ECHOLINK and MMSTV Connect to use:

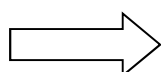


ECHOLINK Set reference



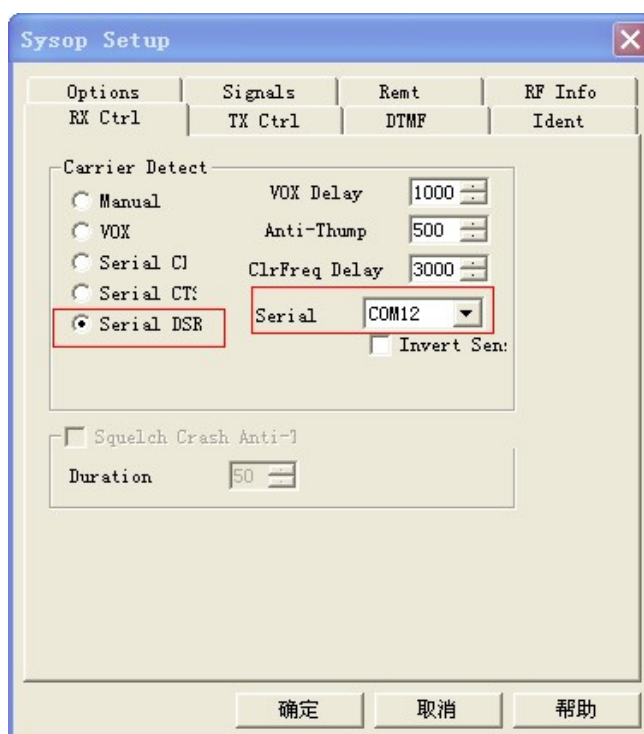
Select audio input and output as: **USB pnp sound device**

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



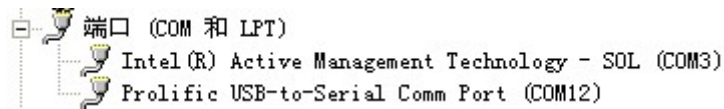
Important function **microphone** settings:

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

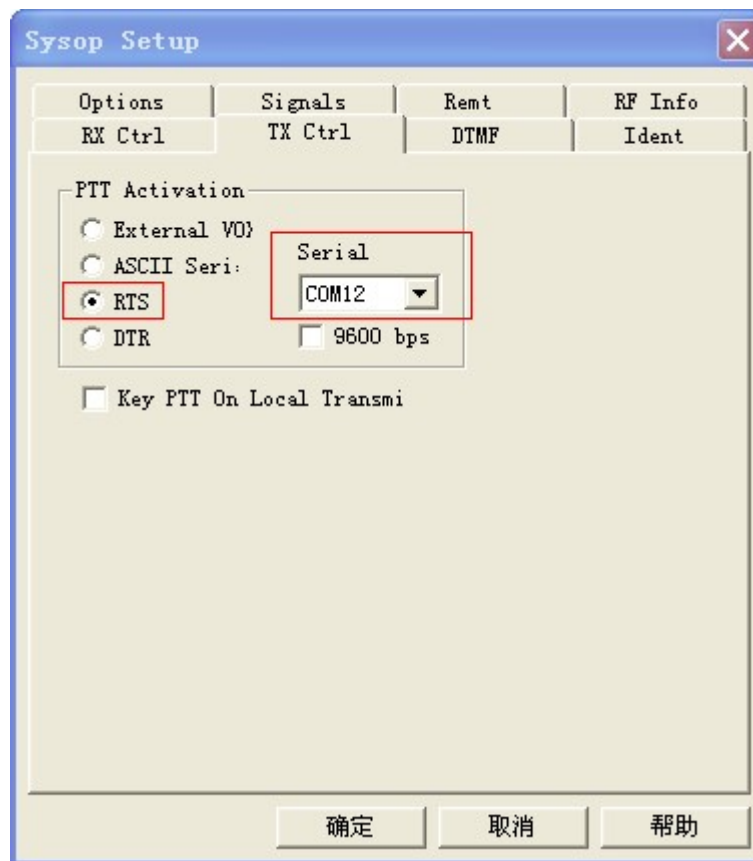


Set receive control as: **Serial DSR**

Select: **USB serial number**



USB serial number, see the hardware manager



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

Select: USB serial number

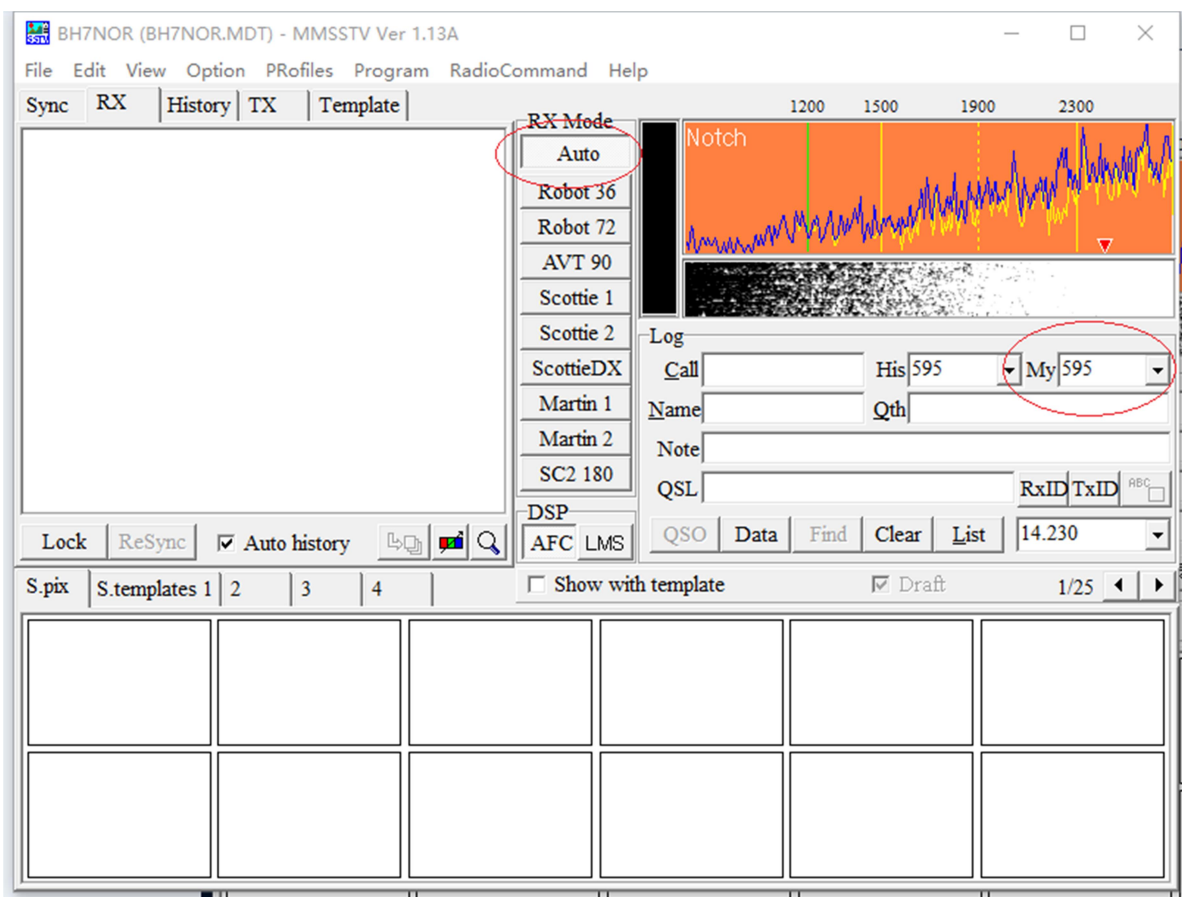
Note 5:

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.

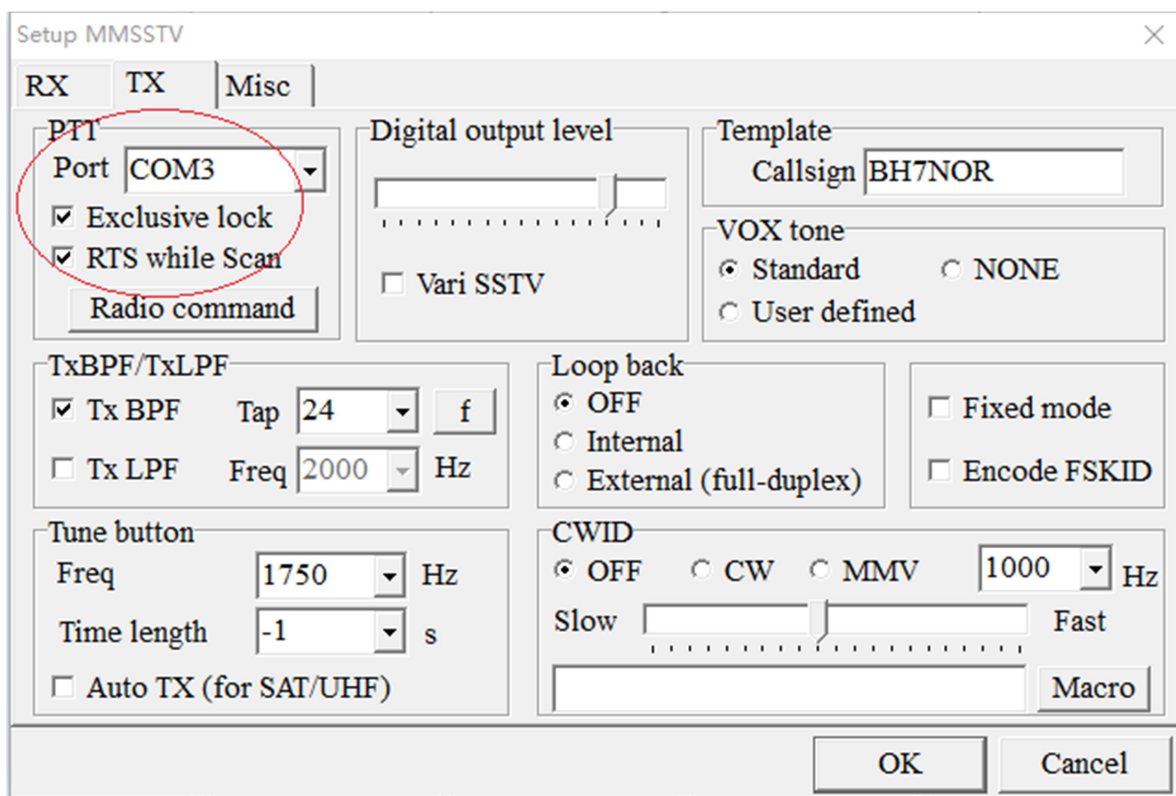
The reason for the above problem is related to the driving control principle of the R1 and PC. There is no solution on this problem yet.

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

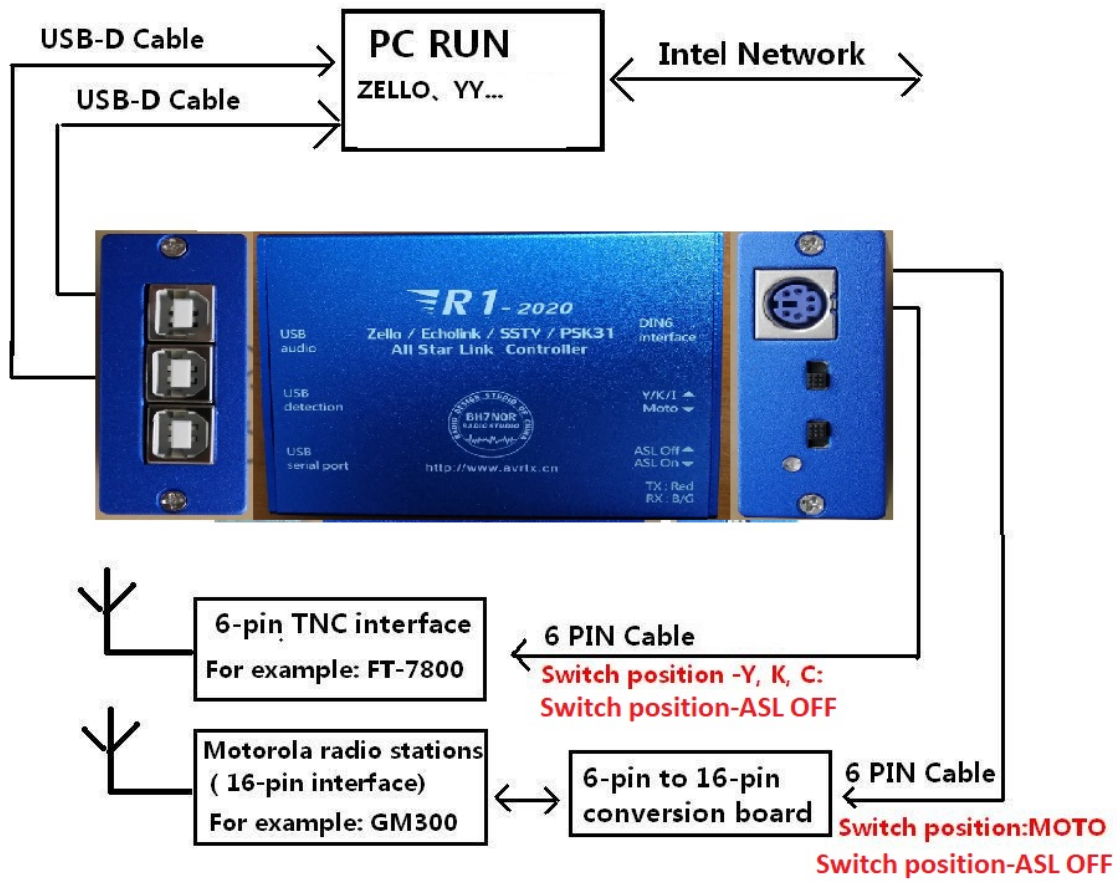


Select RX MODE : AUTO

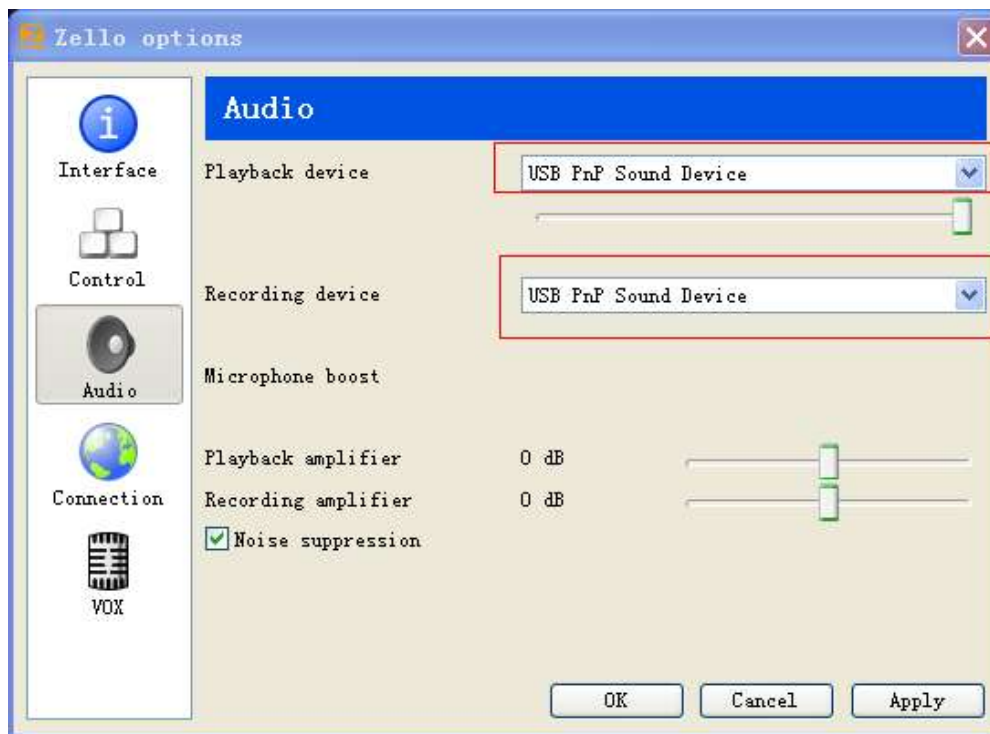


Select: USB serial COM number, Select Exclusive Lock and RTS While Scan

ZeLLO / TeamSpeak / Mumble / ESChat... Connect to use:



The “set reference” for ZeLLO:-

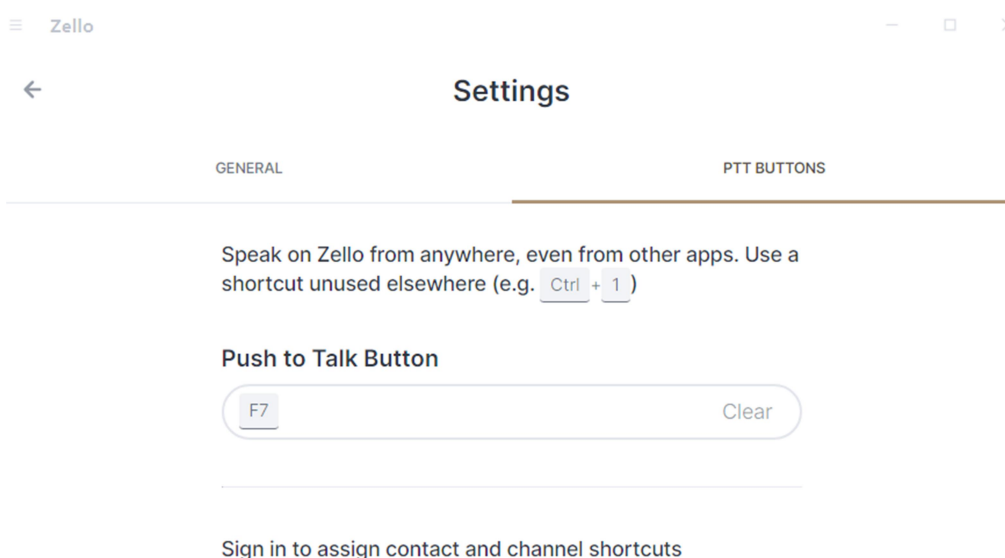


zello ver 1.38

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 "

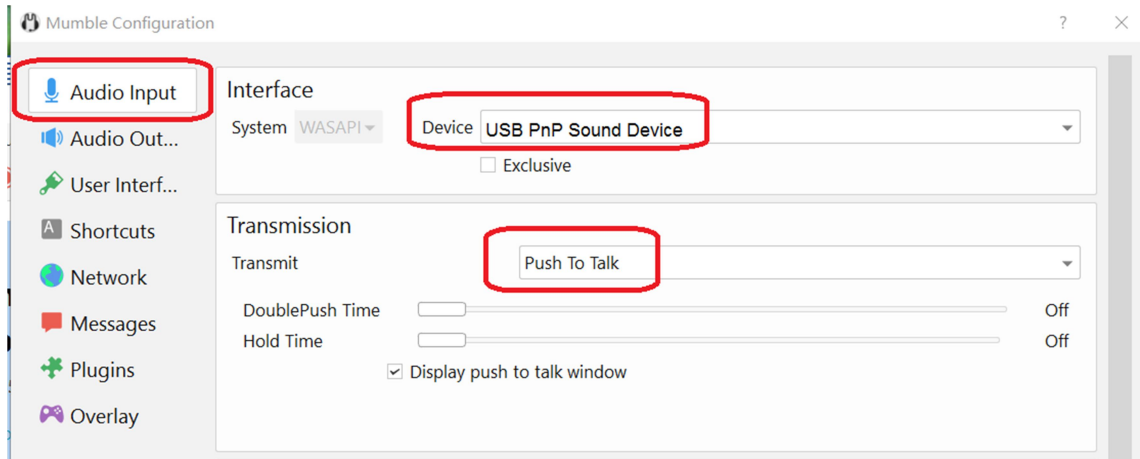


zello ver 15.0.1

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

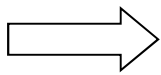
Note: Note: The new version of ZELLO supports any keyboard value, and the internal default keyboard value of R1-2023 is "F7". Therefore, only "F7" can be selected. If you need other keyboard values, you need to change the keyboard values inside R1-2023.

The “set reference” for Mumble:



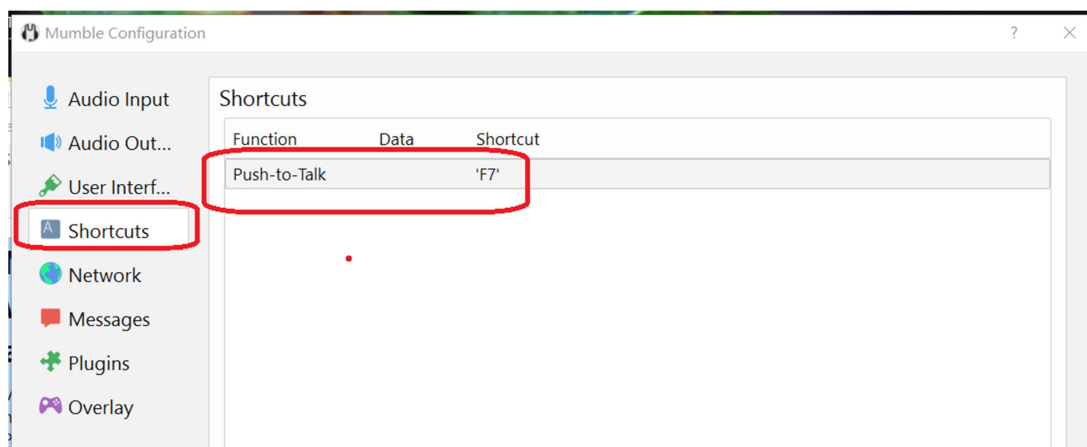
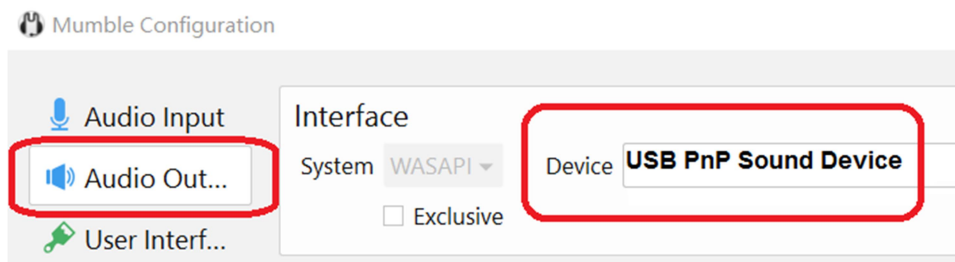
Select audio input and output as: **USB pnp sound device**

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



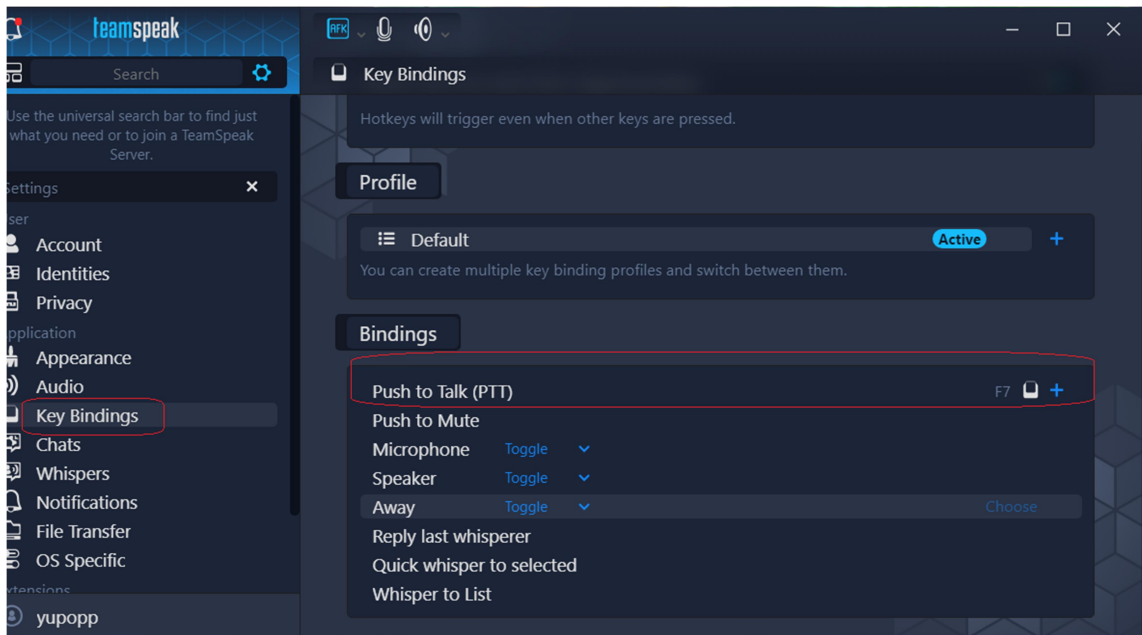
Important function **microphone** settings:

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.



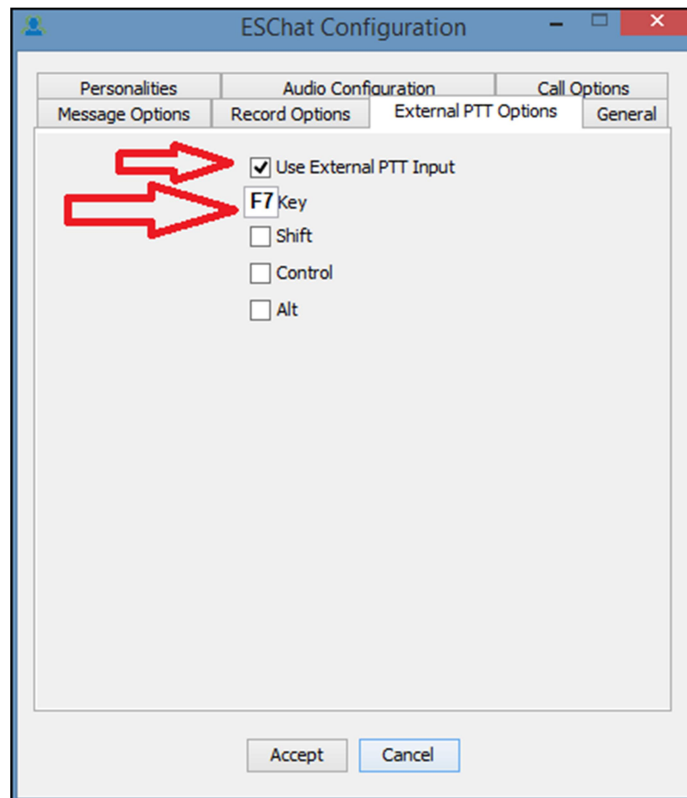
Enter the menu "shortcuts", add the function "Push-to-Talk (PTT)" is the keyboard value "F7"

The “set reference” for TeamSpeak:



The “set reference” for ESChat (Windows) :

To reach the External PTT Options tab, click on the ESChat tab and select "Options." Inside the resulting pop up window, click on the External PTT Options tab.

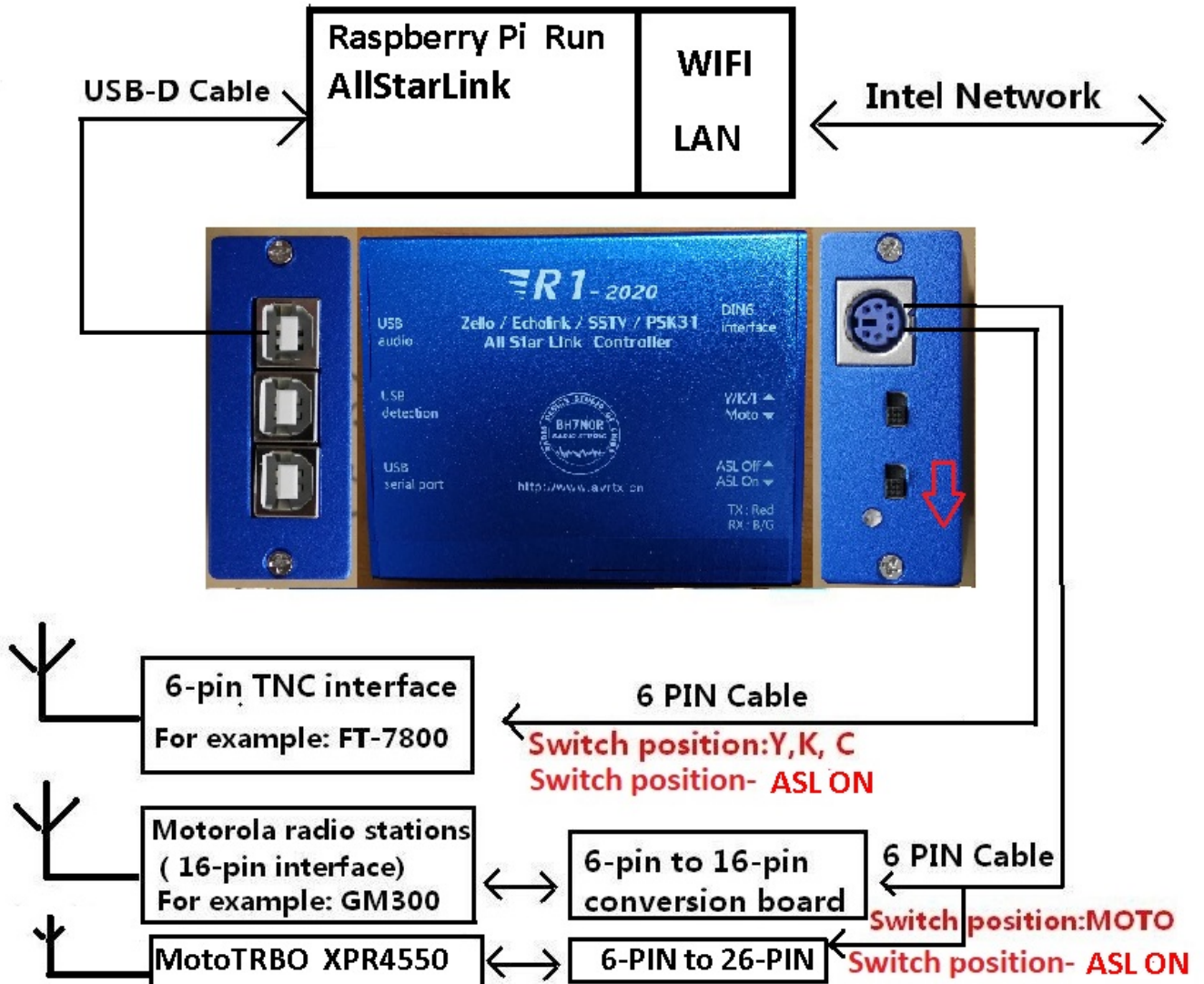


In the "Key" field, select "F7" to use as the key for the PTT talk button shortcut

Note: Do not select key combinations, SHIFT/CONTROL/ALT, R1 is not supported.

If support is required, sales customization is required.

AllstarLink Connect to use:



Allstarlink settings and Raspberry Pi system mirror download URL:

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

ASL3 Setup Manual Download: https://hamvoip.org/howto/hamvoip_v1.5_Allstar_README.pdf

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

R1 hardware related settings of allstarlink:

The following image shows the settings for receiving and transmitting R1-2023 on PI-ASL3 using the 9W2LWK.

```
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: p
USB device String: 1-1.4.1:1.0

Card is: 0
Name is: usb
Rx Level: 100
Rx ondelay: 0
Rx audio-delay: 0
Tx A Level: 900
Tx B Level: 900
Tx DSP Level: 600
preemphasis: no
deemphasis: no
plfilter: yes
dcsfilter: no
rxboost: no

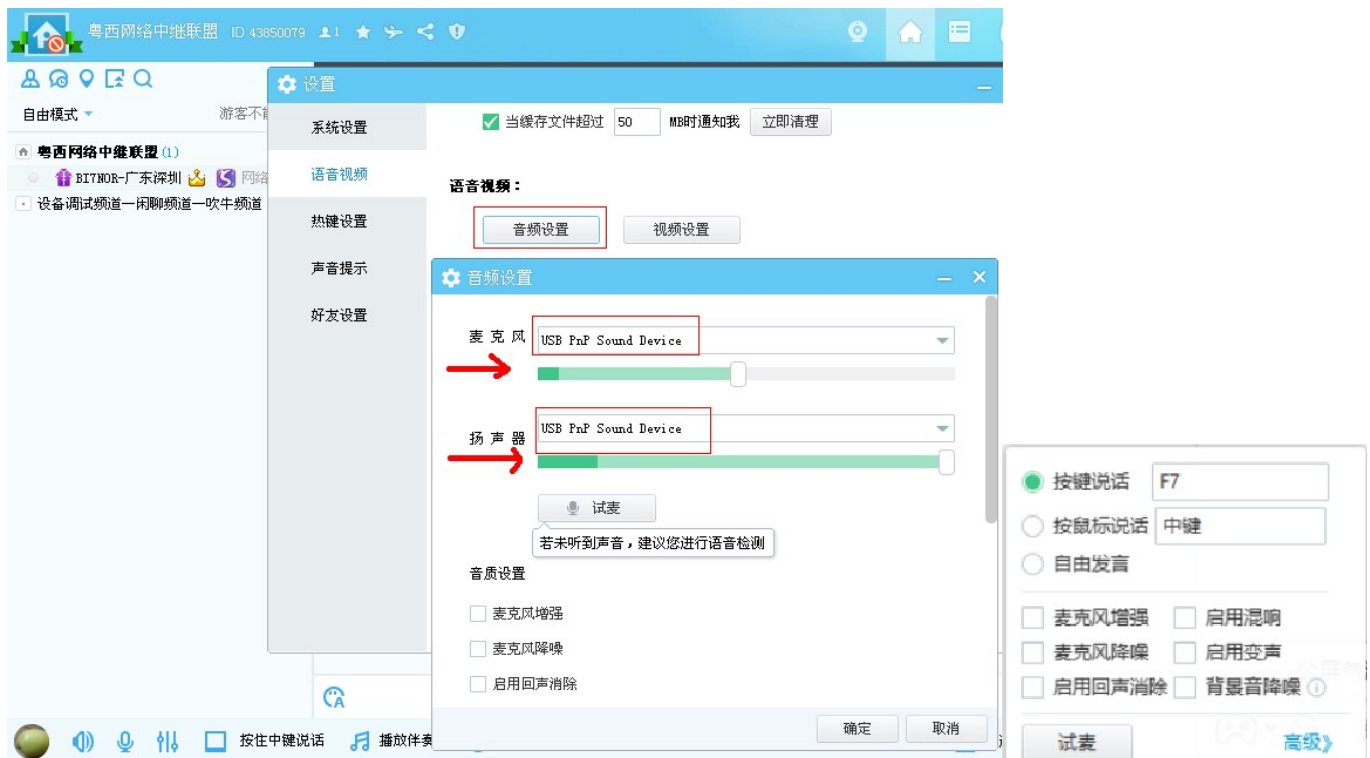
PTT: Active LOW
PTT status: Un-Keyed

CTCSS (input): Ignored
COS (input): CM108/CM119 Active LOW
COS (test): Un-Keyed
COS (composite): Un-Keyed

Press <enter> to continue.
```

Note: Have questions about ASL3 settings? Please contact 9W2LWK (only answers questions about PI-ASL3 settings), 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 up external radio to receive audio sent by the other party over the network, please select “F7” on the keyboard to speak: (select the green dot and then click “F7” on the keyboard). External radio transmission is internal default control and does not need to be set. Tip: The keyboard F7 control function should be reserved for YY software. In order to avoid incorrect forwarding of network communication, other software cannot overlap/reuse/overwrite the key value “F7”.



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

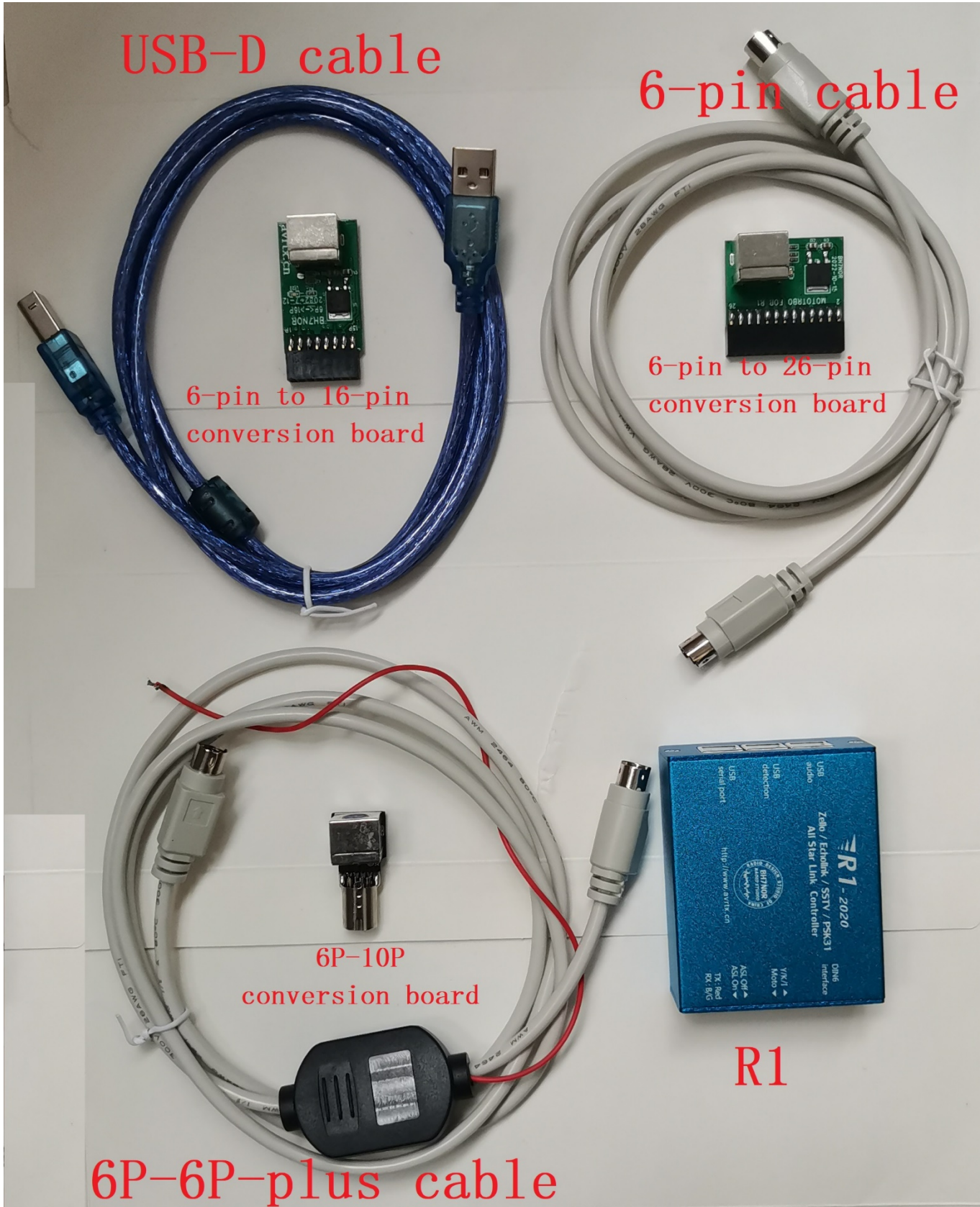
6-pin to 16-pin
conversion board

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、GM9501、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 Verterx Standard: VX-1700
	R1 * 1 PCS +USB-D cable * 2 PCS	6P-6P-plus cable	6P-10P conversion board	YAESU: FTM-100, FTM-150 , FTM-200, FTM-300, TM-310 ,FTM-400, FTM-500,FTM-510 , FTM-6000, YAESU repeater: DR-1, DR-1E,DR-1X, DR-1X FR, DR-1XE, DR-1XE FR, DR-2X, DR-2XE, DR-1XLAN

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



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

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

manufacture: BH7NOR (Old callsign: BI7NOR)

Manual Fix: 9W2LWK

April 21, 2026